APPENDICES

APPENDIX A
Scoping Documents

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The Miami Herald

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PUBLISHED DAILY
MIAMI-DADE-FLORIDA

STATE OF FLORIDA
COUNTY OF MIAMI-DADE

Before the undersigned authority personally appeared:

JEANNETTE MARTINEZ

who on oath says that he/she is

CUSTODIAN OF RECORDS

of The Miami Herald, a daily newspaper published at Miami in Miami-Dade County, Florida; that the attached copy of advertisement was published in said newspaper in the issues of:

April 27, 2003

Affiant further says that the said The Miami Herald is a newspaper published at Miami, in the said Miami-Dade County, Florida and that the said newspaper has heretofore been continuously published in said Miami-Dade County, Florida each day and has been entered as second class mail matter at the post office in Miami, in said Miami-Dade County, Florida, for a period of one year next preceding the first publication of the attached copy of advertisement; and affiant further says that he has neither paid nor promised any person, firm or corporation any discount, rebate, commission or refund for the purpose of securing this advertisement for publication in the said newspapers(s).

Sworn to and subscribed before me this
_28th day of __April, 2003

My Commission
Expires: ___August 1, 2006_____
Silvia Acosta

Notary

SILVIA ACOSTA
MY COMMISSION # DD 138634
EXPIRES: August 1, 2006
Bonded Thru Notary Public Underwriters

U.S. ARMY CORPS OF ENGINEERS
JACKSONVILLE DISTRICT

U.S. Army Corps of Engineers Jacksonville District

PUBLIC MEETING
Tuesday, May 6, 2003
6:30 p.m.
Port of Miami - Terminal 12
1200 Port Blvd.
Miami, Florida
(305) 371-7678

The U.S. Army Corps of Engineers will hold a public meeting to discuss the recently released draft General Reevaluation Report (GRR), and Environmental Impact Statement (EIS) for the Miami Harbor Navigation Project, Miami-Dade County, Florida.

The purpose of the meeting is to present the results of the Miami Harbor Study document with draft GRR and EIS. Interested individuals, groups and agencies will be given an opportunity to express their views and furnish specific data to support their views for consideration in preparing the final report.

Written statements may be mailed prior to or within five (5) days after the meeting to: District Engineer, ATTN: Richard Powell, CESAJ-PD-PN, P.O. Box 4970, Jacksonville, FL 32232-0019.

The DEIS is posted on the Internet at www.saj.usace.army.mil/pd/envdocs/envdocsab.htm. Two copies of the GRR and EIS are also available at the Miami-Dade County Main Public Library, 101 West Flagler Street, Miami, Florida.

For more information or if you need special accommodations, contact Ms. Terri Jordan at (904) 232-1817.

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

REPLY TO
ATTENTION OF

Planning Division
Environmental Branch

APR 04 2003

TO WHOM IT MAY CONCERN:

This announces a public meeting to discuss the recently released draft General Reevaluation Report (GRR) and Environmental Impact Statement (EIS) for the Miami Harbor Navigation Project, Miami-Dade County, Florida.

The public meeting is scheduled as follows:

DATE: Tuesday, May 6, 2003
TIME: 6:30 p.m.
PLACE: Terminal 12 – Port of Miami
1200 Port Blvd
Miami, Florida

Parking for the evening at the port adjacent to the terminal.

We invite Federal and State agencies, local agencies, interested organizations and individuals to participate in the meeting.

The purpose of the meeting is to present the results of the Miami Harbor Study document with draft GRR and EIS. Interested individuals, groups and agencies will be given an opportunity to express their views and furnish specific data to support their views for consideration in preparing the final report.

All statements will be recorded by a court reporter, and a transcript prepared for inclusion in the official record of the project. Mail written statements prior to or within 5 days after the meeting to the District Engineer, Attn: Richard Powell, CESAJ-PD-PN, at the above address.

The DEIS is available on the U.S. Army Corps of Engineers website under "Miami Harbor " at http://www.saj.usace.army.mil/pd/envdocs/envdocsb.htm (the document has been divided into smaller sections for quicker downloading). Two copies of the draft GRR & EIS are also available at the Miami-Dade County Main Public Library, 101 West Flagler Street, Miami, Florida. For library hours, phone 305-375-2665.

This letter has been sent to those individuals who asked to be on the mailing list or otherwise expressed an interest in the project by providing comments during the EIS scoping process. If you know others who may wish to attend the meeting, please advise

them of this notice. Any questions may be directed to Ms. Terri Jordan at the letterhead address, or telephone 904-232-1817.

Sincerely,

James C. Duck
Chief, Planning Division

air filters and playground soils; and failure to consider the facility's possible failure to comply with a permit provision prohibiting emissions causing a public nuisance.

The EAB found that the petitioners made no showing of clear error, the existence of an important policy matter or an abuse of discretion warranting review and denied review.

Dated: April 3, 2003.

Bharat Mathur,

Acting Regional Administrator, Region 5.

[FR Doc. 03–10272 Filed 4–24–03; 8:45 am]

BILLING CODE 6560–50–P

ENVIRONMENTAL PROTECTION AGENCY

[ER–FRL–6639–7]

Environmental Impact Statements and Regulations; Availability of EPA Comments

Availability of EPA comments prepared pursuant to the Environmental Review Process (ERP), under section 309 of the Clean Air Act and section 102(2)(c) of the National Environmental Policy Act as amended. Requests for copies of EPA comments can be directed to the Office of Federal Activities at (202) 564–7167. An explanation of the ratings assigned to draft environmental impact statements (EISs) was published in the **Federal Register** dated April 1, 2003 (68 FR 16511).

Draft EISs

ERP No. D–AFS–F65037–MI Rating LO, Interior Wetlands Project, Timber Harvest, White Pine Trees Pruning, Growth System Adjustment, Wildlife Openings Creation and Maintenance and Transportation System Improvements, Hiawatha National Forest, Eastside Administrative Unit, Chippewa County, MI.

Summary: EPA did not identify any potential environmental impacts requiring substantive changes to the 2 main project alternatives. EPA believes that A5 would better accomplish old growth stand improvement and road conversion to forests and wetlands.

ERP No. D–AFS–J65371–WY Rating EC2, Medicine Bow National Forest Revised Draft Land and Resource Management Plan, Implementation, Albany, Carbon and Laramie Counties, WY.

Summary: EPA expressed environmental concerns that without specifically outlining the baseline by which future projects are tiered from this Plan, potential impacts to ecosystem processes, water and habitat quality may occur.

ERP No. D–AFS–K61158–CA Rating EC2, Silver Pearl Land Exchange Project, Proposal to Exchange 2,153 Acres of National Forest System (NFS) Land for up to 3,963 Acres of Sierra Pacific Industries (SPI) Land within the boundary of Eldorado National Forest, Eldorado and Placer Counties, CA.

Summary: EPA expressed environmental concerns and requested additional information regarding impacts to threatened and endangered species and Forest Service sensitive species. EPA also requested additional information on cumulative impacts.

ERP No. D–SFW–K99032–CA Rating EC2, Western Riverside County Multiple Species Habitat Conservation Plan (MSHCP), Implementation, Incidental Take Permits Issuance, Riverside and Orange County, CA.

Summary: EPA raised environmental concerns that information from other regional plans has not been fully integrated with the analysis and conclusions of the MSHCP. Other EPA concerns are the assumptions regarding the level of species protection provided by Public/Quasi-Public lands, the scientific basis of MSHCP assumptions and conclusions, enforcement, and consultation with and evaluation of potential impacts on Indian Tribes. EPA also recommended the Service provide future opportunities for public and agency input, and consult with Indian Tribes on a government-to-government basis.

ERP No. DS–COE–C36031–NY Rating LO, Irondequoit Creek at Panorama Valley Flood Damage Reduction Project, New Information concerning Resumption and Evaluation of a Flood Damage Reduction Project, Town of Penfield, Monroe County, NY.

Summary: EPA has no objections to the implementation of the proposed project.

ERP No. DS–DOE–L08055–WA Rating EC2, Kangley—Echo Lake Transmission Line Project, New 500 Kilovolt (kV) Transmission Line Construction, Updated Information concerning Re-evaluating Alternatives not Analyzed, U.S. Army COE Section 10 and 404 Permits Issuance, King County, WA.

Summary: EPA expressed environmental concerns with the lack of clearly defined mitigation measures to protect drinking water sources and ensure the integrity of the City of Seattle's Habitat Conservation Plan. EPA recommended that the EIS not be finalized until such mitigation has been determined. EPA also recommended that the final EIS more clearly identify the significance of predicted effects of the project.

Final EISs

ERP No. F–AFS–E65053–NC Croatan National Forest Revised Land and Resource Management Plan (1986), Implementation, Carteret Craven and Jones Counties, NC.

Summary: The final EIS is responsive to issues raised in the draft EIS and EPA has no objections to the proposed action.

ERP No. F–AFS–J82016–MT Bitterroot National Forest Noxious Weed Treatment Project, Ground and Aerial Herbicides Application, Mechanical, Biological and Cultural Weed Treatment and Public Awareness Measures, Implementation, Stevensville Ranger District, Bitterroot National Forest, Ravalli County, MT.

Summary: EPA's review has not identified potential environmental impacts requiring substantive changes to the proposal.

ERP No. F–AFS–L65403–WA Quartzite Watershed Management Project, Watershed Management Activities including Vegetation Management, Riparian/Wetland Management and Road Management, Colville National Forest, Thomason Sherwood-Cottonwood Creek, Three Rivers Ranger District, Stevens County, WA.

Summary: No formal comment letter was sent to the preparing agency.

ERP No. F–DOE–L08059–WA Schultz-Hanford Transmission Line Project, New 500 kilovolt (kV) Transmission Line Construction, Central Washington north of Hanford connecting to an existing line at the Schultz Substation, Kittitas, Yakima, Grant and Benton Counties, WA.

Summary: No formal comment letter was sent to the preparing agency.

Dated: April 22, 2003.

Joseph C. Montgomery,

Director, NEPA Compliance Division, Office of Federal Activities.

[FR Doc. 03–10273 Filed 4–24–03; 8:45 am]

BILLING CODE 8010–01–P

ENVIRONMENTAL PROTECTION AGENCY

[ER–FRL–6639–6]

Environmental Impact Statements; Notice of Availability

Responsible Agency: Office of Federal Activities, General Information (202) 564–7167 or *http://www.epa.gov/compliance/nepa/.* Weekly receipt of Environmental Impact Statements filed April 14, 2003, through April 18, 2003, pursuant to 40 CFR 1506.9.

EIS No. 030172, Final EIS, FTA, NC, South Corridor Light Rail Project to Provide Light Rail Service between the Town of Pineville and Downtown Charlotte, City of Charlotte, Charlotte-Mecklenburg County, NC, Wait Period Ends: May 19, 2003, Contact: Alex McNeil (404) 562–3511. The above FTA EIS should have appeared in the 04/18/03 **Federal Register**. The 30-day Wait Period is Calculated from 04/18/2003.

EIS No. 030173, Final EIS, FRC, ID, Bear River Hydroelectric Project, Application for a New License (Relicense) for Three Existing Hydroelectric Projects: Soda (FERC No. 20–019), Grace-Cove (FERC No. 2401–007) and Oneida (FERC No. 472–017), Bear River Basin, Caribou and Franklin Counties, ID, Wait Period Ends: May 27, 2003, Contact: Susan O'Brian (202) 502–8449. This document is available on the Internet at: *http://www.ferc.gov.*

EIS No. 030174, Final EIS, FHW, RI, Sakonnet River Bridge Rehabilitation or Replacement Project, Portsmouth & Tiverton, Newport County, RI, Wait Period Ends: May 27, 2003, Contact: Daniel J. Berman (401) 528–2503.

EIS No. 030175, Final EIS, FHW, WV, KY, Appalachian Corridor I–66 Highway Construction, US 23/119 south of Pikeville, KY eastward to the King Coal Highway southeast of Matewan, Funding and U.S. Army COE Section 404 Permits Issuance, Pike County, KY and Mingo County, WV, Wait Period Ends: May 27, 2003, Contact: Jose Sepulveda (502) 223–6720.

EIS No. 030176, Final EIS, FHW, NY, U.S. 219 between Springville to Salamanca, Improvements from NY 39 to NY 17, PIN 5101.53, Funding and U.S. Army COE Section 404 Permit, Erie and Cattaraugus Counties, NY, Wait Period Ends: May 27, 2003, Contact: Robert E. Arnold (518) 431–4127.

EIS No. 030177, Draft EIS, TVA, TN, 500 kV Transmission Line in Middle Tennessee Project, Construct and Operation, Proposed Transmission Line would Connect Cumberland Fossil Plant in Stewart County with either Montgomery 500 kV Substation Montgomery County, or Davidson 500 kV Substation Davidson County, Stewart, Houston, Montgomery, Dickerson, Cheatham, TN, Comment Period Ends: June 10, 2003, Contact: Charles P. Nicholson (865) 632–3582. This document is available on the Internet at: *http://www.tva.gov/environment/reports/index.htm.*

EIS No. 030178, Draft EIS, FHW, WA, I–90 Two-Way Transit and HOV Operation Project, To Provide Reliable Transportation between Seattle and Bellevue, Sound Transit Regional Express, U.S. Coast Guard Permit and U.S. Army Corps Nationwide Permit, King County, WA, Comment Period Ends: June 9, 2003, Contact: James A. Leonard (360) 753–9408. This document is available on the Internet at: *http://www.soundtransit.org/stplans/eastling/I_90.htm.*

EIS No. 030179, Final EIS, FHW, KY, IN, Louisville-Southern Indiana Ohio River Bridges Projects, To Improve Cross-River Mobility between Jefferson County, KY and Clark County, ID, Coast Guard Bridge and U.S. Army COE Section 10 and 404 Permits Issuance, Jefferson County, KY and Clark County, IN, Comment Period Ends: June 25, 2003, Contact: John Ballantyme (502) 223–6747.

EIS No. 030180, Draft EIS, NPS, CA, Whiskeytown Fire Management Plan, Implementation, Whiskeytown National Recreation Area, Klamath Mountains, Shasta County, CA, Comment Period Ends: June 24, 2003, Contact: Paul DePrey (530) 242–3445. This document is available on the Internet at: *http://www.nps.gov/whis/exp/fireweb/firehomepage.htm.*

EIS No. 030181, Draft EIS, AFS, AK, Greens Creek Tailings Disposal Project, To Authorize Construction of Additional Dry Tailings Disposal Storage, Admiralty National Monument, Tongass National Forest, AK, Comment Period Ends: June 9, 2003, Contact: Pete Griffin (907) 586–8800. This document is available on the Internet at: *http://www.greenscreekeis.com.*

EIS No. 030182, Final Supplement, FHW, UT, U.S. Highway 189, Wildwood to Heber Valley, between the junctions with Ut-92 and U.S. Highway 40, Utah and Wasatch Counties, UT, Wait Period Ends: May 27, 2003, Contact: Michael Morrow, P.E. (801) 963–0182.

Amended Notices

EIS No. 030080, Draft EIS, AFS, SC, Sumter National Forest Revised Land and Resource Management Plan, Implementation, Oconee, Chester, Fairfield, Laurens, Newberry, Union-Abbeville, Edgefield, Greenwood, McCormick and Saluda Counties, SC, Comment Period Ends: June 21, 2003, Contact: Jerome Thomas (803) 561–4000. Revision of FR Notice Published on 3/14/2003: CEQ Comment Period Ending 6/21/2003 has been Extended to 7/3/2003.

EIS No. 030104, Draft EIS, AFS, TN, Cherokee National Forest Revised Land and Resource Management Plan, Implementation, Carter, Cocke, Greene, Johnson, McMinn, Monroe, Polk, Sullivan and Unicoil, TN, Comment Period Ends: July 3, 2003, Contact: Terry McDonald (423) 476–9700. Revision of FR Notice Published on 3/21/2003: CEQ Comment Period Ending 6/16/2003 has been Extended to 7/3/2003.

EIS No. 030106, Draft EIS, AFS, VA, KY, WV, Jefferson National Forest Revised Land and Resource Management Plan, Implementation, Mount Rogers National Recreation Area, Clinch, Glenwood, New Castle, and New River Valley Rangers Districts, VA, WV and KY, Comment Period Ends: July 3, 2003, Contact: Nancy Ross (540) 265–5172. Revision of FR Notice Published on 3/21/2003: CEQ Comment Period Ending on 6/19/2003 has been Extended to 7/3/2003.

EIS No. 030134, Draft EIS, COE, FL, Miami Harbor Navigation Improvement Project, Provide Greater Navigation Safety and Accommodating Larger Vessels, Port of Miami, Miami-Dade County, FL, Comment Period Ends: May 19, 2003, Contact: James McAdams (904) 232–2117. The above EIS was inadvertently published in the 4/4/2003 FR. The Correct Notice of Availability was published in the 3/14/2003 FR. The CEQ is #030092. Comments are due back to the preparing agency on May 4, 2003.

EIS No. 030171, Draft EIS, AFS, UT, Prima East Clear Creek Federal No. 22–42 Gas Exploration Well, Application for Permit to Drill and (Surface Use Plan of Operations) Castle Valley Ridge, Ferron/Price Ranger District, Manti-La Sal National Forest, Carbon and Emery Counties, UT, Comment Period Ends: June 9, 2003, Contact: Karl Boyer (435) 637–2817.

Revision of FR Notice Published on 04/18/2003: CEQ Comment Period Ending 06/02/2003 has been Reestablished to 06/09/2003. Due to Incomplete Distribution of the DEIS at the time of Filing with USEPA under Section 1506.9 of the CEQ Regulations.

Dated: April 22, 2003.

Joseph C. Montgomery,

Director, NEPA Compliance Division, Office of Federal Activities.

[FR Doc. 03–10274 Filed 4–24–03; 8:45 am]

BILLING CODE 6560–50–P

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

REPLY TO
ATTENTION OF

Planning Division
Environmental Branch

MAR 05 2003
RECEIVED

MAR 20 2003

DIAL CORDY AND ASSOCIATES INC

TO WHOM IT MAY CONCERN:

Pursuant to the National Environmental Policy Act and U.S. Army Corps of Engineers Regulation (33 CFR 230.11), this letter constitutes the Notice of Availability of the Draft Environmental Impact Statement (DEIS) and General Re-evaluation Report (GRR) for the Port of Miami, Miami Harbor Federal Navigation Project, Miami-Dade County, Florida.

The Environmental Protection Agency (EPA) will publish the notice of availability in the Federal Register no later than March 21, 2003. The comment period for the DEIS will close 45-days after the publication date.

Any questions or comments should be submitted in accordance with the Abstract and Cover Page of the DEIS. A copy of the DEIS and GRR is available at the Miami-Dade Public Library, 101 West Flagler Street, Miami, Florida. The library hours are Monday - Saturday 9:00 - 6:00 p.m.; Thursday 9:00 - 9:00 p.m.; Sundays 1:00 p.m. - 5:00 p.m. (October-May only). The point of contact at the library is the reference librarian, 305-375-2665.

Sincerely,

Lou M. Mason, Ph. D.
for

James C. Duck
Chief, Planning Division

Federal, Commonwealth, and local agencies including but not limited to the following: U.S. Fish and Wildlife Service, National Marine Fisheries Service, U.S. Environmental Protection Agency, U.S. Coast Guard, Puerto Rico Department of Natural and Environmental Resources, Puerto Rico Environmental Quality Board, Puerto Rico Planning Board, Puerto Rico State Historic Preservation Officer, and other agencies as identified in scoping, public involvement, and agency coordination.

Other Environmental Review and Consultation: The proposed action would involve evaluation for compliance with guidelines pursuant to Section 404(b) of the Clean Water Act, public interest review, application for Water Quality Certification pursuant to Section 401 of the Clean Water Act, and determination of Coastal Zone Management Act consistency.

DEIS Preparation: We estimate that the DEIS will be available to the public on or about November 15, 2001.

Dated: August 20, 2001.

John R. Hall,

Chief, Regulatory Division.

[FR Doc. 01–21698 Filed 8–27–01; 8:45 am]

BILLING CODE 3710–AJ–M

DEPARTMENT OF DEFENSE

Department of the Army, Corps of Engineers

Intent To Prepare a Draft Environmental Impact Statement (DEIS) for a General Reevaluation Study of Navigation Improvements at Miami Harbor, Dade County, FL

AGENCY: U.S. Army Corps of Engineers, DoD.

ACTION: Notice of intent.

SUMMARY: The Jacksonville District, U.S. Army Corps of Engineers intends to prepare a Draft Environmental Impact Statement for Navigation Improvements at Miami Harbor, Dade County, Florida. The study is a cooperative effort between the U.S. Army Corps of Engineers and the Miami-Dade County Seaport Department of the Port of Miami.

FOR FURTHER INFORMATION CONTACT: Rea Boothby, 904–232–3453, Environmental Branch, Planning Division, P.O. Box 4970, Jacksonville, Florida 32232–0019.

SUPPLEMENTARY INFORMATION:

1. Project Background and Authorization

The initial authorization for a Federal channel providing navigation access to the City of Miami occurred in 1902. Later reports and documents recommended further improvement of the harbor's channels, turning basins, and jetties. A Resolution provided by the Committee on Transportation and Infrastructure of the United States House of Representatives dated October 29, 1997 provided the authorization for the current study.

2. Need or Purpose

Improvements, including channel deepening and widening, are required to accommodate future commercial fleet and to more effectively transit the existing fleet. Those improvements would allow commercial ships to call at the harbor with increased draft and cargo tonnage, resulting in transportation cost savings.

3. Proposed Solution and Forecast Completion Date

Widen and deepen the harbor's container ship channels and turning basins. Extend the Federal channel to the west end of Dodge Island. Construction is forecast to begin around October 2003.

4. Prior EAs or EISs

An EIS was prepared in 1985 to accommodate dredging in the Port of Miami.

5. Alternatives

Alternatives currently under consideration include no action, one nonstructural, and five structural alternatives. Six alternatives identified by the Biscayne Bay Pilots and the Miami-Dade County Seaport Department include:

- The first involves flaring the existing 500-foot wide entrance channel to provide an 800-foot wide entrance at buoy 1. Deepening of the entrance channel along Cut–1 and Cut-2 from an existing depth of 44 feet in one-foot increments to a depth of 52 feet will receive consideration.
- The second alternative will consider adding a turn widener between buoys 13 and 15 and deepening to depths of 50 feet.
- Alternative three involves extending the existing Fisher Island turning basin to the north. A turning notch (1600 feet by 1450 feet) extending approximately 500 feet to the north of the existing channel edge along the West End of Cut-3 would require evaluation. Depths from 43 to 50 feet at one-foot increments below the existing depth of 42 feet will receive consideration in the area of the turning notch.
- Alternative four consists of relocating the main channel (cruise ship channel or Cut-4) about 175 feet to the south between channel miles 2 and 3 over a two or three degree transition to the existing cruise ship turning basin. No dredging is expected for alternative four since existing depths allow for continuation of the authorized depth of 36 feet.
- Alternative five proposes to increase the width of the Lummus Island Cut (Fisherman's Channel) about 100 feet to the south of the existing channel. Deepening would include examination of 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.
- Alternate six includes deepening of 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.

6. Issues

The EIS will consider impacts on seagrasses (including Johnson Seagrass, a threatened species), mangrove, and hardbottom communities, other protected species, Essential Fish Habitat, shore protection, health and safety, water quality, aesthetics and recreation, fish and wildlife resources, cultural resources, energy conservation, socio-economic resources, and other impacts identified through scoping, public involvement, and interagency coordination.

7. Scoping Process

a. A scoping letter was sent to interested parties on January 6, 2000. In addition, all parties were invited to participate in the scoping process by identifying any additional concerns on issues, studies needed, alternatives, procedures, and other matters related to the scoping process.

b. A local, state, and Federal resource agency scoping meeting occurred on March 13, 2000, to determine the areas of coverage for an environmental baseline resource survey. A meeting followed on November 1, 2000, with those resource agencies to review preliminary results.

c. No public scoping meeting is planned at this time.

8. Public Involvement

We invite the participation of affected Federal, state and local agencies, affected Indian tribes, and other interested private organizations and parties.

9. Coordination

The proposed action is being coordinated with the U.S. Fish and Wildlife Service (FWS) and the National Marine Fisheries Service (NMFS) under Section 7 of the Endangered Species Act, with the FWS under the Fish and Wildlife Coordination Act, with the NMFS concerning Essential Fish Habitat and with the State Historic Preservation Officer.

10. Other Environmental Review and Consultation

The proposed action would involve evaluation for compliance with guidelines pursuant to Section 404(b) of the Clean Water Act; application (to the State of Florida) for Water Quality Certification pursuant to Section 401 of the Clean Water Act; certification of state lands, easements, and rights of way; and determination of Coastal Zone Management Act consistency.

11. Agency Role

The Corps and the non-Federal sponsor, the Miami-Dade County Seaport of the Port of Miami, will provide extensive information and assistance on the resources to be impacted, mitigation measures, and alternatives.

12. DEIS Preparation

It is estimated that the DEIS will be available to the public on or about November 2001.

Dated: August 10, 2001.

James C. Duck,

Chief, Planning Division.

[FR Doc. 01–21692 Filed 8–27–01; 8:45 am]

BILLING CODE 3710–AJ–M

DEPARTMENT OF DEFENSE

Department of the Army, Corps of Engineers

Intent To Prepare a Draft Supplement Environmental Impact Statement (SEIS) to the 1996 Final Environmental Impact Statement for Coast of Florida Erosion and Storm Effects Study, Region III, Palm Beach, Broward, and Dade County, FL, To Address an Application for a Department of the Army Permit to Nourish Phipps Beach in Palm Beach County, FL

AGENCY: U.S. Army Corps of Engineers, DoD

ACTION: Notice of intent.

SUMMARY: Pursuant to Section 404 of the Clean Water Act and Section 10 of the Rivers and Harbors Act, the U.S. Army Corps of Engineers has regulatory authority to permit the discharge of dredge and fill material into waters of the United States. In compliance with its responsibilities under the National Environmental Policy Act (NEPA) of 1969, the Jacksonville District, U.S. Army Corps of Engineers intends to prepare a SEIS as a result of the dredge and fill permit application for the Phipps Ocean Park Beach Restoration project located within the Town of Palm Beach, Palm Beach County, Florida.

FOR FURTHER INFORMATION CONTACT: Brice McKoy, 561–683–0792, U.S. Army Corps of Engineers, Jacksonville District, Regulatory Division, South Permits Branch, 400 North Congress Avenue, Suite 130, West Palm Beach, Florida 33401.

SUPPLEMENTARY INFORMATION: The Town of Palm Beach, Florida is seeking a Department of Army permit to construct a 1.9-mile beach restoration project located in the Town of Palm Beach, Florida, between Florida Department of Environmental Protection reference monument R–116 and R–126 in the vicinity of Phipps Ocean Park. Approximately 1.5 million cubic yards of sand would be dredged from two borrow areas located approximately 3,500 feet offshore and approximately 1.5 and 2.6 miles south of the fill area. The beach fill profile consists of a +9 ft. NGVD berm elevation with an average construction berm width varying from 190 to 455 ft, with a projected life of 8 years. The shoreline within the project area contains rock outcrops located at and below the mean low water line. This project is located within project segment ''6'' in Palm Beach County and referred to as the ''South-end Palm Beach Island Segment'' in the Coast of Florida Erosion and Storm Effects Study, which was authorized on 16 July 1984, by Section 104 of the 1985 Appropriations Act (Public Law 98–360). The specific study area for this Draft Supplemental Environmental Impact Statement is approximately 1.9 miles of beach, between Sloans Curve and the Ambassador South II Condominium including Phipps Ocean Park and the Palm Beach Par 3 Golf Club, located within the Town of Palm Beach, Florida, in Sections 11, 14, and 23, Township 44 South, Range 43 East.

Alternatives: Alternatives are being considered in the study and will be addressed in the Draft SEIS. These alternatives include: no action alternatives, non-structural alternatives, revetment, beach fill with periodic nourishment, beach fill with periodic nourishment stabilized by an offshore breakwater or submerged artificial reef, beach nourishment with maintenance material from updrift inlet, beach fill and periodic nourishment stabilized by groins, seawalls, beach fill with periodic nourishment and hurricane surge protection sand dune, beach fill with periodic nourishment and hurricane surge protection—offshore breakwaters or submerged artificial reefs, nearshore berms, beach fill with nearshore berms, stabilization of beaches and dunes by vegetation, feeder beach: beach fill strategically located to nourish downdrift erosion problem areas, relocation of structures, flood proofing of structures, abandon or modify navigation projects, sand tightening of jetties, upgrading on construction of sand transfer plants for renourishment; dune restoration, PEP reef, and various combinations of the above.

Issues: The Draft SEIS will consider impacts on protected species, health, conservation, economics, aesthetics, general environmental concerns, wetlands (and other aquatic resources), historic properties, fish and wildlife value, flood hazards, floodplain values, land use, navigation, recreation, water supply and conservation, water quality, energy needs, safety, food and fiber production, mineral needs, considerations of property ownership, and, in general, the needs and welfare of the people, and other issues identified through scoping, public involvement and interagency coordination.

Scoping: The scoping process will involve Federal, State, county, municipal agencies, and other interested persons and organizations. A scoping letter will be sent to interested Federal, State, county and municipal agencies requesting their comments and concerns. Any persons and organizations wishing to participate in the scoping process should contact the U.S. Army Corps of Engineers at the above address. Significant issues that are anticipated include concern for nearshore and offshore hard bottom communities, fisheries, water quality, threatened and endangered species, and cultural resources.

Public Involvement: We invite the participation of affected federal, state and local agencies, affected Indian tribes, and other private organizations and parties by submitting written comments to the information contact provided in this notice.

Coordination: Coordination with the U.S. Fish and Wildlife Service has been completed in compliance with Section 7 of the Endangered Species Act. Coordination with the National Marine Fisheries Service will be accomplished in compliance with Section 7 of the Endangered Species Act. Coordination

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

REPLY TO
ATTENTION OF

Planning Division
Environmental Branch

JAN 0 6 2000

TO WHOM IT MAY CONCERN:

The Miami-Dade County Seaport Department of the Port of Miami has requested that the U.S. Army Corps of Engineers (Corps), Jacksonville District, study the feasibility of widening and deepening portions of Miami Harbor, Dade County, Florida (enclosure 1). To assist in this effort, the Corps is gathering information to define issues and concerns that will be addressed in a general reevaluation and review (GRR) study of Miami Harbor to consider modifying portions of the deep draft navigation project.

Six alternatives identified by the Biscayne Bay Pilots and the Miami-Dade County Seaport Department are under consideration as indicated on the enclosed drawing and described below:

- The first involves flaring the existing 500-foot wide entrance channel to provide an 800-foot wide entrance at buoy 1. Deepening of the entrance channel along Cut-1 and Cut-2 from an existing depth of 44 feet in one-foot increments to a depth of 52 feet will receive consideration.

- The second alternative will consider adding a turn widener between buoys 13 and 15 and deepening to depths of 50 feet.

- Alternative three involves extending the existing Fisher Island turning basin to the north. A turning notch (1600 feet by 1450 feet) extending approximately 500 feet to the north of the existing channel edge along the West End of Cut-3 would require evaluation. Depths from 43 to 50 feet at one-foot increments below the existing depth of 42 feet will receive consideration in the area of the turning notch.

- Alternative four consists of relocating the main channel (cruise ship channel or Cut-4) about 175 feet to the south between channel miles 2 and 3 over a two or three degree transition to the existing cruise ship turning basin. No dredging is expected for alternative four since existing depths allow for continuation of the authorized depth of 36 feet.

- Alternative five proposes to increase the width of the Lummus Island Cut (Fisherman's Channel) about 100 feet to the south

of the existing channel. Deepening would include examination of 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.

- Alternative six includes deepening of 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.

Examination of the impacts of the proposed dredging alternatives on the harbor system and shoreline processes is also part of the study. During the study our objectives include identifying any problems and needs associated with deep-draft vessel movements serving cargo and cruise ship facilities within Miami Harbor and seeking a solution.

Approval of a prior study allowed the Port of Miami's Miami-Dade County Seaport Department to improve the entrance channel and deepen it from 38 feet to 44 feet during the past Phase I construction effort. That work included addition of a widener on the north side of Government Cut at the Fisher Island turning basin along with deepening from 36 feet to 42 feet through the Fisher Island turning basin to the first half of the Lummus Island Cut or Fisherman's Channel. Under the same authorization the Port of Miami's current Phase II deepening involves extending the 42-foot depth to the end of the Lummus/Dodge Island turning basin.

The Corps welcomes your views, comments, suggestions, and any information about resources, study objectives, and important features within the described study area. Letters of comment or inquiry should be addressed to the letterhead address to the attention of Planning Division, Environmental Coordination Section and received by this office within thirty (30) days of the date of this letter.

Sincerely,

EP Rausch, for

James C. Duck
Chief Planning Division

Enclosures

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

REPLY TO
ATTENTION OF

AUG 1 3 2001

Planning Division
Environmental Branch

TO WHOM IT MAY CONCERN:

Pursuant to the National Environmental Policy Act and the U.S. Army Corps of Engineers Regulation (33 CFR 230.12), this letter constitutes the Notice of Intent to prepare a Draft Environmental Impact Statement (DEIS) for the Miami Harbor Navigation Improvements, Dade County, Florida.

Sincerely,

James C. Duck
Chief, Planning Division

Enclosures

RECEIVED

AUG 17 2001

DIAL CORDY AND ASSOCIATES, INC

DEPARTMENT OF DEFENSE
CORPS OF ENGINEERS, DEPARTMENT OF THE ARMY
JACKSONVILLE DISTRICT, JACKSONVILLE, FLORIDA, 32202

Intent to Prepare a Draft Environmental Impact Statement (DEIS) for a General Reevaluation Study of Navigation Improvements at Miami Harbor, Dade County, Florida.

AGENCY: U.S. Army Corps of Engineers, Department of Defense
COOPERATING AGENCY: Miami-Dade County Seaport Department of the Port of Miami.

ACTION: Notice of Intent.

SUMMARY: The Jacksonville District, U.S. Army Corps of Engineers intends to prepare a Draft Environmental Impact Statement for Navigation Improvements at Miami Harbor, Dade County, Florida. The study is a cooperative effort between the U.S. Army Corps of Engineers and the Miami-Dade County Seaport Department of the Port of Miami.

FOR FURTHER INFORMATION CONTACT: Rea Boothby, 904-232-3453, Environmental Branch, Planning Division, P.O. Box 4970, Jacksonville, Florida 32232-0019.

SUPPLEMENTARY INFORMATION:

1. *Project Background and Authorization.* The initial authorization for a Federal channel providing navigation access to the City of Miami occurred in 1902. Later reports and documents recommended further improvement of the harbor's channels, turning basins, and jetties. A Resolution provided by the Committee on Transportation and Infrastructure of the United States House of Representatives dated October 29, 1997 provided the authorization for the current study.

2. *Need or Purpose.* Improvements, including channel deepening and widening, are required to accommodate future commercial fleet and to more effectively transit the existing fleet. Those improvements would allow commercial ships to call at the harbor with increased draft and cargo tonnage, resulting in transportation cost savings.

3. *Proposed Solution and Forecast Completion Date.* Widen and deepen the harbor's container ship channels and turning basins.

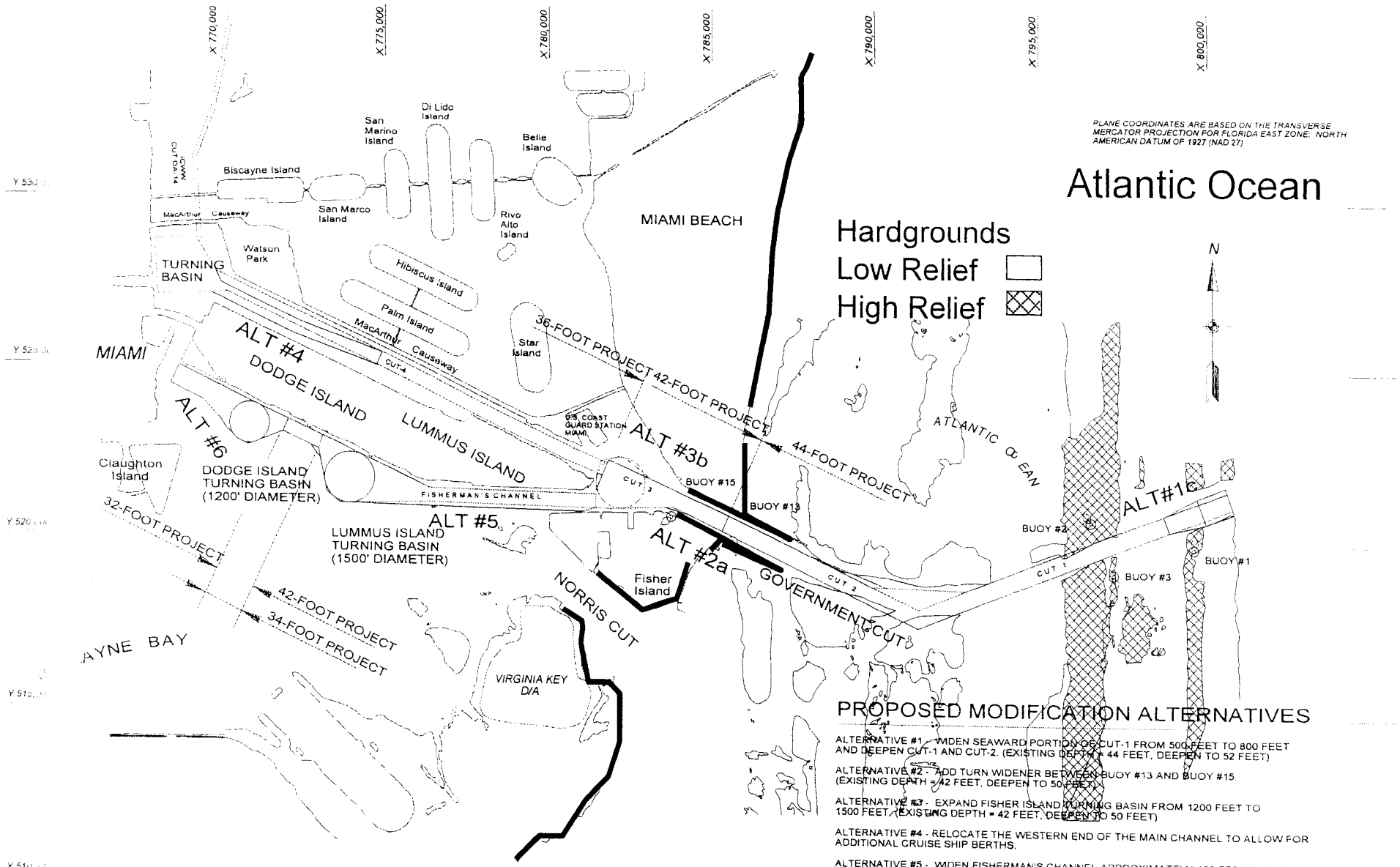
Extend the Federal channel to the west end of Dodge Island. Construction is forecast to begin around October 2003

4. *Prior EAs or EISs.* An EIS was prepared in 1985 to accommodate dredging in the Port of Miami.

5. *Alternatives.* Alternatives currently under consideration include no action, one nonstructural, and five structural alternatives. Six alternatives identified by the Biscayne Bay Pilots and the Miami-Dade County Seaport Department include:

- The first involves flaring the existing 500-foot wide entrance channel to provide an 800-foot wide entrance at buoy 1. Deepening of the entrance channel along Cut-1 and Cut-2 from an existing depth of 44 feet in one-foot increments to a depth of 52 feet will receive consideration.
- The second alternative will consider adding a turn widener between buoys 13 and 15 and deepening to depths of 50 feet.
- Alternative three involves extending the existing Fisher Island turning basin to the north. A turning notch (1600 feet by 1450 feet) extending approximately 500 feet to the north of the existing channel edge along the West End of Cut-3 would require evaluation. Depths from 43 to 50 feet at one-foot increments below the existing depth of 42 feet will receive consideration in the area of the turning notch.
- Alternative four consists of relocating the main channel (cruise ship channel or Cut-4) about 175 feet to the south between channel miles 2 and 3 over a two or three degree transition to the existing cruise ship turning basin. No dredging is expected for alternative four since existing depths allow for continuation of the authorized depth of 36 feet.
- Alternative five proposes to increase the width of the Lummus Island Cut (Fisherman's Channel) about 100 feet to the south of the existing channel. Deepening would include examination of 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.
- Alternative six includes deepening of 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.

6. *Issues.* The EIS will consider impacts on seagrasses (including Johnson Seagrass, a threatened species), mangrove, and hardbottom communities, other protected species, Essential



PROPOSED MODIFICATION ALTERNATIVES

ALTERNATIVE #1 - WIDEN SEAWARD PORTION OF CUT-1 FROM 500 FEET TO 800 FEET AND DEEPEN CUT-1 AND CUT-2. (EXISTING DEPTH = 44 FEET, DEEPEN TO 52 FEET)

ALTERNATIVE #2 - ADD TURN WIDENER BETWEEN BUOY #13 AND BUOY #15. (EXISTING DEPTH = 42 FEET, DEEPEN TO 50 FEET)

ALTERNATIVE #3 - EXPAND FISHER ISLAND TURNING BASIN FROM 1200 FEET TO 1500 FEET. (EXISTING DEPTH = 42 FEET, DEEPEN TO 50 FEET)

ALTERNATIVE #4 - RELOCATE THE WESTERN END OF THE MAIN CHANNEL TO ALLOW FOR ADDITIONAL CRUISE SHIP BERTHS.

ALTERNATIVE #5 - WIDEN FISHERMAN'S CHANNEL APPROXIMATELY 100 FEET TO THE SOUTH. (EXISTING DEPTH = 42 FEET, DEEPEN TO 50 FEET) DEEPENING WOULD INCLUDE CUT-3, STA. 0+00 TO CUT-3, STA. 42+00.

ALTERNATIVE #6 - DEEPEN DODGE ISLAND CUT AND THE PROPOSED 1200 FOOT DIAMETER TURNING BASIN FROM 32 & 34 FEET TO 36 FEET AND RELOCATE WESTERN END OF DODGE ISLAND CUT TO ACCOMODATE PROPOSED PORT EXPANSION.

MIAMI HARBOR GENERAL REEVALUATION REPORT

APPENDIX B
Scoping Correspondence

APPENDIX B
Scoping Correspondence

City of Miami

ERDAL DÖNMEZ
Director

DONALD H. WARSHAW
City Manager

February 3rd, 2000

Mr. James C. Duck
Chief Planning Division
Environmental Branch
Department of the Army
Jacksonville District Corps of Engineers
P.O. Box 4970
Jacksonville, FL 32233-0019

Dear Mr. Duck:

Your letter concerning a request from the Miami-Dade County Seaport Department to study the feasibility of widening and deepening portions of the Miami Harbor in Miami-Dade County dated January 6th, 2000, was routed to my office at the City of Miami. Your letter states that examination of the impacts of the proposed dredging alternatives on the harbor system and shoreline processes is also part of the study.

My comments offered on behalf of the City of Miami relate to *alternative six* which suggests deepening of Dodge Island Cut and turning basin, and relocation of the western end of the Dodge Island Cut to accommodate proposed port expansion. The City of Miami is in support of dredging alternatives that encompass the entire western shoreline of Watson Island, to accommodate proposed port expansion as well as proposed City marina improvements to accommodate large yachts.

It is respectfully requested that our views be taken into consideration as you proceed with the Miami Harbor dredging feasibility study. I would be pleased to provide additional information, as necessary.

Sincerely,

Erdal Dönmez

Erdal Donmez
Director

ED/AW

c: Charles A. Towsley, Port Director
Miami-Dade County Seaport Department, Port of Miami

DEPARTMENT OF REAL ESTATE & ECONOMIC DEVELOPMENT
444 S.W. 2nd Avenue, 3rd Floor/Miami, FL 33130/ (305) 416-1435/Telecopier: (305) 416-2156
P.O. Box 330708 /Miami, Florida 33233-0708

UNITED STATES DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration
NATIONAL MARINE FISHERIES SERVICE
Southeast Regional Office
9721 Executive Center Drive North
St. Petersburg, FL 33702
(727) 570-5312; FAX (727) 570-5517

F/SER3:EGH

FEB 22 2000

Mr. James C. Duck
Chief, Planning Division
Army Corps of Engineers, Jacksonville District
P.O. Box 4970
Jacksonville, FL 32232-0019

Dear Mr. Duck:

This responds to your January 6, 2000 notice and request for comments on the widening and deepening of portions of Miami Harbor, Dade County, Florida. Six alternatives were presented. The National Marine Fisheries Service (NMFS) supports Alternative No. 4 because no dredging is expected with this alternative, since existing depths allow for the continuation of the authorized depth of 36 feet.

Dredging activities may adversely affect threatened and endangered species under NMFS purview, notably, sea turtles (which are susceptible to entrainment in hopper dredge dragheads) and Johnson's seagrass. If an alternative other than Alternative 4 is ultimately selected, the activity may adversely affect federally-listed species. Consequently, the Corps would be required to consult with NMFS on the activity pursuant to section 7 of the Endangered Species Act (ESA).

We appreciate the opportunity to comment on this project and work with the Corps to ensure the protection of threatened and endangered species under NMFS purview, and to help the Corps fulfill its mandate under the ESA. Please contact Mr. Eric Hawk at 727/570-5312 if you have any questions or if we may be of assistance.

Sincerely,

Charles A. Oravetz

Charles A. Oravetz
Assistant Regional Administrator
Protected Resources Division

cc: F/SER4 - A. Mager
F/PR3

o:\section7\informal\mia-hbr
File: 1514-22 f.1. FL

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

Southeast Regional Office
9721 Executive Center Drive North
St. Petersburg, Florida 33702

February 1, 2000

Colonel Joe R. Miller
District Engineer, Jacksonville District
Department of the Army, Corps of Engineers
Planning Division, Environmental Branch
P.O. Box 4970
Jacksonville, Florida 32232-0019

Dear Colonel Miller:

The National Marine Fisheries Service (NMFS) has reviewed your staff's letter dated January 6, 2000, requesting comments that will be incorporated into a general reevaluation and review (GRR) of a Miami Harbor deep draft navigation project. The applicant, Miami-Dade County Seaport Department of the Port of Miami, is requesting comments on six alternative plans to the widening and deepening of portions of Miami Harbor, Dade County, Florida.

The information supplied in the letter briefly outlines the six alternative plans under consideration for the project. However, detailed information concerning the impacts to aquatic resources and measures of avoidance and minimization from each alternative was not provided. Therefore, we have no specific comment to provide at this time. The NMFS will be available to review the GRR for the project when it is completed.

Thank you for your consideration of our comments. If you have questions, please contact Michael Johnson in Miami, Florida at 305/595-8352.

Sincerely,

W. Mark Thompson/for
Andreas Mager, Jr.
Assistant Regional Administrator
Habitat Conservation Division

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION 4
WATER MANAGEMENT DIVISION
SOUTH FLORIDA OFFICE
400 NORTH CONGRESS AVE., SUITE 120
WEST PALM BEACH, FLORIDA 33401

February 2, 2000

James C. Duck
U.S. Army Corps of Engineers
Planning Division
P.O. Box 4970
Jacksonville, FL 32232-0019

SUBJECT: Miami Harbor Project

Dear Mr. Duck:

This is in response to your letter dated January 6, 2000 concerning a request by the Miami-Dade County Seaport Department of the Port of Miami to study the feasibility of widening and deepening portions of Miami Harbor, Dade County, FL. All six project design alternatives that are outlined in your letter include new dredging. Dredging has the potential to directly impact existing seagrass and hardbottom communities. Also, turbidity generated from dredging activities can degrade existing live bottom habitats over a broad area. Thus, we suggest that your considerations include an evaluation of the potential environmental impacts for each alternative and an analysis of the least environmentally damaging alternative that fulfills the project purpose. This analysis will require a detailed map of benthic habitats in the areas proposed for dredging. Also, no information is provided on disposal sites for the dredged material; we will require information on disposal sites to assess the potential environmental impacts of the project.

I request that you keep this office informed on your progress in selecting an alternative since we will provide specific comments on the selected alternative during the permit review phase of the project. Please contact Bill Kruczynski, of my staff, at telephone 305 743-0537 if you have any questions concerning our comments. He will be available to attend any meetings you may convent to discuss alternatives or view sites. Thank you for the opportunity to provide comments during the early planning stage of this project.

Sincerely,

for Richard Harvey, Chief
South Florida Office

STATE OF FLORIDA

DEPARTMENT OF COMMUNITY AFFAIRS

"Dedicated to making Florida a better place to call home"

JEB BUSH
Governor

STEVEN M. SEIBERT
Secretary

February 23, 2000

Mr. James C. Duck
Department of the Army
Jacksonville District Corps of Engineers
Post Office Box 4970
Jacksonville, Florida 32232-0019

Attn: Planning Division
Environmental Coordination Section

RE: Department of the Army - District Corps of Engineers - Notice of Intent - Study of Feasibility of Widening and Deepening Portions of Miami Harbor - Miami-Dade County, Florida
SAI: FL200001100015C

Dear Mr. Duck:

The Florida State Clearinghouse has been advised that our reviewing agencies require additional time to complete the review of the above-referenced project. In order to receive comments from all agencies, an additional fifteen days is requested for completion of the state's consistency review in accordance with 15 CFR 930.41(b). We will make every effort to conclude the review and forward the consistency determination to you on or before March 10, 2000.

Thank you for your understanding. If you have any questions regarding this matter, please contact Ms. Cherie Trainor, Clearinghouse Coordinator, at (850) 922-5438.

Sincerely,

Ralph Cantral, Executive Director
Florida Coastal Management Program

RC/cc

2555 SHUMARD OAK BOULEVARD • TALLAHASSEE, FLORIDA 32399-2100
Phone: 850.488.8466/Suncom 278.8466 FAX: 850.921.0781/Suncom 291.0781
Internet address: http://www.dca.state.fl.us

FLORIDA KEYS
Area of Critical State Concern Field Office
2796 Overseas Highway, Suite 212
Marathon, Florida 33050-2227

STATE OF FLORIDA

DEPARTMENT OF COMMUNITY AFFAIRS

"Dedicated to making Florida a better place to call home"

JEB BUSH
Governor

STEVEN M. SEIBERT
Secretary

March 16, 2000

Mr. James C. Duck
Department of the Army
Jacksonville District Corps of Engineers
Post Office Box 4970
Jacksonville, Florida 32232-0019

Attn: Planning Division
Environmental Coordination Section

RE: Department of the Army - District Corps of Engineers - Notice of Intent - Study of Feasibility of Widening and Deepening Portions of Miami Harbor - Miami-Dade County, Florida
SAI: FL200001100015C

Dear Mr. Duck:

The Florida State Clearinghouse, pursuant to Presidential Executive Order 12372, Gubernatorial Executive Order 95-359, the Coastal Zone Management Act, 16 U.S.C. §§ 1451-1464, as amended, and the National Environmental Policy Act, 42 U.S.C. §§ 4321, 4331-4335, 4341-4347, as amended, has coordinated a review of the above-referenced project.

The Florida Fish and Wildlife Conservation Commission (FWC) offers comments regarding potential impacts to seagrasses and dredging methods that involve the use of in-water explosives. Please refer to the enclosed FWC comments.

The Department of Environmental Protection (DEP) offers comments and recommendations regarding the proposed project. DEP encourages a thorough evaluation of the six proposed alternatives to widen and deepen the Miami Harbor. If the proposed study indicates that the harbor deepening and widening is feasible, DEP will request a meeting with the Corps to review the available information and history of the project prior to any request for permits related to a preferred alternative. Please refer to the enclosed DEP comments.

2555 SHUMARD OAK BOULEVARD • TALLAHASSEE, FLORIDA 32399-2100
Phone: 850.488.8466/Suncom 278.8466 FAX: 850.921.0781/Suncom 291.0781
Internet address: http://www.dca.state.fl.us

CRITICAL STATE CONCERN FIELD OFFICE
2796 Overseas Highway, Suite 212
Marathon, FL 33050-2227
(305) 289-2402

COMMUNITY PLANNING
2555 Shumard Oak Boulevard
Tallahassee, FL 32399-2100
(850) 488-2356

EMERGENCY MANAGEMENT
2555 Shumard Oak Boulevard
Tallahassee, FL 32399-2100
(850) 413-9969

HOUSING & COMMUNITY DEVELOPMENT
2555 Shumard Oak Boulevard
Tallahassee, FL 32399-2100
(850) 488-7956

Based on the information contained in the notification of intent and the enclosed comments provided by our reviewing agencies, the state has determined that the above-referenced project is consistent with the Florida Coastal Management Program.

In addition, the South Florida Regional Planning Council (SFRPC) has identified the policies and goals of its Strategic Regional Policy Plan which may apply to the proposed activity. The comments provided by the SFRPC are enclosed for your review and consideration.

Thank you for the opportunity to review the proposed project. If you have any questions regarding this letter, please contact Ms. Cherie Trainor, Clearinghouse Coordinator, at (850) 414-5495.

Sincerely,

Chris McCay

for Ralph Cantral, Executive Director
Florida Coastal Management Program

RC/cc

Enclosures

cc: Bradley Hartman, Fish and Wildlife Conservation Commission
Robert Hall, Department of Environmental Protection
Eric Silva, South Florida Regional Planning Council

Department of Environmental Protection

Jeb Bush
Governor

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

David B. Struhs
Secretary

February 22, 2000

FEB 24 2000
State of Florida Clearinghouse

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

Re: Department of the Army, District Corps of Engineers, Notice if Intent, Study of Feasibility of Widening and Deepening Portions of Miami Harbor, Miami-Dade County

SAI: FL200001100015C

Dear Ms. Trainor:

This Department has reviewed the above-described project proposal and based on the information provided, we submit the following comments and recommendations.

Background: The Miami-Dade County Seaport department of the Port of Miami has requested that the U.S. Army Corp of Engineers (ACOE), study the feasibility of widening and deepening portions of Miami Harbor, Dade County. Six alternatives are listed in the ACOE letter requesting information for use in their general reevaluation and review (ORR) study of Miami Harbor. The letter states that the alternatives were identified by the Biscayne Bay Pilots and the Miami-Dade County Seaport Department

Comments: The six alternatives described in the ACOE appear to be six separate deepening and widening projects that the Port may wish to pursue. The six projects are located in different areas of the Port, and collectively would result in dredging operations that encompass nearly all the channels and turning basins leading into the surrounding port. There are no clear objectives outlined for these alternatives, nor is there any indication given on how the six alternatives would serve to accomplish port goals. It is recommended that the Port's goals and objectives be incorporated into the feasibility study with the evaluation of each alternative.

Although all the alternatives cause concern, alternatives 5 and 6 are of particular concern. Alternative 5 is potentially troublesome in that it seems to square off the SW corner of Dodge Island, and it appears that the Port is proposing to fill the remaining submerged area in order to increase the landmass of the port. This needs to be clarified within the feasibility study.

6

Alternative 6 appears to deepen and widen the central turning basin, and is referred to in the proposal as the Lummus Island Turning Basin. This is similar to a previously submitted project application in 1997. Subsequent to the Port's application and this department's requests for additional information, it was discovered that the port had already conducted the dredging for the widening project. This was apparently accomplished before submittal of the permit application to DEP in 1997. This dredging violation has resulted in several acres of seagrass destruction immediately adjacent to the Bill Sadowski Wildlife Conservation Area. Notice of violation has been issued by the ACOE, DERM, and the DEP and it is our understanding that a plan of mitigation is currently being negotiated. Further widening of this area would exacerbate the damage already done from that earlier dredging. A deepening project could have water quality impacts as well as direct impacts on submerged habitat by changing the slope of the channel. Since the port has not yet agreed to a mitigation plan for the previous violation, and since part of that mitigation might include restoration of the previous dredging, a request for further dredging in the same location appears to be premature. The feasibility study should include a discussion of the Port's plan for mitigation of the previous damage to the Aquatic Preserve that resulted from illegal dredging.

There are concerns for all the proposed alternatives as they lie within the Biscayne Bay Aquatic Preserve (BBAP), which is designated a Class III Outstanding Florida Water body. The preserve boundaries include all submerged bottomlands and the water column above those lands, both publicly and privately owned (Section 258.397, F.S.). Therefore, these proposed projects are subject to both OFW water quality standards and more fundamentally the need to demonstrate that reasonable alternatives do not exist for projects proposed within the preserve, and that there is a resulting extreme hardship resulting from denial of the project.[1]

The Department is also concerned for the effects of dredging on the seagrass beds within the bay. Dredging not only physically removes seagrass plants, but also creates turbid water that reduces the amount of sunlight penetrating to the seagrass, thereby reducing photosynthesis and plant growth. Silt particles can also smother and suffocate animals and plants living in the seagrass beds. Other impacts to submerged habitat include pollution from heavy metals, oil spills, and nutrient overload which may occur as a result of increased boat and ship traffic to the seaport. Anticipated impacts to the resources within the BBAP need to be evaluated within the feasibility study and the proposed alternatives realistically assessed as to how the proposed alternatives will either avoid or minimize impacts to the BBAP.

---

[1] The bay was designated an Aquatic Preserve because it is considered one of a few areas in the state that has resources of the highest quality and condition. The proposed project area may have, but is not limited to, the following resources: corals, oyster bars, marine seagrass beds, all of which are habitat for many endangered or threatened species including the seagrass Halophila johnsonii. Marine seagrass beds are vital to the ongoing health of our coastal waters and fisheries. They stabilize the sand and mud in which they grow, and provide food, shelter, breeding grounds and nursery areas for many marine organisms.

The Department encourages a thorough evaluation of the six proposed alternatives to widen and deepen the Miami Harbor. Should the proposed study indicate that the harbor deepening and widening is feasible, the Department will request a meeting with the Corps to review the available information and history of this project prior to any request for permits related to a preferred alternative.

Thank you for the opportunity of commenting on this proposal. If you have any questions regarding this letter please give me a call at (850) 487-2231.

Sincerely,

Robert W. Hall
Office of Legislative and Governmental Affairs

cc: Lauren Milligan
Carolyn Ansay
David Mayer

FLORIDA FISH AND WILDLIFE CONSERVATION COMMISSION

JAMES L. "JAMIE" ADAMS, JR. Bushnell
BARBARA C. BARSH Jacksonville
QUINTON L. HEDGEPETH, DDS Miami
H.A. "HERKY" HUFFMAN Deltona
DAVID K. MEEHAN St. Petersburg
JULIE K. MORRIS Sarasota
TONY MOSS Miami
EDWIN P. ROBERTS, DC Pensacola
JOHN D. ROOD Jacksonville

ALLAN L. EGBERT, Ph.D., Executive Director
VICTOR J. HELLER, Assistant Executive Director

OFFICE OF ENVIRONMENTAL SERVICES
BRADLEY J. HARTMAN, DIRECTOR
(850)488-6661 TDD (850)488-954
FAX (850)922-567

February 3, 2000

FEB 10 2000
State of Florida Clearinghouse

Ms. Cherie Trainor, Director
Florida State Clearinghouse
2555 Shumard Oak Blvd.
Tallahassee, Florida 32399-2100

Re: SAI #FL200001100015C,
Study of Feasibility of Widening and Deepening Portions of Miami Harbor-Miami-Dade County, Florida

Dear Ms. Trainor:

The Office of Environmental Services of the Florida Fish and Wildlife Conservation Commission has reviewed the referenced project, and offers the following comments.

This project involves a request from the Miami-Dade County Seaport Department that the U.S. Army Corps of Engineers (USCOE) study the feasibility of widening and deepening portions of Miami Harbor. Six alternatives are to be considered, and they are briefly listed and portrayed on one map.

Our concerns with widening and deepening the Port of Miami have historically involved potential impacts to seagrasses and dredging methods that involve the use of in-water explosives. Additionally, during certain times of the year Alternative #2 would raise lighting concerns for sea turtles due to the proximity of Fisher Island and the south end of South Beach. In general, Alternatives #1, 2, 3,and 4 would have fewer seagrass issues, but should have seagrass surveys conducted to evaluate the impacts. Alternatives 5 and 6 are located adjacent to areas with significant seagrass beds, and seagrass surveys must be conducted for these two alternatives to evaluate impacts. We recommend that seagrass surveys be conducted during the months of April thru October in this area of the state.

Blasting as a method of dredging will be problematic for all the alternatives. If blasting can be allowed, it will likely be confined to some calendar window that minimizes risks for listed marine species. An extensive watch program must be developed and approved by our agency and the USFWS. The watch plan will require that aerial surveys be conducted before, during, and after blast events, along with the provision of land based observers to insure that no manatees or sea turtles are within the safety circle. If animals are sighted in the circle, the blast

event must be delayed until the animal moves to a safe distance. Aerial surveys are typically conducted during slack tide to improve visibility in the water. All of these limitations can cause unpredictable delays in dredging operations.

If you have any questions regarding these comments, please contact me or Ms. Carol A. Knox at (850) 922-4330.

Sincerely,

Brian Barnett, for

Bradley J. Hartman, Director
Office of Environmental Services

BJH/CAK
ENV 1-3-2
cc: U.S. Army Corps of Engineers, Jacksonville
USFWS-Vero Beach
Miami-Dade DERM
Ms. Lynn Griffin, DEP
A:\sai0015c.wpd

Florida Department of Transportation

JEB BUSH
GOVERNOR

605 Suwannee Street
Tallahassee, Florida 32399-0450

THOMAS F. BARRY, JR.
SECRETARY

January 25, 2000

RECEIVED
JAN 27 2000
State of Florida Clearinghouse

Department of Community Affairs
2555 Shumard Oak Boulevard
Tallahassee, Florida 32399-2100

SUBJECT: Miami Harbor - SAI FL200001100015C

The Department has reviewed the subject application and has no comments.

Sincerely,

Larry B. Phillips
Intermodal Specialist/Seaport

cc: Rene Rodriguez, D-6
Sandra Whitmire
File

COUNTY: Miami-Dade

DATE: 01/10/2000
COMMENTS DUE-2 WKS: 01/25/2000
CLEARANCE DUE DATE: 02/24/2000
SAI#: ~~FL2001100015C~~ FL200001100015

Message:

STATE AGENCIES	WATER MANAGEMENT DISTRICTS	OPB POLICY UNITS
Community Affairs Environmental Protection Fish & Wildlife Conserv. Comm State X Transportation	South Florida WMD RECEIVED JAN 27 2000 State of Florida Clearinghouse	Environmental Policy/C & ED Rec. DOT 1/18/00

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

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

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

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

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

Project Description:

Department of the Army - District Corps of Engineers - Notice of Intent - Study of Feasiblity of Widening and Deepening Portions of Miami Harbor - Miami-Dade County, Florida.

To: **Florida State Clearinghouse**
Department of Community Affairs
2555 Shumard Oak Boulevard
Tallahassee, FL 32399-2100
(850) 922-5438 (SC 292-5438)
(850) 414-0479 (FAX)

EO. 12372/NEPA

- ☐ No Comment
- ☐ Comments Attached
- ☐ Not Applicable

Federal Consistency

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

From:

Division/Bureau: FDOT / PUBLIC TRANSPORTATION - RAIL OFFICE

Reviewer: Gary B. Fulfi

Date: 1/25/00

COMMENTS E-2 WKS: 01/25/2000
CLEARANCE DUE DATE: 02/24/2000
SAI#: ~~FL200011000015C~~ FL200001100015C

Message:

STATE AGENCIES	WATER MANAGEMENT DISTRICTS	OPB POLICY UNITS
Community Affairs Environmental Protection Fish & Wildlife Conserv. Comm State Transportation	X South Florida WMD	Environmental Policy/C & ED RECEIVED JAN 18 2000 EXECUTIVE OFFICE

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

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Project Description:

Department of the Army - District Corps of Engineers - Notice of Intent - Study of Feasiblity of Widening and Deepening Portions of Miami Harbor - Miami-Dade County, Florida.

To: **Florida State Clearinghouse**
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EO. 12372/NEPA	Federal Consistency
☐ No Comment	☐ No Comment/Consistent
☐ Comments Attached	☐ Consistent/Comments Attached
☒ Not Applicable	☐ Inconsistent/Comments Attached
	☒ Not Applicable

UNDER THE OPERATING AGREEMENT BETWEEN DEP AND THE WMDs, THIS PROJECT WILL BE REVIEWED BY DEP.

From:
Division/Bureau: ENVIRONMENTAL RESOURCE REGULATION
Reviewer: JIM GOLDEN
Date: 1/20/99

Carliane

COUNTY: Miami-Dade

DATE: 01/10/2000
COMMENTS DUE-2 WKS: 01/25/2000
CLEARANCE DUE DATE: 02/24/2000
SAI#: ~~FL200011000015C~~ FL200001100015C

Message:

STATE AGENCIES	WATER MANAGEMENT DISTRICTS	OPB POLICY UNITS
Community Affairs Environmental Protection Fish & Wildlife Conserv. Comm State Transportation	South Florida WMD RECEIVED JAN 25 2000 State of Florida Clearinghouse	X Environmental Policy/C & ED RECEIVED JAN 24 2000 OFFICE OF POLICY AND BUDGET ENVIRONMENTAL POLICY UNIT

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Project Description:

Department of the Army - District Corps of Engineers - Notice of Intent - Study of Feasiblity of Widening and Deepening Portions of Miami Harbor - Miami-Dade County, Florida.

To: **Florida State Clearinghouse**
Department of Community Affairs
2555 Shumard Oak Boulevard
Tallahassee, FL 32399-2100
(850) 922-5438 (SC 292-5438)
(850) 414-0479 (FAX)

EO. 12372/NEPA

- [x] No Comment
- [ ] Comments Attached
- [ ] Not Applicable

Federal Consistency

- [ ] No Comment/Consistent
- [ ] Consistent/Comments Attached
- [ ] Inconsistent/Comments Attached
- [ ] Not Applicable

From:

Division/Bureau: OPB / Env. Policy Unit

Reviewer: Carliane Shu

Date: 1-18-00

South
Florida
Regional
Planning
Council

FEB 10 2000
State of Florida Clearinghouse

February 7, 2000

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

RE: SFRPC #00-0154, SAI #FL200001100015C – Response to a request for comments on the notice of intent for the feasibility study on the widening and deepening of portions of Miami Harbor, Department of the Army, Miami-Dade County.

Dear Ms. Trainor:

We have reviewed the above-referenced project and offer the following comments:

- Council staff is concerned about the cumulative impacts of this and similar projects. Staff recognizes the location of this project as being in the Biscayne Bay Aquatic Preserve, a natural resource of regional significance as designated in the *Strategic Regional Policy Plan for South Florida*. While this project may have little effect on the Biscayne Bay ecosystem by itself, the cumulative impacts on the water quality and ecological integrity of the region are of concern to Council staff and need to be considered with all projects. In addition, the proposed project should be consistent with the goals and policies of the Miami-Dade County comprehensive plan.

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

- The goals and policies of the *Strategic Regional Policy Plan for South Florida*, in particular those indicated below, should be observed when making decisions regarding this project.

Strategic Regional Goal

3.1 Eliminate the inappropriate uses of land by improving the land use designations and utilize land acquisition where necessary so that the quality and connectedness of Natural Resources of Regional Significance and suitable high quality natural areas is improved.

Regional Policies

3.1.1 Natural Resources of Regional Significance and other suitable natural resources shall be preserved and protected. Mitigation for unavoidable impacts will be provided either on-site or in

3440 Hollywood Boulevard, Suite 140, Hollywood, Florida 33021
Broward (954) 985-4416, Area Codes 305, 407 and 561 (800) 985-4416
SunCom 473-4416, FAX (954) 985-4417, SunCom FAX 473-4417
e-mail sfadmin@sfrpc.com

identified regional habitat mitigation areas with the goal of providing the highest level of resource value and function for the regional system. Endangered faunal species habitat and populations documented on-site shall be preserved on-site. Threatened faunal species and populations and species of special concern documented on-site, as well as critically imperiled, imperiled and rare plants shall be preserved on-site unless it is demonstrated that off-site mitigation will not adversely impact the viability or number of individuals of the species.

3.1.9 Degradation or destruction of Natural Resources of Regional Significance, including listed species and their habitats will occur as a result of a proposed project only if:

a) the activity is necessary to prevent or eliminate a public hazard, and
b) the activity is in the public interest and no other alternative exists, and
c) the activity does not destroy significant natural habitat, or identified natural resource values, and
d) the activity does not destroy habitat for threatened or endangered species, and
e) the activity does not negatively impact listed species that have been documented to use or rely upon the site.

3.1.10 Proposed projects shall include buffer zones between development and existing Natural Resources of Regional Significance and other suitable natural resources. The buffer zones shall provide natural habitat values and functions that compliment Natural Resources of Regional Significance values so that the natural system values of the site are not negatively impacted by adjacent uses. The buffer zones shall be a minimum of 25 feet in width. Alternative widths may be proposed if it is demonstrated that the alternative furthers the viability of the Natural Resource of Regional Significance, effectively separating the development impacts from the natural resource or contributing to reduced fragmentation of identified Natural Resources of Regional Significance.

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.

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.

Thank you for the opportunity to comment. We would appreciate being kept informed on the progress of this project. Please do not hesitate to call if you have any questions or comments.

Sincerely,

Eric Silva
Senior Planner

ES/ms

cc: Guillermo E. Olmedillo, Miami-Dade County
Jean Evoy, Miami-Dade County DERM

FLORIDA DEPARTMENT OF STATE
the Secretary
ce of International Relations
Division of Elections
Division of Corporations
Division of Cultural Affairs
Division of Historical Resources
Division of Library and Information Services
Division of Licensing
Division of Administrative Services

MEMBER OF THE FLORIDA CABINET
State Board of Education
Trustees of the Internal Improvement Trust Fund
Administration Commission
Florida Land and Water Adjudicatory Commission
Siting Board
Division of Bond Finance
Department of Revenue
Department of Law Enforcement
Department of Highway Safety and Motor Vehicles
Department of Veterans' Affairs

FLORIDA DEPARTMENT OF STATE
Katherine Harris
Secretary of State

DIVISION OF HISTORICAL RESOURCES

Ms. 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

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

September 6, 2001

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 (NMFS) has reviewed your letter dated August 13, 2001, regarding the Notice of Intent to prepare a Draft Environmental Impact Statement (DEIS) for the Miami Harbor Navigation Improvements in Biscayne Bay, Dade County, Florida. To accommodate future commercial fleet and increased draft and cargo tonnage, the Corps of Engineers (COE) proposes widening and deepening of the existing channels and turning basins. Several alternatives are being considered including no action, one nonstructural, and five structural alternatives.

The NMFS has not yet reviewed detailed information regarding the project's impacts to wetland and aquatic resources. However, the proposed project has the potential to have significant adverse impacts to Essential Fish Habitat (EFH) as defined by 1996 amendment to the Magnuson-Stevens Fishery Conservation and Management Act. Marine and estuarine resources found in the project vicinity include seagrasses, including the federally-listed Johnson's seagrass, hard bottom reefs, coral reefs, and mangroves wetlands. Seagrasses, estuarine scrub/shrub mangroves, live/hard bottoms, coral and coral reefs, estuarine mud bottom, and the estuarine and marine water column have been identified as EFH by the South Atlantic Fishery Management Council (SAFMC). In addition, submerged aquatic vegetation, hermatypic coral reefs, hard bottoms, and mangroves have been designated as a Habitat Area 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.

Considering the potential impact from the proposed project on EFH, HAPC, and other NMFS-trust resources, we recommend that the following be included in the DEIS:

1. An EFH Assessment should be completed 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 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.

2. The mitigation plan should include a complete analysis of the proposed locations for wetland and estuarine/marine benthic habitat restoration and/or creation for this project. In-kind mitigation for all habitat types to be impacted and long-term monitoring to document success should be provided. A contingency mitigation should be developed to provide out-of-kind mitigation if in-kind is not successful.

We look forward to the opportunity to provide comments to the DEIS when it becomes available. If we can be of further assistance, please advise. Related comments, questions or correspondence should be directed to Mr. Michael R. Johnson, in Miami, at 305/595-8352.

Sincerely,

W. Mark Thompson for

Andreas Mager, Jr.
Assistant Regional Administrator
Habitat Conservation Division

cc:
F/SER3
F/SER4
F/SER43-Johnson

APPENDIX C
404 (b)(1) Evaluation Report

Section 404(b)(1) Evaluation Report
Miami Harbor General Reevaluation Report
Miami-Dade County, Florida

I. PROJECT DESCRIPTION:

1. a. Location. Miami Harbor is located in Miami-Dade County on the Atlantic coast of Florida.

b. Authority and Purpose. The Miami-Dade County Seaport Department of the Port of Miami (Port) requested the U.S. Army Corps of Engineers (USACE), Jacksonville District, to study the feasibility of widening and deepening portions of the Port of Miami, Miami-Dade County, Florida. A resolution from the Committee on Transportation and Infrastructure, United States House of Representatives, adopted October 29, 1997, provides the study authority as follows:

> "Resolved by the Committee on Transportation and Infrastructure of the United States House of Representatives, That the Secretary of the Army is requested to review the report of the Chief of Engineers on Miami Harbor published as Senate, Document 90-93, 90th Congress, 2nd Session, and other pertinent reports, with a view to determining the feasibility of providing channel improvements in Miami Harbor and channels."

Additional authorization appeared in a subsequent appropriations bill for Miami Harbor, Florida, which contained the following language:

> "The Committee has provided $25,000,000 to reimburse the Miami-Dade Seaport Department for the Federal share of dredging work which has been accomplished and an additional $300,000 to initiate a General Reevaluation Report (GRR) to determine the feasibility of further Port deepening."

Improvements including channel deepening and widening are required to provide improved navigation and safety within the Federal channel and Port and to more effectively handle the existing and future commercial ship fleet. The recommended improvements would allow commercial ships with increased draft and cargo tonnage to call at the Port, resulting in transportation cost savings.

c. General Description.

The Corps proposes to deepen and widen the following channels:

Component 1C. Flaring the existing 500-foot wide entrance channel to provide an 800-foot wide entrance 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 2A. Widen the southern intersection of Government Cut 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 3B. 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 over a two or three degree transition 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 5A. 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. A widener at the northwest corner of the turning basin helps ease the turn to the Dodge Island Cut. 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 and within Gantry crane berthing areas 99-140.

The following describes general dredging information:

a. Approximately 6,000,000cy of material will be removed for the improvement work. Material from the project will be placed in the seagrass mitigation site, the artificial reef mitigation site, or an approved upland disposal area located. Blasting will be required to remove some of the material.

d. General Description of Dredged or Fill Material. Due to previous dredging projects of the Port and Entrance Channel, the majority of the project area is exposed rock. A few localized areas are mantled by a few feet of sand due to shoaling. The sand is usually tan or gray, contains some fines and also fills solution holes in the underlying rock. A portion of the Entrance Channel, between the reefs is sand with no rock. In areas not previously dredged, yellow to white massive limestone and sandstone units of the Miami Oolite Formation are overlain by sand and silt. The Miami Oolite Formation has many solution channels and is very permeable. It has a maximum thickness of 30 feet in the project area and has its base at an approximate elevation of –35.0 ft. MLW. The presence of a hard basal conglomerate at this elevation signifies the unconformable contact with the older Fort Thompson Formation. The Fort Thompson consists of tan colors, sandy limestone, calcareous sandstone, and seams of sand. With deeper depths, the sand seams

increase in size and are thicker than the rock strata in some places. Many solution holes are present and are either open or filled with sand or secondary limestone. In both the Miami Oolite and the Fort Thompson Formations solution activity and re-crystallization have created zones of different rock strength that cause the rock to fragment into large pieces that makes excavation difficult.

e. Description of the Proposed Disposal Sites. The appropriate sand and rock material will be placed in the proposed seagrass mitigation area, additional rock will be placed in the confines of the permitted artificial reef creation area, and an additional upland disposal area. The upland site will be diked with weirs and pipelines for settlement of the material and return flow.

The seagrass mitigation area consists of old borrow holes north of the Julia Tuttle Causeway used for fill materials for the causeway. The natural elevation prior to excavation was approximately two to six feet below MHW, and the existing contour elevations range from eight to 30 feet below the historic elevations. Geology and sediments on the site consist of rock, sand and silts. The site is mostly unvegetated; however, some algae and scattered seagrasses inhabit some of the shallow slopes of the borrow areas. The areas adjacent to the site are vegetated by dense seagrass.

The artificial reef site (specifically, the areas to be used for disposal placement with this project) consists of unvegetated sandy substrates.

The upland disposal site has not been determined.

f. Description of Disposal Methods. The disposal method at the seagrass mitigation site will be primarily hopper dredge pumpout. Clamshell barge may be used at the excavation site, where material will be segregated for disposal at the various disposal sites based on size and quality of the material.

II. FACTUAL DETERMINATIONS:

a. Physical Substrate Determinations.

(1). Substrate Elevations The existing depths are between approximately -8 feet and –52 feet.

(2). Sediment Type. Sand, rock, silt, and clay.

(3). Fill Material Movement. No movement is expected at the upland site or the artificial reef site. Only slight shifting of materials may occur at the seagrass mitigation area.

(4). Physical Effect on Benthos. Wherever material is placed on the substrate, the benthic inhabitants will be lost. However, rapid recovery of the benthic community is expected.

(5). Other Effects. Other than the loss of benthic organisms, environmental impacts at the site are expected to be minimal.

b. Water Circulation, Fluctuation and Salinity Determinations. Water fluctuation, circulation and salinity will not be adversely affected.

c. Suspended Particle/Turbidity Determinations.

(1). Expected Changes in Suspended Particulates and Turbidity Levels in the Vicinity of the Disposal Sites. Except for minor disturbances at the disposal site, little or no turbidity is expected during construction and State water quality and turbidity standards will be met unless a mixing zone exemption is required.

(2). Effects (Degree and Duration) on Chemical and Physical Values

(a). Light Penetration. No difference in light penetration is expected in the vicinity of construction activities. A reduction of light penetration during placement of the materials at the seagrass mitigation site may occur, but because of tidal action in the harbor these effects will be of short duration. However, benthic resources would not be much impacted by the work.

(b). Dissolved Oxygen. Dissolved oxygen (DO) levels should be unaffected by disposal activities.

(c). Toxic Metals and Organics. No toxic metals or organics are known to occur at the sites.

(d). Pathogens. Not applicable.

(e). Aesthetics. The presence of equipment during dredging activities will be aesthetically displeasing; however, upon completion of these activities all equipment will be removed. Therefore, there will be no long-term adverse aesthetic impacts.

d. Contaminant Determinations. No sources of pollutants or contaminants have been identified within the construction or disposal areas.

e. Aquatic Ecosystem and Organism Determinations.

(1). Effects on Plankton. No adverse impacts expected.

(2). Effect on Benthos. Benthic organisms at the disposal sites will be lost. Rapid recovery of those populations is expected.

(3). Effect on Nekton. No adverse impacts expected.

(4). Effect on the Aquatic Food Web. No significant adverse impacts expected.

(5). Effects on Special Aquatic Sites.

(a). Sanctuaries or Refuges. No significant adverse impacts are expected to the adjacent Critical Wildlife Area. Only minor turbidity may occur during construction.

(b). Wetlands. No wetlands would be affected.

(c). Mud Flats. No adverse impacts expected.

(d). Vegetated Shallows. A small amount of vegetation located on some of the slopes of the seagrass mitigation site will be affected. However, the seagrass population after completion will be substantially greater than pre-project conditions.

(e). Reefs. Existing reefs and hardbottom communities would not be affected by disposal of the dredged materials. New reef and hardbottom habitat will be created with disposal as mitigation for project impacts.

(f). Threatened and Endangered Species. Threatened or endangered species will not be affected by disposal of the dredged materials. Appropriate manatee and sea turtle protection measures will be implemented during dredging and disposal operations.

(g). Other Wildlife. Adverse impacts to other wildlife will not occur due to disposal of the dredged materials.

f. Proposed Disposal Site Determinations.

(1). Mixing Zone Determination. Not applicable.

(2). Determination of Compliance with Applicable Water Quality Standards. State water quality certification will be obtained for the work and applicable state water quality standards will be met during construction. An exemption may be required during placement of dredged materials in the seagrass mitigation area.

(3). Potential Effects on Human Use Characteristics. No adverse impacts expected.

(a). Municipal or Private Water Supply. No effect.

(b). Recreational and Commercial Fisheries. No adverse impacts expected.

(c). Water Related Recreation. No impacts expected.

(d). Aesthetics. The presence of construction equipment during the construction period will be unsightly; however, upon completion of construction the equipment will be removed and there will be no long-term adverse aesthetic impacts.

(e). Parks, National and Historic Monuments, National Seashores, Wilderness Areas, Research Sites and Similar Preserves. Some increased turbidity may occur in the Biscayne Bay Aquatic Preserve. These impacts are expected to be minor and temporary.

g. Determination of Cumulative Effects on the Aquatic Ecosystem. No significant impacts expected. The long-term effect of the disposal and restoration of seagrass beds would reverse past trends of water quality and aquatic habitat degradation.

h. Determination of Secondary Effects on the Aquatic Ecosystem. Secondary impacts on the aquatic ecosystem will be a stabilization of the system. Water quality will see improvement due to stabilization of substrates, and increased seagrass beds will provide foraging habitat for aquatic species.

APPENDIX D
Coastal Zone Management Plan
Consistency Determination

Department of Environmental Protection

Jeb Bush
Governor

Marjory Stoneman Douglas Building
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.

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

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.

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

MIAMI HARBOR IMPROVEMENT AND MAINTENANCE DREDGING
FLORIDA COASTAL ZONE CONSISTENCY PROGRAM
FEDERAL CONSISTENCY EVALUATION PROCEDURE

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

Consistency Statement: The purpose of the proposed action is to improve and maintain safe navigation depths in Miami Harbor, Dade County, Florida. Information will be submitted to the State for a permit in compliance with this chapter.

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

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

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

Consistency Statement: This chapter does not apply.

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

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

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

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

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

Consistency Statement: The proposed action will not directly impact any State managed parks or preserves. Potential impacts could occur to the adjacent Critical Wildlife Area (CWA) due to turbidity during construction. Monitoring will occur during construction to insure that State water quality levels are not exceeded.

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

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

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

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

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

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

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

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

11. Chapter 372, Living Land and Freshwater Resources. This chapter establishes the Game and Freshwater Fish Commission and directs it to manage freshwater aquatic life

and wild animal life and their habitat to perpetuate a diversity of species with densities and distributions which provide sustained ecological, recreational, educational, aesthetic and economic benefits.

Consistency Statement; The work in the port will be consistent with the goals of this chapter.

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

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

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

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

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

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

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

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

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

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

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

Consistency Statement: Appropriate State permits will be obtained for this project. The project is not expected to violate any State air or water pollution standards.

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

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

APPENDIX E
Environmental Baseline Study

APPENDIX E
Environmental Baseline Study

Environmental Baseline Study
Miami Harbor
General Reevaluation Report

FINAL REPORT

Revised
November 2001

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

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

PREFACE

This report was previously issued to the US Army Corps of Engineers Jacksonville District during May 2001 and included an assessment of impacts and a preliminary list of mitigation options that were identified based on limited site investigations and communications with local resource personnel. The information was intended solely for internal planning purposes by the Corps, and due to the preliminary nature of the project alternatives and evaluations at the time the report, it was determined that those sections regarding a discussion of impacts and mitigation should not be circulated. Any information regarding project impacts and mitigation will be included in the Environmental Impact Statement for the project once the project alternatives have been determined and appropriate mitigation has been identified. A summary of direct impacts acreages is provided for the preliminary design alternatives.

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1.0 INTRODUCTION

The Miami-Dade County Seaport Department of the Port of Miami requested the U.S. Army Corps of Engineers, Jacksonville District, to study the feasibility of modifying portions of Miami Harbor to improve the Federal navigation system of channels. Hence, Dial Cordy and Associates Inc. (DC&A) was subcontracted by Gulf Engineers and Consultants Inc. (GEC) to conduct an environmental baseline study and preliminary impact assessment for proposed deepening and widening of Miami Harbor at Miami, Florida for the U.S. Army Corps of Engineers, Jacksonville District, under contract No. DACW17-99-D-0043.

The DC&A study included conducting an environmental resource survey of the study area (Figure 1) that included field investigations (video surveys and diver surveys) to characterize marine habitats within the areas to be potentially impacted. Also, literature, data, and other information were collected, compiled, and reviewed. A summary of the findings of the DC&A study are presented in this report.

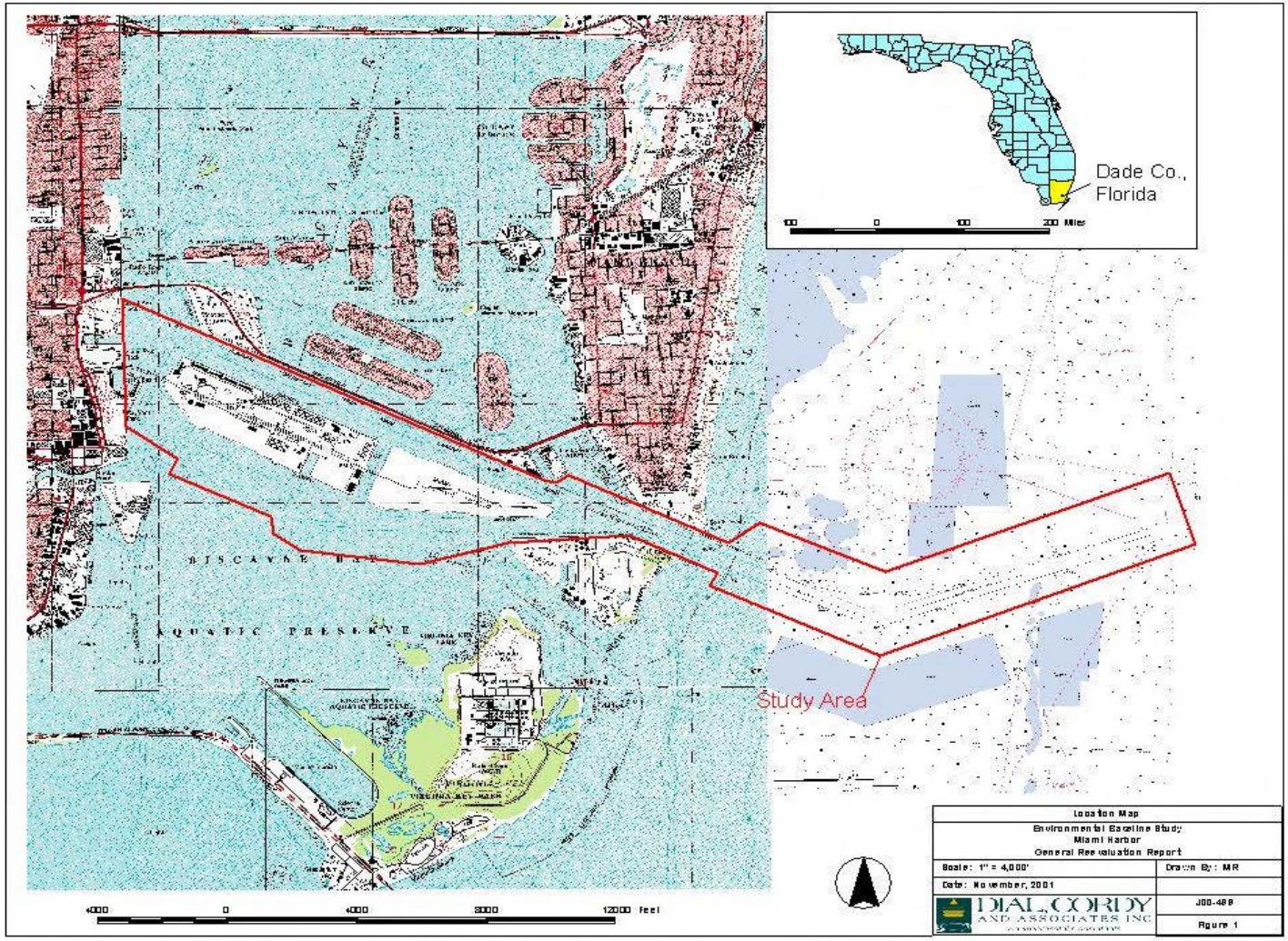
1.1 Project Description

The objective of the environmental baseline survey report was to document benthic marine habitat types in the Miami Harbor (Miami, Florida) area. These habitats included seagrass, unvegetated softbottom, rock/rubble, hardbottom, and reef communities. The field survey for this study was conducted from offshore Buoy #1 of Federal Channel through Government Cut; within and adjacent to Miami Harbor from Government Cut to the cruise ship channel turning basin; and along Fisherman's Channel to the southwest end of Dodge Island (Figure 1). The survey also included identification of protected marine plants, animals and habitats within the project area.

1.2 Background

Miami Harbor is a shallow saltwater sound at the northern end of Biscayne Bay, Florida. The Port of Miami is one of the major port complexes along the east coast of the United States. The first modifications authorized by Congress to expand the Port came in 1902 and several Acts have been authorized since to keep up with the demands of larger vessels using the Port. Many of the suggested alternative modifications for the report were discussed in the Navigation Study for Miami Harbor Channel, Feasibility Report and Environmental Impact Statement-10140 (USACE, 1989). In the interim since that document resulted in the authorization of navigation improvements to Miami Harbor, container ships using the harbor and associated waterways have continued to increase in length, width, and draft. Cruise ships have also increased in size. Currently these types of ships experience delays and increased operational costs due to the existing limitations of channel depth and width.

Figure 1 Location of Study Area



The Miami-Dade County Seaport Department provided correspondence (Appendix A) from the Biscayne Bay Pilots outlining their concerns for the need to widen certain segments of the navigation channels in addition to the need for deepening. According to the harbor pilots, several Maersk container ships have grounded off of Buoy #1 at the beginning of the entrance channel due to variable and unpredictable currents. The pilots have requested widening the entrance channel from an existing 500-foot width to an 800-foot tapered entrance. The second location of proposed widening includes an area south of Government Cut between beacons 13 and 15. That portion of the channel includes an area where ships turn from one channel into another. Strong currents at that intersection of three different channels combined with the required decreased speed of the ship make it important to have as much swinging room as possible for the ship. A third location for widening recommended by the harbor pilots includes the south part of the Lummas Island (Fisherman's) Channel. Vessels docked along Lummas Island swing their onboard cranes 90 degrees out into the channel thereby blocking a portion of the channel. Under different conditions of wind, current, ship size and draft, passing those docked vessels results in an unsafe situation. Ships at dock sometimes experience a surging effect. The pilots suggest extending the southern edge of the Lummas Island Channel 100 feet to the south. Other alternatives for channel modifications relate to requests by the Miami-Dade County Seaport Department to expand their cruise ship terminals.

The proposed navigation modifications will undergo ship simulation testing and further environmental evaluation as part of the current study process for the Miami Harbor General Reevaluation Report and Environmental Impact Statement. Further coordination will occur as the study process continues.

1.3 Proposed Modification Alternative Descriptions

Proposed preliminary modification alternatives are summarized in Figure 2. A description of the proposed modification alternatives is as follows:

No Action Plan	**Port would continue operation under the existing conditions.**
Alternative 1	Widen seaward portion of cut-1 from 500 feet to 800 feet and deepen Cut-1 and Cut-2 from existing depth of 44 feet to a depth of 52 feet.
Alternative 2	Add turn widener between Buoy #13 and Buoy #15 and deepen from existing depth of 42 feet to a depth of 50 feet.
Alternative 3	Expand Fisher Island turning basin and deepen from existing depth of 42 feet to a depth of 50 feet.
Alternative 4	Relocate the western end of the main channel to allow for additional cruise ship berths.
Alternative 5	Widen Fisherman's channel approximately 100 feet to the south and deepen from current depth of 42 feet to a depth of 50 feet. Deepening would include Cut-3, station 0+00 to Cut-3 station 42+00

Alternative 6	Deepen Dodge Island Cut and the proposed 1200-foot diameter turning basin from 32 and 34 feet to 36 feet and relocate western end of Dodge Island cut to accommodate proposed Port expansion.

Figure 2 Proposed Modification Alternatives

2.0 TECHNICAL APPROACH

The technical approach utilized to document and characterize marine seagrass, hardbottom, and coral reef communities within the study area (Figure 1) is described below. Surveys were conducted during August and September 2000, with additional seagrass mapping of the Critical Wildlife Area (CWA) in November 2000.

2.1 Seagrass Community Assessment

2.1.1 Location of Survey Transects

Survey transects within the study area included the area 400 feet south of Fisherman's Channel, including the area within the CWA, the area adjacent to the Coast Guard Station, the Entrance Channel, and the area 500 feet north and south of the offshore channel (Figure 3).

2.1.2 Seagrass Mapping

Marine seagrass was mapped along 35 transects within the designated project study area by locating the end positions of the transects using Differential Global Positioning System (DGPS), laying a weighted line marked in one meter increments from the shore, and then conducting a visual diver survey along the weighted line to document seagrass distribution and occurrence from the shore to the edge of channel. Seagrass habitat and bottom type observed while crossing each transect were noted. Divers drift dove to the next transect, and if any seagrass was found between transects, a DGPS position at the start and end of the grass bed was recorded and the width of the grass bed estimated. Information recorded on seagrass habitat type and distribution was transferred from field logs and entered into a spreadsheet. Table 1 lists a description of habitat classifications used for mapping purposes. This approach allowed a visual representation of species' associations and occurrences across the shelf, channel, and slope as compared with bottom depth. Maps were produced for all stations surveyed that had seagrass present. A GIS map (ArcView) and database were created to illustrate seagrass distribution throughout the study area.

2.1.3 Seagrass Occurrence, Abundance and Density

To obtain biological data regarding the location, occurrence, abundance, and density of marine seagrass, a SCUBA point intercept survey was performed along each transect. For each transect,

the average percent (percent of sixteen 25 x 25 cm sub-units within a $1m^2$ quadrat that contains at least one seagrass shoot) was estimated in $1m^2$ quadrats at 10m intervals along

Figure 3 Seagrass and Hardbottom/Reef Habitat Assessment Transects

Table 1 Habitat Classification System Used for Mapping of Seagrass Species

Habitat Types	Description
Halophila decipiens	Monospecific bed of this species
Halophila johnsonii	Monospecific bed of this species
Halodule wrightii	Monospecific bed of this species
Syringodium filiforme	Monospecific bed of this species
Mixed Submerged Aquatic Vegetation	*S. filiforme or H. wrightii* with *H. decipiens*
Mixed Submerged Aquatic Vegetation with *H. johnsonii*	*S. filiforme* and or *H. wrightii* with *H. johnsonii*
Mixed Submerged Aquatic Vegetation with *H. johnsonii* and *H. decipiens*	*H. wrightii* with both species of *Halophila*
Unvegetated Bottom	Sand, silt or shell substrate with no seagrass or live bottom, may have marine algae present
Live-Bottom Habitat	Sponge and soft coral community over thin veneer of silty-sand

the transect line (Virnstein 1995; Fonseca et al. 1998; Braun-Blanquet 1965). Specific data recorded within each $1m^2$ quadrat for each 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 substrate type, and any other observations considered useful. The cover abundance scale is shown below.

Cover abundance was measured at 10m intervals beginning along each transect. The content of each quadrat was visually inspected and a cover-abundance scale value assigned to the seagrass coverage.

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 sub-units/total number of sub-units
Abundance = Sum of cover scale values/number of occupied quadrats
Density = Sum of cover scale values/total number of quadrats

2.1.4 Analysis and Interpretation of Seagrass Data

Distribution of seagrass community types were mapped for each transect from data collected in the field, as the potential for occurrence in an area. Frequency of occurrence, abundance, and density were calculated from the quadrat data based on Braun-Blanquet (1965) methodology.

2.2 Hardbottom and Reef Habitat Assessment

A reef and live-hardbottom assessment was conducted in the area offshore from the jetty in the federal channel to 15,000 feet offshore to verify existing resource maps and to characterize the marine resources in the study area. To verify the accuracy of existing reef and hardbottom maps (e.g., those of Continental Shelf Associates, 1993), towed underwater video (J.W. Fishers TOV-1™) in conjunction with DGPS was used to record and mark the occurrence of hardbottom and

reef habitats along transects on each side of the entrance channel (Figure 3). Side-scan sonar imaging (Klein 590™) was also utilized to map the hardbottom and reef habitat features offshore. Side-scan, video and field data collected was used to assess the accuracy of existing maps of coral reef and nearshore hardbottom habitats within the study area. A revised resource map was prepared based on remote surveys conducted and existing resource maps.

2.2.1 Habitat Characterization and Mapping

To illustrate the occurrence of reef and hardbottom habitats within the study area, existing resource maps of the area were compared to video and side-scan data. The classification system utilized for mapping is described in Table 2. Following compilation of habitat distribution in reef and hardbottom communities, data were transferred into a database for use in mapping using ArcView (GIS). A visual representation of habitat types was constructed using these data and existing maps for the Port area.

2.2.2 Visual Fish Survey

A visual survey of fishes found within Miami Harbor hardbottom communities was performed. Reef and hardbottom communities were chosen from stations where DGPS coordinates were taken in conjunction with towed video documentation of reef or hardbottom sighted. On reef and hardbottom areas, divers were deployed along a 50m transect. All dominant fish species observed were recorded and relative abundance gauged. Species lists were then compiled using existing reports and data collected.

2.2.3 Photodocumentation

Both video and still photos were used to document fish species present along fish survey transects. Video was recorded along each side of the 50m transect to document marine life. Still photographs were taken every 2m along the transect length.

2.3 Essential Fish Habitat Identification

The comprehensive Fishery Management Plan prepared by the South Atlantic Fishery Management Council (SAFMC 1998b) establishes mangrove, seagrass, nearshore, and offshore reefs as essential fish habitat for coral, coral reefs, live-bottom habitat, snapper-grouper complex, red drum, penaeid shrimp, and coastal migratory pelagics. Furthermore, the plan establishes Essential Fish Habitat-Habitat Areas of Particular Concern (EFH-HAPC) within these areas for the spiny lobster

(*Panulirus argus*), Snapper-Grouper complex, and penaeid shrimp. Areas meeting the criteria of the management plan were identified within the study area and noted during the study.

Table 2 Classification System Used for Mapping of Hardbottom and Reef Habitats

Habitat Type	Description
Low -Relief Reef	Low profile stony coral, sponge, and gorgonian community
High-Relief Reef	High profile stony coral, sponge and gorgonian community
Patchy Low-Relief Reef	Isolated low profile stony coral, sponge, and gorgonian community
Patchy High-Relief Reef	Isolated high profile stony coral, sponge and gorgonian community
Scattered Rock/Algae/Sponge Community in Sand	Carbonate rock covered with algae, sponge or algae and sponge in sand
Sand	Softbottom habitats composed primarily of sand/sand with algae layer
Underlying Nearshore Bedrock with Sand	Oolitic limestone layer covered with fine layer of sand

3.0 ENVIRONMENTAL BASELINE

This section includes a description and review of the results of the marine resources survey. It outlines the findings of the seagrass community survey, including species occurrence, abundance, and density. It also addresses reef and hardbottom community distribution, species profiles, the presence of EFH, and occurrence records of protected marine plants and mammals. A summary of field data is located in Appendix B, while a list of persons contacted and pertinent correspondence is contained in Appendix A.

3.1 Seagrass Communities

Seagrass habitat cover type, abundance, and density for the study area are described below. Distribution and occurrence observations range from approximately 400 feet south of Fisherman's Channel, including the area of the CWA, and the area adjacent to the Coast Guard Station north of the entrance channel at the southern tip of Miami Beach (Figure 4).

3.1.1 Quantitative Measures

Marine seagrass species observed within the study area included *Halodule wrightii*, *Halophila decipiens*, *Syringodium filiforme* and *Thalassia testudinum.* Of the 35 transects surveyed (Figure 3), marine seagrass species were observed at 25 transects. A summary of occurrence records for each transect where seagrass is found in Table 3. Seagrass occurrence in these areas consisted of mixed Submerged Aquatic Vegetation (SAV) with *H. decipiens* and *H. wrightii*, mixed SAV with *H. wrightii, and T. testudinum,* mixed SAV of *T. testudinum and S. filiforme,* mixed beds of all species and, monospecific beds of *T. testudinum*, and monospecific beds of *H. decipiens*. No *H. johnsonii* was observed while surveying the 35 transects.

<u>Frequency of Occurrence</u>. *S. filiforme* had a range of occurrence values between 0 to 82 percent with a mean of 36 percent over the study area. *H. wrightii* occurred within 16 of the 35 transects sampled. Frequency of occurrence values ranged from 0 to 52 percent with a mean of 29 percent. *H. decipiens* occurred within 7 transects sampled. Frequency of occurrence for *H. decipiens* values ranged between 0 to 38 percent with a mean of 15 percent. In comparison, *T. testudinum* occurred within 15 transects surveyed, with a range of 0 to 50 percent and a mean of 19 percent.

Figure 4 Seagrass Distribution

Table 3 Seagrass Frequency of Occurrence, Abundance, and Density Values for Miami Harbor Survey Transects

	Halodule wrightii	*Halophila decipiens*	*Thalassia testudinum*	*Syrigonium filiforme*	*Halodule wrightii*	*Halophila decipiens*	*Thalassia testudinum*	*Syrigonium filiforme*	*Halodule wrightii*	*Halophila decipiens*	*Thalassia testudinum*	*Syrigonium filiforme*
Transect	**Frequency of Occurrence**				**Abundance**				**Density**			
F4	-*	-	-	-	-	-	-	-	-	-	-	-
F5	-	-	0.1000	0.6000	-	-	4.0000	3.0000	-	-	0.8000	1.8000
F6	-	-	0.2500	0.5000	-	-	3.0000	3.5000	-	-	0.2500	0.5000
F7	-	-	0.2500	0.2969	-	-	2.0000	3.0000	-	-	0.5000	1.5000
F8	-	-	0.1667	0.5417	-	-	2.0000	3.7500	-	-	0.3333	2.5000
F9	-	-	0.4000	0.5250	-	-	3.5000	2.5250	-	-	1.4000	2.0200
F10	-	-	0.5000	0.2500	-	-	2.6667	3.0000	-	-	2.0000	0.7500
F11	-	0.1000	-	-	-	0.7500	-	-	-	0.3000	-	-
F12	0.1750	0.0500	0.2500	0.0500	3.0000	1.0000	1.5000	0.5000	0.6000	0.2000	0.6000	0.1000
F13	0.0625	-	0.0625	-	1.0000	-	1.0000	-	0.2500	-	0.2500	-
F14	-	-	-	0.3375	-	-	-	3.5000	-	-	-	1.4000
F15	0.5250	-	-	0.3375	4.3333	-	-	3.5000	2.6000	-	-	1.4000
F16	-	-	0.0625	0.5000	-	-	1.2500	3.5000	-	-	0.6250	1.7500
F17	-	-	-	-	-	-	-	-	-	-	-	-
B1	0.1667	0.1667	-	-	4.0000	4.0000	-	-	0.6670	0.6670	-	-
B2	0.2000	-	0.3000	-	5.0000	-	3.0000	-	1.0000	-	1.2000	-
B3	0.2000	0.2875	-	0.0063	4.0000	2.8000	-	0.0100	0.8000	1.4000	-	0.0100
B4	0.2153	0.3472	0.0833	-	2.1250	2.5000	3.0000	-	0.9444	1.3889	0.3333	-
B5	0.0179	0.3839	-	-	0.5000	2.1000	-	-	0.0714	1.5000	-	-
B6	-	-	-	-	-	-	-	-	-	-	-	-
B7	0.1339	-	-	0.2857	4.0000		-	5.0000	0.5714	-	-	1.4286
B8	-	-	-	-	-	-	-	-	-	-	-	-
B9	-	-	-	-	-	-	-	-	-	-	-	-
B10	-	-	-	-	-	-	-	-	-	-	-	-

	Halodule wrightii	*Halophila decipiens*	*Thalassia testudinum*	*Syrigonium filiforme*	*Halodule wrightii*	*Halophila decipiens*	*Thalassia testudinum*	*Syrigonium filiforme*	*Halodule wrightii*	*Halophila decipiens*	*Thalassia testudinum*	*Syrigonium filiforme*
Transect	**Frequency of Occurrence**				**Abundance**				**Density**			
MB1	0.3889	-	-	-	3.5000		-	-	2.3330	-	-	-
MB2	-	-	-	-	-	-	-	-	-	-	-	-
MB3	0.0568	0.0682	-	-	1.5500	3.0000	-	-	0.2818	0.2727	-	-
MB4	-	-	-	-	-	-	-	-	-	-	-	-
1A	0.2727	-	-	-	1.6250	-	-	-	0.5909	-	-	-
2A	-	-	-	-	-	-	-	-	-	-	-	-
3A	-	-	-	-	-	-	-	-	-	-	-	-
4A	0.2768	-	-	-	2.0000	-	-	-	0.5714	-	-	-
6A	0.0313	-	0.1719	0.3125	0.5000	-	3.0000	2.1250	0.0625	-	0.7500	1.0625
7A	0.2500	-	0.0179	0.8214	3.0000	-	0.5000	3.8333	0.8571	-	0.1429	3.2870
8A	0.1042	-	0.2639	0.5278	0.6667	-	2.8333	3.0000	0.2222	-	0.9444	1.6667

*= not detected

Note: Transects initially labeled F1, F2, F3, and 5A were determined to be outside of the study area and, therefore, were not surveyed.

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 <5 percent cover, 2.0 is 5 to 25 percent cover, 4.0 is 50 to 75 percent cover, and 5.0 is >75 percent cover.

S. filiforme had the highest mean abundance within the study area (2.82). The range of abundance values ranged from 0 to 5 at the 14 transects where *S. filiforme* occurred. *H. wrightii* abundance values ranged from 0 to 5 over transects sampled with a mean of 2.67. *T. testudinum* occurred within 15 transects and had a mean abundance of 2.5, while *H. decipiens* had the lowest abundance values in the survey area with a mean value of 2.24 and a range of 0 to 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 are very low compared to abundance 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 (1.41). Density values for *S. filiforme* ranged from 0 to 3.27. In comparison, *H. wrightii* had density values ranging from 0 to 2.6 with a mean of 1.14. *T. testudinum* and *H. decipiens* both had relatively low density values (0.74 and 0.59).

3.1.2 Flora and Fauna Associated with Seagrasses

Seagrass communities provide important habitat for many different species of flora and fauna. *Caulerpa prolifera* was observed in video transects of *H. wrightii*, and algae of the genera *Halimeda*, *Udotea*, and *Penicillus* have also been listed as associates of seagrasses in southeastern Florida (Zieman, 1982). Many invertebrate species also utilize seagrass communities. The most obvious inhabitants include the queen conch (*Strombus gigas*), urchins including the long spine urchin (*Diadema antillarum*), nudibranchs, bivalve mollusks, and crustaceans including the spiny lobster (*Panulirus argus*), and the blue crab (*Callinectes sapidus*). In some shallow seagrass areas, various soft corals and sponges were observed scattered within and adjacent to seagrass beds (see species listed in Section 3.2). Many fish species have also been shown to have life cycles dependent on seagrass beds. Of particular importance are the mullet (*Mugil cephalus*), snook (*Centropomis undecimalis*), and many prey species including mojarras and pinfish. Seagrass beds are also important nurseries for many of the fish associated with SAFMS Snapper-Grouper Complex (SAFMC 1998b).

3.2 Hardbottom and Reef Communities

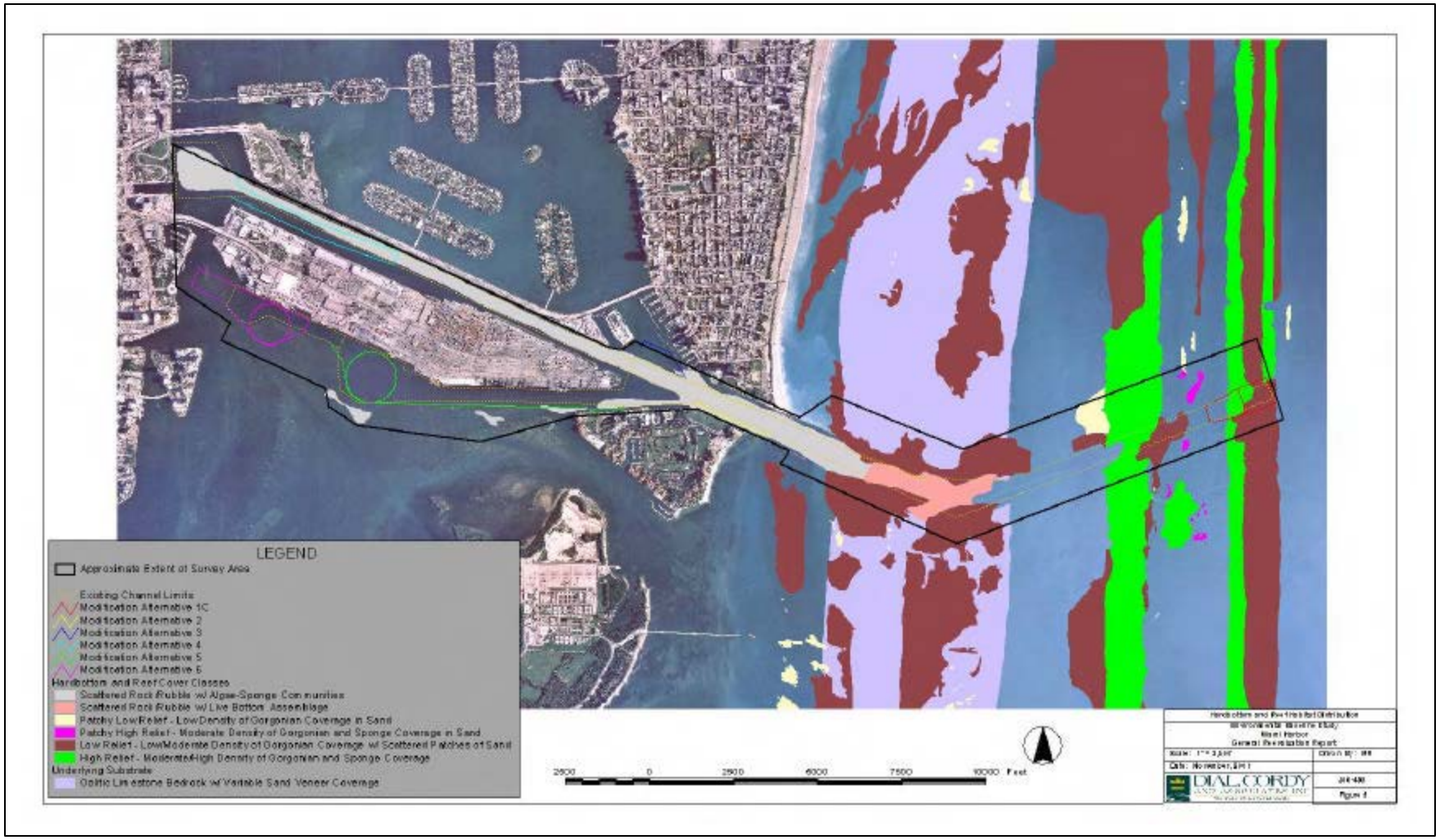
Hardgrounds associated with the project area include a nearshore hardbottom area and three additional parallel reef tracts that run generally north/south (Figure 5). The hardbottom zone nearest to shore exists in a physically stressed environment, and involves the Miami Oolite Formation (Hoffmeister 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 (see Appendix C for additional side scan data). Resources found within the Main Channel included scattered low- and high-relief reef, with its characteristic biota, but largely comprised softbottom and rock/rubble habitat. The areas of scattered rock/rubble within the channel do exhibit some sponge and coral growth, although, this habitat is not of the same quality as areas of hardbottom outside of the channel. The channel hardbottom is rock/rubble exposed from prior dredging events, and was colonized after previous dredging activities.

3.2.1 Dominant Biota of Hardbottom/Reef Habitats

Live hardbottom and coral reef communities in the offshore areas of the study area are predictably speciose and have been characterized several times (see Seaman, 1985; Blair and Flynn, 1989; and USACE 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 (USACE, 1989 and 1996a). Observed gorgonians during this 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*. 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. Sponges observed within the project area's hardgrounds and reefs during the 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*. The biota of the three outer reef tracts are consistent with the overall assemblage of stony corals, sponges, and gorgonians found offshore of Miami-Dade, Broward, and Palm Beach Counties (USACE 2000). (Photographs of reef transects are shown in Appendix D.) 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.

Figure 5 Hardbottom and Reef Habitat Distribution



3.2.2 Fishes Associated with Hardbottom/Reef Habitats

A total of 28 species of fish were observed on the offshore reef sites. A summary of the species observed is shown in Table 4. 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; 1999).

3.3 Unvegetated Softbottom Communities

Off of Miami-Dade County, softbottom habitats fall between the second and third reef lines within the study area and hence may provide a corridor for reef species to travel between reef lines and also be an important foraging area for some fish species (Jones, et al., 1991). Other unvegetated softbottom habitats are located between scattered reef patches and rock/rubble habitats both within and adjacent to the channel and between seagrass beds that occur outside the channel.

During the summer months, the most abundant algal species on unvegetated sand substrates in the project area belong to the green algae genera *Caulerpa*, *Halimeda*, and *Codium* (USACE, 1989 and 1996b). The former two taxa were observed during summer 2000 surveys. In winter months, brown algae (*Dictyota* spp. and *Sargassum* spp.) dominate (USACE, 1989 and 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. 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*) (USACE, 1996b).

The most ubiquitous infauna of inshore softbottom communities 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 supports a less diverse infaunal species assemblage.

Table 4 Relative Abundance of Fish Species Observed During Visual Survey Miami Harbor, Florida

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

3.4 Rock/Rubble Communities

Within the project area there are both naturally occurring rock outcrops and rubble material that has been left from prior dredging events. The most obvious biological features of most of the rock/rubble-based habitats are resident sponges and macroalgae, whereas the remainder of the rock/rubble habitats serves as raw material for reef-building species. The latter case was apparent in the channel zone adjacent to the existing reef tracts. Observed sponge species included *Ircinia campana*, *Callyspongia vaginalis*, and *Iotrochota* sp. (possibly *I. birotulata*). Observed soft corals were similar to those of adjacent reefs, and included the genera *Eunicea Plexaura* and *Pseudopterogorgia*. Habitats provided by rock and rubble and associated sponges, algae, and soft corals provide significant refugia many species of juvenile fish species.

3.5 Essential Fish Habitat (EFH)

The SAFMC (1998a, 1998b) has designated that mangrove, seagrass, nearshore hardbottom, and offshore reef areas within the study area as EFH (Table 5). The nearshore bottom and offshore reef habitats of southeastern Florida have also been designated as EFH-HAPC (SAFMC 1998a, 1998b). Managed species that commonly inhabit the study area include penaid shrimp and spiny lobster (*Panulirus argus*). These shellfish utilize both the inshore and offshore habitats within the study area. Life stage utilization of these and other managed species are shown in Tables 6, 7, and 8.

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 Nassau grouper (*Epinephelus striatus*). These species utilize the inshore habitats as juveniles and sub-adults. As adults, they utilize the hardbottom and reef communities offshore Table 6. 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, the king mackerel (*Scomberomorus cavalla*), and the Spanish mackerel (*Scomberomorus maculatus*) are the most common. As many as 60 corals can occur off the coast of Florida and all of these fall under the protection of the South Atlantic Fishery Management Plan (SAFMC 1998a).

Table 5 Essential Fish Habitat Areas in South Florida

Estuarine Areas (Fisher Island, Main Channel, Inner Entrance Channel)	Seagrass
	Estuarine Water Column
Marine Areas (Outer Entrance Channel, Nearshore and Offshore areas)	Live/Hard Bottom
	Coral and Coral Reef
	Artificial Reefs
	Water Column

Source: South Atlantic Fisheries Management Council, 1998

Table 6 Habitat Associations of Selected EFH Managed Species

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Species	Life stage	Habitat Associations: Domain: Freshwater: Lacustrine	Riverine - coastal plain	Riverine - inland	Estuarine: Inlet mouth	Channel	Inter- and subtidal flats	Salinity range: NEI: Tidal fresh (0-0.5‰)	Mixing (0.5-25‰)	Seawater (>25‰)	Venice system: Limnetic (0-0.5‰)	Oligohaline (0.5-5‰)	Mesohaline (5-18‰)	Polyhaline (18-30‰)	Euhaline (>30‰)	Temperature range: 0-5°C	5-10°C	11-15°C	16-20°C	21-25°C	26-30°C	>30°C	Marine: Beach/surf	Neritic	Oceanic	Substrate preference: Mud/silt/clay	Sand	Pebble/cobble/gravel	Boulder/rocky outcrop	Shell	Submergent vegetation	Emergent vegetation	Floating vegetation	None	Depth preference: Littoral: Intertidal	Subtidal	Sublittoral: Inner shelf (10-50 m)	Middle shelf (50-100 m)	Outer shelf (100-200 m)
Brown shrimp	A				●				●	●		●	●	●	●	●	●	●	●	●	●	●		●		●	●										●		
Penaeus	S									●					●				●	●	●			●		●	●										●	
aztecus	J				●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●				●					●	●			●	●			
	L					●			●	●				●	●			●	●	●	●	●		●		●					●			●			●	●	
	E									●					●						●	●		●										●				●	
Pink shrimp	A				●	●	●			●				●	●		●	●	●	●	●	●		●		●	●			●						●	●	●	
Penaeus	S									●					●				●	●	●	●		●		●	●			●						●	●		
duorarum	J						●		●	●		●	●	●	●	●	●	●	●	●	●	●				●	●			●	●	●	●		●	●	●		
	L									●					●					●	●			●	●									●		●	●		
	E									●					●					●	●	●		●	●									●		●	●		
White shrimp	A					●			●	●		●	●	●	●		●	●	●	●	●	●		●		●	●						●				●		
Penaeus	S									●					●				●	●	●			●		●	●										●		
setiferus	J					●	●		●	●		●	●	●	●		●	●	●	●	●	●				●	●				●	●	●		●	●			
	L									●					●			●	●	●	●			●							●			●			●		
	E									●					●				●	●	●			●										●			●		
Cobia	A									●				●	●					●	●	●		●	●									●			●		
Rachycentron	S																				●	●		●										●			●		
canadum	J								●	●				●	●					●	●	●	●	●	●		●									●	●		
	L									●				●	●						●	●		●										●			●		
	E																				●	●		●										●			●		
Gray snapper	A		●		●	●	●	●	●	●	●	●	●	●	●			●	●	●	●	●		●		●	●	●	●	●	●		●			●	●	
Lutjanus	S									●					●					●	●			●					●	●						●	●		
griseus	J		●		●	●	●	●	●	●	●	●	●	●	●				●	●	●	●		●		●	●		●	●	●		●			●	●	
	L								●	●		●	●	●					●	●	●			●		●					●		●			●	●		
	E									●				●	●					●	●			●					●	●							●	●	
Red drum	A				●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●		●	●			●						●	●	●	
Sciaenops	S																			●				●										●		●	●		
ocellatus	J				●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●		●	●			●	●		●		●	●			
	L						●	●	●	●	●	●	●	●	●				●	●	●	●		●		●	●				●		●	●	●	●			
	E						●		●	●				●	●					●	●			●										●		●	●		
Spanish mackerel	A				●					●				●	●					●	●	●		●										●		●	●		
Scomberomorus	S																			●	●	●		●			●										●		
maculatus	J				●	●	●		●	●		●	●	●	●			●	●	●	●	●	●	●										●		●	●		
	L																		●	●	●			●										●		●	●		
	E																			●	●	●		●										●			●		

Source: NOAA Biogeography Program Http://biogeo.noaa.nos.gov/

Table 7 Biological Attributes Table for Selected EFH Managed Species

DRAFT 1/30/98		Biological Attributes																															Value			
		Life Mode					Spatial Strategy					Mobility			Feedin		Prey Items										Longevity									
Species / life stage		Epibenthic	Benthic	Demersal	Nektonic	Planktonic	Freshwater resident	Estuarine resident	Marine resident	Coastal migrant	Ocean migrant	Nonmobile	Low mobility	High mobility	Filter feeder	Non-filter feeder	Detritus	Phytoplankton	Zooplankton	Infauna	Epibenthos	Insects	Fish (eggs, larvae)	Fish (juveniles, adults)	Macroalgae	Vascular plants	1 day	1-30 days	1-12 months	1-5 years	5-20 years	>20 years	Recreational	Commercial	Ecological	Indicator of stress
Brown shrimp	A			●					●					●		●	●			●	●				●					●			●	●	●	
Penaeus	S			●					●																											
aztecus	J			●				●						●		●	●		●	●	●		●		●				●				●	●	●	
	L					●		●	●				●			●		●	●									●							
	E			●					●			●															●								
Pink shrimp	A			●				●	●					●		●	●			●	●				●					●			●	●	●	
Penaeus	S			●					●																											
duorarum	J			●				●						●		●	●		●	●	●				●				●					●	●	
	L					●		●	●				●			●		●	●				●					●							
	E			●					●			●															●								
White shrimp	A			●				●	●					●		●	●			●	●				●	●				●			●	●	●	
Penaeus	S			●					●																											
setiferus	J			●				●						●		●	●			●	●				●	●			●				●	●	●	●
	L				●	●			●				●			●		●	●									●							
	E			●					●			●															●								
Cobia	A				●				●	●	●			●		●					●			●							●	●		●	
Rachycentron	S				●				●																											
canadum	J				●			●	●	●	●			●		●			●		●		●	●						●			●		●	
	L					●			●				●			●			●									●							
	E					●			●			●															●								
Gray snapper	A			●			●	●	●	●				●		●					●			●		●					●		●	●	●	
Lutjanus	S			●					●																											
griseus	J			●			●	●	●	●				●		●					●		●	●		●				●			●	●	●	
	L					●			●				●			●			●									●							
	E			●					●			●															●								
Red drum	A				●				●					●		●					●			●	●	●						●	●	●	●	●
Sciaenops	S				●																															
ocellatus	J				●	●		●	●					●		●					●		●	●	●	●				●			●	●	●	
	L					●			●				●			●			●									●							
	E					●			●			●															●								
Spanish mackerel	A				●				●	●	●			●		●					●			●							●	●	●	●	●	●
Scomberomorus	S				●				●																											
maculatus	J				●			●	●	●	●			●		●					●									●						●
	L					●			●				●			●			●		●		●					●							
	E					●			●			●																●							

Source: NOAA Biogeography Program Http://biogeo.noaa.nos.gov/

Table 8 Reproductive Requirements of Selected EFH Species

DRAFT
1/30/98

Species	Reproduction																																																
	Fertilization/ development					Mating type			Spawning strategy					Parent care		Domain			Temporal Schedule											Periodicity				Fecundity								Maturation age						
	External	Internal	Oviparous	Ovoviviparous	Viviparous	Monogamous	Polygamous	Broadcast spawner	Andromous	Catadromous	Iteroparous	Semelparous	Batch	Protected	Non-protected	Riverine	Estuarine	Marine	January	February	March	April	May	June	July	August	September	October	November	December	Annual spawning	2 or more per year	2 or more years	Undescribed	<100	100-1,000	1,000-10,000	10,000-100,000	100,000-1 million	1-10 million	>10 million	Undescribed	<6 months	0.5 to 1 Year	1 to 3 Years	3 to 5 Years	> 5 Years	Undescribed
Brown shrimp *Penaeus aztecus*	●		●				●				●			●				●	●	●	●	●	●	●	●	●	●	●	●		●							●				●						
Pink shrimp *Penaeus duorarum*	●		●				●				●			●				●				●	●	●	●							●							●				●						
White shrimp *Penaeus setiferus*	●		●				●				●			●			●	●			●	●	●	●	●	●	●	●				●							●				●						
Cobia *Rachycentron canadum*	●		●				●				●		●		●								●	●	●	●						●								●					●			
Gray snapper *Lutjanus griseus*	●		●				●	●			●		●		●			●						●	●	●	●					●							●						●			
Red drum *Sciaenops ocellatus*	●		●				●	●			●		●		●		●	●	●							●	●	●	●	●		●								●						●		
Spanish mackerel *Scomberomorus maculatus*	●		●				●	●			●		●		●			●				●	●	●	●	●	●	●				●								●					●			

Source: NOAA Biogeography Program Http://biogeo.noaa.nos.gov/

3.6 Threatened and Endangered Species

3.6.1 Johnson's Seagrass

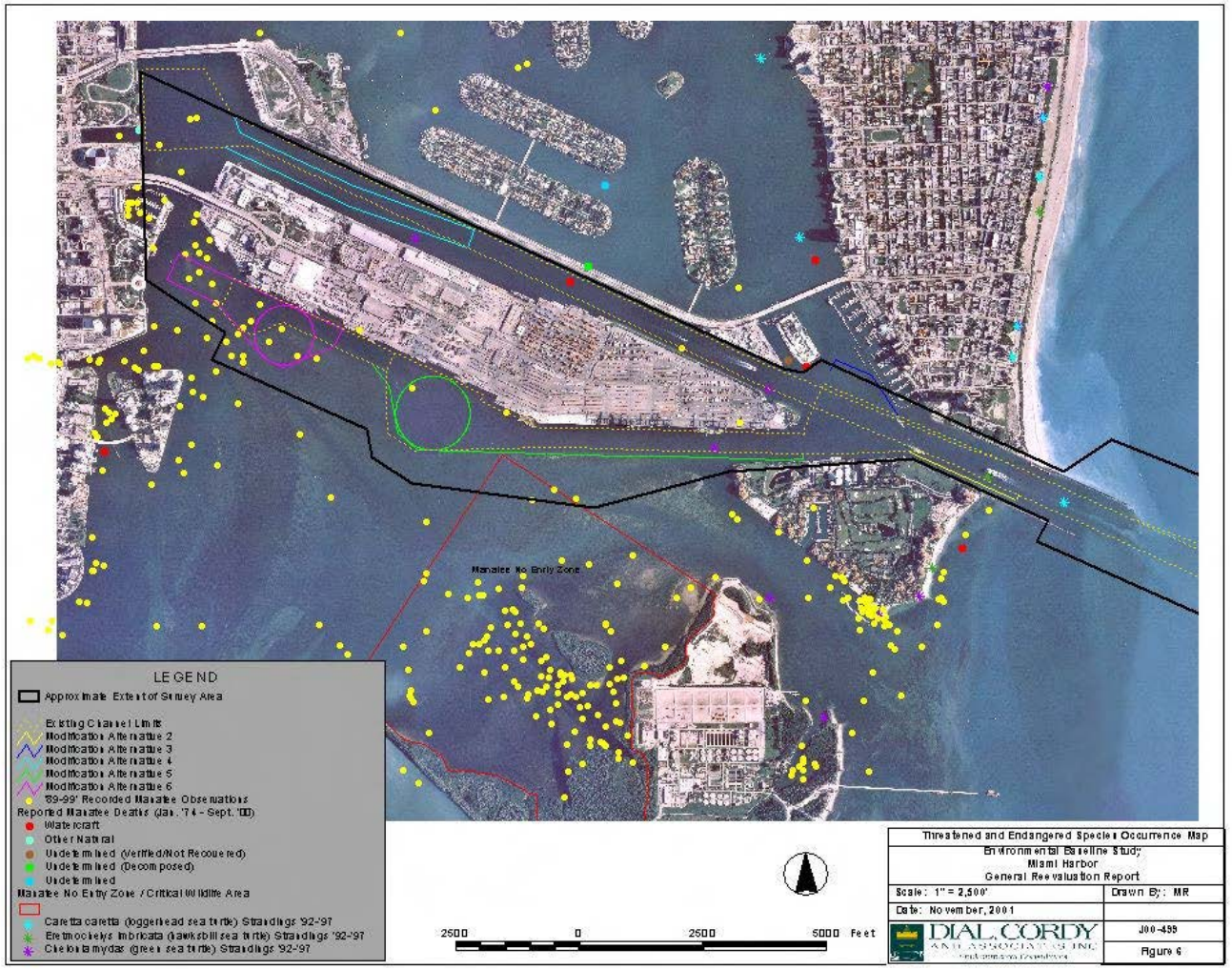
Johnson's Seagrass (*Halophila johnsonii*) was listed as a threatened species by NMFS on September 14, 1998 (63 FR 49035) and a re-proposal to designate critical habitat pursuant to Section 4 of the Endangered Species Act (ESA) was published on December 2, 1998 (64 FR 64231). The final rule for critical habitat designation for *H. johnsonii* was published April 5, 2000 (Federal Register, Vol. 65, No. 66). *H. johnsonii* has one of the most limited geographic ranges of all seagrass species. It is only known to occur between Sebastian Inlet and northern Biscayne Bay on the east coast of Florida (Kenworthy 1997). No *H. johnsonii* was observed within the study area.

3.6.2 West Indian Manatees

The West Indian manatee (*Trichechus manatus*) has been listed as a protected mammal in Florida since 1893. Federal law under the Marine Mammal Protection Act of 1972 and the Endangered Species Act as amended in 1973 protects manatees. 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.

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 (FPL) power plant at Port Everglades (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 (Figure 6) confirm manatees are present within Miami-Dade County all year (Miami-Dade County 1999a, USGS 2000).

Figure 6 Threatened and Endangered Species Occurrence Map



3.6.3 Sea Turtles

Miami-Dade County is within the normal nesting range of three species of sea turtles: the loggerhead (*Caretta caretta*), the green turtle (*Chelonia mydas*), and the leatherback (*Dermochelys coriacea*). The green sea turtle and leatherback turtle are both listed under the U. S. Endangered Species Act, 1973 and Chapter 370, F.S. The loggerhead turtle is listed as a threatened species. Within the 21 miles of beach within the Miami-Dade County line a total of 319 sea turtle nests were found in 1999 (Miami-Dade County 1999b). From 1980 through 2000, an average of 183 sea turtle nests were discovered on Miami-Dade County beaches. On Fishers Island a total of 24 sea turtle nests were observed during 2000. A summary of sea turtle nesting activity for Miami-Dade County is found in Table 9. 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 and possibly the hawksbill turtle (*Eretmochelys imbricata*) and the Kemp's ridley turtle (*Lepidochelys kempii*).

4.0 PROJECT IMPACTS

Direct impacts to seagrass, hardbottom, and reef communities from the various proposed preliminary modifications are numerically described in Table 10. One of the purposes of this document was to provide the Corps with the baseline environmental information to assist in formulating reasonable alternatives for the project. Therefore, it should be noted that the proposed modifications are preliminary in design and could change during the planning process, thereby reducing impacts to the natural resources described in this report.

Table 9 Summary of Sea Turtle Nesting for Dade County Florida, 1980-2000

Year	Number Nests	Number Hatchlings Released
1980	10	800
1981	31	2800
1982	66	6505
1983	69	6772
1984	69	6678
1985	75	7200
1986	123	14991
1987	129	10966
1988	105	10682
1989	164	13609
1990	185	16941
1991	166	14294
1992	163	15835
1993	267	20751
1994	288	25359
1995	369	27771
1996	290	23726
1997	258	18809
1998	333	22470
1999	319	26580
2000	193	-

Table 10 Direct Impact Acreages by Habitat Type

	Footprint Area (Acres)	Seagrass (Acres)	Unvegetated Bottom (Acres)	Rock Rubble w/ Algal Sponge Community (Acres)	Rock/Rubble w/ Live Bottom (Acres)	Low-Relief Hardbottom (Acres)	High Relief Reef (Acres)
Alternative 1	227.8	0	70.1	41.3	51.7	35.1	21.1
Alternative 2	5.6	0	1.7	3.9	0	0	0
Alternative 3	15.5	0.7	9.4	5.4	0	0	0
Alternative 4	56.3	0	30.1	26.2	0	0	0
Alternative 5	228.9	1.7	166.8	59.4	0	0	0
Alternative 6	78.2	22.8	55.4	0	0	0	0

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APPENDICES

APPENDIX A

Persons Consulted and Correspondence

Appendix A List of Persons Consulted and Pertinent Correspondence

Name	Affiliation	Information
Susan Markley, Ph.D.	Miami-Dade County Environmental Resource Management	Manatee Data
Craig K Grossenbacher	Miami-Dade County Environmental Resource Management	Project History
Steven M. Blair	Miami-Dade County Environmental Resource Management	Hardbottom Maps
Bill Ahern	Haulover Park	Turtle Monitoring Data
Kelly Schratwieser	FDEP	Dade County Manatee Protection Plan
Ricardo Zambrano	FFWCC	Critical Wildlife Area Bird Species List
Mike Johnson	National Marine Fisheries Service	Seagrass information
Carol Knox	Florida Fish and Wildlife Conservation Commission	Manatee Data

FLORIDA FISH AND WILDLIFE CONSERVATION COMMISSIO

JAMES L. "JAMIE" ADAMS, JR.
Bushnell

BARBARA C. BARSH
Jacksonville

QUINTON L. HEDGEPETH, DDS
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H.A. "HERKY" HUFFM
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DAVID K. MEEHAN
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JULIE K. MORRIS
Sarasota

TONY MOSS
Miami

EDWIN P. ROBERTS, DC
Pensacola

JOHN D. ROOI
Jacksonville

ALLAN L. EGBERT, Ph.D., Executive Director
VICTOR J. HELLER, Assistant Executive Director

BUREAU OF PROTECTED SPECIES MANAG
DAVID W. ARNOLD
(850)5
FAX (850)5

DATE: November 7, 2000
COUNTY: Dade
PERMIT NO.: 00-04-13-001
EXPIRATION DATE: Nov 10, 2000

Mr. Jason Croop
Dial Cordy and Associates
115 Professional Drive, Suite 104
Ponte Vedra, Florida 32082

Re: Access to the Virginia Key No Entry Zone in Dade County

Dear Mr. Croop:

This letter shall serve as notification of the Florida Fish and Wildlife Conservation Commission's (Commission) determination in response to your November 6, 2000, request for authorization to conduct an environmental survey within a portion of the Virginia Key No Entry zone in Dade County (as designated in 68C-22.025, Florida Administrative Code (FAC)). Pursuant to 68C-22.003, FAC, the Commission is authorized to issue permits allowing the permit holder to engage in activities otherwise prohibited by Chapter 68C-22, FAC.

As stated in your request, Dial Cordy and Associates ("Dial Cordy") has been contracted by the United States Army Corps of Engineers to conduct an environmental survey of the Port of Miami area that would include mapping seagrass beds in the area of Fisherman's channel near the Virginia Key No Entry zone. This activity would involve the deployment of a snorkeler to assess seagrass abundance in the area from the channel to about 500 feet south into the No Entry zone. The activity would involve the use of a 21-foot boat with a 12" draft and would be conducted on Wednesday November 8, 2000 (or on November 9 or 10 if inclement weather prevents surveying on November 8). Based on the information provided, we have determined that limited entry into the zone should not pose a serious threat to manatees provided that Dial Cordy and Associates complies with certain conditions, as described below. Therefore a permit is hereby granted with the following conditions:

1. Access to the Virginia Key No Entry zone is authorized for Dial Cordy and Associates and their employees or authorized agents provided that entry into the zone is necessary to conduct activities associated with the environmental survey of the Port of Miami area. Movement of the vessel and snorkeling activities within the No Entry zone should be as limited as possible.

2. As requested, the permit is only valid from Wednesday, November 8, through Friday, November 10, 2000.

3. All personnel entering the No Entry zone must be informed as to the possible presence of manatees, the characteristics used to identify the presence of manatees, and the conditions of this permit.

4. At least one person must be designated as a manatee observer on the vessel. That person must have experience in manatee observation, and must be equipped with polarized sunglasses to aid in observation. (Polarized sunglasses reduce the glare created by sunlight reflecting off of the water's surface. Wearing polarized sunglasses can help boaters spot manatees, underwater obstructions, submerged aquatic vegetation, such as seagrass beds, much more clearly). The manatee observer must remain on the vessel at all times, maintain a vigilant watch, and advise all other personnel as to the presence and location of nearby manatees.

5. Only the 21' vessel and the snorkeler(s) are covered under this permit.

6. The vessel must be operated at no greater than Idle Speed while in the No Entry area and must not be anchored at any time.

7. Clearance of at least one foot (1') between vessel propellers and submerged bottom must be maintained at all times to prevent any damage to seagrasses or benthic communities. Vessel operation and monitoring activities must be performed in such a manner so as to reduce potential sediment suspension and resulting increases in ambient turbidity.

8. The vessel must be clearly marked as belonging to Dial Cordy or its authorized agent. A copy of this permit letter must be kept on board the vessel at all time while in the No Entry zone.

9. All activities, including boat movements, within the No Entry zone must be halted if manatees are observed within 100 feet of the vessel and may be resumed only after the manatee(s) have left the area on their own volition.

By copy of this letter, the Commission's Division of Law Enforcement/Bureau of Marine Enforcement, the Dade County Sheriff's Department, and the Metro-Dade Department of Environmental Resource Management are hereby advised of the nature and conditions of this permit.

This notification represents an agency determination. Please see the attached *Notice of Rights* if you wish to dispute or challenge this agency action. **FAILURE TO EXERCISE YOUR RIGHTS IN A TIMELY MANNER WILL OPERATE AS A WAIVER OF THOSE RIGHTS.** If you have any questions regarding this permit or its applicability, please contact me, Dawn Griffin or Scott Calleson of my staff at (850) 922-4330.

Sincerely,

David W. Arnold, Chief
Bureau of Protected Species Management

Enclosures: *Notice of Rights*

cc (w/encl.): FWC, Office of General Counsel
FWC, DLE District 2
Dade County Sheriff's Office
Miami-Dade DERM

APPENDIX B

Seagrass Survey Data

Seagrass Survey Data

Alt 5									
Transect	**Total Quadrats**	**Occupied Quadrats**	**Sub Units**	**Occupied Sub Units**	**Sum Cover Score**	**Species**	**Frequency**	**Abundance**	**Density**
F11	5	2	80	8	1.5	HD	0.1000	0.7500	0.3000
F12	5	1	80	4	1	HD	0.0500	1.0000	0.2000
F12	5	1	80	14	3	HW	0.1750	3.0000	0.6000
F13	4	1	64	4	1	HW	0.0625	1.0000	0.2500
F15	5	3	80	42	13	HW	0.5250	4.3333	2.6000
F5	5	3	80	48	9	SF	0.6000	3.0000	1.8000
F6	4	2	64	32	7	SF	0.5000	3.5000	1.7500
F7	4	2	64	19	6	SF	0.2969	3.0000	1.5000
F8	6	4	96	52	15	SF	0.5417	3.7500	2.5000
F9	5	4	80	42	10.1	SF	0.5250	2.5250	2.0200
F10	4	1	64	16	3	SF	0.2500	3.0000	0.7500
F12	5	1	80	4	0.5	SF	0.0500	0.5000	0.1000
F14	5	2	80	27	7	SF	0.3375	3.5000	1.4000
F16	4	2	64	32	7	SF	0.5000	3.5000	1.7500
F5	5	1	80	8	4	TT	0.1000	4.0000	0.8000
F6	4	1	64	16	3	TT	0.2500	3.0000	0.7500
F7	4	1	64	16	2	TT	0.2500	2.0000	0.5000
F8	6	1	96	16	2	TT	0.1667	2.0000	0.3333
F9	5	2	80	32	7	TT	0.4000	3.5000	1.4000
F10	4	3	64	32	8	TT	0.5000	2.6667	2.0000
F12	5	2	80	20	3	TT	0.2500	1.5000	0.6000
F13	4	1	64	4	1	TT	0.0625	1.0000	0.2500
F15	5	2	80	24	6	TT	0.3000	3.0000	1.2000
F16	4	2	64	4	2.5	TT	0.0625	1.2500	0.6250
F4									
F17									
ALT 6									
Transect	**Total Quadrats**	**Occupied Quadrats**	**Sub Units**	**Occupied Sub Units**	**Sum Cover Score**	**Species**	**Frequency**	**Abundance**	**Density**
B1	6	1	96	16	4	HD	0.1667	4.0000	0.6667
B3	10	5	160	46	14	HD	0.2875	2.8000	1.4000
B4	9	5	144	50	12.5	HD	0.3472	2.5000	1.3889
B5	7	5	112	43	10.5	HD	0.3839	2.1000	1.5000
B1	6	1	96	16	4	HW	0.1667	4.0000	0.6667
B2	5	1	80	16	5	HW	0.2000	5.0000	1.0000
B3	10	2	160	32	8	HW	0.2000	4.0000	0.8000
B4	9	4	144	31	8.5	HW	0.2153	2.1250	0.9444

B5	7	1	112	2	0.5	HW	0.0179	0.5000	0.0714
B7	7	1	112	15	4	HW	0.1339	4.0000	0.5714
B3	10	1	160	1	0.1	SF	0.0063	0.1000	0.0100
B7	7	2	112	32	10	SF	0.2857	5.0000	1.4286
B2	5	2	80	24	6	TT	0.3000	3.0000	1.2000
B4	9	1	144	12	3	TT	0.0833	3.0000	0.3333
B6									
B8									
B9									
B10									
ALT 3									
Transect	**Total Quadrats**	**Occupied Quadrats**	**Sub Units**	**Occupied Sub Units**	**Sum Cover Score**	**Species**	**Frequency**	**Abundance**	**Density**
MB3	11	1	176	12	3	HD	0.0682	3.0000	0.2727
MB1	9	6	144	56	21	HW	0.3889	3.5000	2.3333
MB3	11	2	176	10	3.1	HW	0.0568	1.5500	0.2818
MB2									
MB4									
ALT 5/6									
Transect	**Total Quadrats**	**Occupied Quadrats**	**Sub Units**	**Occupied Sub Units**	**Sum Cover Score**	**Species**	**Frequency**	**Abundance**	**Density**
1A	11	4	176	48	6.5	HW	0.2727	1.6250	0.5909
2A									
3A									
4A*	7	2	112	31	4	HW	0.2768	2.0000	0.5714
Manatee zone									
Transect	**Total Quadrats**	**Occupied Quadrats**	**Sub Units**	**Occupied Sub Units**	**Sum Cover Score**	**Species**	**Frequency**	**Abundance**	**Density**
6A	8	1	128	4	0.5	HW	0.0313	0.5000	0.0625
7A	7	2	112	28	6	HW	0.2500	3.0000	0.8571
8A	9	3	144	15	2	HW	0.1042	0.6667	0.2222
6A	8	4	128	40	8.5	SF	0.3125	2.1250	1.0625
7A	7	6	112	92	23	SF	0.8214	3.8333	3.2857
8A	9	5	144	76	15	SF	0.5278	3.0000	1.6667
6A	8	2	128	22	6	TT	0.1719	3.0000	0.7500
7A	7	2	112	2	1	TT	0.0179	0.5000	0.1429
8A	9	3	144	38	8.5	TT	0.2639	2.8333	0.9444

APPENDIX C

Side Scan Survey Report

SIDE-SCAN SONAR AND VIDEO MAPPING OF FEDERAL CHANNEL, MIAMI HARBOR

8 December 2000

Prepared for:

Dial Cordy and Associates, Inc.
115 Professional Drive, Suite 104
Ponte Vedra, Florida 32082

Prepared by:

Continental Shelf Associates, Inc.
759 Parkway Street
Jupiter, Florida 33477-4567

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1.0 INTRODUCTION

Dial Cordy and Associates, Inc. contracted Continental Shelf Associates, Inc. (CSA) to perform a side-scan sonar and video survey in the vicinity of Federal Channel located at Government Cut in Miami, Florida. The survey area encompassed the entrance channel from the mouth of the inlet east to Buoy #1, and extended 600 ft north of the north edge of the channel and 600 ft south of the south edge of the channel. Water depths ranged from 20 to 50 ft. Operations were conducted aboard CSA's 23-ft survey vessel, "The Parker." CSA conducted the 2-day side-scan sonar survey on 30 and 31 August 2000. On 1 September 2000, CSA conducted towed underwater video survey operations in the subject area with one of CSA's towed video system to groundtruth the side-scan sonar data. Following the completion of field operations, CSA reviewed the side-scan sonar data, analyzed the groundtruthing information, and prepared two maps. A Survey Trackline Plot details the positions of side-scan sonar survey tracklines and towed video transects covered during the 3 days of field operations in the subject area. A Seafloor Features Map shows the distribution of hard bottom, scattered hard bottom, and sand bottom throughout the subject area.

2.0 METHODS

FIELD SURVEY EQUIPMENT AND METHODODLOGY

A total of seven 15,000-ft east-west oriented survey lines covering approximately 17.5 nautical line miles were completed during the course of this survey. Side-scan sonar data were collected throughout the survey. A Klein Model 590 side-scan sonar and a Magnavox Model 300 differential global positioning system (DGPS) receiver coupled with a Starlink Model MRB-2A beacon receiver were the primary survey instruments.

Navigation

Accurate positioning data served as the foundation for all survey data collected. The survey vessel navigation system was a Magnavox Model 300 DGPS receiver coupled with a Starlink Model MRB-2A beacon receiver. Differential corrections were acquired using the Coast Guard beacons, which broadcast real-time GPS differential corrections. The Miami Coast Guard beacon station was used during the survey. The survey was conducted using NAD 27, FL East, with the units in feet.

CSA's Navigation and Data Acquisition System (NADAS) is a modular computer software and hardware package that interfaces various data collection sensors with the DGPS positioning system. The core of the system is Coastal Oceanographics' Hypack for Windows software. The system was used during field survey operations for vessel guidance, data logging, and real-time vessel track plotting via both a primary display on the navigator's computer and a secondary display monitor placed in front of the survey vessel's helmsman. All data collected with the NADAS were initially processed and then reduced to common formats and exported to a Computer-Aided Drafting and Design (CADD) program during post-processing.

Side-Scan Sonar

A Klein Model 590 side-scan sonar was used for this survey. The sonar was deployed from a bracket mounted on the bow of the survey vessel to reduce engine and wake interference. Raw side-scan sonar data were recorded on hard copy paper scrolls as well as Digital Audio Tape (DAT) cassettes. The Klein side-scan sonar and the navigation system were interfaced, providing fix positions and vessel speed to be automatically transferred from the navigational computer to the side-scan sonar recorder. The side-scan sonar recorder printed the fix marks on the scrolls and used vessel speed to vary the paper speed to produce fully corrected records. The survey consisted of towing the side-scan sonar towfish along the series of channel-parallel (approximately east/west oriented) survey lines that were pre-plotted with a 75-m line spacing. The side-scan sonar was set to collect 500 kHz records at a slant range of 75 m to provide a swath width of 150 m, providing a 100% overlap of side-scan sonar data.

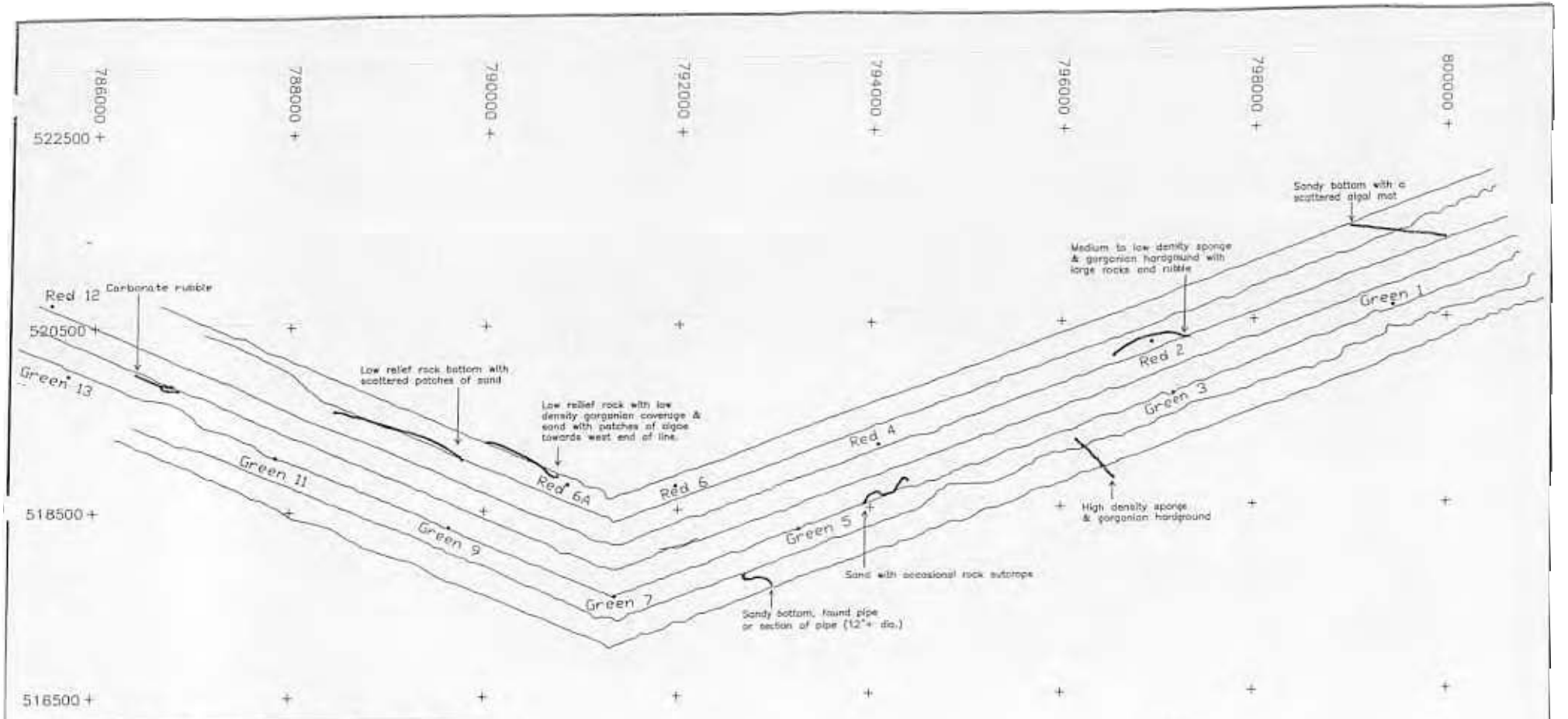
3.0 GROUNDTRUTHING OF THE SIDE-SCAN SONAR DATA

Following the side-scan sonar survey, eight areas were identified for groundtruthing with CSA's shallow water video survey system. This system is a real-time video camera platform that was interfaced with the survey vessel navigation system using a video annotator. The heart of the system is the *DeepSea* Micro-SeaCam 2000 high resolution (470 TV lines horizontal) color CCD videocamera. The Micro-SeaCam 2000 is equipped with a wide angle (95 degree diagonal in water), fixed-iris, 3.5 mm lens that automatically adjusts to varying light levels. The system also used two 250-watt *DeepSea* Multi-Lights. The camera and lights were mounted on an aluminum frame and towed and/or drifted over the eight areas of interest.

4.0 RESULTS AND DELIVERABLES

Following the completion of the surveys, the navigational data were reduced and a Survey Trackline Plot of the survey lines was completed. This trackline plot was used to display the bottom type descriptions resulting from the towed video groundtruthing. The side-scan sonar records were assessed, and the channel and hard bottom, scattered hard bottom, and sand bottom areas were digitized onto a Seafloor Features Map that overlays the Survey Trackline Plot. The final plot sheets were produced at a scale of 1 in.:1,000 ft with an X,Y coordinate overlay (in feet in the Florida State Plane Grid System). The following data are included as attachments to this final report:

A Side-scan Sonar Survey Tracklines Plot at a scale of 1in.:1,000 ft (1 sheet),
A Seafloor Features Map at a scale of 1in.:1,000 ft (1 sheet), and
One VHS videotape cassette with groundtruthing data.



Federal Channel Side-Scan Sonar Survey			
REVISIONS		Client: Dial Cordy and Associates, Inc.	
DATE	BY	Survey Area: Government Cut, Miami Harbor	
9/15/00	MHS		
12/08/00	FRJ	Side-scan sonar tracklines and video transects	
SCALE: 1" = 1000'		UNITS: FEET	PLOT NO. DSA – 1
ELLIPSOID: CLARKE 1866		DATUM: NAD 1927	
PROJECTION: Transverse Mercator		ZONE: FL EAST	JOB NO. 1762 DGN NO. 1
NAVIGATION: Differential GPS		CHECKED BY: F. A.	SURVEY DATE: 6/30 – 9/1/00
CSA	CONTINENTAL SHELF ASSOCIATES, INC. JUPITER, FL		

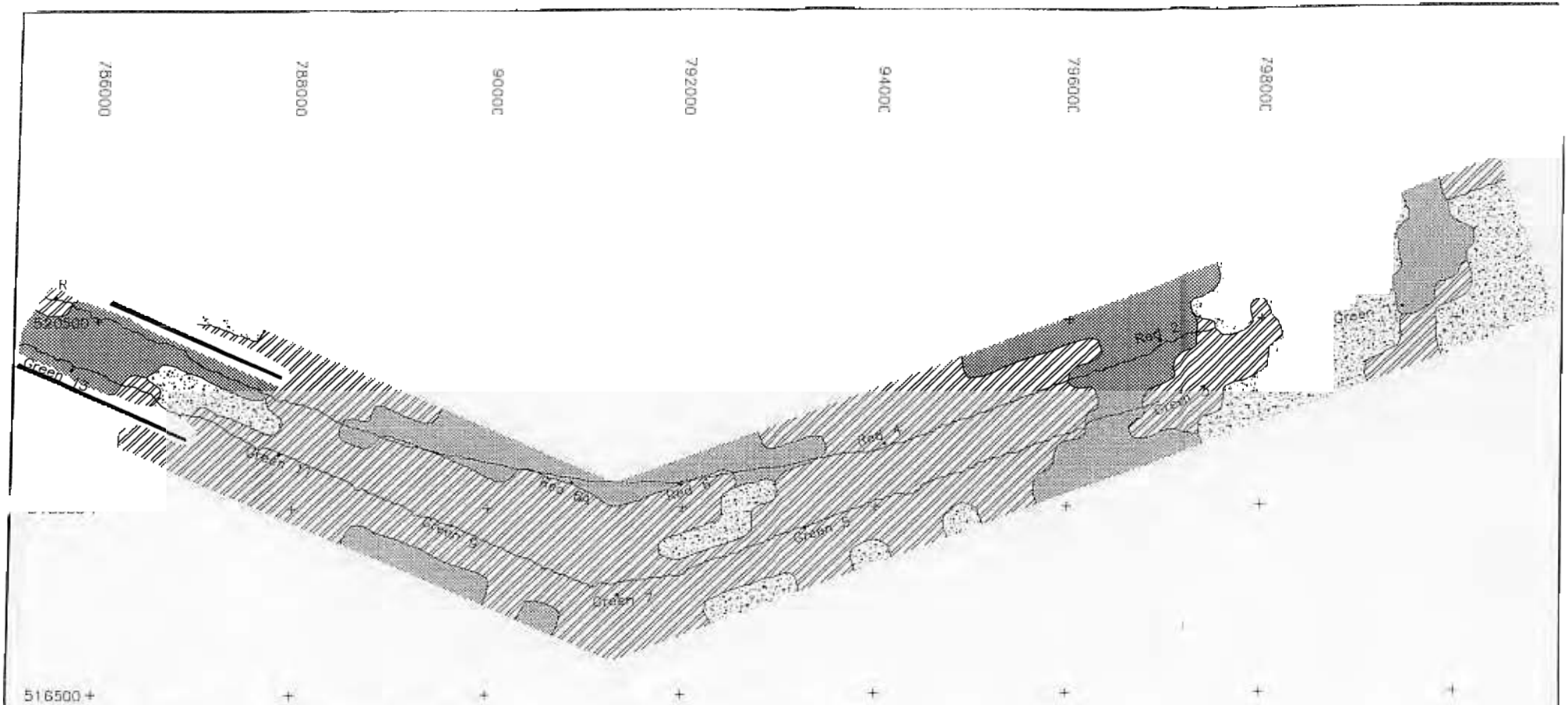
LEGEND

- Side-scan Track Line
- Video transect
- Red 4 – Channel Marker

N

0 1000 2000 3000 4000 5000

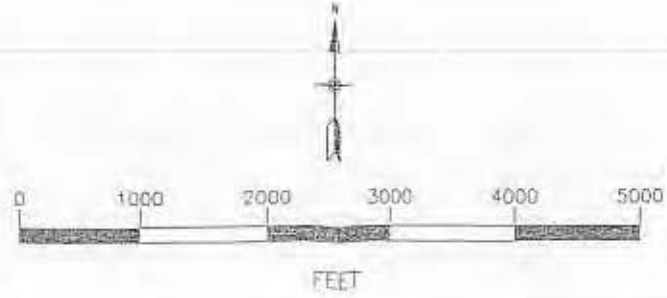
FEET



Federal Channel Side-Scan Sonar Survey			
REVISIONS	Client: Dial Cordy and Associates, Inc.		
DATE / BY	Survey Area: Government Cut, Miami Harbor		
12/01/00 FRJ	Side-scan sonar seafloor features		
SCALE: 1" = 1000'	UNITS: FEET		PLOT NO. DSA – 2
ELLIPSOID: CLARKE 1866	DATUM: NAD 1927		
PROJECTION: Transverse Mercator	ZONE: FL EAST		JOB NO. 1762 TASK NO. 1
NAVIGATION: Differential GPS	CHECKED BY: F. A.		SURVEY DATE: 8/30 – 9/1/00
CSI	CONTINENTAL SHELF ASSOCIATES, INC. JUPITER, FL		

LEGEND

- Channel Edges
- Channel markers
- Jetties
- Sand
- Scattered Hardbottom
- Hardbottom



APPENDIX D

Transect Photographs

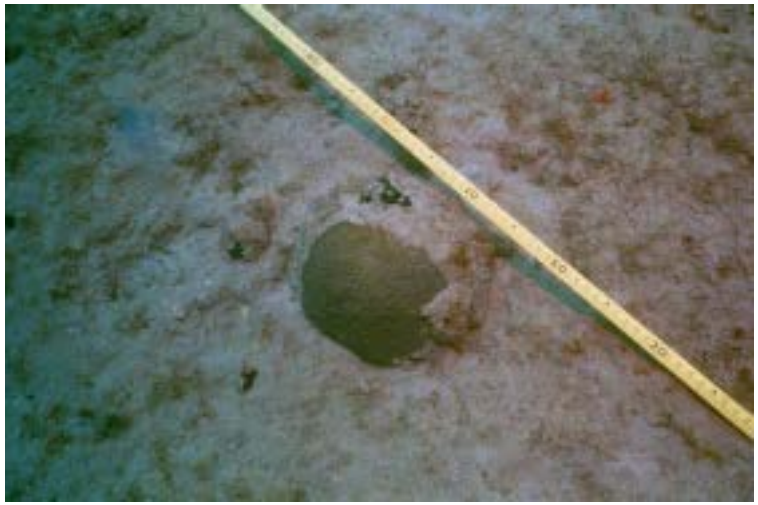


Photo 1: Star mountain coral along mid reef transect north of entrance channel.

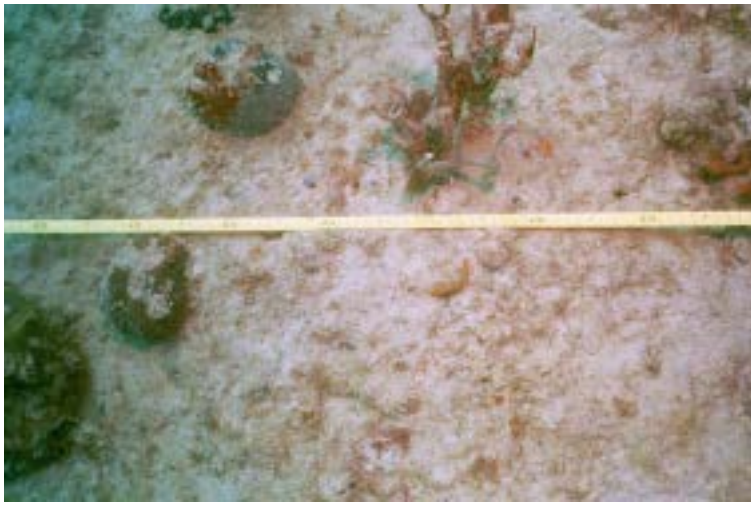


Photo 2: Coral and algae representative of mid reef north of channel.

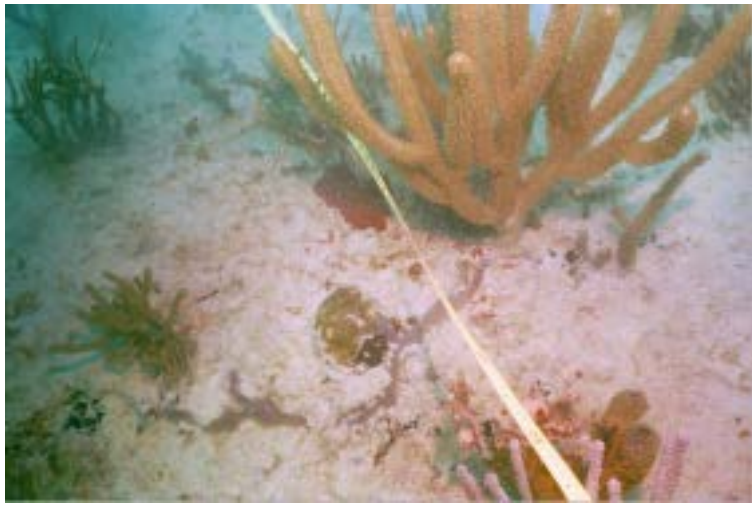


Photo 3: Gorgonian and sponge assemblage along mid reef tract north of entrance channel.

Photo 4: Hardbottom and octocorals along transect.

Photo 1: Coral and sponge growth representative of outer reef area.

Photo 2: Rope sponge, boring sponge and gorgonians on outer reef.

Photo 3: Representative coral, sponge and octocorals along outer reef transect.

Photo 4: Sponge and algae community along transect, outer reef.

Photo 1: Beginning of transect showing hard coral and sponge growth.

Photo 2: Transect line with representative octocoral and algae community.

Photo 3: Hardbottom area along mid reef transect.

Photo 4: Hard coral growth representative of mid reef transect.

APPENDIX F
EFH Coordination Documents

Planning Division
Environmental Branch

Mr. Rickey Ruebsamen
Acting Assistant Regional Administrator
Habitat Conservation Division
National Marine Fisheries Service
9721 Executive Center Drive North
St. Petersburg, Florida 33702

Dear Mr. Ruebsamen:

Thank you for the Essential Fish Habitat Conservation Recommendations included in your April 28, 2003 letter for the Port of Miami Navigation Project in Dade County, Florida. A detailed reply to the 19 EFH recommendations is enclosed. We intend to comply with most of the EFH recommendations (2,3,4,5,6,7,10,11,12,14,15,16,17 & 19). 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

Copy Furnished:
Ms. Amy Kimball-Murley, Port of Miami, 7520 Red Road, Suite M, South Miami, Florida 33143

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

L: group/PDE/Jordan/Miami GRR/DEIS/Appendix F - EFH Assessment/Responses to NMFS EFH Conservation Recommendations

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

Response – The Corps will apply all of the 18.6 acres associated with the dredge hole in north Biscayne Bay toward the mitigation requirements associated with the project.

Recommendation #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 seagrass beds and it shall be determined whether *H. wrightii* and *H. decipiens* are present in locations adjacent to these sites.

Response – The proposed mitigation site meets the seven criteria set forth in Fonseca et *al*. (1998); will be filled to the same depth as surrounding seagrass beds; and *H. decipiens* and *H. wrightii* have been documented near the proposed mitigation site.

1. *They are at similar depths as nearby natural seagrass beds*. The proposed mitigation site currently has a depth of approximately –15 feet. It shall be filled to –3 or –4 feet in depth to match the surrounding seagrass beds.
2. *They were anthropogenically disturbed*. The mitigation site is a 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 vegetated with primary seagrass colonizers dominated by *Halophila decipiens* but is not on a rapid or extensive track towards achievement of a climax community similar to that of surrounding natural beds. The proposed mitigation will remedy this situation.
5. *Seagrass restoration had been successful at similar sites*. Restoration of a 2.6-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 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 was a viable option for mitigating seagrass loss.
6. *There is sufficient acreage to conduct the project*. The proposed mitigation site has a footprint in excess of 18 acres.

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).

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

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 planting of seagrasses.

Recommendation #4 – Successful replacement of seagrasses 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 shall be established.

Response - The Corps agrees to monitor the seagrass mitigation site annually for five years.

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

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.

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

Response – The EIS is being updated to include the use of a cutterhead dredge in the construction operations. Use of this dredge will require anchoring, which has been documented as having the potential to impact. The Corps is working to develop an estimate of potential anchorage needs associated with the project, as well an assessment of potential impacts associated with the use of that technology. The assessment will include an anchoring plan to minimize anchor and cable damage.

Recommendation # 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.

Response – 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.

Recommendation #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).

Response – 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 conservation recommendation 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.

Recommendation #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.

Response - The Corps 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.

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

Response –The combined reef mitigation sites contain more than 130 acres of 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 Corps 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 Corps 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.

Recommendation #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.

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

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

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.

Recommendation #13 – A total of 19.34 acres of hardbottom compensatory mitigation shall be provided.

Response – The Corps 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 Corps 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 Corps 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 Corps has no plans to offer mitigation for the previously dredged and mitigated hardbottoms as requested by NOAA.

Recommendation #14 – Based on a completed EFH/mitigation table to be provided in the FEIS which includes documentation of the total acres impacted by habitat type (including direct and indirect impacts including side slope equilibration); the associated mitigation performed (location, acreage, and type) and details concerning the state of those mitigation sites (monitoring reports) the COE, in coordination with NOAA Fisheries shall identify and provide for additional mitigation, as needed.

Response – The Corps has reviewed table #20 (page 91 & 92 of the DEIS) and agrees that a column or explanation with regard to the success of the previous mitigation will be included.

Recommendation #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.

Response – The Corps 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 Corps 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.

Recommendation #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 exceeded 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 after each blast and use of hydrophones and other technologies to determine likely impacts are encouraged.

Response – Biological monitoring will be conducted during a test blast to be conducted in Miami Harbor in the fall or winter of 2003. This monitoring will be used to prepare a comprehensive monitoring plan for the proposed blasting activities associated with port construction.

Recommendation #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.

Response – The Corps will abide by the water quality monitoring requirements of the FLDEP Water Quality Certificate, when issued and accepted.

Recommendation #18 – A sedimentation-monitoring program shall be developed in coordination, 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 shall be determined and promptly implemented.

Response – The Corps will abide by the monitoring requirements of the FLDEP Water Quality Certificate, when issued and accepted.

Recommendation #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.

Response – While the proposed project does not contain a beach placement component, potential future use of the material placed in the upland confined disposal facility at Virginia Key would require further processing to meet beach quality standards. Some of the sand material will be utilized to cap the proposed seagrass mitigation site.

Southeast Regional Office
9721 Executive Center Drive North
St. Petersburg, Florida 33702-2432

February 25, 2004

MEMORANDUM FOR: CS/EC - Ramona Schreiber

FROM: F/SER45 - David Rackley

SUBJECT: Draft Environmental Impact Statement for Miami Harbor Draft Environmental Impact Statement (DEIS) and General Reevaluation Report (GRR), Dade County Florida

The National Marine Fisheries Service (NOAA Fisheries) Southeast Region has reviewed information contained in the subject document provided by the U.S. Army Corps of Engineers (COE), Jacksonville District. The attached comments were provided to the COE and are provided for your information and use.

Attachment

cc:
F/SER4
F/SER45-Karazsia

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.

<u>General comments</u>:

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. 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).

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.

<u>Specific comments</u>:

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). 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.

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).

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).

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. *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.

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.

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). 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. 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.

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).

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).

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).

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).

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).

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. 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 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).

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 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. 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. 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). 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. 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. 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).

Water Quality

NOAA Fisheries believes that water quality monitoring should be implemented for the Miami Harbor project (see EFH Conservation Recommendation #17). 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 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. 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. 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.

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. In addition, 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.

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).

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;

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
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F/SER45-Karazsia

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ESSENTIAL FISH HABITAT ASSESSMENT

FOR THE
MIAMI HARBOR
GENERAL REEVALUATION REPORT STUDY
DRAFT ENVIRONMENTAL IMPACT STATEMENT

July 2002

Prepared for:
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1.0 INTRODUCTION

The Port of Miami (Port) requested that the U.S. Army Corps of Engineers (USACE) study the feasibility of widening and deepening most of the major channels and basins within the Port. Two major improvement goals were identified to accommodate larger vessels: 1) widen the Entrance Channel, Fisher Island Turning Basin and Fisherman's Channel; and 2) deepen the Entrance Channel, Government Cut and Fisher Island Turning Basin. A number of alternatives were originally considered, but during in an effort to reduce impacts to the natural environment, many were eliminated from further analysis. Three alternatives are being analyzed (two action alternatives and the No-Action alternative) in the Draft Environmental Impact Statement. 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. Disposal of dredged materials would occur at up to four disposal sites [seagrass mitigation area, offshore permitted artificial reef areas, approved upland disposal site or the Miami Offshore Dredged Material Disposal Site (ODMDS)]. The Recommended Plan would impact 0.2 acre of seagrass habitat within the existing channel, 6.1 acres of seagrass habitat outside of the existing channel, 28.7 acres of low relief hardbottom/reef habitat, 20.7 acres of high relief hard/bottom/reef habitat, 123.5 acres of rock/rubble habitat, and 236.4 acres of unvegetated bottom habitat. Impacts to fish species may occur due to loss of habitat and blasting activities associated with project construction activities. The Recommended Plan would cause temporary increases in turbidity; however, these levels would not exceed permitted variance levels outside the mixing zone. Mitigation proposed for seagrass impacts would include restoration of previously dredged borrow areas within northern Biscayne Bay while mitigation proposed to offset impacts to high and low relief reef habitat would include creation of artificial reefs within permitted offshore artificial reef sites.

2.0 PROJECT DESCRIPTION

2.1 Background

The Port is a 660-acre island facility created from two spoil islands, Dodge Island and Lummus Island. The western end is Dodge Island, and the eastern end is Lummus Island. The Port is connected to the Miami mainland by two bridges, a 65-foot high, fixed span vehicular bridge, and a road and a rail bridge linking to the Florida East Coast Railroad Company's main line track (USACE 2002).

The Port is a "clean port," the designation of a seaport that does not handle bulk cargoes or potentially dangerous or hazardous cargoes such as fuel oil. The Port handles only palletized, roll-on/roll-off (RO/RO), and containerized cargo. In addition to cargo traffic, the Port is also a major cruise ship port. It is the year-round homeport of the largest cruise ship in the world, the VOYAGER OF THE SEAS. As reported in the 1999 Port of Miami Master Development Plan (April 30,1999), the Port consists of 518 acres of actual landmass. Of the 518 acres, 372.5 acres (71.9 percent) is devoted to cargo operations, mainly on Lummus Island, and 52 acres (10.0 percent) is devoted to cruise operations on Dodge Island. The Port also leases 34 acres from the Florida East Coast Railway at its Buena Vista yard, which is located approximately 2.5 miles northwest of the Port. This leased property is used as an intermodal container marshaling and storage area for transshipments.

The Port is a landlord port, owned by Miami-Dade County, Florida and managed by the Miami-Dade County Seaport Department. The Port Director reports to the County Manager. Facilities are leased to Port users and operators. There are three principal terminal operators at the Port: Seaboard Marine, the Port of Miami Terminal Operating Company (POMTOC), and Universal Maritime/Maersk. Seaboard Marine's container terminal and storage areas are located along the southern portion of Dodge Island and the southwest corner of Lummus Island. POMTOC's container terminal is located exclusively on Lummus Island, as is Universal Maritime/Maersk's (northeastern portion).

Currently there are three Panamax and seven Post-Panamax gantry cranes. Two additional super-Post-Panamax gantry cranes are scheduled to arrive in October 2002. Panamax, Post-Panamax, and Super-Post-Panamax gantry cranes are designed to reach across 13 containers (each approximately 8 feet wide), 17 containers, and 22 containers, respectively.

In addition to gantry cranes, the Port's cargo handling equipment includes forklifts, toploaders, and mobile truck cranes including three Mi-Jack 850-P Rubber Tire Gantries (RTGs), which allow containers to be stacked 6-wide and 4-high.

There are eleven passenger terminals that accommodated 3.3 million passengers in fiscal year 2000. The Port's passenger terminals are designated Terminals 1 through 5, Terminal 6/7, Terminal 8/9, Terminal 10, and Terminal 12.

As identified in the Port's 1999 Master Plan, approximately 47.5 acres of the Port's land area is utilized by support facilities: parking, 17.0 acres; circulation and open space, 10.5 acres; office – Federal Government, 8.5 acres; recreation, 7.5 acres; office-miscellaneous and office-Seaport Department, 1.7 acres.

CSX Transportation, Inc. serves the Port. The Miami-Dade County Seaport Department owns 2.1 miles of trackage at the Port on Dodge Island, which consists of a main line track extending the length of the island and a four-track, closed-end intermodal rail yard. The main track on Dodge Island connects with the Florida East Coast Railway via a rail bridge. A connection with CSX Transportation, Inc. is effected through an interchange in the west part of the City of Miami. Moreover, the Port is less than one mile from major highways: Interstate 95 and Federal Route 1 via Interstate 395, and Interstate 75 via Dolphin and Palmetto Expressways.

Even though the Port is considered a "clean port" there is a private petroleum facility at Fisher Island. This facility receives Number 6 fuel oil and diesel fuel by tankers and barge (integrated tug and barge units). The fuel is used solely for bunkering the Port's cargo and cruise ships, which are bunkered at the berth by tank truck or by bunkering barge. This facility has an 800-foot long berth with a depth of 36 feet and 12 storage tanks having a total capacity of 667,190 barrels.

As reported in the USACE Port Series No. 16 document (revised 1999), within Metropolitan Miami-Dade County 12 companies operate warehouses having a total of over 1,000,000 square feet of dry storage space and over 6,000,000 cubic feet of cooler and freezer space. All except three of the warehouses have railroad connections, and each is accessible to arterial highways.

Anchorage for deep-draft cargo vessels lies north of the Entrance Channel to the Port of Miami. There are no bridges crossing the shipping channels for Dodge and Lummus Islands.

2.2 Description of the Alternatives

2.2.1 No-Action Alternative

The Port would continue operations under existing conditions. Currently, there are two options available for moving cargo to terminal facilities in those areas. One is to use vessels with drafts that

enable access over existing depths and widths. The second is to use another terminal at the Port and move the cargo to the facilities (USACE 1996). Current dimensions of the channels and turning basins are described below in Table 1.

Table 1 Current Channel and Turning Basin Dimensions

Entrance Channel	500 feet wide and 44-foot depth
Government Cut	500 feet wide and 42-foot depth
Fisher Island Turning Basin	Triangular-shaped bottom with a 42-foot depth
Main Channel	400 feet wide and 36-foot depth
Fisherman's Channel and Lummus Island Turning Basin	The channel is 400 feet wide and 42-foot depth. The turning basin has a turning diameter of 1,500 feet and 42-foot depth.
Dodge Island Cut and Turning Basin	400 feet wide and 34-foot depth

2.2.2 Alternative 1

Alternative 1 consists of six components that are designed to improve Port transit for the existing and future fleets.

Component 1C — Flare the existing 500-foot wide Entrance Channel to provide an 800-foot wide entrance at Buoy #1. The widener would extend from the beginning of the Entrance Channel approximately 150 feet parallel to both sides of the existing Entrance Channel for approximately 900 feet before tapering back to the existing channel edge over a total distance of approximately 2,000 feet. Deepen the Entrance Channel and proposed widener along Government Cut from an existing depth of 44 feet to a depth of 52 feet.

Component 2A — Widen the southern intersection of Government Cut near Buoy #15. The length of the widener would be approximately 700 feet with a maximum width of approximately 75 feet. Deepen from existing project depth of 42 feet to 50 feet.

Component 3B — Extend the existing Fisher Island Turning Basin 300 feet to the north of the existing channel edge near the west end of Government Cut. Widen the basin to 1,500 feet by 1,200 feet. Deepen channel below existing project depths of 42 feet to 50 feet.

Component 4 — Relocate the west end of the Main Channel approximately 250 feet to the south between channel miles 2 and 3 over a two- or three-degree transition

to the existing cruise ship turning basin. No dredging is expected for this component since existing depths allow for continuation of the authorized depth of 36 feet.

Component 5A — Increase the width of the Fisherman's Channel approximately 100 feet to the south of the existing channel. This component also includes a 1,500-foot diameter turning basin, which would reduce the existing size of the Lummus Island Turning Basin. This widener at the northwest corner of the turning basin eases the turn to the Dodge Island Cut. Deepen channel from the current authorized depth of 42 feet to 50 feet along the proposed widener of Fisherman's Channel from Station 0+00 to the Lummus Island Turning Basin.

Component 6 — Deepen Dodge Island Cut and the proposed 1,200-foot turning basin from 32 and 34 feet to 36 feet. Relocate the western end of the Dodge Island Cut to accommodate proposed port expansion.

2.2.3 Alternative 2

Alternative 2 consists of five components that are designed to Port transit for the existing and future fleets.

Component 1C — Flare the existing 500-foot wide Entrance Channel to provide an 800-foot wide entrance at Buoy #1. The widener would extend from the beginning of the Entrance Channel approximately 150 feet parallel to both sides of the existing Entrance Channel for approximately 900 feet before tapering back to the existing channel edge over a total distance of approximately 2,000 feet. Deepen the Entrance Channel and proposed widener along Government Cut from an existing depth of 44 feet to a depth of 52 feet.

Component 2A — Widen the southern intersection of Government Cut near Buoy #15. The length of the widener would be approximately 700 feet with a maximum width of approximately 75 feet. Deepen from existing project depth of 42 feet to 50 feet.

Component 3B — Extend the existing Fisher Island Turning Basin 300 feet to the north of the existing channel edge near the west end of Government Cut. Widen the basin to 1,500 feet by 1,200 feet. Deepen channel below existing project depths of 42 feet to 50 feet.

Component 4 — Relocate the west end of the Main Channel approximately 250 feet to the south between channel miles 2 and 3 over a two- or three-degree transition to the existing cruise ship turning basin. No dredging is expected for this component since existing depths allow for continuation of the authorized depth of 36 feet.

Component 5A — Increase the width of the Fisherman's Channel approximately 100 feet to the south of the existing channel. This component also includes a 1,500-foot diameter turning basin, which would reduce the existing size of the Lummus Island Turning Basin. This widener at the northwest corner of the turning basin eases the turn to the Dodge Island Cut. Deepen channel from the current authorized depth of 42 feet to 50 feet along the proposed widener of Fisherman's Channel from Station 0+00 to the Lummus Island Turning Basin.

2.3 Alternatives Eliminated from Detailed Evaluation

Original components contained in the alternatives considered for this project have been revised several times to minimize cost and impacts to the environment. Previous versions of the components are described below and are listed in Table 2.

Component 1

Four different versions of Component 1 received consideration during the plan formulation process. Receipt of the Baseline Environmental Resource Survey and ship simulation results allowed additional evaluations of the Entrance Channel alternatives based on the location of environmental resources and ship transits.

Further discussions with the Pilots resulted in two additional modifications of Component 1, which completely avoids one reef area (Component 1C). Component 1A avoided one reef location, but did not provide sufficient widening in the area where currents impact vessel transits. Component 1B avoided both reef areas, but did not provide widening in the area of the difficult north and south currents.

Component 2

Two different orientations for the widener received consideration, which included Component 2 and Component 2A. The first recommended by the Pilots (Component 2) extended from the southern edge of Fisherman's Channel parallel to Government Cut between Buoys #13 and #15 over a distance of approximately 2,400 feet.

Ship simulation testing of Component 2 indicated the Pilots did not use the widener during any of the simulation exercises. Subsequent discussions on May 16, 2001 with the Pilots resulted in a reduction of the widener from 2,400 to 700 feet. During a later simulation of the revised Component 2A at the pilot station, a ship grounded at the location of the proposed widener.

Table 2 Avoidance and Minimization of Direct Impacts of the Preliminary Design Plan and Recommended Plan

Habitat Type	Component													
	1[1]	**1C**[2]	**2**[1]	**2A**[2]	**3**[1]	**3B**[2]	**4**[2]	**5**[1]	**5A**[2]	**6**[1]	**6A**[3]		**Previous Total**	**Revised Total**
Seagrass beds[4] (ac)	0	0	0	0	**0.7**	0	0	**1.7**	**0.2**	**22.8**	NA		**25.2**	**0.2**
Low relief hardbottom/reef (ac)	**35.1**	**28.7**	0	0	0	0	0	0	0	0	NA		**35.1**	**28.7**
High relief hardbottom/reef (ac)	**21.1**	**20.7**	0	0	0	0	0	0	0	0	NA		**21.1**	**20.7**
Rock/rubble w/ live bottom (ac)	**51.7**	**51.7**	0	0	0	0	0	0	0	0	NA		**51.7**	**51.7**
Rock/rubble w/ algae/sponges (ac)	**41.3**	**41.3**	**3.9**	**0.6**	**5.4**	**26.1**	0	**59.4**	**3.8**	0	NA		**136.2**	**71.8**
Unvegetated (ac)	**70.1**	**68.2**	**1.7**	**0**	**9.4**	**24.4**	**0**	**166.8**	**143.8**	**55.4**	**NA**		**333.5**	**236.4**
Total Project Footprint (ac)	**227.8**	**210.6**	**5.6**	**0.6**	**15.5**	**50.5**	**0**	**228.9**	**147.8**	**78.2**	**0**		**612.3**	**409.5**

[1]Original Proposed Impacts
[2]Recommended Plan Impacts
[3]Not Evaluated
[4]Does not include side slope equilibration impacts

Component 3

Component 3 proposed a 1,600-foot diameter turning basin. Following review of the Environmental Baseline Survey and ship simulation tests, Component 3A was identified which reduced the turning basin to a turning notch of approximately 1,500 by 1,450 feet. Since ship simulation testing indicated the Pilots did not use the northernmost section of Component 3, Component 3A was identified since it avoided impacts to most to the seagrass beds to the north.

Later discussions on May 16, 2001 resulted in the Pilots' proposal to completely avoid the seagrass area to the north by truncating the northeast section of the turning basin (Component 3B).

Component 4

No alternative design was considered for Component 4.

Component 5

During the ship simulation exercise, Component 5 provided additional room for vessels passing berthed ships along the container terminals. The Pilots used the additional width during almost every proposed condition test in the Fisherman's Channel.

Component 5A resulted from coordination with Fisher Island's engineering representatives to improve clearance between the proposed widener and a proposed new bulkhead in that area.

Component 6

Component 6 includes deepening of 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.

Component 6A proposed widening about 1,200 feet of the Dodge Island Cut an additional 50 feet to the south as a result of ship simulation testing. During the ship simulation testing a number of ships left the south side of the channel segment between Lummus Island Turing Basin and Dodge Island Turning Basin. The Engineering Research and Development Center (Waterways Experiment Station) of the USACE recommended Component 6 on the condition that the southern edge of that segment is widened 50 feet, which resulted in Component 6A.

2.4 Recommended Plan

The Recommended Plan consists of five components that are designed to improve Port transit for the existing and future fleets.

Component 1C — Flare the existing 500-foot wide Entrance Channel to provide an 800-foot wide entrance at Buoy #1. The widener would extend from the beginning of the Entrance Channel approximately 150 feet parallel to both sides of the existing Entrance Channel for approximately 900 feet before tapering back to the existing channel edge over a total distance of approximately 2,000 feet. Deepen the Entrance Channel and proposed widener along Government Cut from an existing depth of 44 feet in one-foot increments to a depth of 52 feet.

Component 2A — Widen the southern intersection of Government Cut and Fisherman's Channel at Buoy #15. The length of the widener would be approximately 700 feet with a maximum width of approximately 75 feet. Deepen from existing project depth of 42 feet to 50 feet.

Component 3B — Extend the existing Fisher Island Turning Basin 300 feet to the north of the existing channel edge near the west end of Government Cut. This would widen the basin to 1,500 feet by 1,200. Deepen at one-foot increments below existing depths of 42 feet to 50 feet.

Component 4 — Relocate the west end of the Main Channel approximately 250 feet to the south between channel miles 2 and 3 over a two- or three-degree transition to the existing cruise ship turning basin. No dredging is expected for this component since existing depths allow for continuation of the authorized depth of 36 feet.

Component 5A — Increase the width of the Fisherman's Channel approximately 100 feet to the south of the existing channel. This component also includes a 1,500-foot diameter turning basin, which would reduce the existing size of the Lummus Island Turning Basin. This widener at the northwest corner of the turning basin would ease the turn to the Dodge Island Cut. Deepen at one-foot increments from the existing 42-foot depth to 50 feet along the proposed widened Government Cut channel from Station 0+00 to Station 42+00.

2.5 Comparison of Alternatives

The following table (Table 3) provides a comparison of the No-Action Alternative and the Recommended Plan with regard to costs and potential impacts to natural resources and human environment. A more thorough analysis of potential impacts is included in Section 4.0, Environmental Consequences.

Table 3 Comparisons of Alternatives

Resource	No-Action Alternative	Alternative 1	Alternative 2 (Recommended Plan)
Coastal Environment	No significant impact.	No significant impact.	No significant impact.
Geology and Sediments	Additional vessel groundings may impact geological formations within the Biscayne Bay.	Additional sediment or material removal would occur.	Sediment or material removal would occur.
Water Quality	Additional vessel groundings may impact water quality.	Temporary increases in turbidity during dredging events may cause increased turbidity at the point of discharge from the disposal sites.	Temporary increases in turbidity during dredging events may cause increased turbidity at the point of discharge from the disposal sites.
Seagrass Communities	Additional vessel groundings may impact seagrass communities.	Significant direct impacts would include the removal of seagrass habitat. Indirect impacts to seagrass would occur through side slope equilibration.	Direct impacts would include the removal of seagrass habitat. Indirect impacts to seagrass would occur through side slope equilibration.
Hardbottom and Reef Communities	Additional vessel groundings may impact hardbottom and reef communities.	Widening and deepening would result in both direct and indirect impacts to hardbottom and reef communities within the Entrance Channel.	Widening and deepening would result in both direct and indirect impacts to hardbottom and reef communities within the Entrance Channel.
Rock/ Rubble Communities	Additional vessel groundings may impact rock rubble communities.	Proposed impacts to rock/rubble habitats are principally in areas that have already been dredged.	Proposed impacts to rock/rubble habitats are principally in areas that have already been dredged.
Unvegetated Bottom	Additional vessel groundings may impact unvegetated bottom communities.	Direct impacts to unvegetated bottom communities would include the impacts to both benthic epifauna and infauna but other direct effects and indirect effects would differ based on the general location of the impacts.	Direct impacts to unvegetated bottom communities would include the impacts to both benthic epifauna and infauna but other direct effects and indirect effects would differ based on the general location of the impacts.

Resource	No-Action Alternative	Alternative 1	Alternative 2 (Recommended Plan)
Essential Fish Habitat (EFH)	Additional vessel groundings may impact EFH.	EFH would be impacted.	EFH would be impacted.
Protected Species	Additional vessel groundings may impact protected species.	Potential impacts due to blasting and loss of habitat may occur during dredging and construction activities.	Potential impacts due to blasting and loss of habitat may occur during dredging and construction activities.
Other Areas of Special Concern	Navigational difficulties may impact Areas of Special Concern.	No significant impacts.	No significant impacts.
Air Quality	No significant impact.	Short-term impacts from dredge emissions and other construction equipment would not significantly impact air quality.	Short-term impacts from dredge emissions and other construction equipment would not significantly impact air quality.
Noise	No significant impact.	None of the project components are expected to have a significant impact to noise levels.	None of the project components are expected to have a significant impact to noise levels.
Utilities	No significant impact.	Four utility crossings would be impacted.	Four utility crossings would be impacted.
Hazardous, Toxic, and Radioactive Waste	No significant impact.	No significant impacts to HTRW within the project area would occur.	No significant impacts to HTRW within the project area would occur.
Economic Factors	Significant loss of cargo business would occur at the Port due to the inability to handle new industry standard deep draft cargo vessels.	Cargo business would be retained and may increase.	Cargo business would be retained and may increase.
Land Use	No significant impacts.	No significant impacts.	No significant impacts
Recreation	No significant impacts.	No significant impacts.	No significant impacts.
Aesthetic Resources	No significant impacts.	No significant impacts.	No significant impacts.
Cultural Resources	No significant impacts.	No significant impacts.	No significant impacts.

3.0 ESSENTIAL FISH HABITAT DESIGNATION

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

3.1 Assessment

The Port lies in the north side of Biscayne Bay, a shallow subtropical lagoon that extends from the City of North Miami (Miami-Dade County, Florida) south to the northern end of Key Largo (at the juncture of Miami-Dade and Monroe Counties). Biscayne Bay is a long, narrow, water body approximately thirty-eight miles long, and three to nine miles wide. Average depth is six to ten feet (USACE 1989). 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 (Hoffmeister 1974).

A thin layer of sediment less than six inches in depth characterizes the bay bottom over most of its area. Sediment thickness is increased up to 40 inches in the northern part of the Biscayne Bay near Miami Beach. Two major natural communities inhabit the bay bottom: seagrass communities and hardbottom communities. In the Atlantic Ocean, waterward of Biscayne Bay and barrier islands, similar communities occur. Nearshore seagrass beds give way to mixed seagrass and hardbottom, deeper channels and, finally, the Florida Reef Tract, which runs from Soldier Key south through the Florida Keys.

The most obvious direct impact of the Recommended Plan 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. 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.

Blasting would also have a direct impact on managed fish species residing in/migrating through the harbor and associated waterways. Previous studies (USACE 1996; O' Keefe 1984; 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 such as shrimp and crabs (Keevin and Hempen 1997). Small fish are the most likely to be impacted.

Although dredge operations are likely to directly impact individuals of managed species in observable lethal and sublethal ways, dredging and blasting may also have more subtle effects observable only at the population level, rather than at the individual level. For example, dredging/blasting activities, particularly in linear corridors (such as Government Cut and Fisherman's Channel) may temporarily interfere with existing 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 the dredging of 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 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 occur due to temporarily increased levels of turbidity. Re-suspended materials may interfere with the diversity and concentration of phytoplankton and zooplankton, and therefore could affect foraging success and patterns of schooling fishes and other grazers that comprise prey for managed species. Foraging patterns are expected to return to normal soon after cessation of dredging activities.

The temporary or permanent loss of EFH habitats results 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) such as seagrass beds, , hardbottoms, and reefs. Coastal inlets are HAPC for shrimps, red drum, and grouper. These species prefer estuarine, inshore habitats such as mangroves, seagrass beds, and mudflats for portions of their life histories. 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).

Losses to EFH-HAPC within the areas proposed for dredging under Alternative 1 include impacts to seagrass and hardbottom/reef habitats. Seagrass beds are an important part of the Biscayne Bay

ecosystem due to their proximity to reef and hardbottom habitats. Their function is closely coupled with reefs to provide life-stage-specific habitat for certain managed species. Seagrass habitat directly adjacent to the existing Port channels are subjected to daily manmade and natural disturbances that make it a less optimal habitat for managed species relative to the surrounding area. Therefore, the selection of Alternative 2 as the Recommended Plan greatly minimizes the significance of seagrass impacts to managed species in terms of both quantity and quality. Nevertheless, loss of these two habitats (hardbottom/reef and seagrasses) would result in a loss of habitat essential in the spawning and early life-stages for species of the Snapper-Grouper Complex, including blue stripe grunts, French grunts, mahogany snapper, yellowtail snapper, and red grouper. Managed crustaceans including pink shrimp and spiny lobster found in nearby mangrove habitats at Virginia Key also likely use grassbeds for foraging during some life stages.

Impacts to populations of managed species would occur due to dredging unvegetated habitats (sand/silt/rubble, sand), including those that lack seagrasses. Dredging would 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 two years (Taylor et. al 1973; Culter and Mahadevan 1982; Saloman et. al 1982).

The aquatic communities associated with these different bottom types and the water column have been identified as EFH in accordance with the amendment to the Fishery Management Plans of the South Atlantic Region (SAFMC 1998). Impacts associated with widening and deepening of the harbor have been minimized with the Recommended Plan and remaining impacts under that alternative are unavoidable. However, the temporary disruption of the water column, seagrass beds, sand bottom, and hardbottom areas that may provide habitat or contribute to aquatic food chains would be minimized by implementing strict management practices to reduce turbidity. These practices along with the construction of new seagrass and hardbottom habitat should mitigate for any direct impacts.

3.2 Managed Species

Thirty-seven fish species are listed under the Affected Fishery Management Plans and Fish Stocks of the Comprehensive EFH Amendment (SAFMC 1998). Consequently, the project area has been designated as EFH for theses fishes, brown shrimp, white shrimp, pink shrimp, and spiny lobster (Table 4). Six coastal migratory pelagic fish species have been included owing to their distribution patterns along the Florida coast. In addition, the nearshore bottom and offshore reef habitats of South Florida have also been designated as EFH-Habitat Areas of Particular Concern (EFH-HAPC) (SAFMC 1998). Over 60 species of coral can occur off the coast of Florida all of which fall under the protection of the management plan (SAFMC 1998). At least 11 genera of mostly gorgonian corals have been observed in the study area.

Table 4 Managed Species Identified by the South Atlantic Fishery Management Council That Are Known to Occur in Miami-Dade County, Florida

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

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

[1] Coastal Migratory Pelagic Fish Species

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

3.2.1 Crustacea

3.2.1.1 Life Histories

3.2.1.1.1 Brown Shrimp

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

3.2.1.1.2 Pink Shrimp

Of the three penaeid shrimp species, pink shrimp is the most prevalent in Florida waters. Consequently, the pink shrimp fishery is the most economically important of all fisheries in Florida.

Spawning of pink shrimp occurs in oceanic waters at depths of 4 to 48 m and possibly deeper (Bielsa et al. 1983) where adult females lay demersal eggs. Spawning takes place year round in some areas (e.g., Tortugas Shelf), but peak spawning activity appears to coincide with maximum bottom water temperatures (Bielsa et al. 1983). Recruitment of planktonic post-larvae into estuarine and coastal bay nurseries occur in the spring and late fall during flood tides. Post-larvae become benthic at approximately 10 mm TL and prefer areas with a soft sand or mud substrate mixture containing sea-grasses and turtle-grass (Bielsa et al. 1983; Howe et al. 1999; Howe and Wallace 2000). Pink shrimp spend from 2 to 6 months in the nursery ground prior to emigration. During this time there is a dietary shift from nauplii and microplankton to polychaetes, ostracods, caridean shrimps, nematodes, algae, diatoms, amphipods, mollusks, and mysids, regarding post-larvae and juveniles, respectively (Bielsa et al. 1983). Although some of their potential prey would initially be lost during dredging activities, recovery would be rapid (Culter and Mahadevan 1982; Saloman et al. 1982) and they can forage in adjacent areas that have not been impacted as they emigrate offshore. Emigration from the nursery grounds to offshore occurs year round with a peak during the fall and a smaller peak during the spring. The greatest concentrations of adults have been reported between 9 and 44 m, although some have been found as deep as 110 m in Florida waters. Although detailed dietary studies concerning adults are non-existent, Williams (1955) reported foraminiferans, gastropod shells, squid, annelids, crustaceans, small fishes, plant material, and debris in the stomachs of adults collected in North Carolina estuaries.

3.2.1.1.3 White Shrimp

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

3.2.1.1.4 Spiny Lobster

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

3.2.1.2 Summary of Impacts to Shrimps and Spiny Lobsters

As outlined by SAFMC (1998), EFH-HAPCs for penaeid shrimps include coastal inlets and both state identified overwintering areas and nursery habitats. Seagrass beds common to the bays of Florida are particularly important areas. EFHs for spiny lobster are varied including nearshore shelf/oceanic waters, shallow, benthic subtidal areas, seagrass beds, soft sediment, coral and both live and hardbottom, sponges, algal communities, mangroves, and the Gulf Stream which it uses for dispersion (SAFMC 1998).

The project area includes sand bottom, sand-veneered hardbottom, hardbottom, and water column that may be used by all three penaeid species and spiny lobster as post-larvae, juvenile, and adults. The project would impact a relatively small area of the sand and hardbottoms, and the impacts would be minor. Some possible refuge may be lost in regards to the impact to the hardbottom areas; however, additional refuge would be created by the construction of artificial reefs to serve as

replacement habitat. The project would cause localized turbidity during construction; however, turbidity would be minimized using the best management practices so that any impacts would be minor and temporary. Penaeid shrimp and spiny lobster would be temporarily displaced, but would quickly return to the project area.

3.2.2 Habitat Areas of Particular Concern

3.2.2.1 Hardbottom and Reef Habitat

The South Atlantic Fisheries Management Council has designated nearshore hardbottom and offshore reef areas within the study site as EFH. The nearshore bottom and offshore reef habitats of South Florida have also been designated as EFH-HAPC (SAFMC 1998). Over 60 species of coral can occur off the coast of Florida all of which fall under the protection of the management plan (SAFMC 1998).

The warm waters of the Florida current are the most dominant hydrographic feature beginning at Palm Beach, Florida, and continuing south. As a result, the Carolinian corals in the Palm Beach area (> 4 km offshore) are replaced by a highly diverse hardbottom community that is dominated by gorgonian corals off Miami-Dade County (USACE 1989 and 1996a, SAFMC 1998). Observed gorgonians during a recent video survey of the project area were primarily of the genera *Eunicea* (e.g., *E. palmeri)*, *Plexaura* (e.g., *P. homomalla)*, and *Pseudopterogorgia* spp. (DC&A 2001). Other observed genera included *Gorgonia*, *Plexaurella* (*P. dichotoma)*, and *Pterogorgia* (*P. citrina* and *P. anceps),* and *Pseudoplexaura* spp. Hard coral species also make up a significant part of the reef assemblages in this area. The dominant species of hermatypic corals in this area include the large star coral, *Montastraea cavernosa*, the small star coral, *M. annularis*, *Diploria clivosa*, *Siderastrea siderea,* and *Porites asteroides,* (Blair and Flynn 1989; SAFMC 1998). All five of these dominant species were observed during the 2000 survey (DC&A 2001). Sponges observed within the project area's hardbottoms and reefs during the survey included *Ircinia campana*, *Callyspongia vaginalis*, *Cliona* sp., *Iotrochota* sp. (*I. birotulata*), *Geodia* spp. (*G. gibberosa* and *G. neptuni*) and *Amphimedon compresa*. The biota of the three outer reef tracts are consistent with the overall assemblage of stony corals, sponges, and gorgonians found offshore of Miami-Dade, Broward, and Palm Beach Counties (USACE 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. Flynn et al. (1991) noted the additional presence of *Dictyota* spp. and *Jania* spp. in the area.

3.2.2.2 Summary of Impacts to Hardbottom and Reef Habitat

Direct impacts to hardbottom and reef communities would occur as a result of the dredging process to deepen and widen channels within the Port. Areas that have been dredged previously would be affected. In total there would be 49.4 acres of impact to hardbottom/reef habitat within the existing channel including 28.7 acres of low relief hardbottom/reef and 20.7 acres of high relief

hardbottom/reef. Of this total 49.4 acres of combined hardbottom/reef impacts, 46.1 acres are areas that have been previously dredged and recolonized. In addition, the proposed project would temporarily impact established hardbottom habitat on the limestone walls of the existing channel. Inshore channel walls may also function as hardbottom, in particular the inshore wall habitat of Fisherman's Channel would be impacted with the proposed widening

Due to the lack of research and long-term monitoring on nearshore hardbottom/reef communities, determining what amount of cumulative impact is significant is difficult. Past impacts within the region do not appear to have had any adverse or significant cumulative impact on the resource. Proposed future actions would add cumulatively to the impact and are adverse. Due to the significant amount of adjacent habitat remaining, it is unlikely that the amount of hardbottom habitat would become a limiting resource. Consequently, the impacts are most likely adverse, but not significant, since the adjacent habitat is clearly not limited. Also, addition of new artificial reef proposed as mitigation would replace the proposed losses of high and low relief hardbottom/reef.

3.2.2.3 Seagrass Habitat

Seagrass habitat cover type and characteristics for the study area are described below. Distribution and occurrence observations were surveyed `from approximately 400 feet south of Fisherman's Channel, including the area of the CWA, and the area adjacent to the Coast Guard Station north of the entrance channel at the southern tip of Miami Beach.

Marine seagrass species observed within the study area included *Halodule wrightii, Halophila decipiens, Syringodium filiforme* and *Thalassia testudinum.* Seagrass occurrence in these areas 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 species and, monospecific beds of *T. testudinum*, and *H. decipiens*. No *H. johnsonii* was observed while surveying (DCA 2001, nor has any been reported from the study area by resource agencies or other sources.

Review of historic aerial photography over an approximate ten-year period (1989 to 1998) shows that major seagrass coverage patterns have essentially remained the same in the harbor and BSCWA. Site-specific coverage patterns along Fisherman's Channel revealed that the "colonizing" species, especially *H. wrightii* and *H. decipiens* tended to occur along the turning basins and nearshore areas in softer sediments with higher chronic turbidity. In fact some *H. decipiens* beds near the turning basins were covered with heavy silt loads. These colonizing species may predominate closer to shore because they can better withstand daily fluctuations in water quality. Mixed beds of the more climactic species, *T. testudinum* and *S. filiforme*, were predominant in silty sand substrate along Fisherman's Channel. This area may experience more flushing by high tides and a more stable substrate with less chronic resuspension. All seagrass beds were patchy and interspersed with bare substrate and density of individual beds decreased from east to west. The

seagrass communities located directly along the channel edge are of moderate quality when compared to the seagrasses in the surrounding area, especially to the south. Daily water quality perturbations from runoff, river flushing, shipping activities and propeller dredging by recreational boaters create a less stable, less diverse habitat although nutrient loads are probably exploited by some marine species at times.

Seagrass communities provide important habitat for many different species of flora and fauna. *Caulerpa prolifera* was observed in video transects associated with *H. wrightii*, and algae of the genera *Udotea* and *Penicillus* were also observed in the field along the channel edge. Many invertebrate species also utilize seagrass communities. There is a prevalence of bottom feeders in the beds directly along the channel edge including queen conch (*Strombus gigas*), urchins such as the sea biscuit (*Clypeaster* spp.), nudibranchs, bivalve mollusks, and crustaceans including the spiny lobster (*Panulirus argus*), and the blue crab (*Callinectes sapidus*). Filter feeders such as soft corals and sponges were observed scattered within adjacent seagrass beds, especially in the BSCWA where increased water clarity appeared to allow a more diverse and higher quality habitat (see species listed in Section 3.2). Many fish species have also been shown to have life cycles dependent on seagrass beds. Of particular importance are the mullet (*Mugil cephalus*), snook (*Centropomis undecimalis*), and many prey species including mojarras and pinfish. Seagrass beds are also important nurseries for many of the fish associated with SAFMS Snapper-Grouper Complex (SAFMC 1998b).

3.2.2.4 Summary of Impacts to Seagrass Habitat

Direct impacts as a result of Components 3B and 5A include the removal and sloughing of seagrass habitat along Fisherman's Channel and Fisher Island Turning Basin during dredging activities. Dredging associated with deepening and widening would impact a total of 0.2 acre of seagrass habitat by removal of substrate, and an estimated additional loss of 6.1 acres due to side slope equilibration of adjacent substrate.

Direct impacts associated with the removal of these seagrass beds include the loss of habitat and functional values attributable to submerged aquatic vegetation. The reduction of seagrass beds in the areas inside the proposed new channel and in areas immediately adjacent to dredging activities may result in the direct loss of forage for manatees. This impact would be significant for Component 6, which includes several acres of seagrass removal from an area of frequent manatee occurrence. Component 6 (see Alternative 1) was therefore rejected. Component 5A has a greatly reduced impact because of the much lower quantity and lower relative quality of the habitat and because of its location directly along the channel. Loss of habitat for seagrass bed resident and transient fish and invertebrates may also result. Mitigation offered for seagrass impacts would result in replacement of lost habitat values.

Deepening/widening of the Fisher Island Turning Basin (Component 3B) would not directly impact seagrass communities but may include some indirect effects on seagrass habitats, particularly those immediately to the northeast (a large mixed-species bed of *H. decipiens* and *H. wrightii*) and southeast (an isolated *H. decipiens* bed associated with the littoral zone of Fisher Island) of the proposed dredging activity. Assuming a three to one cut for the basin widening and deepening and a 1:7 slope equilibrium profile from subsidence of the adjacent sand shelf, the seagrass beds to the northeast would not be directly impacted. For the remaining three project components (1C, 2A, and 4), direct and/or indirect impacts to seagrass beds are not anticipated. No impacts would occur due to Component 2A (widening the channel at the intersection of Government Cut and Fisherman's Channel). Resources within 2,000 feet of the proposed dredge site for that component includes an isolated *H. decipiens* bed (over 500 feet away), and a large mixed-species (*H. decipiens* and *H. wrightii*) bed (over 750 feet away). Since material to be dredged as a part of Component 2A principally comprises limestone, sandstone, and clean quartz sand (USACE 2001) transport and deposition of fine sand/ silt onto the nearby seagrass beds is not expected. Component 1C falls outside Biscayne Bay and inner channels and is not likely to result in any adverse direct or indirect impacts to seagrass. Component 4 does not involve any dredging activity, and would therefore not affect seagrass beds mapped during the 2000 survey (DC&A 2001).

3.2.2.5 Rock/Rubble Habitat

Within the project area there are both naturally occurring rock outcrops and rubble material that has been left from prior dredging events. The most obvious biological features of most of the rock/rubble-based habitats are resident sponges and macroalgae, whereas the remainder of the rock/rubble habitats serves as raw material for reef-building species. The latter case was apparent in the channel zone adjacent to the existing reef tracts. Observed sponge species included *Ircinia campana*, *Callyspongia vaginalis*, and *Iotrochota* sp. (*I. birotulata*). Observed soft corals were similar to those of adjacent reefs, and included the genera *Eunicea*, *Plexaura*, and *Pseudopterogorgia*. Habitats provided by rock and rubble and associated sponges, algae, and soft corals provide significant refugia for many species of juvenile fish.

3.2.2.6 Summary of Impacts to Rock/Rubble Habitat

To implement the Recommended Plan approximately 123.5 acres of combined rock/rubble habitat would be impacted. Of those habitats, 120.5 acres lie within previously dredged areas, and only 3 acres lie outside previously dredged areas. Rock/rubble live bottom habitats composed 51.7 acres of the area to be impacted. All of the rock/rubble live bottom acreage impacted by Alternative 1 has been impacted previously by earlier dredging activity within the Port (Table 12). An additional 68.8 acres of rock/rubble with algae/sponge habitat has been previously dredged and would again be impacted by the Recommended Plan. Three acres of new rock/rubble with sponge/algae habitat impacts would occur with the implementation of Alternative 2.

3.2.2.7 Unvegetated Bottom Habitat

Unvegetated bottom habitat within the study area has been classified as either sand bottom habitat or sand/silt/rubble habitat. Off of Miami-Dade County, unvegetated sand bottom habitats fall between the first and second, and the second and third reef lines within the study area and hence may provide a corridor for reef species to travel between reef lines. They may also be an important foraging area for some fish species (Jones et al. 1991). Other unvegetated sand bottom habitats are located between scattered reef patches and rock/rubble habitats both within and adjacent to the channel and between seagrass beds that occur outside the channel. Areas surveyed along the channel edge in the Port (within 400 feet perpendicular) were classified as unvegetated bottom if no seagrass/algae beds were recorded and mapped. The unvegetated sand bottom just west of the Lummus Island Turning Basin is an example (DC&A 2001. The unvegetated-sand/silt/rubble habitat is found within Fisherman's Channel, and occurs as a patchy mosaic of each of these components.

Softer silty-sand substrates occurred mainly inshore, while unvegetated habitats offshore included some bare sand substrate over rock with sparse algae. During the summer months, the most abundant of these algal species found in the study area belong to the green algae genera *Caulerpa*, *Halimeda*, and *Codium* (USACE 1989 and 1996). The former two taxa were observed during summer 2000 surveys (DC&A 2001. In winter months, brown algae (*Dictyota* spp. and *Sargassum* spp.) dominate (USACE 1989 and 1996). 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 along transects through unvegetated habitats. 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 sand bottom areas include the Florida fighting conch (*Strombus alatus*), milk conch (*Strombus costatus*), king helmet (*Cassia tuberosa*), and the queen helmet (*Cassia madagascariensis*) (USACE 1996).

The most ubiquitous infauna of inshore softer sand/silt/rubble communities 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 Port likely support a less diverse infaunal species assemblage and are a lower quality habitat.

3.2.2.8 Summary of Impacts to Unvegetated Bottom Habitat

Unvegetated sand/silt/rubble and sandy bottom habitats comprise a significant proportion or the total area proposed for dredging. In areas where these habitats may comprise 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 (see DC&A 2001) unless the

condition was clearly dominant. Wide expanses of this type of community in its natural state are found only in the area comprising Component 1C, but smaller tracts are also presented adjacent to seagrass habitats along the south side of Fisherman's Channel and between the Lummus and Dodge Island Turning Basins. Direct impacts to unvegetated communities (due to dredging operations) in all three of these areas would mainly include impacts to benthic epifauna and infauna with the magnitude of impacts differing according to location. In total there would be 68.2 acres of unvegetated habitat impacted during dredging under Component 1C and the vast majority of this acreage, comprises previously dredged substrate (66.9 ac). The USACE believes that benthic infaunal populations in these areas would recolonize after dredging operations are complete. The degree to which the substrate remains viable for benthos may depend on light attenuation relative to additional eight feet of depth. Increased depth may not promote the growth of macroalgae and epipsammic algae.

In comparison, impacts to unvegetated habitats within Component 3B would entail direct removal of 24.4 acres of unvegetated habitat, 19.1 acres of which has been dredged previously.

The largest impact acreages in the Recommended Plan to unvegetated communities occur with Component 5A mainly within the previously dredged channel. Approximately 143.8 acres of the area proposed for dredging under Component 5A includes unvegetated bottom. Of this, 127.1 acres is from previous dredging activities, while an additional impact of 16.73 acres of habitat that has not been dredged previously is also required to complete this part of the project of which 39.3 is from previous dredging activities.

Impacts to benthic infaunal and epifaunal communities would be considered as relatively minimal when examined on a spatial scale. Infaunal communities in particular have very high reproductive potential and recruitment. Adjacent areas that have not been impacted would most likely be the primary source of recruitment to the impacted areas. Previous studies have shown a relatively short recovery time for infaunal communities following dredging (Taylor et. al 1973, Culter and Mahadevan 1982; Saloman et. al 1982). Succession of infaunal communities post dredging should begin within days following construction. This initial settlement usually consists of pelagic larval recruits settling within the impact area. Later recruitment from adjacent non-impacted areas would be more gradual, and involve less opportunistic species. Saloman et al. (1982) stated that communities would be close to pre-dredge conditions within one year and potentially as quickly as 8 to 9 months. Culter and Mahadevan (1982) found similar results and no long-term effects to benthic communities resulting from dredging activities. Based on these previous studies infaunal communities would most likely be re-established within 1 to 2 years post dredging.

3.2.3 South Atlantic Snapper-Grouper Complex

Miami-Dade County, Florida is designated as EFH for 37 species of reef fishes (Table 1) that are listed under the Affected Fishery Management Plans and Fish Stocks of the Comprehensive EFH Amendment (SAFMC 1998). Collectively, these 37 species, representing eight different families,

are all members of the 73 species Snapper-Grouper Complex as outlined by SAFMC (1998). The association of these fishes with coral or hardbottom structure, vegetated and unvegetated inshore areas during some period of their life cycle, and their contribution to a reef fishery ecosystem is why they are included in the snapper-grouper plan. A discussion of how these fishes utilize the different inshore habitats and the hardbottom and reef communities follows.

3.2.3.1 Life History

3.2.3.1.1 Balistidae

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

3.2.3.1.2 Carangidae

Miami-Dade County is designated as EFH for five carangids (Table 1) because they utilize the offshore and possibly inshore areas adjacent to the study area. Spawning of the bar jack, yellow

jack, blue runner, and the crevalle jack takes place in offshore waters associated with a major current system such as the Gulf Stream from February through September (Berry 1959). Consequently, these four species have an offshore larval existence. Data indicates that peak spawning months for blue runners is May through July (Shaw and Drullinger 1990). Although spawning data regarding the greater amberjack doesn't exist, it is assumed that it is similar to the other four species. As young juveniles, crevalle jack migrate into inshore waters at about 20 mm SL whereas blue runners don't migrate into inshore areas until their late juvenile stage (Berry 1959). Young bar jacks have a tendency to remain offshore and yellow jacks occur inshore only occasionally as juveniles (Berry 1959). Based on collections of juveniles regarding these four species, there is some indication that there is a mobile, northward population of developing young in the Gulf Stream that developed from spawning that occurred in more southern waters (Berry 1959).

As juveniles and sub-adults, blue runners occur singly or in schools while juveniles have a high affinity for *Sargassum* and other floating objects in the Gulf Stream off southeast Florida (Goodwin and Finucane 1985). Blue runners are a fast growing, long-lived specie which attains 75 percent of its maximum size in its first 3 to 4 years of life (Goodwin and Johnson 1986). The greater amberjack is a far ranging species that inhabits inlets, shallow reefs, rock outcrops, and wrecks with reef fishes such as snappers, sea bass, grunts, and porgies (Manooch and Potts 1997a). They are generally restricted to the continental shelf to depths as great as 350 m (Manooch and Haimovici 1983). Small individuals (< 1 m SL) are usually found in water < 10 m deep while larger individuals frequent waters 18 - 72 m deep (Manooch and Potts 1997b). Greater amberjack are a fast growing species and are recruited to the headboat fishery in the Gulf by age 4 and fully recruited to the fishery by age 8 (Manooch and Potts 1997a; Manooch and Potts 1997b).

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

3.2.3.1.3 Ephippidae

Miami-Dade County is designated as EFH for the spadefish because as juveniles it inhabits shallow sandy beaches, estuaries, jetties, wharves, and other inshore areas, as well as deeper offshore habitats as adults. Spawning which takes place from May to September involves an offshore migration as far as 64.4 km (Chapman 1978; Thresher 1984). Although no data exists regarding egg and larvae development in nature, small individuals (~ 1-2 cm TL) appear inshore in early summer (Walker 1991). These small juveniles are commonly observed drifting motionless along side vegetation (e.g., *Sargassum*). It has been suggested that they mimic floating debris and vegetation to escape predation. As spadefish mature they move further offshore where large schools would take

residence around wrecks, oil and gas platforms, reefs, and occasionally open water. Spadefish are opportunistic feeders, preying upon a variety of items including small crustaceans, worms, hydroids, sponges, sea cucumbers, salps, anemones, and jellyfish. In certain areas, the spadefish is an important game fish.

3.2.3.1.4 Haemulidae

Miami-Dade County is designated as EFH for eleven species of grunts (Table 1). Collectively, these grunts inhabit shallow inshore areas (e.g., estuaries, mangroves, jetties, piers, seagrass beds), coral reefs, rock outcrops, and offshore waters as deep as 110 m. Although most of the life history data concerning grunts (Cummings et al. 1966; Manooch and Barans 1982; Darcy 1983; McFarland et al. 1985; Sedberry 1985) are from studies of tomtate, white grunt, French grunt, blue stripe grunt, and the margate, the general information can probably be applied to the other species as well. As a reef-dwelling species, grunts are probably similar to other roving benthic predators such as snappers and groupers that migrate to select spawning sites along the outer reef and participate in group spawning at dusk. Some data suggests that spawning takes place over much of the year, while other suggests spawning peaks in later winter and spring (Manooch and Barans 1982; Darcy 1983). The eggs are pelagic as well as the planktonic larvae. After this pelagic larval stage that may last several weeks, they settle to the bottom as benthic predators (Darcy 1983). The juveniles are commonly found in seagrass beds, near mangroves, and other inshore, shallow areas. Studies in the Caribbean regarding French grunt, suggested that fertilization and settlement was associated with the lunar cycle (quarter moon, rather than the full or new moon) and daily tidal cycles (rising and falling tides), respectively (McFarland et al. 1985). Juveniles are diurnal planktivores that tend to feed higher in the water column than adults on amphipods, copepods, decapods, and small fishes (Darcy 1983; Sedberry 1985). The transformation to adult involves a change in feeding strategy from diurnal planktivore to nocturnal benthic foraging. Most grunts take refuge near the reef in schools, but at dusk they disperse and forage over the reef, along sandy flats, and grass beds for crustaceans, fishes, mollusks, polychaetes, and ophiuroids. Because of these nocturnal foraging migrations, grunts are a major source of food for higher tropic level, piscivorous fishes. In addition, they are very important to hardbottom reef-related fisheries regarding the energy transfer from sandy expanses to these reefs (Darcy 1983). Several species of grunt such as the tomtate and white grunt have some commercial and recreational importance. Tomtate are commonly caught by sport fishermen from shore, bridges, jetties, and inshore waters by boat. In the southeastern United States, the hook and line fishery is the most important method of commercial harvest regarding tomtate (Darcy 1983). In addition, tomtate are collected using traps, trawls, and seines off southeast Florida. Commercially, tomtate are usually discarded or cut up and used as bait for the grouper or snapper fishery. Similarly, white grunt are commercially harvested by hook and line along the southeast United States and is also a common sport species.

3.2.3.1.5 Labridae

Miami-Dade County is designated as EFH for two species of wrasse (Table 1). The EFH for both species ranges from shallow reef and patch reefs, areas of hard sand and rock, and/or along areas inshore or offshore of the main reef. The puddingwife appears to be depth restricted as it is rare to find this species in waters deeper than 13.3 m, while the hogfish inhabits areas as shallow as 3.3 m deep (Thresher 1980). Reproduction in wrasses involves a complex reproductive system based on protogynous hermaphroditism which features a complex socio-sexual system involving sex reversal, alternate spawning systems and variable color patterns (Thresher 1980). Both species participate in group (the dominant or terminal male with a harem of females) broadcast spawning that occurs along the outer edge of a patch reef or on an extensive reef complex along the outer shelf during the summer months (Thresher 1984). Hogfish spawn during the late afternoon or early evening hours, while puddingwife spawning is synchronized with strong tidal or shoreline currents. Although the exact duration of both the planktonic egg and larval stage is unknown, some records suggest that the latter may be as short as one month before the larvae settle out. Newly settled hogfish and puddingwifes use common areas around grass flats and the shallow reef, respectively. The smallest juvenile on record collected on reefs is approximately 10 mm SL. Other data suggests that puddingwife as small as 30 mm SL may be sexually active. As a benthic predator, the diet of adult hogfish consists of mollusks, echinoderms, and small crustaceans (primarily crabs). Owing to their large size, hogfish are popular with sport fishers.

3.2.3.1.6 Lutjanidae

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

3.2.3.1.7 Serranidae

Miami-Dade County is designated as EFH for six species of sea bass (Table 1). Collectively, the EFH of these sea bass ranges from shallow estuarine areas (e.g., seagrass beds, jetties, mangrove swamps) to offshore waters as deep as 300 m (Heemstra and Randall 1993; Jory and Iverson 1989; Mercer 1989). Like all other serranids, these six species are protogynous hermaphrodites; functioning initially as females only to undergo a sexual transformation at a later time to become functional males. In addition, like all other serrranids, these six species produce offshore planktonic eggs, moving into shallow, inshore water during their post-larval benthic stage. Juveniles inhabit estuarine, shallow areas such as seagrass beds, bays, harbors, jetties, piers, shell bottom, mangrove swamps, and inshore reefs. Juveniles feed on estuarine dependent prey such as invertebrates, primarily crustaceans, that comprise the majority of their diet at this developmental stage. As sub-adults and adults, they migrate further offshore taking refuge along rocky, hard, or live bottom, on artificial or coral reefs, in crevices, ledges, or caverns associated with rocky reefs. During this stage in their lives, the bulk of their diet consists of fishes, supplemented with crustaceans, crabs, shrimps, and cephalopods. Except for the Goliath grouper, the other species discussed in this section have some importance to commercial and/or recreational fisheries.

3.2.3.1.8 Sparidae

Miami-Dade County is designated as EFH for two species of porgy (Table 1). The EFH regarding both species ranges from shallow inshore waters (e.g., vegetated areas, jetties, piers, hard and rock bottoms), to deeper offshore waters with natural or artificial reefs, offshore gas and oil platforms, or live bottom habitat (Darcy 1986). Although nothing is known regarding the sexuality of the jolthead porgy, it is most likely a hermaphroditic species which is widely documented in sparids (Thresher 1984). On the other hand, the sheepshead has been determined to be a protogynous hermaphrodite through histological investigations (Render and Wilson 1992). Information regarding tropical sparids is limited, but in general, it suggests long spawning seasons. Little is known about spawning behavior, but it is presumed that both the sheepshead and the jolthead porgy produce pelagic eggs some distance off the bottom. Whether or not spawning takes place in pairs or in spawning aggregations has not been documented. Settlement of sheepshead larvae to the bottom occurs at about 25 mm TL (Thresher 1984). Based on their dentition, both species are well suited for benthic feeding of sessile and motile invertebrates (e.g., copepods, amphipods, mysids, shrimp, bivalves, gastropods) which are bitten off from hard substrates and vegetation. Neither sparid is considered a schooling species, although they will form small groups composed of several individuals occasionally. There is no direct commercial or sport fishery associated with either sparid; however, both are fished in coastal waters. Both species are an important constituent of grassbed communities in shallow water and live bottom communities in deeper water (Darcy 1986).

3.2.3.2 Summary of the Impacts to the Snapper-Grouper Complex Fishes

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

3.2.4 Coastal Migratory Pelagics Complex

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

3.2.4.1 Life History

3.2.4.1.1 Coryphaenidae

The dolphin is oceanic and distributed worldwide in both tropical and subtropical waters. Data suggest that this species may be involved in northward migrations during the spring and summer with some occasional movements and migrations being controlled by drifting objects in open waters. Spawning which is poorly documented, it thought to take place in oceanic waters where pairing of the sexes occurs (Ditty et al. 1994). Based on the occurrence of young dolphin in the Florida Current, spawning may be almost year round (November - July) with peak activity in January through March (Palko et al. 1982). Owing to the oceanic distribution of this species, its not surprising that both the egg and larval stages are pelagic. Upon hatching, this species experiences rapid growth throughout its life with both sexes reaching sexually maturity within the first year (Palko et al. 1982). In the Straits of Florida, female dolphin begin to mature at 350 mm FL and become fully mature at 550 mm FL. On the other hand, the smallest, mature male on record is 427 mm FL. The maximum life span of dolphin is estimated at 4 years. The diet of dolphin alters throughout its life cycle (Palko et al. 1982). As larvae, they feed primarily on crustaceans, with copepods as the primary prey item. Adult dolphin are opportunistic, top-level predators. They feed upon a variety of

fishes (e.g., flyingfish) and crustaceans, especially those species commonly associated with drifting flotsam and *Sargassum* in the Florida Current. As a prized food, dolphin are sought by both commercial and sport fishers. They are most commonly taken using hook and line around the edges of the continental shelf. In southern Florida, based on recreational catches, they appear most frequently March through August and then again September through February (Palko et al. 1982).

3.2.4.1.2 Rachycentridae

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

3.2.4.1.3 Scombridae

Miami-Dade County is designated as EFH for six scombrid species (Table 1). Collectively, the EFH of these epipelagic scombrids ranges from clear waters around coral reefs, and inshore and continental shelf waters (Collette and Nauen 1983). Spawning of king and Spanish mackerel takes place May through September with peaks in July and August. The cero is thought to spawn year

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

3.2.5 Summary of Impacts to the Coastal Migratory Pelagics Complex Fishes

The project area includes sand bottom, sand-veneered hardbottom, hardbottom, and water column that may be used by these managed fishes and their prey. Some possible refuge and related prey may be lost in regards to the impact to the hardbottom and sand areas; however, additional refuge would be created by the construction of an acre artificial reef to serve as replacement habitat. The project would cause localized turbidity during construction; however, turbidity would be minimized using the best management practices so that any impacts would be minor and temporary. These fishes and possible prey would be temporarily displaced, but should quickly return to the project area.

3.3 Associated Species

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

3.3.1 Invertebrates

Dredging and blasting associated with widening and deepening would result in direct adverse effects on invertebrate species in the area. Initially this would result in a significant, but localized reduction in the abundance, diversity, and biomass of the immediate fauna. Species affected most are those

that have limited capabilities or are incapable in avoiding the dredging activities due to a sedentary lifestyle. The fauna most affected would include predominantly invertebrates such as crustaceans, echinoderms, mollusks, and annelids. However, due to the relatively small area that would be impacted as viewed on a spatial scale, impacts to the benthic community would be minimal due to the relatively short period of recovery following dredging activities (Culter and Mahadevan 1982; Saloman et al. 1982). Adjacent areas not impacted would most likely be the primary source of recruitment to the impacted area.

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

3.3.2 Fishes

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

Larval feeding efficiency depends on many factors such as light intensity, temperature, prey evasiveness, food density, larva experience, and olfaction (Gerking 1994). Larval fishes are visual feeders that depend on adequate light levels in the water column which reduces the reaction distance between larval fish and prey. Suspended sediment and dispersion due to dredging activities would increase turbidity levels in the project area temporarily. This would reduce light levels within the water column, which may have a short-term negative effect on feeding efficiency. In addition, turbidity can affect light scattering, which would impede fish predation (Benfield and Minello 1996). However, because the sediment plumes are transient and temporary, and the area to be impacted is relatively small when examined on a spatial scale, the overall impact to the larval fish population and consequently, the adult population should be minimal (Sale 1991). The majority of larval fish mortality would be attributed to the physical trauma associated with the dredging activities.

Similar to larval fishes, both juvenile and adult fishes are primarily visual feeders. Consequently, the visual effects of turbidity as outlined above will apply. Also, suspended sediment can impair feeding ability by clogging the interraker space of the gill raker or the mucous layer of filter feeding species

(Gerking 1994). However, because these fishes have the ability to migrate away from the dredging activities, the impact of the sediment plumes that are transient and temporary should be minimal. Although few adult fishes have been entrained by dredging operations (McGraw and Armstrong 1988; Reine and Clark 1998), most juvenile and adult fishes again have the ability to migrate away from the dredging activities. Consequently, dredging operations would have minimal effects on juvenile and adult fishes in the area. In addition, the reduction of benthic epifaunal and infaunal prey, and pelagic prey in the immediate area would have little affect on juvenile and adult fishes because they can migrate to adjacent areas that have not been impacted to feed.

In addition to the managed fish species discussed in this document, many other inshore and pelagic fishes in various stages of life occur in the project area (Gilmore 1977; Vare 1991; Lindeman and Snyder 1999). A total of 192 species have been recorded in association with nearshore hardbottom habitats in southeast Florida (Lindeman and Snyder 1999). In the study conducted by Lindeman and Snyder (1999), 80 percent of the fishes collected at all sites were early life stages. In addition, eight of the top ten fish species were consistently represented by early life stages, and the use of hardbottom habitats was recorded for newly settled stages of more than 20 species of fishes. This provided evidence that suggested that these nearshore hardbottom habitats along the mainland coast of east Florida may serve as nursery grounds for a wide diversity of juvenile reef fishes. Lindeman and Snyder (1999) estimated that 34 species of fishes used nearshore hardbottom habitats as a nursery. These nearshore hardbottom habitats may actually serve several nursery-related roles such as, 1) a centrally located refuge for incoming early life stages that would exhibit considerably greater mortality if shelter were not available, 2) habitat for juvenile fishes (e.g., gray snapper, blue stripe grunt) that emigrate out of inlets to offshore waters, and 3) an area to promote growth because of the greater availability of prey at these hardbottom habitats.

3.3.3 Summary of Impacts to Associated Species

Many of the fishes associated with nearshore hardbottom habitats as observed in past studies (Gilmore 1977; Vare 1991; Lindeman and Snyder 1999), would be common along Miami-Miami-Dade County. The majority of juvenile and adult fishes would be displaced to adjacent habitat during dredging operations; consequently, mortality of these fishes should be minimal. Only those species that produce demersal eggs and that comprise the demersal ichthyofauna could potentially be impacted more heavily than their pelagic counterparts. Mortality of demersal eggs and larvae would be expected from the physical trauma associated with dredging operations. Suspended sediments produced by these operations can affect the feeding activity of pelagics as outlined earlier; however, the impact to these fishes should be minimal due to the limited extent and transient nature of the sediment plume.

4.0 CONCLUSIONS

The proposed project would impact seagrass, hardbottom/reef, algae, and water column. Construction of a mitigation reef and restoration of seagrass habitat may create high quality nearshore hardbottom and seagrass habitat similar to what is currently available within the study area. Significant adverse impacts to those species associated with EFH within the project area are not expected.

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APPENDIX G
Side Slope Determination Methodology

APPENDIX G
Side Slope Determination Methodology

CESAJ-EN-DL January 23, 2004

MEMORANDUM FOR RECORD

SUBJECT: Miami Harbor Deepening and Widening Project

1. Reference. Reference comments received in response to the Draft Environmental Impact Statement in regards to the calculation of side slope impacts for the purposes of estimating natural resource impacts associated with the proposed project.

2. The Concern. Federal, state and local environmental agencies, as well as the Miami-Dade County Seaport Department (Port of Miami) requested that the USACE review the side slope impact calculation methodology used in the Draft EIS, as summarized in the USACE Memorandum for Record dated July 9, 2002 (see attachment). This Memorandum for Record, dated January 23, 2004, presents the results of the discussions and coordination that has been on going subsequent to the previous memorandum.

3. Approach. The methods and reasoning used for side slope impact calculations for channel widening have been reviewed and final side slope configurations have been estimated for two types of channel conditions: **1**. Where unconsolidated overburden vegetated with seagrass communities exists over rock, such as along Fisherman's Channel (Components 2A, 3B, and 5A); and **2**. Where rock is at the surface and supports sponge and reef communities, or there is a fine layer of sand over rock, such as along Government Cut (Component 1C). The methodologies for calculating side slopes are provided in the subsequent paragraphs.

Deepening of existing channels will occur below the naturally occurring rock-unconsolidated sediment interface. It is not expected that additional impact to surface areas will result in areas where deepening is confined to the existing channel. Therefore, deepening in those areas are not addressed in this memo. This analysis addresses potential impacts to surface communities in areas where the channel is widened.

4. Methodology for Side Slope Calculation for Widening in Unconsolidated Material. Data used in the analysis were the bathometric survey of the existing channel and side slopes and also core borings drilled in 1989 and 1990. An analysis of Miami Harbor representative cross-sections of the Phase I sections adjacent to the Phase II project, and analysis of the Phase II project was completed. The slopes within the Phase II portion of the project varied from approximately vertical to roughly 1 vertical on 3 horizontal (1V:3H). This appears to be due to excavation outside of the channel at various elevations and not to sloughing of the embankment. Where apparent due care was taken to excavate within the channel limits (as at the eastern end of Fisherman's Channel near Fisher Island) the side slopes are much steeper. While no vertical slopes were observed, slopes as steep as 1V:0.33H were noted. The USACE has selected 1V:0.5H as representative of the final side slope (*equilibration*) in the consolidated rock materials.

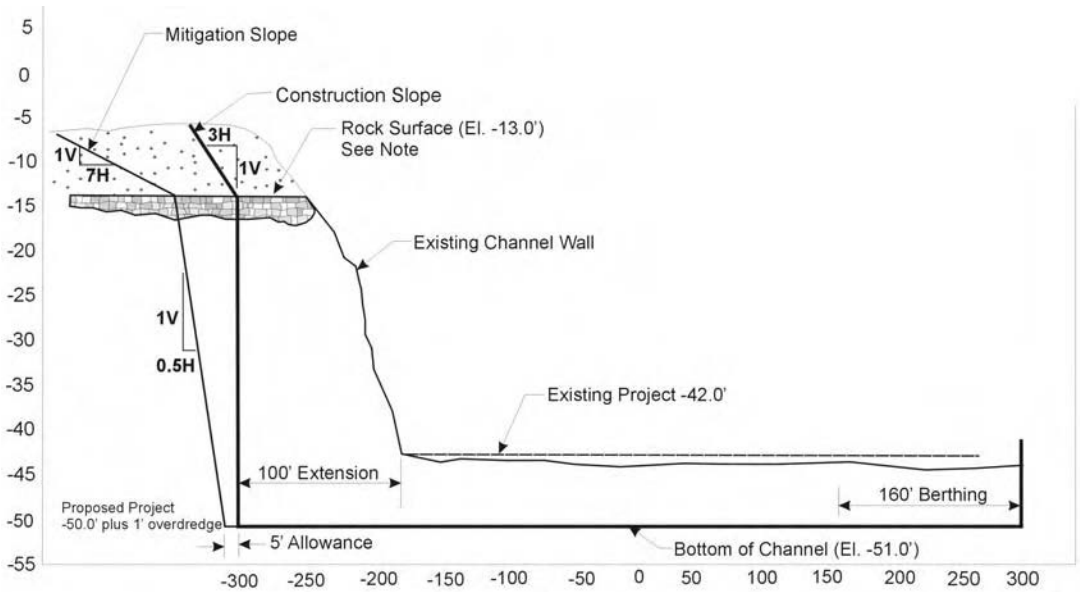
During Phase III construction, the contractor will be required to implement adequate quality control measures to minimize excavation beyond the channel limits. This will insure a more vertical side slope and thereby minimize sea grass impacts.

Unconsolidated materials continue to be estimated to be 1V:7H as discussed in the July 9, 2002 memorandum. While the break where the slope flattens is fairly consistent at -4 to -8 feet MLLW along the southern edge of the Lummus Island Turning Basin, some cross-sections showed this break between -12 and -14 feet MLLW. The USACE has selected -13.0 feet MLLW as the break between consolidated and unconsolidated material and as the basis for calculation for indirect slope impacts.

The geotechnical properties of the excavated slope and the resulting slope stabilization are not controlled by the dredging process. However, since the slope results from the removal of material at the base in a box cut, the contractor can control the dredging limits at the channel toe (base of the slope). In order to provide for conditions in the field and inaccuracies in the dredging process, a five-foot allowance has been added at the base of the slope and the slope calculations begin 5 feet from the channel limit (toe). In addition, the overall calculations are based on an assumed bottom elevation that includes the allowable one-foot overdepth. A representative cross-section for widening in unconsolidated material is shown in Figure 1.

5. Methodology for Side Slope Calculation for Widening in Consolidated Material.
The USACE has determined that channel widening in areas where the surface is consolidated (i.e. rock) will result in a 1V:0.5H side slope with the five-foot allowance as discussed in paragraph 4 above. Channel widening in areas where there is a layer of sand over rock will result in an approximate 1V:3H slope in the sand, as shown in Figure 2.

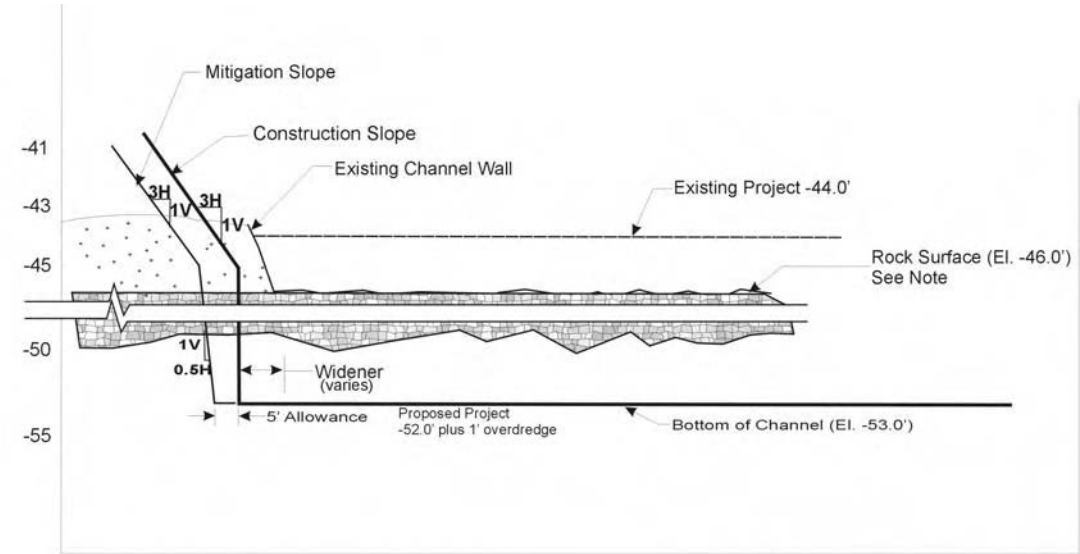
Robert E. Henderson, P.E.
Civil Engineer, Design Branch



Note: Approximate rock elevations estimated from core borings located in the vicinity of the typical sections. The approximate average top elevation along Fisherman's Channel is estimated at El. -13.0'

Legend
- Rock Layer
- Unconsolidated fines and sand

Figure 1
Typical Section
Methodology for Sideslope Calculation for Widening in Unconsolidated Material



Note: Approximate rock elevations estimated from core borings located in the vicinity of the typical sections. The approximate average top elevation along Government Cut is estimated at El. -46.0'

Legend
- Rock Layer
- Sand

Figure 2
Typical Section
Methodology for Sideslope Calculation for Widening in Unconsolidated Material

CESAJ-EN-GS July 9, 2002

MEMORANDUM FOR Record,

SUBJECT: Miami Harbor Deepening and Widening Project

1. Reference. Reference the team meeting with representatives from the Jacksonville District COE and representatives of the Miami Port Authority this morning, same subject.

2. The Port Authority's Concern. The Port Authority expressed concern for estimating, as accurately as possible, the after dredge slope of Fisherman's channel between the Lummus Island Turning Basin and Fisher Island. This concern was born of need for environmental stewardship so that the proper amount of mitigation for sea grasses impacted by the cut could be planned.

With this in mind the Port Authority requested, at the referenced meeting, that Geotechnical Branch provide documentation of the methods and reasoning used for arriving at the after dredge slopes that it provided in December 2001. In addition, it was requested that Design Branch provide a typical cross section of the subject channel indicating the elevation of rock and the anticipated slope configuration of both the rock and the sediments above the rock.

3. Geologic Lithology of Fisherman's Channel and Its Banks. Generally, the geologic lithology of the area of the channel consists of two layers. The lower layer consists of limestone and consolidated sediments of sands and silty sands. The upper layer consists primarily of very soft, low shear strength silts and clays and has a typical thickness of about 12 feet. The thickness of this layer appears to be generally uniform. If this layer was not encountered at this thickness in some locations it was because the portion of the layer was apparently dredged or scoured away. In some locations, a deposit of very loose clayey sand was encountered in the upper two feet.

The core borings encountered rock between the elevations of –11.2 and –16.0 feet NGVD with the exception of core boring CB-MH89-58 at the west end of the channel, which encountered rock at elevation –27.7 feet. However,

this core boring also encountered material with appreciable shear strength over the rock beginning at elevation –17.7 feet.

Aside from the exception of core boring CB-MH89-58, the core borings encountered mainly clays and silts of very low shear strength from the mud line at elevations ranging form –2.8 to –13.0 feet to at or near the top of rock. This low shear strength was indicated on the boring logs by notes that the split spoon sampler settled under its own weight through these materials whereas a 140lb hammer normally drives the sampler.

4. <u>After Dredge Slopes</u>. The dredging will be performed as a box cut. 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 anticipate 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. The materials from this long-term sloughing will settle in the bottom of the channel adjacent to the vertical rock cut making the rock cut appear to be non-vertical in future surveys.

5. <u>Method and Rational Used in Estimating After-Dredge Channel Slopes</u>. Data used in the analysis were the bathometric survey of the existing channel and side slopes and also core borings drilled in 1989 and 1990.

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 the 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 currents and wave action.

A theoretical analysis could be performed. However, for such an analysis to provide a realistic estimate of the actual after-dredge conditions accurate measurements of the material shear strength would need to be made for use in the model. Shear strength measurements are either made by direct means (i.e. an In-Situ test or a laboratory test on an undisturbed sample) or indirectly such as using blow counts from a Standard Penetration Test (SPT) with empirical correlations. However, since this material is so

soft that SPT drill rods will settle through it, field In-Situ measurements are very difficult to make. While it may be possible to make In-Situ measurements or to retrieve an undisturbed sample for laboratory testing in such soft materials, it is typically very difficult. However, it may not be necessary in this case as the after-dredge slopes of the proposed channel will likely be very close to the existing slopes in the subject channel. The rational for this anticipated result is as follows.

The proposed cut will both widen and deepen the existing channel. While some of the soft unconsolidated materials will be dredged in the widening process, deepening will be accomplished by cutting into the underlying rock. Therefore, the vertical distance from the toe of the soft unconsolidated materials to the top of the dredged slope will remain the same. Also, because of the proximity of the new channel slope to the existing, the shear strength and unit weight parameters of the soft sediments of the new slope can be anticipated to be very similar to those of the existing slope. For these principal reasons, it can rationally be anticipated that the existing slope is a suitable approximation of the long-term slope of the proposed channel.

H. Kenneth Hardee, P.E.
Geotechnical Engineer,
Geotechnical Branch

APPENDIX H

Endangered Species Act Coordination Documents

APPENDIX H

Endangered Species Act Coordination Documents

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:

The U.S. Army Corps of Engineers (Corps), Jacksonville District proposes to conduct a feasibility study to assess Federal interest in navigation improvements throughout the Port of Miami, Miami-Dade County, Florida. An evaluation of benefits, costs, and environmental impacts determines Federal interest.

The recommended plan 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 existing depth of 42 feet to 50 feet; (3) extending 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 (without dredging); and (5) increasing the width of Lummus Island Cut (Fisherman's Channel) about 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. Additional activities will include mitigation for unavoidable environmental impacts.

Enclosed please find the Corps’ Biological Assessment (BA) of the effects of the project as currently proposed on listed species in the action area. After preparing this BA of the impacts of the proposed project, the Corps has determined that the proposed project may affect, but is not likely to adversely affect the endangered American crocodile (*Crocodylus acutus*) and the endangered Florida manatee (*Trichecus manatus*) and is not likely to adversely designated critical habitat for either species. We request that you concur with this finding.

If you have any questions, please contact Ms. Terri Jordan at 904-899-5195 or terri.l.jordan@saj02.usace.army.mil.

Sincerely,

James C. Duck
Chief, Planning Division

Enclosure

Jordan/CESAJ-PD-EA/3453/
McAdams/CESAJ-PD-EA
Dugger/CESAJ-PD-E
Schwictenberg/CESAJ-DP-C
Strain/CESAJ-PD-P
Duck/CESAJ-PD

L: group\pde\Jordan\Miami GRR\DEIS\ Miami Section 7 Consultation - FWS Cover letter.doc

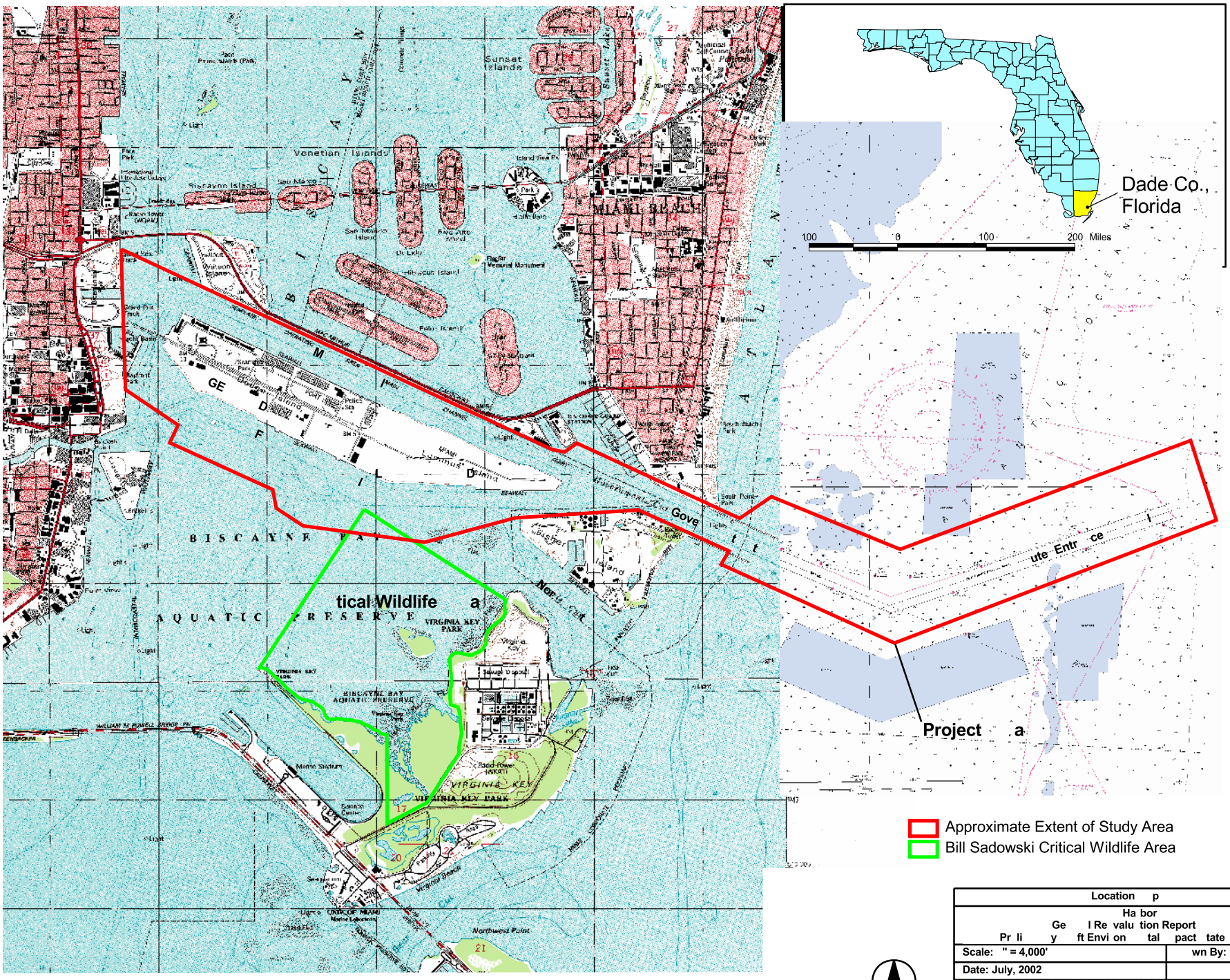
BIOLOGICAL ASSESSMENT TO THE U.S. FISH AND WILDLIFE SERVICE FOR MIAMI HARBOR NAVIGATION PROJECT GENERAL REEVALUATION REPORT

Description of the Proposed Action –

The Port of Miami requested that the U.S. Army Corps of Engineers study the feasibility of widening and deepening most of the major channels and basins within Miami Harbor. A number of alternatives were originally considered, but during efforts to reduce impacts to the environment, many were eliminated from further analysis. Three alternatives were thoroughly analyzed (two action alternatives and the "no action" alternative) in the Environmental Impact Statement. 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 existing depth of 42 feet to 50 feet; (3) extending 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 (without dredging); and (5) increasing the width of Lummus Island Cut (Fisherman's Channel) about 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. The action alternative not selected included these five components and a sixth, involving the deepening of Dodge Island Cut and creation of another turning basin. 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. 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.

Action Area

The Port of Miami (Miami-Dade County, Florida) is one of the major port complexes along the east coast of the U.S. The Port utilizes Miami Harbor, which lies in the north side of Biscayne Bay (Figure 1), a shallow, expansive, subtropical lagoon (thirty-eight miles long, and three to nine miles wide) that extends from the City of North Miami south to the northern end of Key Largo. Average depth is six to ten feet (USACE, 1989). The Bay is bordered on the west by the mainland of peninsular Florida and



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on the east by both the Atlantic Ocean and a series of barrier islands consisting of sand and carbonate deposits over limestone bedrock (Hoffmeister, 1974). Except for Virginia Key, the islands within and adjacent to the project area (Dodge-Lummus, Fisher, Star, Palm, and Claughton Islands, Watson Park, and the barrier island comprising Miami Beach) are completely developed. A mixture of low, medium and high-density residential areas; commercial enterprises; industrial complexes; office parks; and recreational areas characterizes land surrounding the Port of Miami waters. 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 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. 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 beaches and mangroves. Adjacent to the harbor is the Biscayne Bay Aquatic Preserve, a *No Entry* zone for protection of manatees, and a Critical Wildlife Area associated with Virginia Key.

Protected Species Included in this Assessment

Of the listed and protected species under U.S. Fish and Wildlife Service (FWS) jurisdiction occurring in the action area, the Corps believes that the Florida manatee (*Trichecus manatus*) and the American crocodile (*Crocodylus acutus*) may be affected by the implementation of the navigation project and are the subject of this document. Protected/listed species that are known to occur in the area and that are under the jurisdiction of the National Marine Fisheries Service (NMFS) include the green turtle (*Chelonia mydas*), loggerhead turtle (*Caretta caretta*), Kemp's ridley turtle (*Lepidochelys kempii*), Hawksbill turtle (*Eretmochelys imbricata*), and smalltooth sawfish (*Pristis pectinata*). The Corps has initiated consultation with the NMFS concerning the effects of the proposed action on these species.

The American crocodile was listed as an endangered species under the Endangered Species Act in 1975 (40 FR 44151) and critical habitat was established for this species in 1979 (44 FR 75076). Populations are at risk due to habitat loss, direct human disturbance, alteration of habitats (including hydrology) by humans, poaching, and incidental takes during net fishing (USFWS, 1992). The American alligator (*Alligator mississippiensis*) is listed under ESA as *threatened by similarity of appearance* in order to better protect American crocodiles. The number of nests observed in surveys has doubled over the last twenty-five years (P. Moler, *in* Richey, 2002). However, population estimates of adults and total individuals range widely, precluding a robust determination of the status of the species within the United States. If current studies determine that natural dispersal, rather than releases by humans, is the cause of recent observations of crocodiles north of Miami-Dade County, the FWS may recommend downlisting the species to "threatened" (Richey, 2002).

The Federal government has recognized the threats to the continued existence of the Florida manatee, a subspecies of the West Indian manatee, for more than 30 years. The West Indian manatee was first listed as an endangered species in 1967 under the Endangered Species Preservation Act of 1966 (16 U.S.C. 668aa(c)) (32 FR 48:4001). The Endangered Species Conservation Act of 1969 (16 U.S.C. 668aa(c)) continued to recognize the West Indian manatee as an endangered species (35 FR 16047), and the West Indian manatee was also among the original species listed as endangered pursuant to the Endangered Species Act of 1973. Critical habitat was designated for the manatee in 1976, and includes the project area (50 CFR 17.95). The justification for listing as endangered included impacts to the population from harvesting for flesh, oil, and skins as well as for sport, loss of coastal feeding grounds from siltation, and the volume of injuries and deaths resulting from collisions with the keels and propellers of powerboats. Manatees are also protected under the provisions of the Marine Mammal Protection Act of 1972, as amended (16 U.S.C. 1361 *et seq*.) and have been protected by Florida law since 1892. 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.

Species and Suitable Habitat Descriptions

American Crocodile *(Crocodylus acutus)*

There are twenty-three species of crocodilians, including eight alligatorid species (alligators and caimans), fourteen crocodylid species, and one gavialid species. Crocodilians occupy portions of all continents with appropriate habitats in the tropics, subtropics, and (for two species) temperate climatic zones. Fifteen species and two subspecies of crocodilians are protected under the Convention on International Trade in Endangered Species (CITES Appendix I).

The historic range of American crocodiles includes the U.S., Mexico, all Central American countries, many Caribbean islands, Venezuela, Colombia, Ecuador, and Peru. In the U.S., they have been observed in Florida Bay and north along coastal areas to Sanibel Island on the west coast of Florida, and north along coastal areas on the east coast to Key Biscayne.

Project Area Distribution

Recent observations 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, pers com) and Palm Beach, Florida, and as far north as Jupiter, Florida (Richey, 2002 and FWS, 1999).

Habitats and Habits

The American crocodile is found primarily in mangrove swamps and along low-energy mangrove-lined bays, creeks, and inland swamps (Kushlan and Mazzotti 1989). In Florida, patterns of crocodile habitat use shift seasonally. During the breeding and nesting seasons, adults outside of Key Largo and Turkey Point use the exposed shoreline of Florida Bay. Males tend to stay more inland than the females at this time (FWS, 1999). During the non-nesting season, they are found primarily in the fresh and brackish-water inland swamps, creeks, and bays, retreating further into the backcountry in fall and winter

(Kushlan and Mazzotti 1989). In a study by Kushlan and Mazzotti (1989) along northeastern Florida Bay, crocodiles were found in inland ponds and creeks (50 percent of observations), protected coves (25 percent of observations), exposed shorelines (6 percent of observations) and a small number were observed on mud flats. The high use of inland waters suggests crocodiles prefer less saline waters, using sheltered areas such as undercut banks and mangrove snags and roots that are protected from wind and wave action. Access to deep water (>1.0 m) is also an important component of preferred habitats (Mazzoti 1983).

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 American crocodile is typically active from shortly before sunset to shortly after sunrise (Mazzotti 1983). During these times, crocodiles forage opportunistically; eating whatever animals they can catch. Juveniles typically eat fish, crabs, snakes, and other small invertebrates, whereas adults are known to eat fish, crabs, snakes, turtles, birds, and small mammals (FWS, 1999). American crocodiles probably feed only rarely during periods of low ambient air temperatures, since metabolic and digestive systems are slowed at lower body temperatures.

Females reach sexual maturity at about 2.25 m (Mazzotti 1983), a size reached at an age of about 10 to 13 years. It is not known at what age and size females mature. Similarly, the maximum reproductive age for either sex is not known, although it is known that captively reared crocodilians eventually fail to reproduce. As with most crocodilians, courtship and mating are stimulated by increasing ambient water and air temperatures. Reproductive behaviors peak when body temperatures reach levels necessary to sustain hormonal activity. In South Florida, temperatures sufficient to allow initiation of courtship behavior are reached by late February through March. Like all other crocodilians, the mating system of the American crocodile is polygynous; breeding males may mate with a number of females. Following courtship and mating, females search for and eventually select a nest site in which they deposit an average of about 38 elongated oval eggs. Reported clutch size ranges from 8 to 56 eggs (Kushlan and Mazzotti 1989). Although American crocodile nesting is generally considered a non-social event, communal nesting is the norm in parts of the Caribbean, southeast Cuba, and Haiti. In the U.S., several incidents of 2-clutch nests have been reported (Kushlan and Mazzotti 1989). Nest sites are typically selected where a sandy substrate exists above the normal high water level. Nesting sites include areas of well drained sands, marl, peat, and rocky spoil and may include areas such as sand/shell beaches, stream banks, and canal spoil banks that are adjacent to relatively deep water (Kushlan and Mazzotti 1989). In some instances, where sand or riverbanks are not available for nesting sites, a hole will be

dug in a pile of vegetation or marl the female has gathered. The use of mounds or holes for nesting is independent of the substrate type and may vary among years by the same female (Kushlan and Mazzotti 1989). Hatching occurs after approximately 90 days (Britton, 2002). Some parental care has been observed, and it may be critical that parents and hatchlings are left undisturbed by humans as young are emerging from nests with the assistance of adults (FWS, 1992). A complete review of crocodile biology is included in the South Florida Multi-species Recovery Plan (FWS, 1999) and will not be repeated here.

Population Trends

American crocodiles have been reported in South Florida since the arrival of the first non-native settlers. However, many records are anecdotal and many of the observations may have been confused with sympatric alligators. In addition, habitats preferred by crocodiles were remote and inaccessible by early settlers, thereby precluding reliable observations. Early 20th century population estimates of up to 2,000 crocodiles have been published (FWS, 1999), yet this is believed to be an underestimate since hunting and habitat destruction had already occurred by this time. In the late 19th and early 20th centuries many crocodiles were hunted and collected for museums and zoos. The species was also legally hunted in Florida until 1962. By the mid 1970's it is estimated that the population had been reduced to between 100 and 400 animals (Ogden, 1978a *in* FWS, 1999).

Combined, many natural and anthropogenic factors have resulted in adverse effects to the American crocodile. Compared to the historical estimates of 1,000 to 2,000 animals (Ogden, 1978a *in* FWS, 1999), populations have declined, and shifts in the nesting distribution have likely occurred. The lowest estimated population levels apparently occurred sometime during the 1960s or 70s, when Ogden estimated the Florida population of the American crocodile to be between 100 and 400 non-hatchlings.

The American crocodile population in South Florida has increased substantially over the last 20 years. P. Moler (cited in FWS, 1999) believes between 500 and 1,000 individuals (including hatchlings) persist there currently. The recent increase is best represented by changes in nesting effort. Survey data gathered with consistent effort indicate that nesting has increased from about 20 nests in the late 1970s to about 50 nests in 1997. Since female crocodiles produce only one clutch per year, it follows that the population of reproductively active females has more than doubled in the last 20 years. In addition, since at least a portion of the population's sex ratio approaches 1:1, it is likely that the male portion of the population has also increased substantially.

Florida Manatee *(Trichecus manatus)*

All manatees belong to the order Sirenia. The living sirenians consist of one species of dugong and three species of manatee. A fifth species, the Steller's sea cow, was hunted to extinction by 1768. All living sirenians are found in warm tropical and subtropical waters. The West Indian manatee was once abundant throughout the tropical and subtropical western North and South Atlantic and Caribbean waters. The Florida manatee occurs throughout the southeastern United States. However, the only year-round populations of manatees occur throughout the coastal and inland waterways of peninsular

Florida and Georgia (Hartman, 1974). During the summer months, manatees may range as far north along the East Coast of the U.S. as Rhode Island, west to Texas, and, rarely, east to the Bahamas (FWS 1996, Lefebvre et al. 1989). There are reports of occasional manatee sightings from Louisiana, southeastern Texas, and the Rio Grande River mouth (Gunter 1941, Lowery 1974).

Distribution

In Florida, manatees are commonly found from the Georgia/Florida border south through Biscayne Bay on the Atlantic coast, and from the Wakulla River south to Cape Sable on the Gulf coast (Hartman 1974, Powell and Rathbun 1984). Manatees are also found in Lake Okeechobee, throughout waterways in the Everglades, and in the Florida Keys. Low numbers of manatees in the Florida Keys has been attributed to the scarcity of fresh water (Beeler and O'Shea 1988).

In warmer months (April to November), the distribution of manatees along the east coast of Florida tends to be greater around the St. Johns River, the Banana and Indian rivers to Jupiter Inlet, and Biscayne Bay. In the winter, higher numbers of manatees are seen on the east coast at the natural warm waters of Blue Spring and near man-made warm water sources on or near the Indian River Lagoon, at Titusville, Vero Beach, Ft. Pierce, Riviera Beach, Port Everglades, Ft. Lauderdale, and throughout Biscayne Bay and nearby rivers and canals (FWS 1996). On the west coast of Florida, larger numbers of manatees are found at the Suwannee, Crystal and Homosassa rivers, Tampa Bay, Charlotte Harbor/Matlacha Pass/San Carlos Bay area, the Caloosahatchee River and Estero Bay area, the Ten Thousand Islands, and the inland waterways of the Everglades. On the west coast, manatee's winter at Crystal River, Homosassa Springs, and other warm mineral springs (Powell and Rathbun 1984, Rathbun *et al.*1990). They also aggregate near industrial warm water outflows in Tampa Bay, the warmer waters of the Caloosahatchee and Orange rivers (from the Ft. Myers power plant), and in inland waters of the Everglades and Ten Thousand Islands. The patchy distribution of manatees throughout all their ranges is due to the distribution of suitable habitat: plentiful aquatic plants and a freshwater source.

Habits

Florida manatees are herbivores that feed opportunistically on a wide variety of submerged, floating and emergent vegetation. Shallow grass beds with ready access to deep channels are the preferred feeding areas in coastal and riverine habitats. Bengtson (1983) estimated that the annual mean consumption rate for manatees feeding in the upper St. John's River at 4% to 9% of their body weight per day depending on season. A complete review of manatee biology is included in the manatee section of the South Florida Multi-species Recovery Plan (FWS, 1999).

Preferred Habitats

Manatees occur in fresh, brackish, and salt water and move freely between environments of salinity extremes. They inhabit rivers, bays, canals, estuaries, and coastal areas that provide seagrasses and macroalgae. Freshwater sources, either natural or human-influenced/created, are especially important for manatees that spend time in estuarine and brackish waters (FWS 1996). Because they prefer water above 70 °F (21 °C), they depend on areas with access to natural springs or water effluents warmed by human activities, particularly in areas outside their native range.

Manatees often seek out quiet areas in canals, lagoons or rivers. These areas provide habitat not only for feeding, but also for resting, cavorting, mating, and calving. Manatees may be found in any waterway over 3.3 ft. (1 m) deep and connected to the coast. Deeper inshore channels and nearshore zones are often used as migratory routes (Kinnaird 1983). Although there are reports of manatees in locations as far offshore as the Dry Tortugas Islands, approximately 50 mi. (81 km) west of Key West, Florida, manatees rarely venture into deep ocean waters.

Migration Patterns

The overall geographic distribution of manatees within Florida has changed since the 1950s and 60s (Lefebvre et al 1989), and prominent shifts in seasonal distribution are also evident. Specifically, the introduction of power plants and paper mills in Texas, Louisiana, southern Georgia, and northern Florida has given manatees the opportunity to expand their winter range to areas not previously frequented (Hartman 1979). Florida manatees move into warmer waters when the water temperature drops below about 68 °F (20 °C). Before warm effluents from power plants became available in the early 1950s, the winter range of the manatee in Florida was most likely limited on its northern bounds by the Sebastian River on the east coast and Charlotte Harbor on the west coast (Moore 1951). Since that time, manatees altered their normal migration patterns, and appreciable numbers of manatees began aggregating at new sites. As new power plants became operational, more and more manatees began taking advantage of the sites even though it required traveling great distances. Among the most important of the warm-water discharges are the Florida Power and Light Company's power plants at Cape Canaveral, Fort Lauderdale, Port Everglades, Riviera Beach, and Fort Myers, and the Tampa Electric Company's Apollo Beach power plant in Tampa Bay. During cold weather, more than 200 manatees have been reported at some power plants. These anthropogenically heated aquatic habitats have allowed manatees to remain north of their historic wintering grounds. Although seemingly conducive for survival, warm-water industrial discharges alone cannot furnish suitable habitats for manatees, as they may not be associated with forage that is typically found near natural warm-water refugia of natural springs.

Population Trends

Determining exact population estimates or trends is difficult for this species. The best indicator of population trends is derived from mortality data and aerial surveys (Ackerman et al. 1992, Ackerman et al. 1995, Lefebvre et al. 1995). Increases in the number of recovered dead manatees have been interpreted as evidence of increasing mortality rates (Ackerman et al. 1992, Ackerman et al. 1995). Because manatees have low reproductive rates, these increases in mortality may lead to a decline in the population (O'Shea et al. 1988, 1992). Aerial surveys, which represent the minimum number of manatees in Florida waters (not the total population size), have been conducted for more than 20 years, and may indicate population growth. However, because survey methods were inconsistent, conclusions are tentative. O'Shea (1988) found no firm evidence of a decrease or increase between the 1970s and 1980s, even though aerial survey counts increased. Over the last decade, aerial counts have varied from 1,267 (in 1991) to 3,276 (in 2001) (FMRI 2002). The mean number observed during all counts (January, February, and/or March of all years since 1991) is 2,027 (std dev = 512).

Mortality

Human activities have likely affected manatees by eliminating or modifying suitable habitat; causing alteration of, or limiting access to historic migratory routes; and killing or injuring individuals through incidental or negligent activities. To understand manatee mortality trends in Florida, Ackerman et al. (1995) evaluated the number of recovered carcasses between 1974 and 1992 and categorized the causes of death. The number of manatees killed in collisions with watercraft increased each year by 9.3%. The number of manatees killed in collisions with watercraft each year correlated with the total number of pleasure and commercial watercraft registered in Florida (Ackerman et al. 1995). Other deaths or injuries were incurred due to flood-control structures and navigational locks, entanglement in fishing line, entrapment in culverts, and poaching, which together accounted for 162 known mortalities between 1974 and 1993 (FMRI 2002a).

Table 2 Manatee deaths in Florida (statewide) from 1974 through 2001 (source: FMRI)

Year	Watercraft	Flood Gate/ Canal Lock	Other Human	Perinatal	Cold Stress	Natural	Undetermined	Unrecovered	Total
1974	3	0	2	0	0	0	2	0	7
1975	6	1	1	7	0	1	10	3	29
1976	10	4	0	14	0	2	22	10	62
1977	13	6	5	9	0	1	64	16	114
1978	21	9	1	10	0	3	34	6	84
1979	24	8	9	9	0	4	18	5	77
1980	16	8	2	13	0	5	15	4	63
1981	24	2	4	13	0	9	62	2	116
1982	20	3	1	14	0	41	29	6	114
1983	15	7	5	18	0	6	28	2	81
1984	34	3	1	25	0	24	40	1	128
1985	33	3	3	23	0	19	32	6	119
1986	33	3	1	27	12	1	39	6	122
1987	39	5	2	30	6	10	22	0	114
1988	43	7	4	30	9	15	23	2	133
1989	50	3	5	38	14	18	39	1	168
1990	47	3	4	44	46	21	40	1	206
1991	53	9	6	53	1	13	39	0	174
1992	38	5	6	48	0	20	45	1	163
1993	35	5	6	39	2	22	34	2	145
1994	49	16	5	46	4	33	37	3	193
1995	42	8	5	56	0	35	53	2	201
1996	60	10	0	61	17	101	154	12	415
1997	54	8	8	61	4	42	61	4	242
1998	66	9	6	53	9	12	72	4	231
1999	82	15	8	53	5	37	69	0	269
2000	78	8	8	58	14	37	62	8	273
2001	81	1	7	61	32	33	108	2	325

Of interest is the increase in the number of perinatal deaths. The frequency of perinatal deaths (stillborn and newborn calves) has been consistently high over the past 5 years. The cause of the increase in perinatal deaths is uncertain, but may result from a combination of factors that includes pollution, disease, or environmental change (Marine Mammal Commission 1992). It may also result from the increase in collisions between manatees and watercraft because some newborn calves may die when their mothers are killed or seriously injured by boat collisions, when they become separated from their mothers while dodging boat traffic, or when stress from vessel noise or traffic induces premature births (Marine Mammal Commission 1992).

The greatest present threat to manatees is the high rate of manatee mortalities caused by watercraft collisions. Between 1974 and 1997, there were 3,270 known manatee mortalities in Florida. Of these, 749 were watercraft-related. Since 1974, an average of 31 manatees have died from watercraft-related injuries each year. Between 1983 and 1993, manatee mortalities resulting from collisions with watercraft reached record levels (DEP 1994). Between 1986 and 1992, watercraft collisions

accounted for 37.3% of all manatee deaths where the cause of death could be determined (Ackerman *et al.* 1995).

The significance of manatee mortalities related to watercraft appears to be the result of dramatic increases in vessel traffic (O'Shea et al. 1985). Ackerman *et al.* (1995) showed a strong correlation between the increase in recorded manatee mortality and increasing boat registrations. In 1960, there were approximately 100,000 registered boats in Florida; by 1990, there were more than 700,000 registered vessels in Florida (Marine Mammal Commission 1992, Wright *et al.* 1995). Approximately 97 percent of these boats are registered for recreational use. The most abundant number of registered boats is in the 16-foot to 26-foot size class. Watercraft-related mortalities were most significant in the southwest and northeast regions of Florida; deaths from watercraft increased from 11 to 25 percent in southwestern Florida. In all of the counties that had high watercraft-related manatee deaths, high numbers of watercraft were combined with high seasonal abundance of manatees (Ackerman *et al.* 1995).

Approximately twice as many manatees died from impacts suffered during collisions with watercraft than from propeller cuts; this has been a consistent trend over the last several years. Medium or large-sized boats cause most lethal propeller wounds, while impact injuries are caused by fast, small to medium-sized boats (Wright *et al.* 1992). The Florida Marine Research Institute (FMIR) conducts carcass recovery and necropsy activities throughout the state to attempt to assess the cause of death for each carcass recovered. Dr.

Designated Critical Habitat for Species Included in this Assessment

American Crocodile *(Crocodylus acutus)*

There have been at least two observations of crocodiles at or near Virginia Key (FWC, pers com; Mazzotti, pers com), however designated critical habitat for this species does not include the island (U.S. Fish and Wildlife Service 1999). Crocodiles are more frequently observed in Bill Baggs/Cape Florida State Park on Key Biscayne (G. Milano, Department of Environmental Resource Management-Dade County, 2002).

Florida Manatee *(Trichecus manatus)*

Critical habitat was designated for the manatee in 1976, although no specific primary or secondary constituent elements were included in the designation (50 CFR 17.95). Critical habitat for the manatee identifies specific areas occupied by the manatee, which have those physical or biological features essential to the conservation of the manatee and/or may require special management considerations.

Project Area Specific Information for Species Included in this Assessment

American Crocodile *(Crocodylus acutus)*

Local Distribution and Status

The current distribution of the American crocodile is limited to extreme South Florida, including coastal areas of Miami-Dade, Monroe, Collier, and Lee counties. In Biscayne Bay, crocodiles have been observed as far north as Crandon Park, Bill Baggs Cape Florida SRA, and Snapper Creek (FWS,

1999). Occasional sightings are still reported farther north on the east coast, and there are also records from Broward County, along the entire length of Biscayne Bay; a few isolated crocodiles still survive in remnant mangrove habitats there.

While there are no published records specifically citing American crocodiles utilizing the waters of the Port of Miami, it is possible that they utilize the waters of the Bill Sadowski Critical Wildlife Area north of Virginia Key for foraging. Crocodiles have been recorded in the vicinity of Virginia Key and nesting on Key Biscayne (Crandon Park Marina and Bill Baggs State Recreation Area).

Florida Manatee *(Trichecus manatus)*

Local Distribution and Status

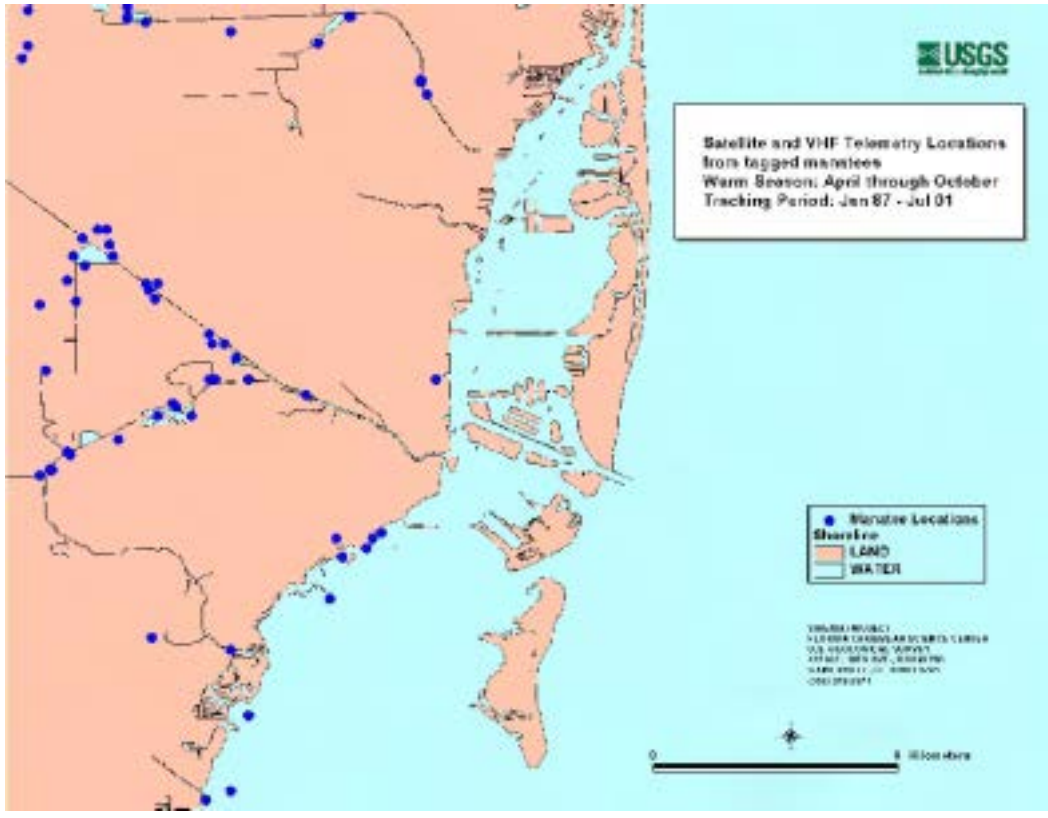
Historical records regarding manatees in South Florida are sparse. Manatees are mentioned in documents that are dated as early as the mid 1800's and early 1900's (O'Shea 1988). Moore (1951) indicated that manatees commonly used the New River and the Miami River. He also noted a 1943 anecdotal observation 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 Dade County (upper reaches of canals), manatees are feeding primarily on the exotic *Hydrilla verticillata.* During cooler weather, manatees feed on extensive meadows of seagrasses in many parts of Biscayne Bay.

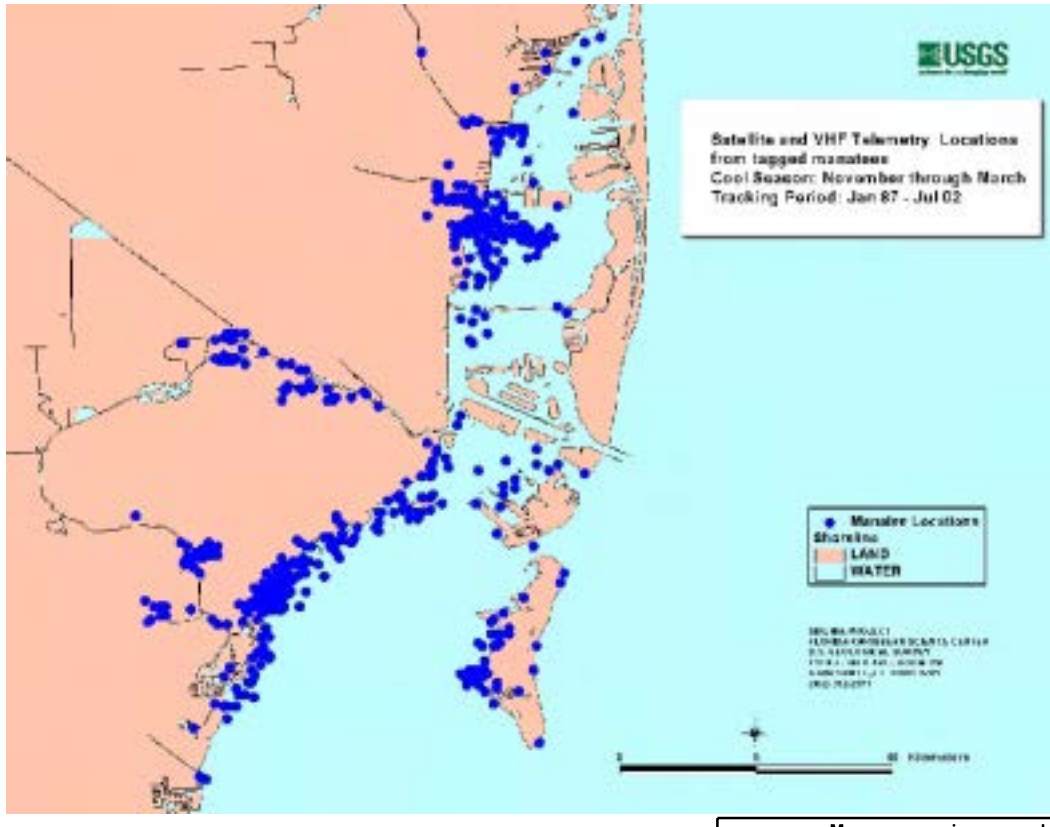
Local Mortality

The causes for manatee deaths in Dade County are varied (Table 3; Figure 4). The highest number of manatee deaths in 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 the ambient water. An example of this situation is the floodgate on the Little River in 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. Miami Harbor is well within the historic range for the Florida manatee described by Moore (1951), 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.

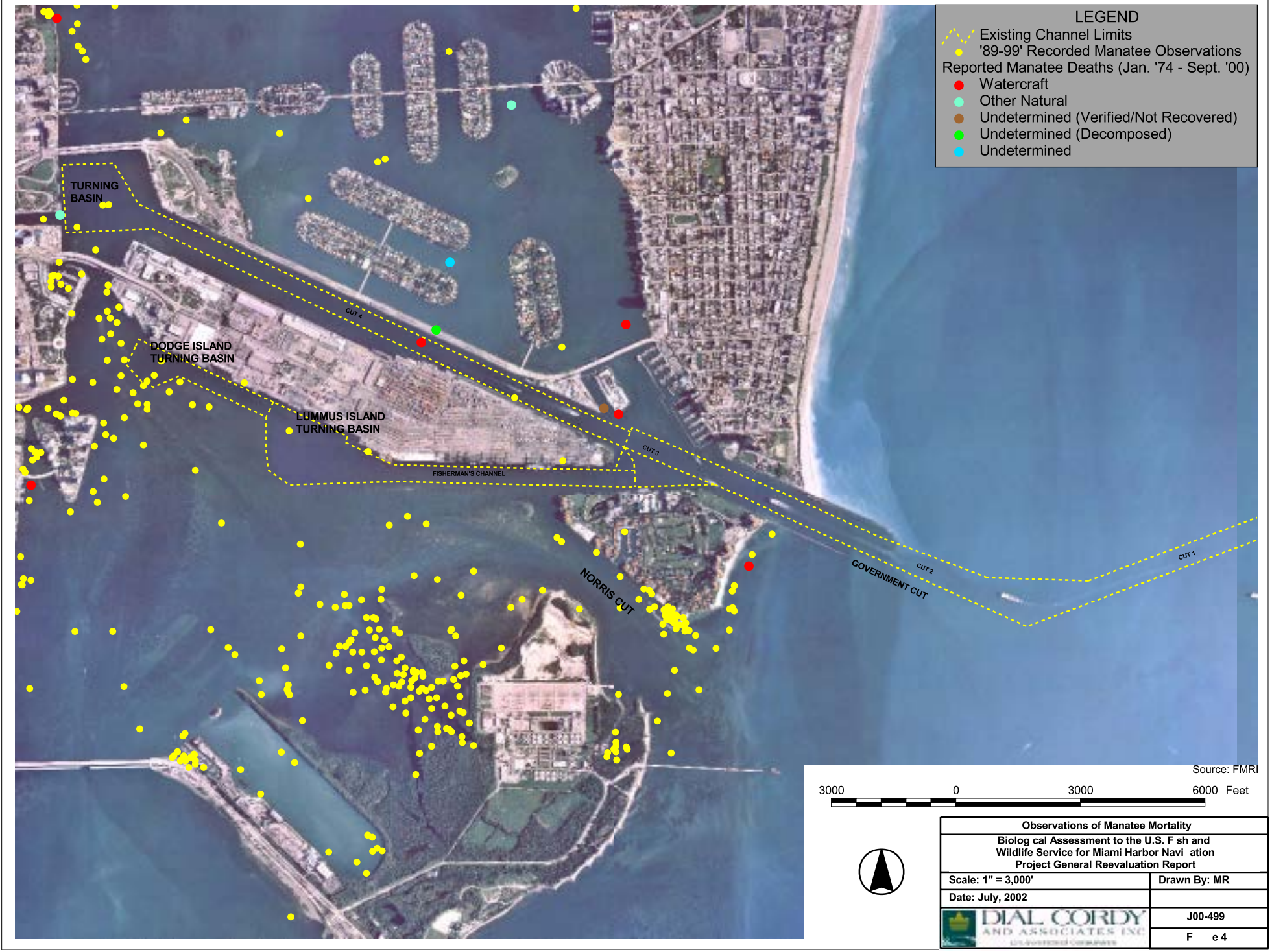
Aerial Survey Observations of Manatees	
Biological Assessment to the U.S. Fish and Wildlife Service for Miami Harbor Navigation Project General Reevaluation Report	
Scale: 1" = 3,000'	Drawn By: MR
Date: July, 2002	
DIAL CORDY AND ASSOCIATES INC	J00-499
	Figure 2





Ma oc ion d on ry	
iologic o S. is d Wildlife Servic for Mia i Harbor Naviga ion roj ra va ion port	
S : 1" = ,000'	Drawn y: MR
D : Ju y, 2002	
DIAL CORDY AND ASSOCIATES INC Environmental Consultants	J00-499
	Figure 3

Source: USGS



Observations of Manatee Mortality	
Biolog cal Assessment to the U.S. F sh and Wildlife Service for Miami Harbor Navi ation Project General Reevaluation Report	
Scale: 1" = 3,000'	Drawn By: MR
Date: July, 2002	
DIAL CORDY AND ASSOCIATES INC	J00-499
	F e 4

Figure #5 – Location of Water Control Structures near the Project Area

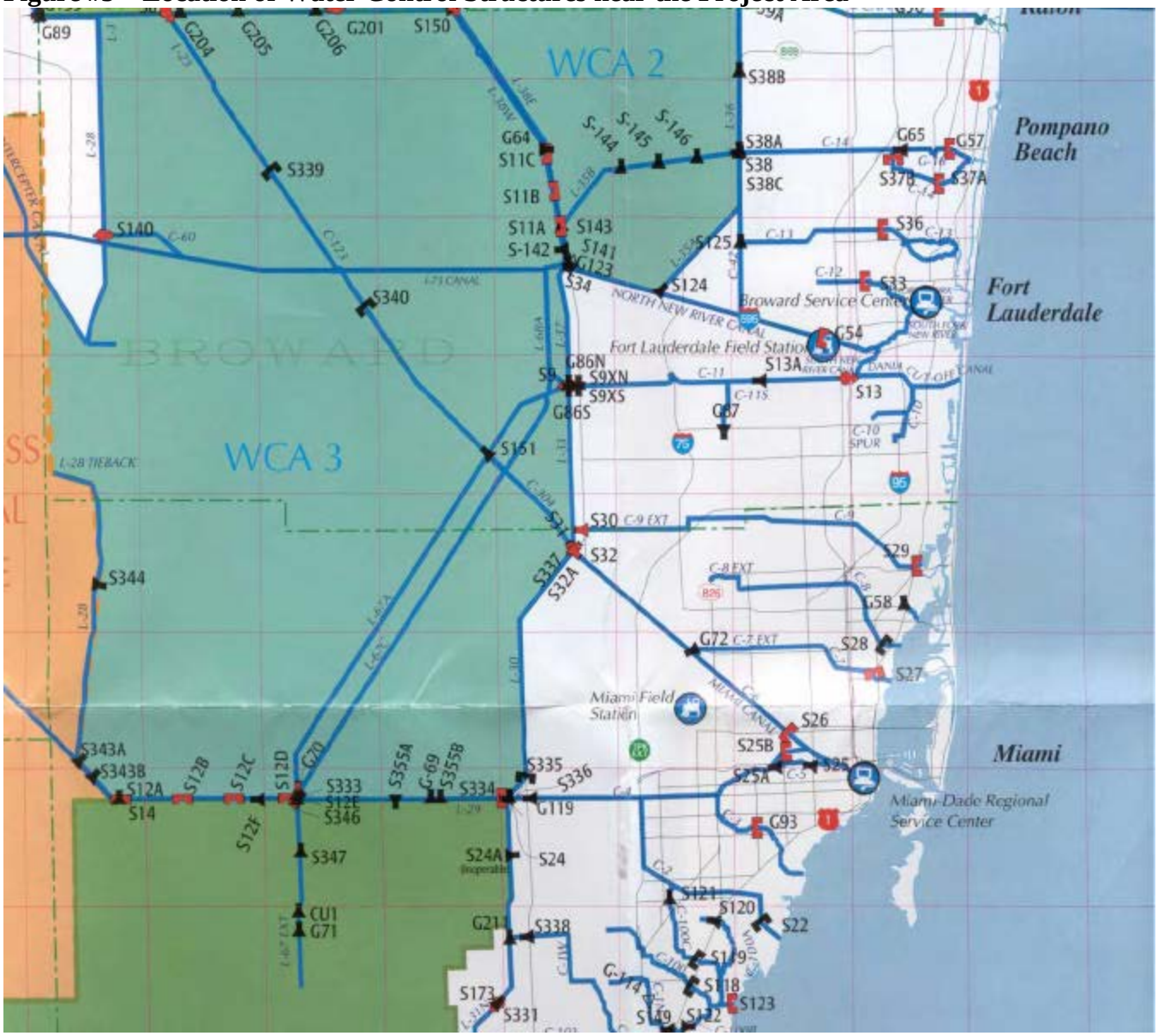


Table #3 Manatee deaths in Miami-Dade County from 1974 through 2001 (source: FMRI)

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

Protective Measures Taken in the Project Area Separate from Conservation Measures the Corps will Undertake as Part of the Proposed Action

Miami-Dade County

Miami-Dade County is one of 13 Florida counties required to have a manatee protection plan (MPP) developed under the Local Government Comprehensive Planning and Land Development Regulation Act (LGCPALDRA) of 1985. The LGCPALDRA requires these plans include speed and no entry zones, boat facility siting policies and other measures to protect manatees. Miami-Dade County has prepared a plan, submitted it to the State, through the Florida Fish and Wildlife Conservation Commission, and to the Federal government through the US Fish and Wildlife Service. As of November 2001, both the state nor the USFWS had approved the Miami-Dade County plan (USFWS 2001). The following discussions of speed zones, boat facility siting policies and other protective measures are taken directly from the Miami-Dade Manatee Protection Plan (Dade County, 1995).

Speed & No Entry Zones
In 1979, the Florida Department of Natural Resources designated the Black Creek area including Black Point Marina (south of the project area) as a manatee sanctuary. The "Idle Speed No Wake" zone associated with this sanctuary extends from the Black Creek enterance channel in Biscayne Bay to the salinity control structure on Black Creek and Goulds Canal, and includes all tidal canals in the vicinity. Prior to late 1991, there were no other speed zones in Dade County established for manatee protection, although several other areas were regulated for boating safety. In November 1991, the Florida Governor and Cabinet approved a state rule establishing many additional vessel speed restrictions for manatee protection. Figure 6 denotes all current speed zones and manatee protection areas in Dade County.

Boating facility Siting Policies
The LGCPALDRA requires "manatee" counties to prepare policies concerning the siting of boating facilities. Dade County has include Marine Facility Siting Criteria in their MPP.

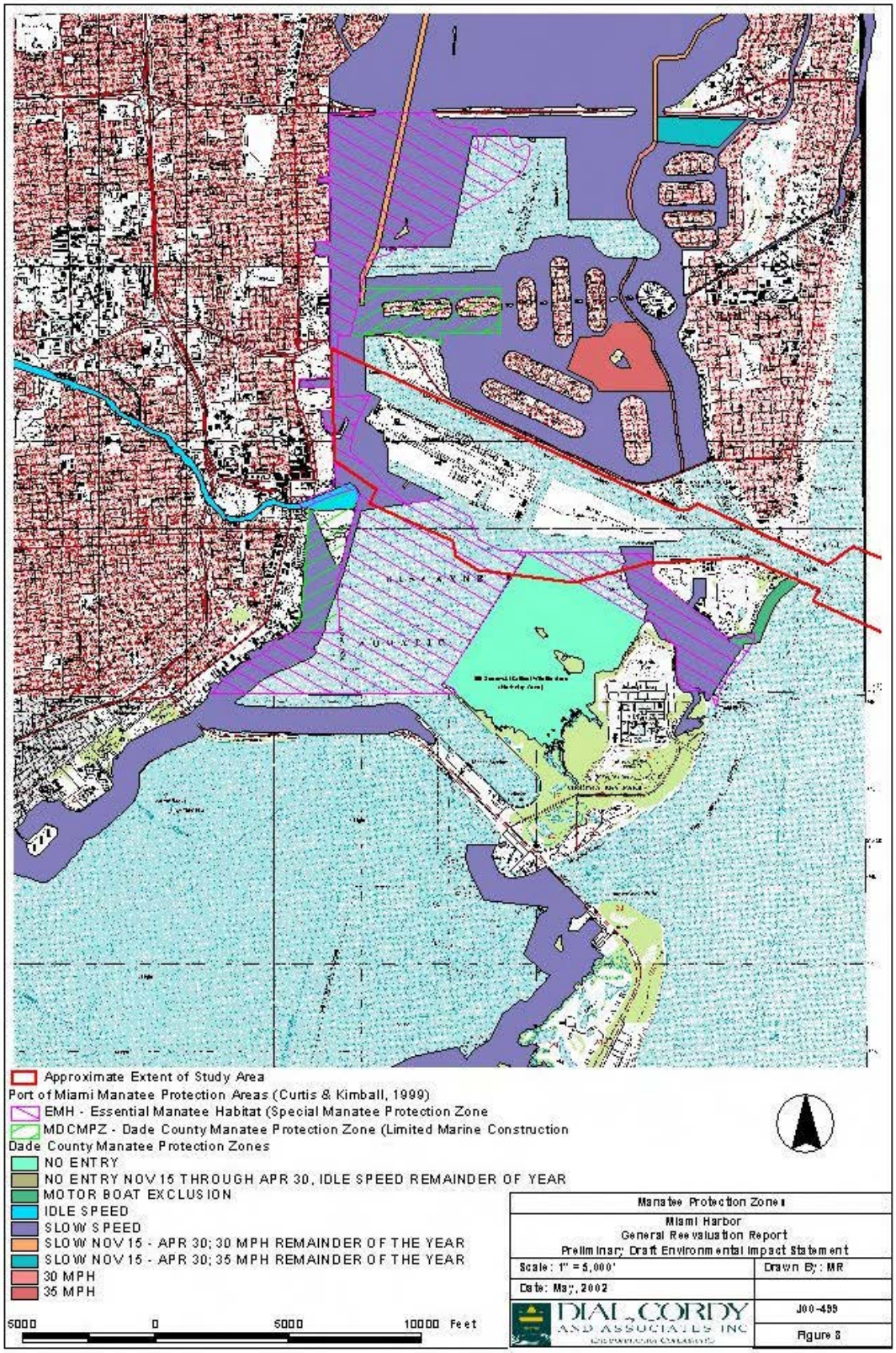
Designation of Essential Habitat for Manatees within the County
Dade County has identified areas to be designated as essential habitat: seagrass beds – specifically those in Dumfoundling Bay and Biscayne Bay between the 79th Street and the Julia Tuttle causeways, between the Port of Miami and Rickenbacker Causeway, in the Chicken Key area and in the area of the Black Creek channel. Additional habitat areas listed for protection under the Dade County MPP include sources of freshwater; warm water refuges (although none currently operate in the boundaries of Dade county); aggregation areas (including Sky Lake, 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) and manatee travel corridors.

Scientific Research on Manatees
Regulations developed under the ESA allow for the taking of ESA-listed manatees for the purposes of scientific research. In addition, the ESA also allows for the taking of listed species by states through cooperative agreements developed per section 6 of the ESA. Prior to issuance of these authorizations for taking, the proposal must be reviewed for compliance with section 7 of the ESA. Permits to conduct scientific research on manatees are issued by the FWS' headquarters in Arlington, Virginia (Jim Valade, USFWS – Jacksonville, 2002 pers.com). Research activities currently conducted under permit from FWS in the action area include:

- Photo identification study of manatees by the USGS-Sirenia project.
- Carcass recovery and necropsy activities conducted by the State of Florida through the Florida Marine Research Institute's Marine Mammal Pathology Laboratory.

Other consultations of Federal actions in the area to date
The Corps has been working with the citizens of Dade County since 1902 on improving and maintaining the Port of Miami (USACE 2002). The following table lists the improvements authorized by Congress. None of the projects authorized by Congress through 1968 were required to consult under the ESA.

Figure #6 – Manatee Protection Zones in Dade County



ACTS	WORK AUTHORIZED	DOCUMENTS
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 Mar 1907	South Jetty and channel 100 feet wide.	Specified in Act
25 June 1912	Channel 20 feet deep by 300 feet wide and extension of jetties.	H. Doc. 554/62/2
3 Mar 1925	Channel 25 feet deep at entrance and 25 feet deep by 200 feet across Biscayne Bay	H. Doc. 516/67/4
3 Jul 1930	Channel 300 feet wide across Biscayne Bay and enlarging municipal turning basin.	R&H Comm. Doc. 15/71/2
30 Aug 1935	Depth of 30 feet to and in turning basin.	S. Comm. Print 73.2
26 Aug 1937	Widen turning basin 200 feet on south side.	R&H. C. Doc. 86/74/2
2 Mar 1945	Virginia Key Improvement (De-authorized)	S. Doc. 251/79/2
2 Mar 1945	Consolidation of Miami River and Miami Harbor projects; widening at mouth of Miami River (De-authorized); a channel from the mouth of the river to the Intracoastal Waterway (De-authorized); thence a channel from the Intracoastal Waterway to Government Cut (De-authorized); and a channel from Miami River to harbor of refuse in Palmer Lake (De-authorized).	H. Doc. 91/79/1
14 Jul 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; de-authorize Virginia Key development.	S. Doc. 71/85/2
13 Aug 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 Nov 1986	De-authorized 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 Nov 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 Law 101-640 11/28/90

The Corps is also working with Miami-Dade County on an environmental restoration project on Virginia Key, located to the south of the Port. The FWS issued a biological opinion on the proposed Virginia Key project on May 17, 2002 stating "… the Service anticipates that the responses of sea turtles to the proposed action will be minimal, or positive."

Another action, the Lummus Island Turning Basin deepening project, is a project with similar risks as the proposed project, but on a much smaller scale (only one inshore dredge area) and includes precautions similar to those proposed for the Miami Harbor deepening/widening project. The Corps re-initiated consultation with FWS on March 25, 2002 and the Service concluded consultation with the Corps on the project on June 19, 2002 concurring with the Corps finding that the Lummus Island Turning Basin deepening may affect, but will not adversely affect listed species under FWS jurisdiction in the action area.

Effects of the Proposed Action

Direct Effects

The highest potential to directly effect manatees and crocodiles may be the use of explosives to remove areas of rock within channels. Both the pressure and noise associated with blasting can injure or kill marine organisms, depending on the distance from the discharge (Keevin and Hempen, 1997).

American Crocodile

To date, there has not been a single comprehensive study to determine the effects of underwater explosions on reptiles that defines the relationship between distance/pressure and mortality or damage (Keevin and Hempen, 1997). However, there have been studies, which demonstrate that sea turtles are killed and injured by underwater explosions (Keevin and Hempen, 1997). Crocodiles are shy, un-aggressive animals, and as such, the Corps believes that it is very unlikely that a crocodile will be seen in or near the project area during construction. However, due to the proximity of areas of recorded sightings of crocodiles, we are including the American crocodile in the assessment of effects. Crocodiles possess integumentary sensory organs (ISO). At this time, there is little information documented about the purpose of these organs, however, some research has hinted that the purpose of these ISOs includes detecting pressure changes, sensory role in detecting underwater prey and possibly in detecting changes in salinity. The Corps plans to protect crocodiles in the same manner as manatees and other listed and protected species in the action area. Details concerning our protection methods are provided below.

Florida Manatee

The effects of noise and pressure on manatees, associated with confined underwater blasting have not been documented. After discussions with Dr. Darlene Kettin of the Woods-Hole Oceanographic Institute, the Corps has determined that manatees would be impacted similar to dolphins, for which some published data do exist.

Blasting

To achieve the deepening of the Port of Miami from the existing depth of -42 feet to project depth of -50 feet, pretreatment of the rock areas may be required. Blasting is anticipated to be required for some or all of the deepening of the channel inside of the entrance jetties, where standard construction methods are unsuccessful. The total volume to be removed in these areas is up to 2.3 million cubic yards. The work may be completed in the following manner:

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

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.

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

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.

Based upon industry standards and USACE, Safety & Health Regulations, the blasting program may consist of the following:

The weight of explosives to be used in each blast will be limited to the lowest poundage (~90 lbs. or less) of explosives that can adequately break the rock. The blasting would consist of up to 3 blasts per day, preparing for removal of approximately 1500 cubic yards per blast. This equates to about 520 blast days to complete the project (based on an assumption of one drillboat, and assuming that the entire project area inside the jetties will require blasting).

The following safety conditions are standard in conducting underwater blasting:

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

- 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.

Because of the potential duration of the blasting and the proximity of the blasting to a Critical Wildlife Area, a number of issues will need to be addressed. One of the key issues is the extent of a safety radius for the protection of marine wildlife. This is the distance from the blast site which any protected species must be in order to commence blasting operations. Ideally the safety radius is large enough to offer a wide buffer of protection for marine animals while still remaining small enough that the area can be intensely surveyed

There are a number of methods that can be used to calculate a safety radius. Little published data exists for actual measurements of sub aqueous blasts confined to a rock layer and their impacts to marine mammals or turtles. There is some information on the impacts to fish from similar blasts. Both literature searches and actual observations from similar blasting events will be used as a guide in establishing a safety radius that affords the best protection from lethal harm to marine wildlife. The following will be considered in establishing the radius:

The U.S. Navy Dive Manual and the FFWCC 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

This formula is a conservative for the blasting being done in the Port of Miami since the blast will be confined within the rock and not suspended in the water column.

The FFWCC Endangered Species Watch Manual designation that an extra 1000 ft buffer is required to afford animals an added measure of safety.

Utilizing data from rock-contained blasts such as those at Atlantic Dry Dock and Wilmington, North Carolina, the Corps has been able to estimate potential effects on protected species. These data can be correlated to the biological opinion issued on October 10, 2000 by NMFS for the incidental taking of listed marine mammals for the explosive shock testing of the USS Winston Churchill (DDG-81) (66 FR 22450) concerning blasting impacts to marine mammals. The data references in the Federal Register 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 is based on the lowest possible affected mammal weight (infant dolphin). Non- lethal injuries include tympanic membrane (TM) rupture; however, given that dolphin & 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 five (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 Marine Mammal Protection Act (MMPA).

A dual criteria for marine mammal acoustic harassment has also been developed for explosive-generated signals. Noise levels that fall between the 5 psi-msec to a distance where a noise level of 180 dB (3 psi), while outside any physical damage range, can be considered to fall within the incidental harassment zone.

Conservation Measures
<u>Construction</u>
The Corps will incorporate the standard manatee protection construction conditions into our plans and

specifications for this project. These standard conditions are:

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

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

3. Prior to commencement of construction, the prime contractor involved in the construction activities shall construct and display at least two temporary signs (placard) concerning manatees. For all vessels, a temporary sign (at least 8 1/2" x 11") reading "Manatee Habitat/Idle Speed In Construction Area" will be placed in a prominent location visible to employees operating the vessels. In the absence of a vessel, a temporary sign (at least 2' x 2') reading "Warning: Manatee Habitat" will be posted in a location prominently visible to land based, water-related construction crews.

   A second temporary sign (at least 8 1/2" x 11") reading "Warning, Manatee Habitat: Operation of any equipment closer than 50 feet to a manatee shall necessitate immediate shutdown of that equipment. Any collision with and/or injury to a manatee shall be reported immediately to the Florida Marine Patrol at 1-800-DIAL-FMP" will be located prominently adjacent to the displayed issued construction permit. Temporary notices are to be removed by the permittee upon completion of construction.

4. Siltation barriers are properly secured so that manatees cannot become entangled, and are monitored at least daily to avoid manatee entrapment. Barriers must not block manatee entry to or exit from essential habitat.
5. All vessels associated with the project operate at "idle speed/no wake" at all times while in the construction area and while in waters where the draft of the vessel provides less than a four foot clearance from the bottom. All vessels will follow routes of deep water whenever possible.

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

7. Any collision with and/or injury to a manatee shall be reported immediately to the Florida

Marine Patrol (1-800-DIALFMP) and to the Florida Department of Protection, Office of Protected Species Management at (904)922-4330.

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

Blasting

It is crucial to balance the demands of the blasting operations with the overall safety of the species. A 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.

Aerial reconnaissance, where feasible, is critical to support the safety radius selected in addition to 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 blaster in charge.

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

- Drill Boat Capabilities and Production Rates
- Ideal Drill Pattern for Typical Boreholes
- Acceptable Rock Breakage for Excavation
- Tolerable Vibration Level Emitted
- Directional Vibration
- Calibration of the Environment

The Test Blast Program begins with a single range of individually delayed holes and progresses up 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 Test Blast Program 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:

- Distance
- Pounds Per Delay
- Peak Particle Velocities (TVL)
- Frequencies (TVL)
- Peak Vector Sum
- Air Blast, Overpressure

Other Rock Removal Options
The Corps investigated methods to remove the rock in the Port of Miami without blasting using 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 impactful 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.

Indirect effects
The regulations for interservice consultation found at 50 CFR 402 define indirect effects as "are those that are caused by the proposed action and are later in time, but still are reasonably certain to occur". The Corps does not believe that the project will have any indirect effects on manatees or crocodiles in the action area.

Interrelated and Interdependent Effects
The regulations for interservice consultation found at 50 CFR 402 define interrelated actions as "those that are part of a larger action and depend on the larger action for their justification" and interdependent actions as "those that have no independent utility apart from the action under consideration."

The Corps does not believe that there are any interrelated actions for this proposed project; however, the recommended plan for the Port of Miami contains widening components and deepening components. As a result of the widening components of the project, larger container vessels will call at the Port of Miami. As a result of both the widening and the deepening components of the project, more tonnage will be carried per vessel call, so the total number of vessel calls may be reduced (Dawedit 2002. pers comm.). This will be an indirect benefit to the manatees and crocodiles since there will be fewer ships in the area to potentially affect them. Additionally, the wider channel will provide manatees

and crocodiles more room to maneuver around incoming and outgoing vessels throughout the action area.

The Corps believes that the increase in size within the Port will not have an adverse effect on manatees in the area for three reasons:

1) Recent data shows that manatees are not using the Port itself as a primary habitat. Aerial surveys conducted between 1989-2001 show that very few manatees use the area of the Port proper. During the winter, they congregate in the BSCWA area to the south, the Miami River to the northwest, and north of the Julia Tuttle causeway to the north of the Port. Distribution of manatees in the area is also highly seasonal (Figures 2 and 3);
2) Efforts being undertaken by the port to comply with the Miami-Dade county MPP's protection provisions.
3) As previously demonstrated, fewer manatees are utilizing the general area of the Port in the summer (between April and October), so there are fewer animals in the area that could be affected by the project.

Cumulative effects
The regulations for interservice consultation found at 50 CFR 402 define cumulative effects as "those effects of future state or private activities, not involving Federal activities, that are reasonably certain to occur within the action area of the Federal action subject to consideration." The Corps is not aware of any future state or provate activites, not involving Federal activities that are reasonably certain to occur within the action area.

Take Analysis
Due to the restrictions and special conditions placed in our construction specifications for construction and blasting the Corps does not anticipate any take of the endangered American crocodile or the Florida manatee.

Determination
The Corps has determined that the proposed expansion and deepening of Miami Harbor is likely to affect, but not likely to adversely affect listed species within the action area. The Corps believes that the restrictions placed on construction and blasting previously discussed in this assessment will diminish/eliminate the effect of the project on protected species within the action area.

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Planning Division
Environmental Branch

Ms. Georgia Cranmore
National Marine Fisheries Service
Southeast Regional Office
Protected Species Resources Division
9721 Executive Center Drive North
St. Petersburg, Florida 33702

Dear Ms. Cranmore:

The U.S. Army Corps of Engineers (Corps), Jacksonville District, proposes to conduct a feasibility study to assess Federal interest in navigation improvements throughout the Port of Miami, Miami-Dade County, Florida. An evaluation of benefits, costs, and environmental impacts determines Federal interest.

The recommended plan 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 existing depth of 42 feet to 50 feet; (3) extending 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 (without dredging); and (5) increasing the width of Lummus Island Cut (Fisherman's Channel) about 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. Additional activities will include mitigation for unavoidable environmental impacts.

Enclosed please find the Corps’ Biological Assessment of the effects of the project as currently proposed on listed species in the action area. After preparing this Biological Assessment of the impacts of the proposed project, the Corps has determined that the proposed project may affect, but is not likely to adversely affect the green turtle (*Chelonia mydas*), loggerhead turtle (*Caretta caretta*), Kemp's ridley turtle (*Lepidochelys kempii*), Hawksbill sea turtle (*Eretmochelys imbricata*),

leatherback turtle (*Dermochelys coriacea*), Johnson's seagrass (*Halophila johnsonii*), blue (*Balenoptera musculus*), humpback, (*Balaenoptera physalus*), sei (*Balaenoptera borealis*), fin (*Balenoptera physalus*) and sperm (*Physeter macrocephalus*) whales and smalltooth sawfish (*Pristis pectinata*), and is not likely to adversely modify designated critical habitat for Johnson's seagrass. We request that you concur with this finding.

If you have any questions, please contact Ms. Terri Jordan at 904-899-5195 or terri.l.jordan@saj02.usace.army.mil.

Sincerely,

James C. Duck
Chief, Planning Division

Enclosure

Jordan/CESAJ-PD-EA/3453/
McAdams/CESAJ-PD-EA
Mason/CESAJ-PD-E
Schwictenberg/CESAJ-DP-C
Strain/CESAJ-PD-P
Duck/CESAJ-PD

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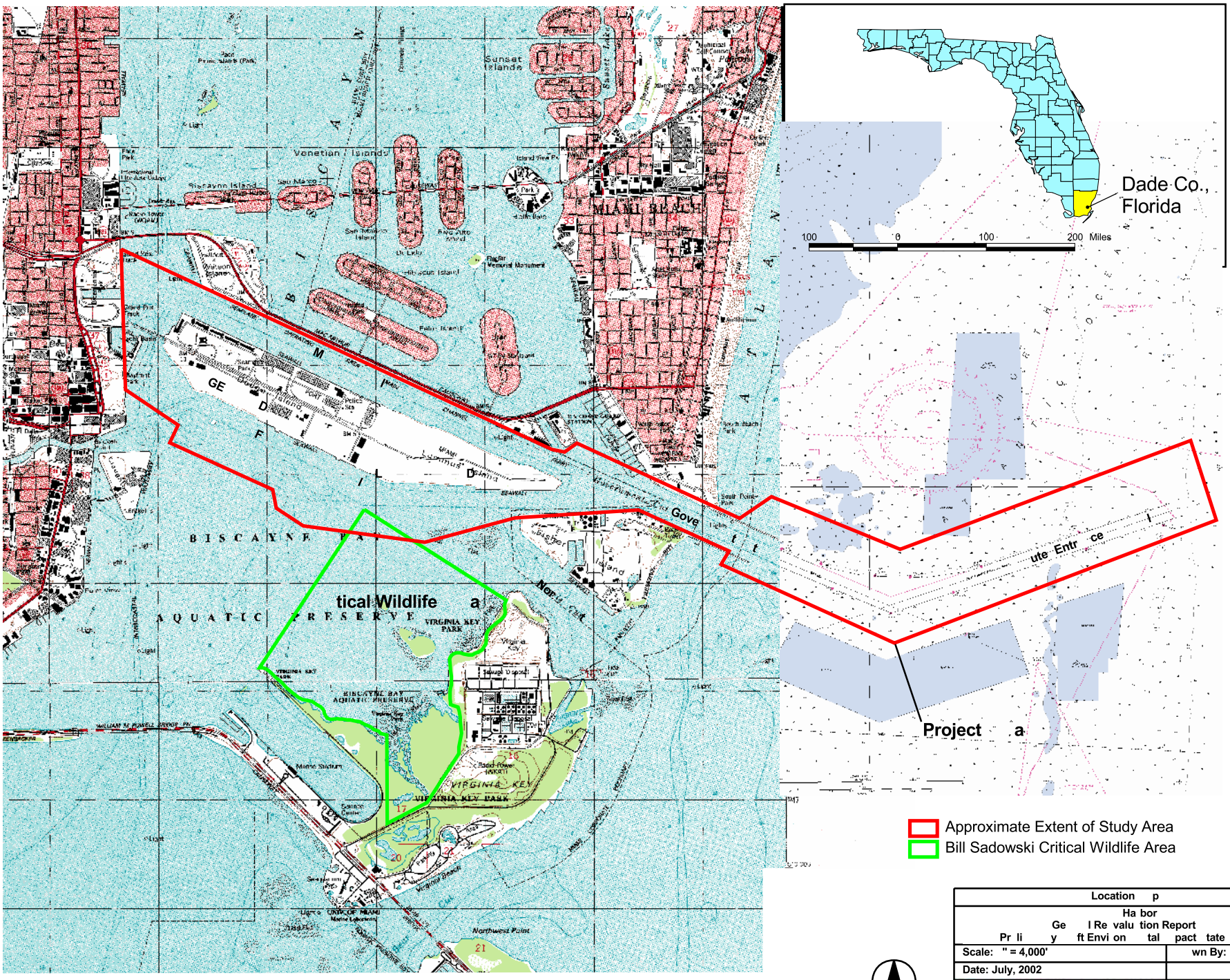
BIOLOGICAL ASSESSMENT TO THE NATIONAL MARINE FISHERIES SERVICE FOR MIAMI HARBOR NAVIGATION PROJECT GENERAL REEVALUATION REPORT

Description of the Proposed Action – The Port of Miami requested that the U.S. Army Corps of Engineers study the feasibility of widening and deepening most of the major channels and basins within Miami Harbor. A number of alternatives were originally considered, but during efforts to reduce impacts to the environment, many were eliminated from further analysis. Three alternatives were thoroughly analyzed (two action alternatives and the "no action" alternative) in the Environmental Impact Statement. 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 existing depth of 42 feet to 50 feet; (3) extending 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 (without dredging); and (5) increasing the width of Lummus Island Cut (Fisherman's Channel) about 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. The action alternative not selected included these five components and a sixth, involving the deepening of Dodge Island Cut and creation of another turning basin. 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. 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. The balance of rock and coarse materials that cannot be utilized will be transported to the Ocean Dredged Material Disposal Site (ODMDS) in accordance with the approved Site Management and Monitoring Plan (SMMP). 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 by Miami-Dade County.

Action Area

The Port of Miami (Miami-Dade County, Florida) is one of the major port complexes along the east coast of the U.S. The Port utilizes Miami Harbor, which lies in the north side of Biscayne Bay (Figure 1), a shallow, expansive, subtropical lagoon (thirty-eight miles long, and three to nine miles wide) that extends from the City of North Miami south to the northern end of Key Largo. Average depth is six to



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ten feet (USACE, 1989). The 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 (Hoffmeister, 1974). Except for Virginia Key, the islands within and adjacent to the project area (Dodge-Lummus, Fisher, Star, Palm, and Claughton Islands, Watson Park, and the barrier island comprising Miami Beach) are completely developed. A mixture of low, medium and high-density residential areas; commercial enterprises; industrial complexes; office parks; and recreational areas characterizes land surrounding the Port of Miami waters. 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 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. 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 beaches and mangroves. Adjacent to the harbor is the Biscayne Bay Aquatic Preserve, a *No Entry* zone for protection of manatees, and a Critical Wildlife Area associated with Virginia Key.

Protected Species Included in this Assessment

Of the listed and protected species under NMFS jurisdiction occurring in the action area, the Corps believes that the green turtle (*Chelonia mydas*), loggerhead turtle (*Caretta caretta*), Kemp's ridley turtle (*Lepidochelys kempii*), Hawksbill sea turtle (*Eretmochelys imbricata*), leatherback turtle (*Dermochelys coriacea*), Johnson's seagrass (*Halophila johnsonii*), blue (*Balenoptera musculus*), humpback, (*Balaenoptera physalus*), sei (*Balaenoptera borealis*), fin (*Balenoptera physalus*) and sperm (*Physeter macrocephalus*) whales and smalltooth sawfish (*Pristis pectinata*), may be adversely affected by the implementation of the proposed action. The Corps has relied heavily upon the Surtass LFA Biological Opinion that was completed by NMFS on May 31, 2002 for biological information concerning the biology, life history and status for the large whale species discussed in this assessment. This document was accessed from the NMFS website at: http://www.nmfs.noaa.gov/prot_res/readingrm/ESAsec7/7pr_surtass-2020529.pdf.

The Corps has reviewed the biological, status, threats and distribution information presented in this assessment and believes that the following species will be in or near the action area and thus may be affected by the proposed project: the five sea turtle species; humpback and sperm whales and smalltooth sawfish.

Six species of endangered marine mammals may be found seasonally in the waters offshore southeastern

Florida. The Corps believes that only the sperm and humpback whales may be adversely affected by activities associated with the proposed action. These effects would be a result of acoustic harassment.

The blue, fin, northern right and sei whales are not discussed because they are unlikely to be within the vicinity of the project. Additional information on blue, fin and sei whales can be found in Waring *et al*. (1999). Due to the rarity of sightings of these four whale species near the project area, the Corps believes that any effects to them by the project are discountable. Discountable effects under Section 7 of the ESA are those "extremely unlikely to occur. Based on best judgment, a person would not: (1) be able to meaningfully measure, detect, or evaluate insignificant effects; or (2) expect discountable effects to occur."

The endangered Florida manatee (*Trichecus manatus*) and the American crocodile (*Crocodylus acutus*) also occur with the action area and the Corps has initiated consultation with the U.S. Fish and Wildlife Service concerning the effects of the proposed action on these species.

Species and Suitable Habitat Descriptions

Green Turtle (*Chelonia mydas*)

Distribution. Green turtles are distributed circumglobally. In the western Atlantic they range from Massachusetts to Argentina, including the Gulf of Mexico and Caribbean, but are considered rare north of Cape Hatteras (Wynne and Schwartz, 1999). Several major nesting assemblages have been identified and studied in the western Atlantic (Peters 1954; Carr and Ogren, 1960; Carr *et al.*, 1978). Most green turtle nesting in the continental United States occurs on the Atlantic Coast of Florida (Ehrhart 1979). Green turtles are the largest of the hard-shelled sea turtles. Adult male green turtles are smaller than adult females whose lengths range from 92 to 110 cm (36 to 43 in.) and weights range from 119 to 182 kg (200 to 300 lbs). Their heads are small compared to other sea turtles and the biting edge of their lower jaws is serrated.

Green turtles have a more tropical distribution than loggerhead turtles; they are generally found in waters between the northern and southern 20°C isotherms (Hirth 1971). Green turtles, like most other sea turtles, are distributed more widely in the summer when warmer water temperatures allow them to migrate north along the Atlantic coast of North America. In the summer, green turtles are found around the U.S. Virgin Islands, Puerto Rico, and continental North America from Texas to Massachusetts. Immature greens can be distributed in estuarine and coastal waters from Long Island Sound, Chesapeake Bay, and the North Carolina sounds south throughout the tropics (Musick and Limpus, 1997). In the United States, green turtles nest primarily along the Atlantic Coast of Florida, the U.S. Virgin Islands, and Puerto Rico. In the winter, as water temperatures decline, green turtles that are found north of Florida begin to migrate south into subtropical and tropical water.

Status and Population Trends. The green turtle was protected under the ESA in 1978; breeding populations off the coast of Florida and the Pacific coast of Mexico are listed as endangered, all other populations are listed as threatened. Recent population estimates for the western Atlantic area are not

available. However, there is evidence that green turtle nesting has been on the increase during the past decade. Recently, green turtle nesting occurred on Bald Head Island, North Carolina just east of the mouth of the Cape Fear River, on Onslow Island, and on Cape Hatteras National Seashore. Increased nesting has also been observed along the Atlantic Coast of Florida, on beaches where only loggerhead nesting was observed in the past (Pritchard 1997). Certain Florida nesting beaches where most green turtle nesting activity occurs have been designated index beaches. Index beaches were established to standardize data collection methods and effort on key nesting beaches. The pattern of green turtle nesting shows biennial peaks in abundance, with a generally positive trend during the six years of regular monitoring since establishment of the index beaches in 1989. A nesting summary for the county in which the proposed project resides is found in Table 1. 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). Ten green turtle carcasses have been found in the vicinity of the action area (Wendy Teas, pers com, 2002, NMFS - SEFSC Miami Laboratory).

Table 1: Summary of Green Turtle (*Chelonia mydas*) Nesting in Miami-Dade County, 1988-2001

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	-	-

Source: Florida Marine Research Institute. 2002a

Natural History. While nesting activity is obviously important in determining population distributions, the remaining portion of the green turtle's life is spent on the foraging grounds. Some of the principal feeding pastures in the western Atlantic Ocean include the upper west coast of Florida, the northwestern coast of the Yucatan Peninsula, the south coast of Cuba, the Mosquito Coast of Nicaragua, the Caribbean Coast of Panama, and scattered areas along Colombia and Brazil (Hirth 1971). Juvenile green sea turtles occupy pelagic habitats after leaving the nesting beach. Pelagic juveniles are assumed to be omnivorous, but with a strong tendency toward carnivory during early life stages. At approximately 20 to 25 cm carapace length, juveniles leave pelagic habitats and enter benthic foraging areas, shifting to a chiefly herbivorous diet (Bjorndal 1997). Post-pelagic green turtles feed primarily on sea grasses and benthic algae but also consume jellyfish, salps, and sponges. In the western Atlantic region, the summer developmental habitat encompasses estuarine and coastal waters as far north as Long Island Sound, Chesapeake Bay, and North Carolina sounds, and south throughout the tropics

(Musick and Limpus, 1997). Like loggerheads and Kemp's ridleys, green sea turtles that use northern waters during the summer must return to southern waters in autumn, or face the risk of cold stunning.

Threats. The greatest threat to this species is the loss of its nesting habitat. Throughout the tropical and subtropical distribution of this species, beaches are eroded, armored, renourished, or converted for residential or commercial purposes. Green turtles are also threatened by fibropapilloma disease; incidental takes in commercial or recreational fishing gear; and poaching (although poaching is infrequent in the United States). Green turtles are harvested in some nations for food, leather, and jewelry. Green turtles are also threatened by natural causes including hurricanes; predation by fire ants, raccoons, and opossums; and poaching of eggs and nesting females.

Anthropogenic impacts to the green turtle population are similar to those for other sea turtle species. Sea sampling coverage in the pelagic driftnet, pelagic longline, scallop dredge, southeast shrimp trawl, and summer flounder bottom trawl fisheries has recorded takes of green turtles. In addition, the NMFS/Northeast Fisheries Science Center (NEFSC) is conducting a review of bycatch levels and patterns in all fisheries in the western Atlantic for which observer data is available. Bycatch estimates will be made for all fisheries for which sample sizes are sufficiently large to permit reasonable statistical analysis. This will be compiled into an assessment report. Until that analysis is completed, the only information on the magnitude of takes available for fisheries in the action area are unextrapolated numbers of observed takes from the sea sampling data. Preliminary sea sampling data summary (1994-1998) shows the following total take of green turtles: one (anchored gillnet), two (pelagic driftnet), and two (pelagic longline). Stranding reports indicate that between 200-300 green turtles strand annually from a variety of causes (Sea Turtle Stranding and Salvage Network, unpublished data). As with the other species, fishery mortality accounts for a large proportion of annual human-caused mortality outside the nesting beaches, while other activities like dredging, pollution, and habitat destruction account for an unknown level of other mortality.

Critical Habitat. In 1998, NMFS designated the waters surrounding the islands of Culebra, Puerto Rico as critical habitat for the green turtle. This area supports major seagrass beds and reefs that provide forage and shelter habitat. The action area does not comprise critical habitat for green turtles.

Loggerhead Turtle (*Caretta caretta*)

Distribution. Loggerhead turtles occur throughout the temperate and tropical regions of the Atlantic, Pacific, and Indian Oceans and are the most abundant species of sea turtle occurring in U.S. waters. Loggerheads concentrate their nesting in the north and south temperate zones and subtropics, but generally avoid nesting in tropical areas of Central America, northern South America, and the Old World (NRC 1990). The largest known nesting aggregation of loggerhead turtles occurs on Masirah and Kuria Muria Islands in Oman (Ross and Barwani, 1982). In the western Atlantic, most loggerhead turtles nest from North Carolina to Florida and along the gulf coast of Florida. The best scientific and commercial data available on the genetics of loggerhead turtles suggests there are four major subpopulations of loggerheads in the northwest Atlantic: (1) a northern nesting subpopulation that occurs

from North Carolina to northeast Florida, about 29° N (approximately 7,500 nests in 1998); (2) a south Florida nesting subpopulation, occurring from 29° N on the east coast to Sarasota on the west coast (approximately 83,400 nests in 1998); (3) a Florida panhandle nesting subpopulation, occurring at Eglin Air Force Base and the beaches near Panama City, Florida (approximately 1,200 nests in 1998); and (4) a Yucatán nesting subpopulation, occurring on the eastern Yucatán Peninsula, Mexico (Márquez 1990) (approximately 1,000 nests in 1998, according to TEWG, 2000). This biological opinion will focus on the northwest Atlantic subpopulations of loggerhead turtles, which occur in the action area. A nesting summary for the county in which the action is proposed is included 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). Seven loggerhead turtle carcasses have been found in the vicinity of the action area (Wendy Teas, pers com, 2002, NMFS - SEFSC Miami Laboratory).

Table 2: Summary of Loggerhead (*Caretta caretta*) Nesting in Miami-Dade County, 1988-2001

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

source: Florida Marine Research Institute. 2002b

Although NMFS and FWS have not completed the administrative processes necessary to formally recognize populations or subpopulations of loggerhead turtles, these sea turtles are generally grouped by nesting locations. Based on the most recent reviews of the best scientific and commercial data on the population genetics of loggerhead sea turtles and analyses of their population trends (TEWG, 1998; TEWG 2000), NMFS and FWS treat these loggerhead turtle nesting aggregations as distinct subpopulations whose survival and recovery is critical to the survival and recovery of the species. Further, any action that appreciably reduced the likelihood that one or more of these nesting aggregations would survive and recover would appreciably reduce the species' likelihood of survival and recovery in the wild. Consequently, this biological opinion will focus on the four nesting aggregations of loggerhead turtles identified in the preceding paragraph (which occur in the action area) and treat them as subpopulations for the purposes of this analysis. Natal homing to the nesting beach provides the genetic barrier between these subpopulations, preventing recolonization from turtles from

other nesting beaches. The importance of maintaining these subpopulations in the wild is shown by the many examples of extirpated nesting assemblages in the world. In addition, recent fine-scale analysis of mtDNA work from Florida rookeries indicate that population separations begin to appear between nesting beaches separated by more than 50-100 km of coastline that does not host nesting (Francisco *et al.* 2000) and tagging studies are consistent with this result (Richardson 1982, Ehrhart 1979, LeBuff 1990, CMTTP: in NMFS SEFSC 2001). Nest site relocations greater than 100 km occur, but generally are rare (Ehrhart 1979; LeBuff 1974, 1990; CMTTP; Bjorndal *et al.* 1983: *in* NMFS SEFSC 2001).

The loggerhead turtles in the action area are likely to represent differing proportions of the four western Atlantic subpopulations. Although the northern nesting subpopulation produces about 9% of the loggerhead nests, they comprise more of the loggerhead sea turtles found in foraging areas from the northeastern U.S. to Georgia: between 25 and 59 percent of the loggerhead turtles in this area are from the northern subpopulation (NMFS SEFSC 2001; Bass *et al*., 1998; Norrgard, 1995; Rankin-Baransky, 1997; Sears 1994, Sears *et al.*, 1995). In the Carolinas, the northern subpopulation is estimated to make up from 25% to 28% of the loggerheads (NMFS SEFSC 2001; Bass *et al.* 1998, 1999). About ten percent of the loggerhead turtles in foraging areas off the Atlantic coast of central Florida are from the northern subpopulation (Witzell *et al*., in prep). In the Gulf of Mexico, most of the loggerhead turtles in foraging areas will be from the South Florida subpopulation, although the northern subpopulation may represent about 10% of the loggerhead sea turtles in the Gulf (Bass pers. comm). In the Mediterranean Sea, about 45 - 47 percent of the pelagic loggerheads are from the South Florida subpopulation and about two percent are from the northern subpopulation, while only about 51% originated from Mediterranean nesting beaches (Laurent *et al.*, 1998). In the vicinity of the Azores and Madiera Archipelagoes, about 19% of the pelagic loggerheads are from the northern subpopulation, about 71% are from the South Florida subpopulation, and about 11% are from the Yucatán subpopulation (Bolten *et al*., 1998).

Natural History. Loggerhead turtles originating from the western Atlantic nesting aggregations are believed to lead a pelagic existence in the North Atlantic Gyre for as long as 7-12 years. Turtles in this life history stage are called "pelagic immatures" and are best known from the eastern Atlantic near the Azores and Madeira and have been reported from the Mediterranean as well as the eastern Caribbean (Bjorndal *et al*., in press). Stranding records indicate that when pelagic immature loggerheads reach 40-60 cm SCL they recruit to coastal inshore and nearshore waters of the continental shelf throughout the U.S. Atlantic and Gulf of Mexico.

Benthic immatures have been found from Cape Cod, Massachusetts, to southern Texas, and occasionally strand on beaches in northeastern Mexico (R. Márquez-M., pers. comm.). Large benthic immature loggerheads (70-91 cm) represent a larger proportion of the strandings and in-water captures (Schroeder *et al.*, 1998) along the south and western coasts of Florida as compared with the rest of the coast, but it is not known whether the larger animals actually are more abundant in these areas or just more abundant within the area relative to the smaller turtles. Benthic immature loggerheads foraging in

northeastern U.S. waters are known to migrate southward in the fall as water temperatures cool (Epperly *et al.*, 1995; Keinath, 1993; Morreale and Standora, 1999; Shoop and Kenney, 1992), and migrate northward in spring. Given an estimated age at maturity of 21-35 years (Frazer and Ehrhart, 1985; Frazer and Limpus, 1998), the benthic immature stage must be at least 10-25 years long. NMFS SEFSC 2001 analyses conclude that juvenile stages have the highest elasticity and maintaining or decreasing current sources of mortality in those stages will have the greatest impact on maintaining or increasing population growth rates.

Like other sea turtles, the movements of loggerheads are influenced by water temperature. Since they are limited by water temperatures, sea turtles do not usually appear on the summer foraging grounds until June, but are found in Virginia as early as April. The large majority leaves the Gulf of Maine by mid-September but may remain in these areas until as late as November and December. Loggerhead sea turtles are primarily benthic feeders, opportunistically foraging on crustaceans and mollusks (Wynne and Schwartz, 1999). Under certain conditions they may also scavenge fish, particularly if they are easy to catch (e.g., caught in nets) (NMFS and USFWS, 1991).

Adult female loggerheads in the western Atlantic come ashore to nest primarily from North Carolina southward to Florida. Additional nesting assemblages occur in the Florida Panhandle and on the Yucatán Peninsula. Non-nesting, adult female loggerheads are reported throughout the U.S. and Caribbean Sea; however, little is known about the distribution of adult males who are seasonally abundant near nesting beaches during the nesting season. Aerial surveys suggest that loggerheads (benthic immatures and adults) in U.S. waters are distributed in the following proportions: 54% in the southeast U.S. Atlantic, 29% in the northeast U.S. Atlantic, 12% in the eastern Gulf of Mexico, and 5% in the western Gulf of Mexico (TEWG 1998).

Threats. Loggerhead sea turtles face a number of human-related threats in the marine environment, including oil and gas exploration, development, and transportation; marine pollution; trawl, purse seine, hook and line, gill net, pound net, longline, and trap fisheries (see below); underwater explosions; dredging, offshore artificial lighting; power plant entrapment; entanglement in debris; ingestion of marine debris; marina and dock construction and operation; boat collisions; and poaching.

Although loggerhead turtles are most vulnerable to pelagic longlines during their pelagic, immature life history stage, there is some evidence that benthic immatures may also be captured, injured, or killed by pelagic fishery operations. Recent studies have suggested that not all loggerhead turtles follow the model of circumnavigating the North Atlantic Gyre as pelagic immatures, followed by permanent settlement into benthic environments. Some may not totally circumnavigate the North Atlantic. In addition, some of these turtles may either remain in the pelagic habitat in the North Atlantic longer than hypothesized or they may move back and forth between pelagic and coastal habitats (Witzell in prep.). Any loggerhead turtles that follow this developmental model would be adversely affected by shark gill nets and shark bottom longlines set in coastal waters, in addition to pelagic longlines.

On their nesting beaches in the U.S., loggerhead turtles are threatened with beach erosion, armoring, and nourishment; artificial lighting; beach cleaning; increased human presence; recreational beach equipment; exotic dune and beach vegetation; predation by fire ants, raccoons, armadillos, opossums; and poaching. Elimination/control of these threats are especially important because, from a global perspective, the southeastern U.S. nesting aggregation is critical to the survival of this species: it is second in size only to the nesting aggregations in the Arabian Sea off Oman and represents about 35 and 40 percent of the nests of this species. The status of the Oman nesting beaches has not been evaluated recently, but they are located in a part of the world that is vulnerable to extremely disruptive events (e.g. political upheavals, wars, and catastrophic oil spills), the resulting risk facing this nesting aggregation and these nesting beaches is cause for considerable concern (Meylan *et al*., 1995).

Loggerhead turtles also face numerous threats from weather and coastal processes. For example, there is a significant overlap between hurricane seasons in the Caribbean Sea and northwest Atlantic Ocean (June to November) and loggerhead turtle nesting season (March to November); hurricanes can have potentially disastrous effects on the survival of eggs in sea turtle nests. In 1992, Hurricane Andrew affected turtle nests over a 90-mile length of coastal Florida; all of the eggs were destroyed by storm surges on beaches that were closest to the eye of this hurricane (Milton *et al*., 1992). On Fisher Island near Miami, Florida, 69% of the eggs did not hatch after Hurricane Andrew, probably because they were drowned by the storm surge. Nests from the northern subpopulation were destroyed by hurricanes, which made landfall in North Carolina in the mid to late 1990's. Sand accretion and rainfall that result from these storms can appreciably reduce hatchling success. These natural phenomena probably have significant, adverse effects on the size of specific year classes; particularly given the increasing frequency and intensity of hurricanes in the Caribbean Sea and northwest Atlantic Ocean.

Status and Population Trends. The loggerhead turtle was listed as threatened under the ESA on July 28, 1978. The most recent work updating what is known regarding status and trends of loggerhead sea turtles is contained in NMFS SEFSC 2001. The recovery plan for this species (NMFS and USFWS 1991) state that southeastern U.S. loggerheads can be considered for delisting if, over a period of 25 years, adult female populations in Florida are increasing and there is a return to pre-listing annual nest numbers totaling 12,800 for North Carolina, South Carolina, and Georgia combined. This equates to approximately 3,100 nesting females per year at 4.1 nests per female per season. NMFS SEFSC 2001 concludes, "…nesting trends indicate that the numbers of females associated with the South Florida subpopulation are increasing. Likewise, nesting trend analyses indicate potentially increasing nest numbers in the northern subpopulation" (TEWG 2000). However, NMFS SEFSC 2001 also cautions that given the uncertainties in survival rates (of the different life stages, particularly the pelagic immature stage), and the stochastic nature of populations, population trajectories should not be used now to quantitatively assess when the northern subpopulation may achieve 3,100 nesting females.

Several published reports have presented the problems facing long-lived species that delay sexual maturity in a world replete with threats from a modern, human population (Crouse *et al.*, 1987, Crowder *et al.*, 1994, Crouse 1999). In general, these reports concluded that animals that delay sexual

maturity and reproduction must have high, annual survival as juveniles through adults to ensure that enough juveniles survive to reproductive maturity and then reproduce enough times to maintain stable population sizes. This general tenet of population ecology originated in studies of sea turtles (Crouse *et al.*, 1987, Crowder *et al.*, 1994, Crouse 1999). Heppell *et al.* (in prep.) specifically showed that the growth of the loggerhead sea turtle population was particularly sensitive to changes in the annual survival of both juvenile and adult sea turtles and that the adverse effects of the pelagic longline fishery on loggerheads from the pelagic immature phase appeared critical to the survival and recovery of the species. Crouse (1999) concluded that relatively small changes in annual survival rates of both juvenile and adult loggerhead sea turtles would adversely affect large segments of the total loggerhead sea turtle population.

The four major subpopulations of loggerhead sea turtles in the northwest Atlantic, northern, south Florida, Florida panhandle, and Yucatán are all subject to fluctuations in the number of young produced annually because of natural phenomena like hurricanes as well as human-related activities. Although sea turtle nesting beaches are protected along large expanses of the northwest Atlantic coast (in areas like Merrit Island, Archie Carr, and Hobe Sound National Wildlife Refuges), other areas along these coasts have limited or no protection and probably cause fluctuations in sea turtle nesting success. Sea turtles nesting in the southern and central counties of Florida can be affected by beach armoring, beach renourishment, beach cleaning, artificial lighting, predation, and poaching (NMFS & FWS 1991).

As discussed previously, the survival of juvenile loggerhead sea turtles is threatened by a completely different set of threats from human activity once they migrate to the ocean. Pelagic immature loggerhead sea turtles from these four subpopulations circumnavigate the North Atlantic over several years (Carr 1987, Bjorndal 1994). During that period, they are exposed to a series of long-line fisheries that include an Azorean long-line fleet, a Spanish long-line fleet, and various fleets in the Mediterranean Sea (Aguilar *et al*., 1995, Bolten *et al.*, 1994, Crouse 1999). Based on their proportional distribution, the capture of immature loggerhead sea turtles in long-line fleets in the Azores and Madiera Archipelagoes and the Mediterranean Sea will have a significant, adverse effect on the annual survival rates of juvenile loggerhead sea turtles from the western Atlantic subpopulations, with a disproportionately large effect on the northern subpopulation that may be significant at the population level.

In waters off coastal U.S., a suite of fisheries in Federal and State waters threatens the survival of juvenile loggerhead sea turtles. Loggerhead turtles are captured, injured, or killed in shrimp fisheries off the Atlantic coast; along the southeastern Atlantic coast, loggerhead turtle populations are declining where shrimp fishing is intense off the nesting beaches (NRC 1990). Conversely these nesting populations do not appear to be declining where nearshore shrimping effort is low or absent. The management of shrimp harvest in the Gulf of Mexico demonstrates the correlation between shrimp trawling and impacts to sea turtles. Waters out to 200nm are closed to shrimp fishing off of Texas each year for approximately a three-month period (mid- May through mid-July) to allow shrimp to migrate out of estuarine waters; sea turtle strandings decline dramatically during this period (NMFS, STSSN unpublished data). Loggerhead sea turtles are captured in fixed pound-net gear in the Long Island

Sound, in pound-net gear and trawls in summer flounder and other finfish fisheries in the mid-Atlantic and Chesapeake Bay, in gill net fisheries in the mid-Atlantic and elsewhere, in fisheries for monkfish and for spiny dogfish, and in northeast sink gillnet fisheries (see further discussion in the *Environmental Baseline* of this Opinion). Witzell (1999) compiled data on capture rates of loggerhead and leatherback turtles in U.S. longline fisheries in the Caribbean and northwest Atlantic; the cumulative takes of these fisheries approach those of the U.S. shrimp fishing fleet (Crouse 1999, NRC 1990).

Based on the data available, it is not possible to estimate the size of the loggerhead population in the U.S. or its territorial waters. There is, however, general agreement that the number of nesting females provides a useful index of the species' population size and stability at this life stage. Nesting data collected on index nesting beaches in the U.S. from 1989-1998 represent the best dataset available to index the population size of loggerhead turtles. However, an important caveat for population trends analysis based on nesting beach data is that this may reflect trends in adult nesting females, but it may not reflect overall population growth rates. Given this, between 1989 and 1998, the total number of nests laid along the U.S. Atlantic and Gulf coasts ranged from 53,016-89,034 annually, representing, on average, an adult female population of 44,780 [(nests/4.1) * 2.5]. On average, 90.7% of the nests were from the South Florida subpopulation, 8.5% were from the northern subpopulation, and 0.8% were from the Florida Panhandle subpopulation. There is limited nesting throughout the Gulf of Mexico west of Florida, but it is not known to what subpopulation they belong. Based on the above, there are only an estimated 3,800 nesting females in the northern loggerhead subpopulation. The status of this population, based on number of loggerhead nests, has been classified as stable or declining (TEWG 2000). Another consideration adding to the vulnerability of the northern subpopulation is that NMFS scientists estimate, using genetics data from Texas, South Carolina, and North Carolina in combination with juvenile sex ratios from those states, that the northern subpopulation produces 65% males, while the Florida subpopulation is estimated to produce 80% females (NMFS SEFSC 2001, Part I).

Critical Habitat. No critical habitat has been designated for loggerhead turtles.

Hawksbill Turtle (*Eretmochelys imbracata*)

Distribution. Hawksbill turtles occur in tropical and subtropical waters of the Atlantic, Pacific, and Indian Oceans. Recognized subspecies occupy the Atlantic Ocean (ssp. *imbricata*) and the Pacific Ocean (ssp. *squamata*). Richardson *et al*. (1989) estimated that the Caribbean and Atlantic portions of the U.S. support a minimum of 650 hawksbill turtle nests each year. In the United States, hawksbill turtles have been recorded in all states along the Gulf of Mexico and along the Atlantic coast from Florida to Massachusetts. United States populations nest primarily in the U.S. Virgin Islands and Puerto Rico, but occasionally on the Atlantic coast of Florida. Two hawksbill turtle carcasses have been found in the vicinity of the action area (Wendy Teas, pers com, 2002, NMFS - SEFSC Miami Laboratory).

Natural History. Hawksbill turtles use different habitats for different stages in their life cycles. Post-hatchling hawksbill turtles remain in pelagic environments to take shelter in weedlines that accumulate at

convergence points. Juvenile hawksbill turtles (those with carapace lengths of 20-25 cm) re-enter coastal waters where they become residents of coral reefs, which provide sponges for food and ledges, and caves for shelter. Hawksbill turtles are also found around rocky outcrops, high-energy shoals, and mangrove-fringed bays and estuaries (particularly in areas where coral reefs do not occur). Hawksbill turtles remain in coastal waters when they become subadults and adults.

Status and Threats. The hawksbill turtle was listed as an endangered species on June 2, 1970 (35 FR 8491). Populations are threatened by significant modifications of its coastal habitat throughout its range. The National Research Council (1990), and NMFS/FWS (1993) have published general overviews of the effects of habitat alteration on hawksbill turtles. In the U.S. Virgin Islands, problems such as egg poaching, domestic animals, beach driving, litter, and recreational use of beaches have presented problems for nesting hawksbill turtles. In addition, beachfront lights appear to pose a serious problem for hatchling hawksbill (and other) turtles in the U.S. Virgin Islands. At sea, activities that damage coral reefs and other habitats that are important to the hawksbill turtle threaten the continued existence of this species. Hawksbill turtles are also threatened by stochastic events (e.g., hurricanes); predation by fire ants, raccoons and opossums; and by poaching of eggs and nesting females by humans.

Critical Habitat. In 1998, NMFS designated the waters surrounding Mona and Monito Islands, Puerto Rico as critical habitat for the hawksbill turtle. The action area does not comprise designated critical habitat for the species.

Kemp's Ridley Turtle (*Lepidochelys kempii*)

Status and Population Trends. Of the seven extant species of sea turtles of the world, the Kemp's ridley has declined to the lowest population level. The Recovery Plan for the Kemp's Ridley Sea Turtle (*Lepidochelys kempi*) (USFWS and NMFS 1992) contains a description of the natural history, taxonomy, and distribution of the Kemp's ridley turtle. Kemp's ridleys nest in daytime aggregations known as *arribadas*. The primary arribada in the Gulf of Mexico is at Rancho Nuevo, a stretch of beach in Mexico. Most of the population of adult females nest in this single locality (Pritchard 1969). When nesting aggregations at Rancho Nuevo were discovered in 1947, adult female populations were estimated to be in excess of 40,000 individuals (Hildebrand 1963). By the early 1970's, the world population estimate of mature female Kemp's ridleys had been reduced to 2,500-5,000 individuals. The population declined further through the mid-1980s. Recent observations of increased nesting suggest that the decline in the ridley population has stopped and there is cautious optimism that the population is now increasing.

After unprecedented numbers of Kemp's ridley carcasses were reported from Texas and Louisiana beaches during periods of high levels of shrimping effort, NMFS established a team of population biologists, sea turtle scientists, and managers, known as the Turtle Expert Working Group (TEWG) to conduct a status assessment of sea turtle populations. Analyses conducted by the group have indicated that the Kemp's ridley population is in the early stages of recovery; however, strandings in some years have increased at rates higher than the rate of increase in the Kemp's population (TEWG 1998).

The TEWG (1998) developed a population model to evaluate trends in the Kemp's ridley population through the application of empirical data and life history parameter estimates chosen by the TEWG. Model results identified three trends in benthic immature Kemp's ridleys. Benthic immatures are those turtles that are not yet reproductively mature but have recruited to feed in the nearshore benthic environment where they are available to nearshore mortality sources that often result in strandings. Benthic immature ridleys are estimated to be 2-9 years of age and 20-60 cm in length. Increased production of hatchlings from the nesting beach beginning in 1966 resulted in an increase in benthic ridleys that leveled off in the late 1970s. A second period of increase followed by leveling occurred between 1978 and 1989 as hatchling production was further enhanced by the cooperative program between the U.S. Fish and Wildlife Service (FWS) and Mexico's Instituto Nacional de Pesca to increase the nest protection and relocation program in 1978. A third period of steady increase, which has not leveled off to date, has occurred since 1990 and appears to be due to the greatly increased hatchling production and an apparent increase in survival rates of immature turtles beginning in 1990 due, in part, to the introduction of turtle excluder devices (TEDs). Adult ridley numbers have now grown from a low of approximately 1,050 adults producing 702 nests in 1985, to greater than 3,000 adults producing 1,940 nests in 1995 and about 3,400 nests in 1999.

The TEWG (1998) was unable to estimate the total population size and current mortality rates for the Kemp's ridley population. However, the TEWG listed a number of preliminary conclusions. The TEWG indicated that the Kemp's ridley population appears to be in the early stage of exponential expansion. Over the period 1987 to 1995, the rate of increase in the annual number of nests accelerated in a trend that would continue with enhanced hatchling production and the use of TEDs. Nesting data indicated that the number of adults declined from a population that produced 6,000 nests in 1966 to a population that produced 924 nests in 1978 and a low of 702 nests in 1985. This trajectory of adult abundance tracks with trends in nest abundance from an estimate of 9,600 in 1966 to 1,050 in 1985. The TEWG estimated that in 1995 there were 3,000 adult ridleys. The increased recruitment of new adults is illustrated in the proportion of neophyte, or first time nesters, which has increased from 6% to 28% from 1981 to 1989 and from 23% to 41% from 1990 to 1994. The population model in the TEWG projected that Kemp's ridleys could reach the intermediate recovery goal identified in the Recovery Plan of 10,000 nesters by the year 2020 if the assumptions of age to sexual maturity and age specific survivorship rates plugged into their model are correct. It determined that the data reviewed suggested that adult Kemp's ridley turtles were restricted somewhat to the Gulf of Mexico in shallow near shore waters, and benthic immature turtles of 20-60 cm straight line carapace length are found in nearshore coastal waters including estuaries of the Gulf of Mexico and the Atlantic.

The TEWG (1998) identified an average Kemp's ridley population growth rate of 13% per year between 1991 and 1995. Total nest numbers have continued to increase. However, the 1996 and 1997 nest numbers reflected a slower rate of growth, while the increase in the 1998 nesting level has been much higher and decreased in 1999. The population growth rate does not appear as steady as originally forecasted by the TEWG, but annual fluctuations, due in part to irregular inter-nesting periods,

are normal for other sea turtle populations. Also, as populations increase and expand, nesting activity would be expected to be more variable.

The area surveyed for ridley nests in Mexico was expanded in 1990 due to destruction of the primary nesting beach by Hurricane Gilbert. The TEWG (1998) assumed that the increased nesting observed particularly since 1990 was a true increase, rather than the result of expanded beach coverage. Because systematic surveys of the adjacent beaches were not conducted prior to 1990, there is no way to determine what proportion of the nesting increase documented since that time is due to the increased survey effort rather than an expanding ridley nesting range. As noted by TEWG, trends in Kemp's ridley nesting even on the Rancho Nuevo beaches alone suggest that recovery of this population has begun but continued caution is necessary to ensure recovery and to meet the goals identified in the Kemp's Ridley Recovery Plan.

Natural History. Juvenile Kemp's ridleys use northeastern and mid-Atlantic coastal waters of the U.S. Atlantic coastline as primary developmental habitat during summer months, with shallow coastal embayments serving as important foraging grounds. Post-pelagic ridleys feed primarily on crabs, consuming a variety of species, including *Callinectes* sp., *Ovalipes* sp., *Libinia* sp., and *Cancer* sp. Mollusks, shrimp, and fish are consumed less frequently (Bjorndal, 1997). Juvenile ridleys migrate south as water temperatures cool in fall, and are predominantly found in shallow coastal embayments along the Gulf Coast during fall and winter months.
Ridleys found in mid-Atlantic waters are primarily post-pelagic juveniles averaging 40 centimeters in carapace length, and weighing less than 20 kilograms (Klinger and Musick 1995). Next to loggerheads, they are the second most abundant sea turtle in Virginia and Maryland waters, arriving in these areas during May and June, and migrating to more southerly waters from September to November (Keinath *et al.*, 1987; Musick and Limpus, 1997). In the Chesapeake Bay, ridleys frequently forage in shallow embayments, particularly in areas supporting submerged aquatic vegetation (Lutcavage and Musick, 1985; Bellmund *et al.*, 1987; Keinath *et al.*, 1987; Musick and Limpus, 1997). The juvenile population in Chesapeake Bay is estimated to be 211 to 1,083 turtles (Musick and Limpus, 1997).

Research being conducted by Texas A&M University has resulted in the intentional live-capture of hundreds of Kemp's ridleys at Sabine Pass and the entrance to Galveston Bay. Between 1989 and 1993, Galveston NMFS Laboratory staff tracked 50 of these turtles using satellite and radio telemetry. The tracking study was designed to characterize sea turtle habitat and to identify small and large-scale migration patterns. Preliminary analysis of the data collected during these studies suggests that subadult Kemp's ridleys stay in shallow, warm, nearshore waters in the northern Gulf of Mexico until cooling waters force them offshore or south along the Florida coast (Renaud, NMFS Galveston Laboratory, pers. comm.).

Threats. Observations in the northeast otter trawl fishery, pelagic longline fishery, and southeast shrimp and summer flounder bottom trawl fisheries have recorded takes of Kemp's ridley turtles. As with loggerheads, a large number of Kemp's ridleys are taken in the southeast shrimp fishery each year.

Kemp's ridleys were also affected by the apparent large-mesh gillnet interaction that occurred in spring off of North Carolina. A total of five Kemp's ridley carcasses were recovered from the same North Carolina beaches where 277 loggerhead carcasses were found. This is expected to be a minimum count of the number of Kemp's ridleys that were killed or seriously injured as a result of the fishery interaction since it is unlikely that all carcasses washed ashore. Stranding events illustrate the vulnerability of Kemp's ridley and loggerhead turtles to the impacts of human activities in nearshore Gulf of Mexico waters as well (TEWG 1998). While many of the stranded turtles observed in recent years in Texas and Louisiana have been incidentally taken in the shrimp fishery, other sources of mortality, such as those observed in the northeastern and southeastern Atlantic zones, exist in these waters.

Critical Habitat. No critical habitat has been designated for the Kemp's ridley turtle.

Leatherback Turtle (*Dermochelys coriacea*)

Species Description and Distribution
The leatherback is the largest living turtle. Leatherback sea turtles are widely distributed throughout the oceans of the world, and are found throughout waters of the Atlantic, Pacific, Caribbean, and the Gulf of Mexico (Ernst and Barbour 1972).

Leatherback turtles undertake the longest migrations of any other sea turtle and exhibit the broadest thermal tolerances (NMFS and USFWS 1998). Leatherback turtles are able to inhabit intensely cold waters for a prolonged period of time because leatherbacks are able to maintain body temperatures several degrees above ambient temperatures. Leatherback turtles are typically associated with continental shelf habitats and pelagic environments, and are sighted regularly in offshore waters (>328 ft). Leatherback turtles regularly occur in deep waters (>328 ft), and an aerial survey study in the north Atlantic Ocean sighted leatherback turtles in water depths ranging from 3 to 13,618 ft, with a median sighting depth of 131.6 ft (CeTAP 1982). This same study found leatherbacks in waters ranging from 7 to 27.2°C.

Life History Information
Although leatherbacks are a long lived species (> 30 years), they are somewhat faster to mature than loggerheads, with an estimated age at sexual maturity reported as about13-14 years for females, and an estimated minimum age at sexual maturity of 5-6 years, with 9 years reported as a likely minimum (Zug and Parham 1996).

Leatherback sea turtles are predominantly distributed pelagically where they feed on jellyfish such as *Stomolophus, Chryaora,* and *Aurelia* (Rebel 1974). Leatherbacks are deep divers, with recorded dives to depths in excess of 1000 m, but they may come into shallow waters if there is an abundance of jellyfish nearshore. They also occur annually in places such as Cape Cod and Narragansett bays during certain times of the year, particularly the fall.

Listing status
The leatherback was listed as endangered on June 2, 1970 and a recovery plan was issued in 1998. Leatherback turtles are included in Appendix I of the Convention on International Trade in Endangered Species of Wild Fauna and Flora, which effectively bans trade.

Population status and trends

Globally, leatherback turtle populations have been decimated worldwide. The global leatherback turtle population was estimated to number approximately 115,000 adult females in 1980 (Pritchard 1982), but only 34,500 in 1995 (Spotila *et al*. 1996). The decline can be attributed to many factors including fisheries as well as intense exploitation of the eggs (Ross 1979). On some beaches nearly 100% of the eggs laid have been harvested (Eckert 1996). Eckert (1996) and Spotila *et al*. (1996) record that adult mortality has also increased significantly, particularly as a result of driftnet and longline fisheries.

The status of the Atlantic population is not clear. In 1996, it was reported to be stable, at best (Spotila 1996), but numbers in the Western Atlantic at that writing were reported to be on the order of 18,800 nesting females. According to Spotila (pers. com.), the Western Atlantic population currently numbers about 15,000 nesting females, whereas current estimates for the Caribbean (4,000) and the Eastern Atlantic (i.e. off Africa, numbering ~ 4,700) have remained consistent with numbers reported by Spotila *et al*. in 1996. Between 1989 and 1995, marked leatherback returns to the nesting beach at St. Croix averaged only 48.5%, but that the overall nesting population grew (McDonald, et. al 1993). This is in contrast to a Pacific nesting beach at Playa Grande, Costa Rica, where only 11.9% of turtles tagged in 1993-94 and 19.0% of turtles tagged in 1994-95 returned to nest over the next five years. Characterizations of this population suggest that it has a very low likelihood of survival and recovery in the wild under current conditions.

Spotila *et al*. (1996) describe a hypothetical life table model based on estimated ages of sexual maturity at both ends of the species= natural range (5 and 15 years). The model concluded that leatherbacks maturing in 5 years would exhibit much greater population fluctuations in response to external factors than would turtles that mature in 15 years. Furthermore, the simulations indicated that leatherbacks could maintain a stable population only if both juvenile and adult survivorship remained high, and that if other life history stages (i.e. egg, hatchling, and juvenile) remained static, stable leatherback populations could not withstand an increase in adult mortality above natural background levels without decreasing.

Threats

The primary threats to leatherback turtles are entanglement in fishing gear (e.g., gillnets, longlines, lobster pots, weirs), boat collisions, and ingestion of marine debris (NMFS and USFWS 1997). The foremost threat is the number of leatherback turtles killed or injured in fisheries. Spotila (2000) states that a conservative estimate of annual leatherback fishery-related mortality (from longlines, trawls and gillnets) in the Pacific during the 1990s is 1,500 animals. He estimates that this represented about a 23% mortality rate (or 33% if most mortality was focused on the East Pacific population). As noted above, leatherbacks normally live at least 30 years, usually maturing at about 12-13 years. Such long-lived species cannot withstand such high rates of anthropogenic mortality.

Blue Whale (*Balenoptera musculus*)

Species description and distribution

Blue whales are the largest living mammal species. They may measure over 30 meters in length and weigh up to 160 metric tons. They are blue-gray in color with distinct gray and white mottling, while their ventral surface may be light pink in coloration. Their dorsal fin is relatively small. Like other baleen whales, they have fringed baleen plates instead of teeth, and ventral grooves which filter large quantities of water during feeding. Blue whales are found in all major oceans, including the continental shelf in coastal shelves and far offshore in pelagic environments of the North Pacific.

At least three subspecies of blue whales have been identified based on body size and geographic distribution (*B. musculus intermedia*, which occurs in the higher latitudes of the Southern Oceans, *B. m. musculus*, which occurs in the Northern Hemisphere, and *B. m. brevicauda* which occurs in the mid-latitude waters of the

southern Indian Ocean and north of the Antarctic convergence), but this consultation will treat them as a single entity.

Blue whales are found in the Atlantic Ocean from the Arctic to at least the mid-latitude waters of the North Atlantic with occasional occurrences in the U.S. EEZ (CeTAP 1982, Wenzel *et al*. 1988, Yochem and Leatherwood 1985, Gagnon and Clark 1993). Blue whales are most frequently sighted off eastern Canada. During winter, they are found in the waters off Newfoundland. In summer, they are found in Davis Strait (Mansfield 1985), in the Gulf of St. Lawrence (from the north shore of the St. Lawrence River estuary to the Strait of Belle Isle), and off eastern Nova Scotia (Sears *et al*. 1987). Blue whales have been sighted off the Azores Islands, but Reiner *et al*. (1993) do not consider them common in that area.

In the Atlantic Ocean, blue whales are found from the Arctic to least the mid-latitude waters of the North Atlantic (CeTAP 1982, Wenzel *et al*.1988, Yochem and Leatherwood 1985, Gagnon and Clark 1993). The IWC treats these whales as one stock (Donovan1991).

Sightings of blue whales occur most frequently off eastern Canada. During winter, they are found in the waters off Newfoundland. In summer, they are found in Davis Strait (Mansfield 1985), in the Gulf of St. Lawrence (from the north shore of the St. Lawrence River estuary to the Strait of Belle Isle), and off eastern Nova Scotia (Sears *et al*. 1987).

In 1992, the U.S. Navy conducted an extensive acoustic survey of the North Atlantic using the Integrated Underwater Surveillance System's (IUSS) fixed acoustic array system (Clark 1995). This study gave researchers insight into the seasonality of baleen whale vocalizations (Clark *et al*. 1993). Concentrations of blue whale sounds were detected in the Grand Banks off Newfoundland and west of the British Isles. In the lower latitudes, one blue whale was tracked acoustically for 43 days, during which time the animal traveled 1400 nautical miles around the western North Atlantic from waters northeast of Bermuda to the southwest and west of Bermuda
(Gagnon and Clark 1993).

Life history information
Blue whale reproductive activities occur primarily in winter (see Yochem and Leatherwood 1985). Gestation takes 10-12 months, followed by a nursing period that continues for about 6-7 months. They reach sexual maturity at about 5 years of age (see Yochem and Leatherwood 1985). The age distribution of blue whales is unknown and little information exists on natural sources of mortality (such as disease) and mortality rates. Killer whales are known to attack blue whales, but the rate of these attacks or their effect on blue whale populations is unknown. Important foraging areas include the edges of continental shelves and ice edges in polar regions (Yochem and Leatherwood 1985; Reilly and Thayer 1990). Data indicate that some summer feeding takes place at low latitudes in upwelling-modified waters (Reilly and Thayer 1990), and that some whales remain year-round at either low or high latitudes (Yochem and Leatherwood 1985; Clark and Charif 1998). The species *Thysanoëssa inermis*, *T. longipes*, *T. raschii*, and *Nematoscelis megalops* have been listed as prey of blue whales in the North Pacific (Kawamura 1980; Yochem and Leatherwood 1985).

Although some stomachs of blue whales have been found to contain a mixture of euphausiids and copepods or amphipods (Nemoto 1957; Nemoto and Kawamura 1977), it is likely that the copepods and amphipods were consumed adventitiously or incidentally. Reports that blue whales feed on small, schooling fish and squid in the western Pacific (Mizue 1951; Sleptsov 1955) have been interpreted as suggesting that the zooplankton blue whales prefer are less available there (Nemoto 1957). Between February and April, blue whales in the Gulf of California, Mexico, have been observed feeding on euphausiid surface swarms (Sears 1990) consisting mainly of *Nyctiphanes simplex* engaged in reproductive activities (Gendron 1990, 1992).

Sears (1990) regarded *Nyctiphanes simplex* as the principal prey of blue whales in the region, and results from recent fecal analyses confirmed this assertion (Gendron and Del Angel-Rodriguez 1997). However, this phenomenon appears to be strongly influenced by the occurrence of El Niño Southern Oscillation (ENSO) events (Gendron and Sears 1993).

Other baleen whales whose range overlaps with the range of blue whales could potentially compete with blue whales for food (Nemoto 1970). Nevertheless, there is no evidence of competition among these whales and the highly migratory behavior of blue whales may help them avoid competition with other baleen whales (Clapham and Brownell 1996).

Diving and social behavior

Generally, blue whales make 5-20 shallow dives at 12-20 second intervals followed by a deep dive of 3-30 minutes (Mackintosh 1965; Leatherwood *et al.* 1976; Maser *et al.* 1981; Yochem and Leatherwood 1985; Strong 1990; Croll *et al.* 1999). Croll *et al.* (1999) found that the dive depths of blue whales foraging off the coast of California during the day averaged 132 m (433 ft) with a maximum-recorded depth of 204 m (672 ft) and mean dive duration of 7.2 minutes. Nighttime dives are generally less than 50 m (165 ft) in depth (Croll *et al.* 1999).

Blue whales are usually found swimming alone or in groups of two or three (Ruud 1956; Slijper 1962; Nemoto 1964; Mackintosh 1965; Pike and MacAskie 1969; Aguayo 1974). However, larger foraging aggregations and aggregations mixed with other rorquals such as fin whales are regularly reported (Schoenherr 1991; Fiedler *et al.* 1998; Croll and Tershy pers. obs.). Little is known of the mating behavior of blue whales.

Vocalizations and hearing

Known vocalizations of blue whales include a variety of sounds described as low frequency moans or long pulses (Cummings and Thompson 1971, 1977; Edds 1982, Thompson and Friedl 1982; Edds-Walton 1997). Blue whales produce a variety of low frequency sounds in the 10-100 Hz band (Cummings and Thompson 1971; Edds 1982; Thompson and Friedl 1982; McDonald *et al.* 1995; Clark and Fristrup 1997; Rivers 1997; Ljungblad *et al.* in press). The most typical signals are very long, patterned sequences of tonal infrasonic sounds in the 15-40 Hz range. The sounds last several tens of seconds. Estimated source levels are as high as 180-190 dB (Cummings and Thompson 1971). Ketten (1997) reports the frequencies of maximum energy between 12 and 18 Hz. In temperate waters, intense bouts of long patterned sounds are very common from fall through spring, but these also occur to a lesser extent during the summer in high latitude feeding areas. Short sequences of rapid calls in the 30-90 Hz band are associated with animals in social groups (Clark pers. obs., McDonald pers. comm.). The seasonality and structure of long patterned sounds suggest that these sounds are male displays for attracting females and/or competing with other males. The context for the 30-90 Hz calls suggests that they are communicative but not related to a reproductive function. Vocalizations attributed to blue whales have been recorded in presumed foraging areas, along migration routes, and during the presumed breeding season (Beamish and Mitchell 1971; Cummings and Thompson 1971, 1977, 1994; Cummings and Fish 1972; Thompson *et al.* 1996; Rivers 1997; Tyack and Clark 1997; Clark *et al.* 1998).

Blue whale moans within the low frequency range of 12.5-200 Hz, with pulse duration up to 36 seconds, have been recorded off Chile (Cummings and Thompson 1971). A short, 390 Hz pulse also is produced during the moan. One estimate of the overall source level was as high as 188 dB, with most energy in the 1/3-octave bands centered at 20, 25, and 31.5 Hz, and also included secondary components estimates near 50 and 63 Hz (Cummings and Thompson 1971). The function of vocalizations produced by blue whales is unknown. Hypothesized functions include: 1) maintenance of inter-individual distance, 2) species and individual recognition, 3) contextual information transmission (e.g., feeding, alarm, courtship), 4) maintenance of social

organization (e.g., contact calls between females and offspring), 5) location of topographic features, and 6) location of prey resources (review by Thompson *et al.* 1979). Responses to conspecific sounds have been demonstrated in a number of mysticetes, and there is no reason to believe that blue whales do not communicate similarly (Edds-Walton 1997). The low-frequency sounds produced by blue whales can, in theory, travel long distances, and it is possible that such long-distance communication occurs (Payne and Webb 1971; Edds-Walton 1997). The long range sounds may also be used for echolocation in orientation or navigation (Tyack 1999).

Cetaceans have an auditory anatomy that follows the basic mammalian pattern, with some modifications to adapt to the demands of hearing in the sea. The typical mammalian ear is divided into the outer ear, middle ear, and inner ear. The outer ear is separated from the inner ear by the tympanic membrane, or eardrum. In terrestrial mammals, the outer ear, eardrum, and middle ear function to transmit airborne sound to the inner ear, where the sound is detected in a fluid. Since cetaceans already live in a fluid medium, they do not require this matching, and thus do not have an air-filled external ear canal. The inner ear is where sound energy is converted into neural signals that are transmitted to the central nervous system via the auditory nerve. Acoustic energy causes the basilar membrane in the cochlea to vibrate. Sensory cells at different positions along the basilar membrane are excited by different frequencies of sound (Tyack 1999). Baleen whales have inner ears that appear to be specialized for low-frequency hearing.

In a study of the morphology of the blue whale auditory apparatus, Ketten (1997) hypothesized that blue whales have acute infrasonic hearing. No studies have directly measured the sound sensitivity of blue whales.

Listing status
Blue whales have been listed as endangered under the ESA since 1973. They are also protected by the Convention on International Trade in Endangered Species of wild flora and fauna and the MMPA. Critical habitat has not been designated for blue whales.

Population status and trends
The global population of blue whales has been estimated to range from 11,200 to 13,000 animals (Maser *et al.* 1981; U. S. Department of Commerce 1983) which is a fraction of pre-whaling populations estimates of 200,000 animals. The size of the blue whale population in the north Atlantic is also uncertain. The population has been estimated from a few hundred individuals (Allen 1970; Mitchell 1974) to 1,000 to 2,000 individuals (Sigurjónsson 1995). Gambell (1976) estimated there were between 1,100 and 1,500 blue whales in the North Atlantic before whaling began and Braham (1991) estimated there were between 100 and 555 blue whales in the North Atlantic during the late 1980s and early 1990s.

Sears *et al.* (1987) identified over 300 individual blue whales in the Gulf of St. Lawrence, which provides a minimum estimate for their population in the North Atlantic. Sigurjónsson and Gunnlaugson (1990) concluded that the blue whale population had been increasing since the late 1950s; from 1979 to 1988, they concluded that the blue whale population was increasing at an annual rate of about 5 percent.

Threats
From 1889 to 1965 approximately 5,761 blue whales were taken from the North Pacific Ocean (NMFS 1998). Evidence of a population decline can be seen in the catch data from Japan. In 1912, 236 blue whales were caught, 58 whales in 1913, 123 whales in 1914, and from 1915 to 1965, the catch numbers declined continuously (Mizroch *et al.* 1984a). In the eastern North Pacific, 239 blue whales were taken off the California coast in 1926. And, in the late 1950s and early 1960s, Japan caught 70 blue whales per year off the Aleutian Islands (Mizroch *et al.* 1984a). The IWC banned commercial whaling in the North Pacific in 1966, since that time there have been no reported blue whale takes. Nevertheless, Soviet whaling probably continued

after the ban so Soviet catch reports under-represent the number of blue whales killed by whalers (as cited in Forney and Brownell 1996). Surveys conducted in these former-whaling areas in the 1980s and 1990s failed to find any blue whales (Forney and Brownell 1996).

There are no reports of fisheries-related mortality or serious injury in any of the blue whale stocks. Blue whale interaction with fisheries may go undetected because the whales are not observed after they swim away with a portion of the net. However, fishers report that large blue and fin whales usually swim through their nets without entangling and with very little damage to the net (Barlow *et al.* 1997).

In 1980, 1986, 1987, and 1993, ship strikes have been implicated in the deaths of blue whales off California (Barlow *et al.* 1997). In addition, several photo-identified blue whales from California waters were observed with large scars on their dorsal areas that may have been caused by ship strikes. Studies have shown that blue whales respond to approaching ships in a variety of ways, depending on the behavior of the animals at the time of approach, and speed and direction of the approaching vessel. While feeding, blue whales react less rapidly and with less obvious avoidance behavior than whales that are not feeding (Sears *et al.* 1983). Within the St. Lawrence Estuary, blue whales are believed to be affected by large amounts of recreational and commercial vessel traffic. Blue whales in the St. Lawrence appeared more likely to react to these vessels when boats made fast, erratic approaches or sudden changes in direction or speed (Edds and Macfarlane 1987, Macfarlane 1981). The number of blue whales struck and killed by ships is unknown because the whales do not always strand or examinations of blue whales that have stranded did not identify the traumas that could have been caused by ship collisions. In the California/Mexico stock, annual incidental mortality due to ship strikes averaged 0.2 whales during 1991в1995 (Barlow *et al.* 1997), but we cannot determine if this reflects the actual number of blue whales struck and killed by ships.

Humpback Whale *(Balaenoptera physalus)*

Species description and distribution
Humpback whales typically migrate between tropical/sub-tropical and temperate/polar latitudes. Humpback whales feed on krill and small schooling fish on their summer grounds. The whales occupy tropical areas during winter months when they are breeding and calving, and polar areas during the spring, summer, and fall, when they are feeding, primarily on small schooling fish and krill (Caldwell and Caldwell 1983).

In the Atlantic Ocean, humpback whales feed in the northwestern Atlantic during the summer months and migrate to calving and mating areas in the Caribbean. Six separate feeding areas are utilized in northern waters after their return. This area will not be affected because it is within the biologically important area defined by the 200-m (656-ft) isobath on the North American east coast. Humpback whales also use the mid-Atlantic as a migratory pathway and apparently as a feeding area, at least for juveniles. Since 1989, observations of juvenile humpbacks in that area have been increasing during the winter months, peaking January through March (Swingle *et al.* 1993). Biologists theorize that non-reproductive animals may be establishing a winter-feeding range in the Mid-Atlantic since they are not participating in reproductive behavior in the Caribbean. They feed on a number of species of small schooling fishes, particularly sand lance and Atlantic herring, by targeting fish schools and filtering large amounts of water for the associated prey. Humpback whales have also been observed feeding on krill.

Life history information
Humpback whale reproductive activities occur primarily in winter. They become sexually mature at age four to six. Annual pregnancy rates have been estimated at about 0.40-0.42 (NMFS unpublished and Nishiwaki 1959). Cows will nurse their calves for up to 12 months. The age distribution of the humpback whale

population is unknown, but the portion of calves in various populations has been estimated at about 4в12% (Chittleborough 1965, Whitehead 1982, Bauer 1986, Herman *et al.* 1980, and Clapham and Mayo 1987).

The information available does not identify natural causes of death among humpback whales or their number and frequency over time, but potential causes of natural mortality are believed to include parasites, disease, predation (killer whales, false killer whales, and sharks), biotoxins, and entrapment in ice.

Humpback whales exhibit a wide range of foraging behaviors, and feed on a range of prey types including small schooling fishes, euphausiids, and other large zooplankton. Fish prey in the North Pacific include herring, anchovy, capelin, pollack, Atka mackerel, eulachon, sand lance, pollack, Pacific cod, saffron cod, arctic cod, juvenile salmon, and rockfish. In the waters west of the Attu Islands and south of Amchitka Island, Atka mackerel were preferred prey of humpback whales (Nemoto 1957). Invertebrate prey includes euphausiids, mysids, amphipods, shrimps, and copepods.

Diving and social behavior

In Hawaiian waters, humpback whales remain is almost exclusively within the 1820 m isobath and usually within 182 m. Maximum diving depths are approximately 150 m (492 ft) (but usually <60 m [197 ft]), with a very deep dive (240 m [787 ft]) recorded off Bermuda (Hamilton *et al.* 1997). They may remain submerged for up to 21 min (Dolphin 1987). Dives on feeding grounds ranged from 2.1-5.1 min in the north Atlantic (Goodyear unpubl. manus.). In southeast Alaska average dive times were 2.8 min for feeding whales, 3.0min for non-feeding whales, and 4.3 min for resting whales (Dolphin 1987). In the Gulf of California humpback whale dive times averaged 3.5 min (Strong 1989). Because most humpback prey is likely found above 300 m depths most humpback dives are probably relatively shallow.

Clapham (1986) reviewed the social behavior of humpback whales. They form small unstable groups during the breeding season. During the feeding season they form small groups that occasionally aggregate on concentrations of food. Feeding groups are sometimes stable for long periods of times. There is good evidence of some territoriality on feeding grounds (Clapham 1994, 1996), and on wintering ground (Tyack 1981). On the breeding grounds males sing long complex songs directed towards females, other males or both. The breeding season can best be described as a floating lek or male dominance polygyny (Clapham 1996). Intermale competition for proximity to females can be intense as expected by the sex ratio on the breeding grounds that may be as high as 2.4:1.

Vocalizations and hearing

Humpbacks produce a wide variety of sounds. During the breeding season males sing long, complex songs, with frequencies in the 25-5000 Hz range and intensities as high as 181 dB (Payne 1970; Winn *et al.* 1970a; Thompson *et al.* 1986). Source levels average 155 dB and range from 144 to 174 dB (Thompson *et al.* 1979). The songs appear to have an effective range of approximately six to 12 miles (10 to 20 km). Animals in mating groups produce a variety of sounds (Tyack 1981; Tyack and Whitehead 1983, Silber 1986). Sounds are produced less frequently on the summer feeding grounds. Feeding groups produce distinctive sounds ranging from 20 Hz to 2 kHz, with median durations of 0.2-0.8 sec and source levels of 175-192 dB (Thompson *et al.* 1986). These sounds are attractive and appear to rally animals to the feeding activity (D=Vincent *et al.* 1985; Sharpe and Dill 1997). In summary, humpback whales produce at least three kinds of sounds: 1) complex songs with components ranging from at least 20Hz в 4 kHz with estimated source levels from 144 в 174 dB, which are mostly sung by males on the breeding grounds (Payne 1970; Winn *et al.* 1970a; Richardson *et al.* 1995); 2) social sounds in the breeding areas that extend from 50Hz в more than 10 kHz with most energy below 3kHz (Tyack and Whitehead 1983, Richardson *et al.* 1995); and 3) Feeding area vocalizations that are less frequent, but tend to be 20Hz в 2 kHz with estimated sources levels in excess of

175 dB re 1 μPa-m (Thompson *et al.* 1986; Richardson *et al.* 1995). Sounds often associated with possible aggressive behavior by males (Tyack 1983; Silber 1986) are quite different from songs, extending from 50 Hz to 10 kHz (or higher), with most energy in components below 3 kHz. These sounds appear to have an effective range of up to 9 km (Tyack and Whitehead 1983). A general description of the anatomy of the ear for cetaceans is provided in the description of the blue whale above. Humpback whales respond to low frequency sound. Humpback whales have been known to react to low frequency industrial noises at estimated received levels of 115 в 124 dB (Malme *et al.* 1985), and to conspecific calls at received levels as low as 102dB (Frankel *et al.* 1995). Humpback whales apparently reacted to 3.1 в 3.6 kHz sonar by changing behavior (Maybaum 1990 1993). Malme *et al.* (1985) found no clear response to playbacks of drill ship and oil production platform noises at received levels up to 116dB re 1 μPa. Studies of reactions to airgun noises were inconclusive (Malme *et al.* 1985). Humpback whales on the breeding grounds did not stop singing in response to underwater explosions (Payne and McVay 1971). Humpback whales on feeding grounds did not alter short-term behavior or distribution in response to explosions with received levels of about 150dB re 1 μPa/Hz at 350Hz (Lien *et al.* 1993; Todd *et al.* 1996). However, at least two individuals were likely killed by the highintensity, impulsed blasts and had extensive mechanical injuries in their ears (Ketten *et al.* 1993; Todd *et al.* 1996). The explosions may also have increased the number of humpback whales entangled in fishing nets (Todd *et al.* 1996). Frankel and Clark (1998) showed that breeding humpbacks showed only a slight statistical reaction to playback of 60 в 90 Hz bounds with a received level of up to 190 dB. While these studies have shown short-term behavioral reactions to boat traffic and playbacks of industrial noise, the potential for habituation, and thus the longterm effects of these disturbances are not known.

Listing status

Humpback whales were listed as endangered under the ESA in 1973. They are also protected by the Convention on International Trade in Endangered Species of wild flora and fauna and the MMPA. Critical habitat has not been designated for the species.

Population status and trends

New information has become available on the status and trends of the humpback whale population in the North Atlantic (NMFS, 2001). Although current and maximum net productivity rates are unknown at this time, the population is apparently increasing. It has not yet been determined whether this increase is uniform across all six feeding stocks (Waring *et al. in prep.*). Katona and Beard (1990) estimated the rate of increase at 9.0 percent, while Barlow and Clapham (1997) reported a 6.5 percent rate for the Gulf of Maine using data through 1991. The rate reported by Barlow and Clapham (1997) may roughly approximate the rate of increase for the portion of the population within the action area. The best estimate of abundance for the North Atlantic humpback whale population is 10,600 animals (CV=0.067; Smith *et al.* 1999), while the minimum population estimate used for NMFS management purposes is 10,019 animals (CV = 0.067; Waring *et al. in prep.*). The Northeast Fisheries Science Center is considering recommending that NMFS identify the Gulf of Maine feeding stock as the management stock for this population in U.S. waters. A population estimate for the Gulf of Maine portion of the population is not available.

Impacts of human activity on this species

In the 1990s, no more than 3 humpback whales were killed annually in U.S. waters by commercial fishing operations in the Atlantic and Pacific Oceans. Between 1990 and 1997, no humpback whale deaths have been attributed to interactions with groundfish trawl, longline and pot fisheries in the Bering Sea, Aleutian Islands, and Gulf of Alaska (Hill and DeMaster 1999). Humpback whales have been injured or killed elsewhere along the mainland U.S. and Hawaii (Barlow *et al.* 1997). In 1991, a humpback whale was observed entangled in longline gear and released alive (Hill *et al.* 1997). In 1995, a humpback whale in Maui waters was found

trailing numerous lines (not fishery-related) and entangled in mooring lines. The whale was successfully released, but subsequently stranded and was attacked and killed by tiger sharks in the surf zone.

Humpback whales seem to respond to moving sound sources, such as whale-watching vessels, fishing vessels, recreational vessels, and low-flying aircraft (Beach and Weinrich 1989, Clapham *et al.* 1993, Atkins and Swartz 1989). Their responses to noise are variable and have been correlated with the size, composition, and behavior of the whales when the noises occurred (Herman *et al.* 1980, Watkins *et al.* 1981, Krieger and Wing 1986). Several investigators have suggested that noise may have caused humpback whales to avoid or leave feeding or nursery areas (Jurasz and Jurasz 1979b, Dean *et al.* 1985), while others have suggested that humpback whales may become habituated to vessel traffic and its associated noise. Still other researchers suggest that humpback whales may become more vulnerable to vessel strikes once they habituate to vessel traffic (Swingle *et al.* 1993; Wiley *et al.* 1995).

Many humpback whales are killed by ship strikes along both coasts of the U.S. On the Atlantic coast, 6 out of 20 humpback whales stranded along the mid-Atlantic coast showed signs of major ship strike injuries (Wiley *et al.* 1995). Almost no information is available on the number of humpback whales killed or seriously injured by ship strikes outside of U.S. waters.

Sperm Whale (*Physeter macrocephalus*)

Species description and distribution
Sperm whales are distributed in the entire world's oceans. Sperm whales have a strong preference for the 3,280 ft (1,000 m) depth contour and seaward. Berzin (1971) reported that they are restricted to waters deeper than 300 m (984 ft), while Watkins (1977) and Reeves and Whitehead (1997) reported that they are usually not found in waters less than 3,281 ft (1,000m) deep. While deep water is their typical habitat, sperm whales have been observed near Long Island, NY, in waters of 41-55 m (135-180 ft) (Scott and Sadove 1997). When found relatively close to shore, sperm whales are usually associated with sharp increases in bottom depth where upwelling occurs and biological production is high, implying the presence of a good food supply (Clarke 1956). They can dive to depths of at least 2000 m (6562 ft), and may remain submerged for an hour or more (Watkins *et al.* 1993). Sperm whales feed primarily on buoyant, relatively slow-moving squid (Clark *et al.* 1993), but may also eat a variety of fish, including salmon (*Oncorhynchus* spp.), rockfish (*Sebastes* spp.), and lingcod (*Ophiodon elongatus*) (Caldwell and Caldwell 1983).

In the Atlantic Ocean, NMFS' most recent stock assessment report notes that sperm whales are distributed in a distinct seasonal cycle, concentrated east-northeast of Cape Hatteras in winter and shifting northward in spring when whales are found throughout the Mid-Atlantic Bight. Distribution extends further northward to areas north of Georges Bank and the Northeast
Channel region in summer and then south of New England in fall, back to the Mid-Atlantic
Bight. There is also a very large population of sperm whales found in the Gulf of Mexico near the Mississippi River delta.

Life history information
Female sperm whales take about 9 years to become sexually mature (Kasuya 1991, as cited in Perry *et al.* 1999). Male sperm whales take between 9 and 20 years to become sexually mature, but will require another 10 years to become large enough to successfully compete for breeding rights (Kasuya 1991). Adult females give birth after about 15 months gestation and nurse their calves for 2 - 3 years. The calving interval is estimated to be about four to six years (Kasuya 1991). The age distribution of the sperm whale population is unknown, but sperm whales are believed to live at least 60 years (Rice 1978). Estimated annual mortality rates

of sperm whales are thought to vary by age, but previous estimates of mortality rate for juveniles and adults are now considered unreliable (IWC 1980, as cited in Perry *et al.* 1999). Sperm whales are known for their deep foraging dives (in excess of 3 km). They feed primarily on mesopelagic squid, but also consume octopus, other invertebrates, and fish (Tomilin 1967, Tarasevich1968, Berzin 1971). Perez (1990) estimated that their diet in the Bering Sea was 82% cephalopods (mostly squid) and 18% fish. Fish eaten in the North Pacific included salmon, lantern fishes, lancetfish, Pacific cod, pollack, saffron cod, rockfishes, sablefish, Atka mackerel, sculpins, lumpsuckers, lamprey, skates, and rattails (Tomilin 1967, Kawakami 1980, Rice 1986b). Sperm whales taken in the Gulf of Alaska in the 1960s had fed primarily on fish. Daily food consumption rates for sperm whales ranges from 2 - 4% of their total body weight (Lockyer 1976b, Kawakami 1980). Potential sources of natural mortality in sperm whales include killer whales and papilloma virus (Lambertson *et al.* 1987).

Diving and social behavior

Sperm whales are likely the deepest and longest diving mammals. Typical foraging dives last 40 min and descend to about 400m followed by approximately 8 min of resting at the surface (Gordon 1987; Papastavrou *et al.* 1989). However, dives of over 2 hr and as deep as 3,000 m have been recorded (Clarke 1976; Watkins *et al.* 1985). Descent rates recorded from echosounders were approximately 1.7m/sec and nearly vertical (Goold and Jones 1995). There are no data on diurnal differences in dive depths in sperm whales. However, like most diving vertebrates for which there is data (e.g. rorqual whales, fur seals, chinstrap penguins), sperm whales probably make relatively shallow dives at night when organisms from the ocean's deep scattering layers move toward the ocean's surface.

The groups of closely related females and their offspring develop dialects specific to the group (Weilgart and Whitehead 1997) and females other than birth mothers will guard young at the surface (Whitehead 1996b) and will nurse young calves (Reeves and Whitehead 1997).

Vocalizations and hearing

Sperm whales produce loud broadband clicks from about 0.1 to 20 kHz (Weilgart and Whitehead 1993, 1997; Goold and Jones 1995). These have source levels estimated at 171 dB re 1 μPa (Levenson 1974). Current evidence suggests that the disproportionately large head of the sperm whale is an adaptation to produce these vocalizations (Norris and Harvey 1972; Cranford 1992; but see Clarke 1979). This suggests that the production of these loud low frequency clicks is extremely important to the survival of individual sperm whales. The function of these vocalizations is relatively well studied (Weilgart and Whitehead 1993, 1997; Goold and Jones 1995). Long series of monotonous regularly spaced clicks are associated with feeding and are thought to be produced for echolocation. Distinctive, short, patterned series of clicks, called codas, are associated with social behavior and intragroup interactions; they are thought to facilitate intra-specific communication, perhaps to maintain social cohesion with the group (Weilgart and Whitehead 1993).

A general description of the anatomy of the ear for cetaceans is provided in the description of the blue whale above. The only data on the hearing range of sperm whales are evoked potentials from a stranded neonate (Carder and Ridgway 1990). These data suggest that neonatal sperm whales respond to sounds from 2.5-60 kHz. Sperm whales have been observed to frequently stop echolocating in the presence of underwater pulses made by echosounders and submarine sonar (Watkins and Schevill 1975; Watkins *et al.* 1985). They also stop vocalizing for brief periods when codas are being produced by other individuals, perhaps because they can hear better when not vocalizing themselves (Goold and Jones 1995). Sperm whales have moved out of areas after the start of air gun seismic testing (Davis *et al.* 1995). Seismic air guns produce loud, broadband, impulsive noise (source levels are on the order of 250 dB) with shots at every 15 seconds, 240 shots per hour, 24 hours per day during active tests. Because they spend large amounts of time at depth and use low frequency sound sperm whales are likely to be susceptible to low frequency sound in the ocean (Croll *et al*

1999). Furthermore, because of their apparent role as important predators of mesopelagic squid and fish, changes in their abundance could affect the distribution and abundance of other marine species.

Listing status
Sperm whales have been protected from commercial harvest by the IWC since 1981, although the Japanese continued to harvest sperm whales in the North Pacific until 1988 (Reeves and Whitehead 1997). Sperm whales were listed as endangered under the ESA in 1973. They are also protected by the Convention on International Trade in Endangered Species of wild flora and fauna and the MMPA. Critical habitat has not been designated for sperm whales.

Population status and trends
The best abundance estimate that is currently available for the western North Atlantic sperm whale population is 2,698 (CV=0.67) animals, and the minimum population estimate used for NMFS management purposes is 1,617 (CV=0.67) (Waring *et al. in prep.*). Due to insufficient data, no information is available on population trends at this time for the western North Atlantic sperm whale stock.

Impacts of human activity on this species
In U.S. waters in the Pacific, sperm whales are known to have been incidentally taken only in drift gillnet operations, which killed or seriously injured an average of 9 sperm whales per year from 1991-1995 (Barlow *et al.* 1997). Interactions between longline fisheries and sperm whales in the Gulf of Alaska have been reported over the past decade (Rice 1989, Hill and DeMaster 1999). Observers aboard Alaskan sablefish and halibut longline vessels have documented sperm whales feeding on fish caught in longlines in the Gulf of Alaska. During 1997, the first entanglement of a sperm whale in Alaska's longline fishery was recorded, although the animal was not seriously injured (Hill and DeMaster 1998). The available evidence does not indicate sperm whales are being killed or seriously injured as a result of these interactions, although the nature and extent of interactions between sperm whales and long-line gear is not yet clear.

Smalltooth Sawfish (*Pristis pectinata*)

Distribution. The smalltooth sawfish has a circumtropical distribution and has been reported from shallow coastal and estuarine habitats. In U.S. waters, *P. pectinata* historically occurred from North Carolina south through the Gulf of Mexico, where it was sympatric with the largetooth sawfish *P. pristis* (west and south of Port Arthur, TX) (Adams and Wilson, 1995). Individuals have also historically been reported to migrate northward along the Atlantic seaboard in the warmer months. It also was an occasional visitor to waters as far north as New York.

Few individuals are observed outside of peninsular Florida (NMFS, 2000). Records indicate that smalltooth sawfish have been found in the lower reaches of the St. Johns River and the Indian River Lagoon system. At least one recorded observation has occurred to the north of the project area, within the vicinity of Broward County (NMFS, 2000). Florida Museum of Natural History (at University of Florida- Gainesville) data include 13 records of *P. pectinata* from 1912 to 1998 (and one undated record). Nine of these specimens were recorded from the Gulf of Mexico off Florida, three came from the Atlantic side of Florida, and one animal was caught in Pacific waters off Ecuador. Three additional records of smalltooth sawfish from the Atlantic coast of Florida have yet to be cataloged in this collection: one specimen is from 1979; the second is not dated (the Museum received both these fish from the Harbor Branch Oceanographic Institute); a third specimen was landed May 22, 1998 from the

Indian River (Burgess, pers. comm.). There are eight reports of smalltooth sawfish along the Florida east coast in the 1990's, most from coastal rather than lagoon areas.

Natural History. Worldwide, six species of sawfish (family Pristidae) exist, belonging to the genera *Pristis* and *Anoxypristis* (Nelson, 1994). Sawfish are in fact rays (order Rajiformes), but resemble sharks more than other rays due to fin size, orientation, and position. Like rays, however, the trunk and especially the head are vertically flattened. The snout is a long narrow flattened rostral blade with a series of transverse teeth along either edge. The two U.S. Atlantic coast species (both genus *Pristis*) are distinguishable, as the smalltooth sawfish (*P. pectinata*) lacks a distinct lower lobs on the caudal fin (NMFS, 2000).

Robins and Ray (1986) note body length may achieve 5.5 m, whereas largetooth sawfishes may reach 6.1 m. Bigelow and Schroeder (1953) reported litter size of 15-20 embryos. Overall, life history parameters for this species are largely unknown.

The smalltooth sawfish is euryhaline, occurring in fresh water, nearshore estuaries, and coastal waters to depths of 25 meters. In the United States, the smalltooth sawfish is generally a shallow-water fish of inshore bars, mangrove edges, and seagrass beds, but are occasionally found in deeper coastal waters.

Status and Population Trends. The smalltooth sawfish was added to the list of candidate species under the ESA in 1991, removed in 1997, and placed back on the list again in 1999. In November 1999, NMFS received a petition from the Center of Marine Conservation requesting that this species be listed as endangered under the ESA. NMFS completed a status review for smalltooth sawfish in December 2000, and published a proposed rule to list the U.S. population of this species as endangered under the ESA on April 16, 2001. A final rule on this proposal has not been issued as of this date.

According to NMFS (2000), "The U.S. DPS of smalltooth sawfish has experienced a ninety percent curtailment of its range and severe declines in abundance. Agriculture, urban development, commercial activities, channel dredging, boating activities, and the diversion of freshwater run-off have resulted in the destruction and modification of smalltooth habitat throughout the southeastern U.S. Although habitat degradation is not likely the primary reason for the decline of smalltooth sawfish abundance and their contracted distribution, it has likely been a contributing factor. Over 50% of the U.S. human population lives within fifty miles of the ocean or Great Lakes. Migration to the coastlines for home, livelihood or recreation is predicted to increase by the year 2010 (National Ocean Service, 2000). Increases in coastal human populations will likely result in additional losses of marine habitats and increased pollution, further threatening the survival of smalltooth sawfish."

Simpfendorfer (2000) used a demographic approach to estimate intrinsic rate of natural increase and population doubling time. Since there are very limited life history data for smalltooth sawfish, much of the data (e.g. reproductive periodicity, longevity and age-at-maturity) were inferred from the more well-

known largetooth sawfish. The litter size of smalltooth sawfish in the literature is given as 15 – 20 and Simpfendorfer used a mean of 17.5. However, the data on which this litter size is based are somewhat dubious. To account for uncertainty in the life-history parameters several different scenarios were tested, covering longevities from 30 to 70 years and ages-at-maturity from 10 to 27 years. The results indicated that the intrinsic rate of population increase ranged from 0.08/year to 0.13/ year, and population-doubling times ranged from 5.4 years to 8.5 years. These models assume the literature value for litter size is correct; doubling times would be longer if litter sizes are more in the range observed for largetooth sawfish (1 to 13, with a mean of 7.3). Simpfendorfer concluded, "The estimated population doubling times for smalltooth sawfish indicate that the recovery times for this population will be very long. There are no data available on the size of the remaining populations, but anecdotal information indicates that smalltooth sawfish survive today in small fragmented areas where the impact of humans, particularly from net fishing, has been less severe. Fragmenting of the population will increase the time that it takes for recovery since the demographic models used in the study above assume a single inter-breeding population. The genetic effects of recovery from very small population sizes may also impact conservation efforts. It is likely that even if an effective conservation plan can be introduced in the near future, recovery to a level where the risk of extinction is low will take decades, while recovery to pre-European settlement levels would probably take several centuries."

Threats. The principal habitats for smalltooth sawfish in the southeast U.S. are the shallow coastal areas and estuaries, with some specimens moving upriver in freshwater (Bigelow and Schroeder, 1953). Therefore, the continued urbanization of the southeastern coastal states has resulted in substantial loss of coastal habitat through such activities as agricultural and urban development; commercial activities; dredge and fill operations; boating; erosion and diversions of freshwater run-off (SAFMC, 1998). Smalltooth sawfish may be especially vulnerable to coastal habitat degradation due to their affinity to shallow, estuarine systems. Because of the slow individual growth, late maturation, and low fecundity, long-term commitments to habitat protection are necessary for the eventual recovery of the species. Overfishing and incidental take in nets (due in part to its body size and unusual morphology) are suspected to be strongly linked to population declines (NMFS, 2000). Other details pertaining to the factors contributing to the decline of the smalltooth sawfish can be found in the "Status Review of Smalltooth Sawfish (*Pristis pectinata*)", (NMFS, 2000) and will not be repeated in detail here.

Critical Habitat. No critical habitat has yet been proposed for the smalltooth sawfish.

Johnson's Seagrass (*Halophila johnsonii*)

Distribution. H. johnsonii has one of the most limited geographic ranges of all seagrass species. The species has only been found growing along approximately 200 km of coastline in southeastern Florida from Sebastian Inlet, Indian River County to northern Key Biscayne, Miami-Dade County (Kenworthy 1997). This narrow range and apparent endemism indicates that Johnson's seagrass has the most limited geographic distribution of any seagrass in the world.

Johnson's seagrass occurs in dynamic and disjunct patches throughout its range. Growth appears to be rapid and leaf pairs have short life spans while horizontally spreading from dense apical meristems (Kenworthy 1997). Kenworthy suggested that horizontal spreading rapid growth pattern and a high biomass turnover could explain the dynamic patches observed in distribution studies. New information reviewed in Kenworthy (1999, 1997) confirms *H. johnsonii's* limited geographic distribution in patchy and vertically disjunct areas between Sebastian Inlet and northern Biscayne Bay. Surveys conducted by NMFS Biscayne Bay, Florida Bay, the Florida Keys, outer Florida Bay, Puerto Rico, and the Virgin Islands provided no verifiable sightings of Johnson's seagrass outside of the range already reported. After the completion of many surveys by resource agencies, including those conducted for this project, no *H. johnsonii* has been reported within the action area.

Status and Population Trends. Johnson's Seagrass (*Halophila johnsonii*) 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 Endangered Species Act (ESA) was published on December 2, 1998 (64 FR 64231). The final rule for critical habitat designation for *H. johnsonii* was published April 5, 2000 (Federal Register, Vol. 65, No. 66). It is the first marine plant ever listed. Kenworthy (1993, 1997, 1999) discusses the results of the field studies and summarizes an extensive literature review and associated interviews regarding the status of Johnson's seagrass.

There is currently insufficient information to clearly determine trends in the Johnson's seagrass population, which was described in 1980 and has only been extensively studied during the 1990s. Generally, stem densities have declined in some areas and increased in others. Where multiyear mapping studies have been conducted within the Indian River Lagoon, recent increases in Johnson's seagrass have been noted but may be attributed in part to the recent increase in search effort and increased familiarity with this species (Virnstein *et al.* 1997). The authors conclude that from 1994 through 1997, no strong seasonal distribution or increases or decreases in abundance or range can be discerned.

Natural History. The species is perennial and may spread even during winter months under favorable conditions (Virnstein et al. 1997). Sexual reproduction in Johnson's seagrass has not been documented. Female flowers have been found; however, dedicated surveys in the Indian River Lagoon have not discovered male flowers, fertilized ovaries, fruits, or seeds either in the field or under laboratory conditions (Jewett-Smith et al. 1997). Searches throughout the range of Johnson's seagrass have produced the same results, suggesting that the species does not reproduce sexually or that the male flowers are difficult to observer or describe, as noted for other *Halophila* species (Kenworthy 1997). Surveys to date indicate that the incidence of female flowers appears to be much higher near the inlets leading to the Atlantic Ocean, suggesting that inlet conditions are qualitatively better for flowering than conditions further inshore (Kenworthy pers. comm. 1998). It is possible that male flowers, if they exist, occur near inlets as well. Maintenance of good water quality around inlets may be essential for promoting flowering in the Johnson's seagrass population.

The essential features of habitat appear to be adequate water quality, salinity, water clarity and stable sediments free from physical disturbance. Important habitat characteristics include shallow intertidal as well as deeper subtidal zones (2-5 m). Water transparency appears to be critical for Johnson's seagrass, limiting its distribution at depth to areas of suitable optical water quality (Kenworthy 1997). In areas in which long-term poor water and sediment quality have existed until recently, such as Lake Worth Lagoon, *H. johnsonii* appears to occur in relatively higher abundance perhaps due to the previous inability of the larger species to thrive. These studies support unconfirmed previous observations that suspended solids and tannin, which reduce light penetration and water clarity, may be important factors limiting seagrass distribution. Good water clarity is essential for *Halophila johnsonii* growth in deeper waters.

Johnson's seagrass occurs over varied depths, environmental conditions, salinities, and water quality. In tidal channels *H. johnsonii* is found in coarse sand substrates, although it has been found growing on sandy shoals, in soft mud near canals and rivers where salinity many fluctuate widely (Virnstein *et al.* 1997). Virnstein has called Johnson's seagrass a "perennial opportunistic species." Within his study areas in the Indian River Lagoon, *H. johnsonii* was found by itself, with other seagrass species, in the intertidal, and (more commonly) at the deep edge of some transects in water depths of up to 180 cm. *H. johnsonii* was found shallowly rooted on sandy shoals, in soft mud, near the mouths of canals, rivers and in shallow and deep water (Virnstein *et al.* 1997). Additionally, recent studies have documented large patches of Johnson's seagrass on flood deltas just inside Sebastian Inlet, as well as far from the influence of inlets (reported at the workshop discussed in Kenworthy, 1997). These sites encompass a wide variety of salinities, water quality, and substrates. *Halophila johnsonii* appears to be outcompeted in ideal seagrass habitats where environmental conditions permit the larger species to thrive (Virnstein *et al.* 1997, Kenworthy 1997).

Critical Habitat. The northern and southern ranges of Johnson's seagrass are defined as Sebastian Inlet and central Biscayne Bay, respectively. These limits to the species' range have been designated as critical habitat for Johnson's seagrass. Within its range, Johnson's seagrass critical habitat designations have been designated for 10 areas: a portion of the Indian River Lagoon, north of the Sebastian Inlet Channel; a portion of the Indian River Lagoon, south of the Sebastian Inlet Channel; a portion of the Indian River Lagoon near the Fort Pierce Inlet; a portion of the Indian River Lagoon, north of the St. Lucie Inlet; a portion of Hobe Sound; a site on the south side of Jupiter Inlet; a site in central Lake Worth Lagoon; a site in Lake Worth Lagoon, Boynton Beach; a site in Lake Wyman, Boca Raton; and most of Biscayne Bay south to 25° 45' north latitude (except authorized federal navigational channels).

The Boca Raton and Boynton Beach critical habitats have populations that are distinguished by a higher index of genetic variation than any of the central and northern populations examined to date (Kenworthy, 1999). These two sites represent a genetically semi-isolated group that could be the reservoir of a large part of the overall genetic variation found in the species. Information is still lacking on the geographic extent of this genetic variability.

Threats. The natural history of the species itself makes it especially vulnerable. A factor leading to the listing of *H. johnsonii* is its rareness within its extremely restricted geographic range. Johnson's seagrass is characterized by small size (it is the smallest of all of the seagrasses found within its range, averaging about 3 cm in height), fragile rhizome structure and associated high turnover rate, and is apparently reliant on vegetative means to reproduce, grow and migrate across the sea bottom. These factors make Johnson's seagrass extremely vulnerable to human or environmental impacts by reducing its capacity to repopulate an area once removed. The species and its habitat are impacted by human-related activities throughout the length its range, including bridge construction and dredging, and the species' threatened status produces new and unique challenges for the management of shallow submerged lands. Vessel traffic resulting in propeller and anchor damage, maintenance dredging, dock and marine construction, water pollution, and land use practices could require special management within critical habitat.

Kenworthy (1997, 1999) summarized the newest information on Johnson's seagrass biology, distribution, and abundance and confirmed the limited range and rareness of this species within its range. Additionally, the apparent restriction of propagation through vegetative means suggests that colonization between broadly disjunct areas is likely difficult, suggesting that the species is vulnerable to becoming endangered if it is removed from large areas within its range by natural or anthropogenic means. Human impacts to Johnson's seagrass and its habitat include: (1) Vessel traffic and the resulting propeller dredging and anchor mooring; (2) dredging; (3) dock and marina construction and shading from these structures; (4) water pollution; and (5) land use practices including shoreline development, agriculture, and aquaculture.

Activities associated with recreational boat traffic account for the majority of human use associated with the proposed critical habitat areas. The destruction of the benthic community due to boating activities, propeller dredging, anchor mooring, and dock and marina construction was observed at all sites during a study by NMFS from 1990 to 1992. These activities severely disrupt the benthic habitat, breaching root systems, severing rhizomes, and significantly reducing the viability of the seagrass community. Propeller dredging and anchor mooring in shallow areas are a major disturbance to even the most robust seagrasses. This destruction is expected to worsen with the predicted increase in boating activity. Trampling of seagrass beds, a secondary effect of recreational boating, also disturbs seagrass habitat. Populations of Johnson's seagrass inhabiting shallow water and water close to inlets, where vessel traffic is concentrated, will be most affected.

The constant sedimentation patterns in and around inlets require frequent maintenance dredging, which could either directly remove essential seagrass habitat or indirectly affect it by redistributing sediments, burying plants and destabilizing the bottom structure. Altering benthic topography or burying the plants may remove them from the photic zone. Permitted dredging of channels, basins, and other in- and on-water construction projects cause loss of Johnson's seagrass and its habitat through direct removal of the plant, fragmentation of habitat, and shading. Docking facilities that, upon meeting certain provisions, are exempt from state permitting also contribute to loss of Johnson's seagrass through construction

impacts and shading. Fixed add-ons to exempt docks (such as finger piers, floating docks, or boat lifts) have recently been documented as an additional source of seagrass loss due to shading (Smith and Mezich, 1999).

Decreased water transparency caused by suspended sediments, water color, and chlorophylls could have significant detrimental effects on the distribution and abundance of the deeper water populations of Johnson's seagrass. A distribution survey in Hobe and Jupiter Sounds indicates that the abundance of this seagrass diminishes in the more turbid interior portion of the lagoon where reduced light limits photosynthesis.

Other areas of concern include seagrass beds located in proximity to rivers and canal mouths where low salinity, highly colored water is discharged. Freshwater discharge into areas adjacent to seagrass beds may provoke physiological stress upon the plants by reducing the salinity levels. Additionally, colored waters released into these areas reduce the amount of sunlight available for photosynthesis by rapidly attenuating shorter wavelengths of photosynthetically active radiation. Continuing and increasing degradation of water quality due to increased land use and water management threatens the welfare of seagrass communities. Nutrient overenrichment caused by inorganic and organic nitrogen and phosphorous loading via urban and agricultural land run-off stimulates increased algal growth that may smother Johnson's seagrass, shade rooted vegetation, and diminish the oxygen content of the water. Low oxygen conditions have a demonstrated negative impact on seagrasses and associated communities.

A wide range of activities funded, authorized or carried out by Federal agencies may affect the essential habitat requirements of Johnson's seagrass. These include authorization by the COE for beach nourishment, dredging, and related activities including construction of docks and marinas; bridge construction projects funded by the Federal Highway Administration; actions by the U.S. Environmental Protection Agency and the COE to manage freshwater discharges into waterways; regulation of vessel traffic by the U.S. Coast Guard; management of national refuges and protected species by the U.S. Fish and Wildlife Service; management of vessel traffic (and other activities) by the U.S. Navy; authorization of state coastal zone management plans by NOAA's National Ocean Service, and management of commercial fishing and protected species by NMFS.

Critical habitat. Critical habitat for Johnson's seagrass was finalized on April 5, 2000 (65 FR 17786). Critical habitat ranges from Sebastian Inlet in central Florida south including a portion of Biscayne Bay. Existing federal navigation channels were excluded from the designation. The Corps has reviewed the final rule for critical habitat, and has determined that NMFS did not designate constituent elements to be addressed in assessing modifications to designated critical habitat.

Protective Measures Taken in the Project Area Separate from Conservation Measures the Corps will Undertake as Part of the Proposed Action

State of Florida

The State of Florida maintains the Bill Sadowski Critical Wildlife Area (CWA), which is immediately south of the action area. This CWA utilizes a *No Entry Zone* (for human-exclusion) to preserve marine resources associated with the area. These resources include extensive seagrass beds, which may be utilized by foraging sea turtles. There have been no continuously employed measures specifically designed by the Port of Miami or Miami Dade County for the conservation of sea turtles and the smalltooth sawfish. However, consultations with federal agencies in the prudent planning and implementation of conservation measures have been carried out for decades.

Scientific Research on Sea turtles, Endangered large whales, Johnson's seagrass or smalltooth sawfish

- Regulations developed under the ESA allow for the taking of ESA-listed species for the purposes of scientific research. In addition, the ESA also allows for the taking of listed species by states through cooperative agreements developed per section 6 of the ESA. Prior to issuance of these authorizations for taking, the proposal must be reviewed for compliance with section 7 of the ESA. Permits to conduct scientific research on listed species found in the action area are issued by the NMFS Office of Protected Resources in Silver Spring, Maryland. Currently no research on the listed species found in the action area under NMFS jurisdiction is proposed or underway (Lillian Becker, NMFS- OPR, Silver Spring, 2002 pers.com.).

Other consultations of Federal actions in the area to date

The Corps has been working with the citizens of Miami-Dade County for several years on expanding and maintaining Miami Harbor (Table 3). None of the projects authorized by Congress through 1968 were required to consult under the Endangered Species Act of 1973 (ESA). Miami Harbor projects following implementation of the ESA included a 1980 deepening of a turning basin, for which a Biological Opinion was issued by FWS (August 21, 1980), and the 1990 federal project, for which the FWS issued a Planning Aid Report (December 21, 1987) and a Fish and Wildlife Coordination Act Report (February 9, 1989). Through such coordination, conservation measures have increasingly addressed cumulative project impacts and have been effective in mitigating such effects (see "Conservation Section").

The Corps is also working with Miami-Dade County on an environmental restoration project on Virginia Key, located to the south of the Port. The project is scheduled to begin in fall 2002, and will primarily entail removal of exotic vegetation (sometimes via heavy equipment), planting of native species, and creating a two-acre pond with a surrounding wetland, and restoration of another wetland. The Corps believes that the species addressed in the current biological assessment may be affected, but not adversely affected in any way by the project, as the island interior is inaccessible to them. The NMFS Section 7 consultation on that project (April 8, 2002) stated a finding that that project is not likely to adversely impact Johnson's seagrass or it's designated critical habitat (consultation number I/SER/2001/00277).

Another action, the Lummus Island Turning Basin deepening project, is a project with similar risks as the proposed project, but on a much smaller scale (one inshore dredge area) and includes precautions similar to those proposed here for the Miami Harbor deepening/widening project. The Corps has initiated consultation with NMFS on this project under section 7 of the ESA and is currently waiting for either a biological opinion or letter of concurrence from NMFS.

Table 3: Previously Authorized Federal Actions at Miami Harbor

ACTS	WORK AUTHORIZED	DOCUMENTS
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 Mar 1907	South Jetty and channel 100 feet wide.	Specified in Act
25 June 1912	Channel 20 feet deep by 300 feet wide and extension of jetties.	H. Doc. 554/62/2
3 Mar 1925	Channel 25 feet deep at entrance and 25 feet deep by 200 feet across Biscayne Bay	H. Doc. 516/67/4
3 Jul 1930	Channel 300 feet wide across Biscayne Bay and enlarging municipal turning basin.	R&H Comm. Doc. 15/71/2
30 Aug 1935	Depth of 30 feet to and in turning basin.	S. Comm. Print 73.2
26 Aug 1937	Widen turning basin 200 feet on south side.	R&H. C. Doc. 86/74/2
2 Mar 1945	Virginia Key Improvement (De-authorized)	S. Doc. 251/79/2
2 Mar 1945	Consolidation of Miami River and Miami Harbor projects; widening at mouth of Miami River (De-authorized); a channel from the mouth of the river to the Intracoastal Waterway (De-authorized); thence a channel from the Intracoastal Waterway to Government Cut (De-authorized); and a channel from Miami River to harbor of refuse in Palmer Lake (De-authorized).	H. Doc. 91/79/1
14 Jul 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; de-authorize Virginia Key development.	S. Doc. 71/85/2
13 Aug 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 Nov 1986	De-authorized 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 Nov 1990	[illegible]	Public Law 101-640 11/28/90

	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.	

Protective Measures Taken in the Project Area as Part of the Proposed Action

Consideration of Plans and Methods to Minimize/Avoid Environmental Impacts. Conservation measures were a major focus during the plan formulation phase for the proposed project. Avoiding and minimizing some potential impact areas significantly decreased the risk of indirect effects on managed and protected species, and a great deal of consideration was given to the utilization of rock removal methods to decrease the likelihood of incidental take, injury, and behavioral modification of protected species. While efforts to reduce impacts to habitats were fruitful, it was determined that rock removal options not involving blasting were possibly more detrimental to populations and individuals of protected species. One alternative option was the use of a punchbarge/piledriver to break rock. However, it was determined that the punchbarge, which would work for 12-hour periods, strikes the rock approximately once every 60-seconds. This constant pounding would serve to disrupt animal behavior in the area. Using the punchbarge would also extend the length of the project, thus increasing any potential impacts to all fish and wildlife resources in the area. The Corps believes that blasting is actually the least environmentally impactful method for removing the rock in the Port. Each blast will last no longer than five (5) seconds in duration, and may even be as short as 2 seconds each. 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 (see discussion below).

Development of Protective Measures. The proposed project includes measures to conserve sperm and humpback whale, sea turtles and smalltooth sawfish. Foremost among the measures are protective actions to ensure that sea turtles and smalltooth sawfish are not killed and whales are not harassed due to blasting activities, if in fact such methods are required as a part of the overall dredging operation. Development of the measures involved consideration of past practices and operations, anecdotal observations, and the most current scientific data. The discussion below summarizes the development of the conservation measures, which, although developed for marine mammals, will also be utilized to protect such species as sea turtles and smalltooth sawfish.

Blasting

To achieve the deepening of the Port of Miami from the existing depth of -42 feet to project depth of -50 feet, pretreatment of the rock areas may be required. Blasting is anticipated to be required for some or all of the deepening and extension of the channel, where standard construction methods are unsuccessful. The total volume to be removed in these areas is up to 4.1 million cubic yards. The work may be completed in the following manner:

Contour dredging with either bucket, hydraulic or excavator dredges to remove material that can be

dredged conventionally and determine what areas require blasting.

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.

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

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.

Based upon industry standards and USACE, Safety & Health Regulations, the blasting program may consist of the following:

The weight of explosives to be used in each blast will be limited to the lowest poundage (~90 lbs. or less) of explosives that can adequately break the rock. The blasting would consist of up to 3 blasts per day, preparing for removal of approximately 1500 cubic yards per blast. This equates to about 1550 blast days to complete the project (based on an assumption of one drillboat, and assuming that the entire project area will require blasting).

The following safety conditions are standard in conducting underwater blasting:

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

Because of the potential duration of the blasting and the proximity of the inshore blasting to a Critical Wildlife Area, a number of issues will need to be addressed. One of the key issues is the extent of a safety radius for the protection of marine wildlife. This is the distance from the blast site which any protected species must be in order to commence blasting operations. Ideally the safety radius is large enough to offer a wide buffer of protection for marine animals while still remaining small enough that the area can be intensely surveyed

There are a number of methods that can be used to calculate a safety radius. Little published data exists

for actual measurements of sub aqueous blasts confined to a rock layer and their impacts to marine mammals or turtles. There is some information on the impacts to fish from similar blasts. Both literature searches and actual observations from similar blasting events will be used as a guide in establishing a safety radius that affords the best protection from lethal harm to marine wildlife. The following will be considered in establishing the radius for blasting inshore of the outer reef:

The U.S. Navy Dive Manual and the FFWCC 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

This formula is a conservative for the blasting being done in the Port of Miami since the blast will be confined within the rock and not suspended in the water column.

For blasting on the outer reef, the Corps proposes to use aerial and passive acoustic surveys to determine if there are sperm or humpback whales within a 1-nautical mile (nm) radius of the project area. In the Biological Opinion for the shock trial of the Winston Churchill (DDG-81) (NMFS, 2000b), NMFS required the Navy to establish a zone of 3 nm for acoustic monitoring and 2 nm for aerial monitoring for three 10,000 lb open water unconfined explosions. Blasting for the channel extension will utilize confined blasts drilled into the substrate, and as a result the Corps believes that any acoustic or pressure effects to the project area will be substantially less than those evaluated by NMFS in setting the safety zones for the Churchill tests.

Utilizing data from rock-contained blasts such as those at Atlantic Dry Dock and Wilmington, North Carolina, the Corps has been able to estimate potential effects on protected species. These data can be correlated to the biological opinion issued on October 10, 2000 by NMFS for the incidental taking of listed marine mammals for the explosive shock testing of the USS Winston Churchill (DDG-81) (66 FR 22450) concerning blasting impacts to marine mammals. The data references in the Federal Register 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 is based on the lowest possible affected mammal weight (infant dolphin). Non- lethal injuries include tympanic membrane (TM) rupture; however, given that dolphin & 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 five (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 Marine Mammal Protection Act (MMPA). To address any potential take under the MMPA, the Corps will apply for an incidental harassment authorization from NMFS.

Dual criteria for marine mammal acoustic harassment have also been developed for explosive-generated signals. Noise levels that fall between the 5 psi-msec to a distance where a noise level of 180 dB (3 psi), while outside any physical damage range, can be considered to fall within the incidental harassment zone.

Conservation Measures

It is crucial to balance the demands of the blasting operations with the overall safety of the species. A 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.

Aerial reconnaissance, where feasible, is critical to support the safety radius selected in addition to 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 blaster in charge.

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

- Drill Boat Capabilities and Production Rates
- Ideal Drill Pattern for Typical Boreholes
- Acceptable Rock Breakage for Excavation
- Tolerable Vibration Level Emitted
- Directional Vibration
- Calibration of the Environment

The Test Blast Program begins with a single range of individually delayed holes and progresses up 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 Test Blast Program 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:

- Distance
- Pounds Per Delay
- Peak Particle Velocities (TVL)
- Frequencies (TVL)
- Peak Vector Sum
- Air Blast, Overpressure

Other Rock Removal Options

The Corps investigated methods to remove the rock in the Port of Miami without blasting using a punchbarge. It was determined that the punchbarge, which would work for 12-hour periods, strikes the rock below approximately once every 60-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 impactful method for removing the rock in the Port. Each blast will last no longer than 5-seconds in duration, and may even be as short as 2 seconds, occurring no more than three times per day. As stated previously, , 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.

Effects of the Action on Protected Species

Direct Effects

Whales, Sea turtles and Sawfish. Possible direct effects on whales, sea turtles and sawfish include mortality and injury from dredge and blasting operations. Although hopper dredging has negative impacts on sea turtles; clamshell, hydraulic, and cutterhead dredges were determined not to have detrimental direct effects on sea turtles (NMFS, 1997). Since only the latter three types of dredges are likely to be used in the construction of the proposed project, direct impacts on sea turtles from dredging operations are unlikely.

The effects of an underwater explosion on marine mammals, sea turtles fishes are dependent upon many factors, including the size, type, and depth of both the animal and the explosive, the depth of the water column, and the standoff distance from the charge to the animal. Potential impacts can range from brief acoustic effects, tactile perception, and physical discomfort to both nonlethal and lethal injuries. Annoyance of and discomfort to marine mammals and turtles could occur as a result of noninjurious physiological responses to both the acoustic signature and the shock wave from the underwater explosion. Nonlethal injury includes slight injury to internal organs and the auditory system; however, delayed lethality can be a result of complications from individual or cumulative sublethal injuries. Short-term or immediate lethal injury would be a result of massive combined trauma to internal organs as a direct result of proximity to the point of detonation. It is very unlikely that injury would occur from exposure to the chemical by-products released into surface waters (NMFS, 2000b).

Whales – The Corps expects no direct effects (injury or mortality) associated with blasting activities on endangered whales that may be near the project area based on the findings of the NMFS Biological Opinion for the Winston Churchill (NMFS, 2000b).

Sea turtles - 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. Dept 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 lbs 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 m 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.

Sawfishes - 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' of a confined blast (USACE, 2000a). Sawfishes, as chondrichthyans, have no air bladders, and, therefore, they would be more tolerant of blast overpressures closer to the discharge, possibly even within 70' of a blast.

Johnson's Seagrass - Johnson's seagrass (*H. johnsonii*) beds will not be directly or indirectly affected by project actions, as no population has been observed in the action area or the vicinity of the action area. Although *H. johnsonii* has been reported to occur in north Biscayne Bay, no *H. johnsonii* was encountered within the study area (DC&A 2001, Appendix E). Further, past field surveys conducted by resource agency personnel and for other studies of the Port have failed to identify *H. johnsonii* within the study area (Craig Grossenbacher, DERM, 2002, personal communication). 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), substrates that fall within critical habitats will be removed. It should be noted though, that these substrates 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 (see discussion of the natural history of the species above). Therefore, the proposed project is not likely to adversely modify designated critical habitat of Johnson's seagrass.

Mitigative Measures - Due to conservation safeguards (see "Conservation Measures" below) that will be implemented for the proposed project, no direct impacts on whales, 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 be miniscule as there are no historic or recent records of the species in the project area.

Indirect effects

The regulations for interservice consultation found at 50 CFR 402 define indirect effects as "are those that are caused by the proposed action and are later in time, but still are reasonably certain to occur".

Whales - The Corps believes that whales that may be near the project area may be harassed acoustically as a result of the blast detonations. This harassment is expected to be in the form of a temporary threshold shift (TTS), which is a change in the threshold of hearing which could temporarily affect an animal's ability to hear calls, echolocation, and other ambient sounds.

Sea Turtles

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 it's 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.

Acoustical Harassment - The Corps believes that turtles that may be near the project area may be harassed acoustically as a result of the blast detonations. The harassment is expected to be in the form of a TTS.

Habitat Modification - Both seagrass habitats and reefs provide resources utilized by sea turtles. Approximately ¼-acre of seagrasses will be removed during construction, and six acres of seagrass beds may experience declined productivity and/or senescence over the next several years. In addition, approximately 3.3 acres of non-previously-dredged reef/hardground habitat will be impacted. Nevertheless, detrimental indirect impacts on sea turtle populations are not anticipated. (In fact, fish and invertebrates killed or injured by blasting may provide a short-term enhancement of foraging opportunities for sea turtles.) Because of the abundance of both seagrass beds and reefs in the vicinity of the action area, and because the project entails the creation of approximately ten acres of substrates suitable for recruitment at a nearby mitigation site and over six acres of artificial reef habitat, the Corps does not anticipate that the proposed project will have any indirect effects on sea turtles in the vicinity of the action area. In addition, because no critical habitats for sea turtles are found within the action area, no indirect impacts to the species will be incurred due to modification of critical habitat.

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, as noted above, 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, if not nil. In addition, because no critical habitats for sawfish have been determined, indirect impacts to the species through loss of critical habitat cannot be considered.

Interrelated and Interdependent Effects

The regulations for interservice consultation found at 50 CFR 402 define interrelated actions as "those that are part of a larger action and depend on the larger action for their justification" and interdependent actions as "those that have no independent utility apart from the action under consideration."

The Corps does not believe that there are any interrelated actions for this proposed project; however, the recommended plan for the Port of Miami contains widening components and deepening components. As a result of the widening and deepening components of the project, larger container and cruise vessels will call at the Port of Miami. As a result of both the widening and the deepening components of the project, more tonnage will be carried per vessel call, so the total number of vessel calls may be reduced (Dawedit 2002. pers comm.). This will be an indirect benefit to the whales, sea turtles and sawfish since there will be fewer ships in the area to potentially affect them. Additionally, the wider channel will provide sea turtles and sawfish more room to maneuver around incoming and outgoing vessels throughout the action area.

Cumulative Effects

The regulations for interservice consultation found at 50 CFR 402 define cumulative effects as "those effects of future state or private activities, not involving Federal activities, that are reasonably certain to occur within the action area of the Federal action subject to consideration." The Corps is not aware of any future state or provate activites, not involving Federal activities that are reasonably certain to occur within the action area.

Take Analysis

Due to the restrictions and special conditions placed in our construction specifications the Corps does not anticipate any injurious or lethal take of endangered whales, endangered/threatened sea turtles, or proposed endangered smalltooth sawfish. The Corps does expect take through harassment in the form of TTS for sea turtles and endangered whales that may be near the action area. The Corps does not anticipate any take of Johnson's seagrass, since the species has not been reported in the project area.

Determination

The Corps has determined that the proposed expansion and deepening of Miami Harbor is likely to affect, but not likely to adversely affect listed species within the action area. The Corps believes that the

restrictions placed on the blasting previously discussed in this assessment will diminish/eliminate the effect of the project on protected species within the action area.

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F/SER3:BH

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

Dear Mr. Duck:

This constitutes the National Marine Fisheries Service's (NOAA Fisheries) biological opinion (Opinion) based on our review of a Corps of Engineers' (COE) proposed project to improve the Port of Miami, in Miami-Dade County, Florida. This Opinion analyzes this project's effects on Johnson's seagrass (*Halophila johnsonii*) and its critical habitat in accordance with section 7 of the Endangered Species Act (ESA) of 1973 as amended. The COE requested formal ESA section 7 consultation on September 5, 2002.

This Opinion is based on information provided in your September 5, 2002, letter and attached biological assessment as well as information received in e-mails dated December 17, 2002, and January 27, 2003. NOAA Fisheries initiated formal consultation on January 27, 2003. A complete administrative record of this consultation is on file at the NOAA Fisheries Southeast Regional Office (F/SER/2002/01094).

Incidental takes of marine mammals (listed or non-listed) are not authorized through the ESA section 7 process. If such takes may occur, an incidental take authorization under Marine Mammal Protection Act (MMPA) Section 101 (a)(5) is necessary. For more information regarding MMPA permitting procedures contact Ken Hollingshead of our Headquarters' Protected Resources staff at (301) 713-2323.

We look forward to further cooperation with you on other COE projects to ensure the conservation and recovery of our threatened and endangered marine species.

Sincerely,

Roy E. Crabtree, Ph.D.
Regional Administrator

Enclosures (2)

cc: F/PR

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Endangered Species Act - Section 7 Consultation

Agency: United States Army Corps of Engineers (COE), Jacksonville District

Activity: Expansion of the Port of Miami, Miami-Dade County, Florida (F/SER/2002/01094)

Consultation Conducted By: National Marine Fisheries Service (NOAA Fisheries) Southeast Region

Date Issued: _____

Approved By: _____
Roy E. Crabtree, Ph.D.
Regional Administrator

This constitutes the National Marine Fisheries Service's (NOAA Fisheries) biological opinion (Opinion) based on our review of a Corps of Engineers' (COE) proposed project to improve the Port of Miami, in Miami-Dade County, Florida. This Opinion analyzes this project's effects on Johnson's seagrass (*Halophila johnsonii*) and its critical habitat in accordance with section 7 of the Endangered Species Act (ESA) of 1973 as amended. The COE requested formal ESA section 7 consultation on September 5, 2002.

Consultation History

The COE requested formal ESA section 7 consultation on September 5, 2002, with a letter and an attached biological assessment. NOAA Fisheries requested additional information which was received on December 17, 2002, via e-mail. The COE modified the proposed action via e-mail on January 27, 2003. NOAA Fisheries considered the September 5, 2002, letter and its attached biological assessment along with the information received via e-mail on December 17, 2002, and January 27, 2003, a complete ESA section 7 consultation package and initiated formal consultation on January 27, 2003.

BIOLOGICAL OPINION

I. Description of the Proposed Action

The proposed action includes the widening and deepening of most of the major channels and turning basins within Miami Harbor. This action includes five components: (1) flaring the existing 500-foot

wide entrance to provide an 800-foot wide entrance channel at Buoy 1, and deepening the entrance channel from a depth of 44 feet to a depth of 52 feet; (2) widening the southern intersection of Cut-3 and the Lummus Island Channel at Buoy 15, and deepening the area from 42 feet to 50 feet; (3) extending the existing Fisher Island turning basin to the north by approximately 300 feet near the west end of Cut-3, and deepening the area from 43 feet to 50 feet; (4) relocating the west end of the main channel to about 250 feet to the south (without dredging); and (5) increasing the width of the Lummus Island Cut by about 100 feet to the south of the existing channel, reducing the existing size of the Lummus Island turning basin to a diameter of 1,500 feet, and deepening the area from 42 feet to 50 feet. Hydraulic, cutterhead, and clam shell dredges will be used.

Sand, silt, clay, soft rock, rock fragments, and loose rock will be removed via traditional dredging methods (hopper dredges are not expected to be used because of the generally hard nature of the bottom in this area). Where hard rock is encountered, the COE anticipates that the explosives, punch-barge/pile driver equipment, and/or large cutterhead equipment will be used to remove the rock. Dredged material will be transported by barge and deposited in four locations: (1) an artificial reef site in the nearshore Atlantic Ocean off Dade County, Florida; (2) the Ocean Dredge Material Disposal Site in the Atlantic Ocean approximately 4.5 miles off Miami-Dade County, Florida; (3) an upland site on Virginia Key, Florida; and (4) a previously dredged depression in North Biscayne Bay, Florida.

Based on an e-mail dated January 27, 2003, the use of explosives will be inshore of the outer reef. To protect marine mammals and sea turtles the following mitigative measures will be used:

> A danger zone will be determined based on the explosive weight used and its effects during an open water detonation. This will be conservative because there will be no open water explosions.
>
> This danger zone will be monitored by a combination of aerial observers, on water observers, and observers on the drill vessel.
>
> Any marine mammal or sea turtle in the danger zone shall not be forced to move out of those zones. Detonations shall not occur until the animal has moved out of the danger zone on its own volition.
>
> In the event a protected species is injured or killed during the use of explosives, the COE will immediately notify NOAA Fisheries.
>
> If explosives are used the COE will place the explosives in strategically oriented pre-drilled holes. These holes will be stemmed with angled gravel to direct the explosive energy into the rock.

Action Area

The action area includes the Port of Miami and Miami Harbor which are located on the north side of Biscayne Bay in Miami-Dade County, Florida (see map at attachment 2). This includes the access channel which extends approximately 3 miles into the Atlantic Ocean. The action area also includes the spoil disposal sites which include an artificial reef site in the nearshore Atlantic Ocean off Dade County, Florida; the Ocean Dredge Material Disposal Site in the Atlantic Ocean approximately 4.5 miles off Miami-Dade County, Florida; an upland site on Virginia Key, Florida; and a previous dredged depression in North Biscayne Bay, Florida (see attachment 3).

II. Status of the Species

The following endangered (E) and threatened (T) marine mammal, sea turtle, and marine plant species and designated critical habitat under the jurisdiction of NOAA Fisheries are known to occur in or near the action area:

Common Name	**Scientific Name**	**Status**
Johnson's seagrass	*Halophila johnsonii*	T
Blue whale	*Balaenoptera musculus*	E
Humpback whale	*Megaptera novaeangliae*	E
Fin whale	*Balaenoptera physalus*	E
Northern right whale	*Eubalaena glacialis*	E
Sei whale	*Balaenoptera borealis*	E
Sperm whale	*Physeter macrocephalus*	E
Leatherback sea turtle	*Dermochelys coriacea*	E
Hawksbill sea turtle	*Eretmochelys imbricata*	E
Kemp's ridley sea turtle	*Lepidochelys kempii*	E
Green sea turtle	*Chelonia mydas*[1]	E/T
Olive ridley sea turtle	*Lepidochelys olivacea*[2]	E/T
Loggerhead sea turtle	*Caretta caretta*	T

Critical Habitat

[1]Green turtles in U.S. waters are listed as threatened except for the Florida breeding population which is listed as endangered. Due to the inability to distinguish between these populations away from the nesting beach, green turtles are considered endangered wherever they occur in U.S. waters.

[2]Olive ridley turtles are listed as threatened except for the Mexican breeding population which is listed as endangered. Due to the inability to distinguish between these populations away from the nesting beach, olive ridley turtles are considered endangered wherever they occur in U.S. waters. Olive ridley turtles in the United States are mainly found in the Pacific Ocean and rarely found in the southeast United States. However, in the past two years three confirmed strandings of olive ridleys have been recorded in South Florida. Although present, NOAA Fisheries believes their occurrence is very rare.

Johnson's seagrass *Halophila johnsonii*

Blue, fin, sei, and sperm whales are predominantly found seaward of the continental shelf. Northern right whales and humpback whales are coastal animals and have been sighted in the nearshore environment in the Atlantic along the southeastern United States from November through March on their migration south. Right whales are rarely sighted south of northeastern Florida. None of these whale species are expected to be found in the shallow waters inshore of the outer reef. NOAA Fisheries believes that these whales could be affected by the use of explosives offshore of the outer reef; however, the COE has modified the proposed action such that explosives are not expected to be used seaward of the outer reef. NOAA Fisheries believes that this change in the proposed action, in combination with the above mentioned mitigation measures decreases the effects of the proposed action on listed whales to insignificant levels. If the COE decides to use explosives seaward of the outer reef they must reinitiate consultation as NOAA Fisheries believes that this may affect listed whale species. It should be noted that incidental takes of marine mammals (listed or non-listed) are not authorized through the ESA section 7 process. If such takes may occur, an incidental take authorization under Marine Mammal Protection Act (MMPA) Section 101 (a)(5) is necessary. For more information regarding MMPA permitting procedures contact Ken Hollingshead of our Headquarters' Protected Resources staff at (301) 713-2323.

The six species of sea turtles (loggerhead, green, Kemp's ridley, hawksbill, leatherback, and olive ridley) found in the action area are not expected to be adversely affected by the proposed action. Injury or death of sea turtles has not been recorded with the use of clam shell or cutterhead dredges; however, sea turtles can be affected by the use of explosives. NOAA Fisheries believes that the use of the mitigative measures above in combination with stemming the hole the explosives are placed in (which will greatly reduce the explosive energy released into the water column) will reduce the proposed action's effects on sea turtles to insignificant levels.

Since NOAA Fisheries has determined that the sea turtles and marine mammals listed above are not likely to be adversely affected by the proposed action, these species will not be considered further in this Opinion. The remainder of this Opinion will focus on the only federally-listed species likely to be adversely affected by the proposed action, Johnson's seagrass, and its critical habitat.

Johnson's Seagrass (*Halophila johnsonii*)

A. Species Description

Johnson's seagrass was listed as threatened under the ESA on September 14, 1998, based on the results of field work and a status review initiated in 1990. Johnson's seagrass is the first marine plant ever listed under the ESA. Kenworthy (1993, 1997, 1999) discusses the results of the field studies and summarizes an extensive literature review and associated interviews regarding the status of Johnson's

seagrass. The following discussion summarizes those findings relevant to our evaluation of the proposed action.

Range

Johnson's seagrass has only been found growing along approximately 200 km of coastline in southeastern Florida between Sebastian Inlet, Indian River County, to northern Key Biscayne. This narrow range and apparent endemism suggests that Johnson's seagrass may have the most limited known geographic distribution of any seagrass in the world.

Johnson's seagrass occurs in dynamic and disjunct patches throughout its range. Growth appears to be rapid and leaf pairs have short life spans while horizontally spreading from dense apical meristems (Kenworthy 1997). Kenworthy suggested that the observed horizontal spreading, rapid growth patterns, and high biomass turnover could explain the dynamic patches observed in distribution studies of this species. New information reviewed in Kenworthy (1999, 1997) confirms *H. johnsonii*'s limited geographic distribution in patchy and vertically disjunct areas between Sebastian Inlet and northern Biscayne Bay. Surveys conducted by NOAA Fisheries and Florida Marine Research Institute staff in Biscayne Bay, Florida Bay, the Florida Keys, outer Florida Bay, Puerto Rico, and the Virgin Islands have provided no verifiable sightings of Johnson's seagrass outside of the range already reported.

Extent of critical habitat

The northern and southern ranges of Johnson's seagrass are defined as Sebastian Inlet and central Biscayne Bay, respectively. These limits to the species' range have been designated as critical habitat for Johnson's seagrass (May 5, 2000; 65 FR 17786). The designation of critical habitat provides explicit notice to Federal agencies and the public that these areas and features are vital to the conservation of the species. Within its range, Johnson's seagrass critical habitat has been designated for 10 areas: a portion of the Indian River Lagoon, north of the Sebastian Inlet Channel; a portion of the Indian River Lagoon, south of the Sebastian Inlet Channel; a portion of the Indian River Lagoon near the Fort Pierce Inlet; a portion of the Indian River Lagoon, north of the St. Lucie Inlet; a portion of Hobe Sound; a site on the south side of Jupiter Inlet; a site in central Lake Worth Lagoon; a site in Lake Worth Lagoon, Boynton Beach; a site in Lake Wyman, Boca Raton; and a portion of Biscayne Bay. Based on the best available information, NOAA Fisheries identified the following physical and biological features as those constituent elements which are essential to the conservation of Johnson's seagrass: adequate water quality, salinity levels, water transparency, and stable, unconsolidated sediments that are free from physical disturbance. The specific areas designated as critical habitat which are currently occupied by Johnson's seagrass include one or more of the following criteria: 1) locations with populations that have persisted for 10 years; 2) locations with persistent flowering populations; 3) locations at the northern and southern range limits of the species; 4) locations with unique genetic diversity; and 5) locations with a documented high abundance of Johnson's seagrass compared to other areas in the species' range.

B. Life History

Reproductive strategy

The species is perennial and may spread even during winter months under favorable conditions (Virnstein et al. 1997). Sexual reproduction in Johnson's seagrass has not been documented. Female flowers have been found; however, dedicated surveys in the Indian River Lagoon have not discovered male flowers, fertilized ovaries, fruits, or seeds either in the field or under laboratory conditions (Jewett-Smith et al. 1997). Searches throughout the range of Johnson's seagrass have produced the same results, suggesting that the species does not reproduce sexually or that the male flowers are difficult to observe or describe, as noted for other *Halophila* species (Kenworthy 1997). Surveys to date indicate that the incidence of female flowers appears to be much higher near the inlets leading to the Atlantic Ocean, suggesting that inlet conditions are qualitatively better for flowering than conditions further inshore (Kenworthy, pers. comm. 1998). It is possible that male flowers, if they exist, occur near inlets as well. Maintenance of good water quality around inlets may be essential for promoting flowering in the Johnson's seagrass population.

Niche

The essential features of habitat appear to be adequate water quality, salinity, water clarity, and stable sediments free from physical disturbance. Important habitat characteristics include shallow intertidal as well as deeper subtidal zones (2-5 m). Water transparency appears to be critical for Johnson's seagrass, limiting its distribution at depth to areas of suitable optical water quality (Kenworthy 1997). In areas in which long-term poor water and sediment quality have existed until recently, such as Lake Worth Lagoon, *H. johnsonii* appears to occur in relatively higher abundance perhaps due to the previous inability of the larger species to thrive. These studies support unconfirmed previous observations that suspended solids and tannin, which reduce light penetration and water clarity, may be important factors limiting seagrass distribution in the Indian River Lagoon (Woodward-Clyde 1994). Good water clarity is essential for *Halophila johnsonii* growth in deeper waters.

Johnson's seagrass occurs over varied depths, environmental conditions, salinities, and water quality. In tidal channels *H. johnsonii* is found in coarse sand substrates, although it has been found growing on sandy shoals, and in soft mud near canals and rivers where salinity may fluctuate widely (Virnstein et al. 1997). Virnstein has called Johnson's seagrass a "perennial opportunistic species." Within his study areas in the Indian River Lagoon, *H. johnsonii* was found by itself, with other seagrass species, in the intertidal, and (more commonly) at the deep edge of some transects in water depths of up to 180 cm. *H. johnsonii* was found shallowly rooted on sandy shoals, in soft mud, near the mouths of canals, rivers, and in shallow and deep water (Virnstein et al. 1997). Additionally, recent studies have documented large patches of Johnson's seagrass on flood deltas just inside Sebastian Inlet, as well as far from the influence of inlets (reported at the workshop discussed in Kenworthy 1997). These sites encompass a wide variety of salinities, water quality, and substrates.

Competitors

Halophila johnsonii appears to be out-competed in ideal seagrass habitats where environmental conditions permit the larger species to thrive (Virnstein et al. 1997; Kenworthy 1997).

C. Population Dynamics

Population stability

A factor leading to the listing of *H. johnsonii* is its rareness within its extremely restricted geographic range. Johnson's seagrass is characterized by small size (it is the smallest of all of the seagrasses found within its range, averaging about 3 cm in height), fragile rhizome structure and associated high turnover rate, and its apparent reliance on vegetative means to reproduce, grow, and migrate across the sea bottom. These factors make Johnson's seagrass extremely vulnerable to human or environmental impacts by reducing its capacity to repopulate an area once removed. The species and its habitat are impacted by human-related activities throughout the length of its range, including bridge construction and dredging, and the species' threatened status produces new and unique challenges for the management of shallow submerged lands. Vessel traffic resulting in propeller and anchor damage, maintenance dredging, dock and marine construction, water pollution, and land use practices could require special management within critical habitat.

Population (genetic) variability

The Boca Raton and Boynton Beach sites which have been designated as critical habitat have populations which are distinguished by a higher index of genetic variation than any of the central and northern populations examined to date (Kenworthy 1999). These two sites represent a genetically semi-isolated group which could be the reservoir of a large part of the overall genetic variation found in the species. Information is still lacking on the geographic extent of this genetic variability.

D. Status and Distribution

Reasons for listing

Kenworthy (1997, 1999) summarized the newest information on Johnson's seagrass biology, distribution and abundance, and confirmed the limited range and rareness of this species within its range. Additionally, the apparent restriction of propagation through vegetative means suggests that colonization between broadly disjunct areas is likely difficult, suggesting that the species is vulnerable to becoming endangered if it is removed from large areas within its range by natural or anthropogenic means. Human impacts to Johnson's seagrass and its habitat include: (1) vessel traffic and the resulting propeller dredging and anchor mooring; (2) dredging; (3) dock and marina construction and shading from these structures; (4) water pollution; and (5) land use practices including shoreline development, agriculture, and aquaculture.

Activities associated with recreational boat traffic account for the majority of human use associated with the designated critical habitat areas. The destruction of the benthic community due to boating activities, propeller dredging, anchor mooring, and dock and marina construction was observed at all sites during a study by NOAA Fisheries from 1990 to 1992. These activities severely disrupt the benthic habitat, breaching root systems, severing rhizomes, and significantly reducing the viability of the seagrass

community. Propeller dredging and anchoring in shallow areas are a major disturbance to even the most robust seagrasses. This destruction is expected to worsen with the predicted increase in boating activity. Trampling of seagrass beds, a secondary effect of recreational boating, also disturbs seagrass habitat. Populations of Johnson's seagrass inhabiting shallow water and close to inlets, where vessel traffic is concentrated, will be most affected.

The constant sedimentation patterns in and around inlets require frequent maintenance dredging, which could either directly remove essential seagrass habitat or indirectly affect it by redistributing sediments, burying plants, and destabilizing the bottom structure. Altering benthic topography or burying the plants may remove them from the photic zone. Permitted dredging of channels, basins, and other in- and on-water construction projects causes loss of Johnson's seagrass and its habitat through direct removal of the plant, fragmentation of habitat, and shading. Docking facilities that, upon meeting certain provisions, are exempt from state permitting also contribute to loss of Johnson's seagrass through construction impacts and shading. Fixed add-ons to exempt docks (such as finger piers, floating docks, or boat lifts) have recently been documented as an additional source of seagrass loss due to shading (Smith and Mezich 1999).

Decreased water transparency caused by suspended sediments, water color, and chlorophylls could have significant detrimental effects on the distribution and abundance of the deeper water populations of Johnson's seagrass. A distribution survey in Hobe and Jupiter Sounds indicates that the abundance of this seagrass diminishes in the more turbid interior portion of the lagoon where reduced light limits photosynthesis.

Other areas of concern include seagrass beds located in proximity to rivers and canal mouths where low salinity, highly colored water is discharged. Freshwater discharge into areas adjacent to seagrass beds may provoke physiological stress upon the plants by reducing the salinity levels. Additionally, colored waters released into these areas reduce the amount of sunlight available for photosynthesis by rapidly attenuating shorter wavelengths of photosynthetically active radiation.

Continuing and increasing degradation of water quality due to increased land use and water management threatens the welfare of seagrass communities. Nutrient overenrichment caused by inorganic and organic nitrogen and phosphorous loading via urban and agricultural land run-off stimulates increased algal growth that may smother Johnson's seagrass, shade rooted vegetation, and diminish the oxygen content of the water. Low oxygen conditions have a demonstrated negative impact on seagrasses and associated communities.

Range-wide trend

Lamentably, there is currently insufficient information to clearly determine trends in the Johnson's seagrass population, which was first described in 1980 and has only been extensively studied during the 1990s. Generally, seagrasses within the range of Johnson's seagrass have declined in some areas and increased in others. Where multi-year mapping studies have been conducted within the Indian River

Lagoon, recent increases in Johnson's seagrass have been noted but may be attributed in part to the recent increase in search effort and increased familiarity
with this species (Virnstein et al. 1997). The authors conclude that from 1994 through 1997, no strong seasonal distribution or increases or decreases in abundance or range can be discerned.

E. Analysis of the Species Likely to be Affected

Of the listed species under NOAA Fisheries' jurisdiction occurring in the Atlantic Ocean in the Southeast Region, NOAA Fisheries believes that only Johnson's seagrass and its critical habitat may be adversely affected by the proposed action. *Halophila johnsonii* may be affected because of its limited range, distribution within its range, reproductive capacity, and largely unknown ability to recover from removal from a site. Spread of the species into new areas is limited by its reproductive potential. Johnson's seagrass is thought to possess only female flowers; thus, vegetative propagation, most likely through asexual branching, appears to be its only means of reproduction and dispersal. If an established community is disturbed, the extent of regrowth and reestablishment, if any, is uncertain. If extirpated from an area, it is doubtful that the species would be capable of repopulation. This species' method of reproduction impedes the ability to increase distribution as establishment of new vegetation requires considerable stability in environmental conditions and protection from human-induced disturbances.

III. Environmental Baseline

A. Status of the Species Within the Action Area

Because of the limited nature of this species' range, the range-wide status of the species, given in Section II above, most appropriately reflects the species status within the action area.

B. Factors Affecting the Species Environment Within the Action Area

This seagrass occurs within inshore waters of the most populated counties in Florida, and is therefore influenced by numerous actions and potential sources of harm. Since 1981, the state of Florida has regulated activities that affect seagrasses and has implemented measures to minimize these effects. These protective measures directly benefit Johnson's seagrass.

Inlets into the Intracoastal Waterway (ICW) have been established or stabilized and maintained since the early 1900s, in some cases creating a marine environment where freshwater once occurred. Naturally-occurring channels have been expanded, deepened, and stabilized into continuous channels with access to harbors and inlets. These activities have had a dominant effect on the seagrass habitat throughout the range of *H. johnsonii*.

Urban development since the 1960s has affected inshore water quality throughout the range of Johnson's seagrass. However, Woodward-Clyde (1994) opined that improvements in erosion and sediment control in association with urban development in the 1980s and 1990s may have been responsible for reduced turbidity in those decades as compared to the previous two decades of development. Reductions in seagrasses were apparent in the 1970s, along with areas of highly turbid water. Increases in submersed aquatic vegetation were noted until coverage and density peaked in 1986, albeit at levels remaining below those observed in the decades prior to 1960.

In association with upland development, water quality and transparency within the range of Johnson's seagrass are affected by storm water and agricultural runoff, wastewater discharges, and other point and non-point sources. The effects of water management may result in large discharges of fresh water from Lake Okeechobee. Nutrient overenrichment resulting from these discharges may stimulate increased algal growth that may smother seagrasses, shade rooted vegetation, and diminish the oxygen content of the water. Water clarity, which has been identified as an essential feature to allow Johnson's seagrass to occur in the deeper reaches of its
range, may also be affected by these discharges. Although Johnson's seagrass has shown tolerance of wide salinity ranges, the discharge of large amounts of fresh water into the ICW may exceed even these ranges.

Increasing recreational vessel traffic in the range of Johnson's seagrass results in marina and dock construction, anchor mooring, propeller scoring and scouring by vessels operating outside of boat channels, and intentional, illegal propeller dredging. Additionally, seagrass beds may be trampled by fishermen and others using these inshore waters. These activities disrupt the benthic habitat, and easily breach the shallow root systems of Johnson's seagrass. A marina project permitted by the COE in 2002, is expected to cover 3.01 acres of the Biscayne Bay designated critical habitat.

Natural disasters, including hurricanes and large coastal storms, could also significantly harm seagrass beds. Storm surges could easily pull the shallowly-rooted *H. johnsonii* from the sediments and remove a large portion of its population in proximity to inlets. Because of its restricted geographic distribution and apparent reliance on asexual reproduction, it is less likely to survive environmental perturbations and to be able to repopulate an area once lost.

A wide range of activities funded, authorized, or carried out by Federal agencies may affect the essential habitat requirements of Johnson's seagrass. These include authorization by the COE for beach nourishment, dredging, and related activities including construction of docks and marinas; bridge construction projects funded by the Federal Highways Administration; actions by the Environmental Protection Agency and the COE to manage freshwater discharges into waterways; regulation of vessel traffic by the U.S. Coast Guard (USCG); management of national refuges and protected species by the U.S. Fish and Wildlife Service; management of vessel traffic (and other activities) by the U.S. Navy; authorization of state coastal zone management plans by NOAA's National Ocean Service; and management of commercial fishing and protected species by NOAA Fisheries.

Summary and Synthesis of the Environmental Baseline

In summary, several factors are presently adversely affecting Johnson's seagrass within the action area. These factors are ongoing and are expected to occur contemporaneously with the proposed action:

- the creation, widening, and deepening of inlets and channels will continue to fragment, smother, and directly remove seagrass beds;

- urban development will continue to create demands for new docks and marinas which will preclude the expansion of seagrasses by direct displacement and shading;

- upland development and associated runoff will continue to degrade water quality and decrease water clarity necessary for growth of seagrasses; and

- increased vessel traffic will continue to result in fragmentation of seagrass beds due to accidental groundings and propeller scarring.

These activities are expected to combine to adversely affect the recovery of Johnson's seagrass throughout its range.

IV. Effects of the Action

The proposal to list Johnson's seagrass as a threatened species identified a number of human and natural perturbations which adversely affect the species including 1) dredging and filling, 2) propeller scarring, 3) storm surge, 4) alterations in water quality, and 5) siltation. Due to the fragile nature of *H. johnsonii*'s shallow root system, these seagrasses are vulnerable to human-induced disturbances in addition to the major natural disturbances to the sediment.

A seagrass survey conducted by the COE (attachment 4) indicates that there is no Johnson's seagrass located in the areas of the port's channels and turning basins that will be dredged as part of the proposed action. The previously dredged depression in Biscayne Bay that will be used for spoil disposal is approximately 18.9 acres and between 11 and 15 feet deep. A seagrass survey completed by the COE (not yet published) indicates that there is no Johnson's seagrass around the perimeter of the depression nor is there Johnson's seagrass or any other seagrass species in the depression (Terry Jordan, COE biologist, personal communication). Based on this information the proposed action's effects on Johnson's seagrass will be insignificant.

As stated in the Environmental Baseline section of this Opinion and based on the best available information, NOAA Fisheries identified the following physical and biological features as those

constituent elements which are essential to the conservation of Johnson's seagrass: adequate water quality, salinity levels, water transparency, and stable, unconsolidated sediments that are free from physical disturbance. The specific areas designated as critical habitat which are currently occupied by Johnson's seagrass include one or more of the following criteria: 1) locations with populations that have persisted for 10 years; 2) locations with persistent flowering populations; 3) locations at the northern and southern range limits of the species; 4) locations with unique genetic diversity; and 5) locations with a documented high abundance of Johnson's seagrass compared to other areas in the species range.

A portion of Northern Biscayne Bay, Florida, defined by the following: The northern boundary of Biscayne Bay Aquatic Preserve, N.E. 163rd Street, and including all parts of the Biscayne Bay Aquatics Preserve as defined in 18-18.002 of the Florida Administrative Code (F.A.C.) excluding the Ortega River beyond its mouth, and all Federal navigation channels at the Port of Miami, not including the ICW, to the currently documented southern-most range of Johnson's seagrass, Central Key Biscayne (25°45'N) is designated as critical habitat. Therefore portions of the proposed action will occur in Johnson's seagrass critical habitat (see attachment 2, component 5A and attachment 3, "proposed seagrass restoration site").

This portion of Biscayne Bay was designated as critical habitat because it is the southern most portion of the species range. The geographical limits of the distributional range of a species can indicate a reduction or expansion of the species' range. Greater adaptative stresses can occur at the limits of the species' range. If the range extension were shrinking, the edges should be protected to prevent further loss. Secondly, the distribution limits may be a point where the populations are expanding and invading new environments. The unique phenotypic and genotypic characteristics of these populations could be an important reservoir for characteristics resistant to extinction and conducive to survival and growth.

Approximately 24.9 acres of this designated critical habitat will be affected by the proposed action. Six acres will be affected by the widening of the Lummus Island Cut by about 100 feet to the south of the existing channel (see attachment 2, component 5A) and an additional 18.9 acres will be affected by the disposal of spoil material in the previously dredged depression, mentioned above (attachment 3). The six acres of critical habitat that will be lost due to the widening of the Lummus Island Cut represents approximately .05% of the total Biscayne Bay critical habitat (6 acres of loss/19,000 total acres of the Biscayne Bay critical habitat). The deminimis nature of this loss will not stop the species from expanding and invading new environments. This loss will also not cause the loss of unique phenotypic and genotypic characteristics that may be present due to this area being the southern limit of Johnson's seagrass's range (this is due to no actual loss of Johnson's seagrass). The dredging associated with the widening will cause disturbances to the water quality, water transparency, and the sediments (due to the disturbance and temporary suspension of sediments) of the immediate area; however, these effects will be temporary and no permanent alteration of these constituent elements is expected. Salinity levels are not expected to be affected as a result of the proposed action. Based on this NOAA Fisheries believes that the loss of six acres of the Biscayne Bay critical habitat will not appreciably diminish the value of the critical habitat for both the survival and recovery of Johnson's seagrass.

The 18.9 acres of area to be filled is currently devoid of seagrass including Johnson's seagrass. The area is 11 to 15 feet deep with suspended sediments causing low light at the bottom (Terry Jordan, personal communication). The COE intends to fill this area to a depth of 4 feet and intends to use this area for seagrass mitigation (Terry Jordan, personal communication). This should increase the area's ability to support seagrasses including Johnson's seagrass by adjusting the bottom to a depth more conducive to light penetration and seagrass growth. Based on this information NOAA Fisheries believes that the filling of this depression may increase the area within the critical habitat that contain the constituent elements which are essential to the conservation of Johnson's seagrass and will add additional area for the expansion of Johnson's seagrass.

Based on the above information NOAA Fisheries does not believe that the proposed action will cause the destruction or adverse modification of the Biscayne Bay Johnson's seagrass critical habitat.

V. Cumulative Effects

Cumulative effects include the effects of future state, tribal, or local private actions that are reasonably certain to occur in the action area considered in this Opinion. Future Federal actions that are unrelated to the proposed action are not considered in this section because they require separate consultation pursuant to section 7 of the ESA.

No effects beyond those already described in Sections IIIB and IV are expected in the action area. Dock and marina construction will likely continue at current rates, with concomitant loss and degradation of seagrass habitat, including Johnson's seagrass; however, these activities are subject to COE permitting and thus the ESA section 7 consultation requirement. Furthermore, NOAA Fisheries and the COE have developed protocols to encourage the use of light-transmitting materials in future constructions of single-family docks within the range of Johnson's seagrass.

In or near the action area it is expected that recreational watercraft use will continue to increase; however, it is expected that boater education programs and posted signage about the dangers to seagrass beds (and manatees) of propeller scarring will reduce boat interactions with listed species at a rate greater than the increase in boating activity. NOAA Fisheries does not believe that continuation of recreational boating activities at the current rate of increase will jeopardize the existence of *Halophila johnsonii* because of boater education programs and because of the designation of critical habitat for the species. This designation will help protect areas with persistent patches (patches that have been viable for at least 10 years), and areas of genetic variability, from adverse modifications.

VI. Conclusion

After reviewing the current status of Johnson's seagrass and its critical habitat, the environmental baseline for the action area, the effects of the proposed action and the cumulative effects, it is NOAA Fisheries' biological opinion that the action, as proposed, is not likely to jeopardize the continued existence of Johnson's seagrass nor destroy or adversely modify critical habitat. Further surveys and monitoring of the action area after construction are necessary to quantify the effects of this project and to verify the conclusion of this Opinion.

VII. Conservation Recommendations

Section 7(a)(1) of the ESA directs Federal agencies to use their authorities to further the purposes of the ESA by carrying out conservation programs for the benefit of endangered and threatened species. Conservation recommendations are discretionary agency activities to minimize or avoid adverse effects of a proposed action on listed species or critical habitat, to help implement recovery plans, or to develop information.

NOAA Fisheries believes the following conservation recommendations are reasonable, necessary, and appropriate to minimize impacts on Johnson's seagrass and Johnson's seagrass critical habitat. The NOAA Fisheries strongly recommends that these measures be considered and adopted.

1. NOAA Fisheries recommends that a report of all current and proposed COE projects in the range of Johnson's seagrass be prepared and used by the COE to assess impacts on the species from these projects, to assess cumulative impacts, and to assist in early consultation that will avoid and/or minimize impacts to Johnson's seagrass and its critical habitat. Information in this report should include location and scope of each project and identify the Federal lead agency for each project.

The information should be made available to the South Florida Water Management District and NOAA Fisheries.

2. NOAA Fisheries recommends that the COE conduct and support research to assess trends in the distribution and abundance of Johnson's seagrass. Data collected should be contributed to the Florida Fish and Wildlife Conservation Commission's Florida Marine Research Institute to support ongoing GIS mapping of Johnson's and other seagrass distribution.

3. NOAA Fisheries recommends that the COE, in coordination with seagrass researchers and industry, support ongoing research on light requirements and transplanting techniques to preserve and restore Johnson's seagrass, and on collection of plants for genetics research, tissue culture, and tissue banking.

4. NOAA Fisheries recommends that the COE participate in state efforts to preserve and restore seagrass, and in the implementation of the Seagrass Preservation and Restoration Plan for the Indian River Lagoon.

5. NOAA Fisheries recommends that the COE prepare an assessment of the effects of other actions under its purview on Johnson's seagrass for consideration in future consultations. NOAA Fisheries recommends that the standardized survey methods identified at Attachment 1 (Recommendations for Sampling *Halophila johnsonii* at a Project Site) be used to collect data to support assessments of these new projects.

6. NOAA Fisheries recommends that the COE recommend the use of the *Key for Construction Conditions for Docks or other Minor Structures Constructed in or over Johnson's Seagrass*, revised October 2002, as the construction methodology for proposed docks located in the range of Johnson's seagrass.

7. NOAA Fisheries recommends that the COE monitor the seagrass mitigation site that is part of the proposed action for a period of no less than 5 years. Yearly reports should be completed and sent to NOAA Fisheries' Southeast Regional Office, Protected Resources Division.

Reinitiation of Consultation

As provided in 50 CFR Section 402.16, reinitiation of formal consultation is required where discretionary Federal agency involvement or control over the action has been retained (or is authorized by law) and if (1) the amount or extent of taking specified in the proposed action is exceeded, (2) new information reveals effects of the action that may affect listed species or critical habitat in a manner or to an extent not previously considered, (3) the identified action is subsequently modified in a manner that causes an effect to listed species or critical habitat that was not considered in the biological opinion, or (4) a new species is listed or critical habitat designated that may be affected by the identified action.

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ATTACHMENT 1

Recommendations for Sampling *Halophila johnsonii* at a Project Site

The above-suggested approaches for sampling *H. johnsonii* are recommendations of the *H. johnsonii* Recovery Team.

Objective:

To outline recommended survey methods for determining the distribution and abundance of *H. johnsonii* at sites under permit review. The methods should be applicable to a broad range of project scales, from a 20-m long dock, to marinas, bridges, and channels several kilometers long.

Problem:

Three aspects make quantitative sampling for *H. johnsonii* difficult: (1) Poor visibility; it is sometimes difficult to see more than 0.1 or even 0.01 m^2 at a time. (2) Patchy and clumped distribution, with patches as small as 0.01 m^2, which may be clumped together within a sub-area of the project area. (3) Stratified distribution, with occurrence perhaps limited to a particular depth gradient within a project area.

Recommended Methods:

The most appropriate approach depends on scale, and the amount of expected error depends on the approach. Unless a complete survey of the entire area is done, the estimated distribution and abundance of this species may be significantly in error. With the exception of very small project areas, efficient field sampling may require sampling in two stages. A preliminary visual reconnaissance of the site should be conducted to locate any occurrences of *H. johnsonii*. "The importance of preliminary sampling is probably the most under emphasized principal related to field studies. There is no substitute for it." (Green 1979). Following the preliminary reconnaissance, a more comprehensive sampling, using one of the techniques outlined below, should be initiated.

In situ monitoring for *H. johnsonii* is absolutely necessary. Aerial photography may be used to map distributions of larger canopy-forming species; however, mapping of *H. johnsonii* cannot be done reliably from aerial photos. Because of significant seasonal and annual variation in distribution and abundance of *H. johnsonii*, surveys must be conducted during spring/summer (April 1-August 31) period of maximum abundance, and sampling in more than one summer is recommended. Length of time between survey date and actual start of project should consider the potentially rapid turnover and migration of *H. johnsonii*. Personnel conducting the survey should clearly demonstrate that they can distinguish between *H. johnsonii* and *H. decipiens*. Surveys labeled simply as *"Halophila"* are not sufficient.

Deliverables: 1) amount (acres or square meters) impacted, 2) estimate of percent coverage and the species present/absent, 3) site map with seagrass patch or bed locations, 4) size of the patches, and 5) shoot density estimate.

SMALL PROJECT SITES (<0.1 ha, e.g., 10-m by 100-m, such as single-family docks). Two methods.

1. Provide a site map of submerged lands adjacent to the action area. The site map should include transects approximately every 7.5 m apart, perpendicular to the shore, and for a length 6 m longer than the proposed activity. A preliminary visual reconnaissance is necessary to fill in the information between the transects. Seagrass patches should be identified by species composition and drawn on the site map. Density can be accomplished with random sub-sampling for density within the identified patches. (An overall site map is important since it identifies seagrass habitat, not just existing seagrass patches.) (Mezich 2000).

2. The site is sub-divided into m^2 grids. A complete and intensive mapping of the entire area of concern can be developed by using DGPS, with coordinates provided every m^2, or every patch >0.01-0.1 m^2, with a tested map accuracy of >50%-95%. If percent cover is not used, an illustrated, standardized scale of density should be used. Presence-absence should be determined for every m^2 grid cell.

For monitoring project effects, additional information on shoot density, blade length, and flowering, can be collected from a random sub-sample of grids using 25-cm by 25-cm quadrants or multiple 10-cm by 10-cm sub-cells within the m^2 grid.

INTERMEDIATE-AREA PROJECT SITES (0.1 to 1 ha, e.g., a 100-m by 100-m marina). A two-step process is required.

a. Preliminary visual reconnaissance to locate general *H. johnsonii* areas and distribution.
b. The site should then be surveyed using transects across the dominant spatial gradient (e.g., depth, inshore-offshore, channel-shoal, etc.) of the site. The number of transects and sample intervals should adequately describe distribution and abundance of *H. johnsonii* patches. Besides noting presence-absence, x-y-z diameters of encountered patches should be noted, together with sub-samples of shoot density, blade length, and presence of flowering.

LARGE-AREA PROJECT SITES (>1 ha). Three choices are possible after preliminary visual reconnaissance.

1. Random sampling of points or quadrats within the area.

Sampling at least 1%-30% of the total area.

- 2 stages: (1) visual reconnaissance, then stratify, (2) second intensive sampling, with intensity relative to abundance of *H. johnsonii* within the strata.
- single step of 100-1,000 points/quadrats (min. # = ?).

2. Intensive survey of transects.

Transects across the entire area, sampling at least 1%-30% of the total area.

- point-intersects sampling along transects (with the size of a “point” defined, e.g., 5-cm x 5- cm or 10-cm x 10-cm).
- belt transect, of 0.1-2 m width.
- transects randomly located (min. # transects = 10-50 or min. spacing = 50 m).
- regularly-spaced transects (min. # transects = 10-50 or min. spacing = 50 m).
- quadrants at regular intervals along line (min. # = 10-50 or min. spacing = 50 m).

For any of these transect methods, x-y-z diameters of any patches encountered should be measured. At a minimum, presence-absence should be recorded at each point of each quadrant.

3. Combinations of above methods, e.g.,

(a) Intensive mapping in area of primary impact (e.g., within footprint of proposed dock), plus random points in surrounding, potentially affected area.

(b) Stratify from random point sampling, then map intensively in areas of greatest abundance.

It is the position of the Recovery Team, however, that the adoption of a valid survey protocol for identifying Johnson's seagrass be required by permitting agencies in the range of the species. In all seagrass surveys, emphasis should be placed on the identification of seagrass habitat as well as the distribution of currently existing patches. Identifying impacts to seagrass habitat, particularly from large projects, is more important in the long run than the "point-in-time" management approach of avoiding currently existing patches.

References

Green, R.H. 1979. Sampling design and statistical analysis methods environmental biologists. John. W. and Sons, Inc., New York.

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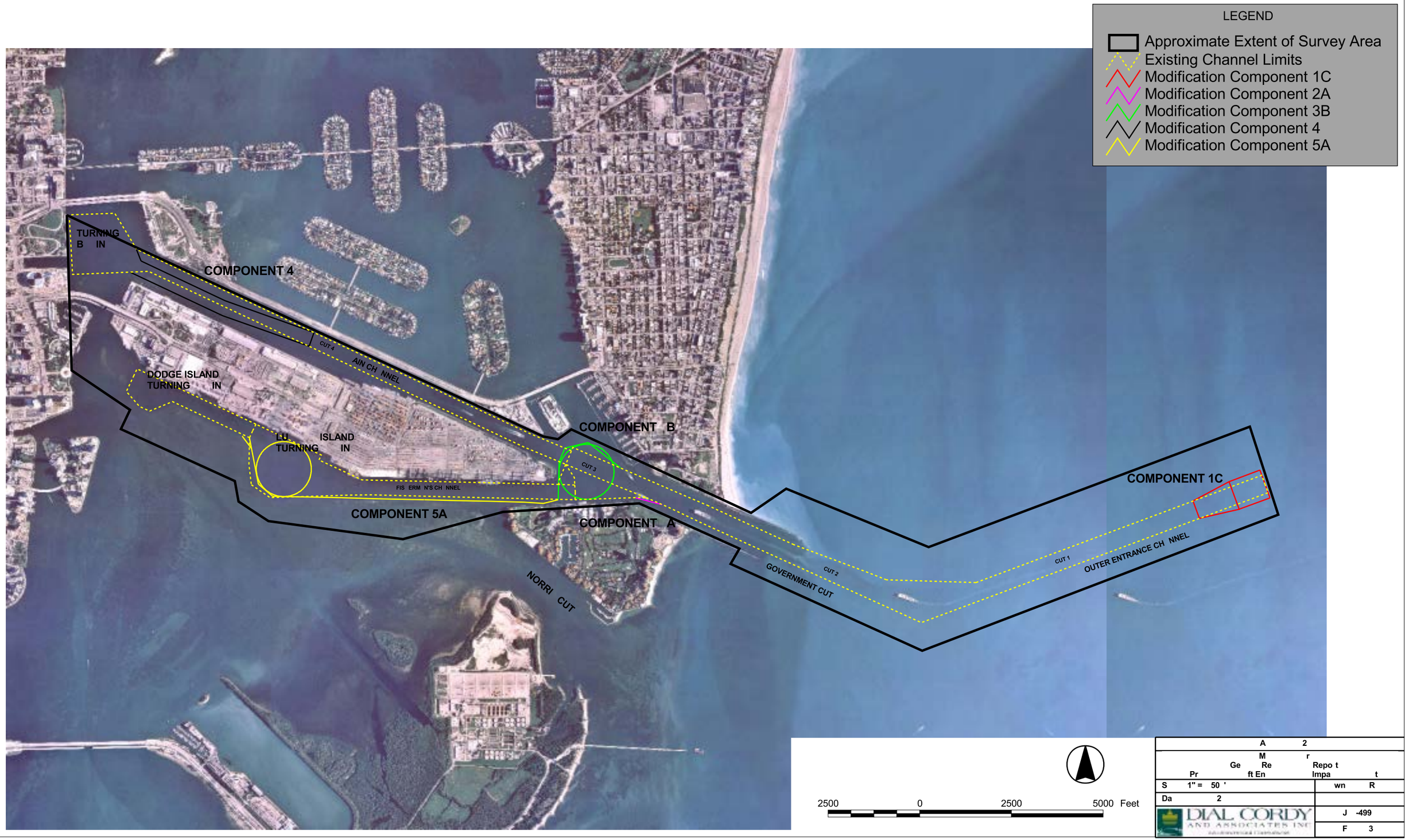
Attachment 2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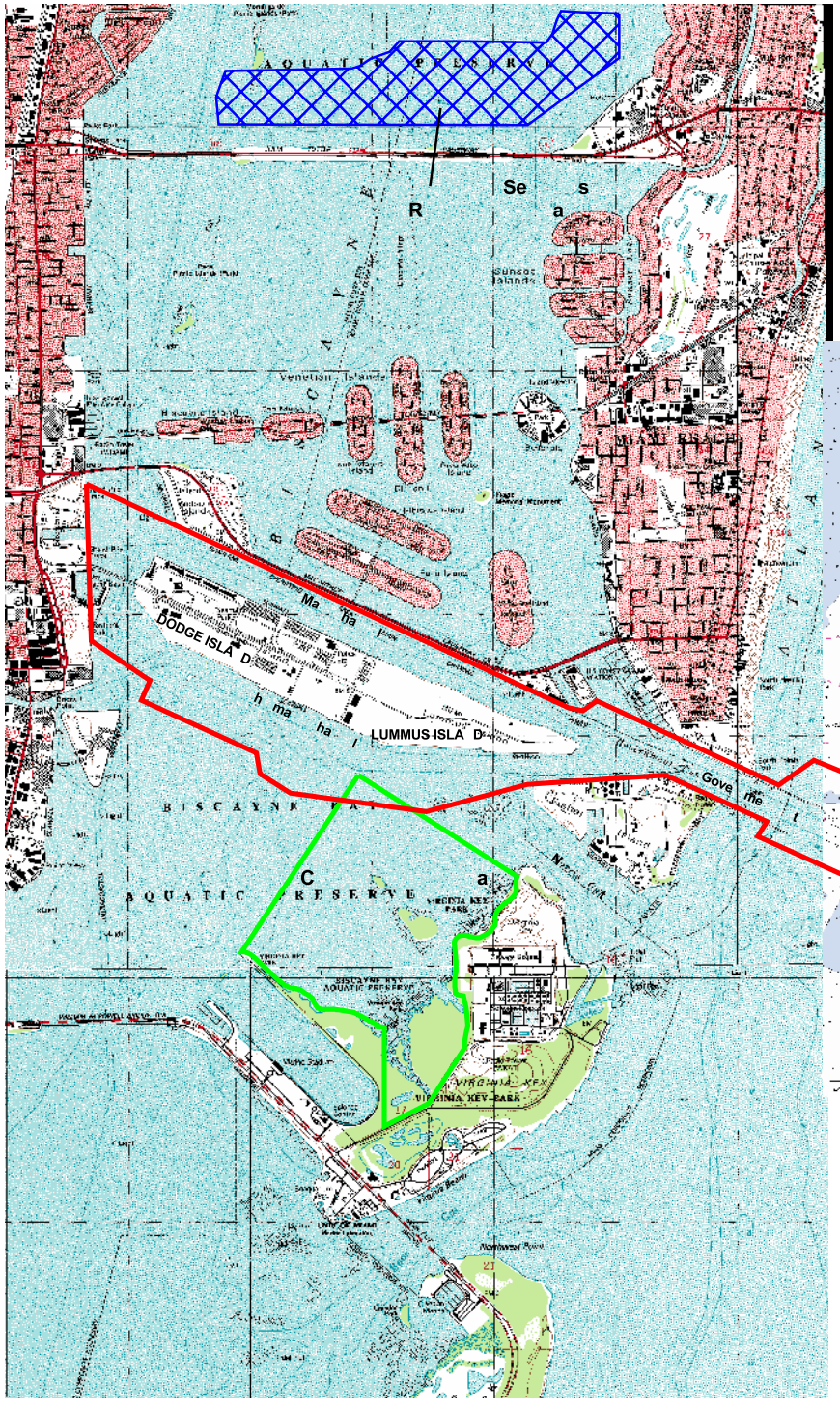
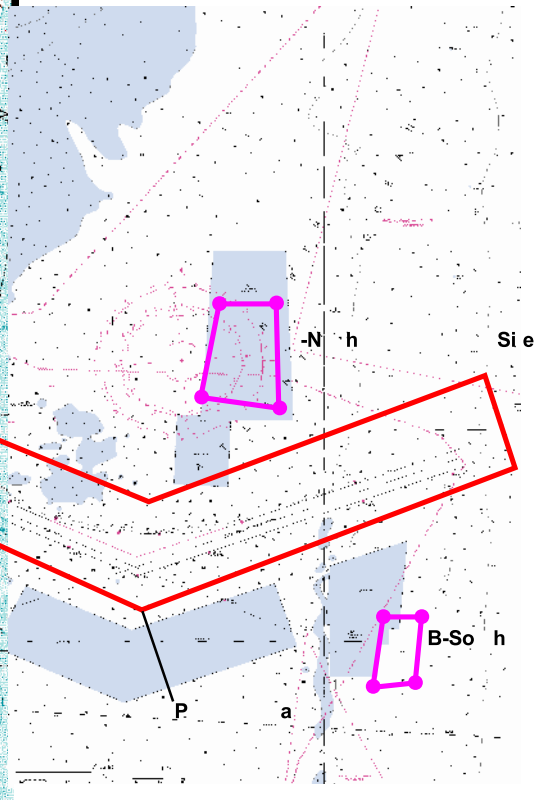
Attachment 3





LEGEND

- Approximate Extent of Study Area
- Bill Sadowski Critical Wildlife Area
- DERM Permitted Artificial Reef Site (Corners)

Dredge Material Disposal

- Offshore Dredge Material Disposal Site (ODMDS)
- Proposed Seagrass Restoration Area

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ODMDS

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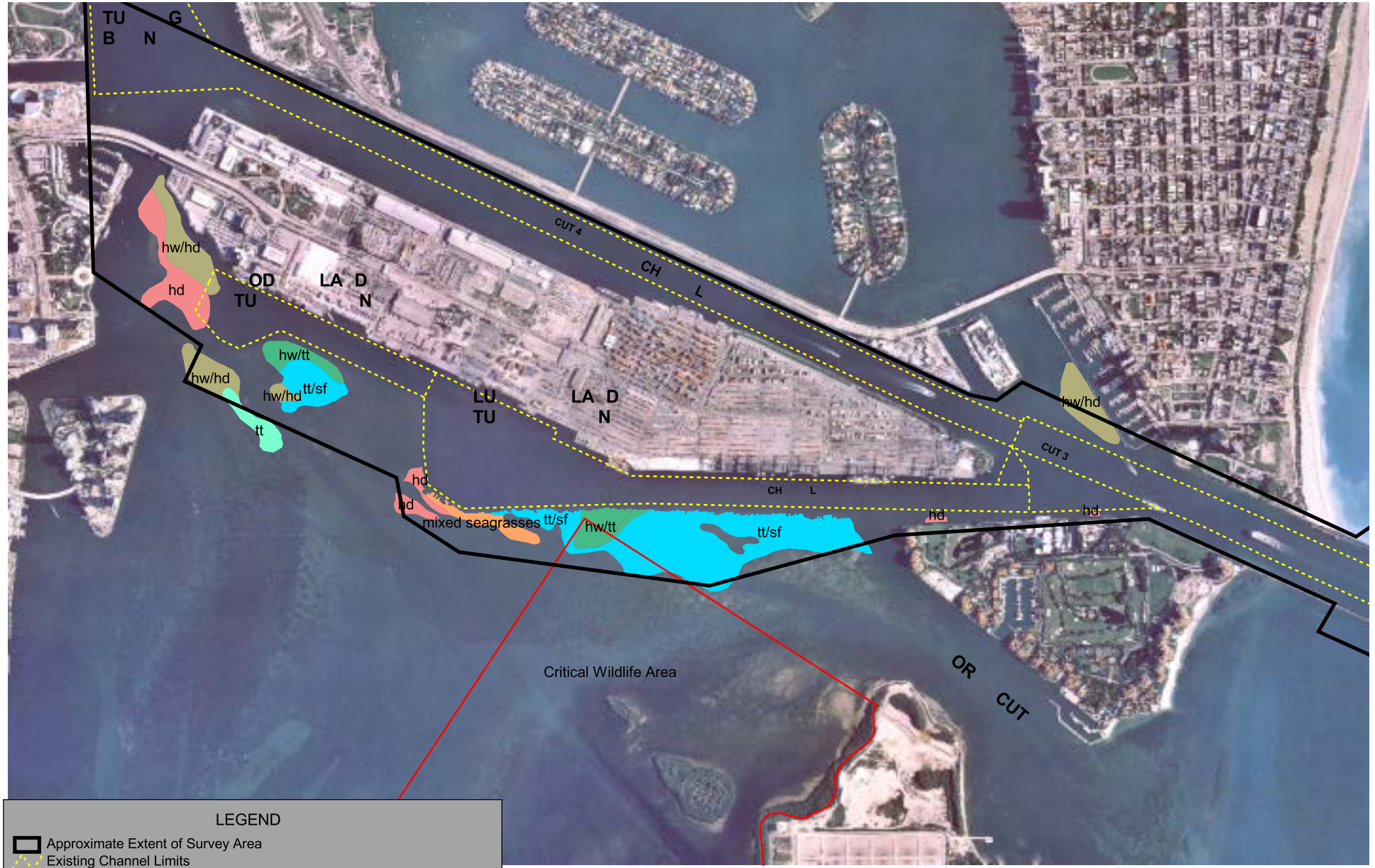
Attachment 4



LEGEND

- Approximate Extent of Survey Area
- Existing Channel Limits
- Bill Sadowski Critical Wildlife Area
- 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

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