APPENDIX I
SHPO Concurrence Letter

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DIVISIONS OF FLORIDA DEPARTMENT OF STATE
Office of the Secretary
Office of International Relations
Division of Elections
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FLORIDA DEPARTMENT OF STATE
Katherine Harris
Secretary of State
DIVISION OF HISTORICAL RESOURCES

April 18, 2002

Mr. James C. Duck
Jacksonville District US Army Corps of Engineers
P.O. Box 4970
Jacksonville, Florida 32232-0019

Re: DHR No. 2002-03669 / Date Received by DHR: April 11, 2002
Historic Assessment and Remote Sensing Survey of Miami Harbor, Dade County, Florida (Tidewater Atlantic Research, Inc. 2002) Draft Report

Dear Mr. Duck:

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 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 minimize adverse effects.

Results of the survey indicate that a total of 46 anomalies were identified within construction alternatives 1 - 6. All of the anomalies recorded during this survey are interpreted as modern debris based on their signature characteristics and historical research. It is the opinion of the project archaeologist that the proposed project will have no effect on any historic properties eligible for listing in the *National Register of Historic Places*. Based on the information provided, this office concurs with this determination and finds the submitted draft report complete and sufficient.

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

Sincerely,

Janet Snyder Matthews

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

FLORIDA DEPARTMENT OF STATE
the Secretary
ce of International Relations
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FLORIDA DEPARTMENT OF STATE
Katherine Harris
Secretary of State

DIVISION OF HISTORICAL RESOURCES

Ms. Cherie Trainor
State Clearinghouse
Department of Community Affairs
2555 Shumard Oak Boulevard
Tallahassee, Florida 32399-2100

March 31, 2000

RE: DHR Project File No. 2000-00351
Cultural Resource Assessment Request
SAI# FL200001100015C
Study of Feasibility of Widening and Deepening Portions of Miami Harbor
Miami-Dade County, Florida

Dear Ms. Trainor:

In accordance with the procedures contained in 36 C.F.R., Part 800 ("Protection of Historic Properties"), Florida's Coastal Zone Management Act, and implementing state regulations, we have reviewed the referenced project for possible impact to historic properties listed, or eligible for listing, in the *National Register of Historic Places*, or otherwise of historical, architectural or archaeological value.

We have reviewed the information submitted by your office for the above referenced project. Because of the rich maritime history of the Miami Harbor, it is the opinion of this office that a systematic survey be conducted in any undisturbed areas of the selected alternative.

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.

Provided the applicant concurs with the condition, the proposed activities will be consistent with the historic preservation laws of Florida's Coastal Management Program.

If you have any questions concerning our comments, please contact Scott Edwards, Historic Preservation Planner, at 850-487-2333 or 800-847-7278. Your interest in protecting Florida's historic properties is appreciated.

Sincerely,

Janet Snyder Matthews, Ph.D., Director
Division of Historical Resources
State Historic Preservation Officer

JSM/Ese

xc: Jasmin Raffington, FCMP-DCA
James C. Duck, USACOE

APPENDIX J
Revised Mitigation Plan

Miami Harbor GRR Study
Environmental Impact Statement
Revised Mitigation Plan

January 2004

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

EXECUTIVE SUMMARY

This report outlines compensatory mitigation for unavoidable impacts to seagrass and offshore hardbottom/reef habitats impacted by implementation of the Recommended Plan (Alternative 2). Direct impacts include 7.9 acres of seagrass habitat, 49.4 acres (3.3 acres new impacts) of hardbottom/reef habitat outside or deeper than the present authorized channel width and depth, 123.5 acres of rock/rubble habitat previously impacted by channel dredging, and 236.4 acres of unvegetated sand/silt bottom located in the authorized channel. Of these impacts, mitigation is proposed for seagrass and hardbottom/reef habitats where new construction or dredging is proposed. The South Atlantic Fishery Management Council (SAFMC) and National Marine Fisheries Service (NMFS) consider seagrass and reef habitat types Essential Fish Habitat (EFH) (SAFMC 1998). For dredging the rock/rubble and unvegetated bottom within the channel, mitigation is not proposed since dredging was previously performed in the channel and temporal impacts are minimal.

Seagrass Impacts and Mitigation

Direct impacts to seagrass communities are restricted to the widening of Fisherman's Channel cut and the Fisher Island Turning Basin. Impacts include the permanent loss (removal) of 0.2 acre of mixed seagrass beds. Indirect losses will occur from the natural equilibration of the side slopes described in Appendix G of the EIS, resulting in the loss of 7.7 acres of seagrass. Based upon coordination with the resource agencies and comments received on the DEIS, restoration of approximately 24 acres of seagrass beds is proposed as compensation for unavoidable impacts.

In order to replace local seagrass functions and values, restoration will be implemented within Biscayne Bay, preferably in areas where seagrass once occurred and is now absent due to past anthropogenic activities such as dredging. Seagrass habitat will be restored by filling approximately 24 acres of old borrow areas located in North Biscayne Bay. Based on a 1989 report prepared by DERM, there are eight borrow areas which were considered suitable for filling with dredged material, capping with sand, and restoring seagrass habitat to an elevation consistent with the depths where adjacent seagrass beds are present (CTC 1989). Further site evaluations of the area were conducted in June 2002, July 2003, and October 2003 to determine the most appropriate site for seagrass mitigation. The mitigation plan presented in the DEIS has been revised based on the results of the subsequent surveys of the proposed mitigation site.

The preferred mitigation area is a series of interconnected submerged borrow holes located just north of Julia Tuttle Causeway (Interstate 195) where seagrass habitat has been removed in years past by dredging fill for the causeway construction.

Dredged material will either be hauled or pumped to the selected borrow area(s) based on engineering analysis, cost, and recipient site conditions. Dredged material will be placed into

the borrow areas. It is assumed that this can be accomplished without a coffer dam and will require a variance from water quality standards within a defined mixing zone. It is anticipated that ambient depths will range from -4 feet to -7 feet MSL in the restored areas following restoration and that seagrass recruitment will occur rapidly. Beds of *H. decipiens, H. wrightii,* and *S. filiforme* have been documented adjacent to the proposed mitigation site and are expected to serve as recruitment sources. Site monitoring will be conducted for five years to document the characteristics and extent of recruitment. Detailed plans and specifications for the seagrass restoration will be prepared and provided for agency concurrence prior to construction.

Hardbottom Impacts and Mitigation

New impacts to low relief hardbottom and high relief hardbottom total 0.6 acre and 2.7 acres, respectively. Based on the Habitat Equivalency Analyses calculations (Appendix A), direct impacts to reef and hardbottom habitats would require the creation of artificial reef habitat at an effective mitigation ratio of 2.0 for high relief hardbottom/reef habitat and an effective mitigation ratio of 1.3 for low relief hardbottom/reef habitat. Mitigation reefs will be constructed in two different designs, to reflect the differences in the habitat structure of the two types of reef/hardbottom habitat to be impacted. The proposed mitigation will be type-for-type, to reflect the ecological differences between the different reef types impacted. A total of 0.8 acre of low relief-low complexity (LRLC) reef will be required to mitigate for the new low relief hardbottom/reef and previously impacted hardbottom habitat. A total of 5.4 acres of high relief-high complexity (HRHC) reef would be required to mitigate for the high relief impact. Reefs will be constructed at proposed artificial reef sites to be managed by DERM.

Native rock excavated from the Entrance Channel will be used in reef construction. Artificial reef construction will be conducted at one or two of the sites located south of the entrance channel identified in Appendix L of the EIS. The dredged rock material will be deployed to mimic the orientation of typical natural reefs. This reef design will have an approximate vertical relief of 3 to 5 feet to provide the maximum structural complexity and to provide refugia for cryptic and reclusive species. As interstitial sand patches associated with reef habitat are thought to be important in the ecological function of the reef habitat, the reef footprint will contain approximately 20 percent open sand surface. Temporary buoys delineating the deployment strip will mark areas for deployment. Corner buoys for the sites shall be placed using DGPS with sub-meter accuracy. Natural excavated rock from the dredged channel will provide an ideal substrate for the establishment of a fouling community and colonization by the common reef community species. HRHC reefs are intended to provide persistent habitat with higher complexity and habitat diversity than LRLC hardbottom or reefs.

LRLC reefs will have a vertical relief of 1 to 2 feet and will be placed inshore of, and shallower than, HRHC reefs. It is recognized that the LRLC reefs may be periodically buried by shifting sands, like the low relief natural reefs they are intended to mimic. This does limit their habitat value to some extent, but it has been suggested (albeit without much empirical

evidence) that this sort of ephemeral, low relief habitat may be particularly important in supporting the recruitment and post settlement survival of juvenile fishes. Natural rock excavated from the channel as described above and placed in sites where they may be expected to partially settle in the substrate, should provide LRLC habitat. Deployment sites will be delineated as outlined above for HRHC reefs.

The monitoring program for the mitigation reefs will consist of both physical and biological components. Physical monitoring one year after placement will assess the degree of settling of the reef materials, and biological monitoring will assess populations of algae, invertebrates, and fishes, as compared with concurrent control sampling of natural reefs. Biological monitoring will be conducted annually in the summer months for five years. Each monitoring effort will include video transects of the mitigation reefs to document Snapper Grouper Complex utilization.

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1.0 INTRODUCTION

This report outlines compensatory mitigation for unavoidable impacts to seagrass and offshore hardbottom/reef habitats impacted by implementation of the Recommended Plan considered in the Draft Environmental Impact Statement (DEIS). Direct impacts to the total project include 7.9 acres of seagrass habitat, 49.4 acres of reef habitat outside or deeper than the present authorized channel width and depth, 123.5 acres of rock/rubble habitat previously impacted by channel dredging, and 236.4 acres of unvegetated sand/silt bottom located in the authorized channel. Of these impacts, mitigation will be required for seagrass and hardbottom/reef habitats where new construction or dredging is proposed. The South Atlantic Fishery Management Council (SAFMC) and National Marine Fisheries Service (NMFS) (SAFMC 1998) consider all of these habitat types Essential Fish Habitat (EFH). For dredging the rock/rubble and silt/sand/rubble bottom within the channel, mitigation is not proposed since dredging was previously performed in the channel and temporal impacts are minimal.

1.1 Mitigation Policies

A summary of mitigation programs and policies in effect by the Corps and Federal reviewing agencies, including the Environmental Protection Agency (EPA), U.S. Fish and Wildlife Service (FWS), and NMFS, are provided below.

U.S. Army Corps of Engineers Mitigation Policy

Damages to fish and wildlife resources will be prevented to the extent practicable through good planning and design incorporating the mitigation principles defined within the Council on Environmental Quality's (CEQ) NEPA guidelines, i.e., first avoid the impact; next, minimize the impact; and, finally compensate for unavoidable damages to significant fish and wildlife resources. Measures to offset unavoidable damages to significant fish and wildlife resources will be included in projects when the cost of these measures are justified by the combined monetary and non-monetary benefits attributable to the proposed measures. These mitigation plans are to contain the most efficient and least costly measures appropriate to reduce fish and wildlife resource losses. Mitigation of losses will be provided to the maximum extent practicable through the development and implementation of mitigation measures on project lands. If project lands cannot fulfill our mitigation requirements, then separable public lands adjacent to project lands, to the extent possible, should be considered next. Any consideration of separable private lands not adjacent to project lands should be the last option considered. Acquisition of an interest in any lands or waters for mitigation of damages to fish and wildlife resources that do not comply with the limited authority provided by Subsection 906(b) of WRDA 1986 requires specific congressional authorization (See paragraph 19-8.a(2)). Measures to mitigate project caused damages to significant fish and wildlife resources are project costs and will be allocated to the responsible (causative) purposes of the project in the same way as other project costs. Mitigation costs will also be

shared to the same extent as the other costs allocated to such purposes are shared. The mitigation costs include separable first costs (any lands and construction) and separable operation, maintenance, repair, replacement, and rehabilitation (OMRR&R) costs (EP 1165-2-1; 30 Jul 99).

U.S. Environmental Protection Agency Mitigation Policy

Policy regarding mitigation under the Clean Water Act (CWA) Section 404(b)(1) guidelines were expressed within a Memorandum of Agreement (MOA) between EPA and the U.S. Army Corps of Engineers (USACE) and became effective February 7, 1990. The purpose of the MOA is to provide guidance to determine appropriate and practicable mitigation under the Section 404 Regulatory Program. Practicable is defined as "available and capable of being done after taking into consideration cost, existing technology, and logistics in light of the overall project purposes."

According to the MOA, on-site mitigation is preferable to off-site mitigation. Similarly, in-kind mitigation is preferable to out-of-kind mitigation. However, EPA may prefer off-site or out-of-kind mitigation if it is the most practicable solution. EPA expressed a preference of restoration of wetlands over creation of wetlands from upland habitat for two reasons. First, EPA considers the likelihood of success higher for restored wetlands than for created wetlands. Second, EPA is concerned about the reduction of potentially valuable uplands resulting from the mitigation.

The MOA states that the objective of mitigation for unavoidable impacts is to offset environmental losses. Mitigation should provide, at a minimum, one for one functional replacement (i.e., no net loss of wetland value), with an adequate margin of safety to reflect the expected degree of success, but this requirement may not be appropriate and practicable in all cases. A minimum of 1:1 acreage replacement may be used as a reasonable surrogate for no net loss of functions and values where definitive information is lacking. However, this ratio may be greater where the wetland being impacted is high and the replacement wetlands are of lower functional value or the likelihood of success is low. Conversely, the ratio may be less than 1:1 for areas where the wetland being impacted is low and the likelihood of success associated with the mitigation proposed is high.

U.S. Fish and Wildlife Service Mitigation Policy

The U.S. Fish and Wildlife Service Mitigation Policy (January 23, 1981) established policy for mitigating the adverse impacts of land and water developments on fish, wildlife, and their habitats. According to the policy, compensation may be accepted for wetland impacts in a variety of ways. Mitigation activities may include: wildlife management activities, habitat construction activities, fishery propagation, protective designations on public lands, buffer zones, property leases, wildlife easements, water right acquisition, and fee title acquisition. Compensatory mitigation actions should only occur after all efforts to avoid and minimize impacts have been utilized. FWS policy states that appropriate mitigation for unavoidable wetland impacts are based on the resource value of the potential impacted wetland. Four

categories of resource value have been defined by the FWS for which different levels of mitigation may be determined.

A wetland classified as Resource Category 1 consists of high value wetland that is unique and irreplaceable on a national basis or in the eco-region. For this category, no loss of existing habitat value is the goal, and the FWS will recommend that all losses of existing habitat be prevented.

A Resource Category 2 wetland is of high value and relatively scarce on a national basis or within the eco-region. For this category, the FWS maintains a goal of no net loss of in-kind value. If unavoidable loss is likely to occur, in-kind replacement will be the recommendation. An exception to this rule may occur where the out-of-kind replacement is of greater value than the habitat to be impacted, or in-kind replacement is not physically or biologically obtainable in the region.

A Resource Category 3 wetland is of high to medium value and is relatively abundant on a national basis. The FWS mitigation goal is no net loss of habitat value while minimizing loss of in-kind habitat value. For impacts to Resource Category 3 wetlands, in-kind replacement is preferred. If in-kind replacement is not practicable, out-of-kind creation or restoration, or increased management of replacement habitat that increases the value of the existing habitat can achieve mitigation goals.

A Resource Category 4 wetland is of medium to low value, with a goal of minimum loss of habitat value. Compensatory mitigation for unavoidable losses to Resource Category 4 wetlands may be required.

National Marine Fisheries Service

As described in the Magnuson-Stevens Fishery Conservation and Management Act, as amended by the Sustainable Fisheries Act of 1996 (Public Law 104-267), the EFH provisions of the act support one of the nation's overall marine resource management goals – maintaining sustainable fisheries.

The focus of the mitigation policy is to conserve and enhance EFH and to avoid, minimize, or compensate for impacts to EFH due to development activities. As with the other federal agency policies, the primary goal of any action is to avoid impacts to natural resources. However, if impacts to these resources are unavoidable, compensatory mitigation may be required. When unavoidable impacts to EFH occur, the NMFS will recommend mitigation measures to compensate for any loss of resource value. Recommendations may include: restoration of riparian and shallow coastal areas (i.e., re-establishment of vegetation, restoration of hardbottom characteristics, removal of unsuitable material, and replacement of suitable substrate), upland habitat restoration, water quality improvement or protection, watershed planning, and habitat creation. The preferred type of mitigation is enhancement of existing habitat, followed by restoration, and finally creation of new habitat.

Mitigation should focus on the replacement of lost habitat and associated values attributed to the habitat and toward maintaining sustainable fisheries. In particular, mitigation should be targeted toward impacts as a result of the proposed action to the listed managed species discussed in the Environmental Impact Statement (EIS).

Mitigation for EFH should focus on the replacement of lost habitat and associated values attributed to the habitat and towards maintaining sustainable fisheries. Since no definitive policy is currently available on mitigating EFH impacts, development of mitigation strategies is subjective and somewhat difficult to address. Therefore, mitigation for EFH impacts must focus on strategies that enhance fisheries production and help ensure the sustainability of fisheries. Creation of mangrove habitat and mud flats, enhancement of fisheries resources by creating shallow water habitat or artificial structures, restoration of seagrass habitat where feasible, and preservation of environmentally sensitive waterfront land threatened by development are all viable options that can compensate for impacts to EFH, and have been used and accepted elsewhere.

Mitigation requirements for EFH impacts, associated with proposed dredging of channels and basins, are difficult to define. While these areas will see a temporary loss of benthic production, all the affected areas will see recruitment of the benthic community, followed by fish utilization of the habitat. All of these dredged areas will continue to provide food chain support and act as functional EFH habitat, including the turning basins, terminals and inner and outer Entrance Channels. Since the existing harbor basin provides seasonal fishery habitat, we would expect the proposed basin to likewise provide comparable habitat.

2.0 MITIGATION OPTIONS

A total of 25 mitigation options have been identified that could serve as full or partial mitigation for impacts to seagrasses in Biscayne Bay (Figure 1). The amount of site-specific information known at this time varies among projects listed below. Table 1 summarizes the mitigation potential of each site identified to date. Options explored vary from significant restoration of mangrove communities in Biscayne Bay; restoring prop scars adjacent to Virginia Key and restoring seagrass habitat in North Biscayne Bay through filling of old borrow areas with dredged material.

Based on significant coordination with Federal, state, and local resource agencies in-kind restoration of seagrass habitat is the agency-preferred option for mitigating seagrass impacts. In the event that restoration of seagrass habitat is not feasible or no sites acceptable to the resource agencies are available, other options will be explored. Restoration of seagrass habitat through filling of old borrow areas in North Biscayne Bay is the preferred choice and is further discussed and analyzed in Sections 3 and 4 of this plan.

In a survey completed in October 2002, the Corps mapped a former borrow location located in northern Biscayne Bay for the purpose of using this site for seagrass mitigation. For a detailed review of the recommended site for seagrass restoration, reference Appendix L of the EIS.

Source: Patricia L. McNeese; The Curtis & Kimball Company; Case O'Bourke Engineering

Location of Potential Miti ation Options	
Revised Miti ation Plan Miami Harbor Gene al Re valuation Report inal Envionmental Impact Statement	
Scale: NTS	Drawn By: MR
Date: January, 2004	
DIAL CORDY AND ASSOCIATES INC Environmental Consultants	J00-499
	F 1

Table 1 Summary of Mitigation Project Sites

PROJECT NAME	OWNER	PROJECT DESCRIPTION			BENEFITS			
		Habitat	Credit Type	Acres	Wild-life	T/E Species	Water Quality	Public Park
Chapman/Matheson	Dade County							
Old King's Bay Landfill		Tidal mangroves	Restoration	10.23	X	X	X	
Small Fill Pad		Tidal mangroves	Restoration	1.63	X	X	X	
Old Plant Nursery		Brackish marsh	Creation	8.55	X	X	X	X
		Tidal mangroves, brackish marsh	Enhancement					
			Total:	13.04				
East Culvert		Tidal mangroves and lagoon	Enhancement	48	X	X	X	
Middle Culvert		Tidal mangroves and lagoon	Enhancement	48	X	X	X	
West Culvert and Spoil		Tidal mangroves, brackish marsh	Enhancement	55	X	X	X	
Exotics Eradication		Tidal mangroves, brackish marsh	Enhancement	40.83	X	X	X	X
Main Fill Pad		Tidal mangroves	Restoration	unk	X	X	X	X
			Enhancement	unk				
			Total:	19.4				
Old South Dade Landfill	Dade County	Brackish marsh	Restoration	20	X		X	
Virginia Key								
Marine Stadium	Dade County, City of Miami	Seagrass	Restoration	4.62	X	X	X	
		Tidal mangroves	Creation	9.47				
		Tidal mangroves	Restoration	1.32				
		Brackish marsh	Creation	4.14				
			Total:	19.55				

Table 1. (continued).

PROJECT NAME	OWNER	PROJECT DESCRIPTION			BENEFITS			
		Habitat	Credit Type	Acres	Wild-Life	T/E Species	Water Quality	Public Park
Virginia Key								
Virginia Key Impounded	Dade County	Forested freshwater wetlands	Enhancement and Creation	48.13	X		X	
Sewage Treatment East		Tidal mangroves	Restoration	0.77	X		X	
		Tidal mangroves	Enhancement	4.4				
		Coastal upland buffer	Creation	1.74				
			Total:	6.91				
Sewage Treatment West	Dade County	Tidal mangroves	Restoration	7	X		X	
Spoil Islands	Dade County	Coastal hammock, Tidal mangroves	Creation	unk	X		X	
Virginia Beach Hammock	City of Miami	Coastal hammock	Restoration	unk	X		X	X
CWA/BAP Seagrass	State of Fla.	Seagrass	Restoration	unk	X	X	X	
BNP Seagrass	USA	Seagrass	Restoration	unk	X	X	X	X
EEL Program	Private		Preservation					
Biscayne Wetlands		Coastal wetlands		445	X	X	X	
Black Point Wetlands		Coastal wetlands		192	X	X	X	
Cutler Wetlands		Coastal wetlands		1,194	X	X	X	
Hardy Matheson Addition		Coastal wetlands		42	X	X	X	
Deering Estate N. Addition		Coastal wetlands		5	X	X	X	
Vizcaya Hammock Addition		Coastal uplands		2	X			
Oleta River State Park	State of Fla.	Mangrove wetlands	Restoration	7	X		X	X
North Biscayne Bay Borrow Areas	State of Fla.	Seagrass	Restoration	±40 *	X	X	X	

* Potentially available for restoration

3.0 MITIGATION REQUIREMENTS

3.1 Seagrass

Direct impacts to seagrass communities are restricted to the widening of Fisherman's Channel cut and the Fisher Island Turning Basin. Impacts include the permanent loss (removal) of 0.2 acre of mixed seagrass beds. Indirect losses will occur from the natural equilibration of the side slopes as described in Appendix G of the EIS, resulting in the loss of 7.7 acres of seagrass. Based upon coordination with the resource agencies and comments received on the DEIS, restoration of approximately 24 acres of seagrass beds is proposed as compensation for unavoidable impacts.

In order to replace local seagrass functions and values, restoration will be implemented within Biscayne Bay, preferably in areas where seagrass once occurred and is now absent due to past anthropogenic activities such as dredging. Seagrass habitat will be restored by filling at least 24 acres of old borrow areas located in North Biscayne Bay. Based on a 1989 report prepared by DERM, there are eight borrow areas which were considered suitable for filling with dredged material, capping with sand, and restoring seagrass habitat to an elevation consistent with the depths where adjacent seagrass beds are present (CTC 1989). Further site evaluations of the area were conducted in June 2002, July 2003, and October 2003 to determine the most appropriate site for seagrass mitigation. The mitigation plan has been revised based on the results of the subsequent surveys of the proposed mitigation site.

Restoration of seagrass communities, while still considered experimental by some resource agencies, can enhance habitat heterogeneity and the diversity of invertebrate and fish communities, if carefully implemented. The recent treatise on seagrass restoration entitled "Guidelines for the Conservation and Restoration of Seagrasses in the United States and Adjacent Waters" by Fonseca et al. (1998) discusses the benefits, risks, and successful approaches associated with seagrass restoration. Given the documented success of more recent efforts to restore seagrass communities including those in South Florida, restoration is quickly becoming a proven resource management tool in some areas where conditions are appropriate.

LEGE D

- Existing Channel Limits
- Modification Component 1C
- Modification Component 2A
- Modification Component 3B
- Modification Component 4
- Modification Component 5A

Seagrass Cover Classes

- Halophila decipiens (paddle grass) - hd
- Thalassia testudinum (turtle grass) - tt
- Halodule wrightii (shoal grass) w/ Halophila decipiens - hw/hd
- Halophila wrightii w/ Thalassia testudinum - hw/tt
- Thalassia testudinum w/ Syringodinum filiforme (manatee grass) - tt/sf
- Mixed Seagrasses

Hardbottom and Reef Cover Classes

- Scattered Rock/Rubble w/ Algae-Sponge Communities
- Scattered Rock/Rubble w/ Live Bottom Assemblage
- Patchy Low Relief - Low Density of Gorgonian Coverage in Sand
- Patchy High Relief - Moderate Density of Gorgonian and Sponge Coverage in Sand
- Low Relief - Low/Moderate Density of Gorgonian Coverage w/ Scattered Patches of Sand
- High Relief - Moderate/High Density of Gorgonian and Sponge Coverage
- Low Relief (Previously Dredged) - Low/Moderate Density of Gorgonian Coverage w/ Scattered Patches of Sand
- High Relief (Previously Dredged) - Moderate/High Density of Gorgonian and Sponge Coverage

Underlying Substrate

- Oolitic Limestone Bedrock w/ Variable Sand Veneer Coverage

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DIAL CORDY AND ASSOCIATES INC Environmental Consultants	J0 -499
	Figur 2

Table 2 Dredging Impacts by Habitat Type

Habitat Type and Current Dredge Status	Component					
	1C	**2A**	**3B**	**4**	**5A**	**Total**
Seagrass- new impacts, side slope equilibration to areas not previously dredged that exist *outside proposed channel boundaries* (ac)	0.0	0.0	**0.1**	0.0	**7.6**	**7.7**
Seagrass- new impacts, not previously dredged, inside proposed channel boundaries (ac)	0.0	0.0	0.0	0.0	**0.2**	**0.2**
Low relief hardbottom/reef- new impacts, not previously dredged (ac)	**0.6**	0.0	0.0	0.0	0.0	**0.6**
Low relief hardbottom/reef, previously dredged and recolonized (ac)	**28.1**	0.0	0.0	0.0	0.0	**28.1**
High relief hardbottom/reef- new impacts, not previously dredged (ac)	**2.7**	0.0	0.0	0.0	0.0	**2.7**
High relief hardbottom/reef, previously dredged and recolonized (ac)	**18.0**	0.0	0.0	0.0	0.0	**18.0**
Rock/rubble w/ live bottom- new impacts, not previously dredged (ac)	0.00	0.0	0.0	0.0	0.0	0.0
Rock/rubble w/ live bottom, previously dredged and recolonized (ac)	**51.7**	0.0	0.0	0.0	0.0	**51.7**
Rock/rubble w/ algae/sponges- new impacts, not previously dredged (ac)	0.0	**0.6**	**0.9**	0.0	**1.5**	**3.0**
Rock/rubble w/ algae/sponges, previously dredged and recolonized (ac)	**41.3**	0.0	**25.2**	0.0	**2.3**	**68.8**
Unvegetated (i.e., sand/silt/rubble, sand habitats without seagrasses)- new impacts, not previously dredged (ac)	**1.3**	0.0	**5.3**	0.0	**16.7**	**23.3**
Unvegetated (i.e., sand/silt/rubble, sand habitats without seagrasses), previously dredged (ac)	**66.9**	0.0	**19.1**	0.0	**127.1**	**213.1**
Project Footprint, excludes seagrass impacts that are outside proposed channel boundaries and "deepwater non-impacts" (ac)	**210.6**	**0.6**	**50.6**	**0.0**	**153.8**	**441.5**

*Channel Wall Impacts are not included in the table.

3.2 Hardbottom/Reef

Mitigation Requirements

To calculate the acreage of creation of artificial reef required for compensation, Dial Cordy and Associates Inc. performed Habitat Equivalency Analyses (HEA) (see NOAA 2000). The method used was designed to take into account both projected impact acreages for various habitats and recovery times to calculate the overall loss of habitat function that occurs from the time a new impact occurs to the time of full functional recovery. HEA is usually applied to situations where previously non-impacted habitats are damaged and was used, in this case, to calculate compensatory mitigation acreages for removal of habitat in previously undredged areas. Projected impact acreages were not only classified according to the method that would be applied to calculate functional loss, but were further classified according to relief/profile. This was necessary because the proposed mitigation will be type-for-type, to reflect the ecological differences between the hardbottom/reef types impacted.

Several assumptions are involved in the HEA method. These assumptions include (1) the relative functionality (usually expressed as a percentage) of both impact and mitigation areas at "time-0" (time zero) (i.e., at the initiation of mitigation operations or at the time the impact occurs to the habitat), (2) the relative functionality of both the impact and mitigation area at the completion of recovery of each area, (2) the form of the recovery function (e.g., linear, exponential, hyperbolic, etc.), and (3) the recovery/completion time for the impact area and mitigation area to reach full functionality (i.e., the level that existed prior to impact/mitigation activities. For low relief hardbottom/reefs assessed with HEA, the following assumptions were used: (1) dredging would leave habitat 10 percent functional, (2) habitat value in both the impact and mitigation areas would increase in a linear fashion, (3) both the impact and mitigation areas will reach full (i.e., 100%) functionality in 12 years, and (2) placement of substrate in the mitigation area will immediately result in 20 percent of full habitat function. For high-relief hardbottoms assessed with HEA, the same assumptions were used, except recovery to full functionality was based on a 30-year period.

Based on the HEA calculations, direct impacts to reef and hardbottom habitats would require the creation of artificial reef habitat at an effective mitigation ratio of 2.0 for high relief hardbottom/reef habitat and an effective mitigation ratio of 1.3 for low relief hardbottom/reef habitat (Appendix A). Mitigation reefs will be constructed in two different designs, to reflect the differences in the habitat structure of the two types of reef/hardbottom habitat to be impacted. The proposed mitigation will be type-for-type, to reflect the ecological differences between the different reef types impacted. The tables and calculations of the HEA are included in Appendix A.

Mitigation reefs will be required in two different designs, to reflect the differences in the habitat structure of the two types of hardbottom/reef habitat to be impacted. A total of 0.8

acre of low relief-low complexity reef will be required to mitigate for the new low relief reef and previously impacted hardbottom habitat (Table 3). A total of 5.4 acres of high relief-high complexity reef would be required to mitigate for the high relief impact (see Section 3.2.2 for reef design).

Table 3 Reef and Hardbottom Impacts and Proposed Artificial Reef Ratios and Areas

Habitat Type	Impact Area (ac)	Ratio	Type of Mitigation	Mitigation Required
Low Relief Reef/Hardbottom	0.6 Ac	1.3:1	Creation of LRLC	0.8 Ac
High Relief Reef/Hardbottom	2.7 Ac	2:1	Creation of HRHC	5.4 Ac
Total	3.3 Ac			6.2 Ac

4.0 PROPOSED PLAN

This mitigation plan focuses on compensation options available for unavoidable impacts associated with implementation of Alternative 2 (Recommended Plan) to seagrass and hardbottom/reef habitats located within the tidal influence of the Port Entrance Channel, including Biscayne Bay and adjacent offshore waters. Other options evaluated did not provide in-kind type-for-type replacement of habitat lost and may not be acceptable to the resource agencies unless opportunities to provide like replacement were not available or did not have a likely probability of success.

4.1 Seagrass Restoration

In order to replace local seagrass functions and values, restoration will be implemented in Biscayne Bay within areas that have been anthropogenically disturbed in the past (Fonseca et al. 1998). The preferred mitigation area is a series of interconnected submerged borrow holes located just north of Julia Tuttle Causeway (Interstate 195) where seagrass habitat has been removed in years past by dredging fill for the causeway construction. The general location of the Julia Tuttle Dredge Hole is shown on Figure 3, Proposed Seagrass Mitigation Area site. Several previously identified dredge hole sites located throughout Biscayne Bay were considered (see Table 4). The Julia Tuttle Dredge Hole was determined to be the preferred area because:

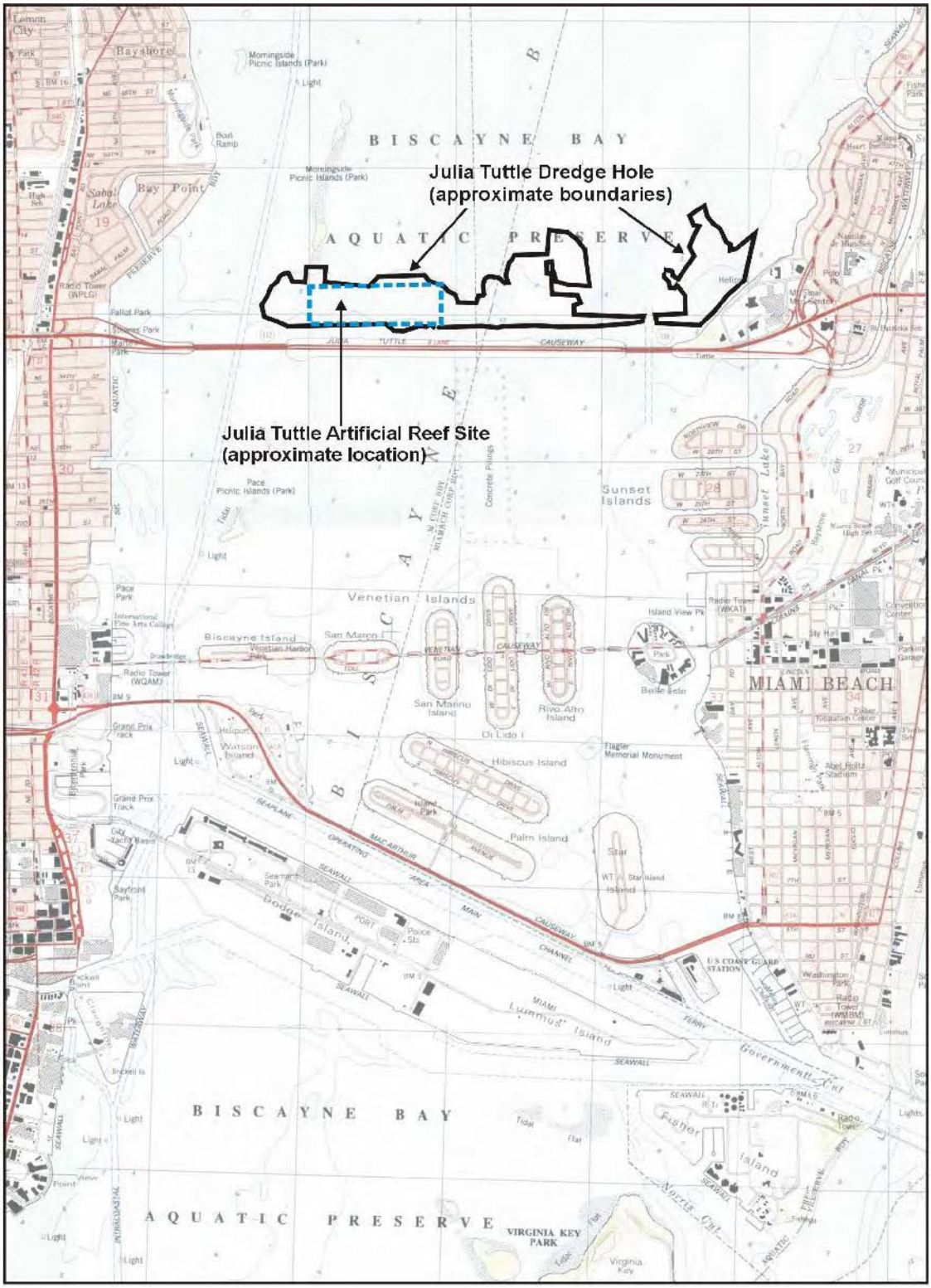
- It is almost completely surrounded by mature climax marine seagrass beds and it apparently supported seagrass habitat prior to creation of the dredge hole,
- It appears to be a good candidate for cost-effective hauling or pumping of borrow material from the Port of Miami for the purpose of topographic restoration (subject to a cost-feasibility analysis),
- It appears to experience a relatively calm but well-circulated tidal current and little or no daily perturbations from boating activities, and,
- It appears that there are sites within the hole that can be restored to seagrass over a sufficient area to achieve the desired amount of mitigation.

A reconnaissance level survey of the Julia Tuttle Dredge Hole revealed several deep areas within the larger pit feature (see Appendix L of the EIS, Marine Survey). Further detailed investigation of potential restoration sites within the pit, conducted in July 2003 and October 2003, revealed the following general conditions:

- The areas at natural grade that surround the pit were typically 5 to 8 feet deep and were generally dominated by manatee grass, *Syringodium filiforme* in sandy mud substrate. Other seagrasses, including *Thalassia testudinum*, *Halodule wrightii* and *Halophila decipiens*, occurred variably throughout the *S. filiforme*-dominated beds. Several algaes, especially *Halimeda* sp. were also present. These beds had an unusual morphology in that the *S. filiforme* plants tended to have very long blades, usually one meter or more. The beds formed a very uniform and fairly dense cover with very little patchiness. The tidal current conditions were calm and older seagrass blades tended to have a heavy load of

epiphytes. The *S. filiforme*-dominated beds maintained their uniform dense cover down to a depth of about 8 feet. The beds then thinned out significantly with scattered *S. filiforme* plants occurring down to a depth of 10 or 11 feet.

- The dominant seagrass at deeper depths (10 feet to 17 feet) was *H. decipiens* with few *H. wrightii* plants occurring at the shallower end of the range. *H. decipiens* occurred as sparse patches or single runners down to about 16 to 17 feet but consistently gave way to unvegetated bottom below that depth contour.
- *Halophila johnsonii* was seen at approximate depths of 11 to 15 feet among moderately dense *H. decipiens* patches in the shallow northern reaches of the hole during the July 2003 site visit. *H. johnsonii* was not seen during the October 2003 site visit.
- The main area where at natural grade the seagrass habitat gave way to hardbottom habitat was at the western end of the hole adjacent to the Intracoastal Waterway (ICW) where stronger currents have an influence. The sandy bottom there was dominated by loggerhead sponges (*Spheciospongia vesparium*), vase sponges (*Ircinia campana*), and blue sponges (species not identified), *Halimeda* algae and occasional small patches of *H. decipiens*.
- The Julia Tuttle Dredge Hole contains an artificial reef area known as the Julia Tuttle Artificial Reef Site (Figure 3). DERM, who holds the permit for the artificial reef site and is responsible for its management, considers the site to be successful and continues to add material to the site (Gary Milano, Miami-Dade County Department of Environmental Resources Management (DERM), pers. comm.). Shallow reef materials were observed at a depth of about 15 feet and had sponges, bryozoans and other organisms growing on them. Deeper reef materials tended not to support any attached growth. All of the material clearly attracted fish.
- The depths within the Julia Tuttle Dredge Hole varied throughout. It appeared that since the original dredging, some re-arrangement of sediments had occurred so that some of the hole edges remained as steep or sheer walls while other edges had sloping shelves where sediments had covered over the original excavated walls.
- The steep walls tended to contain hardbottom communities typical of submerged borrow pits. These communities were dominated primarily by loggerhead sponges and bryozoans and tended to be of relatively low diversity. The steep-walled hole edges tended to have a narrow eroded shelf of about 15 to 20 feet in width. These shelves were occupied with a mix of generally sparse sponges, algae and seagrass plants. Once the shelves sloped up to the approximate –10 elevation, the Syringodium plants could be seen quickly increasing in density.
- Sloping edges of the holes were variably vegetated with seagrasses, algae, scattered sponges and bryozoans, depending on the location, substrate and depth. Density and diversity tended to be lower as depth increased.
- Below a depth of about 16 to 17 feet, the bottom areas in the hole consisted of a packed mud substrate of “gelatinous” consistency and these areas were barren of vegetation. Regularly spaced holes created by bottom dwellers were scattered throughout this substrate.



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Based on the combined observations of the original marine survey (Appendix L) and the subsequent investigative field work, the following screening criteria were developed to assist in locating a specific seagrass restoration site within the Julia Tuttle Dredge Hole. The preferred site should:

- maximize the facilitation of natural recruitment from adjacent *S. filiforme* beds,
- avoid impacts to existing seagrass both outside and within the Julia Tuttle Dredge Hole,
- avoid the DERM permitted artificial reef area within the hole, if possible,
- have sufficient access and working area for the required equipment with no risk of damage to adjacent shallow resources.

The site that best meets the criteria is located in the approximate center of the Julia Tuttle Dredge Hole and is termed the Central Hole (Figure 4, Seagrass Mitigation Conceptual Design). This is the preferred seagrass restoration site and it has the following characteristics:

- The site varies in depth from about 12 to 13 feet down to over 30 feet.
- There are two distinct deep features that are about 22 to 30 feet in depth (see Figure 4).
- Portions of the site are bordered by steep walls while other portions are bordered by sloping topography.
- Those portions of the site at the 16 to 17 foot contour and shallower are generally vegetated with seagrasses, especially sparse *H. decipiens*.
- Those portions of the site below the 16 to 17 foot contour are unvegetated.
- Areas of natural grade adjacent to the site are dominated by *S. filiforme* with *T. testudinum*, *H. decipiens* and *H. wrightii* also being present.

4.1.1 Conceptual Seagrass Site Design

The goal of the mitigation is to compensate for the loss of climax-community seagrass habitat at the impact site by restoring a productive climax-community seagrass habitat at the mitigation site. To compensate for 7.9 acres of projected seagrass losses at the impact site, approximately 24-acres of seagrass habitat is expected to be constructed within the Proposed Seagrass Mitigation Site (the Julia Tuttle Dredge Hole, see Figure 3). Success for purposes of this conceptual mitigation design is defined as achievement of the target acreage of seagrass coverage within 5 years of site construction. The success criteria will be finalized as part of the detailed mitigation design. To achieve success, the following objectives will be implemented:

1. Fill unvegetated areas of the Central Hole with native material (dredge spoil) to restore topography for climax community seagrasses (target elevation).

2. Utilize dredge spoil material of a consistency that will allow for settling and achievement of stable slopes and for support of the maximum possible surface area of fine capping fill material.
3. Using finer capping fill material, create a stabilized surface treatment of approximately 24 acres in size (target acreage) to achieve an elevation and substrate composition suitable for recruitment of seagrasses.
4. Design the site to maximize facilitation of recruitment from adjacent seagrass beds but also incorporate strategic planting to achieve recovery within the desired timeframe.

To achieve these objectives, dredged material would either be hauled up the ICW or pumped to the mitigation site. The site boundaries will be clearly delineated in the field prior to deposition of fill. The site will be filled generally as shown in Figure 4, Illustrative Site Filling Approach. The first step will be to fill the holes to the base fill elevation. The base fill elevation is estimated to be between (-) 15 to (-) 17 feet, or the elevation below which seagrass communities no longer grow. The specific base fill elevation will be defined during detailed mitigation design, based on site surveys at one foot contours combined with biological assessments. Where the delineated site border meets a steep pit wall the fill will be leveled as closely as possible to adjacent seagrass elevation (target elevation) in order to encourage recruitment and also to improve connectivity of the restoration site to the adjacent seagrass bed community. In these specific areas, some resources may be covered by material on the narrow eroded shelf described earlier that occurs between natural grade and the sharp drop (see Figure 4). Wherever the delineated site border does not meet a steep wall the fill will be sloped up from the base fill elevation in order to avoid impacting existing seagrasses. The material will be deposited in two phases: coarse fill phase and capping phase. The coarse fill phase will utilize dredge spoil for the purpose of providing a supporting base for the site. Some amount of rocky material is acceptable for this phase provided that stable compaction and slopes are achieved. The coarse fill will be brought to within approximately one foot of the final target elevation for the site. The capping phase will utilize finer grain material suitable for seagrass recruitment and will be brought up to the target elevation. Although the site design does not specifically seek to provide seagrass or other communities on the side slopes of the mounded areas, it is likely that either seagrass and/or hardbottom communities (calcareous algae and sponges) will grow on the side slopes, based on observations in the field of similar areas with the Julia Tuttle Dredge Hole.

It is currently envisioned that the construction of the site would incorporate the following features:

- Transport: Barge access would be restricted to deep water. It appears that, should the barge transport method be used, there is more than sufficient depth and area to push the barge along the ICW, enter and exit the site, and turn the barge within the site. If a piping method is used, the pipe could be placed in deep water wherever possible. The transport method is not expected to have significant impacts on surrounding seagrass beds adjacent to the transport route or the mitigation site.
- Turbidity Control: Some method of turbidity control such as curtains would be employed at the site in order to ensure compliance with state water quality standards. Significant

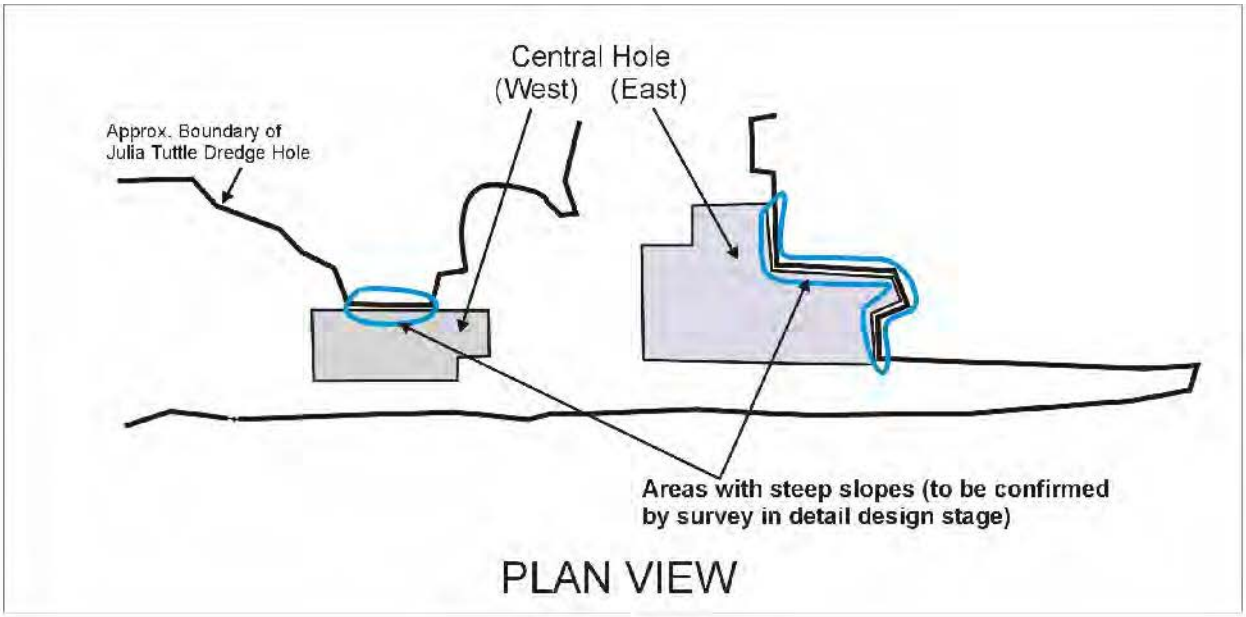
turbidity is not expected during construction since the majority of the fill will consist of coarse grain material that will drop quickly during deployment. The calm conditions that make this site a good seagrass restoration candidate will also help to contain turbidity.

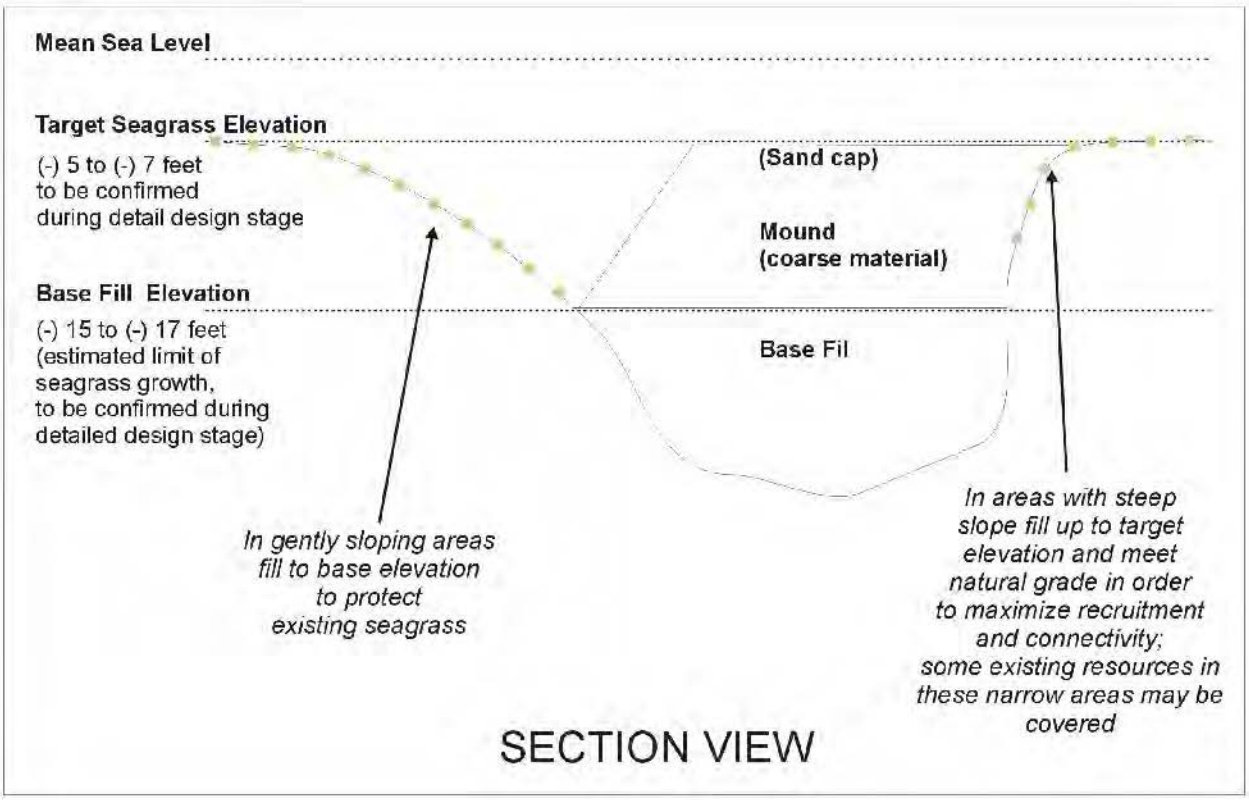
- Site Grading: Regardless of the method used to transport and deploy the fill, site finishing and grading will need to achieve the target elevation as closely as possible. A flat-blade excavator will most likely be used to grade the site to the specified elevation, but a combination of methods may be used. The final method will be determined as part of the detailed mitigation design.
- Planting: Some limited seagrass planting may be employed to help ensure that success can be achieved within the desired timeframe. A final design will be developed as part of the detailed mitigation plan but it is envisioned that individual plots of *H. wrightii* and/or *S.filiforme* may be distributed over portions of the site in areas where recruitment may otherwise be slow to occur.
- Site Protection: Once the site is finished it may need to be protected from erosion, boating activities or other possible disturbance sources. The detailed mitigation design will address any protection measures such as boulder revetments or site markers that may be needed.

Once constructed, the site will be monitored. For purposes of this conceptual plan, monitoring will be designed to evaluate achievement of the following:

- recruitment of the site with seagrasses within 3 years, and
- achievement of the target acreage of seagrass coverage within 5 years.

It is anticipated that seagrass recruitment will occur rapidly by *H. wrightii* and *H. decipiens*. Other species including *S. filiforme* and *T. testudinum* are expected to colonize the site at a slower rate. Detailed success criteria, design and specifications for the seagrass mitigation will be prepared and provided for agency concurrence prior to construction. It is possible that construction techniques outlined here may change due to availability of new information during the more detailed design phase, or that a more appropriate site or sites for mitigation may be identified in the future.





Source: Port of Miami

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4.2 Artificial Reef Creation

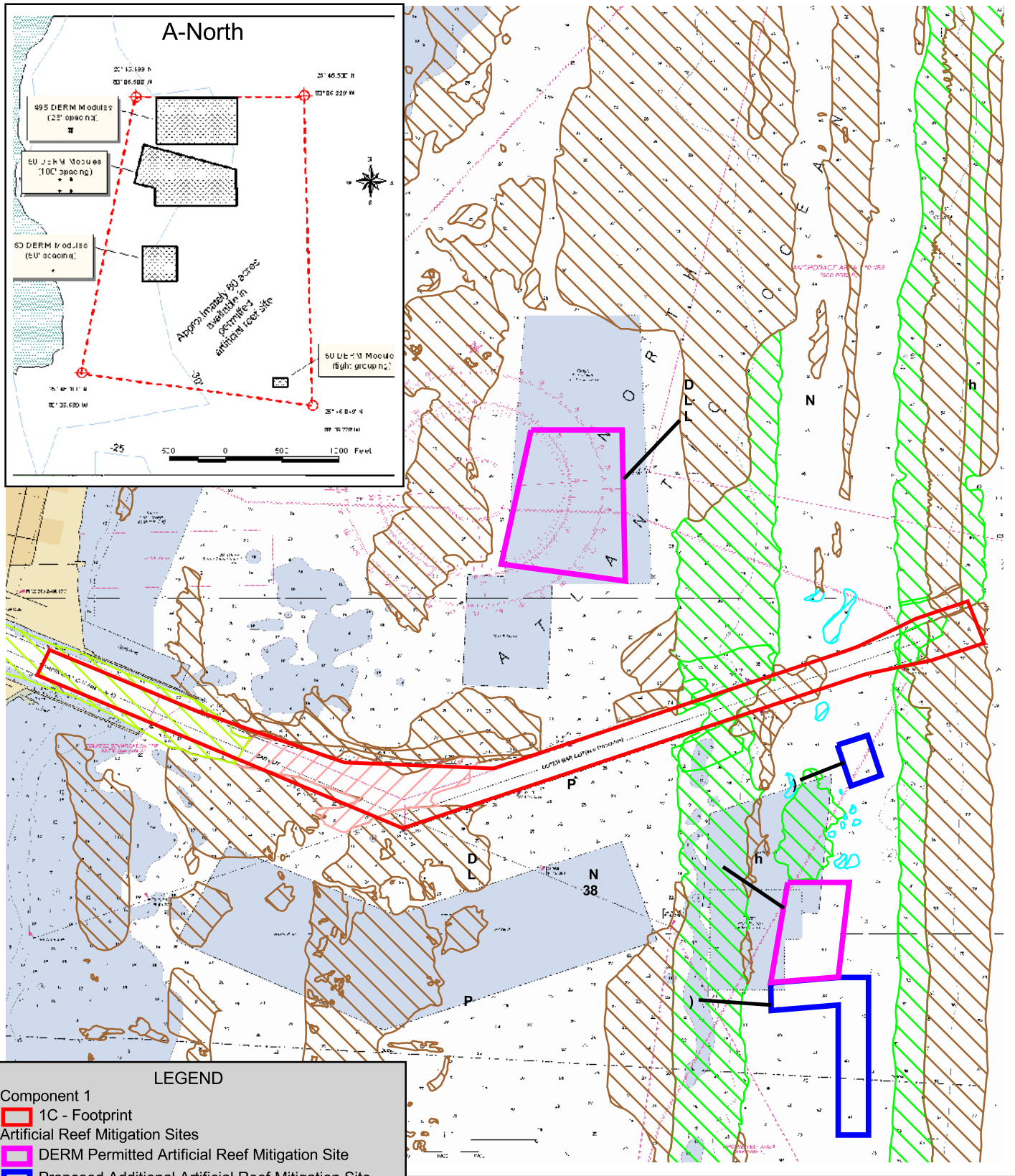
The proposed mitigation for reef and hardbottom impacts will be type-for-type, to reflect the ecological differences between the different reef types impacted. A total of 0.8 acre of low relief-low complexity (LRLC) reef will be created to mitigate for the new low relief reef and previously impacted hardbottom habitat. A total of 5.4 acres of high relief-high complexity (HRHC) reef will be created to mitigate for the high relief impact. The proposed location for mitigation reefs is found in Figure 5 and design drawings for LRLC and HRHC types are found in Figure 6. Specific design requirements and the reef design are described in this section.

4.2.1 General Design Requirements

Artificial reefs are often proposed for mitigating impacts to natural hardbottom habitats as a result of beach restoration (Lutz 1998). Mitigation reefs differ in several ways from traditional artificial reefs for fishing enhancement. Traditional artificial reefs are usually constructed offshore, are generally of high relief, are promoted as fishing destinations, and often utilize vessels or other non-natural substrate to offer divers an interesting alternative to natural reefs. In contrast, mitigation reefs should be designed to mimic the lost habitat as closely as possible in terms of relief and structural complexity. They should be placed in the same habitat depth zones as the impacted natural hardbottom/reef, and consumptive use of the reefs should be discouraged.

Artificial reefs have been used successfully for many years to mitigate impacts in sheltered waters (Duffy 1985; Davis 1985) or in relatively deep water offshore (Mostkoff 1993). Reef deployments in shallow, open coastal areas present special challenges in the wave stability of materials and burial by sand movements in this very dynamic habitat. Palm Beach County has had considerable success with deploying shallow water artificial reefs as mitigation measures. The proposed design reflects the limitations on design and placement imposed by navigation regulations, liability issues, construction limitations, and stability concerns.

Mitigation reefs have often been required to be built in the immediate vicinity of the natural reefs impacted by construction activities. In areas where the habitat that was impacted was the only habitat in the area, this approach has merit. A guiding principle of artificial reef development has always been that reefs should not be deployed adjacent to productive reef habitats. From a fisheries standpoint, reefs placed in non-reef habitats are biologically more productive as they are trophically coupled with foraging habitats that are unexploited by other reef fishes (Bortone 1998). More importantly, the shifting of reef materials in storms may severely damage adjacent natural habitats. For this reason, the Florida Artificial Reef Development Plan prohibits material from being placed within 100 yards of “live bottom” areas (Myatt and Myatt 1992). Following Hurricanes Andrew, Opal, and Erin, it was found



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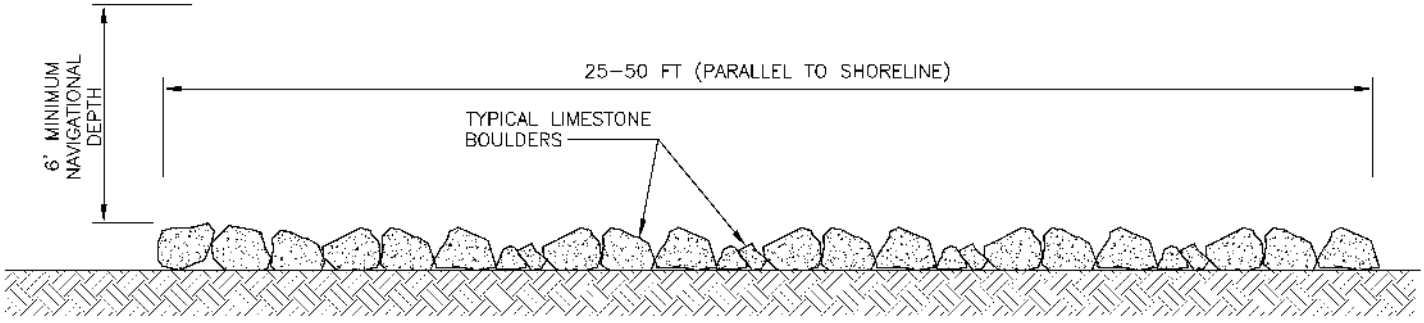
Low-Relief, Low Complexity Artificial Reef Design



High-Relief, High Complexity Artificial Reef Design

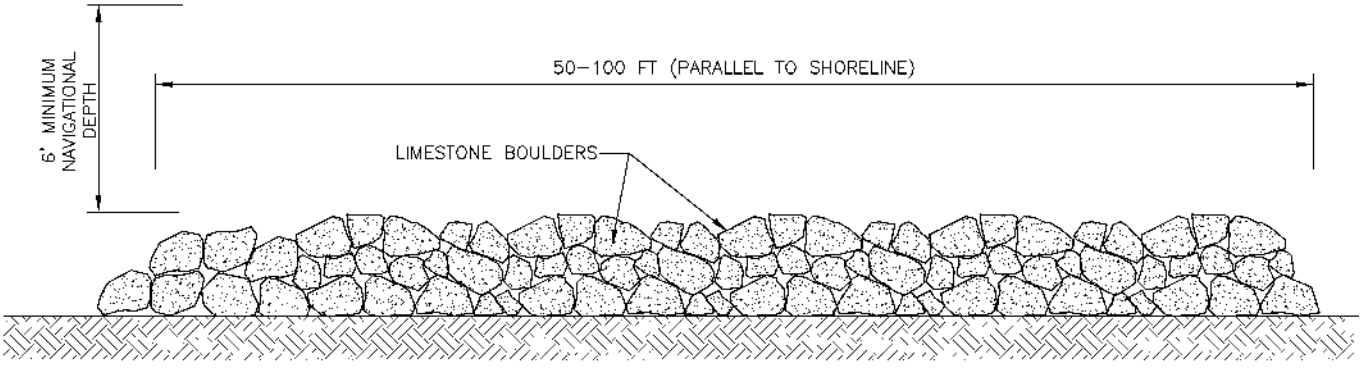


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	Figure 6

that even massive materials in relatively deep water were moved or broken up by tremendous wave forces (Lin 1998, Turpin 1998). For the above reasons, sites selected for mitigation reef construction should have no significant areas of natural reef within 100 yards and no reefs should be placed directly seaward of any significant area of natural reef.

The most desirable areas for deployment of reefs are areas that have a thin veneer of sand over bedrock, which limits the extent that deployed materials will settle. After reviewing the Miami-Dade county permitted sites, it was determined that one of the sites (DERM reef site A – north of the entrance channel) is too shallow to mimic the reef that is being impacted. DERM reef site B – located to the south of the entrance channel has very little available space for reef construction. However, it already has some artificial reef located within the boundaries, which would allow for quicker colonization of artificial reef material, as well as allowing for easier monitoring since it is adjacent to a county mitigation site that is currently monitored. Water depths of this site are similar to the depths of high relief reefs being impacted by the proposed project (40 to 45 feet). The County has already completed the permitting process with the State of Florida for this artificial reef site.

The Corps reviewed two additional sites for placement of reef mitigation material. Both sites are located south of the entrance channel. The northernmost site is located north of DERM reef site B, and has shallower water depths (35 to 40 feet). The southern "L"-shaped site is directly adjacent to the DERM reef site B. However, it was determined that some hardbottom communities are located within the proposed site, which would need to be avoided (with an appropriate buffer) in using this site for mitigation

In summary – the Corps proposes to use Corps site #1 adjacent to DERM reef site B and Corps site #2. DERM reef site B does not have capacity for the entire mitigation need, DERM reef site A is too shallow for the proposed mitigation.

4.2.2 Reef Design

Two types of mitigation reefs will be constructed; HRHC reefs and LRLC reefs. The HRHC reefs are intended to mitigate for impacts to high relief habitat and the LRLC reefs are intended to mitigate for impacts to lower relief reef. The two reef types will be deployed in acreages proportional to direct impacts expected on each type of natural reef habitat in the final project design.

Limestone rock excavated from the Entrance Channel will be used in reef construction. The material will be deployed to mimic the orientation of typical natural reefs. This reef design will have a vertical relief of 3 to 5 feet and rocks will be deployed to provide the maximum structural complexity and to provide refugia for cryptic and reclusive species. As interstitial sand patches associated with reef habitat are thought to be important in the ecological function of the reef habitat, the reef footprint will contain approximately 20 percent open sand surface. Temporary buoys delineating the deployment strip will mark areas for deployment. Corner buoys for the sites shall be placed using Differential Global Positioning System

(DGPS) with sub-meter accuracy. Natural limestone provides an ideal substrate for the establishment of a fouling community and colonization by the common reef community species. HRHC reefs are intended to provide persistent habitat with higher complexity and habitat diversity than LRLC hardbottom or reefs.

LRLC reefs will have a vertical relief of 1 to 2 feet and will be placed inshore of, and shallower than, HRHC reefs. It is recognized that the LRLC reefs may be periodically buried by shifting sands, like the low relief natural reefs they are intended to mimic. This does limit their habitat value to some extent, but it has been suggested (albeit without much empirical evidence) that this sort of ephemeral, low relief habitat may be particularly important in supporting the recruitment and post settlement survival of juvenile fishes. Dredged limestone rock will be placed in sites where they may be expected to partially settle in the substrate and should provide LRLC habitat. To provide interstitial sand habitat, approximately 20 percent of the LRLC reef footprint shall be open sand. Deployment sites will be delineated as outlined above for HRHC reefs.

Construction of mitigation reefs will take place during dredging of the Entrance Channel, such that suitable rock material excavated from the channel may be used for reef building.

4.2.3 Reef Monitoring

The monitoring program for the mitigation reefs will consist of both physical and biological components. An initial pre-construction monitoring event will be performed to provide baseline conditions for future comparison. Physical monitoring will assess the degree of settling of the reef materials after the first year, and biological monitoring will assess populations of algae, invertebrates, and fishes, as compared with concurrent control sampling of natural reefs for five years. Monitoring will be conducted annually in the summer months. In order to provide a permanent record of reef conditions and biota, each sampling effort will include video transects covering representative areas of the mitigation reefs.

Fish population evaluations will be based on visual censuses conducted separately on HRHC and LRLC mitigation reefs and high and low relief control reefs. The point-count method (Bohnsack and Bannerot 1986) will be used for fish assessment. This method has the advantage of gathering quantitative data in a relatively short time in a very repeatable pattern that is relatively insensitive to differences in habitat structure. Each census will have a duration of 5 minutes and a radius (the distance from the stationary observer) of 10 feet. Ten censuses will be collected on each of the four reef types. Data from these types of censuses are rarely distributed, so the Wilcoxon Rank-Sum or a similar nonparametric test will be used for significance testing. The criteria for mitigation reef success will be a finding of no significant difference at $p=0.05$ between reef type pairs (HRHC vs. high relief control and LRLC vs. low relief control).

Results of all mitigation reef-monitoring efforts will be summarized in an annual report to be completed by December 31 of each year the monitoring program is in place. Copies of the report will be distributed to all agencies and interested parties.

5.0 EFFECTIVENESS OF PROPOSED MITIGATION

A review of the effectiveness of each proposed mitigation treatment is summarized below.

5.1 Seagrass Restoration

Restoring seagrass beds, if successful, can be an appropriate mitigation strategy due to its high ecological value and declining abundance. Seagrass restoration adds habitat value to unvegetated sand or mud substrates. The addition of seagrass beds increases the productivity and diversity of the unvegetated bottom, which can directly compensate for the historic loss in productivity and diversity.

Fonseca, et al. (1996a, 1996b) found that within three years, restored seagrass beds (*H. wrightii*) planted on 0.5-m centers reach the same areal density and support animal densities, number of taxa, and species composition equivalent to natural beds. Some restored seagrass beds support invertebrate populations that are as or more abundant than those in natural grassbeds (Bell, et al. 1993). Restored seagrass beds appear to be as suitable as natural seagrass beds for juvenile and small adult fish (Brown-Peterson, et al. 1993).

Restored seagrass beds support animal densities similar to natural seagrass beds when shoot density is only one-third that of a natural seagrass bed (Fonseca et al. 1996). Thus, the habitat value of a restored seagrass bed is maximized relatively quickly, prior to the restored bed reaching the same vegetative density as a natural seagrass bed. In addition to providing habitat itself, seagrass beds increase the productivity of adjacent habitats. Irandi and Crawford (1997) found that the presence of seagrass beds adjacent to tidal marshes increased the abundance and growth rates of fish in the tidal marsh.

Research has identified that seagrass beds are more diverse and productive than unvegetated substrate. Average fish densities in natural seagrass beds were ten times greater than those on unvegetated areas (~20 individuals/m^2 versus 1.74 individuals/m^2). Shrimp densities in natural shoal grass beds averaged 151 individuals/m^2 compared to 3.02 individuals/m^2 in unvegetated areas. Crab densities in natural seagrass beds were 20 to 50 individuals/m^2 compared to an average of 1.91 individuals/m^2 on unvegetated areas (Fonseca et al. 1996). Within 1.5 years of planting, restored seagrass beds support shrimp, fish, and crab densities similar to natural seagrass beds (Fonseca et al. 1996). Thus, restored seagrass beds can increase the density of shrimp, fish, and crabs by 10 to 50 times compared to unvegetated substrates.

Although research has identified that seagrass beds are more diverse and productive than unvegetated substrates, relatively few studies compare secondary productivity between seagrass beds and other habitats. Heck, et al. (1995) determined that eelgrass beds in the northeastern United States had macroinvertebrate production 5 to 15 times higher than adjacent unvegetated habitats. At least a similar increase in productivity is expected for *H. wrightii* and *T. testudium*, which have a higher primary productivity than eelgrass. Also, a

similar increase in abundance, diversity, and productivity of fish species may also be expected.

Restoration of seagrass communities, while still considered experimental and not highly successful by resource agencies, can enhance habitat heterogeneity and the diversity of invertebrate and fish communities, if carefully implemented. The recent treatise on seagrass restoration entitled "Guidelines for the Conservation and Restoration of Seagrasses in the United States and Adjacent Waters" by Fonseca, et al. (1998) discusses the benefits and risks associated with seagrass restoration. Given the documented success of more recent efforts to restore seagrass communities, including those in South Florida, restoration is quickly becoming a proven resource management tool in some areas where conditions are appropriate.

Restoration of a three-acre borrow area in North Biscayne Bay was completed in the late 1990's by Miami-Dade Department of Environmental Resources Management (DERM) and recently inspected by NMFS, FWS, and DERM staff during an agency site visit with the USACE's contractor in March of 2002. Although no monitoring has been done by DERM since planting of the site, a visual inspection by the agency team revealed that seagrass occurs throughout the site and was dominated by *H. wrightii* and *T. testudinum*. Discussions with DERM staff indicate the old borrow area was filled with rubble and sand and planting units of both *H. wrightii* and *T. testudinum* installed. Based on this evidence of general success, all in attendance agreed that seagrass restoration was a viable option for mitigating seagrass loss.

Another example of successful seagrass restoration is the Miami-Dade sewage cross-bay force main installed by the Miami-Dade Water and Sewer Authority Department in the mid-1990s. The project required trenching of over one mile of Miami Harbor baybottom for pipeline installation, including excavation of 1.80 acres of seagrass beds. Once the pipeline was installed the 22-foot wide trench path was refilled and allowed to recruit with seagrasses. Recruitment had begun within one-year and after two years seagrasses and macroalgaes covered the trench pathway so that it was no longer visible on aerial photography.

Recent success has also been achieved with restoration of propeller scars through various methods in the Florida Keys. Filling of scars, planting with seagrass and "spiking" scars with concentrated nutrient loads have all been used to encourage expansion and recruitment of seagrasses there (Kenworthy et al. 2000).

5.2 Artificial Reef Construction

Currently there are many options for the construction of artificial reefs. Methods used previously have included limestone boulders, concrete tetrahedrons, and Reef Balls^{TM}, among others. Miami-Dade County currently prefers the use of limestone boulders as the material for artificial reef construction. Placement of limestone material in any or all of these areas would provide suitable habitat replacement for the loss of reef associated with channel widening and deepening.

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APPENDIX A
Habitat Equivalency Analyses

Table A-1: HEA effective acreage gained from recovery of low-relief hardbottoms

Assumptions: dredging leaves 10% service, w/ linear increase

Year	% Service Level	% Service Loss	Effective Ac lost	Discount Factor	Discount Off ac lost
2003	10.00%	90.00%	0.60	0.97	0.58
2004	17.50%	82.50%	0.50	0.94	0.47
2005	25.00%	75.00%	0.45	0.91	0.41
2006	32.50%	67.50%	0.41	0.88	0.36
2007	40.00%	60.00%	0.36	0.85	0.30
2008	47.50%	52.50%	0.32	0.82	0.26
2009	55.00%	45.00%	0.27	0.79	0.21
2010	62.50%	37.50%	0.23	0.76	0.17
2011	70.00%	30.00%	0.18	0.73	0.13
2012	77.50%	22.50%	0.14	0.70	0.09
2013	85.00%	15.00%	0.09	0.67	0.06
2014	92.50%	7.50%	0.05	0.64	0.03
2015	100.00%	0.00%	0.00	0.61	0.00
				Total effective-acre years/ac:	3.07

Table A-2: HEA effective acreage gained from recovery of low-relief hardbottoms

Assumptions: 20% service immediate, w/ linear increase

Year	% Service Level	% Service Increase	Discount Factor	Discount Eff ac gain
2003	20.00%	0.00%	1.00	0.00
2004	26.67%	6.67%	0.97	0.06
2005	33.33%	13.33%	0.94	0.13
2006	40.00%	20.00%	0.91	0.18
2007	46.67%	26.67%	0.88	0.23
2008	53.33%	33.33%	0.85	0.28
2009	60.00%	40.00%	0.82	0.33
2010	66.67%	46.67%	0.79	0.37
2011	73.33%	53.33%	0.76	0.41
2012	80.00%	60.00%	0.73	0.44
2013	86.67%	66.67%	0.70	0.47
2014	93.33%	73.33%	0.67	0.49
2015	100.00%	80.00%	0.64	0.51
			Total effective-acre years/ac:	3.90

Table A-3: HEA acreage calculation for low-relief hardbottom compensation

Impact area	0.6
Present discounted interim losses	3.07
Present discounted lifetime gains per acre of replacement project	3.9
R= # acres required for compensation	
3.07=3.9*R	
R= 3.07/3.9	
R= 0.787179	
Effective mitigation to compensation ratio:	1.316667

Table A-4: HEA effective acreage lost from impacts to high-relief reefs

Assumptions: dredging leaves 10% service, w/ linear increase

Year	% Service Level	% Service Loss	Effective Ac lost	Discount Factor	Discount Eff ac lost
2003	10.00%	90.00%	2.70	0.97	2.62
2004	13.00%	87.00%	2.35	0.94	2.21
2005	16.00%	84.00%	2.27	0.91	2.06
2006	19.00%	81.00%	2.19	0.88	1.92
2007	22.00%	78.00%	2.11	0.85	1.78
2008	25.00%	75.00%	2.03	0.82	1.65
2009	28.00%	72.00%	1.94	0.79	1.53
2010	31.00%	69.00%	1.86	0.76	1.41
2011	34.00%	66.00%	1.78	0.73	1.29
2012	37.00%	63.00%	1.70	0.70	1.19
2013	40.00%	60.00%	1.62	0.67	1.08
2014	43.00%	57.00%	1.54	0.64	0.98
2015	46.00%	54.00%	1.46	0.61	0.88
2016	49.00%	51.00%	1.38	0.58	0.79
2017	52.00%	48.00%	1.30	0.55	0.71
2018	55.00%	45.00%	1.22	0.52	0.63
2019	58.00%	42.00%	1.13	0.49	0.55
2020	61.00%	39.00%	1.05	0.46	0.48
2021	64.00%	36.00%	0.97	0.43	0.41
2022	67.00%	33.00%	0.89	0.40	0.35
2023	70.00%	30.00%	0.81	0.37	0.30
2024	73.00%	27.00%	0.73	0.34	0.25
2025	76.00%	24.00%	0.65	0.31	0.20
2026	79.00%	21.00%	0.57	0.28	0.16
2027	82.00%	18.00%	0.49	0.25	0.12
2028	85.00%	15.00%	0.40	0.22	0.09
2029	88.00%	12.00%	0.32	0.19	0.06
2030	91.00%	9.00%	0.24	0.16	0.04
2031	94.00%	6.00%	0.16	0.13	0.02
2032	97.00%	3.00%	0.08	0.10	0.01
2033	100.00%	0.00%	0.00	0.07	0.00
			Total effective-acre years/ac:		25.76

Table A-5: HEA effective acreage gained from recovery of high-relief reefs

Assumptions: 20% service immediate, w/ linear increase

Year	% Service Level	% Service Increase	Discount Factor	Discount Eff ac gain
2003	20.00%	0.00%	1.00	0.00
2004	22.67%	2.67%	0.97	0.03
2005	25.33%	5.33%	0.94	0.05
2006	28.00%	8.00%	0.91	0.07
2007	30.67%	10.67%	0.88	0.09
2008	33.33%	13.33%	0.85	0.11
2009	36.00%	16.00%	0.82	0.13
2010	38.67%	18.67%	0.79	0.15
2011	41.33%	21.33%	0.76	0.16
2012	44.00%	24.00%	0.73	0.18
2013	46.67%	26.67%	0.70	0.19
2014	49.33%	29.33%	0.67	0.20
2015	52.00%	32.00%	0.64	0.20
2016	54.67%	34.67%	0.61	0.21
2017	57.33%	37.33%	0.58	0.22
2018	60.00%	40.00%	0.55	0.22
2019	62.67%	42.67%	0.52	0.22
2020	65.33%	45.33%	0.49	0.22
2021	68.00%	48.00%	0.46	0.22
2022	70.67%	50.67%	0.43	0.22
2023	73.33%	53.33%	0.40	0.21
2024	76.00%	56.00%	0.37	0.21
2025	78.67%	58.67%	0.34	0.20
2026	81.33%	61.33%	0.31	0.19
2027	84.00%	64.00%	0.28	0.18
2028	86.67%	66.67%	0.25	0.17
2029	89.33%	69.33%	0.22	0.15
2030	92.00%	72.00%	0.19	0.14
2031	94.67%	74.67%	0.16	0.12
2032	97.33%	77.33%	0.13	0.10
2033	100.00%	80.00%	0.10	0.08
			Total effective-acre years/ac:	4.84

Table A-6: HEA acreage calculation for high-relief compensation

Injured area	2.7
Present discounted interim losses	25.76
Present discounted lifetime gains per acre of replacement project	4.84

R= # acres required for compensation

25.76=4.84*R

R= 25.76/4.84

R= 5.322314

Effective mitigation to compensation ratio: 1.971227

APPENDIX K
Final FWS Coordination Act Report

Planning Division
Environmental Branch

Mr. James J. Slack
U. S. Fish and Wildlife Service
1339 20th Street
Vero Beach, Florida 32960-3559

Dear Mr. Slack:

Thank you for the Draft Fish and Wildlife Coordination Act Report (CAR) of July 24, 2002, and amended on Jan 14, 2003 for the Port of Miami Navigation Project in Dade County, Florida. A detailed reply to the 17 recommendations in the CAR is enclosed. We intend to comply with some of the recommendations in the draft CAR (2,3,4,7,9,10,11,12,13 & 17). The remaining recommendations are not under our jurisdiction or are economically infeasible to implement.

If you have any questions, please contact Terri Jordan at 904 232-1817.

Sincerely,

James C. Duck
Chief, Planning Division

Enclosure
Cc: Port of Miami – Becky Hope

Jordan/CESAJ-PD-EA/1817/
McAdams/CESAJ-PD-EA
Mason/CESAJ-PD-E
Perez/CESAJ-DP-C
Strain/CESAJ-PD-P
Duck/CESAJ-PD

Recommendations in CAR
Port of Miami GRR Navigation Project
Detailed Reply

(1) Develop a monitoring plan and survey methodology to determine the extent of the direct and/or indirect effects of sand placement, groin construction, and/or borrow site dredging on seagrass and/or hardbottom. A mitigation plan will be needed, if resources are adversely impacted. Prior to the initiation of the monitoring plan and/or surveys, copies should be submitted to the Service for review. Jan 14, 2003 addendum – This recommendation addressed monitoring; however, we would like to clarify that the monitoring plan should encompass channel walls and previously dredged channel bottom, if it is to be an element of mitigation should be instituted during dredging regardless of the water column exemption for turbidity monitoring within the stated 150 foot mixing zone.

Response to recommendation – The Corps will abide by the monitoring requirements of the FLDEP Water Quality Certificate, when issued and accepted. Recommendation #1 appears contradict recommendation #2 with regard to monitoring.

(2) The Service should be provided with final details for disposal methods, land-use history and current habitat data for areas adjacent to the upland disposal site on Virginia Key and resource information for areas surrounding seagrass mitigation sites (which will receive some spoil material). If necessary, Service staff may visit the sites to ensure that there are no anticipated adverse impacts to jurisdictional wetlands, surface waters, or protected species. If the upland site is judged adequate for disposal based on lack of effects to fish and wildlife, the Service recommends that discarded materials be contained in a diked area and that Best Management Practices are followed in order to prevent erosion and runoff following storm events and dewatering. Plans should include turbidity containment devices at the dewatering outfall.

The Service requests participation in the development of a water quality monitoring program to determine if turbidity levels (and contaminant levels, if relevant) may be adversely affecting fish and wildlife resources and/or habitats in or adjacent to the project area. The Service recommends water quality monitoring to occur at regular intervals, particularly in reef and seagrass communities, during dredging activities to ensure compliance with State of Florida water quality requirements. In addition, the Service requests copies of all water quality data resulting from sampling activities both during and after dredge operations. Finally, a contingency plan to halt operations must be in place should suspended sediment concentrations exceed acceptable levels. A 150-meter allowable mixing zone near the cutterhead would be exempt from data collection for monitoring purposes.

A monitoring plan to monitor channel-wall hardbottom habitat should be submitted to FWS/NMFS, and all data/reports pertaining to recovery of coral and sponge communities on channel walls must be submitted to the Vero Beach FWS office and the Miami NMFS office. Schedule for submittal, monitoring parameters and methods, will correspond with artificial reef monitoring.

Response to Recommendation – If the upland disposal site will be used for material disposal, details of that disposal site can be provided to the Service if it is determined that any resources under the Services jurisdiction will be impacted. When a detailed mitigation plan is completed, this will be submitted to the resource agencies, including the Service, for review – this report will include details of the selected mitigation sites.

(3) Implement an effective watch program during blasting that is designed to delay detonation until the designated safety zone is clear of marine mammals and/or sea turtles to minimize possible adverse effects to listed species during blasting activities, as described in the following section. The most effective watch program consists of the primary survey observer based in an aircraft with secondary observers on boats, bridges, and/or land with sufficient communication among all observers and the demolition contractor.

Response to Recommendation - As stated in the Corps' DEIS and Biological Assessment under the ESA submitted to the FWS, the Corps will instigate an effective watch program to be initiated during blasting activities during port construction that will include a safety zone to ensure protection of listed and protected species in the action area.

(4) During the coordination meetings, troubleshoot for potential problems such as radio contact failure among observers and/or the blasting subcontractor, poor weather or visibility issues, etc., and develop a contingency plan to resolve the issues.

Response to Recommendation - A coordination meeting will be held between the parties involved in the construction and observers to address these potential issues.

(5) Remove and relocate all brain and star coral within the 2.7 acre of high-relief coral reef impact area related to Component 1 by authorized and experienced personnel to appropriate areas within the vicinity of the original location and include monitoring provisions. Amended recommendation (Jan 14, 2003) – Remove and relocate all hard coral colonies larger than 6 inches in diameter within the project footprint (including the previously dredged areas) by experienced personnel through established methods to suitable nearby hardbottom substrate. Biological monitoring should be instituted.

Response to Recommendation - To accept this recommendation, the Corps must conduct a survey and map corals greater than 6 inches throughout more than 49 acres of hardbottom communities throughout the project area. Forty-six acres of this is previously dredged, and will recover, as demonstrated by the recovery of the community since the dredging completed in the early 1990s. Then the Corps must obtain a permit to relocate the corals, or coordinate with Miami- Dade DERM to determine if they have a permit to relocate corals that would cover the project area. This recommendation as amended, is not feasible due to the cost of this survey and the relocation activities. The Corps will discuss this recommendation with the non-federal sponsor and will determine if it is feasible to relocate these corals from the 3.1 acres of reef that is not previously dredged.

(6) Schedule construction activities (blasting and dredging) outside of the winter season, November through March, when manatees are more dispersed.

Response to Recommendation -
Blasting - The Corps has put in place a manatee and protected species protection plan that prohibits blasting when any of those animals are within a certain radius of the blasting activities. During the winter months, when manatee densities may be higher near the project area, the Corps may not be able to blast as often as during the summer months. The Corps will not blast when manatees, or other protected species, enter the no blast zone.

Dredging - After years of construction activities taking place near manatee habitats, neither the Corps nor the Service has any documented adverse effects of Corps dredging operations on manatees. The Corps will implement the standard manatee protection techniques drafted in conjunction with the Service to protect manatees during dredging operations.

(7) The Service recommends decreasing the impact area as much as possible by narrowing the channel width as much as is practicable. Likewise, impacts to reefs at the east end of the entrance channel should also be reduced as much as is practicable. January 14, 2003 - Amended – The Service would like to emphasize this recommendation to reduce channel expansion in hardbottom, seagrass, and shallow sandy bottom habitats prior to the consideration of mitigation.

Response to Recommendation - The Corps has minimized the width of the entrance channel as much as vessel safety allows through consultation and vessel simulations with the Port pilots, as well as the Coast Guard. The extension and widening of the entrance channel is necessary for ship safety and maneuverability due to the currents of the Gulf Stream directly offshore of the port. All of the avoidance and reduction in impacts was done early in the project-planning phase, and through this planning process, impacts of the project have been greatly reduced from the initial project design.

(8) Second, due to the fact that larger, less maneuverable ships will be utilizing the harbor, there may be an increased need for use of tugboats to position vessels. Therefore, the Service recommends that tugs be required to have kort nozzles or ducted propellers, and that operators are sure that no manatees are behind tugs when backing.

Response to Recommendation - The Corps has no jurisdictional authority to implement this recommendation.

(9) Minimize possible adverse effects to nesting sea turtles and hatchlings by reducing or redirecting the lighting on offshore equipment and/or vessels.

Response to Recommendation - The Corps has addressed this concern in the DEIS as well as in consultation with the National Marine Fisheries Service under the ESA. The following language was included in the Biological Assessment sent to NMFS for this project:

> Disorientation due to lighting - One possible element of the action that may indirectly affect sea turtles is the presence of light and/or noise from construction/dredging vessels anchored offshore. These factors may interrupt the

movement of adult, nesting, female turtles swimming toward or away from nesting beaches, and may cause disorientation of hatchlings following emergence. However, since the port is an active facility, offshore lighting is not an unusual feature of the area, and should not appreciably change the ambient conditions of nesting areas in the vicinity of the action. In addition, all construction/dredging vessels are required to adhere to best management practices, such as preventing lights from exposure to shore through use of shields, as required by NMFS in its 1997 Biological Opinion (NMFS, 1997) and adopted by the Corps in its standard specifications for working in areas where sea turtles may be present. Therefore, no adverse indirect impacts due to dredging operations are anticipated for the proposed action.

The Corps is currently awaiting a Biological Opinion from NMFS for this project.

(10) Any incident involving the death or injury of listed species should be immediately reported to the Service (Vero Beach), National Marine Fisheries Service (St. Petersburg office), and the Corps (Jacksonville District).

Response to Recommendation - The Corps or our contractors will immediately report the death or injury of any protected species to the FWS, NMFS, and FFWCC.

(11) Best Management Practices (BMPs) should be implemented to prevent excessive siltation during hopper barge loading (if such a vehicle is used). Proper maintenance of dredging equipment, the use of silt curtains or gunderbooms, performing operations when protected species are not present, and dredging only when environmental conditions are not contributory to siltation/sediment transport would minimize the impacts to fish and wildlife resources. It is recommended that certain protocols be followed, depending on the method used for dredging. If a hopper dredge is used, operators are recommended to eliminate or reduce hopper overflow, lower hopper fill-level, and use a re-circulation system. If a mechanical dredge is used, operators should increase cycle time and eliminate both multiple bites and bottom stockpiling. For operations where a hydraulic dredge is used, cutterhead rotation speed and swing speed should be reduced, and bank undercutting should be eliminated. When applicable, special equipment, such as pneuma pumps, closed buckets, large capacity dredges, and precision dredging tools and technologies, are recommended to further decrease the potential for adverse effects to marine communities (Corps 2001a).

Care should be taken during dredging efforts to limit the amount of fine sediment re-suspended to assure that impacts to adjacent seagrass beds and coral reefs would be minimized. If possible, turbidity containment devices should be installed.

Response to Recommendation - Best Management Practices will be used during the construction of the Miami Harbor Navigation Project.

(12) Due to the level of fine-grained material present in the benthic sediments of Biscayne Bay, this material should not be used for beach renourishment activities; instead it should be used as substrate at the seagrass restoration site.

Response to Recommendation - None of the material that will be dredged from the Miami Harbor Project will be placed on Miami beaches.

(13) Biological monitoring should be conducted during a test blast in order to assess damage to populations of managed and protected fish species, and hence assess whether blasting impacts exceed acceptable levels. If results indicate that blasting has only minimal impacts on populations, and other Service recommendations are followed, blasting may be used where absolutely necessary. However, further monitoring would be required during project blasting. After each blast during project implementation, it is recommended that the effects of blasting on EFH and managed species, and species protected under ESA or MMPA is determined. This plan should be coordinated and approved by FWS and NMFS, and should ensure that no incidental take of manatees, sea turtles or sawfish occurs during construction (dredging, blasting, and hopper barge transport), and that harassment as defined by MMPA is avoided. Use of hydrophones and other technologies to determine likely impacts are encouraged.

Response to Recommendation - The Corps will be conducting blasting in the Miami Harbor, Dodge-Lummus Island turning basin in the near future as part of the completion of the phase II project. The Service was involved in coordination on this activity, including conducting a Section 7 Consultation dated June 19, 2002, that resulted in a concurrence with the Corps' determination of not likely to adversely impact the endangered manatee. We plan to monitor the effects of this deepening as a test blast for the Miami Harbor Navigation project. Additionally, during construction of the Miami Harbor Navigation Project, the effects of each blasting event will be recorded by onsite observers to determine the effects of the action on protected and managed species in the area. The current monitoring plan, as approved by the Service in its Section 7 Consultation dated July 24, 2002, ensures that no incidental take of crocodiles or manatees will occur. The Corps is currently awaiting a Biological Opinion from NMFS concerning potential impacts of the project on listed species under their jurisdiction, and NMFS will make a determination concerning incidental take of those same species; however, the Corps does not expect any incidental take to occur as a result of our current blasting program.

(14) Continue bi-annual monitoring of mitigation areas for a minimum of 10 years to ensure acreage is maintained and remediate, if required.

Response to Recommendation - The Corps or the non-federal project sponsor will abide by the monitoring requirements of the Florida Department of Environmental Quality Water Quality Certificate, when issued and accepted.

(15) A minimum of 19.3 acres of in-kind mitigation should be provided should be provided for hardbottom impacts to newly and previously dredged hardbottom habitat. This should be included in the hardbottom-monitoring plan.

Response to Recommendation - The Corps and its non-federal sponsor will provide sufficient mitigation for the impacts associated with the project. However, the Corps does not accept this recommendation for additional mitigation as requested by the Service. The area that will be dredged has been previously dredged and has recovered

since that dredging event, as noted by both the Corps and the Service. Additionally, the Port of Miami mitigated for the impacts of the dredging of those hardbottoms during the 1990 dredging event. At this time the Corps has no plans to offer mitigation for the previously dredged and mitigated hardbottoms as requested by the Service.

Upon reviewing the mitigation recommendations of the January 14, 2003 letter, we have discovered an inconsistency between the proposed impacts stated in the Draft EIS and those stated in the Draft CAR. Please see the table below, specifically the value for low relief hardbottom/reefs that have been previously dredged and recolonized.

Habitat Type and Dredge Status	DEIS value	CAR value
Low relief hardbottom/reef – not previously dredged	0.6	0.6
Low relief hardbottom/reef – previously dredged	28.1	30.7
High relief hardbottom/reef – not previously dredged	2.7	2.7
High relief hardbottom/reef – previously dredged	18.0	18.0

This inconsistency has caused an over estimation of the impacts associated with the proposed project, which also means that FWS over estimated the recommended mitigation associated with the project. We request that FWS revise its impact values for the final CAR.

(16) In-kind mitigation should be provided from dredging 23.3 acres of shallow sandy softbottom habitat, at a ratio of 1:1, such as filling or partially filling existing dredge holes and/or abandoned channels in nearby waters.

Response to Recommendation – Compared to the seagrasses and hardbottom reef communities being impacted by this project, the Corps considers shallow, sandy softbottom to be a lower value habitat type. This habit is not considered EFH by NMFS and as a result the Corps rejects this recommendation for the requested mitigation.

(17) In addition, the Service strongly recommends inclusion of the following in the project design, to further minimize and reduce potential adverse effects of blasting on listed species, as excerpted from the FWC's Endangered Species Conservation Conditions for Blasting Activities dated June 2001.

Response to Recommendation - The Corps will incorporate into our plans and specifications as many of the Conservation Conditions for Blasting Activities as are feasible and practicable.

Additionally, the Corps noted that no recommendation concerning seagrass mitigation was included in the Services recommendation section of the CAR, however, Section 7.1.1, found under section 7.1 "Evaluation of Mitigation" states the following:

> "The Service recommends that for each acre of seagrasses that is anticipated to be impacted as a result of widening Fishermen's Channel and the Fisher Island Turning Basin, three acres be created or restored (3:1 ratio). This includes the impacts during dredging (0.34 acre), as well as the impacts to 6.0 acres adjacent seagrass beds during equilibration of the side-slope ("sloughing"), which is reasonably certain to occur. Therefore, restoration of 18.9 acres of seagrass would compensate for the 6.3 acres of seagrass impacted during the construction of Components 3 and 5. However, monitoring must be conducted to ensure recruitment of seagrasses at the mitigation site. If acceptable coverage of seagrasses is not achieved within three years, another mitigation site must be constructed, or installation of plants must occur at the site. Survival and coverage standards must be achieved in either case."

If this is the Service's position and recommendation, the Corps rejects the mitigation ratio for the following reasons. The Corps and the project sponsor believe that this restoration project will demonstrate the same recovery pattern as seen by other seagrass restoration projects in Biscayne Bay. Examples of these sites are included as a reference. The Corps believes that due to the likelihood of success of the proposed seagrass mitigation, a 1:1 ratio is acceptable for the impacts of the proposed construction. Although we reject the mitigation ratio, we accept the Services request that monitoring of the site for three years post-filling be conducted and that if the site does not naturally recruit, then supplemental planting be performed to speed recovery. Planting methods will be developed following guidance by Fonseca et al. (1998) and peer review by NMFS. Detailed plans and specifications for the seagrass creation will be prepared and provided for agency concurrence prior to construction.

Seagrass recovery examples

Restoration of a three-acre borrow area in North Biscayne Bay was completed in the late 1990's by Miami-Dade Environmental Resources Management (DERM) and recently inspected by NMFS, FWS, and DERM staff during an agency site visit with the USACE's contractor in March of 2002. Although no monitoring has been done by DERM since planting of the site, a visual inspection by the agency team revealed that seagrass occurs throughout the site and was dominated by *H. wrightii* and *T. testudinum*. Discussions with DERM staff indicate the old borrow area was filled with rubble and sand and planting units of both *H. wrightii* and *T. testudinum* installed. Based on this evidence of general success, all in attendance agreed that seagrass restoration was a viable option for mitigating seagrass loss.

Another example of successful seagrass restoration is the Miami-Dade sewage cross-bay force main installed by the Miami-Dade Water and Sewer Authority Department in the mid-1990s. The project required trenching of over one mile of Miami Harbor baybottom for pipeline installation, including excavation of 1.80 acres of seagrass beds. Once the pipeline was installed the 22-foot wide trench path was refilled and allowed to recruit with seagrasses. Recruitment had begun within one-year and after two years seagrasses and macroalgaes covered the trench pathway so that it was no longer visible on aerial photography.

June 17, 2003

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

Service Log No.: 4-1-03-I-786
Project: Miami Harbor General Reevaluation Report and Draft Environmental Impact Statement
Sponsor: Port of Miami
County: Miami-Dade

Dear Colonel May:

In accordance with the Fiscal Year 2001 Transfer Fund Agreement between the Fish and Wildlife Service (Service) and the U.S. Army Corps of Engineers, enclosed is the Final Fish and Wildlife Coordination Act (FWCA) Report regarding the Miami Harbor Expansion Project, Miami-Dade County, Florida. This final report, provided in accordance with the FWCA of 1958, as amended (48 Stat.401; 16 U.S.C. 661 *et seq*.) and under the provisions of section 7 of the Endangered Species Act of 1973, as amended (87 Stat. 884; 16 U.S.C. 1531 *et seq.*), has been prepared to provide an evaluation of environmental effects of the navigation improvements to Miami Harbor. This report constitutes the final report of the Secretary of the Interior as required by Section 2(b) of the FWCA.

Thank you for your cooperation and effort in protecting fish and wildlife resources. Should you have any questions regarding the findings and recommendations contained in this report, please contact Trish Adams at 772-562-3909, extension 232.

Sincerely yours,

James J. Slack
Field Supervisor
South Florida Ecological Services Office

Enclosure

cc:
FWC, Vero Beach, Florida
FWC, West Palm Beach, Florida (Ricardo Zambrano)
FWC, Bureau of Protected Species Management, Tallahassee, Florida (Carol Knox)
NMFS, Habitat Conservation Division, Miami, Florida (Jocelyn Karazsia)
NMFS, Protected Species Division, St. Petersburg, Florida (Eric Hark)
Sierra Club, Miami Group, Miami, Florida (Kent Robbins)

C:\Project Files\Miami GRR\EIS\Appendix K - FWS CAR\Miami Harbor Cvr Final CAR.wpd

Miami Harbor Expansion Project
Fish and Wildlife Coordination Act Report

FINAL

Prepared for
Fish and Wildlife Service
South Florida Ecological Services Office
1339 20th Street
Vero Beach, Florida 32960

by
Dial Cordy and Associates Incorporated
490 Osceola Avenue
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June 17, 2003

EXECUTIVE SUMMARY

The Seaport Department of Miami-Dade County requested that the U.S. Army Corps of Engineers (Corps), study the feasibility of modifying portions of Miami Harbor to improve the Federal navigation system of channels. This Fish and Wildlife Coordination Act (FWCA) Report evaluates the likely effects of the proposed harbor expansion project on fish and wildlife resources and is submitted in accordance with provisions of the FWCA of 1958, as amended (48 Stat. 401; 16 U.S.C. 661 *et seq.*) and the Endangered Species Act (ESA) of 1973, as amended (87 Stat. 884; 16 U.S.C. 1531 *et seq.*).

The Port of Miami (Port) located in Miami-Dade County, Florida is one of the major port complexes along the east coast of the United States. The Port utilizes Miami Harbor, which lies in the north side of Biscayne Bay, a shallow, expansive, subtropical estuary. The mainland and islands surrounding the Port of Miami are fully developed, except for Virginia Key. Terrestrial and marine habitats in the vicinity of the project area include the coastal strand, mangroves, seagrass beds, coral reefs and other hardbottom, sand/silt-bottom habitats, and rock/rubble-bottom habitats. Miami Harbor is located in the Biscayne Bay Aquatic Preserve and is adjacent to the Bill Sadowski Critical Wildlife Area (CWA), a "No Entry" zone for protection of the West Indian manatee and wading birds associated with Virginia Key. In addition, the project lies within the boundaries of designated Critical Habitat for the West Indian manatee (*Trichecus manatus*) and Johnson's seagrass (*Halophila johnsonii*).

The proposed navigational improvements to Miami Harbor will impact habitats utilized by fish and wildlife populations. Modifications to the Federal system of channels under the Recommended Plan include: (1) deepening the entrance channel through Government Cut and Fishermen's channel in Miami Harbor; (2) relocating channel makers within the main channel, which does not include dredging; (3) widening the east end of the entrance channel; (4) widening the intersection of the main and fishermen's channels at the northeast side of Fisher Island; (5) creating a turning basin just east of Lummus Island; (6) widening Fisherman's Channel by traditional dredging methods and/or the use of explosives inshore and offshore. Unconsolidated and consolidated material generated during dredging will be deposited within either approved offshore and upland disposal sites or used during the construction of mitigation areas associated with the proposed project.

The Corps estimates that 6.3 acres of seagrass, 28.7 acres of low-relief hardbottom, 20.7 acres of high-relief coral reef, 123.5 acres of rock/rubble, and 236.4 acres of unconsolidated/unvegetated benthic habitat will likely be adversely affected as a result of the expansion of Miami Harbor. However, many of these habitats occur in areas that were impacted during previous dredging activities within Miami Harbor. Therefore, the total impact to habitats not previously dredged include: 6.3 acres of seagrass, 0.6 acre of low-relief hardbottom, 2.7 acres of high-relief coral reef, 3 acres of rock/rubble, and 23.3 acres of unconsolidated/unvegetated benthic habitat.

As compensation for the impacts to habitat that was not dredged previously, the Corps has proposed the following: (1) mitigate for the removal of 6.3 acres of seagrass at a ratio of 1:1 through the restoration of a 18.6-acre historic dredged borrow site in northern Biscayne Bay

where the restored acres provided in excess of the 1:1 mitigation ratio would serve as a compensation "bank" for seagrass impacts associated with future Port projects; (2) mitigate for the removal of 2.7 acres of high-relief coral reef habitat at a ratio of 2:1 through the creation of 5.3 acres of high-complexity, high-relief artificial reef habitat; and (3) mitigate for the 0.6 acre of impact to low-relief hardbottom habitat at a ratio of 1.3:1 through the creation of 0.8 acre of low-complexity, low-relief artificial hardbottom habitat. The Corps has not proposed compensation for the removal of the biotic communities, such as soft corals, sponges, and hard corals, which have colonized within the existing channel walls since the last dredging event in 1991.

The Fish and Wildlife Service (Service) has provided several recommendations in this document to further minimize or avoid possible adverse effects of the harbor expansion project on fish and wildlife resources. Specifically, regarding the permanent removal of 6.3 acres of seagrass and to compensate for the temporal loss of 48.7 acres of hardbottom habitat within the existing channel, the following compensatory mitigation and monitoring is recommended: (1) restore 18.6 acres of seagrass habitat (2.9:1 ratio); (2) develop a Seagrass Monitoring Plan that contains success criteria that is consistent with Fonesca (1998); and (3) create a 15.94-acre mitigation reef to compensate for direct impacts to high- and low-relief hardbottom reef habitat and the temporal loss of function and value associated with the low-relief hardbottom habitat located within the previously dredged channels, particularly the channel walls. In addition, the Service recommends the development of a comprehensive (pre, during, post project) environmental monitoring programs to verify that project impacts occurred within the levels anticipated and to ensure that the mitigation areas are preforming to a level where habitat replacement values are maintained.

The Corps has determinated that the project "may affect, but is not likely to adversely affect" the federally endangered West Indian manatee, endangered American crocodile (*Crocodylus acutus*), endangered green sea turtle (*Chelonia mydas*), threatened loggerhead sea turtle (*Caretta caretta*), endangered Kemp's ridley turtle (*Lepidochelys kempii*), endangered Hawksbill sea turtle (*Eretmochelys imbricata*), endangered leatherback turtle (*Dermochelys coriacea*), threatened Johnson's seagrass, and a species proposed as a candidate for listing (endangered), the smalltooth sawfish (*Pristis pectinata*). In addition, the Corps has determinated that the following whale species may be affected during blasting activities: the endangered humpback whale (*Megaptera novaeangliae*), endangered fin whale (*Balaenoptera physalus*), endangered sei whale (*Balaenoptera borealis*), and endangered sperm whale (*Physeter macrocephalus*) which are known to occur along the Atlantic coast. The Corps has determined that the proposed action "may affect but is not likely to adversely affect" critical habitat that has been designated for the West Indian manatee and the American Crocodile. Since the Corps has agreed to incorporate the *Standard Manatee Protection Construction Conditions* and implement a comprehensive blasting plan to minimize possible adverse effects to listed marine species using the standard "Navy diver" protocol, the Service concurs with the Corps' determination for the two species, which fall under the jurisdiction of the Service, the West Indian manatee and the American crocodile. The Corps has initiated consultation with the National Marine Fisheries Service (NMFS) concerning the remaining listed species.
This report is submitted in accordance with the FWCA and constitutes the final report of the

Secretary of the Interior as required by Section 2(b) of the FWCA.

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1.0 IDENTIFICATION OF PURPOSE, SCOPE, AND AUTHORITY

The Seaport Department of Miami-Dade County requested the Corps to study the feasibility of modifying portions of Miami Harbor to improve the Federal navigation system of channels. This FWCA Report evaluates the possible adverse effects of the proposed harbor expansion project on fish and wildlife resources, including federally listed species and is submitted in accordance with provisions of the FWCA and the ESA.

2.0 PROJECT HISTORY AND SERVICE INVOLVEMENT

The Miami Harbor Project was first authorized by the River and Harbor Act of 1899. Since 1902, several authorized actions such as inlet creation, jetty construction, channel deepening and widening, and maintenance dredging have occurred most notably in 1902, 1912, 1925, 1930, 1935, 1937, 1960, and 1968 (Appendix A). During the 1970s and 1980s, extensive construction occurred as the Port of Miami expanded its facilities on Dodge and Lummus Islands.

Significant commercial shipping activity in the original mainland location of the Port of Miami on Biscayne Boulevard began when a channel was dredged from the mouth of the Miami River east through Biscayne Bay to the Atlantic Ocean in 1896. The dredging of Government Cut in 1903 (which segmented the barrier island and created Fisher Island) and Government Channel in 1916 increased the depth of the port channel. Further deepening took place in 1929 and 1935. By 1946, the old port on Biscayne Boulevard was outgrown, and by 1960, the construction of an entirely new port facility on Dodge Island, an artificial island, in Biscayne Bay began. By the mid-1960's port operations were shifted to Dodge Island. By the 1980's, port operations were further expanded today incorporating Lummus Island, a 225-acre artificial island, into the Dodge Island port operation (Corps 1989). In the late 1980's, plans for further Port expansion were initiated and in June 1989, the Corps Planning Division completed the Feasibility Study Report and Environmental Impact Statement (EIS) (10140) for Navigation Improvements within Miami Harbor. These improvements were authorized by Congress in the 1990 Water Resources Development Act (Public Law 101-640).

However, in the past 12 years, shipping and cruise ship technology has advanced to allow the construction of longer, wider vessels, and deeper-draft vessels, such as the Post-Panamax and Super Post-Panamax. As a result of this shift in the industry standard, the 1990 Miami Harbor expansion proposal was rendered obsolete. A Resolution provided by the Committee on Transportation and Infrastructure of the United States House of Representatives dated October 1997 provided the authorization for the current study to investigate further deepening and widening of channels and turning basins within Miami Harbor to accommodate the changes within the shipping industry. This project includes: the Federal Channel from Buoy #1 offshore, the Government Cut, areas within and adjacent to Miami Harbor from Government Cut to the cruise ship channel turning basin, and Fisherman's Channel to the southwest end of Dodge Island (Figure 1).

Service Involvement

In addition to the Service and the, other Federal agencies involved in the review of the current project included the U.S. Coast Guard, the Environmental Protection Agency (EPA), and the NMFS. State agencies include the Florida Department of Environmental Protection (DEP), State Historical Preservation Officer, and the Florida Department of Transportation. Local agencies include Miami-Dade County Environmental Resources Management (DERM), South Florida Regional Planning Council, and the City of Miami. Non-Government Organizations/Institutions Biscayne Bay Pilots Association and Biscayne Bay Partnership Initiative.

On January 6, 2000, the Corps invited the Service to participate in the plan formulation process regarding the proposed expansion at the Port of Miami and provided information describing the potential dredging activities.

On March 13, 2000, the Service participated in a multi-agency resource meeting to determine the areas of coverage for an environmental baseline resource survey hosted by the Corps.

On November 1, 2000, the Service participated in a follow-up meeting with the resource agencies to review preliminary survey results and discuss additional survey needs.

On January 15, 2001, the Service received the Environmental Baseline Study for the Miami Harbor General Reevaluation Report compiled by Dial Cordy and Associates (DC&A).

On February 19, 2001, the Service and Corps met to designate the scopes of work for the Port of Miami expansion and other Federal projects for the 2001/2002 fiscal year.

On December 2001, the Service participated in a field visit with DC&A, NMFS, and DERM to evaluate the seagrass habitat present within the area to be affected south of Fishermen's channel. In addition, staff snorkeled a previous seagrass restoration site initiated by DERM in the 1990's to consider the applicability of a similar effort as mitigation for possible seagrass impacts associated with the proposed Port expansion.

On February 19, 2002, the Service participated in a meeting with the Corps, DC&A, NMFS, and DEP to discuss various elements of the project components to identify opportunities to minimize and avoid impacts to fish and wildlife resources, including listed species. In addition, we received the initial preliminary FWCA report for discussion during this meeting.

On March 20, 2002, the Service participated in a multi-agency field investigation of the potential reef and seagrass impact areas associated with Project Components 1, 2, 3, and 5.

On May 24, 2002, the Service received a complete preliminary Draft FWCA report from the contractor for the Service's review and comment.

On June 20, 2002, the Service attended the Alternatives Formulation Briefing sponsored by the Corps' Jacksonville Office.

On July 24, 2002, the Service provided a complete Draft FWCA to the Corps.

On January 14, 2003, the Service provided a letter to the Corps, which included additional mitigation recommendations regarding the temporal loss of function to low-relief hardbottom habitat located within the existing channels.

On February 2, 2003, the Corps provided a response to the Service's Draft FWCA report and our additional mitigation recommendations described above.

On May 1, 2003, the Corps provided information concerning the 15.1-acre mitigation reef constructed in 1996 as compensation for hardbottom impacts associated with the 1991 Port dredging project.

On May 6, 2003, the Service attended and participated in the public meeting held by the Corps at the Port of Miami to discuss the Draft EIS and General Reevaluation Report for the proposed Miami Harbor expansion project.

3.0 AREA SETTING

3.1 Project Location

The City of Miami is located within Miami-Dade County on the mainland of Florida's southeast coast. The Port of Miami is one of the major port complexes along the east coast of the United States. Dodge/Lummus Island, which comprises the Port of Miami facility, is located within northern Biscayne Bay and lies between the City of Miami to the west and the barrier island of Miami's South Beach to the east. Three islands, Fisher Island, Virginia Key, and Key Biscayne, are located south of the Port and Government Cut. Specific features found to the north of the port's Main Channel include the MacArthur Causeway (Highway A1A), park/recreation and commercial facilities at Watson Island, the Terminal Island industrial area, and the U.S. Coast Guard Base at Causeway Island. Low-density residential uses areas are found beyond the MacArthur Causeway on Palm, Hibiscus and Star Islands. Also, the mouth of the Miami River is located to the west of the Port and can be accessed by two channels adjacent to the Port.

Biscayne Bay is a long, narrow, shallow subtropical estuary that extends from the City of North Miami south to the northern end of Key Largo at the juncture of Miami-Dade and Monroe counties. It is approximately 38 miles long, and ranges from 3 to 9 miles-wide with an average depth of 6 to10 feet (Corps 1989). In addition, Biscayne Bay in its entirety was designated as an Aquatic Preserve in 1980 under Chapter 18-18, F.A.C. and is considered to be State-Owned Submerged Land under the jurisdictional authority of DEP. All aquatic preserves in Florida are designated as Class III, Outstanding Florida Waters (OFW) under Section 62-302.700 of the

Florida Administrative Code. The Biscayne Bay Aquatic Preserve includes all of the waters of Biscayne Bay south to Biscayne National Park. Southern Biscayne Bay is comprised of Biscayne Bay National Park.

In addition to these designations, Biscayne Bay in its entirety, including the waters of Miami Harbor, is designated as critical habitat for the West Indian manatee. The areas designated as critical habitat for the crocodile are located south of the proposed project's boundaries.

Furthermore, 3 areas in the vicinity of the port have been designated by Miami-Dade DERM as special manatee protection areas. Miami-Dade County has identified areas to be designated as essential habitat, such as the seagrass beds located in Dumfoundling Bay and Biscayne Bay between the 79th Street and the Julia Tuttle causeways, between the Port of Miami and Rickenbacker Causeway, in the Chicken Key area and in the area of the Black Creek channel. Additional habitat areas listed for protection under the Miami-Dade County Manatee Protection Plan (1995) include sources of freshwater; warm water refuges (although none currently operate in the boundaries of Miami-Dade County; aggregation areas, which include Sky Lake, the Biscayne Canal near the Miami Shores Country Club golf course, Little River west of Biscayne Boulevard, northwest Virginia Key, upstream Miami River including Palmer Lake, upstream Coral Gables Waterway, and Black Point marina basin as well as manatee travel corridors. In addition, the State-approved Miami-Dade County Manatee Protection Plan places limitations on future construction in two areas near the Port (Curtis and Kimball 1999).

The Bill Sadowski CWA, located adjacent to the Port of Miami (just south of Fisherman's Channel), was established in 1990 by the Florida Fish Wildlife Conservation Commission (FWC). A no-entry zone for the protection of manatees has been created around the Bill Sadowski CWA. Encompassing approximately 700 acres, this area was designated to protect the shallow submerged seagrass and hardbottom habitats, intertidal mudflats and coastal mangrove wetlands in the bay area west of Virginia Key (Figure 4). When first established, the area was protected primarily as a refuge for shorebirds and wading birds, but the boundary was later expanded to include important manatee habitat including calving grounds. This expanded area surrounding the wetland and terrestrial habitats of the CWA has been designated as a "no-entry" zone in order to protect manatees. Buoys demark the no-entry zone, which is closed to boating year-round.

3.2 Description of Project Area

3.2.1 Physical Conditions

Tides, currents, and winds affect environmental conditions in the project area. Tides within the Miami area are semi-diurnal; there are two high and two low tides each day. The mean range at Miami Beach is 2.5 feet (3.0 feet in spring) and the lowest tide is 1.4 feet below mean low water. The Gulf Stream current off the east coast of Florida flows north and varies in velocity from 17 miles per day in November to 37 miles per-day in July. Maximum tidal current velocities through Government Cut are ordinarily about 5.5 feet-per second on an average tide, but

occasional velocities of approximately 6.2 feet per-second have been recorded during Spring tide (Corps 1989). From September through February, waves and prevailing winds are predominantly in the northeast and east. During March, April, and May, winds and waves are usually easterly. June through August, winds and waves are in the southeast.

The Biscayne Bay Harbor Pilots have provided comments to the Miami-Dade County Seaport Department describing the navigation challenges and safety concerns regarding the current channel configuration. These challenges would be exacerbated by the increase in ship size and with the addition of the new and larger Gantry cranes that are required to off-load the Super-Post Panamax container ships. The pilots have requested to widen the mouth of the entrance channel (buoy #1), widen the channel in the vicinity of Fisher Island (beacons 13 and 15), and widen Fishermen's channel. The Harbor Pilots have requested these changes based on the following factors: (1) the currents in the vicinity of the entrance channel are variable, unpredictable, and difficult to navigate due to the close proximity of the Gulf Stream current, as evidenced by the groundings of several Maersk container ships at the mouth of the entrance channel (Buoy #1); (2) the area between beacons 13 and 15 immediately south of Government Cut is the intersection ships turn from one channel another. Strong currents in this area, particularly during ebb and flood tides, combined with the required decrease in speed make it important to have as much swinging room as possible for the ship coming into harbor; (3) Currently vessels docked at Lummus Island block a portion of Fishermen's channel during cargo off-loading procedures; thereby, posing a hazard to passing ships. Also, depending on certain conditions (*e.g.*, wind, current, ship size and draft), passing ships may create an unsafe situation where the dock vessels may experience a surge effect as a result of water displacement. This surge has caused a number of mishaps where ships were ripped from their moorings and resulted in damage to the ship, equipment, and cargo. In addition, tankers off-loading fuel at Fisher Island may also experience these effects, posing another hazard. Therefore, to minimize these hazards, the pilots request the widening of Fishermen's channel south of Lummus Island.

3.2.2 Geology

Biscayne Bay is bordered on the west by the mainland of peninsular Florida and on the east by both the Atlantic Ocean and a series of barrier islands consisting of sand and carbonate deposits over limestone bedrock. The bottom of Biscayne Bay is characterized by a thin layer of sediment less than 6 inches in depth over most of its area. However, sediment thickness in the northern part of the Bay near the City of Miami Beach is an average of approximately 40 inches. Miami Harbor typically has 1 to 8 feet (12 to 96 inches) of sands, clays or silts overlying limestone bedrock (Corps 1996a). The limestone has cavities and solution holes, which may be exposed or sediment-filled. This bedrock comprises two geologic formations. One is the Miami Oolite, which is composed of a permeable oolitic limestone, and the other is the Fort Thompson Formation which is composed of sandy limestones, sandstones, and sand seams. In the Miami area, the Miami Oolist and the Fort Thompson Formation combine to form the Biscayne Bay Aquifer, which serves as the primary source of drinking water for the south Florida area.

3.2.3 Sediment and Water Quality

The predominant sediments are largely composed of unconsolidated carbonate/quartz sands over limestone. The Corps and the EPA have recently pronounced the harbor sediments clean and appropriate for ocean disposal based on results of testing conducted over a 6-year period from 1992 to 1998 (Kimball-Murley, personal communication). Additionally, the *Final EIS Miami Ocean Dredged Material Disposal Site Designation (1995)* indicates that sediments removed from the Miami Harbor that are not beach quality sand or fine grained material are suitable for ocean disposal.

Since Biscayne Bay is classified as an Aquatic Preserve and an OFW, by law ambient water quality cannot be degraded below its existing level. However, certain previously dredged areas may be excluded from the OFW designation for particular waterbodies. Sources of water quality degradation in the Miami Harbor area mainly include stormwater discharges and runoff from the Miami River, Intracoastal Waterway and nearby land sources. There are no major chronic water quality problems that persist in the bay primarily due to its configuration as an open system that readily flushes out pollutants. However, in February 2002, the Service provided a Draft FWCA report to the Corps expressing our concerns related to possible degradation of water quality and possible contamination of portions of Biscayne Bay as a result of the proposed maintenance dredging of the Miami River.

3.2.4 Land Use

Except for Virginia Key, the natural and artificial islands within and adjacent to the project area are completely developed. These islands include: Dodge-Lummus, Fisher, Star, Palm, and Claughton Islands, Watson Park, and the barrier island comprising Miami Beach. Land surrounding Port of Miami waters is characterized by a mixture of low, medium and high-density residential areas; commercial enterprises; industrial complexes; office parks; and recreational areas. Specific features found to the north of the Port's Main Channel include the MacArthur Causeway (A1A), park/recreation and commercial facilities at Watson Island, the Terminal Island industrial area, and the U.S. Coast Guard Base at Causeway Island. Low-density residential uses are found beyond the MacArthur Causeway on Palm, Hibiscus and Star Islands. Medium and high density residential, park/recreation, commercial, and institutional land uses are found to the east of the port on Fisher Island and the southern portion of the City of Miami Beach. Located approximately one-half mile south of the port, across the waters of Biscayne Bay, is Virginia Key. Land uses found on Virginia Key include park/recreation, environmentally protected areas, and institutional and public facilities including the Miami-Dade County Virginia Key Wastewater Treatment Plant. Miami's Central Business District is found to the west of the Port.

4.0 FISH AND WILDLIFE RESOURCES

4.1 Biotic Communities

Habitats within the project impact area include seagrass beds; coral reefs and other hardgrounds; sand-, silt-, and rubble-bottom habitats; and rock/rubble habitats. Other habitats in the vicinity of the project include coastal strand and mangroves.

4.1.1 Coastal strand

Common plants associated with southeast Florida beach dunes include sea-oat (*Uniola paniculata*), sea-grape (*Coccolobis uvifera*), cabbage palm (*Sabal palmetto*), and palmetto (*Serenoa* spp.) (Kurz 1942). Dune species noted on Virginia Key included seashore paspalum (*Paspalum vaginatum*), dune sunflower (*Helianthus debilis*), and beach elder (*Iva imbricata*) (Grossenbacher, personal communication).

Miami-Dade County, the DEP, the City of Miami, and the Biscayne Bay Environmental Enhancement Fund are currently conducting dune and wetland restoration activities on Virginia Key (NOAA 2000). The vast majority of the terrestrial habitats adjacent to the project area are developed. Groins and bulkheads typically reinforce shorelines adjacent to the harbor's channels. Shoreline areas lacking these structures can be found on Miami Beach's Atlantic waterfront, portions of Fisher Island, and Virginia Key. In these areas, terrestrial habitats give way to dunes and beaches or transitional habitats such as wetlands, including those dominated by mangroves.

At least two species of dune vegetation protected by State and/or Federal law are known to occur on Virginia Key. Beach jacquemontia (*Jacquemontia reclinata*), listed as endangered by both U.S. Department of Agriculture and the State of Florida, and the beach peanut (*Okenia hypogaea*), a species endangered in the State of Florida, have been observed on the island, as has beach star (*Remirea maritime*), sea lavender (*Mallotonia gnaphalodes*), spider Lilly (*Hymenocallis latifolia*), and bay cedar (*Suriana maritime*) (Grossenbacher, personal communication).

The piping plover (*Charadrius melodus*), a migratory shorebird, is protected as a threatened species by the State of Florida and the Federal government, and is also protected under the Migratory Bird Treaty Act. According to the American Ornithologists' Union (1998), the species breeds in the northern Great Plains, the Great Lakes region, and Atlantic Coastal States/Provinces from New Brunswick to South Carolina. Individuals of the species winter along the Atlantic and Gulf Coasts from Texas to North Carolina, arriving on Florida's coasts in September and departing for the north in March. Foraging areas include intertidal beaches, mudflats, sandflats, lagoons, and salt marshes, where they feed on invertebrates such as marine worms, insect larvae, crustaceans, and mollusks.

The least tern (*Sterna antillarum*) is a small member of the gull family (Laridae) listed by

Florida as a threatened species (FWC 1997) and protected federally under the Migratory Bird Treaty Act. The eastern least tern population breeds primarily from coastal Maine through Florida (American Ornithologists' Union 1998). Florida populations arrive each year in mid- to late March to breed, and nests through mid-September, and typically choose open sandy substrates to form breeding colonies. Although typically nesting on open, sandy beach areas, an increasing number of colonies are located on open, flat, artificial surfaces (*e.g.*, warehouse roof tops). Least terns forage along coastal areas feeding on small fishes, as well as some crustaceans and insects. Individuals of this species have been noted on Virginia Key.

Species designated as "Species of Special Concern" by the State of Florida that have been found adjacent to the project area (specifically, on Virginia Key) include black skimmer (*Rynchops niger*), brown pelican (*Pelecanus occidentalis*), reddish egret (*Egretta rufescens*), roseate spoonbill (*Ajaia ajaja*), snowy egret (*Egretta thula*), tricolored heron (*Egretta tricolor*), and white ibis (*Eudocimus albus*) (Zambrano, personal communication). The presence of these species caused the State to create the Bill Sadowski Critical Wildlife Area at Virginia Key.

4.1.2 Mangroves

The mangrove strands on Virginia Key are of moderately high-quality (Curtis and Kimball Company 1999). These strands and those on Key Biscayne are important resources in Central Biscayne Bay due to the long-term decline of such communities in the general area (Harlem 1979) and their proximity to seagrass and hardbottom resources. The primary constituents of coastal wetlands on Virginia Key are black, red, and white mangroves (*Avicennia germinans*, *Laguncularia racemosa*, and *Rhizophora mangle*, respectively) with bottonwood (*Conocarpus erectus*), cordgrasses (*Spartina* spp.), sea daisies (*Borrichia* spp.), salt-grass (*Distichlis spicata*), and black rush (*Juncus romoerianus*) are other common occupants of saline coastal wetlands (BBPI, 2001).

Florida mangrove communities are known to support up to 220 species of fishes, 24 species of amphibians and reptiles, 18 species of mammals, and 181 species of birds (Odum *et al*, 1982). Mangrove habitats provide many important ecological functions, including providing refugia for juvenile stages of managed fish species, and have been identified as significant resources for seven species, and four subspecies, of federally protected species (Odum and McIvor 1990). Managed fish species associated with mangroves during at least one life-cycle phase include pink shrimp (*Penaeus duorarum*), spiny lobster (*Panulirus argus*), goliath grouper (*Epinephelus itajara*), gray snapper (*Lutjanus griseus*), black drum (*Pogonias cromis*), red drum (*Sciaenops ocellatus*), and snook (*Centropomus undecimalis*) (SAFMC 1998b).

In addition, mangrove communities provide valuable habitat for State listed species such as the mangrove rivulus (*Rivulus marmoratus*) and federally listed species such as sea turtles (*Lepidochelys kempi* and *Eretmochelys imbricata*), eastern indigo snake (*Drymarchon corais couperi*), wood stork (*Mycetaria americana*), and the American crocodile (*Crocodylus acutus*).

4.1.3 Seagrass

Seagrasses are a vital component of the coastal ecosystem by serving as a primary producer, providing forage habitat and shelter for multiple organisms, improving water quality and clarity, and providing substrate stabilization. Seagrasses are a highly productive, faunally rich, and ecologically important habitat within the coastal lagoons, bays, and estuaries of south Florida. Rapidly growing seagrass shoots provide food for trophically higher organisms via direct herbivory or from the detrital food web. The canopy structure formed by these shoots offers shelter and protection. This combination of shelter and food availability results in seagrass beds being the richest nursery grounds in South Florida's shallow coastal waters. As such, many important commercial and recreational fisheries (*e.g.*, clams, shrimp, lobster, fish) are associated with seagrass beds. Many of these recreationally and commercially important species rely on seagrasses for at least part, if not all, of their life history. Seagrass contributes to improving water quality and clarity by absorbing excess nutrients and trapping suspended solids. In addition, the roots and rhizomes of the seagrass help stabilize the substrate while the shoots of dense beds absorb wave energy, thereby buffering their effects on the shoreline.

Seagrasses have experienced declines in abundance and distribution due to water quality degradation and through the direct loss of habitat related to dredge and fill activities and boating impacts. The degradation of water quality is largely the result of point source pollution, such as wastewater discharge, agricultural runoff, and excessive freshwater discharge; non-point source pollution, such as, stormwater runoff and leaching from septic tanks); and the alteration of adjacent watersheds. The subsequent decline in seagrasses has significantly reduced the fisheries resources in south Florida. Implementation of several protective and restorative measures has improved water quality and radically reduced the rate of habitat loss within south Florida′s estuaries. Such measures include the regulation of dredge and fill activities, the elimination of wastewater discharge to surface waters, the treatment of stormwater runoff, and the rehabilitation of adjacent watersheds.

Fauna utilizing seagrass beds range from invertebrates to top-level predators in multiple guilds. A few common species are bittium (*Bittium* sp.), sea urchins (*Lytechinus variegatus*), pen shell (*Atrina rigida*), pink shrimp (*Penaeus duorarum*), spiny lobster (*Panulirus argus*), pinfish (*Lagodon rhomboides*), spotted sea trout (*Cynoscion nebulosus*), red drum (*Sciaenops ocellata*), great blue heron (*Ardea herodias*), roseate spoonbill (*Ajaia ajaja*), osprey (*Pandion haliaetus*), West Indian manatee, and green sea turtle (USDOI 1982).

Of the seven species of seagrass occurring in Florida, at least five species are found in waters of Miami-Dade County. Species common to the Biscayne Bay include shoal grass (*Halodule wrightii*), manatee grass (*Syringodium filiforme*), turtle grass (*Thalassia testudinum*), star grass (*Halophila englemannii*), paddle grass (*Halophila decipens*), and Johnson's seagrass. A recent survey of known seagrass habitats adjacent to the project area (DC&A 2001) included the area 400 feet south of Fisherman's Channel, including the area within the Bill Sadowski CWA, the

area adjacent to the Coast Guard Station, the Entrance Channel, and the area 500 feet north and south of the offshore channel. Seagrasses were observed in 25 of the 35 survey transects. Significant seagrass resources were found bordering Fisherman's Channel, south and southwest of Dodge Island, and north of the Fisher Island Turning Basin (Figure 2). Observed seagrass species included shoal grass (*Halodule wrightii),* paddle grass *(Halophila decipiens),* manatee grass (*Syringodium filiforme),* and turtle grass *(Thalassia testudinum).* Seagrass communities consisted of mixed beds of *H. decipiens* and *H. wrightii*, mixed beds of *H. wrightii*, and *T. testudinum*, mixed beds of *T. testudinum* and *S. filiforme*, mixed beds of all four species; and monospecific beds of *T. testudinum*, and *H. decipiens*. No Johnson's seagrass (*H. johnsonii),* the only federally protected seagrass species, was observed in the 35 survey transects (DC&A 2001). Quadrats, placed at 10-meter intervals within each transect, were used to assess frequency of occurrence and coverage for each species. The overall, average frequencies of occurrence for *S. filiforme, H. wrightii, T. testudinum,* and *H. decipiens* were 36, 29, 19, and 15 percent respectively. If at all present in sampled transects, average percent-area coverage for each species was between 5 and 25 percent. Percent-area coverage was greatest for *S. filiforme* (approximately 21 percent), followed by *H. wrightii* (approximately 19 percent), *T. testudinum* (approximately 15 percent), and *H. decipiens* (approximately 9 percent). Among all available habitat sampled using quadrats, percent-coverage was less than 5 percent for each species.

Seagrass communities provide important habitat for many different species of flora and fauna. *Caulerpa prolifera* was recently observed in video transects of *H. wrightii* (DC&A 2001), and algae of the genera *Halimeda, Udotea*, and *Penicillus* have also been identified as associates of seagrasses in southeastern Florida (Zieman 1982). Many invertebrate species also utilize seagrass communities. The most obvious inhabitants include queen conch (*Strombus gigas*); urchins, including the long spine urchin (*Diadema antillarum*); nudibranchs; bivalve mollusks; crustaceans, including spiny lobster (*Panulirus argus*); and blue crab (*Callinectes sapidus*). In some shallow areas, various soft corals and sponges were observed scattered within and adjacent to patches of seagrasses (DC&A 2001). Many fish species have also been shown to have life cycles dependent on seagrass beds. Of particular importance are mullet (*Mugil cephalus*), snook (*Centropomis undecimalis*), and many prey species, such as pinfish (*Lagodon rhomboides*) and mojarras (family Gerreidae). Seagrass beds are also important nurseries for many of the fish associated with snapper-grouper complex (SAFMC 1998b).

4.1.4 Unvegetated Softbottom and Rock/Rubble Habitats

Softbottom areas are defined as areas where hard substrates are covered by more than 5 inches of sediment (Corps 1989). Furthermore, for the purposes of classification, "unvegetated softbottom habitats" may include those with small-diameter rubble left over from previous dredging events and/or those supporting isolated macroalgae beds. Even without vegetation, this subtidal may provide a corridor for reef species to travel between reef lines and these areas may also be important foraging areas for some fish species (Jones *et al.* 1991). Many unvegetated softbottom habitats are located between seagrass beds, between scattered reef patches and between rock/rubble habitats both within and adjacent to the channel (Figure 3). In addition, unconsolidated sediments can be found along the south margin of Fisherman's Channel and in

the area south of Dodge Island (based on data from Corps 2001).

The biota that comprises the subtidal zone include benthic invertebrate assemblages, epifaunal invertebrates, and macrophyte assemblages that form reef communities where hard substrate is present for colonization, and the fish and motile crustacean species that utilize this habitat. The organisms associated with the nearshore surf zone and deeper subtidal sand bottom habitats are generally dominated by polychaetes, amphipods, isopods, decapods, mollusks, echinoderms, and a variety of other taxa. The most ubiquitous infauna of inshore softbottom communities of the project area likely include: polychaete and sipunculan worms, oligochaetes, platyhelminthes, nemerteans, mollusks, and peracarid crustaceans. Compared to shallow sand flats, seagrass communities, and areas adjacent to reef tracts, the deeper, dredged areas of the channel and harbor likely support a less-diverse infaunal species assemblage. Other frequent occupants of these habitats include benthic fishes (*e.g.*, flounders), bivalves, decapod crustaceans, and certain shrimp species.

Softbottom substrates in Biscayne Bay, channel zones, and offshore areas that are generally unvegetated support isolated algae, coral, or sponge colonies, but are on average much less diverse in terms of habitat and species assemblages than are hardgrounds, reefs, or seagrass beds. During the summer months, the most abundant algal species in the project area belong to the green algae genera *Caulerpa*, *Halimeda*, and *Codium* (Corps 1996b). In winter months, brown algae (*Dictyota* spp. and *Sargassum* spp.) dominate (Corps 1996b). In addition, several species of sponges (*e.g.*, *I. campana*, *C. vaginalis*, and *Iotrochota sp.*) and gorgonians (*e.g.*, *Eunicia* spp. and *Gorgonia* sp.) were observed during transects through softbottom habitats (DC&A 2001). Individual colonies of algae, soft corals, and sponges that occasionally occur in these areas where little structure is available may serve to provide temporary refugia for small, motile species. Invertebrate fauna utilizing softbottom areas include the Florida fighting conch (*Strombus alatus*), milk conch (*Strombus costatus*), king helmet (*Cassia tuberosa*), and the queen helmet (*Cassia madagascariensis*) (Corps 1996b).

Rock/rubble habitats scattered over expanses of softbottom habitats is the most common community type in the channel west of Cut 2 of the entrance channel. Rock/rubble substrates within the project area may comprise either naturally occurring rock outcrops or rubble material that has been left from prior dredging events. These substrates provide structure for use by fishes and motile invertebrates, and may also provide surfaces for attachment of reef-building corals and sessile organisms, such as sponges. In deeper zones (the channel bed), where rock/rubble habitats are subjected to lower light levels, biodiversity is typically much lower than in shallow waters or in moderate depths.

Rock/rubble habitats can be further classified according to dominant sessile biota. One such biotic community is dominated by sponges and macroalgae, the other by sponges and occasional octocorals. The algae/sponge communities consist of the sponges *Ircinia* sp., *Niphates* sp., *Cliona* sp., and *Iotrochota* sp., and dominant algae are *Caulerpa* sp., *Jania* sp., *Laurencia* sp., *Dictyota* sp. and *Halimeda* sp. (Corps 1989; Dodge 1991; Vare 1991). Interspersed among the sponges are colonial anemones (*Zoanthus* sp.) and hydrocorals (*Millepora alcicornis*). The

sponge/coral community may develop given adequate water depth and clarity, and if there is a nearby source population. This was apparent in the channel zone, including the channel walls, adjacent to the existing reef tracts, and may be considered "rock/rubble with livebottom" (DC&A 2001). Observed sponge species included *Ircinia campana*, *Callyspongia vaginalis*, and *Iotrochota* sp. (possibly *I. birotulata*) (DC&A 2001). Observed soft corals were similar to those of adjacent reefs, and included the genera *Eunicea Plexaura* and *Pseudopterogorgia* (DC&A 2001). Habitats provided by rock and rubble and associated sponges, algae, and soft corals provide significant refugia many species of invertebrates and juvenile fish species.

4.1.5 High- and Low-Relief Hardbottom Reef

Nearshore and offshore low-relief hardbottom are characterized by limestone, rock, or worn coral substrates that contain crevasses, holes, and low-lying ledges that create microhabitat diversity, and thereby can support higher species diversity than unvegetated, softbottom habitats. Low-relief hardbottom habitats are important for organisms such as crustaceans, notably, crabs, spiny lobster, and penaeid shrimp and numerous fishes, including species of the Snapper-Grouper complex. Several species utilize hardbottom as refugia during juvenile life-history stages, whereas adults of various predatory species use these areas as foraging grounds.

Hardbottom fauna may be divided into sessile and motile components. The sessile component contains the primary producers, such as macroalgae; some grazers or first order consumers, planktivores, and filter feeders. Hard corals occupy niches as both producer and consumer. Zooxanthellic algae within coral polyps photosynthesize while the polyps themselves capture planktonic organisms for consumption. Similar to hard corals, tunicates and sponges concentrate carbon that is typically fixed far offsite. These attached filter-feeding organisms contribute to the organic base by trapping nutrient-rich plankton as it is swept past by wave and wind generated currents. Tunicates, sponges, and hydroids add structure to the bottom, providing shelter from predation for many crustaceans and smaller fishes.

Hardbottom and coral reef habitats associated with the project area include a nearshore hardbottom area and three additional parallel reef tracts that run generally north/south (Figure 3). The hardbottom zone nearest to shore exists in a physically stressed environment, and involves the Miami Oolite Formation (Hoffmeister *et al.* 1967). Offshore from this nearshore hardbottom area, there are three parallel reef tracts (Duane and Meisburger 1969). The first reef occurs approximately 100 to 2000 feet from shore, the second reef is located 3,000 to 6,000 feet offshore, and the third reef is approximately 8,000 feet or more offshore. There is an extensive sand area located between the second and third reef lines. The area between the first and second reef lines is characterized by small isolated hermatypic coral heads and interspersed coral rubble, with areas of open sand (DC&A 2001).

Reef habitats within the channel are generally restricted to areas where reef tracts were bisected by dredging (Figure 3). It seems corals and sponges colonized rock/rubble deposited during dredging activities in those areas over the last 10 years. The highest profile reefs within the

channel are associated with the two outermost reef tracts, but the re-colonized area within Cut 2 also possesses significant biodiversity. These areas grade into either lower-profile habitats that sustain gorgonians, or rock/rubble habitats supporting sponges and algae.

Live hardbottom and coral reef communities in the offshore areas of the study area are predictably speciose and have been characterized several times (Seaman 1985; Blair and Flynn 1989; and Corps 1989). The dominant feature of the reefs and hardgrounds (low- and high-relief habitats) off Miami-Dade County is the high density and diversity of gorgonian corals (Corps 1996a). Gorgonians observed during the 2000 survey were primarily of the genera *Eunicea* (*e.g., E. palmeri), Plexaura* (*e.g., P. homomalla),* and *Pseudopterogorgia*. Other observed genera included *Gorgonia, Plexaurella* (possibly *P. dichotoma),* and *Pterogorgia* (possibly *P. citrina* and *P. anceps),* and possibly *Pseudoplexaura* (DC&A 2001). Hard coral species also make up a significant part of the reef assemblages in this area. They include *Porites asteroides, Diploria clivosa, Siderastrea siderea,* and *Montastrea cavernosa* (Blair and Flynn 1989). All four of these dominant species, and a fifth, *Montastrea annularis*, were observed during the 2000 survey (DC&A 2001). Sponges observed within the project area's hardgrounds and reefs during that survey included *Ircinia campana, Callyspongia vaginalis, Cliona* sp., *Iotrochota* sp. (possibly *I. birotulata*), Geodia spp. (possibly *G. gibberosa* and *G. neptuni*) and possibly *Amphimedon compresa* (DC&A 2001). The biota of the three outer reef tracts is consistent with the overall assemblage of stony corals, sponges, and gorgonians found offshore of Miami-Dade, Broward, and Palm Beach counties (Corps 2000). Colonizing taxa such as sponges and certain gorgonians were more prevalent in the channel's hardbottom areas then were hard corals. Observed algal species in both channel and offshore areas included *Caulerpa* spp., *Laurencia* spp., *Cladophora* spp., and *Halimeda* spp. (DC&A 2001). Flynn, *et al.* (1991) noted the additional presence of *Dictyota* spp. and *Jania* spp. in the area.

A recent survey in offshore reef habitats resulted in the observation of 28 species of fish on the offshore reef sites (DC&A 2001). A summary of the species observed is shown in Table 1. The most abundant species encountered were cocoa damselfish (*Pomacentrus variabilis*), bicolor damselfish (*Pomacentrus partitus),* barjack (*Caranx ruber*), and bluehead wrasse (*Thalasomma bifasciatum*). Many other fishes were commonly or occasionally encountered within the study area. These included members of the families Chaetodontidae (butterflyfishes), Acanthuridae (surgeonfishes), Scaridae (parrotfishes), Labridae (wrasses), Haemulidae (grunts), Lutjanidae (snappers), and Pomacanthidae (angelfishes). Other species encountered in lesser numbers included hogfish (*Lachnolaimus maximus*), rock hind (*Epinephelus adsecnsionis*), and Spanish hogfish (*Bodianus rufus*). These results are similar to fish species observed by Bohnsack *et al.* (1992 and 1999).

4.1.6 Essential Fish Habitat

The community types listed above are considered Essential Fish Habitat (EFH) as described in the Magnuson-Stevens Fishery Conservation and Management Act, as amended by the

Sustainable Fisheries Act of 1996 (Public Law 104-267). EFH provisions support the management goals of sustainable fisheries. EFH that may be directly and indirectly impacted by the proposed project are likely to include the water column, littoral zone, sublittoral zone, hardbottom, and seagrass habitats. Specific aspects of EFH that may be adversely affected include spawning, foraging, predator/prey relationship, and refuge habitats for such managed species such as the snapper/grouper complex, penaeid shrimp, and spiny lobster. The NMFS is the lead agency responsible for the complete assessment of the possible adverse impacts of the proposed project to EFH.

The SAFMC (1998b) has designated mangrove, seagrass, nearshore hardbottom, and offshore reef areas within the study area as Essential Fish Habitat. The nearshore bottom and offshore reef habitats of southeastern Florida have also been designated as Essential Fish Habitat- Habitat Areas of Particular Concern (EFH-HAPC) (SAFMC 1998b). Managed species that commonly inhabit the study area include pink shrimp (*Farfantepenaeus duorarum*), and spiny lobster (*Panularis argus*). These shellfish utilizes both the inshore and offshore habitats within the study area, including macroalgae beds (*e.g.*, *Laurencia* spp.). Members of the 73-species snapper-grouper complex that commonly use the inshore habitats for part of their life cycle include blue stripe grunts (*Haemulon sciurus*), French grunts (*Haemulon flavolineatum*), mahogany snapper (*Lutjanus mahogoni*), yellowtail snapper (*Ocyurus chysurus*), and red grouper (*Epinephelus morio*). These species utilize the inshore habitats as juveniles and sub-adults and as adults utilize the hardbottom and reef communities offshore. In the offshore habitats, the number of species within the snapper-grouper complex that may be encountered increases. Other species of the snapper-grouper complex commonly seen offshore in the study area include gray triggerfish (*Balistes capriscus*), and hogfish (*Lachnolaimus maximus*). Coastal migratory pelagic species also commonly utilize the offshore area adjacent to the study area. In particular, king mackerel (*Scomberomorus cavalla*) and Spanish mackerel (*Scomberomorus maculatus*) are the most common. As many as 60 corals can occur off the coast of Florida (SAFMC 1998b) and all of these fall under the protection of the management plan.

Snook (*Centropomus undecimalis*), an important gamefish in the State of Florida, is currently listed as a species of special concern by the State of Florida (FWC 1997). The species is associated with several habitats found within the project area. Another species listed by the State as a Species of Special Concern is the mangrove rivulus (*Rivulus marmoratus*). These small fish likely occupy mangrove habitats associated with Virginia Key.

As described in the Magnuson-Stevens Fishery Conservation and Management Act of 1976, as amended by the Sustainable Fisheries Act of 1996 (Public Law 104-267), the EFH provisions of the act support the objective of maintaining sustainable fisheries. Mitigation would be required for first-time impacts to seagrass beds and reef/hardbottom habitats. In addition, mitigation will not be required for dredging softbottom habitats lacking seagrasses or for habitats with rubble substrates within the channel since dredging was previously performed in the channel.

The focus of the mitigation policy is to conserve and enhance EFH and to avoid, minimize, and thereafter compensate for impacts to EFH due to development activities. Like other Federal

agencies with regulatory responsibilities, the first priority of the NMFS is to advocate avoidance of impacts to natural resources when presented with any development plan. However, when unavoidable impacts to EFH are proposed, NMFS may recommend mitigation measures to compensate for any loss of resource value. Recommendations may include restoration of riparian and shallow coastal areas (*i.e.*, reestablishment of vegetation, restoration of hardbottom characteristics, removal of unsuitable material, and replacement of suitable substrate), upland habitat restoration**,** water quality improvement or protection, watershed planning, and habitat creation. The preferred type of mitigation is enhancement of existing habitat, followed by restoration, and finally creation of new habitat.

4.2. Threatened and Endangered Species

4.2.1 West Indian manatee

The West Indian manatee is known from coastal areas of Beaufort, North Carolina through Florida and the Gulf of Mexico. Manatees frequently inhabit shallow areas where seagrasses are present and are commonly found in protected lagoons and freshwater systems. In winter, they frequently move into areas where water temperatures are mitigated by spring-fed streams or power generation plan effluent. In general, very few manatees are present in the offshore waters from November through April. However, during the remainder of the year, manatees occasionally use open ocean passages to travel between favored habitats (Hartman, 1979).

The manatee has been listed as a protected mammal in Florida since 1893, and is also protected under the Marine Mammal Protection Act (MMPA) of 1972 and the ESA of 1973. Florida provided further protection in 1978 by passing the Florida Marine Sanctuary Act designating the state as a manatee sanctuary, and providing signage and speed zones in Florida's waterways. All of Biscayne Bay has been designated as Critical Habitat under the ESA. Adjacent to the project area, a *No Entry* zone within the Bill Sadowski CWA has been established for manatee conservation purposes.

Within Miami-Dade County there exist both permanent and transient populations of manatees. Surveys show that during the winter months when temperatures drop, manatees from north Florida and also Miami-Dade County will migrate to the Florida Power and Light's power plants at Port Everglades and Fort Lauderdale (USGS 2000). During the summer months when the water warms, manatees return to the counties to the north and south to forage and reproduce. Telemetry and aerial surveys confirm manatees are present within Miami-Dade County all year (Miami-Dade County 1995, and USGS 2000) (Figure 4).

Historical records regarding manatees in South Florida are sparse. Manatees are mentioned in documents that are dated as early as the mid 1800's and early 1900's (O'Shea 1988). Moore (1951) indicated that manatees commonly used the New River and the Miami River. He also noted a 1943 anecdotal observation of more than 100 manatees killed during the deepening of the Miami River Channel and a reference to 195 manatees aggregating at the Miami power plant discharge in 1956 (Mezich 2001). In general, the rivers, creeks and canals that open into

Northern Biscayne Bay were locations noted for their manatee abundance. These remain important habitats, particularly on a seasonal basis (Figures 2 and 3). In freshwater environments in Miami-Dade County (upper reaches of canals), manatees are feeding primarily on the exotic Hydrilla *Hydrilla verticillata*. During cooler weather, manatees feed on extensive meadows of seagrasses in many parts of Biscayne Bay.

The causes for manatee deaths in Miami-Dade County are varied (Table 3; Figure 4). The highest number of manatee deaths in Miami-Dade County result from water control structures. Floodgates often have qualities that are attractive to manatees. Freshwater is often available at floodgates, and is typically slightly warmer than the ambient water. An example of this situation is the floodgate on the Little River in Miami-Dade County. This site is known to attract manatees in winter during mild weather. This location has a 1-degree Celsius higher water temperature than surrounding areas and freshwater is available (Deutsch 2000). Also, freshwater vegetation is often washed down from upriver and made available when the gates are opened. Figure 5 demonstrates the location of water control structures near the project area. The second most frequent cause of manatee deaths in Miami-Dade County is boat-related injuries.

No deaths related to cold stress have been reported as shown on the table below. Miami Harbor is well within the historic range for the Florida manatee described by Moore (1951b), and therefore, water temperatures likely seldom reach stressing levels for extended periods of time. Also, power plants located to the north in Broward County have likely ameliorated cold-related stress.

Manatee deaths in Miami-Dade County from 1974 through 2001 (source: FMRI)

Year	Watercraft	Gate/Lock	Human/ Other	Perinatal	Cold stress	Natural	Undetermined	Total
1974	2	0	0	0	0	0	0	2
1975	1	1	0	1	0	0	1	4
1976	2	4	0	0	0	1	8	15
1977	1	5	2	2	0	0	2	12
1978	2	8	0	0	0	0	2	12
1979	1	5	2	0	0	0	1	9
1980	0	2	0	0	0	0	0	2
1981	1	0	2	0	0	0	2	5
1982	0	2	0	0	0	0	2	4
1983	0	1	4	1	0	0	1	7
1984	1	0	0	0	0	0	0	1
1985	1	1	0	2	0	0	0	4
1986	1	0	1	0	0	0	0	2
1987	4	2	0	1	0	0	1	8
1988	1	6	0	0	0	1	1	9
1989	3	0	0	0	0	0	0	3
1990	1	1	0	0	0	0	2	4
1991	0	1	0	2	0	2	2	7
1992	4	1	1	1	0	1	2	10
1993	0	2	2	0	0	0	1	5
1994	1	4	3	1	0	1	1	11
1995	2	3	2	0	0	3	4	14
1996	0	3	0	1	0	0	3	7
1997	5	5	1	2	0	0	1	14
1998	2	3	1	0	0	0	3	9
1999	1	5	3	0	0	2	1	12
2000	2	2	2	0	0	0	2	8
2001	5	0	2	2	0	0	2	11
Totals	26	30	17	9	0	9	24	115

4.2.2 Sea Turtles

Miami-Dade County is within the normal nesting range of three species of sea turtles, all of which are listed under the ESA: the loggerhead, green turtle, and leatherback. The green and leatherback turtles are listed as endangered, whereas the loggerhead turtle is listed as a threatened species. On the 37.8 miles of beach surveyed within the Miami-Dade County, a total of
505 nests were found in 2001 (FMRI 2002a,b, & c). On Fisher Island, a total of 24 sea turtle nests were observed during 2000 (Miami-Dade County 2000). A summary of sea turtle nesting activity for Miami-Dade County is found in Table 2. The majority of sea turtle nesting activity

occurred during the summer months of June, July and August, with nesting activity occurring as early as March and as late as September (Miami-Dade County 2000). The waters offshore of Miami-Dade County are also used for foraging and shelter for the three species listed above as well as the hawksbill turtle and possibly the Kemp's ridley turtle.

4.2.3 American Crocodile

The American crocodile is a State and federally listed endangered species. The current range of the species in the southeastern United States includes coastal and estuarine habitats in the extreme southern Florida peninsula. Females nest primarily on northern Key Largo and from Florida Bay to Turkey Point. Nesting begins in March and extends until late April or early May. Approximately 90 days following fertilization, eggs are buried in sand or marl nests adjacent to deep water. Adult crocodiles feed at night on schooling fish in creeks, open water, and deep channels (FP&L 1987), and are also known to eat crabs, raccoons, and water birds.

Crocodiles have been observed throughout the Key Biscayne-Fisher Island-Biscayne Bay Area (Mazzotti 2000), and at least two to three individuals have been observed in the vicinity of Virginia Key (Zambrano personal communication). Recent observations within the vicinity of the project area have occurred at several localities on Key Biscayne (Crandon Park and Bill Baggs State Recreation Area), as well as scattered records of individual animals in Hollywood (Mazzotti personal communication) and Palm Beach, Florida, and as far north as Jupiter, Florida (Service 1999).

Critical habitat for the American crocodile includes all land and water within an area encompassed by a line beginning at the easternmost tip of Turkey Point, Miami-Dade County, on the coast of Biscayne Bay; southeast along a straight line to Christmas Point at the southernmost tip of Elliott Key; southwest along a line following the shores of the Atlantic Ocean side of Old Rhodes Key, Palo Alto Key, Angelfish Key, Key Largo, Plantation Key, Lower Matecumbe Key, and Long Key, to the westernmost tip of Long Key; northwest along a straight line to the westernmost tip of Middle Cape; north along the shore of the Gulf of Mexico to the north side of the mouth of Little Sable Creek; east along a straight line to the northernmost point of Nine-Mile Pond; northeast along a straight line to the point of beginning (50 CFR 17.95). The Port of Miami is not located within crocodile critical habitat.

4.2.4 Johnson's Seagrass

Johnson's seagrass was listed as a threatened species by NMFS on September 14, 1998, (63 FR 49035) and a re-proposal to designate critical habitat pursuant to section 4 of the ESA was published on December 2, 1998, (64 FR 64231). The final rule for critical habitat designation for the species was published April 5, 2000, (65 FR 17786). All areas adjacent to Miami Harbor channels fall within designated critical habitat.

Johnson's seagrass has one of the most limited geographic ranges of all seagrasses, and little is known about its natural history, biology, and ecology. Observations lending evidence for

asexual reproduction and a limited capacity to store energy indicate that the plant may be especially vulnerable to human activity and natural impacts (NMFS 1998). It is known to occur only in lagoons between Sebastian Inlet and central Biscayne Bay on the east coast of Florida (NMFS 1998). Johnson's seagrass was not encountered within the study area during a widespread survey in 2001) (DC&A 2001). However, during the March 19, 2002, site visit, NMFS staff collected an unidentified blade that was thought to be Johnson's seagrass. The sample was collected just outside an area where proposed dredging may occur (at 25° 46' 04.3817" N latitude/ 80° 08' 25.7528" W longitude).

4.2.5 Smalltooth Sawfish

During 2002, the smalltooth sawfish (*Pristis pectinata*)was federally listed as an endangered species. This species of sawfish inhabits softbottom estuarine habitats in depths generally less than 30 feet. Its former range in United States waters extended from Texas through Maryland. Currently, few are observed outside peninsular Florida. At least one recorded observation has occurred in Biscayne Bay (NMFS 2000). Populations likely decreased due to a low intrinsic rate of natural increase, the long interval to time of reproduction, and human impacts, most notably overfishing, incidental take in nets (due in part to its body size and unusual morphology), and habitat loss (development of shoreline and nearshore habitats) (NMFS 2000).

4.2.6 Whales and Dolphins

The Northern right whale (*Eubalaena glacialis*) is a federally listed endangered species and is protected under the MMPA. The current migratory population within the Atlantic Region is less than 350 animals. Right whales are highly migratory and summer in the Canadian Maritime Provinces. They migrate southward in winter to the eastern coast of Florida. The breeding and calving grounds for the right whale occur off of the coast of southern Georgia and north Florida. During these winter months right whales are routinely seen close to shore and have been sighted as far south as south Florida, with isolated sightings into the Gulf of Mexico.

Since the project will occur nearshore, it is unlikely that endangered whale species, such as the fin whale (*Balaenoptera physalus)*, humpback whale (*Megaptera novaeangliae*), and sperm whale (*Physeter macrocephalus*) would be observed in the project boundaries. However, dolphins common to inshore waters of southeast Florida include the Atlantic spotted dolphin (*Stenella frontalis*), the spinner dolphin (*Stenella longirostris*), and the spotted dolphin (*Stenella attenuata*), and the bottlenose dolphin (*Tursiops truncates*), which is listed as *depleted* under MMPA. A resident population of bottlenose dolphins can be found in Biscayne Bay (Contillo in press).

5.0 DESCRIPTION OF RECOMMENDED PLAN AND ALTERNATIVES

The Corps indicated that a number of alternatives were originally considered, but during efforts to minimize adverse effect to the natural resources, many were eliminated from further analysis. However, three alternatives were analyzed in the EIS; Alternatives 1 and 2 were "action

alternatives" while Alternative 3 was described as the "no action" alternative (Table 4). In addition, the existing channel dimensions and turning basin authorized depths are described in Table 3.

The recommended plan (Alternative 2) includes five components: (1) flaring the existing 500-foot wide entrance channel to provide an 800-foot wide entrance channel at Buoy 1, and deepening the entrance channel and widener from an existing depth of 44 feet to a depth of 52 feet; (2) widening the southern intersection of Cut-3 with Lummus Island (Fisherman's) Channel at Buoy 15, and deepening from the existing depth of 42 feet to 50 feet; (3) extending and truncating the existing Fisher Island turning basin to the north by approximately 300 feet near the west end of Cut-3, and deepening from 43 to 50 feet; (4) relocating the west end of the main channel to about 250 feet to the south, which will not require dredging; and (5) increasing the width of Lummus Island Cut (Fisherman's Channel) by approximately 100 feet to the south of the existing channel, reducing the existing size of the Lummus Island (or Middle) turning basin to a diameter of 1,500 feet, and deepening from the existing 42-foot depth to 50 feet. Alternative 1 included these five components and a sixth component that involved the deepening of Dodge Island Cut and creation of another turning basin which would have resulted in the permanent removal of approximately 25 acres of seagrass habitat (Figures 5, 6, and 7).

Sand, silt, clay, soft rock, rock fragments, and loose rock will be removed via traditional dredging methods. Where hard rock is encountered, the Corps anticipates that contractors will utilize other methods, such as blasting, use of a punch-barge/pile driver, or large cutterhead equipment. Blasting will be implemented only in those areas where standard construction methods are unsuccessful. Dredged/broken substrates will be deposited at up to four locations**.** Some rock and coarse materials will be transported by barge and placed at an artificial reef site as mitigation for impacts to hardbottom communities. Other rock/coarse materials will be placed in a previously dredged depression in North Biscayne Bay as part of construction measures to create seagrass habitat adjacent to the Julia Tuttle Causeway. The balance of rock and coarse materials that cannot be utilized will be transported to the Offshore Dredged Materials Disposal Site (ODMDS). Viable sand dredged from inshore areas will be relocated and used as a sand cap for the seagrass mitigation site. The balance of sand will be placed on a permitted, upland disposal area on Virginia Key, for possible future use as beach renourishment material on Virginia Key.

With the alteration of the planned configuration and size of the Fisher Island Turning Basin that took place during the plan formulation phase of this project, impacts to seagrasses were altogether avoided at that location, except for some possible impacts due to side-slope erosion. By recommending Alternative 2 rather than Alternative 1, the Corps will further significantly reduce seagrass impacts. However, there will be an appreciable loss of seagrass (6.24 acres) as a result of Component 5. Minimization of indirect impacts to habitat resources, such as surrounding seagrass beds, is addressed in Section 6.1.

In total, the Corps estimates that 6.3 acres of seagrass, 31.4 acres of low-relief hardbottom, 20.7 acres of high-relief coral reef, 123.5 acres of rock/rubble, and 236.4 acres of

unconsolidated/ unvegetated benthic habitat will likely be adversely affected as a result of the expansion of Miami Harbor. However, many of these habitats occur in areas that were impacted during previous dredging activities within Miami Harbor. Therefore, the total impact of habitats not previously dredged include: 6.3 acres of seagrass, 0.6 acre of low-relief hardbottom, 2.7 acres of high-relief coral reef, 3 acres of rock/rubble, and 23.3 acres of unconsolidated/unvegetated benthic habitat.

5.1 Blasting Methodology

The Corps states that to achieve the deepening of the Port of Miami from the existing depth of minus 42 feet to project depth of minus 50 feet, pretreatment of the rock areas may be required. Blasting is anticipated for some or all of the deepening of the channel west of the Government Cut jetties, where standard construction methods have been unsuccessful. The Corps anticipates that about three blasts per day may be required to pre-treat approximately 1,500 cubic yards of material per blast. This equates to approximately 1,550 blast days or 4.2 years to complete the project, if all one drill vessel is used throughout the project area. The total volume to be removed in these areas is up to 2.3 million cubic yards. Channel excavation activities may occur in the following manner:

(1) Contour dredging with either bucket, hydraulic or excavator dredges to remove material that can be dredged conventionally and determine what areas require blasting.

(1) Pre-treating (blasting) the remaining above grade rock, drilling and blasting the "Site Specific" areas where rock could not be conventionally removed by the dredges.

(2) Excavating with bucket, hydraulic or excavator dredges to remove the pre-treated rock areas to grade.

(3) All drilling and blasting will be conducted in strict accordance with local, State and Federal safety procedures. Marine Wildlife Protection, Protection of Existing Structures, and Blasting Programs coordinated with Federal and State agencies.

In addition, industry standards and Corps, Safety & Health Regulations typically limit the weight of explosives to be used in each blast to the lowest poundage (approximately 90 pounds or less) possible to adequately break the rock. The blasting would consist of three blasts per day and removal of approximately 1,500 cubic yards per blast. This equates to about 520 blast days to complete the project (based on an assumption of one drillboat, and that the entire project area inside the jetties will require blasting). The following safety conditions are standard and will likely be implemented in conducting underwater blasting:

(1) Drill patterns are restricted to a minimum 8-foot separation from a loaded hole.
(2) Hours of blasting are restricted from 2 hours after sunrise to 1 hour before sunset to allow for adequate observation for protected species.

(3) Selection of explosive products and their practical application method must address vibration and air blast (overpressure) control for protection of existing structures and marine wildlife.
(4) Loaded blast holes will be individually delayed to reduce the maximum pounds per delay at point detonation, which in turn will reduce the mortality radius.
(5) The blast design will consider matching the energy in the "work effort" of the borehole to the rock mass or target for minimizing excess energy vented into the water column or hydraulic shock.

The U.S. Navy Dive Manual and the FWC Endangered Species Watch Manual the safety formula for an uncontrolled blast suspended in the water column, which is as follows:

R = 260 (cube root w)
R = Safety radius
W = Weight of explosives

The Corps contends this formula is conservative for the blasting being done in the Port of Miami since the blast will be confined within the rock and will not suspend in the water column.

5.1.1 Proposed Protection Measures

Because of the potential duration of the blasting and the proximity of the blasting to a Critical Wildlife Area, the Corps has indicated that in addition to the *Standard Manatee Protection Construction Conditions*, conservation methods will be included in the project design to reduce possible adverse effects to marine wildlife. The Corps recognizes that it is crucial to balance the demands of the blasting operations with the overall safety of the species. However, a safety radius that is excessively large will result in significant delays that prolong the blasting, construction, traffic and overall disturbance to the area. A radius that is too small puts the animals at too great of a risk should one go undetected by the observers and move into the blast area. Because of these factors, the goal is to establish the smallest radius possible without compromising animal safety and provide adequate observer coverage for whatever radius is agreed upon. The Service has provided suggestions concerning the blasting protocols in the Recommendations section of this FWCA report.

The Corps has indicated that aerial reconnaissance of the safety radius, where feasible, will be implemented and added to a boat-based and land support reconnaissance. Additionally, an observer will be placed on the drill barge for the best view of the actual blast zone and to be in direct contact with the blast contractor in charge.

5.1.2 Proposed Test Blast

Prior to implementing a blasting program a Test Blast Program (TBP) will be completed. The purpose of the TBP is to demonstrate and/or confirm the following:

(1) Drill Boat Capabilities and Production Rates
(2) Ideal Drill Pattern for Typical Boreholes
(3) Acceptable Rock Breakage for Excavation
(4) Tolerable Vibration Level Emitted
(5) Directional Vibration
(6) Calibration of the Environment

The TBP begins with a single range of individually delayed holes and progresses to the maximum production blast intended for use. Each test blast is designed to establish limits of vibration and airblast overpressure, with acceptable rock breakage for excavation. The final test event simulates the maximum explosive detonation as to size, overlying water depth, charge configuration, charge separation, initiation methods, and loading conditions anticipated for the typical production blast.

The results of the TBP will be formatted in a regression analysis with other pertinent information and conclusions reached. This will be the basis for developing a completely engineered procedure for Blasting Plan. During the testing the following data will be used to develop a regression analysis:

(1) Distance
(2) Pounds Per Delay
(3) Peak Particle Velocities (TVL)
(4) Frequencies (TVL)
(5) Peak Vector Sum
(6) Air Blast, Overpressure

5.1.3 Other Rock Removal Methods Considered

The Corps has investigated other alternatives to remove the rock in Port Everglades without blasting through the use of a punchbarge. It was determined that the punchbarge, which would work for 12-hour periods, strikes the rock below approximately once every 30-seconds. This constant pounding would serve to disrupt manatee behavior in the area, as well as impact other marine animals in the area. Using the punchbarge will also extend the length of the project temporally, thus increasing any potential impacts to all fish and wildlife resources in the area.

The Corps believes that blasting is actually the least environmentally impacting method for removing the rock in the Port. Each blast will last no longer than 25 seconds in duration, and may even be as short as 2 seconds, and will be spaced out twelve hours apart. Additionally, the blasts are confined in the rock substrate. Boreholes are drilled into the rock below, the blasting charge is set and then the chain of explosives is detonated. Because the blasts are confined within the rock structure, the distance of the blast effects are reduced as compared to an unconfined blast.

5.2 Proposed Mitigation

5.2.1 Seagrass

Mitigation for the loss of approximately 6.4 acres of seagrass bed impacted by project activities may entail seagrass habitat creation, enhancement, or preservation, or equivalent activities that supply ecological functions provided by impacted seagrass beds. The Corps proposes to fill 10.0 acres of borrow area(s) associated with construction causeways and other activities in the past 40 years. These areas located in North Biscayne Bay (Figure 8) will compensate for the loss of seagrass habitat as a result of the proposed project. It is anticipated that introduced substrates will be naturally colonized by seagrasses from adjacent areas. Further site evaluation (including seagrass surveys, bathymetric profiles within and adjacent to each area, the collection and analysis of sediment samples, measurement of ambient PAR and TSS levels) will be conducted at the site prior to final approval. Dredged material will either be hauled or pumped to the selected borrow area(s) based on engineering analysis, cost and recipient site conditions. It is anticipated that ambient depths will range from minus 2 feet to minus 6 feet MSL in the restored areas following restoration and that seagrass recruitment will occur rapidly by *H. wrightii* and *H. decipiens,* both of which likely occur within the shallow flats adjacent to these sites. Other species including *T. testudinum* and *S. filiforme* will also colonize the sites, but generally only after occupation by the early colonizing species previously cited. In the event that natural recruitment has not started within 12 months following excavation, methods to plant seagrass donor material will be initiated. Planting methods will be developed following guidance by Fonseca *et al* (1998) and peer review by NMFS and the Service. Detailed plans and specifications for the seagrass creation will be prepared and provided for agency concurrence prior to construction.

5.2.2 High- and Low-Relief Hardbottom Reef

As compensation for the permanent removal of hardbottom reefs outside of the existing channel, the Corps proposes: (1) mitigation for the removal of 2.7 acres of high-relief coral reef habitat at a ratio of 2:1 through the creation of 5.3 acres of high-complexity, high-relief artificial reef habitat and (2) mitigation for the removal of 0.6 acre of impact to low-relief hardbottom habitat at a ratio of 1.3:1 through the creation of 0.8 acre of low-complexity, low-relief artificial hardbottom habitat.

The two types of mitigation reefs to be constructed, high-relief, high complexity (HRHC) and low-relief, low-complexity (LRLC) reefs are illustrated in Figure 10. HRHC relief will range in profile from 3 to 6 feet, whereas LRLC will range from 1 to 2 feet. Limestone rock excavated from the channel bed and expansion area will be used in reef construction. If necessary, supplemental, quarried limestone will also be used.
The Corps has not proposed compensation for the temporal loss of function as a result of the removal of the biotic communities, such as soft corals, sponges, and hard corals, which are considered previously dredged hardbottom habitat. These communities have colonized the existing channel walls and bottom since the last Miami Harbor dredging events in 1991 (entrance and Fishermen's channel) and 1968 (Fisher Island Turning basin). The Corps states that mitigation for impacts to previously dredged hardbottom habitat has been compensated through the construction of a 15.9 mitigation reef in 1996 for impacts associated with the 1991 dredging event.

In addition, rock/rubble-based habitats and softbottom marine habitats that lack seagrass are not proposed for mitigation, since the Corps considered that this habitat type will remain after construction and will re-colonize rapidly after construction.

5.3 Proposed Monitoring

5.3.1 Seagrass Mitigation Areas

Based on the recommended monitoring frequency recommended by Fonseca *et. al.* (1998), a time-zero monitoring event will be performed and then the seagrass community will be monitored quarterly for year 1, semi-annually for year 2 and annually for years 3 to 5.
Twenty paired, one-square-meter quadrats will be randomly placed within the created seagrass habitat each monitoring event. Random rather than fixed quadrats will be use so that the results are without bias (you can design fixed stations to minimize bias or better yet run multiple transects through entire site) and can be used to accurately generalize over the entire area. Replicate quadrats will be established in the adjacent, surrounding seagrass beds to serve as a control. The following data will be collected at each quadrat:

- Relative water depth
- Time
- Shoot counts
- Aerial coverage by photo-documentation
- Qualitative observations of natural seagrass recruitment and vegetative expansion of planting units

In addition to the above-listed data, the following data will also be collected for each monitoring event: tides, weather, water temperature, and wind. A staff gauge or piezometer will be installed to record tide level.

Survivorship rates will be assessed based on measurements within the paired 1-m^2 quadrats.

Abundance measurements will be made through visual and photographic assessment of percent aerial coverage by species. The 1-m^2 quadrat will be divided into 10 cm x 10 cm grid and the number of squares containing seagrasses will be counted to estimate cover.

In addition, percent aerial coverage will be equated to Cover Classes, based on the Braun-Blanquet technique, as follows:

Cover Class	Description
0	Absent
0.1	Solitary individual ramet, less than 5% cover
0.5	Few individual ramets, less than 5% cover
1	Many individual ramets, less than 5% cover
2	5% -25% cover
3	25% -50% cover
4	50% -75% cover
5	75% -100% cover

Seagrass success criteria shall be based on

(1) A target goal of greater than 3 percent and 6 percent coverage by the third
and fourth years, respectively.

(2) A target goal of greater than 10 percent coverage (Cover Class 2 or higher) by the fifth year.

(3) Supplemental seagrass will be planted on 2 m centers if:

a) at the end of the third year there is less than 3 percent cover.
b) at the end of the fourth year there is less than 6 percent cover.
c) at the end of the fifth year there is less than 10 percent cover.

Panoramic photo-stations will be established and underwater photographic documentation of each quadrat will also be collected.

Aquatic macrofauna will be identified and quantified along transects established for seagrass monitoring. This identification will be performed prior to monitoring of seagrasses to minimize disturbance. Macrofauna observed within a 2-meter wide area (and from the sediment to water' s

surface), centered on the established transect, will be recorded while traversing the entire length of the transect. Benthic fauna below the sediment surface will not be sampled. The following data will be collected for each transect:

- Identification of fauna to lowest practical taxonomic level
- Number of individuals of a given species (abundance)
- Number of species (diversity)
- Location of identified fauna (sediment surface, water column)
- Behavior of identified fauna (swimming, foraging, etc.)
- Time to complete transect

Finally, incidental faunal observations will be recorded.

Agencies to receive and review reports include the Miami-Dade County Department of Planning and Environmental Protection, the South Florida Water Management District, and the Corps. The following schedule incorporates the monitoring frequency recommended by Fonseca *et al.* (1998): a time-zero monitoring event, quarterly monitoring for year 1, semi-annually for year 2, and annually for years 3 to 5. The spacing of the monitoring events has been adjusted so that one monitoring event each year occurs during the summer, within the time of increased seagrass productivity:

Estimated Date	Activity
TBD	Earthwork begins
TBD	Earthwork completed
TBD	Planting completed
TBD	Time-zero report
TBD	First monitoring report (quarterly year 1)
TBD	Second monitoring report (quarterly year 1)
TBD	Third monitoring report (quarterly year 1)
TBD	Fourth monitoring report (quarterly year 1)
TBD	Fifth monitoring report (semi-annual year 2)
TBD	Sixth monitoring report (semi-annual year 2)
TBD	Seventh monitoring report (annual year 1)
TBD	Eighth monitoring report (annual year 2)
TBD	Ninth monitoring report (annual year 3)

5.3.2 Artificial Reefs

Artificial reefs constructed for mitigation must be monitored to ensure viability and adequate compensatory value. The monitoring program for the mitigation reefs will consist of both physical and biological components. Physical monitoring will assess the degree of settling of the reef materials, and biological monitoring will assess populations of algae, invertebrates, and fishes, as compared with concurrent control sampling of natural reefs. Monitoring will be conducted annually in the summer months. In order to supplement quantitative monitoring

efforts and provide a permanent record of reef conditions and biota, each sampling effort will include a video transect swim covering the entire area of the mitigation reefs.

The degree of settling and/or sand covering will be assessed by measuring the relief at each of the permanent quadrat stations established as outlined below. Measurements will be taken with a weighted flexible tape from a point 1 meter shoreward of the quadrat benchmark to the surface of the water and from the top of the reef structure at the benchmark to the surface of the water, with the difference being the relief. The mean of five such measurements will be used to assess the degree of settling and/or sand covering of the materials. Changes in relief at the control reef quadrat benchmarks will be assessed by the same method.

6.0 EVALUATION OF RECOMMENDED PLAN

The evaluation of the Recommended Plan examines the potential adverse effects of project activities to fish and wildlife resources, listed species, and their associated habitats. Direct and indirect effects of the action on habitats within the project footprint and areas adjacent to the project are considered. Direct impacts may occur as a result of removal during dredging (or blasting) and as a result of side-slope equilibrium or sloughing of unconsolidated material along the channel walls within Biscayne Bay. Indirect effects such as turbidity associated with dredging or spoil deposition may effect seagrass, hardbottom, and/or coral reef habitat. Effects on habitats are discussed through examining biological communities, while effects of the project on important fish and wildlife taxa, such as protected species and managed species, are discussed in subsequent sections. The use of traditional dredging methods in addition to the use of explosives to deepen and widen specific channels is anticipated. The effects of blasting on commercially and recreationally important fish species, marine mammals, and marine reptiles were also considered. Impact acreage values were taken from the Miami Harbor, General Reevaluation Report Study, Draft EIS, currently in preparation by DC&A.

6.1 Fish and Wildlife Resources

The Recommended Plan would impact approximately 418.2 acres of marine resources, including impacts to seagrass beds, low- relief hardbottom, high-relief coral reefs, rock/rubble, and unconsolidated/unvegetated softbottom habitat, including impacts to 2.3 acres of epibenthic invertebrate communities that have colonized in the past 10 to 15 years on the channel wall. Component 4 and parts of Component 1 involve zones where dredging will not occur, but are nevertheless considered part of the project area. Impacts are quantified in Table 5, and illustrated in Figures 5 and 6.

In addition, delivery and deposition of dredged materials at the proposed seagrass compensation site, the Virginia Key upland disposal site, or the offshore dredged material disposal site may have consequences for fish and wildlife resources. Dredge anchors, pipelines, equipment, and dredged materials themselves may incidentally injure sensitive habitats, such as dunes, mangroves, and seagrass beds. In marine habitats, increases in turbidity will likely result from deposition of materials.

6.1.1 Coastal Strand

It is unlikely that coastal strand habitats will be directly affected during the construction of the recommended plan. Likewise, the species associated with these habitats will not likely be directly affected. Though, nesting bird species may be affected during the utilization of the spoil containment area on Virginia Key or by the noise associated with blasting. Also, erosion problems on Miami Beach, Fisher Island, and Virginia Key may be exacerbated as a result of increased harbor traffic and increased vessel size.

6.1.2 Mangroves

The principal mangrove area adjacent to the project area lies along the northwest side of Virginia Key. Mangrove wetlands are not located within the project footprint. Dredging, increased vessel traffic, and vessel size are not expected to be detrimental to the stability of nearby mangrove communities due to the location of the habitat, and the limited speeds vessels use in the channel. The mangroves fall within the manatee protection "No Entry Zone" section of the Bill Sadowski CWA.

The northern shore and mangrove habitats of Virginia Key comprise important breeding and nesting grounds for at least eight species of birds protected by the State of Florida (Zambrano, personal communication). While proposed dredging activities are not anticipated to affect bird populations, use of an adjacent area on Virginia Key for dredge disposal purposes may disturb individuals when nesting, mating, or foraging. However, noise generated during blasting or dredge operation may adversely affect wading birds particularly during the nesting season.

6.1.3 Seagrass

The greatest impacts of implementation of the Recommended Plan on seagrass beds would occur along Fisherman's Channel as part of Component 5 (Figure 5). Seagrass bed margins that had been estimated by DC&A (2001) were further refined using data provided by Miami-Dade DERM. These data, in conjunction with project plans for channel boundaries, were used to calculate direct and indirect impact areas. Impacts as a result of Components 5 include the removal of 6.3 acres of seagrass beds along Fisherman's Channel during dredging activities and includes the anticipated loss of 6.0 acres seagrass adjacent to the channel within the Bill Sadowski CWA. This acreage was calculated based on the expected acreage of seagrass to be removed during dredging, geologic data and previous erosion of soft substrates and seagrass habitats in the area adjacent to the channel. Based on their observations of unauthorized seagrass impacts related to previous channel dredging activities within the Port, DERM suggested that the Corps examine possible effects of dredging on adjacent softbottom habitats. The Corps determined that soft substrates along channels typically achieve an angle of repose of 7 (horizontal): 1 (vertical). The extent of indirect loss of seagrasses was based on this ratio and the depth of soft-substrate overburden adjacent to the proposed channel, which is approximately

12 feet, based on geotechnical data. The majority of seagrass loss in the area would involve 4.08 acres of a seagrass bed dominated by *T. testudinum* and *S. filiforme* that extends into the neighboring Bill Sadowski CWA.

The effects of Component 5 on fish and wildlife resources would be significant and result in an adverse affect to manatee Critical Habitat. Direct impacts associated with the destruction of seagrasses include the loss of habitat and functional values attributable to the habitat. The diminution of seagrass beds in the areas inside the proposed new channel areas and in areas immediately adjacent to dredging activities will result in the direct loss of forage habitat for

manatees, and the direct loss of habitat for seagrass bed residents and transients such as fishes and invertebrates. Dredging and sloughing will significantly increase water depth. Therefore, seagrass recovery is unlikely to occur upon the newly exposed substrate.

Indirect environmental impacts will result from implementation of Component 5. Based on sediment analysis, substrates along the southern margin of Fisherman's Channel comprise a considerable amount of fine materials (Corps 2001). Therefore, dredging will likely re-suspend fine sediments into the water column. Fisherman's Channel's strong tidal currents may redistribute suspended sediments to other areas both inside and outside the study area that support submerged vegetation. Possibly affected areas would include seagrass habitats immediately adjacent to the Channel (*i.e.*, directly south of the Fisherman's Channel and the seagrass beds south of the Dodge Island), as well as habitats inside the Manatee No Entry Zone, the Bill Sadowski CWA, and possibly other areas of the Biscayne Bay Aquatic Preserve. Resuspended particulate matter may appreciably decrease water clarity and consequently photosynthetic activity of seagrasses in these areas. Deposition of sediments on beds may have adverse effects. These effects include, but are not limited to, the displacement of, and/or alteration of, fish, invertebrate, and epiphyte communities.

Deepening/widening of the Fisher Island Turning Basin, which is part of Component 3 will not impact seagrass communities via direct removal of substrate, but may affect up to 0.14 acres of beds located directly northeast of the proposed dredging limits due to substrate sloughing. The habitat that may be affected is a large mixed-species bed of *H. decipiens* and *Halodule wrightii*. That bed and another to the southeast (an isolated *Halophila decipiens* bed associated with the littoral zone of Fisher Island) may also be affected by dredging activities. These beds may temporarily experience decreased productivity due to decreases in water clarity, but this may not be very likely, as sediments to be dredged lack silt, clays, and silty sands.

For the remaining three project components (1, 2, and 4), direct and/or indirect impacts to seagrass beds will likely be minor or undetectable. Impacts that may occur due to Component 2 (widening the channel at the intersection of Government Cut and Fisherman's Channel) will be extremely minor. Resources within 2000 feet of the proposed dredge site for that component include only an isolated *H. decipiens* bed (over 500 feet away), and a large mixed-species (*H. decipiens* and *Halodule wrightii*) bed (over 750 feet away). Material to be dredged as a part

of Component 2 principally comprises limestone, sandstone, and clean quartz sand (Corps 2001). Therefore, precipitation of fine particulate matter onto the seagrass beds will not occur due to the lack of resuspension of such materials. Component 1 falls outside the Bay and inner channels and is not likely to cause direct or indirect impacts to seagrasses. Component 4 does not involve any dredging activity; therefore, the seagrass beds identified during the 2000 survey (DC&A 2001) will not likely be adversely affected.

6.1.4 Unvegetated Softbottom Habitats and Rock/Rubble

Unvegetated softbottom habitats comprise a significant proportion or the total area proposed to be dredged. Although these habitats may be minor associates of other major habitat categories (such as seagrass beds, rock/rubble, or reef), substrata were not categorized as "unvegetated softbottom" during recent surveys (DC&A 2001) unless the condition was clearly dominant. Wide expanses of this type of community are found only in the area comprising Component 1, but smaller tracts are also present adjacent to seagrass habitats along the south side of Fisherman's Channel. Direct impacts to softbottom communities (due to dredging operations) in all three of these areas would include the destruction or displacement of both benthic epifauna and infauna, such as crustaceans, polychaetes, and small fishes. Iverson and Beardsley (1974) did not expect population effects on these taxa to be severe. However, direct and/or indirect effects may be more detrimental, based on the general location of the impacts. For example, in offshore areas, scattered or isolated patches of sessile colonial taxa, such as sponges and gorgonians, may also be removed with sediments. However, in the harbor and inshore channels, water clarity and depth limits growth of such species, and the only common taxa providing structure may be occasional macroalgae. In offshore areas, indirect impacts to reefs adjacent to softbottom habitats may occur. Marszalek (1981) found that reef areas adjacent to dredge zones were susceptible to the effects of the deposition of silt.

In total there would be 68.2 acres of unvegetated habitat impacted during dredging under Component 1. The vast majority comprises previously dredged substrate (66.9 ac). As long as the areas remained as viable aquatic habitat following dredging, benthic infaunal populations in these areas would re-colonize. Whether the substrate remains viable for benthos may depend on the degree to which light attenuates with the additional 8 feet of depth. Increased depth may not promote the growth of macroalgae and epipsammic algae.

Impacts to unvegetated habitats with Component 3 would entail the direct removal of 24.4 acres of unvegetated softbottom habitat, 19.1 acres of which has been dredged previously. Indirect impacts of dredging to seagrasses in this area would be like those described above, such as turbidity and sediment deposition effects. Impacts to benthos and infauna, and possibly corals, would likely occur, as described above.

As with other components, the largest impacts with Component 5 would be impacts to areas left from previous dredging activities within Miami Harbor. Approximately 127.1 acres of the area proposed to be dredged under Component 5 includes unvegetated bottom and rubble left from previous dredging activities. An additional impact to 16.7 acres of softbottom that has not been

dredged previously is also required to complete this part of the project.

Proposed impacts to rock/rubble habitats are principally in areas that have already been dredged (Table 5), comprising approximately 123.5 acres. In much of the project area, where rock/rubble is present, sponges and algae have re-colonized these substrates that were deposited as a result of previous dredging activities. On 51.7 acres of substrate planned for re-dredging, soft corals have developed isolated colonies among sponges. Re-dredging these areas will return these substrates to a barren state, but re-colonization by invertebrates and utilization by fishes will likely follow.

6.1.5 High- and Low-Relief Hardbottom Reef

Widening and deepening of Miami Harbor's entrance channel to implement Component 1 would result in both direct and indirect impacts to hardbottom and reef communities (Table 5 and Figure 6). At least 31.4 acres of low-relief hardgrounds and 20.7 acres of high-relief reef will be impacted in total (49.4 acres, not including impacts to channel wall habitats). Most of the hardbottom and coral reef habitat to be impacted lies on substrates that have been previously dredged, whereas some habitats lie outside the channel zone and have substrates that have never been dredged.

6.1.5.1 Direct Impacts Inside the Existing Channels

Deepening the channel will impact a total of 31.4 acres of low-relief hardgrounds and 20.7 acres of high-relief reef that currently exist in the channel bed. In addition, the proposed project will destroy approximately 2.3 acres of low-relief hardbottom habitat located on the limestone walls of the existing channel that has colonized in the past 10 to 12 years during the deepening of the channel. As the inshore channels are widened, this activity will impact approximately 7,750 linear feet of wall, specifically along the south wall of Fisherman's Channel (Component 5) and the south wall of the entrance channel just north of Fisher Island (Component 2). These walls include as much as 2.3 acres (7000 feet in length by estimated 15 foot in depth of production surface along Fisherman's Channel) and 0.26 acres of vertically oriented hardbottom habitats (750 feet in length x 15 foot in depth along entrance channel). Based on bathymetric data, the Corps states that only a negligible amount of wall will be impacted where widening is proposed in the offshore entrance channel. In that area, the depths increase from approximately minus 44 to minus 47 feet within a high-relief habitat. Because these habitats are already defined by reef substrates having profiles from 3 to 6 feet, the habitat attributable to channel wall height contributes no more habitat value than the surrounding reef. Other areas where channel wall impacts may occur were considered in conjunction with geotechnical data (Corps 2001) to determine hardbottom impacts. Impacts to channel walls along the west and north side of the proposed Fisher Island Turning Basin (Component 3) affect sandstone surfaces, which presumably comprise less suitable habitat for managed species and limestone-affiliated biota.

Hard substrates such as outcrops, rocks, and exposed hardbottom form the backbone of a diverse, and economically and ecologically important ecosystem. Even though the existing channel has been dredged in the past, the substrates still exist within the channel, and, therefore, their value to fish and wildlife is considerable. Impacts to the 2.3 acres of invertebrate communities would result in direct removal of colonies of many coral species, including both reef-building species and gorgonians, which occur in this area at a high density. These corals provide important habitats for a myriad of fishes and invertebrates. Assemblages of sessile organisms in previously dredged areas may recover and reach the functional value of hardbottom habitats currently found in the channel in approximately 10 to15 years (based on current community structure and time elapsed since last dredging).

6.1.5.2 Direct Impacts Outside the Existing Channels

Widening at the eastern end of the entrance channel would result in both direct and indirect impacts to hardbottom and reef communities that have never been dredged. Specifically, 2.7 acres of high-relief reef and 0.6 acre of low-relief hardbottom will be affected. Direct impacts involve the destruction of both reef organisms and reef habitats. Though this habitat has not been previously dredged, this habitat has been impacted during several vessel grounding events.

The outermost reef tract is one of the most important reef resources in southeast Florida. Its distance from shore and the harbor result in increased health and less disturbances in comparison to the other two reef tracts. The reef habitats are significant resources due to their high biodiversity, which comprises dense populations of managed fishes and invertebrates and numerous colonies of hard and soft corals and sponges. Impacts to this reef habitat will decrease the offshore ecosystem's carrying capacity for many reef-dependent invertebrate and vertebrate species, including managed species. Therefore, loss of coral reef habitat will likely result in changes at the population level for many species, and possibly an overall change in fish community structure. Individual coral colonies, which may have taken hundreds of years to form, will be entirely lost. However, most of the ecological functionality of coral and sponge assemblages in dredged areas may recover in approximately 30 years (Banks *et al.*, 1998, used a "very conservative" 35-year recovery period in an assessment of another site).

6.1.5.3 Indirect Impacts

Indirect impacts to hardbottom and reef habitat associated with the project (*i.e.*, Component 1) may include physical damage or temporary environmental changes to the habitats adjacent to the area being dredged. Dredge equipment or dislodged rocks or limestone could collide with and crush nearby coral reef. Likewise, errors in blast engineering could cause damage to non-target reef structures and substrates. In addition, disturbances caused by the pressure and acoustic effects of blasting are not easily anticipated and may inflict damage on individual coral colonies

and other reef-dwelling fishes and invertebrates. These effects are described in subsequent sections of this report. Other indirect effects due to dredging and blasting include the displacement of fishes and invertebrates. These effects would probably be short-term. Finally, dredging may result in suspension of any fine carbonate materials that have settled on substrates or have been enclosed within reef structures ("powder pockets"). This re-suspension of sediments may result in temporary periods of increased turbidity within the area. Turbidity will likely affect the productivity and health of hermatypic corals, and deposition of suspended sediments on adjacent areas could cause the temporary displacement of fishes and invertebrates.

Delivery and deposition of dredged materials at the proposed seagrass compensation site (see below), the Virginia Key upland disposal site, or the offshore dredged material disposal site may have consequences for fish and wildlife resources. Dredge pipelines, equipment, and dredged materials themselves may incidentally impact sensitive habitats, such as dunes, mangroves, and seagrass beds. In marine habitats, increases in turbidity will likely result from deposition of materials.

6.1.6 Essential Fish Habitats

Essential Fish Habitats (EFH) present in the project area include seagrass beds, hardbottom, reefs, inshore softbottom habitats, the water column, and beds of the red alga genus *Laurencia* (SAFMC 1998b). With the exception of water column habitat and algae beds, anticipated loss of these habitats due to project implementation is quantified in Section 5.1. Every proposed component, except Component 4, will cause damage to EFH (Table 6). Decreases in EFH, particularly high-quality habitat and those designated as Habitat Areas of Particular Concern (HAPC), would affect populations of managed fish and invertebrate species. Section 3.2.5.3 addresses the various habitat affiliations of several managed fish and invertebrate species in southeast Florida.

The most obvious direct impact of the Recommended Plan on managed species in all habitats is the potential for mortality and/or injury of individuals through the dredging and/or blasting processes. Species in any and all of the project area's habitats are susceptible. Fishes and invertebrates are at risk at any life-history stage; eggs, larvae, juveniles, and even adults may be inadvertently killed, disabled, or undergo physiological stress, which may adversely affect behavior or health. Forms that are less motile, such as juvenile shrimp, are particularly vulnerable (they would be sucked into the dredge apparatus, or otherwise directly removed from their habitat).

Blasting will also have a direct impact on managed fish species residing in/migrating through the harbor and associated waterways. Previous studies (Corps 1996; Keevin and Hempen 1997; Young 1991) have addressed the impacts of blasting on fishes. Fishes with air bladders are particularly more susceptible to the effects of blasting than aquatic taxa without air bladders (*e.g.*, shrimp, crabs, etc.), which are more resistant to the impacts of blasting (Keevin and Hempen 1997). Fish species that are relatively small in size and/or exhibit territorial behavior, are most likely to impact during blasting.

Although dredge operations are likely to directly impact individuals of managed species in observable lethal and sublethal manners, dredging and blasting may have more subtle adverse effects. These subtle effects act on individuals, but may be perceived only at the population level. For example, dredging/blasting activities, particularly in linear corridors (such as Cut 3 and Fisherman's Channel) may interfere with migration patterns of species that require utilization of both inshore and offshore habitats through ontogeny. This is a particular concern for species that travel along shorelines and bulkheads. Therefore, dredging berths and littoral zone habitats is anticipated to have greater effects. These impacts may result in displacement of individuals or disjuncture in the life-cycles of managed species.

Impacts to the water column can have widespread effects on marine and estuarine species. Hence, it is recognized as EFH. The water column is a habitat used for foraging, spawning, and migration by both managed species and organisms consumed by managed species. Water quality concerns are of particular importance in the maintenance of this important habitat. During dredging in substrates comprising coarser materials and rock, water quality impacts are expected to be minimal. However, where silt and/or silty sand are to be dredged, water quality impacts are expected to be significant, and take several weeks/months after cessation of dredging activities to return to background levels. Re-suspended materials will interfere with the diversity and concentration of phytoplankton and zooplankton, and therefore affect foraging success and patterns of schooling fishes and other grazers that comprise prey for managed species. Recent efforts to quantify areal impacts of dredging incorporate only the waters directly above dredged substrates. However, due to the physical properties of water and the complex hydraulics operating within the harbor and channels, these efforts greatly underestimate the extent of negative effects of dredging.

The destruction of Essential Fish Habitat habitats, such as seagrass beds, inshore softbottom, mangroves, hardgrounds, and reefs result in the loss of substrates used by managed species for spawning, nursery, foraging, and migratory/temporary habitats. The most critical losses of EFH would be those areas additionally designated as Habitat Areas of Particular Concern (HAPC). Coastal inlets are HAPC for shrimps, red drum, and grouper. Inlets are important for these species that prefer estuarine, inshore habitats such as mangroves, seagrass beds, and mudflats. Medium- and high-profile reefs are also considered HAPC for grouper, and the hardbottom existing in 5 to 30 meters of depth off of Miami-Dade County is listed as HAPC for corals and coral reefs (SAFMC 1998a).

Significant losses to EFH-HAPC within the areas proposed for dredging include destruction of seagrass beds and coral reef. Seagrass beds provide important habitat, but seagrasses in the project area are even more important due to their proximity to reef and hardbottom habitats. Their function is intimately coupled with reefs to provide life-stage-specific habitat for certain managed species. Loss of these two habitats (reef and seagrass) will result in a loss of habitat critical in the spawning and early life-stages for species of the snapper-grouper complex, which is consists of 73 species that commonly use the inshore habitats for part of their life cycle. These include blue stripe grunts, French grunts, mahogany snapper, yellowtail snapper, and red grouper.

Seagrass beds are also intimately coupled with mangroves, such as at nearby Virginia Key. These mangrove areas serve a nursery for many managed species including pink shrimp, spiny lobster, and members of the snapper-grouper complex, many of which also rely on seagrass habitats at certain phases during ontogeny.

Impacts to populations of managed species will occur due to dredging softbottom habitats, including those that lack seagrasses. Dredging will remove benthic organisms used as prey by managed species and as a result may temporarily impact certain species, such as red drum, that forage largely on such taxa. Dredged habitats are anticipated to recover, in terms of benthic biodiversity and population density, within 2 years.

Populations recreationally and commercially important fish species may be affected by turbidity, which may alter the algae and plankton assemblages of the harbor, channels, and nearshore habitats. Entire food webs rely on specific types of algae and plankton. Their absence or decrease in concentration could alter primary consumer populations and cause a ripple effect throughout each trophic level in the food chain.

6.2 Threatened and Endangered Species

The Corps has determined that the proposed expansion and deepening of the Miami Harbor as described in the Recommended Plan "may affect, but is not likely to adversely affect" the endangered West Indian manatee, endangered American crocodile, endangered green sea turtle, threatened loggerhead sea turtle, endangered Kemp's ridley, endangered hawkskbill sea turtle, and endangered leatherback sea turtle, endangered smalltooth sawfish, and endangered whale species which are known to occur along the Atlantic Coast. Possible adverse effects to these species during construction include injury, mortality, or harassment and may affect the life history of these species as a result of the loss or modification of habitats via dredging and/or blasting associated with construction. In addition, possible adverse effects to critical habitat designated for the West Indian manatee and Johnson's seagrass are likely as a result of the permanent removal of substrate during the widening Fishermen's channel and the Fisher Island turning basin. Indirect impacts would include effects to nearby habitats or species within nearby areas either during dredging, spoil deposition, and/or blasting activities as a result of turbidity and/or sedimentation.

6.2.1 West Indian Manatee

The Corps has determined that the proposed expansion and deepening of Miami Harbor "may affect, but is not likely to adversely affect"the manatee since the *Standard Manatee Protection Conditions* and a comprehensive blasting plan will be incorporated in the project design to minimize possible adverse effects of the project on listed species within the action area. The Corps anticipates that three blasts per-day over a period of 1,553 days will be the maximum blast days required, if all the rock material in the channels will require blasting and one blast barge is utilized. In the public hearing on May 6, 2003, the Corps further assured those in attendance that

“take” of a listed marine mammal or reptile, as defined by the ESA, will not occur as a result of blasting activities at the Port of Miami.

In addition, approximately 6.3 acres of seagrass, manatee foraging habitat, within the boundaries of both State and federally designated Critical Habitat for the manatee will be adversely affected as a result of the construction activities within Fishermen’s Channel. The Corps has proposed to compensate for seagrass at a 1:1 mitigation ratio. However, the Service believes that this mitigation ratio is insufficient and recommends a 3:1 mitigation ratio (18.9 acres) to replace the function and value of manatee foraging habitat, as well as, to compensate for the risk associated with seagrass restoration projects. Provided that adequate mitigation is conducted that incorporates the temporal loss of function and risk of success, which equates to a 2.9:1 ratio, the Service believes the construction activities associated with the proposed project would not likely result in an adverse affect to manatee Critical Habitat.

6.2.2 American Crocodile

The Service concurs with the Corps determination that the proposed project “may effect, but is not likely to adversely affect” adults, hatchlings, and/or juveniles of the American crocodile during dredge spoil disposal operations on Virginia Key and/or blasting activities. Since the implementation of protection measures designated to minimize possible adverse effects to frequently observed listed species such as the manatee and sea turtles, these provisions will include the American crocodile.

6.2.3 Sea Turtles

In general, beaches immediately adjacent to proposed dredging sites support little sea turtle nesting activity. However, other resources comprise important habitats for turtles. Removal of sections of hardbottom, reef, and seagrass habitats will eliminate potential foraging habitat for juvenile and adult turtles and refugia for hatchlings. Also, dredge activities and associated disturbances (noise, lights, etc.) offshore may interrupt the movement of turtles swimming toward or away from nesting beaches to the north or south. Specifically, the highest potential impact to sea turtles may result from the use of explosives to break/dislodge rock substrates in offshore channels. Threshold lethal pressures for sea turtles are probably similar to those of marine mammals (U.S. Department of the Navy, 1998, as cited in Corps 2000a). Therefore, turtles in the immediate vicinity of any detonation site would likely be killed, and individuals existing within 400-600 feet of the blast would likely suffer injury. Additional information is provided in Effects of Blasting below.

Another possible element of the action that may affect sea turtles is the presence of light and/or noise from construction/dredging vessels anchored offshore. These factors may interrupt the movement of adult, nesting, female turtles swimming toward or away from nesting beaches, and may cause disorientation of hatchlings following emergence. However, since the port is an active facility, offshore lighting is not an unusual feature of the area, and should not appreciably change the ambient conditions of nesting areas in the vicinity of the action. In addition, all

construction/dredging vessels are required to adhere to best management practices, such as preventing lights from exposure to shore through use of shields. Therefore, no adverse indirect impacts due to dredging operations are anticipated for the proposed action.

6.2.4 Johnson's seagrass

Adverse effects to beds of Johnson's seagrass beds are not anticipated by project actions, as populations of the seagrass has not been observed in the action area or the vicinity of the action area. Portions of the action area where deepening will occur (federally authorized channels) are excluded from designated critical habitat, and therefore impacts to critical habitat will not occur. However, where widening will occur in the Biscayne Bay (Fisherman's Channel and Fisher Island Turning Basin), substrate that fall within critical habitats will be removed.

The Corps states that the substrate to be removed are not amenable to colonization by Johnson's seagrass because they are currently occupied by beds of other species of seagrass; a "colonizing" species such as Johnson's seagrass would not be able to establish a population due to interspecific competition. Therefore, the Corps concludes that the proposed project is not likely to adversely modify designated critical habitat of Johnson's seagrass.

6.2.5 Smalltooth Sawfish

Although seagrass and other softbottom habitats will be removed, the Corps does not anticipate that the proposed project will have any indirect effects on smalltooth sawfish in the vicinity of the action area. These habitats may be utilized by the species. However, loss of seagrass habitats is relatively small with respect to nearby resources, and will be compensated through mitigative measures. Nearshore softbottom areas are also plentiful in and near the action area, and impacts to them would not limit resource use by sawfish, especially since population density of individuals in the area is extremely low, or nil.

6.2.6 Whales and Dolphins

Adverse effects to species of marine mammals, particularly resident populations of dolphins within Biscayne Bay, may occur during blasting activities. These effects are described below.

6.2.7 Effects of Blasting

The highest potential for direct impacts to threatened and endangered marine mammal species may result from the use of explosives to break/dislodge rock substrates in Fisherman's Channel, where manatees are known to congregate during winter months. Both the pressure and noise associated with blasting can injure marine mammals. Noise and pressure effects on manatees have not been well documented, however, it is assumed that manatees will be impacted similar to dolphins. For the current project, there is a risk that both taxa may be affected during the proposed maximum of three blasts per day over a period of 1,550 days.

Direct impacts on marine mammals due to dredging/blasting and construction activities in the project area include alteration of behavior and autecology. For example, daily movements and/or seasonal migrations of manatees and dolphins may be impeded or altered. In addition, marine mammals may alter their behavior or sustain minor physical injury from detonation of blasts outside the 600-foot safety zone. Although incidental take would not result from sound/noise at this distance, disturbances of this nature (alteration of behavior/movements) may be considered harassment under MMPA and ESA. These are special concerns for resident populations of manatees and bottlenose dolphins.

The use of blasting to break apart substrates in offshore areas, particularly at the outermost reef, is strongly discouraged. Effects of blasting on managed/protected reef and pelagic species would be detrimental (at the individual and population levels), and it is likely that non-target reef structures will be damaged, and there will be direct mortality of fishes up to 140 feet away from each charge (Keevin and Hempen 1997) and turtles and marine mammals up to 400 feet away from each charge. Conducting a test blast with subsequent biological monitoring would help the Service appraise what damages would be to local fish populations, and allow for exploration of mitigative measures that may be employed to decrease impacts. Mortality of sea turtles and marine mammals can be generally eliminated by ensuring that none pass within 600 feet of the discharge.

Utilizing data from rock-contained blasts such as those at Atlantic Dry Dock North Carolina, the Corps has been able to estimate potential effects on protected species. These data can be correlated to the data from the EPA concerning blasting impacts to marine mammals. The EPA data indicates that impacts from explosives can produce lethal and non-lethal injury as well as incidental harassment. The pressure wave from the blast is the most causative factor in injuries because it affects the air cavities in the lungs & intestines. The extent of lethal effects are proportional to the animal's mass, *i.e.*, the smaller the animal, the more lethal the effects; therefore all data are based on the lowest possible affected mammal weight (infant dolphin). Non-lethal injuries include tympanic membrane (TM) rupture; however, given that dolphin and manatee behavior rely heavily on sound, the non-lethal nature of such an injury is questionable in the long-term. For that reason, it is important to use a limit where no non-lethal (TM) damage occurs. Based on the EPA test data, the level of pressure impulse where no lethal and no non-lethal injuries occur is reported to be 5 psi-msec.

The degradation of the pressure wave
George Young (1991) noted the following limitations of the cube root method:

> *Doubling the weight of an explosive charge does not double the effects. Phenomena at a distance, such as the direct shock wave, scale according to the cube root of the charge weight. For example, if the peak pressure in the underwater shock wave from a 1-pound explosion is 1000 pounds per square inch at a distance of 15 feet, it is necessary to increase the charge weight to approximately 8 pounds in order to double the peak pressure at the same distance. (The cube root of eight is two.)*

Effects on marine life are usually caused by the shock wave. At close-in distances, cube root scaling is generally valid. For example, the range at which lobster have 90 percent survivability is 86 feet from a 100-pound charge and double that range (172 feet) from an 800-pound charge.

As the wave travels through the water, it reflects repeatedly from the surface and seabed and loses energy becoming a relatively weak pressure pulse. At distances of a few miles, it resembles a brief acoustic signal. Therefore, shock wave effects at a distance may not follow simple cube root scaling but may decline at a faster rate. For example, the survival of swim bladder fish does not obey cube root scaling because it depends on the interaction of both the direct and reflected shock waves. In some cases, cube root scaling may be used to provide an upper limit in the absence of data for a specific effect.

More recent studies by Finneran *et. al*. (2000), showing that temporary and permanent auditory threshold shifts in marine mammals were used to evaluate explosion impacts. Due to the fact that marine mammals are highly acoustic, such impacts in behavior should be taken into account when assessing harmful impacts. While many of these impacts are not lethal and this study has shown that the impacts tend not to be cumulative, significant changes in behavior could constitute a “take” under the MMPA.

The effects of blasting on sea turtles and the smalltooth sawfish are described as follows. There have been studies that demonstrate that sea turtles are killed and injured by underwater explosions (Keevin and Hempen 1997). Sea turtles with untreated internal injuries would have increased vulnerability to predators and disease. Nervous system damage was cited as a possible impact to sea turtles caused by blasting (U.S. Department of Navy 1998). Damage of the nervous system could kill sea turtles through disorientation and subsequent drowning. The Navy's review of previous studies suggested that rigid masses such as bone (or carapace and plastron) could protect tissues beneath them; however, there are no observations available to determine whether the turtle shells would indeed afford such protection. Studies conducted by Klima *et al*., (1988) evaluated blasts of only approximately 42 pounds on sea turtles (four ridleys and four loggerheads) placed in surface cages at varying distances from the explosion. Christian and Gaspin's (1974) estimates of safety zones for swimmers found that, beyond a cavitation area, waves reflected off a surface have reduced pressure pulses; therefore, an animal at shallow depths would be exposed to a reduced impulse. This finding, which considered only very small explosive weights, implies that the turtles in the Klima *et al*. (1988) study would be under reduced effects of the shock wave. Despite this possible lowered level of impact, five of eight turtles were rendered unconscious at distances of 229 to 915 meters from the detonation site. Unconscious sea turtles that are not detected, removed and rehabilitated likely have low survival rates. Such results would not have resulted given blast operations confined within rock substrates rather than unconfined blasts. The proposed action will use confined blasts, which will significantly reduce the area around the discharge where injury or death may occur. The Corps assumes that tolerance of turtles to blast overpressures is approximately equal to that of marine mammals (Department of the Navy 1998); *i.e.*, death would not occur to individuals

farther than 400 feet from a confined blast (Konya 2001).

Review of ichthyological information and test blast data indicate that fishes with swim bladders are more susceptible to damage from blasts, and some less-tolerant individuals may be killed within 140 feet of a confined blast (Corps 2000a). Sawfishes, as chondrichthyans, do not have air bladders, and, therefore, they would be more tolerant of blast overpressures closer to the discharge, possibly even within 70 feet of a blast.

Due to conservation safeguards that will be incorporated into the project design, the Corps does not anticipate adverse effects to either sea turtles or sawfish are anticipated. To avoid or minimize any possibility of direct impacts, blasting is not anticipated to occur offshore where mature females may be migrating to nesting areas in the county. Risk to sawfish will likely be minimal as there are no historic or recent records of the species in the project area.

7.0 SERVICE'S MITIGATION POLICY

Potential impacts of the proposed Port expansion project include the following habitat: unconsolidated benthic habitat, seagrasses, nearshore hardbottom, coral reef, rock/rubble, and channel wall. Impacts may include removal as a result of dredging and/or blasting activities, burial from actual fill placement at mitigation and offshore disposal sites, burial and suffocation from suspension and settling generated from dredging and/or blasting activities, dredged material placement at mitigation site, and damage during construction activities.

In developing the Service's Mitigation Policy (Federal Register 46 (15), Pg. 7656), the definition of mitigation contained in the Council on Environmental Quality's National Environmental Policy Act regulations (40 CFR 1508.20[a-e]) was used. This definition recognizes mitigation as a stepwise process that incorporates both careful project planning and compensation for unavoidable losses and represents the desirable sequence of steps in the mitigation planning process. Initially, project planning should attempt to ensure that adverse effects to fish and wildlife resources are avoided or minimized as much as possible. In many cases, however, the prospect of unavoidable adverse effects will remain in spite of the best planning efforts. In those instances, compensation for unavoidable adverse effects is the last step to be considered and should be used only after the other steps have been exhausted.

The Service's Mitigation Policy focuses on the mitigation of fish and wildlife habitat values, and it recognizes that not all habitats are equal. Thus, four resource categories, denoting habitat type of varying importance from a fish and wildlife resource perspective, are used to ensure that the mitigation planning goal will be consistent with the importance of the fish and wildlife resources involved. These categories are based on the habitat's value for the fish and wildlife species in the project area (evaluation species) and the habitat's scarcity on a national, regional or local basis. Resource Category l is of the highest value and Resource Category 4, the lowest. Mitigation goals are established for habitats in each resource category.

The mitigation goal for Resource Category 1 habitats is no loss of habitat value since these

unique areas cannot be replaced. The goal for Resource Category 2 habitats is no net loss of in-kind habitat value. Thus, a habitat in this category can be replaced only by the same type of habitat (*i.e.*, in-kind mitigation). The mitigation goal for Resource Category 3 habitats is no net loss of overall habitat value. In-kind replacement of these habitats is preferred, but limited substitution of different types of habitat (out-of-kind mitigation) perceived to be of equal or greater value to replace the lost habitat value may be acceptable. The mitigation goal for Resource Category 4 habitats (considered to be of marginal value) is to avoid or minimize losses, and compensation is generally not required.

Priority habitats in the project area are seagrasses, nearshore hardbottom, and coral reef. These habitats are considered by the Service to be in Resource Category 2, and no net loss of in-kind habitat value is recommended. However, we consider any significant colonies of hard (stony) coral in this area to be Resource Category 1. Research suggests that two species of brain and star

coral grow at a rate of approximately 0.5 centimeter per year (Dodge 1987). Based on this information, we estimate it would take these corals, and likely other hard coral species, at least 100 years to reach 1 meter in diameter.

7.1 Evaluation of Proposed Mitigation

As previously stated, the Corps estimates that a total of 418.2 acres of aquatic resources, including seagrass communities, unvegetated softbottom, hardbottom, and coral reef habitat will likely be adversely affected as a result of construction activities associated with the expansion of Miami Harbor. Specifically, 6.3 acres of seagrass; 236.4 acres of unconsolidated/ unvegetated benthic habitat (softbottom); 123.5 acres of rock/rubble bottom; 31.4 acres of low relief hardbottom; and 20.7 acres of high relief hardbottom and coral reef habitat may be adversely affected. However, many of these habitats occur in areas that were impacted during previous dredging activities within Miami Harbor. Therefore, the total impact to habitats not previously dredged include: 6.3 acres of seagrass, 0.6 acre of low-relief hardbottom, 2.7 acres of high-relief coral reef, 3 acres of rock/rubble, and 23.3 acres of unconsolidated/unvegetated benthic habitat.

The Corps states that a 15.9 acre-mitigation reef was constructed as compensation for hardbottom impacts associated with the 1991 dredging event; therefore, mitigation is proposed for new impacts only. As compensation for the impacts to habitats that were not dredged previously, the Corps has proposed the following: (1) mitigate for the removal of 6.3 acres of seagrass at a ratio of 1:1 through the restoration of a 18.6-acre historic dredged borrow site in northern Biscayne Bay, where the restored acres provided in excess of the 1:1 mitigation ratio would serve as a compensation “bank” for seagrass impacts associated with future Port projects; (2) mitigate for the removal of 2.7 acres of high-relief coral reef habitat at a ratio of 2:1 through the creation of 5.3 acres of high-complexity, high-relief artificial reef habitat; and (3) mitigate for the 0.6 acre of impact to low-relief hardbottom habitat at a ratio of 1.3:1 through the creation of 0.8 acre of low-complexity, low-relief artificial hardbottom habitat. In addition, the Corps has not proposed compensation for the removal of the biotic communities, such as soft corals,

sponges, and hard corals, which have colonized within the existing channel walls since the last dredging event in 1991.

The two types of mitigation reefs to be constructed, high-relief, high-complexity (HRHC) and low-relief, low-complexity (LRLC) reefs are illustrated in Figure 10. The HRHC relief will range in profile from 3 to 6 feet, whereas LRLC will range from 1 to 2 feet. Limestone rock excavated from the channel bed and expansion area will be used in reef construction. If necessary, supplemental, quarried limestone will also be used.

Rock/rubble-based habitats and softbottom marine habitats that lack seagrass are not proposed for mitigation, since the Corps considered that this habitat type will remain after construction and will re-colonize rapidly after construction.

7.1.1 Seagrass

The Corps proposes to compensate for the impacts to 6.3 acres of seagrass habitat at a 1:1 mitigation ratio through restoration of a borrow area in Northern Biscayne Bay. Specifically, the Corps proposes to fill an 18.6-acre borrow area located approximately 1 mile north of the project area, which was created during the construction of the Julia Tuttle Causeway approximately 40 years ago (Figure 8). In addition, any excess seagrass habitat restored as part of the filling the dredged holes with suitable dredged material would be banked by the Port of Miami for future use.

Overall, the Service supports the proposed seagrass mitigation site selected by the Corps. However, the Service recommends that for each acre of seagrasses that is impacted as a result of widening Fishermen's Channel and the Fisher Island Turning Basin, 3 acres be created or restored (3:1 ratio). This includes the impacts during dredging (0.34 acre), as well as the impacts to 6.0 acres adjacent seagrass beds during equilibration of the side-slope ("sloughing") which is reasonably certain to occur based on the calculation of impacts related to the unauthorized seagrass dredging south of Fisherman's Channel in the 1991. The Service considers side-slope sloughing, which is expected to occur within 50 to 70 feet of the channel as a direct impact. As previously stated, the Service believes the restoration of 18.9 acres of seagrass would compensate for the 6.3 acres of seagrass impacted during the construction of Components 3 and 5.

The Corps anticipates that the proposed seagrass mitigation site located north of the Julia Tuttle Causeway will be naturally colonized by seagrass since ample seed source is available from adjacent seagrass beds. The Corps states that further site evaluation will be conducted (including seagrass surveys, bathymetric profiles within and adjacent to each area, the collection and analysis of sediment samples, measurement of ambient PAR and TSS levels) at the site prior to final approval. Dredged material will either be hauled or pumped to the selected borrow area(s) based on engineering analysis, cost and recipient site conditions. It is anticipated that ambient depths will range from minus 2 feet to minus 6 feet MSL in the restored areas following restoration and that seagrass recruitment will likely occur within 3 years by *H. wrightii* and

H. decipiens, both of which likely occur within the shallow flats adjacent to these sites. Other species including *T. testudinum* and *S. filiforme* may colonize the site, but generally only after occupation by the early colonizing species previously cited, which may be at least10 years after construction. Furthermore, the Corps states that in the event that natural recruitment is not observed within 12 months following excavation, methods to plant seagrass donor material will be initiated. Planting methods will be developed following guidance by Fonseca *et al* (1998) and subject to peer review by NMFS and the Service. Detailed plans and specifications for the seagrass creation will be prepared and provided for agency review and comments prior to construction.

To support the Corps' proposed 1:1 mitigation ratio and to validate their determination that the proposed seagrass mitigation has a high probability of success, two examples of "successful" Biscayne Bay seagrass restoration projects were described in the Miami Harbor Draft EIS. However, those projects were much smaller in scale (less than 5 acres) as compared to the proposed mitigation project, a major causeway was not located adjacent to the example sites, natural seagrass beds entirely surrounded the restoration sites (unlike the proposed mitigation site), and monitoring plans were not initiated at either restoration site; therefore, the "success" of the projects was not documented. The Service acknowledges that the examples do provide adequate information for the Service to support the proposed mitigation technique and location. However, they lack the appropriate documentation (*e.g.*, monitoring reports) to support the assumption that the proposed mitigation project: (1) will result in seagrass habitat that will be of higher value than what was impacted; (2) is without risk and has a high probability of success; and (3) additional acreage to address temporal loss of function.

The Service maintains its position that the mitigation ratio should include a 1:1 ratio for habitat replacement, plus additional acreage to replace the function and value of seagrass habitat, as well as, to compensate for the risk associated with seagrass restoration projects. Therefore, the Service recommends that a 3:1 mitigation ratio (18.9 acres) would be more appropriate to compensate for temporal seagrass loss and risk of success associated with seagrass mitigation. The Service bases its mitigation ratio recommendation on the following: (1) natural colonization at the mitigation site will not provide immediate replacement of the impacted habitat since 3 or more years may be required to establish a viable "pioneer" seagrass community, which typically includes shoal grass and paddle grass; (2) a large portion of the anticipated impacts to seagrass will involve turtle grass, which is considered a climax seagrass community; (3) turtle grass often requires at least 10 years to recover naturally; and (4) replanting turtle grass is often ineffective (Fonesca *et al.* 1998). Furthermore, seagrass restoration projects that were considered successful rarely achieved 100 percent recovery due to a number of factors that may limit the restoration success, such as inadequate site preparation, bioturbation, storms and other natural effects.

However as stated above, the Service supports the Corps' decision that the proposed seagrass mitigation site most closely matches the selection criteria as recommended in Fonesca *et al.* 1998. Though the site does not contain the full 18.9 acres recommended for seagrass mitigation, the Service believes that if the entire 18.6 acre site is utilized for seagrass restoration then a 2.9:1 mitigation ratio would be sufficient compensation for 6.3 acres of seagrass impacts

associated with the current project. In the Miami Harbor Draft EIS, the Corps states that success criteria will be established and a seagrass monitoring plan will be followed. The Service recommends that a minimum of 5 years of monitoring should be conducted to ensure recruitment of seagrasses at the mitigation site.

7.1.2 Low-Relief Hardbottom and Coral Reef

As proposed, the project involves the direct impacts to approximately 52.07 acres of high- and low-relief reef and other hardbottom habitat of variable quality and composition (including an estimated 2.67 acres of channel wall habitat). Approximately 3.3 acres (0.6 ac of low-relief, and 2.7 acres of high-relief) of impacts will occur to previously non-dredged habitat. The Corps has not proposed mitigation for direct impacts to previously dredged high- and low- relief hardbottom habitat and rock/rubble habitat within the project footprint.

The Corps has proposed the construction of approximately 5.4 acres of high-complexity, high-relief reef (HCHR) and approximately 0.8 acres of low-complexity, low-relief (LCLR) hardbottom habitat. The proposed mitigation values were determined through the NOAA's Habitat Equivalency Analyses (HEA) (NOAA 2000b) (Appendix B). As a result, the Corps has proposed mitigation at a 2:1 ratio (2 acres of creation for each acre of impact) for new impacts to high-relief reef habitat, and a 1.3:1 ratio for low-relief reef habitat. The proposed locations for mitigation reefs are previously permitted, Miami-Dade County artificial reef sites (Figure 9). The proposed mitigation will include direct replacement for habitat type, to reflect the ecological differences between the reef types impacted. The Service concurs with the proposed mitigation ratios.

The Corps has not proposed mitigation for impacts to previously impacted rock/rubble or high- and low- relief hardbottom habitat located within the existing channel bed and wall. The Service concurs with the Corps that additional mitigation is not required for impacts to rock/rubble habitat since similar substrate will remain after construction and colonization will likely occur fairly rapidly. The Service conducted an analysis to determine the temporal loss of function of the rock/rubble habitat to be impacted. Since colonization of the remaining habitat will likely occur within 2 to 4 years, the temporal loss of function was found to be insignificant; therefore, additional mitigation acreage was not recommended.

The Corps contends that mitigation is not necessary for impacts to previously impacted hardbottom habitat since mitigation was provided for similar impacts. Specific information regarding the mitigation reef (*e.g.*, acreage, location, monitoring reports, acres of habitat impacted, etc.) was requested by during several coordination meetings with the Corps; however, the information was difficult to obtain. In an email dated May 1, 2003, the Corps provided photos and stated that a 15.9 acre-mitigation reef was constructed in 1996 as compensation for impacts associated with the 1991 Miami Harbor dredging project. The Service contacted DERM on May 29, 2003, for additional information regarding the mitigation reef. According to DERM, the 15.9 mitigation reef was constructed as compensation for high-relief coral reef impacts outside of the channel as a result of anchor damage caused by the dredged. Specifics regarding

the exact extent of the damage were not available. Therefore, mitigation has not been provided for hardbottom impacts associated with previous dredging projects in Miami Harbor.

The Service recommends that additional mitigation is provided to compensate for the temporal loss of function as a result of the removal of epibenthic organisms that have colonized previously dredged high-and low-relief hardbottom habitat, including the channel walls, in the past 12 years since the last dredging event. The channel walls are oriented vertically up to 3 feet back from edges (on a horizontal plane) but provide refugia for a large number of federally managed fish and invertebrate species, therefore, these areas are considered low-relief hardbottom habitat. Table 7 below indicates the total acreage of impact to high-and low-relief hardbottom habitats, including the 2.67 acres of channel wall impacts.

Table 7: Acreage of Hardbottom Impacts

Habitat type	**Low-relief hardbottom** (previously dredged acres)	**High-relief hardbottom** (previously dredged acres)	**Low-relief hardbottom** (new impacts acres)	**High-relief hardbottom** (new impacts acres)
Proposed impact acreage	28.1	18.0	0.6	2.7
Proposed mitigation (acres)	0	0	0.8	5.4
			Total= 6.2 acres	
HB Impact Acres, including sidewall impacts	30.7 (incl. 2.6 acres side wall impacts)	18.0	0.8	5.4
	Total =48.7 acres		**Total= 6.2 acres**	

The Service conducted a Mitigation Bank Review Team (MBRT) analysis to determine the temporal loss mitigation acreage for impacts to 48.7 acres of previously impacted hardbottom habitat. Using a temporal loss factor of 12 years for full functional habitat recovery, the creation of 64.64 acres (58.44 acres for temporal loss of previously mitigated hardbottom plus 6.2 acres for new hardbottom impacts) artificial reef would meet the hardbottom mitigation requirements (Table C-1). However, approximately 48.7 acres of similar habitat base (high- and low- relief hardbottom) will remain in the channel after dredging that will likely be re-colonized and/or utilized by similar affected biotic communities. Thereby, the remaining 48.7 channel bottom acres could then be subtracted from the 58.44 acres (MBRT temporal loss mitigation acres), which would result in a deficit of 9.74 acres to be fulfilled by "outside-of-channel footprint" hardbottom artificial reef creation. Therefore, if 9.74 acres of outside-of-channel footprint hardbottom is added to 6.2 acres of new-impact hardbottom mitigation, the Service's final recommended hardbottom mitigation is 15.94 acres (Table 8).

Table 8: Hardbottom Mitigation Recommendations

	Proposed impact acreage	**Proposed mitigation (acres)**		**FWCA Report Impact Calculation (acres)**	**Service's Hardbottom Mitigation Recommendations (acres)**	
Low-relief hardbottom (previously dredged)	28.1	0		30.7 (incl. sidewall impacts 0	58.44 (MBRT result)	**Post-dredging channel footprint** (remaining habitat)
High-relief hardbottom (previously dredged)	18.0	0		0		48.7 acres Total
Low-relief hardbottom (new impacts)	0.6	0.8	6.2	0.6	6.2	

High-relief hardbottom **(new impacts)**	2.7	5.4		2.7		Total hardbottom mitigation recommended **6.2 +9.74= 15.94 Acres**

8.0 RECOMMENDATIONS

The Service offers the following recommendations regarding the proposed mitigation and monitoring:

(1) As compensation for the loss of 6.3 acres of seagrass within designated manatee Critical Habitat and the Bill Sadowski State Critical Wildlife Area, the Service recommends that 18.6 acres of seagrass mitigation is provided at a 2.9:1 ratio. The Service maintains its position that seagrass mitigation proposed at a 1:1 ratio is insufficient.

(2) Detailed seagrass surveys to locate and quantify the existing seagrass coverage within the proposed seagrass mitigation site should be conducted. Since the Service maintains that the proposed seagrass mitigation site should be dedicated in its entirety as compensation for seagrass impacts associated with the proposed project, additional mitigation acreage for unavoidable impacts to seagrass within the proposed seagrass mitigation site should be provided.

(3) The project monitoring plan should include surveys during and after construction for potential impacts as a result of dredge anchors and cables. If impacts to hardbottom or seagrass habitat are documented, mitigation should be provided at ratios previously determined for “new” impacts.

In the Draft FWCA report, the Service provided recommendations to the Corps to avoid and minimize impacts to fish and wildlife resources. The Corps provided the following responses to our recommendations.

(1) As compensation for direct impacts to hardbottom habitat, as well as temporal loss of function to hardbottom habitat with the previously dredged channels, the Service recommends that 19.3 acres (now reduced to 15.94 acres) of in-kind mitigation is provided.

Corps response: The Corps rejects the recommendation to provide compensation for impacts within the previously dredged channel since mitigation has been provided.

The information provided to the Service by the Corps regarding the mitigation reef indicated that a 15.9 acre mitigation reef was constructed as compensation related to hardbottom impacts within the channel as a result of the 1991 harbor dredging event, but details regarding the type or extent of impact were not provided. Based on information provided by DERM, the mitigation reef was constructed as compensation for anchor and cable impacts. Therefore, the Service maintains its position that in-kind mitigation in the amount of 15.94 acres should be provided as compensation for the direct impacts to hardbottom habitat in the project area, as well as, the temporal loss of function of the hardbottom habitat located within the previously dredged channels.

(2) Remove and relocate all brain and star coral larger than 6 inches within the 2.7 acres of high-relief coral reef impact area, which has not been previously dredged, by authorized and experienced personnel to appropriate areas within the vicinity of the original location and include monitoring provisions. However, in our January 14, 2003, letter to the Corps, the Service revised this recommendation as follows: Remove and relocate all hard coral colonies larger than 6 inches in diameter within the project footprint, including the previously dredged areas by experienced personnel through established methods to suitable nearby hardbottom substrate. Biological monitoring should be instituted.

Corps Response: The Corps stated that the recommendation, as amended, is not feasible due to the costs associated with surveying and mapping 49 acres of hardbottom communities in the project area. However, the Corps will discuss the recommendation with the non-Federal sponsor to consider the relocation of hard corals within the 3.1 acres of reef that has not been previously impacted.

The Service strongly recommends the removal and relocation of all stony corals larger than 6 inches specifically within the entrance channel and Fisher Island turning basin. Significant stony corals, such as a brain coral greater than 2 feet in diameter, were observed in notable locations within the entrance channel and Fisher Island turning basin by the Service, NMFS, and the Corp's consultant during our site visits to the project area. Since video surveys of the channels in Miami Harbor have been conducted, the Service recommends review of the existing video data to select specific areas to survey for detailed evaluation.

The Service acknowledges the Corps' funding constraints during the Feasibility stage of project planning; however, the detailed hard coral surveys within the channel can be conducted during the Preconstruction Engineering and Design phase of the project, if Congress approves the appropriations for the project under Water Resources Development Act.

If the Corps maintains their objection to hard coral removal and relocation, then the Service recommends that the HEA and MBRT analysis are recalculated to address the significant increase of recovery time for those species, particularly in the proposed

entrance channel expansion areas, as well as the portions of the entrance channel and Fisher Island turning basin that were last dredged in 1968. Therefore, the mitigation acreage for hardbottom impacts should increase to reflect the increased temporal loss of function, since the present assumption of 12 year factor will no longer be valid, even at a coral growth rate of greater than 1 centimeter per year.

(3) The Service should be provided with final details for disposal methods, land-use history and current habitat data for areas adjacent to the upland disposal site on Virginia Key and resource information for areas surrounding seagrass mitigation sites (which will receive some spoil material). If necessary, Service staff may visit the sites to ensure that there are no anticipated adverse impacts to jurisdictional wetlands, surface waters, or protected species. If the upland site is judged adequate for disposal based on lack of effects to fish and wildlife, especially the threatened American crocodile, the Service recommends that discarded materials be contained in a diked area and that Best Management Practices are followed in order to prevent erosion and runoff following storm events and dewatering. Plans should include turbidity containment devices at the dewatering outfall.

The Service requests participation in the development of a water quality monitoring program to determine if turbidity levels (and contaminant levels, if relevant) may be adversely affecting fish and wildlife resources and/or habitats in or adjacent to the project area. The Service recommends water quality monitoring to occur at regular intervals, particularly in reef and seagrass communities, during dredging activities to ensure compliance with State of Florida water quality requirements. In addition, the Service requests copies of all water quality data resulting from sampling activities both during and after dredge operations. Finally, a contingency plan to halt operations must be in place should suspended sediment concentrations exceed acceptable levels. A 150-meter allowable mixing zone near the cutterhead dredge would be exempt from data collection for monitoring purposes.
Corps response: If the upland disposal site will be used for material disposal, details of that disposal site can be provided to the Service if it is determined that any resources under the Services jurisdiction will be impacted.

(4) A monitoring plan to evaluate the extent of the impact to hardbottom habitat should be submitted to the Service and NMFS, and all data/reports pertaining to recovery of coral and sponge communities on channel walls must be submitted to the Service in Vero Beach office and the Miami NMFS office. The monitoring plan should include survey methodology to determine the extent of the direct and indirect effects of the construction activities on the channel walls and previously dredged channel bottom associated with the Miami Harbor expansion. In addition, hardbottom reef sedimentation monitoring should be instituted during dredging regardless of the water column exemption for turbidity monitoring within the stated 150-foot mixing zone. Schedule for submittal, monitoring parameters, and methods, will correspond with artificial reef monitoring.

Corps Response: When a detailed mitigation plan is completed, this will be submitted to

the resource agencies, including the Service, if it is determined that any resources under the Service's jurisdiction. The Corps will adhere to the monitoring requirements of the DEP's Water Quality Certificate, when issued and accepted.

(5) Implement an effective watch program during blasting that is designed to delay detonation until the designated safety zone is clear of marine mammals and/or sea turtles to minimize possible adverse effects to listed species during blasting activities, as described in the following section. The most effective watch program consists of the primary survey observer based in an aircraft with secondary observers on boats, bridges, and/or land with sufficient communication among all observers and the demolition contractor.

Corps Response: As stated in the Corps' Draft EIS and Biological Assessment submitted to the Service, the Corps will instigate an effective watch program to be initiated during blasting activities during port construction that will include a safety zone to ensure protection of listed species in the action area.

(6) During the coordination meetings, troubleshoot for potential problems such as radio contact failure among observers and/or the blasting subcontractor, poor weather or visibility issues, etc., and develop a contingency plan to resolve the issues.

Corps Response: A coordination meeting will be held between the parties involved in the construction and observations to address these potential issues.

(7) Schedule construction activities (blasting and dredging) outside of the winter season, November through March, when manatees are more dispersed.

Corps Response: The Corps has established a manatee and protected species protection plan that prohibits blasting when any of those animals are within a certain radius of the blasting activities. During the winter months, when manatee densities may be higher near the project area, the Corps may not be able to blast as often as during the summer months. The Corps will not blast when manatee or other protected species, enter the no blast zone. Since the standard manatee protection techniques, which were developed in conjunction with the Service, will be implemented, the Corps believes that limiting dredging seasonally is unnecessary.

To further minimize possible adverse affects of blasting on the manatee, the Service maintains its recommendation to limit blasting activities to outside of the winter season.

(8) The Service recommends decreasing the impact area (seagrass, hardbottom, and sandy bottom), as much as possible by narrowing the channel width as much as is practicable. Likewise, impacts to reefs at the east end of the entrance channel should also be reduced as much as is practicable.

Corps response: The Corps has minimized the width of the channels as much as vessel safety allows through consultation and vessel simulation with the Port Harbor Pilots as well as the Coast Guard.

(9) Since larger and less maneuverable ships will be utilizing Miami Harbor, there may be an increased need for use of tugboats to position vessels. Therefore, the Service recommends that tugs be required to have kort nozzles or ducted propellers, and that operators are sure that no manatees are behind tugs when backing.

Corps response: The Corps states that it has no jurisdictional authority to implement this recommendation.

The Service recommends that the non-Federal sponsor consider this recommendation to minimize the potential effects of an increase in the number of tugs and tug activity that will be required to accommodate Super Post-Panamax vessels.

(10) Minimize possible adverse effects to nesting sea turtles and hatchlings by reducing or redirecting the lighting on offshore equipment and/or vessels.

Corps response: The NMFS biological opinion, which will address possible adverse affects of the project on listed marine turtles, will address dredging, blasting, and lighting concerns.

(11) Any incident involving the death or injury of listed species should be immediately reported to the Service (Vero Beach), NMFS (St. Petersburg office), and the Corps (Jacksonville District).

Corps response: The Corps concurs.

(12) Best Management Practices (BMPs) should be implemented to prevent excessive siltation during hopper barge loading (if such a vehicle is used). Proper maintenance of dredging equipment, the use of silt curtains or gunderbooms, performing operations when protected species are not present, and dredging only when environmental conditions are not contributory to siltation/sediment transport would minimize the impacts to fish and wildlife resources. It is recommended that certain protocols be followed, depending on the method used for dredging. If a hopper dredge is used, operators are recommended to eliminate or reduce hopper overflow, lower hopper fill-level, and use a recirculation system. If a mechanical dredge is used, operators should increase cycle time and eliminate both multiple bites and bottom stockpiling. For operations where a hydraulic dredge is used, cutterhead rotation speed and swing speed should be reduced, and bank undercutting should be eliminated. When applicable, special equipment, such as pneuma pumps, closed buckets, large capacity dredges, and precision dredging tools and technologies, are recommended to further decrease the potential for adverse effects to

marine communities (Corps 2001a).

Care should be taken during dredging efforts to limit the amount of fine sediment re-suspended to assure that impacts to adjacent seagrass beds and coral reefs would be minimized. If possible, turbidity containment devices should be installed.

Corps response: The Corps concurs.

(13) Due to the level of fine-grained material present in the benthic sediments of Biscayne Bay, this material should not be used for beach renourishment activities, instead it should be used as substrate at the seagrass restoration site.

Corps response: None of the material that will be dredged from the Miami Harbor Project will be placed on Miami Beaches.

(14) Biological monitoring should be conducted during a test blast in order to assess damage to populations of managed and protected fish species, and hence assess whether blasting impacts exceed acceptable levels. If results indicate that blasting has only minimal impacts on populations, and other Service recommendations are followed, blasting may be used where absolutely necessary. However, further monitoring would be required during project blasting. After each blast during project implementation, it is recommended that the effects of blasting on EFH and managed species, and species protected under the ESA or MMPA is determined. This plan should be coordinated and approved by Service and NMFS, and should ensure that no incidental take of manatees, sea turtles or sawfish occurs during construction (dredging, blasting, and hopper barge transport), and that harassment as defined by the MMPA is avoided. Use of hydrophones and other technologies to determine likely impacts is encouraged.

Corps response: The Corps does not expect any incidental take to occur as a result of our current blasting program.

(15) Continue bi-annual monitoring of mitigation areas for a minimum of 10 years to ensure acreage is maintained and remediate, if required.

Corps response: The Corps will adhere to the monitoring requirements of the DEP's Water Quality Certificate, when issued and accepted.

In addition, the Service strongly recommends inclusion of the following in the project design, to further minimize and reduce potential adverse effects of blasting on listed species, as excerpted from the FWC's Endangered Species Conservation Conditions for Blasting Activities dated June 2001.

(5) The FWC and Service must review a Blasting Proposal prior to any blasting activities. The blasting proposal must include information concerning a watch program and details

of the blasting events. This information must be submitted in writing at least 30 days prior to the proposed date of the blast(s) to the FWC, OES-BPS, 620 South Meridian Street, Tallahassee, Florida 32399-1600 and the Service's South Florida Ecological Services Office, 1339 20th Street, Vero Beach, Florida 32960. At a minimum, it should include the following information:

a) A list of observers, qualifications, and positions for the watch, including a map depicting the proposed locations for the boat or land-based observers.

b) The amount of explosive charge proposed, the explosive charge's equivalency in TNT, how it will be executed (depth of drilling, in-water, etc.), a drawing depicting the placement of the charges, size of the safety radius and how it will be marked (also depicted on a map), tide tables for the blasting event(s), and time tables (days and times) for blasting event(s).

(6) A formal watch coordination meeting at least 2 days prior to the first blast event. Attendants should include the designated observers, construction contractors, demolition subcontractors, and other interested parties such as the Service, FWC, and NMFS. All participants will be informed about the possible presence of manatees, dophins, marine turtles or whales in nearshore areas and that civil or criminal penalties can result from harassment, injury, and/or death of a listed species.

(7) The watch program should begin at least 1 hour prior to the scheduled start of blasting to identify the possible presence of manatees, dolphins, marine turtles or whales, if applicable. The watch program shall continue until at least one half-hour after detonations are complete.

(8) The watch program shall consist of a minimum of six observers. Each observer shall be equipped with a two-way radio that shall be dedicated exclusively to the watch program. Extra radios should be available in case of failures. All of the observers shall be in close communication with the blasting subcontractor in order to halt the blast event if the need arises. If all observers do no have working radios and cannot contact the primary observer and the blasting subcontractor during the pre-blast watch, the blast shall be postponed until all observers are in radio contact observers will be equipped with polarized sunglasses, binoculars, a red flag for backup visual communication, and a sighting log with a map to record sightings. All blasting events will be weather dependent. Climatic conditions must be suitable for optimal viewing conditions, determined by the observers.

(9) The watch program shall include a continuous aerial survey to be conducted by aircraft. The event shall be halted if an animal(s) is spotted within 300 feet of the perimeter of the safety zone or the danger zone as defined by the Corps in their project description. An "all-clear" signal must be obtained from the aerial observer before detonation can occur.

The blasting event shall be halted immediately upon request of any of the observers. If animals are sighted, the blast event shall not take place until the animal(s) move out of the area under their own volition. Animals shall not be herded away or harassed into leaving. Specifically, the animal must not be intentionally approached by project watercraft. If the animal(s) is not sighted a second time, the event may resume 30 minutes after the last sighting.

(10) The observers and contractors shall evaluate any problems encountered during blasting events and logistical solutions shall be presented to the Service and the FWC. Corrections to the watch shall be made prior to the next blasting event. If any one of the aforementioned conditions is not met prior to or during the blasting, the watch observers shall have the authority to terminate the blasting event until resolution can be reached with the Service and FWC.

(11) If an injured or dead marine mammal or turtle is sighted after the blast event, the watch observers shall contact the Service at 772-562-3909 and the FWC through the Manatee Hotline at 1-888-404-FWCC and 850-922-4330. The observers shall maintain contact with the injured or dead marine mammal or sea turtle until authorities arrive. Blasting shall be postponed until the Service and FWC can determine the cause of injury or mortality. If blasting injuries are documented, all demolition activities shall cease. A revised plan shall then be submitted to the Service and FWC for approval.

(12) Within 14 days after completion of all blasting events, the primary observer shall submit a report to the Service and FWC providing a description of the event, number and location of animals seen and what actions were taken when the animals were seen. Any problems associated with the events and suggestions for improvements shall also be documented in the report.

9.0 SUMMARY OF THE SERVICE'S POSITION

In conclusion, implementation of the Recommended Plan may impact fish and wildlife resources directly and indirectly as a result of dredging and/or blasting activities. The fish and wildlife resources likely to be directly and indirectly affected include: seagrasses, low-relief hardbottom, high-relief coral reefs, rock/rubble habitat, and shallow sandy bottom habitat. However, the Corps has proposed to avoid and minimize potential adverse effects through the redesign or exclusion of certain project elements and the implementation of listed species protection plans during construction activities.

In total, the Corps estimates that 6.3 acres of seagrass, 31.4 acres of low-relief hardbottom, 20.7 acres of high-relief coral reef, 123.5 acres of rock/rubble, and 236.4 acres of unconsolidated/ unvegetated benthic habitat will likely be adversely affected as a result of the expansion of Miami Harbor. However, many of these habitats occur in areas that were impacted during previous dredging activities within Miami Harbor. Therefore, the total impact of habitats not previously dredged and proposed for mitigation include: 6.3 acres of seagrass, 0.6 acre of

low-relief hardbottom, 2.7 acres of high-relief coral reef.

As compensation for the effects of the action on previously non-dredged habitats, the Corps has proposed the following: (1) mitigate for the removal of 6.3 acres of seagrass at a ratio of 1:1 through the restoration of a 18.6-acre historic dredged borrow site in northern Biscayne Bay and bank the remaining acreage for potential seagrass impacts related to future Port dredge projects; (2) mitigate for the removal of 2.7 acres of high-relief coral reef habitat at a ratio of 2:1 through the creation of 5.4 acres of high-complexity, high-relief artificial reef habitat; and (3) mitigate for the 0.6 acre of impact to low-relief hardbottom habitat at a ratio of 1.3:1 through the creation of 0.8 acre of low-complexity, low-relief artificial hardbottom habitat. The Corps has not proposed compensation for the removal of the biotic communities that have colonized the channel walls since the last dredging event in 1991.

The Service has provided several recommendations in this document concerning blasting, monitoring, and mitigation to further minimize or avoid possible adverse effects of the action on fish and wildlife resources. Specifically, for the permanent removal hardbottom reef communities and seagrass habitat, as well as, the temporal loss of function of the invertebrate communities and habitat located within the existing channel, the following compensatory mitigation and monitoring are recommended: (1) restore 18.6 acres of seagrass habitat (2.9:1 ratio); (2) develop a Seagrass Monitoring Plan that contains success criteria that is consistent with Fonesca (1998); (3) provide additional mitigation for potential seagrass impacts within the proposed seagrass mitigation site; (4) create a 15.94 acre mitigation reef to compensate for the direct impact to all hardbottom habitat, as well as, the temporal loss of function of hardbottom habitat located within the previously dredged channels; (5) relocate existing stony coral greater than 6 inches in base diameter; and (6) recalculate mitigation acreage based on an increased time for recovery, if stony corals are not removed from the entrance channel and Fisher Island turning basin and relocated to a suitable area outside of the project area. In addition, the development of a comprehensive (pre, during, post project) environmental monitoring program is recommended to verify that project impacts occurred within the levels anticipated and to ensure that the mitigation areas are performing to level where habitat replacement values are maintained. The monitoring program should include damage assessments of the dredge anchoring and cable areas, as well as, include surveys of the hard coral relocation sites to determine transplant success.

The Service concurs with the Corps determination that the construction activities related to the modification of Miami Harbor to accommodate the expansion of the Port of Miami “may affect, but is not likely to adversely affect” the West Indian manatee and the American crocodile since appropriate monitoring to minimize these effects will be incorporated into the project design. In addition, the effects of the action will not result in the adverse modification to designated Critical Habitat for the West Indian manatee if sufficient mitigation is provided for seagrass impacts.

This final report is submitted in accordance with the FWCA and constitutes the final report of the Secretary of the Interior as required by Section 2(b) of the FWCA.

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APPENDIX A
History of the Miami Harbor Federal Project

MIAMI HARBOR, FLORIDA
Condition of Improvement, 30 September 1996

ACTS, WORK AUTHORIZED, and DOCUMENTS:

MIAMI RIVER
3 Jul 1930 Channel 15 feet deep by 90-150 feet wide Specified in Act.

MIAMI HARBOR
13 June 1902 Channel (Government Cut) 18 feet deep across
peninsula and north jetty H. Doc.662/56/1 &
A.R. for 1900 p.1987

2 March 1907 South Jetty and channel 100 feet wide. Specified in Act.

25 July 1912 Channel 20 feet deep by 300 feet wide and extension of Jetties H. Doc. 554/62/2

3 March 1925 Channel 25 feet deep at entrance and 25 feet deep by 200 feet across Biscayne Bay H. Doc. 516/67/4

3 July 1930 Channel 300 feet wide across Biscayne Bay and enlarging municipal turning basin. R. & H. Comm.
Doc. 15/71/2

30 August 1935 Depth of 30 feet to and in turning basin. S. Comm. Print 73.2

26 August 1937 Widen turning basin 200 feet on south side. R. & H. C.
Doc. 86/74/2

2 March 1945 Virginia Key improvement. (Deauthorized) S. Doc. 251/79/2

2 March 1945 Consolidation of Miami River and Miami Harbor projects; widening at mouth of Miami River (Deauthorized); a channel from the mouth of the river to the Intracoastal Waterway (Deauthorized); thence a channel from the Intracoastal Waterway to Government Cut(Deauthorized); and a channel from Miami River to harbor of refuse in Palmer Lake (Deauthorized). H. Doc. 91/79/1

14 July 1960 Channel 400 feet wide across Biscayne Bay; enlarge turning basin 300 feet on south and northeasterly sides; dredge turning basin on north side Fisher Island; deauthorize Virginia Key development. S. Doc. 71/85/2

13 August 1968 Enlarging the existing entrance channel to 38-foot depth and 500-foot width from the ocean to the existing beach line; deepening the existing 400-foot wide channel across Biscayne Bay to 36 feet; and deepening the existing turning basin at Biscayne Boulevard terminal and Fisher Island to 36 feet. S. Doc. 93/90/2

17 November 1986 Deauthorized the widening at the mouth of Miami River to existing project widths; and the channels from the mouth of Miami River to the turning basin, to Government Cut, and to a harbor of refuge in Palmer Lake. Public Law 99-662

28 November 1990 Deepening the existing Outer Bar Cut, Bar Cut, and Govt Cut to a depth of 44 ft.; Enlarging Fishermans Channel, south of Lummus Island, to a depth of 42 ft. and a width of 400 ft.; and Constructing a 1600 ft. diameter Turning Basin near the west end of Lummus Island to a depth of 42 ft. Public Law101-640
11/28/90

PROJECT: A channel 38 feet deep by 500 feet wide from the ocean to the existing beach line, thence 36 feet deep by 400 feet wide through the entrance and across Biscayne Bay and including a turning basin 16,500 feet wide and 1,700 feet long at the seaport terminals; two jetties at entrance; a turning basin along the north side of Fisher Island, about 39 acres in extent and 36 feet deep; a channel in Miami River 15 feet deep under flood conditions, 150 feet wide for 3 miles thence 125 feet wide for 1.1 miles, and thence 90 feet wide for 1.4 miles. Length of project is about 11.5 miles including 6.0 miles of channel from ocean to seaport terminals; and 5.5 miles in river, from its mouth westerly.

LOCAL COOPERATION: 204(e) Agreement between the U.S. Army Corps of Engineers and Port of Miami, Nov. 1991.

PROGRESS: Phase I of the project authorized by the 1990 Act is complete. Phase II was awarded for construction in September 1994 and is scheduled for completion in June 1998.

COST:

SPONSOR: Port of Miami
1015 North American Way
Miami, Florida 33132

Source:	http://www.saj.usace.army.mil/digitalproject/dpn/sajn_021.htm
Accessed:	8 May 2002
Date	
Page Created:	04/23/98
Date	
Page Last Updated:	10/17/01
Point of Contact:	Barry.D.Vorse@saj02.usace.army.mil

APPENDIX B
Habitat Equivalency Analyses

Table B-1: HEA effective acreage gained from recovery of low-relief hardbottom

Assumptions: dredging leaves 10% service, w/ linear increase

Year	% service level	% service loss	effective ac lost	discount factor	discount eff ac lost
2003	10.00%	90.00%	0.60	0.97	0.58
2004	17.50%	82.50%	0.50	0.94	0.47
2005	25.00%	75.00%	0.45	0.91	0.41
2006	32.50%	67.50%	0.41	0.88	0.36
2007	40.00%	60.00%	0.36	0.85	0.30
2008	47.50%	52.50%	0.32	0.82	0.26
2009	55.00%	45.00%	0.27	0.79	0.21
2010	62.50%	37.50%	0.23	0.76	0.17
2011	70.00%	30.00%	0.18	0.73	0.13
2012	77.50%	22.50%	0.14	0.70	0.09
2013	85.00%	15.00%	0.09	0.67	0.06
2014	92.50%	7.50%	0.05	0.64	0.03
2015	100.00%	0.00%	0.00	0.61	0.00
				total effective-acre years/ac:	3.07

Table B-2: HEA effective acreage gained from recovery of low-relief hardbottom

Assumptions: 20% service immediate, w/ linear increase

Year	% service level	% service increase	discount factor	discount eff ac gain
2003	20.00%	0.00%	1.00	0.00
2004	26.67%	6.67%	0.97	0.06
2005	33.33%	13.33%	0.94	0.13
2006	40.00%	20.00%	0.91	0.18
2007	46.67%	26.67%	0.88	0.23
2008	53.33%	33.33%	0.85	0.28
2009	60.00%	40.00%	0.82	0.33
2010	66.67%	46.67%	0.79	0.37
2011	73.33%	53.33%	0.76	0.41
2012	80.00%	60.00%	0.73	0.44
2013	86.67%	66.67%	0.70	0.47
2014	93.33%	73.33%	0.67	0.49
2015	100.00%	80.00%	0.64	0.51
			total effective-acre years/ac:	3.90

Table B-3: HEA acreage calculation for low-relief hardbottom compensation

impact area		0.6
present discounted interim losses		3.07
present discounted lifetime gains per acre of replacement project		3.9
R= # acres required for compensation		
3.07=3.9*R		
R=	3.07/3.9	
R=	0.787179	
	effective mitigation to compensation ratio:	1.316667

Table B-4: HEA effective acreage lost from impacts to high-relief reefs

Assumptions: dredging leaves 10% service, w/ linear increase

Year	% service level	% service loss	effective ac lost	discount factor	discount eff ac lost
2003	10.00%	90.00%	2.70	0.97	2.62
2004	13.00%	87.00%	2.35	0.94	2.21
2005	16.00%	84.00%	2.27	0.91	2.06
2006	19.00%	81.00%	2.19	0.88	1.92
2007	22.00%	78.00%	2.11	0.85	1.78
2008	25.00%	75.00%	2.03	0.82	1.65
2009	28.00%	72.00%	1.94	0.79	1.53
2010	31.00%	69.00%	1.86	0.76	1.41
2011	34.00%	66.00%	1.78	0.73	1.29
2012	37.00%	63.00%	1.70	0.70	1.19
2013	40.00%	60.00%	1.62	0.67	1.08
2014	43.00%	57.00%	1.54	0.64	0.98
2015	46.00%	54.00%	1.46	0.61	0.88
2016	49.00%	51.00%	1.38	0.58	0.79
2017	52.00%	48.00%	1.30	0.55	0.71
2018	55.00%	45.00%	1.22	0.52	0.63
2019	58.00%	42.00%	1.13	0.49	0.55
2020	61.00%	39.00%	1.05	0.46	0.48
2021	64.00%	36.00%	0.97	0.43	0.41
2022	67.00%	33.00%	0.89	0.40	0.35
2023	70.00%	30.00%	0.81	0.37	0.30
2024	73.00%	27.00%	0.73	0.34	0.25
2025	76.00%	24.00%	0.65	0.31	0.20
2026	79.00%	21.00%	0.57	0.28	0.16
2027	82.00%	18.00%	0.49	0.25	0.12
2028	85.00%	15.00%	0.40	0.22	0.09
2029	88.00%	12.00%	0.32	0.19	0.06
2030	91.00%	9.00%	0.24	0.16	0.04
2031	94.00%	6.00%	0.16	0.13	0.02
2032	97.00%	3.00%	0.08	0.10	0.01
2033	100.00%	0.00%	0.00	0.07	0.00
			total effective-acre years/ac:		25.76

Table B-5: HEA effective acreage gained from recovery of high-relief reefs

Assumptions: 20% service immediate, w/ linear increase

Year	% service level	% service increase	discount factor	discount eff ac gain
2003	20.00%	0.00%	1.00	0.00
2004	22.67%	2.67%	0.97	0.03
2005	25.33%	5.33%	0.94	0.05
2006	28.00%	8.00%	0.91	0.07
2007	30.67%	10.67%	0.88	0.09
2008	33.33%	13.33%	0.85	0.11
2009	36.00%	16.00%	0.82	0.13
2010	38.67%	18.67%	0.79	0.15
2011	41.33%	21.33%	0.76	0.16
2012	44.00%	24.00%	0.73	0.18
2013	46.67%	26.67%	0.70	0.19
2014	49.33%	29.33%	0.67	0.20
2015	52.00%	32.00%	0.64	0.20
2016	54.67%	34.67%	0.61	0.21
2017	57.33%	37.33%	0.58	0.22
2018	60.00%	40.00%	0.55	0.22
2019	62.67%	42.67%	0.52	0.22
2020	65.33%	45.33%	0.49	0.22
2021	68.00%	48.00%	0.46	0.22
2022	70.67%	50.67%	0.43	0.22
2023	73.33%	53.33%	0.40	0.21
2024	76.00%	56.00%	0.37	0.21
2025	78.67%	58.67%	0.34	0.20
2026	81.33%	61.33%	0.31	0.19
2027	84.00%	64.00%	0.28	0.18
2028	86.67%	66.67%	0.25	0.17
2029	89.33%	69.33%	0.22	0.15
2030	92.00%	72.00%	0.19	0.14
2031	94.67%	74.67%	0.16	0.12
2032	97.33%	77.33%	0.13	0.10
2033	100.00%	80.00%	0.10	0.08
			total effective-acre years/ac:	4.84

Table B-6: HEA acreage calculation for high-relief compensation

injured area	2.7
present discounted interim losses	25.76
present discounted lifetime gains per acre of replacement project	4.84

R= # acres required for compensation

25.76=4.84*R

R= 25.76/4.84

R= 5.322314

effective mitigation to compensation ratio: 1.971227

APPENDIX C
Calculation of Compensation for Temporal Loss of Habitat

Table C-1: MBRT acreage calculations for compensation for adverse effects to previously impacted hardbottom habitat, including channel walls.

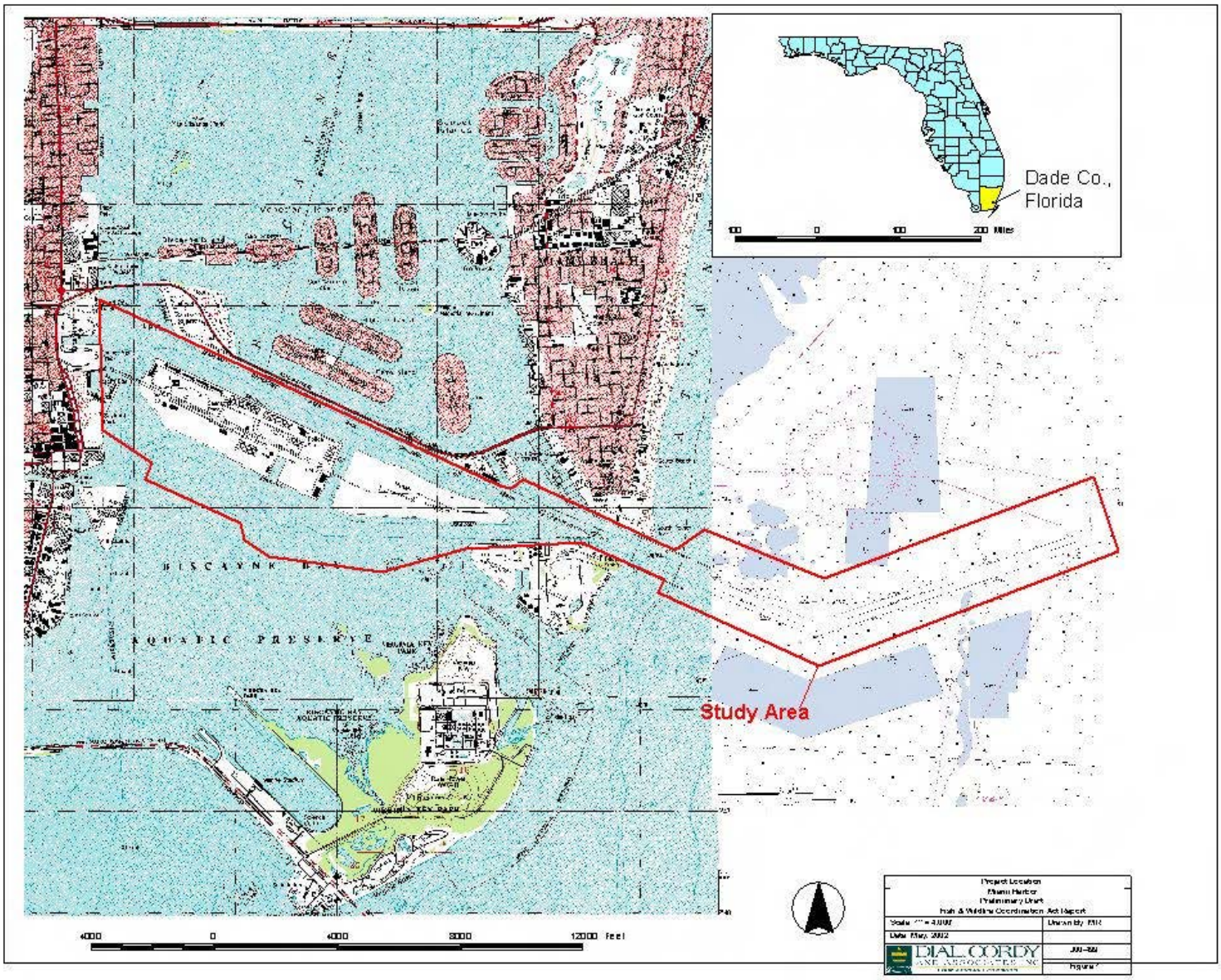
Previously Dredged Hardbottom (Component 1: Low-and High-Relief Hardbottom)

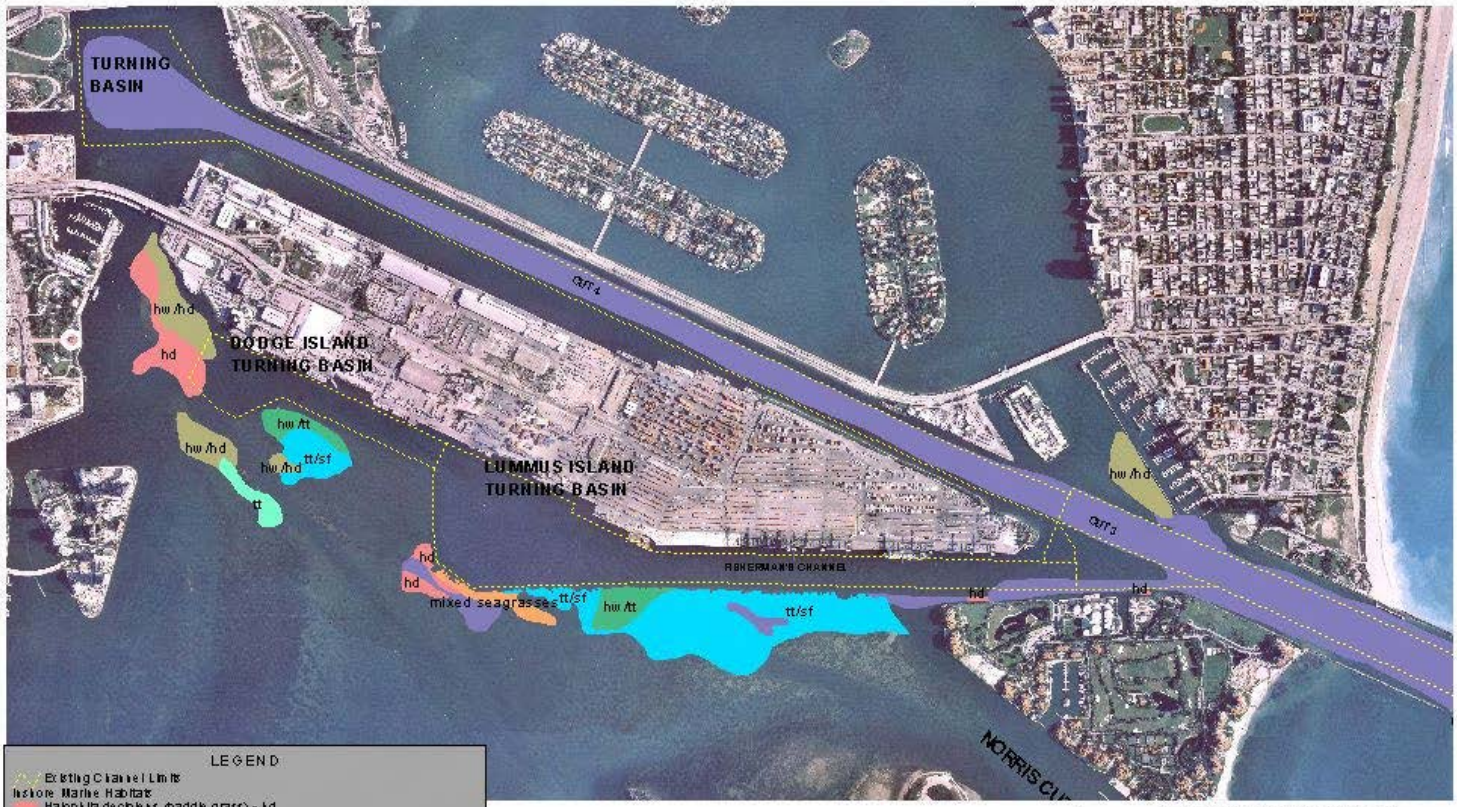
Δ TA = F	where:
Δ =	change in the capacity of an individual habitat function for a given polygon (0.90)
T =	temporal lag factor correction to account for temporal losses of habitat function (0.8339 from table)
A =	area for impacts, or unknown mitigation area
F =	functional units
48.7	= A = impacts to habitats requiring **12** years for recovery, i.e., channel bottom habitat, not including previous mitigation acreage. (from GIS analyses)
0.9x48.7=	functional units in impact area
43.83	= F = functional units in impact area
0.9x.8333(A)=43.83	compensation equation
A= 43.83 / 0.75 A= 58.44	area required for mitigation of temporal loss of habitat, previously impacted high- and low-relief hardbottom habitat , including channel walls.

Channel Wall (Component 1: Low-relief hardbottom within the areas proposed for widening)

Δ TA = F	where:
Δ =	change in the capacity of an individual habitat function for a given polygon (0.90)
T =	temporal lag factor correction to account for temporal losses of habitat function (0.9507from table)
A =	area for impacts, or unknown mitigation area
F =	functional units
2.67	= A = impacts to habitats requiring **4** years for recovery, i.e., channel wall habitat (from GIS analyses)
0.9x2.67=	functional units in impact area
2.403	= F = functional units in impact area
0.9x.9507(A)=2.40	compensation equation
2.8 = A	area required for mitigation of temporal loss of habitat, previously impacted substrates in area proposed for widening

APPENDIX D: Figures

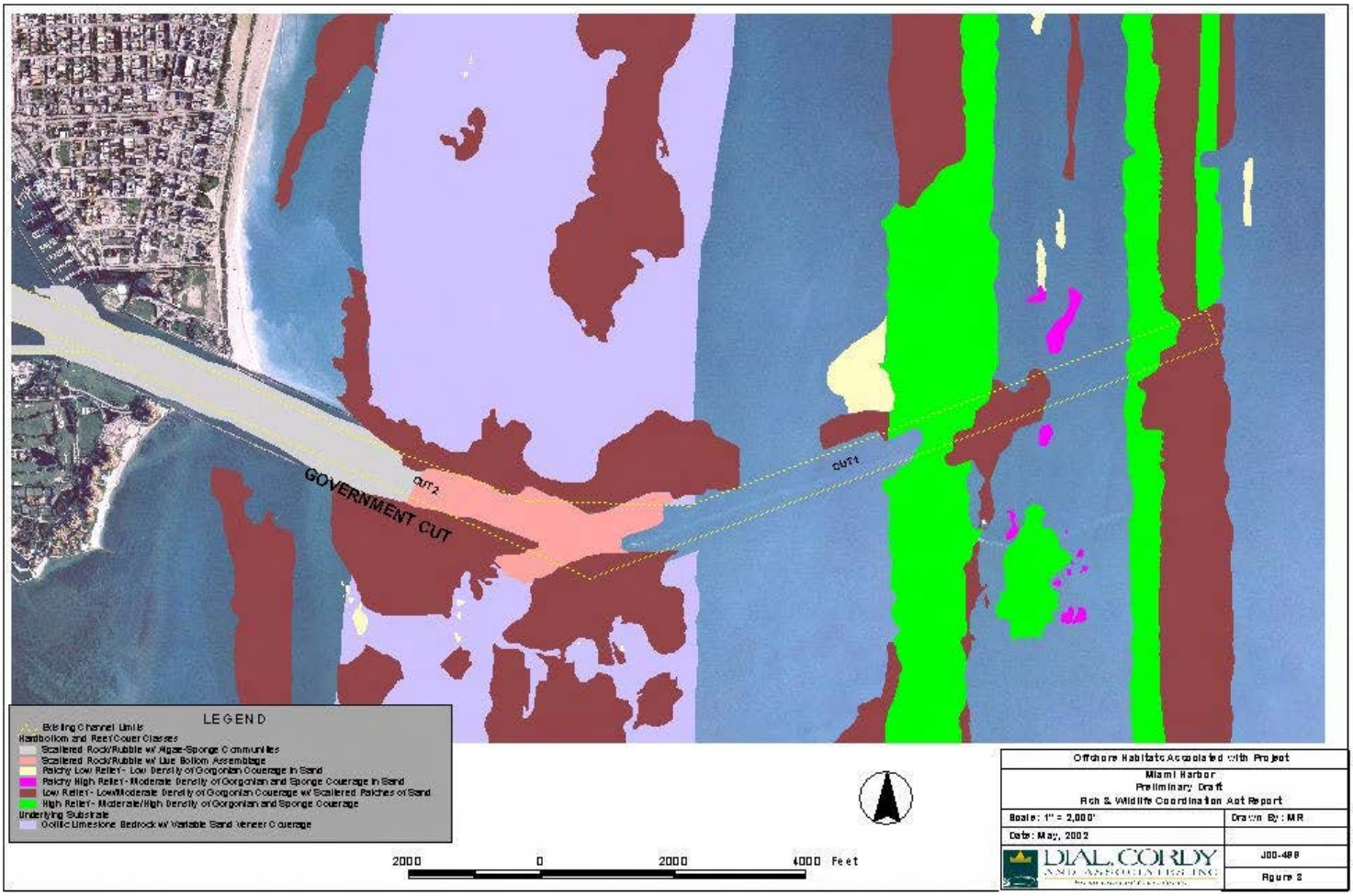

Dade Co.,
Florida
100
0
100
200 Miles
BISCAYNE BAY
AQUATIC PRESERVE
Study Area
4000
0
4000
8000
12000 Feet
Project Location
Miami Harbor
Preliminary Draft
Fish & Wildlife Coordination Act Report
Date: May, 2002
DIAL CORDY
AND ASSOCIATES INC



Inshore Habitats Associated with Project

Miami Harbor
Preliminary Draft
Fish & Wildlife Coordination Act Report

Scale: 1" = 2,000'	Drawn By: MR
Date: May, 2002	
DIAL CORDY AND ASSOCIATES INC	J00-488
	Figure 2



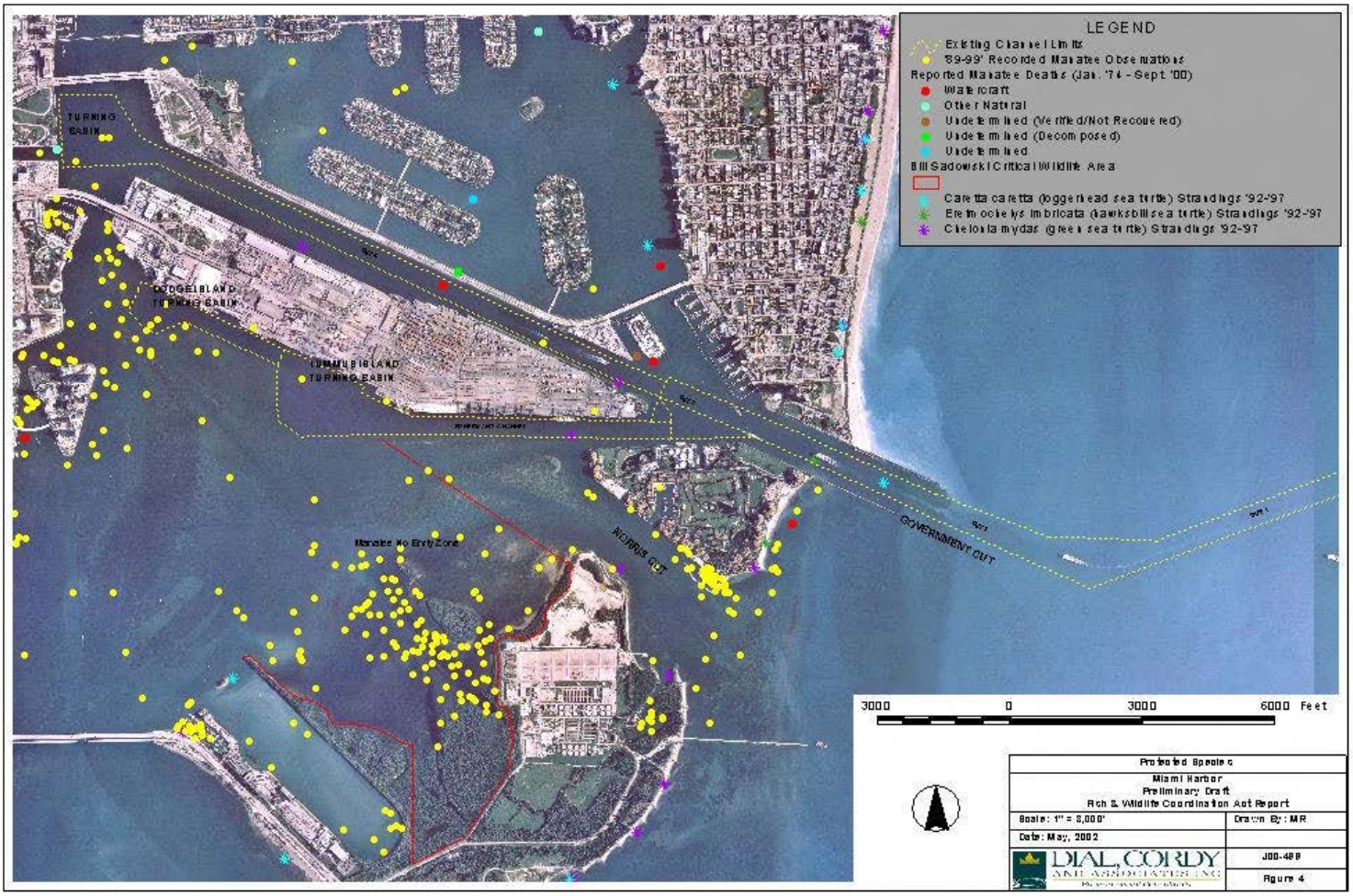
Offshore Habitats Associated with Project

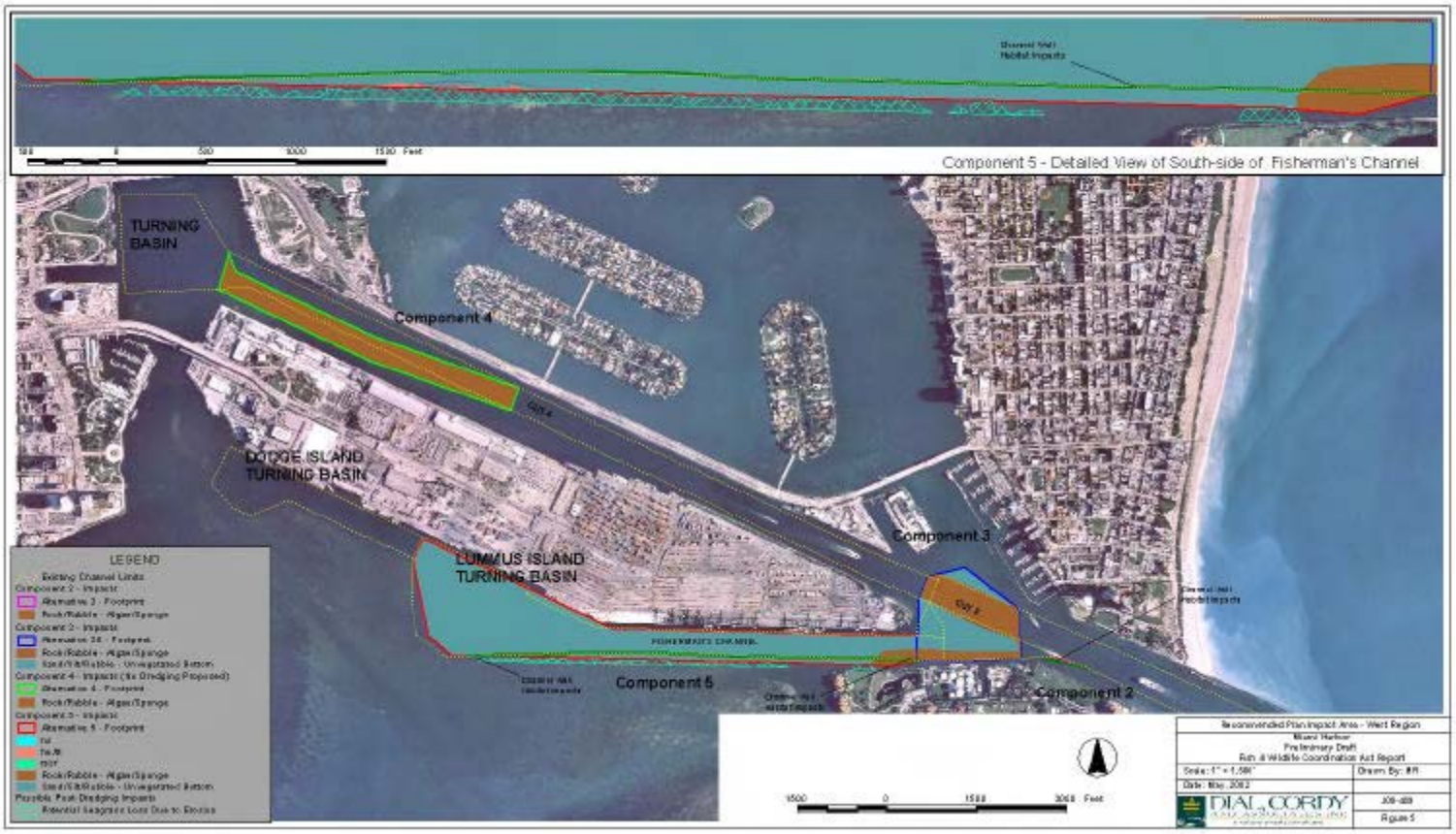
Miami Harbor

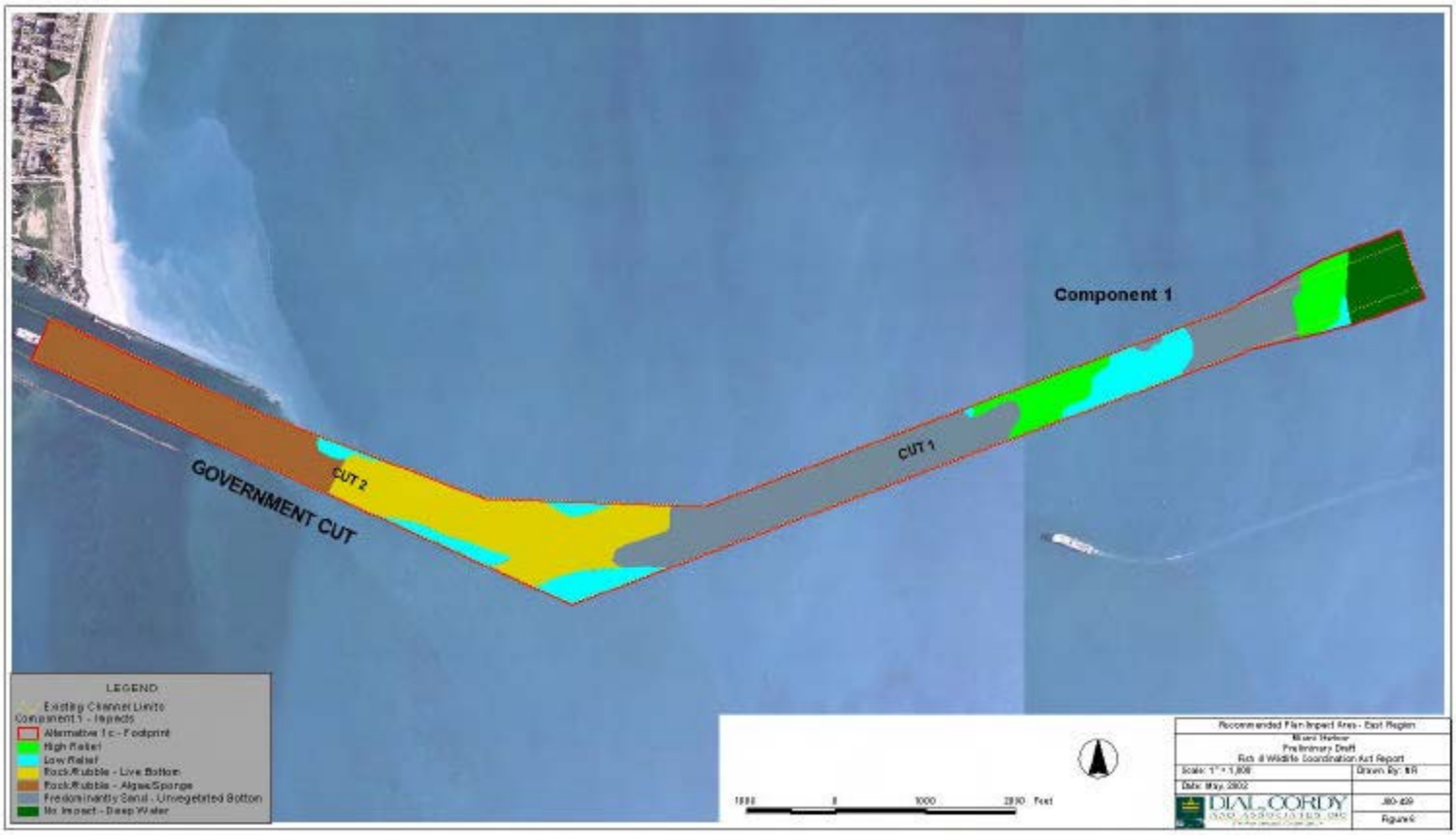
Preliminary Draft

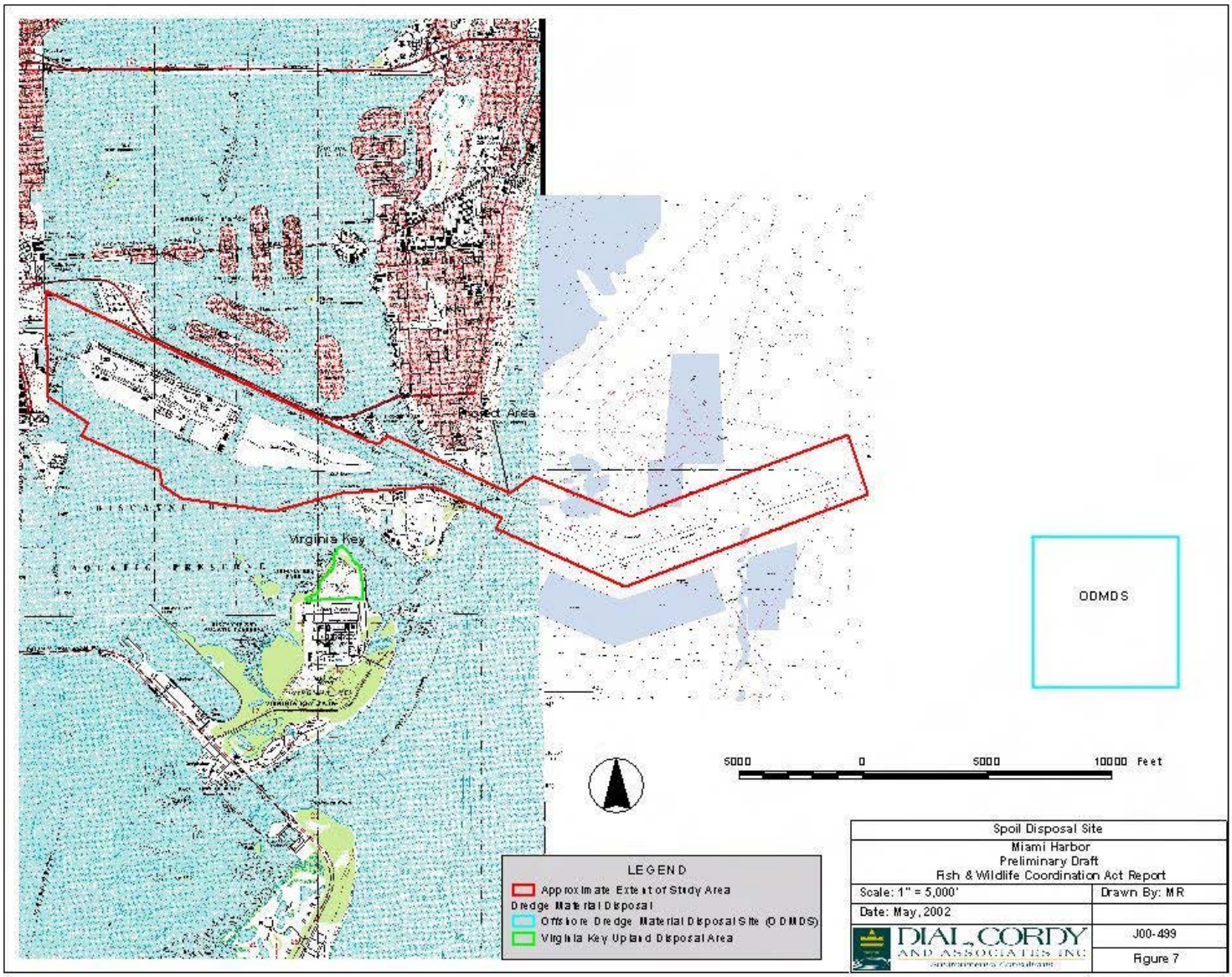
Fish & Wildlife Coordination Act Report

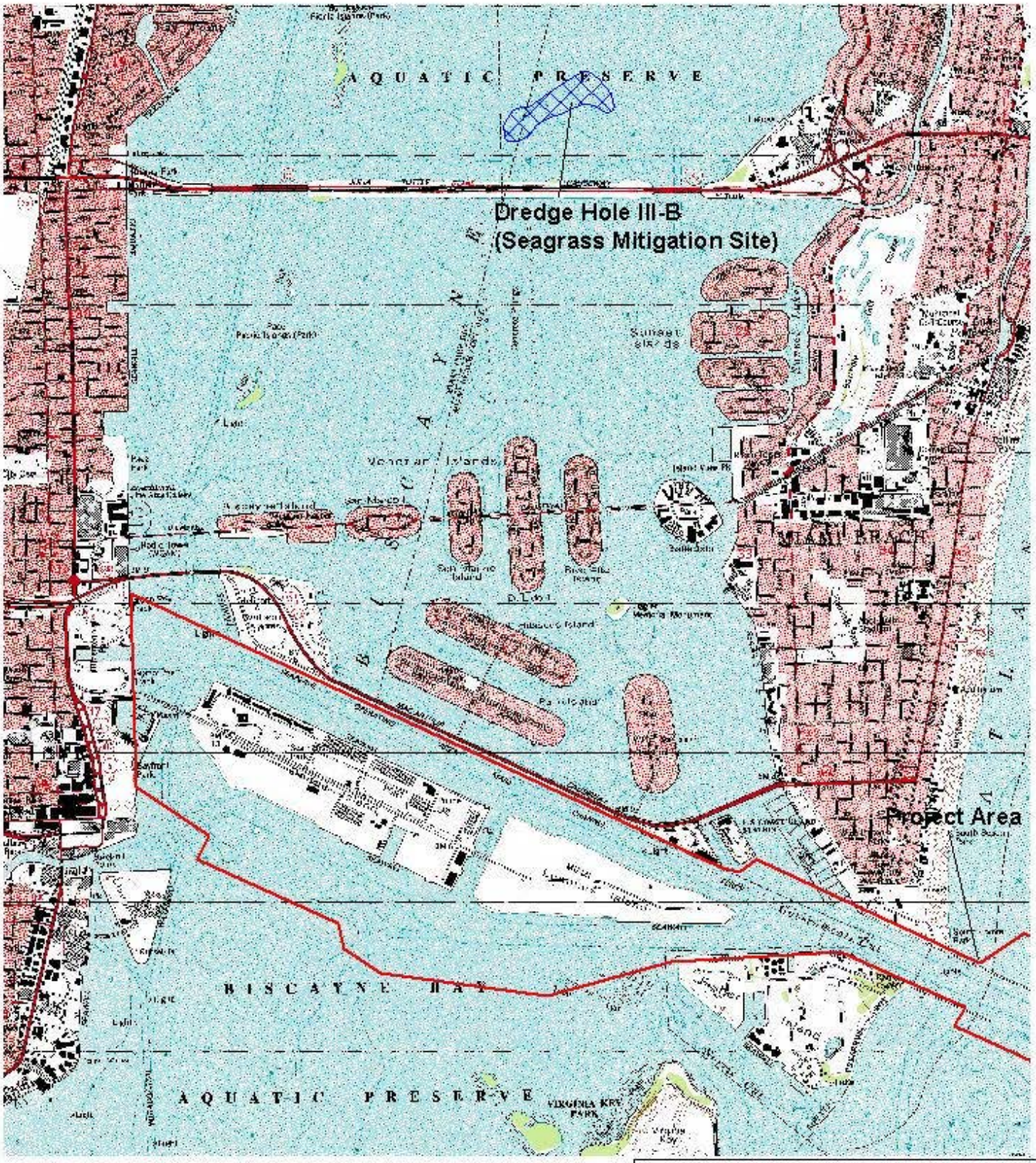
Scale: 1" = 2,000'	Drawn By: MR
Date: May, 2002	
DIAL, CORDY AND ASSOCIATES INC	J00-488
	Figure 2


LEGEND
Existing Channel Limits
'89-99' Recorded Manatee Observations
Reported Manatee Deaths (Jan. '74 - Sept. '00)
Watercraft
Other Natural
Undetermined (Verified/Not Recovered)
Undetermined (Decomposed)
Undetermined
Bill Sadowski Critical Wildlife Area
Caretta caretta (loggerhead sea turtle) Strandings '92-'97
Eretmochelys imbricata (hawksbill sea turtle) Strandings '92-'97
Chelonia mydas (green sea turtle) Strandings '92-'97
TURNING BASIN
DODGE ISLAND TURNING BASIN
FUNAUR ISLAND TURNING BASIN
Manatee No Entry Zone
NORRIS CUT
GOVERNMENT CUT
3000 0 3000 6000 Feet
Proposed Species
Miami Harbor
Preliminary Draft
Fish & Wildlife Coordination Act Report
Scale: 1" = 8,000'
Drawn By: MR
Date: May, 2002
DIAL, CORDY AND ASSOCIATES INC
J00-489
Figure 4


Component 5 - Detailed View of South-side of Fisherman's Channel
TURNING BASIN
Component 4
DODGE ISLAND TURNING BASIN
LUMMUS ISLAND TURNING BASIN
Component 3
Component 5
Component 2
LEGEND
Existing Channel Limits
Component 2 - Impacts
Alternative 3 - Footprint
Rock/Rubble - Algae/Sponge
Component 3 - Impacts
Alternative 3A - Footprint
Rock/Rubble - Algae/Sponge
Sand/Silt/Mud - Unvegetated Bottom
Component 4 - Impacts (No Dredging Proposed)
Alternative 4 - Footprint
Rock/Rubble - Algae/Sponge
Component 5 - Impacts
Alternative 5 - Footprint
Rock/Rubble - Algae/Sponge
Sand/Silt/Mud - Unvegetated Bottom
Possible Post-Dredging Impacts
Potential Seagrass Loss Due to Shoals
Recommended Plan Impact Area - West Region
Miami Harbor
Preliminary Draft
Fish & Wildlife Coordination Act Report
Scale: 1" = 1,500'
Drawn By: RR
Date: May, 2002
DIAL CORDY
Figure 5


Component 1
CUT 1
CUT 2
GOVERNMENT CUT
LEGEND
Existing Channel Limits
Component 1 - Impacts
Alternative 1c - Footprint
High Relief
Low Relief
Rock/Rubble - Live Bottom
Rock/Rubble - Algae/Sponge
Predominantly Sand - Unvegetated Bottom
No Impact - Deep Water
1000
0
1000
2000 Feet
Recommended Plan Impact Area - East Region
Miami Harbor
Preliminary Draft
Fish & Wildlife Coordination Act Report
Scale: 1" = 1,000'
Drawn By: BR
Date: May, 2002
DIAL CORDY AND ASSOCIATES, INC.
J80-429
Figure 6


Project Area
Virginia Key
ODMDS
5000
0
5000
10000 Feet
LEGEND
Approximate Extent of Study Area
Dredge Material Disposal
Offshore Dredge Material Disposal Site (ODMDS)
Virginia Key Upland Disposal Area
Spoil Disposal Site
Miami Harbor
Preliminary Draft
Fish & Wildlife Coordination Act Report
Scale: 1" = 5,000'
Drawn By: MR
Date: May, 2002
DIAL, CORDY AND ASSOCIATES INC.
J00-499
Figure 7



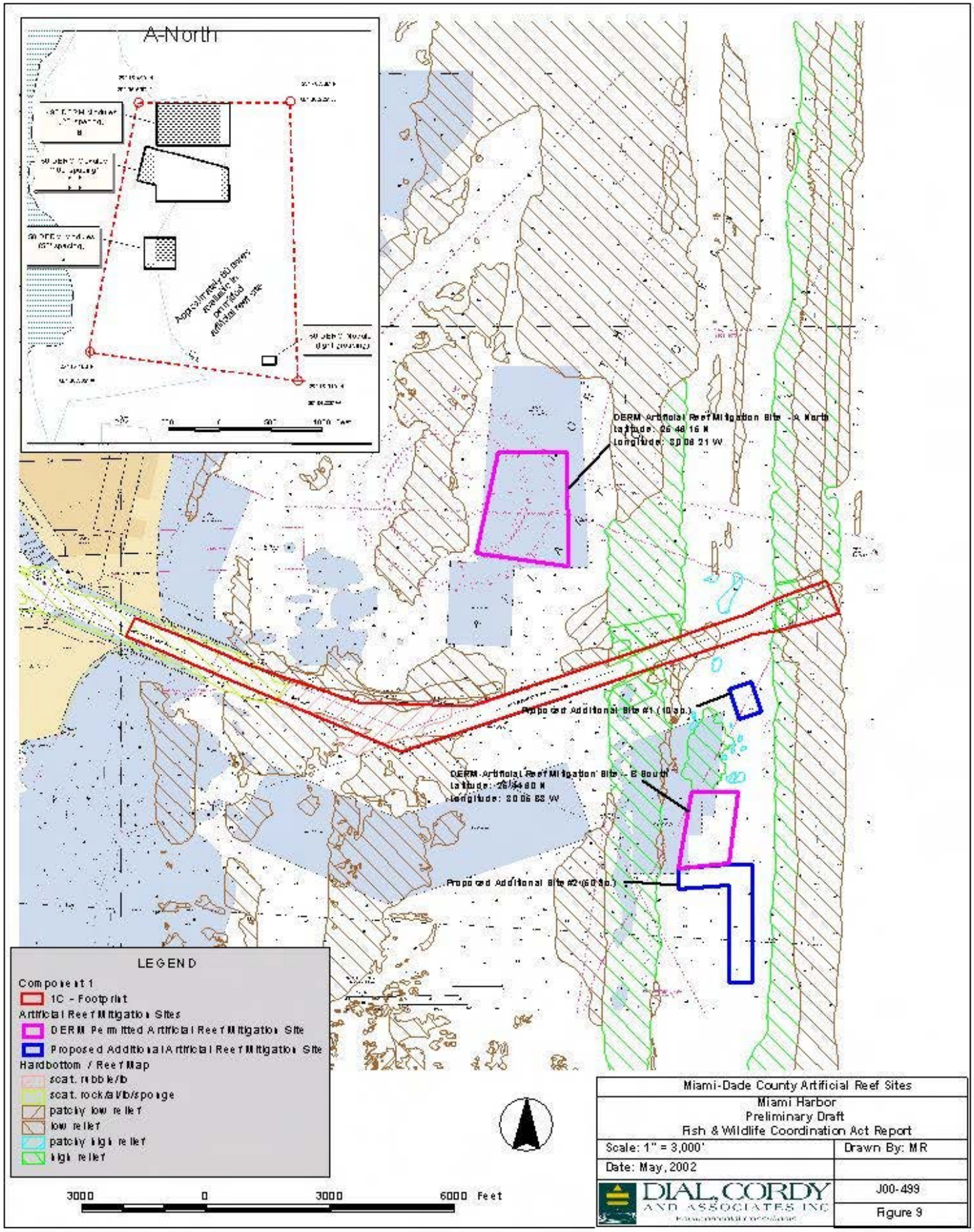
LEGEND

Approximate Extent of Study Area

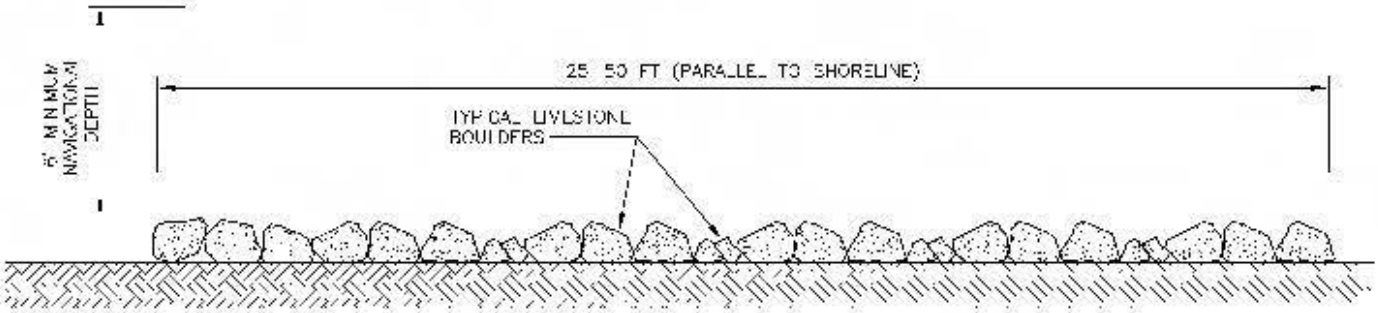
Dredge Hole III-B

3000 0 3000 6000 Feet

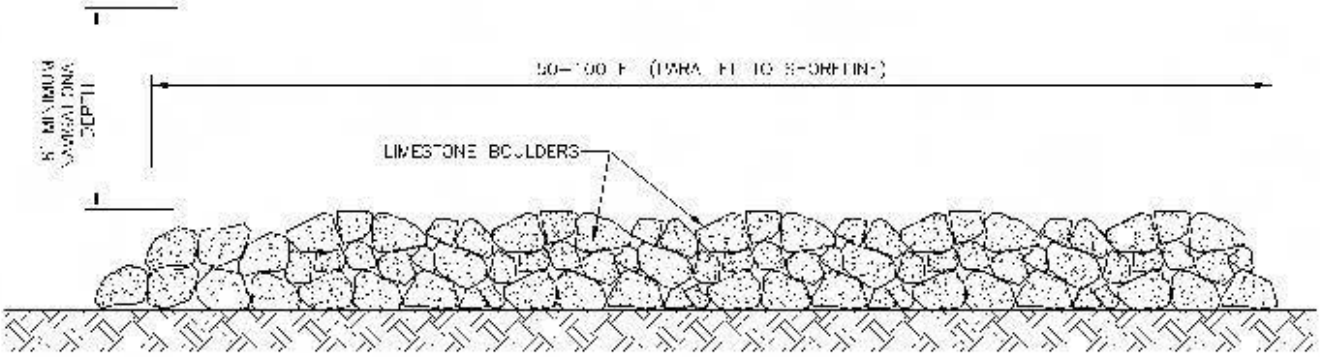
Seagrass Compensation Site Miami Harbor Preliminary Draft Fish & Wildlife Coordination Act Report	
Scale: 1" = 3,000'	Drawn By: MR
Date: May, 2002	
DIAL, CORDY AND ASSOCIATES INC Environmental Consultants	J00-499
	Figure 8


A-North
DERM Artificial Reef Mitigation Site - A North
Latitude: 25 48 16 N
Longitude: 80 08 21 W
Proposed Additional Site #1 (10 ac.)
DERM Artificial Reef Mitigation Site - B South
Latitude: 25 44 60 N
Longitude: 80 06 83 W
Proposed Additional Site #2 (60 ac.)
LEGEND
Component 1
1C - Footprint
Artificial Reef Mitigation Sites
DERM Permitted Artificial Reef Mitigation Site
Proposed Additional Artificial Reef Mitigation Site
Hardbottom / Reef Map
scat. rubble/lb
scat. rock/al/lb/sponge
patchy low relief
low relief
patchy high relief
high relief
3000
0
3000
6000 Feet
Miami-Dade County Artificial Reef Sites
Miami Harbor
Preliminary Draft
Fish & Wildlife Coordination Act Report
Scale: 1" = 3,000'
Drawn By: MR
Date: May, 2002
DIAL, CORDY AND ASSOCIATES INC
J00-499
Figure 9

Low-Relief, Low Complexity Artificial Reef Design



High-Relief, High Complexity Artificial Reef Design



Conceptual Design for Artificial Reefs Miami Harbor Preliminary Draft Fish & Wildlife Coordination Act Report	
Scale: NTS	Drawn By: MR
Date: May, 2002	
DIAL, CORDY AND ASSOCIATES INC Environmental Consultants	J00-499
	Figure 10

APPENDIX E: Tables

Table 1: Relative Abundance of Fish Species Observed During Visual Survey

Common Name	Scientific Name	South Transects	North Transects
Bar Jack	Caranx ruber	A	--
Beaugregory	Pomacentrus partitus	A	A
Bluehead Wrasse	Thalassoma bifasciatum	A	C
Bluestripe Grunt	Haemulon sciurus	-	C
Cocoa Damselfish	Pomacentrus variabilis	A	A
Foureye Butterflyfish	Chaetodon capistratus	C	C
French Angelfish	Pomacanthus paru	O	O
Gray Snapper	Lutjanus griseus	O	C
Grey Angelfish	Pomacanthus arcuatus	O	-O
Hogfish	Lachnolaimus maximus	O	O
Ocean surgeon	Acanthurus bahianus	-	C
Pearly Razorfish	Hemipteronotus novacula	-	O
Pigfish	Orthoprisits chysoptera	C	C
Porkfish	Anisotremus virginicus	C	C
Princess parrotfish	Scarus guacamaia	O	O
Rainbow parrotfish	Scarus guacamaia	O	O
Redlip Blenny	Opioblennius atlanticus	O	O
Reef Butterflyfish	Chaetodon sedentarius	C	C
Rock Beauty	Holocanthus tricolor	-	C
Seaweed Blenny	Parablennius marmoreus	O	O
Slippery Dick	Halichores bivittatus	C	C
Spanish Hogfish	Bodianus rufus	-	R
Spotted Scorpionfish	Scorpaena plumieri	O	O
Stoplight parrotfish	Sparisoma viride	O	O
Tomtate	Haemulon aurolineatum	C	C
Townsend Angelfish	Holocanthus sp.	R	-
Yellowtail Snapper	Ocyurus chysurus	C	C

KEY: A = abundant, C = common, O = occasional, R = rare

Source: Dial Cordy and Associates, 2001

Table 2: Summary of Sea Turtle Nesting for Miami-Dade County, 1988-2001

Loggerhead (Caretta caretta)[1]

Year	Beach Length (km)	Number of Nests	Number of Non-Nesting Emergences	Date of First Nest	Date of Last Nest
1988	29.9	219	196	05/02/88	08/27/88
1989	29.9	325	407	04/17/89	08/12/89
1990	31.5	390	486	04/07/90	08/22/90
1991	30.7	439	510	04/25/91	08/28/91
1992	38.6	367	416	04/23/92	09/15/92
1993	38.9	392	401	04/28/93	10/03/93
1994	34.7	445	454	04/22/94	08/30/94
1995	37.4	470	595	04/29/95	08/27/95
1996	37.6	448	517	04/26/96	08/20/96
1997	38.1	415	599	04/23/97	08/14/97
1998	38.1	545	937	04/18/98	08/26/98
1999	37.8	516	565	04/10/99	08/18/99
2000	37.8	516	775	04/12/00	09/20/00
2001	37.8	496	564	04/19/01	08/21/01

Green turtles (Chelonia mydas)[2]

Year	Beach Length (km)	Number of Nests	Number of Non-Nesting Emergences	Date of First Nest	Date of Last Nest
1988	29.9	6	2	06/13/88	07/08/88
1989	29.9	2	6	07/01/89	07/07/89
1990	31.5	3	2	05/16/90	07/01/90
1991	30.7	2	2	07/17/91	07/26/91
1992	38.6	4	5	06/27/92	08/03/92
1993	38.9	1	0	06/20/93	06/20/93
1994	34.7	1	1	06/02/94	06/02/94
1995	37.4	2	0	05/21/95	06/27/95
1996	37.6	12	13	06/17/96	08/19/96
1997	38.1	0	2	-	-
1998	38.1	4	10	05/31/98	07/28/98
1999	37.8	64	78	04/23/99	08/18/99
2000	37.8	5	7	06/20/00	07/28/00
2001	37.8	0	0	-	-

Leatherbacks (Dermochelys coriacea)[3]

Year	Beach Length (km)	Number of Nests	Number of Non-Nesting Emergences	Date of First Nest	Date of Last Nest
1988	29.9	5	0	04/25/88	05/14/88
1989	29.9	0	0	-	-
1990	31.5	0	0	-	-
1991	30.7	0	0	-	-
1992	38.6	6	3	04/11/92	05/29/92
1993	38.9	1	0	05/09/93	05/09/93
1994	34.7	0	0	-	-
1995	37.4	2	2	05/15/95	05/25/95
1996	37.6	0	0	-	-
1997	38.1	3	3	04/30/97	05/19/97
1998	38.1	2	1	03/30/98	05/16/98
1999	37.8	9	5	03/29/99	06/09/99
2000	37.8	2	5	03/05/00	03/20/00
2001	37.8	9	7	03/28/01	05/24/01

[1]source: Florida Marine Research Institute. 2002c.
[2]source: Florida Marine Research Institute. 2002a.
[3]source: Florida Marine Research Institute. 2002b.

Table 3 Current Channel and Turning Basin Dimensions

Component 1 – Entrance Channel (Cut-1) & Government Cut (Cut-2)	500 feet wide, 44-foot depth
Component 2 - Cut-3 at Fisherman's Channel	500 feet wide, 42-foot depth
Component 3 – Fisher Island Turning Basin	1200-foot-diameter turning basin, 42-foot depth
Component 4 – Main Channel (Cut-4)	400 feet wide, 36-foot depth
Component 5 – Fisherman's Channel and Lummus Island Turning Basin	400 feet wide, 42-foot depth; turning basin with 42-foot depth and diameter of 1,600 feet
Component 6 – Dodge Island Cut and Turning Basin	400 feet wide with 34 and 32-foot depths (existing turning basin not part of federal project)

Table 4 Components of the Alternatives

Component 1	Flaring the existing 500-foot wide entrance channel to provide an 800-foot wide entrance channel at Buoy 1. The widener extends from the beginning of the entrance channel about 150 feet parallel to both sides of the existing entrance channel for about 900 feet before tapering back to the existing channel edge over a total distance of about 2000 feet. Deepening of the entrance channel and proposed widener along Cut 1 and Cut 2 from an existing depth of 44 feet in one-foot increments to a depth of 52 feet received consideration.
Component 2	Widen the southern intersection of Cut-3 with Lummus Island (Fisherman's) Channel at Buoy 15. The length of the widener is about 700 feet with a maximum width of about 75 feet. Depths considered for 2A varied from an existing project depth of 42 feet to 50 feet.
Component 3	Extend the existing Fisher Island turning basin to the north. A turning notch of about 1500 feet by 1200 feet extends approximately 300 feet to the north of the existing channel edge near the West End of Cut-3. Depths from 43 to 50 feet at one-foot increments below the existing depth of 42 feet received consideration in the area of the turning notch.
Component 4	Relocate the west end of the main channel (cruise ship channel or Cut-4) about 250 feet to the south between channel miles 2 and 3 to the existing cruise ship turning basin. No dredging is expected for measure four since existing depths allow for continuation of the authorized depth of 36 feet.
Component 5	Increase the width of the Lummus Island Cut (Fisherman's Channel) about 100 feet to the south of the existing channel. Measure 5 includes a 1500-foot diameter turning basin, which would reduce the existing size of the Lummus Island (or Middle) turning basin. The deepening evaluation examined depths below the existing 42-foot depth at one-foot increments from 43 to 50 feet along the proposed widened channel from Cut-3, Station 0+00 to Cut-3, Station 42+00.
Component 6	Deepen Dodge Island Cut and the proposed 1200-foot turning basin from 32 and 34 feet to 36 feet. It also involves relocating the western end of the Dodge Island Cut to accommodate proposed port expansion.

Components of the Recommended Plan are listed in boldface.

Table 5: Impact Acreages by Habitat Type and Current Dredge Status

Habitat Type and Current Dredge Status	Component no.					
	1	**2**	**3**	**4**	**5**	**Total**
Seagrass- new impacts to areas not previously dredged and that exist *outside proposed channel boundaries* (ac)	00.0	00.0	00.1	00.0	**6.0**	**6.1**
Seagrass- new impacts, not previously dredged, inside proposed channel boundaries (ac)	00.0	00.0	00.0	00.0	**0.2**	**0.2**
Seagrass- previously dredged and recolonized, inside proposed channel boundaries (ac)	00.0	00.0	00.0	00.0	00.0	00.0
Low-relief hardbottom- new impacts, not previously dredged (ac)	**0.6**	00.0	00.0	00.0	00.0	**0.6**
Low-relief hardbottom, previously dredged and recolonized (ac)	**28.1**	**0.26**	00.0	00.0	**2.41**	**30.7**
High-relief hardbottom- new impacts, not previously dredged (ac)	**2.7**	00.0	00.0	00.0	00.0	**2.7**
High-relief hardbottom, previously dredged and recolonized (ac)	**18.0**	00.0	00.0	00.0	00.0	**18.0**
Rock/rubble w/ livebottom- new impacts, not previously dredged (ac)	00.0	00.0	00.0	00.0	00.0	00.0
Rock/rubble w/ livebottom, previously dredged and recolonized (ac)	**51.7**	00.0	00.0	00.0	00.0	**51.7**
Rock/rubble w/ algae/sponges- new impacts, not previously dredged (ac)	00.0	**0.6**	**0.9**	00.0	**1.5**	**3.0**
Rock/rubble w/ algae/sponges, previously dredged and recolonized (ac)	**41.3**	00.0	**25.2**	00.0	**2.3**	**68.8**
Unvegetated (i.e., softbottom habitats without seagrasses)- new impacts, not previously dredged (ac)[1]	**1.3**	00.0	**5.3**	00.0	**16.7**	**23.3**
Unvegetated (i.e., softbottom habitats without seagrasses), previously dredged (ac)	**66.9**	00.0	**19.1**	00.0	**127.1**	**213.1**
Total Impacts, including impacts to seagrass beds that exist outside proposed channel boundaries (ac)	**210.6**	**0.86**	**50.6**	**00.0**	**156.2**	**418.2**

[1]not including secondary impacts acting over time, such as side-slope erosion

Table 6 Essential Fish Habitats Associated with Recommended Plan

Plan Component	Essential Fish Habitats Impacted
1	Water Column, Hardbottom, Reefs, possible *Laurencia* beds
2	Water Column, possible *Laurencia* beds
3	Water Column, Inshore Softbottom
4	None
5	Water Column, Inshore Softbottom, Seagrass Beds

APPENDIX L

Marine Survey and Assessment for Potential Mitigation Sites Miami Harbor General Re-evaluation Report

Miami Harbor, Miami-Dade County, Florida

APPENDIX L

Marine Survey and Assessment for Potential Mitigation Sites
Miami Harbor General Re-evaluation Report
Miami Harbor, Miami-Dade County, Florida

FINAL

MARINE SURVEY AND ASSESSMENT
FOR POTENTIAL MITIGATION SITES
MIAMI HARBOR GENERAL RE-EVALUATION REPORT
MIAMI HARBOR
MIAMI-DADE COUNTY, FLORIDA

October 2002

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

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

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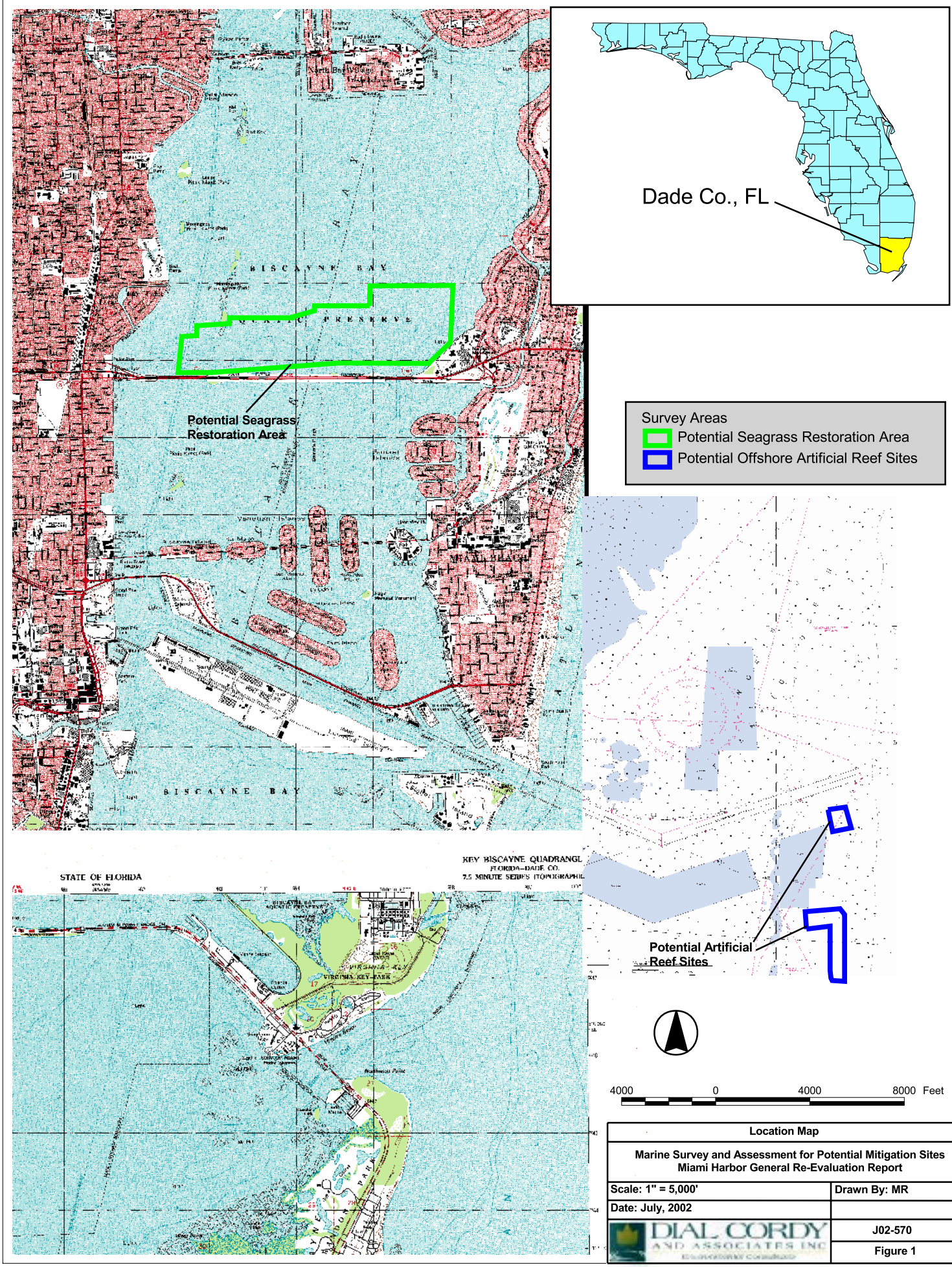
1.0 INTRODUCTION

Dial Cordy and Associates Inc. (DC&A) was contracted by the Jacksonville District Army Corps of Engineers (Corps) under contract DACW17-99-D-0057, W.O. 0029 to provide a marine benthic and bathymetric survey and assessment of potential mitigation sites in the vicinity of Miami Harbor, Miami-Dade County, Florida (Figure 1). This work is being done in conjunction with the Miami Harbor General Re-evaluation Report.

1.1 Project Purpose

North Biscayne Bay has undergone extensive man-made changes since the early 20th century. In particular, construction of the Julia Tuttle Causeway created depressions from dredge and fill operations associated with construction of islands to support the causeway. The Corps has identified potential seagrass mitigation sites in North Biscayne Bay near the Julia Tuttle Causeway based on review of a previous study conducted for Miami-Dade County Department of Environmental Resources Management (DERM) (Coastal Technology Corporation 1989). The Corps has an interest in potentially utilizing these borrow areas left from this construction as seagrass mitigation areas. To further define site conditions within and adjacent to these areas, field studies including seagrass mapping, biological characterization, bathymetric survey, and surficial sediment sampling were conducted. The results of these surveys are summarized in this report.

In addition to the potential seagrass mitigation areas, two potential offshore mitigation reef sites were identified and investigated for future use in artificial reef creation. The Corps will use this information to help plan mitigation measures in relation to planned Port of Miami Federal Channel improvement efforts. This information will also be incorporated by the Corps and utilized as baseline biological information during the planning and permitting process.



Location Map	
Marine Survey and Assessment for Potential Mitigation Sites Miami Harbor General Re-Evaluation Report	
Scale: 1" = 5,000'	Drawn By: MR
Date: July, 2002	
DIAL CORDY AND ASSOCIATES INC	J02-570
	Figure 1

2.0 TECHNICAL APPROACH

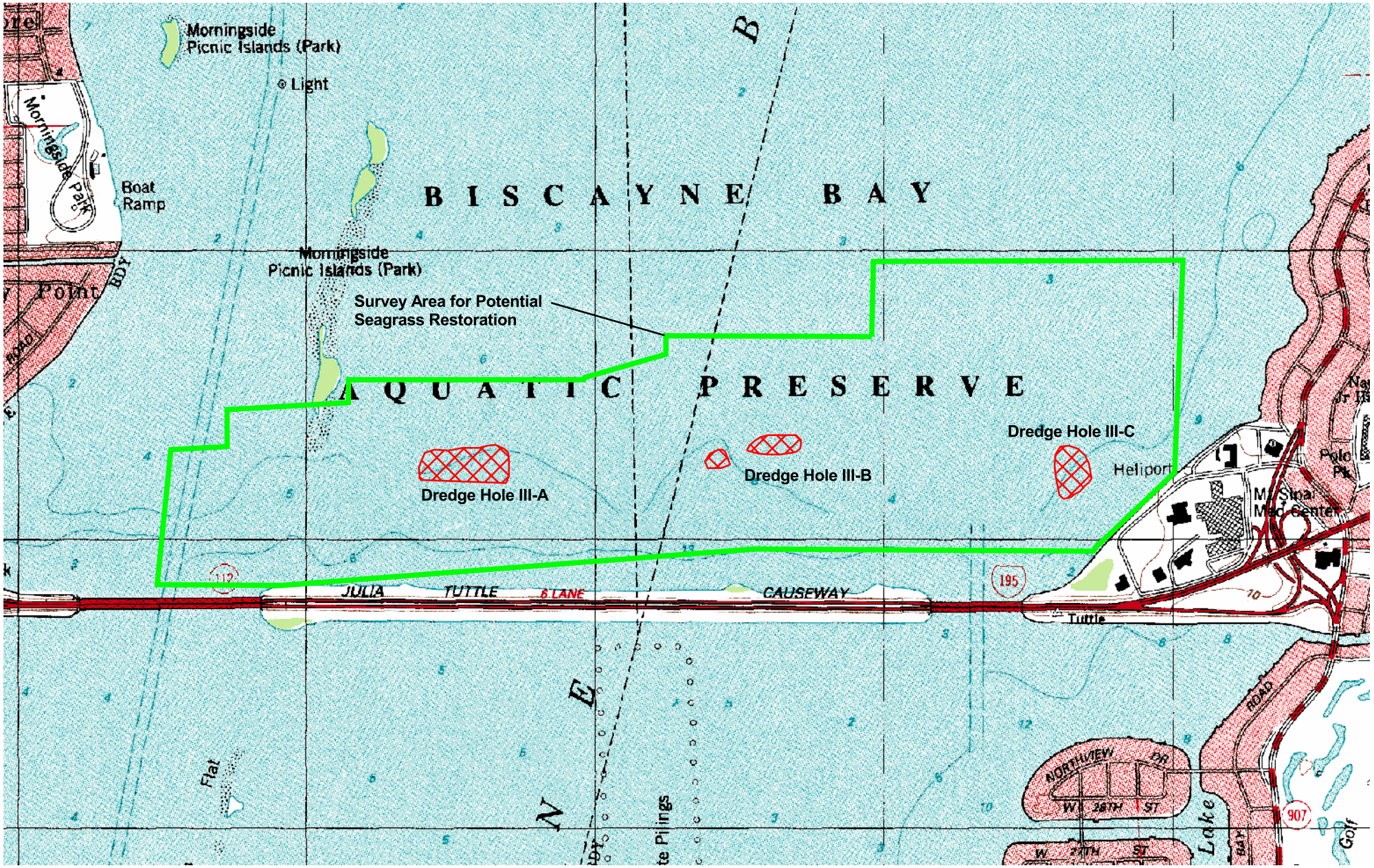
A description of the methods utilized to document marine resources within the study area is described below. Surveys were conducted June 4-6, 2002.

2.1 Location of Survey

The potential seagrass mitigation areas surveyed included a previously used borrow area located just north of the Julia Tuttle Causeway in north Biscayne Bay (Figure 2). This borrow area was evaluated previously for use as potential habitat restoration (Coastal Technology Corporation 1989). Coastal Technology (1989) referred to the borrow areas located here as Unit III, and identified three potential areas for restoration that they labeled Area III-A, Area III-B, and Area III-C. Survey locations were supplied to DC&A by the Corps based on review of this document. The offshore areas surveyed for potential artificial reef creation are adjacent to Miami-Dade County Artificial Reef Sites A and B (Figure 3). The potential artificial reef creation sites were chosen for their proximity to currently permitted artificial reef creation sites and also water depths within the survey areas.

2.2 Bathymetric Survey

To define the extent of the borrow areas left from previous dredging efforts, a bathymetric survey was performed. Bathymetric data was collected using an Odum Hydrotrac® echosounder and data recorded electronically. A tide gauge was deployed throughout the survey period and vertical control was obtained from a marker set by the project surveyor.



1500 0 1500 3000 Feet

Seagrass Survey Area	
Marine Survey and Assessment for Potential Mitigation Sites Miami Harbor General Re-Evaluation Report	
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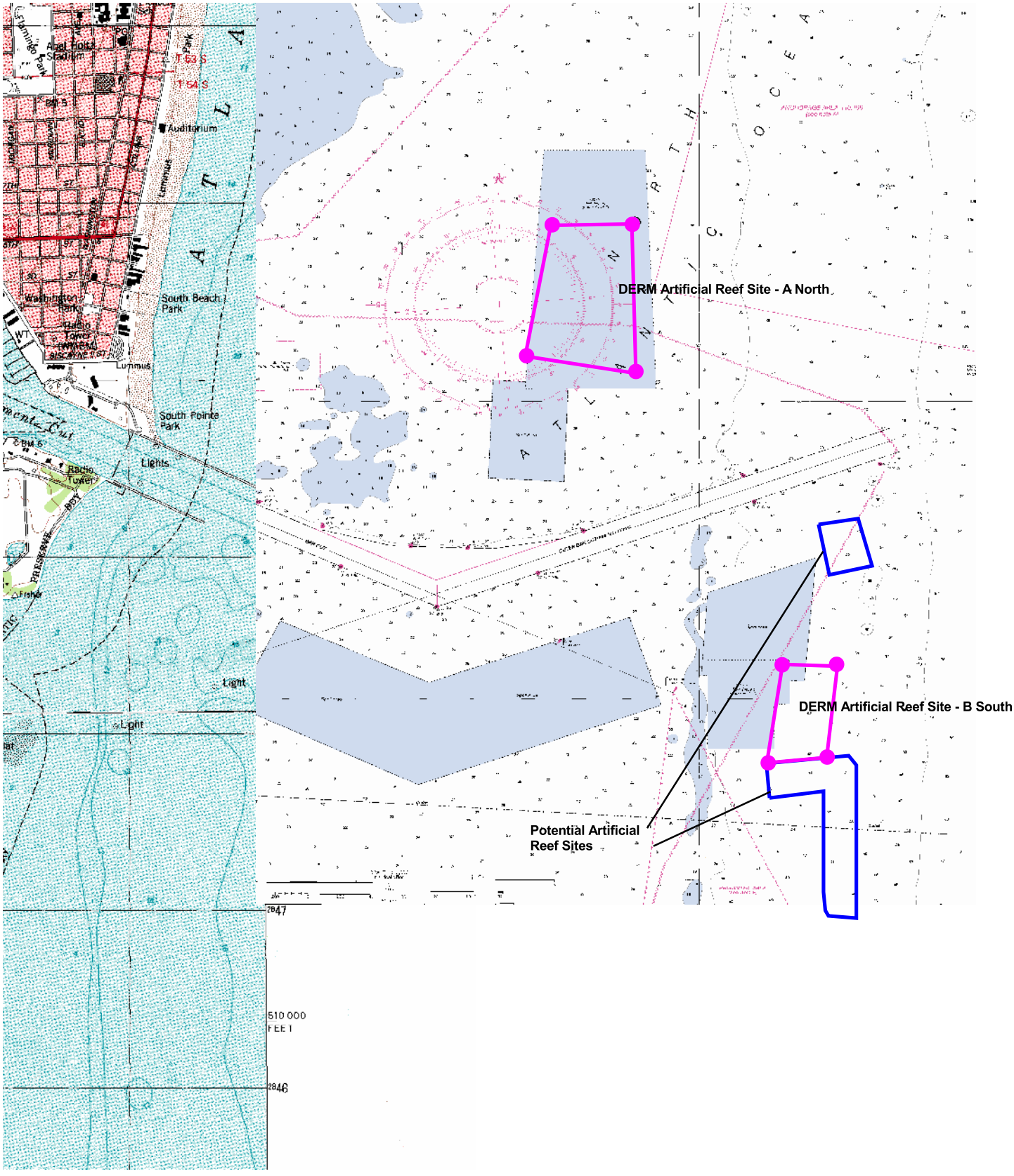
	Figure 2



Potential Offshore Artificial Reef Sites

Permitted Artificial Reef Site Corners

2500 0 2500 5000 Feet

Potential and Permitted ffshore Artificial Reef Sites	
Marine Survey and Assessment for Potential Mitigation Sites Miami Harbor General Re-Evaluation Report	
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	Figure 3

Positioning was determined by using a Trimble Differential Geographic Positioning System (DGPS) receiver coupled with Coastal Oceanographic's HYPACK®Max navigational software. The system was used during the survey for vessel guidance, data logging, and real time vessel track plotting. Data were then used to create a mosaic for analysis and interpretation.

2.3 Video Survey Methodology

The beginning and end of each transect was located using a Trimble DGPS. Once the beginning of each transect was located, an underwater video camera was lowered to within one-foot of the bottom and towed along the transect line using Hypack® Max software to maintain the vessel's course and also superimpose location coordinates onto the video. The underwater video camera was viewed onboard while being towed and the occurrence of seagrass, rocks, sand, algae, and hardbottom were documented. The documentation was used later when reviewing the video to denote the resource description and DGPS location. For mapping purposes, the following resource type classification system was used (Table 1)

Table 1 Resource Type Classification System

Bottom Resources	Description
Thalassia testudinum	Turtle grass was the dominant resource
Halodule wrightii	Shoal grass was the dominant resource
Syringodium filiforme	Manatee grass was the dominant resource
Mixed grasses	A mixture of *Thalassia testudinum, Syringodium filiforme,* and/or *Halodule wrightii* was the dominant resource
Sand	Sand was the dominant resource
Sand/Algae	Marine algae was the dominant resource
Rock/Algae	A mixture of rock and algae were the dominant resource
Artificial Reef	Artificial Reef material previously placed
Hardbottom/Reef	Living hardbottom (offshore survey site)

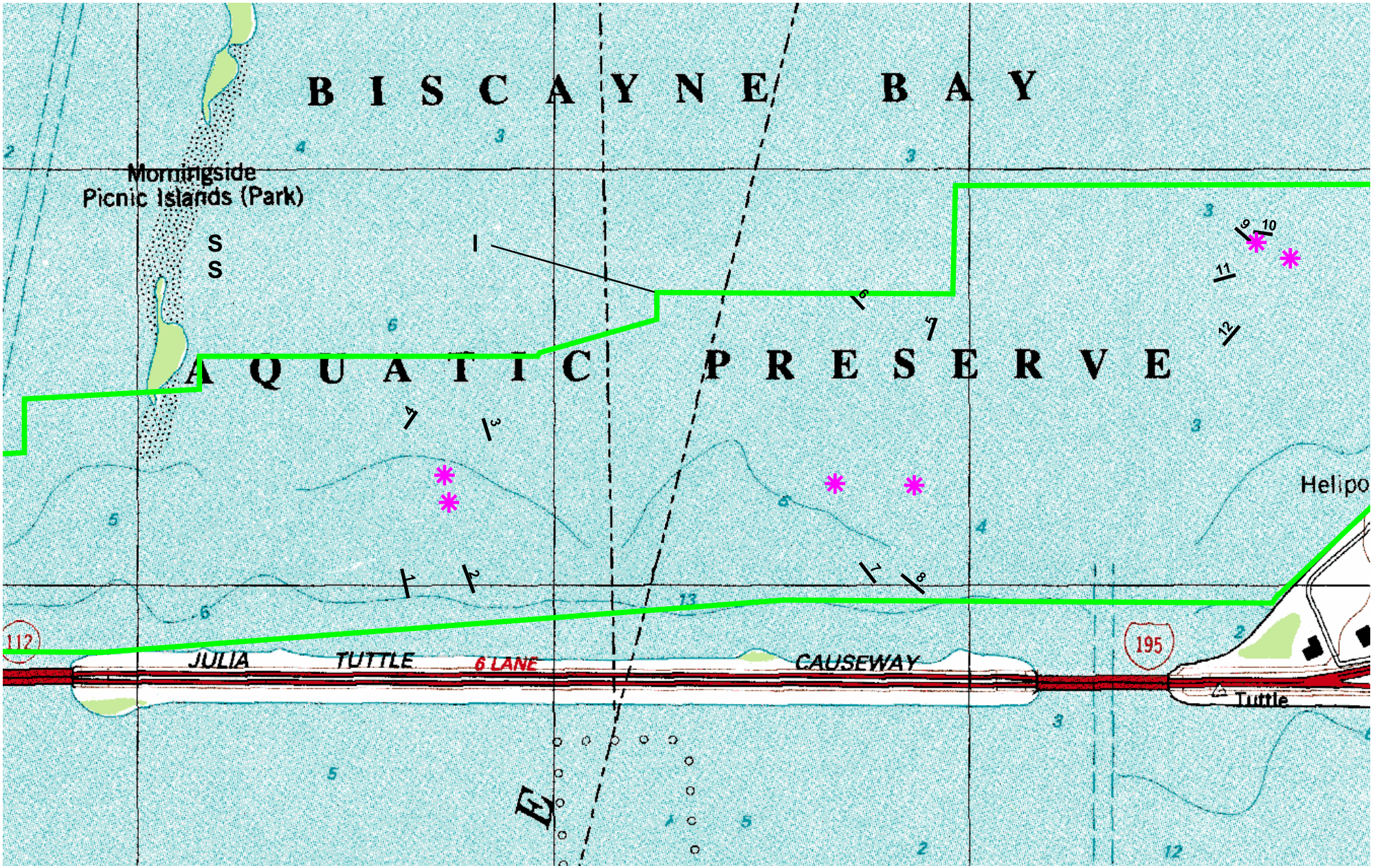
Following compilation of resource type distribution, a spreadsheet was developed incorporating the resource classification system. Resource types were superimposed over an aerial map using ArcView® GIS.

2.4 Biological Data Collection

2.4.1 Seagrass Mitigation Areas

To obtain biological data regarding the location, occurrence, abundance, and density of marine seagrass, a snorkel point intercept survey was performed. For each transect, the average percent (percent of 16, 25 x 25 cm sub-units within a 1 m^2 quadrat that contains at least one seagrass shoot) was estimated in 1 m^2 quadrats at four intervals along each transect line (Fonseca, et al. 1998; Virnstein 1995; Braun-Blanquet 1965). Transect lines were 60 m in length and randomly selected along the north and south sides of the borrow areas. Locations of quadrat sampling are shown in Figure 4. Specific data recorded within each 1 m^2 quadrat for each marine seagrass species present included the number of sub-units containing at least one shoot, an average cover abundance score (Braun-Blanquet 1965), a description of the substrate type, and any other observations considered useful. Field data were entered into a spreadsheet for analysis.

Diver characterizations using digital video were also conducted within the deeper extents of the borrow areas. Previous artificial reef sites and other dominant biological communities were documented and recorded. Surficial sediment samples were also collected during these diver surveys and archived for later use.



Potential Seagrass Restoration Area
Surficial Sediment Sample Locations
Seagrass Quadrat Transects

1000 0 1000 2000 Feet

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DIAL CORDY AND ASSOCIATES INC	J 570
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2.4.2 Offshore Artificial Reef Areas

Following completion of the towed video survey, areas of potential hardbottom occurrence were located and divers deployed to document the biological communities present and the extent of coverage of each. Digital video and still photography were used to document the dominant biological communities.

2.5 Analysis and Interpretation

Community types were classified by the dominant resource type within the area. For example, if one or two rocks were identified within an area composed predominately of *H. wrightii*, then *H. wrightii* was considered the dominant resource type. The towed video and seagrass transect data were incorporated into resource maps. Frequency of occurrence, abundance, and density were calculated from the quadrat data based on Braun-Blanquet (1965) methodology.

Bathymetry data collected during the survey was post processed and a contour map produced for the survey area. Bathymetry lines shown are based on a 5-foot contour referenced to NAVD 88. Depths within the survey area ranged from 5 feet to greater than 30 feet (NAVD 88).

3.0 RESULTS

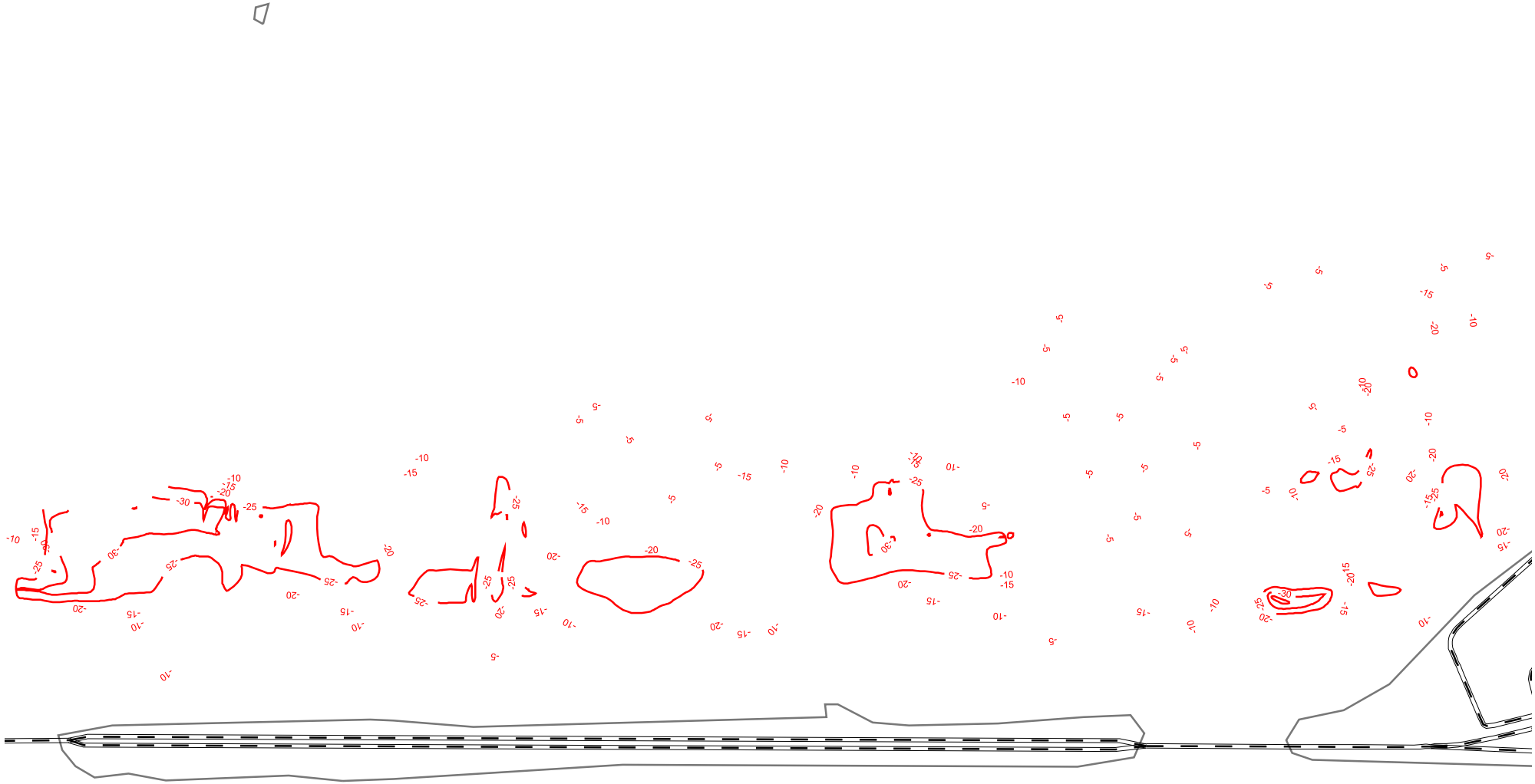
3.1 Seagrass Mitigation Sites-Bathymetry and Marine Resource Characterization

The occurrence and distribution patterns of marine habitats within the survey area surrounding the potential seagrass mitigation areas are described below.

3.1.1 Bathymetry

This survey was conducted based on information gained from a previous report on potential seagrass mitigation sites in northern Biscayne Bay (Coastal Technology Corporation 1989). Based on this previous study, it was believed that three distinct relatively shallow (8 to 10 feet in depth) borrow areas existed within this area. The present survey revealed different conditions. Bathymetric survey contours and depth characterizations within the study area are shown in Figures 5 and 6 and reveal that there two borrow areas in the study area. The first is a very large hole of over 100 acres in size that dominates the area. Depths within this area range from approximately 5 feet at the edge to over 30 feet (NAVD 88) in the deeper recesses of the borrow area. The second borrow area also is much larger in overall area (approx. 40 acres) than previously documented. The borrow areas identified by Coastal Technology Corporation were actually smaller holes within these larger borrow areas.

The majority of the area surveyed had depths greater than 5 feet (NAVD 88), while the areas of mixed grasses occurred in areas where water depths were shallower (approximately 5 feet NAVD 88). In general, the more homogeneous beds of *S. filiforme* occurred in the deeper water farther from the islands created for the Julia Tuttle Causeway, while the shallower areas nearest to the islands, along the southern side of the survey area, had shallower depths and more diverse mixed grass assemblages (Figure 5).



Bathymetry Contours (5 ft. interval)

1

Roads

Shoreline

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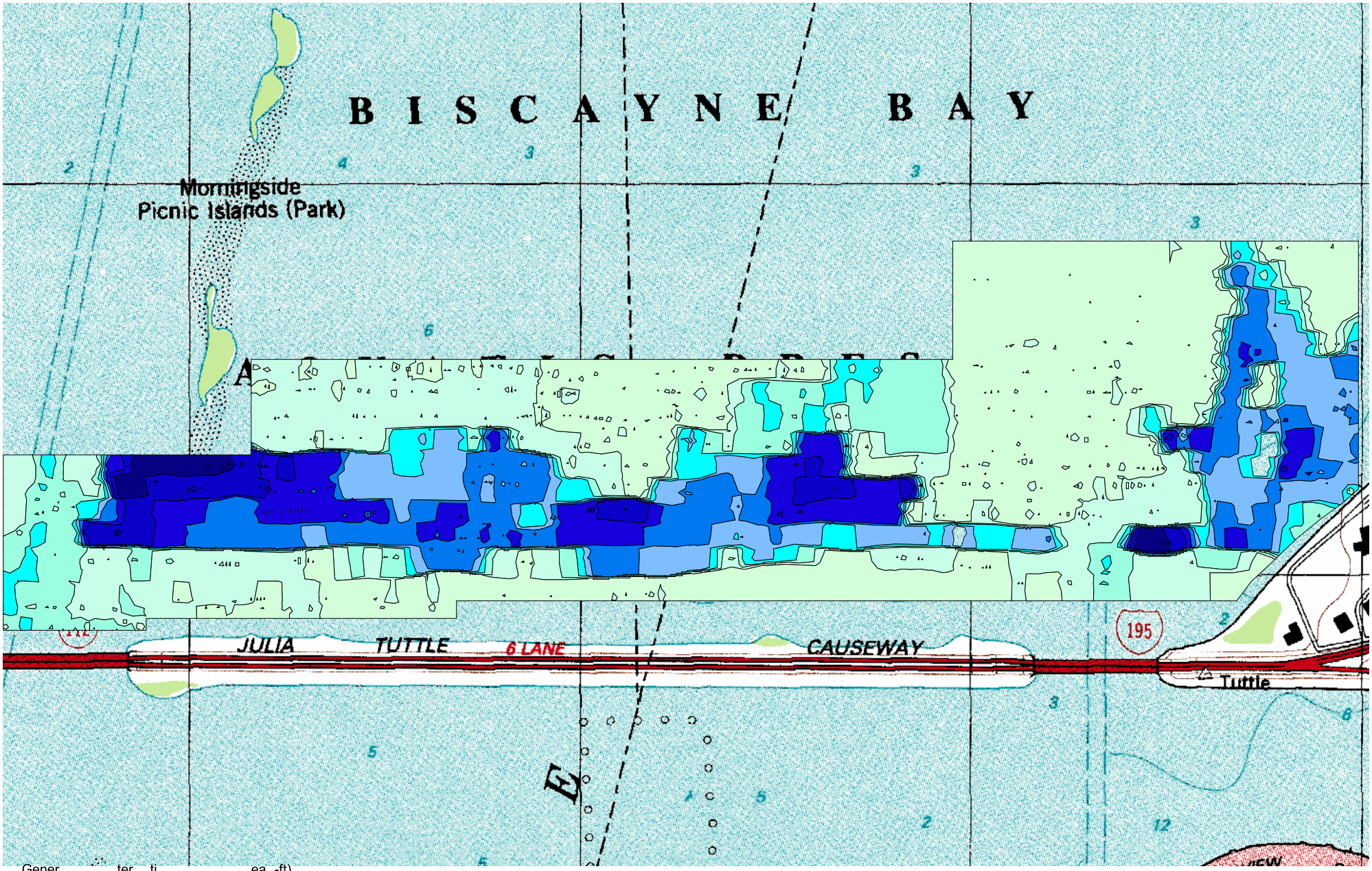

Gener ter ti ea -ft)

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- 4 - 8
- 8 - 11
- 11 - 15
- 15 - 19
- 19 - 23
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- 26 - 30
- 30 - 34

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3.1.2 Marine Resources

3.1.2.1 Live Bottom Habitat

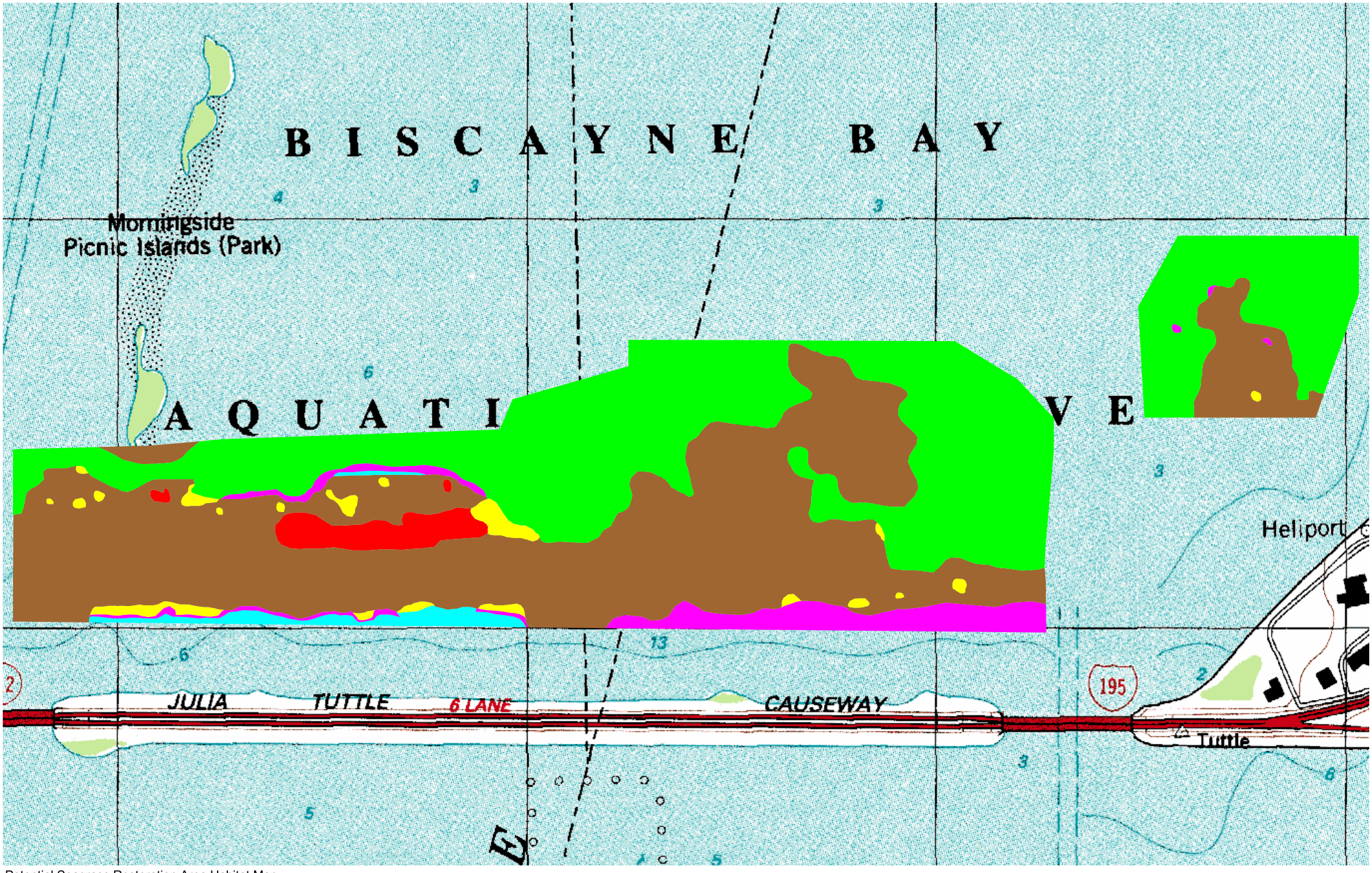
Live bottom assemblages along the walls of the borrow holes were also documented within the study area. Sponges were particularly abundant along the steep side slopes of the borrow areas as shown in Figure 7. The loggerhead sponge (*Spheciospongia vesparium*) was the most common, with some specimens reaching over 2 feet in diameter (Photograph 1, Appendix A). These live bottom areas correspond most closely with Area III-A from the Coastal Technology Corporation (1989) report. Other areas of live bottom habitat occur within the far eastern edge of the current study area (Figure 7) and do not correspond to areas identified in the previous studies.

3.1.2.2 Artificial Reef Habitat

Previously placed artificial reef material was also encountered in the deeper (>20 feet, NAVD 88) sections of the survey area (Figure 7) (Photograph 2, Appendix A). This area is close to the area identified as Area III-A by Coastal Technology (1989). This area appears to be significantly deeper than previously identified in the earlier report and now contains an artificial reef. This artificial reef material consisted of large cement pilings stacked on the bottom. No apparent growth was observed on artificial reef material.

3.1.2.3 Seagrass Distribution

Four marine seagrasses were identified during the survey. These seagrasses occurred in single and mixed species assemblages within the survey area. Marine seagrass species observed within the survey area include *H. wrightii, T. testudinum, S. filiforme,* and *Halophila*



Potential Seagrass Restoration Area Habitat Map

- Artificial Reef
- Livebottom/Hardbottom
- Syringodinum filiforme (manatee grass)
- Syringodinum filiforme (manatee grass) Mixed w/ Halophila decipiens (paddle grass), Halophila wrightii (shoal grass), and Thalassia testudinum (turtle grass)
- Mixed Halophila decipiens (paddle grass), Halophila wrightii (shoal grass), and Thalassia testudinum (turtle grass)
- Sand

1000 0 1000 2000 Feet

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DIAL CORDY AND ASSOCIATES INC	J 5
	F 7

decipiens. The endangered Johnson's seagrass (*Halophila johnsonii)* has been documented to occur within the Biscayne Bay area (Kenworthy 1997). No Johnson's seagrass was encountered during this survey. Although seagrasses occurred throughout most of the study area, the frequency of occurrence, abundance, and density varied. Of the four marine seagrass species observed, *S. filiforme* and *T. testudinum* were the most prevalent along the transects surveyed. *H. decipiens* occurred in small patches within the deeper areas along the sloping edges of the borrow holes.

Seagrass distribution is illustrated in Figure 5. The area surrounding the borrow areas was dominated by *S. filiforme* along the northern edge of the survey area (Photograph 3, Appendix A). Small patches of *H. decipens* and *H. wrightii* occur where the bottom begins to slope toward previously dredged areas along the northwestern edge of the survey area (Figure 5). Along these edges of the previously dredged areas, *S. filiforme* and *T. testudinum* become sparse and *H. decipiens* occurs. Along the southern portions of the survey area, mixed seagrasses were most prevalent. Mixed assemblages of *S. filiforme, H. wrightii, T. testudinum*, and along some of the interior deeper edges, *H. decipiens* were most common.

3.1.2.3.1 Seagrass Frequency of Occurrence, Abundance, and Density

Frequency of occurrence, abundance, and density were calculated for each seagrass species along survey transects as they occurred based on the Braun-Blanquet technique (Braun-Blanquet 1965). Quadrat samples were taken along a 60 m long transect at 0 m, 20 m, 40 m, and 60 m.

The scale values are:

0.1	=	Solitary shoots with small cover
0.5	=	Few shoots with small cover
1.0	=	Numerous shoots but less than 5% cover
2.0	=	Any number of shoots but with 5-25% cover
3.0	=	Any number of shoots but with 25-50% cover
4.0	=	Any number of shoots but with 50-75% cover
5.0	=	Any number of shoots but with >75% cover

From the survey of quadrats along each transect, frequency of occurrence, abundance, and density of seagrass was computed as follows:

Frequency of occurrence	=	Number of occupied quadrats/total number of quadrats
Abundance	=	Sum of cover scale values/number of occupied quadrats
Density	=	Sum of cover scale values/total number of quadrats

Mean values are illustrated in Table 2.

Table 2 Mean Seagrass Frequency of Occurrence, Abundance, and Density Values for Survey Transects

Transect	Species *	Frequency	Abundance	Density
1	HD	0.11	2.00	0.50
	SF	0.69	2.25	2.25
	TT	0.02	0.10	0.03
2	HD	0.14	1.00	0.25
	SF	0.75	3.75	3.75
	TT	0.08	1.00	0.25
3	HD	0.06	1.00	0.25
	SF	0.78	2.25	2.25
	TT	0.03	0.10	0.03
4	HD	0.13	1.00	0.25
	SF	0.33	1.00	0.50
	HW	0.73	3.67	2.75
5	SF	0.95	4.50	4.50
6	SF	0.97	4.50	4.50
7	HD	0.25	4.00	1.00
	SF	0.70	2.67	2.00
	TT	0.50	3.33	2.50

Transect	Species *	Frequency	Abundance	Density
8	HW	0.25	0.05	0.03
	SF	0.53	0.70	0.53
	TT	0.75	5.00	3.75
9	HD	0.05	1.00	0.25
	HW	0.11	1.00	0.25
	SF	0.75	3.75	3.75
10	SF	0.91	4.75	4.75
11	SF	0.81	4.25	4.25
	TT	0.25	5.00	1.25
12	SF	0.86	4.25	4.25

*HW = *Halodule wrightii* SF = *Syringodium filiforme*
TT = *Thalassia testudinum* HD =*Halophila decipiens*

3.1.2.3.2 Frequency of Occurrence

Within the area surveyed, *S. filiforme* was the most frequently occurring seagrass species and the dominant cover type. Frequency of occurrence scores ranged from 0.70 to 0.97, with a mean of 0.79. In contrast, all other seagrass species had mean frequency values of less than 0.30. *T. testudinum*, *H. wrightii*, and *H. decipiens* had mean values of 0.27, 0.23, 0.12, respectively.

3.1.2.3.3 Abundance

Abundance is expressed as a sum of the cover abundance scores divided by the number of quadrats where the specific species was assigned a score. Scores range from 0 to 5, where 1.0 is less than 5 percent cover, 2.0 is 5 to 25 percent cover, 4.0 is 50 to 75 percent cover, and 5.0 is greater than 75 percent cover.

S. filiforme had the highest mean abundance within the study area (3.22). Abundance values ranged from 0.70 to 4.75 at the 12 transects where *S. filiforme* occurred. *T. testudinum* occurred within 6 transects and had a mean abundance of 2.42, while *H. wrightii* had the lowest abundance values in the survey area with a mean value of 1.57. *H. decipiens* abundance values ranged from 1.0 to 4.0 over transects where it occurred with a mean of 1.67.

3.1.2.3.4 Density

Density is expressed as the sum of the cover abundance scores divided by the total quadrats sampled. When compared to abundance values, density values can be very low because values are averaged across all quadrats within each transect, rather than only at occupied quadrats.

Across all transects sampled, *S. filiforme* had the highest density (3.12). Density values for *S. filiforme* ranged from 0.53 to 4.75. In comparison, *T. testudinum* had density values ranging from 0 to 3.75 with a mean of 1.30. *H. wrightii* and *H. decipiens* both had relatively low density values (1.00 and 0.417).

3.1.2.4 Potential Seagrass Mitigation Area Survey-Diver Reconnaissance

Diver surveys of the previously dredged borrow areas were also conducted. Divers were deployed with digital video and still cameras to document the dominant biological communities present within the deeper reaches of the borrow areas. The divers also examined the artificial reef material present within each area and documented with digital video the condition of the material. Six surficial sediment cores were also taken and archived for future examination should the need arise. The sampling locations of the sediment cores are shown on Figure 4.

Diver reconnaissance into the borrow area just south of Area III-A revealed a deep area consisting of a layer of fine silt material (Figure 7). Coastal Technology Corporation (1989) found similar habitats within these areas during the previous survey and described them as a soft mud. This area also contained a large area of artificial reef material. This artificial reef material which occupies the deeper portions of the area, is covered in this fine silt. The artificial reef has no apparent growth due to this heavy siltation. Very few fish or invertebrate species were documented on or near the artificial reefs during the survey.

Shallower portions of the borrow areas seem to have more diversity associated with them. In particular, the steep walls along the northern and southern edges of the hole south of Area III-A provide habitat for a variety of marine creatures. Loggerhead sponges, spiny lobster (*Panuliris argus*), hydroids, bryozoans, and a variety of juvenile fish species occur along these edges. Fish species observed included pinfish (*Lagodon rhomboides*), mojarra (*Euchinostomus* sp.), both juvenile and adult grunts (*Haemulon* spp.), and snappers (*Lutjanus* spp.). Also observed within the study area was a large tarpon (*Megalops atlanticus*).

3.2 Offshore Artificial Reef Areas

Two potential offshore artificial reef areas were surveyed. Hardbottom habitats were delineated using data collected from the integrated towed video survey and locations of suitable potential reef sites located. Localized areas of hardbottom habitats were located within each of the offshore areas surveyed and are shown on Figure 7 and Photograph 4 (Appendix A).

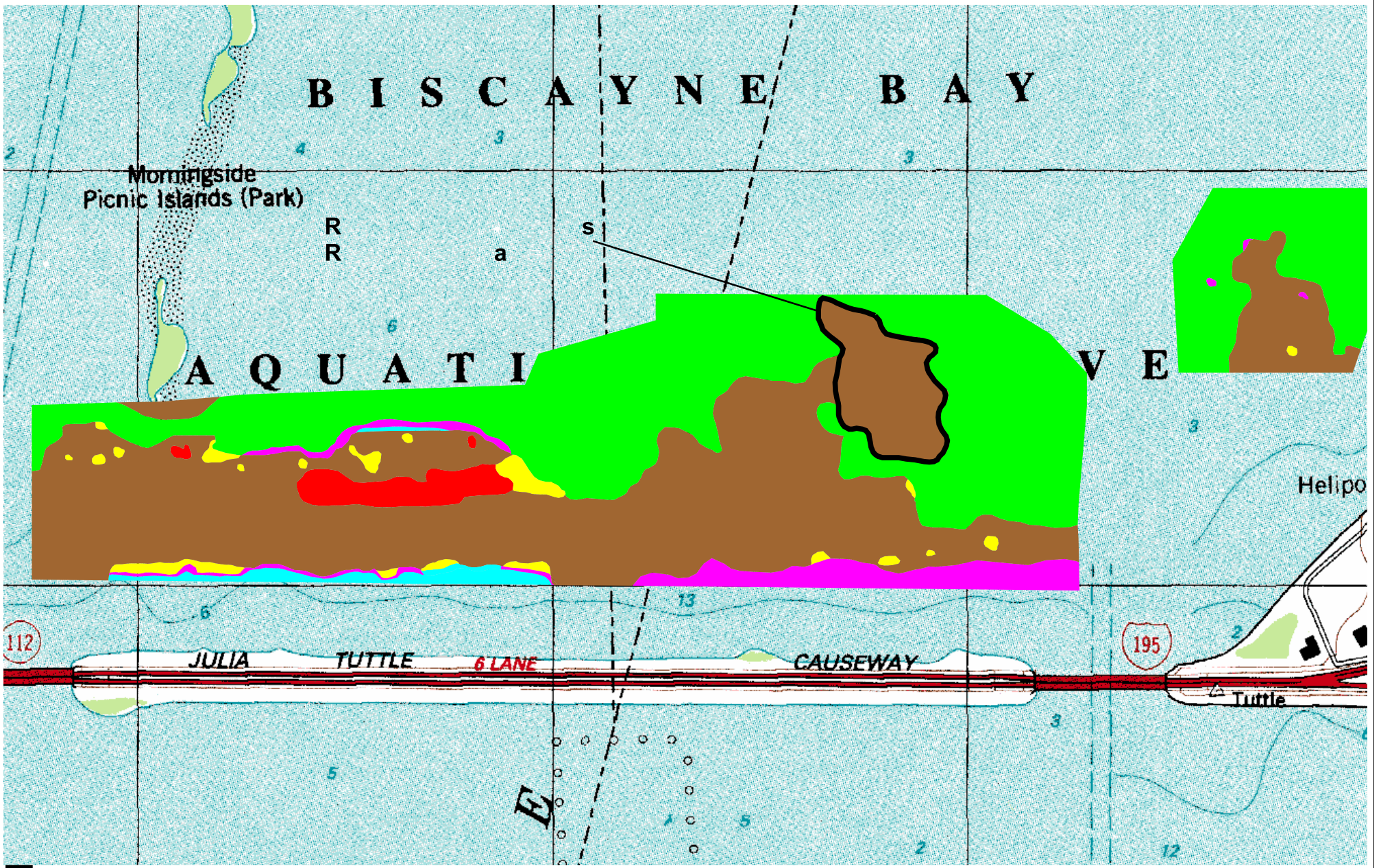
4.0 RECOMMENDATIONS

4.1 Seagrass Mitigation Areas

Coastal Technology Corporation (1989) identified three potential areas within the larger borrow area identified during this survey. Areas III-A and III-B were identified as possible mitigation areas by Coastal Technology Corporation and their results state that they may be too deep to accommodate seagrass mitigation and may be better suited for artificial reef creation. Results of this survey reveal depths even greater than identified in the previous survey. These areas may not even be suitable for artificial reef creation due to the high degree of siltation and lack of reef habitats here naturally. The artificial reef present south of Area III-A is covered in a layer of silt and has very little life associated with it; however, some small fishes and one tarpon were observed in the area.

The results of this survey and previous surveys reveal that Area III-C or similar areas in the northeastern corner of the survey area may be best suited for seagrass mitigation (Figure 8). The actual area labeled Area III-C is difficult to determine from the line drawings in the Coastal Technology Corporation report, as there are no coordinates associated with the areas identified in that report. Results of this survey reveal that a portion of the northeastern corner of the survey area has the most promise as a potential seagrass mitigation area (Figure 8). This area covers a total of 18.6 acres and has depths ranging from 4 to 8 feet (NAVD 88).

Since the survey area was most likely dominated by seagrass prior the construction of the borrow areas within this area, and continues to be bordered by dense seagrass beds to this day, successful seagrass mitigation through natural recruitment is likely. Fill material from Port expansion projects is proposed to be utilized to fill portions of these borrow areas back to ambient depths and natural seagrass recruitment will likely take place.



Recommended Seagrass Restoration Area (18.6 ac.)

Potential Seagrass Restoration Area Habitat Map

- Artificial Reef
- Livebottom/Hardbottom
- Syringodinum filiforme (manatee grass)
- Syringodinum filiforme (manatee grass) Mixed w/ Halophila decipiens (paddle grass), Halophila wrightii (shoal grass), and Thalassia testudinum (turtle grass)
- Mixed Halophila decipiens (paddle grass), Halophila wrightii (shoal grass), and Thalassia testudinum (turtle grass)
- Sand

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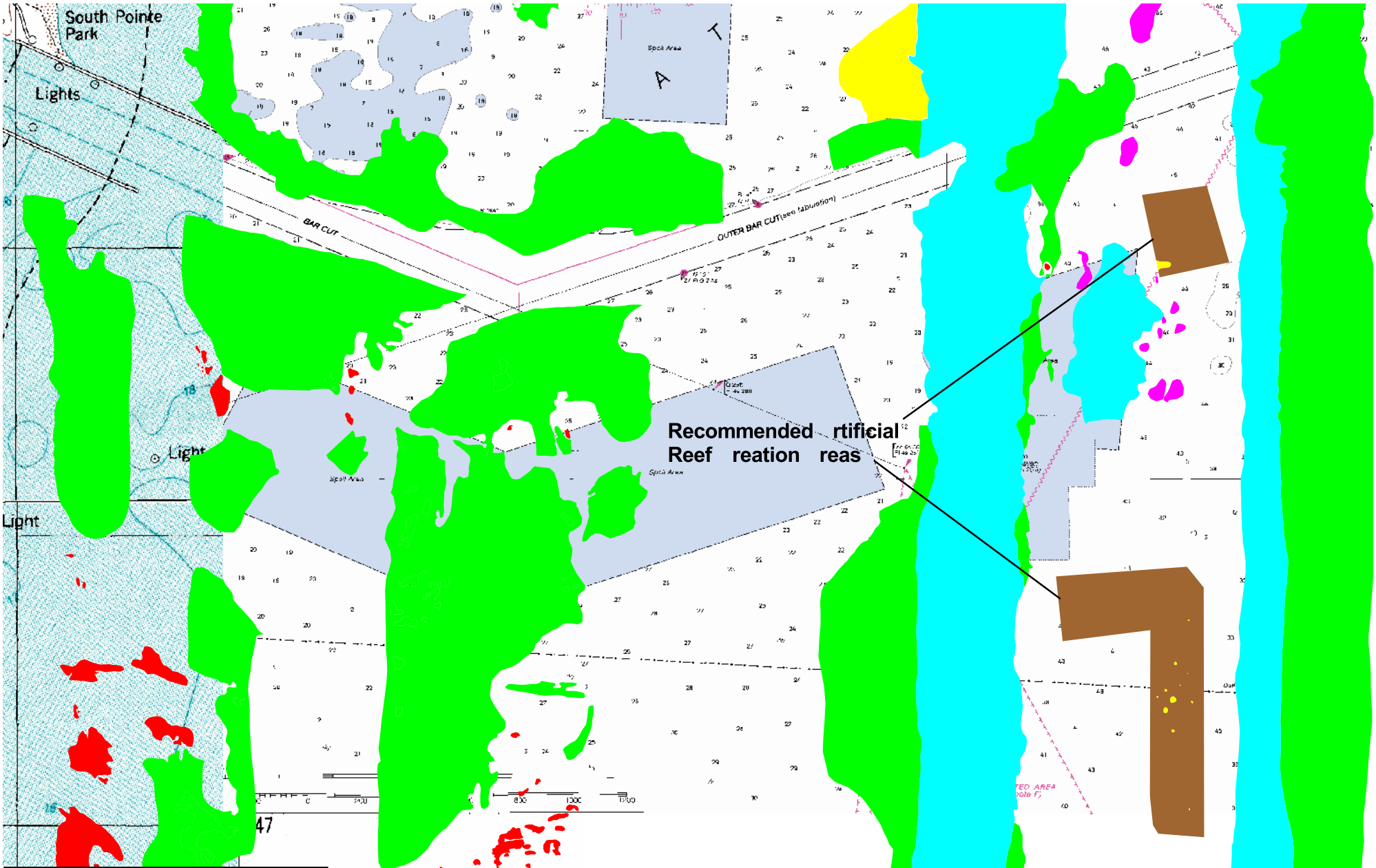
4.2 Offshore Artificial Reef Areas

Results of this survey reveal two potential area of artificial reef creation offshore of Miami Harbor (Figure 9). The southern survey area adjacent to Miami-Dade County Artificial Reef Site B has the most potential with 58.3 acres available for reef creation. The relative closeness to already permitted and constructed artificial reef sites makes it a viable option. This would allow for quicker colonization of artificial reef material and allow for easy monitoring and comparison to other artificial reef projects in the area. Depths within this area are also similar to the depths impacted in the proposed future Port project (40 to 45 feet).

The northern potential reef site surveyed contains 16.3 acres of sand bottom habitat that may be used for artificial reef creation. Water depths in this area range from 35 to 40 feet. Overall, the two offshore sites surveyed contain 74.6 acres of sand bottom habitat that may be permitted for artificial reef creation.



Potential Offshore Artificial Reef Habitat
- Patchy Low Relief
- Sand

Existing Naturally Occurring Reef
- high relief
- patchy high relief
- low relief
- patchy low relief

1500 0 1500 3000 Feet

Recommended rtificial Reef reation reas	
Marine Survey and ssessment for Potential Mitigation Sites Miami Harbor General Re-Evaluation Report	
Scale: 1" = 1, '	rawn By: MR
Date: uly, 2	
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	Figure 9

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October 22, 2002

APPENDIX A

Photographs

Photograph 1. Large sponge along southern wall of previously dredged borrow areas along the Julia Tuttle Causeway.

Photograph 2. Artificial reef material placed in previously dredged borrow areas . Reef material showed no living growth and was covered in a fine silt.

Photograph 3. Towed video captured image showing dense *Syringodium filiforme* along edge of previous borrow area.

Photograph 4. Hardbottom habitat present within potential offshore mitigation areas.

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APPENDIX N
DEIS Comments and Responses

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MAY 0 5 2003

James C. Duck, Chief, Planning Division
Jacksonville District - Corps of Engineers
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Attention: Ms. Terry Jordan-
Planning Division

Subject: **Draft Environmental Impact Statement (DEIS) for the Miami Harbor Navigation Upgrades, Miami-Dade County, Florida, (dtd. February, 2003) (CEQ # 030092, ERP# COE-E321980-FL)**

Dear Mr. Duck

Pursuant to Section 309 of the Clean Air Act and Section 102(2)(C) of the National Environmental Policy Act (NEPA), EPA (Region 4) has reviewed the subject document, an evaluation of the consequences/feasibility of modifying portions of the existing Port of Miami (Port) navigation system. The evaluation is structured to examine the ramifications of a series of individual channel widenings/deepenings. These were combined and then examined in the context of two action alternatives which in turn were compared to the status quo (no-action). The structural measures which comprise the two action options seek to improve navigational safety and facilitate current and future commercial ship transit. Specifically, the recommended plan includes five elements, viz., flaring the existing entrance channel to 800', widening the intersection of Government Cut and Fisherman's Channel, extending the Fisher Island Turning Basin to the north, relocating the west end of the Main Channel to the south between channel mile 2 and 3, increasing the width of Fisherman's Channel, and deepening the Dodge Island Cut and its proposed 1,200' turning basin.

To accomplish these proposed upgrades, a number of biologically important communities (seagrass, hardbottom/reef, rock/rubble, and essential fish habitat) will be adversely affected by the dredging and blasting attendant to their construction. Mitigation for unavoidable losses will be attempted via fabrication of artificial habitat(s) on a type-for-type basis. A reconnaissance of the area revealed a number of prospective sites where these communities types historically existed and were lost to previous construction activities and/or dismissed by boat traffic. The material (6,000,000 cubic yards) to be excavated in the

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process of deepening/widening the noted channels will be variously placed in the seagrass/artificial reef mitigation sites, an adjacent offshore dredged material disposal site, or in an approved upland disposal area.

As a result of our review, the following observations are provided for your use in preparing/improving the final EIS:

- An examination of the harbor pilot's report revealed a number of recurrent safety problems at the Port; hence, it is understandable why they requested certain channels/turning basins be upgraded. Nonetheless, it may also be possible to improve existing and future traffic safety margins via management/scheduling measures. For example, could off-loading of container cargo on the Lummus Island facilities be scheduled to avoid affecting vessels transiting Fisherman's Channel? 1 While measures of this nature would require coordination among the user groups at the Port, the DEIS did not fully justify the need for assessing just structural options to the exclusion of all non-structural alternatives. It is possible that the volume of shipping traffic would make this approach impractical, but this should be discussed. Hence, the FEIS would be improved by reviewing operational measures which would serve both the noted project purpose(s) and at the same time reduce impacts to seagrass and 2 hardbottom resources by lessening excavation needs. As regards the noted structural components, an incremental analysis should be conducted which examines their scope at appropriate intervals (e.g., entrance channel at 50 to 100 foot intervals and the Fisherman's Channel at 25 foot intervals). It would also be helpful for reviewers if the results, i.e., figures 3-31, track plots, and pilot ratings (Appendix A of Attachment B in Volume II), of the real-time testing analysis for the Ship Simulation Modeling Report were included in the FEIS.

- The DEIS states that mitigation proposals are under evaluation by various resource agencies. To date, EPA has not participated in this process; however, we agree with the conceptual decision of segregating rubble (by size classes) for eventual use in reef construction in lieu of co-mingling this material. Moreover, we suggest that the mitigation plan include a relocation plan for *living rock*, sponges, coral, etc., where practicable, to reduce further the project's impacts on the aquatic environment. We recommend an analysis of alternative construction techniques/designs before the construction contract is finalized. For example, with Component 5A could a barrier system be installed along the alignment of the proposed box cut channel to reduce the amount of side slope equilibrium impacts? If this proves infeasible, the deepened channel cut(s) could be excavated at an angle (or a combination approach is also a possibility). Since the COE contracts are objective rather than means oriented, unanticipated construction techniques with unevaluated environmental impacts have recently proved problematic in other Districts. To lessen the potential for unnecessary administrative delays resulting from subsequent interagency

Comments 1 and 2 Response

The USACE does not concur with the suggestion that coordination among user groups would resolve navigational safety issues identified by the Biscayne Harbor Pilots along Fisherman's Channel. The situation triggering the Pilots concerns in Fisherman's Channel can occur anytime that a berthed ship is unloading along the container wharves and a second ship transits the channel. Efforts to control this situation would essentially result in either curtailing unloading of cargo or transit of the channel. Either would have significant negative impacts on the movement of cargo and business of the port.

The Miami-Dade Seaport Department requested that the U.S. Army Corps of Engineers study the feasibility of improvements to the shipping channels at Miami Harbor for the purpose of providing safe navigation and accommodating larger container ships. The Biscayne Bay Pilots identified areas within the harbor where operational safety could be improved. The widening alternatives result in safer, as well as more efficient, vessel operations. The deepening alternatives allow for the efficient utilization of Post-Panamax container ships. These larger container ships can carry more cargo per trip, which reduces the transportation cost per ton. They become more cost effective to operate, as the channel gets deeper. The shipping trend is turning towards these deeper draft vessels, and unless the Port of Miami can handle these ships, they may lose business overall to non-U.S. ports. In contrast, the largest cruise ships in the world fleet are not draft-constrained by the current channel depth at Miami Harbor; and as such, are not impacted by the proposed deepening.

The Port has experienced significant historical average annual growth in its overall cargo traffic over the last decade: 8.1% from 1990 to 2000. As such, continued average annual cargo growth, albeit to a lesser extent (4.75% 2003 to 2059), is forecasted for the future. As shown in Table A-18 of the Economics Appendix, projected growth rates for the study period vary over time and by trade region, as well as by imports and exports. The annual rates of growth for the first 20 years of the 50-year study period (2009 to 2059) reflect historical annual rates and near-term government agency and industry projections. For the remaining 30 years, all annual rates projected for the first 20 years are adjusted downward to account for increasing uncertainty about the economic conditions in the more distant future. All rates represent an average over the period of analysis. Continues growth is not assumed as the actual absolute amount of cargo may vary between years reflecting swings in the business cycles. Moreover, projected growth is not dependent on the proposed project improvements. But, the growth in cargo traffic will be more cost effectively managed with the improvements.

The proposed improvements are designed to accommodate this growth in Port cargo and vessel activity, and insure operational safety within the harbor. The widening alternatives (seaward portion of the entrance channel, Government Cut at the southern intersection with Fisherman's Channel, and southern portion of Fisherman's Channel) are intended to address operational safety problems that were identified by the Biscayne Bay Pilots Association. Deepening the Entrance Channel, Government Cut and Fisherman's Channel allows for the efficient utilization of the largest container ships in the world fleet. These vessels are called Post-Panamax because they are too large to transit the Panama Canal. The Port's fastest growing foreign trade is with Europe and the Far East where the Post-Panamax container ships are currently deployed. The Post-Panamax container ships in the Far East trade would use the Suez Canal route to call at Miami Harbor. The Suez Canal route is longer than the Panama Canal route, but the Suez Canal route allows for the inclusion of Mediterranean region cargo on the same ship so as to take full advantage of the ship's cargo capacity and associated operational cost savings. The largest container ships currently calling at Miami Harbor are Panamax container ships. The largest Post-Panamax container ships carry almost twice the number of containers as the Panamax container ships. Thus, the Post-Panamax container ships reduce the transportation cost per ton per call. Moreover, the transition from smaller to larger vessels results in fewer vessel calls at Miami Harbor, reducing traffic congestion and associated safety problems. This is demonstrated by the fact that although cargo and passenger traffic grew at average annual rates of 8.1 % and 2.1%, respectively, from 1990 to 2000; the number of ship calls remained about the same: 3,456 calls in 1990; and 3,447 calls in 2000. This phenomenon is the direct result of the increase in size of cargo and cruise ships during the 1990's as well as the Port of Miami's previous deepening efforts.

Growth in containerized cargo is not dependent on the utilization of the Post-Panamax container ships. Increasing regional and world demand for goods, most likely the result of rising personal income and Gross Domestic Product (GDP) is the driving force behind the significant historical and project growth in containerized cargo movements through the Port of Miami. Using Post-Panamax size ships rather than smaller container ships reduces the ultimate consumer price of goods by lowering transportation costs, which is a benefit shared by the general public. Accordingly, the transportation cost savings represent the National Economic Development (NED) benefit of the project. Since the estimated transportation cost savings or benefits exceed the estimated cost of the improvements, the construction of the project is economically justified in accordance with general Federal and specific Corps of Engineers policy and

Comments 1 and 2 Response (continued)

The terminals at ports are as efficient as the circumstances require. The Port of Miami efficiently moves the current number of containers and trailers, however, as the amount of containerized cargo grows, operational and infrastructure changes will need to occur. The Port of Miami plans for these changed conditions through their Port Master Development Plan and associated capital improvement program (POM 2020 Master Implementation Plan). Recently, larger, faster gantry cranes have been installed and more are on order. Rubber-Tire Gantry (RTG) cranes have replaced traditional stackers. These cranes allow for higher stacking of containers, freeing up more Port-side yard space. Additional Port-side yard space is being made available by the transition from trailers to "grounded" containers, and the utilization of off-site storage facilities for empty containers. On-island transportation improvements, particularly separation of cruise and cargo traffic and construction of cargo gates, are also expected to improve the efficiency of cargo movement. Moreover, the Port is committed to promoting rail delivery of regional waterborne cargo through on-Port rail improvements and the development off-site intermodal container transfer facilities. Furthermore, the Florida Department of Transportation (DOT)'s planned multi-lane tunnel from Dodge Island to Watson Island will facilitate Port traffic, reducing congestion in the immediate Port area. These improvements, which are part of the Port Master Development Plan, will significantly reduce truck traffic to and from the Port on local (particularly Downtown Miami), regional and state roads. Tariffs, terminal leases, and state and federal grants pay for on-island capital improvements. Given the Port's landside capital improvement record and planned improvements via the Master Plan, it is reasonable to assume that any future growth in cargo and vessel calls would be handled by capital and operational improvements financed by the Port and paid for by tariffs and terminal leases, as well as grant and loan programs. Off-island improvements are funded through local, state and federal programs. Accordingly, it is assumed that necessary capital and operational improvements will be implemented in a planned manner as needed over time and paid for without the project.

Miami is an international city that is linked to the global economy through the Port, which facilitates the transportation of a variety of goods between producers and consumers worldwide. Because of the nature of the service it provides, and the employment and income it generates, the Port is an integral part of the regional economy. Moreover, Miami Harbor is part of a system of ports in the State of Florida, all of which are required to handle the current and future volume waterborne commerce for the State of Florida. Each port generally serves a particular portion of the State of Florida in addition to various areas of the United States. Shippers usually select a port because it is the most cost effective to utilize in the multi-modal shipment of goods: vessel, train, truck and air cargo. Thus, shifting cargo shipments to another port would typically result in increased costs, as well as landside logistical problems in the form of portside and highway congestion. To avoid the negative consequences of unplanned growth, the Port of Miami, and all other ports, manage port related activities by developing a master plan, which is a public document intended to guide future development consistent with local community, regional, and state goals and objectives. For example, Goal B of the adopted Port Master Plan states:

In carrying out its day-to-day operations and its long-term expansion program, the Port of Miami shall minimize any detrimental effects on the environment, the community, and supporting infrastructure and shall continue to coordinate its operation and expansion activities with federal, state, and regional agencies, other Miami-Dade County Departments, neighboring municipalities and surrounding communities as appropriate.

The Port has determined that the proposed deepening and widening improvements are necessary and consistent with its publicly stated goals and objectives, and benefit the immediate Miami area, Miami-Dade region and State of Florida.

process of deepening/widening the noted channels will be variously placed in the seagrass/artificial reef mitigation sites, an adjacent offshore dredged material disposal site, or in an approved upland disposal area.

As a result of our review, the following observations are provided for your use in preparing/improving the final EIS:

- An examination of the harbor pilot's report revealed a number of recurrent safety problems at the Port; hence, it is understandable why they requested certain channels/turning basins be upgraded. Nonetheless, it may also be possible to improve existing and future traffic safety margins via management/scheduling measures. For example, could off-loading of container cargo on the Lummus Island facilities be scheduled to avoid affecting vessels transiting Fisherman's Channel? While measures of this nature would require coordination among the user groups at the Port, the DEIS did not fully justify the need for assessing just structural options to the exclusion of all non-structural alternatives. It is possible that the volume of shipping traffic would make this approach impractical, but this should be discussed. Hence, the FEIS would be improved by reviewing operational measures which would serve both the noted project purpose(s) and at the same time reduce impacts to seagrass and hardbottom resources by lessening excavation needs. {As regards the noted structural components, an incremental analysis should be conducted which examines their scope at appropriate intervals (e.g., entrance channel at 50 to 100 foot intervals and the Fisherman's Channel at 25 foot intervals)} 3 {It would also be helpful for reviewers if the results, i.e., figures 3-31, track plots, and pilot ratings (Appendix A of Attachment B in Volume II), of the real-time testing analysis for the Ship Simulation Modeling Report were included in the FEIS.} 4

- The DEIS states that mitigation proposals are under evaluation by various resource agencies. To date, EPA has not participated in this process; however, we agree with the conceptual decision of segregating rubble (by size classes) for eventual use in reef construction in lieu of co-mingling this material. Moreover {we suggest that the mitigation plan include a relocation plan for *living rock*, sponges, coral, etc., where practicable, to reduce further the project's impacts on the aquatic environment} 5 {We recommend an analysis of alternative construction techniques/designs before the construction contract is finalized.} 6 For example, with Component 5A could a barrier system be installed along the alignment of the proposed box cut channel to reduce the amount of side slope equilibrium impacts? If this proves infeasible, the deepened channel cut(s) could be excavated at an angle (or a combination approach is also a possibility). Since the COE contracts are objective rather than means oriented, unanticipated construction techniques with unevaluated environmental impacts have recently proved problematic in other Districts. To lessen the potential for [illegible]

Comment 3 Response

An incremental analysis was included for width and depth considerations in the NED Plan Optimization section of the main report paragraphs 137 – 138 and the Economics Appendix A pages 102 - 105. The width considerations included in the incremental analysis resulted from several iterations involving use of ship simulation testing followed by further discussions with the Biscayne Bay Harbor Pilots which resulted in additional modifications to wideners and a turning basin to avoid and minimize impacts to reefs and seagrass areas. Incremental depths analyzed ranged from the existing 42-foot project depth to a proposed 50-foot depth.

Comment 4 Response

The Alternative Plan Considerations section of the main report, paragraphs 80 - 81 and Attachment B to Engineering Appendix B, contain results of the Ship Simulation. For more information contact Phil Sylvester at the Hydraulic Investigations Section of the USACE, Jacksonville District 904-232-1142.

Comment 5 Response

The USACE does not plan to relocate "living rock" or sponges. However, we do plan to use native rock from within the Port to construct the reef mitigation site, which will serve as a good substrate for reef fauna and flora. We expect sponges and other species that cover "live rock" to quickly recruit to the new habitat. The USACE will determine if it is feasible to relocate corals of a specific size (greater than 6 inches in diameter), without damage to the coral colony from the 3.1 acres of reef that is not previously dredged. The remaining 46-acres of the project are expected to recolonize within a ten-year period, as has been demonstrated by the recolonization of the hardbottom substrate within the port boundaries since the last dredging project.

Comment 6 Response

The USACE concurs that further discussion regarding construction techniques and analysis of alternatives should be provided. The Request for Proposal (RFP) process conducted prior to award of a construction contract will allow for an in-depth evaluation of a potential contractor's proposal. The RFP process as currently planned for this potential project will rate the technical portion of a contractor's proposal as the most significant. This results in an incentive approach, which will encourage the contractor to avoid impacts to reef areas and seagrasses. A general description of dredging techniques and their applicability to the project is included in Section 2.7 of the EIS. Additional analysis of these techniques is included in Volume II of the main report Appendix F – Mitigation Plan Incremental Cost Analysis.

coordination{it may be prudent for the Jacksonville District to secure a preliminary construction contract for this project prior to circulation of the FEIS, but certainly before finalizing the Record of Decision.} 7

- Appendix E, *Environmental Baseline Study*. The study indicates seagrass surveys were conducted during August and September, with additional mapping of *Critical Wildlife Areas* carried out two months later in November of 2000. Given the variability (seasonal and otherwise) in the spacial coverage of these aquatic species, federal resource agencies are reluctant to accept surveys which are this dated, especially one partially conducted outside the active growing season (May- August). {It is possible that some of the seagrasses were dormant (unobserved) during the initial study. Hence, we suggest a follow-up reconnaissance be conducted to verify the original acreage values} 8 In a relater matter{total acres of future planned impacts is incorrect (Page 98, Table 23 *Cumulative Natural Resources)*, i.e., total needs to be changed from 26.3 to 28.9 acres} 9

- The direct/indirect project impacts to seagrasses are noted to be approximately 6.3 acres.{In order to ensure mitigation success for these losses, the District has elected to fill all of the (previously dredged) borrow area. Given the experimental nature of seagrass restoration together with the limited success of many previous attempts, we agree that filling the entire depression is a prudent measure. There is an intuitive appeal for use of this North Biscayne Bay site, i.e., the presence of surrounding seagrass beds which would serve as a recruitment source . Nonetheless, care must be taken to avoid adversely impacting these sensitive communities during the necessary fill operations} 10 {Mitigation for construction activities is proposed at a rate of 1:1 with the difference between the two values (6.3 versus 18.6) serving as "banking credits" for future losses attendant to Port development. However, since the loss will be instantaneous and the compensation occurs through time via natural recruitment and successional processes, the idea that the entire areal difference between the loss-gain acreage can be banked needs to be discussed between the involved principals.} 11 We have no quarrel with the decision to limiting site monitoring to a 3 year term to ascertain overall success.{However, the 3 years should begin after all fill operations are completed and it has been determined that natural recruitment is starting.} 12 Based on our experience with similar mitigation attempts in south Florida, success with this type of seagrass restoration is not a given. This notwithstanding, we will agree to the mitigation proposal if the District is prepared to re-open the entire issue in the event that compensation is not achieved within the noted three-year time frame. The mitigation plan also provides that artificial reef monitoring will occur on an annual basis for three years. Instead, EPA urges that monitoring be conducted semi-annually for 3 years and then annually for the next two. We also encourage the District to continue its coordination during the monitoring process with the other involved resource agencies to obtain solutions for this and future mitigation plans.

Comment 7 Response

This would not be possible under the USACE process. Federal regulations prohibit this practice.

Comment 8 Response

The USACE does not concur with the EPA's assessment that spatial variability in seagrass coverage would generate survey results at this time that would be significantly different from the results obtained during the 2000 survey. A review of annual repeat aerial photography of the survey area and adjacent waters shows that the overall pattern of submerged aquatic vegetation (SAV) coverage remained essentially the same over a ten-year period from 1989 to 1998 (see discussion in Section 3.4 FEIS). The USACE survey shows extensive seagrass coverage throughout the entire study area (see Figure 5 of the FEIS), consistent with patterns seen in aerial photography. The USACE cannot identify any basis to expect SAV coverage to be significantly different (lesser or greater) than what has already been documented in the survey. Further, the USACE does not agree with the EPA's statement that seagrasses would be dormant (unobserved) outside the growing season. Annual repeat aerial photography shows the extensive SAV coverage reflected in the survey to be present year-round, including through the winter months. While new growth on seagrass plants may be restricted to certain months of the year, the plants are present and observable year-round in this subtropical environment. In addition, reconnaissance site visits of the study area have been conducted since the study was completed. One was conducted in March 2002 with a representative of the National Marine Fisheries Services (NMFS) in attendance and another was conducted in May 2003 with representatives of the NMFS, U.S. Fish and Wildlife Service, and the Florida Department of Environmental Protection. These reconnaissance field visits substantiated the findings of the 2000 survey. Seagrass coverage patterns were found to correspond with the results presented in the 2000 survey. Therefore, the additional study or verification of seagrass acreage values is not necessary.

Comment 9 Response

Concur. The numeric value has been corrected for the Final EIS.

Comment 10 Response

The USACE agrees to employ construction techniques that will avoid and minimize direct and indirect impacts to seagrass beds. An expanded conceptual mitigation plan for this site, which includes a more detailed explanation of construction methods, is included in Appendix J of the FEIS.

Comment 11 Response

Banking of mitigation has been removed from the proposed plan. The entire acreage of the mitigation site 24 acres will be applied to the project for mitigation.

Comment 12 Response

The USACE commits to five years of monitoring for the seagrass mitigation, from the date that the mitigation site construction is completed.

coordination, it may be prudent for the Jacksonville District to secure a preliminary construction contract for this project prior to circulation of the FEIS, but certainly before finalizing the Record of Decision.

- Appendix E, *Environmental Baseline Study*. The study indicates seagrass surveys were conducted during August and September, with additional mapping of *Critical Wildlife Areas* carried out two months later in November of 2000. Given the variability (seasonal and otherwise) in the spacial coverage of these aquatic species, federal resource agencies are reluctant to accept surveys which are this dated, especially one partially conducted outside the active growing season (May- August). It is possible that some of the seagrasses were dormant (unobserved) during the initial study. Hence, we suggest a follow-up reconnaissance be conducted to verify the original acreage values. In a relater matter, total acres of future planned impacts is incorrect (Page 98, Table 23 *Cumulative Natural Resources)*, i.e., total needs to be changed from 26.3 to 28.9 acres.

- The direct/indirect project impacts to seagrasses are noted to be approximately 6.3 acres. In order to ensure mitigation success for these losses, the District has elected to fill all of the (previously dredged) borrow area. Given the experimental nature of seagrass restoration together with the limited success of many previous attempts, we agree that filling the entire depression is a prudent measure. There is an intuitive appeal for use of this North Biscayne Bay site, i.e., the presence of surrounding seagrass beds which would serve as a recruitment source . Nonetheless, care must be taken to avoid adversely impacting these sensitive communities during the necessary fill operations. Mitigation for construction activities is proposed at a rate of 1:1 with the difference between the two values (6.3 versus 18.6) serving as "banking credits" for future losses attendant to Port development. However, since the loss will be instantaneous and the compensation occurs through time via natural recruitment and successional processes, the idea that the entire areal difference between the loss-gain acreage can be banked needs to be discussed between the involved principals. We have no quarrel with the decision to limiting site monitoring to a 3 year term to ascertain overall success. However, the 3 years should begin after all fill operations are completed and it has been determined that natural recruitment is starting. Based on our experience with similar mitigation attempts in south Florida, success with this type of seagrass restoration is not a given. This notwithstanding, we will agree to the mitigation proposal if the District is prepared to re-open the entire issue in the event that compensation is not achieved within the noted three-year time frame. The mitigation plan also provides that artificial reef monitoring will occur on an annual basis for three years. Instead, EPA urges that monitoring be conducted semi-annually for 3 years and then annually for the next two. We also encourage the District to continue its coordination during the monitoring process with the other involved resource agencies to ensure compliance for this the entire mitigation plan. 13 14 15

Comment 13 Response

The USACE concurs in general with this comment. The USACE had already proposed to monitor the site for 3 years to document recruitment of seagrass into the site (see Section 5.1of the FEIS). However, the USACE and the Port of Miami (the local sponsor performing the monitoring) will agree to extend the monitoring for two more years for a full five-year monitoring timeframe, to begin after the entire seagrass mitigation site has been constructed (i.e., "after all fill operations are completed"). The USACE has included some minimal strategic planting of portions of the site in the conceptual design (see Appendix J) in order to supplement the expected natural recruitment. If by Year 5 the site has not met the success but is on a trajectory towards meeting the criteria then the USACE may recommend additional monitoring. As outlined in the FEIS, the USACE wishes to retain the option of performing remedial planting of the site should recruitment not occur within the site and then to continue monitoring the site through the fifth year. If planted seagrass fails and there is still no further recruitment within the site after five years, the USACE is prepared to re-open project mitigation discussions.

Comment 14 Response

The USACE agrees to five-years of monitoring on the artificial reef sites. The USACE also agrees to semi-annual monitoring for the first three years and annual monitoring for the remaining two years.

Comment 15 Response

The monitoring will be conducted by the local sponsor and will include coordination with the resource agencies

- {Some of the channel bottoms are already incised into limestone; hence, blasting may be necessary to fragment rock material that proves resistant to normal cutter-head dredging. We suggest that Mr. Frank Yelverton (Wilmington District) be contacted (910-251-4640) if this proves to be a significant issue.} He was the project officer for a project (Northeast Cape Fear River Navigation) with similar issues as well as a principal in an interagency work group that studied the short- and long-term ramifications of blasting on the biotic/abiotic environment. 16

- {On the basis of our review a rating of EC-1 has been assigned. That is, we have some environmental concerns about the unavoidable project impacts to sensitive biological resources, but the proposed mitigation plan should adequately address these losses in the long-term.} 17

Thank you for the opportunity to comment on this proposed upgrade. If you have any questions, please contact Mr. Ron Miedema (561- 616-8741) of our South Florida office.

Sincerely,

Heinz J. Mueller, Chief
Office of Environmental Assessment

Comment 16 Response

The District agrees and has already been in contact with Mr. Yelverton.

Comment 17 Response

The District agrees with the designation and determination made by EPA.

United States Department of the Interior

OFFICE OF THE SECRETARY
OFFICE OF ENVIRONMENTAL POLICY AND COMPLIANCE
Richard B. Russell Federal Building
75 Spring Street, S.W.
Atlanta, Georgia 30303

ER 03/288

April 29, 2003

James C. Duck
Chief, Planning Division
Department of the Army
Jacksonville District
Corps of Engineers
P.O. Box 4970
Jacksonville, FL 32232

RE: Miami Harbor Draft Environmental Impact Statement and General Reevaluation Report

Dear Mr. Duck:

The Department of the Interior has reviewed the Draft Environmental Impact Statement and General Reevaluation Report for the proposed Miami Harbor expansion project located in Miami, Miami-Dade County, Florida. We offer the following comments for your consideration.

General Comments

For the past three years, the U.S. Fish and Wildlife Service's (FWS) South Florida Ecological Services Office has played an active role in coordination with the U.S. Army Corps of Engineers (Corps) to identify issues and provide recommendations to avoid and minimize potential adverse affects of the proposed project on fish and wildlife resources, including threatened and endangered species. The FWS's draft Fish and Wildlife Coordination Act (FWCA) report for the proposed project was submitted to the Corps in July 2002, and is included in the Miami Harbor Draft EIS. The draft FWCA report includes their evaluation of the project impacts on fish and wildlife resources, including recommendations to minimize adverse affects and mitigation for unavoidable impacts. {Over-all, the FWS believes that adequate measures to avoid, minimize, and mitigation for impacts to fish and wildlife resources, including threatened and endangered species, have been considered in the project design.} However, one unresolved issue remains regarding the proposed mitigation for the unavoidable impacts to sea grass habitat. 1

Comment 1 Response

The USACE agrees with this determination.

The draft EIS states that the proposed mitigation for impacts to 6.3 acres of sea grass habitat would include the restoration of a previously dredged borrow area within northern Biscayne Bay (Paragraphs 162-163 of the EIS, Environmental Mitigation). The proposed mitigation ratio is one acre of mitigation for every acre of impact (6.3 acres). However, the Corps intends to fill the entire 18.6 acre borrow site and reserve the remaining 12.3 acres of available sea grass habitat for mitigation credits for potential sea grass impacts related to future projects in Miami Harbor. The remnant of this particular sea grass bed is of significant value to nationally important ecological resources. The sea grass bed has been fragmented, disturbed, and otherwise adversely impacted for 100 years or more. Maintaining the existing ecological patterns and processes, and proximity is as important as no net loss of total acreage in mitigation considerations. The unavoidable loss of ecological patterns and processes should be included in mitigation.

We support the use of the historic dredge borrow area as proposed sea grass mitigation site for the loss of the 6.3 acres of sea grass habitat. However, we believe that a temporal displacement (lag factor) of 3:1 should be incorporated into the compensation proposal. Sea grass mitigation should total no less than 18.9 acres. Therefore, the Department can not support any assertions that the proposed 6.3 acres of sea grass mitigation offsets the loss of sea grass habitat. Similarly, we do not concur that sea grass mitigation credits will be available for banking or any other purpose. 2

If you should have any questions I can be reached at 404-331-4524.

Sincerely,

Gregory Hogue
Regional Environmental Officer

cc:
FWS, Vero Beach Field Office
FWS, Region 4
OEPC, WASO

Comment 2 Response

The USACE revised the mitigation plan and will provide approximately 24 acres of seagrass restoration in the east central hole of the Julia Tuttle hose as described in Appendix J of the FEIS.

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

April 28, 2003

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

Dear Mr. Duck:

The National Marine Fisheries Service (NOAA Fisheries) has reviewed the **Miami Harbor Draft Environmental Impact Statement (DEIS) and General Reevaluation Report (GRR)**, dated March 14, 2003. The proposed Federal project is located in the vicinity of Biscayne Bay in Dade County, Florida. The Recommended Plan includes components that would widen and deepen the Entrance Channel, deepen Government Cut, deepen and widen Fisher Island Turning Basin, relocate the west end of the Main Channel (no dredging involved), and deepen and widen Fisherman's Channel and the Lummus Island Turning Basin. A total volume of up to 4.1 million cubic yards of material would be dredged to deepen the Port from the existing depth of -42 feet to a project depth of -50 feet. The Recommended Plan would impact over 415 acres of habitat including 6.1 acres of seagrass habitat, 28.7 acres of low-relief hardbottom/reef habitat, 20.7 acres of high relief hardbottom/reef habitat, 123.5 acres of rock/rubble habitat, and 236.4 acres of unvegetated bottom habitat. Blasting is anticipated in site specific areas to remove substrate that cannot be removed via conventional dredge. The Biscayne Bay area, including the Miami Harbor is located within State of Florida Class III waters, which are designated for recreation, propagation, and maintenance of a healthy, well-balanced population of fish and wildlife.

By letter dated September 6, 2001, NOAA Fisheries provided preliminary comments to the U.S. Army Corps of Engineers (COE) regarding plans to prepare a DEIS for the project. We requested preparation of an Essential Fish Habitat (EFH) Assessment that identifies and describes EFH and other fishery resources in the vicinity of the project, describes the impacts to EFH associated with each action alternative, identifies the COE's views regarding effects on EFH, and identifies mitigation needed to fully offset losses of the functions and values of wetlands, aquatic resources, and EFH. In addition, NOAA Fisheries requested that the mitigation plan include a complete analysis of the proposed locations of wetland and estuarine/marine benthic habitat restoration and/or creation, in-kind mitigation for all habitat types to be impacted, and long-term monitoring to document success of any proposed mitigation. We further recommended that contingency out-of-kind mitigation plans be developed in case planned in-kind is not successful.

According to the DEIS, three alternative project plans for Miami Harbor expansion have been developed by the COE. Each alternative, except for "No Action," consists of widening and/or deepening Miami Harbor navigation channels and turning basins. According to information provided, the primary objective of the project is to provide access for larger vessels such as Post-Panamax cargo and Eagle Class cruise ships and to provide for the future capacity needs of the Port.

The Recommended Plan (Alternative 2) consists of the following five project components: *Component 1C*--widening the Entrance Channel from 500 feet to 800 feet, approximately 150 feet parallel to both sides of the Entrance Channel for approximately 900 feet. In addition, this component involves deepening the Entrance Channel and proposed widener from an existing depth of 44-feet to a depth of 52-feet; *Component 2A*--widen 700-feet of the southern intersection of Government's Cut by approximately 75-feet and deepen the existing project depth of 42-feet to 50-feet; *Component 3B*--widening and deepening the Fisher Island Turning Basin 300-feet to the north to 1,200-feet by 1,500-feet and deepen the existing project depth of 42-feet to 50-feet; *Component 4*--relocating the west end of the Main Channel about 250-feet to the south; *Component 5A*--widening and deepening Fisherman's Channel about 100-feet to the south. This component will reduce the size of the Lummus Island Turning Basin and would deepen the existing 42-foot channel depth to 50-feet.

General comments:

{NOAA Fisheries is concerned the proposed work will significantly impact managed species through habitat alteration and loss, and as a result of blasting activities associated with the proposed modifications.} 1 The proposed project is located in an area identified as EFH by the South Atlantic Fishery Management Council (SAFMC). Categories of EFH that occur within the project vicinity include the estuarine water column, seagrass, macroalgae, coastal inlets, coral, and hardbottoms. Managed species associated with seagrass habitat include postlarval, juvenile, and adult gray, mutton, lane and schoolmaster snapper and white grunt. Seagrass habitat has been identified as EFH for postlarval/juvenile, subadult, and adult red drum, and brown and pink shrimp. Hardbottom areas are designated as EFH by the SAFMC for juvenile and adult red and gag grouper, gray and mutton snapper, white grunt, penaeid shrimp, and spiny lobster. Coral reef habitat has been designated as EFH for juvenile and adult red and gag grouper, gray and mutton snapper, white grunt, and spiny lobster. Marcoalgae has been designated as EFH for juvenile and adult spiny lobster and the marine water column has been designated as EFH due to its importance as the medium of transport for nutrients and migrating organisms between estuarine systems and the open ocean. In addition, coastal inlets are designated as EFH for penaeid shrimp. NOAA Fisheries has also identified EFH for highly migratory species that utilize the estuarine water column and seagrass beds in this area including nurse, bonnethead, lemon, black tip, and bull sharks. Detailed information on shrimp, red drum, snapper/grouper complex (containing ten families and 73 species), and other Federally managed fisheries and their EFH is provided in the 1998 generic amendment of the Fishery Management Plans for the South Atlantic region prepared by the SAFMC. The generic amendment was prepared as required by the Magnuson-Stevens Fishery Conservation and Management Act (MSFCMA).

Comment 1 Response

The USACE acknowledges the impacts and has described them in detail in the DEIS; we have avoided and minimized to the maximum extent practicable, and is proposing to mitigate for the remaining unavoidable impacts. The avoidance and minimization are detailed in both the EIS and GRR. A complete discussion of avoidance and minimization efforts is included in Section 3.0 of the GRR (Planning Formulation). The FEIS is included with this document in volume one of the report.

In addition, seagrass, coral, hardbottoms, coastal inlets, and Biscayne Bay have been designated as Habitat Areas of Particular Concern (HAPC) by the SAFMC. HAPCs are subsets of EFH that are rare, particularly susceptible to human-induced degradation, especially ecologically important, or located in an environmentally stressed area.

According to the DEIS, the Recommended Plan would directly impact over 415 acres of aquatic resources, including seagrass beds, soft bottom habitat (silt/sand/rubble and sand bottom), hardbottom, and coral habitat. Impacts to seagrasses would include 6.3 acres (0.2 acres of direct impacts and 6.1 acres of indirect impacts through side slope equilibration); 123.5 acres of rock/rubble bottom (51.7 acres of previously dredged rock/rubble with live bottom including coral; 3.0 acres of new impacts to rock rubble with algae/sponges; and 68.8 acres of previously dredged rock/rubble with algae/sponges); 28.7 acres of low relief hardbottom (0.6 acre of low relief hardbottom; 28.1 acres of previously impacted low relief hardbottom); 20.7 acres of high relief hardbottom (2.7 acres of high relief hardbottom; and 18.0 acres of high relief hardbottom); and 236.4 acres of soft bottom habitat (213.1 acres have been previously dredged). As noted, some of the habitats impacted by the Recommended Plan have been impacted by previous Miami Harbor expansion projects. According to the DEIS, the anticipated direct impacts associated with new dredging at the Miami Harbor are: 6.3 acres of seagrasses; 3.0 acres of rock/rubble bottom; 0.6 acre of low-relief hardbottom; 2.7 acres if high-relief hardbottom; and 23.3 acres of soft bottom habitat (DEIS Tables 12-18).

NOAA Fisheries biologists participated in site inspections of the proposed project with U.S. Fish and Wildlife Service (FWS) biologists in December 2001, and March 2002. The following comments provided are primarily based on our review of the DEIS, but consider information obtained as a result of field observations and participation in interagency meetings as well.

Specific comments:

NOAA Fisheries has a variety of specific comments resulting from our review of the DEIS. Those comments are stratified into the following primary sections:

- *Seagrasses;*
- *Hardbottom and coral reefs;*
- *Mitigation, previously dredged channel impacts involving shallow water soft bottom, high- and low-relief hardbottom/coral reef, rock/rubble habitats, and indirect impacts;*
- *Blasting;*
- *Water Quality;*
- *EFH Assessment; and*
- *Beneficial Use of Dredged Material.*

Seagrasses

NOAA Fisheries concurs with the COE's determination that compensatory mitigation is needed for direct and indirect impacts to seagrass habitat. To compensate for impacts to previously non-dredged habitats, the COE proposes to mitigate for the removal of 6.3 acres of seagrass at a ratio of 1:1 through the restoration of an 18.6 acre historic dredged borrow site in northern Biscayne Bay (GRR p 56). Any excess restoration resulting from filling of dredge holes would be retained by the Port for future use (DEIS p 103). The COE considers a compensation ratio of one acre seagrass compensation for one acre of seagrass impact to be conceptually valid based on a high probability of success and high likelihood that the restored seagrass beds would be of much higher quality than those impacted (GRR p 59; DEIS Mitigation Plan p ii).

{NOAA Fisheries does not concur with the COE in regard to the aforementioned seagrass compensatory mitigation ratio or the expectation that excess mitigation credits would be available. Instead, we concur with the FWS recommendation, as provided in the draft Coordination Act Report (CAR) that 18.9 acres of compensatory mitigation [a 3:1 (mitigation:impact) ratio] for impacts to 6.3 acres of seagrasses is needed (see EFH Conservation Recommendation #1).} 2 NOAA Fisheries considers 18.9 acres of compensatory mitigation appropriate for 6.3 acres of seagrass impacts since (1) natural colonization, while effective in properly prepared seagrass restoration sites, will not provide immediate replacement habitat and three years or more may be required to establish a viable "pioneer" seagrass community with shoal grass (*Halodule wrightii*) and paddle grass (*Halophila decipiens*). In addition, a large portion of the anticipated impacts to seagrasses would involve turtle grass (*Thalassia testudinum*), which is considered a climax seagrass community. Because this community often requires ten years to recover and replanting turtle grass has not been effective in seagrass restoration efforts (Fonseca *et al.* 1998), a higher mitigation ratio is needed to compensate for temporal losses. We further note that the risks associated with seagrass restoration projects can be large. Even "successful" seagrass restoration rarely achieves 100 percent recovery and a number of factors may limit the restoration success (e.g., interim seagrass losses, bioturbation, storm and other natural effects, and inadequate site preparation).

The mitigation plan proposed by the COE involves filling previous dredge holes in Biscayne Bay to match adjacent seagrass habitat elevations and monitoring of natural recruitment for at least three years. If success criteria are not met by natural recruitment of seagrasses, the COE would replant seagrasses. NOAA Fisheries can support the use of mitigation sites that support or appropriately exceed the following (minimum) criteria (from Fonseca *et al.*, 1998):

1. They are at similar depths as nearby natural seagrass beds;
2. They were anthropogenically disturbed;
3. They exist in areas that were not subject to chronic storm disruption;
4. They are not undergoing rapid and extensive natural colonization by seagrasses;
5. Seagrass restoration had been successful at similar sites;
6. There is sufficient acreage to conduct the project; and
7. Similar quality habitat would be restored as was lost.

Comment 2 Response

The USACE will provide approximately 24 acres of seagrass restoration within the east central hole of the Julia Tuttle dredge hole in north Biscayne Bay toward the mitigation requirements associated with the project (see Appendix J of the FEIS).

According to the information provided, the site selection criteria, as outlined in the DEIS, are consistent with several components outlined in Fonseca *et al.*, (1998). {Therefore, based on the limited information provided, NOAA Fisheries preliminarily concurs that natural seagrass recruitment at this site will likely occur. Specifically, seagrass restoration would be performed in an area where seagrass once occurred and is now absent due to anthropogenic activities and the proposed site is bordered by dense seagrass beds (DEIS Marine Survey and Assessment for the Potential Mitigation Sites p 20)} 3 In addition, according to the information provided the fill material from the Port would be utilized to fill portions of this previous borrow area to ambient depths. It is anticipated that depths will range from -2 feet to -6 feet MSL in the restored areas following restoration (DEIS Mitigation Plan p 13). However, some discrepancies exist in the information provided which warrant further clarification. According to the information provided, recruitment by *H. wrightii* and *H. decipiens*, is expected to occur rapidly since both species *likely* occur within the shallow flats adjacent to these sites (DEIS Mitigation Plan p 13). {The Final EIS (FEIS) should definitively state that: (1) the seagrass restoration site will be filled to the same depths as nearby natural seagrass beds and (2) that the presence and relative abundance of *H. wrightii* and *H. decipiens* or other seagrasses has been verified in the shallow flats located adjacent to these sites (see EFH Conservation Recommendation #2).} 4

{NOAA Fisheries concurs that the seagrass planting methods should follow guidance developed by Fonseca *et al.*, (1998) and peer reviewed by NOAA Fisheries prior to construction.} 5 However, we have concerns regarding the criteria that will trigger contingency seagrass planting. The DEIS (p 104) states that in the event that natural recruitment has not started within three years following excavation, then methods to plant seagrass donor material *would be* initiated; however, other sections of the DEIS are less direct in this regard. For example, the DEIS Marine Survey and Assessment for the Potential Mitigation Sites (p iii), states that if established success criteria are not met within three years, supplemental planting *may* be performed to speed recovery. {NOAA Fisheries requests that the FEIS provide specific criteria that would trigger contingency seagrass planting and that such criteria be in concert with EFH Conservation Recommendation #3.} 6

In our previous comments we also recommend that the criteria to be used to determine when adequate and successful seagrass restoration had been attained should be implemented into the Seagrass Monitoring Plan. Specifically, we recommend that "successful replacement" should be defined in accordance with Fonseca *et al.*, (1998) as the *unassisted persistence of the required acreage of seagrass coverage for a prescribed period of time* (suggested minimum of five years). We note that in an area having physical conditions capable of supporting *H. decipiens* restoration, this species of seagrass is likely to colonize rapidly within the first year of restoration, and to be followed by a marked decline in the percent spacial coverage if an adequate seed bank is not developed early-on. Therefore, it is necessary to evaluate the persistence of restored seagrass coverage over a fixed (absolute minimum of three years) period of time (Fonseca, M. pers. comm., 2003). Therefore, the FEIS should contain a detailed seagrass biological monitoring plan which calls for a minimum of five years of monitoring and integrates the Fonseca *et al.*, (1998) definition of success criteria (see EFH Conservation Recommendation #4).

Comment 3 Response

The USACE concurs with this determination

Comment 4 Response

The USACE believes that the proposed mitigation site meets the seven criteria set forth in Fonseca et al. (1998):

1. They are at similar depths as nearby natural seagrass beds. The proposed mitigation site currently has a depth of approximately –17 feet to –34 feet. The conceptual plan calls for filling the site to depths similar to nearby natural seagrass beds, at approximately –5 to –7 feet.
2. They were anthropogenically disturbed. The mitigation site is a man-made hole that was previously dredged (between 1922-1945) to allow the construction of the Julia Tuttle causeway to Miami Beach.
3. They exist in areas not subject to chronic storm disruption. The entire South Florida ecosystem is subject to hurricane events and tropical storms, however, the proposed mitigation site is located in Biscayne Bay, behind the sheltering effects of the Miami Beach barrier island. In addition, it appears that the site does not experience regular wind-driven turbulence or strong tidal currents. Relatively calm conditions prevail.
4. They are not undergoing rapid and extensive natural colonization by seagrass. The site is a deep borrow pit and is unvegetated below a contour depth of 16 to 17 feet. Conditions in the deeper depths currently preclude recruitment of seagrass there. The goal of site construction will be to retain fill to the maximum extent possible to within these deeper areas and then mound the fill up to create an elevation suitable for seagrass recruitment.
5. Seagrass restoration had been successful at similar sites. Restoration of a 2.4-acre borrow area in North Biscayne Bay was completed in the early 1990's by Miami-Dade Department of Environmental Resources Management (DERM) and recently inspected by NMFS, FWS, and DERM staff during an agency site visit with the USACE' contractor in March of 2002. Although no monitoring has been done by DERM since planting of the site, a visual inspection by the agency team revealed that seagrass occurs throughout the site and was dominated by H. wrightii and *T. testudinum*. Discussions with DERM staff indicate the old borrow area was filled with rubble and planting units of both H. wrightii and *T. testudinum* installed, the site was not capped with sand. Based on this evidence of general success, all in attendance agreed that seagrass restoration utilizing old borrow sites was a viable option for mitigating seagrass loss.
6. There is sufficient acreage to conduct the project. The proposed mitigation area will be approximately 24 acres in size. It appears at this time that the preferred fill site in the central area of the large borrow pit feature will be able to accommodate this acreage.
7. Similar quality habitat would be restored as was lost. The seagrass beds being impacted by the proposed dredging are characterized by a climax community of patchy dense seagrasses. The community surrounding the mitigation site will serve as the target community for restoration at the site. This community also consists of a climax community of patchy dense seagrass beds. (Please refer to the mitigation site survey conducted in June 2002, Appendix L of the DEIS for a detailed species composition assessment).

The USACE plans to fill the site to the same depth as surrounding seagrass beds in order to ensure project success. Beds of *H. decipiens*, *H. wrightii* and *S. filiforme* have been documented adjacent to the proposed mitigation site and are expected to serve as recruitment sources.

Comment 5 Response

The USACE concurs with this determination

Comment 6 Response

When a detailed mitigation plan is completed, this will be submitted to the resource agencies, including NOAA Fisheries, for review. The mitigation plan will include criteria to trigger additional planting of seagrasses.

According to the information provided, the site selection criteria, as outlined in the DEIS, are consistent with several components outlined in Fonseca *et al.*, (1998). Therefore, based on the limited information provided, NOAA Fisheries preliminarily concurs that natural seagrass recruitment at this site will likely occur. Specifically, seagrass restoration would be performed in an area where seagrass once occurred and is now absent due to anthropogenic activities and the proposed site is bordered by dense seagrass beds (DEIS Marine Survey and Assessment for the Potential Mitigation Sites p 20). In addition, according to the information provided the fill material from the Port would be utilized to fill portions of this previous borrow area to ambient depths. It is anticipated that depths will range from -2 feet to -6 feet MSL in the restored areas following restoration (DEIS Mitigation Plan p 13). However, some discrepancies exist in the information provided which warrant further clarification. According to the information provided, recruitment by *H. wrightii* and *H. decipiens*, is expected to occur rapidly since both species *likely* occur within the shallow flats adjacent to these sites (DEIS Mitigation Plan p 13). The Final EIS (FEIS) should definitively state that: (1) the seagrass restoration site will be filled to the same depths as nearby natural seagrass beds and (2) that the presence and relative abundance of *H. wrightii* and *H. decipiens* or other seagrasses has been verified in the shallow flats located adjacent to these sites (see EFH Conservation Recommendation #2).

NOAA Fisheries concurs that the seagrass planting methods should follow guidance developed by Fonseca *et al.*, (1998) and peer reviewed by NOAA Fisheries prior to construction. However, we have concerns regarding the criteria that will trigger contingency seagrass planting. The DEIS (p 104) states that in the event that natural recruitment has not started within three years following excavation, then methods to plant seagrass donor material *would be* initiated; however, other sections of the DEIS are less direct in this regard. For example, the DEIS Marine Survey and Assessment for the Potential Mitigation Sites (p iii), states that if established success criteria are not met within three years, supplemental planting *may* be performed to speed recovery. NOAA Fisheries requests that the FEIS provide specific criteria that would trigger contingency seagrass planting and that such criteria be in concert with EFH Conservation Recommendation #3.

In our previous comments we also recommend that the criteria to be used to determine when adequate and successful seagrass restoration had been attained should be implemented into the Seagrass Monitoring Plan. Specifically, we recommend that "successful replacement" should be defined in accordance with Fonseca *et al.*, (1998) as the *unassisted persistence of the required acreage of seagrass coverage for a prescribed period of time* (suggested minimum of five years). We note that in an area having physical conditions capable of supporting *H. decipiens* restoration, this species of seagrass is likely to colonize rapidly within the first year of restoration, and to be followed by a marked decline in the percent spacial coverage if an adequate seed bank is not developed early-on. Therefore, it is necessary to evaluate the persistence of restored seagrass coverage over a fixed (absolute minimum of three years) period of time (Fonseca, M. pers. comm., 2003). Therefore, the FEIS should contain a detailed seagrass biological monitoring plan which calls for a minimum of five years of monitoring and integrates the Fonseca *et al.*, (1998) definition of success criteria (see EFH Conservation Recommendation #4). 7

Comment 7 Response

The USACE and Port of Miami (the local sponsor that will be responsible for conducting the monitoring) agree to monitor the seagrass mitigation site annually for five years.

In addition, it is not clear who would be responsible for long-term management of the mitigation area. According to the GRR page 59, item 165, the Miami-Dade Seaport is responsible for the operation, maintenance, repair, and replacement, and rehabilitation of all mitigation areas for the life of the authorized project.{Please identify the party responsible for the biological monitoring and long-term management of the seagrass mitigation area (see EFH Conservation Recommendation #5).} 8

{NOAA Fisheries is concerned that Johnson's seagrass (*Halophila johnsonii*) may be present in the area of the proposed work.} This species is rare, has a limited reproductive capacity, and is vulnerable to a number of anthropogenic and natural disturbances. Johnson's seagrass exhibits the most limited geographic distribution of any seagrasses. Due to its limited reproductive capacity and energy storage capacity, it is less likely to survive environmental perturbations and to be able to repopulate an area when lost (NOAA Fisheries 2001). Despite its diminutive size, studies indicate that Johnson's seagrass provides similar ecological and economic benefits (i.e., food source, refuge, nursery for numerous wildlife species, sediment stabilization, and deceleration of water currents and waves reducing turbidity and erosion) to the larger seagrasses (Zieman 1982; Virnstein et al. 1983; Phillips and Menez 1988; Fonseca 1994). Similar to other *Halophila* species, because of its small size and rapid turnover rate, this seagrass is especially important in detritus and nutrient cycling (Kenworthy 1993; Bolen 1997). If extirpated from an area, *H. johnsonii* will be at a disadvantage compared to either highly fecund or larger species in re-establishing itself due to its known lack of seed banks and limited energy storage capabilities. Importantly, *H. johnsonii* has the ability to stabilize sediments of disturbed sites before the larger seagrasses can establish themselves (Packard n1981; Fonseca 1989; Kenworthy 2000). The above mentioned knowledge of the species coupled with NOAA Fisheries biologists observations regarding the biology of the species, NOAA Fisheries recognizes *H. johnsonii* as an important pioneer species that stabilizes sediments and may ultimately facilitate colonization of more climatic species. 9

{*H. johnsonii* has been positively identified and documented in areas around Biscayne Bay and in areas adjacent to the Harbor and no justification exists that the species would not occur within the Miami Harbor, since the conditions are similar to the areas in Biscayne Bay where it has been found.} 9 cont

As previously mentioned, NOAA Fisheries was involved with the resource surveys conducted in the Miami Harbor.{During the March 20, 2002, site visit, a NOAA Fisheries biologist observed *H. johnsonii* in the vicinity of the proposed work. While NOAA Fisheries recognizes that Miami-Dade Department of Environmental Resources Management (DERM) has not observed *H. johnsonii* in any of their resource surveys in the Harbor, we note that DERM has not conducted a focused survey for the species specifically using standard survey methods recommended by the Johnson Seagrass Recovery Team (Craig Grossenbacher, pers. comm., 2003). The diminutive nature of this species and the low visibility in areas where it is normally located, make it difficult to accurately identify and characterize during typical resource surveys. Representatives from Dial Cordy, an agent for the COE, recorded the Latitude/Longitude on a map where the specimen was located. NOAA Fisheries is concerned that this information has been omitted in the DEIS.} 11

Comment 8 Response

The local sponsor (Port of Miami) is responsible for the biological monitoring and management of all mitigation associated with the proposed project. The Port may choose to contract to Miami-Dade DERM, or another contractor to perform the actual monitoring activities.

Comment 9 Response

The USACE agrees that H. johnsonii has been positively identified and documented in Biscayne Bay but the USACE does not concur with the statement that the documented absence of H. johnsonii from the study area is not justified. The seagrass survey conducted by the USACE covered the entire seagrass area. Divers were used to conduct quantitative surveying of seagrasses along 35 transects and also to map all seagrass coverage and habitat type between transects (see Appendix E of the FEIS). Using this methodology, Johnson's seagrass was not detected within the entire study area. In addition, several reconnaissance visits to the impact site within Components of 5 and 5A have been conducted both before and after the USACE study by qualified agency and consulting personnel. Johnson's seagrass has not been detected during any of those visits. The Port of Miami (Port) biological consultants have surveyed the site at least four times. In addition, DERM has mapped the entire seagrass edge in this area through extensive fieldwork and to our knowledge has not identified H. johnsonii. In fact the DERM seagrass line is used in the GRR impact analysis. In addition, the following site visits with federal agency personnel in attendance have also been conducted relative to Components 5 and 5A:

- December 2001 – Biologists from the Port, DERM, National Marine Fisheries Service (NMFS) and U.S. Fish and Wildlife Service (FWS) in attendance.
- March 2002 – Biologist from NMFS in attendance.
- May 2003 – Biologists from the USACE, DERM, NMFS, FWS and Florida Department of Environmental Protection in attendance.

During the May 2003 visit, agency personnel experienced in identifying Johnson's seagrass expressed the general opinion that the high energy conditions found along Fisherman's Channel (impact site for Components 5 and 5A) probably do not favor recruitment of Johnson's seagrass. This opinion was based on the strong tidal currents experienced in this area and the prevalence of sandy/shelly substrate. While the USACE does not want to speculate on specific conditions necessary for recruitment and survival of Johnson's seagrass in Biscayne Bay, we do not agree with the foregone conclusion that "there is no apparent physiological or ecological limitation for H. johnsonii to exist" in the study area. The USACE believes that the intensive transect survey they have conducted in conjunction with numerous agency reconnaissance site visits over the years provide more than sufficient confidence in the conclusion that H. johnsonii is currently and has been in the past, absent from Components 5 and 5A of the study area. Although, as stated in NOAA's comment letter (see comment NOAA-11, page 6), a NOAA fisheries biologist observed a specimen of *H. johnsonii* in the vicinity of the proposed work (Component 3). However, the specimen was not definitively identified as *H. johnsonii,* and subsequent attempts to confirm its presence proved unsuccessful.

Comment 11 Response

The information was not omitted in the DEIS. It was not included in the DEIS because the specimen was not confirmed as H. johnsonii, by either the USACE' contractor, the NMFS Biologist or the FWS Biologist on the vessel. The USACE reviewed the video of the area and could not confirm presence of *H. johnsonii*. The specimen in question was collected by the NMFS Biologist who stated that the specimen would be examined and confirmed as to species at a later date. It is the USACE understanding that the specimen was never evaluated. A complete seagrass survey, using towed video and four-diver transects was completed for this area (Aug/Sept 2000) and *H. johnsonii* was not located during that survey.

Given that there is no apparent physiological or ecological limitation for *H. johnsonii* to exist in Miami Harbor, that at least one unconfirmed identification of the species in Miami Harbor vicinity exists, and the diminutive nature of the species, NOAA Fisheries believes some level of further investigation is prudent. Therefore we recommend that a survey is conducted of the Harbor using survey methodologies (see NOAA Fisheries 2000) developed for *H. johnsonii*. NOAA Fisheries believes that conducting a survey specific for *H. johnsonii* would provide more credible and reliable evidence that impacts to this federally-protected plan will be avoided. The results of this survey in addition to the map where the specimen was located in 2002, should be included in the FEIS. 12

Additional issues pertaining to seagrass impacts are addressed in the *Water Quality* section (below).

Hardbottom and Coral Reefs

NOAA Fisheries considers the anticipated impacts to corals and hardbottoms as being highly significant and we find that avoidance and minimization of impacts to these resources is not been sufficiently addressed in the DEIS. As presently written, this component of the DEIS, does not comply with sequential mitigation requirement which is defined in Section 1508.20 of the Regulations for Implementing the Procedural Provisions of the NEPA (40 CFR Parts 1500-1508). Therefore, we again request that the COE consider reducing channel expansion in hardbottom habitats prior to the consideration of mitigation. In addition, NOAA Fisheries also recommends that an anchoring and vessel operation plan be developed to assist in reducing anchor and anchor cable damage to hardbottom habitat (see EFH Conservation Recommendation #6). Once developed, these plans should be forwarded to FWS and NOAA Fisheries for review prior to project implementation. These matters and any planned action should be fully addressed and appropriately described in the FEIS. 13

NOAA Fisheries concurs with the FWS recommendation (number 7, page 36 of the CAR) that proposed widening and deepening of the Entrance Channel should be reduced. Increasing the channel width from 500 feet to 800 feet would result in elimination of over 20 acres of high relief hardbottom and coral reef habitat. A joint FWS-NOAA Fisheries site inspection of the Entrance Channel on March 20, 2002, revealed that some of these areas, particularly the existing channel edges, contain hard and soft coral colonies. These habitats provide important ecological functions for numerous marine species. Some of the hard coral colonies (e.g., *Montastrea* sp. and *Diploria* sp.) observed were in excess of 36 inches in diameter and the vertical relief of the habitat was two to three feet in elevation. Using an average hard coral growth rate of 0.5 centimeter per year for this area, these coral colonies may be greater than 100 years old (Dodge 1987). In addition to designation as Resource Category 1 by the FWS, they are identified as EFH-Habitat Areas of Particular Concern by the South Atlantic Fishery Management Council (SAFMC) and NOAA Fisheries. Rather than attempting to compensate for their loss by constructing artificial habitats, we believe the COE should make further effort to avoid hardbottom and coral reef habitats in the area of the Entrance Channel (see EFH Conservation Recommendation #7). With regard to the FEIS, we recommend that the COE reexamine the need to widen the Entrance Channel and describe possible alternatives and, if possible, a less damaging alternative.

Comment 12 Response

The USACE agrees that *H. johnsonii* has been positively identified and documented in Biscayne Bay but the USACE does not concur with the statement that the documented absence of *H. johnsonii* from the study area is not justified. The seagrass survey conducted by the USACE covered the entire seagrass area. Divers were used to conduct quantitative surveying of seagrasses along 35 transects and also to map all seagrass coverage and habitat type between transects (see Appendix E of the DEIS). Using this methodology, Johnson's seagrass was not detected within the entire study area. In addition, several reconnaissance visits to the impact site within Components of 5 and 5A have been conducted both before and after the USACE study by qualified agency and consulting personnel. Johnson's seagrass has not been detected during any of those visits. In addition, DERM has mapped the entire seagrass edge in this area through extensive field work and to our knowledge has not identified *H. johnsonii*. In fact the DERM seagrass line is used in the GRR impact analysis. In addition, the following site visits with federal agency personnel in attendance have also been conducted relative to Components 5 and 5A:

- December 2001 – Biologists from the Port, DERM, National Marine Fisheries Service (NMFS) and U.S. Fish and Wildlife Service (FWS) in attendance.
- March 2002 – Biologist from NMFS in attendance.
- May 2003 – Biologists from the USACE, DERM, NMFS, FWS and Florida Department of Environmental Protection in attendance.

During the May 2003 visit, agency personnel experienced in identifying Johnson's seagrass expressed the general opinion that the high energy conditions found along Fisherman's Channel (impact site for Components 5 and 5A) probably do not favor recruitment of Johnson's seagrass. This opinion was based on the strong tidal currents experienced in this area and the prevalence of sandy/shelly substrate. While the USACE does not want to speculate on specific conditions necessary for recruitment and survival of Johnson's seagrass in Biscayne Bay, we do not agree with the foregone conclusion that "there is no apparent physiological or ecological limitation for *H. johnsonii* to exist" in the study area. The USACE believes that the intensive transect survey they have conducted in conjunction with numerous agency reconnaissance site visits over the years provide more than sufficient confidence in the conclusion that *H. johnsonii* is currently and has been in the past, absent from Components 5 and 5A of the study area. Although, as previously addressed (NOAA-10), a NOAA fisheries biologist observed a specimen of *H. johnsonii* in the vicinity of the proposed work (Component 3). However, the specimen was not definitively identified as *H. johnsonii,* and subsequent attempts to confirm its presence proved unsuccessful. A map will not be included in the FEIS because the specimen was not confirmed as H. johnsonii, by either the USACE' contractor, the NMFS Biologist or the FWS Biologist on the vessel. A complete seagrass survey, using towed video and four-diver transects was completed for this area (Aug/Sept 2000) and H. johnsonii was not located during that survey.

Comment 13 Response

The USACE does not concur with this comment. A complete discussion of avoidance and minimization efforts was included in Section 3.0 of the GRR (Planning Formulation). The DEIS was included with this document in volume one of the report. Vessel safety is the #1 consideration for the entrance channel. The original plan for the Entrance Channel (Component 1C in the GRR) included the flare starting closer to the Port and would have impacted the 2nd and 3rd reefs. After reviewing comments received on the scoping documents and meeting with the Port Pilots, it was determined that the flare could be shortened to remove the impacts to the 2nd reef. A detailed discussion on this process can be found on pages 26 and 27 of the GRR in section 81. As a result of this coordination, the COE has implemented the least damaging alternative for hardbottom and coral habitats within the constraints of vessel safety. And due to this coordination and review, the USACE has complied with the implementing regulations for NEPA.

Given that there is no apparent physiological or ecological limitation for *H. johnsonii* to exist in Miami Harbor, that at least one unconfirmed identification of the species in Miami Harbor vicinity exists, and the diminutive nature of the species, NOAA Fisheries believes some level of further investigation is prudent. Therefore we recommend that a survey is conducted of the Harbor using survey methodologies (see NOAA Fisheries 2000) developed for *H. johnsonii*. NOAA Fisheries believes that conducting a survey specific for *H. johnsonii* would provide more credible and reliable evidence that impacts to this federally-protected plan will be avoided. The results of this survey in addition to the map where the specimen was located in 2002, should be included in the FEIS.

Additional issues pertaining to seagrass impacts are addressed in the *Water Quality* section (below).

Hardbottom and Coral Reefs

NOAA Fisheries considers the anticipated impacts to corals and hardbottoms as being highly significant and we find that avoidance and minimization of impacts to these resources is not been sufficiently addressed in the DEIS. As presently written, this component of the DEIS, does not comply with sequential mitigation requirement which is defined in Section 1508.20 of the Regulations for Implementing the Procedural Provisions of the NEPA (40 CFR Parts 1500-1508). Therefore, we again request that the COE consider reducing channel expansion in hardbottom habitats prior to the consideration of mitigation. In addition, {NOAA Fisheries also recommends that an anchoring and vessel operation plan be developed to assist in reducing anchor and anchor cable damage to hardbottom habitat (see EFH Conservation Recommendation #6)} 14 Once developed, these plans should be forwarded to FWS and NOAA Fisheries for review prior to project implementation. These matters and any planned action should be fully addressed and appropriately described in the FEIS.

{NOAA Fisheries concurs with the FWS recommendation (number 7, page 36 of the CAR) that proposed widening and deepening of the Entrance Channel should be reduced.} 15 Increasing the channel width from 500 feet to 800 feet would result in elimination of over 20 acres of high relief hardbottom and coral reef habitat. A joint FWS-NOAA Fisheries site inspection of the Entrance Channel on March 20, 2002, revealed that some of these areas, particularly the existing channel edges, contain hard and soft coral colonies. These habitats provide important ecological functions for numerous marine species. Some of the hard coral colonies (e.g., *Montastrea* sp. and *Diploria* sp.) observed were in excess of 36 inches in diameter and the vertical relief of the habitat was two to three feet in elevation. Using an average hard coral growth rate of 0.5 centimeter per year for this area, these coral colonies may be greater than 100 years old (Dodge 1987). In addition to designation as Resource Category 1 by the FWS, they are identified as EFH-Habitat Areas of Particular Concern by the South Atlantic Fishery Management Council (SAFMC) and NOAA Fisheries. {Rather than attempting to compensate for their loss by constructing artificial habitats, we believe the COE should make further effort to avoid hardbottom and coral reef habitats in the area of the Entrance Channel (see EFH Conservation Recommendation #7). With regard to the FEIS, we recommend that the COE reexamine the need to widen the Entrance Channel and describe possible alternatives and, if possible, a less damaging alternative.} 15 Cont.

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Comment 14 Response

Implementation of an anchoring and vessel operation plan to effectively minimize anchor and cable impacts to hardbottom habitat will occur through the RFP process and will include incentives to encourage potential contractors to avoid reef impacts. The evaluation criteria in the RFP will consider the technical aspects of the contractor's proposal as the most significant factor. As a result the vessel operational and anchoring plan that best avoids or reduces impacts to reefs will receive the highest evaluation and the incentives that follow. The idea proposed by the RFP process to the contractor is that if you break it, you buy it. Potential ideas provided by coordination with DERM, dredging companies, and other consultants that will probably appear in contractor proposals for evaluation during the RFP process include:

- Use of surge buoys along the anchor cable to help lift it up off the reef areas during dredging operations to minimize the area impacted by the anchor cable;
- Restricted anchor placement, which restricts placement of the anchors for the cutter-suction dredge to within the channel edge limits. That method reduces impacts but almost doubles dredging time since only half of the channel can effectively be dredged at a time.

Comment 15 Response

Vessel safety is the primary consideration for the entrance channel. The original plan for the Entrance Channel (Component 1C in the GRR) included the flare starting closer to the Port and would have impacted the second and third reefs. After reviewing comments received on the scooping documents and meeting with the Port Pilots, it was determined that the flare could be shortened to remove the impacts to the second reef. A detailed discussion on this process can be found in section 81 of the GRR. As a result of this coordination, the USACE has implemented the least damaging alternative for hardbottom and coral habitats within the constraints of vessel safety.

{If dredging in these areas cannot be avoided then NOAA Fisheries maintains that the COE should develop a plan to relocate hard corals that comprise the high-relief hardbottom/coral reef. NOAA Fisheries recommends that, at a minimum, all hard coral colonies larger than 12 inches in diameter be relocated by experienced personnel and using established methods, to suitable nearby hardbottom substrate (see EFH Conservation Recommendation #8).} In this regard, we recommend all hard coral colonies in all areas be relocated when larger than 12 inches in diameter and are located in proposed dredging sites, including previously dredged areas within Cut 2 and Cut 3 (e.g., a NOAA Fisheries biologist identified a 2-foot diameter brain coral within the littoral zone of Cut 3, to the north of Fisher Island). 16

NOAA Fisheries agrees with the COE in that mitigation for reef and hardbottom impacts should be type-for-type, to reflect the ecological differences between the different reef types impacted (DEIS Mitigation Plan p 17). To compensate for the effects of the action on previously non-dredged habitats, the COE has proposed to mitigate for the removal of 2.7 acres of high-relief coral habitat at a ratio of 2:1 through the creation of 5.3 acres of high complexity, high relief artificial reef habitat; and to mitigate for the 0.8 acre of impact to low-relief hardbottom at a ratio of 1.3:1 (GRR p 56). NOAA Fisheries supports the use of endemic rock for the mitigation sites as opposed to other non-native materials and, therefore, we concur that the limestone rock excavated from the Entrance Channel should be used in reef construction and that construction should take place concurrent with the dredging of the Entrance Channel (DEIS p 104-107; DEIS Mitigation Plan p 20-21). Further, we support relocating rocks that have been colonized by coral and other epifauna. However, the criteria that will be used for selecting the rocks for transplantation to the artificial reef areas is not provided in the DEIS. {The criteria that will be used for selecting the live rocks from the Entrance Channel to be transplanted to the artificial reef areas should be provided in the FEIS (see EFH Conservation Recommendation #9).} 17

NOAA Fisheries also concurs that interstitial sand patches associated with reef habitat are important in the ecological functioning of the reef habitat (DEIS p 104-5; Mitigation Plan p 21) and, therefore, the proposed artificial reef footprint should contain approximately 20 percent open sand surface. However, we are concerned that through integrating a 20 percent open sand surface within the artificial reef design, a 20 percent decrease in the footprint of hardbottom mitigation area would result. Therefore {NOAA Fisheries recommends that the acreage of the impact hardbottom/coral sites should be increased by 20 percent to ensure provision of adequate artificial hardbottom mitigation as well as 20 percent interstitial spacing (see EFH Conservation Recommendation #10).} 19

Furthermore, an artificial reef biological and physical monitoring plan should be developed and submitted to {NOAA Fisheries and FWS for review. Although the DEIS Marine Survey and Assessment for the Potential Mitigation Sites (p iii) states that biological monitoring will be conducted annually in the summer months for three years, we believe that bi-annual physical and biological monitoring of mitigation areas for a minimum of five years is warranted in order to ensure acreage is maintained and remediation occurs, if necessary (see EFH Conservation Recommendation #11).} 20

Comment 16 Response

To accept this recommendation, the USACE must conduct a survey and map corals greater than 6 inches throughout more than 49 acres of hardbottom communities throughout the project area. Forty-six acres of this is previously dredged, and will recover, as demonstrated by the recovery of the community since the dredging completed in the early 1990s. Then the USACE must obtain a permit to relocate the corals, or coordinate with Miami- Dade DERM to determine if they have a permit to relocate corals that would cover the project area. This conservation recommendation is not feasible due to the cost of this survey and the relocation activities. The USACE will discuss this recommendation with the non-federal sponsor and will determine if it is feasible to relocate these corals from the 3.1 acres of reef that is not previously dredged.

Comment 17 Response

The USACE is not planning on relocating “live rock.” However, we do plan to use native rock from within the Port to construct the reef mitigation site, which will serve as a good substrate for reef fauna and flora. We expect sponges and other species that cover “live rock” to quickly recruit to the new habitat.

Comment 19 Response

The proposed reef mitigation sites contain sufficient available space for placement of artificial reef material with appropriate spacing between reef structures. Thus there is no need to increase the amount of proposed hardbottom mitigation.

Comment 20 Response

The USACE agrees that five (5) years of physical and biological monitoring will be conducted on the artificial reef mitigation areas.

{According to the GRR page 59, item 165, the Miami-Dade Seaport is responsible for the operation, maintenance, repair, and replacement, and rehabilitation of all mitigation areas for the life of the authorized project. However, page 104 of the DEIS states that reefs would be constructed at approved sites managed by Dade Environmental Resources Management. Please clarify the responsible party for the long-term maintenance and biological and physical monitoring of the artificial reef mitigation areas (see EFH Conservation Recommendation #12).} 21

Mitigation, previously dredged channel impacts involving high- and low-relief hardbottom/coral reef, rock/rubble habitats, and indirect impacts to hardbottoms:

{NOAA Fisheries is concerned that development of a compensatory mitigation site was premature in connection with the Miami Harbor Expansion Project since it has not been demonstrated that requisite impact avoidance and minimization efforts have been fully implemented. In the absence of clear application of sequential mitigation involving impact avoidance, minimization, and offset (compensation) the NEPA requirements are unmet.} 22 We further note that the CWA §404(b)(1) Guidelines state that no discharge of dredged or fill material shall be permitted unless appropriate and practicable steps have been taken which will minimize potential adverse impacts of the discharge on the aquatic environment. In addition, the U.S. Army Corps of Engineer's Regulatory Guidance Letter 02-2 reinforces that compensatory mitigation is the last step in the sequencing requirements of the CWA §404(b)(1) Guidelines.

To compensate for the effects of the action on habitats that have not been previously dredged, the COE has proposed: (1) to mitigate for the removal of 6.3 acres of seagrass at a ratio of 1:1 through the restoration of an 18.6 acre historic dredged borrow site in northern Biscayne Bay; (2) mitigate for the removal of 2.7 acres of high-relief coral habitat at a ratio of 2:1 through the creation of 5.3 acres of high complexity, high relief artificial reef habitat; and (3): mitigate for the 0.8 acre of impact to low-relief hardbottom at a ratio of 1.3:1 (GRR p 56).

According to the COE, mitigation for previously impacted areas was provided by the Port of Miami during their last dredging event and neither the COE nor the Port propose to mitigate for additional work in these areas (Terri Jordon, pers. comm.). NOAA Fisheries believes that this perspective does not consider the value of the resources being impacted. During site inspections of the areas proposed for dredging within the existing Entrance Channel, we found that previously dredged bottoms contain sponges, soft corals, and small hard coral colonies with average diameters of two inches. These benthic habitats support a large number Federally-managed species such as snappers, grunts, hogfish, and spiny lobster. Proposed impacts to previously dredged areas within Miami Harbor include approximately 28.1 acres of low-relief hard bottom habitat, 18 acres of high-relief hard bottom habitat, 52 acres of rock/rubble (with live bottom), 68.8 acres of rock/rubble (with algae and sponges), and 213 acres of soft bottom habitat. Although these areas have been affected by previous dredging projects, they are productive fishery habitats. The functional loss of these habitats will diminish fishery resource production and the replacement time for related ecological functions and values could exceed ten years. Therefore,{we do not support the COE's determination that "all previously dredged areas including hardgrounds on channel walls are expected to colonize rapidly 23

Comment 21 Response

The local sponsor (Port of Miami) is responsible for the biological monitoring and management of all mitigation associated with the proposed project. The Port may choose to contract to Miami-Dade DERM, or another contractor to perform the actual monitoring activities.

Comment 22 Response

The USACE does not concur with this comment. The Compensatory Mitigation was developed after all avoidance and minimization efforts were exhausted. As previously stated a detailed discussion on the avoidance and minimization efforts for the Miami Harbor expansion can be found on pages 26 and 27 of the GRR in section 81. As a result of this effort, the USACE has implemented the least damaging alternative for the port project and as a result has complied with the implementing regulations for NEPA.

See next page for Comment 23 Response

with similar species assemblages after dredging (DEIS p 63)." No scientific data or monitoring reports were provided to support this assertion. Therefore, the FEIS should include documentation supporting the determination that all previously dredged areas including hardgrounds on channel walls are expected to colonize rapidly with similar species assemblages after dredging and the need for mitigation for impacts to previously dredged and colonized bottoms should be reconsidered. 23 cont.

Although the COE quantified indirect impacts to seagrass habitat, indirect impacts to hardbottom areas that would occur through side slope equilibration (i.e., the hardbottom habitat located on the edge of existing channels) have not been quantified (DEIS Table 2, p 13; DEIS EFH Assessment Table 2, p 7). A NOAA Fisheries biologist participated in two site inspection at the Port of Miami which revealed the presence of well developed hardbottom/coral reef areas along the side slopes of the channels. Significant levels of fish biomass of managed species (i.e., grunts and spiny lobsters) were observed along these habitat corridors. Our observations support the determination that this edge habitat provides refuge and requisite needs for managed species. The FEIS should provide an assessment of direct and indirect impacts to these areas (i.e., the channel walls). NOAA Fisheries believes that, at a minimum, additional hardbottom mitigation should be provided for impacts to the channel walls. We concur with the FWS recommendation, as provided in the revised draft CAR, that 19.34 acres of hardbottom compensatory mitigation is needed (see EFH Conservation Recommendation #13). 24 25

Although a subset of the historical impacts to EFH and the associated mitigation required is provided in the DEIS (Table 20, p 91), NOAA Fisheries considers the Natural Resource Impact and Mitigation Table (DEIS Table 20, p 91-92) as incomplete. More specifically, the table does not identify all mitigation required in connection with the issued COE permit nor does not include information regarding the success of the mitigation provided (e.g., the 140 acres mitigation for seagrass impacts resulting from the 1980 Expansion Project was largely unsuccessful). To address this the FEIS should include a complete table that includes: (1) documentation of the total acres impacted per habitat type (including direct and indirect impacts, e.g., side slope equilibration); (2) the associated mitigation performed (location, acreage, and type); and (3) details concerning the status of those mitigation sites (monitoring reports). This information is needed to determine whether a net loss of EFH will result if previously impacted sites are not mitigated through compensatory mitigation. In order for NOAA Fisheries to concur that adequate mitigation for previous impacts has been provided and additional mitigation is not warranted, documentation is needed of the acres of each respective habitat impacted, the associated mitigation performed, and the status of those mitigation projects (see EFH Conservation Recommendation #14).

Blasting

The COE also proposes to use explosives to fracture solid rock bottom and hardbottom habitat in areas where large cutterhead or other dredges cannot be used. According to the COE, blasting is preferred over other methods such as punch barge or pile driver since blasting would require less time and is less expensive. The COE also believes that, compared to dredging, blasting would be less damaging to bottom and other communities and it may be used in all areas where needed. To

Response 23 Response

The current entrance channel walls are characterized by a hardbottom community dominated by sponges, alga and soft and hard corals. This growth has occurred over the last ten years since the last port expansion project was completed in 1993. Therefore, the USACE believes that after dredging operations are complete, the same assemblage of species is expected to recolonize the channel walls and associated hardbottoms. Page 21 of the Environmental Baseline report prepared as Appendix E of the DEIS states: "Colonizing taxa such as sponges and certain gorgonians were more prevalent in the channel's hardbottom areas then were hard corals. Observed algal species in both channel and offshore areas included *Caulerpa* spp., *Laurencia* spp., *Cladophora* spp., and *Halimeda* spp. Flynn, et al. (1991) noted the additional presence of *Dictyota* spp. and *Jania* spp. in the area." Additionally section 3.4 of the baseline report reviews the current rock/rubble habitat and species assemblage associated with this environment. The USACE expects that dredging operations will leave rock/rubble in the bottom of this channel, which can be recolonized by the species found there now. During the 1993 dredging operations, the Port agreed to mitigate for unavoidable hardbottom impacts associated with dredging operations. This mitigation was completed in 1996 providing 15.91 acres of hardbottom artificial reef habitat. No additional mitigation for previously dredged areas will be considered.

Comment 24 Response

Appendix G of the FEIS provides revised cross sections, which estimate the resulting side slopes based on a revised side slope in rock from vertical to 1.0V to 0.5H.

Comment 25 Response

The USACE and its non-federal sponsor will provide sufficient mitigation for the impacts associated with the project. Currently a total of 3.3 acres of hardbottom mitigation is planned. The USACE does not accept this recommendation for additional mitigation as requested by NOAA. The area that will be dredged has been previously dredged and has recovered since that dredging event, as noted by both the USACE and the NOAA. Additionally, the Port of Miami mitigated for the impacts of the dredging of those hardbottoms during the 1990 dredging event by the placement of 15.91 acres of harbottom mitigation in 1996. At this time the USACE has no plans to offer mitigation for the previously dredged and mitigated hardbottoms as requested by NOAA.

with similar species assemblages after dredging (DEIS p 63)." No scientific data or monitoring reports were provided to support this assertion. Therefore, the FEIS should include documentation supporting the determination that all previously dredged areas including hardgrounds on channel walls are expected to colonize rapidly with similar species assemblages after dredging and the need for mitigation for impacts to previously dredged and colonized bottoms should be reconsidered.

Although the COE quantified indirect impacts to seagrass habitat, indirect impacts to hardbottom areas that would occur through side slope equilibration (i.e., the hardbottom habitat located on the edge of existing channels) have not been quantified (DEIS Table 2, p 13; DEIS EFH Assessment Table 2, p 7). A NOAA Fisheries biologist participated in two site inspection at the Port of Miami which revealed the presence of well developed hardbottom/coral reef areas along the side slopes of the channels. Significant levels of fish biomass of managed species (i.e., grunts and spiny lobsters) were observed along these habitat corridors. Our observations support the determination that this edge habitat provides refuge and requisite needs for managed species. The FEIS should provide an assessment of direct and indirect impacts to these areas (i.e., the channel walls). NOAA Fisheries believes that, at a minimum, additional hardbottom mitigation should be provided for impacts to the channel walls. We concur with the FWS recommendation, as provided in the revised draft CAR, that 19.34 acres of hardbottom compensatory mitigation is needed (see EFH Conservation Recommendation #13).

{Although a subset of the historical impacts to EFH and the associated mitigation required is provided in the DEIS (Table 20, p 91), NOAA Fisheries considers the Natural Resource Impact and Mitigation Table (DEIS Table 20, p 91-92) as incomplete. More specifically, the table does not identify all mitigation required in connection with the issued COE permit nor does not include information regarding the success of the mitigation provided (e.g., the 140 acres mitigation for seagrass impacts resulting from the 1980 Expansion Project was largely unsuccessful). To address this the FEIS should include a complete table that includes: (1) documentation of the total acres impacted per habitat type (including direct and indirect impacts, e.g., side slope equilibration); (2) the associated mitigation performed (location, acreage, and type); and (3) details concerning the status of those mitigation sites (monitoring reports). This information is needed to determine whether a net loss of EFH will result if previously impacted sites are not mitigated through compensatory mitigation.} In order for NOAA Fisheries to concur that adequate mitigation for previous impacts has been provided and additional mitigation is not warranted, documentation is needed of the acres of each respective habitat impacted, the associated mitigation performed, and the status of those mitigation projects (see EFH Conservation Recommendation #14). 26

Blasting

The COE also proposes to use explosives to fracture solid rock bottom and hardbottom habitat in areas where large cutterhead or other dredges cannot be used. According to the COE, blasting is preferred over other methods such as punch barge or pile driver since blasting would require less time and is less expensive. The COE also believes that, compared to dredging, blasting would be less damaging to bottom and other communities and it may be used in all areas where needed. To

Comment 26 Response

The USACE updated the table to include mitigation status. Additionally, the USACE and local sponsor have conducted a one-time snapshot review of the two previously created hardbottom mitigation sites to document the status of these two mitigation sites. A report of the results of this study will be distributed to Federal, State and Local resource agencies and other interested parties by the Port of Miami when complete.

The USACE has reviewed Table 20 (FEIS, Section 4.20.) and partially concurs with the requested revisions as follows:
Item 1) The table already includes all available information on the total acres impacted per habitat type for past dredging projects. For the 1980 expansion project, acreage impacts and habitats impacted were not specifically stated in any of the resource agency permits and we have not been able to obtain any other historic documents indicating impact areas. The FEIS explains this further in Section 4.20.1.2, as follows: "Submerged natural resource communities impacted by the 1980 expansion project within Biscayne Bay may have included hardbottom, seagrasses, and unvegetated bottom although the impact acreages were not specified in the permits. Required mitigation on the original permit included 251 acres of seagrass habitat creation. A FWS report on the project states that the Port was 'required to mitigate for the loss of 251 acres of shallow water and marine grassbeds by planting seagrasses' implying that the 251 acreage figure represented the project impact as well as the required mitigation (USACE 1989)." While 251 acres of seagrass mitigation was originally required, only 140 acres was actually planted and the permit was subsequently revised to replace the remaining 111 acres of required seagrass planting with several other mitigation projects including mangrove wetland restoration, spoil island enhancement, shoreline enhancement, and artificial reef creation.

Item 2) The acreage and type of each required mitigation are already included in Table 20. The USACE has added location information to Table 20 in the FEIS, and is providing Figure 15 illustrating project locations.

Item 3) The USACE has also included the status of the previous mitigation in Table 20 in the FEIS. Please note that the age of the 1980 projects makes provision of detailed information difficult or impossible. All the activities were monitored through permit conditions and to our knowledge have been deemed successful by those agencies unless otherwise noted. We understand that NOAA is particularly concerned with the status of the artificial reef projects constructed as part of the 1991 project. In order to more fully assess NOAA's concerns, to the local sponsor is working with DERM to conduct an assessment of the reefs. We will provide this information as soon as it is available.

1980 project	Location	Status
140 acres seagrass	Biscayne Bay	Complete; Less than 10% successful; alternative mitigation provided by the following projects
15 acres mangroves	Oleta River State Park	Complete
Artificial reefs	Several – see map	Complete
Spoil island enhancement	Several – see map	Complete
Shoreline habitat enhancement	Several – see map	Complete
1991 project		
Mangrove wetlands restoration	Biscayne Bay canals	Complete
15.91 acres artificial reef	Area adjacent to channel	Complete
94 acres channel bottom rock rubble	In channel	Complete

with similar species assemblages after dredging (DEIS p 63)." No scientific data or monitoring reports were provided to support this assertion. Therefore, the FEIS should include documentation supporting the determination that all previously dredged areas including hardgrounds on channel walls are expected to colonize rapidly with similar species assemblages after dredging and the need for mitigation for impacts to previously dredged and colonized bottoms should be reconsidered.

Although the COE quantified indirect impacts to seagrass habitat, indirect impacts to hardbottom areas that would occur through side slope equilibration (i.e., the hardbottom habitat located on the edge of existing channels) have not been quantified (DEIS Table 2, p 13; DEIS EFH Assessment Table 2, p 7). A NOAA Fisheries biologist participated in two site inspection at the Port of Miami which revealed the presence of well developed hardbottom/coral reef areas along the side slopes of the channels. Significant levels of fish biomass of managed species (i.e., grunts and spiny lobsters) were observed along these habitat corridors. Our observations support the determination that this edge habitat provides refuge and requisite needs for managed species. The FEIS should provide an assessment of direct and indirect impacts to these areas (i.e., the channel walls). NOAA Fisheries believes that, at a minimum, additional hardbottom mitigation should be provided for impacts to the channel walls. We concur with the FWS recommendation, as provided in the revised draft CAR, that 19.34 acres of hardbottom compensatory mitigation is needed (see EFH Conservation Recommendation #13).

Although a subset of the historical impacts to EFH and the associated mitigation required is provided in the DEIS (Table 20, p 91), NOAA Fisheries considers the Natural Resource Impact and Mitigation Table (DEIS Table 20, p 91-92) as incomplete. More specifically, the table does not identify all mitigation required in connection with the issued COE permit nor does not include information regarding the success of the mitigation provided (e.g., the 140 acres mitigation for seagrass impacts resulting from the 1980 Expansion Project was largely unsuccessful). To address this the FEIS should include a complete table that includes: (1) documentation of the total acres impacted per habitat type (including direct and indirect impacts, e.g., side slope equilibration); (2) the associated mitigation performed (location, acreage, and type); and (3) details concerning the status of those mitigation sites (monitoring reports). This information is needed to determine whether a net loss of EFH will result if previously impacted sites are not mitigated through compensatory mitigation. {In order for NOAA Fisheries to concur that adequate mitigation for previous impacts has been provided and additional mitigation is not warranted, documentation is needed of the acres of each respective habitat impacted, the associated mitigation performed, and the status of those mitigation projects (see EFH Conservation Recommendation #14).} 27

Blasting

The COE also proposes to use explosives to fracture solid rock bottom and hardbottom habitat in areas where large cutterhead or other dredges cannot be used. According to the COE, blasting is preferred over other methods such as punch barge or pile driver since blasting would require less time and is less expensive. The COE also believes that, compared to dredging, blasting would be less damaging to bottom and other communities and it may be used in all areas where needed. To

Comment 27 Response

The USACE has revised Table 20 (FEIS, Section 4.20.1) and has provided more detail on available documentation as previously outlined (see NOAA-26 response). However, the USACE does not concur that additional mitigation shall automatically be provided should NOAA judge previous mitigation to be inadequate in their view. The USACE presumes the mitigation to have been adequate and successful based upon the fact that the two dredging projects outlined in Table 20 were permitted and overseen by federal, state, and local regulatory agencies. Therefore, the USACE does not agree to provide any mitigation based on re-opening of past permits and evaluation of permit requirements based on undefined criteria. Nevertheless, through revision of Table 20, the USACE has endeavored to document the details of past mitigation based on available information. It may be worthwhile to note that all of the mitigation projects described above, with the exception of the failed seagrass planting in the 1980's, was conducted by the Miami-Dade County Department of Environmental Resource Management, Department of Restoration and Enhancement.

minimize impacts, the COE intends to use best management practices, such as conducting test blasts and employing turtle/manatee observers. NOAA Fisheries is concerned regarding direct and indirect adverse effects of blasting on marine mammals, sea turtles, and fishes. Previous studies on blasting effects have revealed that organisms having air bladders are more susceptible than those without air bladders (e.g. shrimp and crabs) (Keevin and Hempen 1997); and juvenile and larval fish are more susceptible than adult fish (Settle *et al.*, 2002). {Although best management practices have been utilized to reduce adverse effects of blasting in other dredging projects, such as in the Cape Fear River in North Carolina, we believe the use of explosives in Miami Harbor may pose risks and impacts that are significantly greater than those at other COE dredging projects. The most important distinction between the proposed project and other port dredging projects is that fish and invertebrates feed, aggregate around, and live within the three-dimensional spaces of hardbottom and coral reef habitats while organisms such as sea turtles are attracted to hardbottom and coral reefs for protection and resting. Consequently, the use of explosives in the vicinity of reefs poses greater risk of significant harm to marine organisms since resident fish and invertebrates are more likely to be present when blasting occurs} 28 {NOAA Fisheries does not concur with the COE's determination in the DEIS EFH Assessment (p 14) that impacts associated with the recommended Plan have been minimized and remaining habitats under that alternative are unavoidable} 29 {Therefore, NOAA Fisheries recommends that alternatives to blasting be explored and further analysis be conducted to better evaluate the effect of other dredging methods, such as punch barges and pile drivers, on reef biota (see EFH Conservation Recommendation #15).} 30 The results of this additional analysis should be provided in the FEIS.

{Biological monitoring should be conducted during a test blast in order to assess damage to populations of managed species and other resources, and to determine whether blasting impacts exceed acceptable levels} 31 {If results indicate that blasting has only minimal impacts on populations, and other NOAA Fisheries recommendations are followed, blasting should be used only when absolutely necessary and alternative conventional dredging methods have been proven to be ineffective.} 32 {Also, after each blasting event during project implementation, it is recommended the effects of blating on EFH and managed species is determined (use of hydrophones and other technologies to determine likely impacts is encouraged and information regarding the extent of the blasting safety radius should be determined and addressed in the FEIS (see EFH Conservation Recommendation #16).} 33

Water Quality

{NOAA Fisheries believes that water quality monitoring should be implemented for the Miami Harbor project (see EFH Conservation Recommendation #17)} 34 The COE has determined, based on sediment analyses, that substrates along the southern margin of Fisherman's Channel and the Dodge Island Cut are comprised of considerable amounts of fine materials (USACE 2001). Therefore, dredging is likely to suspend these sediments into the water column. The strong tidal currents may redistribute suspended sediments in other areas both inside and outside the study area that support submerged vegetation. Potentially affected areas include seagrass habitats immediately adjacent to Fisherman's Channel, as well as habitats inside the Bill Sadowski Critical Wildlife Area, and possibly other areas

Comment 28 Response

The USACE has coordinated the use of blasting with NMFS-Protected Resources and the US Fish and Wildlife Service to address potential effects of blasting on endangered, threatened and protected species. Plans currently call to use blasting only in areas where other dredging techniques are unsuccessful.

Comment 29 Response

The USACE does not concur with this comment. A complete discussion of avoidance and minimization efforts is included in Section 3.0 of the GRR (Planning Formulation). The FEIS is included with this document in volume one of the report. A detailed discussion on this process can be found in section 81 of the GRR. Any remaining impacts associated with the project are unavoidable and will be mitigated for.

Comment 30 Response

The USACE has reviewed all of the blasting alternatives, including the use cutterhead dredges, pile drivers and punch barges. A section will be added to the FEIS discussing the alternative construction methods reviewed and the determination made concerning the feasibility of each alternative construction technique. Currently the USACE is investigating the use of a cutterhead dredge in the Entrance Channel in lieu of blasting, however the remaining work, specifically the work in Fisherman's Channel will require blasting due to the hardness of the limestone.

Comment 31 Response

Biological monitoring will be conducted during a test blast to be conducted in Miami Harbor during Phase II dredging. This monitoring will be used to prepare a comprehensive monitoring plan for the proposed blasting activities associated with port construction.

Comment 32 Response

Biological monitoring will be conducted during a test blast to be conducted in Miami Harbor during Phase II dredging. This monitoring will be used to prepare a comprehensive monitoring plan for the proposed blasting activities associated with port construction.

Comment 33 Response

Biological monitoring will be conducted during a test blast to be conducted in Miami Harbor during Phase II dredging. This monitoring will be used to prepare a comprehensive monitoring plan for the proposed blasting activities associated with port construction.

Comment 34 Response

The USACE will abide by the water quality monitoring requirements of the FDEP Water Quality Certificate, when issued and accepted.

of the Biscayne Bay Aquatic Preserve. Resuspended particulate matter may temporarily decrease water clarity in the above areas. Deposition of sediments on grass beds and coral reefs may have adverse effects including, but are not limited to, temporary displacement of, and alteration of, fish, invertebrate, or epiphyte communities (DEIS p 59). {The presence of highly important living marine resources both inside and beyond the limits of the Miami Harbor (i.e., corals sensitive to sedimentation and turbidity; seagrasses located south of the Port in the Virginia Key Basin) warrant water quality standards that exceed the State of Florida's general water quality certificate for dredging.} 35 In addition {we recommend that a sedimentation monitoring program be developed for the Miami Harbor project, incorporating the protocols developed for the Broward County Shoreline Protection Project (see EFH Conservation Recommendation #18). If the sedimentation monitoring reveals lethal or sublethal effects to marine resources, additional mitigation may be warranted.} 36 These matters and recommendations should be fully addressed in the FEIS.

{According to the DEIS, because the sediment plumes are transient and temporary, and the area to be impacted is relatively small when examined on a spatial scale and the overall impact to the larval fish population and, consequently, the adult population should be minimal (Sale 1991). The chapters Dr. Sale contributed to the referenced book did not address this issue. Therefore, if the COE intended to cite one of the other chapters, the specific author should be mentioned. Furthermore, according to Dr. Sale (Sale pers. comm. 2003), he would be "hard pressed to find any of these chapters as a useful citation supporting the idea that dredging does not impact fishes." Based on this, the FEIS should be modified to ensure proper citation concerning the above mentioned statement to which we take exception.} 37

Essential Fish Habitat Assessment

The EFH Assessment provides a reasonably complete description of EFH and other fishery resources in the vicinity of the project, quantifies the direct impacts to EFH associated with Recommended Plan, identifies the COE's views regarding the effects of the action on EFH, and discusses the proposed mitigation to fully offset any losses of the functions and values of wetlands, aquatic resources, and EFH. The majority of our EFH comments are stated in the preceding; however a few outstanding items are discussed below.

{The EFH Assessment recognizes that where silt and/or silty sand are to be dredged, water quality impacts are expected due to temporarily increased levels of turbidity. Resuspended materials may interfere with the diversity and concentration of phytoplankton and zooplankton and could, consequently, affect foraging success patterns of schooling fishes and other grazers that serve as prey for managed species (DEIS EFH Assessment p 13). However, the information provided does not take into account sublethal effects to managed species. The information provided states that juvenile and adult species have the ability to migrate away from the dredging activities (DEIS EFH Assessment p 34), managed species can forage in adjacent areas (DEIS EFH Assessment p 17), will only be temporarily displaced (DEIS EFH Assessment p 19), should quickly return to the project area (DEIS EFH Assessment p 33), and mortality should be minimal (DEIS EFH Assessment p 35). The FEIS should include proper scientific citations with the above referenced statements.} 42 In addition, we

Comment 35 Response

The project will be required to meet water quality standards set forth by the State of Florida in their Water Quality Certificate, when issued and accepted.

Comment 36 Response

The USACE will abide by the monitoring requirements of the FDEP Water Quality Certificate, when issued and accepted.

Comment 37 Response

The error is acknowledged.

Comment 42 Response

The USACE acknowledges that sublethal effects to managed fisheries will occur. A study conducted by the New York District between 1995 and 1999 found no significant differences between pre-and post dredging activities in larval, juvenile and adult fish species diversity and density.

{we do not concur with the determination that past impacts within the region do not appear to have had any adverse or significant cumulative impact on hardbottom and coral resources (DEIS EFH Assessment p 21), especially when considering that the DEIS cumulative impact analysis was limited to Port activities and did not include other significant projects beyond the geographic scope of the Port (e.g., beach renourishment of Miami beaches, destructive fishing activities, other large-scale dredging projects). Given the lack of research and long-term monitoring in the region, NOAA Fisheries believes these statements lack meaning without supporting data and should be substantiated in, or deleted from, the FEIS} 43

Beneficial Use of the Dredged Material

According to GRR, item 167 (p 60), the COE proposes to place beach quality material on the north side of Virginia Key where it can be offloaded in the future to provide hurricane and storm damage protection for the easterly shoreline of Virginia Key. NOAA Fisheries concurs with the FWS recommendation, as provided in the draft CAR, that due to the level of fine grained material present in the benthic sediments of Biscayne Bay, this material should not be used for beach renourishment activities; however it may be used as substrate at the seagrass restoration site. {Although the COE, in responding to the FWS, advised that none of the material dredged from Miami Harbor would be placed on Miami beaches and the DEIS does not specifically identify the Virginia Key as an approved upland disposal site (DEIS page 18), this mater warrants clarification (see EFH Conservation Recommendation #19).} 44

EFH Conservation Recommendations:

1. As mitigation for elimination of 6.3 acres of seagrass habitat, 18.9 acres of compensatory replacement habitat (a 3:1 ratio) shall be provided;

2. The seagrass restoration site shall meet the seven criteria outlined by Fonseca *et al.* (1998). Additionally, it shall be demonstrated that the seagrass restoration site will be filled to the same elevation as nearby natural sea grass beds and it shall be determined whether *H. wrightii* and *H. decipiens* are present in locations adjacent to these sites;

3. The criteria to be used to trigger contingency seagrass planting shall be provided for resource agency review prior to initiation of dredging;

4. Successful replacement of seagrass shall be defined in accordance with Fonseca *et al.*, (1998) as the *unassisted persistence of the required acreage of seagrass coverage for a prescribed period of time*. In connection with this project, a five (5) year minimum seagrass restoration monitoring period shall be established;

5. The COE shall identify the party responsible for biological monitoring and long-term management of the seagrass mitigation site;

Comment 43 Response

Previous impacts to hardbottom communities associated with previous Port project have been mitigated for. The area has been previously dredged and has recovered since that dredging event, as noted by both the USACE and NOAA. Additionally, the Port of Miami mitigated for the impacts of the dredging of those hardbottoms during the 1990 dredging event by the placement of 15.91 acres of hardbottom mitigation in 1996. In order to more fully assess NOAA's concerns, to the local sponsor is working with DERM to conduct an assessment of the reefs. We will provide this information as soon as it is available.

Comment 44 Response

The USACE will abide by the water quality monitoring requirements of the FDEP Water Quality Certificate, when issued and accepted.

6. An anchoring and vessel operation plan to effectively minimize anchor and anchor cable damage to hardbottom habitat shall be developed and implemented;

7. Based on reexamination of the need to expand the Entrance Channel and evaluation of less damaging alternatives involving reduced channel dimensions, as discussed in the FEIS, the COE shall implement the least damaging alternative with regard to loss of hardbottom and coral habitats;

8. Using experienced personnel and established methods, remove and relocate to suitable nearby hardbottom substrate, all hard coral colonies larger than 12 inches in diameter within the project footprint (including previously dredged areas);

9. In coordination with NOAA Fisheries, identify the criteria that will be used for selecting "live rocks" to be transplanted from the Entrance Channel to the artificial reef areas;

10. The acreage of the impact hardbottom/coral sites shall be increased by 20 percent to provide an adequate artificial hardbottom mitigation area that includes 20 percent interstitial spacing;

11. A five (5) year (minimum) physical and biological monitoring plan for the artificial reef mitigation areas shall be developed and implemented. The plan shall be developed cooperatively with NOAA Fisheries;

12. The COE shall identify the party responsible for the physical and biological monitoring and long-term management of the artificial reef mitigation sites;

13. A total of 19.34 acres of hardbottom compensatory mitigation shall be provided;

14. Based on a complete EFH impact/mitigation table to be provided in the FEIS which includes documentation of the total acres impacted per habitat type (including direct and indirect impacts including side slope equilibration); the associated mitigation performed (location, acreage, and type); and details concerning the status of those mitigation sites (monitoring reports) the COE, in coordination with NOAA Fisheries shall identify and provide for additional mitigation, as needed;

15. The COE shall explore alternatives to blasting and further analyses shall be conducted to better evaluate the effect of other dredging methods, such as punch barges and pile drivers, on reef biota;

16. Biological monitoring shall be conducted during a test blast in order to assess damage to populations of managed species, and to assess whether blasting impacts exceed acceptable levels. If results indicate that blasting has only minimal impacts on populations, and other NOAA

Fisheries recommendations are followed, blasting may be implemented in locations where conventional dredging methods are clearly not feasible. The effects of blasting on EFH and managed species shall be evaluated immediately after each blast and use of hydrophones and other technologies to determine likely impacts is encouraged;

17. A detailed water quality monitoring program shall be developed in coordination with NOAA Fisheries and implemented at the initiation of any excavation or fill activity;
18. A sedimentation monitoring program shall be developed which incorporates protocols developed for the Broward County Shoreline Protection Project. If the sedimentation monitoring reveals lethal or sublethal effects to marine resources, additional mitigation needs shall be determined and promptly implemented;

19. Due to the level of fine grained material contained in Biscayne Bay sediments, this material shall not be used for beach nourishment; however, it may be used as substrate at the seagrass restoration site.

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

These comments do not satisfy your consultation responsibilities under Section 7 of the Endangered Species Act of 1973, as amended. If any activity(ies) "may effect" listed species and habitats under the purview of NOAA Fisheries, consultation should be initiated with our Protected Resources Division at the letterhead address.

We appreciate the opportunity to provide these comments. Related correspondence should be addressed to the attention of Ms. Jocelyn Karazsia at our Miami Office. She may be reached at 11420 North Kendall Drive, Suite #103, Miami, Florida 33176, or by telephone at (305) 595-8352.

Sincerely,

Rickey N. Ruebsamen
Acting Assistant Regional Administrator
Habitat Conservation Division

cc:
EPA, WPB
DEP, WPB
FFWCC, Tallahassee
FWS, Vero Beach
DERM
F/SER3
F/SER4
F/SER45-Karazsia

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Department of
Environmental Protection

Jeb Bush
Governor

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3900 Commonwealth Boulevard
Tallahassee, Florida 32399-3000

David B. Struhs
Secretary

May 14, 2003

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

Re: Department of the Army, Jacksonville District, U.S. Army Corps of Engineers, Draft General Re-Evaluation Report and Environmental Impact Statement, Miami Harbor Navigation Improvements, Miami-Dade County, Florida

SAI: FL200303191299C

Dear Mr. Duck:

The Florida State Clearinghouse, pursuant to 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. §§ 4321, 4331-4335, 4341-4347, as amended, has coordinated the review of the above-referenced Draft General Re-Evaluation Report (DGRR) and Environmental Impact Statement (EIS) for the proposed project.

The South Florida Water Management District (SFWMD) indicates that the proposed project will modify Biscayne Bay's hydrography, which could impact the Biscayne Bay ecosystem by increasing residence times in portions of Biscayne Bay thereby causing chronic increases in salinity. This has occurred over time in northern Biscayne Bay primarily because of the construction of inlets at Baker's Haulover and Government Cut. The proposed alternative will deepen and widen ship channels and turning basins in the area of the port that may increase tidal flushing with ocean waters. The District points out that the salinity modeling cited by the Corps covers only an area immediately around the port with a simulation period of only 2 weeks. The SFWMD notes out that the projected impacts tend to focus on the short term construction impacts with little discussion of the cumulative effects that can be expected from increased boat traffic within the harbor, and the potential cumulative impacts from changes in currents and salinity within the bay. The SFWMD recommends that a new three-dimensional study be conducted for a minimum one-year simulation period that covers the area from Broad Causeway extending south of Rickenbacker Causeway. Please see the enclosed comments from the SFWMD for additional concerns and recommendations.

The Florida Fish and Wildlife Conservation Commission (FFWCC) expressed concerns for the potential loss of habitat within the BBAP; the risk to wildlife by the proposed dredging

methods; the amount and type of mitigation measures proposed; and, significant changes in ship and boat traffic within the port area. The Mitigation ratios proposed for seagrass impacts are 1:1, and the FFWCC recommends a 3:1 ratio, which is typically required for direct impacts to seagrasses. The FFWCC also questions whether all the secondary impacts to resources resulting from proposed vertical cuts have been correctly identified. Previous vertical cuts have resulted in sloughing at the edges, thereby increasing impacts to adjacent resources. These sloughing impacts have not been calculated or included in the mitigation computations. The FFWCC also expresses concern for the potential dredging method that includes blasting. The agency has been working with blasting experts to evaluate all available information regarding impacts to wildlife that will include protocols to maximize their protection. Those findings are expected to be completed by the end of 2003. Please see the enclosed comments from the FFWCC for additional caveats concerning specific species that will require protection.

The Department of Environmental Protection states that portions of the proposed project will take place within the Biscayne Bay Aquatic Preserve (BBAP), which is a Class III Outstanding Florida Water requiring additional protection to assure that the water quality is not degraded. The department is concerned about the anticipated habitat destruction and mitigation ratios that are proposed to replace the impacted habitat. Additional sloughing is anticipated at the vertical edges of channel cuts, and at present, these impacts have not been included in the mitigation calculations. DEP is also concerned that the watch program that is being designed to protect listed species from blasting will not adhere to existing protocol, and recommends that the techniques and procedures resulting from studies currently under contract by the FFWCC be utilized. Please see the enclosed memo that expresses the DEP concerns.

The South Florida Regional Planning Council (SFRPC) states that the project should be consistent with the goals, policies and land development regulations of the local governments having jurisdiction within the project area. It is recommended that the applicant coordinate with all local governments that will be affected by the project. The SFRPC has summarized the goals, objectives, and policies from its Strategic Regional Policy Plan that apply to this project. Please see the attached comments from the SFRPC and specific recommendations for complying with regulatory requirements.

Based on the information contained in the DGRR and EIS, and the comments provided by our reviewing agencies, as summarized above and enclosed, the state has determined that, at this stage, the above-referenced project is consistent with the Florida Coastal Management Program (FCMP). All subsequent environmental documents prepared for this project 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. 1

The Department's (DEP) Bureau of Beaches and Wetland Resources issued a state water quality certification in the form of a Consolidated Notice of Intent to Issue an Environmental

Comment 1 Response

The USACE acknowledges the Consistency Determination

See prior page for comment response.

Resource Permit and Authorization to Use Sovereign Submerged Lands, on December 23, 2002, for the channel maintenance dredging and deepening project. The potential environmental impacts of the project have been addressed in the permit, water quality certification and authorization to use sovereign submerged lands (Permit No. 0173770-001-EI), pursuant to Chapters 161, 253 and 373, *Florida Statutes*. Final agency action on the permit application will constitute the State of Florida's final consistency determination. For information on the JCP and permitting requirements, please contact Mr. Mike Sole at (850) 487-4471. **1 cont.**

Thank you for the opportunity to review this project. If you have any questions regarding this letter, please contact Mr. Bob Hall at 850/245-2163.

Sincerely,

Sally B. Mann

Sally B. Mann, Director
Office of Intergovernmental Programs

SBM/rwh
Enclosures
cc: Jim Golden, SFWMD
Carol Knox, FFWCC
Marsha Colbert, DEP, BBAP, Miami
Allyn L. Childress, SFRPC
Mike Sole, DEP, BBWR, Tallahassee

Memorandum

Florida Department of
Environmental Protection

TO: Florida State Clearinghouse

FROM: Robert W. Hall, Environmental Specialist
Office of Intergovernmental Programs

DATE: May 14, 2003

PROJECT: Department of the Army, Jacksonville District Corps of Engineers, Draft Environmental Impact Statement (DEIS) and General Re-Evaluation Report (GRR) for Miami Harbor Navigation Improvements, Miami-Dade, Florida

SAI: FL200303191299C

The Department of Environmental Protection (DEP) has reviewed the above-referenced project, and although DEP's Bureau of Beaches and Wetland Resources has published a Consolidated Notice of Intent to Issue an Environmental Resource Permit, some additional concerns for adverse impacts to the Biscayne Bay Aquatic Preserve have been identified.

Portions of the proposed project fall within the boundaries of the Biscayne Bay Aquatic Preserve (BBAP) as defined by Section 258.397, Florida Statutes, and Chapter18-18, Florida Administrative Code.

There are six projects proposed as components within the GRR and considered in the two Action Alternatives in the DEIS. Each component has up to four versions for a total of 14 possible actions which are labeled 1 through 6A. The Recommended Plan (Action Alternative 2) includes the following components: 1C, 2A, 3B, 4, and 5A.

Components 3B and 5A involve destruction of seagrasses either through dredging or side slope equilibration that follows through time. This conflicts with the provisions of Section 18-18.001(4)(f), F.A.C., where BBAP's intent is to "preserve and promote" habitats including seagrasses. One to one mitigation by recolonization (without planting) for these losses is proposed for an area also within BBAP north of the Julia Tuttle Causeway. The site is described as an 18.6 acre hole on the northern edge of a 400 + acre hole "created when the causeway was constructed" (p. 3, Draft Mitigation Plan-Incremental Cost Analysis, Appendix F).

Component 5A also involves blasting which can adversely affect the indigenous life forms that BBAP is charged to "preserve and promote" in Section 18-18.001 (4)(f), F.A.C. These include marine mammals such as the endangered West Indian Manatee, *Trichechus manatus*. Dial Cordy Associates, writing for the Army Corps of Engineers (COE) in the DEIS states that "surveys confirm that they (manatees) frequent the waters in and adjacent to the study area in the Port" (DEIS, p. 32-33 and Figure 7).

Relocate the western end of the Dodge Island Cut to accommodate proposed Port expansion." Component 6 indicates that seagrass impacts due to dredging are listed as 25.9 total acres, of which 22.4 acres are "...New direct impacts, not previously dredged, inside proposed channel boundaries." (Table 11, DEIS p. 60). This conflicts with Section 18-18.001(4)(f), F.A.C. related to preservation and promotion of seagrass habitats.

At this time, there is insufficient information for a finding of consistency; consequently, further review of the proposal will be required. Discussion of some additional provisions follow.

1A. The Amount of Seagrass Mitigation: The EIS Mitigation Plan included as Appendix J of the DEIS states: "Direct impacts to seagrass communities are restricted to the widening of the Fisherman's Channel cut and the Fisher Island Turning Basin. Impacts include the permanent loss (removal) of 0.2 acre of mixed seagrass beds. Indirect losses will occur from the natural equilibration of the side slopes and erosion of the area of seagrass located within 50 to 70 feet south of the proposed top of the new channel. The average equilibrium slope will be 1:7 for the south bank of the channel (see Appendix G in the EIS), resulting in the loss of 6.1 acres of seagrass. Based on the high probability for restoration success, and a high likelihood that the restored seagrass beds would be of much higher quality than those impacted, a compensation ratio of one acre of seagrass, as compensation for one acre of impact is conceptually valid for all impacts due to dredging."

The Department of Environmental Protection has historically accepted seagrass impacts at no less than 5:1. This would require 30.5 acres of seagrass to be restored for 6.1 acres of impact.

Dial Cordy and Associates, writing the Draft Fish and Wildlife Coordination Act Report on behalf of the US Fish and Wildlife Service, states that "the Service recommends that for each acre of seagrasses that is anticipated to be impacted as a result of widening Fisherman's Channel and the Fisher Island Turning Basin, three acres be created or restored (3:1 ratio). This includes the impacts during dredging (0.34 acre), as well as the impacts to the 6.0 acres of adjacent seagrass beds during equilibration of the side-slope ("sloughing") which is reasonably certain to occur. Therefore, restoration of 18.9 acres of seagrass would compensate for the 6.3 acres of seagrass impacted during the construction of components 3 and 5" (Appendix K, DEIS, p. 34).

1B. The Method of Seagrass Mitigation: ACOE considered three options for in-kind restoration of seagrasses: filling prop scars in the Bill Sadowski Critical Wildlife Area, restoring 19.55 acres in the Miami Marine Stadium area with both in-kind (seagrasses) and out-of-kind (mangroves and uplands) mitigation, or filling an 18.6 acre dredge hole at the northern edge of a 400+ acre borrow pit north of Julia Tuttle Causeway. The latter location was chosen.

The ACOE also looked at 6 alternative seagrass mitigation plans that differed in

placement method (planting vs. recolonization) and construction method (sheet pile, rock, or combination). Alternate 4, involving the recolonization method and rock fill, was chosen as the most cost effective, but may incur secondary costs associated with planting if recolonization does not occur within two years. The recolonization method relies on the presence of *Halodule wrightii* and *Halophila decipiens*, which "likely occur within the shallow flats adjacent to the proposed site" and recolonization by current bed expansion which will occur only around the edges of the pit and not in the center (p. 3, Appendix F of the Draft Mitigation Plan- Incremental Cost Analysis).

In the Corps rejection of the U.S. Fish and Wildlife Service's (USFWS) mitigation proposal of 18.9 acres, the Corps cites two "Seagrass recovery examples" on page 9 of their Detailed Reply to the Draft USFWS Coordination Act Report, Appendix K (also, contained in the Draft Mitigation Plan-Incremental Cost Analysis, Appendix F, p. 3-4).

The first example was a three-acre borrow area in North Biscayne Bay whose restoration was completed by Miami-Dade Department of Environmental Resources Management (DERM) in the late 1990's. This project differs from the COE proposed mitigation in two important ways: 1) the project size is 3 acres instead of the 18.6 acres proposed here; and, 2) the project involved installation of planting units of *H. wrightii* and *Thalassia testudinum* instead of natural re-colonization. In the second example, a 22 foot wide trench patch was allowed to re-colonize after the substrate was refilled. This example differs in configuration and size from the proposed COE mitigation of an 18.6 acre hole.

In addition, the literature cited, Fonseca *et al.* (1996a, 1996b), which found that "within three years, restored seagrass beds (*H. wrightii*) planted on 0.5-m centers reach the same areal density … equivalent to natural beds," involves planting to achieve the desired habitat benefits within the time proposed by the COE, not re-colonization (p. 1, Draft Mitigation Plan- Incremental Cost Analysis, Appendix F).

Given these examples and the likely impact to the BBAP seagrasses, the COE can either plant 6.1 acres of seagrasses within the total restored area (18.6 acres) for an area equivalent to a 1:1 mitigation or, alternately, allow re-colonization alone and increase the mitigation site size to 30.5 acres for 5:1 ratio or a minimum of 18.9 acres recommended by the USFWS. With the latter option of re-colonization alone, the presence of the pioneering species *H. wrightii* and *H. decipiens* in the surrounding beds is critical to its success. 1

2. Provisions in Sections 18-18.001(4)(d) and (4)(f), F.A.C. allow the use of applicable state management programs to assist in managing the preserve and especially for the preservation and promotion of Indigenous Life Forms, including the West Indian Manatee, *T. manatus*. One such state management program is the Florida Fish and Wildlife Conservation Commission (FFWCC)'s Endangered Species Conservation Conditions for Blasting Activities (ESCCBA), posted in June, 2001. The COE states "The highest potential for direct impacts to

Comment 1 Response

The Corps revised the mitigation plan and will provide approximately 24 acres of seagrass restoration in the east central hole of the Julia Tuttle hose as described in Appendix J of the FEIS.

placement method (planting vs. recolonization) and construction method (sheet pile, rock, or combination). Alternate 4, involving the recolonization method and rock fill, was chosen as the most cost effective, but may incur secondary costs associated with planting if recolonization does not occur within two years. The recolonization method relies on the presence of *Halodule wrightii* and *Halophila decipiens*, which "likely occur within the shallow flats adjacent to the proposed site" and recolonization by current bed expansion which will occur only around the edges of the pit and not in the center (p. 3, Appendix F of the Draft Mitigation Plan- Incremental Cost Analysis).

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2. Provisions in Sections 18-18.001(4)(d) and (4)(f), F.A.C. allow the use of applicable state management programs to assist in managing the preserve and especially for the preservation and promotion of Indigenous Life Forms, including the West Indian Manatee, *T. manatus*. One such state management program is the Florida Fish and Wildlife Conservation Commission (FFWCC)'s Endangered Species Conservation Conditions for Blasting Activities (ESCCBA), posted in June, 2001. The COE states "The highest potential for direct impacts to

Comment 2 Response

Due to the nature of the seagrass beds adjacent to the proposed mitigation site, it has been determined that extensive planting the area is not necessary. The USACE plans to install strategically located planting plots to speed initial recovery of the site. As stated in our mitigation plan, should the area not colonize naturally, the USACE will plant after a 3-year period.

threatened and endangered marine mammal species may result from the use of explosives to break/dislodge rock substrates in the Government Cut and Fisherman's Channel" (p.72, GRR DEIS). In Appendix H, Endangered Species Coordination Documents, the Corps states that "All drilling and blasting will be conducted in strict accordance with local, state, and federal safety procedures. Marine Wildlife Protection, Protection of Existing Structures, and Blasting Programs coordinated with federal and state agencies (sic)" (p. 16). However, in addition to the Standard Manatee Construction Conditions published by FFWCC and incorporated into Appendix H on pages 18-19, the FFWCC also issued the ESCCBA and its provisions have not been similarly included. The FFWCC states, "An effective watch program is a key element in protecting affected species from blasting activities. ...Previous experience indicates that the most effective watch platform is from an aircraft. The watch shall consist of an aerial survey observer acting as the primary observer and other secondary observers on boats, bridges, or land. All observers must have experience in observing endangered species, and the aerial observer must have significant previous aerial survey experience observing endangered species." A partial list of Manatee Observers is available on-line through the FFWCC's Bureau of Protected Species Management at <http://floridaconservation.org/psm/permit/observers.htm>. 3

Further, the FFWCC's ESCCBA includes the following requirements:

1. Both the "FFWCC and the U.S. Fish and Wildlife Service (USFWS) must approve a Blasting Proposal prior to any blasting activities" that includes "a list of observers, their qualifications, and positions for the watch, including a map depicting the proposed locations for boat and land-based observers." No such listing or map was proposed or included in the Corps' GRR/DEIS.

2. "A formal watch coordination meeting" must be held at least two days before the first blasting with "observers, construction contractors, demolition subcontractors, and other interested parties, such as FFWCC or USFWS." .

3. The safety radius, discussed by the Corps in the GRR, "shall be marked in a highly visible manner, preferably with colored buoys."

4. " The watch program shall begin at least one hour prior to the scheduled start of blasting to identify the possible presence of manatees, dolphins, marine turtles or whales (in the nearshore and offshore areas). The watch program shall continue until at least one half-hour after detonations are complete."

5. "The watch program shall consist of a minimum of four observers. Each observer shall be equipped with a two-way radio that shall be dedicated exclusively to the watch. Extra radios should be available in case of failures. All of the observers shall be in close communication with the blasting subcontractor in order to halt the blast event if the need arises. If all observers do not have working radios and cannot contact the primary observer and the blasting subcontractor during the pre-blast watch, the blast shall be

Comment 3 Response

If blasting is used, a watch program will be prepared in accordance with the Endangered Species Act Section 7 consultation with the USFWS, and we will incorporate as many of the FFWWC's protocols as feasible

construction sites, but are not sufficient for blasting sites. Additional precautions will be needed.

3. **Preservation of habitats within the Biscayne Bay Aquatic Preserve**: Component 6 would have a significant adverse impact on areas containing seagrass, with 22.4 acres of direct impacts resulting from dredging, and 3.5 acres lost due to side slope equilibration (Table 11, p. 60 of the GRR Draft EIS and the corresponding Figure 8). The presence of seagrasses that would be impacted was supported by the findings of the previous Biscayne Bay Aquatic Preserve Manager, David Mayer, and detailed in his memorandum dated May 30, 2001. During a May 24, 2001, biological survey, Mr. Mayer found seagrasses in the widener area of the western turning basin (Dodge Island), Port of Miami, and he included his findings in comments submitted on the Port of Miami Permit Modification, FDEP Permit Number 13116409. {Due to the impact on 25.9 acres of seagrasses, it is recommended that construction projects in this area not be considered.} 4

Please refer technical questions related to these comments to Ms. Marsha Colbert, BBAP manager, at (305) 795-3485. Questions related to this memo should be referred to Bob Hall at 850/245-2163.

Comment 4 Response

The USACE has minimized the impacts to seagrass to the maximum extent practicable, as described in Section 2.0 of the FEIS. In particular, the USACE has reduced potential direct impacts to seagrass communities from 25.2 acres to 0.2 acres (see Table 2). Indirect impacts due to sideslope equilibration are not included in this table. While some impact is unavoidable, it has been minimized to the maximum extent possible.

Department of Environmental Protection

FLORIDA

Jeb Bush
Governor

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

David B. Struhs
Secretary

May 22, 2003

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

Re: Department of the Army, Jacksonville District, U.S. Army Corps of Engineers, Draft General Re-Evaluation Report and Environmental Impact Statement, Miami Harbor Navigation Improvements, Miami-Dade County, Florida

SAI: FL200303191299C

Dear Mr. Duck:

The enclosed comments provided by the Department of Environmental Protection, Bureau of Beaches and Wetland Resources, were received after our prior correspondence of May 14, 2003 was mailed. Please be advised that these comments do not change our finding that, at this stage, the above-referenced project has been determined to be consistent with the Florida Coastal Management Program. 1

If you have any questions or need further assistance, please contact me at (850) 245-2163.

Sincerely,

Robert W. Hall
Environmental Specialist
Office of Intergovernmental Programs

RWH
Enclosures
cc: Roxane Dow

Printed on recycled paper.

Comment 1 Response

The USACE acknowledges the consistency determination

Florida Department of

Memorandum **Environmental Protection**

DATE: May 22, 2003

TO: Bob Hall, Office of Intergovernmental Programs

FROM: Michael W. Sole, Chief, Bureau of Beaches and Wetland Resources

SUBJECT: Draft General Reevaluation Report and Environmental Impact Statement for Miami Harbor, SAI # FL03-1299C

The Bureau has reviewed the referenced documents, and will have the responsibility for permitting should the US Army Corps of Engineers (USACE) and the local sponsor pursue construction. Applicants must provide reasonable assurance that the project will meet the water quality standards for Class III waters, the antidegradation requirements for Outstanding Florida Waters, requirements applicable to Aquatic Preserve management, and habitat and resource protection requirements incorporated into Florida Coastal Zone Management Plan. There are extensive natural resources in the area including low and high hardbottom communities and seagrasses. There are a number of threatened, endangered and state protected species that utilize habitats that would be severely impacted by these improvements. {There have been extensive alterations already made to the system, and varied success in mitigating for them.} 1
Consequently, we note several deficiencies in the draft documents.

1. {The documents provide inadequate justification for the extensive damage to natural resources that would occur. Table Five lists the Coast Guard record of navigational accidents, but does not describe the circumstances or reasons for such accidents. Currents and countercurrents, especially during ebb and flood tides and during storm events are well known at this Harbor. The number of accidents is reported to be less than one-tenth of one-percent of the number of vessels calling at the port (38 during a 10-year period). How does this accident rate compare to similar ports? What assurances are there that the individual recommended improvements will reduce navigational accidents and by how much? Additional data collection and modeling is recommended to provide assurances that navigational safety will be improved to the extent necessary to justify the impacts.} 2

2. {Additional options should be considered for Component 1C, including extending the designated channel seaward into deeper water in order to avoid hardbottom impacts. Plans should also incorporate consideration of how to avoid, minimize or mitigate for hardbottom impacts from anchoring of dredging equipment.} 3

3. {Previous construction and maintenance dredging in Miami Harbor have not resulted in box-cut channels, but in channels with a variety of slopes. Further evaluation of the likely impacts of such slopes from new construction and continued maintenance dredging is needed, including impacts to seagrasses, hardbottom habitats, and erosion stress on the bulkhead at Fisher Island. Additional mitigation will likely be needed.} 4

4. {Seagrasses on the south side of Fisherman's Channel are of high quality and quite dense. The channel appears to have approximately three boat widths of clearance with booms deployed, according to Figure One. Why is this a safety issue? Justification of need and a demonstration of economic hardship commensurate with the destruction of such high quality seagrass beds are inadequate in the draft documents.} 5

Comment 1 Response

The USACE acknowledges that there have been extensive alterations made to the Biscayne Bay system, with varied success in mitigating for them. Prior impacts to the system due to harbor improvements at the Port of Miami are documented in Section 4.20.1.5. Past mitigation projects have been successful, with the exception of seagrass mitigation activities conducted in the 1980's. Those seagrass planting efforts were generally not successful, and additional mitigation to compensate for failed efforts was required by agencies; additional projects included restoration of mangroves and spoil island enhancement. Lessons learned from the Port of Miami seagrass planting in the 1980's have helped the scientific community develop more successful protocols for planting seagrasses today. The seagrass mitigation proposed in this study has a strong likelihood of success ensuring that lost values are replaced.

Comment 2 Response

The USACE acknowledges the impacts and has described them in detail in the DEIS; we have avoided and minimized to the maximum extent practicable, and are proposing to mitigate for the remaining unavoidable impacts. The avoidance and minimization was detailed in both the EIS and GRR. A complete discussion of avoidance and minimization efforts was included in Section 3.0 of the GRR (Planning Formulation). The DEIS was included with this document in volume one of the report. A detailed discussion on this process can be found in the GRR.

Navigational needs associated with the project are detailed in Section 1.3 of the FEIS. The USACE conducted extensive data collection and modeling for ship simulation efforts to determine whether proposed improvements would address navigation safety concerns (see Appendix B of the GRR). The simulation findings confirmed that the proposed project is the minimum, which can provide the navigational safety benefits requested by the harbor pilots. Failure to address navigational safety can have high impacts, which cannot be mitigated, including impacts to human life.

Comment 3 Response

Four different versions of the widener Component 1 received consideration including 1B which extended the channel into deeper water to avoid the reef areas as explained in the Alternative Plan Considerations section of the GRR. As noted, Component 1B avoided the reef areas, but did not satisfy navigation concerns since the area of variable and unpredictable north and south currents occurs over the reef area where ships have grounded not seaward of the reefs. See NOAA-14 comment for the proposed incentive approach to minimize or avoid reef impacts.

Comment 4 Response

The USACE concurs that the methodology for sideslope impacts should be reconsidered, and has updated the sideslope methodology used for the environmental impact calculation in the FEIS (see Appendix G). The new methodology eliminates allowing the box cut to extend outside of the channel limits in response to this comment. It does include a five-foot allowance for field conditions and dredging inaccuracies during construction in the potential impact calculation. See EAS1 and EAS2 for discussion of the Fisher Island bulkhead and to NOAA 24 and DERM 10 regarding hard bottom impacts. If additional impacts to the reef occur as a result of dredging with a cutterhead dredge – an additional mitigation plan will be prepared with the resource agencies, Port, USACE and dredging contractor.

Comment 5 Response

The USACE does not concur with FDEP's assessment of seagrass habitat quality in the context of the proposed project. The seagrass beds along Fisherman's Channel (impact area) are in a relatively high-energy area. Aerial photography and numerous field reconnaissance efforts reveal that this grass bed occupies a sandy "ridge" along the edge of the deep channel. The bed is subject to daily runoff and sediment loading from the Miami River and is also subject to turbidity from navigation operations. Propeller scarring from recreational boating use of the area is also evident throughout the bed. This area appears to be used less frequently by manatees than quieter areas close to shore and in the Critical Wildlife Area (DERM manatee sighting records, 1989-1998). While the area along Fisherman's Channel maintains a healthy growth of seagrass, its location in an area subject to daily perturbations lowers its quality relative to other area seagrass beds, especially in the adjacent CWA. The USACE plans to mitigate for impacts to these beds by restoring a climax community of high-density seagrass beds north of the Julia Tuttle Causeway in an area of lesser disturbance. The quality of the community to be restored is expected to be excellent compensation for the loss of seagrasses at the impact site. This along with the demonstrated need for channel widening from an operations standpoint justifies the proposed impacts.

Bob Hall
May 22, 2003
Page 2

5. Additional surveys will be needed to demonstrate the absence of Johnson's seagrass in the project area. 6

6. The seagrass mitigation plan is inadequate in several ways. The ratio for unplanted mitigation is not expected to compensate for the loss of use over the time period that recruitment of seagrass is anticipated. The Bureau does not agree that there is a "high probability for success, and a high likelihood that the restored seagrass beds would be of a much higher quality that those impacted". If seagrass mitigation is not accomplished prior to the impact, three to five acres of mitigation for every acre of seagrass destroyed is anticipated to be required to address loss of functional value, time-lag and risks of mitigation. The three-year time period proposed for recruitment is an underestimation, based upon previous Biscayne Bay experience. The elevations in the proposed mitigation site are too varied and unlikely to produce the desired coverage. The mitigation plan does not adequately address the transportation or layering of the dredged material and does not provide information on sediment grain size and depth that would provide any assurance of success. Finally, the cost estimates to perform the mitigation are not consistent with previous projects conducted in Biscayne Bay. 7

7. The hardbottom mitigation plan also underestimates the mitigation ratios, the logistical difficulties, the acceptability of materials to be used and the costs. Mitigation ratios for impacts to diverse, high relief hardbottom communities is anticipated to range from two to three acres for every acre impacted. Specific mitigation ratios will need to be developed based on the loss of functional value, time-lag and risk associated with success of the compensatory mitigation reef. Rock acceptable as mitigation reef needs to be of sufficient size to be stable. Previous mitigation at Miami Harbor has required the addition of large limestone boulders in order to produce adequate substrate. Additionally, current designated mitigation/artificial reef sites may have inadequate space to address the mitigation requirement.

8. The project and mitigation sites are in a high energy area and turbidity due to dredging is of concern. Additional prevention measures and consideration of limiting dredging to out-going tides should be considered. The process of transferring appropriate sediments to the mitigation site is also of concern. Additional assurances are needed that the procedures will protect adjacent seagrass beds and fisheries in the area.

We would suggest that the USACE consult directly with the Bureau as they refine these documents to assure there is complete coordination with the concerns and permitting requirements of the Department.

Thank you for the opportunity to comment.

MWS/rd/p

cc: Marty Seeling
Stacy Roberts
Roxane Dow

Comment 6 Response

The USACE agrees that H. johnsonii has been positively identified and documented in Biscayne Bay but the USACE does not concur with the statement that the documented absence of H. johnsonii from the study area is not justified. The seagrass survey conducted by the USACE covered the entire seagrass area. Divers were used to conduct quantitative surveying of seagrasses along 35 transects and also to map all seagrass coverage and habitat type between transects (see Appendix E of the FEIS). Using this methodology, Johnson's seagrass was not detected within the entire study area. In addition, several reconnaissance visits to the impact site within Components of 5 and 5A have been conducted both before and after the USACE study by qualified agency and consulting personnel. Johnson's seagrass has not been detected during any of those visits. The Port of Miami (Port) biological consultants have surveyed the site at least four times. In addition, DERM has mapped the entire seagrass edge in this area through extensive fieldwork and to our knowledge has not identified H. johnsonii. In fact the DERM seagrass line is used in the GRR impact analysis. In addition, the following site visits with federal agency personnel in attendance have also been conducted relative to Components 5 and 5A:

- December 2001 – Biologists from the Port, DERM, National Marine Fisheries Service (NMFS) and U.S. Fish and Wildlife Service (FWS) in attendance.
- March 2002 – Biologist from NMFS in attendance.
- May 2003 – Biologists from the USACE, DERM, NMFS, FWS and Florida Department of Environmental Protection in attendance.

During the May 2003 visit, agency personnel experienced in identifying Johnson's seagrass expressed the general opinion that the high energy conditions found along Fisherman's Channel (impact site for Components 5 and 5A) probably do not favor recruitment of Johnson's seagrass. This opinion was based on the strong tidal currents experienced in this area and the prevalence of sandy/shelly substrate. While the USACE does not want to speculate on specific conditions necessary for recruitment and survival of Johnson's seagrass in Biscayne Bay, we do not agree with the foregone conclusion that "there is no apparent physiological or ecological limitation for H. johnsonii to exist" in the study area. The USACE believes that the intensive transect survey they have conducted in conjunction with numerous agency reconnaissance site visits over the years provide more than sufficient confidence in the conclusion that H. johnsonii is currently and has been in the past, absent from Components 5 and 5A of the study area. Although, as stated in NOAA's comment letter (see comment NOAA-11, page 6), a NOAA fisheries biologist observed a specimen of *H. johnsonii* in the vicinity of the proposed work (Component 3). However, the specimen was not definitively identified as *H. johnsonii,* and subsequent attempts to confirm its presence proved unsuccessful.

Comment 7 Response

The USACE has prepared the mitigation plan in consultation with the Federal resource agencies and Miami-Dade DERM. This site was recommended by DERM based on their experiences with Biscayne Bay. Seagrass mitigation cannot be initiated prior to construction of the project, since filling the mitigation hole will use material from the port construction. The USACE concurs that the proposed mitigation ratio does not adequately consider "loss of use over time" and has revised the planned mitigation area to cover approximately 24 acres. The USACE does maintain, however that the proposed seagrass restoration project has a high probability for success. While there is some inherent risk associated with any restoration project, seagrass restoration properly planned and executed at an appropriate site can have an excellent chance of success. In order to minimize risk the USACE has applied the site selection criteria contained in Fonseca et al. 1998, as suggested by the National Marine Fisheries Service (NMFS) in selecting this site. Based on preliminary observations of the seagrass habitat adjacent to the mitigation site, the USACE anticipates that the restored seagrass bed will be of equal or greater functional capacity as the bed being impacted. See FDEP4-5 response for additional detail.

Bob Hall
May 22, 2003
Page 2

5. Additional surveys will be needed to demonstrate the absence of Johnson's seagrass in the project area.

6. The seagrass mitigation plan is inadequate in several ways. The ratio for unplanted mitigation is not expected to compensate for the loss of use over the time period that recruitment of seagrass is anticipated. The Bureau does not agree that there is a "high probability for success, and a high likelihood that the restored seagrass beds would be of a much higher quality that those impacted". If seagrass mitigation is not accomplished prior to the impact, three to five acres of mitigation for every acre of seagrass destroyed is anticipated to be required to address loss of functional value, time-lag and risks of mitigation. {The three-year time period proposed for recruitment is an underestimation, based upon previous Biscayne Bay experience. The elevations in the proposed mitigation site are too varied and unlikely to produce the desired coverage.} {The mitigation plan does not adequately address the transportation or lavering of the dredged material and does not provide information on sediment grain size and depth that would provide any assurance of success.} Finally {the cost estimates to perform the mitigation are not consistent with previous projects conducted in Biscayne Bay.} 8 9 10

7. {The hardbottom mitigation plan also underestimates the mitigation ratios, the logistical difficulties, the acceptability of materials to be used and the costs. Mitigation ratios for impacts to diverse, high relief hardbottom communities is anticipated to range from two to three acres for every acre impacted. Specific mitigation ratios will need to be developed based on the loss of functional value, time-lag and risk associated with success of the compensatory mitigation reef. Rock acceptable as mitigation reef needs to be of sufficient size to be stable. Previous mitigation at Miami Harbor has required the addition of large limestone boulders in order to produce adequate substrate. Additionally, current designated mitigation/artificial reef sites may have inadequate space to address the mitigation requirement.} 11

8. The project and mitigation sites are in a high energy area and turbidity due to dredging is of concern. Additional prevention measures and consideration of limiting dredging to out-going tides should be considered. The process of transferring appropriate sediments to the mitigation site is also of concern. Additional assurances are needed that the procedures will protect adjacent seagrass beds and fisheries in the area.

We would suggest that the USACE consult directly with the Bureau as they refine these documents to assure there is complete coordination with the concerns and permitting requirements of the Department.

Thank you for the opportunity to comment.

MWS/rd/p

cc: Marty Seeling
Stacy Roberts
Roxana Dow

Comment 8 Response

The USACE does not concur that finished elevations in the proposed mitigation site will be "too varied and unlikely to produce the desired coverage." The proposed plan is to construct the mitigation site to achieve a target elevation comparable to the surrounding natural elevation. The USACE has included in the FEIS an expanded conceptual mitigation plan giving more detail on how the site will be constructed (see Appendix J). Preliminary information shows that the proposed site is situated adjacent to seagrass beds and the USACE sees no reason why the finished site, properly designed, should not recruit with primary colonizers within the first year of monitoring. In addition, the USACE has included some minimal strategic planting of portions of the site in the conceptual design (see Appendix J) in order to supplement the expected natural recruitment. Regarding "Biscayne Bay experience" the only large borrow-filling project in the Bay of which the USACE is aware is the 2.4-acre site construction by Miami-Dade County in the early 1990s. This site has been successful.

Comment 9 Response

The USACE concurs that insufficient information on the mitigation design was included in the DEIS. The USACE has included in the FEIS an expanded conceptual mitigation plan giving more detail on how the site will be constructed (see Appendix J). Detailed design items such as sediment grain size will be further addressed when a detailed mitigation plan is developed for the site.

Comment 10 Response

The only similar previous project conducted in Biscayne Bay of which the USACE is aware is a 2.4-acre dredge hole filled by DERM in the early 1990s. The cost for that project included double handling of dredge spoil used to fill the hole including trucking it to an offloading site. The current proposed project has already incorporated the cost of fill disposal that would otherwise have to be barged offshore to the ODMDS but instead will be disposed of in the mitigation area. Cost estimates for mitigation also include savings resulting from the use of on-site dredging equipment for construction of the reef and seagrass mitigation areas, which eliminates mobilization and demobilization costs from the mitigation estimate since those expenses are already included as project costs. Additionally, the rock for the reef mitigation will come directly from blasting and excavation of the rock from the channel deepening which eliminates the cost for quarried rock. Therefore, the USACE contends that projected costs of both mitigation projects are appropriate and informed by past projects of this type.

It should be noted that the USACE received several comments on the conceptual design of the seagrass mitigation and has included a revised conceptual plan in the FEIS. Mitigation costs have been revised to incorporate changes to the plan. Seagrass mitigation costs have been increased to include turbidity curtains, increased acreage impacts as a result of the change in side slope estimates for rock, increases in monitoring times, and strategic planting of some seagrasses to help encourage growth.

Comment 11 Response

As a result of comments received on the DEIS, the USACE has identified potential anchor and cable impacts from a cutterhead dredge to the impact assessment. The actual impacts due to anchor and cable placement will not be known until completion, and appropriate mitigation will be determined at that time. The determination of necessary mitigation for reef impacts was conducted using a Habitat Equivalency Analysis at the request of the National Marine Fisheries Service and the US Fish and Wildlife Service. The HEA is used by NOAA in determining the necessary amount of mitigation for ship groundings and other impacts to resources within the Florida Keys National Marine Sanctuary and has withstood two challenges in Federal court. The USACE, NMFS and FWS have agreed that the mitigation ratios developed through the HEA process are appropriate for this project.

5. Additional surveys will be needed to demonstrate the absence of Johnson's seagrass in the project area.

6. The seagrass mitigation plan is inadequate in several ways. The ratio for unplanted mitigation is not expected to compensate for the loss of use over the time period that recruitment of seagrass is anticipated. The Bureau does not agree that there is a "high probability for success, and a high likelihood that the restored seagrass beds would be of a much higher quality that those impacted". If seagrass mitigation is not accomplished prior to the impact, three to five acres of mitigation for every acre of seagrass destroyed is anticipated to be required to address loss of functional value, time-lag and risks of mitigation. The three-year time period proposed for recruitment is an underestimation, based upon previous Biscayne Bay experience. The elevations in the proposed mitigation site are too varied and unlikely to produce the desired coverage. The mitigation plan does not adequately address the transportation or layering of the dredged material and does not provide information on sediment grain size and depth that would provide any assurance of success. Finally, the cost estimates to perform the mitigation are not consistent with previous projects conducted in Biscayne Bay.

7. The hardbottom mitigation plan also underestimates the mitigation ratios, the logistical difficulties, the acceptability of materials to be used and the costs. Mitigation ratios for impacts to diverse, high relief hardbottom communities is anticipated to range from two to three acres for every acre impacted. Specific mitigation ratios will need to be developed based on the loss of functional value, time-lag and risk associated with success of the compensatory mitigation reef. Rock acceptable as mitigation reef needs to be of sufficient size to be stable. Previous mitigation at Miami Harbor has required the addition of large limestone boulders in order to produce adequate substrate. Additionally, current designated mitigation/artificial reef sites may have inadequate space to address the mitigation requirement.

8. The project and mitigation sites are in a high energy area and turbidity due to dredging is of concern. Additional prevention measures and consideration of limiting dredging to out-going tides should be considered. 12 The process of transferring appropriate sediments to the mitigation site is also of concern. Additional assurances are needed that the procedures will protect adjacent seagrass beds and fisheries in the area. 13

We would suggest that the USACE consult directly with the Bureau as they refine these documents to assure there is complete coordination with the concerns and permitting requirements of the Department. 14

Thank you for the opportunity to comment.

MWS/rd/p

cc: Marty Seeling
Stacy Roberts
Roxanne Dow

Comment 12 Response

The proposed seagrass mitigation site is not in a high-energy area. The shallow embayment is protected on two sides by Miami Beach and the Julia Tuttle causeway. The USACE will meet water quality standards set forth in the water quality certificate, when issued and accepted.

Comment 13 Response

The USACE concurs that insufficient information on the mitigation design was included in the DEIS. The USACE has included in the FEIS an expanded conceptual mitigation plan giving more detail on how the site will be constructed (see Appendix J). The USACE also notes that state water quality standards, as determined through the water quality certification, must be met during both dredging and mitigation construction.

Comment 14 Response

The USACE has been consulting with the Bureau since the initial planning phases for the Miami Harbor project. As required by NEPA, a Scoping letter was sent to the Bureau (as well as all interested parties) in January 2000 requesting input in project design as well as input on items of concern to the interested parties. No comments were received from the state in response to the letter. A Notice of Intent to Prepare an Environmental Impact Statement was sent to the Bureau in August of 2001 requesting input in the project design and comments on the proposed scope of the DEIS, no comments were received from the Bureau. The Bureau has been invited to participate in field investigations of the project area, and to attend public and resource agency meetings on the project, including the Alternatives Formulation Briefing conducted at the Port in April 2002. During many of these coordination meetings, the Bureau has chosen not to participate.

FLORIDA FISH AND WILDLIFE CONSERVATION COMMISSION

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May 13, 2003

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

RE: SAI #FL200303191299C, Dept. of the Army, Jacksonville District Corps of Engineers, draft GRR and EIS–Miami Harbor Navigation Improvements, Miami-Dade County

Dear Ms. Milligan:

The Office of Environmental Services of the Florida Fish and Wildlife Conservation Commission has reviewed the referenced Navigation Study for the Miami Harbor Draft General Reevaluation Report and Environmental Impact Statement, and offers the following comments.

U.S. Army Corps of Engineers (COE) is working with the Port of Miami to widen and deepen the existing port area to improve navigation and accommodate larger class vessels at the port in the future. After evaluation of various alternatives, the recommended plan proposes to widen and deepen the entrance channel near the sea buoy, widen and deepen the Fisher Island Turning Basin, and widen and deepen Fisherman's Channel. The report states that the anticipated resource impacts would involve 413.4 acres of habitat: 6.1 acres of seagrass habitat, 28.7 acres of low-relief hardbottom/reef habitat, 20.7 acres of high-relief harbottom/reef habitat, 123.5 acres of rock/rubble habitat, and 234.4 acres of unvegetated bottom habitat. Due to the nature of the substrate in some areas, blasting may be used as a dredging method throughout the project. The blasting plan could require as many as three blasts per day for 1,550 days, depending on the number of drill boats used and the amount of rock found in the area proposed for dredging.

Our main concerns with this project are the loss of habitat for wildlife species, the risk to wildlife posed by the dredging methods, the amount and type of mitigation measures proposed, and changes in ship/boat traffic in the port area. The mitigation ratios proposed for seagrass impacts are 1:1. We recommend 3:1, as is typically required for direct impacts to seagrasses. 1
We also question whether all the secondary impacts to resources due to the proposed vertical cuts have been correctly identified. 2 Previously, such vertical cuts have resulted in sloughing at the

Comment 1 Response

The USACE revised the mitigation plan and will provide approximately 24 acres of seagrass restoration in the east central hole of the Julia Tuttle hose as described in Appendix J of the FEIS. The USACE has included all side-slope equilibration impacts ("sloughing") in the impact and mitigation calculations.

Comment 2 Response

The USACE concurs that the methodology for sideslope impacts should be reconsidered, and has updated the sideslope methodology used for environmental impact calculations in the FEIS (see Appendix G) and Engineering Appendix B to the main report (plates B-19 and B-21). Changes in methodology include modification of the vertical slope from 0H:0V to .5H:1V. Use of the revised methodology results in an increase of expected indirect impacts associated with sideslope equilibration, from 6.1 acres of indirect impacts to 7.7 acres of indirect impacts. The FEIS has been revised to reflect these new impact acreages.

edges, thereby increasing impact to adjacent resources. In this case, these impacts have not been calculated, or included in the mitigation computation.

The dredging for this project may be done using a variety of methods, including blasting. As we have previously stated, we continue to have concerns for wildlife species that may be impacted by blasting activities. We currently have a contract with blasting experts who are evaluating all the available information regarding impacts to wildlife, and will be providing an assessment of current mitigation measures to assist in improving our protocols. We expect this effort to be complete by the end of 2003, at which time our protocols for blasting may be different, particularly in calculating the safety radius. We are coordinating this effort with the U.S. Fish & Wildlife Service, who is funding half of the study, and our goal is that both wildlife agencies use the same recommendations for all blasting projects. 3

The proposed changes at the port will allow for larger class vessels to visit the Port of Miami. While many simulations have been conducted to determine the size and depth of the channel needed to accommodate larger ships, no information appears to be provided regarding changes in boat traffic expected at the port such as traffic level increase and expected traffic patterns. These types of considerations are relevant to protected marine species that suffer from lethal and sub-lethal collisions with boats and ships. These risks are currently present at the port and will likely increase if the port is expanded. This information should be collected and evaluated. 4

The following information is provided regarding manatees, sea turtles, and their habitats in the vicinity of the project area, and should be considered as the project moves toward the permitting phase. These are the types of issues we will bring up at that time, as we have for the ports' maintenance dredging water quality certification.

Marine Turtles

The proposed project could impact marine turtles due to take of animals during hopper dredging, loss of significant in-water foraging habitat including hard bottom and seagrass areas, boat strikes due to ancillary vessels, water quality impacts, impacts to marine turtle nesting habitat due to fill placement on the beach, and impacts to hatchling and adult sea turtles due to lights associated with construction activities or new dock or mooring facilities.

The COE should obtain updated Incidental Take and Biological Opinions from both the U.S. Fish & Wildlife Service and the National Marine Fisheries Service for this project. The incidental take authorization should assess take due to dredging, construction of any mooring or dock areas, potential impacts to nesting and nearshore foraging sea turtles, and placement of beach quality sediment on the nesting beach. Dredged material that is similar to the native beach sands should be placed on marine turtle nesting beaches, outside the nesting season. Assessing the suitability of dredged material for beach placement requires detailed geotechnical data from the proposed channel alignment as well as the native beach (e.g., a beach in the project area that has not been previously nourished). Information should be included on gradation curves, mean 5

Comment 3 Response

The USACE has worked closely with the FWS, NMFS and Dr. Thomas Keevin in developing proper protocols with regard to minimizing the impacts to threatened, endangered and protected species by blasting. Dr. Keevin is the consultant currently working with FWS and FFWCC in review of their blasting protocols and as a result, the USACE believes that its blasting plan will be consistent with any new protocols the FFWCC may release at the end of 2003. Additionally, Under Section 7 of the Endangered Species Act of 1973, the FWS & NMFS have agreed with the USACE determination that the blasting associated with the project "may effect, but are not likely to adversely effect" threatened and endangered species.

Comment 4 Response

The USACE concurs and has collected and evaluated information on ship traffic levels and patterns. The Economics Appendix (Appendix A) of the GRR includes an analysis of cargo movements and fleet composition (page 12), an analysis of historic cargo traffic (pages 18-28), future container and trailer traffic (pages 28-39), and cargo fleet trends (pages 40-46). According to this information, the transition from smaller to larger vessels results in fewer vessel calls at Miami Harbor, reducing traffic congestion and associated safety problems. This is demonstrated by the fact that although cargo and passenger traffic grew at average annual rates of 8.1 % and 2.1%, respectively, from 1990 to 2000; the number of ship calls remained about the same: 3,456 calls in 1990; and 3,447 calls in 2000. This phenomenon is the direct result of the increase in size of cargo and cruise ships during the 1990's.

Comment 5 Response

Federal agencies do not obtain Incidental Take Permits under the ESA. They are required to consult with NMFS/FWS and through the consultation process may be granted an Incidental Take Statement if NMFS or FWS feels it is warranted. The USACE has a biological opinion granting incidental take of marine turtles associated with dredging operations from NMFS, and the FWS has concurred with the determination that the project is not likely to adversely effect sea turtles under their jurisdiction (i.e. – beach placement and lighting impacts). Copies of both consultation documents are included as appendices to the EIS. No additional incidental take statements are needed.

grain size, percent shell, percent silt-clay, the amount of calcium carbonate per sample, and composition (carbonate versus quartz) for the dry beach only, as well as for the borrow site and all drillers logs. Please note that coarser sands, 0.8 mm or greater, and very fine sediments, can negatively impact marine turtle nests and hatchlings.

The proposed project could increase the negative impacts of lights on nesting sea turtles and hatchlings either through construction lighting, or creation of an elevated beach berm due to fill placement. Consideration of lighting impacts during construction will need to be developed for this project.

Nearshore reef communities provide important habitat used by four marine turtle species known to inhabit Dade County waters. The threatened loggerhead sea turtle (*Caretta caretta*) and the endangered Kemp's ridley (*Lepidochelys kempii*) forage on a variety of crustaceans, mollusks, gastropods, and fish species that are also found there. The endangered green turtle (*Chelonia mydas*) and hawksbill sea turtle (*Ertetomochelys imbricata*) forage in the reef community. Green turtles, especially the juveniles, are known to feed on algal species growing on and near the reefs, while hawksbill sea turtles have been documented to feed heavily on sponges and a variety of invertebrates. These reef systems also provide numerous protective ledges and outcroppings that are especially appealing to marine turtles, likely because of the protection they provide. All four species of marine turtle use these reef systems as important resting habitat. Baseline information on the abundance and distribution of sea turtles in the project area should be obtained and reviewed during project assessment.

Manatees

Manatee use of this area is documented by aerial survey, mortality, and satellite telemetry data. The project site is located just north of extensive seagrass beds in Biscayne Bay, an area regularly used by manatees for feeding, cavorting, nursing young, mating, and drinking fresh water. In this portion of the county manatees use the Miami River, the western shoreline of Biscayne Bay, and the western shores of Virginia Key and Key Biscayne extensively. The Miami River is used daily by manatees that exit the river to feed on the seagrass beds located in nearby portions of Biscayne Bay, particularly in the area off Virginia Key. The project is located adjacent to the Virginia Key No-Entry Zone whose boundaries are the same as the state-designated Critical Wildlife Area, which was established in recognition of the unique habitat value of this part of Biscayne Bay to manatees and other wildlife species. Aerial surveys of the area consistently find manatees in these waters year-round. Of the twelve-tagged manatees recorded using Dade County waters, ten have used the waters within five-miles of the proposed project. Between January 1974 and December 2002, 220 manatees have died in Miami-Dade County waters. Forty-five of these deaths were a result of watercraft-related injuries. Seventeen manatees have died from watercraft-related causes within five-miles of the project location.

Miami-Dade County has a state-approved manatee protection plan (MPP). The MPP evaluated all available manatee data and determined "essential manatee habitat" for the county waters, and defined it as "all areas frequently used by manatees for feeding, resting, mating,

nursing, cold shelter and travel" {The portion of Biscayne Bay located between Lummus Island (Port of Miami) and Rickenbacker Causeway is located entirely in essential manatee habitat. The MPP recommends that manatee habitat be protected and that all reasonable measures be taken to reduce impacts to manatees from coastal construction activities. The MPP recommends protection of seagrasses and a prohibition of blasting in essential habitat.} 6

Seagrass

The seagrass species found at the project site serve as foraging habitat for manatee and green turtles. Other irreplaceable functions include providing a refuge and nursery for a myriad of wildlife species, commercially and recreationally valuable fishes, and invertebrates. Many species found in seagrass beds provide food for loggerhead turtles. Seagrasses also stabilize the sediments with their root systems. Seagrass leaves decelerate water currents and waves, mitigating turbidity and erosion, and seagrasses recycle nutrients, further cleaning the water column. {We recommend that all seagrass restoration efforts rely on "A guide to planting seagrasses in the Gulf of Mexico" by Mark S. Fonseca, 1994.} 7

Historically in the project area there have been impacts to seagrasses, hardbottom, and the habitat these resources provide. The mitigation provided for seagrasses from previous port expansions has not been very successful. Seagrass plantings that were required under previous mitigation provided less than 10 percent of the target seagrass acreage (251 acres). This mitigation was eventually revised to provide mangrove planting, seagrass monitoring, and artificial reef creation in Biscayne Bay. As a result, there has been a net loss of wetland function in the project area of Biscayne Bay. These continued losses do not bode well for species dependent on these resources.

We will be reviewing the state water quality certification for this project and providing our recommendations to the Department of Environmental Protection once the application is submitted. Many of our recommendations will be similar to those we have provided for the recent maintenance dredging at the Port of Miami. Thank you for the opportunity to comment on this project. Please contact me, or Dr. Robbin Trindell or Ms. Carol Knox 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/CAK
a9sai 1299c.doc
ENV 7-3-2
cc: USFWS-Jacksonville

Comment 6 Response

The Corps acknowledges that manatees frequent the area south of the Port and north of Rickenbacker Causeway. The Corps' plan includes specific protective measures to ensure that manatees are protected throughout the construction period, and thus complies with the recommendations set forth in the MPP. The Port channels are not included in the designated essential habitat for the manatee and thus are not subject to the recommendation prohibiting blasting.

Comment 7 Response

The Corps concurs that the referenced document (Fonseca 1994) will be used in the design and execution of the seagrass mitigation. The Corps also plans to use the more updated document "Guidelines for the Conservation and Restoration of Seagrasses in the United States and Adjacent Waters" (Fonseca et al. 1998) for this purpose.

USFWS-Vero Beach
Mr. Bob Hoffman, NMFS
Dr. Susan Markley, Miami-Dade DERM
Mr. Mike Sole, DEP

SOUTH FLORIDA WATER MANAGEMENT DISTRICT

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GOV 04-14

April 24, 2003

Ms. Lauren Milligan
Florida State Clearinghouse
Florida Dept. of Environmental Protection
3900 Commonwealth Blvd., MS 47
Tallahassee, FL 32399-3000

Dear Ms. Milligan:

Subject: Miami Harbor Navigation Improvements
Draft Environmental Impact Statement/General Re-evaluation Report
[SAI#: FL200303191299C]

In response to your request, South Florida Water Management District (SFWMD) staff has reviewed the Draft General Re-evaluation Report (GRR) and Environmental Impact Statement (DEIS) for the above subject project for consistency with the Florida Coastal Zone Management Program (FCMP). The purpose of the GRR/DEIS is to evaluate the potential widening and deepening of the existing Federal system of channels to achieve the project purpose of providing greater navigational safety and accommodating larger vessels. Three alternatives were analyzed (two action alternatives and the No-Action Alternative). The Recommended Plan (Alternative 2) includes components that would widen and deepen the Entrance Channel, deepen Government Cut, deepen and widen Fisher Island Turning Basin, relocate the west end of the Main Channel (no dredging involved), and deepen and widen Fisherman's Channel and the Lummus Island Turning Basin.

Projects reviewed by the SFWMD pursuant to the FCMP are reviewed for consistency with the provisions of Chapter 373, F.S. (Florida Water Resources Act of 1972, as amended), as well as the programs and regulations developed thereunder. Chapter 373, F.S. authorizes the SFWMD to regulate the withdrawal, diversion, storage, and consumptive uses of water, the construction and operation of stormwater management systems, and work in, on, or over surface waters or wetlands. Chapter 373, F.S. also authorizes the SFWMD to acquire and manage land, to conduct research and investigations into all aspects of water resource management, and to disseminate information relating to the water resources of the state to public and private users.

After review of the GRR/DEIS, the SFWMD offers the following comments and recommendations:

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Hardley K. Thompson

EXECUTIVE OFFICE
Henry Dean, Executive Director

Ms. Lauren Milligan
April 24, 2003
Page 2

1. Hydrography

{Staff is concerned that the proposed project will modify Biscayne Bay's hydrography. This could impact the ecosystem. For example, if the proposed changes result in a reduced residence time in portions of Biscayne Bay, this could cause a chronic increase is salinity.} Salinity has increased over time in northern Biscayne Bay primarily from the construction of Haulover and Government Cut inlets. Many estuarine organisms depend on a salinity less than seawater. The proposed alternatives will deepen and widen ship channels and turning basins in the area of the port that may increase tidal flushing with ocean waters. 1

The GRR/DEIS cites a study (CLH 2001, Brown et al., Miami Harbor Channel Deepening Velocity and Salinity Assessment) conducted to assess the influence of the changes on salinity. However, the study covers only an area immediately around the port and the simulation period is only 2 weeks. In addition, the model used (TABS-MDS) vertically averaged salinity. Past data clearly shows that salinity within the Bay varies with depth. In particular, salinity near the mouth of the Miami River typically exhibits stratification. The study results indicate an increase in salinity in northern Biscayne Bay for both the average and high flow hydrographs.{Staff recommends that a new study be conducted for a one-year minimum simulation period that is three-dimensional and covers the area from Broad Causeway to south of the Rickenbacker Causeway, at a minimum.} 2

2. Long-Term Environmental Impacts

The GRR/DEIS primarily focuses on environmental impacts during construction. There was{very little mention of the long-term impacts due to the increased boat traffic within the Harbor and the potential cumulative impacts from changes in currents and salinity within the Bay due to this project and previous projects. Completing the study recommended in Comment No. 1 above should address these concerns.} 3

In addition, assuming that there will probably be more projects of this type at the Harbor in the future,{staff recommends that salinity monitoring stations be added to collect data in order for the model to be better defined within the area from at least Broad Causeway to south of Rickenbacker Causeway.} This will allow the cumulative impacts on salinity within the Bay for future projects to be more directly addressed. 4

Comment 1 Response

The definition of "modify hydrography" should be specifically defined since this term could mean different physical parameters to different readers, i.e., depths in the Bay, especially in the channel areas, will change as a result of this channel-deepening project. The entire Biscayne Bay was included in the TABS-MDS model, from north of Bakers Haulover Inlet, in the north, to Jewfish Creek in Barnes Sound, to the south. As identified and discussed in this report and study, subtle salinity differences were identified between existing and plan channel conditions. These changes are close to detection limits and confidence levels of present field data collection capability and associated model assessments. The natural salinity variability existing in Biscayne Bay far exceeds the predicted changes associated with the deepened channels. Freshwater discharge, tidal, and wind condition variations have far greater influence on the Bay salinity conditions then the deepened channel condition.

The differences in salinity observed in the two-week simulation assessment period, respectively, represent a typical discharge and a high flow discharge condition and are felt to provide representative hydrodynamic (velocity and salinity) response characteristic associated with deepening the navigation channel. Although the model is a depth-averaged representation of Biscayne Bay, the primary subtle changes identified are felt to provide a reasonable indication of similar response characteristic trends that would be provided by a more complex three-dimensional model, i.e., subtle differences.

Considerable additional effort, including the acquisition of more detailed vertical salinity and velocity data would be required before accomplishing the 3-D modeling effort. As stated above, the subtle differences indicated in the 2-D modeling effort suggest that such an expenditure of time and funding would not be warranted at this time. As indicated, the additional field data collection recommended in comment 2, may provide additional data to support such a consideration. Based on the subtle results indicated by the 2-D study, 3-D results would be likely found to be similarly subtle when compared between existing and deepened conditions, although it is agreed that the magnitude of the change cannot be determined without such a new 3-D modeling effort. Again, however, based on the indicated results, such an effort does not appear to be warranted.

Comment 2 Response

See response to SFWMD-1.

Comment 3 Response

Agree that additional field data would provide meaningful information to help document long-term trends. As stated in response SFWMD-1, model identified changes in velocity and salinity are rather subtle and close to detection limits and confidence levels of present field data collection capability and associated model assessments.

Comment 4 Response

See response to SFWMD-3.

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3. Compatibility With Other Projects

Many of the {other projects proposed within Biscayne Bay are aimed at maintaining or increasing the current freshwater inflow to the Bay with the possibility of maintaining or reducing the salinity levels. These efforts include the Comprehensive Everglades Restoration Plan Biscayne Bay Coastal Wetlands Project, defining the Biscayne Bay Minimum Flows and Levels, and defining the beneficial surface water freshwater flows into Biscayne Bay (an existing legal user) for Water Reservations. None of these efforts were addressed in the GRR/DEIS. Since this project may increase tidal flushing with ocean waters (and possibly increase salinity levels), this project appears to be conflict with these other efforts. Again, the modeling recommended in Comment No. 1 above should address this issue} 5

4. Estuarine Species

The majority of the species listed within the report are marine species. However, {Biscayne Bay is an estuary and it is recommended that the affect of this project on estuarine species also be examined in more detail. For example, in the three efforts mentioned in Comment No. 3, the species that are currently being utilized in the area of the Harbor and the discharge of the Miami River are blue crab, mullet, blue striped grunt, sailors choice, stone crab, turtle grass, manatee grass, shoal grass, paddle grass, and manatee} 6

5. Salinity Levels

As previously mentioned in Comment No. 1, the salinity study results indicate an increase in salinity in northern Biscayne Bay for both the average and high flow hydrographs. Even if this salinity study and the recommended additional modeling mentioned in Comment No. 1 only indicate a 1 or 2 parts per thousand (ppt) increase in salinity, this cannot be automatically assumed as insignificant due to the low value. The results need to be compared to the current salinity levels in the effected areas of the Bay, some of which are already quite high (30 ppt or higher). An increase of 1 or 2 ppt could change an area from estuarine to marine and therefore diminish the variability of species for that area.

6. Hydrology

The GRR/DEIS does not address the possibility that dredging in Biscayne Bay may modify the groundwater hydrology. For example, if the proposed changes significantly impede groundwater flow from the Biscayne Aquifer, freshwater could be drained off more quickly from the watershed resulting in increased

Comment 5 Response

The present project should not influence the amount of freshwater being discharged to the Bay. The primary focus of CERP Projects and concern is not solely to increase the amount of freshwater entering Biscayne Bay but to try and provide desired flows in a more natural and less dramatic spike as presently occurring. Getting the freshwater distribution, timing, quantity, and quality "right" is the primary need and desire for a healthy Biscayne Bay. As indicated by the presented modeling results, the planned channel deepening is predicted to only have overall subtle influences on current and salinity characteristics and conditions. The deepening project may actually be complementary to these other projects and the overall CERP goals since the high flow discharge periods in general have the most negative impacts on Biscayne Bay. Presented results indicate that the deepened channel condition has its largest influence (greatest existing condition to deepened channel condition differences) during the high discharge events allowing the undesirable high flows to more quickly exit to the ocean thereby reducing the overall negative aspects associated with these high flow events. The fact that Miami River water quality is degraded, and even more degraded during these high flow events, provides additional important benefit to the overall quality of Biscayne Bay. As indicated in the time history salinity plots, the differences between the existing condition and the deepened condition quickly adjusts back to typical conditions following the high freshet period of the hydrograph.

Comment 6 Response

The USACE does not concur that Biscayne Bay can be characterized strictly as an estuary in the classic sense but more as a tidal lagoon. The South Florida Water Management District (SFWMD) classification system places Biscayne Bay under the "lagoons and bays" category and correctly refers to Biscayne Bay as a "marine ecosystem" (see 1995 SWIM plan). Likewise, the Florida Department of Environmental Protection (FDEP) describes Biscayne Bay as a "shallow subtropical lagoon" (Biscayne Bay Aquatic Preserve information page, FDEP web site, www.dep.state.fl.us). While the USACE agrees that the bay certainly has some estuarine characteristics, especially in areas most influenced by freshwater input, it is clear that the prevailing nature of the bay, including the project area, is marine. Impacts to marine species listed in SFWMD Comment #4 have been analyzed and stated in the DEIS as follows:

- Blue-striped grunt, sailor's choice (Snapper-Grouper Complex): See Section 4.8, pp. 69-71 and Appendix F, EFH Assessment.
- Turtle grass, manatee grass, shoal grass and paddle grass: See Section 4.4, pp. 59-62.
- West Indian manatee: See Section 4.9.2.1, pp. 72-73 and Appendix H, Endangered Species Act Coordination Documents.

While the USACE agrees that freshwater inflow to the bay is important, and may be expanded in the future closer to historic levels based on studies being conducted by the SFWMD and others, the current conditions have been appropriately characterized and impacts to the major species involved have been addressed.

3. Compatibility With Other Projects

Many of the other projects proposed within Biscayne Bay are aimed at maintaining or increasing the current freshwater inflow to the Bay with the possibility of maintaining or reducing the salinity levels. These efforts include the Comprehensive Everglades Restoration Plan Biscayne Bay Coastal Wetlands Project, defining the Biscayne Bay Minimum Flows and Levels, and defining the beneficial surface water freshwater flows into Biscayne Bay (an existing legal user) for Water Reservations. None of these efforts were addressed in the GRR/DEIS. Since this project may increase tidal flushing with ocean waters (and possibly increase salinity levels), this project appears to be conflict with these other efforts. Again, the modeling recommended in Comment No. 1 above should address this issue.

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The majority of the species listed within the report are marine species. However, Biscayne Bay is an estuary and it is recommended that the affect of this project on estuarine species also be examined in more detail. For example, in the three efforts mentioned in Comment No. 3, the species that are currently being utilized in the area of the Harbor and the discharge of the Miami River are blue crab, mullet, blue striped grunt, sailors choice, stone crab, turtle grass, manatee grass, shoal grass, paddle grass, and manatee.

5. Salinity Levels

{As previously mentioned in Comment No. 1, the salinity study results indicate an increase in salinity in northern Biscayne Bay for both the average and high flow hydrographs. Even if this salinity study and the recommended additional modeling mentioned in Comment No. 1 only indicate a 1 or 2 parts per thousand (ppt) increase in salinity, this cannot be automatically assumed as insignificant due to the low value. The results need to be compared to the current salinity levels in the effected areas of the Bay, some of which are already quite high (30 ppt or higher). An increase of 1 or 2 ppt could change an area from estuarine to marine and therefore diminish the variability of species for that area.} 7

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Comment 7 Response

As indicated in the report (see especially Figure 25, residual salinity differences during the average flow condition and Figure 28, residual salinity differences during the high flow hydrograph), generally subtle salinity changes are identified, centered on the navigation channel between areas just south of Fisherman's Channel and just north of Venetian Causeway. The modeling results for maximum residual salinity values for the average flow hydrograph condition indicate a rather subtle salinity increase for the plan condition in the main ship channel north of Lummus/Dodge Island to just north and west of Venetian Causeway (see Figures 23 and 24, respectively, for existing and plan conditions,) as illustrated by the small extension of the 32-34 ppt salinity values, (as indicated in Figure 25, increases on the order of 0.3 to 0.4 ppt, which are generally close to field and model salinity confidence limits). This change is balanced by an opposite trend of reduced salinity intrusion for the plan condition south of Lummus/Dodge Island, as illustrated by the reduced extent of the 34-36 ppt salinity values (greatest decreases generally less than 0.5 ppt, and these changes are rather localized along the Port and slightly to the southwest). A small localized are of reduced freshwater (increased salinity) is identified in Figure 25, between the mainland and Dodge Island, just north of the Miami River. A general similar trend as above is provided for the high flow hydrograph results (see Figures 26, 27 and 28), although the extent and magnitude of changes are somewhat more pronounced but generally still close to field and model confidence limits. Largest differences are still generally less than 0.5 ppt, or about a maximum two to three percent change (i.e., 0.5 ppt change in 30 to 36 ppt salinity conditions) between the model-predicted existing and planned salinity conditions.

The USACE does not agree that the projected change in salinity would result in a transition of the Biscayne Bay ecosystem from estuarine to marine. Biscayne Bay can currently be characterized primarily as a marine system. Section 4.1.3 (page 57) of the DEIS reports that subtle increases in salinity between current conditions and Alternative 2 conditions may occur. These increases were close to detection limits with a *maximum* increase of 1 ppt noted only in localized areas mainly in the western portions of the project. The USACE does not agree that changes on this scale will result in a diminishment of species variability since the system is already primarily a marine system subject to variations in salinity with the existing species assemblage adapted accordingly. The Miami Harbor project will not change the system. The USACE does agree that Biscayne Bay is a complex ecosystem and, as pointed out by SFWMD, numerous study efforts are planned or underway to understand the bay's historic hydrography. Restoration of significant freshwater flows to the bay may occur as a result of these studies and are likely to result in significant changes in salinity. However, the USACE feels it is appropriate to plan harbor improvements on known conditions today. Anticipated channel conditions at the completion of the Miami Harbor GRR project should be incorporated into the context of the larger bay-wide studies for purposes of planning future changes in freshwater input to the bay. The USACE stands ready to cooperate in supplying any information it can towards these efforts.

Comment 8 Response

The effects of dredging an additional six feet would likely have little if any impact to the ground water flow from the Biscayne Aquifer. This is particularly due to the fact that the Biscayne Aquifer is heavily solutioned, porous, and highly permeable (~1,500m/d or 4900 ft/d horizontal hydraulic conductivities) near the coast. For example, the character of materials from boring CB-MH01-10 located at the entrance of Fisher Island suggest the material as highly weathered, pitted, badly broken (suggesting cavernous or solutioned) intermixed with poorly graded sands to a depth of 56.5 feet. Dredging an additional six more feet within the above type material should have no impact on the hydrology or chloride intrusion that all ready exist within the coast. Few studies have attempted to quantify the rates and flow patterns of ground water discharge to the Biscayne Bay. One study however, "Simulation of Ground Water Discharge to Biscayne Bay, Southeastern, Florida" (Langevin, 2000) has suggested that approximately 12.5 % of the ground water was actually recirculated seawater entering Biscayne Bay. If that is the case, then ground water flow to Biscayne Bay is affected by water-table elevation and the stage in the bay. Hydrodynamic circulation patterns under development by the USACE staff may provide additional insight to velocity and salinity assessment of both surface and ground water. It may also address changes of flux between surface water and ground water through the effects of dredging. The model developed by USGS simulates ground water discharge, surface water and groundwater interaction, and ground water chemistry to Biscayne Bay. The results of this model are documented within the report entitled, "Simulations of ground water discharge to Biscayne Bay, Southeastern, Florida", (Langevin, 2001).

saltwater intrusion. No discussion or analysis of hydrology is provided in the GRR/DEIS. 8

7. Pollutants

There is a concern that polluted sediments may be transferred to other parts of the Bay or reef tract resulting in contamination of cleaner areas. For example, 6% of the sediment samples analyzed around the port exhibited toxicity, while the mitigation plan calls for filling a hole in northern Biscayne Bay with dredged sediments or dumping them at an offshore site. Toxic and fine sediments should be handled differently to minimize re-suspension and contamination of other parts of the environment.

8. Use of Removed Fill

The proposed project will impact seagrass and hard bottom ecosystems. The fill, when at all possible and beneficial, should go towards environmental restoration, such as filling the dredged hole in the Bay. The use of the sand for beach renourishment, levee construction and the establishment of artificial reefs, depending on the construction (such as to attract game fish for fishermen) are more of an economic use than an environmental one. Also, upland fill disposal that sits for any length of time quickly becomes infested with Casuarina equisetifolia, Shinus terebinthifolius and Colubrina asiatica. These upland disposal sites should have regular maintenance to assure they are not contributing to an exotic invasion problem. For instance, there is currently another project sponsored by the U.S. Army Corps of Engineers in the same area, the Virginia Key Section 1135 Ecosystem Restoration Project. Part of this project is to restore native habitat impacted by disposal of dredged material from past navigation projects at the Harbor by clearing exotic invasive species.

9. Mitigation

Staff is concerned that the proposed mitigation ratios are too low. For example, the purpose of the proposed seagrass mitigation is to replace the lost habitat (6.3 acres) at a one-to-one ratio. An argument is presented that the seagrass restoration involves little uncertainty and, therefore, a one-to-one ratio is justified. However, some uncertainty, if not considerable uncertainty, would exist when restoring this seagrass habitat. The conclusion does not take into account lost productivity between the time the habitat is lost and the time that replacement habitat is fully functional. In addition, the proposed mitigation site is significantly different in salinity than the impacted areas. It is not certain, for the same area, that the new habitat will be as productive as the original habitat. Also, there is

Comment 8 Response Continued

The model grid encapsulates the proposed dredge area as shown in Figure 1. However, this document, along with many others, does not reference the regional extent of the easternmost boundary of the Biscayne Aquifer as it relates to the coastline of Miami-Dade County. In other words, data is extremely limited that suggest the boundary thickness and regional coverage of the Biscayne Aquifer off the eastern shore. Nevertheless, many published reports such as "Delineation and Extent of Saltwater Intrusion in the Biscayne Aquifer, Eastern Dade County, Florida", (Sonenshein, 1995) and "Simulations of the Water-Table Altitude in the Biscayne Aquifer, Southern Dade County, Florida"(Merritt, 1996), show the delineation extent of salt-water encroachment and water level altitude of the Biscayne Aquifer. Both these reports provide information that places the salt-water wedge approximately 10-miles within the coastal regions of the Miami canal. It also places an altitude elevation of the ground water at approximately 1 to 2-feet above sea level. Again, dredging a few more feet would have little impact to the chloride concentration since the isochlor line is well within the interior portion of the Miami Canal.

Model

The model results indicate approximate horizontal hydraulic conductivities of about 1,000 ft/d or more with an average of 2.2 x 10^5 m3/d of ground water discharging to Biscayne Bay. A total salt mass in the aquifer of approximately 3.20 x 10^{11} kilograms. During dry periods ground water discharge may exceed surface water discharge to Biscayne Bay. The USGS model results suggest that ground-water discharge is probably between 3 to 10 % of the total discharge from the coastal canals.

Hydrostratigraphy

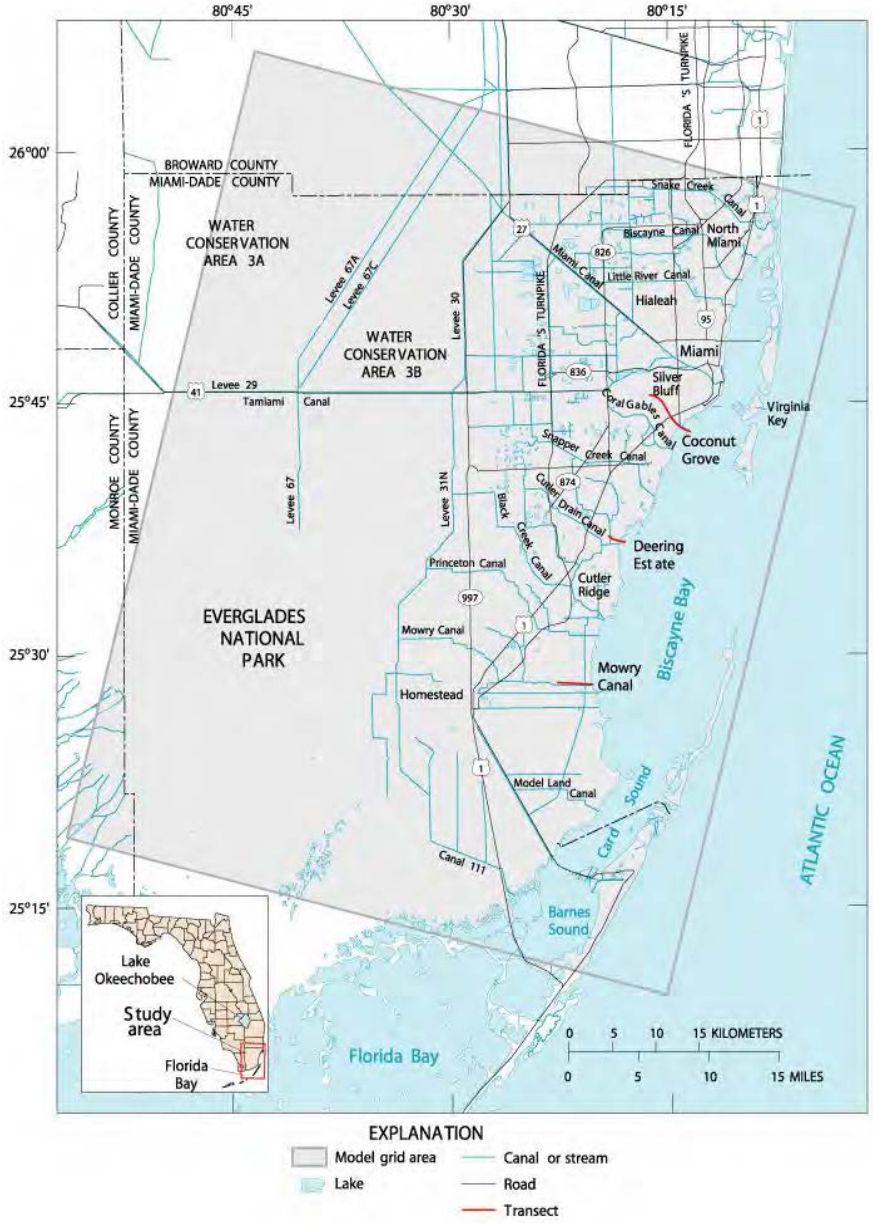
The hydrostratigraphy of southeastern Florida is characterized by the shallow aquifer system. The work of Parker and others (1955) suggest that the ground water discharging to Biscayne Bay originates from the Biscayne Aquifer, which is part of the surficial aquifer system. It is approximately 100 feet thick at the coastline and is comprised of Pamlico Sand, Miami Oolite (limestone), Anastasia Formation, Key Largo Limestone, and Ft. Thompson Formation all of Pleistocene age and contiguous highly permeable beds of the Tamiami Formation of Pliocene age, where at least 10 feet of the section is highly permeable with horizontal hydraulic conductivities of about 1,000 ft/d or more.

Salt Water Encroachment

The SEAWAT model constructed by USGS, (Langevin,2001) estimates 12.5 % of the ground water was actually recirculated seawater entering Biscayne Bay. All ground water discharge occurred within 130m off the shore. The majority of canals in the Miami area are connected with Biscayne Bay; salty water can move inland easily, the distance is depending upon the amount of fresh-water runoff and the condition of the canals. During periods of moderate to heavy runoff the salty water is usually within 1 or 2 miles of the bay. During dry periods, however, salty water has moved inland more than 10 miles within the Miami Canal.

Samples from the Miami Canal were collected periodically by the USGS and DERM both surface and bottom samples were collected. Usually bottom samples contain the maximum amount of chlorides. The density of seawater is 2.5% higher than the density of freshwater. When the freshwater flows toward the coast, it meets saline ground water that originated from the ocean, and the density differences affect the ground water flow paths.

Figure 1 Model Grid Area (Langevin, 2001)



saltwater intrusion. No discussion or analysis of hydrology is provided in the GRR/DEIS.

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8. Use of Removed Fill

The proposed project will impact seagrass and hard bottom ecosystems. {The fill, when at all possible and beneficial, should go towards environmental restoration, such as filling the dredged hole in the Bay.} {The use of the sand for beach renourishment, levee construction and the establishment of artificial reefs, depending on the construction (such as to attract game fish for fishermen) are more of an economic use than an environmental one.} Also, upland fill disposal that sits for any length of time quickly becomes infested with Casuarina equisetifolia, Shinus terebinthifolius and Colubrina asiatica. These upland disposal sites should have regular maintenance to assure they are not contributing to an exotic invasion problem. For instance, there is currently another project sponsored by the U.S. Army Corps of Engineers in the same area, the Virginia Key Section 1135 Ecosystem Restoration Project. Part of this project is to restore native habitat impacted by disposal of dredged material from past navigation projects at the Harbor by clearing exotic invasive species. 10 11

9. Mitigation

Staff is concerned that the proposed mitigation ratios are too low. For example, the purpose of the proposed seagrass mitigation is to replace the lost habitat (6.3 acres) at a one-to-one ratio. An argument is presented that the seagrass restoration involves little uncertainty and, therefore, a one-to-one ratio is justified. However, some uncertainty, if not considerable uncertainty, would exist when restoring this seagrass habitat. The conclusion does not take into account lost productivity between the time the habitat is lost and the time that replacement habitat is fully functional. In addition, the proposed mitigation site is significantly different in salinity than the impacted areas. It is not certain, for the same area, that the new habitat will be as productive as the original habitat. Also, there is

Comment 9 Response

Polluted sediments have not been identified in channels at the Port of Miami. Extensive sediment analysis conducted by the USACE and reviewed by the EPA over the last decade has consistently found that sediments at the Port of Miami are not contaminated (see Section 3.14 of the EIS). The elevated toxicity levels in approximately 6% of relevant sediments sampled in one study conducted by NOAA are also addressed in Section 3.14; the elevated toxicity identified in the NOAA study is a relative measurement against a reference sample, and does not demonstrate any environmentally significant contamination. The relative measurements of the one study should be considered in light of the four sampling events in Port channels over ten years conducted by the USACE and Port, in which the sediments were found consistently to be acceptable.

The USACE's past testing of materials has been oriented towards ocean disposal of material at the approved ODMDS site. The GRR also considers disposal of material for mitigation construction purposes (both in Biscayne Bay and outside of the Bay within artificial reef sites), and at approved upland disposal sites, including possible disposal on the north tip of Virginia Key. Of these possible disposal locations, it appears that the most stringent criteria would apply to ocean disposal. A cursory review of analytic results from the most recent ODMDS-oriented testing event in Fisherman's Channel indicated that unconsolidated materials appeared to meet state standards (Chapter 62.777, Florida Administrative Code) for upland fill, with one exception (a slightly elevated arsenic reading common in Florida soils and sediment testing indicative of naturally occurring background levels). While this analysis is far from conclusive (test locations were limited due to the lack of loose sediments in most locations, indicating the predominance of rock bottom in the channel; and, more extensive analysis would be required to address the arsenic finding), it confirms that sediments likely to occur near the Port in the future are likely to be of adequate quality for a variety of uses.

Prior to project construction the USACE will conduct further sampling and analysis of sediments and determine their suitability for disposal for each described purpose. While the USACE does not attempt to foresee the results of that future testing, all indications are that future sediments will continue to be the same quality as those found in the last decade. Further, it is worthwhile to note that unconsolidated sediments are expected to represent less than 2% of the total dredged material generated by the project; the remaining 98% will be virgin rock.

Comment 10 Response

The USACE concurs with this comment and plans to use material dredged from the Port project to fill a 60+ year old dredge hole in North Biscayne Bay.

Comment 11 Response

The USACE concurs with this comment. NEPA is not limited to environmental issues. It requires the review of all factors involved with the project.

saltwater intrusion. No discussion or analysis of hydrology is provided in the GRR/DEIS.

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There is a concern that polluted sediments may be transferred to other parts of the Bay or reef tract resulting in contamination of cleaner areas. For example, 6% of the sediment samples analyzed around the port exhibited toxicity, while the mitigation plan calls for filling a hole in northern Biscayne Bay with dredged sediments or dumping them at an offshore site. Toxic and fine sediments should be handled differently to minimize re-suspension and contamination of other parts of the environment.

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Comment 12 Response

The USACE generally agrees that new upland disposal sites in general should be planned and maintained in such a manner as not to contribute to invasive exotic vegetation problems. The USACE does not concur with the suggested vegetative maintenance of the Virginia Key Disposal site for the following reasons. First, the fill disposal site is adjacent to large stands of existing exotic vegetation on Virginia Key. This vegetation provides a constant seed source for spread of exotics and in fact is likely the seed source for exotic growth, which has occurred on the fill disposal site since its last use. Any attempt to control exotic vegetation on the fill disposal site when it is not in use is expected to be extremely difficult given the abundance of seed sources in the surrounding areas. Second, any future use of the site by the USACE will require reconstruction of berms, grading and pipe replacement. This work is expected to result in the removal of vegetation, including exotic vegetation, which has grown on the existing facility since its last use. Once in use, the material within the site will be in flux, providing unstable conditions for revegetation. Third, the site is owned by the City of Miami, and used for spoil disposal at the City's pleasure. The overall maintenance of the site is not with the USACE's or the Port's purview.

Comment 13 Response

The USACE revised the mitigation plan and will provide approximately 24 acres of seagrass restoration in the east central hole of the Julia Tuttle hose as described in Appendix J of the FEIS. For hardbottom/reef impacts – the determination of necessary mitigation was conducted using a Habitat Equivalency Analysis at the request of the National Marine Fisheries Service and the US Fish and Wildlife Service. The HEA is used by NOAA in determining the necessary amount of mitigation for ship groundings and other impacts to resources within the Florida Keys National Marine Sanctuary and has withstood two challenges in Federal court. The USACE, NMFS and FWS have agreed that the mitigation ratios developed through the HEA process are appropriate for this project.

Comment 14 Response

The USACE does not concur with SFWMD's assessment of "considerable uncertainty" regarding the likelihood of success of the proposed seagrass restoration project. While there is some inherent risk associated with any restoration project, seagrass restoration properly planned and executed at an appropriate site can have an excellent chance of success. In order to minimize risk the USACE has applied the site selection criteria contained in Fonseca et al. 1998, as suggested by the National Marine Fisheries Service (NMFS) in selecting this site (see NOAA-4 response). The USACE does agree that a temporal lag factor would occur and proposes to compensate for this factor by providing approximately 24 acres of seagrass restoration as mitigation rather than the previously proposed 6.3 acres.

Comment 15 Response

The USACE finds no basis for the statement that salinity is significantly different between the seagrass impact site and the seagrass mitigation site. On a July 8, 2003 visit to the two sites, for example, the USACE recorded surface salinities of 27 parts per thousand (ppt) at the mitigation site (slack tide) and 26 ppt at the impact site (incoming tide). More importantly, both the impact site and the mitigation site are occupied by healthy climax marine seagrass communities, indicating that the salinities appropriate for development of these communities are constantly present. There is no reason to believe that the restored mitigation site will not reach the same productivity level as the surrounding climax community.

Ms. Lauren Milligan
April 24, 2003
Page 5

considerable uncertainty in the time frame that it will take for the seagrass to fully re-establish. {Staff recommends that the ratios be increased.} 16

If you have any questions concerning the above or if I can be of further assistance, please do not hesitate to contact me at (561) 682-6862.

Sincerely,

James J. Golden, AICP
Senior Planner
Environmental Resource Regulation

/jg

c: James C. Duck, USACOE

Comment 16 Response

The USACE revised the mitigation plan and will provide approximately 24 acres of seagrass restoration in the east central hole of the Julia Tuttle hose as described in Appendix J of the FEIS. For hardbottom/reef impacts – the determination of necessary mitigation was conducted using a Habitat Equivalency Analysis at the request of the National Marine Fisheries Service and the US Fish and Wildlife Service. The HEA is used by NOAA in determining the necessary amount of mitigation for ship groundings and other impacts to resources within the Florida Keys National Marine Sanctuary and has withstood two challenges in Federal court. The USACE, NMFS and FWS have agreed that the mitigation ratios developed through the HEA process are appropriate for this project.

South
Florida
Regional
Planning
Council

April 15, 2003

Ms. Lauren Milligan
Florida State Clearinghouse
Department of Community Affairs
2555 Shumard Oak Boulevard
Tallahassee, FL 32399-2100

RE: SFRPC #03-0335; SAI #FL200303191299C – Request for comments on the Draft General Reevaluation Report (GRR) and Environmental Impact Statement (EIS) on the Navigation Study for Miami Harbor (Port of Miami), U.S. Army Corps of Engineers, Miami-Dade County.

Dear Ms. Milligan:

We have reviewed the permit application referenced above and have the following comments:

- The project should be consistent with the goals and policies of the comprehensive plans for Miami-Dade County and the City of Miami and their corresponding land development regulations. It is important for the applicant to coordinate permits with all governments of jurisdiction. 1

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

- The project is located in Biscayne Bay, in waters of the West Indian manatee, and includes multiple estuarine and marine habitats designated as natural resources of regional significance in the *Strategic Regional Policy Plan for South Florida (SRPP)*. The goals and policies of the *SRPP*, in particular those indicated below, should be observed when making decisions regarding this project. 3

Strategic Regional Goal

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

[illegible]
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Comment 1 Response

The USACE concurs with this determination and will coordinate with both Miami-Dade County and the City of Miami and comments on the DEIS and GRR were received from Miami-Dade Planning Division.

Comment 2 Response

The USACE concurs with this comment

Comment 3 Response

The goals and policies of the SRPP will be observed when making decisions regarding the project to the best of the USACE ability.

Regional Policies

3.8.1 Enhance and preserve natural shoreline characteristics through requirements resulting from the review of proposed projects and in the implementation of ICE, including but not limited to, mangroves, beaches and dunes through prohibition of structural shoreline stabilization methods except to protect existing navigation channels, maintain reasonable riparian access, or allow an activity in the public interest as determined by applicable state and federal permitting criteria.

3.8.2 Enhance and preserve benthic communities, including but not limited to seagrass and shellfish beds, and coral habitats, by allowing only that dredge and fill activity, artificial shading of habitat areas, or destruction from boats that is the least amount practicable, and by encouraging permanent mooring facilities. Dredge and fill activities may occur on submerged lands in the Florida Keys only as permitted by the Monroe County Land Development Regulations. It must be demonstrated pursuant to the review of the proposed project features that the activities included in the proposed project do not cause permanent, adverse natural system impacts.

3.8.3 As a result of proposed project reviews, include conditions that result in a project that enhances and preserves marine and estuarine water quality by

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

3.8.4 Enhance and preserve commercial and sports fisheries through monitoring, research, best management practices for fish harvesting and protection of nursery habitat and include the resulting information in educational programs throughout the region. Identified nursery habitat shall be protected through the inclusion of suitable habitat protective features including, but not limited to:

a) avoidance of project impacts within habitat area;
b) replacement of habitat area impacted by proposed project; or
c) improvement of remaining habitat area within remainder of proposed project area.

3.8.5 Enhance and preserve habitat for endangered and threatened marine species by the preservation of identified endangered species habitat and populations. For threatened species or species of critical concern, on-site preservation will be required unless it is demonstrated that off-site mitigation will not adversely impact the viability or number of individuals of the species.

- {The project, as proposed, is generally consistent with the following goals and policies of the *Strategic Regional Policy Plan for South Florida*} 4

Strategic Regional Goal

4.1 Achieve a competitive and diversified regional economy, including lower unemployment rate and higher per capita income than the state and national average for Dade, Broward and

Comment 4 Response

The USACE acknowledges the consistency determination

Monroe Counties through the achievement of cutting edge human resources, economic development infrastructure and other resources to ensure a sustainable regional community.

Regional Policies

4.1.13 Ensure that the conditions of transportation affecting trade opportunities in the region with respect to land, air, ground and shipping are addressed.

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

Sincerely,

Allyn L. Childress, AICP
Senior Planner

ALC/th

cc: Col. James C. Duck, Department of the Army
Ana Gelabert-Sanchez, Director, Planning Department, City of Miami
Jean Evey, Miami-Dade County DERM

MIAMI-DADE COUNTY, FLORIDA

MIAMI-DADE

DEPARTMENT OF PLANNING AND ZONING

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May 12, 2003

James C. Duck, Chief
Planning Division
Department of the Army
Jacksonville District Corp of Engineers
P.O. Box 4970
Jacksonville, FL 32232-0019

Subject: Comments for the Draft -Navigation Study for Miami Harbor
General Reevaluation Report and Environmental Impact Statement
Miami-Dade County, Florida 010140

Dear Mr. Duck:

The Draft -Navigation Study for Miami Harbor, General Reevaluation Report and Environmental Impact Statement, Miami-Dade County, Florida 010140 (Draft Report), was prepared to evaluate the economic and environmental feasibility of the deepening and widening of the navigational channels leading into and surrounding the Miami Harbor. These improvements were requested to enhance the operational efficiency and safety of deep draft commercial vessels. A review of the report was performed by the Miami-Dade Department of Planning and Zoning for consistency with the goals, objectives and policies of the County's Comprehensive Development Master Plan (CDMP). Based on this review, the following comments are given:

1. {The expansion of the navigational channels proposed in the Draft Report will reportedly enhance the operational efficiency of cargo loading. This expansion was contemplated by the 1999 Port of Miami Master Plan, as reflected in the CDMP through the capital improvements listed as "Near Term/Long Term, and is therefore consistent with the CDMP. Additionally, the CDMP in Policy 9I of the Port of Miami Master Plan Sub-element states that the "port shall support the review of future channel and navigational improvements through the United States Army Corps of Engineers Miami Federal Harbor Project General Reevaluation Report and other appropriate means." Therefore support of this report is the direction authorized by the Board of County Commission for the POM.} 1

2. {Projections given in the Draft Report are consistent with those reported in the Port of Miami Master Plan Sub Element of the Transportation Element found in the CDMP.} 2
These projections, forming the basis of growth for the Port of Miami (POM) indicate a

Comment 1 Response

None Needed

Comment 2 Response

The USACE acknowledges the consistency determination

historic growth rate of approximately 4.5%. The POM has completed cargo related infrastructure improvements such as a new banana cargo yard, a cargo container Berth 5, new container lot for Seaboard Marine, and acquisition of three rubber tire gantries to maximize container stacking. Additional efficiency improvements are generally identified in the sub-element and implemented in through the CDMP Capital Improvement Element. Improvements identified in the CDMP support increased growth at the POM and are in compliance with the Sub-element's goal of economic growth at the Port.

3. The CDMP states that the "port shall represent the county's maritime community in enhancement of navigation, safety and commerce. According to the Draft Report, there have been 28 incidences of groundings, collisions, or allision (contact between a moving vessel and a stationary object) between 1995 and 2001. Of these, {nine incidences involved groundings. Reduction in the number of incidents, improved turning radius of the turning basins} and the increased efficiency in cargo handling, as anticipated by this project is consistent with this and many other objectives of the POM Sub-Element. 3

4. The increase in transportation concerns caused by an increase in activity at the POM has been addressed by the Port through their participation in several transportation projects, that will mitigate traffic and transportation concerns at the Port. The Port is involved with the Downtown Transportation Master Plan, which will help improve truck access to and from the Port to I-95. Additionally, a $353 million project designed to diverting port traffic from the downtown area via a tunnel connecting the MacArthur Causeway to Port Boulevard is planned for completion prior to 2020. The Southeast Florida Port Regional Inter-modal Program Study was completed by FDOT and will aid in improving efficiency in cargo and passenger transit. Due to the many transportation programs planned for the POM {the projected increase in transportation does not reflect an inconsistency with the CDMP} 4

5. {Support infrastructure has been upgraded by the Port in accordance} with Objective 10 of the Port of Miami Master Plan Sub Element of the Transportation Element found on page II-70. 5

6. As stated through Policy 4B of the Port of Miami Master Plan Sub Element of the Transportation Element found on page II-66, "…The capital projects proposed in this plan element constitute the development program to be undertaken by the port, with full acknowledgement that each project may proceed only after required environmental and community evaluations are conducted, regulatory and CDMP conformity are determined, and regulatory approvals are obtained." {The Department of Environmental Resources Management (DERM) comments relative to this dredging project were not available as of the writing of these comments and therefore the environmental consistency with the CDMP could not be addressed.} 6

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Comment 3 Response

The USACE concurs with this comment

Comment 4 Response

The USACE acknowledges the consistency determination

Comment 5 Response

The USACE acknowledges the consistency determination

Comment 6 Response

The USACE received comments from DERM under separate cover.

Mr. James C. Duck
May 12, 2003
Page 3

In conclusion, the Miami-Dade County Department of Planning and Zoning finds the Draft Report to be generally consistent with the CDMP. However, no review comments from DERM were received and therefore consistency of the Draft Report with the CDMP environmental policies was not evaluated as part of this review. 7

For additional information please contact Mr. Mark Woemer or Ms. Paula Church of the Metropolitan Planning Section at 305-375-2835.

Sincerely,

Diane O'Quinn Williams
Director

cc: Charles A. Towsley, P.P.M.
John Renfrow, Director, DERM

DOQW:CLR:MW/phc

PHC

Comment 7 Response

The USACE acknowledges the consistency determination.

MIAMI-DADE COUNTY, FLORIDA

MIAMI-DADE

DERM

ENVIRONMENTAL RESOURCES MANAGEMENT
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33 S.W. 2nd AVENUE
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(305) 372-6754 (305) 372-6759 FAX

May 9, 2003

Mr. James Duck
Planning Division, Environmental Branch
U.S. Army Corps of Engineers
Jacksonville District
P.O. Box 4970
Jacksonville, FL 32232

Re: Miami Harbor GRR/DEIS

Dear Mr. Duck:

The Miami-Dade County Department of Environmental Resources Management (DERM) has reviewed the above referenced documents dated March 14, 2003. The following comments address the recommended NED and locally preferred plans which include proposals to widen and deepen the entrance channel near the sea buoy, widen and deepen the Fisher Island Turning Basin, and widen and deepen Fisherman's Channel, among other modifications.

Modeling of the Proposed Miami Harbor Modifications

DERM agrees that the TABS-MDS model is a helpful tool; however, we have serious reservations concerning limitations of the TABS-MDS model for detailed evaluation of the proposed Miami Harbor deepening project unless additional efforts are made to refine its resolution, calibration and verification. Refinements should address the following issues: 1

- The first phase of model development was intended to produce a hydrodynamic model for Biscayne Bay that would reproduce general conditions. Data collection to calibrate and validate the model was limited by funding availability and was therefore focused on locations that would give a representative picture of conditions in the bay as a whole and on a larger scale, rather than specific locations within the bay. Conducting a focused study on a specific location in the bay falls outside the goals and objectives of this phase of model development; thus any results from such a scenario should be viewed with extreme caution, since there are insufficient data to support or refute the results.

- Although the hydrodynamic model is capable of modeling in 3-dimensional mode, it must be run in 2-D vertically averaged mode for scenarios because data to support 3-D modeling were never collected and are not available. The complex bathymetry of the harbor area, with deep

Comment 1 Response

1. [The first phase of model development was intended …] A reduced level of uncertainty could be obtained by greatly increasing the field data collection effort within and immediately adjacent to the Miami Harbor Channel. Minimally, this would include acquiring surface and bottom salinity data and two or three bottom mounted ADCP velocity gages in the immediate study area. The existing global Biscayne Bay TABS-MDS model was used to make preliminary hydrodynamic and salinity modeling assessments in the present GRR effort. This existing model was developed to produce a vertically averaged 2-dimensional (2-D) hydrodynamic model tool for Biscayne Bay that would reproduce general depth-averaged hydrodynamic conditions. Data collection to calibrate/validate the 2-D model was limited by funding availability and focused on locations that would give a representative picture of conditions in the bay as a whole and on a larger scale, rather than concentrate on specific locations within the bay. A more detailed effort concentrating on the Miami Harbor area can be undertaken to provide a reduced level of uncertainty related to model prediction capability. In general, the more data available for model validation, the greater the level of confidence (i.e., a lower the level of uncertainty) associated with model predictions.

2. [Although the hydrodynamic model is capable of modeling …] The existing model can be run in a fully 3-D mode, however, due to the limited amount of field data that could be used to undertake more rigorous vertical 3-D model validation and assessment along with funding limitations, a management decision was made to run the model in the validated 2-D depth-averaged mode. The likelihood of complex vertical hydrodynamic and salinity

3. [The area around Government Cut is highly dissected ...] It is unlikely that the proposed channel deepening would have any additional negative impacts related to more extreme weather conditions. The study findings indicate that in the Miami Harbor Channel area, the deepened channels actually would increase the transport pathway and hydrodynamic efficiency during storm-induced flooding conditions to exit the Biscayne Bay system at a faster rate, thereby reducing weather extreme concerns. In any case, a storm event represents a period in which there is a high degree of flushing in the system, and hence salinities should be relatively low.

4. [The bathymetry used to represent the bay under …] Comparisons between the verified model conditions and the modified to pre-project conditions were examined in the model study and the resulting differences in model predictions was found to be generally insignificant.

5. [The scenarios presented average results….] As indicated above, the hydrodynamic model findings suggest that improved circulation and transport out of Biscayne Bay

The original 2-D study evaluated the plan conditions over a spring-neap cycle, with both average Miami River flows, and a simulated storm hydrograph. Hence, both spring tide and high discharge conditions were evaluated; i.e. the results of the study did not represent only "average results". We concur that a broader range of testing conditions would be beneficial, especially with respect to the wind direction and magnitude. However, it is important to recognize that the real value in this or any model study lies in observing differences between the base and plan condition. By focusing on the differences, we effectively eliminate the boundary condition uncertainties that are so crucial to account for during the verification process. Hence, when determining what types of events need to be examined, we should not be concerned with the entire spectrum of potential boundary forcings, but rather only on those boundary forcings for which the differences between the base and plan condition can be expected to be altered.

See Previous page for response to comment 1

ship channels and shallow surrounding bottom, should be modeled with 3-D because of the real likelihood of countercurrents along the bottom of the channels, especially with strong surface currents during ebb and flood tides that are known to exist in this area. In addition, outflows from the Miami River cause stratification around the mouth of the river, with resulting complex circulation patterns for the freshwater discharges from the river. Two-dimensional modeling will not adequately represent the fate of freshwater in a stratified system because the model mixes water along a vertical front when in actuality the freshwater flows on top of the more dense saline water and spreads out horizontally. 1 cont

- The area around Government Cut is highly dissected with deep dredged ship channels. Although velocity data used to calibrate the model were collected for the two main channels in Government Cut and many of the surrounding major channels, the period was short (two daytime periods, one in October 1997 and one in February 1998) and conducted only under ideal weather conditions. This provides only a limited view of how currents are moving in and out of the channels in this area. More detailed studies over a longer period that includes some weather extremes should be conducted in order to support more accurate modeling in this area.

- The bathymetry used to represent the bay under calibration conditions was not the same as the bathymetry being used to run the scenarios.

The scenarios presented average results. Problems resulting from modification to the ship channels are most likely to arise during more extreme events, e.g. during the strong currents of a spring tide, during a high discharge event from the Miami River, or during frontal passage when strong and rapidly changing winds may alter or even reverse local currents. Navigational safety concerns will be more pronounced during such times, as will potential changes including (but not limited to) discharges and/or other salinity impacts that could prove harmful to benthic communities. Such events deserve careful and prolonged examination in the EIS to assess the degree to which adverse effects would occur as a result of the proposed harbor modification.

Inshore Seagrass Impact

The vertical cut assumption used to estimate the amount of seagrass impacts caused by expansion of Fisherman's channel 100 feet to the south (as well as other proposed cuts) is unlikely and also is not supported by past experience at Miami Harbor. The GRR/DEIS indicates that the channel slopes will be constructed as a vertical cut extending from approximately 50 feet in depth to a depth of about 12 feet (the so-called box cut). However, despite past efforts at Miami Harbor by dredging contractors to achieve a vertical box cut within the consolidated limestone, the resulting slopes at depth are typically (on average) no steeper than approximately 0.5:1 to 1:1 over the vertical extent of the consolidated limestone. Whether such slopes resulted from an inability of the rock to stand vertically or were caused by difficulties inherent in the construction of dredged vertical slopes at such depths is not relevant since the end result is the same. Attachment A illustrates a more typical slope that is likely to be achieved even with considerable effort on the contractor's part to make the channel edges

as vertical as possible. DERM believes that the projected slope shown in the Attachment A cross section is conservative in that it tends to underestimate seagrass impacts. This is because we believe the actual depths where the steeper slope will transition to the less steep 7:1 slopes will be greater in some areas than the Army Corps estimate of 12-16 feet. Based on this conservative slope estimate, the total amount of seagrass loss would be on the order of 11 acres, not the approximately 6 acres estimated in the GRR/DEIS. 2

Proposed Seagrass Mitigation

In kind seagrass mitigation ratios in the Biscayne Bay Aquatic Preserve typically range from 3:1 to 5:1 with higher ratios dependent on time lag (whether planting is initially performed), distance from impact site, likelihood of success, and habitat values provided. Out of kind ratios typically start at 5 or 6:1. The assumptions made in the GRR/DEIS to calculate the mitigation amount are overly optimistic and in some cases unrealistic. Furthermore we do not agree that the seagrass habitat that would be created north of Julia Tuttle Causeway would exceed the habitat values of the seagrasses south of Fisherman's Channel. As a measure of comparison, the 2.4 acre dredge hole that DERM filled with Miami Harbor dredge spoil and planted with seagrasses in 1994 not far from the proposed mitigation site still (after almost 10 years) does not provide the coverage or the habitat values that are provided by the seagrasses that would be destroyed by the proposed Fisherman's Channel widener. It should also be noted that seagrass coverage is currently estimated to be only 30% at the restoration project site. 3

In addition, even considering economics of scale, the cost estimates to perform the mitigation are not consistent with costs for numerous restoration and mitigation projects conducted by Miami-Dade County. As a measure of comparison, DERM's costs to fill in the aforementioned 2.4 acre dredge hole (not including seagrass planting) were $550,000. It should be noted that the DERM project was built without the use of capping material, due to the nature of the fill, construction methods, and budget. If the estimated costs ($162,000) for the sand cap are included (as is proposed in the GRR/DEIS), this type of seagrass mitigation cost DERM approximately $300,000 per acre using a lowest cost public bidding process. There are also significant costs associated with the need to use fill material (grain size, chemistry, etc.) and construction techniques that will achieve results consistent with OFW standards, aquatic preserve requirements, and protection of nearby resources. Depending on techniques for spoil conveyance and placement, it may be necessary to completely enclose the restoration site with temporary sheet pile in order to meet OFW water quality standards beyond approved mixing zones. Such techniques were permitted by the DEP and Army Corps and successfully employed in the construction of the cross bay force main to Virginia Key in the early 1990's. The same techniques were again used to construct the Virginia Key ocean outfall project in the late 1990's. 4

It is worth noting that the Miami-Dade County consultants that prepared the technical report cited in the GRR/DEIS (to support filling of dredge holes) have calculated that due to economies of scale, such seagrass mitigation could be performed for as little as $140,000 per acre in 1989 dollars. However, any economy of scale cost reductions for the mitigation proposed in the GRR/DEIS would be offset by the greater depths (and therefore greater volume of fill) that would be necessary in comparison with the DERM project. Cost estimates in the GRR/DEIS of $4000 to $7000 per acre are not supported by past experience using dredge spoil from Miami Harbor.

Comment 2 Response

The USACE concurs that the methodology for sideslope impacts should be reconsidered, and has updated the sideslope methodology used for environmental impact calculations in the FEIS (see Appendix G) and Engineering Appendix B to the main report (plates B-19 and B-21). Changes in methodology include modification of the vertical slope from 0H:0V to .5H:1V. Use of the revised methodology results in an increase of expected indirect impacts associated with sideslope equilibration, from 6.1 acres of indirect impacts to 7.7 acres of indirect impacts. The FEIS has been revised to reflect these new impact acreages.

Comment 3 Response

The USACE revised the mitigation plan and will provide approximately 24 acres of seagrass restoration in the east central hole of the Julia Tuttle hose as described in Appendix J of the FEIS.

Based on preliminary observations of the seagrass habitat adjacent to the mitigation site, the USACE anticipates that the restored seagrass bed will be of equal or greater functional capacity as compared to the bed being impacted. See FDEP4-5 response for additional detail.

Comment 4 Response

The USACE does not concur that the per acre cost to perform the seagrass mitigation "could be roughly 50 to 100 times greater than estimated in the GRR/DEIS." Even the most liberal comparison of DERM's estimated cost ($300,000/acre) to the costs given in the GRR/DEIS show a factor of just over three times difference between the two. Further, it is the USACE' understanding that the cost for the 2.4-acre hole filling project upon which the DERM estimate is based included double handling of dredge spoil used to fill the hole including trucking it to an offloading site. The current proposed project has already incorporated the cost of fill disposal that would otherwise have to be barged offshore to the ODMDS but instead will be disposed of in the mitigation area. Cost estimates for mitigation also include savings resulting from the use of on-site dredging equipment for construction of the reef and seagrass mitigation areas, which eliminates mobilization and demobilization costs from the mitigation estimate since those expenses are already included as project costs.

It should be noted that the USACE received several comments on the conceptual design of the seagrass mitigation and has included a revised conceptual plan in the FEIS. Mitigation costs have been revised to incorporate changes to the plan. Seagrass mitigation costs have been increased to include turbidity curtains, increased acreage impacts as a result of the change in side slope estimates for rock, increases in monitoring times, and strategic planting of some seagrass to help encourage growth. Strategic planting will be conducted in areas of the mitigation site where natural recruitment would otherwise be slow to occur. This supplemental planting will likely include plots of *Halodule wrightii* and *Syringodium filiforme* plantings. Details of the filling and planting design will be completed at a later stage. However, for planning and estimating purposes the USACE assumed planting of about three acres of the restored seagrass area at an estimated cost of about $576,000, based on the assumption that 20 – 400 square meter plots of *Halodule* will be planted on 1/2 meter centers and 10 – 400 square meter plots of *Syringodium* will be planted on 1 meter centers.

Appropriate, minimum in kind mitigation in the form of restored dredge holes north of Julia Tuttle Causeway would therefore be on the order of 33 acres to 55 acres for widening and deepening Fisherman's Channel alone based on the above, depending on the degree of uncertainty, the length of time it would take to achieve maximum habitat values, and the differences in the created habitat values in comparison with the seagrasses along Fisherman's Channel. The per acre cost to perform such work could be roughly 50 to 100 times greater than estimated in the GRR/DEIS. 4 cont.

Johnson's Seagrass

Additional survey work is needed to determine the extent to which Johnson's seagrass would be impacted by the proposed alternatives. The GRR and draft EIS do not mention the Johnson's seagrass that was found by an NMFS biologist in the area of the Fisher Island Turning Basin. Furthermore, we believe that the seagrass areas between the Fisherman's Channel/Lummus Island Turning Basin and the Rickenbacker Causeway need to be surveyed because of the large turbidity plumes that extend over these seagrasses (during flood tides) when dredging any of the south channels and turning basins at Miami Harbor. Surveys should be conducted in both of these areas during the upcoming summer months in accordance with state and federal requirements for surveying of this species. 5

The Bill Sadowski Critical Wildlife Area

The northernmost corner of the Critical Wildlife Area (CWA) is located less than 200 feet south of the currently permitted channel top of slope (Army Corps Permit 79B-0623). Assuming the toe of slope channel edge is constructed 100 feet beyond the currently permitted toe of slope (with a 20 foot box cut proposed beyond it to allow a steep slope), the resultant top of slope of the project will extend just into the northernmost portion of the CWA. This determination is based on the cross section included as Attachment A.

It should be noted that the existing toe of slope of Fisherman's Channel in most areas extends 10 to 20 feet (or more) south of the authorized toe of slope. If the channel is widened 100 feet from the existing toe of slope rather than the permitted toe of slope, the extent to which the CWA will be impacted will be correspondingly greater. In addition, since even the northernmost portions of the CWA are owned by the City of Miami and since the City's ownership of submerged lands may extend north of the CWA, a portion of the project (at least the channel slopes) may be located on land not owned by the Seaport. This ownership interest is not reflected in the GRR/DEIS.

Offshore Hardbottom Impacts

The offshore portions of the Miami Harbor Project were last deepened in 1992, although little or no direct impact to the extensive hardbottom habitat along the channel slopes occurred at the time since the project was limited to deepening within the toe of slope. This work was authorized by federal, state and local permits including DEP permit 131982259. It should be noted that these permits authorized 4.92 acres of hardbottom destruction beyond the top of slope limits of the project related to anchor and anchor cable impacts because all agencies acknowledged that the anchoring impacts were

Comment 4 Response

See Previous Page for Comment Response.

Comment 5 Response

The USACE agrees that H. johnsonii has been positively identified and documented in Biscayne Bay but the USACE does not concur with the statement that the documented absence of H. johnsonii from the study area is not justified. The seagrass survey conducted by the USACE covered the entire seagrass area. Divers were used to conduct quantitative surveying of seagrasses along 35 transects and also to map all seagrass coverage and habitat type between transects (see Appendix E of the FEIS). Using this methodology, Johnson's seagrass was not detected within the entire study area. In addition, several reconnaissance visits to the impact site within Components of 5 and 5A have been conducted both before and after the USACE study by qualified agency and consulting personnel. Johnson's seagrass has not been detected during any of those visits. The Port of Miami (Port) biological consultants have surveyed the site at least four times. In addition, DERM has mapped the entire seagrass edge in this area through extensive fieldwork and to our knowledge has not identified H. johnsonii. In fact the DERM seagrass line is used in the GRR impact analysis. In addition, the following site visits with federal agency personnel in attendance have also been conducted relative to Components 5 and 5A:

- December 2001 – Biologists from the Port, DERM, National Marine Fisheries Service (NMFS) and U.S. Fish and Wildlife Service (FWS) in attendance.
- March 2002 – Biologist from NMFS in attendance.
- May 2003 – Biologists from the USACE, DERM, NMFS, FWS and Florida Department of Environmental Protection in attendance.

During the May 2003 visit, agency personnel experienced in identifying Johnson's seagrass expressed the general opinion that the high energy conditions found along Fisherman's Channel (impact site for Components 5 and 5A) probably do not favor recruitment of Johnson's seagrass. This opinion was based on the strong tidal currents experienced in this area and the prevalence of sandy/shelly substrate. While the USACE does not want to speculate on specific conditions necessary for recruitment and survival of Johnson's seagrass in Biscayne Bay, we do not agree with the foregone conclusion that "there is no apparent physiological or ecological limitation for H. johnsonii to exist" in the study area. The USACE believes that the intensive transect survey they have conducted in conjunction with numerous agency reconnaissance site visits over the years provide more than sufficient confidence in the conclusion that H. johnsonii is currently and has been in the past, absent from Components 5 and 5A of the study area. Although, as stated in NOAA's comment letter (see comment NOAA-11, page 6), a NOAA fisheries biologist observed a specimen of *H. johnsonii* in the vicinity of the proposed work (Component 3). However, the specimen was not definitively identified as *H. johnsonii,* and subsequent attempts to confirm its presence proved unsuccessful.

The area between Rickenbacker Causeway and the Miami Harbor project area is outside the study area and beyond the scope of this project. Potential turbidity impacts from dredging to all seagrasses and to all other resources adjacent to the project site will be minimized by compliance with the Florida Department of Environmental Protection (FDEP) water quality certification requirements.

Appropriate, minimum in kind mitigation in the form of restored dredge holes north of Julia Tuttle Causeway would therefore be on the order of 33 acres to 55 acres for widening and deepening Fisherman's Channel alone based on the above, depending on the degree of uncertainty, the length of time it would take to achieve maximum habitat values, and the differences in the created habitat values in comparison with the seagrasses along Fisherman's Channel. The per acre cost to perform such work could be roughly 50 to 100 times greater than estimated in the GRR/DEIS.

Johnson's Seagrass

Additional survey work is needed to determine the extent to which Johnson's seagrass would be impacted by the proposed alternatives. The GRR and draft EIS do not mention the Johnson's seagrass that was found by an NMFS biologist in the area of the Fisher Island Turning Basin. Furthermore, we believe that the seagrass areas between the Fisherman's Channel/Lummus Island Turning Basin and the Rickenbacker Causeway need to be surveyed because of the large turbidity plumes that extend over these seagrasses (during flood tides) when dredging any of the south channels and turning basins at Miami Harbor. Surveys should be conducted in both of these areas during the upcoming summer months in accordance with state and federal requirements for surveying of this species.

The Bill Sadowski Critical Wildlife Area

The northernmost corner of the Critical Wildlife Area (CWA) is located less than 200 feet south of the currently permitted channel top of slope (Army Corps Permit 79B-0623). Assuming the toe of slope channel edge is constructed 100 feet beyond the currently permitted toe of slope (with a 20 foot box cut proposed beyond it to allow a steep slope) {the resultant top of slope of the project will extend just into the northernmost portion of the CWA}. This determination is based on the cross section included as Attachment A. 6

It should be noted that the existing toe of slope of Fisherman's Channel in most areas extends 10 to 20 feet (or more) south of the authorized toe of slope. If the channel is widened 100 feet from the existing toe of slope rather than the permitted toe of slope, the extent to which the CWA will be impacted will be correspondingly greater. In addition, since even the northernmost portions of the CWA are owned by the City of Miami and since the City's ownership of submerged lands may extend north of the CWA, {a portion of the project (at least the channel slopes) may be located on land not owned by the Seaport}. This ownership interest is not reflected in the GRR/DEIS. 7

Offshore Hardbottom Impacts

The offshore portions of the Miami Harbor Project were last deepened in 1992, although little or no direct impact to the extensive hardbottom habitat along the channel slopes occurred at the time since the project was limited to deepening within the toe of slope. This work was authorized by federal, state and local permits including DEP permit 131982259. It should be noted that these permits authorized 4.92 acres of hardbottom destruction beyond the top of slope limits of the project related to anchor and anchor cable impacts because all agencies acknowledged that the anchoring impacts were

Comment 6 Response

The USACE does not concur that the project will extend into the Bill Sadowski Critical Wildlife Area (CWA). The proposed project is in the vicinity of the Bill Sadowski Critical Wildlife Area, but it is contained within Port-owned lands and does not intrude upon the CWA. According to information from Florida Fish & Wildlife Conservation Commission (FFWCC) and Florida Department of Environmental Protection (FDEP) staff, the CWA was established in 1990 and then was amended in 1993 to reflect the boundaries of the Virginia Key No Entry Manatee Protection Zone. However, there are a number of problems with the legal description used to identify the CWA area including longitude references that do not exist; longitude references that do not coincide with the corresponding location description; coordinates which are not taken to a consistent level of specificity; and points and bearings which do not define a closed area. As a result, the existing CWA description does not meet the Florida Administrative Code (FAC) provision that the *area shall be described … in sufficient specificity as to permit identification.*

In addition the FAC includes provisions that CWA's may be established *with proper concurrence …by the owner of the property wherein the area is situated.* To date the Port has found no record of coordination with the Port as a landowner within the proposed CWA. A review of records in the FFWCC regional office indicated that land ownership was reviewed but not whether the County (Port) was identified as a land owner. While there is nothing to suggest that the County ever concurred with the designation as a landowner, there is file information that suggests that the CWA was thought to be entirely within land owned by the City of Miami and that the City was an active participant in the CWA designation. Therefore it appears reasonable that the intent was to locate the CWA south of Port owned-land on City of Miami property. The Port formally requested a resolution of CWA boundary issues over a year ago, and is waiting for the FFWCC to respond to this request.

The Port has contracted with a surveyor to define the southern boundary of the Port, as part of the resolution of other issues. As part of that process, a Specific Purpose survey located the boundary between City of Miami and the Port properties. The minimum distance from the existing channel toe and the boundary is greater than 250 feet. The proposed project extends the existing channel 100 feet to the south and the maximum anticipated slope impact extends 78.25 feet from the new channel toe to top of slope. The worst-case scenario of the NW corner of the CWA coinciding with the maximum extension of the channel (178.25 feet (100.0 + 78.25)) continues to place the proposed project within Port owned lands (178.25 feet < 200 feet), outside of the CWA.

Comment 7 Response

The government will be exercising navigational servitude in support of this project. Navigational servitude will apply to all dredging work, deepening within the channels, disposal on Virginia Key, staging work areas, ocean placement of material, the compensatory reef and seagrass mitigation site(s), and the fill areas identified as III-A, III-B, and III-C. All lands below the mean high water line are within the navigable waters of the United States and are available to the Federal Government directly by navigation servitude. If this should be disputed, a topographical survey will be the decisive action for purposes of establishing the elevation for certainty.

unavoidable given the type of dredging equipment (large hydraulic cutterhead) that would be needed to perform the project. The contractor agreed that it would not be possible to dredge the project without anchors placed beyond the project boundaries. The project required 341 anchor sets and the locations of these anchor sets have been documented in a survey map dated 11/16/93 prepared by Miami-Dade County Seaport Department consultants Bermello Ajamil & Partners. This map indicates that the typical distance anchors were needed outside the channel was about 300 feet. However, some anchors were placed more than 900 feet from the channel and inspections conducted after the project was completed confirmed that predicted impacts did occur from both the anchors and cables. Approximately 5 acres of hard bottom outside of the project limits (top of slope) were destroyed by the anchors and cables. {It is likely that at least 5 acres of hardbottom impact outside the channel will occur in addition to the impacts that will result within the channel and channel slopes. Therefore a separate mitigation plan should be developed for such losses; in the unlikely event that the project is authorized and constructed without such impacts, implementation of this additional mitigation would not be required} 8

Based on the DEIS estimates and the likely anchoring impacts described above, {the total amount of hardbottom that would be lost (not including rubble habitat) for which mitigation is appropriate is: 9

- at least 0.6 acres of low relief hardbottom and 2.7 acres of high relief hardbottom that would be destroyed by dredging within the expanded vertical footprint of the entrance channel,
- approximately 18 acres of high relief hardbottom habitat within the existing channel that would be destroyed by deepening,
- approximately 28 acres of low relief hardbottom habitat within the existing channel that would be destroyed by deepening,
- approximately 5 acres of hardbottom that would be destroyed by anchors and cables placed beyond the channel during dredging, and
- very significant large corals and sponges growing along the channel slopes that would be destroyed.

It should also be noted that at the public meeting held in Miami by the Army Corps on May 6, 2003 for this project, we were informed that the offshore impact analysis assumed 3:1 channel side slopes. Based on these statements and the information in the GRR/DEIS, it is not clear what {the assumed slope template is for the impact analysis. This needs to be clarified and clearly detailed before finalization of the DEIS to insure that the impacts analysis is accurate.} 10

Proposed Hardbottom Mitigation

{In kind hardbottom mitigation ratios for these types of reefs typically range from 2:1 to 3:1 in the form of limerock boulders with higher ratios dependent on the length of time for establishment of mature coral colonies on the material, distance from impact site, likelihood of success, etc.} Furthermore, 11

Comment 8 Response

Implementation of an anchoring and vessel operation plan to effectively minimize anchor and cable impacts to hardbottom habitat will occur through the RFP process and will include incentives to encourage potential contractors to avoid reef impacts. The evaluation criteria in the RFP will consider the technical aspects of the contractor's proposal as the most significant factor. As a result the vessel operational and anchoring plan that best avoids or reduces impacts to reefs will receive the highest evaluation and the incentives that follow. The idea proposed by the RFP process to the contractor is that if you break it, you buy it. Potential ideas provided by coordination with DERM, dredging companies, and other consultants that will probably appear in contractor proposals for evaluation during the RFP process include:

- Use of surge buoys along the anchor cable to help lift it up off the reef areas during dredging operations to minimize the area impacted by the anchor cable;
- Restricted anchor placement, which restricts placement of the anchors for the cutter-suction dredge to within the channel edge limits. That method reduces impacts but almost doubles dredging time since only half of the channel can effectively be dredged at a time.

Potential anchor impacts are discussed in Section 4.5.4 of the FEIS.

Comment 9 Response

The current entrance channel walls are characterized by a hardbottom community dominated by sponges, alga and soft and hard corals. This growth has occurred over the last ten years since the last port expansion project was completed in 1993. Therefore, the USACE believes that after dredging operations are complete, the same assemblage of species is expected to recolonize the channel walls and associated hardbottoms. Page 21 of the Environmental Baseline report prepared as Appendix E of the DEIS states: "Colonizing taxa such as sponges and certain gorgonians were more prevalent in the channel's hardbottom areas then were hard corals. Observed algal species in both channel and offshore areas included *Caulerpa* spp., *Laurencia* spp., *Cladophora* spp., and *Halimeda* spp. Flynn, et al. (1991) noted the additional presence of *Dictyota* spp. and *Jania* spp. in the area." Additionally section 3.4 of the baseline report reviews the current rock/rubble habitat and species assemblage associated with this environment. The USACE expects that dredging operations will leave rock/rubble in the bottom of this channel, which can be recolonized by the species found there now. During the 1993 dredging operations, the Port agreed to mitigate for unavoidable hardbottom impacts associated with dredging operations. This mitigation was completed in 1996 providing 15.91 acres of hardbottom artificial reef habitat. No additional mitigation for previously dredged areas will be considered.

Comment 10 Response

The assumed side slope template for the offshore impact analysis is shown in Appendix G of the EIS and includes a 1.0V:0.5H in rock.

Comment 11 Response

Mitigation ratios for hardbottom were determined using the Habitat Equivalency Analysis model as recommended by NOAA-Fisheries and FWS. The analysis is included in the FEIS for review.

{while the 20% spacing proposed between the reef units may be important, it is not appropriate to consider mitigation credit for such open areas} 12 In addition, we do not believe that the assumptions made in the GRR/DEIS to determine what hardbottom impacts would be mitigated, and the amount of such mitigation, are consistent with past projects at Miami Harbor. For example, it does not appear that mitigation is proposed for the extensive hardbottom located along the channel slopes throughout the project. These areas contain large hard corals (some colonies greater than three feet in diameter including *Montatstrea sp.* and *Diporia sp.* noted in the April 28, 2003 comment letter from NMFS and also observed by DERM biologists) that have likely been growing on the channel edges since the dredging project conducted offshore during the 1960's. {Mitigation for the loss of the hardbottom along the channel edges is needed.} 13 In addition, the length of time that would be required for the development of large hard coral colonies of this size on artificial reef substrate (if such large colonies are even possible) could easily be on the order of 50 years or more.

In addition, we {question the proposed construction techniques, source of material and costs.} 14 As a measure of comparison, the artificial reefs constructed by DERM contractors for the Phase I (offshore) deepening in the early 1990's cost $3.5 million for 120,000 tons of limerock placed near the locations proposed in the GRR/DEIS for a per ton cost of $29 dollars in 1995 dollars. Cost estimates in the GRR/DEIS that depend on material generated by the deepening operation may not be appropriate for several reasons. Mitigation for similar work at Miami Harbor in the past focused upon creation of physically stabile hardbottom habitat with similar relief, texture, and structure of the destroyed substrate. This required natural limestone boulders (from local quarries located in western Miami-Dade County) or prefabricated modules without fine-grained material or contaminants. This allowed placement of the material without turbidity or siltation and in a manner that insured the material would remain in place. Since the dredging methods and equipment are undefined, and since the Army Corps will not likely define which type of dredge to use in a contract, there is no certainty that the dredging equipment used will produce material suitable for placement as artificial reefs. In all likelihood, offshore dredging would be performed by a large, hydraulic cutterhead similar to the one used successfully (without blasting) during the Phase I deepening project at Miami Harbor. Such an operation does not produce material suitable for artificial reef placement. In the unlikely event that the dredging was performed by a hydraulic excavator or similar equipment used during the Phase II deepening project (that is capable of producing large rocks), past experience at Miami Harbor has shown that the costs associated with separation of the large rocks from the dredge spoil, cleaning, and double handling add significantly to the cost. In addition, the lack of a staging area to perform this work creates significant logistical problems and can further increase costs. For planning purposes and for calculation of costs, mitigation materials and methods that have been employed successfully in the past at the Miami Harbor project should be used} 14 cont. rather than experimental techniques and sources of material that have been previously rejected at Miami Harbor.

{DERM believes that the assumptions made in the Habitat Equivalency Analyses may need some refinement} 15 to determine the appropriate, minimum in kind mitigation for offshore impacts. We therefore request continued coordination on this issue prior to finalization of the DEIS. Mitigation is also necessary for the aforementioned impacts to hardbottom throughout the project that will occur with the possible exception of rubble habitat provided significant coral colonies are relocated from the rubble. It shall also be noted that DERM has placed natural limerock boulders throughout the

Comment 12 Response

The combined reef mitigation sites contain available space for placement of artificial reef material between them. This will allow for sufficient spacing between reef structures, thus there is no need to increase the amount of proposed hardbottom mitigation. The USACE will provide 6.2-acres of relief spread over an area larger than 3.3 acres in order to include interstitial sand habitat in the design. The USACE notes that this is a conservative approach since the 3.3-acre impact site includes interstitial sand habitat that is being mitigated for as though it were actual relief.

Comment 13 Response

The area that will be dredged has been previously dredged and has recovered since that dredging event, as noted by both the USACE and NOAA. Additionally, the Port of Miami mitigated for the impacts of the dredging of those hardbottoms during the 1990 dredging event by the placement of 15.91 acres of hardbottom mitigation in 1996. At this time the USACE has no plans to offer mitigation for the previously dredged and mitigated hardbottoms as requested.

Comment 14 Response

The contractor selected by the USACE during the bid process would determine construction methodology of the project. However, certain assumptions for planning and estimating purposes were made regarding various proposed construction techniques that may be used.

The most likely dredging methodology alternatives for the Miami Harbor project are listed below in order of estimated costs:

1. Blasting the entire channel, followed by mechanical dredge cleanup, and barge transport of dredged material either to ODMDS or to mitigation site.

2. Blasting of all of the channel except for Cuts 1 and 2 (entrance channel) exclusive of the widening at the elbow (which would also be blasted), followed by mechanical dredge cleanup of the blasted areas, and transport to either ODMDS or to Mitigation site. The non-blasted portions of the channel would be excavated with large cutterhead dredge with no restrictions on anchor placement.

3. Same as alternative 2 above but with restricted anchor placement (i.e., within the limits of the channel).

If a mechanical dredge were used, the larger rock material would be removed and segregated for use in constructing the mitigation sites. Larger rock material would be placed on an ocean going bottom-dump barge to be transported to the proposed artificial reef sites for precise placement with an additional clamshell or barge-mounted crane or to the offshore Ocean Dredged Material Disposal Site (ODMDS).

For construction of the artificial reef sites specifications would require blasting of the required quantity of rock from the Federal channel to approximately one cubic meter or larger boulders. Any loose material is expected to disperse during removal of the rock. Smaller rock would provide bedding material for the larger boulders. This design will provide material of a similar size to past DERM projects and will result in the structural stability necessary for long-term success of the reefs. The low relief, low complexity and high relief, high complexity artificial reef designs are shown in Figure 4 of Appendix J (Mitigation Plan) in the EIS. The low relief, low complexity artificial reef design consists of approximately one-boulder-high rows about 25-50 feet in width placed parallel to the shoreline. The high relief, high complexity design includes approximately three-boulder-high rows about 50-100 feet wide placed parallel to the shoreline. Reef construction will be refined during later detailed design phases.

Comment 15 Response

The USACE has and will continue to work with DERM to resolve any concerns about the HEA process..

while the 20% spacing proposed between the reef units may be important, it is not appropriate to consider mitigation credit for such open areas. In addition, we do not believe that the assumptions made in the GRR/DEIS to determine what hardbottom impacts would be mitigated, and the amount of such mitigation, are consistent with past projects at Miami Harbor. For example, it does not appear that mitigation is proposed for the extensive hardbottom located along the channel slopes throughout the project. These areas contain large hard corals (some colonies greater than three feet in diameter including *Montatstrea sp.* and *Diporia sp.* noted in the April 28, 2003 comment letter from NMFS and also observed by DERM biologists) that have likely been growing on the channel edges since the dredging project conducted offshore during the 1960's. Mitigation for the loss of the hardbottom along the channel edges is needed. In addition, the length of time that would be required for the development of large hard coral colonies of this size on artificial reef substrate (if such large colonies are even possible) could easily be on the order of 50 years or more.

In addition, we question the proposed construction techniques, source of material and costs. As a measure of comparison, the artificial reefs constructed by DERM contractors for the Phase I (offshore) deepening in the early 1990's cost $3.5 million for 120,000 tons of limerock placed near the locations proposed in the GRR/DEIS for a per ton cost of $29 dollars in 1995 dollars. Cost estimates in the GRR/DEIS that depend on material generated by the deepening operation may not be appropriate for several reasons. Mitigation for similar work at Miami Harbor in the past focused upon creation of physically stabile hardbottom habitat with similar relief, texture, and structure of the destroyed substrate. This required natural limestone boulders (from local quarries located in western Miami-Dade County) or prefabricated modules without fine-grained material or contaminants. This allowed placement of the material without turbidity or siltation and in a manner that insured the material would remain in place. Since the dredging methods and equipment are undefined, and since the Army Corps will not likely define which type of dredge to use in a contract, there is no certainty that the dredging equipment used will produce material suitable for placement as artificial reefs. In all likelihood, offshore dredging would be performed by a large, hydraulic cutterhead similar to the one used successfully (without blasting) during the Phase I deepening project at Miami Harbor. Such an operation does not produce material suitable for artificial reef placement. In the unlikely event that the dredging was performed by a hydraulic excavator or similar equipment used during the Phase II deepening project (that is capable of producing large rocks), past experience at Miami Harbor has shown that the costs associated with separation of the large rocks from the dredge spoil, cleaning, and double handling add significantly to the cost. In addition, the lack of a staging area to perform this work creates significant logistical problems and can further increase costs. For planning purposes and for calculation of costs, mitigation materials and methods that have been employed successfully in the past at the Miami Harbor project should be used rather than experimental techniques and sources of material that have been previously rejected at Miami Harbor.

DERM believes that the assumptions made in the Habitat Equivalency Analyses may need some refinement to determine the appropriate, minimum in kind mitigation for offshore impacts. We therefore request continued coordination on this issue prior to finalization of the DEIS. {Mitigation is also necessary for the aforementioned impacts to hardbottom throughout the project that will occur with the possible exception of rubble habitat provided significant coral colonies are relocated} from the rubble. It shall also be noted that DERM has placed natural limerock boulders throughout the 16

Comment 16 Response

The area that will be dredged has been previously dredged and has recovered since that dredging event. Additionally, the Port of Miami mitigated for the impacts of the dredging of those hardbottoms during the 1990 dredging event by the placement of 15.91 acres of hardbottom mitigation in 1996. At this time the USACE has no plans to offer mitigation for the previously dredged and mitigated hardbottoms as requested by DERM.

proposed mitigation site identified in the GRR/DEIS as DERM Artificial Reef Site B – South; as such there is little or no more available area for materials placement. DERM also does not recommend the small limerock boulders (in the one to two foot size range) proposed to offset impacts to low relief hardbottom. A significantly greater portion of such small boulders can be buried and the material can be transported during hurricane events. Placement of such small boulders may also not be cost effective due to the reduced habitat values provided. 18 17

Soft Bottom Impacts 19, 20, and 21

The GRR/DEIS estimates that 23.3 acres of soft bottom habitat will be destroyed in areas never before dredged. No mitigation is proposed for these areas in the DEIS/GRR despite the importance of this habitat and the fact that the natural values of such habitat would be permanently lost. Although DERM acknowledges that a new type of habitat would be created by dredging to replace this softbottom habitat, the habitat values of the new habitat would generally be significantly less and of a temporary rather than permanent nature, because each time the channel is subsequently dredged for maintenance or deepening purposes, this newer habitat would be destroyed. Therefore it is appropriate to mitigate for the large areas of softbottom that would be destroyed by the expansion proposals.

Soft Bottom Mitigation

Mitigation for dredging of previously undredged benthic areas that do not contain hardbottom or seagrasses is typically a 1:1 ratio with higher ratios for out of kind mitigation. As an example, the DEP and Army Corps permits for Miami-Dade County's cross bay force main that was installed in the early 1990's in this basin required mitigation for this habitat type. Therefore, for the permanent elimination of 23.3 acres of this habitat, appropriate, minimum in-kind mitigation in the form of restored dredge holes would be on the order of 23.3 acres.

19, 20, 21 concluded

Water Quality Impacts

Moderate to high quality seagrass and hardbottom habitat is present along much of the channel edges. The swift tidal currents of Miami Harbor make it difficult to protect water quality and benthic resources from turbidity, sedimentation, or release of contaminants that could be present in inshore sediments not previously dredged. In addition to numerical water quality standards, antidegradation standards for Outstanding Florida Waters (OFW) must be met at least within the inshore portions of the project. It should be noted that the GRR/DEIS concludes that turbidity impacts will be temporary and that water quality standards will be met within the approved mixing zone. However, past dredging projects at Miami Harbor, including the Army Corps maintenance dredging in approximately 1990, have resulted in turbidity plumes sometimes extending for miles onto seagrass beds. During this Army Corps maintenance dredging project, turbidity values several hundred times background levels were repeatedly measured one half mile or more away. Even in the most recent Phase II construction dredging project where large turbidity curtains were used, extensive turbidity plumes were routinely documented in violation of water quality standards. Given that turbidity curtains have proven ineffective at Miami Harbor, it is not clear in the GRR/DEIS how water quality standards will be met. This should be clearly outlined in the EIS as well as the extent to which unavoidable impacts will 22

Comment 17 Response

The USACE' estimate includes 1 cubic meter boulders.

Comment 18 Response

The FEIS includes the correct information.

Comments 19, 20, and 21 Response

Compared to the seagrasses and hardbottom reef communities being impacted by this project, the USACE considers shallow, sandy softbottom to be a lower value habitat type. This habit is not considered EFH by NMFS and as a result the USACE rejects this request for additional mitigation.

The USACE does not concur with DERM's assessment that mitigation for impacts to unvegetated bottom has typically been required in the past, especially for Miami Harbor. No mitigation was required for impacts to this type of habitat during the 1991 harbor-deepening project. The USACE has documented that these areas are of relatively low value and are expected to quickly recolonize. For further discussion, see DERM-19 response

The USACE does not concur with DERM's assessment of habitat value for unvegetated areas. These areas are of relatively low value due to their lack of primary productivity. Unvegetated bottoms do serve as a habitat for infaunal organisms that may be exploited by fish and other fauna passing through the area and they serve to provide a transition between other habitats. These values will not be significantly compromised by the dredging. In fact, pieces of rock rubble likely to be left behind after the dredging will add to the variability and diversity of this habitat. As outlined in the FEIS, this habitat is expected to recolonize very quickly (within one or two years) after dredging (FEIS, Section 4.6.2).

Comment 22 Response

The USACE does not concur with the premise that turbidity curtains and other turbidity control techniques cannot be used to reduce turbidity plumes generating from the project. Turbidity curtains have been used effectively at previous Port of Miami projects to meet the relevant water quality standards in place at the time of project construction. It was only at the edges of the project, when dredging adjacent to shallow water depths, that the curtains were difficult to install. The Florida Department of Environmental Protection will establish the overall water quality standards that will control the Miami Harbor project. In order to meet water quality requirements, the Contractor may need to use construction techniques in addition to, or instead of, turbidity curtains while working at the channel edge adjacent to seagrass resources. These operational controls could include working only on the outgoing tide, the addition of turbidity hoods to a cutterhead dredge, using a closed bucket mechanical dredge, reducing speed of the bucket through the water column, or the speed of the cutterhead in this area, while working in the unconsolidated sediment.

likely occur including sedimentation impacts. Given that daily turbidity plumes are possible if not likely during the 4 to 5 years of anticipated construction, these impacts should not be dismissed due to their "temporary" nature} **22 concluded**

Blasting

{Successful completion of the Phase I deepening project (1991-1992) demonstrates that blasting is an avoidable impact at Miami Harbor} The Phase I deepening project involved dredging to depths of 44-46 feet in moderately hard and hard limestone. In some areas, overdredging depths of up to 48 to 49 feet were achieved. This work was performed from the offshore seabuoy throughout the offshore portions of the project and extending into the eastern end of Fisherman's Channel by a hydraulic cutterhead without blasting and the majority of spoil generated was placed on Virginia Key. Since that work was performed, advances in the size and technology of large hydraulic dredges have only increased their power and efficiency. **23**

{According to DERM records, the last time blasting was conducted at Miami Harbor was in 1980. During monitoring of test blasts conducted on April 16-18, 1980, DERM documented the average number of observable fish killed (at the surface) to be 25 per blasting event. Furthermore, despite continuing efforts to reduce fish mortality after the test blasting was concluded (which included small warning blasts which we believe are of little, if any value), conspicuous fish mortality continued to be documented which notably included a school of large tarpon (approximately 50 individuals). During at least one blasting event, approximately 100 fish were observed on the surface to have died. A partial listing of observed species killed included barracuda, red snapper, tarpon, Spanish mackerel and grunts. **24**

DERM acknowledges the difficulties in predicting the magnitude of fish and invertebrate mortality that would occur with blasting. However, we believe it is appropriate to require mitigation for these impacts if blasting is to be conducted. In addition and perhaps of greater concern are the sublethal impacts that would result, particularly to listed species. Given the close proximity of the Critical Wildlife Area to the proposed project and the extraordinary habitat values the CWA provides to marine turtles, manatees, sharks/rays, crocodiles, and commercially and/or recreationally important fish species in addition to birds, we believe that blasting (which may be contracted to occur almost continuously for approximately 4 to 5 years) would result in profound disturbance-type impacts, thereby degrading the habitat values provided by the CWA. The EIS should provide a careful analysis of the extent to which sensitive behaviors would be disrupted by blasting with particular emphasis on listed species.}

{DERM does not believe it appropriate to allow blasting unless it is demonstrated that blasting is unavoidable. In such a case, blasting should be authorized only in the specific areas where the project cannot be otherwise completed and only with comprehensive aerial surveillance prior to and during each blasting event. Mitigation should also be provided for unavoidable impacts. Coordination with the Miami-Dade County Water and Sewer Department (WASD) is also needed for concurrence on measures to protect and monitor critical infrastructure including sewer and water mains in and adjacent to the project. Agreement with WASD should be reached prior to the finalization of contract specifications and bidding documents for any blasting proposed at Miami Harbor} **25**

See previous page for comment 22 response

Comment 23 Response

The USACE concurs that it may be possible to construct the project without blasting. We do not concur that a non-blasting project is likely or necessarily the most cost-effective and environmentally sensitive approach to construction. The USACE will provide every opportunity for contractors with a non-blasting approach to compete for the project within a fair and competitive program. The USACE will continue with the current approach with blasting as an alternative in order to fully assess potential environmental impacts of the project.

Comment 24 Response

Different blasting technologies exist today than were used in the 1980s. The USACE has coordinated the use of blasting with NMFS-Protected Resources and the US Fish and Wildlife Service to address potential effects of blasting on endangered, threatened and protected species. Plans currently call to use blasting only in areas where other dredging techniques are unsuccessful

Comment 25 Response

The USACE has coordinated the use of blasting with NMFS-Protected Resources and the US Fish and Wildlife Service to address potential effects of blasting on endangered, threatened and protected species. Plans currently call to use blasting only in areas where other dredging techniques are unsuccessful

Recommendations for Additional Analysis Prior to Finalization of the DEIS:

Inshore: Deepening of Fisherman's channel to 51 feet will require replacement of the existing Seaport bulkhead since the toe of this bulkhead is not deep enough. Therefore, consideration should be given to a partial or complete realignment of this bulkhead along the northern side of Fisherman's Channel if the channel is to be deepened. Realignment of the bulkhead northward would result in a corresponding increase in width of Fisherman's Channel without dredging along the south channel boundary. Landward realignment of the bulkhead would not necessarily have to result in any net loss of uplands for existing Seaport operations since any fill removed could be used to extend the northern shoreline of Lummus Island to the bulkhead line approved under the Port of Miami Master Plan and Army Corps Permit 79B-0623. By locating the Fisherman's Channel bulkhead northward from its present location when it is reconstructed, a number of important benefits could be achieved in a cost effective way: 26

- Fisherman's Channel could be widened northward instead of southward thereby reducing or eliminating impacts to seagrass.
- Required mitigation would be reduced or eliminated.
- The slight channel misalignment at the intersection of Fisherman's Channel and Fisher Island would be reduced, thereby improving navigational safety; this intersection of the main channel and Fisherman's Channel was identified during the 2000 Miami Harbor Ports and Waterways Safety Assessment (PAWSA) exercise as contributing significantly to channel complexity with a corresponding increase in near collisions, collisions and other incidents.
- The extent of needed realignment or expansion of the channel to the south (that the GRR suggests) in the area of Fisher Island's bulkhead would be reduced or eliminated, thereby minimizing or eliminating potential infrastructure conflicts between the channel and the side slope necessary to protect and maintain existing Fisher Island bulkheads.
- A greater safety buffer could be maintained between the Coastal Tug & Barge fuel terminal and ships traveling in or out of Fisherman's Channel in comparison with both current and proposed conditions; previous incidents including collisions with barges/ships docked at this facility indicate that the existing distance may already be inadequate. The proposed modifications may further exacerbate this existing problem since they are intended to attract larger ships with no corresponding increase in the distance between the Fisher Island bulkhead and the Seaport bulkhead.

Offshore: The most seaward portions of the proposed offshore channel widening would occur in depths greater than the proposed controlling depth of 52 feet. Due to the existing depths in the seaward portions of the channel, no dredging would be required in these deeper areas. Therefore, consideration should be given to shifting the proposed widener to deeper water by extending the ship channel seaward from the seabuoy and widening of the channel in these deeper areas through the

Comment 26 Response

The USACE does not concur that reconfiguration of Lummus Island and relocation of crane operations to the north side of the Port is a feasible suggestion. The Port of Miami has made significant infrastructure investment in the current cargo handling location and commitments to operators on yard locations. Investments go well beyond the construction of bulkheads, and extend to the entire wharf area, yards, and gate systems, as well as to the on-island transportation system. Further, the north side of Lummus Island cannot accommodate all ten cranes (plus additional cranes on order) now at the Port of Miami. From an operational standpoint, conflicts between cruise and cargo vessels would be increased exponentially, since both users would be compressed onto one side of the island. The cost of such a suggestion, and the resulting deleterious impacts to port operations, would have a serious and unacceptable negative impact to the local, state and national economy.

installation of additional navigational aids. By locating the proposed widener further offshore, it could be even wider and deeper than proposed and little or no dredging would be needed. In order to evaluate whether similar (or additional) navigational benefits could be achieved by extending and widening the channel further seaward instead of dredging large areas proposed in the GRR/DEIS, further study of the currents in the area of the seabuoy is needed. If a monitoring system was implemented at the Seabuoy (and other appropriate nearby areas) to collect current and wind information not unlike NOAA's system for monitoring currents at the Miami ODMDS, important data would be generated. These data would likely lead to refinements in the design of Alternative 1 to improve navigational safety, reduce hardbottom impacts and reduce cost. This information could also be made available in real time to the Harbor Pilots which could increase navigational safety even without the proposed project.

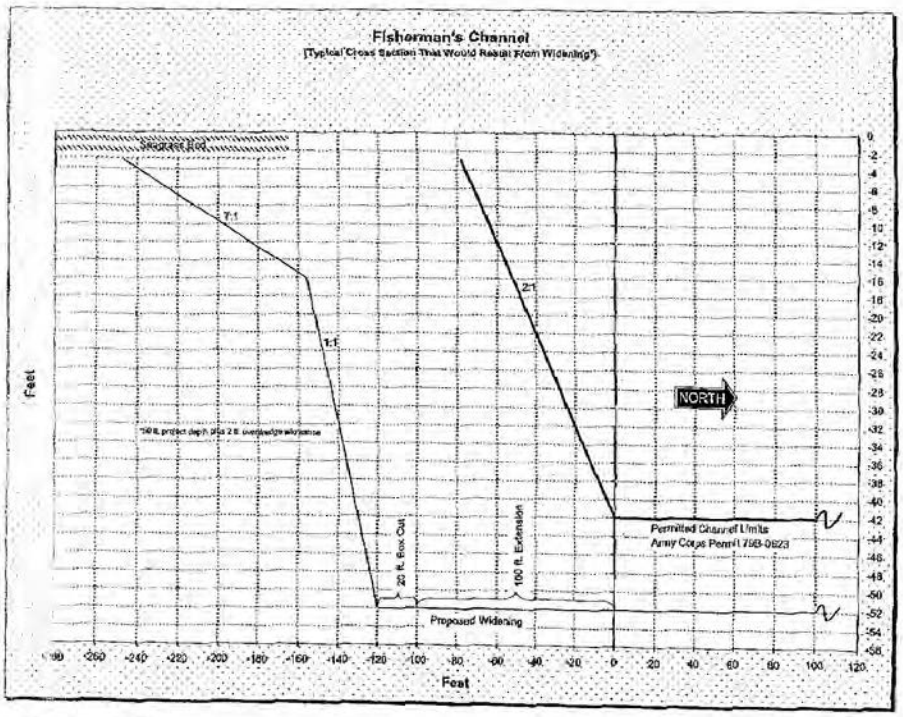
We appreciate the coordination efforts of your staff and consultants and thank you for the opportunity to comment on these documents. Please contact Carlos Espinosa or Craig Grossenbacher at (305) 372-6796 if you have any questions regarding these matters.

Sincerely,

John W. Renfrow, P.E.
Director

Attachment A Fisherman's Channel Edge Cross Section

cc: Miami-Dade Seaport Dept.
Miami-Dade Water & Sewer Dept.
Miami-Dade Planning Dept.
FDEP West Palm Beach
FDEP Tallahassee
FFWCC Tallahassee
SFWMD
FWS Vero Beach
NOAA/AOML
NOAA/NMFS
BNP
EPA West Palm Beach



Miami-Dade County DERM
May 8, 2003

Attachment A

BISCAYNE BAY PILOTS

Serving the Port of Miami since 1911

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May 14, 2003

Mr. Rene Perez
Project Manager
U.S. Army Corps of Engineers
PO Box 4970
Jacksonville, Florida 32232

Dear Mr. Perez:

The Miami harbor pilots wholeheartedly endorse all components of the Locally Preferred plan to deepen and widen the Miami ship channel.

Large newly constructed vessels are routinely arriving at ports of call with drafts in excess of 46 feet. If the Seaport of Miami is to remain a viable and competitive destination for ocean-going commerce on the eastern seaboard then the outer channel should be dredged to preferably 52 feet and the inner channel deepened to 50 feet.

The proposed widening of the channel (cut 1 from 500 feet to 800 feet) is needed to ensure safe transit of the large post panamax ships. With a length of 1138 feet and a beam of 141 feet, these vessels will encounter strong cross currents requiring a leeway or crab angle of 10 to 15 degrees to stay in the channel. This significantly increases the effective beam. Widening Fishermen's Channel an additional 100 feet is another critical "must." The present 500 foot channel provides only 100 to 120 feet of open water clearance if a large beamed vessel (141 feet) using tug assistance was to pass another berthed vessel of similar beam. Increasing the width would reduce the surge affect, increase clearance and should allow for safe routine passages. 1

If the Miami pilots can be of any assistance please contact us.

Thank you.

Yours truly,

Michael M. Wiegert
Vice Chairman

Comment 1 Response

The Corps concurs with this comment.

Port of Miami Terminal Operating Company, L.L.C.
1007 N. America Way, Suite 315
Miami, Florida 33132
www.pomtoc.com
Office Telephone: (305) 416-7600 Terminal Telephone: (305) 533-8200
Office Fax: (305) 374-6724 Terminal Fax: (305) 373-6916

May 13, 2003

VIA FACSIMILE

Mr. Rene Perez
Project Manager
U S Army Corps of Engineers
P.O. Box 4970
Jacksonville, FL 32232-0019

Re: Miami Harbor Navigation Project

Dear Mr. Perez:

POMTOC, LC. is extremely supportive of the Miami Harbor Navigation Project and the harbor deepening presently being considered by the Army Corps of Engineers. The Port of Miami is the 10th largest container port in the nation, and has grown to this status due to the recognized advantages for ocean carriers calling the Port. As last US port of call southbound and/or first US port of call northbound, carriers calling the Port of Miami find a competitive advantage. As such it is extremely important that we compete with other countries for "hub" status. As a hub, larger ships can call on the Port of Miami and depart Miami for other Ports with smaller ships and barges reducing the need for dredging in those ports. 1

The recognition by the maritime trade of the strategic advantages for calling the Port of Miami has served the southern Florida manufacturing community well. This continuous support the shipping public has shown the Port of Miami is obvious as the cargo growth continues here. Many ports have actually shown reductions in volumes; however, the Port of Miami has shown growth over several years indicating the preference the shipping public has for this Port.

Therefore, if the Port of Miami is to continue as a top 10 Port and if the community is to continue to be served, newer bigger ships must be able to call the Port of Miami. In order to do so, a deeper channel and harbor is required. We are very supportive of this project as we are called upon regularly by executives of those carriers, and one of the first questions asked is when is the Port going to deepen its approaches and harbor so we can bring our larger vessels?

Comment 1 Response

The Corps concurs with this comment.

Please consider this project very carefully, and we believe its own merits will show the many benefits to deepening the channel and harbor, and going forward with this project.

Sincerely yours,

F. Brooks Royster, III
CEO

Cc. Mr. Charles A. Towsley – Port of Miami Port Director

Eller-ITO Stevedoring Company L.L.C.
899 South America Way
Miami, Florida 33132
Phone: (305)379-8700
Fax: (305)371-9069
Email: mail@ellerito.com

FAX MESSAGE *Pages: (2)*

To: *Rene Perez*
U.S. Army Corps of Engineers
904-232-2201

From: *Charles J. Arocha*

Date: *May 20, 2003*

Subject: *DREDGING PROJECT*
PORT OF MIAMI

Please find attached a copy of my letter with today's date, conveying our comments on subject matter.

Rgds

ELLER – ITO Stevedoring Company L.L.C.

899 South America Way / Miami, Florida 33132
Telephone: (305) 379-3700 • Facsimile: (305) 371-9969

May 20, 2003

Mr. Rene Perez
Project Manager
US Army Corps of Engineers
P.O. Box 4970
Jacksonville, Florida 32232

RE: MIAMI HARBOR NAVIGATION PROJECT

Dear Mr. Perez:

This letter serves to inform you of our support for the proposed Miami Harbor Navigation project that is presented in the recently released draft General Reevaluation Report (GRR) and Environmental Impact Statement (EIS).

The Port of Miami is Florida's largest container port and is the second largest economic engine in Miami-Dade County. This project will allow cargo carriers to utilize the Port of Miami as the last U.S. port of call southbound and/or the first U.S. port northbound. This will assist the nation to compete with other countries for "hub" status. 1

Our firm, Eller-ITO Stevedoring Company L.L.C. handles over 135 vessels per month, including cruise ships, roll-on/roll-off and large container vessels requiring the draft criteria critical in this project. The economic impact in Southeast Florida Ports, our firm alone at the Port of Miami, employs over 800,000 man-hours a year with total combined hours of approximately 2 million hours. These jobs provide excellent wage and fringe benefits to those employed and contribute to the welfare of our community.

This project is viewed as an opportunity to allow the Port to continue its growth pattern with continued employment and economic benefits to the community as well as an opportunity for imports/exports to be transported competitively to/from the United States. 2

We appreciate the opportunity to commenton this project and look forward to its expeditious approval and completion.

Sincerely,

ELLER-ITO STEVEDORING
COMPANY L.L.C.

Charles J. Arecha
Senior Vice President

CJA:amw

Cc: Charles A. Towsley, Port of Miami Director

Comment 1 Response

The Corps concurs with this comment.

Comment 2 Response

The Corps concurs with this comment

(D) Perez

No response required

AMERICAN CONTAINER LINES L.C.

May 20th, 2003

Rene Perez
Project Manager
US Army Corps of Engineers
PO Box 4970
Jacksonville, FL 32232

RE: Miami Harbor Navigation Project

Dear Mr. Perez:

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The Port of Miami is strategically located in the geographical crossroads of the trade between East and West (Far East-Europe/Med/Middle East) and North and South (North/Central/South America and Caribbean). As such, we as a Port are in a much sought after position by the major liner shipping companies serving the world trades. Consequently, and I order to take full advantage of this privileged and unique situation, we must be able to handle the bigger vessels that are required for transshipment of containers. A deep water port is a must for these large vessels to dock at our Port.

This project is viewed as an opportunity to allow the Port to continue its growth pattern with continued employment and economic benefits to the community, as well as an opportunity for imports/exports to be transported competitively to/from the United States.

We appreciate the opportunity to comment on this project and look forward to its expeditious approval and completion.

Sincerely,

American Container Lines, L.C.

Nancy Ramirez
Sales & Gral. Manager

NR/emp

cc: Charles A. Towsley, Port of Miami Port Director

125 N.E. 9th STREET, MIAMI, FLORIDA 33132 • PHONE (305) 373-4765 • FAX. (305) 374-7231
E-mail: larcv@bridge.net

No response required

FLORIDA STEVEDORING INC.

DP-C

May 20th, 2003

Rene Perez
Project Manager
US Army Corps of Engineers
PO Box 4970
Jacksonville, FL 32232

RE: Miami Harbor Navigation Project

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We appreciate the opportunity to comment on this project and look forward to its expeditious approval and completion.

Sincerely,

FLORIDA STEVEDORING, INC.

Jorge P. Rovirosa
Executive Vice President

JPR/cmp

cc: Charles A. Towsley, Port of Miami Port Director

125 N.E. 9th Street, Miami, Florida 33132 • Telephone 305-373-4765 • Fax 305-374-7231
E-mail: flastev@farovi.com
Mailing Address: P.O. Box 011309, Miami, Florida 33101

DP-C

No response required

FAROVI SHIPPING CORPORATION

STEAMSHIP AGENTS & BROKERS, MIAMI -- PORT EVERGLADES, FLA.
125 N.E. 9th STREET, MIAMI, FLA. 33132 P.O. BOX 011254, MIAMI, FLA. 33101
CABLE ADDRESS: FAVORI-TRT 152130 TELEX 51 9154 / PHONE 373-4765 FAX (305) 374-7231

May 20th, 2003

Rene Perez
Project Manager
US Army Corps of Engineers
PO Box 4970
Jacksonville, FL 32232

RE Miami Harbor Navigation Project

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We appreciate the opportunity to comment on this project and look forward to its expeditious approval and completion.

Sincerely,

FAROVI SHIPPING CORPORATION

Jorge P. Koviroga
Executive Vice President

JPR/emp

cc: Charles A. Towsley, Port of Miami Port Director

SIERRA CLUB
MIAMI GROUP
PO BOX 43-0741
South Miami, Florida 33243-0741

May 9, 2003
By Federal Express

Mr.Richard Powell, CESAJ-PD-PN
District Engineer
US Army Corps of Engineers
Jacksonville District
701 San Marco Blvd.
Jacksonville, FL 32207

Re: Written Statement and Comments Miami Harbor GRR and DEIS
(Public Hearing May 6, 2003)

Dear Mr. Powell:

The Board of Directors of the Sierra Club's Miami Group reviewed the recent (March 14, 2003) ACOE GRR and DEIS for expanding the Miami Harbor, and voted unanimously to OPPOSE the proposed blasting, dredging and expansion of the channels in Biscayne Bay and at the entrance of the Miami Harbor Channel in the Atlantic Ocean for the following reasons:

1. The report and study underestimate the negative impacts on threatened and protected wildlife and water quality in the Virginia Key State Critical Wildlife Area. 1

2. The report and study underestimate the negative impacts on threatened and protected wildlife and water quality in Florida's Biscayne Bay State Aquatic Preserve. 2

3. The report and study underestimate the negative impacts of blasting on manatee and other sea mammals habitats. They fail to study the impact of blasting on the long term behavior of manatee and dolphin; no analysis was performed of the continuous disturbance of manatee and dolphin habitat and the blasting's creation of what would be, in effect, a barrier between North and South Biscayne Bay for the period of the blasting which may extend for nearly four years, that is, 3 times a day for 1150 blasts days (excluding Sundays.) Manatee and Dolphin may avoid the area for many years after the project is completed after having been repeatedly (but perhaps nonlethally) impacted by the blasts. Further, the report and study does not adequately value the loss of fish caused by the blasting. There was no lethal dosage analysis of the proposed blasting and its impact on the immediate fisheries. 3
There is no reasoning presented that compels the blasting as a methodology for construction. It was acknowledged 4
by representatives of the ACOE at the public hearing on May 6, 2003 that similar deep dredging in the Port Everglades Channel did NOT require blasting. Other channels with similar hard rock have been successfully, vertically cut without blasting.

4. The report and study fails to acknowledge that the area is a habitat of a threatened species, Johnson Seagrass, which will be directly and permanently impacted by the channel widening. During the May 6, 2003 pubic hearing, 5
the ACOE biologist conceded that the habitat will be reduced because the channel, as it is widened, reduces the area of seabed that is shallower than 12 feet within the habitat. That area deeper than 12 feet will no longer be viable for Johnson Seagrass. This problem involves several acres of habitat.

5. The project is contrary to the goals, objectives and strategies for protecting and restoring the Biscayne Bay ecosystem provided by Florida's Surface Water Improvement and Management (SWIM) Act (Ch. 373.451-373.459, F.S.).

5. The proposed mitigation is clearly inadequate, considering the extensive and permanent harm to protected marine

Comment 1 Response

The USACE disagrees with this determination. The USACE conducted a thorough evaluation of the impacts associated with the project in the DEIS. Remaining issues and comments were addressed and incorporated into the Final EIS (Appendix N).

Comment 2 Response

The USACE disagrees with this determination. The USACE conducted a thorough evaluation of the impacts associated with the project in the DEIS. Remaining issues and comments were addressed and incorporated into the Final EIS (Appendix N). There has also been extensive coordination with the resource agencies including the U.S. Fish and Wildlife Service, the National Marine Fisheries Service, and the Florida Department of Environmental Protection (FDEP). In addition, water quality certification will need to be obtained from FDEP for this project.

Comment 3 Response

The USACE has coordinated the use of blasting with NMFS-Protected Resources and the U.S. Fish and Wildlife Service to address potential effects of blasting on endangered, threatened and protected species. Plans currently call to use blasting only in areas where other dredging techniques are unsuccessful

Comment 4 Response

Plans currently call to use blasting only in areas where other dredging techniques are unsuccessful

Comment 5 Response

The USACE does not concur with this statement. In the Biological Assessment prepared for the National Marine Fisheries Service under the Endangered Species Act of 1973, the USACE provided a detailed discussion of Johnson's seagrass and the designated critical habitat within the project area. This assessment is found in Appendix H of the EIS. Additionally, Section 3.9.1.1 of the EIS specifically discusses Johnson's seagrass and designated critical habitat for the species

SIERRA CLUB
MIAMI GROUP
PO BOX 43-0741
South Miami, Florida 33243-0741

May 9, 2003
By Federal Express

Mr.Richard Powell, CESAJ-PD-PN
District Engineer
US Army Corps of Engineers
Jacksonville District
701 San Marco Blvd.
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5. {The project is contrary to the goals, objectives and strategies for protecting and restoring the Biscayne Bay ecosystem provided by Florida's Surface Water Improvement and Management (SWIM) Act (Ch. 373.451-373.459, F.S.).} 6

5. {The proposed mitigation is clearly inadequate} considering the extensive and permanent harm to protected marine 7

Comment 6 Response

The USACE does not concur with the Sierra Club's evaluation of the Miami Harbor project with respect to the SWIM Act. The intent of the SWIM Act is to improve and manage surface waters through the development of plans and programs (F.S. 373.451(6)). A SWIM plan for Biscayne Bay has been developed pursuant to the Act. The USACE has reviewed the Biscayne Bay SWIM Plan Planning Document and does not find the Miami Harbor project to be contrary to the goals and objectives. The Biscayne Bay SWIM Plan has three goals designed to address water quality, water quantity and environmental protection. The objectives under each of these goals describe several programs to be implemented, summarized as follows:

- The Water Quality Goal is to "maintain and improve water quality to protect and restore natural ecosystems and compatible human uses of Biscayne Bay." There are eight objectives under this goal that briefly include establishment of water quality targets, documentation of changes, reducing stormwater runoff contaminants, reducing agricultural nitrogen sources, cleaning up existing contaminated areas, improving regulatory compliance, improving water transparency, and increasing public awareness. The Miami Harbor project has included extensive coordination with state agencies on water quality issues and the USACE must also obtain water quality certification for the final project. Therefore, the project is consistent with the Water Quality Goal.
- The Water Quantity Goal is to "improve the quantity, distribution and timing of freshwater flows and circulation characteristics of Biscayne Bay as needed to protect and restore natural ecosystems." This goal has four objectives that include determining the relationship between water quantity and ecosystem health, developing surface water flow enhancement methodologies, promoting groundwater flow and improving circulation and flushing in problem areas. The Miami Harbor project will not significantly impact freshwater flows and circulation in Biscayne Bay.
- The Environmental Protection Goal is to "protect environmental resources of Biscayne Bay and adjacent areas." It includes four objectives: preserving and restoring natural environments, controlling non-native plants and animals, promoting recovery of rare species and promoting public awareness. The Miami Harbor project minimizes impacts to the bay environment by planning for the least damaging project alternative and the project proposes an extensive and ambitious mitigation plan that will promote the overall quality of the bay and offshore environment.

In summary, the Miami Harbor project does not conflict with the implementation of any of these programs. Furthermore, the USACE has demonstrated avoidance and minimization of resource impacts, has proposed a sound mitigation plan for impacts that cannot be avoided, and the project must obtain and comply with state water quality certification standards for Biscayne Bay. This is in keeping with the spirit of the SWIM Act.

Comment 7 Response

The USACE does not concur with this statement. However, the USACE has agreed to additional mitigation based on comments received during the review process.

habitats.

A. The study does not acknowledge or recognize the existence of viable flora along the vertical channel walls. During the public hearing on May 6, 2003, the ACOE biologist acknowledged the existence of coral and sponges along the vertical slopes. 8

B. The study woefully underestimates the amount of seagrass that will be affected by the project. 9

C. The study underestimates the amount of hardbottom impacts affected by the project. 10

D. The study did not consider the impact caused by anchors and cables on hardbottom and seagrass. Past widening and dredging projects have been notorious for ripping, scouring, and tearing reefs and seagrass beds. 11

The appropriate mitigation ratio should be a minimum of 5:1 and should include the entire area affected including channel bottom, side slopes, seagrass beds and hardbottoms in the calculation. (The US Fish and Wildlife Service representative at the May 6, 2003 hearing recommended a 3:1 ratio.) 12

6. The project benefits are to the largest cruise ships and cargo ships who are presently utilizing "extra" tugs to negotiate the harbor, experiencing slight delays in using the ports, and light loading their ships. It appears to be these special interest groups that are pushing the project without concern for good public policy.

7. The economic study is fundamentally flawed:

A. The ACOE economist admitted at the May 6, 2003 hearing that the assumption was made that the growth of the port is not dependent on this project. "If you don't do this, you're still going to have that level of growth." Therefore, this project cannot be justified on increasing economic activity. The economist acknowledged this. The question posed: "You're are basically telling me is that you anticipate this growth to occur no matter what. The question is the methodology by which you permit that growth to occur. Either by deeper channels which allows bigger boats, or by shallower channels which would compel smaller boats, but greater traffic, boat traffic? Correct?" ACOE economist "That's correct."

B. This assumption of constant growth with or without the project is not realistic. The project will likely increase the capacity of the port to accept more cargo from larger vessels increasing the demand for port cargo services. However, the study does not assess the potential negative impacts of port growth. For example, the study does not consider the impact on the road system. Currently, the traffic connections between the port and the national highway systems are being severely taxed by port cargo traffic. With the anticipated ten fold increase in containers and trailers projected by the study, the current ground traffic would fail. The study fails to consider the cost of improvements to expand the capacity of the impacted road systems, including bridges and connectors, which cost would be hundreds of millions of dollars. During the May 6, 2003 hearing, this traffic congestion problem was acknowledged by the ACOE economist but the economist, having made assumptions that the growth would occur with or without the project, characterized this as a local concern to be handled by the local sponsors. Should there not be an adequate plan to handle this traffic, then the port may be compelled to limit its cargo handling which would make the projections of benefits, which are dependent on cargo growth, unrealistic.

C. There was no data and analysis showing that the massive cargo growth assumed by the study (4.53% per year every year for fifty years) would occur with or without the widening and deepening of the port channels. Relying on historic trends at the port in which there was unprecedented growth over the past decade, the study projects growth over a fifty year period from 2009 to 2059, resulting in a 10 fold increase in cargo over the term of the study. Without adequate data and analysis to support this assumption, the economic impact of the project in the real world is not properly assessed. Should cargo growth occur at a slower rate, then the study's enumerated benefits arising from the project would be severely diminished. At the first year of the study period, the benefits are estimated to be slightly less than a million dollars a year. But near the end of the project study period, after massive projected growth, the benefits are estimated to be 15 million dollars a year. Without the projected growth, the estimated benefits would not occur because the benefits are dependent on the projected growth. Therefore, the plan requires the projection of sustained and uninterrupted growth at over 4.53% over a 50 year period to capture the benefits of the project. This is unrealistic. Should there be an unanticipated downturn for only a few years, there would be tremendous shortfall in identified benefits.

For the foregoing reasons, the Sierra Club's Miami Group OPPOSES the ACOE's proposal for the Miami Harbor.

Sincerely,

Comment 8 Response

The USACE does not concur with this statement. Page 21 of the Environmental Baseline report prepared as Appendix E of the DEIS states: "Colonizing taxa such as sponges and certain gorgonians were more prevalent in the channel's hardbottom areas then were hard corals. Observed algal species in both channel and offshore areas included *Caulerpa* spp., *Laurencia* spp., *Cladophora* spp., and *Halimeda* spp. Flynn, et al. (1991) noted the additional presence of *Dictyota* spp. and *Jania* spp. in the area." Additionally section 3.4 of the baseline report reviews the current rock/rubble habitat and species assemblage associated with this environment. The USACE expects that dredging operations will leave rock/rubble in the bottom of this channel, which can be recolonized by the species found there now. Additionally, Section 3.5.1 of the EIS discusses the habitat found within the channel boundaries, including the channel walls

Comment 9 Response

The EIS addresses the direct, indirect and cumulative effects of the project on the environment, including adjacent seagrass beds

Comment 10 Response

The EIS addresses the direct, indirect and cumulative effects of the project on the environment, including hardbottoms found in the project area

Comment 11 Response

Implementation of an anchoring and vessel operation plan to effectively minimize anchor and cable impacts to hardbottom habitat will occur through the RFP process and will include incentives to encourage potential contractors to avoid reef impacts. The evaluation criteria in the RFP will consider the technical aspects of the contractor's proposal as the most significant factor. As a result the vessel operational and anchoring plan that best avoids or reduces impacts to reefs will receive the highest evaluation and the incentives that follow. The idea proposed by the RFP process to the contractor is that if you break it, you buy it. Potential ideas provided by coordination with DERM, dredging companies, and other consultants that will probably appear in contractor proposals for evaluation during the RFP process include:

- Use of surge buoys along the anchor cable to help lift it up off the reef areas during dredging operations to minimize the area impacted by the anchor cable;
- Restricted anchor placement, which restricts placement of the anchors for the cutter-suction dredge to within the channel edge limits. That method reduces impacts but almost doubles dredging time since only half of the channel can effectively be dredged at a time.

Comment 12 Response

Mitigation ratios for impacted areas were developed in coordination with the National Marine Fisheries Service and the US Fish and Wildlife Service. For hardbottom impacts to areas not previously dredged, NOAA's Habitat Equivalency Analysis (HEA) was conducted, in concert with current Federal policy for impacts to coral reefs and hardbottom communities. The HEA is commonly used by NOAA's - National Marine Sanctuary program in assessing mitigation ratios within the boundaries of the Florida Keys National Marine Sanctuary. As a result of comments received on the DEIS, the USACE plans to utilize the entire acreage of the seagrass site as mitigation for project impacts. With regard to previously dredged channel bottoms and channel walls, the Port of Miami developed a mitigation site for the impacts to these habitats in 1996 under the direction of Miami-Dade DERM. No additional mitigation for previously dredged areas will be included

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B. The study woefully underestimates the amount of seagrass that will be affected by the project.

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The appropriate mitigation ratio should be a minimum of 5:1 and should include the entire area affected including channel bottom, side slopes, seagrass beds and hardbottoms in the calculation. (The US Fish and Wildlife Service representative at the May 6, 2003 hearing recommended a 3:1 ratio.)

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A. The ACOE economist admitted at the May 6, 2003 hearing that the assumption was made that the growth of the port is not dependent on this project.} "If you don't do this, you're still going to have that level of growth." Therefore, this project cannot be justified on increasing economic activity. The economist acknowledged this. The question posed: "You're are basically telling me is that you anticipate this growth to occur no matter what. The question is the methodology by which you permit that growth to occur. Either by deeper channels which allows bigger boats, or by shallower channels which would compel smaller boats, but greater traffic, boat traffic? Correct?" ACOE economist "That's correct." 14

B. {This assumption of constant growth with or without the project is not realistic.} The project will likely increase the capacity of the port to accept more cargo from larger vessels increasing the demand for port cargo services. However, the study does not assess the potential negative impacts of port growth. For example, {the study does not consider the impact on the road system.} Currently, the traffic connections between the port and the national highway systems are being severely taxed by port cargo traffic. With the anticipated ten fold increase in containers and trailers projected by the study, the current ground traffic would fail. The study fails to consider the cost of improvements to expand the capacity of the impacted road systems, including bridges and connectors, which cost would be hundreds of millions of dollars. During the May 6, 2003 hearing, this traffic congestion problem was acknowledged by the ACOE economist but the economist, having made assumptions that the growth would occur with or without the project, characterized this as a local concern to be handled by the local sponsors. Should there not be an adequate plan to handle this traffic, then the port may be compelled to limit its cargo handling which would make the projections of benefits, which are dependent on cargo growth, unrealistic.} 15 16

C. {There was no data and analysis showing that the massive cargo growth assumed by the study (4.53% per year every year for fifty years) would occur with or without the widening and deepening of the port channels. Relying on historic trends at the port in which there was unprecedented growth over the past decade, the study projects growth over a fifty year period from 2009 to 2059, resulting in a 10 fold increase in cargo over the term of the study. Without adequate data and analysis to support this assumption, the economic impact of the project in the real world is not properly assessed. Should cargo growth occur at a slower rate, then the study's enumerated benefits arising from the project would be severely diminished. At the first year of the study period, the benefits are estimated to be slightly less than a million dollars a year. But near the end of the project study period, after massive projected growth, the benefits are estimated to be 15 million dollars a year. Without the projected growth, the estimated benefits would not occur because the benefits are dependent on the projected growth. Therefore, the plan requires the projection of sustained and uninterrupted growth at over 4.53% over a 50 year period to capture the benefits of the project. This is unrealistic. Should there be an unanticipated downturn for only a few years, there would be tremendous shortfall in identified benefits.} 17

For the foregoing reasons, the Sierra Club's Miami Group OPPOSES the ACOE's proposal for the Miami Harbor.

Sincerely,

Comment 13 Response

See response to EPA-1 Comment

Comment 14 Response

See response to EPA-1 Comment.

Comment 15 Response

See response to EPA-1 Comment.

Comment 16 Response

Impacts to the road system are not within the scope of the EIS, the purview of the USACE, or the authorization for the study as granted by Congress. The local sponsor is participating in numerous studies and improvement programs intended to help address road system improvements. However, road capacity is not expected to limit cargo growth. See further discussion of transportation in the response to comment EPA-1.

Comment 17 Response

See response to EPA-1 Comment.

TROPICAL AUDUBON SOCIETY, INC.
5530 Sunset Dr., Miami, FL 33143
Phone (305) 666-5111 • Fax (305) 667-9343
"THE VOICE OF CONSERVATION IN SOUTH FLORIDA . ."

May 12, 2003

Mr. Richard B. Powell
US Army Corps of Engineers
Planning Division
PO Box 4970
Jacksonville, FL 32232-0019

Ms. Terri Jordan
US Army Corps of Engineers
Planning Division
PO Box 4970
Jacksonville, FL 32232-0019

Re: Navigation Study for the Miami Harbor, Draft General Reevaluation Report and Environmental Impact Statement

Dear Mr. Powell and Ms. Jordan:

Please accept this correspondence as the Tropical Audubon Society's comments on the Miami Harbor Expansion project. If you have any questions, please feel free to contact me at the above phone number, or by e-mail at director@tropicalaudubon.org.

On behalf of the Tropical Audubon Society (TAS), I would like to convey our concern regarding many aspects of the proposed expansion of the Port of Miami. While it is widely recognized that the Port serves as an economic engine in our community, and while we understand the desire of the Port's administration to remain competitive in their industry, we do not feel that environmental degradation is ever the appropriate price to be paid for economic gains. At some point, it may become appropriate for our community to begin to make the hard decisions that other areas (like the Florida Keys) are now being forced to make. We ask, "What is the carrying capacity of Biscayne Bay and our off-shore waters, and can these water bodies absorb the needs of the Port without suffering?" 1

TAS is not alone in this thinking. In their January 2001 final report, the Policy Development Committee of the Biscayne Bay Partnership Initiative stated that, "some economic activities associated with the bay may need to be phased out due to their adverse environmental impact on the bay, and their role in the Miami-Dade County economy assumed by more environmentally friendly economic activities." This project to expand the Port (which involves the destruction of large areas of benthic habitats and puts other biological resources at risk) so that the Port can

Comment 1 Response

No information is available on the carrying capacity of Biscayne Bay. However, analysis for this project leads the USACE to conclude that the carrying capacity of the bay is not exceeded by the project

{accommodate mega-cruiseships. Post-Panamax, and Super-Post-Panamax vessels may be not be warranted. Can the Port not fill an industry niche and remain economically sustainable by maintaining those services that currently exist?} 2

If the project is to move forward, TAS urges the USACE to consider the following.

Manatees:
Pursuant to the Miami-Dade County Manatee Protection Plan, areas directly south of and adjacent to the Port are designated as Essential Manatee Habitat. {Manatees should be afforded the highest level of protection. 3 Manatees use the waters of the Port and associated channels. Work will occur with and directly adjacent to Essential Manatee Habitat and the Bill Sadowsky Critical Wildlife Area. Construction methods for the dredging are going to be chosen by the bid and contract process, therefore the current EIS doesn't (and can't) address all of the potential impacts and threats to manatees that may materialize as a result of the blasting and dredging activities.} Additionally, the work will result in {direct impacts to seagrass on shallow bay bottom in the Biscayne Bay 4 Aquatic Preserve (an Outstanding Florida Water) and will therefore directly impact forage habitat for manatees. This may result in alteration of migration patterns and behavior of manatees.}

Currently, the USACE is the permit applicant to the Florida Department of Environmental Protection for a pending Consolidated Environmental Resource Permit and Sovereign Submerged Lands Authorization (Permit No 0173770-001-EI). This authorization is being sought for continuation of dredging at the Port (separate from the expansion project in the GRR, but related to Port improvements). {Correspondence we have seen 5 indicates the USACE will only implement stringent manatee protection conditions if or when take occurs. TAS considers this unacceptable and hopes that the USACE will take a more proactive approach with any port expansion activities. TAS urges that blasting be prohibited, which would provide protection to other marine mammals, turtles, and fish as well.}

Seagrasses and other benthic habitats:
Because of the particulars of the proposed expansion project, large acreages of both vegetated and non-vegetated submerged bottom is going to be directly impacted by the proposed work. {TAS urges the USACE to investigate alternatives that would provide the 6 smallest achievable (i.e. most vertical) stabilized slopes in order to minimize destruction of bottom habitats.}

TAS also urges the USACE to reconsider the amount of mitigation that is being proposed, both for seagrass and for hard-bottom communities. Because mitigation areas do not achieve instantaneous ecological benefits (i.e.{there is a time lag in 7 realizing environmental productivity) and because the proposed mitigation areas are far removed from the proposed impact sites, TAS suggests that the mitigation ratios should be increased. As an example, FDEP has required mitigation ratios on the order of 5:1 or more for seagrass.}

Comment 2 Response

See response to EPA-1 Comment.

Comment 3 Response

The USACE has coordinated the use of blasting with NMFS-Protected Resources and the US Fish and Wildlife Service to address potential effects of blasting on endangered, threatened and protected species. Plans currently call to use blasting only in areas where other dredging techniques are unsuccessful.

Comment 4 Response

The USACE disagrees with this determination. Less than 1% (less than 10 acres) of the forage habitat available to manatees in Biscayne Bay (1,000 acres of seagrass in the bay - DERM, 2003) will be affected by the proposed project and creation of the proposed mitigation site will create approximately 24 acres in an area of the bay that has been documented as a manatee forage area, thus creating a net increase of more than 16 acres of available forage habitat for manatees in Biscayne Bay.

Comment 5 Response

The USACE disagrees with this statement. In the current permitting process for Phase II, the USACE has agreed to many manatee protection measures that were proposed by the Florida Fish and Wildlife Conservation Commission. The USACE has anticipated construction methods for the Phase II project and the GRR by looking at the hardness of the rock in the port. The construction methods likely to be utilized for both projects are confined underwater blasting and dredging. The USACE has worked with the FWS and State of Florida to develop a set of standard protective protocols to protect manatees during dredging operations. The conditions are included in the July 2002 BA to FWS found in Appendix H of the EIS, and begin on page 18 of the document, in the section entitled “Conservation Measures”. Due to the likelihood of the use of confined underwater blasting for the Port of Miami projects, the USACE has worked with NMFS, FWS and the State to develop safety protocols for manatees, sea turtles and dolphins that may be near the project area in a proactive manner.

Comment 6 Response

The geotechnical properties of the excavated slope and the resulting slope stabilization cannot be controlled by the dredging process because the slope results from the removal of material from the base, as well as the inherent geological characteristics of the area. The final side slope of an excavation is a function of the geotechnical properties and characteristics of the in-situ material. Because of this, the side slope can only be approximated within a general range. The USACE has tried to estimate as accurately as possible the impacts to environmentally sensitive areas, as shown in Appendix G of the EIS. Construction would also be closely monitored to better ensure that excavation is contained within the proposed channel limits, thereby minimizing the potential for environmental impacts.

Further, TAS is concerned about potential impacts to Johnson's seagrass. {TAS urges the USACE to do more comprehensive studies of the proposed impact sites to determine if Johnson's seagrass will be impacted. We believe that it is highly likely that Johnson's seagrass does occur in some areas slated for dredging, and that this grass has avoided detection due to its diminutive size and ephemeral nature.} 8

The RFP process:

The RFP process is often seen as an opportunity for innovative technologies, cost efficiency, and project success. However {there is a long history of the RFP process resulting in a low-bid winner whose only goal is to maximize profits by utilizing short cuts to minimize costs. The focus of low-bid winners is cost effectiveness, not environmental protection.} 9

Dredging methodology:

{The Tropical Audubon Society urges the USACE to select the most environmentally friendly technology, blasting should be seen as a method of last resort, after all other alternatives have been exhausted. Additionally, the USACE must ensure that water quality does not suffer as a result of any of the dredging methods chosen.} 10

Spoil Disposal:

{Once the material is liberated from the bottom, transport to a final disposal area can pose some problems. If the material is destined for offshore disposal, what methods will be used to verify that the material is making it to the correct offshore disposal location? If the material is to be off-loaded onto Virginia Key, where will that transfer take place? What will be done to keep construction vessels and barges away form the sensitive biological resources of the Bill Sadowsky Critical Wildlife Area? In the absence of local regulatory authority, who will be responsible for disposal monitoring, compliance, and (if necessary) enforcement?} 11

Other Issues:

TAS is also concerned about secondary and indirect impacts that may occur as a result of the proposed expansion. There is a potential, for instance, that vessel and barge activities associated with the mitigation may impact shallow seagrasses in Biscayne Bay. There are tremendous implications on the upland impacts of the Port's expanded activities (increased traffic and infrastructure needs). There is also the potential for larger vessels running aground on our fragile reefs up and down the shores of Florida as they transit to and from the Port (representing a potential adverse effect on Biscayne National Park, John Pennekamp Coral Reef State Park, and the Looe Key National Marine Sanctuary). We urge the USACE to be considerate of these and other secondary and indirect impacts that may result from the proposed expansion.

Thank you for this opportunity to comment on this project. I look forward to your response to our questions and concerns.

Sincerely,

Cynthia Guerra, Executive Director

Comment 8 Response

The USACE agrees that H. johnsonii has been positively identified and documented in Biscayne Bay but the USACE does not concur with the statement that the documented absence of H. johnsonii from the study area is not justified. The seagrass survey conducted by the USACE covered the entire seagrass area. Divers were used to conduct quantitative surveying of seagrasses along 35 transects and also to map all seagrass coverage and habitat type between transects (see Appendix E of the FEIS). Using this methodology, Johnson's seagrass was not detected within the entire study area. In addition, several reconnaissance visits to the impact site within Components of 5 and 5A have been conducted both before and after the USACE study by qualified agency and consulting personnel. Johnson's seagrass has not been detected during any of those visits. The Port of Miami (Port) biological consultants have surveyed the site at least four times. In addition, DERM has mapped the entire seagrass edge in this area through extensive fieldwork and to our knowledge has not identified H. johnsonii. In fact the DERM seagrass line is used in the GRR impact analysis. In addition, the following site visits with federal agency personnel in attendance have also been conducted relative to Components 5 and 5A:

- December 2001 – Biologists from the Port, DERM, National Marine Fisheries Service (NMFS) and U.S. Fish and Wildlife Service (FWS) in attendance.
- March 2002 – Biologist from NMFS in attendance.
- May 2003 – Biologists from the USACE, DERM, NMFS, FWS and Florida Department of Environmental Protection in attendance.

During the May 2003 visit, agency personnel experienced in identifying Johnson's seagrass expressed the general opinion that the high energy conditions found along Fisherman's Channel (impact site for Components 5 and 5A) probably do not favor recruitment of Johnson's seagrass. This opinion was based on the strong tidal currents experienced in this area and the prevalence of sandy/shelly substrate. While the USACE does not want to speculate on specific conditions necessary for recruitment and survival of Johnson's seagrass in Biscayne Bay, we do not agree with the foregone conclusion that "there is no apparent physiological or ecological limitation for H. johnsonii to exist" in the study area. The USACE believes that the intensive transect survey they have conducted in conjunction with numerous agency reconnaissance site visits over the years provide more than sufficient confidence in the conclusion that H. johnsonii is currently and has been in the past, absent from Components 5 and 5A of the study area. Although, as stated in NOAA's comment letter (see comment NOAA-11, page 6), a NOAA fisheries biologist observed a specimen of *H. johnsonii* in the vicinity of the proposed work (Component 3). However, the specimen was not definitively identified as *H. johnsonii,* and subsequent attempts to confirm its presence proved unsuccessful.

Comment 9 Response

Recent experience with the Request for Proposal (RFP) process indicates just the opposite, that potential contractors will respond to incentives, which encourage environmental protection. The proposed project will include as part of the RFP process an incentive approach, which evaluates a potential contractor's technical approach as most significant. The idea (if you break it, you buy it) is to encourage potential contractors to develop a technical approach or construction methodology, which will avoid or minimize impacts to reef and seagrass areas.

Comment 10 Response

The USACE has coordinated the use of blasting with NMFS-Protected Resources and the U.S. Fish and Wildlife Service to address potential effects of blasting on endangered, threatened and protected species. Plans currently call to use blasting only in areas where other dredging techniques are unsuccessful. A state water quality certification will be obtained prior to construction and complied with.

Comment 11 Response

The USACE concurs that spoil disposal operations should follow appropriate guidelines and should be monitored. Use of the ODMDS must comply with the ODMDS Management Plan (as developed by the EPA). The Plan requires monitoring, tracking, and reporting of each disposal event. Should Virginia Key be used for disposal, the material is expected to be piped to the east side of the existing disposal site in the vicinity of where discharge pipes were located during prior disposal events. This area is on the opposite side of the island from the Critical Wildlife area. Material will not be barged into the Critical Wildlife Area.

Further, TAS is concerned about potential impacts to Johnson's seagrass. TAS urges the USACE to do more comprehensive studies of the proposed impact sites to determine if Johnson's seagrass will be impacted. We believe that it is highly likely that Johnson's seagrass does occur in some areas slated for dredging, and that this grass has avoided detection due to its diminutive size and ephemeral nature.

The RFP process:
The RFP process is often seen as an opportunity for innovative technologies, cost efficiency, and project success. However, there is a long history of the RFP process resulting in a low-bid winner whose only goal is to maximize profits by utilizing short cuts to minimize costs. The focus of low-bid winners is cost effectiveness, not environmental protection.

Dredging methodology:
The Tropical Audubon Society urges the USACE to select the most environmentally friendly technology, blasting should be seen as a method of last resort, after all other alternatives have been exhausted. Additionally, the USACE must ensure that water quality does not suffer as a result of any of the dredging methods chosen.

Spoil Disposal:
Once the material is liberated from the bottom, transport to a final disposal area can pose some problems. If the material is destined for offshore disposal, what methods will be used to verify that the material is making it to the correct offshore disposal location? If the material is to be off-loaded onto Virginia Key, where will that transfer take place? What will be done to keep construction vessels and barges away form the sensitive biological resources of the Bill Sadowsky Critical Wildlife Area? In the absence of local regulatory authority, who will be responsible for disposal monitoring, compliance, and (if necessary) enforcement?

Other Issues:
TAS is also concerned about secondary and indirect impacts that may occur as a result of the proposed expansion. There is a potential, for instance, that vessel and barge activities associated with the mitigation may impact shallow seagrasses in Biscayne Bay. There are tremendous implications on the upland impacts of the Port's expanded activities (increased traffic and infrastructure needs). There is also the potential for larger vessels running aground on our fragile reefs up and down the shores of Florida as they transit to and from the Port (representing a potential adverse effect on Biscayne National Park, John Pennekamp Coral Reef State Park, and the Looe Key National Marine Sanctuary). We urge the USACE to be considerate of these and other secondary and indirect impacts that may result from the proposed expansion. 12

Thank you for this opportunity to comment on this project. I look forward to your response to our questions and concerns.

Sincerely,

Cynthia Guerra, Executive Director

Comment 12 Response

Recent surveys and additional diver investigations on October 21, 2003, with DERM representatives of the Julia Tuttle borrow site (proposed as a potential seagrass mitigation site by DERM in their Technical Report 89-10, Filling Program for Dredged Depressions in North Biscayne Bay) indicate sufficient depths for access and construction of the proposed seagrass mitigation site. As a result of the recent site visit, revised drawings of the proposed mitigation site locations and depths are provided in Section 5.0 and Appendix J of the FEIS.

Increased traffic and infrastructure needs are discussed in response to EPA-1 comment. Concerning the potential for larger vessels to run aground on the Florida reef tract as they transit up and down the coast of Florida the response to EPA-1 comment states that the transition from smaller to larger vessels results in fewer vessel calls at Miami Harbor, reducing traffic congestion and associated safety problems. This is demonstrated by the fact that although cargo and passenger traffic grew at average annual rates of 8.1 % and 2.1%, respectively, from 1990 to 2000; the number of ship calls remained about the same: 3,456 calls in 1990; and 3,447 calls in 2000. This phenomenon is the direct result of the increase in size of cargo and cruise ships during the 1990's.

Tropical Audubon Society

EAS ENGINEERING, INC.
55 ALMERIA AVE. • CORAL GABLES • FLORIDA 33134 • (305) 445-5553 • FAX (305) 444 21[illegible]2 • WWW.EAS-ENG.COM

May 5, 2003

Col. James G. May
U.S. Army Corps of Engineers
P.O. Box 4970
Jacksonville, Florida 32232-0019

Re: Miami Harbor Maintenance and Construction Dredging
General Reevaluation Report and Environmental Impact Statement

Dear Col. May:

Please accept this letter as a summary of our concerns regarding above referenced GRR & EIS for the expansion of Miami Harbor for the Port of Miami. These concerns relate to the potential impact of the proposed work on Fisher Island.

{Our primary concern involves Components 5 and 5A, as well as the deepening of Cuts 2 and 3 to 50 feet. It is our understanding that Component 5 involves increasing the width of Fisherman's Channel about 100 feet to the south of the existing channel, and that Component 5A was adopted to improve clearance between the proposed widener and the existing bulkhead on Fisher Island. Even with this modification, the proposed channel will be within 50 feet of the Fisher Island bulkhead. 1

Even with the clearance provided by Component 5A, this component would bring the channel closer to Fisher Island, and would deepen the channel from 42 feet to 50 feet. We believe this activity will seriously impact the seawalls along the north side of Fisher Island and will cause tremendous erosion leading to significant loss of upland property.} The reasons for our concern are summarized below:

1. The existing seawall panels on the north side of Fisher Island were designed to extend to an elevation of (-)6.0' NGVD. A cross-section of this seawall, taken from the construction plans, is presented as Exhibit A. The wall was designed and installed in the mid-1980's. The panels were embedded approximately two feet into the sediment at that time.

2. On December 15, 1999, EAS Engineering inspected the northern seawall after Fisher Island

Comment 1 Response

An economic analysis of the remaining useful life of the bulkhead along Fisher Island will be included in the Economics Appendix A of final report based on a September 5, 2003, report by Shaw Environmental and Infrastructure, Inc. That independent evaluation of the bulkhead along components 5 and 5A indicates that use of a segment of the bulkhead, as a berthing facility may be a significant cause of the structural deterioration.

Reviews of the as-built drawings of the bulkhead indicate that it was not designed for berthing or docking purposes. However, the post-construction installation of mooring cleats and the scratches, cracks, and chips along the cap beam indicate mooring activities.

The report notes that the majority of piles in the area where the mooring cleats are located had cracks greater than 0.25-inches wide and 24-inches long, large spalls, and exposed rusty rebar (Figures 12-17, Shaw Environmental & Infrastructure, Inc. report located in Economics Appendix A). Examination of other areas of the bulkhead reveals damage to the pile cap beam and spalling pile heads, horizontal cracks and spalling on the 6-inch-thick concrete panels (Figures 13 and 14). Those cracks appear to be caused by ship berthing rather than by failed tiebacks. The panel would be deflected in the opposite direction if the damage occurred from tieback failure. Six sinkholes, ranging from one-foot deep to 3- to 4-feet wide were found along the landward face of the cap beam (Figures 6-11). Upland surface water drainage through ruptures in the filter cloth behind panel joints represents the most likely cause of the sinkholes.

The report summarizes findings, which indicate that structural deterioration of the Fisher Island bulkhead, especially along the segment with mooring cleats, may be attributable to ship berthing activities as evidenced by:

- The post-construction addition of cleats and fenders for mooring lines;
- Scratches, dents, cracks, and chips along the waterside portion of the cap beam appearing to be the result of impacts;
- The increased water depth and absence of rip rap along the segment with mooring cleats, both possibly caused by dredging or vessel propeller scour; and
- The specific location, shape, and size of the sinkholes indicating that they are not likely due to toe failure, but ship impact, uneven earth movements, or construction defects.

Paragraph 180 in the main report includes the results of the economic analysis of the remaining useful life of the Fisher Island bulkhead based on information from the September 5, 2003, report by Shaw Environmental and Infrastructure, Inc. A present worth figure of $291,000 is obtained from that information and annualized over the 50-year economic life of the project resulting in an average annual equivalent value of about $18,000, which is included as part of the economic costs of the proposed project. Economics - Appendix A contains a more detailed discussion of the evaluation of the Fisher Island Bulkhead on page 106.
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observed loss of soil from behind the wall. We observed that, along its entire length, from approximately Stations 5+00 to 19+00 in the Fisherman's Channel Cut, the bottoms of the panels were exposed and backfill had eroded out from behind the panels due to subsidence of the bottom sediments waterward of the seawall. A copy of that inspection report is enclosed.

3. We retained a geological consultant with considerable local experience to review the Corps' soil borings and the information presented in Appendix G of the GRR (Side-Slope Determination Methodology). A copy of their report is enclosed. They agree with the Corps' finding that the predicted slope of the sediment above the rock will be 1V:5H to 1V:7H, but they disagree with the Corps' estimate of the depth to rock. They conclude that the lime rock stratum is considerably deeper in the vicinity of Fisher Island than predicted in Appendix G, namely -30 feet NGVD vs. the -11.2 to -16.0 feet NGVD described in Appendix G. As a result, the sloughing of sediment resulting from the proposed dredging would lower the bottom at the face of Fisher Island's north seawall to a depth of -21 feet NGVD, thereby causing severe damage.

4. We prepared cross-sections of the existing bottom in the vicinity of Fisher Island, based on the Corps' own bathymetric data, and we note that past dredging extended well beyond the proposed dredging limits (south of Range 400). The enclosed cross-sections (Exhibit B) show the existing water depths at Stations 2+00, 9+00, 13+00 and 18+00 of Fisherman's Channel and at Station 20+00 of Cut 3. The edge of dredging (arbitrarily defined as the -20' contour) extends from 60 to 110 feet past Range 400, where dredging should have ended. Similar results were common at all stations in this area. We conclude that similar over-dredging could be expected in this new proposed dredging plan, thus bringing the damaging results of sloughing of bottom sediment even closer to Fisher Island than would occur if dredging stopped at the proposed dredging limits.

5. Recent photos of the south edge of Government Cut near Fisher Island (Exhibit C) show what appear to be fragmented rock along the edges of Government Cut, with the fragments falling into the cut. This suggests that either the dredging or subsequent erosion undermined the rock along the edges of the channel to a point where it fragmented. This sort of unanticipated effect could also cause further damage to Fisher Island's shoreline structures.

Finally, Fisher Island operates two (2) ferry terminals; one on the mainland adjacent to Cut 4 and one on Fisher Island, adjacent to Cut 3, just west of component 2A. It is our understanding that no widening or deepening are proposed in Cut 4. It appears, however, that Cut 3 will be deepened to a depth of 50 feet (although it is not clear that this dredging is described in the GRR). Any {deepening of Cut 3 will affect the north shoreline and the island ferry terminal of Fisher Island in the same way as described above} and must be addressed. 2

Comment 2 Response

The Shaw Environmental & Infrastructure report referenced in the response to EAS-1 comment notes that, while more information would be required to make a complete evaluation, the ferry slip bulkhead appears to still be in its useful life assuming that the bulkhead was properly designed for propeller scour potential. Past deepening has not appeared to impact the condition of the existing bulkhead.

The impacts to the infrastructure of Fisher Island, as described above, are unacceptable to Fisher Island and must be addressed before these improvements are approved in any manner.

We appreciate this opportunity to comment on the GRR and EIS and we trust that you will take our concerns into consideration. If you have any questions or need additional information, please feel free to call us.

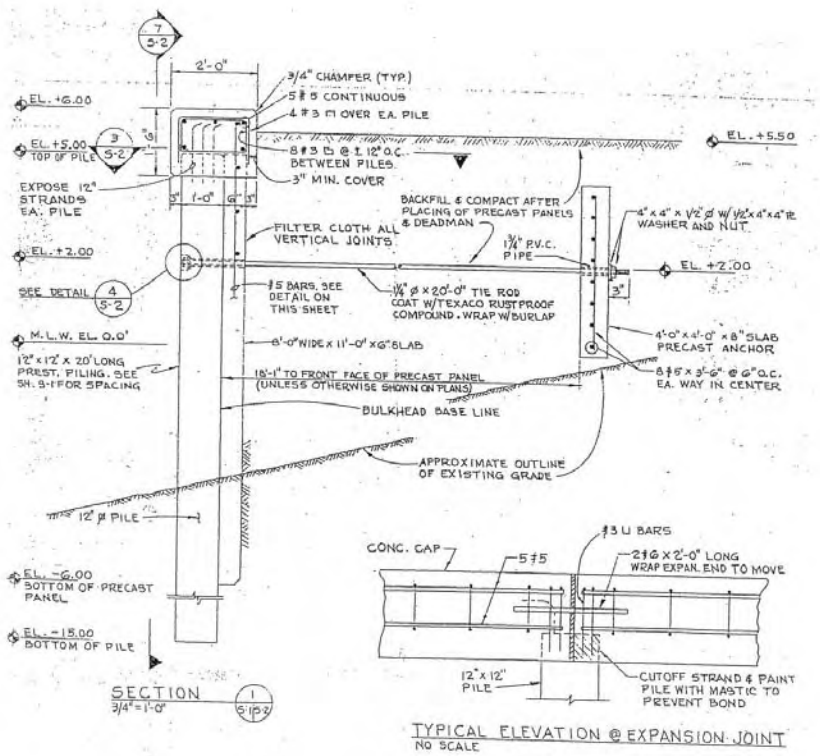
Sincerely,

EAS Engineering, Inc.

Edward A. Swakon, P.E.
President
spl
enclosures

cc: Michael Posey (w/encl)
Cliff Schulman (w/encl)
Charles Towsley, Port Director (w/encl)

Exhibit A


7
S-2
2'-0"
3/4" CHAMFER (TYP.)
5 #5 CONTINUOUS
4 #3 ⊓ OVER EA. PILE
EL. +6.00
EL. +5.00
TOP OF PILE
3
S-2
8 #3 ⊔ @ ± 12" O.C.
BETWEEN PILES
3" MIN. COVER
EL. +5.50
EXPOSE 12"
STRANDS
EA. PILE
3"
1'-0"
6"
3"
BACKFILL & COMPACT AFTER
PLACING OF PRECAST PANELS
& DEADMAN
4" x 4" x 1/2" ø w/ 1/2" x 4" x 4" PL
WASHER AND NUT.
FILTER CLOTH ALL
VERTICAL JOINTS
1 3/4" P.V.C.
PIPE
EL. +2.00
EL. +2.00
SEE DETAIL
4
S-2
#5 BARS, SEE
DETAIL ON
THIS SHEET
1 1/4" ø x 20'-0" TIE ROD
COAT W/TEXACO RUSTPROOF
COMPOUND. WRAP W/BURLAP
3"
M.L.W. EL. 0.0'
8'-0" WIDE x 11'-0" x 6" SLAB
4'-0" x 4'-0" x 8" SLAB
PRECAST ANCHOR
12" x 12" x 20' LONG
PREST. PILING. SEE
SH. 9-1 FOR SPACING
18'-1" TO FRONT FACE OF PRECAST PANEL
(UNLESS OTHERWISE SHOWN ON PLANS)
8 #6 x 3'-6" @ 6" O.C.
EA. WAY IN CENTER
BULKHEAD BASE LINE
APPROXIMATE OUTLINE
OF EXISTING GRADE
12" ø PILE
EL. -6.00
BOTTOM OF PRECAST
PANEL
EL. -15.00
BOTTOM OF PILE
SECTION
3/4" = 1'-0"
1
S-1 & S-2
#3 U BARS
CONC. CAP
5 #5
2 #6 x 2'-0" LONG
WRAP EXPAN. END TO MOVE
12" x 12"
PILE
CUTOFF STRAND & PAINT
PILE WITH MASTIC TO
PREVENT BOND
TYPICAL ELEVATION @ EXPANSION JOINT
NO SCALE

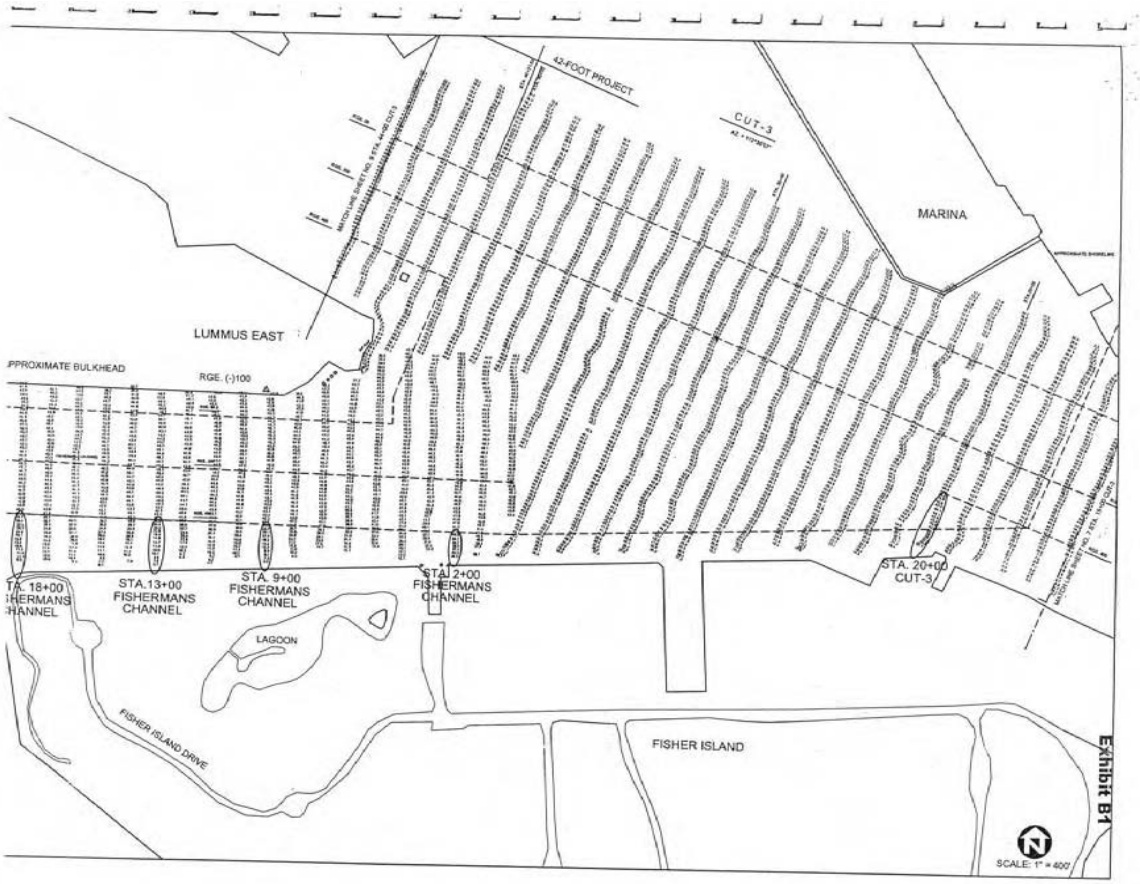
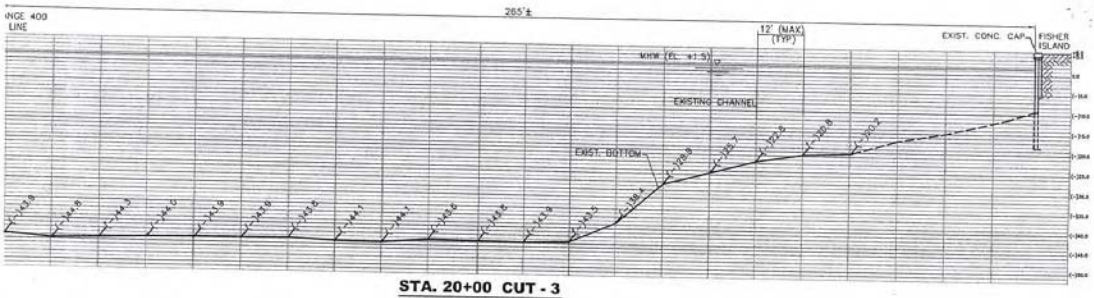
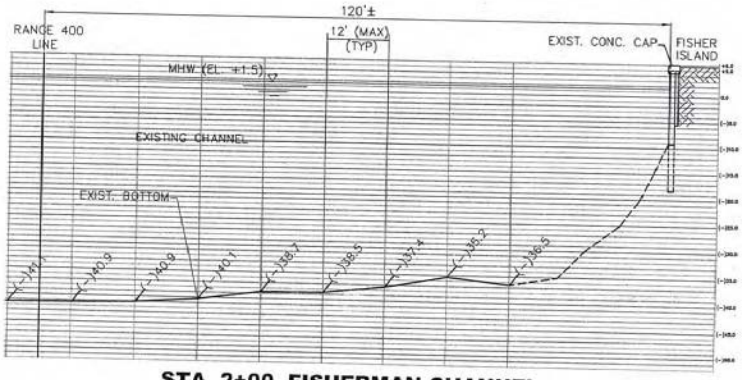

42-FOOT PROJECT
CUT-3
MARINA
LUMMUS EAST
PPROXIMATE BULKHEAD
RGE. (-)100
TA. 18+00
HERMANS
HANNEL
STA.13+00
FISHERMANS
CHANNEL
STA. 9+00
FISHERMANS
CHANNEL
STA. 2+00
FISHERMANS
CHANNEL
STA. 20+00
CUT-3
LAGOON
FISHER ISLAND DRIVE
FISHER ISLAND
SCALE: 1" = 400'

Exhibit B1



STA. 20+00 CUT - 3

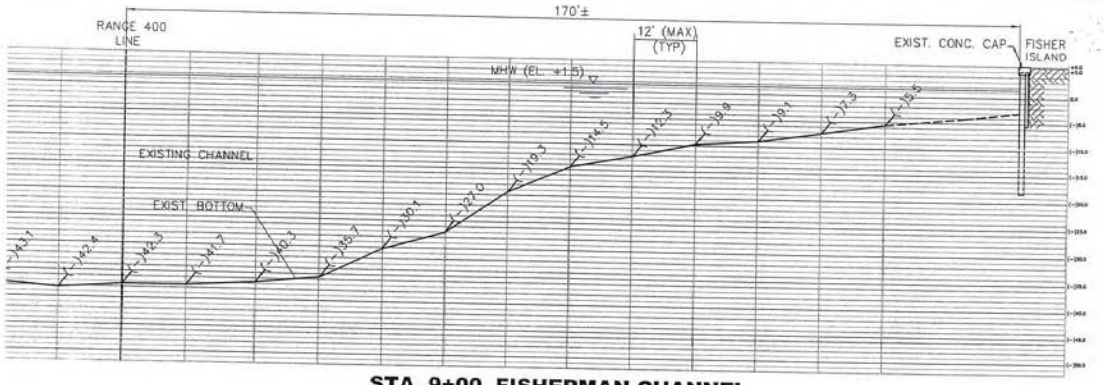
SCALE: 1"= 25'



STA. 2+00 FISHERMAN CHANNEL

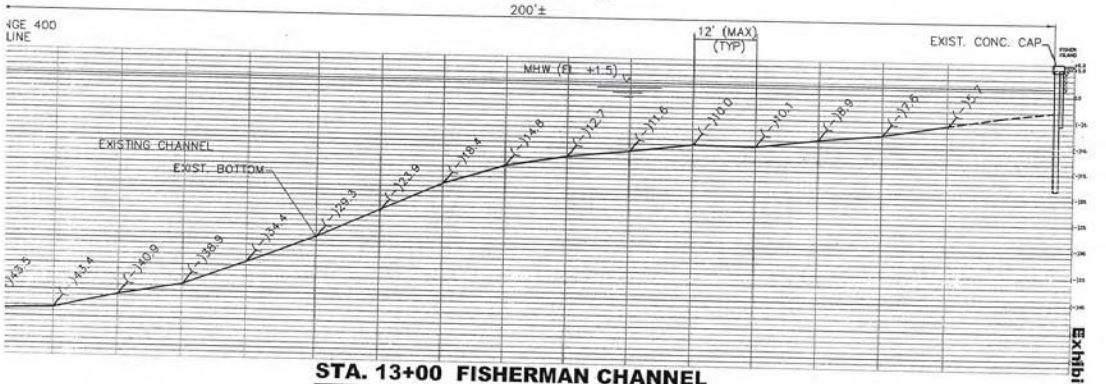
SCALE: 1"= 20'

Exhibit B2



STA. 9+00 FISHERMAN CHANNEL

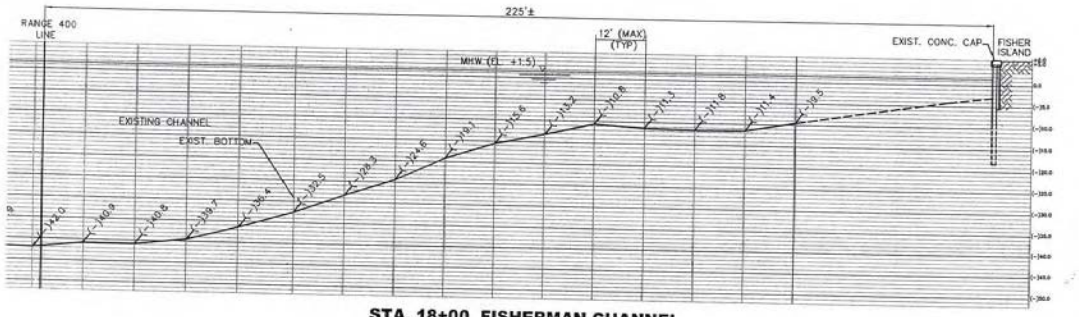
SCALE: 1"= 20'



STA. 13+00 FISHERMAN CHANNEL

SCALE: 1"= 20'

Exhibit B3

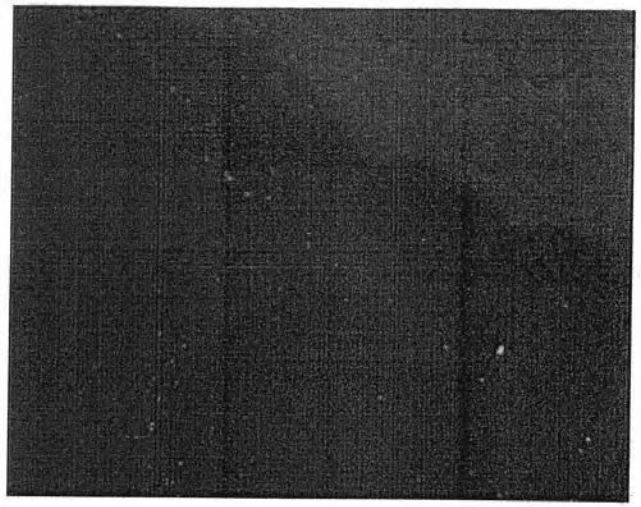


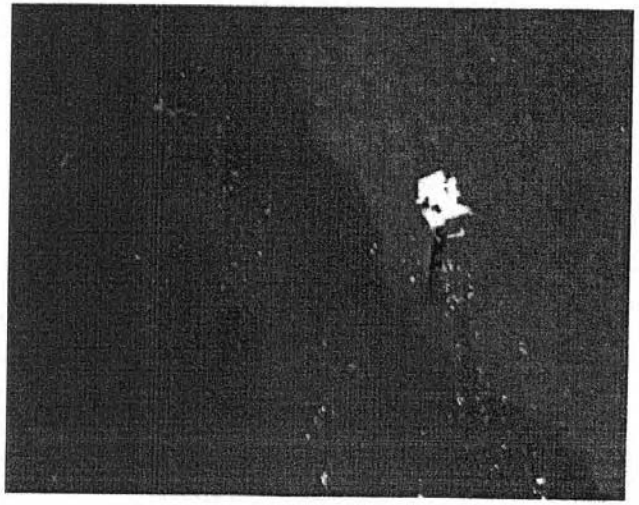
STA. 18+00 FISHERMAN CHANNEL

SCALE: 1"= 25'

Exhibit B4

Exhibit C1





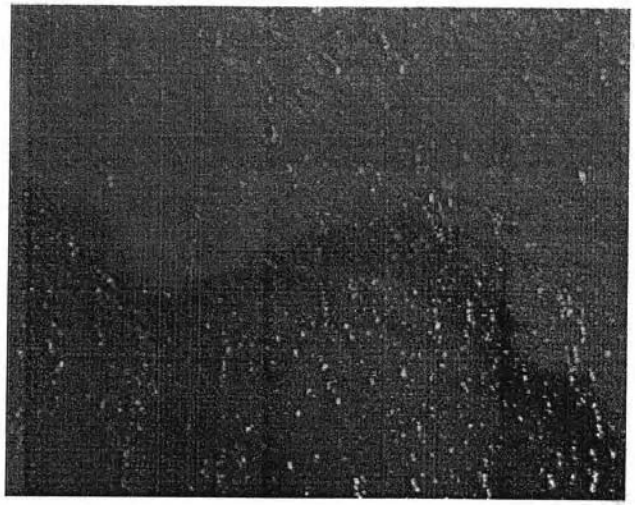
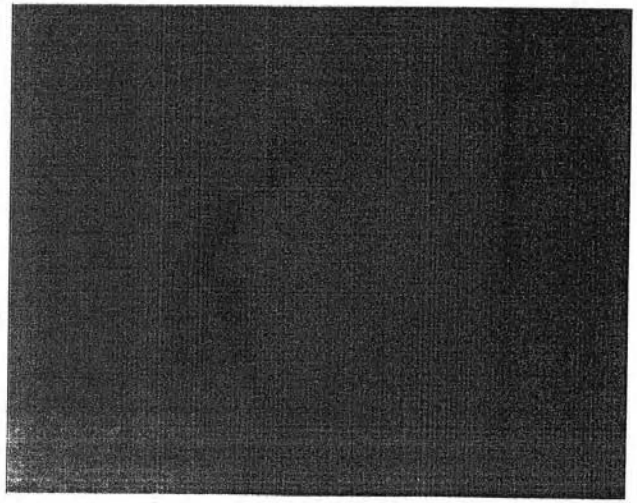
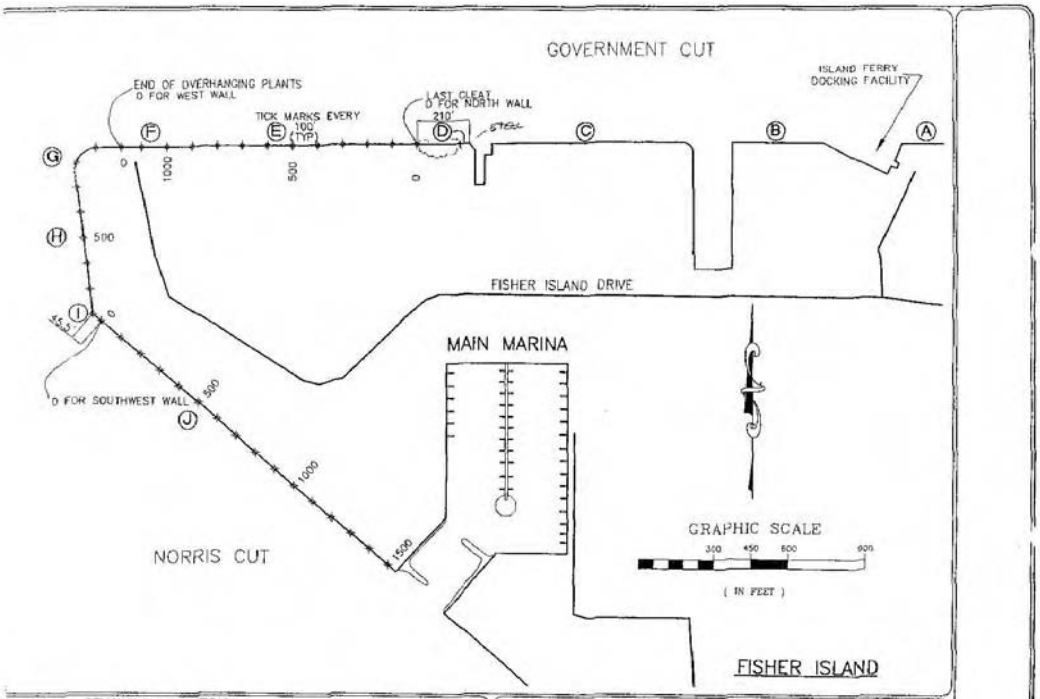


Exhibit C2





PURPOSE: SEAWALL INPECTION
DATUM: N/A

EAS ENGINEERING, INC.
65 ALMERIA AVENUE CORAL GABLES 33134 (305)446-5553

COUNTY OF MIAMI-DADE STATE OF FLORIDA
APPLICATION BY:
FISHER ISLAND CLUB, INC.
ONE FISHER ISLAND DRIVE SECTION:
FISHER ISLAND, FLORIDA TOWNSHIP:
SHEET 1 DATE: 01/18/00 RANGE:

Fisher Island Seawall Inspection

17-Jan-00

SW Seawall

Distance from Start Point (see Sketch)	Observation
42	2" pvc pipe vertical against pile
85	3" gap between pile and panels
130	Several piles discarded in front of wall. Depression (~1" between panel and piles)
186	3" gap between pile and panels
334	Large rock in front of wall
364	Large rock in front of wall
384	Large rock in front of wall
570	Depression adjacent to panel. Bottom of panel not detected
746	3" gap between pile and panels with 3" space between panels
798	3" gap between pile and panels with 3" space between panels
10' back from marina entrance.	Bottom of Panel exposed

West Wall

Distance from Start Point (see Sketch)	Observation
0 to 124	Large boulder riprap adjacent to wall. Bottom of panel exposed (1-3") entire distance
124	Start of deeper panel section
486	Gap between pile and panel
624	Start of steel sheetpile

North Wall

Distance from Start Point (see Sketch)	Observation
8 to 30	2" Gap
38	6" Gap
50 to 180	Piles in front of wall no gap observed, remnants of old seawall visible
212	2" Gap
229	2" Gap
234 to 288	2" Gap
300 to 350	2" Gap
412 to 435	2" Gap
620 to 640	Smaller riprap in this area
640	2" Gap Back to Large riprap boulders
660	2" Gap
715	2" Gap
724	White algae observed from bottom of panel
730	4-6" Gap
835	1" Gap
933	2" Gap
950	2" Gap
995	2" Gap
1100	2" Gap

Island Ferry Docking Terminal

At 2 locations directly below Sycrol ift	The steel sheetpile wall appears to have opened for the entire vertical length of the joint at 2 locations. No loss of sediment was observed, and the opening was not large enough to determine if additional sheetpile sections were installed behind. While this may be how the wall was installed (designed), it is not possible to tell without reviewing the plans.

Q:\8601\seawall_evaluation.xls

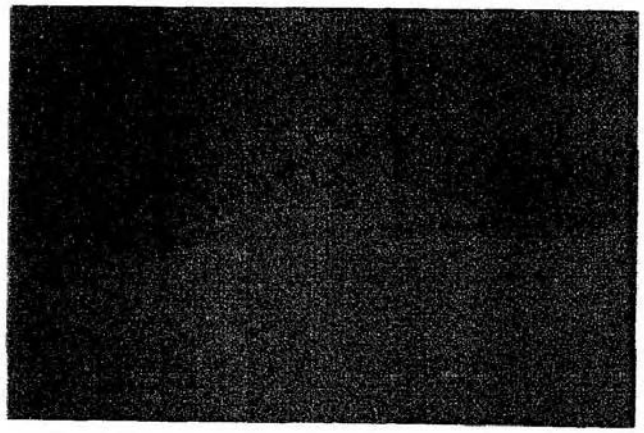


Figure 1. Typical gap at approx. Station 30' (west of cleat).

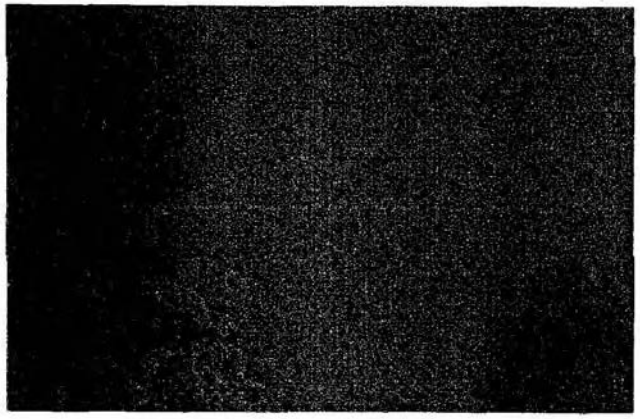


Figure 2. Portion of remnant wall in area between Station 0 west to the start of the pile rubble.

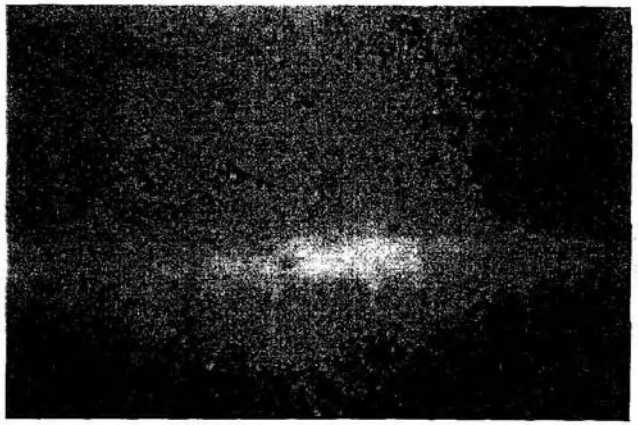


Figure 3. Fungal filaments at junction of pile and panel.

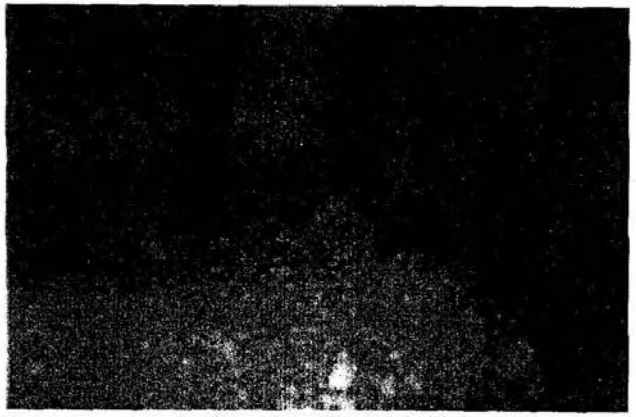


Figure 4. Larger gap at start of pile rubble, with mound of soil in foreground.

Figure 5. Mound of soil at pile rubble with black soil streaks.

Figure 6. Larger gap east of Station 0.

KACO
KADERABEK COMPANY
• Geotechnical Engineering • Construction/Materials Testing • Soil Borings/Monitor Wells

Thomas J. Kaderabek, P.E.

4914 SW 72 Avenue
Miami, Florida 33155
Phone: 305/666-3563
Fax: 305/666-3069

Mr. Edward A. Swakon, P.E.
EAS ENGINEERING, INC.
55 Almeria Avenue
Coral Gables, Florida 33134

April 29, 2003

Re: Geotechnical Engineering Evaluation & Professional Opinion
Proposed Government Cut Dredging Adjacent to Fisher Island
Port of Miami Expansion/Fisher Island
Dade County, Florida
KACO Project No. 03131

Dear Mr. Swakon:

This Report completes the scope of engineering services which you requested, and includes our evaluation and professional opinion.

BACKGROUND INFORMATION

Expansion plans at the Port of Miami involve widening and deepening the entrance to the Port. A dredge depth of elevation –50 feet MLW is proposed within 50-feet of the seawall of Fisher Island. This Geotechnical Report addresses the concern that this dredge depth at the proposed location will effect the existing seawall. We were provided with, and have reviewed the following documents.

- A 24 by 36 inch aerial photograph of the proposed Fisher Island Turning Basin, which includes current bottom elevations.
- Copies of Drilling Logs, Borings Performed Adjacent to Fisher Island, USACOE Hole Nos. CB-MH90-47, and CB-MH89-48.
- The Appendix to the General Re-Evaluation Report for this project, prepared by U.S. Army Corps of Engineers, which included Plate Nos. B-1 to B-21, Attachment A-Velocity and Salinity Assessment, Attachment B-Ship Simulator Modeling Report, and Attachment C-Geotechnical Boring Logs and Laboratory Reports.
- A 4-page Memorandum for Record, Miami Harbor Deepening and Widening Project, prepared by H. Kenneth Hardee, P.E., Geotechnical Engineer USACOE, Geotechnical Branch, dated July 9, 2002.

PURPOSE

The purpose of our services on this project was to: review existing geotechnical data in the area of the proposed dredging, evaluate the stability of the underwater side slopes, and to provide a professional opinion about the effect of dredging on the adjacent seawall.

LOCAL GEOLOGY

Dade County is located on the southern flank of a stable carbonate platform on which thick deposits of limestones, dolomites and evaporites have accumulated. The upper two hundred feet of the soil profile is composed predominantly of limestone and quartz sand. These sediments were deposited during several glacial and interglacial stages when the ocean was at elevations higher than present. In many portions of Dade County, surface sand deposits of the Pamlico Formation are encountered. The Pamlico sands have a thickness of 2 to 5 feet and overlie the Miami Limestone. In western Dade County, portions of the Everglades Region interfinger with the Pamlico sand. The Everglades soil consists of peat and calcareous silt (marl). The Pamlico sands and Everglades soils were not encountered in this study.

The Miami Limestone is a soft to moderately hard, white, porous to very porous, sometimes sandy, oolitic calcareous cemented grainstone. The Miami Limestone outcrops in portions of Dade County. The Miami Limestone has a maximum thickness of about 35 feet along the Atlantic Coastal Ridge and thins sharply near the coastline and more gradually in a westerly direction. Beneath the Miami Limestone the Ft. Thompson and Tamiami geologic formations are encountered. These formations consist of alternating layers of sand, limestone, and sandstone.

The Miami Limestone thins abruptly in an easterly direction. Borings performed at the Port of Miami show a 5 to 10-foot thick layer; while borings on Miami Beach show the formation is non-existent. Borings performed at the Port of Miami, Miami Beach, and Fisher Island show a cemented limestone layer exists between elevation –20 and –25 feet NGVD, but this layer is intermittent, poorly cemented, and sometimes does not exist. When the limestone does not exist, non-cemented sand is encountered.

RELEVANT NEARBY EXPERIENCE

The writer has worked on or reviewed data from the following nearby projects and has reached the following conclusions about the various soil/rock strata present in the vicinity of this dredging project.

- Port of Miami Toe Wall at Container Berth, KBC Project No. 8726-I, dated April 9, 1991. Soil borings for this project indicate a sand layer exists between elevation –32 and –50 feet NGVD.

- Port of Miami Terminal Nos. 3, 4, 5 Improvements, K&B Project No. 97188, dated December 31, 1997. Soil borings for this project indicate a sand or silt layer exists between elevation +8 and –7 feet NGVD; and that a sand or cemented limestone layer exists between –7 and –45 feet NGVD.

- Port of Miami Wharf V Bulkhead & Crane Rail Extension, K&B Project No. 95181, dated December 1, 1995. Soil borings for this project indicate a sand or silt layer exists between elevation +13 and –14 feet NGVD; and that a sand or cemented limestone layer exists between –14 and –55 feet NGVD.

- Port of Miami Lummus/Dodge Island Bulkhead, KBC Project No. 8726-K, dated July 22, 1991. Soil borings for this project indicate a sand or silt layer exists between elevation +10 and –15 feet NGVD; and that a sand or cemented limestone layer exists between –15 and –45 feet NGVD.

- Port of Miami Terminal Nos. 8 & 9, K&B Project No. 94151, dated November 30, 1994. Soil borings for this project indicate a sand or silt layer exists between elevation +8 and –16 feet NGVD; and that a sand or cemented limestone layer exists between –16 and –42 feet NGVD.

- Port of Miami Pilot House Bulkhead, KBC Project No. 8726-J, dated May 21, 1991. Soil borings for this project indicate a sand or silt layer exists between elevation +10 and –15 feet NGVD; and that a sand or cemented limestone layer exists between –15 and –45 feet NGVD.

- Yacht Club at Portofino, Alton Road & 2nd Street, Miami Beach, K&B Project No. 96196, dated December 23, 1996. Soil borings for this project indicate a sand or silt/peat layer exists between elevation +5 and –28 feet NGVD; and that a cemented limestone layer exists between –28 and –85 feet NGVD.

- The Waverly, West Avenue & 8th Street, Miami Beach, K&B Project No. 97142, dated July 21, 1997. Soil borings for this project indicate a sand or peat layer exists between elevation +3 and –18 feet NGVD; a cemented limestone layer exists between –18 and –24 feet NGVD, and another sand layer is present between elevation –24 and –55 feet NGVD.

A soil report provided to use by EAS Engineering, prepared by LAWGIBB Group, for Valencia Estates on Fisher Island, dated June 15, 2000, has soil borings that indicate a sand layer exists between elevation +6 and –19 feet NGVD; and that a cemented limestone layer exists between –19 and –25 feet NGVD.

A soil boring performed for USACOE, Hole No. CB-MH90-47, dated April 12, 1990, which was performed adjacent to Fisher Island, indicates a sand/clay layer exists between elevation -8 and –41 feet MLW.

A soil boring performed for USACOE, Hole No. CB-MH89-48, dated September 8, 1989, which was performed adjacent to Fisher Island, indicates a sand/clay/silt layer exists between elevation -11 and –30 feet MLW; a sandstone layer exists between elevation –30 and –33; a sand layer between elevation –33 and –44 feet MLW.

The writer interviewed KACO personnel who have completed numerous sport dives in Government Cut and the cut adjacent to Fisher Island. These divers report that from a water depth of 0 to 30 feet sandy soils are encountered with "some degree" of side slope; and that from a water depth of 30 to 50 feet a vertical limestone cut was found.

TECHNICAL DISCUSSION

Sand slopes underwater are relatively flat and vary with the soil type, erosion forces, currents, boat traffic. The key element in this discussion is identifying the location of the sand and rock zones: since the underwater rock zones will stand vertical and the underwater sand zones slough to a flat slope. The USACOE borings adjacent to Fisher Island show a sand layer exists to elevation –41 to –44 feet, but one boring has a 3-foot thick cemented layer within the sand zone. Borings performed on Fisher Island show a sand layer to elevation –19 feet and then a 6-foot thick layer of cemented limestone, underlain by more sand. This information seems somewhat contradictory, but the borings are small diameter samples, trying to collect information about a randomly cemented limestone layer. Perhaps the better tool for interpreting the soil profile are the underwater observations made by divers. Considering the above discussion we believe the following subsurface conditions exist:

Elevation, Feet, NGVD	Soil/Rock Description
0 to –5	Seawater
-5 to –20	Sand or Silt
-20 to –30	Sand with random intermittent cemented layers
-30 to –50	Limestone/Sandstone

In our judgement the soils from elevation –5 to –30 feet NGVD will act like a sand and will eventually achieve a flat underwater slope.

Plotting existing bottom elevation data adjacent to Fisher Island indicates the underwater slopes currently have achieved a stable underwater slope of about 6:1(Horizontal:Vertical). This underwater slope is consistent with the writer's experience on other projects.

Regarding an analysis of the stability of the underwater slope, we agree with the rational technique used by the USACOE in their Memorandum For Record prepared by H. Kenneth Hardee, P.E. dated July 9, 2002. Excerpts from this memorandum are repeated below: "Most of the cut in rock should remain vertical after dredging. However, it is anticipated that the sediment above the rock will fall in at slopes as flat as 1V:5H to 1V:7H. It is anticipated that in time (1 to 5 years) the typical slope along the subject channel will become 1V:7H due to wave action and ongoing settlement of materials." "Past experience and existing conditions were

used in estimating the after dredge slopes of the rock and the overlying soft sediments of the proposed channel. For the rock, there is sufficient past experience in Miami Harbor to anticipate that the cut rock will stand vertical. Therefore, no analysis was necessary for the cut in rock. For very soft materials above the rock, the materials are so soft that it was estimated that the existing slopes are representative of natural slopes that form from the scour of current and wave action."

SUMMARY & PROFESSIONAL OPINION

The sandy soils which exist from elevation –5 to –30 feet NGVD will reach equilibrium (a stable slope) on a slope angle of 1:7 (Vertical:Horizontal). The limestone deposit from elevation –30 to –50 feet NGVD will remain stable and vertical after excavation. If the proposed dredging occurs within 50-feet of the Fisher Island seawall, the bottom elevation adjacent to the seawall will eventually be lowered from elevation –5 feet NGVD to about elevation –21 feet NGVD which will jeopardize the stability of the seawall.

REFERENCES

1. Webb, D.L., Settlement of Structures on Sandy Sediments in Durban, South Africa, Conference on In-situ Behavior of Soil and Rock, Institute of Civil Engineers, 1969.

2. Tall Silos on Soft Limestone, by T.J. Kaderabek, Symposium on Engineering Geology and Soil Engineering, Pocatello, Idaho, March 1982.

3. Geotechnical Engineering for 3,200 Acre Development, ASCE, South Florida Section Annual Meeting, 1983, Cape Coral, Florida, prepared by T.J. Kaderabek.

4. Settlements Beneath Preload Test Fill, by Kaderabek and Reynolds, ASCE Volume 105, No. GT6, June 1979.

5. Foundation Engineering and Soil Mechanics by George Sowers, McMillan Publishing Co., New York, New York, 1979.

6. Miami Limestone Foundation Design and Construction, by Kaderabek and Reynolds, Journal of Geotechnical Engineering Division, ASCE, Volume 107, No. GT7, July 1981.

7. Kaderabek, T.J., Geotechnical Design Dade County Administration Building, ASCE South Florida Section Annual Meeting, October 1981.

CLOSURE

It has been our pleasure to provide Geotechnical Engineering services on this project. If you have questions about information contained in this Report, contact the writer at 305/666-3563, extension 222.

Sincerely,

KADERABEK COMPANY

Thomas J. Kaderabek, P.E.
President 04-29-03

Distribution: Original to Addressee Via U.S. Mail & Copy Via Fax 305/444-2112
Copy to KACO File

File: f:\doc\jkrepor\03131-Port of Miami Expansion-Fisher Island-Dredging-Geo Rpt 04-17-03

Lee Swain

From: Terri L.Jordan@saj02.usace.army.mil
Sent: Tuesday, June 24, 2003 11:14 AM
To: lswain@dialcordy.com
Subject: FW: Comments on the Port of Miami Expansion
Importance: High

-----Original Message-----
From: Goines, Sonya B SAJ
Sent: Monday, May 19, 2003 12:09 PM
To: Powell, Richard B SAJ; Jordan, Terri L SAJ; Perez, Luis R SAJ; Scarborough, Jerry W SAJ; McAdams, James J SAJ; Schwichtenberg, Bradd R SAJ; Strain, George M SAJ; 'Bhope@miamidade.gov'; 'khalid@miamidade.gov'
Subject: FW: Comments on the Port of Miami Expansion
Importance: High

Comments from the public mailbox on the Miami Harbor Navigation Project.
-----Original Message-----
From: Captain Dan Kipnis [mailto:captdankipnis@mydirectip.com]
Sent: Monday, May 19, 2003 8:20 AM
To: Cesaj-PA, Publicmail
Subject: Comments on the Port of Miami Expansion

Attached are my comments regarding the proposed expansion on thePort of Miami.

Suite 22-0
1756 N. Bayshore Dr.
Miami, Florida
33132

305-672-3807
Captain Dan Kipnis

Observations Concerning the U.S. Army Corps of Engineers Miami Harbor Expansion Environmental Impact Statement

The environmental, quality of life, and local infrastructure collapse caused by this project will so far out-weigh the projected financial benefits that one must question how the project reached this level of completion. The net financial gain of expanding the port, according to the U.S. Army Corps of Engineer's economic impact statement, reveals that 172 million dollars worth of dredging will produce a net benefit of only 2.6 million dollars a year for the Port. Streets in downtown Miami are hard pressed already moving the nine hundred thousand trailers the port now handles. With the projected 3 million trailers expected to crowd the Port a year, one must ask the question, {where do we put all these units and who will pay for the infrastructure to move and store them?} 1 The Port just lost its lease on the 34 acre Buena Vista yard just north of downtown Miami, further complicating matters.

To bring this into perspective, three million 20 foot by 8 foot trailers stacked 4 high would cover an area of five and a half square miles. I don't mean to imply that all the trailers would be in south Florida at the same time, I just ask the question, who will pay for the needed updates in the county's infrastructure to support the increase? The Corps' answer to this question is, they only do studies involving port expansion and it is up to other municipal departments to analyze their future needs and prepare for them. To date, I have not heard one word other than the proposed billion dollar tunnel from Watson Island to the Port, as a response from our local public planners.

The Corps states, "*cargo at the Port moves through one of three terminal operators (primary cargo businesses): POMTOC, Maersk, and Seaboard. The loss of any single operator would directly result in the loss of between 20 percent to 52 percent of the Port's cargo business*". (p52) At the public hearing on May 10, 2003 the Corps explained that these large operators could abandon the Port for a facility like the one in Freeport, Bahamas, (is a bridge planned from Grand Bahama to Palm Beach?), if the expansion was not completed. {The 172 million dollar Port expansion project will serve to increase the profits of the three major terminal operators and seems much like a government subsidy.} 2

The Port also contends that it will lose the ability to berth new super post-panamax container ships that will be in use within the next 10 years. These ships are too wide to traverse the Panama Canal, indicating that all the super post-panamax shipping trade that leaves

Comment 1 Response

See EPA-1 Comment response

Comment 2 Response

See EPA-1 Comment response

the Far East will have to use west coast ports (LA, Long Beach, Seattle) for berthing and will **never reach the Port of Miami.** Additionally, the economic study noted that, 9 percent of the Port's trade arrives from Europe. Only a small percentage of these ships will be super post-panamax container vessels.{The Port's contention that it will not be able to compete with other container ports without the deepening of the channels is absurd. By their own admission, with only nine percent of the Port's cargo originating in Europe, only a very small percentage of European cargo (-5%) will be shipped on these behemoths.} 3

{The Corps contends that, "*Jobs created by Port and trade activity tend to be good jobs: they pay significantly more than other job growth sectors in the local economy, have better long-term opportunities for employees and offer better training programs (particularly for minorities).*"(p52) First of all, most of Miami-Dade County is comprised of "minorities". Secondly, unless you are a stevedore or cruise ship office employee your pay scale ranks with other workers in Miami-Dade. If the Corps contention of high wages was true, why are the cargo truck drivers staging walkouts on a regular basis? As for the "minorities" that work aboard cruise and cargo ships, it is documented that their pay scale and at times working conditions are, at best, minimal.} 4

On the environmental side, the proposed expansion of the Port of Miami will serve only to endanger an aquatic environment that is already severely stressed, impacting the bay and offshore waters of Miami-Dade County with increased turbidity, changes in tidal flow and ship borne pollutants, as well as jeopardizing the safety of endangered manatees, turtles and porpoises, due to an estimated 1550 blasting days needed to break loose bedrock. The Port's plan is to place observers on barges to notify the blasters that endangered animals have entered the area. According to Miami-Dade County DERM, the habitat that abuts the project around Fisher Island and western Virginia Key is so vital to manatees that DERM created an exclusion zone for all use in these areas.{The Corp's study does not believe that blasting, dredging, piping, pumping, filling, barge and tug traffic and rerouting of other vessels into manatee sensitive habitat will have any affect on these endangered species.} 5

The number of fish killed by 1550 blasting days is hard to estimate. What is known is that any sea creature within 200 feet of the blast will be killed and animals farther away may be stunned. (USACE 1996; O' Keefe 1984; Keevin and Hempen 1997; Young 1991) Extrapolate this

Comment 3 Response

See EPA-1 Comment response

Comment 4 Response

While complete figures regarding the racial composition of port workers is not available, there are striking examples, which demonstrate that indeed, port jobs may provide significant benefits to the minority community of Miami-Dade County. Members of the International Longshoremans Association (ILA) do the work of lifting and moving at the Port of Miami. ILA worker roles at the Port include baggage handling for cruise passengers, crane operation, container movement to and from yards, and container movement within the two unionized yards at the Port. Approximately 1145 ILA members regularly work at the Port. According to the ILA, approximately 98% of their membership is Afro-American. The ILA provides job training and benefits to its members, and also commands good wages for this trained workforce. These jobs are widely considered to be good jobs at a wage scale above similar jobs not associated with the Port.

Comment 5 Response

On June 17, 2003, the FWS issued the "Miami Harbor Expansion Project Fish and Wildlife Coordination Act Report" (CAR). This CAR included a concurrence under the ESA that states, "The Service concurs with the Corps' determination that the construction activities related to the modification of Miami Harbor to accommodate the expansion of the Port of Miami "may affect but is not likely to adversely affect" the West Indian manatee and the American crocodile since appropriate monitoring to minimize the effects will be incorporated into the project design."

out by 7500 (5 blasts per day x 1550 days) and it is safe to say that all the fish within the ports ecosystem will be impacted not to mention large numbers of fish that migrate through this area, (tarpon, snook, permit, mackerel, kingfish, bluefish, jacks, mullet, pilchards, sardines and threadfins). "*Dredging/blasting activities, particularly in linear corridors (such as Government Cut and Fisherman's Channel) may temporarily alter migration patterns of species*". (p72) It should be noted that snook, with an estimated east coast population of only two hundred thousand individuals, congregate to spawn in great numbers during the summer months inside Government Cut.

The Corps report states, "*The most obvious direct impact of Alternative 1* (combined blasting and dredging) *on managed species in all habitats would be the potential for mortality and/or injury of individuals through the dredging and/or blasting processes. Species in any and all of the project area's habitats are susceptible. Fishes and invertebrates are at risk at any life-history stage." "Blasting would also have a direct impact on managed fish species residing in/migrating through the harbor and associated waterways." "Fishes with air bladders are particularly more susceptible to the effects of blasting than aquatic taxa* (shrimp, crabs, lobster) *without air bladders". "Small fishes are the most likely to be impacted."* (p72)

Past studies cited in the Corps' report do not begin to reflect the vitality of the ecosystem that exists around and in the channels and seawalls of the Port of Miami. Years of fisheries regulations and restrictions on both State and Federal levels have started to pay dividends in the return of snapper and grouper juveniles that mature inshore around habitat similar to the ones found at the Port. Thirty-five years ago the bay sustained abundant stocks of gag and black grouper as well as, mutton, mangrove and lane snapper. This resource was essentially lost through over fishing, habitat loss and multiple manipulations of Biscayne Bay's environment due to port dredging, building bulkheads and expansion. {Our recent diligence with fisheries resources is working to restore a semblance of our past fisheries. The Port expansion project threatens to push this advance in south Florida so far back that it may be generations before marine resources recover, if ever.} The Corps fears that the increased depth of the Port's channels may inhibit the new growth of many organisms that thrived before, rendering those areas, **dead zones.** 6

Comment 6 Response

Although the potential for fish mortality associated with blasting is a real possibility, a recent USACE project completed in San Juan Harbor, Puerto Rico had 38 blasting events between 16 July 2000 and 9 Sept 2000 and very few fish killed. Environmental monitoring of the blasts including counts of fishes killed by the blasts. Tarpon are very common in San Juan Harbor, and the environmental monitoring program recorded no injured or dead tarpon. In the case of Miami Harbor, specific fish exclusion efforts that could be utilized to reduce the likelihood that fish would be in the area (scare charges and barrier nets) would have adverse impacts on the endangered and protected species in the area (specifically manatees, sea turtles and dolphins) and as a result cannot be employed in the GRR project.

{A vibrant commercial lobster and stone crab fishery exists in channels and cutbacks created by the port dredging in the past. To date, no one has estimated the economic impact on these users by dredging up and blasting lobster habitat or to recreational fishing anglers that fish these waters daily and businesses that support them.} 7

By the Corp's own admission, "*past impacts have been significant*", and they believe that, "*cumulative impacts from past, present, and future Port expansion are considered adverse, but not significant*" (p116). As the Corps has stated above they have serious concerns regarding environmental damage to marine resources. Even with their concerns the Corps' response to these impacts is that they are acceptable due to, "*the probability of success for proposed mitigation measures*". (p116)

Astonishingly, the Port of Miami has proposed that **.011** percent of the construction cost be made available for mitigation of the 50 acres of hard bottom, 16.8 acres of grass flats, 123 acres of coral covered rock and rubble that will be destroyed as well as 248.5 acres of unvegetated bottom (just because it is classified as unvegetated doesn't mean that it is devoid of sea life). This has to be added to 251 acres of sea grass beds, 4.9 acres of hard bottom, 94 acres of hard bottom and an unreported acreage (they never kept track)(p.116) of unvegetated bottom, for a total of 794.7 acres. This doesn't sound as innocuous as the Corp's would have us believe.

{Proposed environmental mitigation is two fold, back-fill and sand top a six acre dredge hole north east of the Julia Tuttle Causeway and construction of a 3.1 acre limestone artificial reef just south of Government Cut in approximately 50 feet of water. Filling the dredge hole is costly and possibly will not produce the desired effect of recreating lost grass flats. After a 1980 grass flat restoration mitigation project the Corps noted, "*After the seagrass mitigation project proved largely unsuccessful (USACE 1989; Fonseca et al. 1998), the mitigation requirements were revised*". (p111)} 8
To date, the past dredging damage mitigated limestone artificial reefs just south of Government Cut have produced little in the way of improving fishing offshore of Miami. Adding one more seems like a waste of the few dollars allocated for environmental mitigation.

The Corps has decided to "*manage a resource for another purpose*" (p. 117). This decision was made after "*efforts had been made to include all stakeholders in the process*" (p117). A spokesperson for the Corps admitted at the **only public hearing** for environmental and civilian

Comment 7 Response

There is not a legal commercial or recreational fishery for crabs or lobsters within the federal navigation channel boundaries to be analyzed in the report.

Comment 8 Response

The USACE disagrees with this statement. The seagrass mitigation site is located next to a seagrass bed with more than 85% cover and is expected to recruit quickly, particularly since some strategic planting of seagrass will be performed. Both DERM and NOAA have acknowledged this. The purpose of reef mitigation is not to create fishing locations; instead the purpose of the reef mitigation is to replace the habitat and substrates being impacted by project implementation. Baseline fish studies for the impact sites have been conducted and are include in the impact assessment found in Appendix E of the EIS and long-term monitoring of the mitigation sites is also included in the project plans.

The USACE has revised the planned mitigation area to cover approximately 24 acres and will conduct some strategic planting of appropriate species. The USACE maintains that the proposed seagrass restoration project has a high probability for success and that it will recruit with seagrasses once filled. While there is some inherent risk associated with any restoration project, seagrass restoration properly planned and executed at an appropriate site can have an excellent chance of success. In order to minimize risk the USACE has applied the site selection criteria contained in Fonseca et al. 1998, as suggested by the National Marine Fisheries Service (NMFS) in selecting this site. The cost of restoring seagrass beds at this site is significantly offset by the added benefit of fill disposal. Beneficial re-use of dredge spoil is a first priority and strongly encouraged for these types of projects. Dredge spoil used for restoration of the seagrass bed will not have to be otherwise disposed

stakeholders, that the two by three inch noticing for "the public meeting" had been posted in the classifieds of the Miami Herald on Sunday April 20th, three weeks before the meeting. No other reference was given in any other publication or to any other news outlet regarding a project of this magnitude. {There appears to be an effort, whether true or perceived, to keep the public "stakeholders" in the dark regarding questions raised by the Corps document outlining the Ports expansion project.} 9

The report also talks of turbidity associated with the expansion project. "*Based on sediment analysis, substrates along the southern margin of Fisherman's Channel and the Dodge Island Cut comprise a considerable amount of fine materials (USACE 2001). Therefore, dredging would likely resuspend fine sediments into the water column. The strong tidal currents may redistribute suspended sediments to other areas both inside and outside the study area that support submerged vegetation. Possibly affected areas would include seagrass habitats immediately adjacent to Fisherman's Channel, as well as habitats inside the BSCWA, and possibly other areas of the Biscayne Bay Aquatic Preserve. Resuspended particulate matter may temporally decrease water clarity in the above areas. Deposition of sediments on beds may have adverse effects. These effects include, but are not limited to, the temporary displacement of, and/or alteration of, fish, invertebrate, and epiphyte communities.*" (p61){this only deals with dredging and not the siltation caused by hopper barges bringing materials to the offshore dumping site.} 10

In the past large plumes of fine sediment settled out on the reef due to leaching from hopper barges and illegal short dumping of the loads. Five years of continuous siltation riding in and out on the tide, spreading across Biscayne Bay and off shore waters, will have a significant effect on the environment that "mitigation" will not alleviate.

In conclusion, let's look at the Corps' assessment if the Port was not expanded:

"By doing nothing, the transportation savings associated with the proposed improvements would be lost. Goods and services produced by U.S. businesses would be less competitive with foreign goods and services. U.S. citizens would pay more for goods and services than they need to pay. From a regional perspective, there are income and employment impacts. Doing nothing would result in a significant loss of cargo business at

Comment 9 Response

As required by the NEPA process, a Scoping letter was sent to all interested parties (federal, state, local agencies, governments and interest groups) in January 2000 requesting input in project design as well as input on items of concern to the interested parties. A Notice of Intent to Prepare an Environmental Impact Statement was sent to the same individuals in August of 2001 requesting input in the project design and comments on the proposed scope of the DEIS. The Corps has conducted numerous field investigations and meetings for federal, state and local resource agencies, as well as conducting an Alternatives Formulation Briefing at the Port in April 2002, and the public meeting following the release of the Draft EIS. The DEIS was mailed to all effected local, county, state, and federal governments, as well as environmental groups and individuals who had requested to be placed on the Corps mailing list. Two copies of the complete document were also placed on file with the Miami-Dade County main library reference desk and the DEIS was posted to the Jacksonville District's website for anyone to access.

Comment 10 Response

The contract will require the Contractor to use barges that are in good working condition. This means that barges must seal properly and during loading and transit to spoil disposal sites. If during rock loading, the barge seals are damaged, then the Contractor will be required to repair or replace his equipment so that siltation does not occur during transport and water quality objectives are met.

the Port due to the Port's inability to efficiently handle the new industry standard deep draft cargo vessels, which results in an increased cost of doing business." (p86)

1. The major terminal operators will not be able to increase their profits.
2. The entire U.S. economy will suffer.
3. The citizens of the U.S. will pay more for goods and services.
4. Local employment will stagnate.
5. Cargo will go to other ports and not to "the gateway to Latin America".
6. The Port will **not** be able to accommodate less than five percent of the ships that will call on Miami. (super post-panamax vessels)

{The Corps paints a pretty dire prediction of repercussions faced by the country and the community if the Port expansion does not go forward. 11
This seems like a national security problem and in fact it is! Think about it, how are we going to police three million trailers for weapons of mass destruction? It is also good to know that south Florida has such a strangle hold on the state of economic affairs of the country as a whole.

There comes a time when a community must decide on growth for growths sake, or taking a stand for quality of life. The Corps has not demonstrated in their document the **TRUE** need to spend so much money impacting the environment, protected species, Miami-Dade County infrastructure, and most importantly the citizens of south Florida.

Without a more convincing argument this boondoggle of a project should be stopped.}

Comment 11 Response

The Port improvements are based on an economic analysis that demonstrated that National Economic Development (NED) benefits exceeded NED costs, and as such, there is a Federal interest in investing in the improvements. See response to Comment EPA-1 for a description of the general public benefits and costs of the proposed improvements.