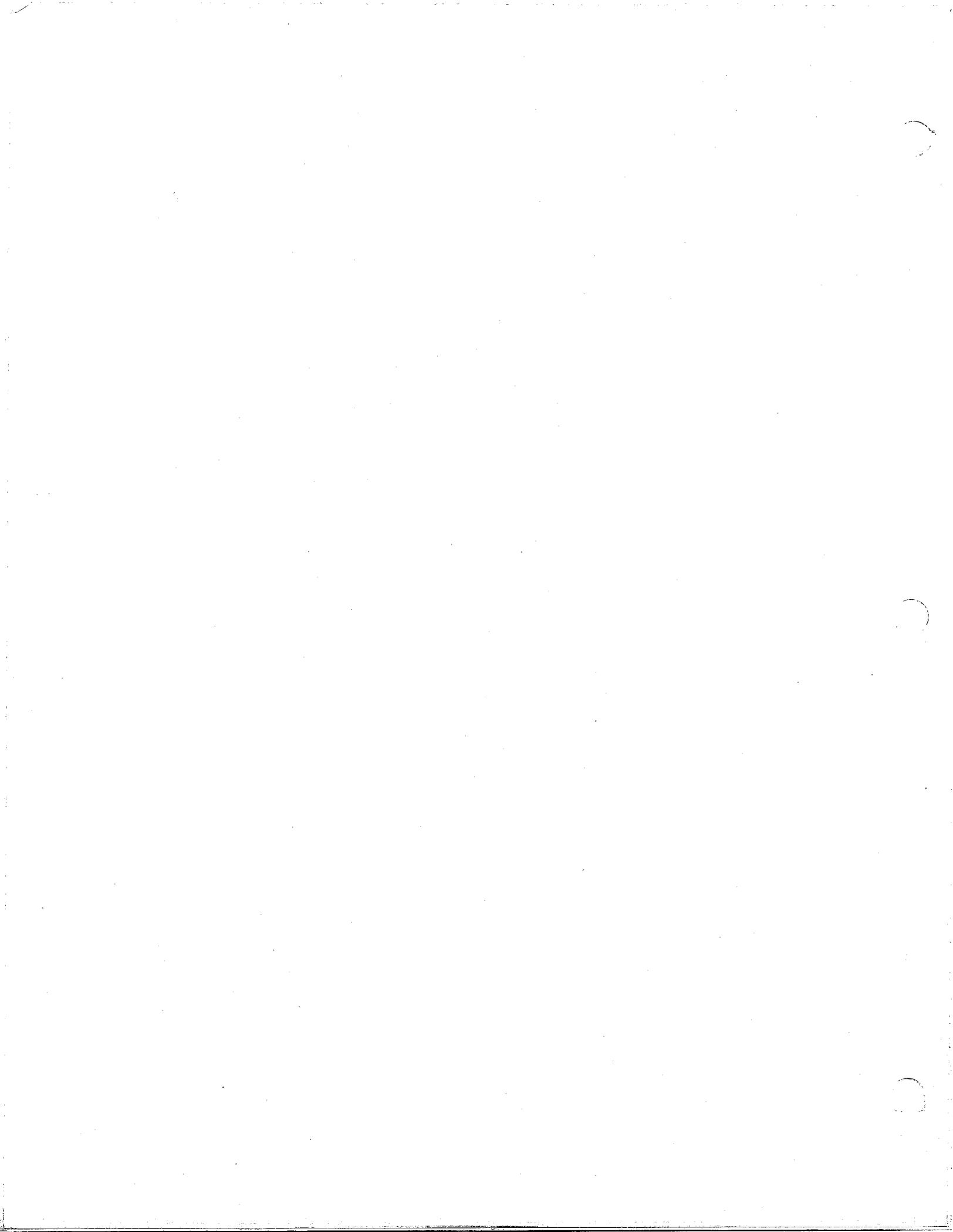


**SECTION 1135
ENVIRONMENTAL RESTORATION REPORT**

**PEANUT ISLAND
PALM BEACH COUNTY, FLORIDA**

ENVIRONMENTAL ASSESSMENT

MARCH 2000



SUMMARY

The purpose of the Peanut Island Environmental Restoration project is to reestablish historic habitat for fisheries and wildlife by creating and restoring wetland and upland habitat on Peanut Island.

Peanut Island is a 79 acre island formed through the placement of dredged material deposits over the last 80 years during the creation and maintenance the Lake Worth Inlet and Intracoastal Waterway (IWW). The island, since its creation, has subsequently been colonized by exotic vegetation.

The proposed environmental restoration will result in the creation of a 1.3 acre shallow-water reef and 3.0 acres shallow-water lagoon habitat; restoration of 3.0 acres of existing mangrove habitat through the creation of an inlet, tidal pond, flushing channels (1.5 acres); and creation of 7.1 acres maritime hammock, 3.9 acres Coastal Strand, 4.6 acres Beach Dune and 16 acres of submerged wetland. The areas restored and created through this environmental restoration will provide valuable habitat and environmental educational opportunities for Palm Beach County.

Peanut Island has a legacy of historic inhabitation that will be protected and preserved through efforts of the Palm Beach Maritime Museum located on Peanut Island. The proposed restoration efforts will be protected and be a distinguished augmentation to the proposed \$4 million dollar master plan to enhance and rehabilitate the island's environment into suitable habitat for fish, wildlife and associated recreational activities providing a key water-oriented County Park for residents and visitors of Palm Beach County.



**PEANUT ISLAND ENVIRONMENTAL RESTORATION
PALM BEACH COUNTY, FLORIDA
FINDING OF NO SIGNIFICANT IMPACT**

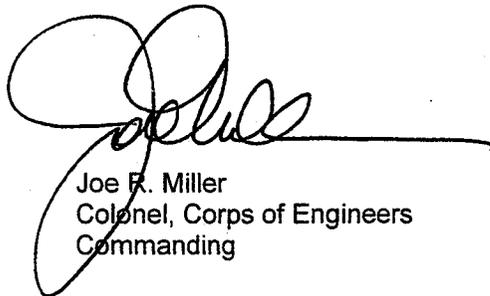
I have reviewed the planning document and the Environmental Assessment of the considered action. Based on information analyzed in the Environmental Assessment, reflecting pertinent data obtained from cooperating Federal and State agencies having jurisdiction by law and/or special expertise, and from the interested public, I conclude that the considered action will have no significant impact on the quality of the human environment.

Reasons for this conclusion are, in summary:

- a. Creation of a 1.3 acre shallow water reef and 3.0 acres shallow-water lagoon; restoration of 3.0 acres mangrove wetland by creation of an inlet, tidal pond, flushing channels (1.5 acres); creation of 7.1 acres maritime hammock, 3.9 acres Coastal Strand, 4.6 acres Beach Dune and 16 acres of submerged wetlands.
- b. Resulting in restoration of fish and wildlife habitat, and
- c. Improvement of water quality, and
- d. Potential enhancement of habitat for two Federally listed endangered species; the West Indian Manatee and Wood Stork and two Federally listed threatened species; the Peregrine Falcon and the Least Tern, as well as many species of special concern, and
- e. Development of environmental educational opportunities, and
- f. Historic properties included in or eligible for inclusion in the National Register of Historic Places are not likely to be located in the proposed environmental restoration area. National Register eligible resources are located on the island, but those resources will not be adversely affected by the project. The State Historic Preservation Officer concurred with this determination.

Measures to prevent or minimize adverse affects to threatened and endangered species will be implemented during construction in accordance with the U.S. Fish and Wildlife Service Coordination Act Report, November 18, 1997 for impacts to manatees, sea turtles, or migratory birds.

In consideration of the information in the Environmental Assessment which is summarized above, I find that the considered action is not a major Federal action significantly impacting the human environment as stated in the National Environmental Policy Act and therefore, the proposed action does not require an Environmental Impact Statement.



Joe R. Miller
Colonel, Corps of Engineers
Commanding



TABLE OF CONTENTS

<u>Subject</u>	<u>Page</u>
Summary	
1.0 Project Purpose.....	1
2.0 Location.....	1
3.0 Alternatives.....	1
3.1 Components.....	1
3.2 Alternatives.....	5
3.2.1 Alternative A.....	5
3.2.2 Alternative B.....	5
3.2.3 Alternative C.....	5
3.2.4 Alternative D.....	5
3.3 Summary of Impacts.....	8
4.0 Description of Affected Environment	8
4.1 History.....	9
4.1.1 Creation of Peanut Island.....	9
4.1.2 Port of Palm Beach.....	9
4.1.3 U.S. Coast Guard.....	9
4.1.4 Kennedy.....	9
4.1.5 Ownership.....	10
4.2 Lake Worth Lagoon.....	10
4.2.1 Shoreline Alterations.....	10
4.2.2 Mangroves.....	10
4.2.2a Distribution.....	10
4.2.2b Importance.....	10
4.2.3 Seagrass.....	14
4.2.3a Distribution.....	14
4.2.3b Importance.....	14
4.2.3c Recruitment.....	14
4.2.4 Shallow-Water Lagoon Habitat.....	18
4.2.4a Distribution.....	18
4.2.4b Importance.....	18
4.2.5 Shallow-Water Reef.....	18
4.2.5a Distribution.....	18
4.2.5b Importance.....	18
4.2.6 Dredged Areas.....	19
4.2.7 Upland Habitat.....	19
4.2.7a Maritime Hammock.....	19
4.2.7b Coastal Strand.....	18
4.2.7c Beach Dune.....	19
4.3 Peanut Island Restoration Status.....	20
4.3.1 Mangroves.....	20
4.3.2 Shallow-Water Lagoon.....	20

Subject

Page

4.3.2a Shallow-Water Lagoon (west).....	22
4.3.2b Shallow-Water Lagoon (east).....	22
4.3.3 Shallow-Water Reef.....	22
4.3.4 Upland Habitat Restoration Status.....	23
4.3.4a Maritime Hammock.....	23
4.3.4b Coastal Strand.....	23
4.3.4c Beach Dune.....	25
4.3.5 Dredged Area within Lake Worth Lagoon.....	25
4.4 Lake Worth Lagoon Habitat Restoration and Enhancement Priorities.....	25
4.4.1 Impacts of Development.....	25
4.4.2 FDEP Ecosystem Management Area.....	25
4.4.3 Peanut Island Restoration Coordination.....	26
4.5 Fish and Wildlife.....	26
4.5.1 Fish Species in Lake Worth Lagoon.....	26
4.5.2 Peanut Island Fish Survey.....	31
4.5.3 Bird Species.....	31
4.6 Threatened and Endangered Species.....	31
4.6.1 General Requirements.....	31
4.6.2 Lake Worth Lagoon Estuary.....	31
4.6.3 Manatees.....	38
4.6.4 Johnson's Seagrass (<i>Halophila johnsonii</i>).....	38
4.7 Water Quality.....	38
4.7.1 Mangroves.....	38
4.7.2 Shallow-Water Lagoon.....	38
4.7.3 Shallow Water Reef Habitat.....	38
4.8 Geotechnical.....	40
4.8.1 Sampling Methods.....	40
4.8.2 Sediment Composition.....	40
4.8.3 Suitability of Material.....	40
4.8.4 Jet Probes.....	40
4.8.4a Locations.....	40
4.8.4b Results.....	43
4.9 Tidal Hydrodynamic Modeling.....	43
4.9.1 Methods.....	43
4.9.2 Results.....	43
5.0 Cultural Resources.....	43
5.1 Environmental Site Assessment.....	45
5.2 Hydraulic Information.....	45
5.2.1 Tides.....	45
5.2.2 Freshwater Input.....	45
5.2.3 Freshwater Residence Time.....	45
5.3 Bathymetry.....	47
5.4 Marinas and Docks.....	47

<u>Subject</u>	<u>Page</u>
6.0 Probable Impacts.....	47
6.1 Tangible Benefits.....	47
6.2 Irreversible and Irretrievable Commitment of Resources.....	47
6.2.1 Irreversible.....	47
6.2.2 Irretrievable.....	47
6.3 Cumulative Impacts.....	47
6.4 Preferred Alternative.....	50
6.4.1 Exotic Vegetation Removal Methods.....	50
6.4.2 Fish and Wildlife.....	50
6.4.2a Mangrove Habitat.....	50
6.4.2b Shallow Water Reef Habitat.....	51
6.4.2c Maritime Hammock	51
6.4.3 Bird Species.....	51
6.4.4 Habitat Creation.....	51
6.4.5 Water Quality.....	51
6.4.6 Hydraulic Information.....	52
6.4.6a Tidal Connection.....	52
6.4.6b Channel Stabilization.....	52
6.5 Other Alternatives.....	52
6.5.1 Alternative A.....	52
6.5.2 Alternative B.....	52
6.5.3 Alternative D.....	52
7.0 Maintenance and Monitoring.....	52
8.0 Coordination.....	52
9.0 Compliance with Environmental Statutes.....	53
9.1 Natural Environmental Policy Act of 1969, as amended.....	53
9.2 Endangered Species Act of 1973, as amended.....	53
9.3 Fish and Wildlife Coordination Act 1958, as amended.....	53
9.4 Natural Historical Preservation Act of 1966, as amended.....	53
9.5 Clean Water Act of 1972, as amended.....	53
9.6 Clean Air Act of 1972, as amended.....	53
9.7 Coastal Zone Management Act of 1972, as amended.....	53
9.8 Farmland Protection Policy Act of 1981.....	53
9.9 Wild and Scenic River Act of 1968, as amended.....	53
9.10 Marine Mammal Act of 1972, as amended.....	54
9.11 Estuary Protection Act of 1968.....	54
9.12 Executive Order 11990, Protection of Wetlands.....	54
9.13 Executive Order 11988, Floodplain Management.....	54
9.14 Executive Order 11990, Environmental Justice.....	54
9.15 Executive Order 13089, Coral Reef Protection.....	54
9.16 Fishery Conservation and Management Act of 1976.....	54
9.17 Submerged Lands Act of 1953.....	54
9.18 Rivers and Harbors Act of 1899.....	54
9.19 Anadromous Fish Conservation Act.....	54

<u>Subject</u>	<u>Page</u>
9.20 Migratory Bird Treaty Act and Migratory Bird Conservation Act.....	55
9.21 Marine Protection, Research and Sanctuaries Act.....	55
9.22 Magnuson-Stevens Fishery Conservation and Management Act.....	55
10.0 List of Preparers.....	55
10.0.1 Preparers.....	55
10.0.2 Contributors.....	55
11.0 References.....	56

TABLES

SUBJECT	PAGE
1. Alternatives Considered and Their Components.....	5
2. Summary of Impacts for Alternatives Considered.....	8
3. Shoreline Characteristics.....	12
4. Mangrove Acreage.....	13
5. Seagrass Acreage.....	17
6. Peanut Island Plant Species List.....	24
7. Fish Species in Lake Worth Lagoon.....	27-29
8. Bird Species Observed at John D. MacArthur Beach State Park.....	32-33
9. Endangered, Threatened and Rare Species of Special Concern.....	34-36
10. Sediment Analysis Results.....	42
11. Jet Probe Results.....	44
12. Hydrological Data.....	46

FIGURES

1. Location Map.....	3
2. Alternative C-Base Plan.....	4
3. Alternative A.....	6
4. Alternative B.....	7
5. Shoreline Characteristics.....	11
6. Seagrass Distribution Map.....	15
7. Dredged Filled Areas.....	16
8. FIND Vegetation Survey.....	21
9. Fish Locations.....	30
10. Endangered, Threatened and Rare Species of Special Concern.....	37
11. Seagrass at Southeast Peanut Island.....	39
12. Location of Sediment Samples and Jet Probes.....	41
13. Bathymetry.....	48
14. Marinas and Docks.....	49

APPENDICES

- A. Section 404(b) Evaluation**
- B. Florida Coastal Zone Consistency Statement**
- C. Environmental Coordination**



ENVIRONMENTAL ASSESSMENT
PEANUT ISLAND ENVIRONMENTAL RESTORATION
PALM BEACH COUNTY, FLORIDA

1.0 Project Purpose. The purpose of this proposed project is to restore wetland and associated upland habitat on Peanut Island. This project will reestablish habitat for fisheries and wildlife.

2.0 Location. Peanut Island lies within north-central Lake Worth Lagoon in Riviera Beach, Section 34, Township 42 South, Range 43 East, Palm Beach County, Florida (Figure 1). Peanut Island is bordered by the Lake Worth Inlet to the east and the Intracoastal Waterway and the Port of Palm Beach to the west. The island's surrounding waters are designated Class III.

3.0 Alternatives. The alternatives section is the heart of this Environmental Assessment. This section describes in detail the proposed action, the no action alternative, and other reasonable alternatives that were studied in detail. Based on the information and analyses presented in the section on the Affected Environment and the Probable Impacts, this section presents the beneficial and adverse environmental effects of all alternatives in comparative form, providing a clear basis for choice among the options for the decision maker and the public.

3.1 Components. Palm Beach County, Department of Environmental Resources Management (County) has identified four alternatives to accomplish the restoration objective. Alternative C, the selected plan, includes all the following components. Common to all alternatives are combinations of the following components (Figure 2, Alternative C and Table 1, Alternatives Considered and Their Components).

- a. Clear exotic vegetation (Australian Pine and Brazilian Pepper) from the wetland and upland project areas. The exotic vegetation will be chipped on site and utilized as mulch in upland restoration areas.
- b. Re-contour the FIND spoil disposal dike to provide a planting area for native upland habitats.
- c. Create native upland habitats to include maritime hammock, coastal strand and beach dune habitat.
- d. Restore tidal flushing to an existing impounded mangrove community through the creation of a tidally connected inlet, pond, flushing channels and shallow-water lagoon the west side of the island.



LEGEND

	EXISTING MANGROVES (3.0 ACRES)
	SHALLOW WATER LAGOON (EAST 1.4 ACRES) (WEST 1.8 ACRES)
	MARITIME HAMMOCK CREATION AREA (7.1 ACRES)
	COASTAL STRAND (3.9 ACRES)
	BEACH DUNE (4.8 ACRES)
	TEMPORARY BEACH DUNE (3.3 ACRES)
	PBC PARKS FACILITIES

PEANUT ISLAND

ENVIRONMENTAL RESTORATION PROJECT
BASE PLAN - ALTERNATIVE C

APPROVED: CV	DWG	REV
DRAWN: JPC	D:\CAD\ENHANCE\PEANUT\BLUETAGOON.dwg	9
CHECKED: JB	DATE: 11/99	SCALE: AS NOTED

DEPARTMENT OF ENVIRONMENTAL RESOURCES MANAGEMENT

Table 1: Alternatives Considered and their Components

TREATMENTS	ALT. A	ALT. B	ALT. C	ALT. D
Exotic Vegetation Removal	YES	YES	YES+	NO
Dredge Materials Removal	YES	YES	YES+	NO
Mangrove Restoration	YES	YES	YES	NO
Shallow-Water Lagoons	YES	YES	YES+	NO
Tidal Pond/Channels	YES	YES	YES	NO
Shallow-Water Reef Habitat	YES	YES	YES+	NO
Maritime Hammock	YES	YES	YES+	NO
Coastal Strand	YES	YES	YES+	NO
Beach Dune	YES	YES	YES+	NO
Submerged Resources Rest.	YES	YES	YES+	NO

ALT. A = Reef, Lagoons, Tidal Pond, Mangrove Flushing and Upland Habitat

ALT. B = Alt. A + Increased Shallow-Water Reef

ALT. C = Proposed Plan: Alt. A + Increased Upland and Wetland Habitat Features

ALT. D = No Federal Participation

3.2 Alternatives.

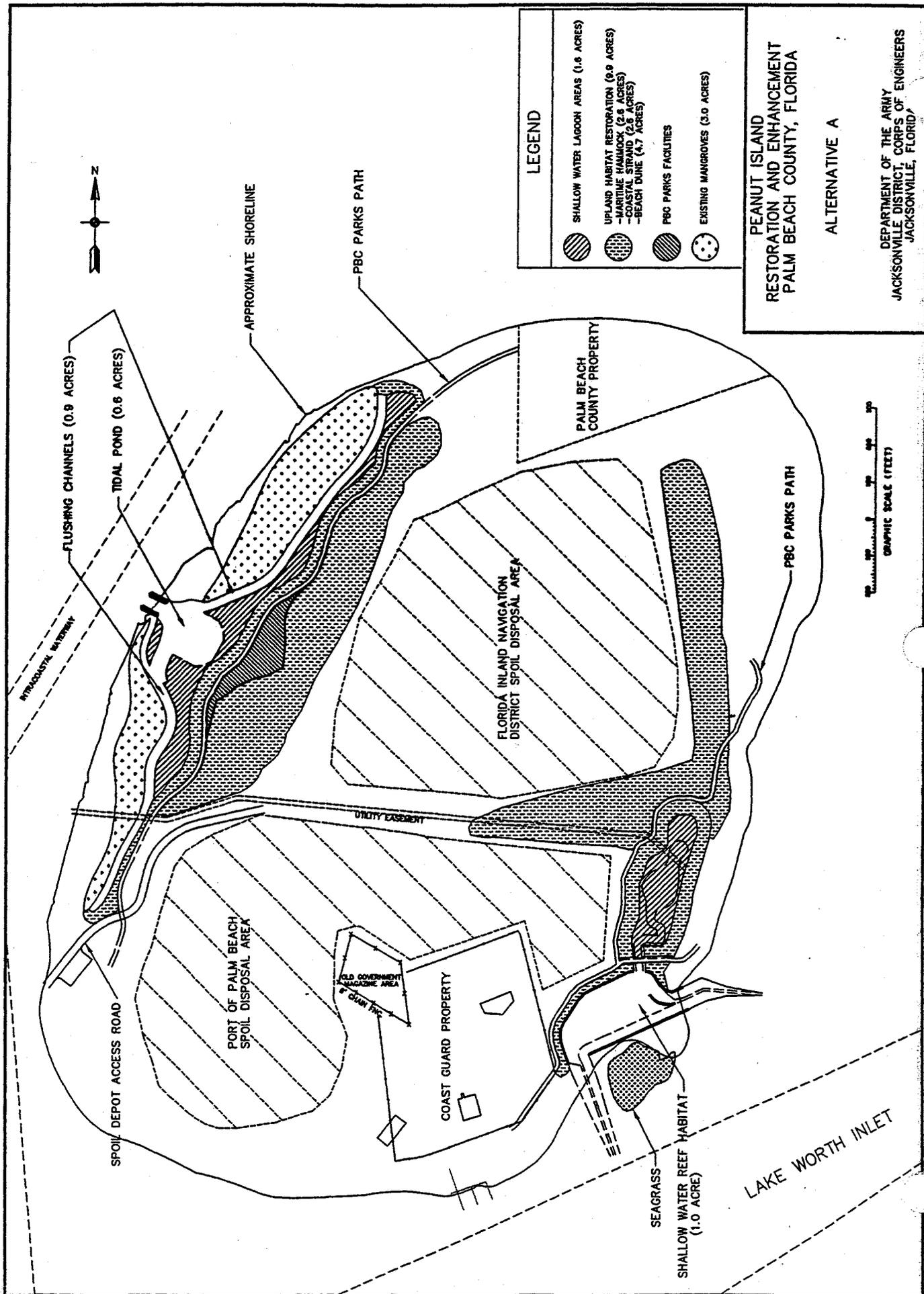
3.2.1 Alternative A. This plan involves all components outlined in 3.1 a-h (Figure 3).

3.2.2 Alternative B. This plan involves all components outlined in 3.1a-h, with an increase in shallow-water reef habitat which was modeled in *Tidal Hydrodynamic Modeling of Peanut Island Improvements* conducted by Tomasello Consulting Engineers, 1997 (Figure 4). The report indicates that the larger area allows dead space in reef flushing. It should be noted that a design placing the footprint of the shallow-water reef habitat waterward of the island was also considered. This design would allow for additional shallow-water lagoon habitat (east) to be created or for the additional area to be utilized to create upland habitat. Based upon surveys of existing seagrasses around Peanut Island, this footprint would require dredging of a seagrass bed, and will, therefore, will not likely be permitted by environmental regulatory agencies.

3.2.3 Alternative C. Alternative C is the selected plan and involves maximum habitat restoration/creation for all components outlined in 3.1 a-h (Figure 2).

3.2.4 Alternative D. No Federal Participation. This plan does not include Federal involvement and would require the local sponsor to construct a number of small projects (as funding would allow) to complete the island restoration. Mobilization and demobilization cost to complete just a portion of the proposed project would make the small project cost-prohibitive and is, therefore, not an option.

FIGURE 3:



LEGEND

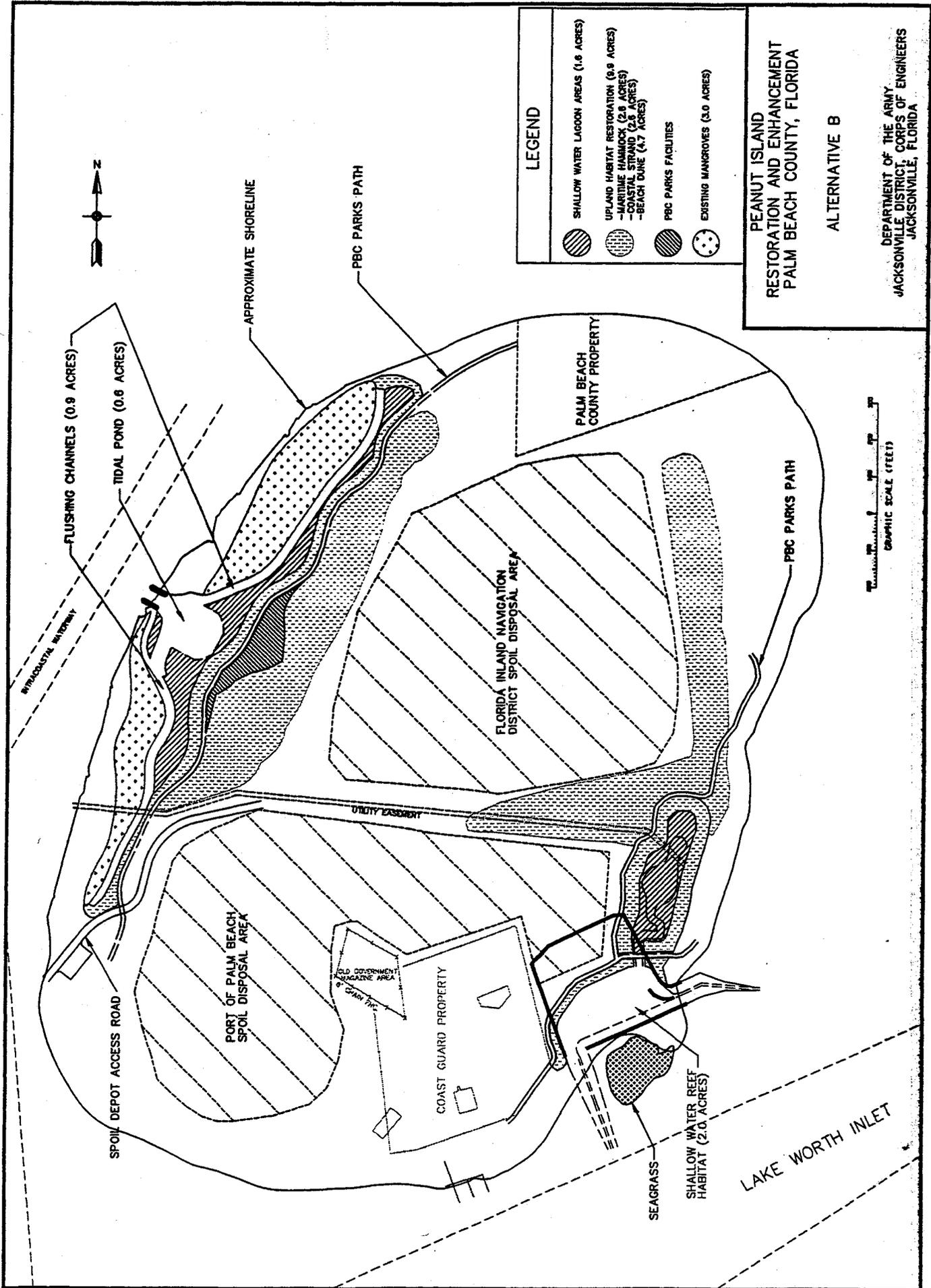
	SHALLOW WATER LAGOON AREAS (1.6 ACRES)
	UPLAND HABITAT RESTORATION (9.9 ACRES) -MARITIME MANGROVES (2.8 ACRES) -COASTAL STRAND (2.6 ACRES) -BEACH DUNE (4.7 ACRES)
	PBC PARKS FACILITIES
	EXISTING MANGROVES (3.0 ACRES)

**PEANUT ISLAND
RESTORATION AND ENHANCEMENT
PALM BEACH COUNTY, FLORIDA**

ALTERNATIVE A

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

FIGURE 4.



3.3 Summary of Impacts. The impacts of the various alternatives are summarized in Table 2, Summary of Impacts for Alternatives Considered. A more detailed description of the impacts are in part 5.0, "Probable Impacts".

Table 2: Summary of Impacts for Alternatives Considered

ENVIRONMENTAL FACTOR	ALT. A	ALT. B	ALT. C	ALT. D
EXOTIC REMOVAL	17.4	18.4	28.4	0.0
SHALLOW-WATER REEF	1.0	2.0	1.3	0.0
MANGROVES RESTORED	3.0	3.0	3.0	0.0
SHALLOW-WATER LAGOON	2.0	2.0	3.0	0.0
TIDAL POND & CHANNELS	1.5	1.5	1.5	0.0
MARITIME HAMMOCK	2.6	2.6	7.1	0.0
COASTAL STRAND	2.6	2.6	3.9	0.0
BEACH DUNE	4.7	4.7	4.6	0.0
SUBMERGED WETLAND	4.8	6.2	16.0	0.0
FISH	Tidal wetland, shallow-water reef / lagoon	Tidal wetland, shallow-water reef / lagoon	Tidal wetland, shallow-water reef / lagoon	0.0
BIRDS & WILDLIFE	Tidal wetland, shallow-water reef / lagoon, hammock, strand, dune	Tidal wetland, shallow-water reef / lagoon, hammock, strand, dune	Tidal wetland, shallow-water reef / lagoon, hammock, strand, dune	0.0
PROTECTED SPECIES	Tidal wetland, shallow-water reef / lagoon, hammock, strand, dune	Tidal wetland, shallow-water reef / lagoon, hammock, strand, dune	Tidal wetland, shallow-water reef / lagoon, hammock, strand, dune	0.0
WATER QUALITY	Tidal wetland, shallow-water reef / lagoon	Tidal wetland, shallow-water reef / lagoon	Tidal wetland, shallow-water reef / lagoon	0.0

Alt. A = Wetland and Upland Restoration

Alt. B = Increase Size Shallow-Water Reef

Alt. C = Proposed Plan-Maximized Wetland and Upland Restoration

Alt. D = No Federal Participation

4.0 Description of Affected Environment. The affected environment section succinctly describes the existing environmental resources of the areas that should be affected if any of the alternatives were implemented. This section describes only those environmental resources that are relevant to the decision to be made. It does not

describe the entire existing environment, but only those environmental resources that would affect or that would be affected by the alternatives if they were implemented. This section, in conjunction with the description of the "no-action" alternative forms the base line conditions for determining the environmental impacts of the proposed action and reasonable alternatives.

4.1 History

4.1.1 Creation of Peanut Island. Originally called Inlet Island, Peanut Island was created in 1918 by the deposition of dredged materials from the excavation of the Inlet between Lake Worth Lagoon and the Atlantic Ocean. At that time it amounted to a mere 10 acres. U.S. Army Corps of Engineer (Corps) records show that maintenance of the Lake Worth Inlet between 1929 and 1993 (Table 1 of the Environmental Restoration Report, ERR) has resulted in the disposal of over 1.2 million cubic yards of dredged material on Peanut Island. The disposal of approximately 2.8 million cubic yards of dredged material was deposited at sea (much of the Peanut Island disposal was sand mixed with rock and/or finer sediments, and therefore, was not suitable for beach disposal).

4.1.2 Port of Palm Beach. By 1923, the Port of Palm Beach acquired the island, then 47 acres in size. Since 1934, the USCOE has maintained the Palm Beach Harbor Navigation Project and has used Peanut Island as a disposal site for the maintenance of the IWW, port turning basin and associated maintenance work.

4.1.3 U.S. Coast Guard. The Coast Guard selected Peanut Island as a site in 1934 and, in 1937, placed in service the Lake Worth Inlet Station. The United States Coast Guard's lifesaving station and boathouse, known as the Lake Worth Inlet Station, approximately 11,980 square feet in size, was built on the southeast part of Peanut Island. The Station was one of the busiest in Florida until 1995, when the Coast Guard moved to another site, on the mainland. The remaining station and boathouse will be restored and incorporated into the Palm Beach Maritime Museum.

4.1.4 Kennedy. In 1962, with the heightened Cold War tensions of the Cuban Missile Crisis, the Coast Guard Station took on national defense importance, due to its proximity to the Palm Beach vacation home of President John F. Kennedy. Peanut Island was only five minutes by speed boat from the Presidential Retreat. The Lake Worth Inlet Station on Peanut Island was the only secure military site suitable for a fallout shelter and command post. The Navy's Seabees, the mobile construction battalions, built the shelter, along with extensive communications facilities, in secrecy. It was designed and stocked as a command communications center to house the President and 25 to 30 others for up to 30 days. The shelter has a lead lined steel and concrete structure, which is buried in the side of the hill of dredged material on Peanut Island. Although built in 1961 and removed from use in 1964, following the President's assassination, the Federal Government did not acknowledge the existence and purpose of the shelter until 1973. The bunker is currently being restored and preserved for public viewing through the Palm Beach Maritime Museum.

4.1.5 Ownership. In 1984, Palm Beach County and the Port of Palm Beach entered into an agreement for maintenance of the island, provided it remained a passive recreation area. The Port owned the island until December 1991, when it sold 50 acres on the north end to the Florida Inland Navigation District (FIND) for \$2.2 million. Palm Beach County owns 3.6 acres on the north end of Peanut Island and in 1994, the County entered into lease agreements with the Port of Palm Beach and FIND for development of the island's perimeter for public use. From 1937, to present, a hill of dredged material to the north and west of the Coast Guard Station on Peanut Island has been continuously fed with sand and silt dredged from the Inlet, Port of Palm Beach and the IWW. The entire island is within the navigation servitude for which the Federal government has paramount jurisdiction, negating the need for the acquisition of any additional interest to proceed with construction of the project.

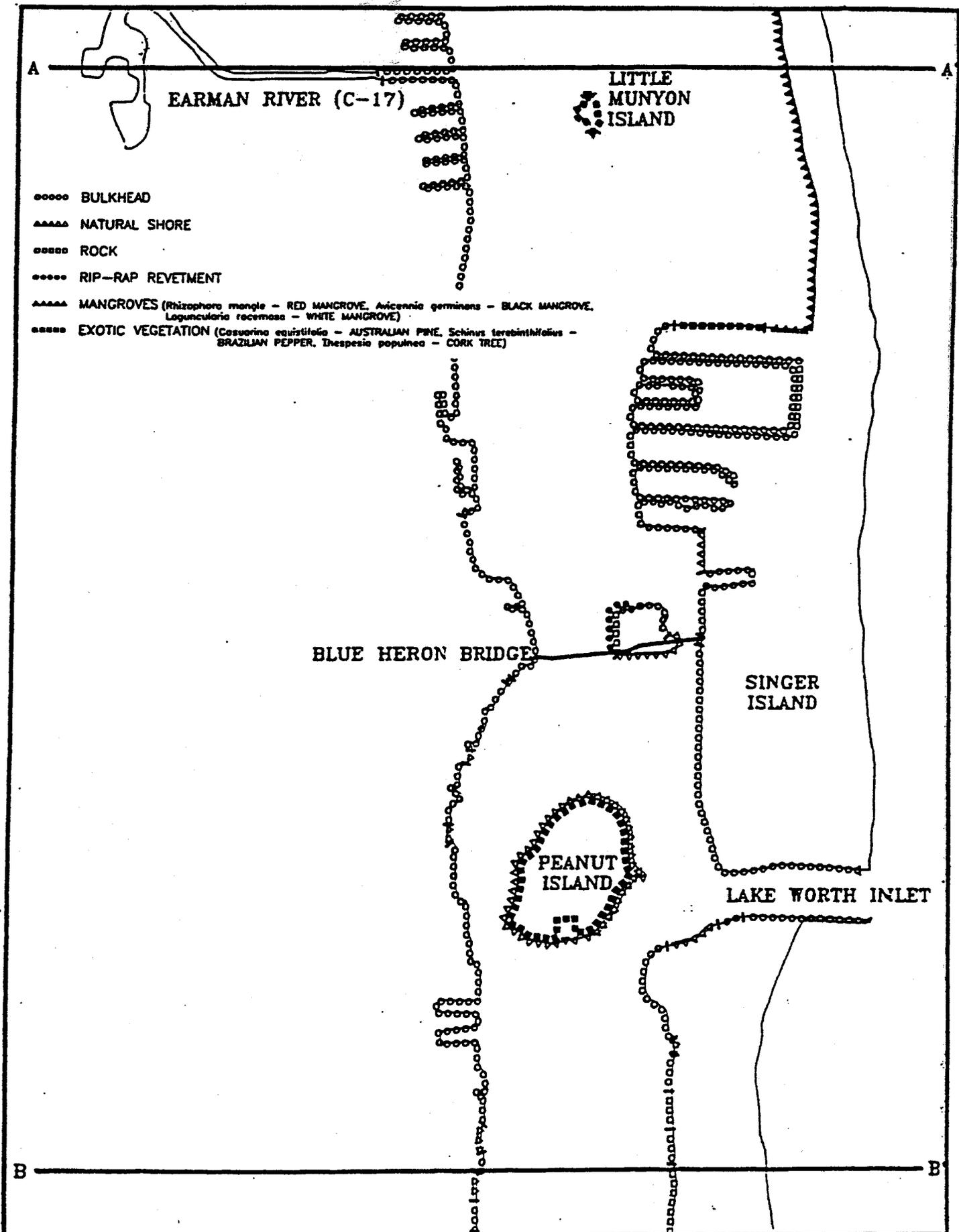
4.2. Lake Worth Lagoon. Water quality and habitat resources of the Lake Worth Lagoon estuary have been drastically impacted by urbanization over the past one hundred years. It is clear from review of historical accounts and catch records that commercial and recreational fisheries have greatly declined over the past forty years (Woodburn, 1961; Harris, et al., 1983; Lewis et al., 1985; McCrary et al., 1985; WPB Fishing Club, 1990). The most likely reasons for fisheries declines are habitat destruction and water quality degradation (Dames and Moore, 1990). Lake Worth Lagoon's shoreline is approximately 70 linear miles, most of which has been altered by dredging, filling, and bulkhead construction (Dames and Moore, 1990).

4.2.1 Shoreline Alterations. Bulkheads have been constructed on approximately 65% of the shoreline, including canals (Dames and Moore, 1990). The linear extent of shoreline types within Lake Worth Lagoon is presented on Table 3 and in Figure 5 within the vicinity of Peanut Island. The destruction of these areas, along with increasing pressures on the remaining resources, have degraded our remaining native habitats and has led to a decline in associated fish and wildlife in the Lake Worth Lagoon estuary.

4.2.2 Mangroves

4.2.2a Distribution. An estimated 87% loss in mangrove wetlands has occurred in Lake Worth Lagoon Estuary as a result of shoreline development (Harris et al., 1983), Table 4. Between 1940 and 1975, an estimated 87% of shoreline mangroves were eliminated by shoreline development (Harris et al., 1983). The ecological value of mangrove communities has been well documented. Currently only about 19% of Lake Worth Lagoon's shoreline (including islands) has fringing mangroves. Figure 5 indicates the absence of mangroves in the vicinity of Peanut Island.

4.2.2b. Importance. Mangroves are vital to the survival of many species of fish, invertebrates and wildlife providing the basis of a complex food chain, breeding habitat and establishment of restrictive areas that offer protection for juveniles. In addition, mangroves contribute to improved water quality by filtering and assimilating pollutants, stabilizing bottom sediments, and protecting shorelines from erosion. Mangrove communities provide habitat for marine organisms, protect shorelines from erosion, and enhance water quality by acting as natural filters. Detrital material produced by



- oooo BULKHEAD
- ▲▲▲▲ NATURAL SHORE
- ROCK
- ◆◆◆◆ RIP-RAP REVETMENT
- ×××× MANGROVES (*Rhizophora mangle* - RED MANGROVE, *Avicennia germinans* - BLACK MANGROVE, *Laguncularia racemosa* - WHITE MANGROVE)
- * * * * * EXOTIC VEGETATION (*Casuarina equisetifolia* - AUSTRALIAN PINE, *Schinus terebinthifolius* - BRAZILIAN PEPPER, *Thecaspesia populnea* - CORK TREE)

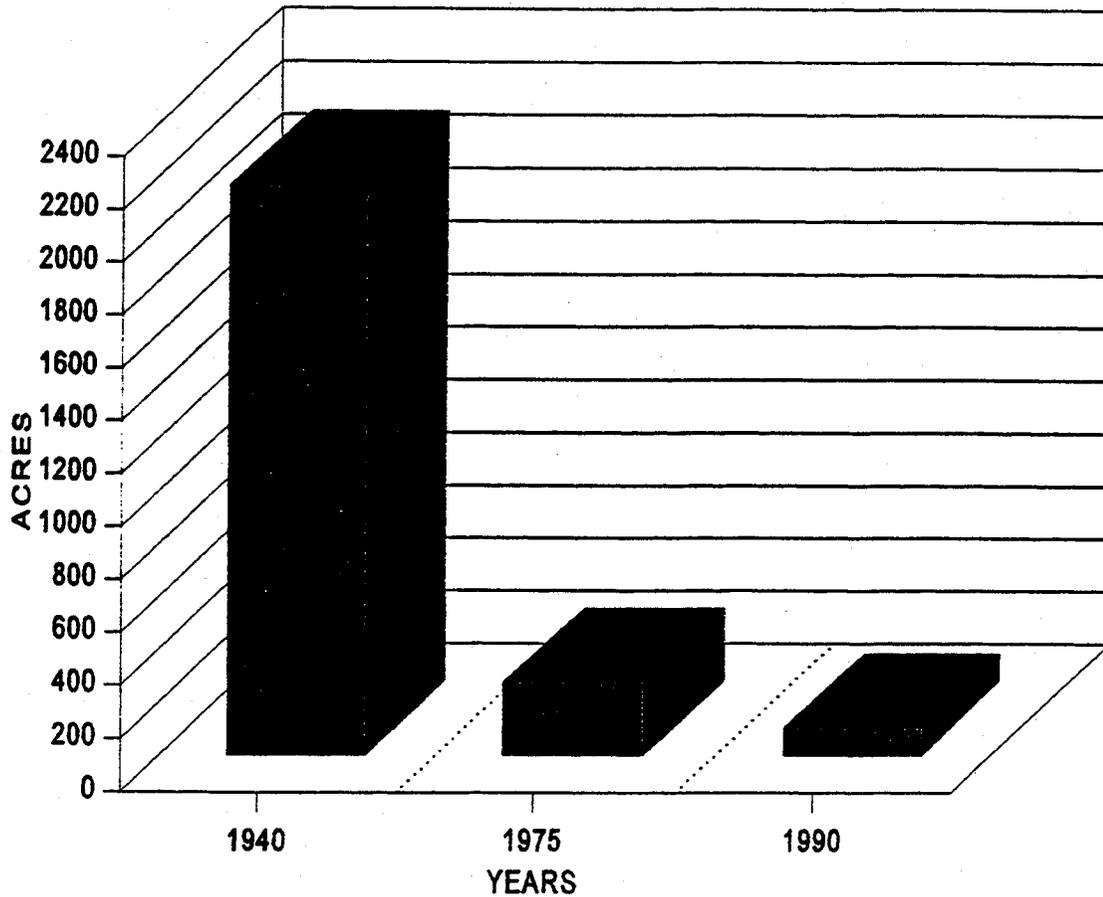
TABLE 3

SHORELINE CHARACTERISTICS OF LAKE WORTH LAGOON

SHORELINE CHARACTERISTICS		
SHORELINE TYPE	LINEAR MILES	PERCENTAGE OF SHORELINE
Bulkhead	55.3	60
Bulkhead with Rip-Rap Revetment	4.1	4.5
Natural Shoreline (Unvegetated)	8.2	9
Rock	0.6	.5
Rip Rap Revetment	3.5	4
Exotic Vegetation	2.5	3
Mangrove	17.3	19
TOTAL	91.5	100
*Includes connected canals.		

MANGROVE ACREAGE

LAKE WORTH LAGOON--PALM BEACH COUNTY



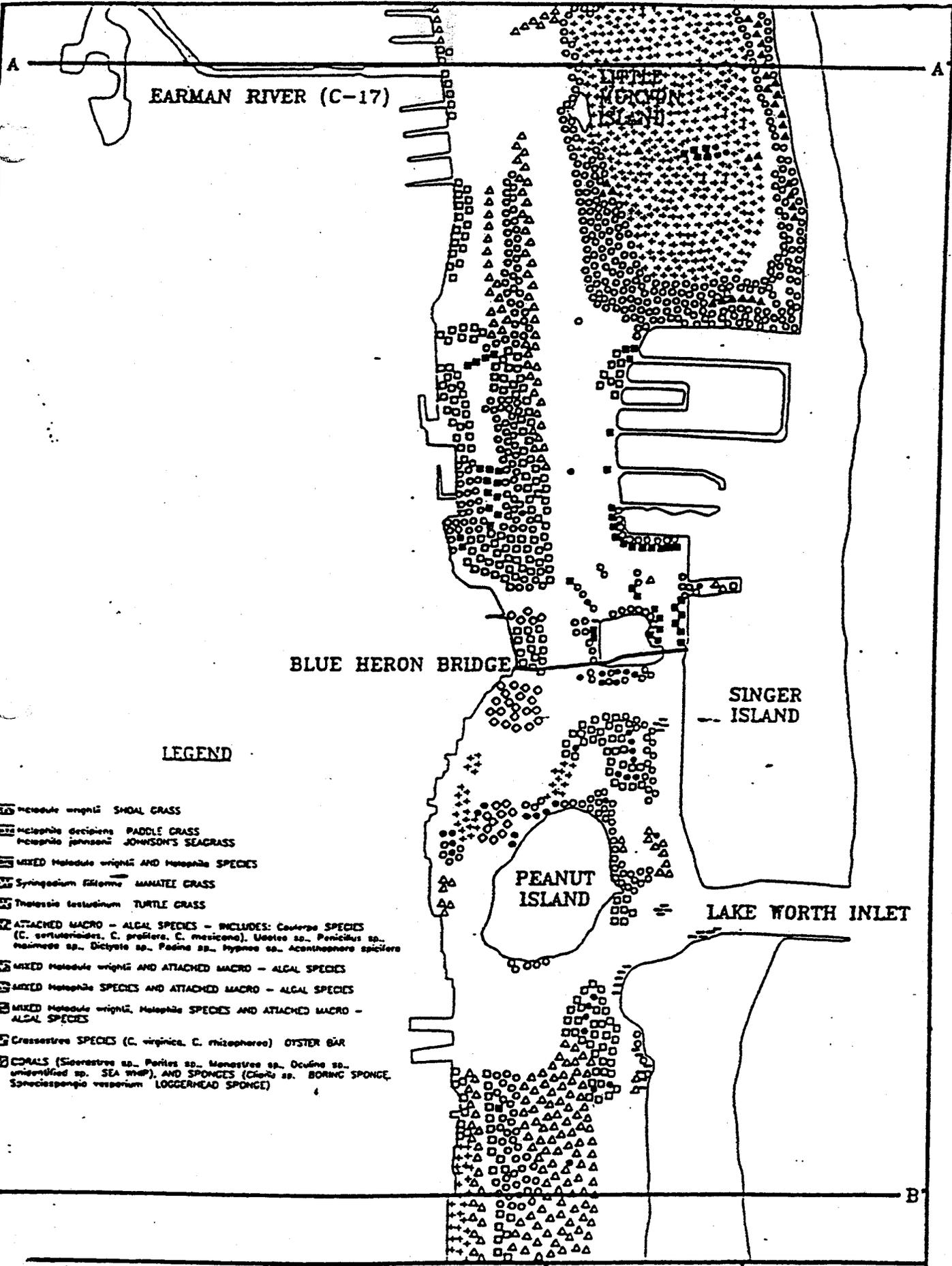
SOURCE: - Harris, B., K. D. Haddad, R. A. Steindinger, S. A. Huff 1983. *Assessment of Fisheries Habitat: Charlotte Harbor and Lake Worth, Florida Department of Natural Resources*
 - Palm Beach County Department of Environmental Resources Management in conjunction with Dames & Moore 1990, *Lake Worth Lagoon Natural Resources Inventory and Resource Enhancement Study*

4.2.3 Seagrasses

4.2.3a. Distribution. Seagrass communities can be found throughout the Lake Worth Lagoon. The highest concentrations are located in the northeast lagoon area (near Munyon Island) and in the vicinities of the Lake Worth (Peanut Island) and South Lake Worth Inlets. In general, seagrasses are most abundant and dense in shallow areas and in areas that contain good water quality. Figure 6 illustrates the distribution of seagrasses in the vicinity of Peanut Island. The seagrass distribution correlates with areas shown in Figure 7 that have avoided the direct impacts of dredging and filling activities. Recent studies indicate seagrasses are a scarce resource in Palm Beach County. In 1940, Palm Beach County had approximately 4820 acres of seagrass. In 1975, a resource inventory found only 161 acres (a 96% decrease) of seagrasses in the Lake Worth Lagoon (Harris et al. 1983). In a more recent survey, a total of 2010 acres of seagrass were inventoried (Dames & Moore, 1990), still a 42% decrease from the 1940 survey as shown in Table 5 (Sargent, et al., 1995).

4.2.3b. Importance. Seagrass beds are highly productive and ecologically important habitats within south Florida's estuaries and coastal lagoons. The combination of plentiful shelter and food results in seagrasses being perhaps the richest nursery and feeding grounds in south Florida's coastal waters. Seagrasses are nursery grounds for the juveniles of a variety of finfish and shellfish of commercial and sports fishing value. Seagrasses maintain water quality through reducing sedimentation by trapping fine sediments with their leaves and stabilizing the bottom with their roots and rhizomes. Seagrasses are the second most important primary habitats in estuaries. Heald and Odum (1969) noted in Waldner, 1989, that, in addition to mangroves, seagrasses contribute significantly to the detrital food chain in estuaries. Their continued survival in Lake Worth Lagoon is dependent upon protection from direct impacts and maintenance of good water quality. Designing shallow-water lagoon habitat will provide a stratum for recruitment and colonization of seagrasses and benthic organisms.

4.2.3c Recruitment. Within the 20 acre wetland habitat created on nearby Munyon Island, Palm Beach County staff have recorded the presence of a number of seagrass and algal species including *Halodule wrightii*, *Thalassia testudinum*, *Halophila johnsonii*, *Halophila decipiens*, *Caulerpa sertularioides*, and *Gracilaria tikvahiae*. The seagrass species *Halophila johnsonii* is currently a threatened species. National Marine Fisheries Service Final Rule listing the grass as a threatened species was published 14 September 1998, 63 Federal Register 49035 (to be codified at 50 C.F.R. Part 227.) The tidal channels and ponds on Munyon Island total approximately 5.0 acres. Of the total (5.0 acres) 1.6 acres were created in 1992-93 (Phases I and II) and are approximately 80% colonized with seagrasses, representing approximately 1.3 acres of new seagrass habitat. 3.4 acres of tidal channels and ponds were created during Phase III, in late 1997 and to date, are approximately 10% colonized with seagrasses, representing approximately .34 acres of seagrasses. The Phase III project area is still developing and it is anticipated that seagrass colonization will soon emulate the percentages seen in Phases I and II (Palm Beach County ER- work in progress). The Munyon Island Environmental Restoration Project and associated mangrove and



EARMAN RIVER (C-17)

PEANUT ISLAND

BLUE HERON BRIDGE

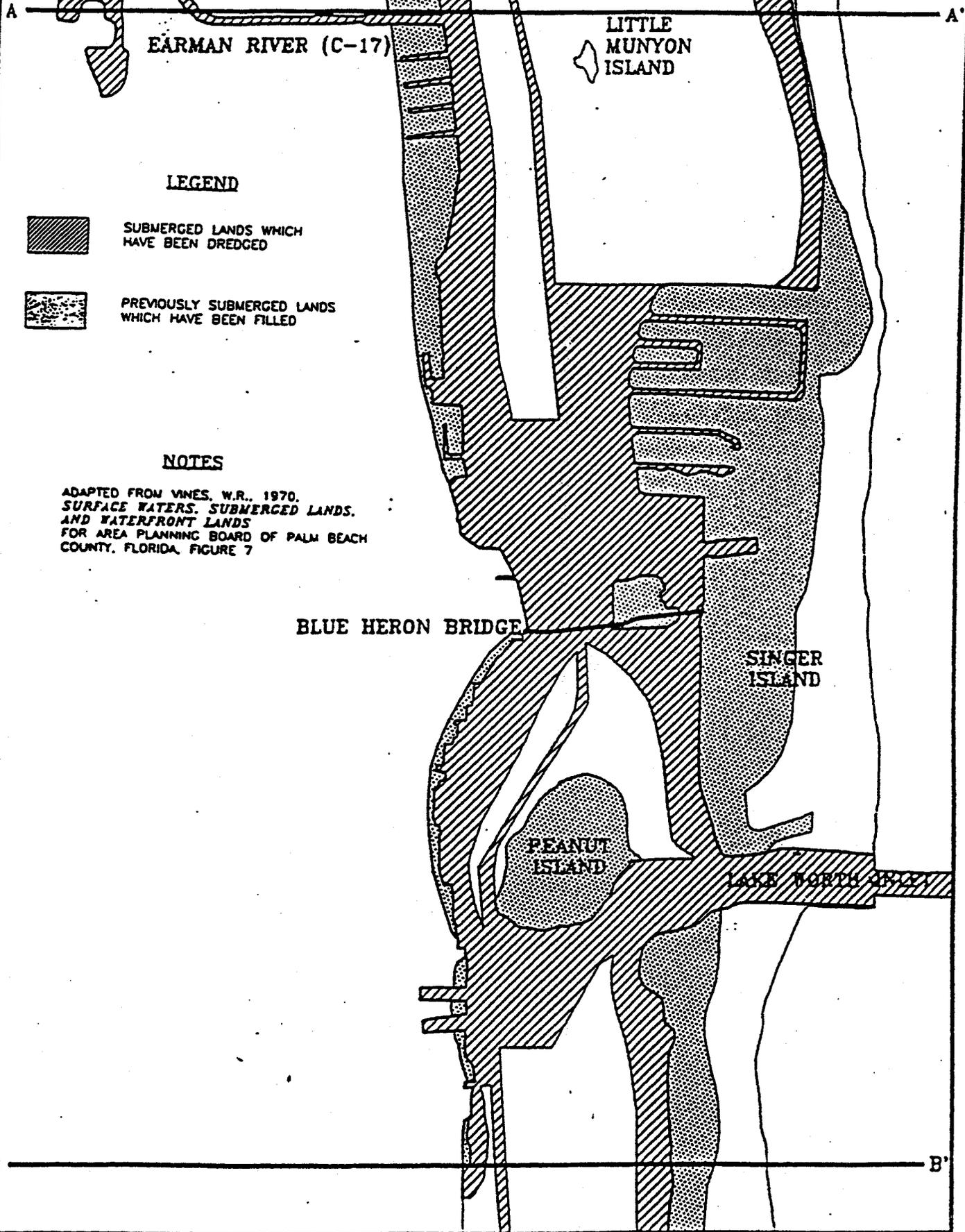
SINGER ISLAND

PEANUT ISLAND

LAKE WORTH INLET

LEGEND

- Halodule wrightii* SHOAL GRASS
- Halophila decipiens* PADDLE GRASS
Halophila johnsonii JOHNSON'S SEAGRASS
- MIXED *Halodule wrightii* AND *Halophila* SPECIES
- Syringodium filiforme* MANATEE GRASS
- Thalassia testudinum* TURTLE GRASS
- ATTACHED MACRO - ALGAL SPECIES - INCLUDES: Caulerpe SPECIES
(*C. verticillata*, *C. prolifera*, *C. mexicana*), *Ulva* sp., *Penicillus* sp.,
Halimeda sp., *Dictyota* sp., *Podium* sp., *Hydrocolea* sp., *Acanthopora spicifera*
- MIXED *Halodule wrightii* AND ATTACHED MACRO - ALGAL SPECIES
- MIXED *Halophila* SPECIES AND ATTACHED MACRO - ALGAL SPECIES
- MIXED *Halodule wrightii*, *Halophila* SPECIES AND ATTACHED MACRO - ALGAL SPECIES
- Crasostrea* SPECIES (*C. virginica*, *C. rhizophora*) OYSTER BAR
- CORALS (*Sclerastrea* sp., *Porites* sp., *Montastrea* sp., *Oculina* sp.,
unidentified sp. SEA TROP), AND SPONGES (*Cliona* sp. BORING SPONGE,
Spongia sp. LOGGERHEAD SPONGE)



EARMAN RIVER (C-17)

LITTLE
MUNYON
ISLAND

LEGEND

 SUBMERGED LANDS WHICH
HAVE BEEN DREDGED

 PREVIOUSLY SUBMERGED LANDS
WHICH HAVE BEEN FILLED

NOTES

ADAPTED FROM VNES, W.R., 1970.
SURFACE WATERS, SUBMERGED LANDS,
AND WATERFRONT LANDS
FOR AREA PLANNING BOARD OF PALM BEACH
COUNTY, FLORIDA, FIGURE 7

BLUE HERON BRIDGE

SINGER
ISLAND

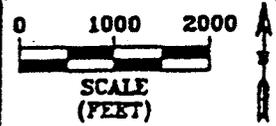
PEANUT
ISLAND

LAKE WORTH CANAL



Palm Beach County
Department of
**ENVIRONMENTAL
RESOURCES
MANAGEMENT**

**LAKE WORTH LAGOON
DREDGED AND FILLED
AREAS**

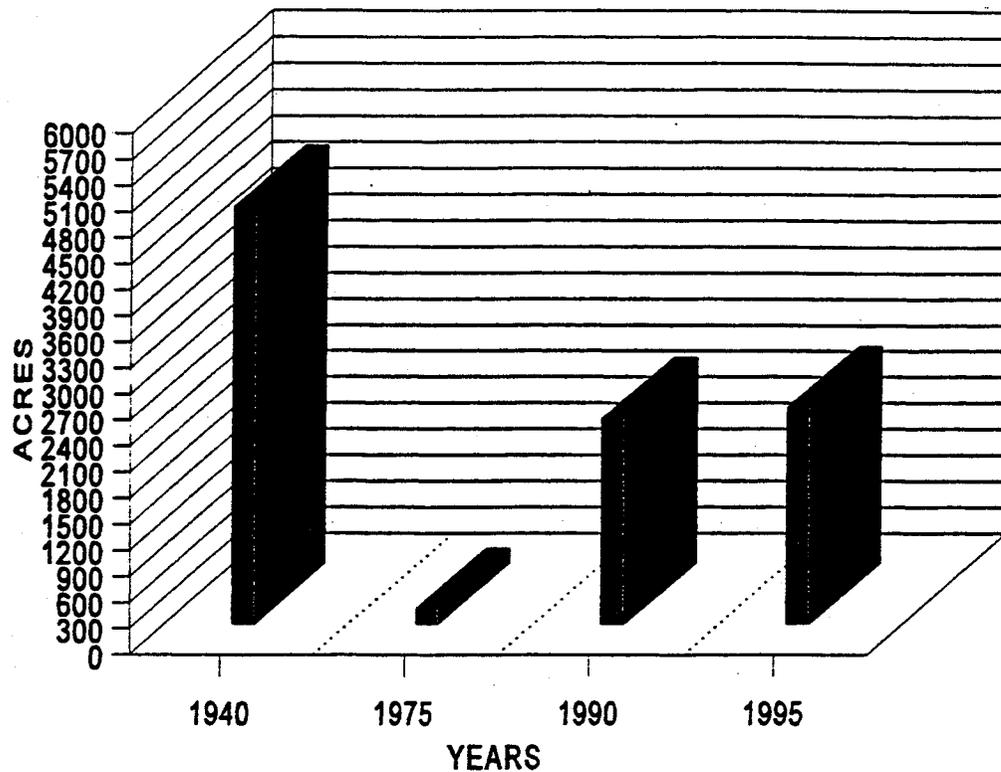


D&M JOB NO.
20335-001-049

**FIGURE
1-C**

SEAGRASS ACREAGE

PALM BEACH COUNTY



SOURCE: - Harris, B., K. D. Haddad, R. A. Steindinger, S. A. Huff 1983. Assessment of Fisheries Habitat: Charlotte Harbor and Lake Worth, Florida Department of Natural Resources

- Palm Beach County Department of Environmental Resources Management in conjunction with Dames & Moore 1990. Lake Worth Lagoon Natural Resources Inventory and Resource Enhancement Study

- Sargent, F.J., T. J. Leary, D. W. Crewz and C. R. Kruer, 1995. Florida Marine Research Institute Technical Reports: Scarring of Florida's Seagrasses: Assessment and Management Options

seagrass habitats have provided a substantial contribution in terms of habitats and productivity to Lake Worth Lagoon's fisheries and wildlife.

4.2.4. Shallow-Water Lagoon Habitat.

4.2.4a Distribution. Discussion of shallow-water lagoon habitat is synonymous with discussion of seagrasses (4.2.3). The tidal flats of nearby John D. MacArthur Beach State Park are virtually the last remaining natural shallow-water habitat in Lake Worth Lagoon and serve as a major nursery area for estuarine fish. A variety of mud, rock, sand, and vegetated substrates at varying depths provide niches for an unusually high number of species (Duever et al., 1981). Figure 6 illustrates the distribution of seagrasses and marine algal species in this area of northern Lake Worth Lagoon (Dames and Moore, 1990).

4.2.4b Importance. Seagrass beds stabilize sediments and are nursery grounds for the juveniles of many finfish and shellfish that possess commercial and recreational value. The seagrass blades provide a substrate on which epiphytes can attach, providing a valuable food source to most benthic consumers.

4.2.5 Shallow-Water Reef

4.2.5a Distribution. Based on surveys completed by the staff of ERM, it is estimated that there has been a loss of approximately 0.9 acres of functional hardbottom reef habitat, commonly referred to as the "Coast Guard Reef", located just south of Peanut Island which was regularly utilized by local divers from the 1970's to 1991 (James J. Barry, III, pers. com.). It has been documented and verified by ERM staff that the shallow-water reef has been covered and no longer exists due to maintenance of the adjacent waterway, turning basin and inlet. In addition, a reef system located just south of the Lake Worth Inlet and running parallel to Palm Beach was well known to local divers in the late 1950's-1960's (James J. Barry, III, pers. com.). The reef system is no longer present due to filling activities associated with the dredging and maintenance of the Lake Worth Inlet. Figure 4 and Table 1 of the Environmental Restoration Report (ERR), indicate that this site was utilized as a disposal site in conjunction with the Palm Beach Harbor (Lake Worth Inlet) Project. In a 1991 survey of the nearshore reefs in Palm Beach County, Florida (Vare, 1991), it is noted that "No reefs were observed within 800 meters of the inlet largely due to the bypassing of sand from inlet maintenance." It is estimated that a reef tract of approximately 2,525 linear feet was filled with dredged materials, covering reef habitat that was approximately 282 feet wide, equivalent to the loss of 17.0 acres of shallow-water reef habitat.

4.2.5b Importance. Shallow-water reef habitat provides a substrate and habitat for oceanic larvae to settle and grow. Losses of intertidal and shallow subtidal habitats are critical to fisheries by virtue of the importance of these environments as essential nurseries for recreationally and commercially valuable fish and invertebrates. Shallow-water reef habitats are widely used to enhance coastal productivity. For shallow-water reef habitats to create an area of new productivity, they must be able to sustain an increase in primary production over what was previously present at the site (Baynes and Szmant, 1989). The greatest resource restoration occurs when the habitat is sited at a depth where there is sufficient light for photosynthesis, and it is designed to

promote nutrient entrapment and recycling (Loder, et al., 1974) especially in low nutrient areas such as the southeastern coast of Florida, and/or if they are located to take advantage of local nutrient sources. Submerged bottom resources in Lake Worth Lagoon include seagrass beds, macro algae, oyster habitat and reef habitat that includes corals and sponges. While not as abundant as seagrass communities, other types of bottom resources including oyster bars, corals and sponges provide important habitat functions for marine organisms, but need a reef habitat to settle out. Siting the reef in an area of high water flow and circulation and low sedimentation positively affects cover and species diversity, which is well documented.

4.2.6. Dredged Areas. Within the Lake Worth Lagoon, there are deep dredged areas that have low water quality due to the lack of circulation and thermo-stratification. With the construction boom in the 1950-60's, these areas were 'borrow sites' to generate fill for nearby properties. These deep holes typically act as sinks for organically enriched sediments and have very low dissolved oxygen levels near the bottom. These conditions generally result in very low diversity of benthic fauna or the sediments are totally devoid of benthic invertebrate life. The material generated from the Peanut Island Environmental Restoration Project is suitable for placement within the Lake Worth Lagoon.

4.2.7. Upland Habitat

4.2.7a Maritime Hammock. Because of intense development within south Florida, maritime hammocks, which are vital to the breeding and wintering of many species of migratory birds have been effectively eliminated. Restoring native upland habitat through creation of hammock will provide food and cover for birds and other wildlife. The U.S. Fish and Wildlife Service (USFWS), in their Environmental Scoping Letter on the Peanut Island Environmental Restoration Project states the following with regard to anticipated environmental benefits: "...maritime hammock will promote natural ecological functions to occur and increase biodiversity in an area with a diminishing coastal ecosystem. An additional ecological benefit includes the restoration of upland habitat by creating the native plant species diversity upon which neotropical migrants depend. For instance, the coastal dredge material disposal site in the Indian River Lagoon have provided unique opportunities for creating appropriate forage habitat for migratory birds" (USFWS Scoping Letter, Nov. 18, 1997, Appendix A).

4.2.7b Coastal Strand. The coastal strand community is probably one of the most rapidly disappearing community in Florida (FL Natural Areas Inventory, 1990). Coastal strand originally occurred as a nearly continuous band along the Atlantic shorelines. Now it occurs largely as broken and isolated small stretches. In south Florida, in addition to developmental pressures, it has also been disturbed by displacement by exotic plant species, primarily Brazilian pepper and Australian pine.

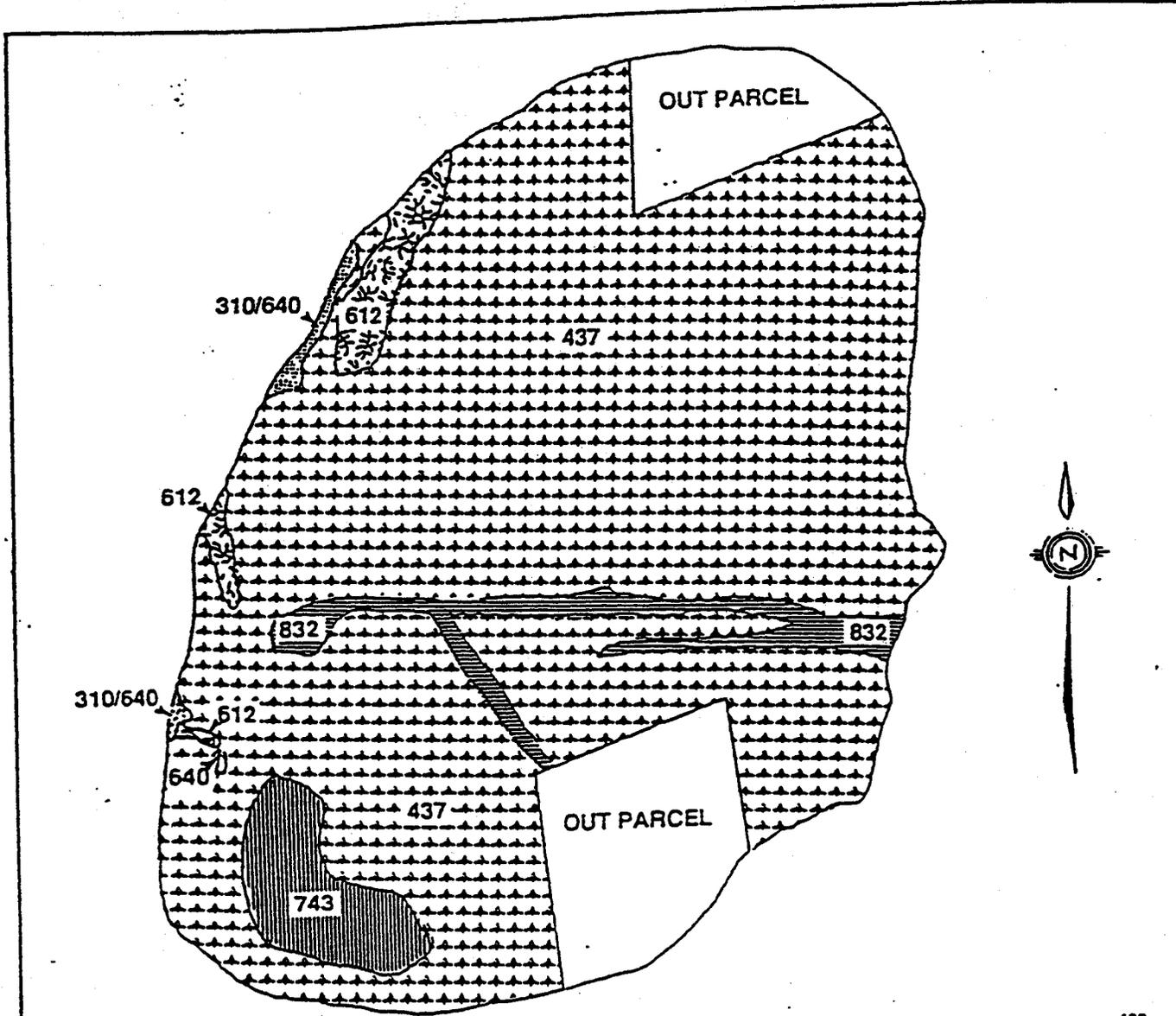
4.2.7c Beach Dune. Beach dune is a primary nesting habitat for numerous shorebirds and marine turtles. Beach dunes are very dynamic communities, which are essential for protection of inland biological communities. Beach dunes occur in an extremely harsh environment. The dune vegetation must be able to tolerate loose, dry, unstable, nutrient poor soils, as well as exposure to wind, salt spray, sand abrasion,

intense sunlight, and storms. Beach dune habitat in south Florida has been impacted by development, beach renourishment projects and direct human impacts from trampling (FL Natural Areas Inventory, 1990).

4.3 Peanut Island Restoration Status. Peanut Island is currently dominated by exotic plant species, primarily Australian pine and Brazilian pepper, but retains an impounded mangrove habitat on the western side of the island. The results of a Peanut Island vegetative survey conducted for Florida Inland Navigation District (FIND) as part of their Peanut Island Dredged Material Management Area are listed in Figure 8. Peanut Island is a site that is scheduled to provide a material management capability to service the maintenance requirements of Reach III of the IWW in Palm Beach County (IWW mile 274.60 to mile 291.72). Thick pine litter in most locations has eliminated or reduced ground cover. Portions of the shoreline experience erosion due to waves (boat and wind generated) and the poor stabilizing capabilities of Australian pine. Pronounced escarpments of exposed sand and large fallen trees are prominent along the southeastern shoreline.

4.3.1 Mangroves. An isolated mangrove strand currently exists on the west side of the island which consists of all three species of mangroves; red, *Rhizophora mangle*; black, *Avicennia germinans*; and white, *Laguncularia racemosa*, as noted by Palm Beach County Department of Environmental Resources Management. The system is impounded by a sand berm that is traversed only at spring high tides, and is therefore, not functioning to capacity due to the inability of the system to be flushed. Lack of flushing precludes the detritus, an important food source and the basis of primary production, from entering the tidal system. Impoundment also affects the nutrient removal and sediment trapping capabilities of the mangrove system. Restoring tidal cuts and flushing to this mangrove habitat will allow this 3.0 acre forest to function as part of the estuarine system by supplying food, shelter, nursery habitat, nutrient removal and sediment stabilization. It should be noted that the Peanut Island mangrove habitat will differ from that created in the Munyon Island Environmental Restoration Project (under Section 1135, WRDA) in the fish species that will be targeted. While both projects will provide habitat for fish common to mangrove habitats, there is a difference in water quality between the two areas. Typically, the fish species found in and around Munyon Island tend to be euryhaline, capable of withstanding excess changes in salinities. Whereas the Peanut Island mangrove habitat will receive the direct influence of clear tidal waters, providing habitat and water quality conditions catering to fish species typically found in nearshore reef habitats.

4.3.2 Shallow-Water Lagoon. The creation of shallow-water lagoon habitat on Peanut Island will provide a stratum for recruitment and colonization of seagrasses and benthic organisms. With review of historic and bathymetric maps, it has been determined that shallow-water/seagrass habitat is the primary resource that was eliminated due to the placement of dredged materials in the 79 acre footprint that is now Peanut Island. In addition to the area filled, roughly another 75 acres of shallow-water habitat/seagrass habitat has been lost due to dredging activities and the creation of the Inlet and the IWW. Upon examination of the documented seagrass habitat one mile to the north and south of Peanut Island (Figure 6), the only areas devoid of



LEGEND

-  310/640 HERBACEOUS RANGELAND/
NON-FORESTED HERBACEOUS WETLAND
-  437 AUSTRALIAN PINE
-  612 MANGROVE SWAMP
-  640 NON-FORESTED HERBACEOUS WETLAND
-  743 SPOIL AREA
-  832 ELECTRICAL POWER TRANSMISSION
LINES

FIGURE 3-1. Land Use and Vegetation of Peanut Island Proposed Dredged Material Disposal Site, Palm Beach County, Florida



PEANUT ISLAND RESTORATION
PLANT SPECIES LIST

Table 6

MARITIME HAMMOCK

Common Name (Genus, species)

Sabal Palm (*Sabal Palmetto*)
Sea Grape (*Coccoloba uvifera*)
Gumbo Limbo (*Bursera simaruba*)
Satin Leaf (*Chrysophy. oliviforme*)
Sand Live Oak (*Quercus virginiana*)
Saw Palmetto (*Serenoa repens*)
Pigeon Plum (*Coccoloba diversifolia*)
Green Buttonwood (*Concarpus ere.*)
Leather fern (*Acrostichum dana.*)
Strangler fig (*Ficus aurea*)
Mastic (*Mastichodendron foetidissimum*)
Lancewood (*Nectandra coriacea*)
Red Mulberry (*Morus rubra*)
Willow Busic (*Dipholis salicifolia*)
Paradise tree (*Simarouba glauca*)
Florida Privet (*Forestiera segregata*)
White indigo berry (*Randia aculeata*)
Marlberry (*Ardisia escallonioides*)
Black Ironwood (*Krugiodendron ferreum*)
Blolly (*Guapira dicolor*)
Spanish Stopper (*Eugenia foetida*)
White Stopper (*Eugenia axillaris*)
Crabwood (*Gymnanthes lucida*)
Wild Lime (*Zanthoxylum fagara*)

COASTAL STRAND

Common Name (Genus, species)

Saw palmetto (*Serenoa repens*)
Sand Live Oak (*Quercus virginiana*)
Cabbage Palm (*Sabal palmetto*)
Sea Grape (*Coccoloba uvifera*)
Snowberry (*Chiococca alba*)
Lantana (*Lantana involucrata*)
Cocoplum (*Chrysoblanus icaco*)
Spanish Bayonet (*Yucca aloifolia*)
Prickly pear (*Opuntia stricta*)

BEACH DUNE

Common Name (Genus, species)

Smooth Cordgrass (*Spartina alterniflora*)
Saltmeadow Cordgrass (*S. patens*)
Salt Jointgrass (*Paspalum vaginatum*)
Beach Panicgrass (*Panicum amarum*)
Seacoast Marsh Elder (*Iva imbricata*)
Sea Purslane (*Sesuvium port.*)
Saltgrass (*Distichlis spicata*)
Sea Oxeye (*Borrichia frutescens*)
Sea Oats (*Uniola paniculata*)
Railroad Vine (*Ipomoea pes-caprae*)
Dune Sunflower (*Helianthus debilis*)

4.3.4.c. Beach Dune. The proposed Beach Dune Habitat area is currently dominated by Australian Pine, that will be cleared and chipped on site. Beach dune is a dynamic community which is able to tolerate exposure to wind, intense sun, salt spray, sand abrasion and establish within steeply sloped areas. Beach dune vegetation is proposed to stabilize the slopes of the re-contoured FIND spoil dike and preclude recurrence of exotic vegetation. The beach dune habitat will function as a transitional zone that will bridge the gap between the existing and created wetland communities to the upland elevations and associated maritime hammock and coastal strand communities. The species utilized within this special ecotone will be an overlap of wetland, coastal strand and beach dune vegetation, which will colonize quickly to stabilize slopes and protect the integrity of bordering habitats. The native vegetation to be installed is consistent with species indigenous to South Florida beach dune habitat. A beach dune plant species list is provide in Table 6.

4.3.5. Dredged Area within Lake Worth Lagoon. An anoxic dredged site known as the City of Lake Worth Wetland Restoration area, has been identified to accommodate the material generated from Peanut Island to subsequently restore 16.0 acres of submerged wetland resources (see Figures 19 and 20 in the Environmental Restoration Report-ERR). Filling the dredged area to historic depths, will effectively restore these areas to shallow-water habitat with the potential to colonize with seagrasses and benthic communities. The proposed design elevation emulates surrounding submerged bottom currently supporting seagrasses and oyster habitat. The dredged material generated from the Peanut Island project will restore a portion (16.0 acres) of the City of Lake Worth Wetland Restoration Area. Appendix J of the ERR details the City of Lake Worth Wetland Restoration Plan.

4.4 Lake Worth Lagoon Habitat Restoration and Enhancement Priorities. The *Lake Worth Lagoon Natural Resources Inventory and Resource Enhancement Study*, completed in 1990 by Dames and Moore for Palm Beach County, identified 20 habitats along Lake Worth Lagoon. These habitats were selected, identified and evaluated in order to establish a prioritized list of areas in need of restoration/enhancement. Munyon Island and Peanut Island were designated as high priority sites for environmental restoration.

4.4.1 Impacts of Development. Analysis of the available information regarding Lake Worth Lagoon indicates that water quality and habitat resources have been drastically impacted by urbanization of the area over the past one hundred years. Fish and wildlife habitat has declined due to dredging and filling activities and watershed erosion. However, productive areas of seagrass beds, shoreline mangrove communities and other habitat components remain and are utilized by a great number of fish and wildlife species. These existing natural areas could be protected and preserved, while other declining habitats could be enhanced or restored to their natural state.

4.4.2 FDEP Ecosystem Management Area. The Florida Department of Environmental Protection (FDEP) has designated the Lake Worth Lagoon as an "Ecosystem Management Area". Ecosystem Management is the State's integrated approach to management of Florida's biological and physical environments--conducted through the

use of tools such as planning, land acquisition, environmental education, regulation, economic incentives, and pollution prevention—designed to maintain, protect and improve the state's natural, managed and human ecosystems. This comprehensive strategy is to provide not only better environmental and public health protection, but also to protect entire systems. The Lake Worth Lagoon Ecosystem Management Mission Statement is as follows:

"To restore, conserve and manage the Lake Worth Lagoon Ecosystem to a level of quality to obtain measurable and significant improvement to the Lagoon's water and sediment quality; and to provide habitat for native plants, fish and wildlife, and aesthetic, recreational and economic benefits for the residents and visitors of Palm Beach County; and to encourage, develop and promote a partnership of public and private interests to manage the Lagoon"

Under Palm Beach County's Comprehensive Management Plan and FDEP's Ecosystem Management Plan, the County Department of Environmental Resources Management has identified numerous objectives to restore and protect the lagoon. These objectives include recommendations for habitat restoration, which have been realized with the completion of the Munyon Island Environmental Restoration Project and the initiation of the Peanut Island Environmental Restoration Project.

4.4.3 Peanut Island Restoration Coordination. In addition to this restoration, the local sponsor, Palm Beach County, plans to use separate non-federal funds in an independent 5-year restoration/recreation effort which began in May, 1998. Palm Beach County is working cooperatively with FIND and the Port of Palm Beach toward the implementation of a \$5 million dollar master plan that will enhance and rehabilitate the island's dilapidated environment, providing a key water-oriented County park for residents and visitors.

Palm Beach County's Department of Environmental Resources Management utilizes the *Lake Worth Lagoon Natural Resources Inventory and Resource Enhancement Study* as a guide providing analysis of resource trends, as well as recommendations and prioritization for habitat enhancement projects to be undertaken. Peanut Island has long been recognized as having great potential for restoration, due to its high marine productivity potential, because of the tidal influence provided by the Lake Worth Inlet.

4.5 Fish and Wildlife.

4.5.1 Fish Species in Lake Worth Lagoon. The *Lake Worth Lagoon Natural Resources Inventory and Resource Enhancement Study*, completed in 1990 by Dames and Moore for Palm Beach County, contains a list of 195 fish species which have been collected and identified in the Lake Worth Lagoon. The list was compiled from six studies conducted from 1962 - 1985 is listed in Table 7. Figure 9 illustrates the locations of the fish collected and the corresponding study in which the data was analyzed. A total of 261 species of fish have been recorded from northern Lake Worth Lagoon. These species are associated with a marine plant community composed of the seagrasses *Halodule wrightii*, *Halophila* spp., and *Thalassia testudinum*, and marine

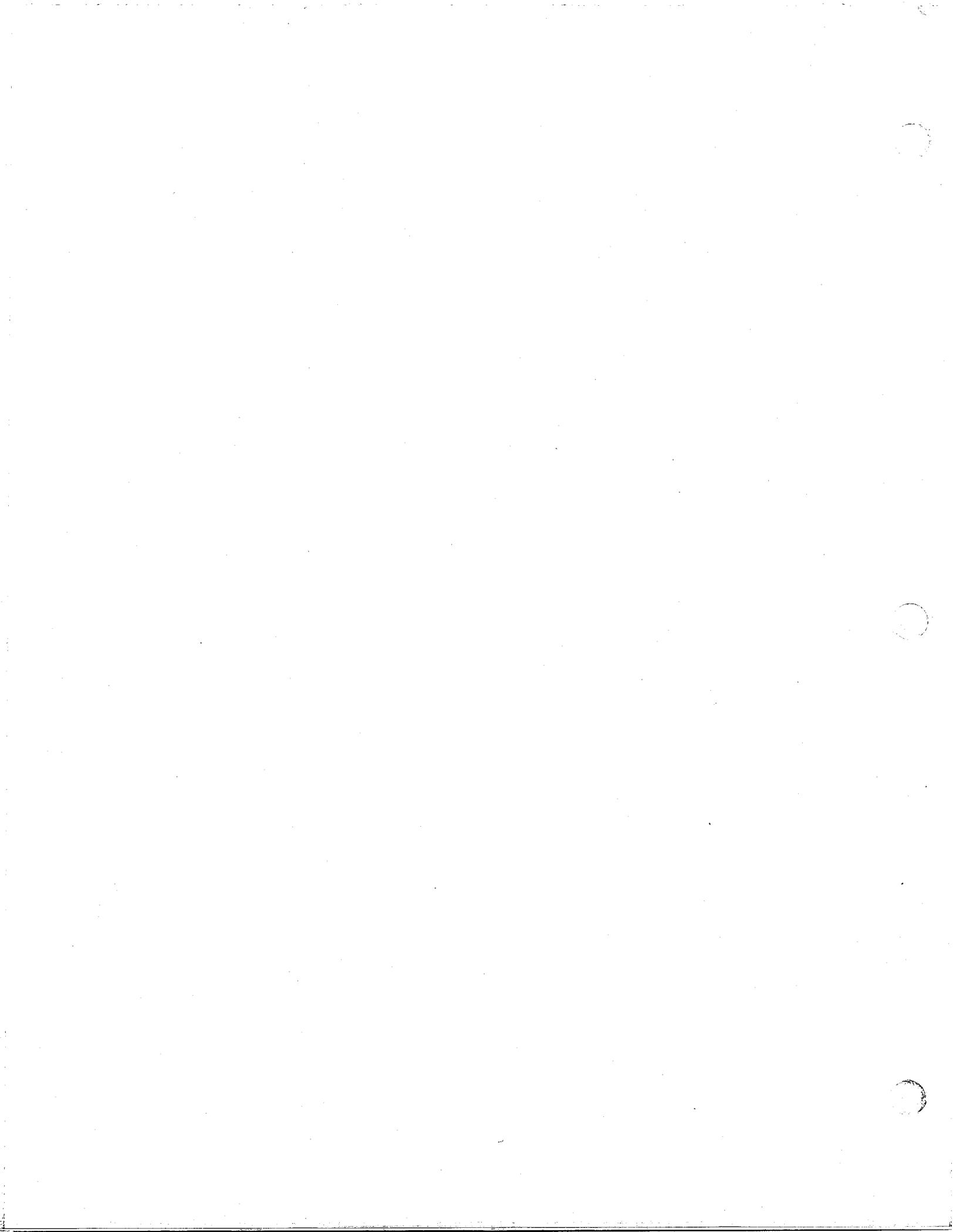


TABLE 7.

FISH COLLECTED IN LAKE WORTH LAGOON

MAP #	FAMILY GENUS, SPECIES	COMMON NAME	MAP #	FAMILY GENUS, SPECIES	COMMON NAME
	BRANCHIOSTOMIDAE			BATRACHOIDIDAE	
1.	<i>Asymmetron</i> sp.	lancelet	34.	<i>Opsanus beta</i>	gulf toadfish
2.	<i>Asymmetron lucayanum</i>	sharptail lancelet			
	CARCHARHINIDAE			ANTENNARIIDAE	
3.	<i>Carcharhinus limbatus</i>	blacktip shark	35.	<i>Antennarius ocellatus</i>	ocellated frogfish
			36.	<i>Histrio histrio</i>	sargassum fish
			37.	<i>Antennaris scaber</i>	splithire frogfish
	RAJIDAE			OGCOCEPHALIDAE	
4.	<i>Raja eglaneria</i>	clearnose ray	38.	<i>Ogcocephalus radianus</i>	polkadot batfish
			39.	<i>Ogcocephalus nasutus</i>	shortnose batfish
	DASYATIDAE			HEMIRAMPHIDAE	
5.	<i>Dasyatis americana</i>	southern stingray		<i>Hyporhamphus unifasciatus</i>	halfbeak
6.	<i>Dasyatis sabina</i>	Atlantic stingray			
7.	<i>Dasyatis sayi</i>	bluntnose stingray	40.		
8.	<i>Gymnura micrura</i>	smooth butterfly ray			
	ELOPIDAE			BELONGIDAE	
9.	<i>Elops saurus</i>	ladyfish	41.	<i>Srorygura</i> sp.	needlefish
			42.	<i>Srorygura marina</i>	Atlantic needlefish
			43.	<i>Srorygura notata</i>	redfin needlefish
	MEGALOPIDAE		44.	<i>Srorygura timuca</i>	timuca
10.	<i>Megalops atlanticus</i>	tarpon	45.	<i>Tylorinus oca</i>	aguon
	ALBULIDAE			CYPRINODONTIDAE	
11.	<i>Albula vulpes</i>	boeefish	46.	<i>Floridichthys carpio</i>	goldspotted killifish
			47.	<i>Fundulus confusus</i>	marsh killifish
	OPHICHTHIDAE		48.	<i>Fundulus grandis</i>	gulf killifish
12.	<i>Myrophis punctatus</i>	speckled worm eel			
	CLUPEIDAE			POECILIDAE	
13.	undetermined sp.		49.	<i>Heierandria formosa</i>	least killifish
14.	<i>Brevoortia smithi</i>	yellowfin menhaden	50.	<i>Poecilia latipinna</i>	gulf killifish
15.	<i>Brevoortia tyrannus</i>	Atlantic menhaden			
16.	<i>Harengula</i> sp.	sardine		ATHERINIDAE	
17.	<i>Harengula chupeola</i>	false pilchard	51.	<i>Menbrus maritima</i>	rough silverside
18.	<i>Harengula humeralis</i>	reardear sardine	52.	<i>Menidia beryllina</i>	tidewater silverside
19.	<i>Harengula jaguana</i>	scaled sardine			
20.	<i>Jenkinsia lamprotaenia</i>	dwarf herring		FISTULARIIDAE	
21.	<i>Jenkinsia majua</i>	little-eye herring	53.	<i>Fistularia tabacaria</i>	bluespotted cornetfish
22.	<i>Opisthonema oglinum</i>	Atlantic thread herring			
23.	<i>Sardinella aurita</i>	spanish sardine		SYNGNATHIDAE	
	ENGRAVLIDAE		54.	<i>Hippocampus erectus</i>	lined seahorse
24.	<i>Anchoa</i> sp.	anchovy	55.	<i>Hippocampus zosterae</i>	dwarf seahorse
25.	<i>Anchoa mitchilli</i>	key anchovy	56.	<i>Syngnathus</i> sp.	pipefish
26.	<i>Anchoa hepsetus</i>	striped anchovy	57.	<i>Syngnathus floridae</i>	dark pipefish
27.	<i>Anchoa hepsetus</i>	striped anchovy	58.	<i>Syngnathus louisianae</i>	chain pipefish
28.	<i>Anchoa hepsetus</i>	striped anchovy	59.	<i>Syngnathus pelagicus</i>	sargassum pipefish
			60.	<i>Syngnathus scovelli</i>	gulf pipefish
	SYNODONTIDAE			SCORPAENIDAE	
29.	<i>Synodus foetens</i>	inshore lizardfish	61.	<i>Scorpaena bergi</i>	goosehead scorpionfish
30.	<i>Trachinocephalus myops</i>	snakefish	62.	<i>Scorpaena calcarata</i>	smoothhead scorpionfish
			63.	<i>Scorpaena grandicornis</i>	plumed scorpionfish
	CYPRINIDAE			TRIGLIDAE	
31.	<i>Nothobranchius maculatus</i>	taillight shiner	64.	<i>Prionocentrus</i> sp.	Scarobin
	ARIDAE		65.	<i>Prionocentrus ophryes</i>	bandtail scarobin
32.	<i>Ariopsis felis</i>	sea catfish	66.	<i>Prionocentrus sciaurus</i>	leopard scarobin
33.	<i>Boye marinus</i>	gafftopsail catfish	67.	<i>Prionocentrus tribulus</i>	bighead scarobin
				CENTROPOMIDAE	
			68.	<i>Centropomus pectinatus</i>	tarpon snook
			69.	<i>Centropomus undecimalis</i>	common snook

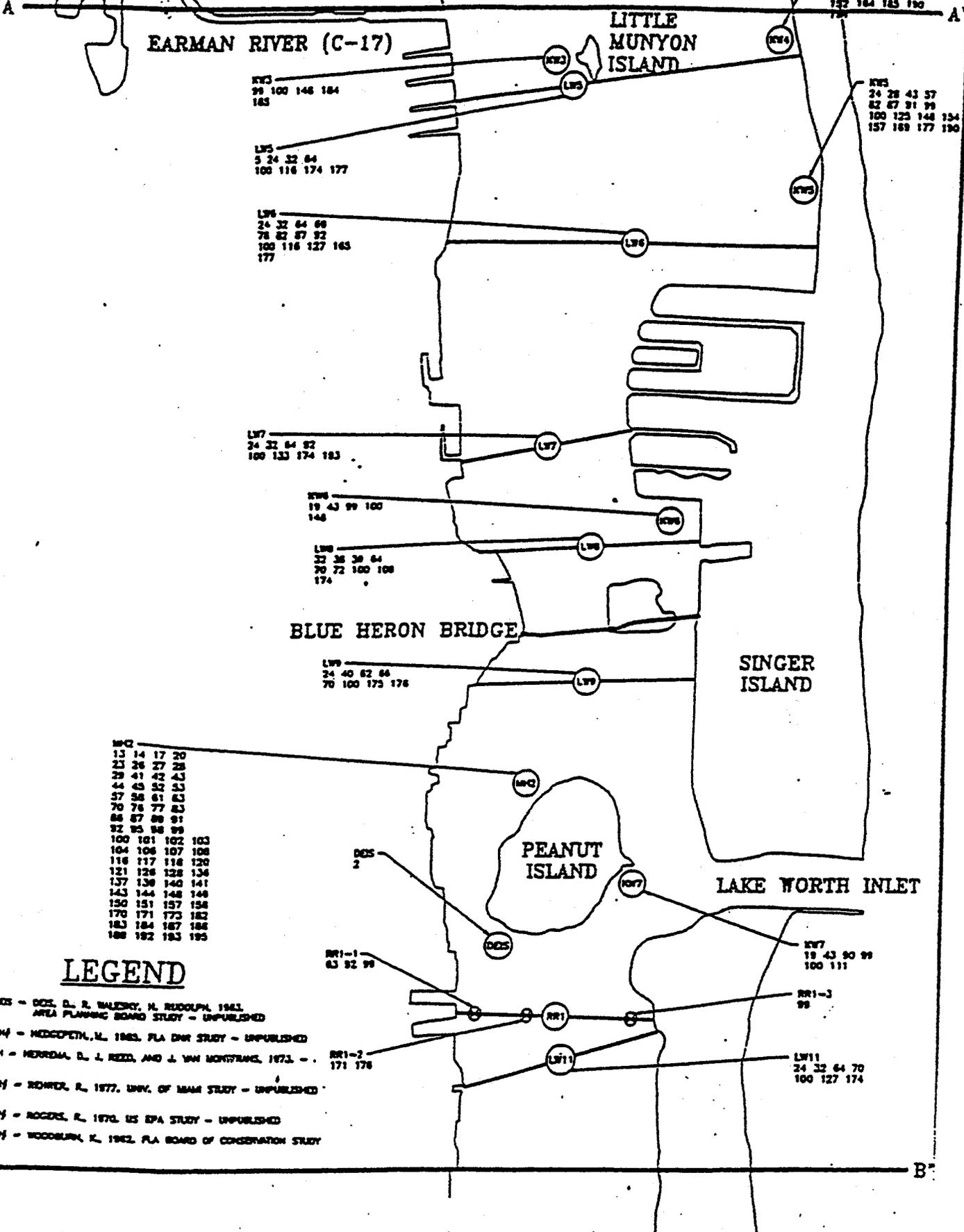
MAP #	FAMILY GENUS, SPECIES	COMMON NAME	MAP #	FAMILY GENUS, SPECIES	COMMON NAME
	SERRANIDAE			SPARIDAE	
70.	<i>Diplectrum formosum</i>	sand perch	115.	<i>undetermined sp.</i>	sheepshead
	PRILACANTHIDOE		116.	<i>Archosargus probatocephalus</i>	sea bream
71.	<i>Pristigaster alba</i>	short bigeye	117.	<i>Archosargus rhomboidalis</i>	porgy
	APOGONIDOE		118.	<i>Calamus sp.</i>	sheepshead porgy
72.	<i>Apogon pseudomaculatus</i>	twospot cardinalfish	119.	<i>Calamus penna</i>	spottail pinfish
73.	<i>Phacopyx pigmentaria</i>	dusky cardinalfish	120.	<i>Diplodus holbrooki</i>	pinfish
	POMATOMIDAE		121.	<i>Lagodon rhomboides</i>	
74.	<i>Pomatomus saltatrix</i>	bluefish		SCIAENIDAE	
	CARANGIDAE		122.	<i>undetermined sp.</i>	drum
75.	<i>undetermined sp.</i>	jack	123.	<i>Bairdiella chrysoura</i>	silver perch
76.	<i>Caranx bartholomaei</i>	yellowjack	124.	<i>Cynoscion arenarius</i>	sand seatrout
77.	<i>Caranx caryoc</i>	blue runner	125.	<i>Cynoscion nebulosus</i>	spotted seatrout
78.	<i>Caranx hippos</i>	craville jack	126.	<i>Leiostomus xanthurus</i>	spot
79.	<i>Caranx laevis</i>	horse-eye jack	127.	<i>Menticirrhus americanus</i>	southern kingfish
80.	<i>Decapterus macarellus</i>	mackerel scad	128.	<i>Micropogonias undulatus</i>	Atlantic croaker
81.	<i>Decapterus punctatus</i>	round scad	129.	<i>Odonotus dentex</i>	reef croaker
82.	<i>Oligoplites saurus</i>	leatherjacket	130.	<i>Pogonias cromis</i>	black drum
83.	<i>Selene vomer</i>	lookdown	131.	<i>Sciaenops ocellata</i>	red drum
84.	<i>Seriola sp.</i>	amberjack	132.	<i>Umbrina coroides</i>	sand drum
85.	<i>Trachinoas sp.</i>			EPHIPPIDAE	
86.	<i>T. achinoas carolinus</i>	Florida pompano	133.	<i>Chaetodipterus faber</i>	Atlantic spadefish
87.	<i>Trachinoas falcatus</i>	permit		POMACANTHIDAE	
	CORYPHAENIDAE		134.	<i>Pomacanthus arcuatus</i>	gray angelfish
88.	<i>Coryphaena hippurus</i>	dolphin		POMACENTRIDAE	
	LUTJANIDAE		135.	<i>Abudefduf saxatilis</i>	sergeant major
89.	<i>Lutjanus analis</i>	mutton snapper		LABRIDAE	
90.	<i>Lutjanus apodus</i>	schoolmaster	136.	<i>Halichoeres maculipinna</i>	clown wrasse
91.	<i>Lutjanus griseus</i>	mangrove (gray) snapper	137.	<i>Hemipteronotus novacula</i>	pearly razorfish
92.	<i>Lutjanus synagris</i>	lane snapper		SCARIDAE	
93.	<i>Rhomboplites aurorubens</i>	vermillion snapper	138.	<i>Cryptomus rosus</i>	bluelip parrotfish
	LOBOTIDAE		139.	<i>Sparisoma sp.</i>	parrotfish
94.	<i>Lobotes surinamensis</i>	tripletail	140.	<i>Sparisoma chrysopterum</i>	redtail parrotfish
	GERREIDAE		141.	<i>Sparisoma radians</i>	bucktooth parrotfish
95.	<i>Diapterus sp.</i>			MUGILIDAE	
96.	<i>Diapterus auratus</i>	Irish pompano	142.	<i>Mugil sp.</i>	mullet
97.	<i>Diapterus plumieri</i>	striped mojarra	143.	<i>Mugil cephalus</i>	striped mullet
98.	<i>Eucinostomus sp.</i>	mojarra	144.	<i>Mugil curema</i>	white mullet
99.	<i>Eucinostomus argenteus</i>	spotfin mojarra	145.	<i>Mugil gaimardianus</i>	reduye mullet
100.	<i>Eucinostomus gula</i>	silver jenny	146.	<i>Mugil trichodon</i>	fantail mullet
101.	<i>Eucinostomus harangulus</i>	tidewater mojarra		SPHYRAENIDAE	
102.	<i>Eucinostomus jonesii</i>	slender mojarra	147.	<i>Sphyracna sp.</i>	
103.	<i>Eucinostomus melanopterus</i>	flagfin mojarra	148.	<i>Sphyracna barracuda</i>	great barracuda
104.	<i>Gerres cinereus</i>	yellowfin mojarra	149.	<i>Sphyracna borealis</i>	northern sennet
105.	<i>Gerres sp.</i>	mojarra	150.	<i>Sphyracna picudilla</i>	southern sennet
106.	<i>Ulaema lefroyi</i>	mottled mojarra		POLYNEMIDAE	
	POMADASYIDAE		151.	<i>Polydactylus oligodon</i>	littlescale threadfin
107.	<i>Haemulon sp.</i>	grunt		CLINIDAE	
108.	<i>Haemulon aurolineatum</i>	tomtate	152.	<i>Paraclinus fasciatus</i>	banded blenny
109.	<i>Haemulon flavolineatum</i>	French grunt		BLENNIIDAE	
110.	<i>Haemulon macrostomum</i>	spanish grunt	153.	<i>Lupinoblennius nicholsi</i>	highfin blenny
111.	<i>Haemulon parrei</i>	sailors choice			
112.	<i>Haemulon sciurus</i>	bluestriped grunt			
113.	<i>Haemulon striatum</i>	striped grunt			
114.	<i>Orthopristis chrysoptera</i>	pigfish			

TABLE 7.
CONTINUED

FISH COLLECTED IN LAKE WORTH LAGOON

MAP #	FAMILY GENUS, SPECIES	COMMON NAME
	GOBIIDAE	
154.	<i>undetermined sp.</i>	goby
155.	<i>Bathygobius soporator</i>	frillfin goby
156.	<i>Coryphopterus glaucofraenum</i>	bridled goby
157.	<i>Gobionellus sp.</i>	goby
158.	<i>Gobionellus boleasoma</i>	darter goby
159.	<i>Gobionellus smaragdus</i>	emerald goby
160.	<i>Gobiosoma sp.</i>	goby
161.	<i>Gobiosoma bosci</i>	naked goby
162.	<i>Gobiosoma longipala</i>	twoscale goby
163.	<i>Gobiosoma gemmatum</i>	frecklefin goby
164.	<i>Gobiosoma robustum</i>	code goby
165.	<i>Lophogobius cyprinoides</i>	crested goby
166.	<i>Microgobius gulosus</i>	clown goby
167.	<i>Microgobius microlepis</i>	banner goby
	NOMEIDAE	
168.	<i>Psenes cyanophrys</i>	freckled driftfish
	BOTHIDAE	
169.	<i>Bothus sp.</i>	flounder
170.	<i>Bothus ocellatus</i>	eyed flounder
171.	<i>Citharichthys macrops</i>	spotted whiff
172.	<i>Citharichthys spilopterus</i>	bay whiff
173.	<i>Paralichthys albigutta</i>	gulf flounder
174.	<i>Syacium sp.</i>	flounder
175.	<i>Syacium micranum</i>	channel flounder
176.	<i>Syacium papillosum</i>	dusky flounder
	SOLEIDAE	
177.	<i>Achirus lineatus</i>	line sole
	CYNOGLOSSIDAE	
178.	<i>Symphurus sp.</i>	tonguefish
179.	<i>Symphurus arawak</i>	caribbean tonguefish
180.	<i>Symphurus plogusa</i>	blackchock tonguefish
	BALISTIDAE	
181.	<i>Balistes sp.</i>	triggerfish
	MONACANTHIDAE	
182.	<i>Ahucerus scripae</i>	scrawled filefish
183.	<i>Monacanthus sp.</i>	filefish
184.	<i>Monacanthus ciliatus</i>	fringed filefish
185.	<i>Monacanthus hispidus</i>	planchhead filefish
	OSTRACIIDAE	
186.	<i>Acanthostracion quadricornis</i>	scrawled cowfish
187.	<i>Lactophrys sp.</i>	trunkfish
188.	<i>Lactophrys trigrorus</i>	trunkfish
189.	<i>Lactophrys triguetter</i>	smooth trunkfish
	TETRAODONTIDAE	
190.	<i>Sphoeroides sp.</i>	puffer
191.	<i>Sphoeroides nephelus</i>	southern puffer
192.	<i>Sphoeroides spengleri</i>	bandtail puffer
193.	<i>Sphoeroides tessellatus</i>	checkered puffer
	DIODONTIDAE	
194.	<i>Chilomyxus schoepfi</i>	striped burrfish
195.	<i>Diodon hisrix</i>	porcupinefish

2 13 36 60
 89 91 100 107
 112 114 121 146
 152 164 185 190



LW1
 99 100 146 184
 185

LW2
 5 24 32 64
 100 116 174 177

LW3
 24 32 64 66
 78 82 87 92
 100 116 127 165
 177

LW4
 24 32 64 82
 100 133 174 183

LW5
 19 43 99 100
 146

LW6
 32 36 38 64
 70 72 100 108
 174

LW7
 34 40 62 64
 70 100 175 176

MC
 13 14 17 20
 23 26 27 28
 29 41 42 43
 44 65 52 53
 57 58 61 63
 70 76 77 83
 86 87 88 91
 92 93 98 99
 100 101 102 103
 104 106 107 108
 116 117 118 120
 121 126 128 134
 137 138 140 141
 143 144 146 148
 150 151 157 158
 170 171 173 182
 183 184 187 188
 188 182 183 185

RW7
 24 28 43 57
 82 87 91 99
 100 125 144 154
 157 169 177 190

RW4

RW5

RW6

RW8

RW9

RW10

RW7

RW7
 19 43 90 99
 100 111

RR1-3
 99

LW11
 24 32 64 70
 100 127 174

RR1-1
 63 92 99

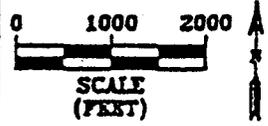
RR1-2
 171 176

LEGEND

- MC - COE, D. R. WALERTY, H. RUDOLPH, 1963. AREA PLANNING BOARD STUDY - UNPUBLISHED
- MC - MEDCOFFIN, M. 1965. FLA DNR STUDY - UNPUBLISHED
- MC - MERRILL, D. J. REED, AND J. VAN MONSTRANG, 1973. - -
- MC - BOWEN, R. 1977. UNIV. OF MIAMI STUDY - UNPUBLISHED
- MC - ROGERS, R. 1970. US EPA STUDY - UNPUBLISHED
- MC - WOODBURN, K. 1962. FLA BOARD OF CONSERVATION STUDY

Palm Beach County
 Department of
**ENVIRONMENTAL
 RESOURCES**

**LAKE WORTH LAGOON
 KNOWN OCCURRENCES
 OF FISH**
 30



D&M JOB NO.
 20335-001-049

**FIGURE
 10-C**

algae species such as *Caulerpa sertularioides*, *Acanthophora spicifera*, and *Dictyota bartayresii* (Herrema, et al., 1973).

4.5.2 Peanut Island Fish Survey. In August, 1996, staff from the Florida Department of Environmental Protection, Division of Aquatic Preserves completed a fish survey in the waters surrounding Peanut Island. The resulting report is included in Table 7.

4.5.3 Bird Species. Table 8 provides a list of birds observed in nearby John D. MacArthur Beach State Park. More than 50 percent of the commonly observed bird species are linked to the aquatic environs of the park. Munyon Island, within the Park, once supported such a large bird rookery that the Seminoles called the Island "Nuksachoo", meaning "pelican" and early white settlers referred to it as Pelican Island (Duever et. al., 1981). The rookery was reportedly decimated by collecting activities and the name, literally, disappeared with the birds. The wetland habitats created and restored on Peanut Island, by this environmental restoration, will provide suitable habitat for all species listed in Table 8, a list of bird species observed within John D. MacArthur Beach State Park or Lake Worth Lagoon. More that 50% of the commonly observed bird species are linked to the aquatic environs and are expected to utilize the habitat provided by the restoration of Peanut Island. Creation of a maritime hammock and associated transitional zone will provide adjacent upland habitat for bird and wildlife species, while providing an important zone between wetland and upland habitats.

4.6 Threatened and Endangered Species.

4.6.1 General Requirements. In accordance with Section 7 of the Endangered Species Act, a biological assessment of potential project impacts to threatened or endangered species was prepared and forwarded to the U.S. Fish and Wildlife Service. Federally protected species utilizing the wetland restoration project area that have been observed by State Biologists and County Environmental staff on nearby Munyon Island include:

Wood Stork, Peregrine Falcon, Manatee, Least Tern, , Little Blue Heron, Great Blue Heron, Reddish Egret, Snowy Egret, Gopher Tortoise, Brown Pelican, White Ibis, Osprey. The Common Snook is a State listed Species of Special Concern.

Federally protected species utilizing nearby Munyon Island and its surrounding wetland habitat are listed in Table 9, along with their Federal designation.

4.6.2 Lake Worth Lagoon Estuary. The shoreline of Lake Worth Lagoon is almost completely developed and densely populated, leaving very few natural areas suitable for support of appreciable numbers of protected (endangered, threatened or rare species, or species of special concern) plant and/or animal species. All known protected plants occur either in John D. MacArthur Beach State Park in north Lake Worth Lagoon or in Gemini Botanical Gardens in south Lake Worth Lagoon. Table 9 indicates protected species found in Lake Worth Lagoon and Figure 10 illustrates species found specifically in north Lake Worth Lagoon in and around John D. MacArthur Beach State Park and the Peanut Island.

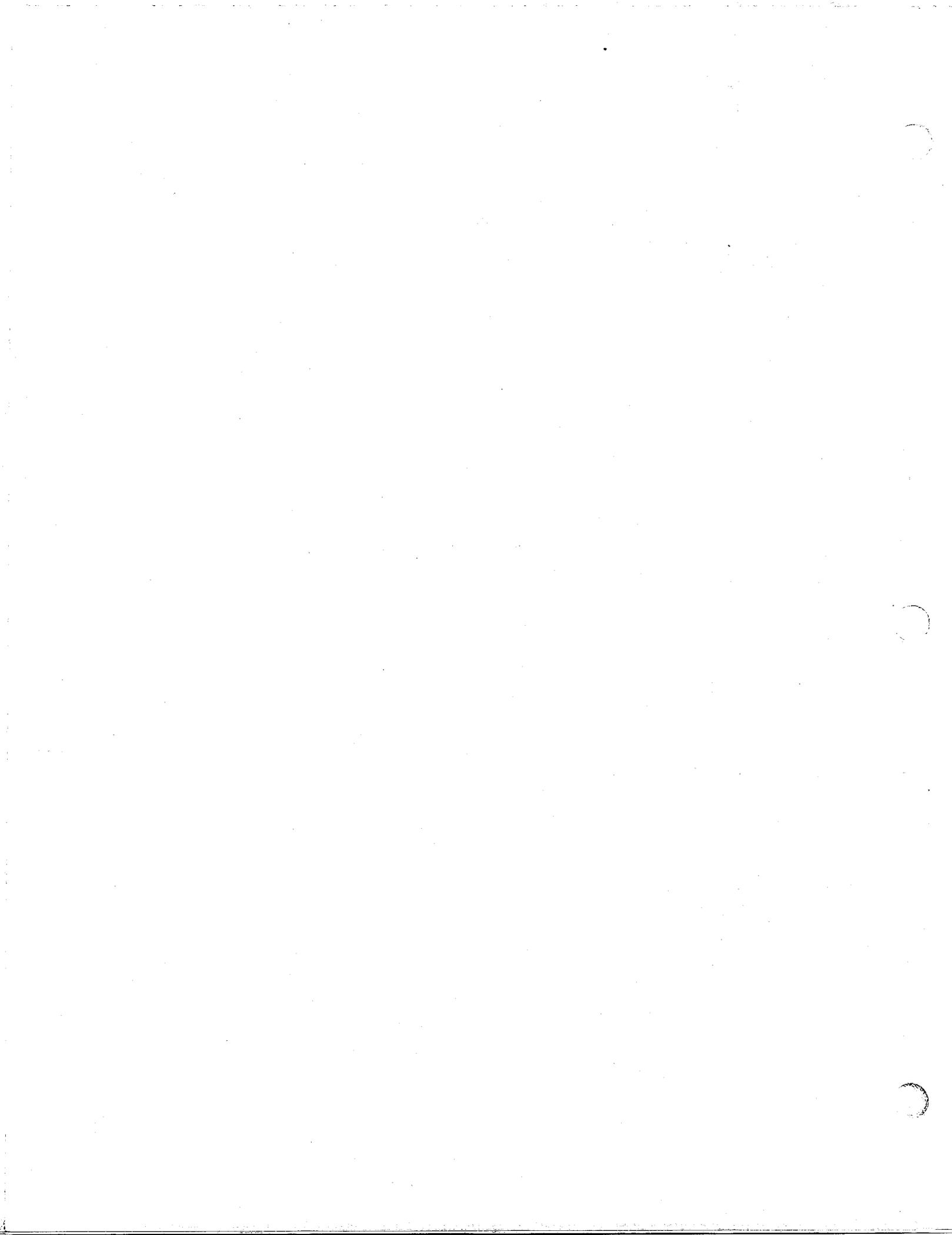


TABLE 8.

BIRD SPECIES OBSERVED AT JOHN D. MACARTHUR BEACH STATE PARK

Common Loon	<i>Gavia immer</i>
Pied-Billed Grebe	<i>Podilymbus podiceps</i>
Brown Pelican	<i>Pelecanus occidentalis carolinensis</i>
Double-Crested Cormorant	<i>Phalacrocorax auritus</i>
Water-Turkey	<i>Anhinga anhinga</i>
Man-O'-War Bird	<i>Fregata magnificens</i>
Great Blue Heron	<i>Ardea herodias</i>
Snowy Egret	<i>Egretta thula</i>
Reddish Egret	<i>Dichromanassa rufescens</i>
Louisiana Heron	<i>Hydranassa tricolor</i>
Little Blue Heron	<i>Florida coerula</i>
Green Heron	<i>Butorides striatus</i>
Black-Crowned Night Heron	<i>Nycticorax nycticorax</i>
Yellow-Crowned Night Heron	<i>Nyctanassa violacea</i>
American Bittern	<i>Botaurus lentiginosus</i>
Least Bittern	<i>Ixobrychus exilis</i>
Wood Stork	<i>Mycteria americana</i>
White Ibis	<i>Eudocimus albus</i>
Roseate Spoonbill	<i>Ajaia ajaja</i>
Lesser Scaup	<i>Aythya affinis</i>
White-Winged Scoter	<i>Melanitta deglandi</i>
Surf Scoter	<i>Melanitta perspicillata</i>
Red-Breasted Merganser	<i>Mergus serrator</i>
Turkey Vulture	<i>Cathartes aura</i>
Black Vulture	<i>Coragyps atratus</i>
Sharp-Shinned Hawk	<i>Accipiter striatus</i>
Cooper's Hawk	<i>Accipiter cooperii</i>
Red-Tailed Hawk	<i>Buteo jamaicensis</i>
Red-Shouldered Hawk	<i>Buteo lineatus</i>
Bald Eagle	<i>Haliaeetus leucocephalus</i>
Osprey	<i>Pandion haliaetus carolinensis</i>
Peregrine Falcon	<i>Falco peregrinus</i>
Merlin	<i>Falco columbarius</i>
Kestrel	<i>Falco sparverius</i>
Limpkin	<i>Aramus guarauna</i>
Clapper Rail	<i>Rallus longirostris</i>
Virginia Rail	<i>Rallus limicola</i>
Sora	<i>Porzana carolina</i>
Coot	<i>Fulica americana</i>
American Oystercatcher	<i>Haematopus palliatus</i>
Semipalmated Plover	<i>Charadrius semipalmatus</i>
Wilson's Plover	<i>Charadrius wilsonia</i>
Killdeer	<i>Charadrius vociferus</i>
Black-Bellied Plover	<i>Pluvialis squatarola</i>
Ruddy Turnstone	<i>Arenaria interpres</i>
Spotted Sandpiper	<i>Actitis macularia</i>
Willet	<i>Catoptrophorus semipalmatus</i>
Greater Yellowlegs	<i>Tringa melanoleuca</i>
Lesser Yellowlegs	<i>Tringa flavipes</i>
Least Sandpiper	<i>Calidris minutilla</i>
Dowitcher	<i>Limnodromus griseus</i>
Semipalmated Sandpiper	<i>Calidris pusillus</i>
Western Sandpiper	<i>Calidris mauri</i>
Sanderling	<i>Calidris alba</i>
Dunlin	<i>Calidris alpina</i>
Great Black-Billed Gull	<i>Larus marinus</i>
Ring-Billed Gull	<i>Larus delawarensis</i>
Laughing Gull	<i>Larus atricilla</i>
Bonaparte's Gull	<i>Larus philadelphia</i>
Forster's Tern	<i>Sterna forsteri</i>
Least Tern	<i>Sterna albifrons</i>
Royal Tern	<i>Sterna maxima</i>

BIRD SPECIES OBSERVED AT JOHN D. MACARTHUR BEACH STATE PARK - CONTINUED

Sandwich Tern	<i>Sterna sandvicensis</i>
Caspian Tern	<i>Sterna caspia</i>
Black Skimmer	<i>Rynchops niger</i>
Rock Dove	<i>Columba livia</i>
Mourning Dove	<i>Zenaida macroura</i>
Ground Dove	<i>Columbina passerina</i>
Yellow-Billed Cuckoo	<i>Coccyzus americanus</i>
Screech Owl	<i>Otus asio</i>
Great Horned Owl	<i>Bubo virginianus</i>
Chuck-Will's Widow	<i>Caprimulgus carolinensis</i>
Common Nighthawk	<i>Chordeiles minor</i>
Ruby-Throated Hummingbird	<i>Archiochus colubris</i>
Belted Kingfisher	<i>Megasceryle alcyon</i>
Flicker	<i>Colaptes auratus</i>
Pileated Woodpecker	<i>Dryocopus pileatus</i>
Red-Bellied Woodpecker	<i>Melanerpes carolinus</i>
Downy Woodpecker	<i>Picoides pubescens</i>
Eastern Kingbird	<i>Tyrannus tyrannus</i>
Great Crested Flycatcher	<i>Myiarchus crinitus</i>
Tree Swallow	<i>Iridoprocne bicolor</i>
Barn Swallow	<i>Hirundo rustica</i>
Purple Martin	<i>Progne subis</i>
Blue Jay	<i>Cyanocitta cristata</i>
Fish Crow	<i>Corvus ossifragus</i>
House Wren	<i>Troglodytes aedon</i>
Carolina Wren	<i>Thryothorus ludovicianus</i>
Mockingbird	<i>Mimus polyglottos</i>
Catbird	<i>Dumetella carolinensis</i>
Brown Thrasher	<i>Toxostoma rufum</i>
Robin	<i>Turdus migratorius</i>
Blue-Gray Gnatcatcher	<i>Polioptila coerulea</i>
Starling	<i>Sturnus vulgaris</i>
White-Eyed Vireo	<i>Vireo griseus</i>
Solitary Vireo	<i>Vireo solitarius</i>
Black-Whiskered Vireo	<i>Vireo altiloquus</i>
Red-Eyed Vireo	<i>Vireo olivaceus</i>
Black and White Warbler	<i>Mniotilta varia</i>
Parula Warbler	<i>Parula americana</i>
Cape May Warbler	<i>Dendroica tigrina</i>
Black-Throated Blue Warbler	<i>Dendroica caerulescens</i>
Yellow-Rumped Warbler	<i>Dendroica coronata</i>
Yellow-Throated Warbler	<i>Dendroica dominica</i>
Prairie Warbler	<i>Dendroica discolor</i>
Palm Warbler	<i>Dendroica palmarum</i>
Oven-Bird	<i>Seiurus aurocapollus</i>
Northern Waterthrush	<i>Seiurus noveboracensis</i>
Yellow-Throat	<i>Geothypis trichas</i>
American Redstart	<i>Setophaga ruticilla</i>
Red-Wing Blackbird	<i>Agelaius phoeniceus</i>
Spotted Oriole	<i>Icterus pectoralis</i>
Boat-Tailed Grackle	<i>Quiscalus major</i>
Common Grackle	<i>Quiscalus quiscula</i>
Cardinal	<i>Cardinalis cardinalis</i>

* Information From: Resource Inventory and Analysis of the John D. MacArthur Beach State Recreation Area (Duever, et al., 1981)

TABLE 8.
CONTINUED

BIRD SPECIES OBSERVED AT JOHN D. MACARTHUR BEACH STATE PARK - CONTINUED

Sandwich Tern	<i>Sterna sandvicensis</i>
Caspian Tern	<i>Sterna caspia</i>
Black Skimmer	<i>Rynchops niger</i>
Rock Dove	<i>Columba livia</i>
Mourning Dove	<i>Zenaida macroura</i>
Ground Dove	<i>Columbina passerina</i>
Yellow-Billed Cuckoo	<i>Coccyzus americanus</i>
Screech Owl	<i>Otus asio</i>
Great Horned Owl	<i>Bubo virginianus</i>
Chuck-Will's Widow	<i>Caprimulgus carolinensis</i>
Common Nighthawk	<i>Chordeiles minor</i>
Ruby-Throated Hummingbird	<i>Archiochus colubris</i>
Belted Kingfisher	<i>Megascops alcyon</i>
Flicker	<i>Colaptes auratus</i>
Pileated Woodpecker	<i>Dryocopus pileatus</i>
Red-Bellied Woodpecker	<i>Melanerpes carolinus</i>
Downy Woodpecker	<i>Picoides pubescens</i>
Eastern Kingbird	<i>Tyrannus tyrannus</i>
Great Crested Flycatcher	<i>Myiarchus crinitus</i>
Tree Swallow	<i>Iridoprocne bicolor</i>
Barn Swallow	<i>Hirundo rustica</i>
Purple Martin	<i>Progne subis</i>
Blue Jay	<i>Cyanocitta cristata</i>
Fish Crow	<i>Corvus ossifragus</i>
House Wren	<i>Troglodytes aedon</i>
Carolina Wren	<i>Thryothorus ludovicianus</i>
Mockingbird	<i>Mimus polyglottos</i>
Catbird	<i>Dumetella carolinensis</i>
Brown Thrasher	<i>Toxostoma rufum</i>
Robin	<i>Turdus migratorius</i>
Blue-Gray Gnatcatcher	<i>Polioptila coerulea</i>
Starling	<i>Sturnus vulgaris</i>
White-Eyed Vireo	<i>Vireo griseus</i>
Solitary Vireo	<i>Vireo solitarius</i>
Black-Whiskered Vireo	<i>Vireo altiloquus</i>
Red-Eyed Vireo	<i>Vireo olivaceus</i>
Black and White Warbler	<i>Mniotilta varia</i>
Parula Warbler	<i>Parula americana</i>
Cape May Warbler	<i>Dendroica tigrina</i>
Black-Throated Blue Warbler	<i>Dendroica caerulescens</i>
Yellow-Rumped Warbler	<i>Dendroica coronata</i>
Yellow-Throated Warbler	<i>Dendroica dominica</i>
Prairie Warbler	<i>Dendroica discolor</i>
Palm Warbler	<i>Dendroica palmarum</i>
Oven-Bird	<i>Seiurus aurocapillus</i>
Northern Waterthrush	<i>Seiurus noveboracensis</i>
Yellow-Throat	<i>Geothypis trichas</i>
American Redstart	<i>Setophaga ruticilla</i>
Red-Wing Blackbird	<i>Agelaius phoeniceus</i>
Spotted Oriole	<i>Icterus pectoralis</i>
Boat-Tailed Grackle	<i>Quiscalus major</i>
Common Grackle	<i>Quiscalus quiscula</i>
Cardinal	<i>Cardinalis cardinalis</i>

* Information From: Resource Inventory and Analysis of the John D. MacArthur Beach State Recreation Area (Duever, et al., 1981)

TABLE. 9
CONTINUED

<i>Nycticorax nycticorax</i>	Blackcrowned Nigh Heron	SSC
<i>Pandion haliaetus</i>	Osprey	SSC
<i>Pelecanus occidentalis</i>	Brown Pelican	SSC
<i>Plegadis falcinellus</i>	Glossy Ibis	SSC
<i>Sterna antillarum</i>	Least Tern	T
<i>Vireo altiloquus</i>	Blackwhiskered Vireo	R

FISHES

<i>Centropomus undecimalis</i>	Common Snook	SSC
<i>Gobionellus stigmaturus</i>	Spottail Goby	SSC
<i>Oostethus lineatus</i>	Opossum Pipefish	R
<i>Rivulus marmoratus</i>	Rivulus	SSC

STATUS DESIGNATION KEY:

E=Endangered
T=Threatened
R=Rare
SSC=Species of Special Concern

The status of the above listed plant and animal species was determined by one or more of the following agencies and/or publications:

Florida Game and Freshwater Fish Commission; United States Fish and Wildlife Service; Florida Department of Agriculture; Rare and Endangered Biota of Florida (Pritchard Series).

LEGEND

CONTINUED

SPECIES

STATUS



PLANTS

- | | | |
|----|--|---|
| 1 | <i>Acrostichum aureum</i> - Golden Leather Fern | E |
| 2 | <i>Acrostichum danaeifolium</i> - Giant Leather Fern | T |
| 3 | <i>Cereus pentagonus</i> - Dildo Cactus | T |
| 4 | <i>Chrysophyllum oliviforme</i> - Satin Leaf | E |
| 5 | <i>Encyclia tampensis</i> - Butterfly Orchid | T |
| 6 | <i>Ophioglossum palmatum</i> - Hand Fern | E |
| 7 | <i>Opuntia humifusa</i> - Twistspine Prickly Pear | T |
| 8 | <i>Opuntia stricta</i> - Prickly Pear | T |
| 9 | <i>Phlebodium aureum</i> - Cabbage Palm Fern | T |
| 10 | <i>Psilotum nudum</i> - Whisk Fern | T |
| 11 | <i>Tillandsia paucifolia</i> - Wild Pine | T |
| 12 | <i>Tillandsia valenzuelana</i> - Soft Leaf Wild Pine | T |
| 13 | <i>Vittaria lineata</i> - Shoestring Fern | T |

VERTEBRATES

MAMMALS

- | | | |
|----|---|---|
| 14 | <i>Trichechus manatus latirostris</i> - West Indian Manatee | E |
|----|---|---|

REPTILES

- | | | |
|----|--|-----|
| 15 | <i>Caretta caretta caretta</i> - Loggerhead Turtle | T |
| 16 | <i>Chelonia mydas mydas</i> - Green Turtle | E |
| 17 | <i>Copherus polyphemus</i> - Gopher Tortoise | SSC |
| 18 | <i>Drymarchon corais couperi</i> - Indigo Snake | SSC |

BIRDS

- | | | |
|--------|--|-----|
| (W) 19 | <i>Ajaia ajaja</i> - Roseate Spoonbill | SSC |
| (W) 20 | <i>Aramus guarana</i> - Limpkin | SSC |
| 21 | <i>Casmerodius albus</i> - Great Egret | SSC |
| (W) 22 | <i>Charadrius melodus</i> - Piping Plover | T |
| (W) 23 | <i>Egretta rufescens</i> - Reddish Egret | SSC |
| (W) 24 | <i>Egretta thula</i> - Snowy Egret | SSC |
| (W) 25 | <i>Egretta tricolor</i> - Tricolored Heron | SSC |
| (W) 26 | <i>Egretta caerulea</i> - Little Blue Heron | SSC |
| (W) 27 | <i>Eudocimus albus</i> - White Ibis | SSC |
| 28 | <i>Falco peregrinus tundrius</i> - Arctic Peregrine Falcon | E |
| 29 | <i>Haematopus palliatus</i> - American Oystercatcher | SSC |
| (W) 30 | <i>Nyctanassa violacea</i> - Yellow-crowned Night Heron | SSC |
| (W) 31 | <i>Nycticorax nycticorax</i> - Black-crowned Night Heron | SSC |
| 32 | <i>Pandion haliaetus</i> - Osprey | SSC |
| 33 | <i>Pelecanus occidentalis</i> - Brown Pelican | SSC |
| (W) 34 | <i>Plegadis falcinellus</i> - Glossy Ibis | SSC |
| 35 | <i>Sterna antillarum</i> - Least Tern | T |
| 36 | <i>Vireo altiloquus</i> - Black-whiskered Vireo | R |

AMPHIBIANS

(none)

FISHES

- | | | |
|----|--|-----|
| 37 | <i>Centropomus undecimalis</i> - Common Snook | SSC |
| 38 | <i>Gobionellus stigmaturus</i> - Spottail Goby | SSC |
| 39 | <i>Oostethus lineatus</i> - Opossum Pipefish | R |
| 40 | <i>Rivulus marmoratus</i> - Rivulus | SSC |

(W) = WADING BIRD GROUP
 E = Endangered
 T = Threatened
 R = Rare
 SSC = Species of Special Concern

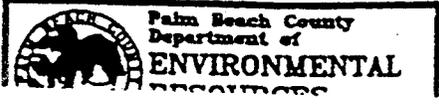
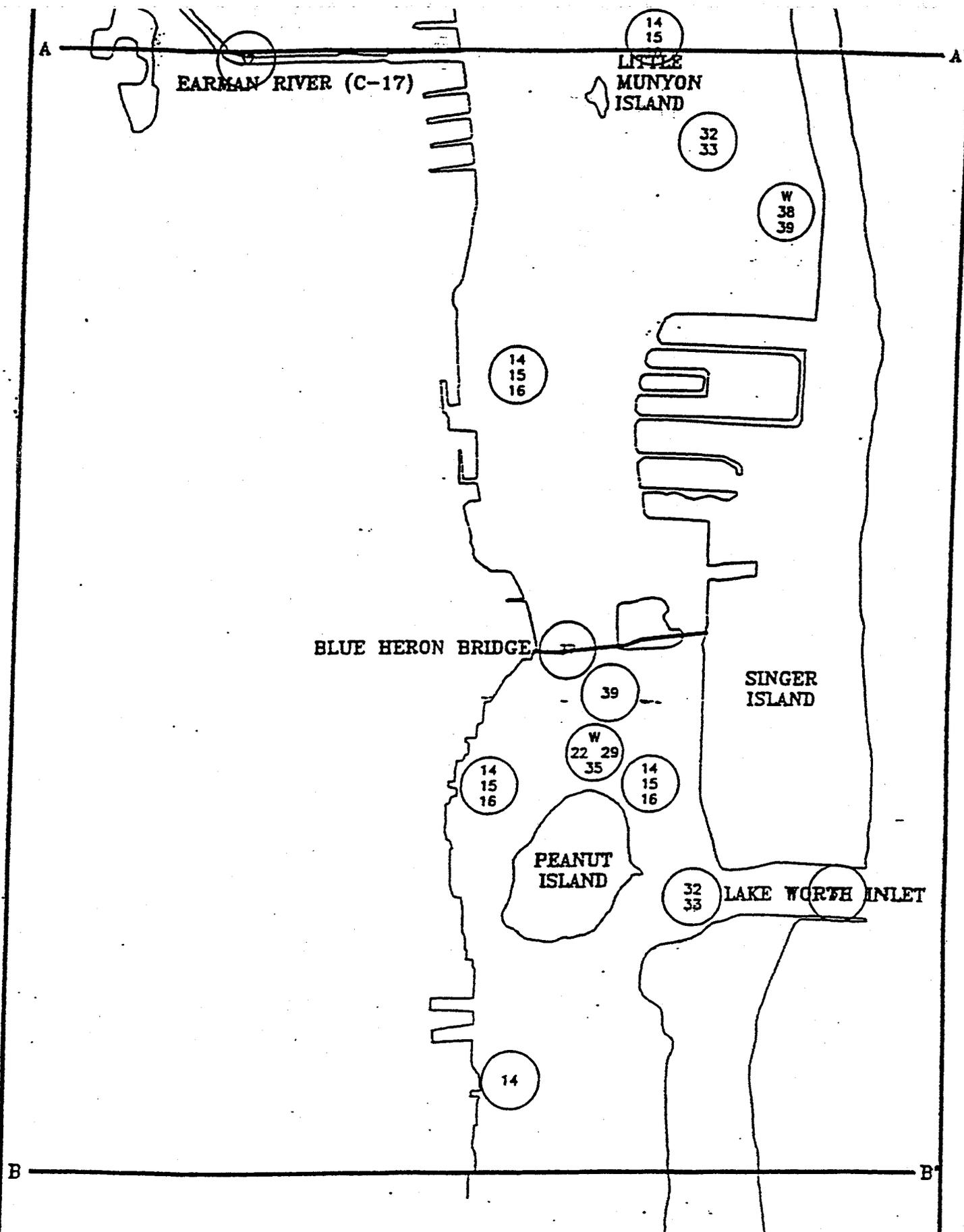
The status of the above listed plant and animal species was determined by one or more of the following agencies and/or publications:

Florida Game and Freshwater Fish Commission; United States Fish and Wildlife Service; Florida Department of Agriculture; Rare and Endangered Biota of Florida (Pritchard Series)

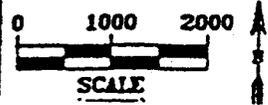


Palm Beach County
 Department of
**ENVIRONMENTAL
 RESOURCES**

LAKE WORTH LAGOON
 ENDANGERED, THREATENED
 AND RARE SPECIES AND
 SPECIES OF SPECIAL CONCERN



LAKE WORTH LAGOON
ENDANGERED, THREATENED
AND RARE SPECIES AND



D&M JOB NO.
20335-001-049

FIGURE

4.6.3 Manatees. Because of Peanut Island's shallow waters and surrounding seagrass beds, along with its proximity to the Inlet and Florida Power and Light (thermal waters), the West Indian Manatee (*Trichechus manatus*) utilizes the island's nearshore waters. Speed signage currently posted for Peanut Island surrounding waters designates "Slow Speed/Minimum Wake". With implementation of the proposed project, the Manatee may utilize the wetland habitats created within the environmental restoration project areas. If the manatee is found to frequent these areas, additional boater caution signs may be necessary. During project construction, the Corps "Standard Manatee Conditions", will be followed.

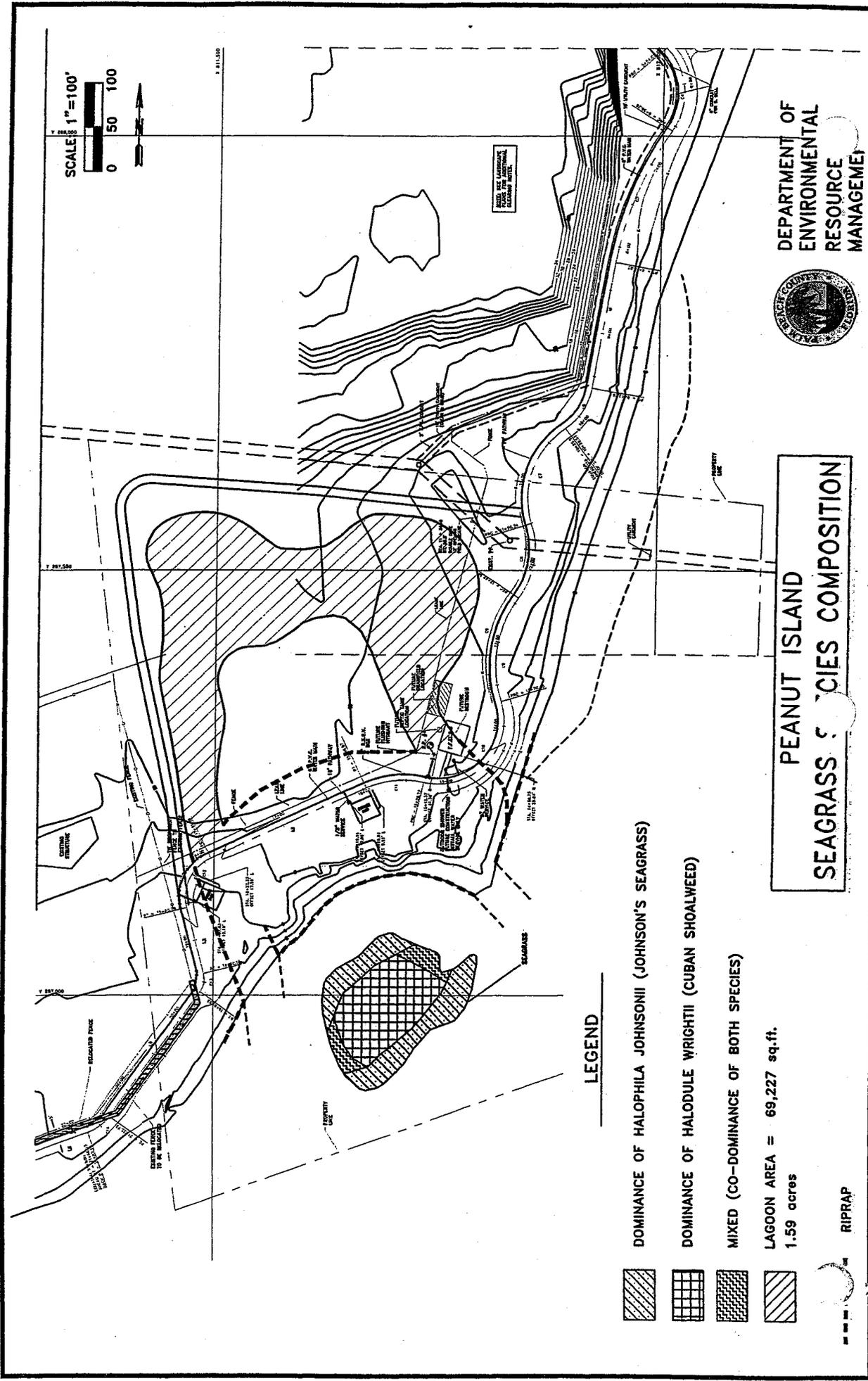
4.6.4 Johnson's Seagrass *Halophila johnsonii*. The proposed tidal channels and shallow-water lagoon habitat have the potential to recruit seagrasses, including *Halophila johnsonii*, currently a Federally threatened species. The proposed restoration features have been based on the successful restoration of nearby Munyon Island, which supports Johnson's Seagrass *Halophila johnsonii* within the created tidal channels and ponds. It is anticipated that the shallow-water lagoon habitats and tidal channels and pond will support the colonization of *H. johnsonii* within these protected areas on Peanut Island, thus providing approximately 4.5 acres of potential area for seagrass colonization. Environmental features associated with this restoration plan have been carefully sited to avoid existing resources. An existing seagrass bed off the southeast corner of Peanut Island has been mapped and is comprised of *H. johnsonii* and *H. wrightii* as illustrated in Figure 11.

4.7 Water Quality. The proposed project will be in compliance with all Federal and State water quality requirements. Turbidity generated from this project shall be regulated as directed in environmental permits. Water quality data has been collected in Lake Worth Lagoon since the late 1960's. Data indicates that the lagoon is a moderately polluted estuarine system. A trend analysis indicates water quality either remained fairly constant or slightly improved over a fifteen year period. Analysis of sediments for heavy metals and organic compounds indicate a system that chronically receives runoff from urban development (Dames and Moore, 1990). Water quality will be improved by the implementation of the proposed environmental restoration, and in particular, the following three components:

4.7.1 Mangroves. Tidally connecting the existing impounded mangrove wetland, allowing it to function in its capacity of sediment stabilization and nutrient uptake will benefit water quality.

4.7.2 Shallow-Water Lagoons. The creation of shallow-water lagoons/seagrass habitat will provide substrate for the recruitment of seagrasses and benthic organisms that will help to improve water quality.

4.7.3 Shallow-Water Reef. The reef habitat will contribute to water quality and clarity in the Lake Worth Lagoon by providing a substrate for benthic filter feeders and beneficial algae that will remove nutrients from the water column. The reef project will



also assist in the reduction of turbidity in lagoon waters by dissipating direct wave energy from the adjacent Lake Worth Inlet.

4.8 Geotechnical. A subsurface investigation within the project area of the Peanut Island Environmental Restoration project area was conducted by Palm Beach County, Department of Environmental Resources Management in January, 1998.

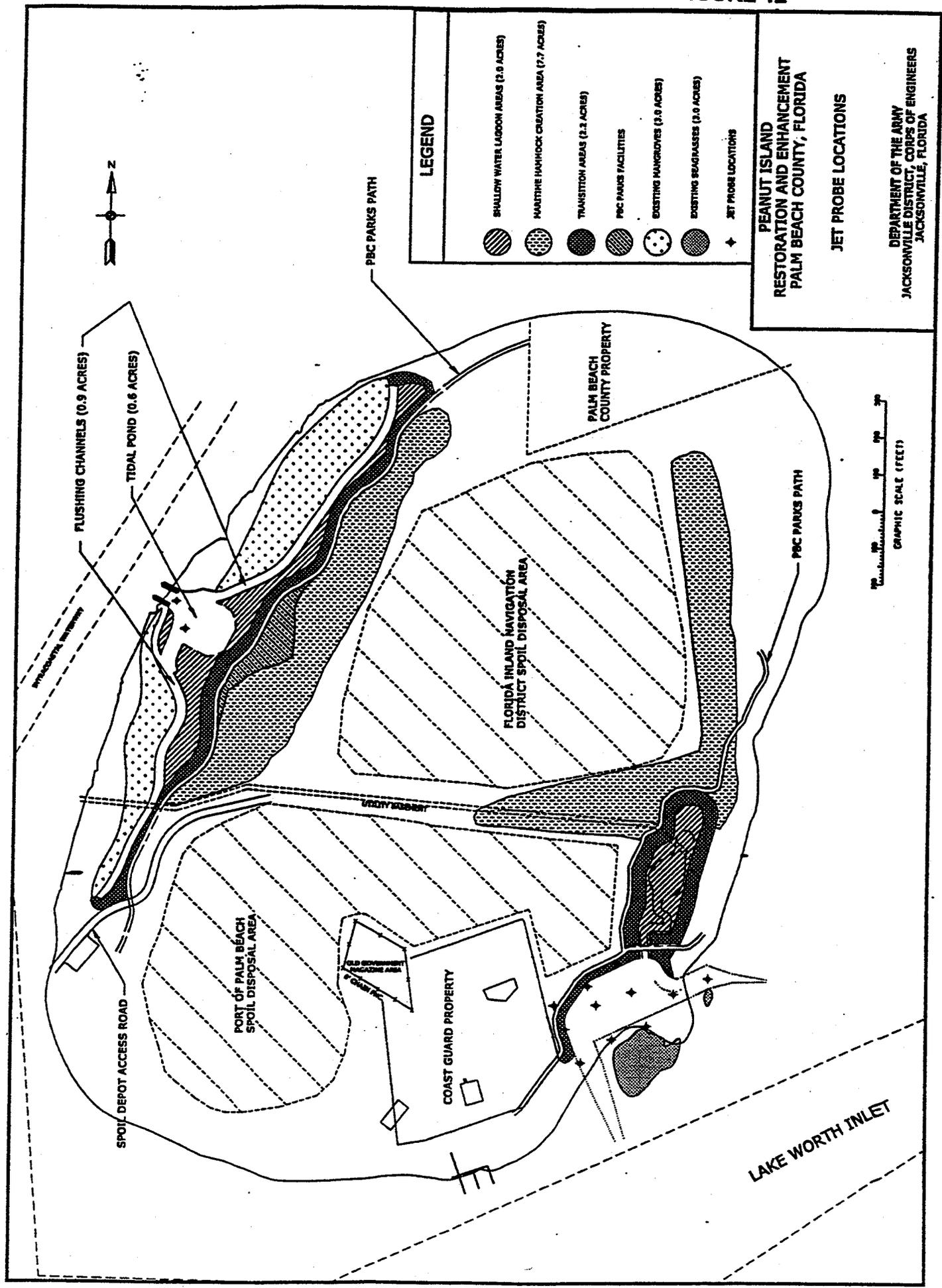
4.8.1 Sampling Methods. The subsurface investigation of the Peanut Island Restoration project area was performed in January, 1998. The investigation consisted of sediment sampling using an augering device at the locations noted in Figure 12. The six sediment samples represent composites of each site augered, which were analyzed for grain size distribution using wet and dry sieve methods and organic content (loss on ignition method), and carbonate content (acid leaching).

4.8.2 Sediment Composition. Samples 1, 2, and 3 were taken in the Shallow Water Habitat. The sediments are composed of clean, well sorted fine sand. Quartz sand and carbonates (whole and broken bivalves and fine shell hash) are present in nearly equal percentages by weight. Samples contain less than 3% silt and clay and 4-5% organics by weight. The samples resemble beach sand and were probably deposited as dredged material from a dredging project. Samples 4, 5, and 6 were collected in the Mangrove Flushing Habitat. The sediments are composed of clean, well sorted, fine quartz sand with less than 17% carbonates by weight. The carbonate constituent is composed of small bivalves and fine broken shell. Samples contain less than 3% silt and clay and less than 3% organics by weight. These samples represent an area of native IWW sediments. Results of the sediment analyses are listed in Table 10. Sample numbers correspond to stations on the map (Figure 12). Appendix E of the Environmental Restoration Report (ERR) contains grain size distribution curves and data sheets for the six samples.

4.8.3 Suitability of Material. Based on the samples taken on the island, the existing sediments are of suitable quality and do not appear to require any treatment prior to disposal within the Lake Worth Lagoon. The samples resemble beach sand and were deposited as dredged material from the Lake Worth Inlet and the Intracoastal Waterway dredging projects. While it is recognized that there is a need for a sand source for local beaches, this material is known to contain rock and coral and would not be considered 'beach quality' without screening. This material presents an opportunity to restore dredged areas within the Lake Worth Lagoon.

4.8.4 Jet probes. Between March 6-10, 1998, Sea Systems Corporation conducted a jet probe investigation within two sites on Peanut Island to assess the subsurface sediment characteristics. The sediment probe results provide valuable information required for the initial planning of shoreline stabilization features or other structures that may be required for the project (Figure 12).

4.8.4a Locations. The dredged material deposits generated to construct proposed modifications will come from three areas on Peanut Island: 1) southeast side-the site for the shallow-water reef and lagoon. 2) west side-the site for the inlet, tidal pond and



LEGEND	
	SHALLOW WATER LAGOON AREAS (2.9 ACRES)
	MARITIME HAWTHORN CREATION AREA (2.7 ACRES)
	TRANSITION AREAS (2.2 ACRES)
	PBC PARKS FACILITIES
	EXISTING MANGROVES (3.9 ACRES)
	EXISTING SEAGRASSES (3.0 ACRES)
	JET PROBE LOCATIONS

**PEANUT ISLAND
RESTORATION AND ENHANCEMENT
PALM BEACH COUNTY, FLORIDA**

JET PROBE LOCATIONS

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

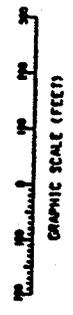


Table 9 Sediment Analysis Results							
Sample No.	Mean Grain Size (mm)	Standard Dev(phi)	%Silt & Clay	%Organics	%Carbonates		
S1	0.26	0.54	2.22	4.16	45.09		
S2	0.32	0.52	1.19	5.08	45.01		
S3	0.52	0.42	0.23	4.17	57.71		
S4	0.20	0.33	1.02	1.12	14.78		
S5	0.30	0.31	1.14	1.78	16.05		
S6	0.14	0.70	2.88	2.88	7.75		
Average	0.29	0.47	1.45	3.20	31.06		

5.3 Bathymetry. Water depths within Lake Worth Lagoon are variable (<-1.0' to -30.0' NGVD). Numerous areas have been dredged for navigation. The Atlantic Intracoastal Waterway is maintained at -11' NGVD, the Lake Worth Inlet and Port of Palm Beach are maintained at -35' NGVD (Figure 14).

5.4 Marinas and Docks. According to the 1990 Lake Worth Lagoon Natural Resources Inventory and Resource Enhancement Study, 47 major marinas comprising 2558 wet boat slips and 2156 storage racks are located in Lake Worth Lagoon. Locations of marinas and boat ramps were determined from municipal comprehensive plan, the Riviera Beach DRI, and field observations. Boats, marinas and associated activities are known to have cumulative impacts that contribute to water quality degradation. The study indicates that Lake Worth Lagoon has storage/dock facilities for almost five thousand boats. This number does not include private docking facilities associated with homes and condominiums. Figure 15 illustrates the boat docks, ramps and marinas in the vicinity of Peanut Island.

6.0 Probable Impacts. This section is the scientific and analytic basis for the comparisons of the alternatives. See Table 2 in Section 3.3 on alternatives for summary of impacts. The following includes anticipated changes to the existing environment including direct, indirect, and cumulative effects.

6.1 Tangible Benefits. Based on the environmental benefits of creating a functioning wetland on an inhabitable dredged island to provide valuable habitat for fisheries and wildlife, it is determined that the proposed modification's tangible and intangible benefits are far greater than the tangible and intangible costs. Therefore, construction of this environmental restoration project on Peanut Island will be consistent with the purposes and goals of Section 1135 and the Water Resources Development Act of 1986 and will be in the public's best interest.

6.2 Irreversible and Irretrievable Commitment of Resources.

6.2.1 Irreversible. An irreversible commitment of resources is one in which the ability to use and/or enjoy the resource is lost forever. An example of an irreversible commitment might be the mining of a mineral resource. No resources will be lost in the construction of this project. On the contrary, upland and wetland resources and underwater wetland habitats will be created by completion of this environmental restoration project.

6.2.2 Irretrievable. An irretrievable commitment of resources is one in which, due to decisions to manage the resource for another purpose, opportunities to use or enjoy the resource as they presently exist are lost for a period of time. No irretrievable loss of resources will occur as a result of the construction of this project.

6.3 Cumulative Impacts. Cumulative impact is the impact on the environment which results from the incremental impact of the action when added to other past, present, and reasonably foreseeable future actions (40 CFR 1508.7). Overall cumulative impacts of this project will be an increase in inshore shallow water reef habitats,

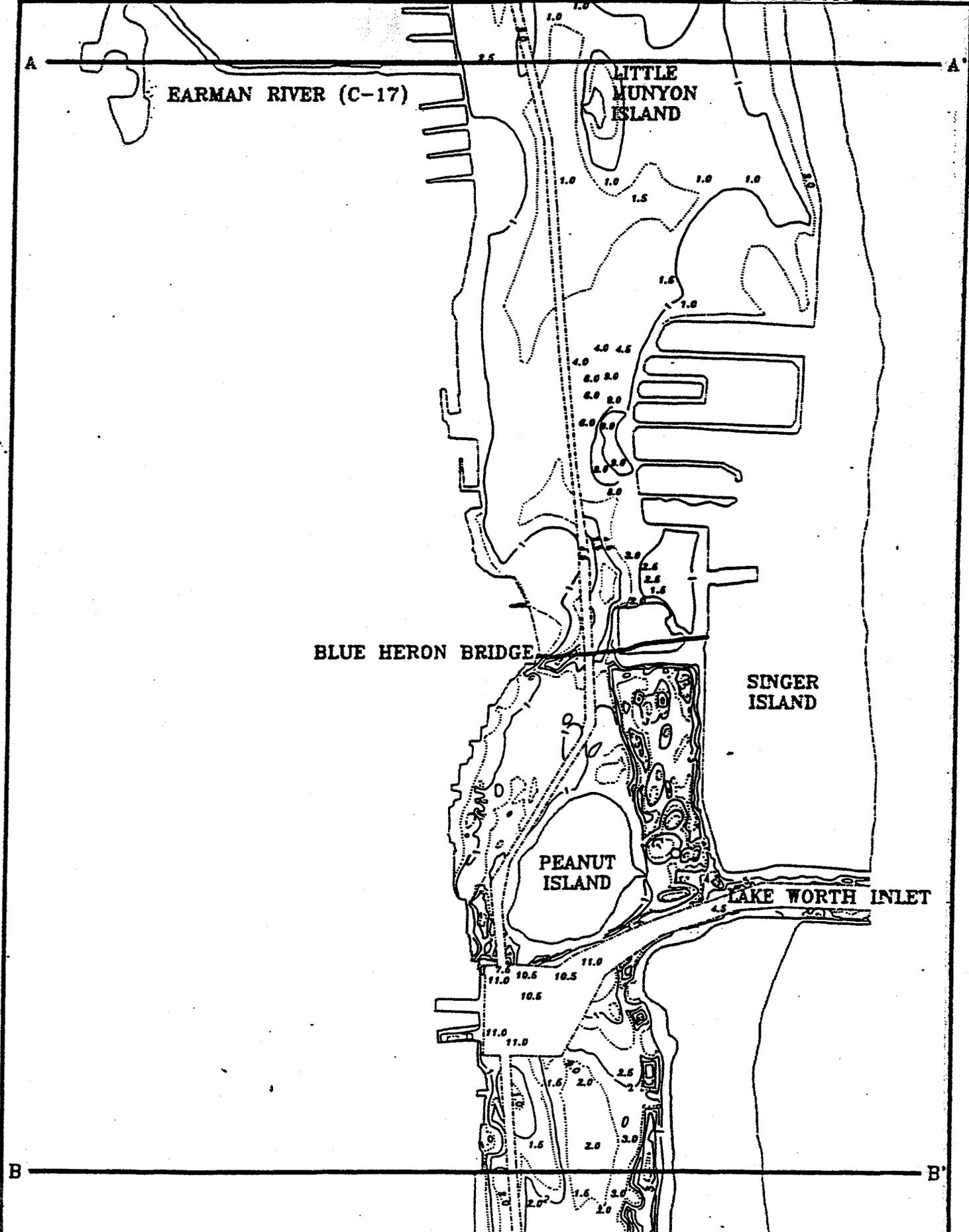
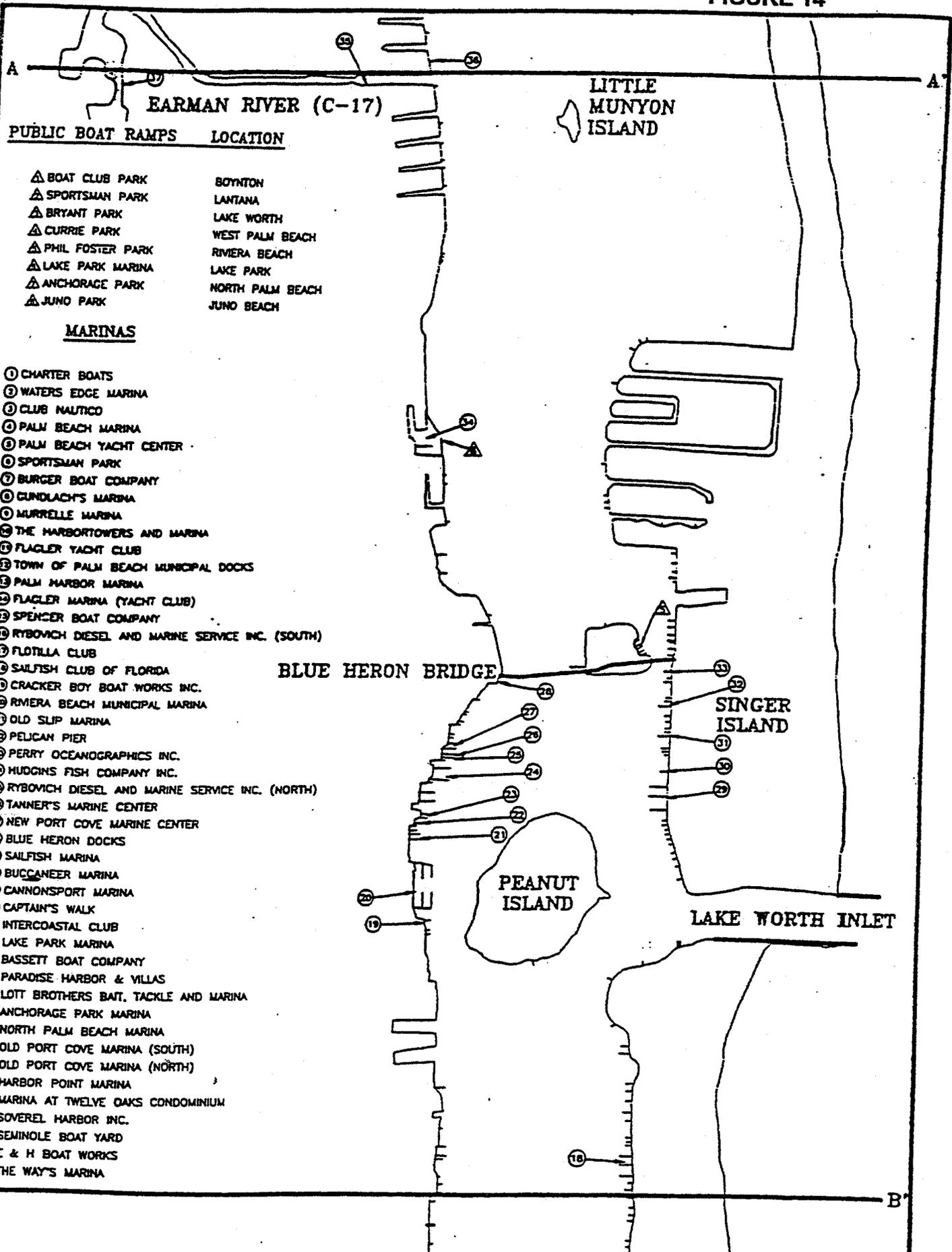


FIGURE 14



PUBLIC BOAT RAMPS LOCATION

- | | |
|--------------------|------------------|
| △ BOAT CLUB PARK | BOYNTON |
| △ SPORTSMAN PARK | LANTANA |
| △ BRYANT PARK | LAKE WORTH |
| △ CURRIE PARK | WEST PALM BEACH |
| △ PHIL FOSTER PARK | RIVIERA BEACH |
| △ LAKE PARK MARINA | LAKE PARK |
| △ ANCHORAGE PARK | NORTH PALM BEACH |
| △ JUNO PARK | JUNO BEACH |

MARINAS

- ① CHARTER BOATS
- ② WATERS EDGE MARINA
- ③ CLUB NAUTICO
- ④ PALM BEACH MARINA
- ⑤ PALM BEACH YACHT CENTER
- ⑥ SPORTSMAN PARK
- ⑦ BURGER BOAT COMPANY
- ⑧ CUNDLACH'S MARINA
- ⑨ MURRELLE MARINA
- ⑩ THE HARBORTOWERS AND MARINA
- ⑪ FLAGLER YACHT CLUB
- ⑫ TOWN OF PALM BEACH MUNICIPAL DOCKS
- ⑬ PALM HARBOR MARINA
- ⑭ FLAGLER MARINA (YACHT CLUB)
- ⑮ SPENCER BOAT COMPANY
- ⑯ RYBOVICH DIESEL AND MARINE SERVICE INC. (SOUTH)
- ⑰ FLOTILLA CLUB
- ⑱ SAILFISH CLUB OF FLORIDA
- ⑲ CRACKER BOY BOAT WORKS INC.
- ⑳ RIVERA BEACH MUNICIPAL MARINA
- ㉑ OLD SLIP MARINA
- ㉒ PELICAN PIER
- ㉓ PERRY OCEANOGRAPHICS INC.
- ㉔ HUGGINS FISH COMPANY INC.
- ㉕ RYBOVICH DIESEL AND MARINE SERVICE INC. (NORTH)
- ㉖ TANNER'S MARINE CENTER
- ㉗ NEW PORT COVE MARINE CENTER
- ㉘ BLUE HERON DOCKS
- ㉙ SAILFISH MARINA
- ㉚ BUCCANEER MARINA
- ㉛ CANNONSPOINT MARINA
- ㉜ CAPTAIN'S WALK
- ㉝ INTERCOASTAL CLUB
- ㉞ LAKE PARK MARINA
- ㉟ BASSETT BOAT COMPANY
- ㊱ PARADISE HARBOR & VILLAS
- ㊲ LOTT BROTHERS BAIT, TACKLE AND MARINA
- ㊳ ANCHORAGE PARK MARINA
- ㊴ NORTH PALM BEACH MARINA
- ㊵ OLD PORT COVE MARINA (SOUTH)
- ㊶ OLD PORT COVE MARINA (NORTH)
- ㊷ HARBOR POINT MARINA
- ㊸ MARINA AT TWELVE OAKS CONDOMINIUM
- ㊹ SOVEREL HARBOR INC.
- ㊺ SEMINOLE BOAT YARD
- ㊻ E & H BOAT WORKS
- ㊼ THE WAY'S MARINA

increase in functioning mangrove and seagrass habitats, and an increase in nesting and feeding habitat for fish, birds and wildlife within the Lake Worth Lagoon.

6.4 Preferred Alternative. Of the alternatives considered, the preferred plan is Alternative C (Figure 2). This plan will include the construction of a 1.3 acre shallow-water reef, 3.0 acres of shallow-water lagoon, restoration of 3.0 acres mangrove habitat through the creation of an inlet, a tidal pond, flushing channels, and the construction of 7.1 acres of maritime hammock, 3.9 acres of coastal strand and 4.6 acres of beach dune habitat. The dredged spoil material generated through construction of these environmental features will be utilized to restore 16.0 acres of submerged wetland habitat within the Lake Worth Lagoon. With the completion of this alternative, habitat promoting fish, birds and wildlife will be created and restored in an area suffering great impacts due to development.

6.4.1 Exotic Vegetation Removal Methods. Due to the presence of native wetland vegetation, exotic plant removal will consist of three methodologies to be employed depending upon the area to be cleared. The three methods consist of:

Method 1. Clearing with Heavy Equipment: least sensitive

Method 2. Selective Clearing: minimum disturbance of surrounding vegetation by cutting or pulling individual trees from the protected area. If it is necessary to cut an exotic tree and leave the stump, the stump shall be treated with herbicide to preclude regrowth.

Method 3. "Hack and Squirt:" application of herbicides to individual trees, which shall be left in place; no disturbance of soils and protected vegetation; most sensitive method.

6.4.2 Fish and Wildlife. There will be substantial benefits to fish and wildlife resources by restoring and creating wetland habitat, upland habitat and enhancing water quality. Nearby Munyon Island wetland channels have been sampled for fish species by seining within the tidal channels. Juvenile fish species observed within the wetland restoration area include, but are not limited to: common snook, mangrove snapper, silver and black mullet, flounder, Irish pompano, hogfish, barracuda, needlefish, checkered puffer, lady fish and stonefish. The area is being heavily utilized by juvenile fish species, large schools are observed throughout the wetland area. A list of fish species observed and collected within the Lake Worth Lagoon is found in Table 7. Fish species inhabiting Munyon Island can be expected to utilize the Peanut Island wetland habitats.

6.4.2a Mangrove Habitat. It should be noted that the Peanut Island mangrove system will differ from that created in the Munyon Island Environmental Restoration Project (under Section 1135, WRDA) in the fish species that will be targeted. While both projects will attract fish common to mangrove habitats, there is a difference in water quality between the two areas. Typically, the fish species found in and around Munyon Island tend to be euryhaline, capable of withstanding excess changes in salinities. The Peanut Island mangrove habitat will receive the direct influence of clear tidal waters, providing habitat and water quality conditions catering to fish species typically found in nearshore reef habitats.

6.4.2b Shallow Water Reef. The Peanut Island shallow water reef habitat is ideally located to optimize light, nutrients and clear tidal waters through the Lake Worth Inlet, which will provide ideal conditions for primary productivity and subsequent enhancement of fisheries. The colonization of the reef system by oceanic larvae including, but not limited to, corals, sponges, hydroids, anemones and barnacles will lay the foundation for a complete reef system to support unlimited species diversity of fish and invertebrates. The reef will become a more complex habitat over time through the recruitment and colonization of epifauna. Species richness will increase over time, typically the recruitment sequence is algal cover followed by colonization of bryozoans, tubeworms, tunicates and sponges. The reef further develops in complexity with the accumulation of tubes, shells, which lay the foundation for coral settlement and development.

6.4.2c Maritime Hammock. Peanut Island is dominated by exotic vegetation which is of little wildlife value. Replacing exotic vegetation with native plant species will provide valuable habitat. Because of intense development within south Florida, maritime hammocks, which are vital to the breeding and wintering of many species of migratory birds, have been virtually eliminated. Restoring native upland habitat through creation of hammock will provide food and cover for birds and other wildlife.

6.4.3 Bird Species. Bird species observed feeding within the wetland area created on Munyon Island include the Great Egret, Reddish Egret, Snowy Egret, Brown Pelican, Wood Stork, Peregrine Falcon, Little Blue Heron, Green Heron, Osprey and Kingfisher. The wetland habitat created/restored by this proposed project will provide suitable habitat for all species listed in Table 8. More than 50% of the commonly observed bird species are linked to the aquatic environs and can be expected to utilize the Peanut Island wetlands.

6.4.4 Habitat Creation. A major goal of the restoration effort is to increase fish and wildlife habitat on Peanut Island. Since the beginning of the restoration efforts on nearby Munyon Island, there has been an increase in fish and wildlife use of Munyon Island. The proposed project on Peanut Island, which is targeted to provide additional habitat resources, will have a positive effect on fish and wildlife. The newly created wetland and upland habitats will provide additional fisheries habitat for juvenile fish species and invertebrates. Creation of upland resources will provide adjacent habitat for bird and wildlife species.

6.4.5 Water Quality. The proposed project will be in compliance with all Federal and State water quality requirements. Turbidity generated from this project shall be regulated as directed in the Water Quality Certification issued by the Department of Environmental Protection. Water quality will be improved within the area once project construction has been completed. The stabilization of sediments and the uptake of nutrients from the wetlands are expected project benefits. In order to reduce any potential water quality problems during excavation of shallow water reef habitat, tidal channels and seagrass habitats, all activity shall take place within the confines of a temporary berm that will keep tidal waters out until specified elevations have been

achieved. While making tidal connections, turbidity curtains shall be utilized as necessary to maintain water quality standards.

6.4.6 Hydraulic Information.

6.4.6a Tidal Connection. The Federal project will tidally connect and add 8.8 acres of wetland habitat to the Lake Worth Lagoon system (3.0 acres of existing mangroves, 1.5 acre of tidal channels/pond, 3.0 acres shallow-water lagoon habitat, and 1.3 acre shallow-water reef).

6.4.6b Channel Stabilization. Limestone rock will line the mouth of the inlet to tidal pond; connections between the shallow-water lagoon to reef; the inlets to the shallow water reef; and the interior/exterior of the shallow-water reef to stabilize these structures from movement, filling and erosion.

6.5 Other Alternatives.

6.5.1 Alternative A. Alternative A optimizes restoration features within the confines of original property lines, but does fails to include the benefits of total island restoration. Implementation of Alternative A would leave an unacceptable exotic plant population and seed source which would impact restoration features and increase long-term maintenance.

6.5.2 Alternative B. Alternative B includes the same features as Alternative A, but with an increase in shallow-water reef habitat to 2 acres. An increase in the shallow-water reef does not optimize tidal flushing to this restoration feature.

6.5.3 Alternative D. Without Federal support, a portion of the proposed project will be completed by the local sponsor. However, mobilization and demobilization costs to complete each portion of the project would make the small project portion cost prohibitive. Peanut Island would be developed for the public without environmental benefits to the surrounding waters of the Lake Worth Lagoon. The environmental benefits of the proposed restoration project would not be realized.

7.0 Maintenance and Monitoring. The area will be monitored and maintained by Palm Beach County for exotic plant removal, plant survival rates and fisheries/ wildlife utilization. Palm Beach County has a full-time park manager residing on the island, who will assist in protection of the project features.

8.0 Coordination. The proposed action was coordinated with appropriate Federal, State and local agencies and individuals in a scoping letter. No substantive comments were received. The proposed action has been coordinated with the State Historic Preservation Officer in compliance with the National Historic Preservation Act of 1966, as amended, and the U.S. Fish and Wildlife Service under the Endangered Species Act and Fish and Wildlife Coordination Act. In the Fish and Wildlife Coordination Act Report dated November 18, 1997, the FWS concurred with the Corps finding of no adverse impacts to threatened or endangered species.

9.0 Compliance with Environmental Statutes.

9.1 National Environmental Policy Act of 1969, as amended. Environmental information on the project has been compiled and this Draft Environmental Assessment and Preliminary Finding of No Significant Impact has been prepared and will be circulated prior to the commencement of the project in accordance with requirements of the National Environmental Policy Act (NEPA), as amended.

9.2 Endangered Species Act of 1973, as amended. A list of endangered, threatened, proposed, or candidate species that may inhabit the project area was received from both the U.S. Fish and Wildlife Service (FWS) and the National Marine Fisheries Service (NMFS). This project has been fully coordinated under the Endangered Species Act; therefore, this project is in full compliance with the Act.

9.3 Fish and Wildlife Coordination Act of 1958, as amended. In response to the requirements of this Act, the District has and will continue to maintain coordination with the FWS during all stages of the planning and construction process. The FWS, in a letter dated October 3, 1994, had no objection to the project as long as Corps standard manatee protection guidelines were followed and maintained during the construction of the project. A copy of this FWS letter is included in this Environmental Assessment, Appendix C.

9.4 National Historic Preservation Act of 1966, as amended. Based on research conducted by a Corps' archeologist, significant historic properties are not likely to be located within the environmental restoration project. Historic properties eligible for inclusion in the National Register are located on Peanut Island. Those resources may be affected by environmental restoration, but that effect will not be adverse. The Florida State Historic Preservation Officer (SHPO) concurred with that determination. The no adverse effect was made, and consultation with the SHPO conducted, according to the guidelines established in 36 CFR Part 800 and in compliance with Section 106 of the National Historic Preservation Act, as amended.

9.5 Clean Water Act of 1972, as amended. This project is in full compliance. A Section 404 (b) Evaluation Report can be found attached to this report in Appendix A.

9.6 Clean Air Act of 1972, as amended. No permits will be required for this project. This project is in full compliance with the Act. This Draft Environmental Assessment will be sent to EPA's Environmental Policy Section for their review. Any comments received from the EPA will be included and addressed in the Final Environmental Assessment.

9.7 Coastal Zone Management Act of 1972, as amended. This project is in compliance with this act. See Appendix B for the Coastal Zone Consistency Statement.

9.8 Farmland Protection Policy Act of 1981. This act is not applicable to the proposed environmental restoration project.

9.9 Wild and Scenic River Act of 1968, as amended. This act is not applicable to the proposed environmental restoration project.

9.10 Marine Mammal Protection Act of 1972, as amended. The customary safeguards to ensure protection of threatened and endangered species such as sea turtles and manatees will be implemented within the construction contract.

9.11 Estuary Protection Act of 1968. No designated estuary will be affected by the proposed environmental restoration project activities. This Act is not applicable.

9.12 E.O. 11990, Protection of Wetlands. Wetlands will be created by this project, therefore, this project is in compliance with the Executive Order.

9.13 E.O. 11988, Floodplain Management. No activities associated with this project will take place within a floodplain, therefore, the intent of this law is not applicable.

9.14 E.O. 12898, Environmental Justice. No adverse impacts to human health or the environment are anticipated as result of the proposed project. Impacts to "subsistence consumption of fish and wildlife resources" are not anticipated as a result of the proposed project.

9.15 E.O. 13089, Coral Reef Protection. Those species, habitats, and other natural resources associated with coral reefs are not anticipated to be adversely affected by the proposed project. Components of the project propose to restore lost reef habitat that could provide substrate for coral and other associated natural resources within the project area.

9.16 Fishery Conservation and Management Act of 1976. The project has been coordinated with the National Marine Fisheries Service (NMFS) and has been found to be in compliance with the act (see letter dated Feb 29, 2000 in Appendix C from NMFS).

9.17 Submerged Lands Act of 1953. The proposed environmental restoration project will not affect submerged State of Florida lands. The disposal of the excavated material from Peanut Island Island is planned for upland disposal on the the island.

9.18 Rivers and Harbors Act of 1899. The proposed work would not obstruct navigable waters of the United States. The proposed action has been subject to the public notice process subject to the Act. The proposed project is in full compliance.

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

9.20 Migratory Bird Treaty Act and Migratory Bird Conservation Act. No migratory birds would be affected by the proposed project activities. The project is in full compliance with these acts.

9.21 Marine Protection, Research and Sanctuaries Act. The term 'dumping' as defined in Act (33 U.S.C. 1402)(f) does not apply to the placement of the excavated material from Johns Island. The excavated material will be placed to form tidal shallows to provide a substrate for the recruitment of seagrass in addition to shoreline plantings of mangroves and spartina. Therefore, the Act does not apply to the proposed project. The disposal activities addressed in this EA will be evaluated under Section 404 of the Clean Water Act.

9.22 Magnuson-Stevens Fishery Conservation And Management Act. This act requires preparation of an Essential Fish Habitat (EFH) Assessment and coordination with the National Marine Fisheries Service (NMFS). EFH coordination with NMFS has been completed and has been found to be in compliance with the act (see letter dated Feb 29, 2000 in Appendix C from NMFS).

10.0 List of Preparers.

10.0.1 Preparers.

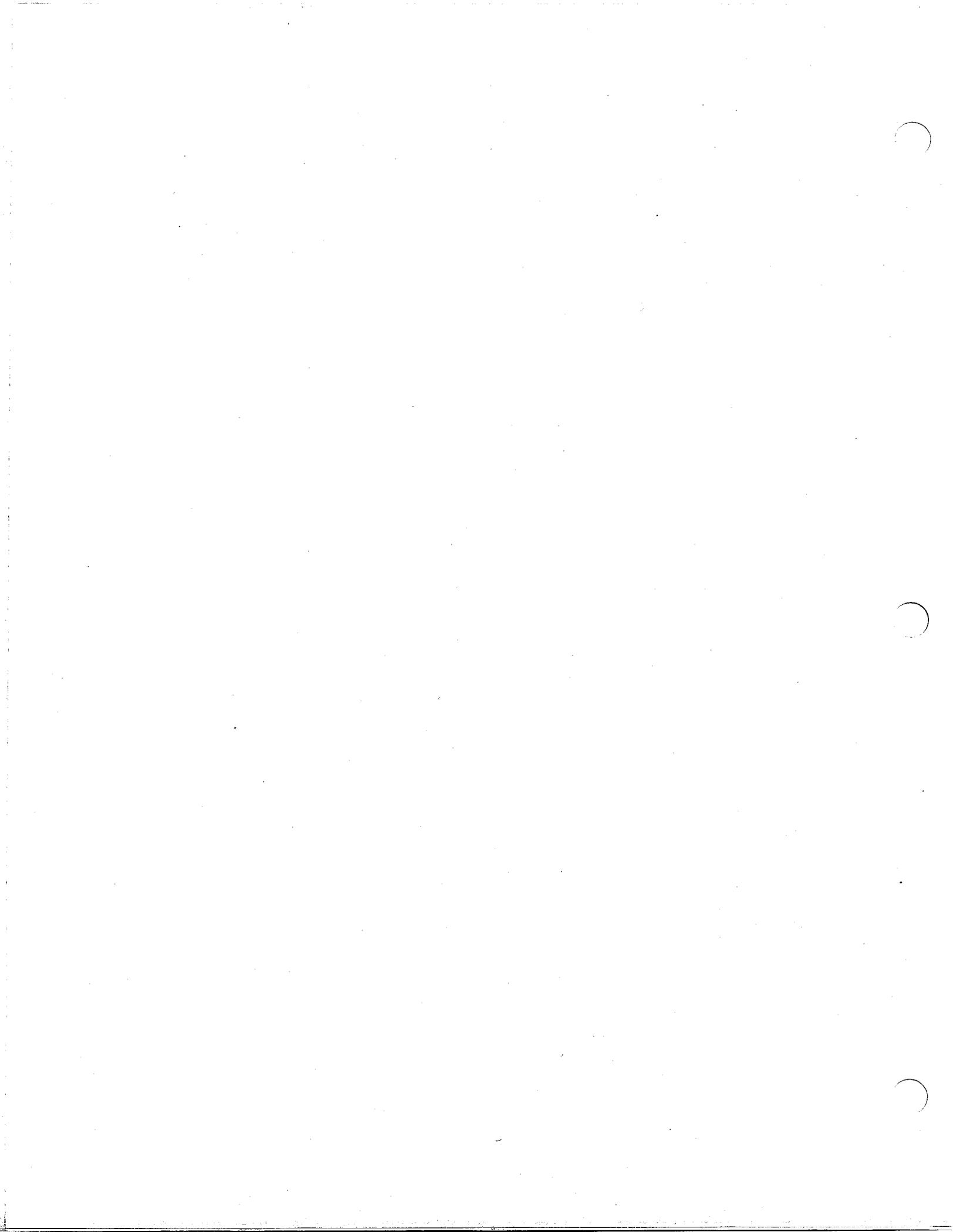
Julie Bishop, Environmental Analyst, PBC-ERM
Carman Vare, Environmental Program Supervisor, PBC-ERM
James J. Barry, III, Environmental Director, PBC-ERM
Juan Cueto, Environmentalist, PBC-ERM
David Carson, Environmental Analyst, PBC-ERM

10.0.2 Contributors.

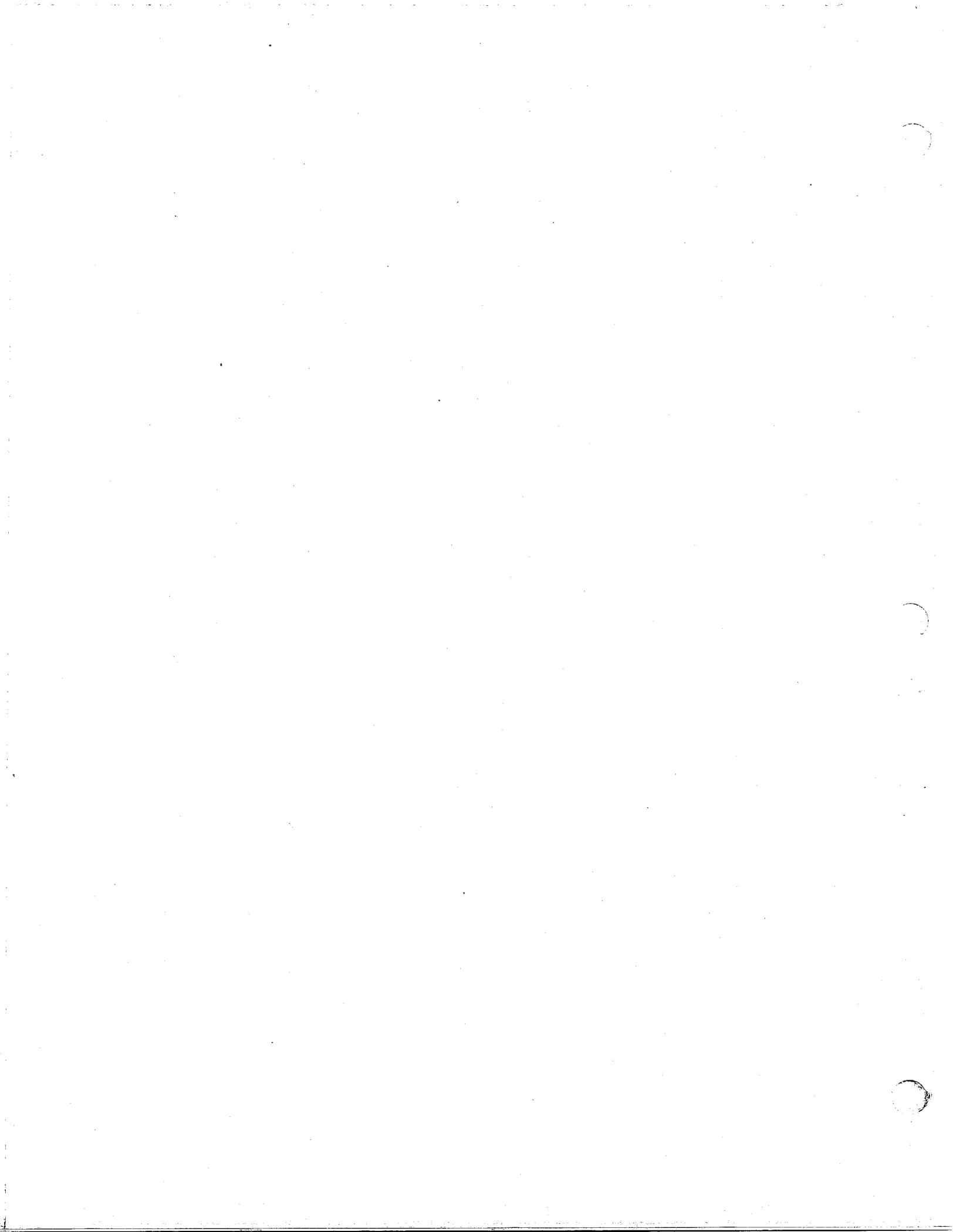
Paul Stevenson, Landscape Architect, Planning Division, USACE
Kenneth Dugger, Chief Reviewer, Planning Division, USACE
John Zediak, Civil Engineer, Planning Division, USACE
Paul Karch, Environmental Engineer, Planning Division, USACE
Tim Murphy, Project & Programs Division, USACE

11.0 Bibliographies & References.

- Baynes, T.W. and A.M. Szmant (1989) "Effect of current on the Sessile Benthic Community Structure of an Artificial Reef", Bulletin of Marine Science.
- Boyce, S. G., (1995), Landscape Forestry, John Wiley & Sons, Inc, New York.
- Brown, M.T., J.M. Schaefer., (1987)., "Buffer Zones for Water, Wetlands, and Wildlife."St. Johns Water Management District.
- Chiu, T.Y., Van De Kreeke, J., Dean, R.G., (1970)., Residence Times of Waters Behind Barrier Islands. Completion Report to the Office of Water Resources Research, Department of the Interior.
- Dames & Moore., (1990)., "Lake Worth Lagoon Natural Resources Inventory and Resource Enhancement Study."
- Duever, L.C., G.B. Iverson, P.F. Lund, M.J. Duever, F.P. Porzel J.N. Burch, and J.F. Meeder., (1981)., "Resource Inventory and Analysis of the John D. MacArthur Beach State Recreation Area."
- FDEP/PBC, (1998)., Lake Worth Lagoon Management Plan, Draft, Lake Worth Lagoon Ecosystem Management Area Team, Palm Beach County, Florida.
- FNAI/FDNR, (1990)., Guide to the Natural Communities of Florida, FNAI/FDNR, Tallahassee, Florida.
- Harris, B., K.D. Haddad, R.A. Steindinger, J.A. Huff., (1983)., "Assessment of FisheriesHabitat: Charlotte Harbor and Lake Worth", Florida Department of Natural Resources.
- Heald, E.J. and W.E. Odum., (1969)., "The Contribution of Mangrove Swamps to Florida Fisheries". Proc. Gulf and Caribb. Fish Inst., 22:130-135.
- Keeton, W. T., (1972)., Biological Science, 2nd Ed., W.W. Norton & Co., Inc., New York.
- Kohm, K.A. & Franklin, J.F., (1997)., Creating a Forestry for the 21st Century, Island Press, Washington, D.C.
- Lewis, R.R. III, R.G. Gilmore, Jr., D.W. Crewz, W.E. Odum., (1985)., "Mangrove Habitat and Fishery Resources of Florida." Florida Aquatic Habitat and Fishery Resources.
- McCrary, J.P., J.W. Jolley, C.Tapp, R.E. Waldner.,(1985)., "Overview of Habitat Degradation in Florida." Unpublished Document of Palm Beach County Chapter of the Florida Conservation Association.



APPENDIX A
SECTION 404(b) EVALUATION



**SECTION 404 (b) EVALUATION REPORT
PROJECT MODIFICATION REPORT
PEANUT ISLAND. PALM BEACH COUNTY, FLORIDA**

I. Project Description.

a. Location. Peanut Island is a 72 acre dredged disposal island located in Palm Beach, Section 15, Township 42 South, Range 43 East, Palm Beach County, Florida (Figure 1). Peanut Island is within the Lake Worth Lagoon Estuary, directly adjacent to the Lake Worth Inlet Federal Channel and Turning Basin, 150 feet east of the Intracoastal Waterway, 1500 feet west of Lake Worth Inlet, and 600 feet east-northeast of the Port of Palm Beach. Rivera Beach and Palm Beach Shores are the landmasses that flank Peanut Island to the west and east respectively.

b. General Description. The purpose of this project is to restore wetland habitat and associated upland habitat on Peanut Island. This project will provide a habitat for fisheries and wildlife in the region.

c. Authority and Purpose. Authority for this project is covered by Section 1135 of the Water Resources Development Act of 1986, as amended. The purpose of the Section 1135 is to determine the need for modifications to existing water resources projects that will improve the quality of the environment in the public interest.

d. General Description of Dredged or Fill Material. The proposed project restoration plans call for excavations to restore tidal flow to existing mangroves and for the shallow water reef. Approximately 1.5 acres will be excavated for the tidal restoration of channels and ponding areas. Removal of about 1.0 acre of dredged material for the shallow water reef construction will be required under the recommended plan. The excavated material disposal plans calls for placement of the material into one of the existing dredged material management areas (DMMA) on Peanut Island.

e. Description of the Proposed Discharge Site. The dredged material to be removed will be disposed of in the Port of Palm Beach DMMA on Peanut Island. All recognized Best Management Practices (BMPs) applicable to project construction will be considered to ensure compliance of water quality certificate parameters before construction begins.

II. Factual Determinations.

a. Water Circulation, Fluctuation and Salinity Determination. Lake Worth is a tidal lagoon subject to tidal influence and freshwater inflows. Tidal waters enter the lagoon through the Lake Worth Inlet. Tides are semi-diurnal with a tidal fluctuation of every twelve hours during the tidal cycle. Salinity in the Lake Worth area ranges from 28.3 to 35.8 parts per thousand. The Florida Department of Environmental Protection (FDEP) maintains a tide gauge adjacent to the Lake Worth Inlet less than half a mile away.

5. There will be no significant long-term adverse impact on any autotrophic organism from the implementation of the selected plan.

6. There will be no direct or indirect adverse impact on highly motile organisms such as fish and crustaceans.

7. No long term significant direct or indirect adverse impacts are anticipated on non-motile infaunal organisms or motile epifaunal organisms in the immediate project area from the proposed project.

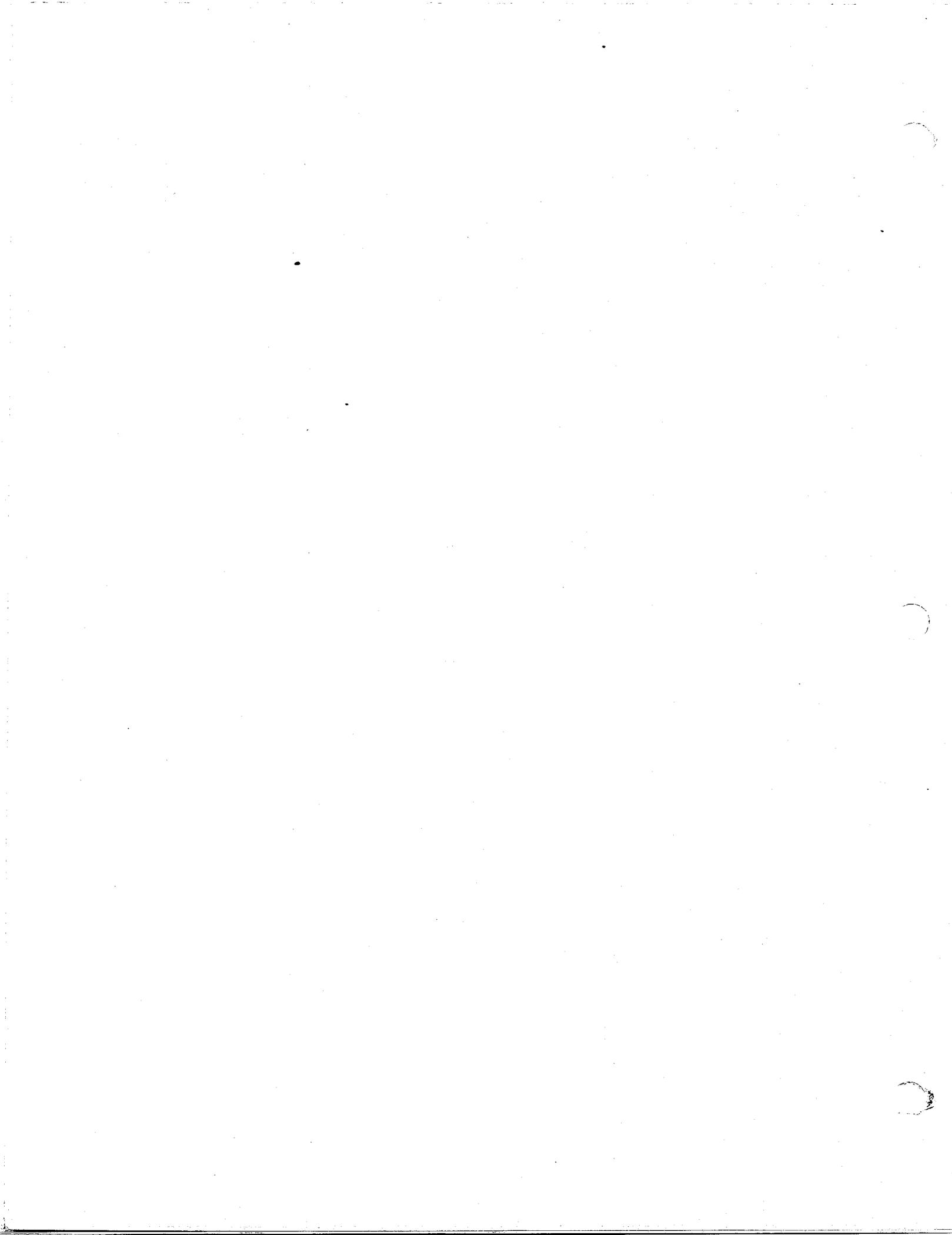
8. No significant adverse impacts are anticipated on terrestrial wildlife in the immediate project area.

9. Implementing the project will pose no threat to juvenile fish or wildlife dependant upon the immediate project area for their subsistence.

10. No significant or long term change in the biodiversity of the communities are anticipated due to the project construction.

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

APPENDIX B
FLORIDA COASTAL ZONE CONSISTENCY STATEMENT



APPENDIX B
PEANUT ISLAND ENVIRONMENTAL RESTORATION
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 restore the Peanut Island ecosystem to provide habitat for fisheries and wildlife. The island will continue to function as a dredged material disposal area, historic properties setting, Coast Guard post and recreational Monday through Thursday, site. The project proposes to remove exotic tree species on the island, restore tidal flushing to existing mangroves, construct a shallow water reef, shallow water lagoon, plant transition zones and a maritime hammock. Information has been submitted to the State of Florida, Department of Environmental Protection (DEP) for a permit in compliance with this chapter.

2. Chapters 186 and 187, State and Regional Planning: These chapters establish the State Comprehensive Plan that sets goals to articulate a strategic vision for the State of Florida's future. The 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 proposed project will comply with the strategic vision of the State of Florida as mentioned in the State and Regional Planning Chapters.

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 protect and preserve the lives and property of the people of Florida.

Consistency Statement: The environmental restoration of Peanut Island will not jeopardize the public health, safety or welfare but could enhance the chapter's goals. Therefore, this work will be consistent with the intent of this chapter.

4. Chapter 253, State Lands: This chapter governs the management of submerged State lands and resources within these lands. This includes archeological and historical resources; water resources; fish and wildlife resources; beaches and dunes; submerged grass beds and other benthic communities; swamps, marshes and other wetlands,

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 fishery 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: The environmental restoration of Peanut Island will not adversely affect such activities and is consistent with the goals of this chapter.

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 that provide sustainable ecological, recreational, educational, scientific, aesthetic and economic benefits.

Consistency Statement: Upland work will include the following: exotic tree removal, island degrading for tidal inundation and mangrove reestablishment, vegetative planting to establish transition habitat zones and a maritime hammock. The shallow water lagoon and reef are not freshwater. The work will comply 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: The proposed work does not involve water resources as described by 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: The proposed 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 fuels. The proposed work will conform with the intent of 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 products.

**APPENDIX C.
ENVIRONMENTAL COORDINATION**

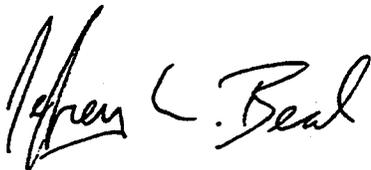
Please keep us informed about the latest decisions for Peanut Island. We would be glad to assist in the future. The natural resources are readily available for colonizing additional artificial reef placements along the southeast corner of the island, especially because the area is well flushed. I think that minus ten feet, as you mentioned, would do the job effectively. However, I think some of the larger fishes (jacks, barracuda, etc.) will be transient at best during the day unless you establish an attraction such as a fish cleaning station a la Sailfish Marina. As I mentioned earlier, I'm also extremely interested in the reconnection of the landlocked mangroves on the west side. We've recently purchased custom-made lift nets for a mangrove fish utilization study and have other gear types on hand. By the way, we finally got a look at Munyon Island and the marsh restoration looks fantastic (not to mention the adjacent seagrass beds to the south). Have you thought about contacting Florida Atlantic University Biology Department for slave labor? I imagine that a prospective grad student in need of a thesis could readily observe changes in the marsh over time via time-series analysis/BACI (using sedimentation/accretion/organics, influx of benthic and natant marsh associates, and so on) as the area assumes a more "natural" landscape.

I did some checking on your inquiry concerning limit of catch/take from the offshore reefs. Historically, the jurisdiction of state or federally owned uplands can be "extended" to include submerged, adjacent resources that are, in turn, afforded certain levels of protection (e.g., 400' perimeter around state parks, "no spearing" zones offshore of Hobe Sound Wildlife Refuge, and so on). I don't imagine that there are public uplands in the area in question in your county. The designation of "Marine Reserve" also affords protection, but the process is very tedious and I do not know if the desire for limited take alone is historically a sufficient factor. Recently, of the tens of square miles requested to be specially protected under the Florida Keys National Marine Sanctuary, NMFS allowed only 9 square miles. User groups have a strong voice despite public support to preserve.

Special Management Zones designated by the South Atlantic Marine Fisheries Council offer protective measures such as gear restrictions. My suggestion would be to write to the directors of NMFS and South Atlantic MFC, making them aware of the public-led concern about overfishing and inquire about their protocol to achieve protective status. In the interim, I would also continue to pursue the public good faith effort to limit take. To my knowledge (and that of Jon Dodrill, FDEP Office of Fisheries Management), no formal, localized, self-policing effort of private citizens to limit take beyond state/federal law has been implemented in this state. Your county might break new ground and set a precedent for the environmental stewardship angle our department is advertising.

Thanks again for a great day of diving. We'll be in touch.

Sincerely,



Fish survey of rock fringe at southeast corner of Peanut Island-8/23/96

Trachinotus falcatus J
Lutjanus griseus A
Lutjanus apodus J/A
Haemulon spp. J
Haemulon parrai J/I
Haemulon plumerei I
Haemulon flavolineatum J/I/A
Anisotremus virginicus J/A
Diplodus agenteus J/A
Diplodus holbrooki J/A
Archosargus rhomboidalis A
Eucinostomus spp. J/A
Equetus acuminatus J
Kyphosus sp. A
Acanthurus chirurgus I/A
Abudefduf saxatilis J/A
Abudefduf taurus A
Stegastes planifrons J
Stegastes fuscus A
Halichoeres radiatus J
Halichoeres bivittatus SM
Scaridae sp. J
Labrisomus nuchipinnis J/A(M,F)
Scorpaena plumieri A

Fish surveys of *rock ledges of Lake Worth Inlet (north side) and **Artificial Reef structures north of Blue Heron Blvd. Bridge (no asterices denotes species seen at both locations)

***Dasyatis sabina* A (sand bottom between piles)

Centropomus undecimalis A

***Mycteroperca bonaci* J

**Serranus tigrinus* A

**Hypoplectrus indigo* A

***Hypoplectrus* spp. J

***Apogon pseudomaculatus* A

Lutjanus griseus J/A

***Lutjanus analis* A

***Lutjanus synagris* A

***Orthopristis chrysoptera* J

Haemulon spp. J/I

Haemulon parrai I

Haemulon plumerei A

Haemulon aurolineatum I

***Haemulon melanurum* I

Anisotremus virginicus J/A

Diplodus agenteus J/A

Diplodus holbrooki J/A

Archosargus probatocephalus J/A

Eucinostomus spp. J/A

***Equetus acuminatus* J/A

Kyphosus sp. A

**Acanthurus chirurgus* I/A

**Holocanthus bermudensis* A

**Holocanthus ciliaris* A

**Pomacanthus paru* J/A

Abudefduf saxatilis J/A

**Stegastes planifrons* A

**Stegastes fuscus* A

Stegastes spp. J

**Bodianus rufus* J

****Lachnolaimus maximus J/A**

Halichoeres radiatus J

Halichoeres bivittatus J/T

Halichoeres spp. J

Sparisoma viride I/T

Scaridae sp. J/A

Sphyraena barracuda A

Labrisomus nuchipinnis J/A(M,F)

Coryphopterus glaucofraenum A

***Aluterus scriptus A**

***Balistes vetula A**

Sphoeroides spengleri A

****Sphoeroides testudineus A**

****Diodon hystrix A**

Key:

J=juvenile

A=adult

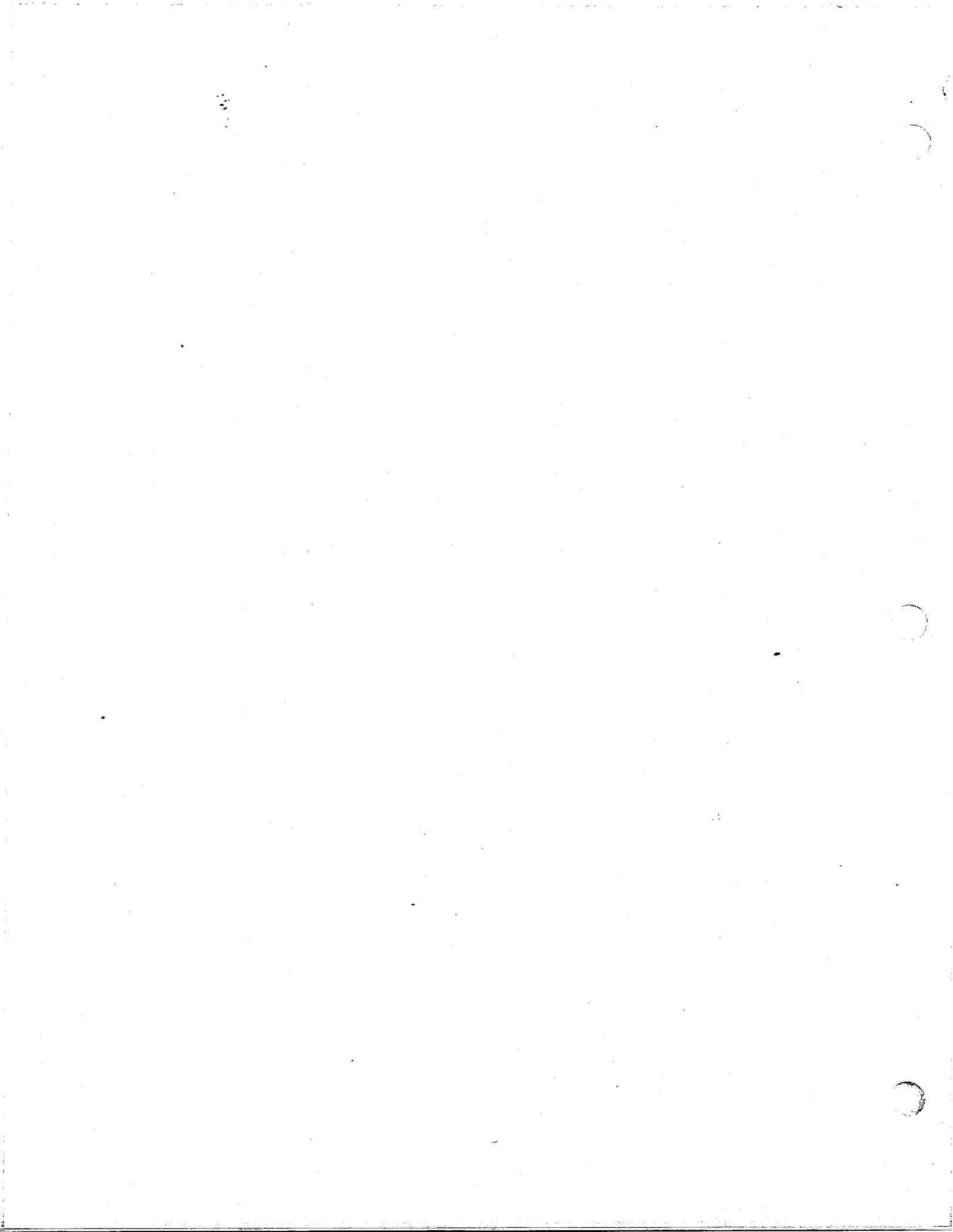
I=intermediate

SM=supermale

T=terminal phase

M=male

F=female



SENI DT

117 3701 11-2300 BUREAU OF NAVAL ENGINEERS

FLORIDA DEPARTMENT OF STATE
 Office of the Secretary
 Office of International Relations
 Division of Administrative Services
 Division of Corporations
 Division of Cultural Affairs



MEMBER OF THE FLORIDA CABINET
 Division of Library & Information Services
 Division of Historical Resources
 Ringling Museum of Art
 Division of Licensing
 Division of Elections

FLORIDA DEPARTMENT OF STATE
 Sandra B. Mortham
 Secretary of State
 DIVISION OF HISTORICAL RESOURCES

November 6, 1997

Mr. Dennis R. Duke
 Planning Division, Environmental Branch
 Jacksonville District Corps of Engineers
 P.O. Box 4970
 Jacksonville, Florida 32232-0019

In Reply Refer To:
 Frank J. Keel
 Historic Preservation Planner
 Project File No. 975725

RE: Cultural Resource Assessment Request
 Environmental Restoration of Peanut Island
 Palm Beach County, Florida

Dear Mr. Duke:

In accordance with the procedures contained in 36 C.F.R., Part 800 ("Protection of Historic Properties"), we have reviewed the referenced project(s) for possible impact to archaeological and historical sites or properties listed, or eligible for listing, in the *National Register of Historic Places*. The authority for this procedure is the National Historic Preservation Act of 1966 (Public Law 89-665), as amended.

The mentioned U.S. Army Corps of Engineers Planning Division project application has been reviewed by this agency. We note that the National Register eligible Kennedy Bunker and Coast Guard Station are located on Peanut Island; however, it is the opinion of this agency that the proposed undertaking will have no effect on the historic significance or character of the structures.

If you have any questions concerning our comments, please do not hesitate to contact us. Your interest in protecting Florida's historic properties is appreciated.

Sincerely,

for 

George W. Peroy, Director
 Division of Historical Resources
 and
 State Historic Preservation Officer

GWP/Kfk

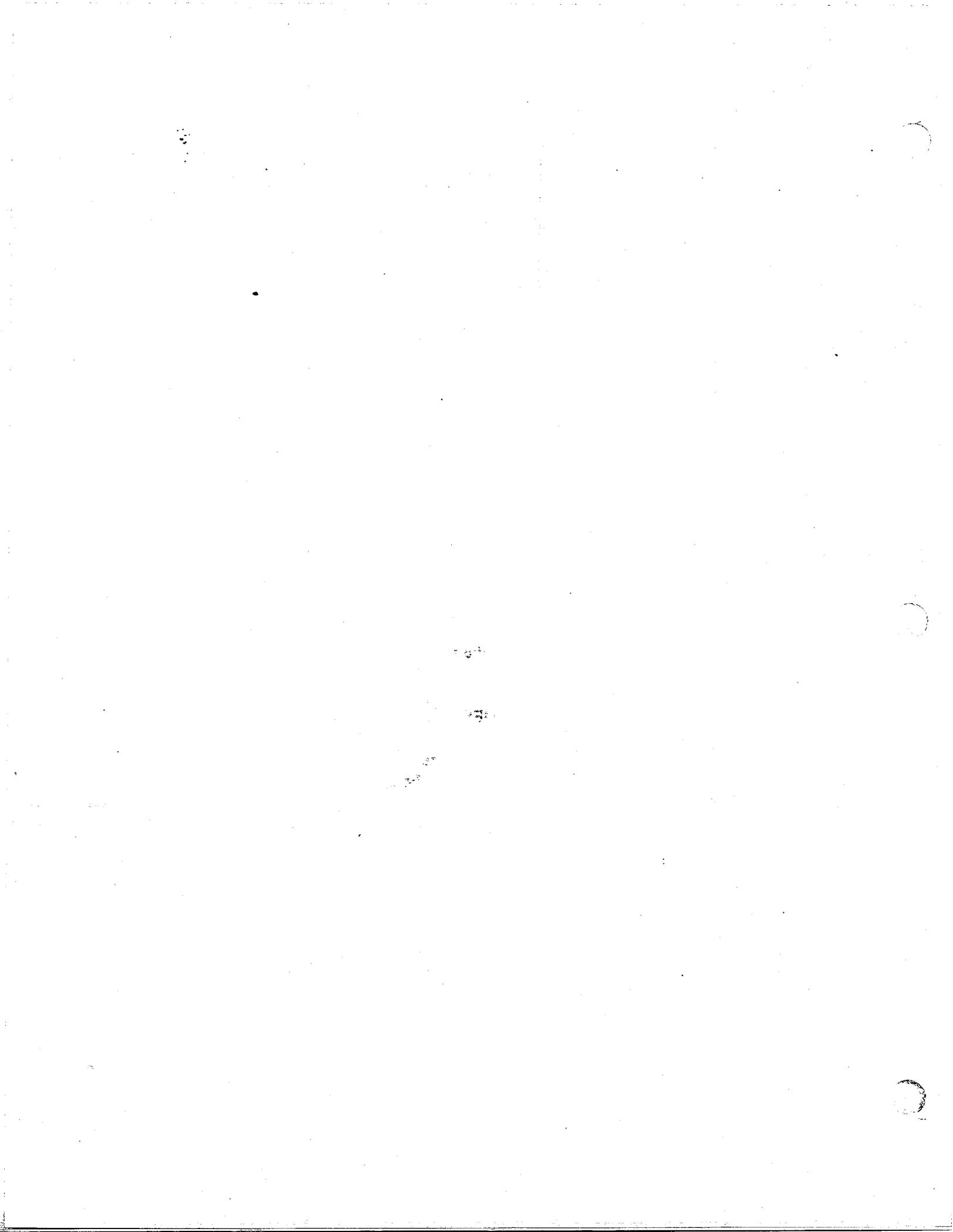
DIRECTOR'S OFFICE

R.A. Gray Building • 500 South Bronough Street • Tallahassee, Florida 32399-0250 • (850) 488-1480
 FAX: (850) 488-3353 • WWW Address <http://www.doc.state.fl.us>

ARCHAEOLOGICAL RESEARCH
 (850) 487-2299 • FAX: 414-2207

HISTORIC PRESERVATION
 (850) 487-2333 • FAX: 922-0496

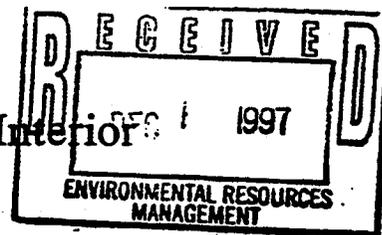
HISTORICAL MUSEUMS
 (850) 488-1484 • FAX: 921-2503





United States Department of the Interior

FISH AND WILDLIFE SERVICE
South Florida Ecosystem Office
P.O. Box 2676
Vero Beach, Florida 32961-2676



November 18, 1997

Dennis R. Duke, Acting Chief
U.S. Army Corps of Engineers
P.O. Box 4970
Jacksonville, FL 32232-0019

Attn: Planning Division

FWS Log No.: 4-1-98-I-237
1135 Project: Peanut Island
County: Palm Beach

Dear Mr. Duke:

The U.S. Fish and Wildlife Service (FWS) has reviewed the U.S. Army Corps of Engineers' (COE) restoration plan for Peanut Island under Section 1135 of the Water Resources Development Act of 1992. This letter represents the FWS' opinion on the effects of the proposed action in accordance with section 7 of the Endangered Species Act of 1973, as amended (16 U.S.C. 1531 *et seq.*) (ESA) and with the Fish and Wildlife Coordination Act (48 Stat. 401, as amended; 16 U.S.C. 661 *et seq.*). We have assigned FWS Log Number 4-1-98-I-237 to this consultation.

PROJECT DESCRIPTION

Originally a shallow water area, Peanut Island was created in 1918 as a result of material excavated from creating Lake Worth Inlet. Since 1934, the COE has used the island as a deposition site for material dredged from Lake Worth Inlet and the Atlantic Intracoastal Waterway. As a result of these numerous dredging efforts, a 79-acre island was formed and subsequently vegetated with exotic plants such as Australian pines (*Casuarina equisetifolia*). The island is located adjacent to the inlet in Lake Worth Lagoon, Palm Beach County, Florida.

In 1994, Palm Beach County, the Port of Palm Beach, and the Florida Inland Navigation District proposed to restore Peanut Island by removing exotic vegetation, enhancing native plant communities, and improving the island's passive recreational opportunities. In 1996, Palm Beach County requested the COE's assistance (through the Section 1135 Program) to restore Peanut Island, thereby providing these benefits. The restoration proposal consists of three components: (1) creating 9.1 acres of maritime hammock, (2) enhancing 3.5 acres of intertidal mangroves, and (3) creating one acre of shallow water hardbottom habitat. Though not an objective under Section 1135, the restoration proposal will also result in providing some limited passive recreational benefits. The details for each restoration component are as follows:

1. Maritime hammock

Two maritime hammocks, totaling 9.1 acres, are proposed on the east and west sides of the island. The proposed actions include clearing and chipping exotic vegetation followed by replanting with native vegetation.

2. Mangrove wetlands

Two isolated mangrove areas, totaling 3.5 acres along the west side of the island, are proposed to be hydrologically reconnected to the lagoon. The proposed action consists of excavating approximately 3,000 feet of channel to tidally flush the mangrove areas.

3. Shallow water reef

This one acre site is located along the southeast corner of the island. The proposed actions include (a) the excavation of approximately 24,000 cubic yards of material to create a basin with a depth of -10 feet NGVD and (b) the placement of approximately 4,800 tons of limestone boulders to create the reef complex. The transitional zone created between the basin and the adjacent uplands will be resloped and stabilized with native vegetation.

THREATENED AND ENDANGERED SPECIES

We have reviewed the information in the restoration plan as well as information available to us on the presence of threatened and endangered species and designated critical habitat in the vicinity of the project site. Based on our review, the West Indian manatee (*Trichechus manatus*) as well as threatened and endangered sea turtles are present in and around Lake Worth Lagoon.

West Indian manatee

Our records indicate that the endangered West Indian manatee is present year-round in Lake Worth Lagoon. Furthermore, the lagoon is designated critical habitat for the manatee (50 CFR 17.95). The COE did not determine if the proposed action will have an effect on the manatee or its designated critical habitat. The restoration plan indicates some work is occurring below the mean low water line; therefore, we have determined a "may affect" for the manatee.

In a phone conversation with Kalani Cairns (FWS biologist) on November 4, 1997, Paul Stevenson (COE Project Manager) indicated that prior to the commencement of any operational activities associated with this project, the COE would implement the standard manatee construction precautions. Based on the COE's willingness to comply with these protective measures, we conclude that the restoration plan for Peanut Island is not likely to adversely affect the manatee nor is it likely to adversely modify or destroy its designated critical habitat.

Sea turtles

The proposed restoration project is located within the nesting ranges of the threatened loggerhead sea turtle (*Caretta caretta*) as well as the endangered green sea turtle (*Chelonia mydas*), leatherback sea turtle (*Dermochelys coriacea*), and hawksbill sea turtle (*Eretmochelys imbricata*). Again, the COE did not determine if the proposed action will have an effect on these

species. Since the restoration plan indicates work is occurring below the mean low water line, we have determined a "may affect" for listed sea turtles. However, based on the nature of the proposed work, we conclude that the restoration plan for Peanut Island is not likely to adversely affect threatened and endangered sea turtles. Currently, there is no critical habitat designated for the sea turtles listed above; therefore, none will be affected.

Although this does not constitute a Biological Opinion described under section 7 of the ESA, it does fulfill the requirements of the ESA, and no further action is required. If modifications are made to the project or if additional information involving potential effects on listed species becomes available, reinitiation of consultation may be necessary.

FISH AND WILDLIFE RESOURCES

Fish and wildlife resources have been previously documented by Palm Beach County and summarized by the COE in the restoration plan for Peanut Island. Hence, it is unnecessary to present this same information on these resources within this letter. Instead, the discussion should focus on the expected benefits associated with this restoration effort. The purpose of the restoration plan is to create and enhance habitat for fisheries and wildlife. For each of the components, the anticipated environmental benefits are as follows:

1. **Shallow water reef**

Due to its close proximity to Lake Worth Inlet, the shallow water reef will provide substrate for oceanic larvae to settle and grow as well as offer excellent habitat for a wide range of fish species.

2. **Mangrove wetlands**

The creation of flushing channels will reconnect the isolated mangrove areas to the lagoon. Hence, the mangrove areas will be tidally flushed with clearer oceanic water, thereby providing habitat and water quality conditions preferred by nearshore reef fish species.

3. **Maritime hammock**

The creation of a maritime hammock will provide food and shelter for migratory birds and other wildlife. As background, tremendous development pressure throughout South Florida has created a multitude of ecosystem problems. Increased human habitation has increased additional development of coastal uplands, which has led to an increase in invasive exotic flora and fauna. The concurrent loss of habitat has resulted in declining numbers of neotropical migratory avifauna. This assemblage of birds utilizes a wide variety of habitats extending throughout North, Central, and South America. Habitat loss and fragmentation have affected their survival and propagation. An additional and significant concern is the loss of refueling depots, areas where these birds have historically paused in their journeys to feed and rest. Maritime hammocks are a very unique and important biological resource. Creating over nine acres of maritime hammock will promote natural ecological functions to occur and increase biodiversity in an area with a diminishing coastal ecosystem. An additional ecological benefit includes the enhancement of upland habitat by creating the native plant species diversity upon which neotropical migrants depend. For instance, the

coastal spoil islands in the Indian River Lagoon have provided unique opportunities for creating appropriate forage habitat for migratory birds.

SUMMARY AND RECOMMENDATIONS

In summary, Palm Beach County and the COE are cooperating under Section 1135 to restore Peanut Island. The FWS supports the proposed restoration plan for Peanut Island. We believe the restoration proposal qualifies for partial funding support from the FWS' South Florida Coastal Ecosystem Program (SFCEP). The primary objective of the SFCEP is to identify opportunities to protect, conserve, and restore coastal living resources. We accomplish this by actively forming partnerships with other federal and state agencies, local governments, non-governmental entities, and private property owners to implement "on-the-ground" restoration projects as well as to perform research, monitoring, and public outreach activities. Thus, we could participate in the creation of the maritime hammock with funding assistance from the SFCEP.

Once again, we are available to coordinate with you on this project as it continues to develop. Thank you for your interest in the effort to protect, conserve, and restore coastal living resources. If you have any questions, please contact Mr. Cairns of our office at (561) 562-3909.

Sincerely,

Kalani Cairns

for James J. Slack
Project Leader
South Florida Field Office

cc:

NMFS, Miami, FL
GFC, Vero Beach, FL
DEP, Tallahassee, FL
Palm Beach County, West Palm Beach, FL

FEDERALLY LISTED THREATENED AND ENDANGERED SPECIES
AND CANDIDATE SPECIES FOR FEDERAL LISTING
IN PALM BEACH COUNTY

Scientific Name	Common Name	Status
Amphibians and Reptiles		
<i>Alligator mississippiensis</i>	American alligator	T (S/A)
<i>Caretta caretta</i>	Loggerhead sea turtle	T
<i>Chelonia mydas</i>	Green sea turtle	E
<i>Dermochelys coriacea</i>	Leatherback sea turtle	E
<i>Drymarchon corais couperi</i>	Eastern indigo snake	T
<i>Eretmochelys imbricata</i>	Hawksbill sea turtle	E
<i>Lepidochelys kempii</i>	Kemp's (=Atlantic) ridley sea turtle	E
Birds		
<i>Aphelocoma coerulescens</i>	Florida scrub-jay	T
<i>Campephilus principalis</i> (probably extinct in south Florida)	Ivory-billed woodpecker	E
<i>Charadrius melodus</i>	Piping plover	T
<i>Dendroica kirtlandii</i>	Kirtland's warbler	E
<i>Haliaeetus leucocephalus</i>	Bald eagle	T
<i>Mycteria americana</i>	Wood stork	E
<i>Picoides borealis</i>	Red-cockaded woodpecker	E
<i>Polyborus plancus audubonii</i>	Audubon's crested caracara	T
<i>Rostrhamus sociabilis plumbeus</i>	Everglade snail kite	E*
<i>Sterna dougalli dougalli</i>	Roseate tern	T
<i>Vermivora bachmanii</i>	Bachman's warbler	E
Mammals		
<i>Felis concolor</i>	Mountain lion	T (S/A)
<i>Felis concolor coryi</i>	Florida panther	E
<i>Trichechus manatus latirostris</i>	West Indian manatee	E*
<i>Ursus americanus floridanus</i>	Florida black bear	C
Plants		
Family Annonaceae <i>Asimina tetramera</i>	Four-petal pawpaw	E
Family Convolvulaceae <i>Jacquemontia reclinata</i>	Beach jacquemontia	E
Family Cucurbitaceae <i>Cucurbita okeechobeensis</i>	Okeechobee gourd	E

* Critical habitat has been designated for this species in this county.

Scientific Name	Common Name	Status
-----------------	-------------	--------

Plants (continued)

Family Polygalaceae
Polygala smalli

Tiny polygala

E

* Critical habitat has been designated for this species in this county.

Palm Beach County

revised 1/15/97



DEPARTMENT OF THE ARMY
 JACKSONVILLE DISTRICT CORPS OF ENGINEERS
 P. O. BOX 4970
 JACKSONVILLE, FLORIDA 32232-0019
 January 27, 1998

REC-100-10000
 Director
 Council & Subunits
 Life Sciences
 Natural Resources
 Water Resources
 Hazardous Waste
 Acad. City & Town
 County Agency
 Copy 13 54
 R. Wilbanks
 2/17/98

REPLY TO
 ATTENTION OF
 Planning Division
 Environmental Branch

TO WHOM IT MAY CONCERN:

The Jacksonville District, U.S. Army Corps of Engineers (Corps), is gathering information to define issues and concerns that will be addressed in the environmental restoration of Peanut Island in Lake Worth, Palm Beach County, Florida. Authority and funding are provided by Section 1135 of the Water Resources Development Act of 1996. An Initial Appraisal Report determined there is Federal interest in the project. This resulted in the undertaking of an Environmental Restoration Report that is currently underway.

It is the intent of the Corps, to prepare an Environmental Assessment for the environmental restoration of Peanut Island in Lake Worth, Palm Beach County, Florida. Exotic vegetation will be removed and a more natural and native landscape will be constructed on the man-made island of dredged material. Peanut Island is owned by the Port of Palm Beach with a lease hold to the Florida Inland Navigation District (FIND) for the storage of dredged material. The Port of Palm Beach has a designated disposal site on the island also. The U.S. Coast Guard also occupies the southeast corner of the island.

Palm Beach County has requested the Corps' assistance in removing exotic vegetation and creating a 9.1 acre maritime hammock, removing exotic vegetation and excavating tidal channels for the establishment of 3.5 acres of mangrove habitat, and the construction of a 1 acre shallow water reef with a breakwater. The maritime hammock (enclosure 2) will be located on the island's western and eastern island areas to provide habitat for migrating and local birdlife. Two existing isolated mangrove areas on the island's western side will be joined and improved with the construction of tidal channels (enclosure 1). Intertidal marshgrass (*Spartina* spp.) will also be planted to help prevent erosion and provide additional habitat for breeding and feeding wildlife. The shallow-water reef is proposed on the southeastern corner of the island (enclosure 1) next to the Lake Worth Inlet Channel. The reef will provide larvae transported in the channel a place to settle and grow.

JAN 29 1998

Please assist the Corps in planning and evaluating the possible environmental impacts of the proposed project. We welcome your views , comments, and information about the resources, study objectives, and important features within the described study area, as well as suggested improvements to the island environment. Letters of comment or inquiry should be directed within thirty (30) days of the date of this letter to the letterhead address, attention Planning Division, Environmental Branch.

Sincerely,


John R. Hall, Acting Chief
Planning Division

Enclosures



FLORIDA DEPARTMENT OF STATE
Sandra B. Mortham
Secretary of State
DIVISION OF HISTORICAL RESOURCES

February 9, 1998

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

In Reply Refer To:
Frank J. Keel
Historic Preservation Planner
Project File No. 980611

RE: Cultural Resource Assessment Request
SAI# 9801280034C
Environmental Restoration of Peanut Island
Palm Beach County, Florida

RECEIVED
FEB 12 1998

Dear Ms. Trainor:

State of Florida Clearinghouse

In accordance with the procedures contained in 36 C.F.R., Part 800 ("Protection of Historic Properties"), as well as the provisions contained in Chapter 267.061, *Florida Statutes*, we have reviewed the above referenced project(s) for possible impact to archaeological and historical sites or properties listed, or eligible for listing, in the National Register of Historic Places, or otherwise of historical or architectural value.

A review of our records indicates that the National Register eligible Kennedy Bunker and Coast Guard Station are located on Peanut Island. However, it is the opinion of this agency that the proposed undertaking will have no effect on the historic significance or character of the structures. The proposed project is also consistent with the historic preservation laws of Florida's Coastal Management Program

If you have any questions concerning our comments, please do not hesitate to contact us. Your interest in protecting Florida's historic properties is appreciated.

Sincerely,

George W. Percy

for

George W. Percy, Director
Division of Historical Resources
and
State Historic Preservation Officer

GWP/Kfk

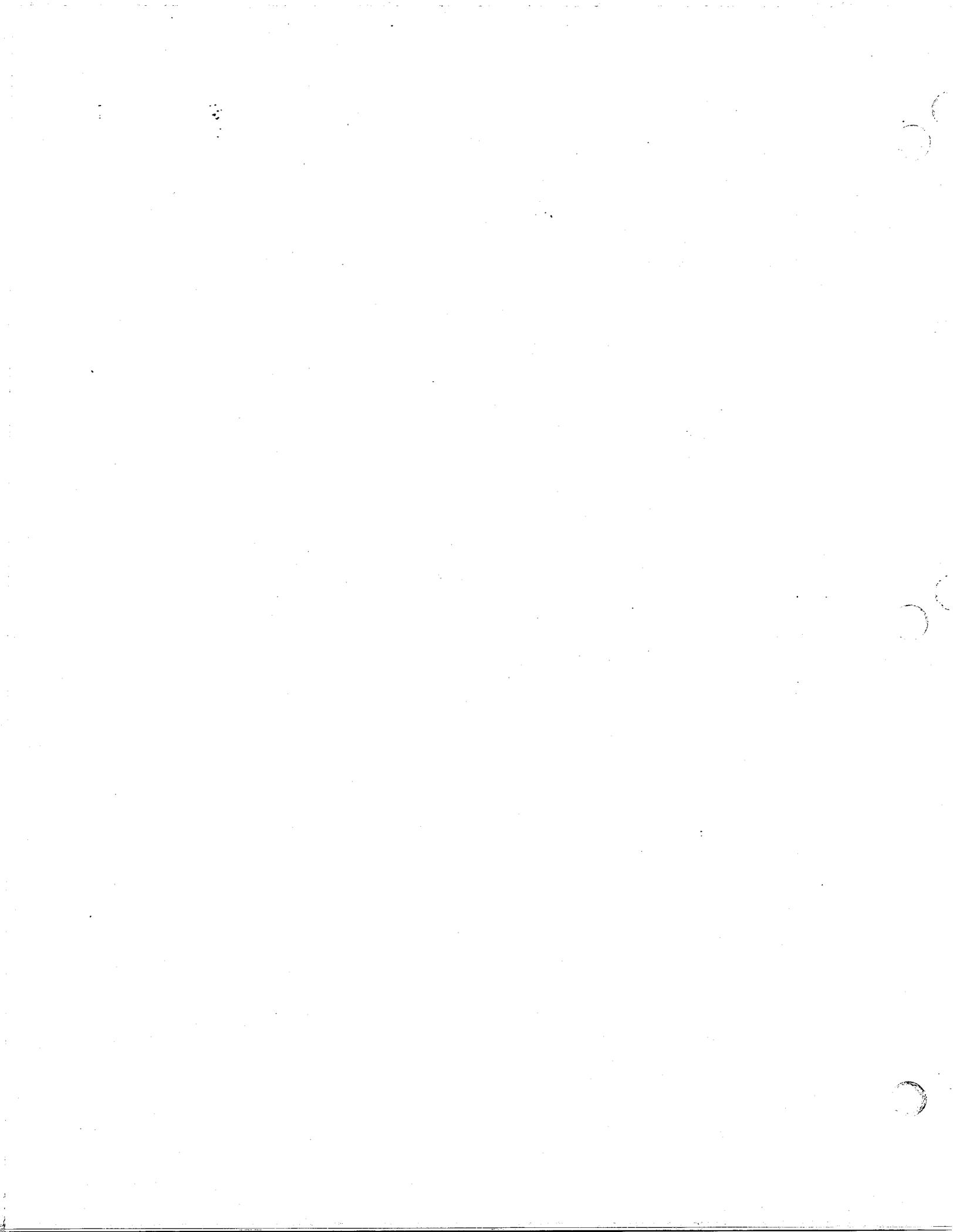
DIRECTOR'S OFFICE

R.A. Gray Building • 500 South Bronough Street • Tallahassee, Florida 32399-0250 • (850) 488-1480
FAX: (850) 488-3353 • WWW Address <http://www.dos.state.fl.us>

ARCHAEOLOGICAL RESEARCH
(850) 487-2299 • FAX: 414-2207

HISTORIC PRESERVATION
(850) 487-2333 • FAX 922-0496

HISTORICAL MUSEUMS
(850) 488-1484 • FAX: 921-2503





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 26, 1998

Department of the Army, Corps of Engineers
Mr. John R. Hall, Acting Chief
Planning Division
P.O. Box 4970
Jacksonville, Florida 32232-0019

Dear Mr. Hall:

The National Marine Fisheries Service (NMFS) has reviewed your notice of intent dated January 27, 1998, regarding the Corps of Engineers proposal to prepare an environmental assessment for the environmental restoration of Peanut Island in Lake Worth, Palm Beach County, Florida.

The proposed restoration project includes constructing of a 9.1 acre maritime hammock, removing exotic vegetation, excavating tidal channels for the establishment of 3.5 acres of mangrove habitat, and constructing of a 1.0 acre shallow water reef habitat. The NMFS supports this restoration effort and believes the project will have a positive impact to living marine resources.

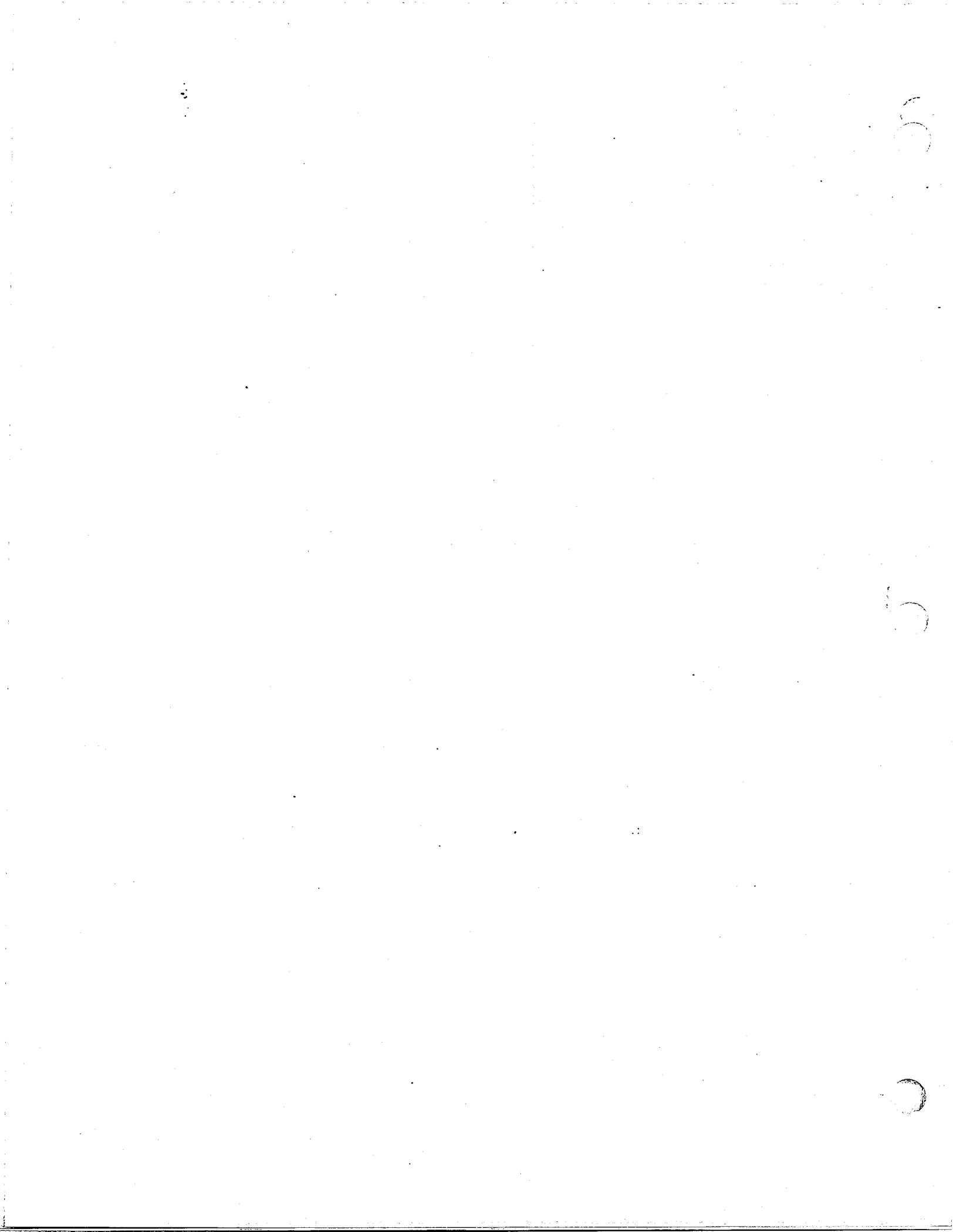
A NMFS ecologist conducted an on-site inspection of the project site. The project site is excellent in terms of fishery recruitment potential and water quality because it is located at the Lake Worth Inlet. The project design should maximize this potential by providing as much tidally influenced habitat as possible, perhaps increasing the mangrove or tidal creek habitats. Also, there is possibility that the proposed tidal creeks may recruit and support seagrasses. Therefore, any project modifications that would result in additional seagrass habitat are desirable.

We appreciate the opportunity to provide comments on the project and look forward to the draft environmental assessment when it becomes available. If there are questions regarding these comments please contact Mr. John Iliff of our Panama City Office in Miami at 305/595-8352.

Sincerely,

Andreas Mager, Jr.
Assistant Regional Administrator
Habitat Conservation Division







South Florida Water Management District

3301 Gun Club Road, West Palm Beach, Florida 33406 • (561) 686-8800 • FL WATS 1-800-432-2045
TDD (561) 697-2574

GOV 04-12 RF: 98080

February 20, 1998

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

RECEIVED
FEB 23 1998

State of Florida Clearinghouse

Dear Ms. Akers:

Subject: Proposed Environmental Restoration of Peanut Island (SAI #9801280034C)

In response to your request, the South Florida Water Management District (SFWMD) has reviewed the Scoping Letter submitted by the U.S. Army Corps of Engineers in connection with the preparation of an Environmental Assessment (EA) for the above-referenced project. Although the proposed plan has the potential to significantly improve the existing environmental condition of Peanut Island and provide the public with increased recreational opportunities, additional information is necessary for staff to evaluate the consistency of this project with the Florida Coastal Management Program (FCMP) and our Environmental Resource Permit (ERP) rules and criteria. After review of the Scoping Letter, staff has the following comments:

- (1) On October 10, 1996, the SFWMD issued an Individual Environmental Resource Permit (ERP) to Palm Beach County (Permit No. 50-03713-P) for the construction and operation of a surface water management system on Peanut Island. The permit authorized the construction of various recreational improvements, including a bulkhead, a fishing pier, dredging for barge access, buildings, and roads. The proposed plan appears to vary from the plan permitted by the SFWMD. Consequently, the proposed plan may require a modification to Permit No. 50-03713-P.
- (2) The following issues should be addressed in the preparation of the EA:
 - (a) Will the flushing channel impact existing wetlands?
 - (b) Will the flushing channel be used as a boat basin? If so, how deep is the basin and what size boats will it accommodate? Will this basin replace the previously permitted barge access area? How does the previously permitted dredge area relate to this proposal? Water quality could be a concern, depending upon how this area is designed. Hydrographic modeling may be necessary to assess this potential impact.

Governing Board:

Frank Williamson, Jr., Chairman
Eugene K. Pettis, Vice Chairman
Mitchell W. Berger

Vera M. Carter
William E. Graham
William Hammond

Richard A. Macheck
Michael D. Minton
Miriam Singer

Samuel E. Poole III, Executive Director
Michael Slayton, Deputy Executive Director

Ms. Keri Akers
February 20, 1998
Page 2

- (c) How will the shallow reef be constructed? Is any excavation proposed? Will rock or other similar material be deposited to create a reef? Reasonable assurances need to be provided that navigational hazards will not be created and that adequate flushing will be provided to prevent water quality problems.
- (3) Prior to preparation of the EA, the applicant should contact John Meyer in our Natural Resource Management Division at (561) 687-6773 to ensure that all SFWMD concerns are addressed.

If I can be of further assistance, please give me a call at (561) 687-6862.

Sincerely,



James J. Golden, AICP
Senior Planner
Regulation Department

/jg

c: John R. Hall, USACOE



Department of Environmental Protection

Lawton Chiles
Governor

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

Virginia B. Wetherell
Secretary

March 9, 1998

RECEIVED
MAR 12 1998

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

State of Florida Clearinghouse

Re: Department of the Army Scoping letter to Gather Information Defining Issues and Concerns for Restoration of Peanut Island in Lake Worth, Palm Beach County

SAI: FL9801280034C

Dear Ms. Trainor:

This Department has reviewed the above-described project proposal and based on the information provided, request that the following environmental concerns be considered in the Environmental Assessment of the project.

Manatees frequent this area due to plentiful seagrasses and a thermal refuge in close proximity; therefore, the Environmental Assessment should include a thorough review of manatee data and literature to help guide design decisions for this restoration project. Also, it is recommended that a seagrass survey be accomplished in the area to determine where potential impacts might occur from any proposed activities on the Island, such as the mooring or docking of boats, or by increased opportunities for swimming and snorkeling. The use of mooring buoys may be desirable to minimize habitat disruption.

This agency would discourage proposed developments which would reduce the amount of seagrasses available to manatees, or which would jeopardize their existence by unimpeded boating visits to the island. When there is sufficient information of the plan for use of the Island, our Bureau of Protected Species will be able to provide more specific recommendations for manatee protection. That office is willing to assist the applicant in preparing the environmental assessment by providing data on manatee use patterns in Palm Beach County.

It has been reported that this site is currently congested with an estimated 1,000 boats within a 2 mile radius. Additional boating activity could severely hinder navigation in the immediate vicinity. The Intracoastal Waterway channel passes very close to the west side

"Protect, Conserve and Manage Florida's Environment and Natural Resources"

Printed on recycled paper.

FL9801280034C

March 9, 1998

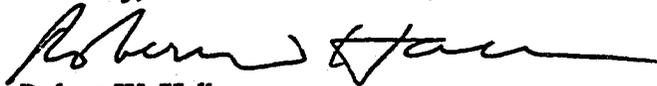
page 2

of the Island and with an alternate channel on the east side that is heavily used by local boat traffic. To the south is the main Port channel and turning basin. Additional structures and boat traffic will serve to exacerbate a navigation hazard which already exists. The Applicant needs to perform a boating safety analysis in conjunction with any proposals to attract additional boating activity to the Island. Recommendations for enhancing boating safety should be incorporated into the plan, by either discouraging additional boat traffic, strictly enforcing speed limits, or in some other way providing guidelines to enhance boating safety.

This proposal includes the placement of a breakwater on one of the most dynamic inlets in Palm Beach County, and it would be advisable to analyze the potential shoaling and accretion effects of this action, as well as any anticipated impact it may have on existing habitat. It is recommended that the Corps explore this issue in its preparation of the Environmental Assessment.

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 Intergovernmental
Programs

cc: Mary Morris
Don Keirn
Phil Flood



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 570-5517

MAR -9 1999

F/SER3:LEB

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

Dear Mr. Duck:

This responds to your February 5, 1999 letter to me regarding the Section 1135 Peanut Island Environmental Restoration Project in Lake Worth Lagoon, Palm Beach County, Florida. The purpose of this project is to reestablish historic habitat for fisheries and wildlife by creating wetland and upland habitat on Peanut Island. The project proposes the creation of a 1.0 acre shallow-water reef habitat to -10 feet National Geodetic Vertical Datum (NGVD), by clearing exotic vegetation, excavating dredged material and placing limestone boulders as substrate for reef habitat on the southeast side of the island, and creating an adjacent 1.0 acre shallow-water lagoon to a depth of -5 feet NGVD by removing dredged material. According to your letter, there may be impacts to seagrass, including the Federally-listed threatened Johnson's seagrass, *Halophila johnsonii*. This initiates consultation under section 7 of the Endangered Species Act (ESA).

In order for National Marine Fisheries Service (NMFS) to complete a section 7 consultation, we need complete information regarding the presence and amount of Johnson's seagrass that occurs in the project site and how this species may be affected by the project's actions. The 1.0 acre seagrass bed located at the site of the proposed shallow-water reef habitat on the southeast end of Peanut Island has not been identified by species. In addition, the Draft Marine Seagrass Survey is of little use for this project since it constitutes a survey of the Intracoastal Waterway (ICW) and is not a survey around Peanut Island. Any *Halophila* observed was not identified to species. The shallow shoreline, an area where Johnson's seagrass is known to occur, was not surveyed. The survey occurred in October rather than in the summer, as recommended, when growth and abundance of seagrass are optimal. In addition, a trained surveyor should be able to identify Johnson's seagrass, distinguishing it from other *Halophila* species, with the naked eye. A surveyor could choose to use an underwater magnifier or light, however, taking of samples should not be necessary (particularly during preferred summers surveys) unless water clarity is so poor that it prevents in-water identification.



Lake Worth Lagoon is a significant area for Johnson's seagrass. According to Figure 2, Page 4 of the Environmental Assessment Report, the 1.0 acre of seagrass will not be directly affected by the construction of the artificial reef with the chosen Alternative A. However, the loss of sea floor adjacent to seagrass beds can negatively impact their existence. NMFS Ecologist Mark Fonseca (1998) wrote: "What we have found is that patchy seagrass beds colonize new space and vacate existing, occupied space over time. This is not news, we have simply documented this in seagrass beds of *Halodule wrightii* and *Zostera marina* in North Carolina. Some of this movement is from vegetative propagation (e.g., runners or tillers), some is the result of successful seed colonization, and some is from plant mortality (creation of vacancies). The rate at which this movement occurs depends upon the inherent population growth rate of the species involved, and *Halophila* spp. have some of the highest rates on record (Josselyn *et al.* 1986, Kenworthy *et al.* 1989). So to remove a section of the sea floor among existing patches from future colonization is to prevent existing seagrass, which *must* migrate, from colonizing new areas and maintaining its local overall abundance. Such a removal ultimately deletes a portion of the baseline resource and when represented as a spatial pattern on the sea floor, constitutes a fragmentation of the existing resource."

It is unclear from the information provided whether the new artificial reef structure (fingers) would eliminate open patches of sea floor that allow for the natural future colonization of seagrasses, particularly Johnson's seagrass which is known to rely heavily on vegetative propagation and migration to adjacent open sea floor. The southeast corner of the proposed reef appears to have the most potential of interrupting seagrass growth. NMFS may concur that this project offers a net benefit to the environment but only if it is not eliminating seagrass habitat in the process. A combination of beneficial and adverse effects is still "likely to adversely affect" Johnson's seagrass.

Although you state that the construction of the artificial reef would be located to avoid any seagrasses, you state further in your letter that "there may be some change in the tidal flushing patterns around the island" and "have not been able to determine how much seagrass could be impacted." Page 35, 4.5.4 of the Environmental Restoration Report states that the proposed tidal changes have the potential to recruit *Halophila johnsonii*. NMFS agrees that the creation of shallow-water habitat adjacent to the shallow-water reef *has the potential* for seagrass recruitment and therefore *may* have an eventual beneficial effect upon Johnson's seagrass. However, if recruitment does occur, it cannot be determined with certainty that it would be of Johnson's seagrass.

If Johnson's seagrass does exist in the project area, then the *preliminary assessment* appears to be that this project may affect but not adversely affect Johnson's seagrass. However, a final determination cannot be made, and a section 7 consultation under the ESA can not be concluded, until further information is provided to NMFS, Protected Resources Division on: a) the presence and amount of Johnson's seagrass in the project area, and b) the submerged structure of the proposed shallow-water reef. If Johnson's seagrass does not exist in the project area, a section 7 consultation with this office is not necessary.

NMFS requests the following information:

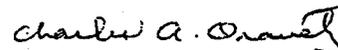
1. Does Johnson's seagrass exist in this 1.0 acre of seagrass? If so, please identify its relative abundance at this site.
2. How much of the sea floor (potential seagrass habitat) will be covered by the new shallow-reef structure? What are the dimensions of the "fingers" that will occur on either side of the seagrass bed? To what maximum depth will they extend? What will be the approximate distance(s) between the reef and seagrass bed? (Figure 2, Page 5, Environmental Restoration Report).
3. Could changes in tidal flushing patterns produce an erosion or deposition of sand on the 1.0 acre seagrass bed or adjacent areas?

In addition, NMFS strongly recommends pre- and post-monitoring for three years of the 1.0 acre seagrass bed and the proposed shallow-water lagoon, regardless of the presence of Johnson's seagrass. Such monitoring could include: species identification and abundance, bed/patch dimensions, seagrass bed location (using GPS to map its boundaries). Changes in the existing seagrass bed would be tracked over time, and the monitoring of the "new" shallow-water lagoon could provide valuable information on the recruitment of seagrass, including Johnson's seagrass, into such an area. This information will be useful to the COE and NMFS when considering future COE permitting requests in areas where *Halophila johnsonii* exists and will facilitate and expedite the permitting process. The COE should develop estimates of annual take of Johnson's (and other) seagrass anticipated by projects within Florida's intracoastal waterways within Johnson's seagrass habitat.

NMFS suggests that the Environmental Restoration Report be amended to include the Federally-listed threatened species under NMFS purview, Johnson's seagrass, *Halophila johnsonii*.

We appreciate the opportunity for initial consultation on this project and look forward to working with you for the conservation of listed species. If you have any questions please contact Ms. Layne Bolen, Fishery Biologist, of the Protected Resources Division at 727-570-5312.

Sincerely,



Charles A. Oravetz
Chief, Protected Resources Division

cc: F/PR3

F/SER4 - M. Thompson

o:/section7/informal/peanutis.jsg

File: 1514-22 f.1 FL (JSG)

References Cited:

Fonseca, M.S. 1998. Memorandum to M. Thompson, NMFS Habitat Conservation Division, Response to comments by C. Isiminger and attachments. 18 August.

Josselyn, M., M.S. Fonseca, T. Niesen and R. Larson. 1986. Biomass, production and decomposition of a deep-water seagrass, *Halophila decipiens* Ostenf. Aquatic Botany, Vol. 25, p. 47-61.

Kenworthy, W.J., C.A. Currin, M.S. Fonseca and G. Smith. 1989. Production, decomposition, and heterotrophic utilization of the seagrass *Halophila decipiens* in a submarine canyon. Mar. Ecol. Prog. Ser. 51:277-290.

Planning Division
Environmental Branch

DEC 08 1999

Mr. Charles A. Oravetz
Chief, Protected Resources Division
National Marine Fisheries Services
Southeast Regional Office
9721 Executive Center Drive North
St. Petersburg, Florida 33702

Dear Mr. Oravetz:

This is in reference to the Section 1135 Peanut Island Environmental Restoration Project Study in Lake Worth Lagoon, which we are currently conducting. We received your March 9, 1999 Section 7 consultation reply (enclosed) that requested additional information concerning the listed Johnson's Seagrass in the project vicinity. After further investigations and design considerations, adverse affect to the Johnson's Seagrass within the project vicinity are unlikely.

The approximate 1.0 acre area of seagrass located to the southeast of the proposed Section 1135 Peanut Island Environmental Restoration Project was inspected by a U.S. Army Corps of Engineers and local sponsor dive team September 20, 1999. No activity is planned within 25 feet of this area. The team's inspection revealed the seagrass area to be comprised primarily of Cuban Shoalweed (*Halodule wrightii*) with Johnson's Seagrass (*Halophila johnsonii*) in the deeper areas (down to 6-0' MLW) and shallow areas (up to 1-0' MLW). It was also noted the substrate changed from sand to small rock along the eastern edge of the seagrass area. Some areas of mixed seagrass (co-dominance of both species) was also noted (see enclosure 2).

The shallow water reef and lagoon component proposed on the southeast corner of Peanut Island is proposed to be excavated from the island upland area to avoid adverse affects to the existing seagrass patch in that vicinity. The "fingers" are no longer proposed in the shallow water reef and lagoon restoration component. The approximate distance between the proposed reef and the existing seagrass bed is still being finalized at this time. The proposed environmental restoration components are not anticipated to change the tidal flushing patterns to adversely affect the seagrass patch in the project vicinity. The National Marine Fisheries Service monitoring recommendations have been noted. We concur that the 'new lagoon' could provide valuable information on the recruitment of seagrasses in a manner similar to the environmental restoration completed at Munyon Island in Lake Worth Lagoon.

Based on this information, we do not believe the existing patch of seagrass in the vicinity of the proposed environmental restoration project will be adversely affected. In addition, the proposed project is an environmental restoration project that proposes to restore historical maritime hammock, mangrove and seagrass habitat. Therefore, pursuant to Section 7 of the Act, we have determined that the proposed action would not likely adversely affect Johnson's Seagrass and are asking for concurrence in this matter.

While we believe there would be no "incidental take" of Johnson's Seagrass, it appears that there is no incidental take prohibition for this threatened plant species (Final ESA Consultation Handbook, March 1998). This action would not occur in or impact any proposed critical habitat for the species (Federal Register, December 2, 1999).

If you have any questions concerning this project, please contact Mr. Paul Stevenson at 904-232-2130.

Sincerely,

James C. Duck
Chief, Planning Division

Enclosures

Copy Furnished:

Mr. Carmen Vare-Vernachio, Environmental Specialist, Palm Beach County DERM
3323 Belvedere Road, Bldg 502, West Palm Beach Florida 33406

bcc: CESAJ-DP-I (T. Murphy)
CESAJ-PD-PF (P. Karch)

Stevenson/CESAJ-PD-ER/2130/
Dugger/CESAJ-PD-ER
Smith/CESAJ-PD-E
Strain/CESAJ-PD-P
Murphy/CESAJ-DP-I
Duck/CESAJ-PD

L: group/pde/pablo/noefnmfseagrs.doc



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 570-5517

MAR -9 1999

F/SER3:LEB

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

Dear Mr. Duck:

This responds to your February 5, 1999 letter to me regarding the Section 1135 Peanut Island Environmental Restoration Project in Lake Worth Lagoon, Palm Beach County, Florida. The purpose of this project is to reestablish historic habitat for fisheries and wildlife by creating wetland and upland habitat on Peanut Island. The project proposes the creation of a 1.0 acre shallow-water reef habitat to -10 feet National Geodetic Vertical Datum (NGVD), by clearing exotic vegetation, excavating dredged material and placing limestone boulders as substrate for reef habitat on the southeast side of the island, and creating an adjacent 1.0 acre shallow-water lagoon to a depth of -5 feet NGVD by removing dredged material. According to your letter, there may be impacts to seagrass, including the Federally-listed threatened Johnson's seagrass, *Halophila johnsonii*. This initiates consultation under section 7 of the Endangered Species Act (ESA).

In order for National Marine Fisheries Service (NMFS) to complete a section 7 consultation, we need complete information regarding the presence and amount of Johnson's seagrass that occurs in the project site and how this species may be affected by the project's actions. The 1.0 acre seagrass bed located at the site of the proposed shallow-water reef habitat on the southeast end of Peanut Island has not been identified by species. In addition, the Draft Marine Seagrass Survey is of little use for this project since it constitutes a survey of the Intracoastal Waterway (ICW) and is not a survey around Peanut Island. Any *Halophila* observed was not identified to species. The shallow shoreline, an area where Johnson's seagrass is known to occur, was not surveyed. The survey occurred in October rather than in the summer, as recommended, when growth and abundance of seagrass are optimal. In addition, a trained surveyor should be able to identify Johnson's seagrass, distinguishing it from other *Halophila* species, with the naked eye. A surveyor could choose to use an underwater magnifier or light, however, taking of samples should not be necessary (particularly during preferred summers surveys) unless water clarity is so poor that it prevents in-water identification.



Lake Worth Lagoon is a significant area for Johnson's seagrass. According to Figure 2, Page 4 of the Environmental Assessment Report, the 1.0 acre of seagrass will not be directly affected by the construction of the artificial reef with the chosen Alternative A. However, the loss of sea floor adjacent to seagrass beds can negatively impact their existence. NMFS Ecologist Mark Fonseca (1998) wrote: "What we have found is that patchy seagrass beds colonize new space and vacate existing, occupied space over time. This is not news, we have simply documented this in seagrass beds of *Halodule wrightii* and *Zostera marina* in North Carolina. Some of this movement is from vegetative propagation (e.g., runners or tillers), some is the result of successful seed colonization, and some is from plant mortality (creation of vacancies). The rate at which this movement occurs depends upon the inherent population growth rate of the species involved, and *Halophila* spp. have some of the highest rates on record (Josselyn *et al.* 1986, Kenworthy *et al.* 1989). So to remove a section of the sea floor among existing patches from future colonization is to prevent existing seagrass, which *must* migrate, from colonizing new areas and maintaining its local overall abundance. Such a removal ultimately deletes a portion of the baseline resource and when represented as a spatial pattern on the sea floor, constitutes a fragmentation of the existing resource."

It is unclear from the information provided whether the new artificial reef structure (fingers) would eliminate open patches of sea floor that allow for the natural future colonization of seagrasses, particularly Johnson's seagrass which is known to rely heavily on vegetative propagation and migration to adjacent open sea floor. The southeast corner of the proposed reef appears to have the most potential of interrupting seagrass growth. NMFS may concur that this project offers a net benefit to the environment but only if it is not eliminating seagrass habitat in the process. A combination of beneficial and adverse effects is still "likely to adversely affect" Johnson's seagrass.

Although you state that the construction of the artificial reef would be located to avoid any seagrasses, you state further in your letter that "there may be some change in the tidal flushing patterns around the island" and "have not been able to determine how much seagrass could be impacted." Page 35, 4.5.4 of the Environmental Restoration Report states that the proposed tidal changes have the potential to recruit *Halophila johnsonii*. NMFS agrees that the creation of shallow-water habitat adjacent to the shallow-water reef *has the potential* for seagrass recruitment and therefore *may* have an eventual beneficial effect upon Johnson's seagrass. However, if recruitment does occur, it cannot be determined with certainty that it would be of Johnson's seagrass.

If Johnson's seagrass does exist in the project area, then the *preliminary assessment* appears to be that this project may affect but not adversely affect Johnson's seagrass. However, a final determination cannot be made, and a section 7 consultation under the ESA can not be concluded, until further information is provided to NMFS, Protected Resources Division on: a) the presence and amount of Johnson's seagrass in the project area, and b) the submerged structure of the proposed shallow-water reef. If Johnson's seagrass does not exist in the project area, a section 7 consultation with this office is not necessary.

NMFS requests the following information:

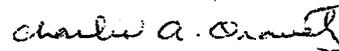
1. Does Johnson's seagrass exist in this 1.0 acre of seagrass? If so, please identify its relative abundance at this site.
2. How much of the sea floor (potential seagrass habitat) will be covered by the new shallow-reef structure? What are the dimensions of the "fingers" that will occur on either side of the seagrass bed? To what maximum depth will they extend? What will be the approximate distance(s) between the reef and seagrass bed? (Figure 2, Page 5, Environmental Restoration Report).
3. Could changes in tidal flushing patterns produce an erosion or deposition of sand on the 1.0 acre seagrass bed or adjacent areas?

In addition, NMFS strongly recommends pre- and post-monitoring for three years of the 1.0 acre seagrass bed and the proposed shallow-water lagoon, regardless of the presence of Johnson's seagrass. Such monitoring could include: species identification and abundance, bed/patch dimensions, seagrass bed location (using GPS to map its boundaries). Changes in the existing seagrass bed would be tracked over time, and the monitoring of the "new" shallow-water lagoon could provide valuable information on the recruitment of seagrass, including Johnson's seagrass, into such an area. This information will be useful to the COE and NMFS when considering future COE permitting requests in areas where *Halophila johnsonii* exists and will facilitate and expedite the permitting process. The COE should develop estimates of annual take of Johnson's (and other) seagrass anticipated by projects within Florida's intracoastal waterways within Johnson's seagrass habitat.

NMFS suggests that the Environmental Restoration Report be amended to include the Federally-listed threatened species under NMFS purview, Johnson's seagrass, *Halophila johnsonii*.

We appreciate the opportunity for initial consultation on this project and look forward to working with you for the conservation of listed species. If you have any questions please contact Ms. Layne Bolen, Fishery Biologist, of the Protected Resources Division at 727-570-5312.

Sincerely,



Charles A. Oravetz
Chief, Protected Resources Division

cc: F/PR3

F/SER4 - M. Thompson

o:/section7/informal/peanutis.jsg

File: 1514-22 f.1 FL (JSG)

References Cited:

Fonseca, M.S. 1998. Memorandum to M. Thompson, NMFS Habitat Conservation Division, Response to comments by C. Isiminger and attachments. 18 August.

Josselyn, M., M.S. Fonseca, T. Niesen and R. Larson. 1986. Biomass, production and decomposition of a deep-water seagrass, *Halophila decipiens* Ostenf. Aquatic Botany, Vol. 25, p. 47-61.

Kenworthy, W.J., C.A. Currin, M.S. Fonseca and G. Smith. 1989. Production, decomposition, and heterotrophic utilization of the seagrass *Halophila decipiens* in a submarine canyon. Mar. Ecol. Prog. Ser. 51:277-290.



SOUTH FLORIDA WATER MANAGEMENT DISTRICT

3301 Gun Club Road, West Palm Beach, Florida 33406 • (561) 686-8800 • FL WATS 1-800-432-2045 • TDD (561) 697-2574
Mailing Address: P.O. Box 24680, West Palm Beach, FL 33416-4680 • www.sfwmd.gov

January 28, 2000

Russ Rote, P.E., Chief
Flood Control and Flood Plain Management Section
Planning Division
U.S. Army Corps of Engineers
Jacksonville District
400 West Bay Street
Jacksonville, FL 32202

Dear Mr. Rote:

**SUBJECT: PEANUT ISLAND ENVIRONMENTAL RESTORATION
ENVIRONMENTAL RESOURCE PERMIT**

This letter is written to provide preliminary comments regarding the conceptual design associated with the Peanut Island Environmental Restoration project (plans attached). The South Florida Water Management District has reviewed the conceptual plans and concludes that the project could meet the conditions for issuance of an Environmental Resource Permit and be recommended for permit issuance.

The project proposes environmental features including a shallow-water reef, shallow-water lagoons, tidal pond and flushing channels to restore existing mangroves and erosion control and public access features. There are likely to be some wetland impacts associated with the project that may necessitate mitigation. Construction techniques will be reviewed to minimize impacts and to maintain compliance with water quality standards.

If you have any questions, please feel free to contact me at (561) 682-6951.

Sincerely:

A handwritten signature in cursive script, appearing to read "Robert Robbins".

Robert Robbins, Director
Natural Resource Management Division

c: Julie Bishop, Palm Beach County DERM

GOVERNING BOARD

Michael Collins, *Chairman*
Michael D. Minton, *Vice Chairman*
Mitchell W. Berger

Vera M. Carter
Gerardo B. Fernandez
Patrick J. Gleason

Nicolas J. Gutierrez, Jr.
Harkley R. Thornton
Trudi K. Williams

EXECUTIVE OFFICE

Frank R. Finch, P.E., *Executive Director*
James E. Blount, *Chief of Staff*

Planning Division
Environmental Branch

DEC 08 1999

Mr. Charles A. Oravetz
Chief, Protected Resources Division
National Marine Fisheries Services
Southeast Regional Office
9721 Executive Center Drive North
St. Petersburg, Florida 33702

Dear Mr. Oravetz:

This is in reference to the Section 1135 Peanut Island Environmental Restoration Project Study in Lake Worth Lagoon, which we are currently conducting. We received your March 9, 1999 Section 7 consultation reply (enclosed) that requested additional information concerning the listed Johnson's Seagrass in the project vicinity. After further investigations and design considerations, adverse affect to the Johnson's Seagrass within the project vicinity are unlikely.

The approximate 1.0 acre area of seagrass located to the southeast of the proposed Section 1135 Peanut Island Environmental Restoration Project was inspected by a U.S. Army Corps of Engineers and local sponsor dive team September 20, 1999. No activity is planned within 25 feet of this area. The team's inspection revealed the seagrass area to be comprised primarily of Cuban Shoalweed (*Halodule wrightii*) with Johnson's Seagrass (*Halophila johnsonii*) in the deeper areas (down to 6-0' MLW) and shallow areas (up to 1-0' MLW). It was also noted the substrate changed from sand to small rock along the eastern edge of the seagrass area. Some areas of mixed seagrass (co-dominance of both species) was also noted (see enclosure 2).

The shallow water reef and lagoon component proposed on the southeast corner of Peanut Island is proposed to be excavated from the island upland area to avoid adverse affects to the existing seagrass patch in that vicinity. The "fingers" are no longer proposed in the shallow water reef and lagoon restoration component. The approximate distance between the proposed reef and the existing seagrass bed is still being finalized at this time. The proposed environmental restoration components are not anticipated to change the tidal flushing patterns to adversely affect the seagrass patch in the project vicinity. The National Marine Fisheries Service monitoring recommendations have been noted. We concur that the 'new lagoon' could provide valuable information on the recruitment of seagrasses in a manner similar to the environmental restoration completed at Munyon Island in Lake Worth Lagoon.

Based on this information, we do not believe the existing patch of seagrass in the vicinity of the proposed environmental restoration project will be adversely affected. In addition, the proposed project is an environmental restoration project that proposes to restore historical maritime hammock, mangrove and seagrass habitat. Therefore, pursuant to Section 7 of the Act, we have determined that the proposed action would not likely adversely affect Johnson's Seagrass and are asking for concurrence in this matter.

While we believe there would be no "incidental take" of Johnson's Seagrass, it appears that there is no incidental take prohibition for this threatened plant species (Final ESA Consultation Handbook, March 1998). This action would not occur in or impact any proposed critical habitat for the species (Federal Register, December 2, 1999).

If you have any questions concerning this project, please contact Mr. Paul Stevenson at 904-232-2130.

Sincerely,

James C. Duck
Chief, Planning Division

Enclosures

Copy Furnished:

Mr. Carmen Vare-Vernachio, Environmental Specialist, Palm Beach County DERM
3323 Belvedere Road, Bldg 502, West Palm Beach Florida 33406

bcc: CESAJ-DP-I (T. Murphy)
CESAJ-PD-PF (P. Karch)

Stevenson/CESAJ-PD-ER/2130/
Dugger/CESAJ-PD-ER
Smith/CESAJ-PD-E
Strain/CESAJ-PD-P
Murphy/CESAJ-DP-I
Duck/CESAJ-PD

L: group/pde/pablo/noefnmfseagr.doc

Planning Division
Environmental Branch

FEB 07 2000

Mr. Charles A. Oravetz
Chief, Protected Resources Division
National Marine Fisheries Services
Southeast Regional Office
9721 Executive Center Drive North
St. Petersburg, Florida 33702

Dear Mr. Oravetz,

This letter initiates coordination under the Magnuson-Stevens Fishery Conservation and Management Act. It is in reference to the Section 1135 Peanut Island Environmental Restoration Project Study in Lake Worth Lagoon, which we are currently conducting. The project proposes to restore approximately 3 acres of existing mangroves habitat by creating 1.5 acres of tidal flushing channels and inlet ponding areas. The project also proposes to create 1.3 acres of shallow water reef, 3 acres of shallow water lagoon, remove exotic vegetation and plant approximately 7 acres of native maritime hammock species, 4 acres of coastal strand species, 4.6 acres of beach dune species and 16 acres of submerged wetlands (see enclosure 1).

The shallow water reef and lagoon component proposed on the southeast corner of Peanut Island is proposed to be excavated from the island upland area to avoid adverse affects to the existing seagrass patch in that vicinity. The proposed environmental restoration components are not anticipated to change the tidal flushing patterns to adversely affect the seagrass patch in the project vicinity (see enclosure 2). The project would provide additional habitat and habitat improvement for seagrass, mangroves and open water.

Therefore, pursuant to the Magnuson-Stevens Fishery Conservation and Management Act (Section 600.920(g)), we have determined that the proposed action would not likely adversely affect any essential fish habitat within the project area and are asking for concurrence in this matter.

A copy of the revised draft Peanut Island, Environmental Assessment, January 2000, is enclosed for your information.

James C. Duck
Chief, Planning Division

Enclosure

Copies Furnished:

Mr. Mark Thompson, National Marine Fisheries Service, Environmental Assessment
Branch, 3500 Delwood Beach Road, Panama City, Florida 32407-7499

Mr. Carmen Vare-Vernachio, Environmental Specialist, Palm Beach County Department
Environmental Resources Management, 3323 Belvedere Road, Building 502, West
Palm Beach, Florida 33406

bcc:

CESAJ-PD-PF (P. Karch)

[Handwritten initials] Stevenson\CESAJ-PD-ER\2130\als 1/27/00
[Handwritten initials] Dugger\CESAJ-PD-ER
[Handwritten initials] Smith\CESAJ-PD-E
[Handwritten initials] Strain\CESAJ-PD-P
[Handwritten initials] Murphy\CESAJ-DP-I *24*
[Handwritten initials] Dyer\CESAJ-PD

L: group/pde/pablo/efhitr.doc



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 29, 2000

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

Dear Mr. Duck:

The National Marine Fisheries Service (NMFS) has reviewed your staff's letter dated February 7, 2000, concerning coordination under the Magnuson-Stevens Fishery Conservation and Management Act (Magnuson-Stevens Act) and the revised draft Environmental Assessment (EA) dated January 2000 for the proposed Peanut Island Environmental Restoration Project in Lake Worth, Palm Beach County, Florida.

The proposed restoration project includes constructing a 1.3 acre shallow water reef, 3.0 acres of mangrove restoration, 3.0 acres of shallow water lagoon, tidal ponds and channels, 7.1 acres of maritime hammocks restoration, 3.9 acres of coastal strand restoration, and 4.6 acres of beach dune restoration. In addition, dredged material used in the above mentioned restoration components of Peanut Island will be used for the restoration of 16.0 acres of a previously dredged site within Lake Worth (City of Lake Worth Wetland Restoration area). The latter will restore the shallow water habitat of the dredged area in order to provide suitable conditions for recolonization of seagrasses and benthic communities. The close proximity of the project to the Lake Worth Inlet should provide high water quality and recruitment of marine organisms to the restored habitat. The project design should maximize the amount of tidally influenced habitat and may increase the potential of mangrove and seagrass recruitment to Peanut Island. For this aspect of the work, we concur with your determination that the proposed action would not likely adversely affect Essential Fish Habitat as designated under the Magnuson-Stevens Act.

However, it is not clear in the EA how the shallow water reef habitat will be designed and constructed, other than placement of limestone boulders will occur in the vicinity of the proposed lagoon area on the southeast side of the island. Because of the apparent close proximity of the proposed shallow water reef to existing seagrasses, the seagrass area should be monitored to assess direct impact during reef construction and from any scouring that may occur from wave energy deflecting from the limestone boulders.



Also, based on a recent Corps of Engineers' (COE) Notice of Noncompliance (199603357[NC-BM]) to Palm Beach County and their contractor, Intercounty Engineering Inc., for unauthorized work in seagrasses at the Light Harbor Marina Park from barges and tug boats associated with permitted work on Peanut Island, the NMFS has concerns that barges and other equipment working within the area around Peanut Island during the COE's restoration project will also impact shallow seagrass beds in Lake Worth. The COE should prepare, and provide for our review, a construction plan that details the operating depths of the barge staging areas, routes to and from Peanut Island, locations in the area where seagrasses exist and the means to avoid impacting these areas. We recommend a pre- and post-construction seagrass monitoring schedule be implemented. This will provide current data if impacts to seagrass habitat do occur.

In consideration of the potential impacts associated with seagrass habitat and to ensure the conservation of Essential Fish Habitat and fishery resources, the NMFS recommends that the final action on the proposed action should require the following:

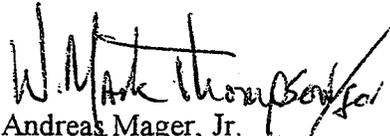
EFH Conservation Recommendation

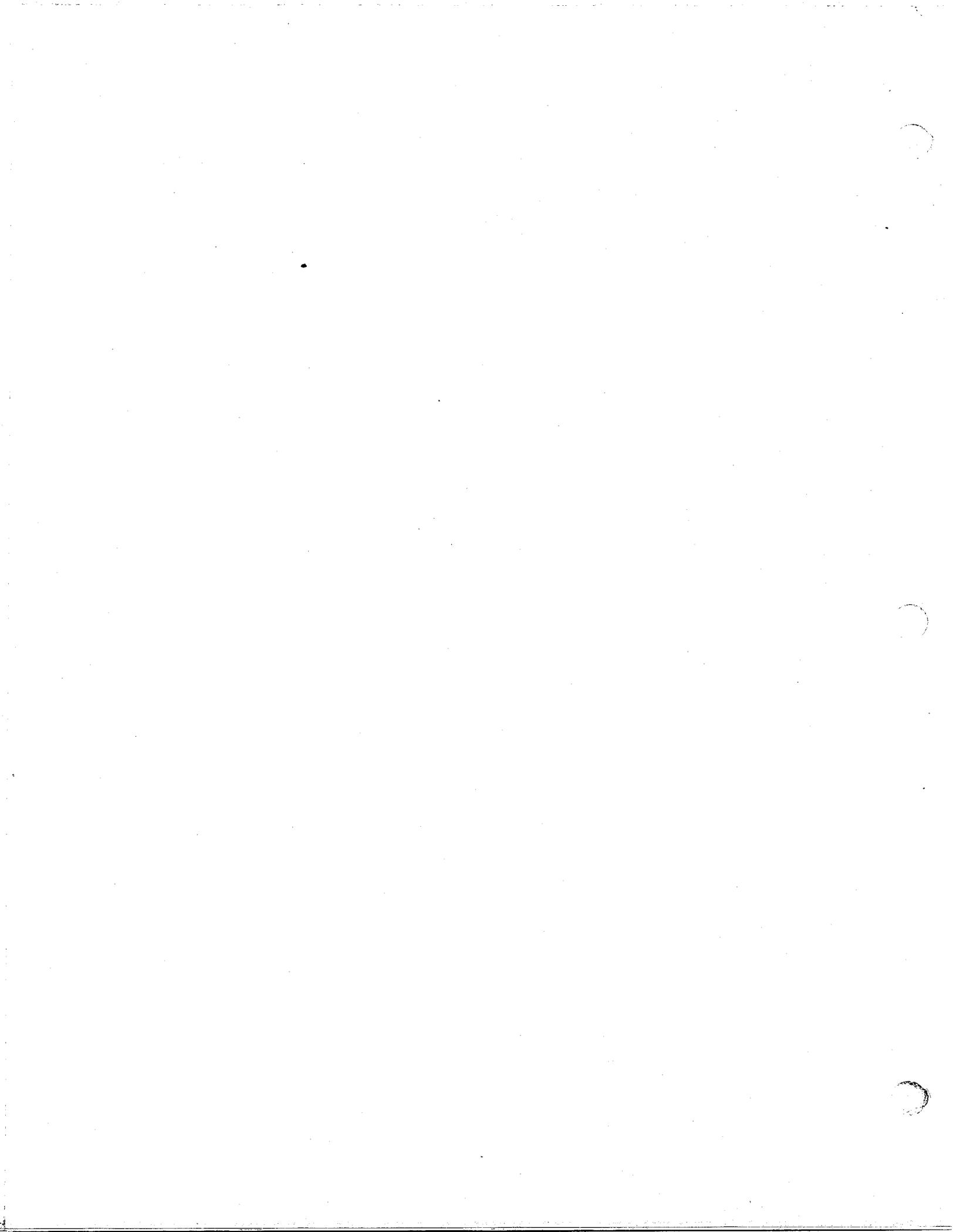
1. That a construction plan for all aspects of the project be developed to avoid seagrass impacts.
2. A seagrass monitoring plan be developed for the area of Lake Worth that will be subjected to construction equipment and activities associated with this project.

Please be advised that the Magnuson-Stevens Act and the regulation to implement the EFH provisions (50 CFR Section 600.920) require your office to provide a written response to this letter. That response must be provided within 30 days and at least 10 days prior to final agency action. A preliminary response is acceptable if final action cannot be completed within 30 days. Your final response must include a description of measures to be required to avoid, mitigate, or offset the adverse impacts of the activity. If your response is inconsistent with our EFH Conservation Recommendation, you must provide an explanation of the reasons for not implementing those recommendations.

We appreciate the opportunity to provide these comments. If we can be of further assistance, please advise. Related comments, questions or correspondence should be directed to Mr. Michael R. Johnson in Miami, Florida, at 305-595-8352.

Sincerely,


Andreas Mager, Jr.
Assistant Regional Administrator
Habitat Conservation Division



PEANUT ISLAND - PALM BEACH COUNTY
MAILING LIST

U.S. Department of Commerce
Attn: Donna Wieting
ACHB SQ Room 6117
Washington, D.C. 20230 (5 cys)

Florida Audubon Society
1101 Audubon Way
Maitland, Florida 32751-5451

Field Supervisor
U.S. Fish and Wildlife Service
P. O. Box 2676
Vero Beach, Florida 32961-2676

Florida State Clearinghouse
The Dept. of Community Affairs
2555 Shumard Oak Blvd.
TAL, FL 32399-2100 (16 cys)

Florida Wildlife Federation
P. O. Box 6870
TAL, Florida 32314-6870

Regional Environmental Officer
Housing & Urban Development
Room 600-C
75 Spring St., SW
ATL, Georgia 30303-3309

Commander (OAN)
Seventh Coast Guard District
909 S.E. 1st Avenue
Bricknell Plaza Federal Building
MIA, Florida 33131-3050

State Conservationist
Natural Resources Conservation
Service, USDA
401 First Avenue, S.E.
P.O. Box 1280
GVL, FL 32602-1280

Wilderness Society
4203 Ponce DeLeon Blvd.
Coral Gables, Florida 33416

National Marine Fisheries Service
Environmental Assessment Branch
3500 Delwood Beach Road
Panama City, Florida 32407-7499

National Marine Fisheries Service
Chief, Protected Species Branch
9721 Executive Center Drive N
St. Petersburg, Florida 33702

Harbor Branch Oceanographic Inst.
5600 Old Dixie Highway
Fort Pierce, Florida 34946

Board of County Commissioners
3111 S. Dixie Hwy, Ste 146
WPB, FL 33405 (5 cys)

U.S. Geological Survey
Water Resources Division
6482 SE Federal Highway
Stuart, Florida 33494

Honorable Bob Graham
P.O. Box 3050
TAL, Florida 32315

Honorable Connie Mack
1211 Governors Square Blvd, Ste 404
TAL, Florida 32301-2988

South Florida Section Leader
Florida Game and Freshwater
Fish Commission
110 43rd Avenue SW
Vero Beach, Florida 32968

Regional Director
U.S. Fish and Wildlife Service
1875 Century Blvd.
ATL, Georgia 30345

Office of the Director
Florida Marine Fisheries Commission
2450 Executive Center Circle West
Ste 204
TAL, Florida 32301

Chief
Environmental Sciences Division
South Florida Water Management
District
P.O. Box 24680
WPB, Florida 33416-4680

Office of the Director
Treasure Coast Regional Planning
Council
P.O. Box 1529
Palm City, Florida 34990

Florida Wildlife Federation
P.O. Box 6870
TAL, FL 32314-6870

Office of the Director
FL Department of Environmental
Protection
1801 Hillmore Drive
Ste C-204
Port St. Lucie, FL 34952 (2 cys)

Derek Busby, Project Director
Indian River Lagoon National
Estuary Program
1900 South Harbor City Blvd
Ste 109
Melbourne, Florida 32901-4749

Mr. Carman Vare-Vernachio
Senior Environmental Analyst
Coastal and Wetlands Division
3111 South Dixie Highway, Ste 146
WPB, Florida 33405

Audubon Society of the Everglades
P.O. Box 16914
WPB, FL 33416-6914

Ms. Sally Warner
Bureau of Survey and Mapping
Division of State Lands
3900 Commonwealth Blvd., M.S. 105
TAL, FL 32311

Mr. Gerald M. Ward
P.O. Box 10441
Rivera Beach, Florida 33419

American Littoral Society
2809 Bird Ave., Ste 162
MIA, Florida 33133

The Nature Conservancy
Florida State Office
1353 Palmetto Avenue
Winter Park, FL 32789

Mr. David Roach
F.I.N.D.
1314 Marcinski Road
Jupiter, FL 33477

Isaac Walton League of America, Inc.
5314 Bay State Road
Palmetto, FL 33561-9712

Mr. David Godfrey
Caribbean Conservation Corp
P.O. Box 2866
GVL, FL 32602-2866

Florida Dept. Of Envir Protection
Office of Aquatic Preserves
1801 SE Hillmoor Drive, Ste 0204
Port St. Lucie, FL 34952-7551

US Env Protection Agency
South Florida Office
400 N. Congress Ave., Suite 120
WPB, FL 33401

Division of State Lands
Bureau of Survey & Mapping
3900 Commonwealth Blvd, M.S. 105
TAL, FL 32399-3000

Florida Dept. of Envir. Protection
Division of State Lands
P.O. Box 15425
WPB, FL 33416-5425

Florida Dept. of Envir. Protection
South Florida District
P.O. Box 15425
WPB, FL 33416-5425

Mr. George W. Percy
State Historic Preservation Officer
Division of Historical Resources
500 South Bronough Street
TAL, FL 32399-0250

Mr. Heinz Mueller
US Envir Protection Agency
Environmental Policy Section
61 Forsythe Street
ATL, GA 30303-3104 (5 cys)

Florida Dept. of Envir. Protection
Florida Marine Research Institute
19100 SE Federal Highway
Tequesta, FL 33469

FL Game & Fresh Water Fish. Comm.
255 154th Avenue
Vero Beach, FL 32968-9041

Regional Director
FEMA Insurance & Mitigation Division
3003 Chamblee-Tucker Road
ATL, GA 30341

Executive Director
South Florida Water Management Dist.
3301 Gun Club Road
WPB, FL 33416

National Marine Fisheries Service
11420 North Kendall Dr., Ste 103
Miami, FL 33176

Regional Director
National Marine Fisheries Service
9721 Executive Center Drive
St. Petersburg, FL 330702

Prof. John Gifford Rasmus
University of Miami
4600 Rickenbacker Causeway
MIA, FL 33149-1098

Mr. Tom Logan
FL Game & Fresh Water Fish Comm
Endangered Species Coordinator
620 South Meridian Street
TAL, FL 32399-1600

Mr. Richard E. Walesky
Palm Beach County Department of
Environmental Resources Mgmt
3323 Belvedere Road
WPB, FL 33406

Mr. Bradley J. Hartman
FL Game & Fresh Water Fish Comm
Director Office of Env Services
520 South Meridian Street
TAL, FL 32399-1600

Honorable Edward J. Healey
3003 S. Congress Ave., Ste 2D
Palm Springs, FL 33461

Honorable E. Clay Shaw, Jr.
222 Lakeview Ave., Ste 162
WPB, FL 33401

Honorable Robert Wexler
2500 N. Military Trail, Ste 100
Boca Raton, FL 33431

Honorable Alcee L. Hastings
5725 Corporate Way, Ste 208
WPB, FL 33407

Honorable William G. Myers, M.D.
50 Kindred St., Ste 301
Stuart, FL 34994-3058

Honorable M. Mandy Dawson-White
33 N.E. 2nd St., Ste 209
Ft. Lauderdale, FL 33301-1033

Honorable James A. Scott
2000 E. Oakland Park Blvd
Ft. Lauderdale, FL 33306-1195

Honorable Ron Klein
333 South Congress Ave., Ste 305A
Delray Beach, FL 33445

Honorable Tom Rossin
1241 Okeechobee Road
Bldg A, Ste 4
WPB, FL 33401-6953

Honorable Sharon J. Merchant
824 U.S. Hwy 1, Ste 260
North Palm Beach, FL 33408

Honorable Addie L. Greene
330 Clematis St., Ste 104B
WPB, FL 33401-4602

Honorable Lois J. Frankel
1645 Palm Beach Lake Blvd
Ste 290
WPB, FL 33401

Honorable William F. Andrews
777 E. Atlantic Ave., Ste 226
Delray Beach, FL 33483-5352

Honorable Suzanne Jacobs
990 S. Congress Ave., Ste 5
Delray Beach, FL 33445-4653

Honorable Debbie P. Sanderson
4800 N.E. 20th Terrace
South Bldg, Ste 401
Ft. Lauderdale, FL 33308-4572

