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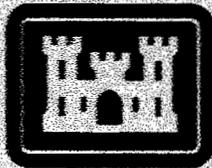
August 2000

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**SARASOTA BAY  
ECOSYSTEM RESTORATION  
SARASOTA BAY, FLORIDA**

**DRAFT  
ECOSYSTEM RESTORATION REPORT  
AND ENVIRONMENTAL ASSESSMENT**

**SECTION 1135  
ECOSYSTEM RESTORATION**



**US Army Corps  
of Engineers  
Jacksonville District**

**DRAFT**  
**SECTION 1135 ENVIRONMENTAL RESTORATION REPORT**  
**AND ENVIRONMENTAL ASSESSMENT**

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**SARASOTA BAY**  
**SARASOTA COUNTY, FLORIDA**

**DRAFT**  
**ENVIRONMENTAL RESTORATION REPORT**

**U.S. ARMY CORPS OF ENGINEERS**  
**JACKSONVILLE DISTRICT**

**AUGUST 2000**

# Draft Ecosystem Restoration Report

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**DRAFT  
ECOSYSTEM RESTORATION REPORT  
FOR SARASOTA BAY  
SARASOTA COUNTY, FLORIDA**

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**1.0 Study Purpose and Need**

**1.1. Study Authority**

This report is submitted under the authority of Section 1135, 1986 Water Resources Development Act (WRDA), as amended by the 1990 Water Resources Development Act. The act reads, in part, as follows:

“The Secretary is authorized to review the operation of water resources projects constructed by the Secretary (Corps built projects) to determine the need for modifications in the structures and operation of such projects for the purpose of improving the quality of the environment in the public interest.”

**1.2. Study Location**

Sarasota Bay is located on the west central coast of Florida between Tampa and Venice, Florida. The system is bordered by a chain of coastal barrier islands (Anna Maria Island, Longboat Key, Lido Key, Siesta Key, and Casey Key). The six priority disposal islands for this project are located in lower Sarasota Bay, see Figure 1. The following is a location description of the proposed project disposal islands from south to north:

- Snake Island is the southernmost project disposal island located at the Venice Inlet. Snake Island is approximately 2 acres in size and is owned by the West Coast Inland Navigation District.
- Palmer Point Park is a 33-acre disposal island owned by Sarasota County. Palmer Point Park is located in lower Sarasota Bay (Little Sarasota Bay) toward the north end of Casey Key. The project area for this island includes approximately 5 acres of the southeast portion of the island.
- Jim Neville Marine Preserve, a 35-acre preserve owned by Sarasota County, is located directly north of Palmer Point Park, toward the southern end of Siesta Key.
- Skier’s Island is an 8-acre disposal island, which is owned by the West Coast Inland Navigation District, located in Roberts Bay.

- The Bird Colony Islands, covering approximately 2 acres, are located across the Gulf Intracoastal Waterway (GIWW) to the northeast of Skiers' Island in Roberts Bay.
- Big Edwards Island is a 6-acre disposal island owned by Sarasota County. Big Edwards Island is located in Roberts Bay just south of the Siesta Key bridge.

### **1.3. Study Need and Opportunity**

Sarasota Bay was designated as a priority water body by the U.S. Environmental Protection Agency (EPA) in Section 320 of the Clean Water Act, as amended in 1987. In 1989, the Sarasota Bay National Estuary Program (SBNEP) completed a comprehensive technical assessment of the estuarine system in Sarasota Bay, *Sarasota Bay - The Voyage to Paradise Reclaimed: The Comprehensive Conservation management Plan for Sarasota Bay* (Reference 1). The findings of the assessment documented problems within the bay including the loss of approximately 40-percent of historical intertidal wetlands and 30-percent of historical seagrass beds. These habitats are critical nursery and foraging habitats for a variety of economically important fisheries species including snook, red drum, spotted sea trout, and mullet.

A portion of the historical wetland and habitat loss in Sarasota Bay is a result of the U.S. Army Corps of Engineers' placement of dredged fill material from the construction of the GIWW during the 1950's and early 1960's. During this time, the dredged material was placed within the bay to build-up existing islands or create new disposal islands visible to navigators, thus preventing dangerous shoals. Dredge material was frequently placed in mangroves and shallow water bay bottoms creating upland areas. The disposal islands that are part of this project, including Big Edwards Island, Bird Colony Islands, Skiers' Island, Snake Island, Jim Neville Marine Preserve, and Palmer Point Park, are all examples resulting from this practice.

The remaining wetlands and habitat within and adjacent to the study limits are impacted by the presence of non-native nuisance vegetation on these disposal islands and on-going erosion problems. The presence of exotic plant species inhibits the growth of native species resulting in low to no diversity of native species found on these islands. In addition, one exotic species, the Australian pine (*Casuarina equisetifolia*), has shallow root systems that can easily be uprooted and displaced by hurricanes and strong winds, potentially causing navigational problems or damaging property. Erosion is a problem on several of the disposal islands, which impacts both the water quality, as a result of the increased turbidity in the bay, and the filling of navigational channels.

The study is consistent with the Sarasota Bay National Estuary Program's *Comprehensive Conservation and Management Plan*. Specifically, the proposed project will help implement Action Items 1.2 (enhance, restore and create wetlands throughout the bay region) and 1.7 (remove exotic plants from wetlands). This project is especially beneficial because of the limited opportunity for restoring lands in the study area resulting from extensive coastal development. The project is also consistent with Sarasota County's Comprehensive Plan, which supports the implementation of the

SBNEP's *Comprehensive and Management Plan* (Policy 2.1.6), disposal island restoration (Policy 2.2.2) and the restoration of productive native habitat.

The purpose of this report is to present a Recommended Plan and the appropriate documentation in compliance with environmental statutes for the restoration of Big Edwards Island, Jim Neville Marine Preserve, Palmer Point Park, Skiers' Island, the Bird Colony Islands, and Snake Island. This project will provide the restoration and creation of habitat for native vegetation, fisheries, and wildlife.

#### **1.4. Study Goal or Objective**

##### General Goal

The primary goal of this study is to ecologically restore the degraded habitat by removing exotic vegetation, excavating tidal channels, and planting native vegetation. Striving to meet this goal, this study will concentrate on the existing disposal islands in Sarasota Bay and Venice Inlet.

##### Study Objective

The primary objective of this study is to restore the degraded ecosystem structure, function, and dynamic processes to a less degraded more natural condition. As a result, this study will identify, analyze, and recommend the most efficient, reliable, and cost effective alternatives for restoring the ecosystem.

#### **1.5. Permits, Licenses, and Entitlements**

On April 4, 2000, a meeting was held for this project between the interagency team and representatives from the Florida Department of Environmental Protection, the US Army Corps of Engineers' Regulatory Division, and the National Audubon Society. The purpose of this meeting was to discuss environmental issues and the permitability of the proposed restoration concepts. The anticipated permits that will be required for this project include:

- Environmental Resource Permit – Florida Department of Environmental Protection (Florida Statute 373)
- Section 10, Rivers and Harbors Act, U.S. Environmental Protection Agency

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## 2.0 ALTERNATIVES

This section describes in detail the No-Action Alternative, the proposed action, and other reasonable alternatives that were studied. Based on the information and analysis presented in the sections 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 decisionmaker and the public.

### 2.1 Description of Alternatives

For each of the disposal islands, several alternatives have been identified to accomplish the restoration objective of the proposed project. Common to all alternatives are combinations of the following components:

- Removal of exotic vegetation in both the upland and wetland areas.
- Creation of coastal upland habitats that will provide resting and feeding areas for native and migratory birds. Upland restoration areas will include coastal hammock vegetation as well as native sub-tropical trees and shrubs that will create diverse habitats.
- Creation of high and low marsh areas, including mangroves, that will function as nursery grounds for many fish and shellfish, as well as provide a benefit to water quality through the assimilation of nutrients and by reduction of erosion.
- Creation of tidal lagoons or open water areas that will provide foraging areas for bottom feeding fish, shorebirds, and invertebrates. These areas will also maximize the "edge effect" of adjacent marsh systems, in addition to providing flow, in several of the alternatives, through the islands.

#### 2.1.1 Big Edwards Island

##### Concept 1

This concept (Figure 2) involves retaining over half of the island as upland restoration and lowering grades to intertidal elevations to support marsh grasses and mangroves. A small area of high marsh is also proposed. With Concept 1, approximately 4.4-acres of habitat will be created, including 2.7-acres of upland restoration, 1.4-acres of low marsh/mangroves, and 0.3-acres of high marsh. This concept will result in the excavation of approximately 33,500 cubic yards of material and a total project cost between \$800,000 and \$1.35 million.

##### Concept 2

Concept 2 (Figure 3) includes each of the components discussed earlier. This concept includes the creation of approximately 4.3-acres of habitat. Approximately 1.7-acres of upland areas will be restored, involving two separate areas on the north and south ends of the island. This concept also includes the creation of 1.9-acres of low marsh/mangroves and 0.2-acres of high marsh. In addition, an open water/tidal lagoon (0.5-acres) that will be exposed at low tides is located in the middle of the island with channel openings on the west and north sides of the islands. This concept will result in

the excavation of approximately 28,600 cubic yards of material and a total project cost between \$700,000 and \$1.15 million.

### Concept 3

Concept 3 (Figure 4) also includes a mosaic of each of the components discussed at the beginning of this section. This concept includes three separate upland restoration/enhancement areas (1.3-acres); a high marsh area (1.0-acres); two separate low marsh/mangrove areas (1.8-acres); and an open water/tidal lagoon feature (0.4-acres) with an opening to the bay on the west side of the island. In addition, this concept includes a trail/boardwalk around the island and two overlooks for public use. It also includes the potential for educational interpretive signage. This concept will result in the excavation of approximately 28,650 cubic yards of material and a total project cost between \$700,000 and \$1.15 million.

### Concept 4

Concept 4 (Figure 5) was developed in response to several public comments at the public workshops held in February 2000 for this project. This concept is similar to Concept 3 with some minor modifications. It includes a mosaic of upland enhancement (1.7-acres), low marsh/mangroves (1.6-acres), high marshes (0.2-acres) and an open water/tidal lagoon (0.5-acres) with openings to the bay on both the north and west sides of the island. As a result of the public workshop, the upland enhancement/restoration areas were modified to retain some of the unique features of the island, such as the southern upland portion of the island used frequently by the public. This concept also includes a recreational/educational element with a meandering foot trail within the upland areas and a boardwalk over the marshes and open water areas. This concept will result in the excavation of approximately 26,750 cubic yards of material and a total project cost between \$650,000 and \$1.10 million.

### No-Action (Status Quo)

The No-Action Alternative does not include the removal of exotic vegetation or the creation of new habitat. As a result, the No-Action Alternative will result in the continued degradation of the existing upland and mangrove areas by exotic vegetation. There will also be continued erosion occurring on the island, resulting in impacts on water quality. In addition, the potential for fully implementing the SBNEP's approved management plan for Sarasota Bay will be reduced by eliminating this site from consideration.

## 2.1.2 Skiers' Island

### Concept 1

Concept 1 (Figure 6) involves both upland restoration (2.9-acres) and the creation of low marsh/mangrove areas (2.7-acres). The upland restoration areas are located longitudinally in the center of the island with low marshes and mangroves around the outer portions. No filling will occur in the deep water areas surrounding the island, which are currently used for recreation. This concept will result in the excavation of approximately 11,500 cubic yards of material and a total project cost between \$500,000 and \$750,000.

### Concept 2

Concept 2 (Figure 7) includes a mosaic of upland restoration (2.0-acres), low marsh/mangroves (3.7-acres), and open water/tidal lagoon (0.4-acres) areas. The upland restoration areas are proposed at the north and south ends of the island, which have the highest existing elevations. These upland areas are surrounded by low marsh/mangroves systems that extend into the middle of the island. Two small open water/tidal lagoon areas are located toward the middle of the island, one opening to the bay on the west side of the island and one opening to the bay on the east side. These open water/tidal lagoon areas will be exposed during low tides. No filling will occur in the deep water areas surrounding the island, currently used for recreation. This concept will result in the excavation of approximately 14,000 cubic yards of material and a total project cost between \$500,000 and \$800,000.

### Concept 3

Concept 3 (Figure 8) includes upland restoration (2.5-acres), low marsh/mangroves (2.0-acres), and open water/tidal lagoons (0.8-acres). The upland restoration areas are located at each end of the island with an open water channel located through the center of the island with openings to the bay on both the east and west side of the island. Mangroves and emergent marshes surround both the upland and open water areas. No filling will occur in the deep water areas surrounding the island, currently used for recreation. This concept will result in the excavation of approximately 15,100 cubic yards of material and a total project cost between \$500,000 and \$800,000.

### Concept 4

This concept (Figure 9) is similar to Concept 3 with some modifications identified by several participants at the public workshops that were held for this project in February 2000. Like Concept 3, this concept includes two upland restoration areas (2.5-acres) on each end of the island. Mangroves and emergent marshes (1.8-acres) surround these upland areas and an open water/tidal lagoon network (1.0-acres) provides both north/south and east/west flow on the island. The addition of a second opening from the tidal lagoon to the bay is the primary difference between Concept 3 and Concept 4. This concept will result in the excavation of approximately 15,700 cubic yards of material and a total project cost between \$550,000 and \$850,000.

### No-Action (Status Quo)

The No-Action Alternative does not include the removal of exotic vegetation or the creation of new habitat. As a result, the No-Action Alternative will result in the continued degradation of the existing upland and mangrove areas by exotic vegetation. There will be no reduction of the amount of erosion occurring on the island and therefore no benefit to water quality and the ecosystem as a result of the No-Action Alternative. In addition, the potential for fully implementing the SBNEP's approved management plan for Sarasota Bay will be reduced by eliminating this site from consideration.

### 2.1.3 Bird Colony Islands

#### Concept 1

Concept 1 involves shoreline armoring of the Bird Colony Islands along the Intracoastal side of the islands to prevent further erosion. No earthwork is proposed on the islands as a result of this concept. This concept will not create any additional habitat; however, it will protect the existing critical bird-nesting habitat that has been documented on these islands. The total project cost for this concept is estimated to be \$17,000.

#### No-Action (Status Quo)

The No-Action Alternative does not provide any additional protection to the Bird Colony Islands. There will be no reduction of the amount of erosion occurring on the island and therefore no benefit to water quality and the ecosystem as a result of the No-Action Alternative.

### 2.1.4 Jim Neville Marine Preserve

#### Concept 1

Concept 1 (Figure 10) involves connecting the two portions of the island with a tidal lagoon network (7.2-acres). The tidal lagoons will have two openings to the bay on the east side of the island, one on the north portion and one on the south portion. Low marsh/mangroves (17.9-acres) surround the tidal lagoon network. The low marsh/mangrove areas and the tidal lagoon network will work together to create a sheet flow effect over a portion of the island during high tides. In addition, there are occasional upland restoration areas (2.0-acres) located at the existing higher elevations on both the north and south portions of the island. Concept 1 will require the excavation of approximately 123,500 cubic yards of material and the total project will cost between \$2.45 million and \$3.95 million.

#### Concept 2

This concept (Figure 11) is identical to Concept 1, except that it does not provide the connection between the two portions of the island. However, two separate tidal lagoon systems (6.1-acres) are proposed, one on each portion of the island. Low marsh/mangrove areas (18.9-acres) surround the tidal lagoon systems on each portion of the island. In addition, occasional upland restoration areas (2.0-acres) are located on both the north and south portions of the island. Concept 2 will require the excavation of approximately 118,900 cubic yards of material and the total project will cost between \$2.40 million and \$3.85 million.

#### Concept 3

Concept 3 (Figure 12) includes an upland restoration plateau and an upland restoration area on the northern portion of the island and a smaller upland restoration area on the southern portion of the island. The project will restore 6.9-acres of uplands. High salt marshes will surround the upland areas (9.3-acres). Areas of low marsh and mangroves (10.5-acres) will be constructed between the high marsh and the existing salterns. This concept will require the excavation of approximately 34,300 cubic yards of material and the total project will cost between \$1.05 million and \$1.65 million.

#### Concept 4

Concept 4 (Figure 13) was developed from public input at the February 2000 workshops for this project. Similar to Concept 1, this concept involves connecting the two portions of the preserve with a tidal lagoon network. This concept also extends that tidal lagoon to provide more openings to the bay on the west, east and north sides of the island. A total of 10.0-acres of tidal lagoon is included in this concept. As with Concept 1, low marsh and mangroves (16.6-acres) surround the tidal lagoon network on the island with occasional upland areas (2.0-acres) at some of the high points of the island. This concept will require the excavation of approximately 127,250 cubic yards of material and the total project will cost between \$2.5 million and \$4.1 million.

#### Concept 5

Concept 5 (Figure 14) is similar to Concept 4 with some modifications. Similar to Concept 4, this concept involves connecting the two portions of the preserve with a tidal lagoon network. However, this concept provides openings to the bay only on the north and east sides of the island. A total of 7.9-acres of tidal lagoon is included in this concept. As with Concept 4 and 1, low marsh and mangroves (17.6-acres) surround the tidal lagoon network on the island with occasional upland areas (2.0-acres). These low marsh/mangrove systems will provide an opportunity for sheet flow across the island during high tides. This concept will require the excavation of approximately 125,400 cubic yards of material and the total project will cost between \$2.50 million and \$4.05 million.

#### No-Action (Status Quo)

The No-Action Alternative does not include the removal of exotic vegetation or the creation of new habitat. As a result, the No-Action Alternative will result in the continued degradation of the existing upland and mangrove areas by exotic vegetation. In addition, the potential for fully implementing the SBNEP's approved management plan for Sarasota Bay will be reduced by eliminating this site from consideration.

### 2.1.5 Palmer Point Park

#### Concept 1

This concept (Figure 15) includes a tidal lagoon/open water system (0.9-acres) in the center of the island surrounded by low marsh and mangroves (1.6-acres). A small area on the western side of the project is proposed for upland restoration (0.3-acres) with a high marsh (0.2-acres) transitioning down to the low marsh areas. Concept 1 will require the excavation of approximately 7,950 cubic yards of material and the total project will cost between \$300,000 and \$500,000.

#### Concept 2

Concept 2 (Figure 16) is similar to Concept 1 except for the upland restoration area (0.4-acres) is proposed toward the southern portion of the project. Like Concept 1, this concept includes a tidal lagoon/open water system (0.8-acres) in the center of the island surrounded by low marsh and mangroves (1.7-acres). Concept 2 will require the excavation of approximately 6,650 cubic yards of material and the total project will cost between \$250,000 and \$450,000.

### Concept 3

Concept 3 (Figure 17) includes lowering the grade of the entire project area to create a low marsh/mangrove area. This concept will create 3.0-acres of low marsh and mangroves and will allow for sheet flow over the island during high tides. Concept 3 will require the excavation of approximately 5,900 cubic yards of material and the total project will cost between \$250,000 and \$450,000.

### Concept 4

Concept 4 (Figure 18) was developed by one group of citizens at the February 2000 public workshop for this project. This concept involves a tidal lagoon network (1.4-acres) that will provide two openings to the bay on the north and east sides of the project site. The tidal lagoon system is surrounded by low marsh/mangrove areas (1.4-acres), including a small mangrove island in the center of the proposed tidal lagoon. Concept 4 will require the excavation of approximately 8,700 cubic yards of material and the total project will cost between \$500,000 and \$300,000.

### No-Action (Status Quo)

The No-Action Alternative does not include the removal of exotic vegetation or the creation of new habitat. As a result, the No-Action Alternative will result in the continued degradation of the existing upland and mangrove areas by exotic vegetation. In addition, the potential for fully implementing the SBNEP's approved management plan for Sarasota Bay will be reduced by eliminating this site from consideration.

## 2.1.6 Snake Island

### Concept 1

Concept 1 (Figure 19) includes lowering the grade of the entire project area to create a low marsh/mangrove area. This concept will create 1.9-acres of low marsh and mangroves and will allow for sheet flow over the island during high tides. Concept 1 will require the excavation of approximately 5,950 cubic yards of material and the total project will cost between \$250,000 and \$400,000.

### Concept 2

This concept (Figure 20) includes an upland enhancement area (0.4-acres) toward the eastern side of the island with low marsh/mangroves (0.8-acres) along the northern, western and southern sides. A high marsh transitional system (0.2-acres) is shown between the uplands and low marshes. Concept 2 will require the excavation of approximately 4,050 cubic yards of material and the total project will cost between \$200,000 and \$350,000.

### Concept 3

Concept 3 (Figure 21) utilizes material dredged from the waterway to re-establish marshes (1.7-acres) along the outer edge of the island. Low marsh and mangroves (1.4-acres) surround a center portion of upland restoration (0.5 acres). The upland areas have public access via a small boardwalk over the marsh area. Shoreline stabilization will be required to protect the marshes after construction. A cove is also included on the west side of the island to provide boater access to the upland area.

Concept 3 will require the excavation of approximately 1,940 cubic yards of material and the total project will cost between \$700,000 and \$1.15 million.

#### Concept 4

Concept 4 (Figure 22) was developed through comments from the February 2000 public workshop. The concept is similar to Concept 3, but includes several modifications to address the public's concern regarding access and use of the island. Like Concept 3, this concept utilizes material dredged from the waterway to re-establish low marshes (1.4-acres) along the western side of the island where much of the erosion has been occurring. Shoreline stabilization will be required to protect the marshes and the island itself after construction. A large area of upland enhancement (0.9-acres) is provided on the eastern side of the island. This area will be surrounded to the north and south of the island by a low marsh/mangrove system (0.9-acres) to help eliminate further erosion of the island. The existing unconsolidated shore (0.6-acres) at the southern end of the island will be maintained and may be enhanced and extended to the eastern side of the island. Concept 4 will require the excavation of approximately 500 cubic yard of material and the total project will cost between \$200,000 and \$350,000.

#### No-Action (Status Quo)

The No-Action Alternative does not include the removal of exotic vegetation or the creation of new habitat. As a result, the No-Action Alternative will result in the continued degradation of the existing upland and mangrove areas by exotic vegetation. In addition, there will be no reduction of the amount of erosion occurring on the island and therefore no benefit to water quality as a result of the No-Action Alternative. In addition, the potential for fully implementing the SBNEP's approved management plan for Sarasota Bay will be reduced by eliminating this site from consideration.

## **2.2 Issues and Basis for Choice**

Several important issues regarding the restoration of the disposal islands have been identified during the feasibility study through data collection and the public involvement process.

### 2.2.1 Big Edwards Island

Because this island is used frequently by the public, continued public use and access is an important issue that was raised during the public workshops held for the project. Related to this is the issue of balancing the recreational element of the island with the restoration of diverse and improved fish and wildlife habitat. The use of upland restoration areas is an important element in the development of restoration concepts because of the public use issue identified for this island. The use of upland restoration areas also helps to reduce the extent of excavation from the island, which reduces the cost of the project. Another issue identified by a few members of the public is a need to maintain the visual buffer currently provided by Big Edwards Island. Finally, a third issue identified through the public involvement process included looking at both Big Edwards Island and Skiers' Island comprehensively. At the public workshop held for this project in February 2000, the majority of the participants indicated a desire to

enhance the recreational and educational opportunities on Big Edwards Island while providing habitat restoration and to focus purely on habitat creation and restoration on Skiers' Island.

#### 2.2.2 Skiers' Island

Issues for consideration identified for Skiers' Island include the need to provide improved and diverse fish and wildlife habitat and the need to reduce erosion from the perimeter of the existing island. In addition, an issue identified through the public involvement process for this project is to maintain the recreational use of the deep-water channel surrounding the island. As stated above, the public also indicated a desire to look at Skiers' Island comprehensively with Big Edwards Island, which includes enhancing the recreational elements on Big Edwards Island and focusing on habitat restoration on Skiers' Island.

#### 2.2.3 Bird Colony Islands

Issues for consideration identified for the Bird Colony Islands include the need to protect, through stabilization and erosion control, the existing nesting bird habitat these islands provide.

#### 2.2.4 Jim Neville Marine Preserve

Issues for consideration identified for Jim Neville Marine Preserve include the need to provide improved and diverse fish and wildlife habitat while minimizing impacts to the existing unique saltern areas and the existing mangrove systems. Another issue is to return the historical sheet flow across the island during high tides prior to the addition of the disposal material. Finally, a separate study regarding whether or not to reopen a closed pass, Midnight Pass, close to the island is currently underway. Therefore, an important issue regarding this disposal island is to provide a concept that will be successful independent of the decision on the Pass.

#### 2.2.5 Palmer Point Park

Similar to the Jim Neville Marine Preserve, issues for consideration identified for Palmer Point Park include the need to provide improved and diverse fish and wildlife habitat while minimizing impacts to the existing unique saltern areas and the existing mangrove systems. In addition, a concept should be developed that is successfully independent of the Midnight Pass decision.

#### 2.2.6 Snake Island

Issues for consideration identified for Snake Island include the need to provide erosion control and stabilization around the perimeter of the island. Another issue is to provide improved and diverse fish and wildlife habitat. Protection of the cultural resource located on the island from further exposure, due to erosion, is also an issue. Finally, through the public involvement process, an issue that has been identified is to maintain

the existing recreational use of the island by the public through provision of an upland restoration/enhancement area for access.

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## 2.3 Recommended Plans

### 2.3.1 Big Edwards Island

Concept 4 (Figure 5) is the Recommended Plan for ecosystem restoration on Big Edwards Island. This concept provides improved and diverse fish and wildlife habitat through the use of a mix of upland restoration, low marsh/mangroves, high marsh, and tidal lagoons. The open water/tidal lagoon system also maximizes the "edge effect" of the adjacent low marsh and mangrove systems. To incorporate public concerns, this concept also maintains public access and use of the island and it enhances public use with a proposed natural foot trail along the upland areas and boardwalk across the marsh and open water systems. In addition, this concept provides potential opportunities for educational interpretive signage promoting and explaining these diverse habitats, which was also suggested at the public workshop held for this project. In response to public comments, the Recommended Plan maintains the existing upland area at the southern portion of the island where the majority of public access to the island occurs. In addition, the Recommended Plan maintains the eastern upland berm along the island and the existing mature mangrove fringe around the perimeter of the island to provide a visual buffer for homeowners located on either side of the island. Concept 4 is also the least expensive concept for Big Edwards Island with a cost range between \$650,000 and \$1.10 million.

The No-Action Alternative does not meet the goals of ecosystem restoration identified for this project.

Although Concept 1 maximizes the upland restoration area for public use and access, this concept does not provide the extent of diverse and beneficial fish and wildlife habitat as the Recommended Plan. In addition, as a result of the extent of upland restoration areas, Concept 1 would result in a larger amount of continued maintenance than the Recommended Plan.

Concept 2 provides diverse fish and wildlife habitat, but limits the public use and access to a small upland area at the southern portion of the island. Unlike the Recommended Plan, Concept 2 does not address the concerns of the public to maintain recreational use of the island.

Although Concept 3 is similar to the Recommended Plan, it does not maintain the upland area at the southern portion of the island that is currently used by the public to access the island.

### 2.3.2 Skiers' Island

Concept 4 (Figure 9) is the Recommended Plan for Skiers' Island. This concept provides improved and diverse fish and wildlife habitat through the use of a mix of upland restoration, low marsh/mangroves, and tidal lagoons. The open water/tidal lagoon system also maximizes the "edge effect" of the adjacent low marsh and mangrove systems, as well as providing an opportunity for water to circulate through the

island. Concept 4 allows for the continued use of the deep-water channel surrounding the island for water skiing. In addition, the upland restoration area proposed at the northern end of the island would allow for public access for passive recreational uses. As identified through public comment, no structural recreational facilities are provided with this concept, instead the focus of this concept is purely ecological restoration. ~~Concept 4 is the most expensive concept evaluated for Skiers' Island. This is primarily a result of the extent of tidal lagoons proposed, which, as discussed above, will provide a significant benefit to the new and existing habitat surrounding this project. The total project cost for this concept is between \$550,000 and \$850,000.~~

The No-Action Alternative does not meet the goals of ecosystem restoration identified for this project.

Concept 1 does not provide the extent of diverse and beneficial fish and wildlife habitat as the Recommended Plan. In addition, due to the extent of upland restoration areas, Concept 1 would result in much more continued maintenance than the Recommended Plan.

Concepts 2 and 3 are similar to the Recommended Plan. However, the Recommended Plan provides a greater amount of open water/tidal lagoon that helps to maximize the "edge effect" with the adjacent mangroves.

### 2.3.3 Bird Colony Islands

The Recommended Plan for the Bird Colony Islands is to provide shoreline armoring along the Intracoastal side of the islands to prevent further erosion. No earthwork is proposed on the islands. The Recommended Plan protects the existing critical bird nesting habitat that has been documented on these islands. The total project cost for the proposed work is estimated to be \$17,000.

### 2.3.4 Jim Neville Marine Preserve

Concept 5 (Figure 14) is the Recommended Plan for Jim Neville Marine Preserve. This concept provides improved and diverse fish and wildlife habitat through the use of primarily low marsh/mangroves and tidal lagoons, with some opportunity for upland restoration on the higher elevation areas of the island. The open water/tidal lagoon system maximizes the "edge effect" of the adjacent low marsh and mangrove systems, as well as providing an opportunity for water to circulate between the northern and southern portions of the island. The Recommended Plan also minimizes the impacts to the existing mangrove systems and unique saltern areas found on the island, while optimizing the use of low marsh areas to recreate the opportunity for sheet flow across the island during high tides. Finally, the Recommended Plan will be successfully independent of any decision regarding the opening/closing of nearby Midnight Pass. The total project cost for Concept 5 is estimated between \$2.50 million and \$4.05 million. This range of costs is close to two of the other proposed concepts.

The No-Action Alternative does not meet the goals of ecosystem restoration identified for this project.

Concept 1 is similar to the Recommended Plan; however, it does not provide as extensive a tidal lagoon system as the Recommended Plan. Therefore, the Recommended Plan will allow for a more diverse fish and wildlife habitat.

Concept 2 provides the diversity of the Recommended Plan; however it does not provide for the circulation between the northern and southern portions of the island. It also does not provide as extensive a tidal lagoon system as the Recommended Plan.

Concept 3 provides some diversity of habitat; however, it does not utilize the tidal lagoon systems to provide circulation between the two portions of the island. In addition, this concept does not allow for the opportunity of sheet flow during high tides events. Finally, the extensive upland areas would require much more continued maintenance than the Recommended Plan.

Concept 4 is similar to the Recommended Plan, except that it also includes tidal lagoons extending through the eastern side of the island. This will result in impacts to existing mature mangrove systems and potential impacts to the unique saltern areas on the island. Therefore, the Recommended Plan offers the same benefits of sheet flow and circulation as this concept without the extent of impacts to the existing mangroves and salterns.

#### 2.3.5 Palmer Point Park

Concept 3 (Figure 17) is the Recommended Plan for Palmer Point Park. This concept provides the creation of low marsh/mangroves in the project area and will benefit from the opportunity of diversity of the adjacent upland areas in the park. The Recommended Plan minimizes impacts to the existing mangroves and salterns located adjacent to the project site. The Recommended Plan will result in minimal maintenance and the elimination of the tidal lagoon provided in some of the other concepts will reduce the potential for stagnant water and therefore mosquitoes. Concept 3 is one of the least expensive concepts evaluated for Palmer Point Park. The total project cost is estimated to be between \$250,000 and \$450,000.

The No-Action Alternative does not meet the goals of ecosystem restoration identified for this project.

Concepts 1 and 2 are similar with proposed uplands, mangroves and tidal lagoon areas. However, the upland areas proposed on these concepts are small (0.3-acres) considering the cost and difficulty in access to maintain and establish them. In addition, the tidal lagoons proposed in these concepts may become stagnant as a result of minimal tidal currents near the proposed opening and therefore may become a haven for mosquitoes, which is a concern of nearby residents.

Concept 4 potentially impacts existing salterns and mangroves by the proposed tidal lagoons. These salterns are a potential feeding source for the federally listed piping plover.

### 2.3.6 Snake Island

Concept 4 (Figure 22) is the Recommended Plan for ecosystem restoration on Snake Island. This concept provides improved and diverse fish and wildlife habitat through the use of a mix of upland restoration and low marsh/mangroves. In addition, the Recommended Plan provides for additional acreage to the island through the creation of a low marsh reclamation area on the west side of the island. To address public concerns, the Recommended Plan also provides a large upland enhancement area accessible on the east side of the island for public use. The Recommended Plan also provides soft-shore stabilization and additional mangroves to reduce the on-going erosion. The Recommended Plan maintains the unconsolidated shore used by the public on the southern end of the island and provides an opportunity to extend this area to the eastern side of the island. The estimated costs for each of the concepts evaluated for Snake Island are fairly close. Therefore, the total estimated project cost for the Recommended Plan (between \$200,000 and \$350,000) is comparable to the costs of the other concepts for this island.

The No-Action Alternative does not meet the goals of ecosystem restoration identified for this project. In addition, this concept will not reduce the on-going erosion of the island.

Concept 1 does not provide diverse fish and wildlife habitat, although the mangroves would help to reduce the on-going erosion. This concept will not allow for continued public use of the island.

Concept 2 provides for diverse fish and wildlife habitat but it does not provide stabilization of the existing shoreline and therefore does not help to reduce the on-going erosion.

Concept 3 is similar to the Recommended Plan; however, it was modified to address some of the concerns identified by the public. First, the public indicated that boat access to the island is primarily on the east side of the island. The public also requested that a portion of the unconsolidated shoreline remain for recreational use. In addition, the upland enhancement area was extended because of the extent of use of the island. Finally, the public did not want the boardwalk or any other structural recreational facility as identified in Concept 3. Therefore, the Recommended Plan was modified to reflect this.

## **2.4 Comparison of Alternatives**

Tables 1 - 5 list the alternatives considered for each island and summarizes the major features and consequences of the proposed action and alternatives.

**Table 1 - Big Edwards Island – Evaluation Matrix**

<b>Environmental Factor</b>	<b>Concept 1</b>	<b>Concept 2</b>	<b>Concept 3</b>	<b>Concept 4 Recommended</b>	<b>No-Action Status Quo</b>
Habitat Types Created (Acres)*	4.4	4.3	4.5	4.0	0
-Upland Restoration	2.7	1.7	1.3	1.7	0
-High Marsh	0.3	0.2	1.0	0.2	0
-Low Marsh/Mangrove	1.4	1.9	1.8	1.6	0
-Tidal Lagoon/Mud Flats	0	0.5	0.4	0.5	0
Federally Protected Species	No Impact	No Impact	No Impact	No Impact	No Impact
Fish and Wildlife Resources	Create potential nesting & migratory bird habitat Low Marsh-potential fisheries habitat	Create potential nesting & migratory bird habitat. Low Marsh-potential fisheries habitat. Tidal lagoon creates feeding grounds for bottom feeding fish, shorebirds and invertebrates.	Create potential nesting & migratory bird habitat Low Marsh-potential fisheries habitat	Create potential nesting & migratory bird habitat Low Marsh-potential fisheries habitat Tidal lagoon creates feeding grounds for bottom feeding fish, shorebirds and invertebrates.	Continued degradation of uplands & low marsh by exotic vegetation.
Removal of Exotic Vegetation	Yes	Yes	Yes	Yes	No
Shoreline Erosion	No Impact	No Impact	No Impact	No Impact	No Impact
Water Quality	Improve, Create low/high marsh wetlands	Improve, Create low/high marsh wetlands	Improve, Create low/high marsh wetlands	Improve, Create low/high marsh wetlands	No Impact
Cultural Resources	No Impact	No Impact	No Impact	No Impact	No Impact
Recreation	Upland areas provide public access to the island for passive recreation	Upland areas provide public access to the island for passive recreation	Provides boardwalk, overlooks, and educational signage for more intense public use	Provides trail/boardwalk, and educational signage for more intense public use	Upland areas provide public access to the island for passive recreation
Navigation	No Impact	No Impact	No Impact	No Impact	No Impact
Public Acceptance**	Moderate	Moderate	High	High	Moderate
Economics (Cost Estimate)	\$800,000 - \$1,350,000	\$700,000 - \$1,150,000	\$700,000 - \$1,150,000	\$650,000 - \$1,100,000	N/A

\* Includes additional acreage created due to restoration. Does not include existing habitat.

\*\* Public Acceptance based on comments received as part of the public involvement efforts conducted for this project.

**Table 2 - Skiers' Island – Evaluation Matrix**

<b>Environmental Factor</b>	<b>Concept 1</b>	<b>Concept 2</b>	<b>Concept 3</b>	<b>Concept 4 Recommended</b>	<b>No-Action Status Quo</b>
Habitat Types Created (Acres)*	5.6	6.1	5.3	5.3	0
-Upland Restoration	2.9	2.0	2.5	2.5	0
-High Marsh	0	0	0	0	0
-Low Marsh/Mangrove	2.7	3.7	2.0	1.8	0
-Tidal Lagoon/Mud Flats	0	0.4	0.8	1.0	0
Federally Protected Species	No Impact	No Impact	No Impact	No Impact	No Impact
Fish and Wildlife Resources	Create potential nesting & migratory bird habitat Low Marsh-potential fisheries habitat	Create potential nesting & migratory bird habitat Low Marsh-potential fisheries habitat Tidal lagoon creates feeding grounds for bottom feeding fish, shorebirds, and invertebrates.	Create potential nesting & migratory bird habitat Low Marsh-potential fisheries habitat Tidal lagoon creates feeding grounds for bottom feeding fish, shorebirds, and invertebrates.	Create potential nesting & migratory bird habitat Low Marsh-potential fisheries habitat Tidal lagoon creates feeding grounds for bottom feeding fish, shorebirds, and invertebrates.	Continued degradation of uplands & low marsh by exotic vegetation.
Removal of Exotic Vegetation	Yes	Yes	Yes	Yes	No
Shoreline Erosion	Reduce	Reduce	Reduce	Reduce	No Change
Water Quality	Improve, Create low marsh wetlands	Improve, Create low marsh wetlands	Improve, Create low marsh wetlands and tidal lagoon provides east/west flow	Improve, Create low marsh wetlands and tidal lagoon provides east/west & north/south flow	No Improvement
Cultural Resources	No Impact	No Impact	No Impact	No Impact	No Impact
Recreation	Maintains Ski-ability	Maintains Ski-ability	Maintains Ski-ability	Maintains Ski-ability. Public access to upland area	Maintains Ski-ability. Public access to upland area
Navigation	No Impact	No Impact	No Impact	No Impact	No Impact
Public Acceptance**	Moderate	High	High	High	Moderate
Economics (Cost Estimate)	\$500,000–\$750,000	\$500,000–\$800,000	\$500,000–\$800,000	\$550,000–\$850,000	N/A

\* Includes additional acreage created due to restoration. Does not include existing habitat.

\*\* Public Acceptance based on comments received as part of the public involvement efforts conducted for this project.

**Table 3 - Jim Neville Marine Preserve – Evaluation Matrix**

Environmental Factor	Concept 1	Concept 2	Concept 3	Concept 4	Concept 5 Recommended	No-Action Status Quo
Habitat Types Created (Acres)*	27.1	27.0	26.7	28.6	27.5	0
-Upland Restoration	2.0	2.0	6.9	2.0	2.0	0
-High Marsh	0	0	9.3	0	0	0
-Low Marsh/Mangrove	17.9	18.9	10.5	16.6	17.6	0
-Tidal Lagoon/Mud Flats	7.2	6.1	0	10.0	7.9	0
Federally Protected Species	Benefit to the Piping Plover, enhances existing habitat	Benefit to the Piping Plover, enhances existing habitat	Benefit to the Piping Plover, enhances existing habitat	Benefit to the Piping Plover, enhances existing habitat	Benefit to the Piping Plover, enhances existing habitat	Exotic vegetation may continue to reduce habitat for the Piping Plover
Fish and Wildlife Resources	Create potential nesting & migratory bird habitat. Low marsh– potential fisheries habitat. Tidal lagoon creates feeding grounds for bottom feeding fish, shorebirds, and invertebrates.	Create potential nesting & migratory bird habitat. Low marsh– potential fisheries habitat. Tidal lagoon creates feeding grounds for bottom feeding fish, shorebirds, and invertebrates.	Create potential nesting & migratory bird habitat. Low marsh – potential fisheries habitat	Create potential nesting & migratory bird habitat. Low marsh – potential fisheries habitat. Tidal lagoon creates feeding grounds for bottom feeding fish, shorebirds, and invertebrates.	Create potential nesting & migratory bird habitat. Low marsh– potential fisheries habitat. Tidal lagoon creates feeding grounds for bottom feeding fish, shorebirds, and invertebrates.	Exotic vegetation may continue to reduce habitat
Removal of Exotic Vegetation	Yes	Yes	Yes	Yes	Yes	No
Shoreline Erosion	No Impact	No Impact	No Impact	No Impact	No Impact	No Impact
Water Quality	Improve, create low marsh wetland	Improve, create low marsh wetland	Improve, create low/high marsh wetland	Improve, create low marsh wetland	Improve, create low marsh wetland	No Impact
Cultural Resources	No Impact	No Impact	No Impact	No Impact	No Impact	No Impact
Recreation	Limited public access	Limited public access	Limited public access	Limited public access	Limited public access	Limited public access
Navigation	No Impact	No Impact	No Impact	No Impact	No Impact	No Impact
Public Acceptance**	Moderate	Low	Low	High	High	Low
Economics (Cost Estimate)	\$2,450,000 - \$3,950,000	\$2,400,000 - \$3,850,000	\$1,050,000 - \$1,650,000	\$2,500,000 - \$4,100,000	\$2,500,000 - \$4,050,000	N/A

\* Includes additional acreage created due to restoration. Does not include existing habitat.

\*\* Public Acceptance based on comments received as part of the public involvement efforts conducted for this project.

**Table 4 - Palmers Point Park – Evaluation Matrix**

<b>Environmental Factor</b>	<b>Concept 1</b>	<b>Concept 2</b>	<b>Concept 3 Recommended</b>	<b>Concept 4</b>	<b>No-Action Status Quo</b>
Habitat Types Created (Acres)*	3	2.9	3	2.8	0
-Upland	0.3	0.4	0	0	0
-High Marsh	0.2	0	0	0	0
-Low Marsh/Mangrove	1.6	1.7	3	1.4	0
-Tidal Lagoon/Mud Flats	0.9	0.8	0	1.4	0
Federally Protected Species	Benefit to the Piping Plover, enhances existing habitat	Benefit to the Piping Plover, enhances existing habitat	Benefit to the Piping Plover, enhances existing habitat	Benefit to the Piping Plover, enhances existing habitat	Exotic vegetation may continue to reduce habitat for the Piping Plover
Fish and Wildlife Resources	Create potential nesting & migratory bird habitat. Low marsh– potential fisheries habitat Tidal lagoon creates feeding grounds for bottom feeding fish, shorebirds, and invertebrates.	Create potential nesting & migratory bird habitat. Low marsh– potential fisheries habitat Tidal lagoon creates feeding grounds for bottom feeding fish, shorebirds, and invertebrates.	Create potential nesting & migratory bird habitat. Low marsh – potential fisheries habitat	Create potential nesting & migratory bird habitat. Low marsh- potential fisheries habitat Tidal lagoon creates feeding grounds for bottom feeding fish, shorebirds, and invertebrates.	Exotic vegetation may continue to reduce habitat
Removal of Exotic Vegetation	Yes	Yes	Yes	Yes	No
Shoreline Erosion	Reduce	Reduce	Reduce	Reduce	No Impact
Water Quality	Improve, Create low/high marsh wetlands	Improve, Create low marsh wetlands	Improve, Create low marsh wetlands	Improve, Create low marsh wetlands. Tidal lagoon provides water flow	No Impact
Cultural Resources	No Impact	No Impact	No Impact	No Impact	No Impact
Recreation	No Impact	No Impact	No Impact	No Impact	No Impact
Navigation	No Impact	No Impact	No Impact	No Impact	No Impact
Public Acceptance**	Moderate	High	Moderate	Moderate	Low
Economics (Cost Estimate)	\$300,000 - \$500,000	\$250,000 - \$450,000	\$250,000 - \$450,000	\$300,000 - \$500,000	N/A

\* Includes additional acreage created due to restoration. Does not include existing habitat.

\*\* Public Acceptance based on comments received as part of the public involvement efforts conducted for this project.

**Table 5 - Snake Island – Evaluation Matrix**

<b>Environmental Factor</b>	<b>Concept 1</b>	<b>Concept 2</b>	<b>Concept 3</b>	<b>Concept 4 Recommended</b>	<b>No-Action Status Quo</b>
Habitat Types Created (Acres)*	1.9	1.4	3.6	3.8	0
-Upland	0	0.4	0.5	0.9	0
-High Marsh	0	0.2	0	0	0
-Low Marsh/Mangrove	1.9	0.8	1.4	0.9	0
-Low Marsh Reclamation	0	0	1.7	1.4	0
-Unconsolidated Shore	0	0	0	0.6	0
Federally Protected Species	No Impact	No Impact	No Impact	No Impact	No Impact
Fish and Wildlife Resources	Creates low marsh wetlands for bird habitat and fisheries	Creates potential nesting & migratory bird habitat. Low marsh-potential fisheries habitat.	Creates potential nesting & migratory bird habitat. Low marsh/reclamation area potential fisheries habitat	Creates potential nesting & migratory bird habitat. Low marsh/reclamation area potential fisheries habitat	Continued degradation of uplands & low marsh by exotic vegetation.
Removal of Exotic Vegetation	Yes	Yes	Yes	Yes	No
Shoreline Erosion	Reduce	Reduce	Reduce & regain some lost acreage	Reduce & regain some lost acreage	Erosion of the island will continue
Water Quality	Improve, Create low marsh wetlands & stabilize erosion	Improve, Create low marsh wetlands & stabilize erosion	Improve, Create low marsh wetlands & stabilize erosion	Improve, Create low marsh wetlands & stabilize erosion	Worsen, continued erosion of the island
Cultural Resources	Creates adverse impacts to archeological site.	Shoreline stabilization will help preserve archeological site	Shoreline stabilization will help preserve archeological site	Shoreline stabilization will help preserve archeological site	Continued erosion and degradation to archaeological site.
Recreation	Limit public access	Public access provided to upland area. Beach remains intact for public use.	Public access provided to upland area through boardwalk. Cove provides boat parking area.	Public access provided to upland area adjacent to beach. Beach area potentially expanded.	Public access currently exists.
Navigation	Reduced channel maintenance, less erosion	Reduced channel maintenance, less erosion	Reduced channel maintenance, less erosion	Reduced channel maintenance, less erosion	Continued need for channel maintenance as a result of erosion
Public Acceptance**	Low	Moderate	Low	High	High
Economics (Cost Estimate)	\$250,000 - \$400,000	\$200,000 - \$350,000	\$300,000 - \$500,000	\$200,000 - \$350,000	

\* Includes additional acreage created due to restoration. Does not include existing habitat.

\*\* Public Acceptance based on comments received as part of the public involvement efforts conducted for this project.

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### 3.0 AFFECTED ENVIRONMENT

The Affected Environment section succinctly describes the existing environmental resources of the areas that would be affected if any of the alternatives were implemented. This section describes only those environmental resources that would affect or be affected by the Recommended Plans 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.

#### 3.1 General Environmental Setting

Sarasota Bay is a classic coastal lagoon system and is located on the central west coast of Florida between Tampa Bay and Venice, Florida. The system is bordered to the west by a chain of substantially developed coastal barrier islands (Anna Maria Island, Longboat Key, Lido Key, Siesta Key, and Casey Key) and to the east by the City of Sarasota mainland. Sarasota Bay is designated as a Class II OFW except for the area directly east of the Intracoastal Waterway in Sarasota County, which is designated as a Class III OFW.

##### Big Edwards Island

Big Edwards Island is a 6-acre island owned by Sarasota County. It is the northernmost project disposal island, located in Roberts Bay immediately south of the Siesta Key Bridge. Historically, Big Edwards Island was originally comprised of two small mangrove islands that were utilized for disposal of dredged material from previous channel dredging operations, including the construction of the GIWW. Big Edwards Island is about 550 feet north-to-south and 400 feet east-to-west. The topography of this island includes a relatively narrow perimeter berm enclosing an area where dredged material was placed during the dredging of the GIWW. The elevation of the perimeter berm generally varies from 12 to 13 feet MSL. The ground elevations of the interior portion of the island range from 5 to 17 feet MSL. The disposal material on Big Edwards Island consists of fine sand with varying amounts of shell and limestone rubble (Figure 23).

##### Skiers' Island

Skiers' Island is an 8-acre island owned by the West Coast Inland Navigation District. It is about 1250 feet long and varies in width from 400 feet at the northern end to 200 feet toward the southern end. Natural ground elevations on the island range from 7 feet MSL to 0 MSL. Historically, the area that is now Skiers' Island was located in the open waters of Roberts Bay, an estimated 600 feet offshore from Siesta Key. The dredged material from the construction of the GIWW was deposited on bay bottom to create the disposal island. The dredged material on Skiers' Island predominately consists of shell and limestone rubble with some fine sands. A deep-water channel surrounds Skiers' Island and is currently used by boaters for water skiing. In the past, Skiers' Island has been known for its importance as a colonial bird nesting site. However in recent years, few active nesting sites have been documented there (Figure 24).

### Bird Colony Islands

The Bird Colony Islands are four small islands, approximately two acres in size located east of the GIWW north of Skiers' Island in Roberts Bay. The Bird Colony Islands constitute one of the most significant bird colonies along Florida's west coast and have suffered substantial erosion primarily from large boat wakes associated with their close proximity to the GIWW (Figure 25).

### Jim Neville Marine Preserve

Jim Neville Marine Preserve is a 35-acre preserve owned by Sarasota County. This island is located to the west of the GIWW toward the southern end of Siesta Key. The former Midnight Pass is located to the west of the preserve. The southern area of the disposal island has gentle topography with a slight ridge running in the northwest to southeast direction. The highest point of this area is elevation 7 feet MSL. The northern portion of the island has gentle topography with a high point of 10.5 feet MSL located near the north end. Historically, a large mangrove island and a small area of adjoining open waters of Little Sarasota Bay occupied the area that is now Jim Neville Marine Preserve. During past dredging and the construction of the GIWW, the dredged material was deposited over much of the eastern portions of the island and adjacent bay waters. This created the present characteristic of the island which is an upland area, slightly elevated above surrounding mangroves. The dredged material on the Jim Neville Marine Preserve predominately consists of a mix of fine sands, shell fragments, limestone, phosphate, and silt (Figure 26).

### Palmer Point Park

Palmer Point Park is a 33-acre park owned by Sarasota County. It is located at the north end of Casey Key. Palmer Point Park has very little topography with the highest point at elevation 4 feet MSL. Prior to the placement of dredge material, Palmer Point Park consisted of a narrow strip of mangrove that extended from the northern tip of Casey Key into the adjoining waters of Little Sarasota Bay. Dredged material was also placed in the bay waters immediately south of the original mangrove strip east of the island. The dredged material on Palmer Point Park predominately consists of primarily fine sands with varying amounts of shell fragments (Figure 27).

### Snake Island

Snake Island is the southernmost project disposal island, located at the Venice Inlet. This island was originally more than 3 acres in size, but over the years this island has decreased to approximately 2 acres. The elevations of the interior portion of the island range from 2 feet MSL to 7 feet MSL. According to 1948 aerial photography, the area that is now Snake Island formed approximately the southern one-quarter of an elongated beach ridge island fringed by mangroves and open water at the confluence of Lyons Bay, Donna Bay, and Venice Inlet. Construction of the GIWW separated Snake Island from the remaining island, which today is called Turner Key. The dredged material on Snake Island predominately consists of fine sands with a small amount of shell fragments (Figure 28).

## 3.2 Vegetation

### Big Edwards Island

Big Edwards Island has distinctive topographic features which includes a high disposal mound at the northern end of the island as well as an embankment around the perimeter of the island and a low, level area at the southern end of the island. As a result of the range of these topographic features, the vegetation on the island varies. The upland disposal mounds are dominated with an exotic nuisance plant canopy of large Australian pines and encroaching carrotwoods (*Cupaniopsis anacardioides*). At the low, level, southern end of the island, a temporary cover of rye grass (*Lolium perenne* L.) appears to have been planted and possibly maintained at certain times of the year. Wetland communities around the fringe of the island are less evident, thus producing a more "beach-like" environment. Few native plants appear to have survived the encroachment of exotic species on the island. Those native plants identified on the island include the shade-tolerant rouge plant (*Rivina humilis*), cabbage palm (*Sabal palmetto*), Florida privet (*Forestiera segragata*), corky passionvine (*Passiflora suberosa*), and moonvine (*Ipomoea alba*). In addition, there are scattered mangroves surrounding the island fringe.

### Skiers' Island

Skiers' Island has had an excessive amount of fill placed on it from past dredging activities. A 7-foot embankment follows the perimeter of the island. The island is surrounded by a deep-cut channel, which is used for recreational water-skiing. This deep-cut channel precludes the colonization and growth of seagrass around the island. The perimeter of the island is dominated by a mixed-mangrove fringe including red (*Rhizophora mangle*), black (*Avicennia germinaus*), and white (*Laguncularia racemosa*) mangroves and buttonwoods (*Conocarpus erecta*). The interior portion of the island is dominated by exotic species including a canopy of large Australian pines and encroaching carrotwoods. A few small areas of native plants exists including native rouge plants, corky passionvine, moonvine, and prickly pear cactus (*Opuntia spp.*) that have been able to survive the increasing shade of the fast-growing Australian pine and carrotwood.

### Bird Colony Islands

The Bird Colony Islands currently consist of primarily mixed-mangrove islands that serve as bird colony nesting sites. These islands are located adjacent to the GIWW and have suffered substantial erosion primarily from large boat wakes.

### Jim Neville Marine Preserve

The wetlands surrounding the upland areas of Jim Neville Marine Preserve are in fairly good condition. These areas have a wide diversity of wetland native vegetation and community types. There is a mix of mangrove swamps as well as a diverse expanse of saltwater marshes with some encroachment of Brazilian pepper (*Schinus terebinthifolius*) primarily in the mangrove fringe and at the center of the northern end of the island. The interior upland portion of the preserve is degraded consisting primarily of a dense canopy of encroaching exotics, including primarily Australian pines with some melaleuca (*Melaleuca quinquenervia*). This monoculture of Australian pine has

totally disrupted the natural upland plant community. There are virtually no native trees in the canopy or subcanopy and only scattered Florida privet and saltbrush (*Baccharis halmifolia*) in the shrub cover. The dense shade and Australian "pine needle" groundcover has virtually excluded the natural community.

### Palmer Point Park

This project area has an intact wetland fringe, which is relatively high in diversity and quality. There are very few nuisance species in the saltgrass (*Distichlis spicata*) meadow or the salt flat marsh dominated by a broad expanse of saltwort (*Batis maritima*), sea purslane (*Sesuvium portulacastrum*), and sea blite (*Suaeda linearis*). The mangrove fringe contains white, black and red mangroves and buttonwood with some encroachment of Brazilian pepper. In addition, the seagrass beds surrounding the island appear to be relatively dense. The upland interior of the area is the most disturbed primarily by the encroachment of exotic nuisance species, including a large monoculture of Australian pines and scattered carrotwood. However, it appears that private citizens and local environmental groups have made a concerted effort to kill and remove nuisance species north of this area in order to recreate and allow a natural native plant community to prevail. These communities consist of the Florida privet, wax myrtle (*Myrica cerifera*), and various shrubs of this maritime hammock.

### Snake Island

Snake Island is a highly disturbed island that consists primarily of exotic plant species including Brazilian pepper, Australian pines and scattered carrotwood. There are several established mangroves on the island which are remnants of the original mangrove island prior to the dredging of the GIWW. Due to its location at the mouth of the Venice inlet, the island is surrounded by several navigational channels including the GIWW. This has resulted in significant erosion primarily on the western side of the island that currently precludes the growth of seagrasses in this area.

## **3.3 Threatened and Endangered Species**

### General Requirements

In accordance with Section 7 of the Endangered Species Act, a biological assessment of potential impacts of the proposed work on threatened and endangered species was prepared and forwarded to the US Fish and Wildlife Service (USFWS) (Appendix G). Federally protected animal species utilizing the wetland restoration project area that have been documented include: the piping plover (*Charadrius melodus*), the West Indian manatee (*Trichechus manatus*), the loggerhead sea turtle (*Caretta caretta*), the green sea turtle (*Chelonia mydas*), and the hawksbill sea turtle (*Eretmochelys imbricata*).

#### 3.3.1 Piping Plover

The piping plover is found in the vicinity of both Palmer Point Park and the Jim Neville Marine Preserve. The piping plover is a threatened bird that spends the winter months along the southern Atlantic and Gulf coasts. The piping plover forages in tidal flats, which are located in the vicinity of both Palmer Point Park and the Jim Neville Marine

Preserve. Therefore, the protection or creation of tidal flat areas as part of the proposed project would be beneficial to this listed species.

### 3.3.2 Sea Turtles

The sea turtles identified by the USFWS within the project area include the loggerhead sea turtle, the green sea turtle, and the hawksbill sea turtle. The habitat for the loggerhead and green sea turtle includes the subtidal areas of the bay, and therefore is associated with each of the proposed disposal islands. Habitat for the hawksbill sea turtle is found in the vicinity of Big Edwards Island, Skiers' Island, the Bird Colony Islands, and Snake Island.

Sea turtle nesting has not been documented on any of the proposed project disposal islands. Therefore, it is highly unlikely that turtles use any of these islands for nesting, given the location and availability of sandy beach areas. Currently, there is no critical habitat designated for the loggerhead or green sea turtle; therefore, none will be affected. In addition, there is no critical habitat designated for the hawksbill sea turtle in the continental United States; therefore, none will be affected. During project construction, if a sea turtle is observed in an area of project activity, an approved sea turtle protection plan will be implemented.

### 3.3.3 Manatees

Habitat for the Western Indian manatee is located throughout the project area, particularly near areas of seagrasses located near several of the project disposal islands. It is anticipated that during the project construction phase, the "Standard Manatee Conditions" will be followed as will be stated in the project permit issued by the Florida Department of Environmental Protection.

## **3.4 Fish and Wildlife Resources**

### 3.4.1 Fisheries

According to the Sarasota Bay National Estuary Program (Reference 1), declines in the water quality of the bay and the loss of shallow water habitats associated with mangroves and seagrass meadows over the last several decades has reduced the available habitat for juvenile fisheries. The proposed project aims to improve water quality through shoreline stabilization of the project disposal islands and increase the amount of shallow water habitat for juvenile fisheries.

### 3.4.2 Salt Flats

Salt flats are areas that experience short periods of tidal inundation that cause rapid algal production. Typically, the areas are slight impoundments that have increased salinities as a result of evaporation. The algae provide the base of the food chain via the grazing of the algal cells by organisms such as fiddler crabs, etc. Both the Jim Neville Marine Preserve and Palmer Point Park currently support this type of rare and

productive habitat. These areas should, if possible, be preserved as part of the project. In addition, salt flats should be created, where possible, as part of the proposed project on the project disposal islands.

### 3.4.3 Bird Habitat

The project areas provide habitat, nesting areas, and foraging areas for a variety of birds. In addition, the project areas provide seasonal habitat for migratory birds. The existing mangroves provide the highest quality habitat for these birds. However, due to the loss of mangroves and other native species, some birds have adapted to nesting in lesser quality habitat of nuisance species such as Australian pines.

#### Bird Colony Islands

According to the National Audubon Society, the following birds have utilized the Bird Colony Islands for nesting in the past three years (Table 6): the brown pelican (*Pelecanus occidentalis*), a state-listed species of special concern; the snowy egret (*Egretta thula*), a state-listed species of special concern; the little blue heron (*Florida caerulea*), a state-listed species of special concern; the tri-colored heron (*Egretta tricolor*), a state-listed species of special concern; the American oystercatcher (*Haematopus palliatus*), a state-listed species of special concern; the reddish egret (*Dichromanassa rufescens*), a state-listed species of special concern; the double-crested cormorant (*Phalacrocorax auritus*); the great blue heron (*Ardea herodias*); the great egret (*Casmerodius albus*); the cattle egret (*Bubulcus ibis*); and the black-crowned night heron (*Nycticorax nycticorax*).

Table 6. Bird Colony Island Nesting Survey\*

Species	Listing**	1997 # Nests	1998 # Nests	1999 # Nests
Brown Pelican	SSC	168	276	239
Double-crowned Cormorant		39	28	32
Great Blue Heron		37	51	40
Great Egret		195	436	271
Snowy Egret	SSC	20	100	30
Little Blue Heron	SSC	-	2	-
Tri-colored Heron	SSC	1	2	3
Reddish Egret	SSC	-	1	-
Cattle Egret		10	111	13
Black-crowned Night Heron		4	10	10
American Oystercatcher	SSC	1	-	-
Total		475	1,017	638

\*Numbers represent nesting pairs

Source: National Audubon Society

\*\*Species of Special Concern

#### Skiers' Island

In the past, Skiers' Island has been known for its importance as a colonial nesting site. However in recent years, few active nesting sites have been documented there.

According to the National Audubon Society, the nesting birds that have been identified on Skiers' Island in the past three years include the great blue heron (*Ardea herodias*) and the yellow-crowned night heron (*Nyctanassa violacea*) (Table 7).

Table 7. Skiers' Island Nesting Survey\*

Species	Listing**	1997 # Nests	1998 # Nests	1999 # Nests
Great Blue Heron		2	No data	8
Yellow-crowned Night Heron		5	No data	-
Total		7		8

\*Numbers represent nesting pairs

Source: National Audubon Society

\*\*Species of Special Concern

### 3.5 Coastal Barrier Resources

Two designated units of the Florida Coastal Barrier Resource System are located in the vicinity of Sarasota Bay and the project disposal islands. These designated units include Casey Key (#P22) and Venice Inlet (#71P). Both the Jim Neville Marine Preserve and Palmer Point Park fall within the boundaries of the #P22 designated COBRA unit. Snake Island falls within the boundary of the #71P designated COBRA unit. The designated units of the Florida Coastal Barrier Resource System are protected under the Coastal Barrier Resources Act, PL 101-591. However, in accordance with Section 6(A) of the Act, projects for the study, management, protection, and enhancement of fish and wildlife resources and habitats, including acquisition of fish and wildlife habitats and related lands; stabilization projects for fish and wildlife habitats; and recreational projects are consistent with the purposes of this Act. The proposed ecosystem restoration of the project disposal islands is consistent with the purposes of this Act and will provide a ecological benefit to these coastal resources.

### 3.6 Water Quality

Sarasota Bay was designated as a priority water body by the US Environmental Protection Agency in Section 320 of the Clean Water Act, as amended in 1987. Sarasota Bay has also been designated as an OFW. Sarasota Bay has been identified as a Class II water body except for the area directly east of the GIWW in Sarasota County, which is designated as a Class III water body. Declines in water quality in Sarasota Bay have been identified as a significant issue because of the impact of water quality on seagrass habitat and fisheries productivity. The primary pollutants of concern are nutrients and toxic substances including heavy metals and pesticides. Sources of nutrient and toxicant loadings into the bay come from stormwater runoff, sewage treatment plant wastewater discharges, septic tanks, and rainfall (Reference 1).

Sarasota County has several programs and efforts in place to help monitor and improve the water quality of the bay. The County and four co-permittees have an U. S. Environmental Protection Agency National Pollutant Discharge Elimination System (NPDES) permit to operate a Municipal Separate Storm Sewer System (MS4) for stormwater discharges.

The permit compliance program includes, but is not limited to:

- 1) operation and maintenance of structural controls and storm water collection system;
- 2) construction site runoff program that operates through requirements in the County's Land Development Regulations;
- 3) operation and maintenance of public streets, roads and highways;
- 4) ensuring flood control projects comply with state storm water quality requirements;
- 5) identification, monitoring, and control of discharges from municipal waste treatment facilities not covered by the NPDES storm water permit;
- 6) control of pollutants related to application of pesticides, herbicides, and fertilizers through public education, applicator certification requirements, and an integrated pest management program for all County facilities;
- 7) illicit connections and illegal dumping regulatory programs that operate through County Ordinance, field screening of outfalls, industrial inspections, and a 24-hour on-call investigative staff and;
- 8) industrial and high risk runoff inspection program.

In addition to the NPDES permit compliance, Sarasota County has a program to encourage acquisition of plant wastewater systems so that flows can be treated at state-of-the-art plants. About 10% have been taken off line, many of which lie within the Phillipi Creek watershed, which is a top priority, based on its environmental condition and connection to Sarasota Bay.

Sarasota County has a Septic to Sewer program that is geared toward replacing septic tanks and hooking residents up to central sewer. The first major project is the Phillipi Creek Project. Construction of the first phase should begin 2001-2002.

Sarasota County has an ordinance that regulates discharges to surface or ground water.

Lastly, the County has an ambient Water Quality Monitoring Program with sampling stations located throughout the waters of Sarasota County. The data generated from this program are analyzed to help identify water quality trends in the bay.

#### Big Edwards Island, Skiers' Island, and Bird Colony Islands

Big Edwards Island, Skiers' Island, and the Bird Colony Islands are all located in Roberts Bay. According to the FDEP 1998 305(b) data report, the status of Roberts Bay with regards to chemistry, fish, standards, metals, and biology is classified as "fair". Table 8 shows the trends (from 1995 to 1997) in several water quality parameters in Roberts Bay surrounding the project disposal islands. This information indicates that the turbidity level has been degrading in Roberts Bay over the past few years. In addition, dissolved oxygen levels and total phosphorus have also been degrading in the past few years. This may be attributed to stormwater discharge influences on the bay.

#### Jim Neville Marine Preserve and Palmer Point Park

The Jim Neville Marine Preserve and Palmer Point Park are located in Upper Little Sarasota Bay. The FDEP 1998 305(b) data reports the status of Upper Little Sarasota

Bay with regards to chemistry, fish, standards, metals, and biology is classified as “fair”. In this portion of Little Sarasota Bay, the water quality parameters that have been degrading from 1995 to 1997 include turbidity, secchi depth, and total phosphorus. Table 8 shows the trends in several water quality parameters in upper Little Sarasota Bay surrounding these two disposal islands.

### Snake Island

Snake Island is located in the southern portion of Little Sarasota Bay. According to the FDEP 1998 305(b) data reports, the status of the Lower Little Sarasota Bay watershed with regards to chemistry, fish, standards, metals, and biology is classified as “good”. In this portion of Little Sarasota Bay, the only water quality parameter that has been degrading between 1995 to 1997 is turbidity. This could be partly due to the erosion of sand from islands like Snake Island. In addition, there is a significant amount of boat activity and strong currents also associated with this island. Table 8 shows the trends in several water quality parameters in lower Little Sarasota Bay surrounding this disposal island.

Table 8. Basin Water Quality Parameter Trends from 1995 - 1997

Water Quality Parameters	Roberts Bay	Upper Little Sarasota Bay	Lower Little Sarasota Bay
Total Coliform	Stable	Stable	Stable
Fecal Coliform	Stable	Stable	Stable
Turbidity	Degrade	Degrade	Degrade
Total Suspended Solids	No Trend	No Trend	No Trend
Biochemical Oxygen Demand	No Trend	No Trend	No Trend
Dissolved Oxygen	Degrade	Stable	Stable
Total Organic Carbon	No Trend	No Trend	No Trend
Chlorophyll a	No Trend	No Trend	No Trend
Secchi Depth	Stable	Degrade	Stable
Total Nitrogen	Stable	No Trend	Stable
Nitrate	Stable	No Trend	Stable
Total Phosphorus	Degrade	Degrade	Stable

Source: Florida Department of Environmental Protection 305(b) Data Report

### **3.7 Hydraulic Information**

According to *A Field and Modeling Study on Circulation and Transport in Sarasota Bay* (Reference 2) prepared in 1993 for the Sarasota Bay National Estuary Program, circulation in Sarasota Bay is driven primarily by tides generated into the bay from the Gulf of Mexico and to a lesser degree by winds. Tides in Sarasota Bay consist of a mix of diurnal (lunar and solar tidal constituents which have periods on the order of 24 hours) and semi-diurnal tides (lunar and solar tidal constituents which have periods on the order of 12 hours).

### Big Edwards Island, Skiers' Island, and Bird Colony Islands

The tides in Roberts Bay have been monitored by the Florida Department of Environmental Protection (FDEP), Bureau of Survey and Mapping and are reported as Published Tide Station Reports. The tide gauge for Big Edwards Island, Skiers' Island, and the Bird Colony Islands is Gauge No. 872 6045, located at the west end of a wooden dock at the Reagle Lagoon Boat Basin. Tidal data recorded at the station have been analyzed by the FDEP and the following tidal statistics are provided:

Mean Higher High Water	2.02' NGVD
Mean High Water	1.75' NGVD
Mean Sea Level	1.02' NGVD
Mean Low Water	0.29' NGVD
Mean Lower Low Water	0.00' NGVD
Mean Tidal Range	1.46' NGVD

### Jim Neville Marine Preserve and Palmer Point Park

The tides in Upper Little Sarasota Bay have been monitored by the FDEP, Bureau of Survey and Mapping and are reported as Published Tide Station Reports. The tide gauge for the Jim Neville Marine Preserve and Palmer Point Park is Gauge No. 872 5985, located on the Midnight Pass Marina Pier. Tidal data recorded at the station have been analyzed by the FDEP and the following tidal statistics are provided:

Mean Higher High Water	1.86' NGVD
Mean High Water	1.57' NGVD
Mean Sea Level	0.95' NGVD
Mean Low Water	0.33' NGVD
Mean Lower Low Water	0.00' NGVD
Mean Tidal Range	1.24' NGVD

### Snake Island

The tides in Lower Little Sarasota Bay, near Venice Inlet, have been monitored by the FDEP, Bureau of Survey and Mapping and are reported as Published Tide Station Reports. Due to the location of Snake Island, with influences from both Dona Bay and the Gulf of Mexico, two tidal gauges were identified to identify the range of tidal influences that occur in this portion of Little Sarasota Bay. The first gauge is Gauge No. 872 5858, located at the Venice Municipal Pier in the Gulf of Mexico. The second gauge is Gauge No. 872 5902, located on a private dock northeast of Snake Island in Dona Bay. Tidal data recorded at these stations have been analyzed by FDEP and the following statistics are provided:

Gauge No. 872 5858 – Venice Municipal Pier – Gulf of Mexico	
Mean Higher High Water	2.25' NGVD
Mean High Water	1.99' NGVD
Mean Sea Level	1.18' NGVD
Mean Low Water	0.37' NGVD
Mean Lower Low Water	0.00' NGVD
Mean Tidal Range	1.62' NGVD

Gauge No. 872 5902 – Dona Bay Northeast of Snake Island	
Mean Higher High Water	1.74' NGVD
Mean High Water	1.46' NGVD
Mean Sea Level	0.86' NGVD
Mean Low Water	0.26' NGVD
Mean Lower Low Water	0.00' NGVD
Mean Tidal Range	1.20' NGVD
Source: FDEP, Bureau of Survey and Mapping	

### 3.8 Geotechnical/Soils and Topography

#### Sampling Methods

A subsurface investigation of the project disposal islands was conducted in late 1999 and early 2000, by Williams Earth Sciences (Appendix E, Reference 3). The investigation was conducted in conjunction with a preliminary topographic survey completed by King Engineering (Reference 4) during this same time period. Utilizing field observations and preliminary sketches, the boring locations were identified prior to sampling. These boring locations were identified on the survey in addition to the preliminary topographic information.

The borings were conducted utilizing either a bucket type hand auger or a post-hole digger. In addition, where a significant amount of rock or shell was found, a pry bar was used to loosen or break the material so that the hole could be advanced. The boring holes were advanced to the water table or practical refusal utilizing the manually operated equipment. In addition to the borings, grab samples were obtained of the initial six inches of soil in two seagrass areas at Palmer Point Park and the Jim Neville Marine Preserve. Samples representative of the soils encountered were then selected for laboratory testing. However, due to the difficulty in obtaining representative samples of the larger sized materials, laboratory testing was limited to the sands and fine-grained soils. The laboratory tests included gradation tests, -200 wash gradations, organic content test and the Atterberg Limits test. Detailed information regarding the geotechnical investigation is found in the *Report of Geotechnical Services - Sarasota Bay Ecosystem Restoration* completed for the project (Reference 3).

#### Big Edwards Island

Big Edwards Island is approximately 6 acres in area with dimensions of 550 feet north-to-south and 400 feet east-to-west. The topography of the island is unique with a relatively narrow perimeter berm enclosing an area where dredged material was placed. The elevation outside of the perimeter berm ranged from 0 MSL to 5 feet MSL. The elevation of the perimeter berm generally varied from about 12 to 13 feet MSL. However, the berm was as high as about 14 feet MSL in the northwest corner of the island. Inside the perimeter berm, the elevation varied from a low of about 5 feet MSL at the south end of the island to a high of about 17 feet MSL near the north end of the island.

Forty-two borings were drilled on Big Edwards Island. The borings drilled both on the berm and inside of the berm encountered similar dredged fill consisting of fine sand with

a varying amount of shell and limestone rock pieces. The rock included pieces as large as eight to ten inches in dimension. In several locations, it was difficult to advance the borings due to large rocks. The greatest amount of shell material was found toward the southern portion of the island and the greatest amount of rocky material was found toward the northern end of the island. The borings conducted at the lower elevations around the perimeter of the island encountered fine sands with some shell fragments. In addition, some silty sands and sandy silts were encountered, primarily at the south end of the island at about 0 MSL.

According to the 1987 Soil Conservation Services (SCS) soil survey (Reference 5), the soils on Big Edwards Island are identified as Kesson and Wulfert mucks. Two borings encountered organic soils at their termination depths and several others encountered silts that may be representative of this soil type.

Based on the samples recovered, it does not appear that the dredged material from the island is suitable for beach restoration or seagrass restoration due to the relatively large size of material encountered. It also does not appear that a sufficient amount of material was large enough to allow it to be used for shoreline stabilization.

#### Skiers' Island

Skiers' Island is a relatively long slender island approximately 1250 feet long by an average of 275 feet wide and encompassing approximately 8 acres. The island has a ridge running along its spine ranging from about 6 feet MSL near the south end to about 7 feet MSL near the north end. In addition, the ridge breaks in the middle of the island to an elevation of approximately 1-foot MSL.

Twenty-nine borings were drilled on Skiers' Island. Borings drilled at elevation 2 feet MSL or less generally encountered fine sands with some shell or limestone pieces. This material was considered sands. The borings drilled at elevation 2 feet MSL or higher encountered dredged fill material consisting of sand with large shell and limestone pieces. Some of the surficial limestone pieces were as large as 12 inches in dimension. In addition, rocks, on the order of 6 inches were observed on the ground surface throughout the island.

According to the 1987 SCS soil survey, the soils on Skiers' Island are identified as Kesson and Wulfert mucks. However, this material was not apparent in the material sampled.

Based on the samples recovered, it does not appear that the dredged material from the island is suitable for beach restoration or seagrass restoration due to the relatively large size of material encountered. It is likely that material on the interior areas of the island, after processing, may be used for erosion protection. However, a sufficient quantity of the material must be identified in order for processing of the material to be cost effective.

### Jim Neville Marine Preserve

Jim Neville Marine Preserve encompasses approximately 35 acres and consists of two areas connected by a mudflat. The southern area has a gentle topography with a slight ridge running in the northwest to southeast direction. The highest point of this area is about elevation 7 feet MSL. The northern area is somewhat larger and also has a gentle topography with a high point of about elevation 10.5 feet MSL, located near the north end.

Nine borings were drilled on the southern portion of the island. Six borings were drilled along the perimeter of the southern area and three were drilled in the interior at elevation +2 feet MSL or higher. Those borings drilled on the perimeter encountered fine sands to their termination 1 to 2 feet below the ground surface. Some shell fragments, phosphate and silt were also present in these samples. The borings drilled on the interior portion encountered fine sand with a significant amount of large, intact shell, shell fragments and limestone fragments to a depth of 5 to 7 feet below the ground surface. Below this material, fine sands were encountered to the termination of the borings. A small amount of peat was identified in a couple of the borings.

Fifteen borings were drilled on the northern portion of the island. Four borings were drilled at higher interior locations while the rest were drilled around the perimeter. These borings encountered similar materials to the southern area.

According to the 1987 SCS soil survey, the soils on the Jim Neville Marine Preserve are Kesson and Wulfert muck. The geotechnical investigation indicates that this type of soil was present prior to the dredge material being placed on the island.

With the exception of the soils found at the perimeter of the island, the dredged material does not appear to be suitable for beach restoration or seagrass restoration due to the significant amount of large material such as shells and limestone pieces.

### Palmer Point Park

Palmer Point Park is a 33-acre disposal area with very little topography. The highest point of the area is at about elevation 4 feet MSL.

Eighteen borings were conducted on Palmer Point Park. The borings generally encountered fine sands with a varying amount of shell fragments. A boring conducted in a mudflat on the east end of the island encountered a silty peat from the ground surface to the termination of the boring at 6 inches.

According to the 1987 SCS soil survey, the soils in the Palmer Point area are identified as Kesson and Wulfert mucks. These soils were most likely present prior to the deposition of dredge material on the island.

Materials found on Palmer Point Park are suitable for beach restoration. In addition, it is possible that the material found on this island may be suitable for seagrass restoration to some extent.

### Snake Island

Snake Island is approximately 2 acres. Topographically, it is characterized by 2-foot high banks close to the water edge. The elevation of the interior of the island generally ranges between 2 feet MSL to a high of about 7 feet MSL (northwest quadrant of the island).

Eleven borings were conducted on Snake Island. The borings encountered soils classified as fine sands from the ground surface to their termination. Some shell, shell fragments, and small pieces of phosphate were found within the sand. At the termination of the borings conducted in the middle of the island and the northwest quadrant, an organic silt was encountered.

According to the 1987 SCS soil survey, the soils on this site are identified as Canaveral fine sands, a natural formation. The soil found on Snake Island is representative of this type of soil.

Soils identified on Snake Island appear to be suitable for beach restoration. However, the shell fragments would need to be removed if the soil was to be used for seagrass restoration.

### **3.9 Air Quality**

Air quality within the project area is good due to the presence of either on or off-shore breezes. Sarasota County is classified as an attainment area for all Federal Air Quality Standards.

### **3.10 Noise**

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

### **3.11 Aesthetic Resources**

Sarasota Bay is bordered primarily by residential developments and some commercial land uses. Throughout the public involvement process, many homeowners have stated that the aesthetic value of these disposal islands are important to them and should be a consideration in the selection of the Recommended Plan.

### **3.12 Recreation Resources**

The primary recreational use of Sarasota Bay is "viewing it", according to a public opinion survey by the Sarasota National Estuary Program in the early 1990's (Reference 1). However, there are numerous other recreational uses of the bay, which include both active and passive forms of recreation. These recreation uses include boating, water-skiing, kayaking, swimming, wildlife observation (birding), and fishing. Recreational fish resources include a variety of species including redfish (*Sciaenops*

*ocellatus*), sea trout (*Cynoscion* spp.), jacks (*Seriola fasciata*), pompano (*Trachinotus carolinus*), black drum (*Pogonias cromis*), sheepshead (*Archosargus probatocephalus*), snook (*Centropomus* spp.), flounder (*Paralichthys albigutta*), and mangrove snapper (*Lutjanus griseus*).

Several of the project disposal islands, particularly Big Edwards Island, Skiers' Island, and Snake Island, are used by the public regularly for picnicking and other activities. However, each of the islands has evidence of human activity except Bird Colony Islands. Skiers' Island's primary recreational use is water skiing. The deep-cut channel surrounding the island is one of the few places in Sarasota Bay where water-skiing is feasible.

### **3.13 Navigation**

The Gulf Intracoastal Waterway is adjacent to each of the project disposal islands. In addition, several other marked channels are located throughout the project area to provide access to residential areas adjacent to the bay.

The majority of the Intracoastal Waterway in the vicinity of the project disposal islands has been designated as "No-Wake" zones.

### **3.14 Cultural Resources**

A cultural resource investigation was conducted for the proposed project and coordination with the State Historic Preservation Officer (SHPO) has been initiated.

#### Big Edwards Island, Skiers' Island, and Bird Colony Islands

Figure 29 is a 1948 aerial of Big Edwards Island taken from the 1959 Soil Conservation Service soil survey for Sarasota County, Florida (Reference 6). In 1948, prior to dredging of the GIWW, the area that is now Big Edwards Island was occupied by two small mangrove keys and the adjoining waters of Roberts Bay.

Figure 30 shows the 1948 aerial for the area that is now Skiers' Island. As shown, this area was occupied by open waters of Roberts Bay an estimated 600 feet offshore from Siesta Key. The dredge material from the GCIW was deposited on the bay bottom to create Skiers' Island.

Figure 31 shows the 1948 aerial for the area identified as the Bird Colony Islands. Similar to today, the 1948 aerial indicates this area was occupied by three small mangrove islands prior to the dredging of the GIWW.

The cultural resource investigation for Big Edwards Island, Skiers' Island and the Bird Colony Islands included archival research and review of soil survey maps. This information indicated that there were no significant cultural resources on any of these islands and that there is little likelihood of sites being present on any of these islands.

### Jim Neville Marine Preserve and Palmer Point Park

The 1948 aerial of the area that is now the Jim Neville Marine Preserve is shown in Figure 32. In 1948, this area was occupied by a large mangrove island (the Bird Keys) and a small area adjoining open waters of Little Sarasota Bay.

~~In 1948, the area that is now Palmer Point Park consisted of a narrow strip of mangroves that extended east from the northern tip of Casey Key into the adjoining waters of Little Sarasota Bay, as well as open water immediately south of this strip (Figure 33).~~

The cultural resource investigation for Jim Neville Marine Preserve and Palmer Point Park included archival research, review of soil survey maps and field reviews. This research resulted in the identification of no significant cultural resources on these islands.

### Snake Island

In 1948, the area that is now Snake Island formed approximately the southern one-quarter of an elongated beach ridge island fringed by mangroves and open water at the conjunction of Lyons Bay, Dona Bay, and Venice Inlet (Figure 34). Construction of the Intracoastal Waterway separated Snake Island from the remaining island (Turner Key).

The cultural resource investigation for Snake Island included archival research, review of soil survey maps and field review. This investigation resulted in the identification of an archaeological site (Site S02336) located on Snake Island. Testing of this site on Snake Island determined that the site is eligible for the *National Register of Historic Places*. Coordination with the SHPO has been initiated. Consultation with the SHPO will determine what is the appropriate mitigation measure for preservation of the archeological site on Snake Island.

## 4.0 ENVIRONMENTAL EFFECTS

This section is the scientific and analytical basis for the comparisons of the alternatives. See Tables 1-5 in Section 2.0, Alternatives, for the summary of impacts. The following includes anticipated changes to the existing environment including direct, indirect, and cumulative effects.

### 4.1 General Environmental Effects

During construction of the GIWW during the 1950's and early 1960's, placement of dredged material on mangrove islands and bay bottom created upland areas. The dredged material was placed within the bay to build islands visible to navigators, thus preventing dangerous shoals. The disposal islands that are part of this project, including Big Edwards Island, Skiers' Island, Bird Colony Islands, Snake Island, Jim Neville Marine Preserve, and Palmer Point Park are all examples of this practice.

The disposal islands were constructed with and without the use of berms. Big Edwards Island is typified by a berm (or containment system) around the outer edge of the island where disposal material was pumped in the interior during dredging operations. The other islands were built without perimeter berms and are mounds with the highest point in the center with decreasing elevations towards the outer edges. The islands were colonized by non-native trees and shrubs such as Australian pine, Brazilian pepper, and carrotwood. Occasional ground cover species such as railroad vine (*Ipomea pes-caprae*), sandspur (*Cenchrus* spp.), and prickly pear cactus are found in the understory.

In addition to the uplands, the wetland fringes of the disposal islands and adjacent habitat are impacted by the presence of non-native nuisance vegetation and by an ongoing erosion problem. The presence of exotic plant species inhibits the growth of native species causing the diversity of native species found on these islands to be reduced as a result of competition and a subsequent loss of native wildlife habitat. Erosion is a problem on several of the disposal islands, which impacts the water quality in the bay and results in deposition of sediments in navigational channels.

### 4.2 Vegetation

The following discussion will focus on the impacts, both positive and negative, resulting from the Recommended Plan. As the intent of this study is to identify the most feasible alternative for ecological restoration of the disposal islands, the concepts developed for each island (as discussed in Section 2.0, Alternatives) are generally consistent regarding potential impacts to the affected environment.

For each of the disposal islands, the control of nuisance species after restoration is an important consideration. In general, the control of these nuisance species, primarily Brazilian pepper, Australian pines, and carrotwood, will be facilitated through the following:

- Grade changes resulting in the removal of substrate will remove the root stock and seed source from these species and will result in incompatible habitat creation for exotics.
- Grade changes resulting in the addition of fill will cover over seed sources preventing germination of seeds.
- Use of composted shredded (tub-ground) woody vegetation will act as a thick mulch layer physically preventing seed germination. Material used from the nuisance species must be composted to prevent seed germination in the mulch.
- Use of applied herbicides (injection, frill and girdle, or cut stump application) may be used to control Australian pines and Brazilian pepper in specified areas.
- Finally, follow-up treatment and monitoring will be necessary.

Planting of desirable species will also help with controlling nuisance species by creating competition in the newly disturbed soils. Upland plantings should include a diverse mix of subtropical hardy native trees and shrubs. Wetland plantings should include mangrove species and high and low marsh species. The wetland plants should be planted on close centers as liners or bare root for quick coverage and optimum competition. Detailed planting plans for each island will be completed during the design phase of the project. Table 9 provides a general list of plant species that will be considered for each of the various habitats.

#### Big Edwards Island

The most significant impact to vegetation associated with the Recommended Plan, Concept 4, on Big Edwards Island will be removal of nuisance species including, but not limited to, Brazilian pepper, Australian pine, and carrotwood. Some desirable species such as cabbage palm, rouge plant, Florida privet, corky passionvine, and moonvine will be impacted by construction activities. The removal of the substrate, whether minor grading or significant grade changes, increases the opportunity for successful eradication of exotics through the removal of root stock and seed sources. Revegetation activities associated with upland restoration will include installation of many of the desirable species impacted as well as other desirable species to create a diverse plant community (Table 9).

The installation of high marsh species such as knotgrass (*Paspalum* ssp), marsh-hay (*Spartina patens*), and saltgrass (*Distichulus*) will improve the habitat functions of the island. These efforts will increase the amount of cover of high marsh species that are almost non-existent in the Sarasota Bay area. The increase in acreage of mangroves is another positive effect of the project. The increased acreage of mangroves will increase the fisheries habitat value as a result of the project. The Recommended Plan increases the open water edge effect of the mangroves that typically improves the function and value of mangroves.

Table 9. Proposed Plant Species List

Upland Trees	
<i>Busera simaruba</i>	Gumbo limbo
<i>Celtis laevigata</i>	Sugarberry
<i>Coccoloba uvifera</i>	Seagrape
<i>Coccoloba diversifolia</i>	Pigeon Plum
<i>Conocarpus erectus</i>	Green buttonwood
<i>Diospyros virginiana</i>	Persimmon
<i>Juniperus silicicola</i>	Southern Red Cedar
<i>Persea borbonia</i>	Red bay
<i>Quercus myrtifolia</i>	Myrtle oak
<i>Quercus virginiana</i>	Live oak
<i>Sabal palmetto</i>	Cabbage palm
<i>Zanthoxylum clava-herculis</i>	Hercules club
Upland Shrubs	
<i>Callicarpa americana</i>	Beautyberry
<i>Chrysobalanus icaco</i>	Coco plum
<i>Chrysophyllum oliviforme</i>	Satinleaf
<i>Dodonaea viscosa</i>	Varnish leaf
<i>Erythrina herbacea</i>	Carol beam
<i>Forestiera segregata</i>	Wild olive
<i>Myrcianthes fragrans</i>	Simpson stopper
<i>Pithecellobium keyense</i>	Blackbead
<i>Psychotria nervosa</i>	Wild coffee
<i>Randia aculeata</i>	White Indigo Berry
<i>Scaevola plumieri</i>	Inkberry
<i>Serenoa repens</i>	Saw palmetto
<i>Sophora tomentosa</i>	Necklace pod
<i>Suriana maritima</i>	Bay cedar
Wetland – High and Low Marsh Species	
<i>Avicennia germinans</i>	Black mangrove
<i>Rhizophoraceae mangle</i>	Red mangrove
<i>Laguncularia racemosa</i>	White mangrove
<i>Conocarpus erectus</i>	Buttonwood
<i>Spartina bakeri</i>	Sand cordgrass
<i>Spartina patens</i>	Marshhay cordgrass
<i>Spartina alterniflora</i>	Smooth cordgrass
<i>Juncus roemerianus</i>	Black needle rush
<i>Scirpus spp.</i>	Bulrush
<i>Batis maritima</i>	Sea pickle
<i>Sesuvium spp.</i>	Seapurslane
<i>Paspalum vaginatum</i>	Seashore paspalum
<i>Distichlis spicata</i>	Saltgrass

Construction access is anticipated to occur from the western side of the island. This location is adjacent to a channel that is not vegetated with seagrasses and therefore no impacts to adjacent seagrasses are proposed. Grade changes in the northwest portion of the island will occur adjacent to existing mangroves. As such, occasional individual mangroves will be impacted to provide a consistent elevation between planted mangroves and the existing vegetation. Where practical, design efforts will identify these locations and adjustment in species type will minimize impacts while providing an opportunity for exchange of water during normal tidal events. Sheet flow of tidal waters is beneficial to the quality of habitat.

Seagrasses adjacent to the east of Big Edwards Island will not be negatively impacted by the Recommended Plan. The installation of temporary erosion control measures during construction and permanent erosion control measures will prevent impacts to the seagrasses from continued erosion of the adjacent shoreline. The seagrasses to the south of the island may experience minor impacts from the existing unconsolidated shore. In order to provide access to upland areas and to take advantage of existing conditions, the upland area on the southern portion of the island will remain. However, through upland restoration plantings, all efforts will be made during the design process to include vegetation and maintenance commitments that will minimize erosion.

#### Skiers' Island

The greatest effect to vegetation by the Recommended Plan, Concept 4, involves the removal of exotic and nuisance vegetation. Skiers' Island is dominated by Australian pine with occasional Brazilian pepper adjacent to the existing mangroves that fringe the island. Within isolated pockets, encroaching carrotwoods will be impacted by the restoration project. Small, healthy communities of native rouge plants, corky passionvine, moonvine, and prickly pear cactus that have been able to survive the increasing shade of the fast-growing carrotwood will be impacted by the project. This unavoidable impact occurs during the removal of substrate, whether minor grading or significant grade changes. However, the removal increases the opportunity for success through the elimination of exotic nuisance root stock and seed sources. Revegetation activities associated with upland restoration will include installation of many of the desirable species impacted, as well as a diverse mix of subtropical upland hammock species (Table 9).

The proposed locations of upland restoration will not impact the existing mangroves. The Recommended Plan reduces the steep slopes of disposal material adjacent to the existing mangroves. The elimination of the upland disposal material and nuisance species adjacent to the existing mangroves will have a positive impact on the existing mangroves.

The existing mangroves are currently inundated from the outside edge of the island. The proposed open water connections to the east, west, and north will have a positive effect on the function and value of the proposed and existing mangroves. The increased inundation improves the fisheries habitat value of the mangroves. Low marsh habitat will be initially installed and will create nursery habitat for fish and estuarine, inter-tidal invertebrates.

Historic dredging adjacent to Skiers' Island and the subsequent placement of fill on the Island precludes much habitat for seagrasses. The limited amount of seagrass habitat present will be impacted in a positive manner from the proposed activities. The Recommended Plan includes mangrove coverage around more than 90% of the island, thus reducing the opportunity for continued erosion. The reduction in erosion should improve water quality and reduce siltation over seagrasses from migrating disposal material.

It is anticipated only minor and temporary construction related impacts will occur to desirable wetland vegetation during construction through the use of best management practices such as the use of silt fences, turbidity barriers, and controlled construction access.

#### Bird Colony Islands

The proposed activities for the Bird Colony Islands are limited to stabilization. It is anticipated that stabilization will occur through the placement of rubble rip-rap and will have no negative impacts on the nesting habitat provided by the mangroves. As a result of the wave energy, which has caused erosion of the mangrove areas, there are no seagrasses on the edge of the small islands. Therefore, placement of the stabilization material will have no impact on seagrasses.

#### Jim Neville Marine Preserve

The Recommended Plan, Concept 5, on the Jim Neville Marine Preserve provides the greatest opportunity for improvements to the existing vegetation and ecological habitat. With more than 27 acres of nuisance species cover, the primary effect will be the positive effect of the removal of nuisance plants. However, as the disposal material was placed in the middle of existing mangroves during excavation of the GIWW, some impacts to existing mangroves and seagrasses will occur during construction. These impacts will be temporary and minor, and are anticipated to return to valuable wetland habitat.

The previously placed disposal material created two mounds which have become vegetated almost exclusively with Australian pines associated with two areas in the interior of Jim Neville Marine Preserve. Upland vegetation restoration will target removal of the Australian pines. Additional areas of melaleuca exist with Brazilian pepper encroaching into the mangrove fringe. Scattered Florida privet and saltbush exist on the island and will be unavoidably impacted by the re-grading efforts. Approximately two acres of upland restoration is proposed for the Recommended Plan, replacing upland exotic nuisance species with a diverse, desirable sub-tropical hammock species (Table 9). It is anticipated the positive effect on the upland vegetation for Jim Neville Marine Preserve will increase the function and value of the ecological restoration. The Recommended Plan provides a favorable balance of uplands and mangroves.

The placement of material on the island created a unique habitat between the upland nuisance species and the mangrove band around the island. This habitat is quite similar to natural salterns in other coastal areas. Typically, the area becomes inundated

with the tide and water is entrapped. As the tide ebbs, the trapped water evaporates and the salinity greatly increases. This increased salinity prevents propagation of seeds and the growth of most vegetation. What does occur is rapid blooms of single cell algae. The algae provide a food source for fiddler crabs (*Uca uca*) and other invertebrates. This habitat will not be impacted by the proposed activities.

The mangrove bands that were left after placement of the disposal material will not be negatively impacted by the Recommended Plan. Positive impacts will occur as a result of increased mangrove acreage as well as increased contact with the restored mangrove areas by tidal flows. The increased function and value of the multiple channel connections included in the Recommended Plan compensates for the temporary, construction-related impacts to mangroves. The existing mangroves as well as the planted mangroves will benefit from sheet flow of tidal water across the island during high tide. It is anticipated the designs provide an opportunity for the sheet flow from all directions, depending on the prevailing tides and/or winds.

The temporary impacts will include removal of mangroves associated with the channel connections, construction access, and construction of the low marsh/mangrove planting areas. The construction access is necessary to build the Recommended Plan as deep water areas do not exist adjacent to the proposed construction areas.

Impacts to the adjacent seagrass habitat will occur. These impacts will be both positive and negative. The negative impacts will occur as a result of tidal channel connections and construction access. Where practical, the proposed location for the tidal channel will be the same location used for access. Additional excavation may occur in the grass flats adjacent to the island to allow ingress and egress of construction equipment and removal of the excavated material. Exact locations will be identified during the design phase and all efforts will be made to determine locations that will provide long-term benefits through increased circulation. The positive benefits will be improved water quality as a result of nutrient assimilation by the wetland vegetation as well as trapping suspended sediments.

The use of best management practices such as the installation of silt fences, turbidity barriers, and controlled construction access will reduce impacts during construction. It is anticipated phased construction would have a negative impact on the vegetation. Nuisance species are opportunistic and colonize quickly on exposed soils. Phased construction would maintain a seed source if nuisance species remained within areas of no work. The recently constructed areas would contain exposed areas of soil adjacent to the nuisance species. As a result maintenance costs would increase substantially.

#### Palmer Point Park

While some removal of nuisance species by volunteers currently occurs on Palmer Point Park, the primary effect of the Recommended Plan, Concept 3, will be a positive one, consisting of the removal of nuisance species such as Australian pine and Brazilian pepper. This site is somewhat different than the other areas as it is part of a contiguous peninsula, not an island. Furthermore, the Recommended Plan, which will create all low marsh and mangrove habitat, considers the presence of nuisance species

on the adjacent uplands. As a result, the loss of upland habitat is an unavoidable impact, but the proposed habitat will have significant benefits. The opportunity for restoration of the uplands on the adjacent properties will eventually provide a mosaic of habitat improving the total ecological value of Palmer Point Park.

~~The mangroves will provide a positive impact to the adjacent habitat by increasing nesting opportunities, improving water quality, and increasing fisheries habitat. The mangroves would benefit from increased sheet flow of tidal waters.~~

As with Jim Neville Marine Preserve, open sandy areas of high salinity that are similar to natural salterns are present. The vegetative value, while considered high, is limited to the rapid algal blooms. The Recommended Plans would have no impact to this community. Detailed analysis during design and careful construction techniques will be required to avoid impacts to this unique habitat.

The Recommended Plan precludes the use of open water lagoons that were considered in other concepts. However, preliminary analysis indicated the small area of open water opening to the bay would not have enough volume to provide high enough flow rates through the connection to existing open water areas. As such, the low flow rates would cause the opening to silt in and would create a stagnant water area of reduced water quality. This potential secondary affect would impact the function and value of the restored wetland.

#### Snake Island

Vegetative impacts to Snake Island include the positive effects of nuisance species removal including Australian pine, Brazilian pepper, and carrotwood. Removal of the nuisance species will eliminate the seed sources from an active inlet. The volume of water that passes through Venice Inlet covers a large area during each tidal cycle and has the potential of vast seed dispersal. Occasional planting of native species such as oaks has occurred and will be impacted by the proposed project.

Upland restoration will improve the habitat value and have a positive impact on the project area. While the recreation value of the island is intended to remain, there is a negative effect on the wildlife value of the upland restoration activities.

The few existing mangroves present on the island will not be impacted by the Recommended Plan.

The continued erosion of Snake Island has impacted adjacent seagrass beds. While few grasses are present within the nearby water, the proposed design will reduce the erosion and avoid additional impacts to seagrass. The No-Action Alternative would continue to reduce water quality and eliminate existing mangroves.

The proposed low marsh area would have a positive impact on the fisheries habitat. The reclaimed area will be protected by soft-shore stabilization such as rubble rip-rap, sand filled fabric tubes, or other geotextile alternatives to reduce the high energy environment creating the current erosion.

### **4.3 Threatened and Endangered Species**

Through a determination by U.S. Fish and Wildlife Service, it has been determined this project will have no negative impact on Threatened and Endangered Species. The piping plover, a federally threatened species, is found in the vicinity of both Palmer Point Park and the Jim Neville Marine Preserve and forages in tidal flats. Therefore, the protection or creation of tidal flat areas as part of the Recommended Plans for each site will be beneficial to this listed species.

Sea turtle nesting has not been documented on any of the project disposal islands and will not be impacted by any of the Recommended Plans. Habitat for the Western Indian manatee is located throughout the project area, especially in areas of seagrasses located near the islands. During the project construction, the "Standard Manatee Conditions" will be followed as will be stated in the project permit issued by the Florida Department of Environmental Protection. It is anticipated that following the conditions will help avoid impacts to the manatee as a result of implementation of the Recommended Plans.

### **4.4 Fish and Wildlife Resources**

As discussed in Section 4.2, impacts to fish and wildlife resources will be primary benefits from the ecological restoration through the removal of nuisance species and their habitat and the replacement by desirable upland and wetland species. In turn, the increase in the acreage of the desirable species improves the function and value of the fisheries and bird habitat.

Temporary impacts will occur during construction. These impacts will be limited to adjustments in cover type and to construction access. While it is recognized a temporal loss in bird nesting habitat will occur, the long-term benefits of planting more desirable species will have a positive impact on the bird habitat.

Construction activities on the Bird Colony Islands are minimal. It is anticipated that stabilization will occur through the placement of rubble rip-rap and will have no negative impacts on the nesting habitat provided by the mangroves. In addition, construction activities will be minimized during the most active nesting season.

Without the implementation of this project, there would continue to be negative impacts as a result of erosion, nuisance species seed dispersal, and reduced water quality.

### **4.5 Water Quality**

Overall, the Recommended Plans will have a long-term positive effect on water quality within the bay because of the reduction of erosion through mangroves, marshes and other shoreline stabilization methods. This vegetation will also help to assimilate nutrients, which will also improve water quality.

Temporary impacts to water quality will occur during construction. Best management practices will be incorporated to reduce impacts. Mixing zones will be established for the work areas. No increase in suspended sediments will be allowed outside of the mixing zones. Creative concepts such as the use of organic fluids in the hydraulic systems of earthmoving equipment will reduce the chance of accidental impacts to water quality.

#### **4.6 Aesthetics**

Each of the project areas and Recommended Plans involve similar impacts to aesthetics.

The visual look of the proposed project islands will change as a result of the project. Newly planted vegetation will require time to mature to the existing heights of the exotic species. However, the majority of these islands have existing mature vegetation, particularly mangroves, which will remain intact with the implementation of the project. Many of these mangrove areas extend up to 20 feet high providing quite a visual buffer around the island.

The public involvement process revealed that "beauty is indeed in the eye of the beholder". Personal differences exist regarding nuisance species, disposal islands, visual buffers, and recreational usage. A small portion of the public is adamant in the feeling that Australian pines are beautiful and should not be cut down. Disposal islands are visual landmarks for boaters while providing visual buffers for adjacent homeowners. Finally, several homeowners felt that increased recreational usage of the islands would be an aesthetic impact to their viewshed. Other members of the public indicated that the restoration of these disposal islands with native, desirable habitat would add to the beauty of the bay. In addition, the increase in species diversity would also improve their view of the bay.

On islands such as Big Edwards Island and Snake Island, for which viewshed seemed an important issue to members of the public, opportunities to minimize dramatic changes to the viewshed will be evaluated during the design phase of this project, including planting larger trees and a phased removal approach.

#### **4.7 Recreation**

Impacts to the recreational value of the proposed project areas are limited. Design alternatives were considered to reduce impacts to recreation. Impacts to passive recreation will result from reduced access on some of the islands. During construction, recreation will be impacted as the islands will be considered construction sites and access by the public will be trespassing. This unavoidable, temporary impact will be mitigated through the increased recreational value associated with the pedestrian trail and small boardwalk on Big Edwards Island.

Through the public involvement process, a general consensus was achieved regarding the desire for recreation on the project disposal islands. Specifically, the public identified the importance of public access and use of Big Edwards Island and Snake Island.

The public also expressed the importance of the continued use of the deep-water channel surrounding Skiers' Island for water skiing. As a result of existing mangroves around the island, recreational water skiing will not be impacted from increased wave action. Through the public involvement process, it was also determined that water skiers preferred the leeward side of the island as a result of the wind break. Through upland restoration, vegetation will be installed that will eventually grow large enough to provide the same level of protection from the wind for the recreational skiers. The existing mature mangroves around the island also provide a wind break. It is anticipated that the changes in vegetation will not impact the recreational value of the island.

Finally, the public identified the importance of limiting public use and access of the Jim Neville Marine Preserve and the project area of Palmer Point Park. These comments were considered and incorporated into the Recommended Plan for each island.

#### **4.8 Cultural Resources**

Project features of the Recommended Plan will impact archeological site 8So2336. Adverse effects to the site, however, will be mitigated by project features. Beneficial uses of dredged material will help in the preservation of the site. A detailed mitigation plan will be worked out through consultation with the SHPO.

#### **4.9 Cumulative Impacts**

Cumulative impact is the impact on the environment which results from the incremental impact of the preferred action when added to other past, present, and reasonable foreseeable future actions (40 CFR 1508.7). The cumulative impact of the proposed action is the positive benefit of removal of the seed source of nuisance species, the improvement of water quality through erosion control, the continued increased production of fisheries resources as a result of increased habitat, and the increased habitat for birds.

#### **4.10 Compatibility with Federal, State, and Local Objectives**

As discussed in Section 1.3 (Project Need and Opportunity), this project is consistent with Federal, State, and Local Objectives.

The project is consistent with the Sarasota Bay National Estuary Program's *Comprehensive Conservation and Management Plan* (Reference 1). Specifically, the proposed project will help implement Action Items 1.2 (enhance, restore, and create wetlands throughout the bay region) and 1.7 (remove exotic plants from wetlands). This project is especially beneficial because of the limited opportunity for restoration lands in the project area resulting from extensive coastal development. The project is also

consistent with Sarasota County's Comprehensive Plan, which supports the implementation of the SBNEP *Comprehensive and Management Plan* (Policy 2.1.6), disposal island restoration (Policy 2.2.2) and the restoration of productive native habitat.

In addition with the above local plans, the project is consistent with the types of projects being proposed by other Federal, State, and Regional agencies, including the Southwest Florida Water Management District, the Sarasota Bay National Estuary Program, the Tampa Bay Estuary Program, the Florida Department of Environmental Protection, and the U.S. Fish and Wildlife Service.

#### **4.11 Conflicts and Controversy**

As discussed in Section 6.0 (Public Involvement), an extensive public involvement program was completed for this project. Through this process, the study team identified issues that were important to the public, including not only ecosystem restoration but also recreation and visual effects. While maintaining the overall goal of ecosystem restoration, the public's issues were addressed in the development of the concepts that were evaluated, and in many cases the Recommended Plans. During the design phase of this project, further consideration will also be given to the visual effects of the island, as discussed in the Section 4.6 (Aesthetics).

#### **4.12 Environmental Commitments**

The U.S. Army Corps of Engineers and its contractor commit to avoiding, minimizing, or mitigating for adverse impacts during construction activities by including the following commitments in the contract specifications: (Environmental Commitments will be included in the Final Ecosystem Restoration Report (ERR), based on comments received during the Draft ERR review period by the review agencies.)

#### **4.13 Compliance with Environmental Requirements**

##### 4.13.1 National Environmental Policy Act of 1969

Environmental information on the project has been compiled and the Draft Environmental Assessment was made available for public review through public notice in compliance with 33 CFR Parts 335-338. These regulations govern the Operations and Maintenance of U.S. Army Corps of Engineers Civil Works Projects involving the Discharge of Dredged or Fill Material into Waters of the U.S. or Ocean Waters. This public coordination and environmental impact assessment complies with the intent of NEPA. The process will fully comply with the Act once the District Commander has signed the Findings of No Significant Impact.

##### 4.13.2 Endangered Species Act of 1973

Consultation with the U.S. Fish and Wildlife Service was initiated in August 1999 for the purposes of Section 7 Coordination. By the letter dated February 24, 2000, the USFWS determined that there would be no impacts on any listed endangered species. This project was fully coordinated under the Endangered Species Act; therefore, this project is in full compliance with the Act (Appendix G).

#### 4.13.3 Fish and Wildlife Coordination Act of 1958

The project has been coordinated with the U.S. Fish and Wildlife Service. It has prepared a Coordination Act Report for the project. Therefore, the project is in compliance with this Act (Appendix G).

#### 4.13.4 National Historic Preservation Act of 1966, as amended (PL 89-665)

Archival research conducted for Big Edwards Island and Skiers' Island including analysis of soil survey data determined that there is little likelihood of sites being present. Archeological surveys completed at Jim Neville Marine Preserve and Palmer Point Park did not locate any significant cultural resources. Testing of archeological site 8So2336 on Snake Island determined that the site is eligible for listing on the *National Register of Historic Places*. Coordination with the Florida State Historic Preservation Officer (SHPO) has been initiated. Consultation with the SHPO will determine what is the appropriate mitigation measure for preservation of the archeological site on Snake Island.

#### 4.13.5 Clean Water Act of 1972

Section 404(b)(1) (Appendix A). As the project is in tidal waters and adjacent to the Intracoastal Water Way, Section 10 of the Rivers and Harbors Act of 1899 will supercede Section 404(b)(1) for any Dredge and Fill activities associated with the project.

Section 401 of the Clean Water Act requires water quality certification for projects that may impact wetlands of the United States. Delegation for the section has occurred to the State of Florida through the Environmental Resource Permitting. By obtaining a permit through Florida Statute 343, water quality certification consistent with Section 401 will be provided.

#### 4.13.6 Clean Air Act of 1972

No air quality permits would be required for this project. Therefore, this Act would not be applicable.

#### 4.13.7 Coastal Zone Management Act of 1972

The project has been evaluated in accordance with Section 307 of the Coastal Zone Management Act (Appendix B). It has been determined that the project would have no unacceptable impacts and would be consistent with the Florida Coastal Zone Management Plan.

#### 4.13.8 Farmland Protection Policy Act of 1981

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

#### 4.13.9 Wild and Scenic River Act of 1968

No designated Wild and Scenic river reaches will be affected by project related activities. This act is not applicable.

#### 4.13.10 Marine Mammal Protection Act of 1972

Incorporation of the safe guards used to protect manatees during dredging and disposal operations will be implemented during construction; therefore, this project is in compliance with this Act.

#### 4.13.11 Estuary Protection Act of 1968

The proposed project is located in a designated estuary, the Sarasota Bay National Estuary. However, this estuary will not be adversely affected by project activities.

#### 4.13.12 Federal Water Project Recreation Act, as Amended

There is no recreational development proposed for maintenance dredging or disposal. Therefore, this Act does not apply.

#### 4.13.13 Resource Conservation & Recovery Act 1976(PL 94-580, 7 U.S.C. 100, et seq.)

This law has been determined not to apply, as there are no items regulated under this act being disposed of or affected by this project.

#### 4.13.14 Toxic Substances Control Act of 1976,(PL94-469; U.S. C. 2601, et seq.)

This law has been determined not to apply, as there are no items regulated under this act being disposed of or affected by this project.

#### 4.13.15 Coastal Barrier Resources Act and Coastal Barrier Improvement Act of 1990

The proposed work is within two Coastal Barrier sites as prepared by the Department of Interior in the Report to Congress on the Coastal Barrier Resources System. However, in accordance with Section 6(a) of the Act, projects for the study, management, protection, and enhancement of fish and wildlife resources and habitats, including acquisition of fish and wildlife habitats and related lands, stabilization projects for fish and wildlife habitats, and recreational projects are consistent with the purposes of the Act. The rehabilitation of the disposal islands is therefore exempt.

#### 4.13.16 E.O. 11990, Protection of Wetlands

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

#### 4.13.17 E.O. 11988, Flood Plain Management

No activities associated with this project will take place within a floodplain; therefore, this project is in compliance with this Executive Order.

#### 4.13.18 Magnuson-Stevens Fishery Conservation and Management Act

This Act requires that Essential Fish Habitat (EFH) be considered when undertaking any dredging project. The proposed action would not have an adverse impact on EFH or Federally managed fisheries. Our final determination relative to project impacts and the need for mitigation measures is subject to review by and coordination with the National Marine Fisheries Service.

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## 5.0 LIST OF PREPARERS

The U.S. Army Corps of Engineers' consultant, HDR Engineering, Inc. had the primary responsibility of preparing this document. The USACE, Jacksonville District, was instrumental in providing information for this document. The USFWS furnished the Fish and Wildlife Coordination Act Report, which was used in preparing the Ecosystem Restoration Report and the Environmental Assessment. The Sarasota Bay National Estuary Program, Florida Department of Environmental Protection, West Coast Inland Navigation District, and Sarasota County provided input on the existing resources.

### 5.1 Preparers

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### 5.3 Reviewers

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## 6.0 PUBLIC INVOLVEMENT

### 6.1 Public Meetings and Workshops

The public involvement process for this study incorporated a three-phased approach to ~~informing the community, identifying community concerns, and achieving consensus.~~ The three phases included several one-on-one/small group meetings with identified interested parties of the community; media contact and public notification prior to public workshops; and advertised public workshops.

The public involvement process for this study was developed to address the concerns of the public, who through past County ecosystem restoration efforts, have indicated a desire to be informed and involved in these types of projects.

#### 6.1.1 One-on-One/Small Group Meetings

Several individuals representing neighborhood groups, environmental groups, or other interest groups in the vicinity of the project disposal islands were identified through coordination with the Sarasota Bay National Estuary Program and Sarasota County. The project team arranged six one-on-one meetings with these individuals in August and September 1999. In addition, approximately 12 phone calls to other identified interested parties were made during this time period. These meetings and conversations were arranged to discuss with interested members of the community their primary concerns and their perceived objectives of ecosystem restoration in Sarasota Bay. Appendix H provides additional correspondence that resulted directly from these meetings.

#### 6.1.2 Public Workshops

A total of five public workshops were held for this project. Appendix H provides a copy of the press release and public notice letters advertising the workshop; mailing lists; the transcripts and summaries from each of these meetings including oral and the written comments received at these workshops; related newspaper articles; and workshop materials.

##### October 28, 1999 Public Workshop

The first public workshop was held on October 28, 1999 at Sarasota High School in Sarasota, Florida. The workshop was attended by 61 members of the public. The purpose of this workshop was to introduce the Sarasota Bay Ecosystem Restoration Feasibility Study and the Section 1135 process to the public, as well as to identify issues that were important to the public in respect to past restoration efforts in and around the bay. The project team provided background on the Section 1135 funding mechanism, the environmental review process under the National Environmental Policy Act, the upcoming public involvement opportunities for this project, the project need and rationale behind the proposed Sarasota Bay ecosystem restoration, and the project schedule. In addition, a representative from Palm Beach County Department of Environmental Resource Management presented the Munyon Island restoration project

as an example of the Section 1135 process and the successful implementation of that project.

During the second half of the meeting, the public was given the opportunity to comment on the project through oral comments and questions. In addition, written comments were accepted both at the Workshop and the 10-day period following the Workshop. Fifteen (15) people presented verbal comments and questions during this period and ten (10) people provided written comments. Many of the written comments reflected a more detailed reiteration of the verbal comments provided at the Workshop. The comments received are summarized below:

- One individual expressed concern for the prior history of disposal island restoration efforts in Sarasota Bay while this person, and several others, thanked the Corps for involving the public at an early stage for this project.
- Several individuals asked for the inclusion of areas and islands not identified in this 1135 project including shoreline along Whittaker Bayou and Little Edwards Island, while another individual indicated that Little Edwards Island should not be included in the project.
- Several comments indicated that the project should look at the restoration of these islands through a “comprehensive, integrated, inter-related” plan including the effects the current study concerning the opening of Midnight Pass may have on the restoration alternatives for the Jim Neville Marine Preserve.
- Several individuals also commented that the historical sheet flow across the Jim Neville Marine Preserve should be included in the restoration efforts.
- Two individuals expressed concern on how the restoration activities at Snake Island may be affected by activities in Shakett Creek and Cowpen Slough, which flow into the Venice Inlet.
- One individual urged the Corps to consider the needs of boaters in the vicinity of the restoration sites while another person urged the Corps to prioritize restoration over recreation. Another individual sought assurances that skiing would remain an allowable recreational activity around Skiers’ Island.
- Concern was expressed over the effect that survey and other activities might have on bird nesting in the Bird Colony Islands. Also in regards to these islands, another individual suggested that the area adjacent to the Bird Colony Islands should be designated as a “no-wake” zone.
- One individual, in favor of the restoration, expressed concern over the long-term maintenance of these projects and asked that this be considered during the feasibility study.
- Several individuals suggested that a project website should be created to provide information and graphics prior to the upcoming public workshops.

#### February 2000 Workshops

Three workshops were held in February 2000 to present, discuss, and receive comments on the preliminary restoration concepts developed for the project. Three separate workshops were held to break the project disposal islands into geographical groups. In addition, surveys were provided to the participants to identify their primary recreation and restoration objectives of the proposed project.

The format of these workshops included a brief summary of the background, need, and authorization of the project followed by the presentation of issues of concern the project team had identified through previous public input. Next, the existing conditions of the islands were presented along with three preliminary restoration concepts followed by a short public comment period. The second portion of the meeting included a break-out group session that gave the participants an opportunity to draw their own ideas and concepts or modify the concepts that had been presented. Additional issues of concern were also identified during this process. Finally, the workshop ended with the presentation of the Break-Out Groups' various concepts and issues. At the conclusion of the workshop, time was allowed for additional public comments and questions.

#### *Snake Island – February 1, 2000*

The first February 2000 workshop was held on February 1, 2000 and focused on the restoration of Snake Island. This Workshop was held at the Venice Community Center in Venice, Florida. Approximately 52 people attended this Workshop. Prior to the break-out group session, approximately ten (10) individuals made oral comments or questions to the group. The majority of these comments focused on Snake Island remaining as a public recreational island. Many of the individuals who commented were concerned that the restoration may prohibit their unrestricted use of the island. However, they also commented on the need to do something to help stop the on-going erosion of the island before the resource is lost completely. Several other individuals commented on their desire to take ownership of the island and to help maintain the island as a community. During this period, others asked questions about the project, data collection, and the Section 1135 process.

The presentation of the break-out groups' concepts and issues resulted in a consensus of all five groups. In general, these groups indicated that stabilization of the island needs to occur to prevent further erosion. Each of the groups indicated that additional acreage with stabilization should be added to the western side of the island with the eastern side of the island providing the best boat access. Each of the groups also expressed their interest in maximizing the upland area for public access. Each group also agreed that they did not want any structural recreational facilities on the island. Although some groups did not see the need for the removal of the exotic species, they requested that a phased approach be considered when the project moves forward. In addition to the oral comments made at the workshop, two written comments were received which covered similar issues raised at the Workshop.

#### *Big Edwards Island, Bird Colony Islands, and Skiers' Island – February 2, 2000*

The second February 2000 workshop was held on February 2, 2000 and focused on the restoration of Big Edwards Island, the Bird Colony Islands, and Skiers' Island. This Workshop was held at the Pine View School in Osprey, Florida. Approximately 36 people attended this Workshop. Prior to the break-out group session, approximately eight (8) individuals made oral comments or questions to the group. In general, comments expressed support for exotic vegetation removal and restoration of the islands. However, some individuals expressed concerns regarding the affect of restoration on the existing visual buffer the Australian pines provide to some homeowners. In respect to this concern, another comment was approaching the

restoration with a phased approach to minimize the affect on the visual buffer. The issue of maintenance of the restoration projects was also brought up. One individual suggested that while the islands should be addressed separately, they should also be viewed comprehensively. Finally, several people commented on the need to armor the Bird Colony Islands and to protect this resource.

All five break-out groups agreed that the protection of the Bird Colony Islands was important and several suggested that the area adjacent to these small islands should become a "no-wake" zone. As for the restoration of Big Edwards and Skiers' Islands, there was generally a consensus of four of the five break-out groups. Essentially, four of the groups identified more active recreational uses on Big Edwards Island, including a foot trail, boardwalk, and possible educational signage, in addition to restoration. They also indicated that the southern portion of the island, currently used for public access, should be maintained as an upland area. These groups also suggested that Skiers' Island should be purely done for ecosystem restoration with minimal opportunity for public recreation on the island. However, each of these groups indicated that it was important to maintain the deep-water channel around this island for recreational activities. In addition, one group indicated the importance of vegetation on the island to provide a windbreak for those skiing around it. The other group indicated that the restoration efforts should be focused on the Bird Colony Islands, but they were concerned about restoration efforts on Big Edwards and Skiers' Island because of the potential impact on the existing visual buffer the Australian Pines provide. This group also expressed concern regarding the long-term maintenance of these restoration efforts on these islands.

In addition to the oral comments made at the workshop, four written comments were received which primarily covered issues raised at the Workshop. However, one individual indicated that on both islands ecological restoration is the primary objective and restoration of these islands to mangrove islands would be beneficial.

#### *Jim Neville Marine Preserve and Palmer Point Park – February 3, 2000*

The third February 2000 workshop was held on February 3, 2000 and focused on the restoration of the Jim Neville Marine Preserve and Palmer Point Park. This Workshop was held at the Pine View School in Osprey, Florida. Approximately 74 people attended this Workshop. Prior to the break-out group session, approximately seventeen (17) individuals made oral comments or questions to the group. In general, the comments supported the restoration project. In addition, many of the comments requested that the project consider the results of the on-going study to open Midnight Pass and asked that the project team look at this project in a comprehensive manner. Individuals also had questions regarding the cost and allocation of the funds for the project and requested information on how citizen input would be quantified in the process.

Four of the five groups had similar ideas for the restoration of these islands. These suggestions included modifications to Concept 1 for Jim Neville Marine Preserve to provide more tidal lagoons for east/west and north/south flow. In addition, each of these groups suggested the importance of returning the historical sheet flow across the islands during high tides. Regarding Palmer Point Park, most of the groups supported

Concept 2 because of the diversity of habitat it provides. One group suggested a concept that included only mangrove and tidal lagoons.

In addition to the oral comments made at the workshop, eleven written comments were received which primarily covered issues raised at the Workshop. Several of these comments focused more on the opening of Midnight Pass, a separate but relevant project. Others commented on the cost of the project and the use of the excess material removed from the Jim Neville Marine Preserve.

#### May 17, 2000 Workshop

The final public workshop was held on May 17, 2000 at the Pine View School in Osprey, Florida. The workshop was attended by 26 members of the public. The purpose of this workshop was to present the concepts developed from the public input from the last public workshops and to present the Recommended Plan for each island. In addition, the public was given the opportunity to comment through both oral and written comments. In general, the written comments covered similar issues discussed at the workshop. The comments received are summarized below:

- A few individuals expressed concern about the removal of the exotic vegetation and its affect on the visual buffers they currently create. Several individuals indicated that replacing this vegetation should be accomplished by planting larger trees.
- Other commentors expressed support for exotic vegetation removal and restoration of the islands and explained how past efforts at exotic removal have been successful. One individual repeatedly supported exotic removal and gave several examples as to why removal of exotics such as Australian Pines would benefit property owners by providing greater protection in a storm. Reference was made to the problems encountered with Australian Pines at Dinner Key in Miami after Hurricane Andrew.
- One individual stated that there was not enough notice about this Workshop, which mailings were not sent out to past participants, and that having this workshop in Osprey prevented people from attending this meeting. Another individual stated that she had received a notice in the mail about the Workshop and stated that she wished that people had gotten involved earlier in the process so that they would understand how these concepts came about as a result of public input from earlier workshops. A representative from the U.S. Army Corps of Engineers explained that notices had been sent to 150 persons who had attended previous meetings and that the Corps had sent out a press release prior to the Workshop.
- Several comments were made concerning the scope of the project. One individual felt that Little Edward's Island should be included in the Project. Another suggested that while each island should be addressed separately, that they should also be viewed in their entirety for specific uses and restoration goals. One individual felt that Midnight Pass should be addressed by this project.
- Several individuals asked questions regarding how the project would affect current flows and waterways and specifically, boater access to the surrounding

areas. The management/maintenance of the islands by the County's Parks and Recreation Department was also an issue raised by several people.

- Specifically regarding Palmer Point Park, one individual expressed support for the Recommended Plan selected. Another individual liked the idea of tidal lagoons throughout the island to allow for kayak access to the area.
- Specifically regarding the Jim Neville Marine Preserve, one individual reminded the project team that there should only be passive recreation on this island. Another stated that they would like to see both an East-West and North-South flow on this island to maximize water flow. This person also stated that the salterns could be a potential mitigation for future projects. Another individual also reminded the project team that the Preserve was subject to deed restrictions to maintain the island in its pristine state.
- Specifically regarding Snake Island, one individual stated that he does not support the Recommended Plan and expressed concern over the source of any sand that would be added to this island. This individual also stated that the island is already crowded with people and putting in marsh and mangroves areas would overcrowd the island further.
- Specifically regarding the Bird Colony Islands, several individuals expressed support for the Recommended Plan for this island. Another individual felt that this island should be given priority, because of the on-going erosion.
- One individual stated that the Corps is going to spend \$6 million to fix something that isn't broken. Another individual stated that Section 1135 is for habitat restoration and that if Sarasota does not take advantage of this opportunity, some other area will. This individual felt that it is in the public interest to restore these areas and the small loss in recreational access is outweighed by the benefits.

### 6.1.3 Notice of Availability of Draft Ecosystem Restoration Report

The draft Ecosystem Restoration Report with the Environmental Assessment will be made available to the public in early August 2000.

## **6.2 Agency Coordination**

The U.S. Army Corps of Engineers, Jacksonville District Office furnished the U.S. Fish and Wildlife Service with the environmental scoping letter (Appendix G). The purpose of the scoping letter is to identify potential problems concerning policy and the acceptability of the project as early as possible in the planning process. The scoping component is a source of communicating the Corps study with interested persons, and it enables the Corps to receive valuable feedback. Responses to the scoping letters were received and incorporated into the plan formulation process.

Additional agency coordination occurred throughout the feasibility study. Monthly interagency meetings or conference calls were held to coordinate with the local sponsor, WCIND; Sarasota County; and the Sarasota Bay National Estuary Program. These coordination meetings provided information to these representatives to update their respective boards and technical advisory committees.

On April 4, 2000, a coordination meeting was held with the project team and representatives from the Florida Department of Environmental Protection, the National Audubon Society, and the US Army Corps of Engineers Regulatory Division to discuss permitability and other environmental issues. The notes from this meeting are provided in Appendix G.

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### **6.3 List of Recipients**

A complete mailing list to which copies of the Draft ERR were mailed is in Appendix H.

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## Recommendations

I have weighted the accomplishments to be obtained from the proposed wetland restoration of Sarasota Bay in Sarasota County, Florida, against project costs and considered the alternatives, impacts, and scope of the proposed project. In my judgement, ~~the proposed project is a justified expenditure of Federal funds.~~ I recommend that the Secretary of the Army approve the Section 1135 Sarasota Bay Ecosystem Restoration Report. The total estimated cost of the project is \$5,150,000 (of which \$3,750,000 would be the Federal cost according to Section 1135(b)(2) of Public Law 99-662. The remaining \$1,400,000 would be non-Federal funds provided by West Coast Inland Navigation District. I further recommend that funds be allocated in the fiscal year of 2001 to initiate preparation of plans and specifications.

The above recommendations are made with the provision that prior to project implementation, the non-Federal sponsor shall enter into a binding agreement with the Secretary of the Army or his designated representative to perform the following items highlighted in the project coordination agreement:

- a. Provide all land, easements, and rights-of-way, and suitable borrow and dredged or excavated material disposal areas, and perform or ensure the performance of all relocations determined by the Federal Government to be necessary for the implementation, operation, and maintenance of the Project Modification;
- b. Provide all improvements required on lands, easements, and rights-of-way to enable the proper disposal of dredged or excavated material associated with the implementation, operation, and maintenance of the Project Modification;
- c. Provide, during implementation, any additional amounts as are necessary to make its total contribution equal to 25 percent of the project environment restoration costs and 50 percent of the project recreation costs;
- d. For so long as the Project Modification remains authorized, operate, maintain, repair, replace, and rehabilitate the complete Project Modification, or functional portion of the Project Modification, at no cost to the Federal Government, in a manner compatible with the Project Modification's authorized purposes and in accordance with applicable with the Project Modification's authorized purposes and in accordance with applicable Federal and State Laws and regulations and any specific directions prescribed by the Federal Government;
- e. Give the Federal Government a right to enter, at reasonable times and in a reasonable manner, upon property that the non-Federal sponsor, now or hereafter, owns or controls for access to the Project Modification for the purpose of inspection, and, if necessary, after failure to perform by the non-Federal sponsor for the purpose of completing, operating, maintaining, replacing, or rehabilitating the Project Modification. No completion, operation, maintenance, repair, replacement, or rehabilitation by the Federal Government shall operate to relieve the non-Federal sponsor of responsibility to

meet the non-Federal sponsor's obligations, or to preclude the Federal Government from pursuing any other remedy at law or equity to ensure faithful performance;

f. Hold and save the United States free from all damages arising from the implementation, operation, maintenance repair, replacement, and rehabilitation of the Project Modification and any Project Modification related betterment, except for damages due to the fault or negligence of the United States or its contractors;

g. Keep, and maintain books, records, documents, and other evidence pertaining to costs and expenses incurred pursuant to the Project Modification in accordance with the standards for financial management systems set forth in the Uniform Administrative Requirements for Grants and Cooperative agreements to State and Local Governments at 32 Code of Federal Regulations (CFR) Sections 33.20;

h. Perform, or cause to be performed, any investigations for hazardous substances as are deemed necessary to identify the existence and extent of hazardous substances regulated under the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA), 42 USC 9601-9675, that may exist in, on, or under lands, easements, or rights-of-way that are owned by the United States and administered by the Federal Government, and except for any such lands that the Federal Government determines to be subject to the navigation servitude.

i. Assume complete financial responsibility, as between the Federal Government and the non-Federal sponsor, for all necessary cleanup and response costs of any CERCLA regulated materials located in, on, or under lands, easements, or rights-of-way that the Federal Government determines to be required for the implementation, operation, or maintenance of the Project Modification, except for any such lands, easements, or right-of-way owned by the United States and administrated by the Federal Government;

j. As between the Federal Government and the non-Federal sponsor, the non-Federal sponsor shall be considered the operator of the Project Modification for the purpose of CERCLA liability. To the maximum extent practicable, operate maintain, repair, replace, and rehabilitate the Project Modification in a manner that will not cause liability to arise under CERCLA;

k. Comply with the applicable provisions of the Uniform Relocation Assistance and Real Property Acquisition Policies Act of 1970, Public Law 91-646, as amended by Title IV of the Surface Transportation and Uniform Relocation Assistance Act of 1987 (Public Law 100-17), and the Uniform Regulations contained in 49 CFR Part 24, in acquiring lands, easements, and rights-of-way, required for the implementation, operation, and maintenance of the Project Modification, including those necessary for relocation, borrow materials, and dredged or excavated materials disposal, and inform all affected persons of applicable benefits, policies, and procedures in connection with said act;

l. Comply with all applicable Federal and State laws and regulations, including, but not limited to, Section 601 of the Civil Rights Act of 1964, Public Law 88-352 (42 U.S.C.2000d), and Department of Defense Directive 5500.11 issues pursuant thereto,

as well as Army Regulation 600-7, entitled "nondiscrimination on the Basis of Handicap in Programs and Activities Assisted or Conducted by the Department of the Army";

m. Provide 25 percent of that portion of total historic preservation mitigation and data recovery costs attributable to the Project Modification that are in excess of one percent of the total amount authorized to be appropriated for the Project Modification;

n. Under no circumstances shall the total cost of the environmental restoration, including previous study costs, exceed the legislated maximum per modification total cost of \$5,000,000;

The recommendations contained herein reflect information available at this time and current departmental policies governing formulation of individual projects. Consequently, the recommendations may be modified before they are approved for implementation.

JOE R. MILLER  
Colonel, Corps of Engineers  
Commanding

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## 8.0 REFERENCES

1. Sarasota Bay National Estuary Program. *The Voyage to Paradise Reclaimed: The Comprehensive Conservation and Management Plan for Sarasota Bay*. 1995.
2. Sheng, Y. Peter, Ph.D. *A Field and Modeling Study on Circulation and Transport in Sarasota Bay*. 1992 – 1993. Prepared for the Sarasota Bay National Estuary Program
3. Williams Earth Sciences. *Report of Geotechnical Services - Sarasota Bay Ecosystem Restoration*. 1999 – 2000, Prepared for the Sarasota Bay Ecosystem Restoration Feasibility Study.
4. King Engineering Associates Inc.. *Report of Survey for the Sarasota Bay Ecosystem Restoration Site Feasibility Study*. December 1999.
5. Soil Conservation Service. *Sarasota County, Florida Soil Survey*. 1987
6. Soil Conservation Service. *Sarasota County, Florida Soil Survey*. 1957

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**DRAFT**  
**SECTION 1135 ECOSYSTEM RESTORATION REPORT**  
**AND ENVIRONMENTAL ASSESSMENT**

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**SARASOTA BAY**  
**SARASOTA COUNTY, FLORIDA**

**DRAFT**  
**ENVIRONMENTAL ASSESSMENT**  
**U.S. ARMY CORPS OF ENGINEERS**  
**JACKSONVILLE DISTRICT**

**AUGUST 2000**

SARASOTA BAY ENVIRONMENTAL RESTORATION  
SARASOTA, 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 the 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. Creating a total of 43.6-acres of habitat to include: 7.1-acres of uplands; 0.2-acres of high marsh; 24.9-acres of low marsh and mangroves; 9.4-acres of tidal lagoon and mud flats; 0.6-acres of beach renourishment; and reclamation of 1.4-acres of low marsh, and
- b. Restoring fish and wildlife habitat in Sarasota Bay and Venice Inlet, and
- c. Improving the water quality, and
- d. Potential enhancement of five Federally listed endangered or threatened species; the piping plover, the Western Indian manatee, the green sea turtle, the Hawksbill sea turtle, and the loggerhead sea turtle, as well as many State listed 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 will be affected by the proposed restoration project. Project features that will help in the preservation of the site, however, will mitigate adverse effects. The State Historic Preservation Officer concurred with a no adverse effect 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, February 24, 2000.

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.

\_\_\_\_\_  
Date

\_\_\_\_\_  
Joe R. Miller  
Colonel, Corps of Engineers  
Commanding

**Draft Environmental Assessment  
Sarasota Bay Ecosystem Restoration  
Sarasota Bay  
Sarasota County, Florida**

~~1.00 Project Purpose. The purpose of the proposed action is to ecologically restore the degraded habitat on six disposal islands (Big Edwards Island, Skiers' Island, the Bird Colony Islands, the Jim Neville Marine Preserve, Palmer Point Park, and Snake Island) in Sarasota Bay. The proposed restoration of these islands and the creation of new habitat will be accomplished through the removal of exotic vegetation, excavating tidal channels, and planting native vegetation.~~

2.00 Location. Sarasota Bay is located on the west central coast of Florida between Tampa and Venice, Florida. The system is bordered by a chain of coastal barrier islands (Anna Maria Island, Longboat Key, Lido Key, Siesta Key, and Casey Key). The six priority disposal islands for this project are located in lower Sarasota Bay, see Figure 1. The following is a location description of the proposed project disposal islands from south to north:

- Snake Island is the southernmost project disposal island located at the Venice Inlet. Snake Island is approximately 2 acres in size and is owned by the West Coast Inland Navigation District.
- Palmer Point Park is a 33-acre disposal island owned by Sarasota County. Palmer Point Park is located in lower Sarasota Bay (Little Sarasota Bay) toward the north end of Casey Key. The project area for this island includes approximately 5 acres of the southeast portion of the island.
- Jim Neville Marine Preserve, a 35-acre preserve owned by Sarasota County, is located directly north of Palmer Point Park, toward the southern end of Siesta Key.
- Skier's Island is an 8-acre disposal island, which is owned by the West Coast Inland Navigation District, located in Roberts Bay.
- The Bird Colony Islands, covering approximately 2 acres, are located across the Gulf Intracoastal Waterway (GIWW) to the northeast of Skiers Island in Roberts Bay.
- Big Edwards Island is a 6-acre disposal island owned by Sarasota County. Big Edwards Island is located in Roberts Bay just south of the Siesta Key Bridge.

2.01 Sarasota Bay was designated as a priority water body by the U.S. Environmental Protection Agency (EPA) in Section 320 of the Clean Water Act, as amended in 1987. In 1989, the Sarasota Bay National Estuary Program (SBNEP) completed a comprehensive technical assessment of the estuarine system in Sarasota Bay, *Sarasota Bay - The Voyage to Paradise Reclaimed: The Comprehensive Conservation management Plan for Sarasota Bay* (Reference 1). The findings of the assessment documented problems within the bay including the loss of approximately 40-percent of historical intertidal wetlands and 30-percent of historical seagrass

beds. These habitats are critical nursery and foraging habitats for a variety of economically important fisheries species including snook, red drum, spotted sea trout, and mullet.

The study is consistent with the SBNEP's *Comprehensive Conservation and Management Plan*. Specifically, the proposed project will help implement Action Items 1.2 (enhance, restore and create wetlands throughout the bay region) and 1.7 (remove exotic plants from wetlands). This project is especially beneficial because of the limited opportunity for restoring lands in the study area resulting from extensive coastal development. The project is also consistent with Sarasota County's *Comprehensive Plan*, which supports the implementation of the SBNEP's *Comprehensive and Management Plan* (Policy 2.1.6), disposal island restoration (Policy 2.2.2) and the restoration of productive native habitat.

3.00 Alternatives. For each of the disposal islands, several alternatives have been identified to accomplish the restoration objective of the proposed project. These alternatives are discussed in detail in Section 2.0 of the *Sarasota Bay Ecosystem Restoration Report*. Common to all alternatives are combinations of the following components:

- Removal of exotic vegetation in both the upland and wetland areas.
- Creation of coastal upland habitats that will provide resting and feeding areas for native and migratory birds. Upland restoration areas will include coastal hammock vegetation as well as native sub-tropical trees and shrubs that will create diverse habitats.
- Creation of high and low marsh areas, including mangroves, that will function as nursery grounds for many fish and shellfish, as well as provide a benefit to water quality through the assimilation of nutrients and by reduction of erosion.
- Creation of tidal lagoons or open water areas that will provide foraging areas for bottom feeding fish, shorebirds, and invertebrates. These areas will also maximize the "edge effect" of adjacent marsh systems, in addition to providing flow, in several of the alternatives, through the islands.

Tables 1 – 5 provide a summary of the evaluation analysis for the concepts developed for each disposal island. There is no table for the Bird Colony Islands since the analysis consisted of only the Recommended Plan and the No-Action alternative.

3.01 Big Edwards Island. For Big Edwards Island, four concepts and the No-Action alternative were evaluated. Concept 1 (Figure 2) involves retaining over half the island as upland restoration and lowering grades to intertidal elevations to support marsh grasses and mangroves. Concepts 2, 3, and 4 (Figures 3 – 5) involve various combinations of upland restoration, high marsh, low marsh and open water/tidal lagoons. In addition, Concepts 3 and 4 provide recreational trails for public use. Alternative 4 was selected as the Recommended Plan because of the maximum habitat diversity that it creates. In addition, this concept incorporates the upland restoration/enhancement areas in the areas that are currently used for public use and allows for a recreational trail to be incorporated into the design.

**Table 1 - Big Edwards Island – Evaluation Matrix**

<b>Environmental Factor</b>	<b>Concept 1</b>	<b>Concept 2</b>	<b>Concept 3</b>	<b>Concept 4 Preferred</b>	<b>No-Action Status Quo</b>
Habitat Types Created (Acres)*	4.4	4.3	4.5	4.0	0
-Upland Restoration	2.7	1.7	1.3	1.7	0
-High Marsh	0.3	0.2	1.0	0.2	0
-Low Marsh/Mangrove	1.4	1.9	1.8	1.6	0
-Tidal Lagoon/Mud Flats	0	0.5	0.4	0.5	0
Federally Protected Species	No Impact	No Impact	No Impact	No Impact	No Impact
Fish and Wildlife Resources	Create potential nesting & migratory bird habitat Low Marsh-potential fisheries habitat	Create potential nesting & migratory bird habitat. Low Marsh-potential fisheries habitat. Tidal lagoon creates feeding grounds for bottom feeding fish, shorebirds and invertebrates.	Create potential nesting & migratory bird habitat Low Marsh-potential fisheries habitat	Create potential nesting & migratory bird habitat Low Marsh-potential fisheries habitat Tidal lagoon creates feeding grounds for bottom feeding fish, shorebirds and invertebrates.	Continued degradation of uplands & low marsh by exotic vegetation.
Removal of Exotic Vegetation	Yes	Yes	Yes	Yes	No
Shoreline Erosion	No Impact	No Impact	No Impact	No Impact	No Impact
Water Quality	Improve, Create low/high marsh wetlands	Improve, Create low/high marsh wetlands	Improve, Create low/high marsh wetlands	Improve, Create low/high marsh wetlands	No Impact
Cultural Resources	No Impact	No Impact	No Impact	No Impact	No Impact
Recreation	Upland areas provide public access to the island for passive recreation	Upland areas provide public access to the island for passive recreation	Provides boardwalk, overlooks, and educational signage for more intense public use	Provides trail/boardwalk, and educational signage for more intense public use	Upland areas provide public access to the island for passive recreation
Navigation	No Impact	No Impact	No Impact	No Impact	No Impact
Public Acceptance**	Moderate	Moderate	High	High	Moderate
Economics (Cost Estimate)	\$800,000 - \$1,350,000	\$700,000 - \$1,150,000	\$700,000 - \$1,150,000	\$650,000 - \$1,100,000	N/A

\* Includes additional acreage created due to restoration. Does not include existing habitat.

\*\* Public Acceptance based on comments received as part of the public involvement efforts conducted for this project.

**Table 2 - Skiers' Island – Evaluation Matrix**

<b>Environmental Factor</b>	<b>Concept 1</b>	<b>Concept 2</b>	<b>Concept 3</b>	<b>Concept 4 Preferred</b>	<b>No-Action Status Quo</b>
Habitat Types Created (Acres)*	5.6	6.1	5.3	5.3	0
-Upland Restoration	2.9	2.0	2.5	2.5	0
-High Marsh	0	0	0	0	0
-Low Marsh/Mangrove	2.7	3.7	2.0	1.8	0
-Tidal Lagoon/Mud Flats	0	0.4	0.8	1.0	0
Federally Protected Species	No Impact	No Impact	No Impact	No Impact	No Impact
Fish and Wildlife Resources	Create potential nesting & migratory bird habitat Low Marsh-potential fisheries habitat	Create potential nesting & migratory bird habitat Low Marsh-potential fisheries habitat Tidal lagoon creates feeding grounds for bottom feeding fish, shorebirds, and invertebrates.	Create potential nesting & migratory bird habitat Low Marsh-potential fisheries habitat Tidal lagoon creates feeding grounds for bottom feeding fish, shorebirds, and invertebrates.	Create potential nesting & migratory bird habitat Low Marsh-potential fisheries habitat Tidal lagoon creates feeding grounds for bottom feeding fish, shorebirds, and invertebrates.	Continued degradation of uplands & low marsh by exotic vegetation.
Removal of Exotic Vegetation	Yes	Yes	Yes	Yes	No
Shoreline Erosion	Reduce	Reduce	Reduce	Reduce	No Change
Water Quality	Improve, Create low marsh wetlands	Improve, Create low marsh wetlands	Improve, Create low marsh wetlands and tidal lagoon provides east/west flow	Improve, Create low marsh wetlands and tidal lagoon provides east/west & north/south flow	No Improvement
Cultural Resources	No Impact	No Impact	No Impact	No Impact	No Impact
Recreation	Maintains Ski-ability	Maintains Ski-ability	Maintains Ski-ability	Maintains Ski-ability. Public access to upland area	Maintains Ski-ability. Public access to upland area
Navigation	No Impact	No Impact	No Impact	No Impact	No Impact
Public Acceptance**	Moderate	High	High	High	Moderate
Economics (Cost Estimate)	\$500,000–\$750,000	\$500,000–\$800,000	\$500,000–\$800,000	\$550,000-\$850,000	N/A

\* Includes additional acreage created due to restoration. Does not include existing habitat.

\*\* Public Acceptance based on comments received as part of the public involvement efforts conducted for this project.

**Table 3 - Jim Neville Marine Preserve – Evaluation Matrix**

Environmental Factor	Concept 1	Concept 2	Concept 3	Concept 4	Concept 5 Preferred	No-Action Status Quo
Habitat Types Created (Acres)*	27.1	27.0	26.7	28.6	27.5	0
-Upland Restoration	2.0	2.0	6.9	2.0	2.0	0
-High Marsh	0	0	9.3	0	0	0
-Low Marsh/Mangrove	17.9	18.9	10.5	16.6	17.6	0
-Tidal Lagoon/Mud Flats	7.2	6.1	0	10.0	7.9	0
Federally Protected Species	Benefit to the Piping Plover, enhances existing habitat	Benefit to the Piping Plover, enhances existing habitat	Benefit to the Piping Plover, enhances existing habitat	Benefit to the Piping Plover, enhances existing habitat	Benefit to the Piping Plover, enhances existing habitat	Exotic vegetation may continue to reduce habitat for the Piping Plover
Fish and Wildlife Resources	Create potential nesting & migratory bird habitat. Low marsh– potential fisheries habitat. Tidal lagoon creates feeding grounds for bottom feeding fish, shorebirds, and invertebrates.	Create potential nesting & migratory bird habitat. Low marsh– potential fisheries habitat. Tidal lagoon creates feeding grounds for bottom feeding fish, shorebirds, and invertebrates.	Create potential nesting & migratory bird habitat. Low marsh – potential fisheries habitat	Create potential nesting & migratory bird habitat. Low marsh – potential fisheries habitat. Tidal lagoon creates feeding grounds for bottom feeding fish, shorebirds, and invertebrates.	Create potential nesting & migratory bird habitat. Low marsh– potential fisheries habitat. Tidal lagoon creates feeding grounds for bottom feeding fish, shorebirds, and invertebrates.	Exotic vegetation may continue to reduce habitat
Removal of Exotic Vegetation	Yes	Yes	Yes	Yes	Yes	No
Shoreline Erosion	No Impact	No Impact	No Impact	No Impact	No Impact	No Impact
Water Quality	Improve, create low marsh wetland	Improve, create low marsh wetland	Improve, create low/high marsh wetland	Improve, create low marsh wetland	Improve, create low marsh wetland	No Impact
Cultural Resources	No Impact	No Impact	No Impact	No Impact	No Impact	No Impact
Recreation	Limited public access	Limited public access	Limited public access	Limited public access	Limited public access	Limited public access
Navigation	No Impact	No Impact	No Impact	No Impact	No Impact	No Impact
Public Acceptance**	Moderate	Low	Low	High	High	Low
Economics (Cost Estimate)	\$2,450,000 - \$3,950,000	\$2,400,000 - \$3,850,000	\$1,050,000 - \$1,650,000	\$2,500,000 - \$4,100,000	\$2,500,000 - \$4,050,000	N/A

\* Includes additional acreage created due to restoration. Does not include existing habitat.

\*\* Public Acceptance based on comments received as part of the public involvement efforts conducted for this project.

**Table 4 - Palmers Point Park – Evaluation Matrix**

<b>Environmental Factor</b>	<b>Concept 1</b>	<b>Concept 2</b>	<b>Concept 3 Preferred</b>	<b>Concept 4</b>	<b>No-Action Status Quo</b>
Habitat Types Created (Acres)*	3	2.9	3	2.8	0
-Upland	0.3	0.4	0	0	0
-High Marsh	0.2	0	0	0	0
-Low Marsh/Mangrove	1.6	1.7	3	1.4	0
-Tidal Lagoon/Mud Flats	0.9	0.8	0	1.4	0
Federally Protected Species	Benefit to the Piping Plover, enhances existing habitat	Benefit to the Piping Plover, enhances existing habitat	Benefit to the Piping Plover, enhances existing habitat	Benefit to the Piping Plover, enhances existing habitat	Exotic vegetation may continue to reduce habitat for the Piping Plover
Fish and Wildlife Resources	Create potential nesting & migratory bird habitat. Low marsh– potential fisheries habitat Tidal lagoon creates feeding grounds for bottom feeding fish, shorebirds, and invertebrates.	Create potential nesting & migratory bird habitat. Low marsh– potential fisheries habitat Tidal lagoon creates feeding grounds for bottom feeding fish, shorebirds, and invertebrates.	Create potential nesting & migratory bird habitat. Low marsh – potential fisheries habitat	Create potential nesting & migratory bird habitat. Low marsh- potential fisheries habitat Tidal lagoon creates feeding grounds for bottom feeding fish, shorebirds, and invertebrates.	Exotic vegetation may continue to reduce habitat
Removal of Exotic Vegetation	Yes	Yes	Yes	Yes	No
Shoreline Erosion	Reduce	Reduce	Reduce	Reduce	No Impact
Water Quality	Improve, Create low/high marsh wetlands	Improve, Create low marsh wetlands	Improve, Create low marsh wetlands	Improve, Create low marsh wetlands. Tidal lagoon provides water flow	No Impact
Cultural Resources	No Impact	No Impact	No Impact	No Impact	No Impact
Recreation	No Impact	No Impact	No Impact	No Impact	No Impact
Navigation	No Impact	No Impact	No Impact	No Impact	No Impact
Public Acceptance**	Moderate	High	Moderate	Moderate	Low
Economics (Cost Estimate)	\$300,000 - \$500,000	\$250,000 - \$450,000	\$250,000 - \$450,000	\$300,000 - \$500,000	N/A

\* Includes additional acreage created due to restoration. Does not include existing habitat.

\*\* Public Acceptance based on comments received as part of the public involvement efforts conducted for this project.

**Table 5 - Snake Island – Evaluation Matrix**

<b>Environmental Factor</b>	<b>Concept 1</b>	<b>Concept 2</b>	<b>Concept 3</b>	<b>Concept 4 Preferred</b>	<b>No-Action Status Quo</b>
Habitat Types Created (Acres)*	1.9	1.4	3.6	3.8	0
-Upland	0	0.4	0.5	0.9	0
-High Marsh	0	0.2	0	0	0
-Low Marsh/Mangrove	1.9	0.8	1.4	0.9	0
-Low Marsh Reclamation	0	0	1.7	1.4	0
-Unconsolidated Shore	0	0	0	0.6	0
Federally Protected Species	No Impact	No Impact	No Impact	No Impact	No Impact
Fish and Wildlife Resources	Creates low marsh wetlands for bird habitat and fisheries	Creates potential nesting & migratory bird habitat. Low marsh-potential fisheries habitat.	Creates potential nesting & migratory bird habitat. Low marsh/reclamation area potential fisheries habitat	Creates potential nesting & migratory bird habitat. Low marsh/reclamation area potential fisheries habitat	Continued degradation of uplands & low marsh by exotic vegetation.
Removal of Exotic Vegetation	Yes	Yes	Yes	Yes	No
Shoreline Erosion	Reduce	Reduce	Reduce & regain some lost acreage	Reduce & regain some lost acreage	Erosion of the island will continue
Water Quality	Improve, Create low marsh wetlands & stabilize erosion	Improve, Create low marsh wetlands & stabilize erosion	Improve, Create low marsh wetlands & stabilize erosion	Improve, Create low marsh wetlands & stabilize erosion	Worsen, continued erosion of the island
Cultural Resources	Create adverse impact to archaeological site	Shoreline stabilization will help preserve archeological site.	Shoreline stabilization will help preserve archeological site.	Shoreline stabilization will help preserve archeological site.	Continued erosion and degradation to archeological site.
Recreation	Limit public access	Public access provided to upland area. Beach remains intact for public use.	Public access provided to upland area through boardwalk. Cove provides boat parking area.	Public access provided to upland area adjacent to beach. Beach area potentially expanded.	Public access currently exists.
Navigation	Reduced channel maintenance, less erosion	Reduced channel maintenance, less erosion	Reduced channel maintenance, less erosion	Reduced channel maintenance, less erosion	Continued need for channel maintenance as a result of erosion
Public Acceptance**	Low	Moderate	Low	High	High
Economics (Cost Estimate)	\$250,000 - \$400,000	\$200,000 - \$350,000	\$300,000 - \$500,000	\$200,000 - \$350,000	

\* Includes additional acreage created due to restoration. Does not include existing habitat.

\*\* Public Acceptance based on comments received as part of the public involvement efforts conducted for this project.

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3.02 Skiers' Island. For Skiers' Island, four concepts and the No-Action alternative were evaluated. Concept 1 (Figure 6) involves both upland restoration and the creation of low marsh/mangrove areas. Concepts 2, 3, and 4 (Figures 7 – 9) involve a combination of upland restoration, creation of low marsh/mangroves, and creation of varying amounts of open water/tidal lagoons. Concept 4 was selected as the Recommended Plan because of the maximum habitat diversity that it creates. This concept also maximizes the beneficial “edge effect” of the open water/tidal lagoon areas on the adjacent low marsh and mangrove systems, as well as providing an opportunity for water to circulate through the island.

3.03 Bird Colony Islands. The Recommended Plan for the Bird Colony Islands is to provide shoreline armoring along the Intracoastal side of the islands to prevent further erosion. No earthwork is proposed on the islands. This concept was evaluated against the No-Action alternative. As the Recommended Plan, this concept protects existing critical bird nesting habitat that has been documented on these islands from further erosion.

3.04 Jim Neville Marine Preserve. For the Jim Neville Marine Preserve, five concepts (Figures 10 – 14) and the No-Action alternative were evaluated. Concepts 1, 2, 4 and 5 are very similar and involve minimal upland restoration, extensive low marsh/mangrove creation and various amounts of open water/tidal lagoon areas. Concept 4 involves the greatest amount of open water/tidal lagoon areas providing both east/west and north/south flow through the island. Concept 5 (the Recommended Plan) involves a similar amount of flow through the island; however, it does not provide complete east/west tidal lagoons across the island. Concept 1 and Concept 2 do not provide either the east/west or north/south tidal lagoon systems. However, Concept 1 does provide a tidal lagoon connection between the northern and southern portions of the island. Concept 3 involves extensive upland restoration, high marsh areas, and low marsh mangrove areas. Concept 5 was selected as the Recommended Plan because it provides a diversity of habitats, allows for the historical sheet flow over the island during high tides, includes an extensive tidal lagoon system that maximizes the “edge effect” of the adjacent low marsh and mangrove systems, and allows water to circulate throughout the island. The Recommended Plan provides the greatest benefits while minimizing the impacts to the existing mangrove system and unique saltern areas found on the island.

3.05 Palmer Point Park. For Palmer Point Park, four concepts (Figures 15 –18) and the No-Action alternative were evaluated. Concepts 1, 2, and 4 involve some small upland restoration areas, low marsh/mangroves and open water/tidal lagoon systems. Concept 3 involves the creation of low marsh/mangroves in the project area. Concept 3 was selected as the Recommended Plan because it will benefit from the opportunity of diversity of the adjacent upland areas in the park, while minimizing impacts to the existing mangroves and salterns located adjacent to the project site. This concept also minimizes maintenance through the

elimination of the small upland area and reduces the potential for stagnant water and therefore mosquitoes with the elimination of the tidal lagoon.

3.06 Snake Island. For Snake Island, four concepts and the No-Action alternative were evaluated. Concept 1 (Figure 19) involves lowering the grade of the entire island to create a low marsh/mangrove area. Concept 2 (Figure 20) includes a upland enhancement area, a high marsh area, and surrounding low marsh/mangroves. Concept 3 (Figure 21) includes an upland enhancement area and surrounding low marsh/mangroves with an area for low marsh reclamation on the west side of the island. Concept 4 (Figure 22) was selected as the Recommended Plan. It is similar to Concept 3, but includes a much larger upland enhancement area to support the existing amount of public use.

4.00 Description of the Affected Environment. Sarasota Bay is a classic coastal lagoon system and is located on the central west coast of Florida between Tampa Bay and Venice, Florida. The system is bordered to the west by a chain of substantially developed coastal barrier islands (Anna Maria Island, Longboat Key, Lido Key, Siesta Key, and Casey Key) and to the east by the City of Sarasota mainland. Sarasota Bay is designated as a Class II – Outstanding Florida Water (OFW) except for the area directly east of the Intracoastal Waterway in Sarasota County, which is designated as a Class III OFW.

#### Big Edwards Island

Big Edwards Island is a 6-acre island owned by Sarasota County. It is the northernmost project disposal island, located in Roberts Bay immediately south of the Siesta Key Bridge. Historically, Big Edwards Island was originally comprised of two small mangrove islands that were utilized for disposal of dredged material from previous channel dredging operations, including the construction of the GIWW. Big Edwards Island is about 550 feet north-to-south and 400 feet east-to-west. The topography of this island includes a relatively narrow perimeter berm enclosing an area where dredged material was placed during the dredging of the GIWW. The elevation of the perimeter berm generally varies from 12 to 13 feet MSL. The ground elevations of the interior portion of the island range from 5 to 17 feet MSL. The disposal material on Big Edwards Island consists of fine sand with varying amounts of shell and limestone rubble (Figure 23).

#### Skiers' Island

Skiers' Island is an 8-acre island owned by the West Coast Inland Navigation District. It is about 1250 feet long and varies in width from 400 feet at the northern end to 200 feet toward the southern end. Natural ground elevations on the island range from 7 feet MSL to 0 MSL. Historically, the area that is now Skiers' Island was located in the open waters of Roberts Bay, an estimated 600 feet offshore from Siesta Key. The dredged material from the construction of the GIWW was deposited on bay bottom to create the disposal island. The dredged material on Skiers' Island predominately consists of shell and limestone rubble

with some fine sands. A deep-water channel surrounds Skiers' Island and is currently used by boaters for water skiing. In the past, Skiers' Island has been known for its importance as a colonial bird nesting site. However in recent years, few active nesting sites have been documented there (Figure 24).

#### The Bird Colony Islands

The Bird Colony Islands are four small islands, approximately two acres in size located east of the GIWW north of Skiers' Island in Roberts Bay. The Bird Colony Islands constitute one of the most significant bird colonies along Florida's west coast and have suffered substantial erosion primarily from large boat wakes associated with their close proximity to the GIWW (Figure 25).

#### Jim Neville Marine Preserve

Jim Neville Marine Preserve is a 35-acre preserve owned by Sarasota County. This island is located to the west of the GIWW toward the southern end of Siesta Key. The former Midnight Pass is located to the west of the preserve. The southern area of the disposal island has gentle topography with a slight ridge running in the northwest to southeast direction. The highest point of this area is elevation 7 feet MSL. The northern portion of the island has gentle topography with a high point of 10.5 feet MSL located near the north end. Historically, a large mangrove island and a small area of adjoining open waters of Little Sarasota Bay occupied the area that is now Jim Neville Marine Preserve. During past dredging and the construction of the GIWW, the dredged material was deposited over much of the eastern portions of the island and adjacent bay waters. This created the present characteristic of the island which is an upland area, slightly elevated above surrounding mangroves. The dredged material on the Jim Neville Marine Preserve predominately consists of a mix of fine sands, shell fragments, limestone, phosphate, and silt (Figure 26).

#### Palmer Point Park

Palmer Point Park is a 33-acre park owned by Sarasota County. It is located at the north end of Casey Key. Palmer Point Park has very little topography with the highest point at elevation 4 feet MSL. Prior to the placement of dredge material, Palmer Point Park consisted of a narrow strip of mangrove that extended from the northern tip of Casey Key into the adjoining waters of Little Sarasota Bay. Dredged material was also placed in the bay waters immediately south of the original mangrove strip east of the island. The dredged material on Palmer Point Park predominately consists of primarily fine sands with varying amounts of shell fragments (Figure 27).

#### Snake Island

Snake Island is the southernmost project disposal island, located at the Venice Inlet. This island was originally more than 3 acres in size but over the years, this island has decreased to approximately 2 acres. The elevations of the interior portion of the island range from 2 feet MSL to 7 feet MSL. According to 1948 aerial photography, the area that is now Snake Island formed approximately the

southern one-quarter of an elongated beach ridge island fringed by mangroves and open water at the confluence of Lyons Bay, Donna Bay, and Venice Inlet. Construction of the GIWW separated Snake Island from the remaining island, which today is called Turner Key. The dredged material on Snake Island predominately consists of fine sands with a small amount of shell fragments (Figure 28).

4.01 Vegetation. With the exception of the Bird Colony Islands, the existing vegetation within the upland and wetland fringe areas on the project disposal islands consists primarily of exotic nuisance species including Australian pines (*Casuarina equisetifolia*), Brazilian pepper (*Schinus terebinthifolius*) and carrotwood (*Cupaniopsis anacardioides*). The Bird Colony Islands consist of primarily mixed-mangrove islands that serve as bird colony nesting sites.

On Big Edwards Island, few native plants have survived the encroachment of exotic species including the shade-tolerant rouge plant (*Rivina humilis*), cabbage palm (*Sabal palmetto*), Florida privet (*Forestiera segregata*), corky passionvine (*Passiflora suberosa*), and moonvine (*Ipomoea alba*). In addition, there are scattered mangroves surrounding the island fringe. At the low, level, southern end of this island, a temporary cover of rye grass (*lolium perenne L.*) appears to have been planted and possibly maintained at certain times of the year.

The perimeter of Skiers' Island is dominated by a mixed-mangrove fringe including red (*Rhizophora mangle*), black (*Avicennia germinaus*), and white (*Laguncularia racemosa*) mangroves and buttonwoods (*Conocarpus erecta*). Within the interior portion of the island, a few small areas of native plants exist that have survived the increasing shade of the Australian pine and carrotwood including native rouge plants, corky passionvine, moonvine, and prickly pear cactus (*Opuntia* spp.).

The wetlands surrounding the uplands on the Jim Neville Marine Preserve are in fairly good condition. These areas have a wide diversity of wetland native vegetation and community types including a mix of mangrove swamps and a diverse expanse of saltwater marshes, with some encroachment of Brazilian pepper. There are virtually no native trees in the canopy or subcanopy and only scattered Florida privet and saltbrush (*Baccharis halmifolia*).

The Palmer Point Park project area has an intact wetland fringe, which is relatively high in diversity and quality and contains white, black and red mangroves with some encroachment of Brazilian pepper. There are very few nuisance species in the saltgrass (*Distichlis spicata*) meadow or the salt flat marsh dominated by saltwort (*Batis maritima*), sea purslane (*Sesuvium portulacastrum*), and sea blite (*Suaeda linearis*). In addition, the seagrass beds surrounding the island appear to be relatively dense. Within the upland areas, a few natural native plant communities exist including the Florida privet, wax myrtle (*Myrica cerifera*), and various shrubs of this maritime hammock.

Vegetation on Snake Island includes several established mangroves that are remnants of the original mangrove island prior to the dredging of the GIWW. Within the upland areas of the island there are virtually no native species remaining.

4.02 Threatened and Endangered Species. Through coordination, the USACE and the U.S. Fish and Wildlife Service (USFWS) have identified the piping plover (*Charadrius melodus*), the West Indian manatee (*Trichechus manatus*), the loggerhead sea turtle (*Caretta caretta*), the green sea turtle (*Chelonia mydas*), and the hawksbill sea turtle (*Eretmochelys imbricata*) as occurring in the vicinity of the project area.

Sea turtle nesting has not been documented on any of the proposed project disposal islands. Therefore, it is highly unlikely that turtles use any of these islands for nesting, given the location and availability of sandy beach areas.

Habitat for the Western Indian manatee is located throughout the project area, particularly near areas of seagrasses located near several of the project disposal islands. It is anticipated that during the project construction phase, the "Standard Manatee Conditions" will be followed as stated in the project permit issued by the Florida Department of Environmental Protection.

Finally, foraging habitat for the piping plover includes tidal flats, as found in the vicinity of both Palmer Point Park and Jim Neville Marine Preserve. Therefore, the protection or creation of tidal flat areas as part of the proposed project would be beneficial to this listed species.

4.03 Fish and Wildlife Resources. One of the major goals for this ecosystem restoration project is to restore and create additional fish and wildlife habitat. Existing resources within the project area supporting fish and wildlife included fisheries, tidal flats and bird habitats.

Within the project area, existing mangroves and seagrass meadows provide some habitat for juvenile fisheries. However according to the SBNEP's Comprehensive Conservation and Management Plan for Sarasota Bay, declines in the water quality of the bay and the loss of shallow water habitats associated with these types of habitat over the last several decades has reduced the available habitat for these fisheries. The proposed project aims to improve water quality through shoreline stabilization of the project disposal islands and increase the amount of shallow water habitat available for juvenile fisheries.

Existing salt flats, currently found on the Jim Neville Marine Preserve and Palmer Point Park, should be preserved or created as part of this project to protect this type of rare and productive habitat for the base of the food chain. These areas also serve as potential foraging habitat for many types of native and migratory birds.

The project area provides existing habitat, nesting areas, and foraging areas for a variety of birds. In addition, the project area provides seasonal habitat for migratory birds. The existing mangroves provide the highest quality habitat for these birds. However, due to the loss of mangroves and other native species, some birds have adapted to nesting in lesser quality habitat of nuisance species such as the Australian pines. The National Audubon Society has been performing nesting surveys for the last several years on several of the project disposal islands and a more detailed discussion is provided in the *Sarasota Bay Ecosystem Restoration Report*. The largest nesting activity has been identified on the Bird Colony Islands, which includes a variety of bird species. Within the last three years, the following state-listed species of special concern have been identified nesting on the Bird Colony Islands: the brown pelican (*Pelecanus occidentalis*), the snowy egret (*Egretta thula*), the little blue heron (*Florida caerulea*), the tri-colored heron (*Egretta tricolor*), the reddish egret (*Dichromanassa rufescens*), and the American oystercatcher (*Haematopus palliatus*).

4.04 Coastal Barrier Resources. Two designated units of the Florida Coastal Barrier Resource System are located in the vicinity of Sarasota Bay and the project disposal islands. These designated units include Casey Key (#P22) and Venice Inlet (#71P). Both the Jim Neville Marine Preserve and Palmer Point Park fall within the boundaries of the #P22 designated COBRA unit. Snake Island falls within the boundary of the #71P designated COBRA unit. The designated units of the Florida Coastal Barrier Resource System are protected under the Coastal Barrier Resources Act, PL 101-591. However, in accordance with Section 6(A) of the Act, projects for the study, management, protection, and enhancement of fish and wildlife resources and habitats, including acquisition of fish and wildlife habitats and related lands; stabilization projects for fish and wildlife habitats; and recreational projects are consistent with the purposes of this Act. The proposed ecosystem restoration of the project disposal islands is consistent with the purposes of this Act and will provide a ecological benefit to these coastal resources.

4.05 Water Quality. A more detailed discussion of the existing water quality is provided in the *Sarasota Bay Ecosystem Restoration Report*. Sarasota Bay was designated as a priority water body by the US Environmental Protection Agency in Section 320 of the Clean Water Act, as amended in 1987. Sarasota Bay has also been designated as a Outstanding Florida Water. Sarasota Bay has been identified as a Class II water body except for the area directly east of the GIWW in Sarasota County, which is designated as a Class III water body. Declines in water quality in Sarasota Bay have been identified as a significant issue because of the impact of water quality on seagrass habitat and fisheries productivity. The primary pollutants of concern are nutrients and toxic substances including heavy metals and pesticides. Sources of nutrient and toxicant loadings into the bay come from stormwater runoff, sewage treatment plant wastewater discharges, septic tanks, and rainfall.

Sarasota County has several programs and efforts in place to help monitor and improve the water quality of the bay. The County and four co-permittees have an U. S. Environmental Protection Agency National Pollutant Discharge Elimination System (NPDES) permit to operate a Municipal Separate Storm Sewer System (MS4) for stormwater discharges. The permit compliance program includes, but is not limited to:

- 1) operation and maintenance of structural controls and storm water collection system;
- 2) construction site runoff program that operates through requirements in the County's Land Development Regulations;
- 3) operation and maintenance of public streets, roads and highways;
- 4) ensuring flood control projects comply with state storm water quality requirements;
- 5) identification, monitoring, and control of discharges from municipal waste treatment facilities not covered by the NPDES storm water permit;
- 6) control of pollutants related to application of pesticides, herbicides, and fertilizers through public education, applicator certification requirements, and an integrated pest management program for all County facilities;
- 7) illicit connections and illegal dumping regulatory programs that operate through County Ordinance, field screening of outfalls, industrial inspections, and a 24-hour on-call investigative staff and;
- 8) industrial and high risk runoff inspection program.

In addition to the NPDES permit compliance, Sarasota County has a program to encourage acquisition of plant wastewater systems so that flows can be treated at state-of-the-art plants. About 10% have been taken off line, many of which lie within the Phillipi Creek watershed, which is a top priority based on its environmental condition and connection to Sarasota Bay.

Sarasota County has a Septic to Sewer program that is geared toward replacing septic tanks and hooking residents up to central sewer. The first major project is the Phillipi Creek Project. Construction of the first phase should begin 2001-2002.

Sarasota County has an ordinance that regulates discharges to surface or ground water.

Lastly, the County has an ambient Water Quality Monitoring Program with sampling stations located throughout the waters of Sarasota County. The data generated from this program are analyzed to help identify water quality trends in the bay.

Big Edwards Island, Skiers' Island, and the Bird Colony Islands are all located in Roberts Bay. According to the Florida Department of Environmental Protection (FDEP) 305(b) Data Report (1998), the status of Roberts Bay with regards to

chemistry, fish, standards, metals, and biology is classified as “fair”. Most water quality parameters in Roberts Bay are designated as “stable”. However, this information also indicates that the turbidity levels, the dissolved oxygen, and the total phosphorus have been degrading in the past few years.

The Jim Neville Marine Preserve and Palmer Point Park are located in the Upper Little Sarasota Bay. The FDEP 305(b) Data Report (1998) reports the status of this area with regards to chemistry, fish, standards, metals, and biology is classified as “fair”. This information also indicates that the following water quality parameters have been degrading over the last few years: turbidity, secchi depth, and total phosphorus.

Snake Island is located in the Lower Little Sarasota Bay area. According to the FDEP 305(b) Data Report (1998), the status of this area with regards to chemistry, fish, standards, metals, and biology is classified as “good”. The only water quality parameter that has been degrading for the past few years in this portion of the bay is turbidity.

4.06 Aesthetic Resources. Sarasota Bay is bordered primarily by residential developments and some commercial land uses. Throughout the public involvement process, many homeowners have stated that the aesthetic value of these disposal islands is important to them and should be a consideration in the selection of the Recommended Plan.

4.07 Recreation Resources. The primary recreational use of Sarasota Bay is “viewing it”, according to a public opinion survey by the SBNEP in the early 1990’s (SBNEP’s, *Sarasota Bay, The Voyage Reclaimed*, 1995). However, there are numerous other recreational uses of the bay, which include both active and passive forms of recreation. These recreation uses include boating, water-skiing, kayaking, swimming, wildlife observation (birding), and fishing.

Recreational fish resources include a variety of species including redfish (*Sciaenops ocellatus*), sea trout (*Cynoscion* spp.), jacks (*Seriola fasciata*), pompano (*Trachinotus carolinus*), black drum (*Pogonias cromis*), sheepshead (*Archosargus probatocephalus*), snook (*Centropomus* spp.), flounder (*Paralichthys albigutta*), and mangrove snapper (*Lutjanus griseus*).

Several of the project disposal islands, particularly Big Edwards Island, Skiers’ Island, and Snake Island, are used by the public regularly for picnicking and other activities. However, each of the islands has evidence of human activity except Bird Colony Islands. Skiers’ Island’s primary recreational use is water-skiing. The deep-cut channel surrounding the island is one of the few places in Sarasota Bay where water-skiing is feasible.

4.08 Navigation. The Gulf Intracoastal Waterway is adjacent to each of the project disposal islands. In addition, several other marked channels are located

throughout the project area to provide access to residential areas adjacent to the bay. The majority of the Intracoastal Waterway in the vicinity of the project disposal islands has been designated as "No-Wake" zones.

4.09 Cultural Resources. A cultural resources investigation was conducted for the proposed project and coordination with the State Historic Preservation Officer has been initiated. Prior to the dredging of the GIWW and the placement of disposal material, Big Edwards Island (Figure 29), the Jim Neville Marine Preserve (Figure 32), Palmer Point Park (Figure 33), and Snake Island (Figure 34) were all existing mangrove islands. The Bird Colony Islands (Figure 31) has always consisted of three small mangrove islands; however, erosion has reduced their size since the dredging of the GIWW. Prior to dredging, Skiers' Island (Figure 30) was baby bottom.

The cultural resources investigation included research of soil survey maps for Big Edwards Island and Skiers' Island; field surveys of Jim Neville Marine Preserve and Palmer Point Park; and survey and testing of archeological site 8So2336 on Snake Island. No significant cultural resources were identified on Big Edwards Island, Skiers' Island, Jim Neville Marine Preserve or Palmer Point Park. Testing of site 8So2336 on Snake Island has indicated the site to be potentially eligible for inclusion on the *National Register of Historic Places*.

5.00 Probable Impacts of the Recommended Plans. For the Recommended Plans for each of the project disposal islands, this section will identify both the benefits and potential impacts associated with the action. A brief description of the Recommended Plans for each of the project disposal islands and a summary of the basis of their selection is presented below.

Big Edwards Island. Concept 4 (Figure 5) is the Recommended Plan for ecosystem restoration on Big Edwards Island. This concept provides improved and diverse fish and wildlife habitat through the use of a mix of upland restoration (1.7-acres), low marsh/mangroves (1.6-acres), high marsh (0.2-acres), and tidal lagoons (0.5-acres). The open water/tidal lagoon system also maximizes the "edge effect" of the adjacent low marsh and mangrove systems. To incorporate public concerns, this concept also maintains public access and use of the island and it enhances public use with a proposed natural foot trail along the upland areas and boardwalk across the marsh and open water systems. In addition, this concept provides potential opportunities for educational interpretive signage promoting and explaining these diverse habitats, which was also suggested at the public workshop held for this project. In response to public comments, the Recommended Plan maintains the existing upland area at the southern portion of the island where the majority of public access to the island occurs. In addition, the Recommended Plan maintains the eastern upland berm along the island and the existing mature mangrove fringe around the perimeter of the island to provide a visual buffer for homeowners located on either side of the island. Concept 4 is

also the least expensive concept for Big Edwards Island with a cost range between \$650,000 and \$1.10 million.

Skiers' Island. Concept 4 (Figure 9) is the Recommended Plan for Skiers' Island. This concept provides improved and diverse fish and wildlife habitat through the use of a mix of upland restoration (2.5-acres), low marsh/mangroves (1.8-acres), and tidal lagoons (1.0-acres). The open water/tidal lagoon system also maximizes the "edge effect" of the adjacent low marsh and mangrove systems, as well as providing an opportunity for water to circulate through the island. Concept 4 allows for the continued use of the deep-water channel surrounding the island for water skiing. In addition, the upland restoration area proposed at the northern end of the island would allow for public access for passive recreational uses. As identified through public comment, no structural recreational facilities are provided with this concept, instead the focus of this concept is purely ecological restoration. Concept 4 is the most expensive concept evaluated for Skiers' Island. This is primarily a result of the extent of tidal lagoons proposed, which, as discussed above, will provide a significant benefit to the new and existing habitat surrounding this project. The total project cost for this concept is between \$550,000 and \$850,000.

Bird Colony Islands. The Recommended Plan for the Bird Colony Islands is to provide shoreline armoring along the Intracoastal side of the islands to prevent further erosion. No earthwork is proposed on the islands. The Recommended Plan protects the existing critical bird nesting habitat that has been documented on these islands. The total project cost for the proposed work is estimated to be \$17,000.

Jim Neville Marine Preserve. Concept 5 (Figure 14) is the Recommended Plan for Jim Neville Marine Preserve. This concept provides improved and diverse fish and wildlife habitat through the use of primarily low marsh/mangroves (17.6-acres) and tidal lagoons (7.9-acres), with some opportunity for upland restoration (2.0-acres) on the higher elevation areas of the island. The open water/tidal lagoon system maximizes the "edge effect" of the adjacent low marsh and mangrove systems, as well as providing an opportunity for water to circulate between the northern and southern portions of the island. The Recommended Plan also minimizes the impacts to the existing mangrove systems and unique saltern areas found on the island, while optimizing the use of low marsh areas to recreate the opportunity for sheet flow across the island during high tides. Finally, the Recommended Plan will be successfully independent of any decision regarding the opening/closing of nearby Midnight Pass. The total project cost for Concept 5 is estimated between \$2.50 million and \$4.05 million. This range of costs is close to two of the other proposed concepts.

Palmer Point Park. Concept 3 (Figure 17) is the Recommended Plan for Palmer Point Park. This concept provides the creation of low marsh/mangroves (3.0-acres) in the project area and will benefit from the opportunity of diversity of the

adjacent upland areas in the park. The Recommended Plan minimizes impacts to the existing mangroves and salterns located adjacent to the project site. The Recommended Plan will result in minimal maintenance and the elimination of the tidal lagoon provided in some of the other concepts will reduce the potential for stagnant water and therefore mosquitoes. Concept 3 is one of the least expensive concepts evaluated for Palmer Point Park. The total project cost is estimated to be between \$250,000 and \$450,000.

Snake Island. Concept 4 (Figure 22) is the Recommended Plan for ecosystem restoration on Snake Island. This concept provides improved and diverse fish and wildlife habitat through the use of a mix of upland restoration (0.9-acres), and low marsh/mangroves (0.9-acres). In addition, the Recommended Plan provides for additional acreage to the island through the creation of a low marsh reclamation area (1.4-acres) on the west side of the island. To address public concerns, the Recommended Plan also provides a large upland enhancement area accessible on the east side of the island for public use. The Recommended Plan also provides soft-shore stabilization and additional mangroves to reduce the on-going erosion. The Recommended Plan maintains the unconsolidated shore used by the public on the southern end of the island and provides an opportunity to extend this area to the eastern side of the island. The estimated costs for each of the concepts evaluated for Snake Island are fairly close. Therefore, the total estimated project cost for the Recommended Plan (between \$200,000 and \$350,000) is comparable to the costs of the other concepts for this island.

5.01 Vegetation. The most significant impact to vegetation on each of the project disposal islands as a result of the Recommended Plans is the removal of nuisance species including, but not limited to, Brazilian Pepper, Australian pine, and carrotwood. However, as a result of construction activities some of the few remaining desirable species, particularly in the upland areas, will be impacted. To maximize the benefit of the exotic removal, the restoration of existing habitat or creation of new habitat will be accomplished through the installation of many of the desirable species impacted as well as other desirable species to create a diverse plant community. Planting of desirable species will also help with controlling nuisance species by creating competition in the newly disturbed soils. Upland plantings should include a diverse mix of subtropical hardy native trees and shrubs. Wetland plantings should include mangrove species and high and low marsh species. The wetland plants should be planted on close centers as liners or bare root for quick coverage and optimum competition. Detailed planting plans for each island will be completed during the design phase of the project. Table 6 provides a general list of desirable plant species that will be considered for each of the various habitats.

Table 6. Proposed Plant Species List

Upland Trees	
<i>Busera simaruba</i>	Gumbo limbo
<i>Celtis laevigata</i>	Sugarberry
<i>Coccoloba uvifera</i>	Seagrape
<i>Coccoloba diversifolia</i>	Pigeon Plum
<i>Conocarpus erectus</i>	Green buttonwood
<i>Diospyros virginiana</i>	Persimmon
<i>Juniperus silicicola</i>	Southern Red Cedar
<i>Persea borbonia</i>	Red bay
<i>Quercus myrtifolia</i>	Myrtle oak
<i>Quercus virginiana</i>	Live oak
<i>Sabal palmetto</i>	Cabbage palm
<i>Zanthoxylum clava-herculis</i>	Hercules club
Upland Shrubs	
<i>Callicarpa americana</i>	Beautyberry
<i>Chrysobalanus icaco</i>	Coco plum
<i>Chrysophyllum oliviforme</i>	Satinleaf
<i>Dodonaea viscosa</i>	Varnish leaf
<i>Erythrina herbacea</i>	Carol beam
<i>Forestiera segregata</i>	Wild olive
<i>Myrcianthes fragrans</i>	Simpson stopper
<i>Pithecellobium keyense</i>	Blackbead
<i>Psychotria nervosa</i>	Wild coffee
<i>Randia aculeata</i>	White Indigo Berry
<i>Scaevola plumieri</i>	Inkberry
<i>Serenoa repens</i>	Saw palmetto
<i>Sophora tomentosa</i>	Necklace pod
<i>Suriana maritima</i>	Bay cedar
Wetland – High and Low Marsh Species	
<i>Avicennia germinans</i>	Black mangrove
<i>Rhizophoraceae mangle</i>	Red mangrove
<i>Laguncularia racemosa</i>	White mangrove
<i>Conocarpus erectus</i>	Buttonwood
<i>Spartina bakeri</i>	Sand cordgrass
<i>Spartina patens</i>	Marshhay cordgrass
<i>Spartina alterniflora</i>	Smooth cordgrass
<i>Juncus roemerianus</i>	Black needle rush
<i>Scirpus</i> spp.	Bulrush
<i>Batis maritima</i>	Sea pickle
<i>Sesuvium</i> spp.	Seapurslane
<i>Paspalum vaginatum</i>	Seashore paspalum
<i>Distichlis spicata</i>	Saltgrass

To maximize the benefit of this project, controlling the regeneration of nuisance species will be facilitated through the following:

- Grade changes resulting in the removal of substrate will remove the root stock and seed source from these species and will result in incompatible habitat creation for exotics.
- Grade changes resulting in the addition of fill will cover over seed sources preventing germination of seeds.
- Use of composted shredded (tub-ground) woody vegetation will act as a thick mulch layer physically preventing seed germination. Material used from the nuisance species must be composted to prevent seed germination in the mulch.
- Use of applied herbicides (injection, frill and girdle, or cut stump application) may be used to control Australian pines and Brazilian pepper in specified areas.
- Finally, follow-up treatment and monitoring will be necessary.

For each of the project disposal islands, it is anticipated only minor and temporary construction related impacts will occur to desirable wetland vegetation during construction through the use of best management practices such as the use of silt fences, turbidity barriers, and controlled construction access.

Big Edwards Island. The installation of high marsh species such as knotgrass (*Paspalum* ssp), marsh-hay (*Spartina patens*), and saltgrass (*Distichulus*) will improve the habitat functions of this island. These efforts will increase the amount of cover of high marsh species that are almost non-existent in the Sarasota Bay area. The increase in acreage of mangroves is another positive effect of the project and will increase the fisheries habitat value as a result of the project. The Recommended Plan increases the open water edge effect of the mangroves that typically improves the function and value of mangroves.

Construction access is anticipated to occur from the western side of the island. This location is adjacent to a channel that is not vegetated with seagrasses and therefore no impacts to adjacent seagrasses are proposed. Grade changes in the northwest portion of the island will occur adjacent to existing mangroves. As such, occasional individual mangroves will be impacted to provide a consistent elevation between planted mangroves and the existing vegetation. Where practical, design efforts will identify these locations and adjustment in species type will minimize impacts while providing an opportunity for exchange of water during normal tidal events. Sheet flow of tidal waters is beneficial to the quality of habitat.

Seagrasses adjacent to the east of Big Edwards Island will not be negatively impacted by the Recommended Plan. The installation of temporary erosion control measures during construction and permanent erosion control measures will prevent impacts to the seagrasses from continued erosion of the adjacent

shoreline. The seagrasses to the south of the island may experience minor impacts from the existing unconsolidated shore. In order to provide access to upland areas and to take advantage of existing conditions, the upland area on the southern portion of the island will remain. However, through upland restoration plantings, all efforts will be made during the design process to include vegetation and maintenance commitments that will minimize erosion.

Skiers' Island. The proposed locations of upland restoration will not impact the existing mangroves. The Recommended Plan reduces the steep slopes of disposal material adjacent to the existing mangroves. The elimination of the upland disposal material and nuisance species adjacent to the existing mangroves will have a positive impact on the existing mangroves.

The existing mangroves are currently inundated from the outside edge of the island. The proposed open water connections to the east, west, and north will have a positive effect on the function and value of the proposed and existing mangroves. The increased inundation improves the fisheries habitat value of the mangroves. Low marsh habitat will be initially installed and will create nursery habitat for fish and estuarine, inter-tidal invertebrates.

Historic dredging adjacent to Skiers' Island and the subsequent placement of fill on the Island precludes much habitat for seagrasses. The limited amount of seagrass habitat present will be impacted in a positive manner from the proposed activities. The Recommended Plan includes mangrove coverage around more than 90% of the island, thus reducing the opportunity for continued erosion. The reduction in erosion should improve water quality and reduce siltation over seagrasses from migrating disposal material.

Bird Colony Islands. The proposed activities for the Bird Colony Islands are limited to stabilization. It is anticipated that stabilization will occur through the placement of rubble rip-rap and will have no negative impacts on the nesting habitat provided by the mangroves. As a result of the wave energy, which has caused erosion of the mangrove areas, there are no seagrasses on the edge of the small islands. Therefore, placement of the stabilization material will have no impact on seagrasses.

Jim Neville Marine Preserve. The placement of material on the island created a unique habitat between the upland nuisance species and the mangrove band around the island. This habitat is quite similar to natural salterns in other coastal areas. Typically, the area becomes inundated with the tide and water is entrapped. As the tide ebbs, the trapped water evaporates and the salinity greatly increases. This increased salinity prevents propagation of seeds and the growth of most vegetation. What does occur is rapid blooms of single cell algae. The algae provide a food source for fiddler crabs (*Uca uca*) and other invertebrates. This unique habitat will not be impacted by the proposed activities.

The mangrove bands that were left after placement of the disposal material will not be negatively impacted by the Recommended Plan. Positive impacts will occur as a result of increased mangrove acreage as well as increased contact with the restored mangrove areas by tidal flows. The increased function and value of the multiple channel connections included in the Recommended Plan compensates for the temporary, construction-related impacts to mangroves. The existing mangroves as well as the planted mangroves will benefit from sheet flow of tidal water across the island during high tide. It is anticipated the designs provide an opportunity for the sheet flow from all directions, depending on the prevailing tides and/or winds.

The temporary impacts will include removal of mangroves associated with the channel connections, construction access, and construction of the low marsh/mangrove planting areas. The construction access is necessary to build the Recommended Plan as deep water areas do not exist adjacent to the proposed construction areas.

Impacts to the adjacent seagrass habitat will occur. These impacts will be both positive and negative. The negative impacts will occur as a result of tidal channel connections and construction access. Where practical, the proposed location for the tidal channel will be the same location used for access. Additional excavation may occur in the grass flats adjacent to the island to allow ingress and egress of construction equipment and removal of the excavated material. Exact locations will be identified during the design phase and all efforts will be made to determine locations that will provide long-term benefits through increased circulation. The positive benefits will be improved water quality as a result of nutrient assimilation by the wetland vegetation as well as trapping suspended sediments.

Palmer Point Park. This site is somewhat different than the other areas as it is part of a contiguous peninsula, not an island. The Recommended Plan, which will create all low marsh and mangrove habitat in the project area, considers the presence of nuisance species on the adjacent uplands. As a result, the loss of upland habitat is an unavoidable impact, but the proposed habitat will have significant benefits. The opportunity for restoration of the uplands on the adjacent properties will eventually provide a mosaic of habitat improving the total ecological value of Palmer Point Park.

The mangroves will provide a positive impact to the adjacent habitat by increasing nesting opportunities, improving water quality, and increasing fisheries habitat. The mangroves would benefit from increased sheet flow of tidal waters. As with Jim Neville Marine Preserve, open sandy areas of high salinity that are similar to natural salterns are present. The vegetative value, while considered high, is limited to the rapid algal blooms. The Recommended Plans would have no impact to this community. Detailed analysis during design and careful construction techniques will be required to avoid impacts to this unique habitat.

The Recommended Plan precludes the use of open water lagoons that were considered in other concepts. However, preliminary analysis indicated the small area of open water opening to the bay would not have enough volume to provide high enough flow rates through the connection to existing open water areas. As such, the low flow rates would cause the opening to silt in and would create a stagnant water area of reduced water quality. This potential secondary affect would impact the function and value of the restored wetland.

Snake Island. Upland restoration will improve the habitat value and have a positive impact on the project area. The few existing mangroves present on the island will not be impacted by the Recommended Plan and the newly created low marsh/mangrove areas will improve the benefits of these mangroves to fish and wildlife resources.

The continued erosion of Snake Island has impacted adjacent seagrass beds. While few grasses are present within the nearby water, the proposed design will reduce the erosion and avoid additional impacts to seagrasses. The No-Action Alternative would continue to reduce water quality and eliminate existing mangroves.

The proposed low marsh area would have a positive impact on the fisheries habitat. The reclaimed area will be protected by soft-shore stabilization such as rubble rip-rap, sand filled fabric tubes, or other geotextile alternatives to reduce the high energy environment creating the current erosion.

5.02 Threatened and Endangered Species. Through a determination by U.S. Fish and Wildlife Service, it has been determined this project will have no negative impact on Threatened and Endangered Species. The piping plover, a federally threatened species, is found in the vicinity of both Palmer Point Park and the Jim Neville Marine Preserve and forages in tidal flats. Therefore, the protection or creation of tidal flat areas as part of the Recommended Plans for each site will be beneficial to this listed species.

Sea turtle nesting has not been documented on any of the project disposal islands and will not be impacted by any of the proposed alternatives. Habitat for the Western Indian manatee is located throughout the project area, especially in areas of seagrasses located near the islands. During the project construction, the "Standard Manatee Conditions" will be followed as stated in the project permit issued by the Florida Department of Environmental Protection. It is anticipated that following the conditions will help avoid impacts to the manatee as a result of implementation of the Recommended Plans.

5.03 Fish and Wildlife Resources. As discussed in Section 5.01, positive impacts to fish and wildlife resources will result from the ecological restoration of the project disposal islands through the removal of nuisance species and their habitat and the replacement by desirable upland and wetland species. In turn,

the increase in the acreage of the desirable species improves the function and value of the fisheries and bird habitat.

Temporary impacts will occur during construction. These impacts will be limited to adjustments in cover type and to construction access. While it is recognized a temporal loss in bird nesting habitat will occur, the long-term benefits of planting more desirable species will have a positive impact on the bird habitat.

Construction activities on the Bird Colony Islands are minimal. It is anticipated that stabilization will occur through the placement of rubble rip-rap and will have no negative impacts on the nesting habitat provided by the mangroves. In addition, construction activities for this island will be minimized during the most active nesting season.

Without the implementation of this project, there would continue to be negative impacts as a result of erosion, nuisance species seed dispersal, and reduced water quality.

5.04 Coastal Barrier Resources. As identified in Section 4.04, two designated units of the Florida Coastal Barrier Resource System are located in the vicinity of the project disposal islands. However, in accordance with Section 6(A) of the Act, projects for the study, management, protection, and enhancement of fish and wildlife resources and habitats, including acquisition of fish and wildlife habitats and related lands; stabilization projects for fish and wildlife habitats; and recreational projects are consistent with the purposes of this Act. The proposed ecosystem restoration of the project disposal islands is consistent with the purposes of this Act and will provide an ecological benefit to these coastal resources.

5.05 Water Quality. Overall, the Recommended Plans will have a long-term positive effect on water quality within the bay because of the reduction of erosion through mangroves, marshes and other shoreline stabilization methods. This vegetation will also help to assimilate nutrients, which will also improve water quality.

Temporary impacts to water quality will occur during construction. Best management practices will be incorporated to reduce impacts. Mixing zones will be established for the work areas. No increase in suspended sediments will be allowed outside of the mixing zones. Creative concepts such as the use of organic fluids in the hydraulic systems of earthmoving equipment will reduce the chance of accidental impacts to water quality.

5.06 Aesthetic Resources. Each of the project areas and Recommended Plans involve similar impacts to aesthetics.

The visual look of the proposed project islands will change as a result of the project. Newly planted vegetation will require time to mature to the existing heights of the exotic species. However, the majority of these islands have existing mature vegetation, particularly mangroves, which will remain intact with the implementation of the project. Many of these mangrove areas extend up to 20-foot-high providing quite a visual buffer around the island.

The public involvement process revealed that "beauty is indeed in the eye of the beholder". Personal differences exist regarding nuisance species, disposal islands, visual buffers, and recreational usage. A small portion of the public is adamant in the feeling that Australian pines are beautiful and should not be cut down. Disposal islands are visual landmarks for boaters while providing visual buffers for adjacent homeowners. Finally, several homeowners felt that increased recreational usage of the islands would be an aesthetic impact to their viewshed. Other members of the public indicated that the restoration of these disposal islands with native, desirable habitat would add to the beauty of the bay. In addition, the increase in species diversity would also improve their view of the bay.

On islands such as Big Edwards Island and Snake Island, for which viewshed seemed an important issue to members of the public, opportunities to minimize dramatic changes to the viewshed will be evaluated during the design phase of this project, including planting larger trees and a phased removal approach.

5.07 Recreation Resources. Impacts to the recreational value of the proposed project areas are limited. Design alternatives were considered to reduce impacts to recreation. Impacts to passive recreation will result from reduced access on some of the islands. During construction, recreation will be impacted as the islands will be considered construction sites and access by the public will be trespassing. This unavoidable, temporary impact will be mitigated through the increased recreational value associated with the pedestrian trail and small boardwalk on Big Edwards Island.

Through the public involvement process, a general consensus was achieved regarding the desire for recreation on the project disposal islands. Specifically, the public identified the importance of public access and use of Big Edwards and Snake Island.

The public also expressed the importance of the continued use of the deep-water channel surrounding Skiers' Island for water-skiing. As a result of the existing mangrove fringe around the island, recreational water-skiing will not be impacted from increased wave action. Through the public involvement process, it was also determined that water skiers preferred the leeward side of the island as a result of the wind break. Through upland restoration, vegetation will be installed that will eventually grow large enough to provide the same level of protection from the wind for the recreational skiers. The existing mature mangroves around the

island also provide a wind break. It is anticipated that changes in the vegetation will not impact the recreational value of the island.

Finally, the public identified the importance of limiting public use and access of the Jim Neville Marine Preserve and the project area of Palmer Point Park. These comments were considered and incorporated into the Recommended Plan for each island.

5.08 Cultural Resources. Project features of the Recommended Plan will impact archaeological site 8So2336. Project features, however, will mitigate adverse effects to the site. Beneficial uses of dredged material will help in the preservation of this site. A detailed mitigation plan will be worked out through consultation with the SHPO.

5.09 Cumulative Impacts. Cumulative impact is the impact on the environment which results from the incremental impact of the preferred action when added to other past, present, and reasonable foreseeable future actions (40 CFR 1508.7). The cumulative impact of the proposed action is the positive benefit of removal of the seed source of nuisance species, the improvement of water quality through erosion control, the continued increased production of fisheries resources as a result of increased habitat, and the increased habitat for birds.

6.00 Coordination. The U.S. Army Corps of Engineers, Jacksonville District Office furnished the U.S. Fish and Wildlife Service with an environmental scoping letter (Appendix G) requesting completion of the development of the Fish and Wildlife Coordination Report (CAR) and the Section 7 consultation. In the Fish and Wildlife Coordination Act Report dated February 24, 2000, the USFWS supports the Sarasota Bay Section 1135 Ecosystem Restoration Feasibility Study. Coordination for the proposed action with the State Historic Preservation Officer in compliance with the National Historic Preservation Act of 1966, as amended, has been initiated.

7.00 Compliance with Environmental Statues.

#### National Environmental Policy Act of 1969

Environmental information on the project has been compiled and the Draft Environmental Assessment was made available for public review through public notice in compliance with 33 CFR Parts 335-338. These regulations govern the Operations and Maintenance of U.S. Army Corps of Engineers Civil Works Projects involving the Discharge of Dredged or Fill Material into Waters of the U.S. or Ocean Waters. This public coordination and environmental impact assessment complies with the intent of NEPA. The process will fully comply with the Act once the District Commander has signed the Findings of No Significant Impact.

### Endangered Species Act of 1973

Consultation with the U.S. Fish and Wildlife Service was initiated in August 1999 for the purposes of Section 7 Coordination. By the letter dated February 24, 2000, the USFWS determined that there would be no impacts on any listed endangered species. This project was fully coordinated under the Endangered Species Act; therefore, this project is in full compliance with the Act (Appendix G).

### Fish and Wildlife Coordination Act of 1958

The project has been coordinated with the U.S. Fish and Wildlife Service. It has prepared a Coordination Act Report for the project. Therefore, the project is in compliance with this Act (Appendix G).

### National Historic Preservation Act of 1966, as amended (PL 89-665)

Archival research conducted for Big Edwards Island and Skiers' Island including analysis of soil survey data determined that there is little likelihood of sites being present. Archeological surveys completed at Jim Neville Marine Preserve and Palmer Point Park did not locate any significant cultural resources. Testing of archeological site 8So2336 on Snake Island determined that site is eligible for listing on the *National Register of Historic Places*. Coordination with the Florida State Historic Preservation Officer (SHPO) has been initiated. Consultation with SHPO will determine what is the appropriate mitigation measure for preservation of the archeological site on Snake Island.

### Clean Water Act of 1972

Section 404(b)(1) (Appendix A). As the project is in tidal waters and adjacent to the Intracoastal Water Way, Section 10 of the Rivers and Harbors Act of 1899 will supercede Section 404(b)(1) for any Dredge and Fill activities associated with the project.

Section 401 of the Clean Water Act requires water quality certification for projects that may impact wetlands of the United States. Delegation for the section has occurred to the State of Florida through the Environmental Resource Permitting. By obtaining a permit through Florida Statute 343, water quality certification consistent with Section 401 will be provided.

### Clean Air Act of 1972

No air quality permits would be required for this project. Therefore, this Act would not be applicable.

### Coastal Zone Management Act of 1972

The project has been evaluated in accordance with Section 307 of the Coastal Zone Management Act (Appendix B). It has been determined that the project would have no unacceptable impacts and would be consistent with the Florida Coastal Zone Management Plan.

Farmland Protection Policy Act of 1981

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

Wild and Scenic River Act of 1968

No designated Wild and Scenic river reaches will be affected by project related activities. This act is not applicable.

Marine Mammal Protection Act of 1972

Incorporation of the safe guards used to protect manatees during dredging and disposal operations will be implemented during construction; therefore, this project is in compliance with this Act.

Estuary Protection Act of 1968

The proposed project is located in a designated estuary, the Sarasota Bay Estuary. However, this estuary will not be adversely affected by project activities.

Federal Water Project Recreation Act, as Amended

There is no recreational development proposed for maintenance dredging or disposal. Therefore, this Act does not apply.

Resource Conservation & Recovery Act 1976(PL 94-580, 7 U.S.C. 100, et seq.)

This law has been determined not to apply, as there are no items regulated under this act being disposed of or affected by this project.

Toxic Substances Control Act of 1976,(PL94-469; U.S. C. 2601, et seq.)

This law has been determined not to apply, as there are no items regulated under this act being disposed of or affected by this project.

Coastal Barrier Resources Act and Coastal Barrier Improvement Act of 1990

The proposed work is within two Coastal Barrier sites as prepared by the Department of Interior in the Report to Congress on the Coastal Barrier Resources System. However, in accordance with Section 6(a) of the Act, projects for the study, management, protection, and enhancement of fish and wildlife resources and habitats, including acquisition of fish and wildlife habitats and related lands, stabilization projects for fish and wildlife habitats, and recreational projects are consistent with the purposes of the Act. The rehabilitation of the disposal islands is therefore exempt.

E.O. 11990, Protection of Wetlands

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

E.O. 11988, Flood Plain Management

No activities associated with this project will take place within a floodplain; therefore, this project is in compliance with this Executive Order.

## Magnuson-Stevens Fishery Conservation and Management Act

This Act requires that Essential Fish Habitat (EFH) be considered when undertaking any dredging project. The proposed action would not have an adverse impact on EFH or Federally managed fisheries. Our final determination relative to project impacts and the need for mitigation measures is subject to review by and coordination with the National Marine Fisheries Service.

8.00 Public Involvement. The public involvement process for this study incorporated a three-phased approach to informing the community, identifying community concerns, and achieving consensus. The three phases included several one-on-one/small group meetings with identified interested parties of the community; media contact and public notification prior to public workshops; and advertised public workshops.

The public involvement process for this study was developed to address the concerns of the public, who through past County ecosystem restoration efforts, have indicated a desire to be informed and involved in these types of projects.

A total of five public workshops were held for this project. Appendix H provides detailed information from each of these workshops including the press release and public notification letters for the workshops; mailing lists for each workshop; transcripts, summaries, and written comments received at these workshops; related newspaper articles; and workshop materials.

The first public workshop was held on October 28, 1999 at Sarasota High School in Sarasota, Florida. The purpose of this workshop was to introduce the Sarasota Bay Ecosystem Restoration Feasibility Study and the Section 1135 process to the public, as well as to identify issues that were important to the public in respect to past restoration efforts in and around the bay. During the second half of the meeting, the public was given the opportunity to comment on the project through oral comments and questions. A summary of these comments is provided in Section 6.0 of the *Sarasota Bay Ecosystem Restoration Report*.

The next three workshops were held in February 2000 to present, discuss, and receive comments on the preliminary restoration concepts developed for the project. Three separate workshops were held to break the project disposal islands into geographical groups. In addition, surveys were provided to the participants to identify their primary recreation and restoration objectives of the proposed project.

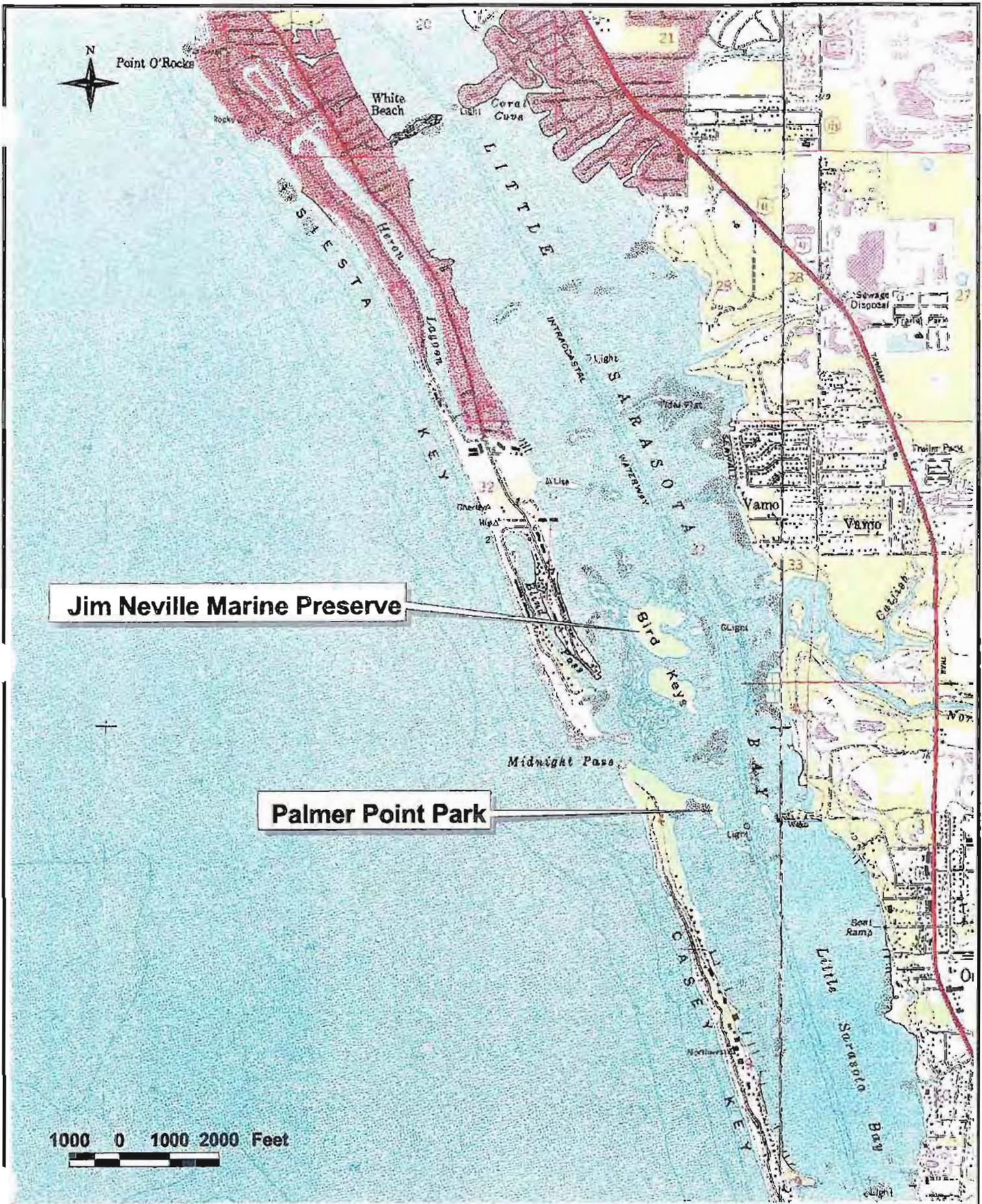
The format of these workshops included a brief summary of the background, need, and authorization of the project followed by the presentation of issues of concern the project team had identified through previous public input. Next, the existing conditions of the islands were presented along with three preliminary restoration concepts followed by a short public comment period. The second portion of the meeting included a break-out group session that gave the

participants an opportunity to draw their own ideas and concepts or modify the concepts that had been presented. Additional issues of concern were also identified during this process. Finally, the workshop ended with the presentation of the Break-Out Groups' various concepts and issues. At the conclusion of the workshop, time was allowed for additional public comments and questions. A detailed summary of these three workshops and the comments received are included in Section 6.0 of the *Sarasota Bay Ecosystem Restoration Report*.

The final public workshop was held on May 17, 2000 at the Pine View School in Osprey, Florida. The workshop was attended by 26 members of the public. The purpose of this workshop was to present the concepts developed from the public input from the last public workshops and to present the Recommended Plan for each island. In addition, the public was given the opportunity to comment through both oral and written comments. A detailed summary of this workshop and the comments received are included in Section 6.0 of the *Sarasota Bay Ecosystem Restoration Report*.

# FIGURES

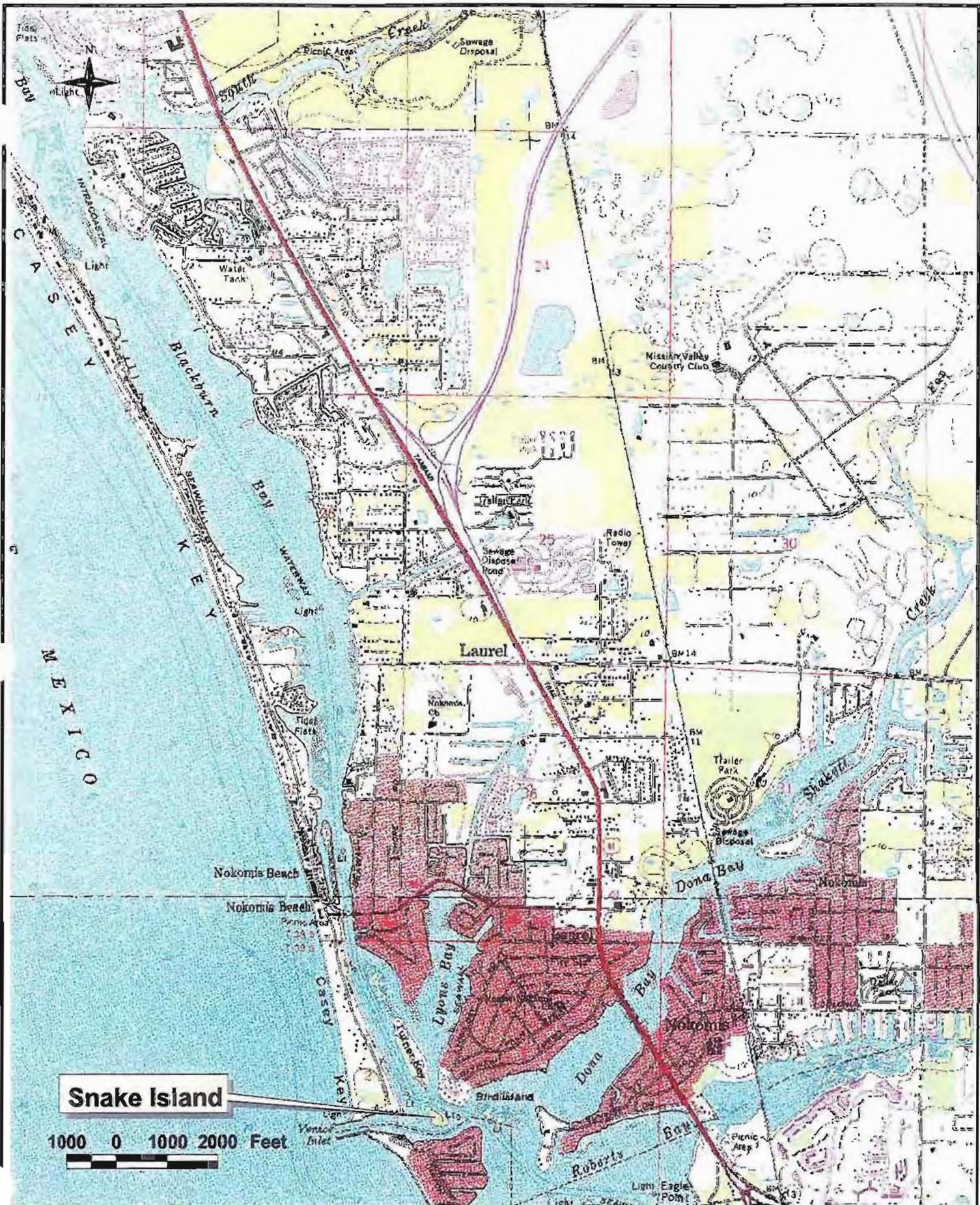


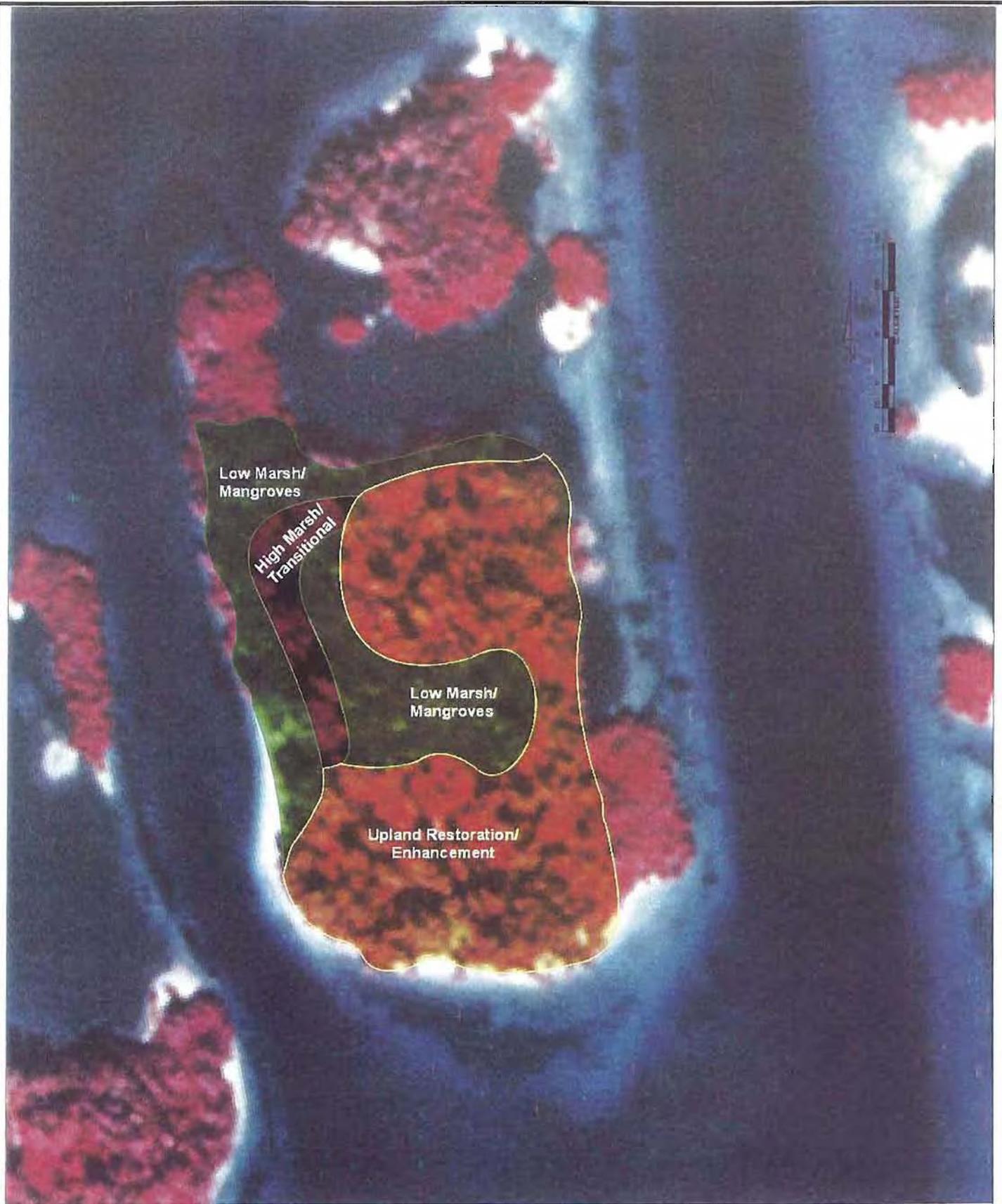


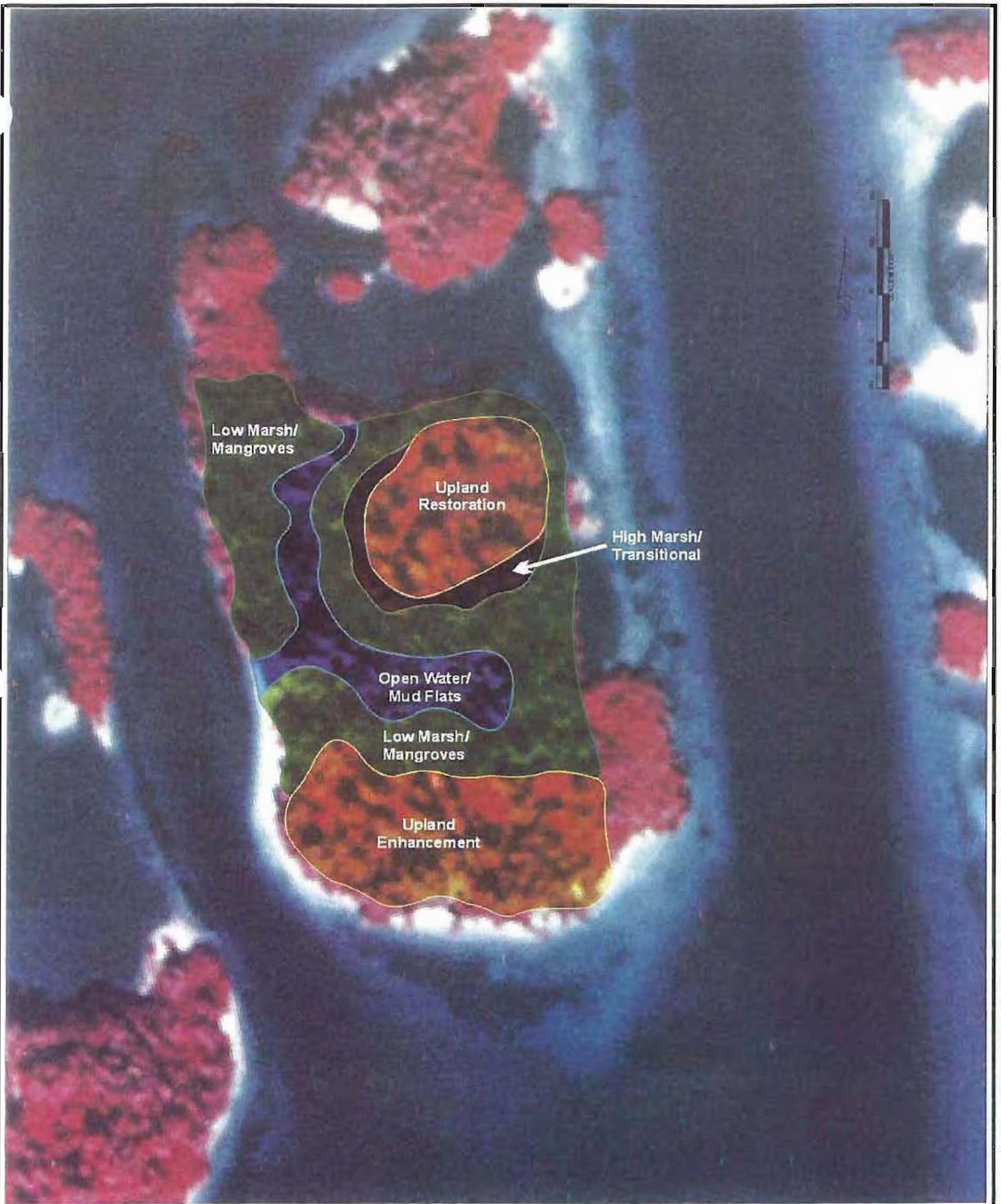
**Jim Neville Marine Preserve**

**Palmer Point Park**

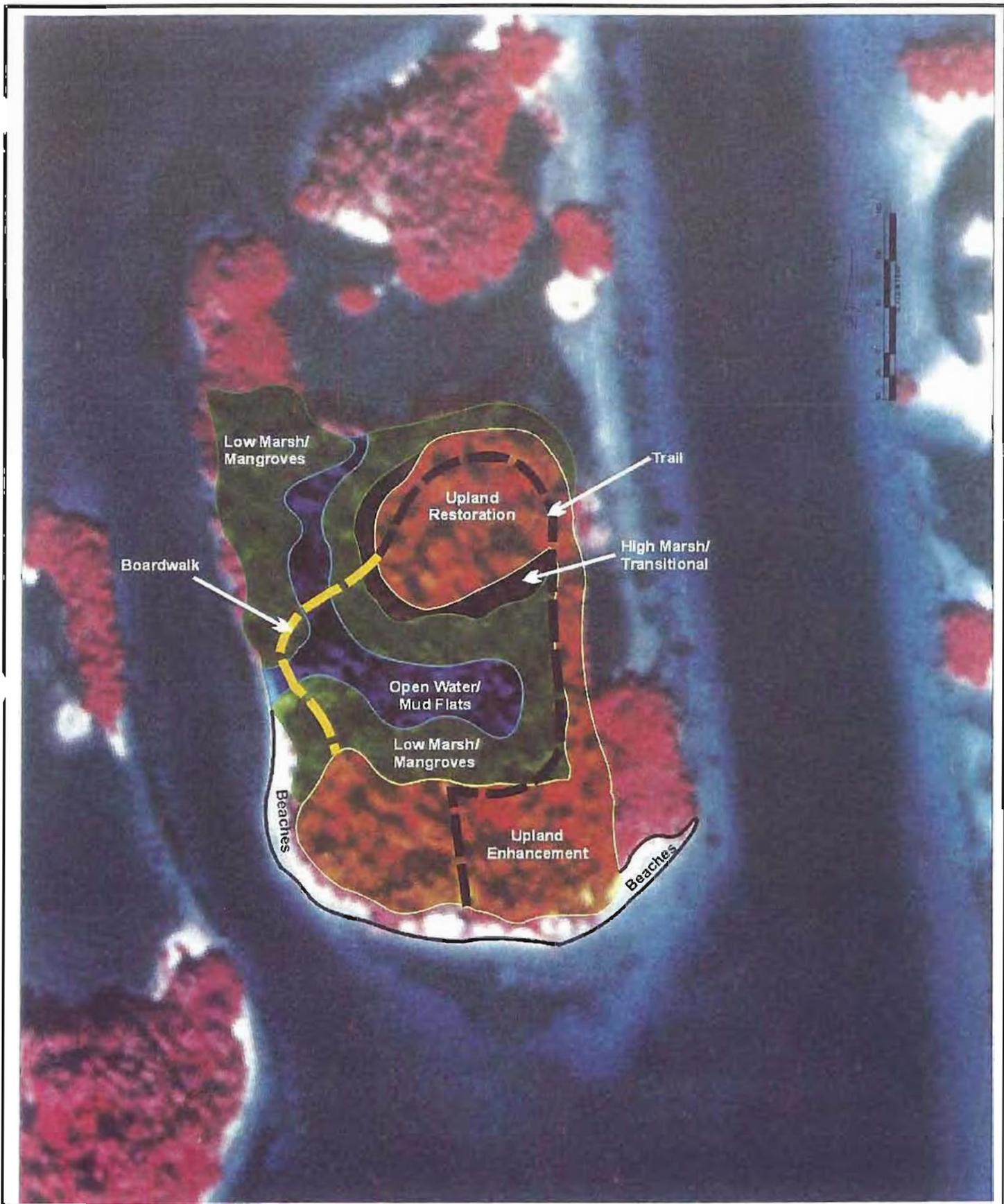


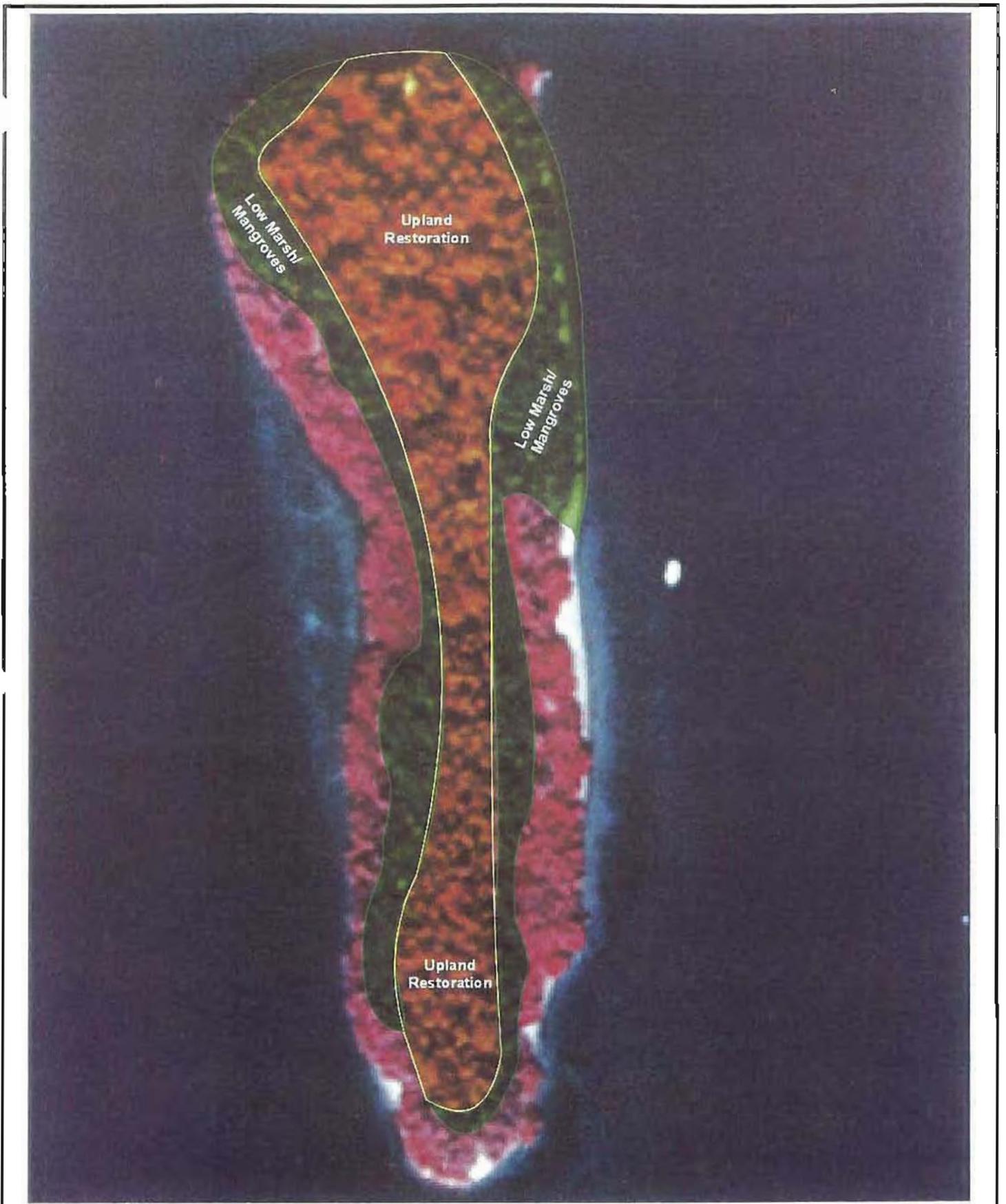












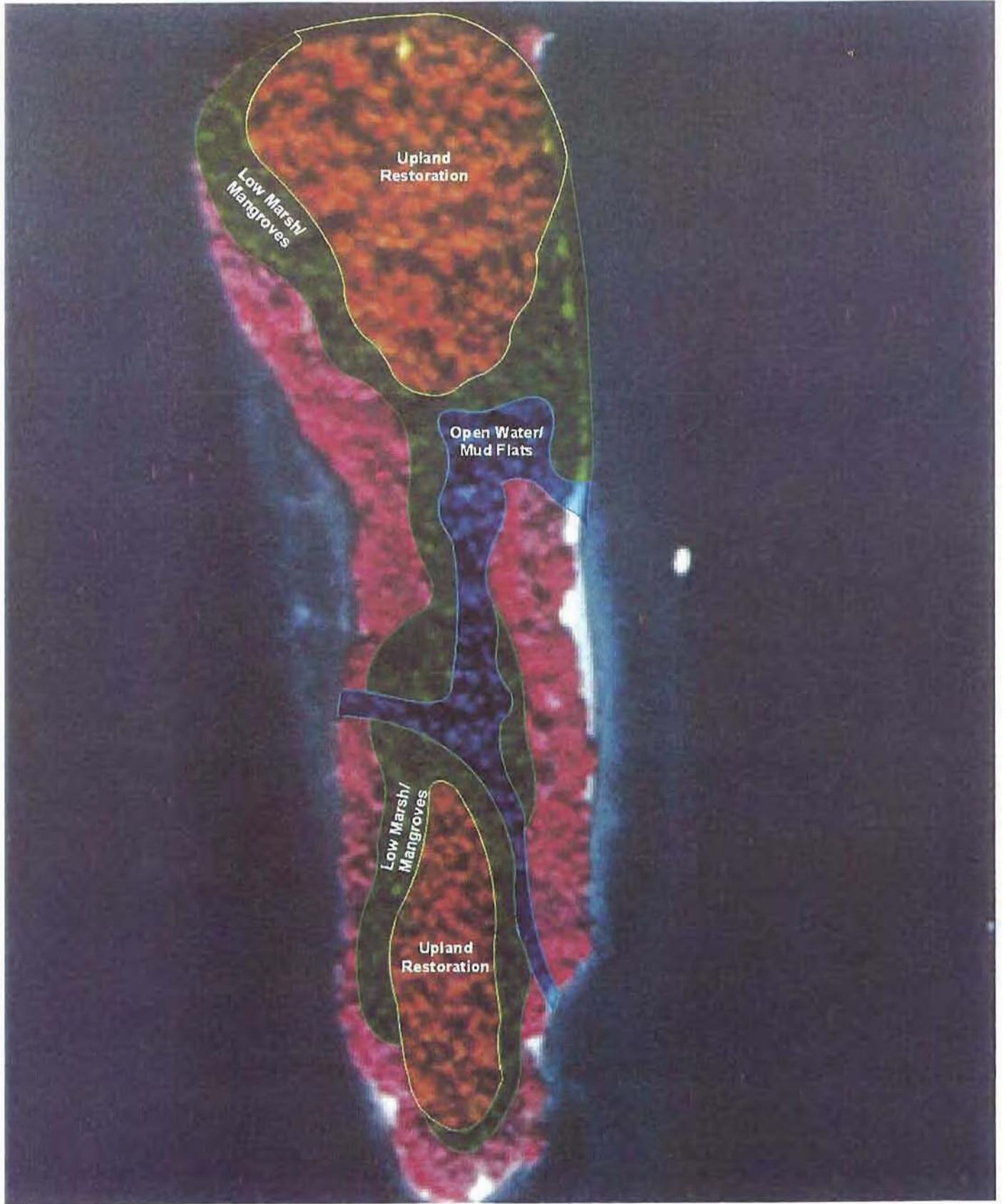


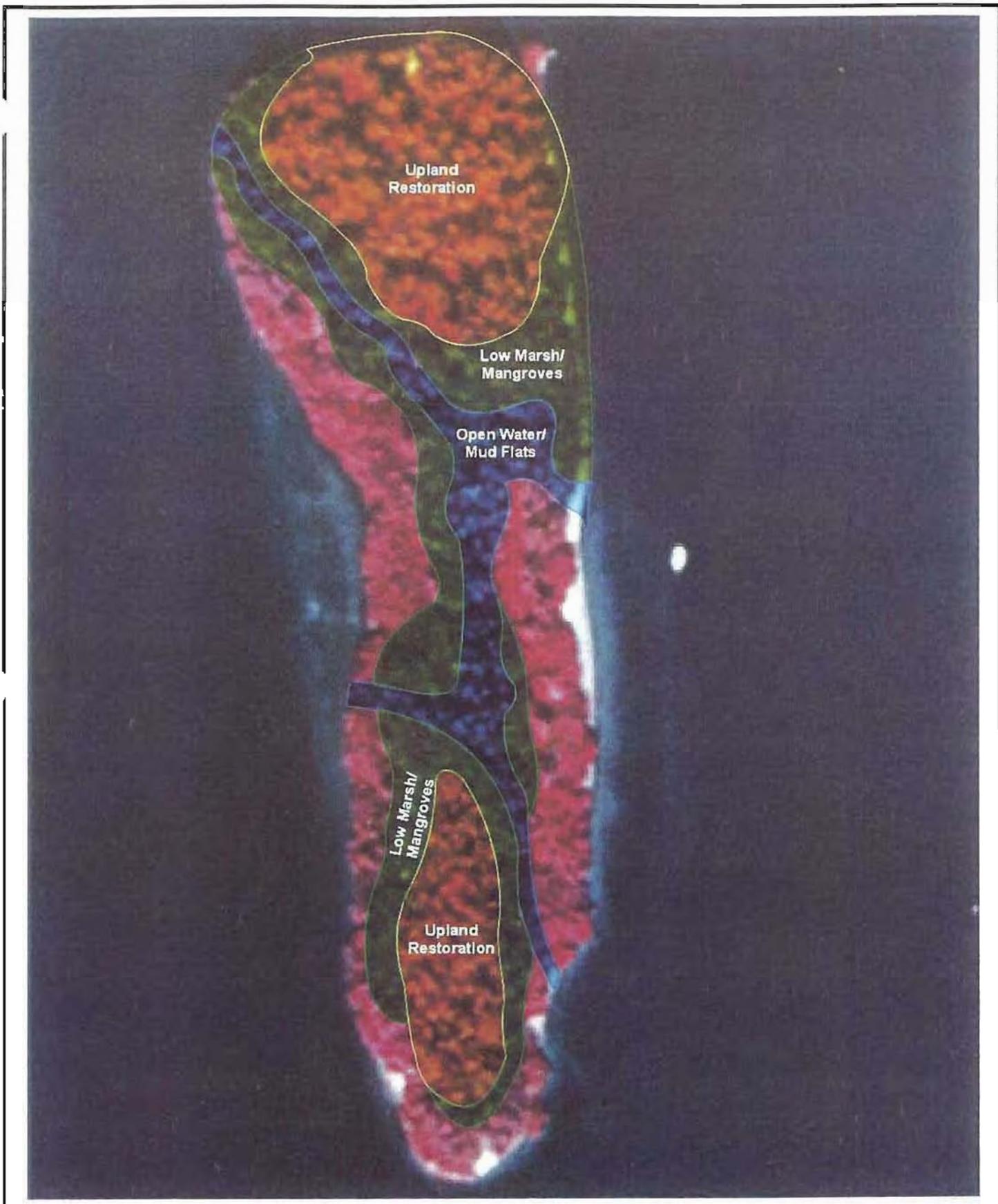
Sarasota Bay  
Ecosystem  
Restoration  
Report

Skiers' Island  
Concept 2

Figure 7



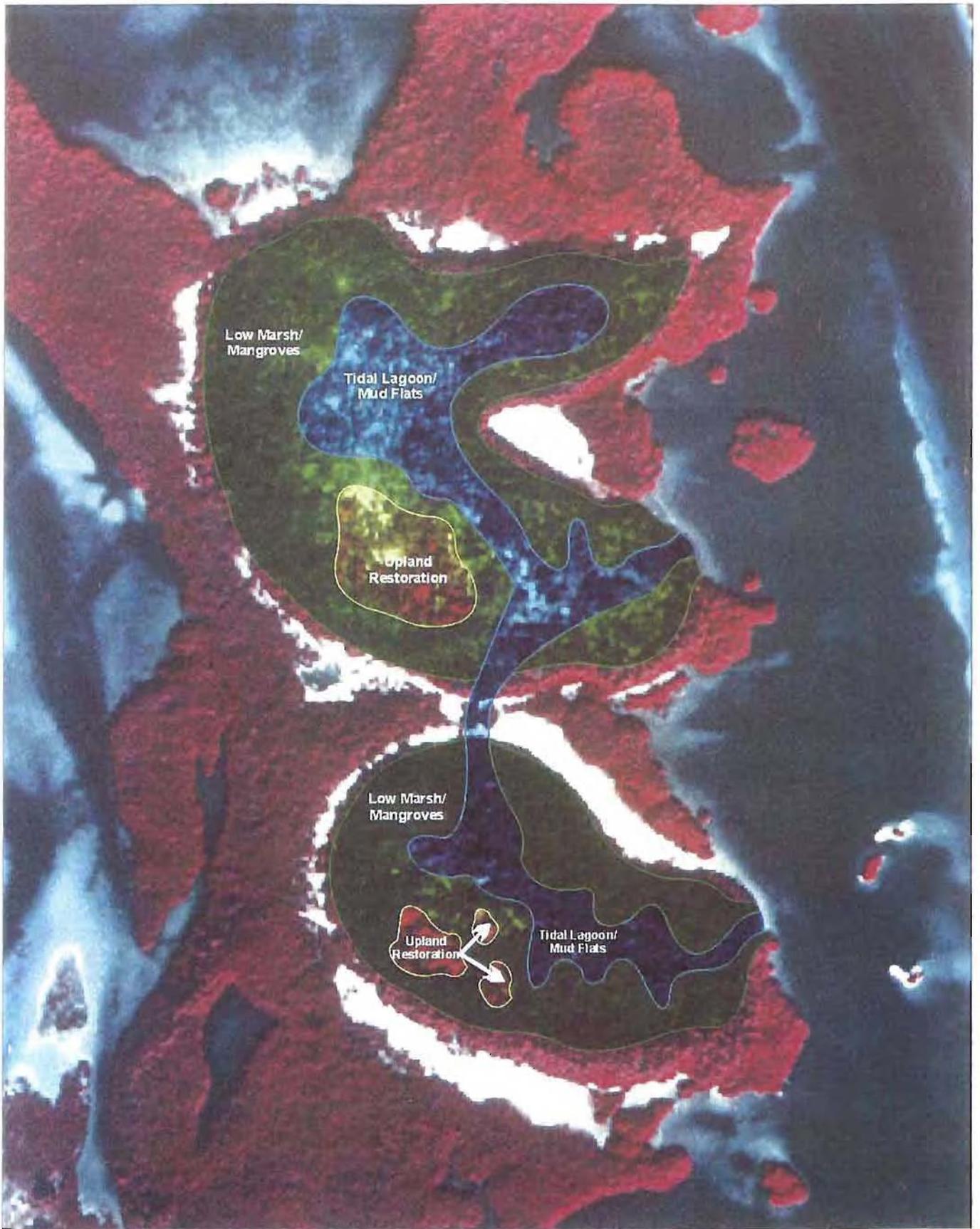




Sarasota Bay  
Ecosystem  
Restoration  
Report

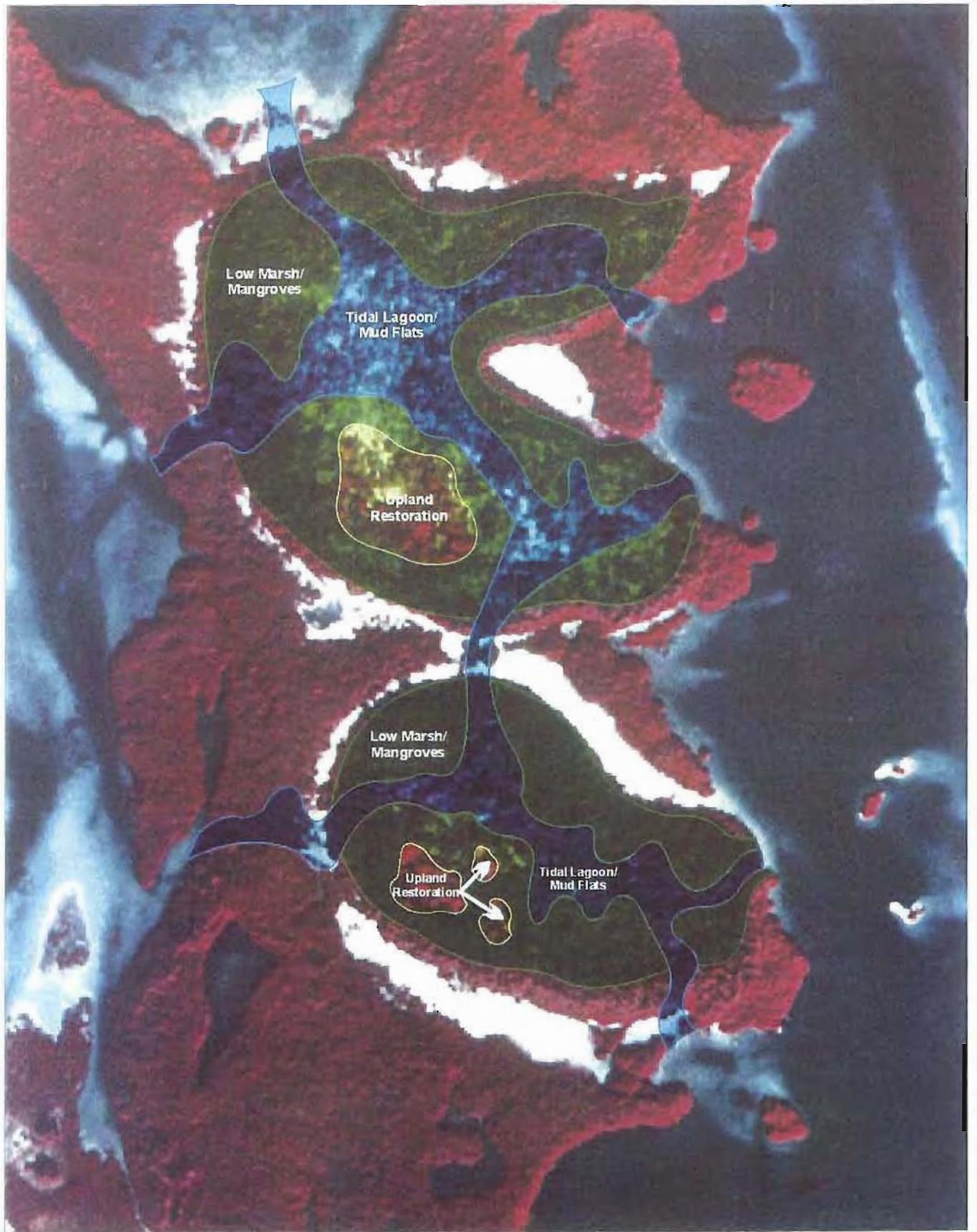
Skiers' Island  
Concept 4  
Preferred Alternative

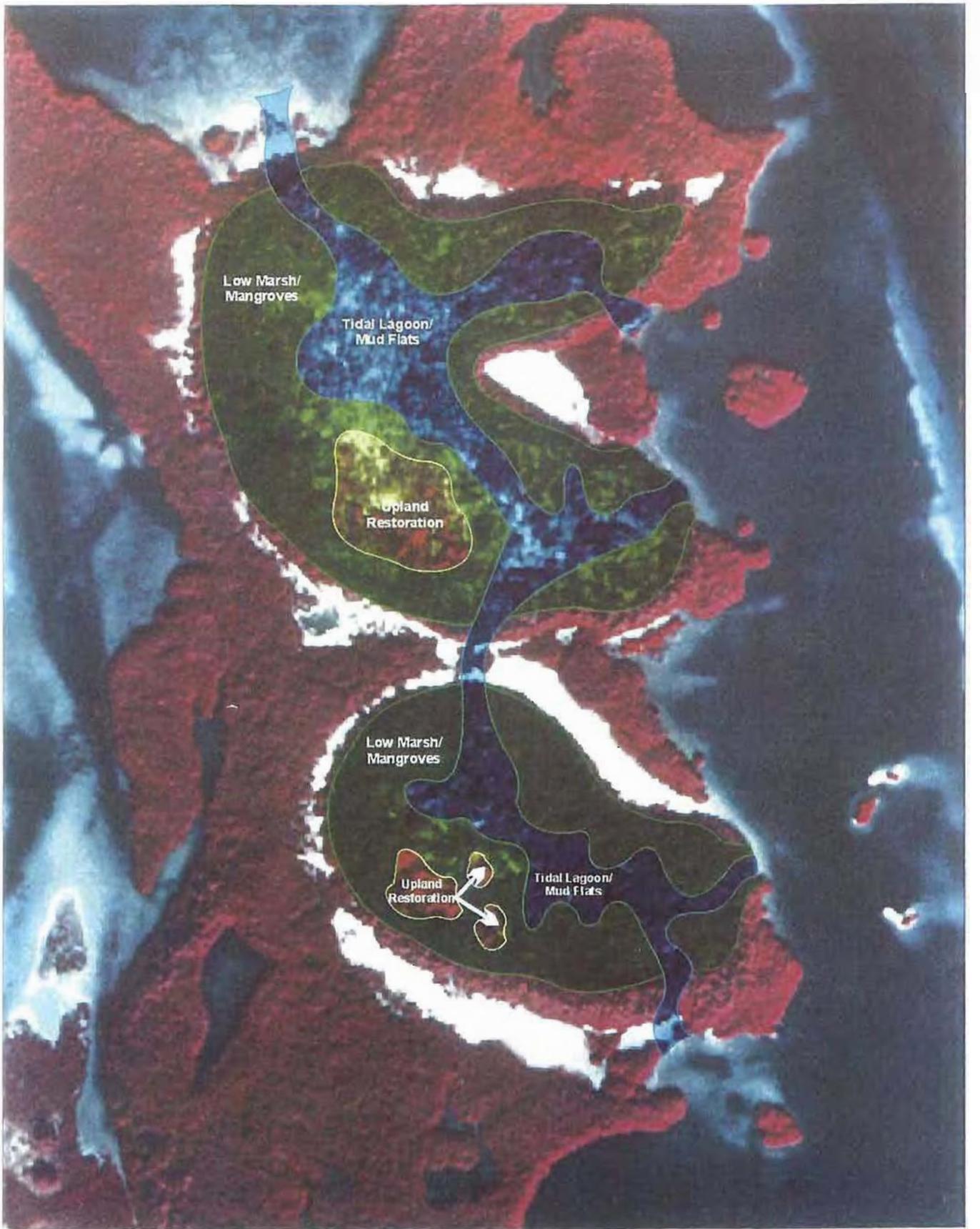
Figure 9

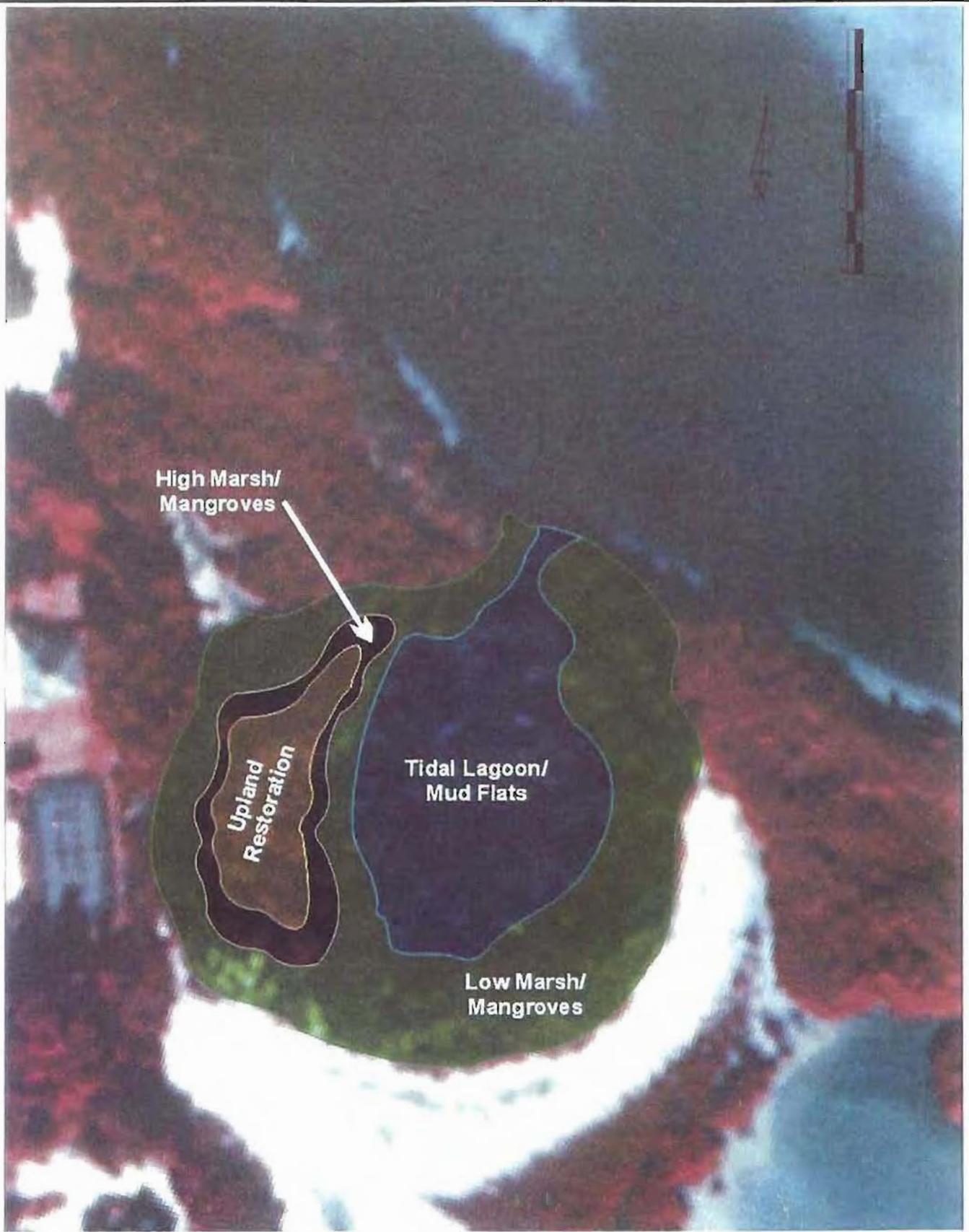


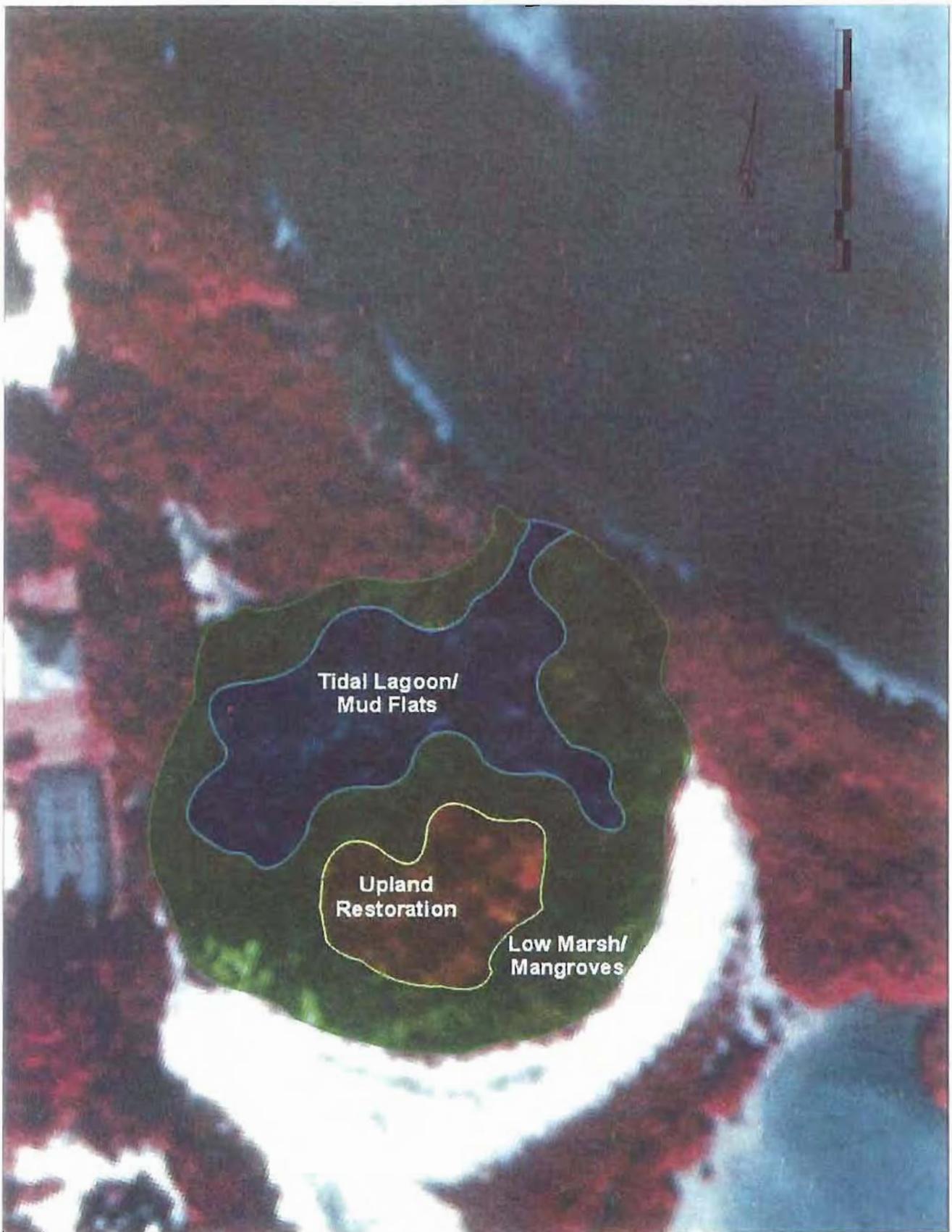








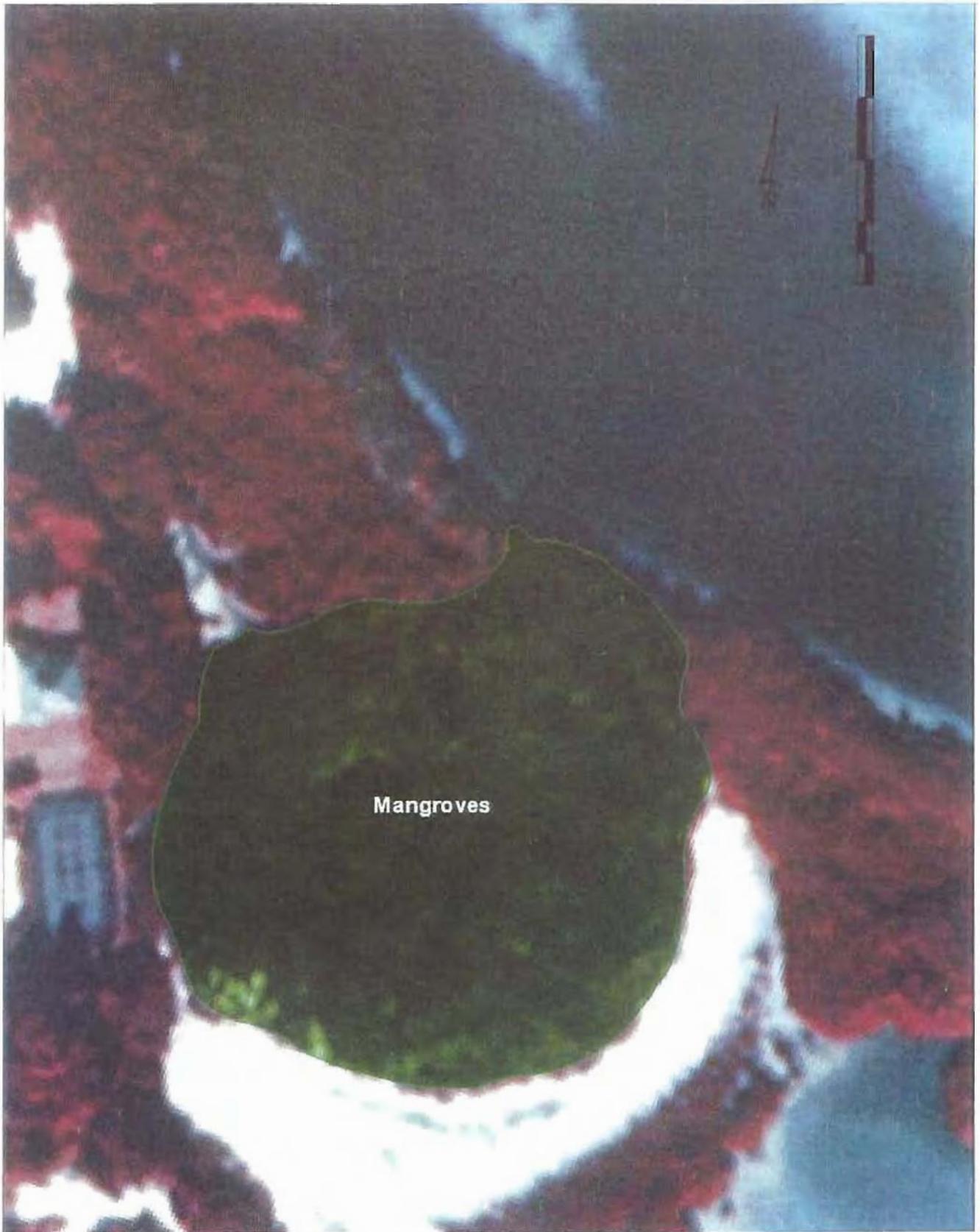




Sarasota Bay  
Ecosystem  
Restoration  
Report

Palmers Point Park  
Concept 2

Figure 16

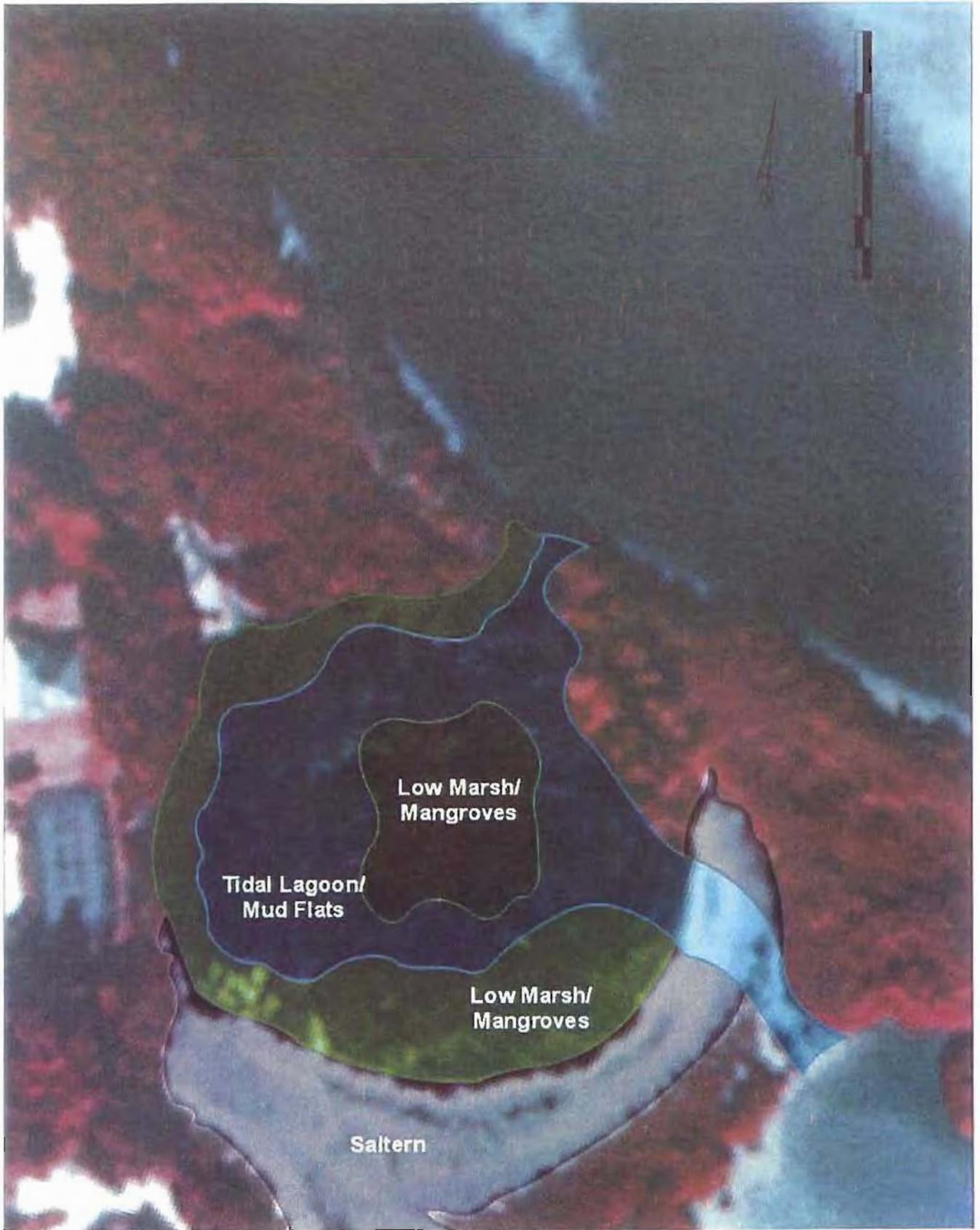


Sarasota Bay  
Ecosystem  
Restoration  
Report

Palmers Point Park  
Concept 3  
Recommended Plan

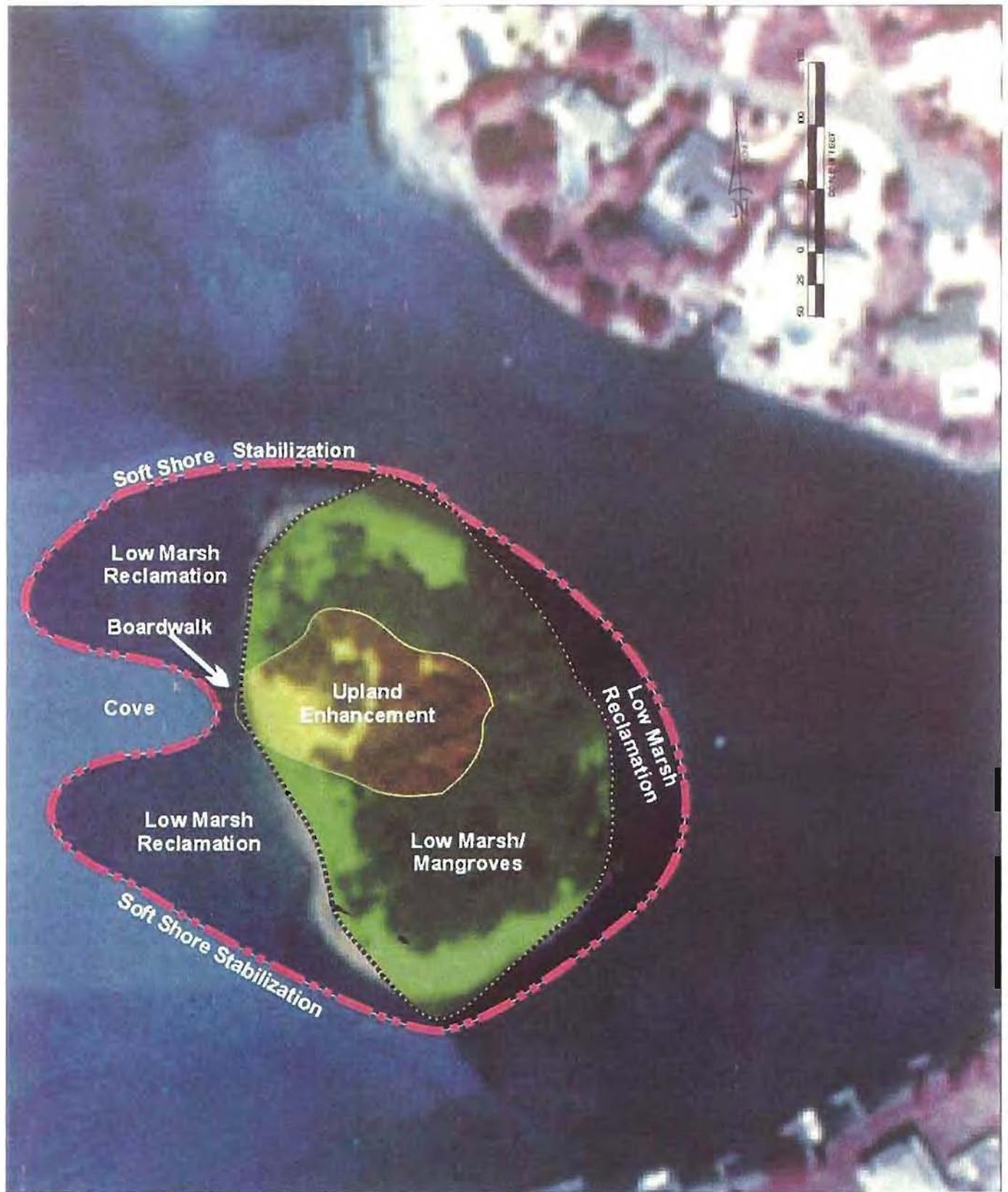
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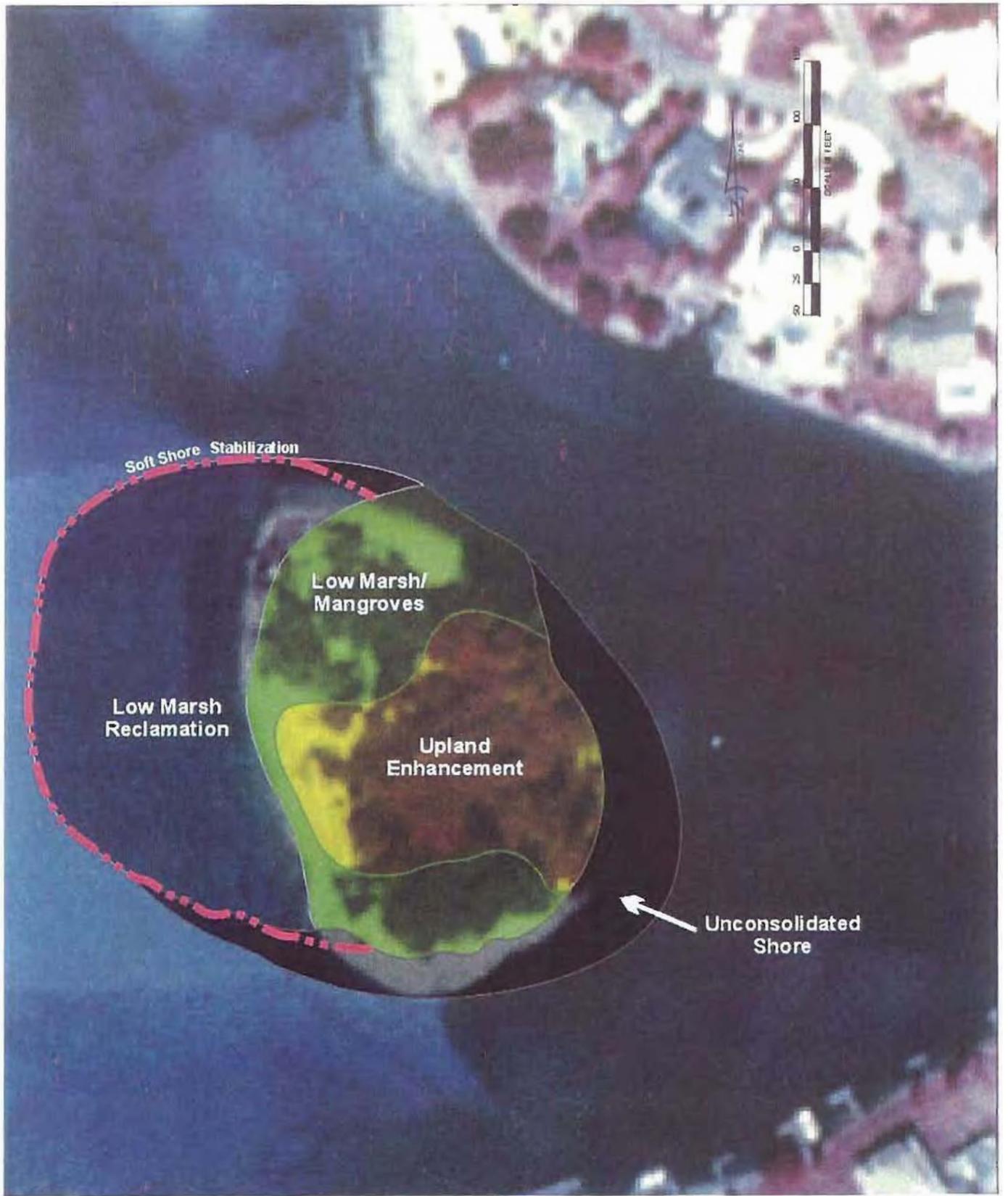
HDR

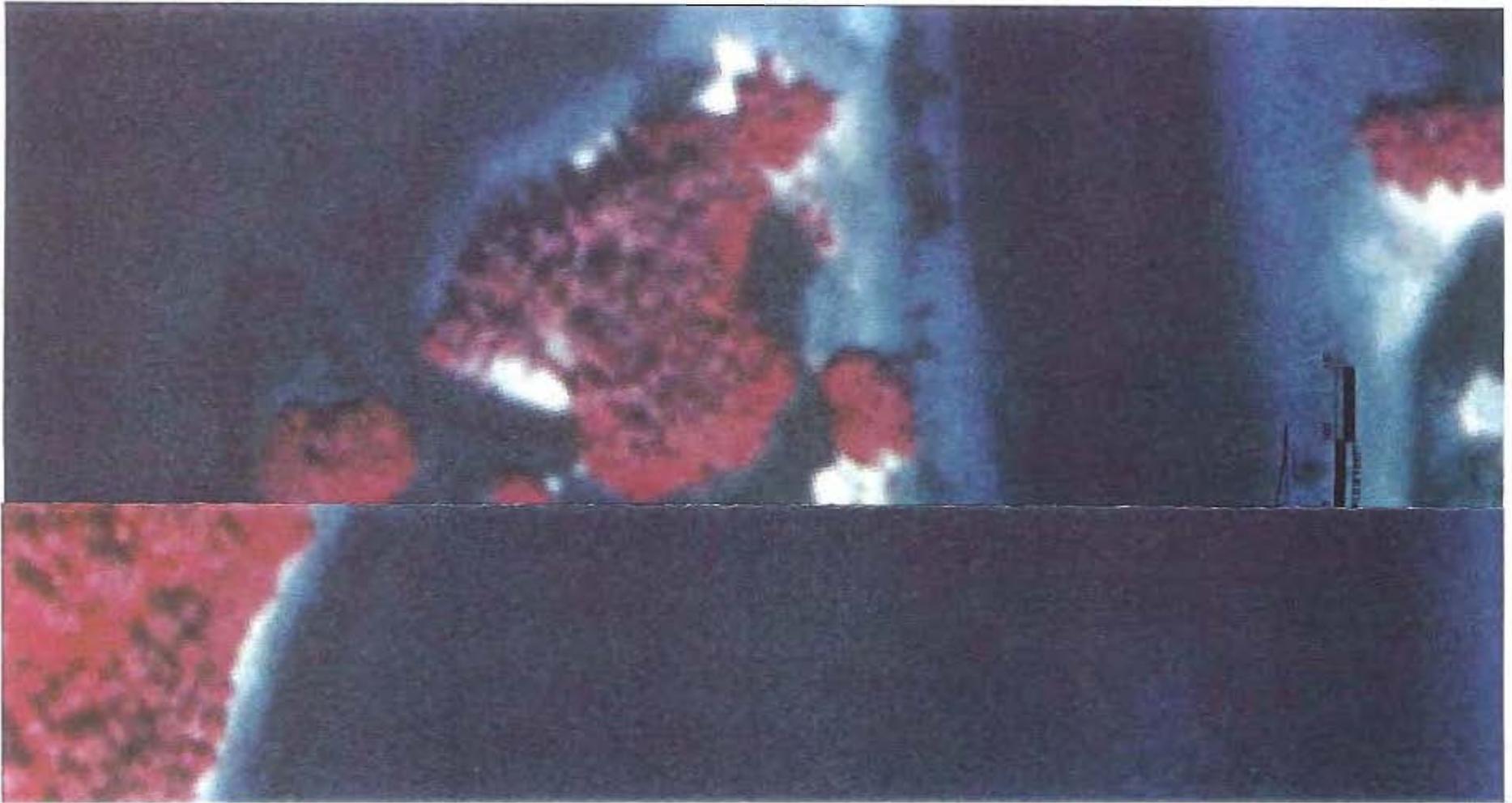










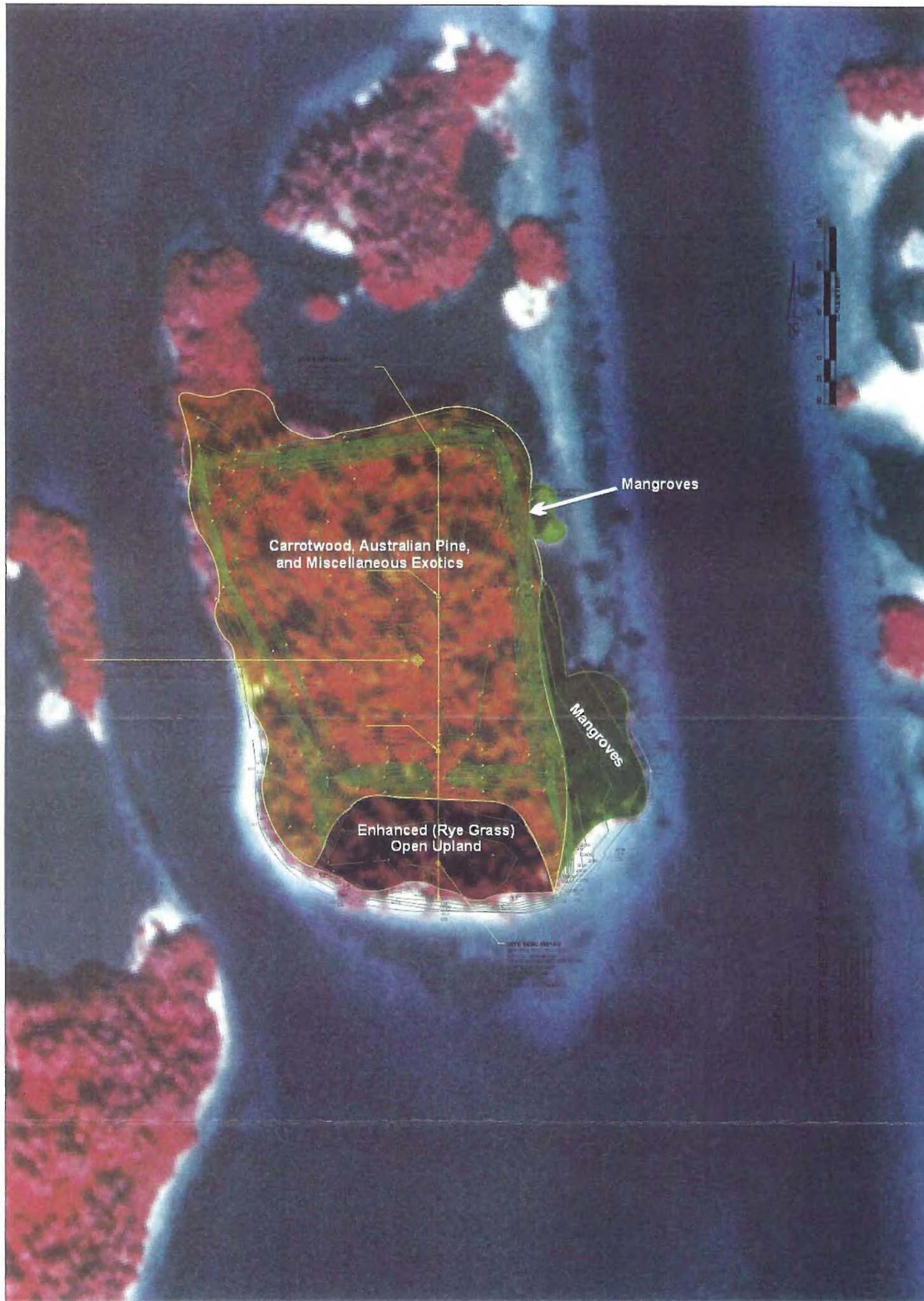


Sarasota Bay  
Ecosystem  
Restoration  
Report

Big Edwards Island  
Existing Conditions

Figure 23

HDR





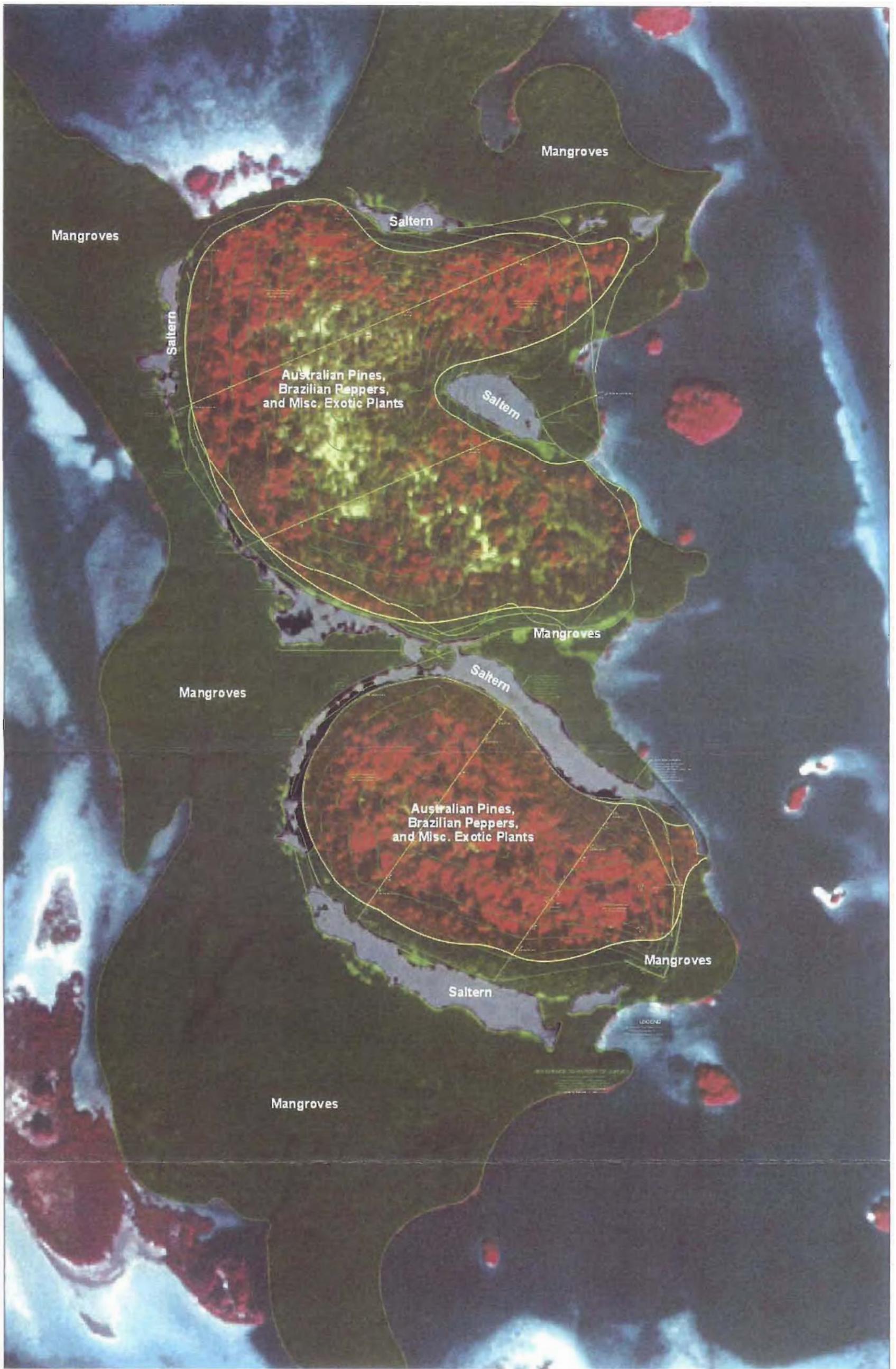


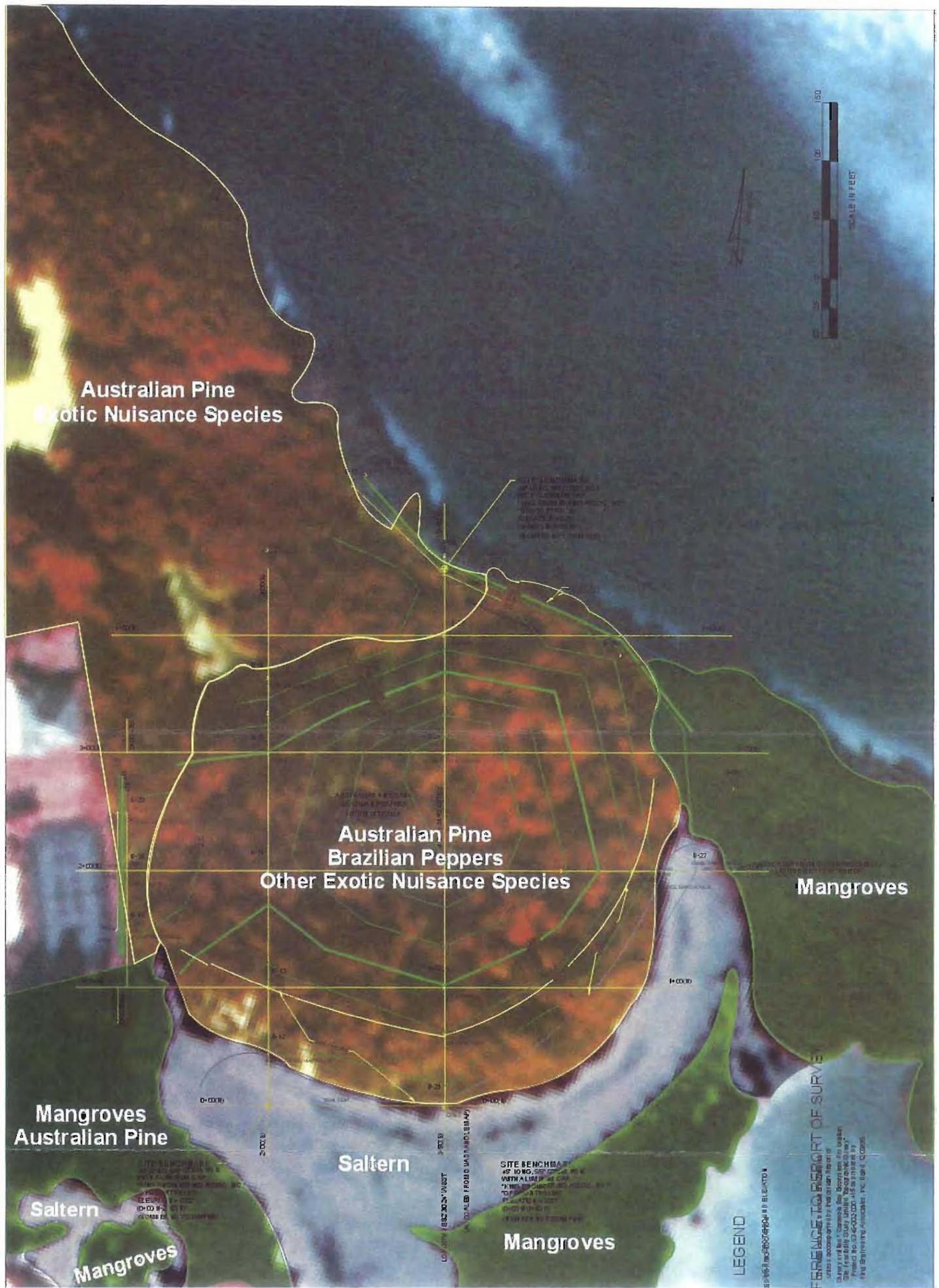
**Sarasota Bay  
Ecosystem  
Restoration  
Report**

**Bird Colony Islands  
Existing Conditions**

**Figure 25**

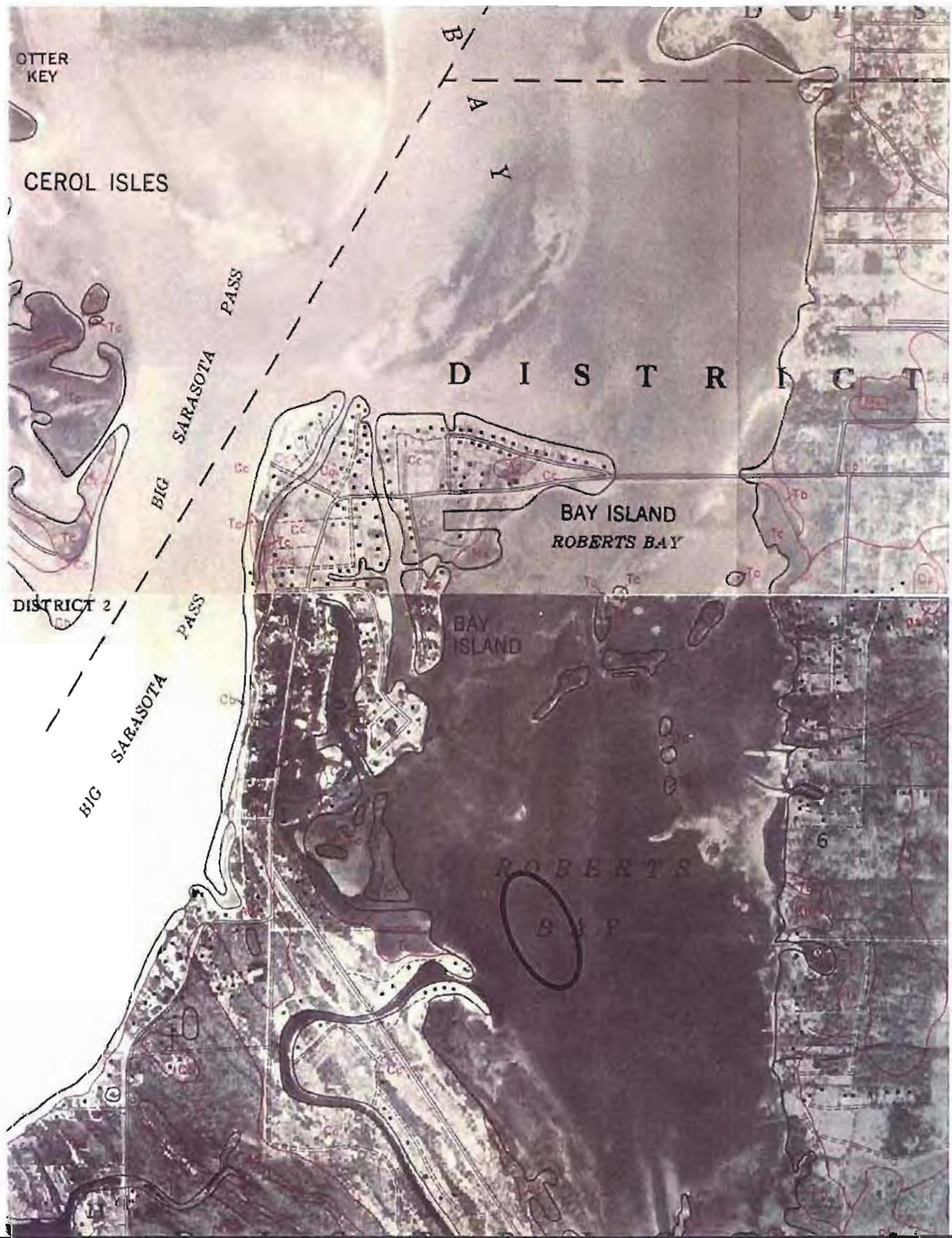
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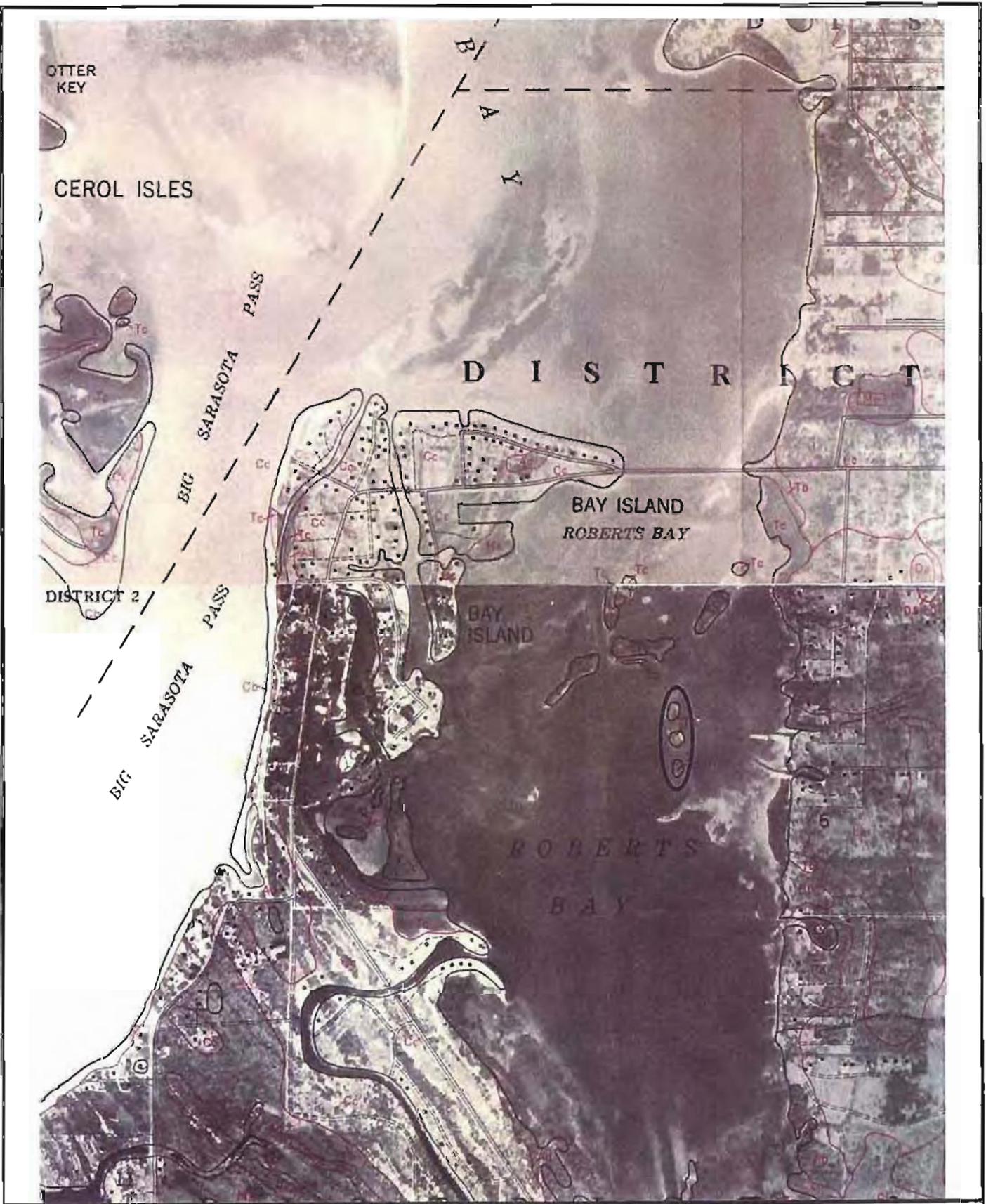




Sarasota Bay  
Ecosystem  
Restoration  
Report

Historic Soils Map  
1948 Aerial  
Skiers' Island

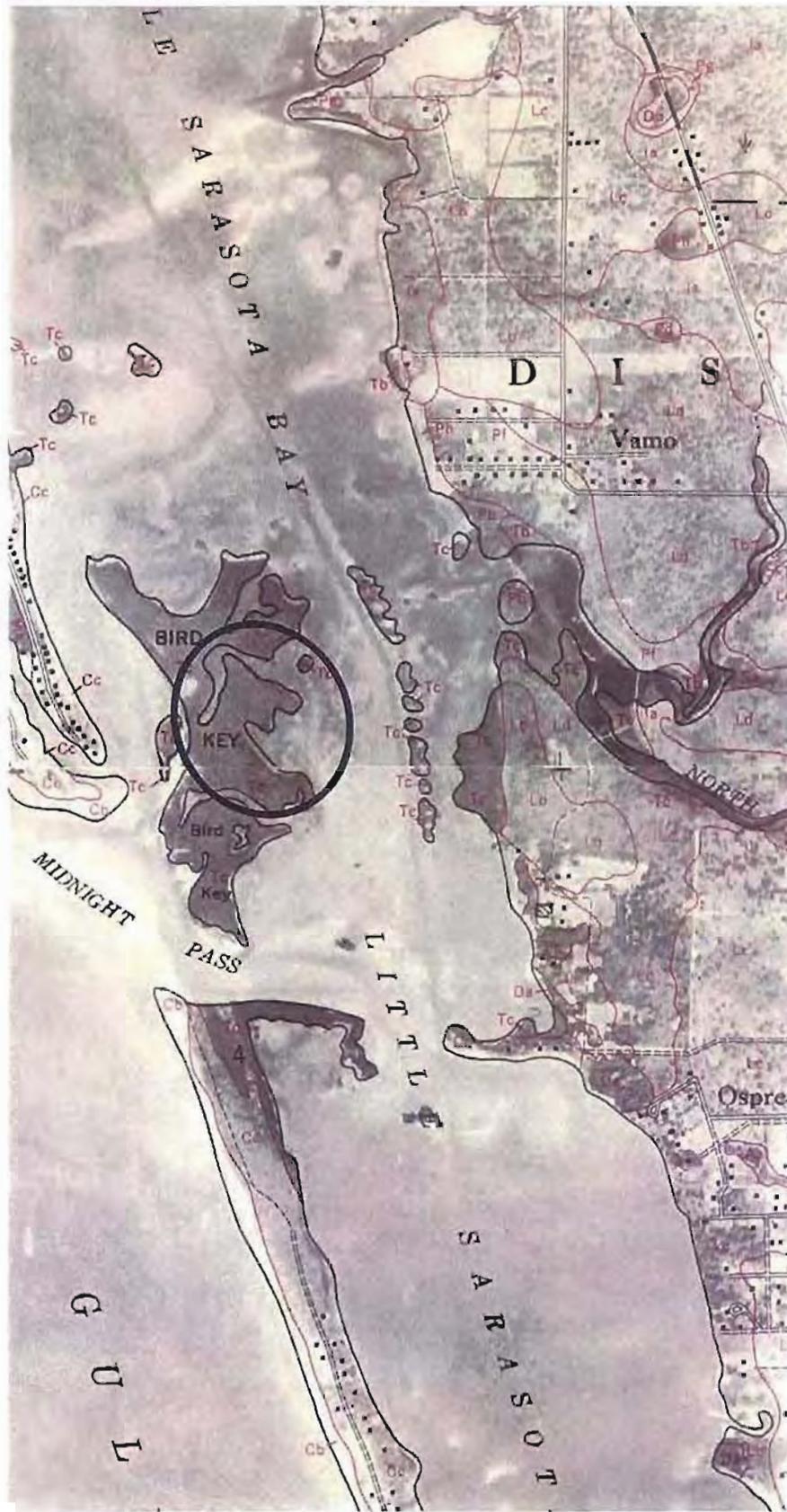
Figure 30



Sarasota Bay  
Ecosystem  
Restoration  
Report

Historic Soils Map  
1948 Aerial  
Bird Colony Islands

Figure 31



Sarasota Bay  
Ecosystem  
Restoration  
Report

Historic Soils Map  
1948 Aerial  
Jim Neville Marine Preserve

Figure 32



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Sarasota Bay  
Ecosystem  
Restoration  
Report

Historic Soils Map  
1948 Aerial  
Snake Island

Figure 34

# **APPENDIX A**

## **SECTION 404 (B) EVALUATION**

## SECTION 404(b)(1) EVALUATION DREDGED MATERIAL

### 1. PROJECT DESCRIPTION:

- a. Location. Sarasota Bay is located on the west central coast of Florida between Tampa and Venice, Florida. The following is a location description of the proposed project disposal islands from the south to the north.
  - Snake Island is the southernmost project disposal island located at Venice Inlet. Snake Island is approximately 2-acres in size and is owned by the West Coast Inland Navigation District.
  - Palmer Point Park is a 33-acre disposal island owned by Sarasota County. Palmer Point Park is located in lower Sarasota Bay (Little Sarasota Bay) toward the north end of Casey Key. The project area is approximately 5 acres.
  - Jim Neville Marine Preserve is a 35-acre preserve owned by Sarasota County and located directly north of Palmer Point park, toward the southern end of Siesta Key.
  - Skier's Island is an 8-acre disposal island, which is owned by the West Coast Inland Navigation District, located in Robert's Bay. The Bird Colony Islands, covering approximately 2 acres, are located across the Gulf Intracoastal Waterway (GIWW) to the northeast of Skiers Island in Roberts Bay.
  - Big Edwards Island is a 6-acre disposal island owned by Sarasota County. Big Edwards Island is located in Roberts Bay just south of Siesta Key.
- b. General Description. The purpose of this project is to ecologically restore the degraded habitat in Sarasota Bay and Venice Inlet by removing exotic vegetation, excavating tidal channels, and planting native vegetation.
- c. Authority and Purpose. Section 1135, 1986 Water Resources Development Act (WRDA), as amended by the 1990 Water Resources Development Act is the authority for this project. The purpose of this project is to restore portions of the historical wetland habitat loss in Sarasota Bay and Venice Inlet due to the Corps of Engineers' placement of dredged fill material from the construction of the Gulf Intracoastal Waterway during the 1950's and early 1960's.

d. General Description of Dredged or Fill Material.

- Big Edwards Island: Fine sands with a varying amount of shell and limestone rock pieces. The greatest amount of shell material is located on the southern portion of this island and the greatest amount of rocky material is on the northern end of the island. Some silty sands and sand silts are also located on the south end of the island.
  - Skiers' Island: Fine sands with some shell or limestone pieces. Rocks approximately six inches in size are located on the ground surface throughout the island.
  - Jim Neville Marine Preserve: The perimeter of the island consisted of fine sands to termination 1 to 2 feet below the ground surface. The interior of the island consists of fine sand with a significant amount of large intact shell, shell fragments and limestone fragments to a depth of 5 to 7 feet below the ground surface.
  - Palmer Point Park: Fine sands with a varying amount of shell fragments. The mudflat on the east end of the island consists of a silty peat from the ground surface to six inches below.
  - Snake Island: Fine sands, some shell, shell fragments, and small pieces of phosphate. The middle of the island and the northwest quadrant consists of organic silt.
- e. Description of the Proposed Discharge Site. To be determined.
- f. Description of Disposal Method. Not yet determined.

II. Factual Determinations

- a. Water Circulation and Fluctuation Determination. The long-term impacts are expected to be positive after the project is complete. There will be a temporary increase in turbidity levels around the perimeter of the island during the dredging and disposal operations. Shortly thereafter, the water is expected to clear up and remain so.
- b. No impacts to color, odor, taste are expected.
- c. Dissolved oxygen levels are expected to increase following project completion.
- d. Expect changes in suspended particulate and turbidity levels in vicinity of disposal site. Slight increase during construction, no long-term effects.

- e. Light penetration would be reduced during project implementation. This would be short-term in duration and would not cause any significant adverse effects.
- f. There will be an increase in noise levels and aesthetic degradation from the presence and operation of dredge equipment at the project site(s). Aesthetics will improve considerably after construction.
- g. No contaminants have been encountered and therefore none are anticipated in the dredging or disposal areas.

# **APPENDIX B**

## **COASTAL ZONE MANAGEMENT PROGRAM**

## **FLORIDA COASTAL ZONE MANAGEMENT PROGRAM FEDERAL CONSISTENCY EVALUATION PROCEDURES**

### **1. Chapter 161, Beach and Shore Preservation.**

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.

Response: This chapter is not applicable to the Sarasota Bay Ecosystem Restoration Project.

### **2. Chapters 186 and 187, State and Regional Planning.**

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

Response: The proposed work has been planned with the cooperation of the State and will be coordinated with relevant agencies.

### **3. Chapter 252, Disaster Preparation, Response and Mitigation.**

This chapter creates a State emergency management agency with authority to provide for the common defense; to protect the public peace, health and safety; and to preserve the lives and property of the people of Florida.

Response: This chapter is not applicable to the Sarasota Bay Ecosystem Restoration Project.

### **4. Chapter 253, State Lands.**

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

Response: The project has been planned with the technical advice of the Florida Department of Environmental Protection (FDEP) and other State of Florida agencies. The project will comply with pertinent State regulations and the intent of this chapter.

### **5. Chapters 253, 259, 260, and 375, Land Acquisition.**

These chapters authorize the State to acquire land to protect environmentally-sensitive areas.

Response: There are environmentally-sensitive lands within the project boundaries. However, this project does not interfere with the authority set forth in these chapters.

#### 6. Chapter 258, State Parks and Aquatic Preserves.

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

Response: This project is not located near a State Park or Preserve and therefore will not result in a direct nor indirect adverse impact.

#### 7. Chapter 267, Historic Preservation.

This chapter establishes the procedures for implementing the Florida Historic Resources Act responsibilities.

Response: This project has been coordinated with the Florida State Historic Preservation Officer. Historic preservation compliance will be completed to meet all responsibilities under Chapter 267.

#### 8. Chapter 288, Economic Development and Tourism.

This chapter directs the State to provide guidance and promotion of beneficial development through encouraging economic diversification and promoting tourism.

Response: Economic contributions from the project area will not be compromised by this action.

#### 9. Chapters 334 and 339, Public Transportation.

These chapters authorize the planning and development of a safe, balanced, and efficient transportation system.

Response: There will be no impacts to public transportation systems associated with this action.

#### 10. Chapter 370, Saltwater Living 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 taking and processing products of fisheries; to secure and maintain statistical records of the catch of each such species; and to conduct scientific, economic, and other studies and research.

Response: Based upon the overall impacts of this work, this project is consistent with the goals of this chapter.

#### 11. Chapter 372, Living Land and Freshwater Resources.

This chapter establishes the Florida Game and Fresh Water 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 sustained ecological, recreational, scientific, educational, aesthetic, and economic benefits.

Response: Coordination with Florida Game and Fresh Water Fish Commission will determine if this action is consistent with State policies and practices as set forth in this chapter.

#### 12. Chapter 373, Water Resources.

This chapter provides the authority to regulate the withdrawal, diversion, storage, and consumption of water.

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

#### 13. Chapter 376, Pollutant Spill Prevention and Control.

This chapter regulates the transfer, storage, and transportation of pollutants and the cleanup of pollutant discharges.

Response: This action does not involve the transportation or discharging of pollutants. Environmental protection measures will be employed during construction and operation of the project to avoid inadvertent spills or other sources of pollution. Therefore, this action will be in compliance with this chapter.

#### 14. Chapter 377, Oil and Gas Exploration and Production.

This chapter authorizes the regulation of all phases of exploration, drilling, and production of oil, gas, and other petroleum products.

Response: This work does not involve the exploration, drilling, or production of oil, gas, or other petroleum product and, therefore, does not apply.

15. Chapter 380, Environmental Land and Water Management.

This chapter establishes criteria and procedures to assure that local land development decisions consider the regional impact nature of proposed large-scale development.

Response: The proposed construction of the Sarasota Bay Ecosystem Restoration Project will be coordinated with the Department of Community Affairs during the planning stage. The work is consistent with the intent of this chapter.

16. Chapter 388, Arthropod Control.

This chapter provides for a comprehensive approach for abatement or suppression of mosquitoes and other pest arthropods within the State.

Response: The work would not further the propagation of mosquitoes or other pest arthropods.

17. Chapter 403, Environmental Control.

This chapter authorizes the regulation of pollution of the air and waters of the State by the FDEP.

Response: Water quality certification from the FDEP will be required for this project. No air pollution permits are required for the project. Effects of the operation of construction equipment on air quality will be minor and conform to State of Florida emission standards. Therefore, the work will comply with this chapter.

18. Chapter 582, Soil and Water Conservation.

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

Response: This work does not involve agricultural lands as described in this chapter.

# **APPENDIX C**

## **PLANS AND SPECIFICATIONS**

## **PLANS AND SPECIFICATIONS WORK PLAN**

**PLANS AND SPECIFICATIONS.** The final design, construction procedures, and the final cost-sharing requirements will be accomplished during the plans and specifications phase. The cost for plans and specification is \$557,000. Table C-1 provides an itemized list of requirements for plans and specifications, as well as, corresponding costs.

**PLAN OF ACTION.** The plan of action will be divided into two major phases.

A. Cost Sharing requirements

B. Preparation of the Final Plans and Specifications Package.

The plan of action for each phase is summarized in the following paragraphs.

**Cost Sharing Requirements.** A document will be prepared detailing project requirements regarding lands, easements, rights-of-way, and administrative costs. Based on the requirements and the local sponsors capabilities, a final Project Cooperation Agreement (PCA) will be prepared and signed by the parties involved.

**Preparation of the Final Plans and Specification Package.** Following the completion and approval of the Section 1135 Ecosystem Restoration Report, and cost-sharing requirements, the final plans and specification package will be prepared for the execution of the project.

TABLE C-1  
ESTIMATED COST FOR PLANS AND SPECIFICATINS  
(Includes 25% Contingency)

ITEM	ESTIMATED COST
Topographic Survey	\$ 50,000
Geotechnical Investigations and Analysis	\$ 60,000
Earthwork Plans and Specifications	\$225,000
Hydrologic Investigations and Hydraulic Design	\$ 35,000
Structure and Recreational Amenities Plans	\$ 50,000
Planting Plans and Specifications	\$ 45,000
Permitting	\$ 42,000
Cost Engineering	\$ 12,500
Real Estate Administrative	\$ 17,500
Legal Costs	<u>\$20,000</u>
<b>Total, Plans &amp; Specifications</b>	<b>\$557,000</b>

# **APPENDIX D**

## **MCACES CONSTRUCTION ESTIMATE**

Wed 09 Aug 2000  
Eff. Date 08/01/00

U.S. Army Corps of Engineers  
PROJECT SBER\_F: Sarasota Bay Ecosystem - Restoration  
Revised Cost Estimate  
\*\* PROJECT OWNER SUMMARY - CONTRACT \*\*

TIME 12:36:59

SUMMARY PAGE 1

	QUANTY UOM	CONTRACT	CONTINGN	ESCALATN	TOTAL COST	UNIT
1 Big Edwards Island	1.00 EA	768,647	153,729	0	922,376	922376
2 Skiers Island	1.00 EA	586,704	117,341	0	704,045	704045
3 Bird Colony Islands	1.00 EA	143,560	28,712	0	172,272	172272
4 Jim Neville Island	1.00 EA	3,308,063	661,613	0	3,969,676	3969676
5 Palmer Point Park	1.00 EA	264,122	52,824	0	316,946	316946
6 Snake Island	1.00 EA	212,981	42,596	0	255,578	255578
TOTAL Sarasota Bay Ecosystem	1.00 EA	5,284,078	1,056,816	0	6,340,893	6340893



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	QUANTITY	UOM	CONTRACT	CONTINGN	ESCALATN	TOTAL COST	UNIT
1_14.00. 6_02_63 Cut/Fill/Grading	2700.00	CY	8,701	1,740	0	10,441	3.87
TOTAL Cut/Fill In-situ Material	2700.00	CY	8,701	1,740	0	10,441	3.87
1_14.00. 6_03 Erosion Control							
1_14.00. 6_03_01 Silt Fence	2000.00	LF	3,271	654	0	3,925	1.96
1_14.00. 6_03_02 Staked Turbidity Barrier	600.00	LF	2,009	402	0	2,411	4.02
TOTAL Erosion Control			5,280	1,056	0	6,336	
1_14.00. 6_04 Landscaping							
1_14.00. 6_04_01 Plants	4498.00	EA	29,116	5,823	0	34,939	7.77
1_14.00. 6_04_02 Water	3.50	ACR	3,899	780	0	4,679	1336.81
1_14.00. 6_04_03 Maintenance	12.00	MO	30,300	6,060	0	36,360	3030.02
TOTAL Landscaping			63,315	12,663	0	75,978	
TOTAL Site Grading and Landscaping			606,878	121,376	0	728,254	
TOTAL Recreation Facilities			697,789	139,558	0	837,347	
TOTAL Recreation Facilities	1.00	EA	697,789	139,558	0	837,347	837347
1_30 Planning, Engineering and Design							
1_30.10 Engineering During Construction							
1_30.10. 6 All Other EDC							
1_30.10. 6_01 Engineering During Construction							
1_30.10. 6_01_01 Engineering During Construction			5,105	1,021	0	6,126	
TOTAL Engineering During Construction			5,105	1,021	0	6,126	
TOTAL All Other EDC			5,105	1,021	0	6,126	
TOTAL Engineering During Construction			5,105	1,021	0	6,126	
TOTAL Planning, Engineering and Design	1.00	EA	5,105	1,021	0	6,126	6125.59
1_31 Construction Management (S&I)							
1_31.20 Construction Phase LCPM							

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	QUANTY UOM	CONTRACT	CONTINGN	ESCALATN	TOTAL COST	UNIT
-----						
1_31.20.01 Construction Management						
1_31.20.01_01 Construction Management						
1_31.20.01_01_01 Construction Management		65,753	13,151	0	78,903	
TOTAL Construction Management		65,753	13,151	0	78,903	
TOTAL Construction Management		65,753	13,151	0	78,903	
TOTAL Construction Phase LCPM		65,753	13,151	0	78,903	
TOTAL Construction Management (S&I)	1.00 EA	65,753	13,151	0	78,903	78903
TOTAL Big Edwards Island	1.00 EA	768,647	153,729	0	922,376	922376
2 Skiers Island						
2_10 Breakwaters and Seawalls						
2_10.00 Breakwaters & Seawalls						
2_10.00.2 Breakwaters						
2_10.00.2_01 Rip-Rap	750.00 TON	57,522	11,504	0	69,026	92.03
TOTAL Breakwaters	750.00 TON	57,522	11,504	0	69,026	92.03
TOTAL Breakwaters & Seawalls	750.00 TON	57,522	11,504	0	69,026	92.03
TOTAL Breakwaters and Seawalls	1.00 EA	57,522	11,504	0	69,026	69026
2_14 Recreation Facilities						
2_14.00 Recreation Facilities						
2_14.00.1 Mob, Demob & Preparatory Work						
2_14.00.1_01 Mobilization						
2_14.00.1_01_01 Mobilization	1.00 EA	6,077	1,215	0	7,292	7292.37
TOTAL Mobilization	1.00 EA	6,077	1,215	0	7,292	7292.37
2_14.00.1_02 Temporary Access To Islands						
2_14.00.1_02_01 Temporary Access To Islands	1.00 EA	36,146	7,229	0	43,375	43375
-----						

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	QUANTY UOM	CONTRACT	CONTINGN	ESCALATN	TOTAL COST	UNIT
TOTAL Temporary Access To Islands	1.00 EA	36,146	7,229	0	43,375	43375
2_14.00. 1_ 03 Clear & Grub						
2_14.00. 1_ 03_ 01 Clear Trees	5.30 ACR	9,379	1,876	0	11,255	2123.50
2_14.00. 1_ 03_ 02 Grubbing	5.30 ACR	6,272	1,254	0	7,526	1420.05
2_14.00. 1_ 03_ 03 Chip Stumps	5.30 ACR	4,689	938	0	5,627	1061.75
2_14.00. 1_ 03_ 04 Spray Herbicide on Exotic Plants	2.70 ACR	893	179	0	1,072	396.92
2_14.00. 1_ 03_ 11 Spread Chips as Mulch	2.50 ACR	3,369	674	0	4,042	1616.95
TOTAL Clear & Grub	5.30 ACR	24,602	4,920	0	29,522	5570.22
TOTAL Mob, Demob & Preparatory Work		66,825	13,365	0	80,190	
2_14.00. 6 Site Grading and Landscaping						
2_14.00. 6_ 01 Excavated & Dispose Of Surplus						
2_14.00. 6_ 01_ 01 Excavate & Haul To Barge	15700 CY	103,049	20,610	0	123,659	7.88
2_14.00. 6_ 01_ 02 Barge Excavated Material	17602 CY	108,405	21,681	0	130,086	7.39
2_14.00. 6_ 01_ 03 Haul from Barge To Disposal Site	17602 CY	93,765	18,753	0	112,518	6.39
2_14.00. 6_ 01_ 04 Grade Excavated Areas	25652 SY	6,220	1,244	0	7,464	0.29
TOTAL Excavated & Dispose Of Surplus	15700 CY	311,439	62,288	0	373,727	23.80
2_14.00. 6_ 02 Cut/Fill In-situ Material						
2_14.00. 6_ 02_ 63 Cut/Fill/Grading	1570.00 CY	5,059	1,012	0	6,071	3.87
TOTAL Cut/Fill In-situ Material	1570.00 CY	5,059	1,012	0	6,071	3.87
2_14.00. 6_ 03 Erosion Control						
2_14.00. 6_ 03_ 01 Silt Fence	2300.00 LF	3,761	752	0	4,513	1.96
2_14.00. 6_ 03_ 02 Staked Turbidity Barrier	350.00 LF	1,172	234	0	1,406	4.02
TOTAL Erosion Control		4,933	987	0	5,920	
2_14.00. 6_ 04 Landscaping						
2_14.00. 6_ 04_ 01 Plants	4.30 ACR	34,550	6,910	0	41,460	9641.89
2_14.00. 6_ 04_ 02 Water	2.50 ACR	2,787	557	0	3,345	1338.00
2_14.00. 6_ 04_ 03 Maintenance	12.00 MO	30,300	6,060	0	36,360	3030.02
TOTAL Landscaping		67,638	13,528	0	81,165	

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	QUANTITY	UOM	CONTRACT	CONTINGN	ESCALATN	TOTAL COST	UNIT
TOTAL Site Grading and Landscaping			389,069	77,814	0	466,883	
TOTAL Recreation Facilities			455,894	91,179	0	547,073	
TOTAL Recreation Facilities	1.00	EA	455,894	91,179	0	547,073	547073
2_30 Planning, Engineering and Design							
2_30.10 Engineering During Construction							
2_30.10.6 All Other EDC							
2_30.10.6_01 Engineering During Construction							
2_30.10.6_01_01 Engineering During Construction			5,226	1,045	0	6,271	
TOTAL Engineering During Construction			5,226	1,045	0	6,271	
TOTAL All Other EDC			5,226	1,045	0	6,271	
TOTAL Engineering During Construction			5,226	1,045	0	6,271	
TOTAL Planning, Engineering and Design	1.00	EA	5,226	1,045	0	6,271	6271.44
2_31 Construction Management (S&I)							
2_31.20 Construction Phase LCPM							
2_31.20.01 Construction Management							
2_31.20.01_01 Construction Management							
2_31.20.01_01_01 Construction Management			68,062	13,612	0	81,675	
TOTAL Construction Management			68,062	13,612	0	81,675	
TOTAL Construction Management			68,062	13,612	0	81,675	
TOTAL Construction Phase LCPM			68,062	13,612	0	81,675	
TOTAL Construction Management (S&I)	1.00	EA	68,062	13,612	0	81,675	81675
TOTAL Skiers Island	1.00	EA	586,704	117,341	0	704,045	704045
3 Bird Colony Islands							
3_10 Breakwaters and Seawalls							

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	QUANTITY	UOM	CONTRACT	CONTINGN	ESCALATN	TOTAL COST	UNIT
3_10.00 Breakwaters & Seawalls							
3_10.00.1 Mob, Demob & Preparatory Work							
3_10.00.1_01 Mobilization							
3_10.00.1_01_01 Mobilization	1.00	EA	6,077	1,215	0	7,292	7292.37
TOTAL Mobilization	1.00	EA	6,077	1,215	0	7,292	7292.37
3_10.00.1_02 Temporary Access To Islands							
3_10.00.1_02_01 Temporary Access To Islands	1.00	EA	36,146	7,229	0	43,375	43375
TOTAL Temporary Access To Islands	1.00	EA	36,146	7,229	0	43,375	43375
TOTAL Mob, Demob & Preparatory Work			42,223	8,445	0	50,668	
3_10.00.2 Breakwaters							
3_10.00.2_01 Rip-Rap	1082.00	TON	82,985	16,597	0	99,582	92.03
TOTAL Breakwaters	1.00	EA	82,985	16,597	0	99,582	99582
TOTAL Breakwaters & Seawalls	1.00	EA	125,208	25,042	0	150,249	150249
TOTAL Breakwaters and Seawalls	1.00	EA	125,208	25,042	0	150,249	150249
3_30 Planning, Engineering and Design							
3_30.10 Engineering During Construction							
3_30.10.6 All Other EDC							
3_30.10.6_01 Engineering During Construction							
3_30.10.6_01_01 Engineering During Construction			1,337	267	0	1,604	
TOTAL Engineering During Construction			1,337	267	0	1,604	
TOTAL All Other EDC			1,337	267	0	1,604	
TOTAL Engineering During Construction			1,337	267	0	1,604	
TOTAL Planning, Engineering and Design	1.00	EA	1,337	267	0	1,604	1604.32
3_31 Construction Management (S&I)							

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	QUANTY UOM	CONTRACT	CONTINGN	ESCALATN	TOTAL COST	UNIT
-----						
3_31.20 Construction Phase LCPM						
3_31.20.01 Construction Management						
3_31.20.01_01 Construction Management						
3_31.20.01_01_01 Construction Management		17,016	3,403	0	20,419	
TOTAL Construction Management		17,016	3,403	0	20,419	
TOTAL Construction Management		17,016	3,403	0	20,419	
TOTAL Construction Phase LCPM		17,016	3,403	0	20,419	
TOTAL Construction Management (S&I)	1.00 EA	17,016	3,403	0	20,419	20419
TOTAL Bird Colony Islands	1.00 EA	143,560	28,712	0	172,272	172272
4 Jim Neville Island						
4_10 Breakwaters and Seawalls						
4_10.00 Breakwaters & Seawalls						
4_10.00.2 Breakwaters						
4_10.00.2_01 Rip-Rap	500.00 TON	38,348	7,670	0	46,017	92.03
TOTAL Breakwaters	1.00 EA	38,348	7,670	0	46,017	46017
TOTAL Breakwaters & Seawalls	1.00 EA	38,348	7,670	0	46,017	46017
TOTAL Breakwaters and Seawalls	1.00 EA	38,348	7,670	0	46,017	46017
4_14 Recreation Facilities						
4_14.00 Recreation Facilities						
4_14.00.1 Mob, Demob & Preparatory Work						
4_14.00.1_01 Mobilization						
4_14.00.1_01_01 Mobilization	1.00 EA	42,539	8,508	0	51,047	51047
TOTAL Mobilization	1.00 EA	42,539	8,508	0	51,047	51047
4_14.00.1_02 Temporary Access To Islands						

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			QUANTY	UOM	CONTRACT	CONTINGN	ESCALATN	TOTAL COST	UNIT
4_14.00.1_02_01	Temporary Access To Islands	1.00 EA			36,146	7,229	0	43,375	43375
TOTAL Temporary Access To Islands			1.00 EA		36,146	7,229	0	43,375	43375
4_14.00.1_03 Clear & Grub									
4_14.00.1_03_01	Clearing Trees	27.50 ACR			48,664	9,733	0	58,396	2123.50
4_14.00.1_03_02	Grubbing	27.50 ACR			32,543	6,509	0	39,051	1420.05
4_14.00.1_03_03	Chip Stumps	27.50 ACR			24,332	4,866	0	29,198	1061.75
4_14.00.1_03_04	Spray Herbicide on Exotic Plants	7.50 ACR			2,481	496	0	2,977	396.92
4_14.00.1_03_11	Spread Chips as Mulch	2.00 ACR			2,695	539	0	3,234	1616.95
TOTAL Clear & Grub			27.50 ACR		110,714	22,143	0	132,857	4831.15
TOTAL Mob, Demob & Preparatory Work					189,399	37,880	0	227,278	
4_14.00.6 Site Grading and Landscaping									
4_14.00.6_01 Excavated & Dispose Of Surplus									
4_14.00.6_01_01	Excavate & Haul To Barge	126000 CY			827,017	165,403	0	992,420	7.88
4_14.00.6_01_02	Barge Excavated Material	141259 CY			869,971	173,994	0	1,043,965	7.39
4_14.00.6_01_03	Haul from Barge To Disposal Site	141259 CY			752,480	150,496	0	902,976	6.39
4_14.00.6_01_04	Grade Excavated Areas	133100 SY			32,273	6,455	0	38,727	0.29
TOTAL Excavated & Dispose Of Surplus			126000 CY		2,481,740	496,348	0	2,978,089	23.64
4_14.00.6_02 Cut/Fill In-situ Material									
4_14.00.6_02_63	Cut/Fill/Grading	6300.00 CY			20,302	4,060	0	24,362	3.87
TOTAL Cut/Fill In-situ Material			6300.00 CY		20,302	4,060	0	24,362	3.87
4_14.00.6_03 Erosion Control									
4_14.00.6_03_01	Silt Fence	1800.00 LF			2,944	589	0	3,532	1.96
4_14.00.6_03_02	Staked Turbidity Barrier	750.00 LF			2,511	502	0	3,014	4.02
TOTAL Erosion Control					5,455	1,091	0	6,546	
4_14.00.6_04 Landscaping									
4_14.00.6_04_01	Plants	36494 EA			182,525	36,505	0	219,030	6.00
4_14.00.6_04_02	Water	2.00 ACR			2,230	446	0	2,676	1338.00
4_14.00.6_04_03	Maintenance	12.00 MO			90,901	18,180	0	109,081	9090.06

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	QUANTY	UOM	CONTRACT	CONTINGN	ESCALATN	TOTAL COST	UNIT
TOTAL Landscaping			275,656	55,131	0	330,787	
TOTAL Site Grading and Landscaping			2,783,153	556,631	0	3,339,784	
TOTAL Recreation Facilities			2,972,552	594,510	0	3,567,062	
TOTAL Recreation Facilities	1.00	EA	2,972,552	594,510	0	3,567,062	3567062
4_30 Planning, Engineering and Design							
4_30.10 Engineering During Construction							
4_30.10. 6 All Other EDC							
4_30.10. 6_ 01 Engineering During Construction							
4_30.10. 6_ 01_ 01 Engineering During Construction			21,269	4,254	0	25,523	
TOTAL Engineering During Construction			21,269	4,254	0	25,523	
TOTAL All Other EDC			21,269	4,254	0	25,523	
TOTAL Engineering During Construction			21,269	4,254	0	25,523	
TOTAL Planning, Engineering and Design	1.00	EA	21,269	4,254	0	25,523	25523
4_31 Construction Management (S&I)							
4_31.20 Construction Phase LCPM							
4_31.20.01 Construction Management							
4_31.20.01_ 01 Construction Management							
4_31.20.01_ 01_ 01 Construction Management			275,895	55,179	0	331,073	
TOTAL Construction Management			275,895	55,179	0	331,073	
TOTAL Construction Management			275,895	55,179	0	331,073	
TOTAL Construction Phase LCPM			275,895	55,179	0	331,073	
TOTAL Construction Management (S&I)	1.00	EA	275,895	55,179	0	331,073	331073
TOTAL Jim Neville Island	1.00	EA	3,308,063	661,613	0	3,969,676	3969676

5 Palmer Point Park

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		QUANTITY	UOM	CONTRACT	CONTINGN	ESCALATN	TOTAL COST	UNIT
-----								
5_14 Recreation Facilities								
5_14.00 Recreation Facilities								
5_14.00. 1 Mob, Demob & Preparatory Work								
5_14.00. 1_ 01 Mobilization								
5_14.00. 1_ 01_ 01	Mobilization	1.00	EA	6,077	1,215	0	7,292	7292.37
TOTAL Mobilization		1.00	EA	6,077	1,215	0	7,292	7292.37
-----								
5_14.00. 1_ 02 Temporary Access To Islands								
5_14.00. 1_ 02_ 01	Temporary Access To Islands	1.00	EA	36,146	7,229	0	43,375	43375
TOTAL Temporary Access To Islands		1.00	EA	36,146	7,229	0	43,375	43375
-----								
5_14.00. 1_ 03 Clear & Grub								
5_14.00. 1_ 03_ 01	Clearing Trees	3.00	ACR	5,309	1,062	0	6,371	2123.50
5_14.00. 1_ 03_ 02	Grubbing	3.00	ACR	3,550	710	0	4,260	1420.05
5_14.00. 1_ 03_ 03	Chip Stumps	3.00	ACR	2,654	531	0	3,185	1061.75
5_14.00. 1_ 03_ 04	Spray Herbicide on Exotic Plants	2.00	ACR	662	132	0	794	396.92
TOTAL Clear & Grub		3.00	ACR	12,175	2,435	0	14,610	4869.91
TOTAL Mob, Demob & Preparatory Work				54,398	10,880	0	65,277	
-----								
5_14.00. 6 Site Grading and Landscaping								
5_14.00. 6_ 01 Excavated & Dispose Of Surplus								
5_14.00. 6_ 01_ 01	Excavate & Haul To Barge	6000.00	CY	39,382	7,876	0	47,258	7.88
5_14.00. 6_ 01_ 02	Barge Excavated Material	6727.00	CY	41,430	8,286	0	49,715	7.39
5_14.00. 6_ 01_ 03	Haul from Barge To Disposal Site	6727.00	CY	35,834	7,167	0	43,001	6.39
5_14.00. 6_ 01_ 04	Grade Excavated Areas	14520	SY	3,521	704	0	4,225	0.29
TOTAL Excavated & Dispose Of Surplus		6000.00	CY	120,166	24,033	0	144,200	24.03
-----								
5_14.00. 6_ 02 Cut/Fill In-situ Material								
5_14.00. 6_ 02_ 63	Cut/Fill/Grading	600.00	CY	1,934	387	0	2,320	3.87
TOTAL Cut/Fill In-situ Material		600.00	CY	1,934	387	0	2,320	3.87
-----								

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-----						
5_14.00. 6_ 03 Erosion Control						
5_14.00. 6_ 03_ 01 Silt Fence	1200.00 LF	1,962	392	0	2,355	1.96
5_14.00. 6_ 03_ 02 Staked Turbidity Barrier	150.00 LF	502	100	0	603	4.02
		-----				
TOTAL Erosion Control		2,465	493	0	2,958	
5_14.00. 6_ 04 Landscaping						
5_14.00. 6_ 04_ 01 Plants	6776.00 EA	28,929	5,786	0	34,715	5.12
5_14.00. 6_ 04_ 03 Maintenance	12.00 MO	24,265	4,853	0	29,118	2426.53
		-----				
TOTAL Landscaping		53,194	10,639	0	63,833	
		-----				
TOTAL Site Grading and Landscaping		177,759	35,552	0	213,311	
		-----				
TOTAL Recreation Facilities		232,157	46,431	0	278,588	
		-----				
TOTAL Recreation Facilities	1.00 EA	232,157	46,431	0	278,588	278588
5_30 Planning, Engineering and Design						
5_30.10 Engineering During Construction						
5_30.10. 6 All Other EDC						
5_30.10. 6_ 01 Engineering During Construction						
5_30.10. 6_ 01_ 01 Engineering During Construction		2,309	462	0	2,771	
		-----				
TOTAL Engineering During Construction		2,309	462	0	2,771	
		-----				
TOTAL All Other EDC		2,309	462	0	2,771	
		-----				
TOTAL Engineering During Construction		2,309	462	0	2,771	
		-----				
TOTAL Planning, Engineering and Design	1.00 EA	2,309	462	0	2,771	2771.10
5_31 Construction Management (S&I)						
5_31.20 Construction Phase LCPM						
5_31.20.01 Construction Management						
5_31.20.01_ 01 Construction Management						
5_31.20.01_ 01_ 01 Construction Management		29,656	5,931	0	35,587	
		-----				

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		QUANTITY	UOM	CONTRACT	CONTINGN	ESCALATN	TOTAL COST	UNIT
TOTAL Construction Management				29,656	5,931	0	35,587	
TOTAL Construction Management				29,656	5,931	0	35,587	
TOTAL Construction Phase LCPM				29,656	5,931	0	35,587	
TOTAL Construction Management (S&I)		1.00	EA	29,656	5,931	0	35,587	35587
TOTAL Palmer Point Park		1.00	EA	264,122	52,824	0	316,946	316946
6 Snake Island								
6_10 Breakwaters and Seawalls								
6_10.00 Breakwaters & Seawalls								
6_10.00. 2 Breakwaters								
6_10.00. 2_ 01 Rip-Rap		800.00	TON	61,357	12,271	0	73,628	92.03
TOTAL Breakwaters		1.00	EA	61,357	12,271	0	73,628	73628
TOTAL Breakwaters & Seawalls		1.00	EA	61,357	12,271	0	73,628	73628
TOTAL Breakwaters and Seawalls		1.00	EA	61,357	12,271	0	73,628	73628
6_14 Recreation Facilities								
6_14.00 Recreation Facilities								
6_14.00. 1 Mob, Demob & Preparatory Work								
6_14.00. 1_ 01 Mobilization								
6_14.00. 1_ 01_ 01 Mobilization		1.00	EA	6,077	1,215	0	7,292	7292.37
TOTAL Mobilization		1.00	EA	6,077	1,215	0	7,292	7292.37
6_14.00. 1_ 02 Temporary Access To Islands								
6_14.00. 1_ 02_ 01 Temporary Access To Islands		1.00	EA	36,146	7,229	0	43,375	43375
TOTAL Temporary Access To Islands		1.00	EA	36,146	7,229	0	43,375	43375
6_14.00. 1_ 03 Clear & Grub								
6_14.00. 1_ 03_ 01 Clearing Trees		1.60	ACR	2,831	566	0	3,398	2123.50

LABOR ID: SB0700 EQUIP ID: NAT95A

Currency in DOLLARS

CREW ID: NAT95A UPB ID: NAT95A

Wed 09 Aug 2000  
 Eff. Date 08/01/00

U.S. Army Corps of Engineers  
 PROJECT SBBER\_F: Sarasota Bay Ecosystem - Restoration  
 Revised Cost Estimate  
 \*\* PROJECT OWNER SUMMARY - LEVEL\_6 \*\*

TIME 12:36:59

SUMMARY PAGE 22

		QUANTY UOM	CONTRACT	CONTINGN	ESCALATN	TOTAL COST	UNIT
6_14.00. 1_03_02	Grubbing	1.60 ACR	1,893	379	0	2,272	1420.05
6_14.00. 1_03_03	Chip Stumps	1.60 ACR	1,416	283	0	1,699	1061.75
6_14.00. 1_03_04	Spray Herbicide on Exotic Plants	0.40 ACR	132	26	0	159	396.92
6_14.00. 1_03_11	Spread Chips as Mulch	0.90 ACR	1,213	243	0	1,455	1616.95
TOTAL Clear & Grub		1.60 ACR	7,485	1,497	0	8,983	5614.06
TOTAL Mob, Demob & Preparatory Work			49,708	9,942	0	59,650	
6_14.00. 6 Site Grading and Landscaping							
6_14.00. 6_01 Excavated & Dispose Of Surplus							
6_14.00. 6_01_01	Excavate & Haul To Barge	500.00 CY	3,282	656	0	3,938	7.88
6_14.00. 6_01_02	Barge Excavated Material	561.00 CY	3,452	690	0	4,143	7.38
6_14.00. 6_01_03	Haul from Barge To Disposal Site	561.00 CY	2,988	598	0	3,586	6.39
6_14.00. 6_01_04	Grade Excavated Areas	7744.00 SY	1,878	376	0	2,253	0.29
TOTAL Excavated & Dispose Of Surplus		500.00 CY	11,600	2,320	0	13,920	27.84
6_14.00. 6_02 Cut/Fill In-situ Material							
6_14.00. 6_02_63	Cut/Fill/Grading	100.00 CY	322	64	0	387	3.87
TOTAL Cut/Fill In-situ Material		100.00 CY	322	64	0	387	3.87
6_14.00. 6_03 Erosion Control							
6_14.00. 6_03_01	Silt Fence	800.00 LF	1,308	262	0	1,570	1.96
6_14.00. 6_03_02	Staked Turbidity Barrier	800.00 LF	2,679	536	0	3,215	4.02
TOTAL Erosion Control			3,987	797	0	4,784	
6_14.00. 6_04 Landscaping							
6_14.00. 6_04_01	Plants	8737.00 EA	29,057	5,811	0	34,868	3.99
6_14.00. 6_04_02	Water	0.90 ACR	1,005	201	0	1,206	1340.04
6_14.00. 6_04_03	Maintenance	12.00 MO	30,300	6,060	0	36,360	3030.02
TOTAL Landscaping			60,362	12,072	0	72,434	
TOTAL Site Grading and Landscaping			76,272	15,254	0	91,526	
TOTAL Recreation Facilities			125,980	25,196	0	151,176	
TOTAL Recreation Facilities		1.00 EA	125,980	25,196	0	151,176	151176

Wed 09 Aug 2000  
 Eff. Date 08/01/00

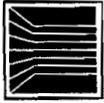
U.S. Army Corps of Engineers  
 PROJECT SBER\_F: Sarasota Bay Ecosystem - Restoration  
 Revised Cost Estimate  
 \*\* PROJECT OWNER SUMMARY - LEVEL\_6 \*\*

TIME 12:36:59  
 SUMMARY PAGE 23

	QUANTITY	UOM	CONTRACT	CONTINGN	ESCALATN	TOTAL COST	UNIT
-----							
6_30 Planning, Engineering and Design							
6_30.10 Engineering During Construction							
6_30.10. 6 All Other EDC							
6_30.10. 6_ 01 Engineering During Construction							
6_30.10. 6_ 01_ 01 Engineering During Construction			1,823	365	0	2,188	
			-----	-----	-----	-----	
TOTAL Engineering During Construction			1,823	365	0	2,188	
			-----	-----	-----	-----	
TOTAL All Other EDC			1,823	365	0	2,188	
			-----	-----	-----	-----	
TOTAL Engineering During Construction			1,823	365	0	2,188	
			-----	-----	-----	-----	
TOTAL Planning, Engineering and Design	1.00	EA	1,823	365	0	2,188	2187.71
6_31 Construction Management (S&I)							
6_31.20 Construction Phase LCPM							
6_31.20.01 Construction Management							
6_31.20.01_ 01 Construction Management							
6_31.20.01_ 01_ 01 Construction Management			23,822	4,764	0	28,586	
			-----	-----	-----	-----	
TOTAL Construction Management			23,822	4,764	0	28,586	
			-----	-----	-----	-----	
TOTAL Construction Management			23,822	4,764	0	28,586	
			-----	-----	-----	-----	
TOTAL Construction Phase LCPM			23,822	4,764	0	28,586	
			-----	-----	-----	-----	
TOTAL Construction Management (S&I)	1.00	EA	23,822	4,764	0	28,586	28586
			-----	-----	-----	-----	
TOTAL Snake Island	1.00	EA	212,981	42,596	0	255,578	255578
			-----	-----	-----	-----	
TOTAL Sarasota Bay Ecosystem	1.00	EA	5,284,078	1,056,816	0	6,340,893	6340893

# **APPENDIX E**

# **GEOTECHNICAL REPORT**



W I L L I A M S  
E A R T H S C I E N C E S INC.

February 10, 2000

HDR Engineering, Inc.  
2202 North Westshore Boulevard  
Suite 250  
Tampa, Florida 33607-5711

Attention: Mr. Bruce Hasbrouck, VP  
Senior Environmental Scientist

Subject: Report of Geotechnical Services  
Sarasota Bay Ecosystem Restoration  
Sarasota County, Florida  
Williams Project No. C399322

Dear Mr. Hasbrouck:

As authorized, Williams Earth Sciences, Inc. (Williams), has conducted a geotechnical exploration of five dredge spoil areas in Sarasota Bay. The purpose of this work was to determine the nature of the materials present in the dredge spoil areas and the potential use of the materials for the ecosystem restoration of Sarasota Bay.

The five dredge spoil areas explored included: Snake Island in the mouth of the Venice Inlet; Palmer Point and Jim Neville Preserve located in the vicinity of Midnight Pass; and Skier's Island and Big Edwards Island located in Robert's Bay off of Siesta Key. The scope of work included conducting hand auger borings to determine the nature of materials present at each location; conducting laboratory testing on selected samples to better define the characteristics of the materials; and an evaluation of the materials found to determine their potential for use in beach restoration, erosion protection and sea grass bed restoration.

On September 3, 1999, Williams representative, Stephen C. Knauss, P.E. visited all of the spoil areas accompanied by HDR representatives. Utilizing the observations made at that time and preliminary sketches of the areas prepared by King Engineering, boring locations were decided and those locations were sent to King Engineering. The borings were then located in the field by King Engineering as they surveyed the areas. There was a time gap between the boring layout and the execution of the field work. In some cases, the stakes had been removed before we conducted our borings. We then relocated the borings, measuring from existing stakes and topographic features. Therefore, some of the boring locations may be approximate. The boring elevations as noted on the boring logs were determined by King Engineering or from the topographic plans they supplied.

In addition, grab samples were obtained of the initial 6 inches of soil in two sea grass areas. One sample was obtained off of Palmer Point and the other was obtained off Jim Neville Preserve. These samples were obtained for laboratory testing and identification. The results of laboratory testing of samples from the spoil areas were compared with the sea grass samples to see if they were similar in nature.

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GEOTECHNICAL & MATERIALS ENGINEERING & TESTING



All of the areas were reached by boat. Public launch ramps were utilized to place our boat(s) into the water.

The borings were conducted by utilizing either a bucket type hand auger or a post-hole digger. In addition, where a significant amount of rock or shell was found, it was necessary to use a pry bar to loosen or break the material so that the hole could be advanced. The holes were advanced to the water table or practical refusal utilizing the manually operated equipment. It is our understanding that the water level represented the original grade before the dredged materials were deposited.

For ease in identifying which spoil area the borings represented, the borings from Snake Island were identified as SN-; from Palmer Point Park PP-; from Jim Neville Preserve JN-; from Skier's Island SK-; and from Big Edwards Island BE-. In addition, the samples from sea grass areas were identified as SG-. Boring Location Plans for each of the studied areas are attached.

Upon completion of the field work, the samples were returned to the laboratory where the field identifications were confirmed by a Professional Geologist. Samples were selected for laboratory testing. The samples selected were felt to be representative of the soils encountered. However, due to the difficulty in obtaining representative samples of the larger sized materials, laboratory testing was limited to the sands and fine-grained soils. The laboratory tests included gradation tests, -200 wash gradations, organic content tests and Atterberg Limits tests. These were conducted in accordance with appropriate ASTM test procedures. Attached to this report are the boring logs, a summary of the laboratory tests as well as gradation curves for each of the soils tested.

This report is organized so that the subsurface conditions and uses of material from each spoil area will be discussed in their entirety with a summary at the end of the report. The field and laboratory data have also been organized by study area.

### SEA GRASS SAMPLES

Two samples from sea grass areas were obtained. SG-1 was taken from off Palmer Point while SG-2 was taken off Jim Neville Preserve. In both cases, the samples were obtained in shallow water. The samples were taken utilizing a hand auger and digging about 6 inches into the bottom.

The soils obtained included a shelly fine sand and a slightly silty slightly shelly fine sand. These soils were classified as SP and SP-SM respectively. Laboratory tests indicated that as much as 15 percent was larger than a No. 4 sieve. The amount of material passing the No. 200 sieve ranged from 2 to 9 percent.

### SNAKE ISLAND

Snake Island is a dredge spoil island located in the Venice Pass in south Sarasota County. It is approximately 2 acres in size. Topographically, it is characterized by about 2 foot high banks close to the waters edge. The elevation of the interior generally ranges from about 2 feet MSL to a high of about 7 feet MSL. The high point is located in the northwestern quadrant of the island. Vegetation included mangroves, dense shrub trees as well as some grass areas and large pine trees. There was evidence that people picnic on the island. A significant amount of shoreline erosion was observed on the west side of the island. It was noted during our drilling operations that the wake from virtually every boat entering Venice Pass washed the west side of the island. This appeared to be true even if the boats slowed when they were supposed to do so.

The field work on Snake Island was conducted on December 10, 1999. Eleven borings were conducted at the locations staked by King, or relocated, if necessary. According to the topographic survey of this island, the highest point on the island is about +7 feet (MSL) and as a result, the borings were as deep as 8 feet. The borings encountered soils classified as fine sands from the ground surface to their termination. Some shell and shell fragments, as well as small pieces of phosphate, were found within the sand. In observing the banks of the island, it appeared that the shell may be present in relatively thin layers. However, when sampled with a hand auger, these layers were not apparent. Boring SN-4 encountered soils consisting predominately of small shell fragments from 2 feet to the termination of the boring at 3.5 feet. This type of material has been described as a shell hash. At the termination of the borings conducted in the middle of the island and the northwest quadrant, an organic silt was encountered.

According to the 1987 Soil Conservation Service (SCS) soil survey, the soils on this site are identified as Canaveral fine sands, a natural formation. This soil type is described as fine sand with shell fragments. The 1959 soil survey shows Snake Island to be part of the island which presently exists to its northwest with the island described as a coastal beach ridge with some areas of tidal swamp. In comparing these descriptions with the results of our borings, it appears that it is possible that most of Snake Island may represent a natural deposit, not dredged material.

The results of the laboratory tests indicate that the soils can generally be identified as poorly graded fine sand (SP). Due to the shell fragments, there was some material that did not pass a No. 4 sieve. This ranged from 1 percent to as great as 41 percent in the case of the shell hash. All of the sand samples tested had less than 6 percent passing a No. 200 sieve. All material in the shell hash passed a 1-1/2 inch sieve with 7 percent retained on the No. 200 sieve. Two of the organic containing soils were tested for moisture content and organic content. The natural moisture content was on the order of 50% and the organic content ranged from 3.8 to 7 percent.

It appears that the soils found on the island may be utilized for beach restoration or sea grass restoration. The amount of shell present may preclude its use as a final layer on a beach where the area will be frequented by the public unless the material is screened to remove the larger material. In our preliminary report, we indicated that it may take processing the soil to remove the shell if it is to be used for sea grass restoration. However, based upon the tests of soil from sea grass areas, it now appears that such processing will not be necessary, as it appears that a significant amount of shell may be present in sea grass areas. As a result, it appears that all of the material from this island can be used for sea grass restoration areas. Large sized material was not found and as a result, the soils from this island will not be suitable for use as erosion protection material.

### PALMER POINT PARK

Palmer Point Park is located at the north end of Casey Key, just south of the former location of Midnight Pass. The dredge spoil area is about 5 acres. A mud flat is located to the south and Midnight Pass is located to the north. A tidal flat is located to the east. Residential property is located to the west and a tennis court adjoins the park on that side. Palmer Point has very little topography with the highest point at about elevation 4 feet MSL. However, there is an embankment adjacent to the tennis court with its top at about elevation 5 feet MSL. Vegetation ranges from underbrush to large trees. Mangroves are located on all sides of the park

The field work was conducted on December 28, 1999. Eighteen borings were conducted at the locations staked by King Engineering. The borings encountered fine sands with varying amounts of shell fragments. A boring conducted in a mud flat on the east end of the Palmer Point, PP-29, encountered a silty peat from the ground surface to the termination of the boring at 6 inches. This may represent a former sea grass or mangrove area.

According to the 1987 SCS soil survey, the soils in the Palmer Point area are identified as Kesson and Wulfert mucks. These soil types are typically found in tidal marshes and swamps. Based upon our field work, it appears that these soils were present before the dredged material was deposited. The 1959 soil survey indicates that this area was generally below the water level and not given a soil description.

The results of the laboratory tests on the soils recovered indicated that the material was a fine sand with a relatively small amount of fines. Almost all of the shell fragments passed the No. 200 sieve. Most of the samples had less than 5 percent passing a No. 200 sieve and those identified as being silty had 6 to 12 percent passing a No. 200 sieve. An organic content test conducted on a sample from boring PP-29 revealed a natural moisture content of 147 percent and an organic content of 24 percent.

It appears that the materials found on Palmer Point may be used for beach restoration. In our preliminary report we indicated that it did not appear that the material could be used for sea grass restoration. However, a review of the laboratory data indicates that the gradation of these soils is not significantly different from the soils from the sea grass restoration areas. Therefore it appears that all of the material encountered may be utilized for either of the two uses. The materials encountered by our exploration are not suitable for erosion protection because the particle size of the materials was too fine.

### JIM NEVILLE PRESERVE

Jim Neville Preserve is the largest spoil area studied in this project. This spoil area is located to the east of the south end of Siesta Key, just to the north of what once was Midnight Pass. The area explored consisted of two areas separated by a mud flat. The total area is about 35 acres. The southern area has a gentle topography with a slight ridge running in northwest to southeast direction. The highest point of this area is at about elevation 7 feet MSL. The northern area is somewhat larger. It too has a gentle topography with a high point of about elevation 10.5 feet MSL located near its north end. The outer edges of the areas were vegetated with mangroves. On the interior, vegetation consisted of pine trees and pepper plants. In some cases, the peppers were very dense and impenetrable without cutting.

The bulk of the borings were drilled on December 28, 1999. However, due to difficult drilling conditions, it was necessary to return to this spoil area on January 4, 2000 to complete four of the borings. Twenty-four borings were drilled in the Jim Neville Preserve area.

Nine borings were drilled on the southern area. While most of the borings were drilled on the perimeter, three borings were drilled in the interior at an elevation of +2 feet MSL or higher. Those borings drilled on the perimeter encountered fine sands to their termination 1 to 2 feet below the ground surface. Some shell fragments, phosphate and silt were present in the samples. The three borings in the interior encountered fine sand with a significant amount of large, intact shell, shell fragments and limestone fragments to a depth of 5 to 7 feet below the ground surface. This material appears to represent dredged fill. It was difficult to advance these holes manually due to the size and amount of shell and rock pieces encountered. It was necessary to utilize a rod to break or loosen the material before it could be removed from the hole using either a hand auger or a posthole digger. Due to the large size of the material, it was not possible to recover a representative sample for laboratory testing. Below the dredged material, fine sands were encountered to the termination of the borings. Boring JN-38, drilled at the northwest end of this area, encountered peat below one foot. This probably represents mangrove areas covered by dredged materials.

In the northern area, 15 borings were drilled. Four of the borings were drilled at higher interior locations while the rest were drilled around the perimeter of the area. These borings encountered similar materials to the southern area. The perimeter borings encountered fine sand with some shell fragments, phosphate and silt. These borings were terminated within 2 feet of the ground surface. The interior borings encountered dredged material consisting of large, intact shell, shell fragments and limestone fragments

from the ground surface to a depth of 3 to 6 feet below the ground surface. One boring, JN-48 could not be advanced beyond 6 feet due to the large rock and therefore, it did not reach its anticipated termination depth at about 7 to 8 feet below the ground surface. The digging was difficult and representative samples could not be obtained for laboratory testing. Three borings, JN-39, JN-40 and JN-45, encountered peat from one to two feet below the ground surface and were terminated in this material.

The peat was encountered in those borings drilled at the interface of the two areas. This would appear to represent an area where pre-existing vegetation was buried during the dredging operations.

According to the 1987 SCS soil survey, the soils in the Jim Neveille Preserve area are Kesson and Wulfert mucks. These soil types are typically found in tidal marsh areas and tidal swamps. Our field work indicates that this type was present before the dredge material was placed. The 1959 soil survey shows a somewhat different configuration for this area and identifies the soils as tidal swamp area.

Laboratory testing was limited to those samples representative of the soils present in the field. As a result, those soils containing significant amounts of shell or limestone fragments were not tested. Therefore, the laboratory tests were primarily conducted on samples taken from borings on the exterior of the area. The results of the laboratory tests indicated that the perimeter soils are poorly graded fine sands. Most of the samples tested had 95 percent or more passing the No. 4 sieve with less than 10 percent passing the No. 200 sieve. A near surface sample from JN-37 had 79 percent passing the No. 4 sieve. One sample of the soil identified as peat was tested for moisture content and organic content. The results of the test indicated a moisture content of 167 percent and an organic content of 23 percent by weight.

With the exception of the soils found at the perimeter of the Jim Neveille Preserve, the dredged material encountered does not appear to be suitable for beach restoration due to the significant amount of large material such as whole shells as well as limestone pieces. For the same reason, it does not appear that the material from the interior will be suitable for use in sea grass restoration areas. The manual sampling techniques did not provide for recovery of material large enough to be considered for erosion protection. However, no large limestone pieces (6"+) were observed and as a result, we do not believe that there is a significant amount of dredged material from this area that will be suitable for erosion protection. As a result, without processing, it does not appear that material from this area can be used for restoration projects and its use appears to be limited to general fill.

### SKIER'S ISLAND

Skier's Island is a dredge spoil island located in the south half of Robert's Bay. It is to the west of the Gulf Intracoastal Waterway. It is a relatively long, slender island approximately 1250 feet long by an average of 275 feet wide and encompassing approximately 8 acres. The site has a ridge running along its spine ranging in elevation from about 6 feet MSL near the south end to about 7 feet MSL near its north end. In addition, there was a break in the ridge at about the middle of the island where the ridge dips to an elevation of about 1 foot MSL. Vegetation included mature pines as well as mangroves along the edge of the island. Rocks, on the order of 6 inches +/-, were observed on the ground surface. At the time of our field work, a camp ground occupied by at least one person was observed at the north end of the island.

The field work was conducted on Skier's Island from January 5<sup>th</sup> to January 8<sup>th</sup>, 2000. Twenty-nine borings were drilled on Skier's Island, most at locations as staked by King Engineering. Some stakes had been removed and they were relocated by Williams' personnel utilizing a tape and turning approximate angles from existing landmarks. In general, the borings drilled at elevation +2 feet (MSL) or less, encountered fine sands with some shell or limestone pieces and are considered to be sands. The borings drilled where the elevation was +2 feet MSL or higher encountered dredged fill material consisting of sand with large shell and pieces of limestone. In some borings, the samples consisted almost entirely of

shell and were identified as shell hash, while in other areas the samples primarily consisted of limestone pieces. These soils were sometimes classified as gravels even though there technically may be very little "gravel" present. Some of the surficial limestone pieces were as large as 12 inches in one dimension. It was very difficult to advance the holes due the size of material encountered as well as its interlocked nature. It was necessary to utilize a rod to loosen the formation before it could be removed utilizing the hand auger or posthole digger. It was not possible to advance all of the borings to their programmed depth due to size of material encountered. Due to the manual excavation techniques utilized, it was also not possible to determine how large the larger pieces of limestone were.

According to the 1987 SCS soil survey, the soils on Skier's Island are identified as Kesson and Wulfert mucks. With the exception of one boring where a significant amount of roots were found, this material was not apparent. A review of the 1959 soil survey does not show any evidence of Skier's Island. Therefore, we do not believe that this island is underlain by organic material.

Laboratory testing was generally conducted on selected samples from the borings made at elevation +2 feet MSL or less. The test results indicated that soils identified as very shelly or shell hash had 23 to 29 percent retained on the No. 4 sieve, the dividing sieve between gravel and sand. Most of them also had less than 5 percent passing the No. 200 sieve. However, a sample taken from SK-62 from 0 to 1.5 feet MSL and identified as an SM, contained 22 percent material finer than the No. 200 sieve. A gradation test conducted on the initial 2 feet of material from boring SK-80 at elevation 5.3 feet MSL and identified as an SM, indicated that 30 percent of the sample was retained on the No. 4 sieve and 24 percent of the sample passed a No. 200 sieve. Laboratory tests were not conducted on those samples identified as gravels and poorly graded sands because we could not obtain a large enough sample to consider it representative of the materials present.

With the exception of the soils found at the perimeter of the island it appears that the material present can't be used for beach or sea grass restoration areas due to the size of material encountered. It also appears that without processing, the material sampled and/or observed in the interior areas of the island is not of sufficient size to allow it to be used for erosion protection. It is likely that some of the material could be used for erosion protection, but it does not appear that there is a sufficient quantity that it would be cost effective to process the material. Excavation utilizing machinery would be necessary to confirm this opinion.

### **BIG EDWARDS ISLAND**

Big Edwards Island is located in the northern area of Robert's Bay, just south of the Siesta Key Bridge. The island is relatively square in shape with dimensions of 550 feet north-to-south and 400 feet east-to-west. The island is approximately 6 acres in area. It is our understanding that this area had been a mangrove island which had been used as a spoils area for the dredging of the Inland Waterway which is located on the east side of the island. The topography of this island was unlike the other 4 areas studied under this contract. There was a relatively narrow perimeter berm enclosing an area where dredged material was placed. The elevation outside the perimeter of the berm ranged from 0 MSL to about 5 feet MSL. According to the survey, the elevation of the top of the berm generally varied from about 12 to 13 feet MSL. However, the berm was as high as about 14 feet MSL in the northwest corner of the island. Inside of the berm, the elevation varied from a low of about 5 feet MSL at the south end of the island to a high of about 17 feet MSL near the north end of the island. Vegetation ranged from mature pine trees to areas of mangroves. The island was generally accessible without cutting vegetation. There was some evidence that people visited the island on a regular basis.

Field work on Big Edward's Island was conducted between January 7 and 13, 2000. Forty-two borings were drilled on Big Edward's Island. Most of the borings were drilled at stakes placed by King Engineering. However, some stakes had been removed and those drilling locations were determined by the Williams drill crew by measuring from the remaining stakes and the topographic features. Prior to drilling it was suspected that the material in the berm would be different from the material inside of the bermed area. However, the borings drilled in the berm and inside of the berm encountered similar dredged fill consisting of fine sand with varying amounts of shell and limestone rock pieces. The rock included pieces as large as 8 to 10 inches in dimension. In some cases, the soils encountered were classified as gravel. It was very difficult to advance the borings and in two cases the auger heads broke off in the holes and were lost. At several locations, the holes were abandoned before their scheduled termination depth due to large rocks being encountered. This was in spite of the fact that posthole diggers and a rod with a point were used to assist in the advancement of the boring. It appeared that more shell was found at the south end of the island with more rock found in the samples from the northern end of the island. As with the Skier's Island which had significant rock or shell, the borings conducted at the lower elevations of the perimeter of the island encountered fine sands with some shell fragments. In addition, some silty sands and sandy silts were encountered, primarily at the south end of the island and at about 0 MSL.

According to the 1987 SCS soil survey, the soils on Big Edwards Island are identified as Kesson and Wulfert mucks. Two borings encountered organic soils at their termination depths and several other borings encountered silts which may represent the top of this soil type. The 1959 soil survey shows an island with a slightly different configuration and identifies the soils as representative of tidal swamps. It is possible that the organic deposits are more extensive, but have settled under the load of the dredged material and were below the depth of our exploration.

Laboratory tests were conducted on selected samples. It was not possible to conduct tests on much of the dredged material because the sampling technique did not allow us to obtain representative samples of the large shell or rock. The laboratory grain size tests indicated that the soils from the lower elevations on this island contained much more silt than the other dredge spoil areas studied under this contract. Samples with 71 to 91 percent passing a No. 4 sieve had 22 to 32 percent passing a No. 200 sieve. Laboratory grain size tests were also conducted on three samples identified as silts. The fines content ranged from 56 to 96 percent. An Atterberg Limits test was conducted on a sample from BE-88 at 3 to 4 feet below the ground surface with 82 percent passing the No. 200 sieve. The results indicated a liquid limit of 41 and a plasticity index of 16. This means that this soil is at the borderline of being a low plasticity silt (ML) and a low plasticity clay (CL). The natural moisture content of this soil was 50 percent.

Based upon the samples recovered, it does not appear that the dredged material from this island can be used for beach restoration or sea grass restoration due to the relatively large size of material encountered. It also did not appear that a sufficient amount of material was large enough to allow it to be used for erosion protection. The samples recovered and the material observed suggest that there would be a relatively small amount of material suitable for erosion protection after processing has been conducted.

### GENERAL COMMENTS

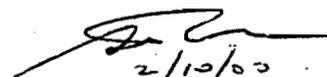
The nature of dredging operations is such that the soils found in spoils areas will vary significantly within a relatively short distance. We have described the soils encountered in this study in general terms, however, the soils did vary from boring to boring as can be expected for dredged fill. It should be noted that the manual exploration techniques utilized did not allow us to obtain representative samples of the larger material on Jim Neville Preserve, Skier's Island and Big Edwards Island. As a result, we could not conduct gradation tests on the recovered samples. It would be necessary to excavate test pits, probably

utilizing a backhoe, to allow us to obtain a representative sample, particularly at depth. That was beyond the scope of our exploration. In addition, the nature of dredged material is such that it is possible that pockets and layers of material not encountered by our exploration will be encountered during construction operations.

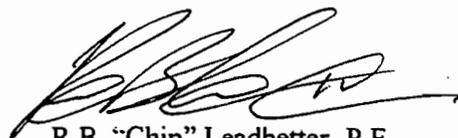
Williams has appreciated this opportunity to be of service to you on this project. Should you have any questions, please contact us at your convenience.

Sincerely,

**WILLIAMS EARTH SCIENCES, INC.**



2/10/00  
Stephen C. Knauss, P.E.  
Senior Geotechnical/Materials Engineer  
Florida Registration No. 28202

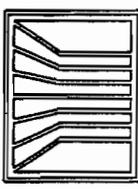
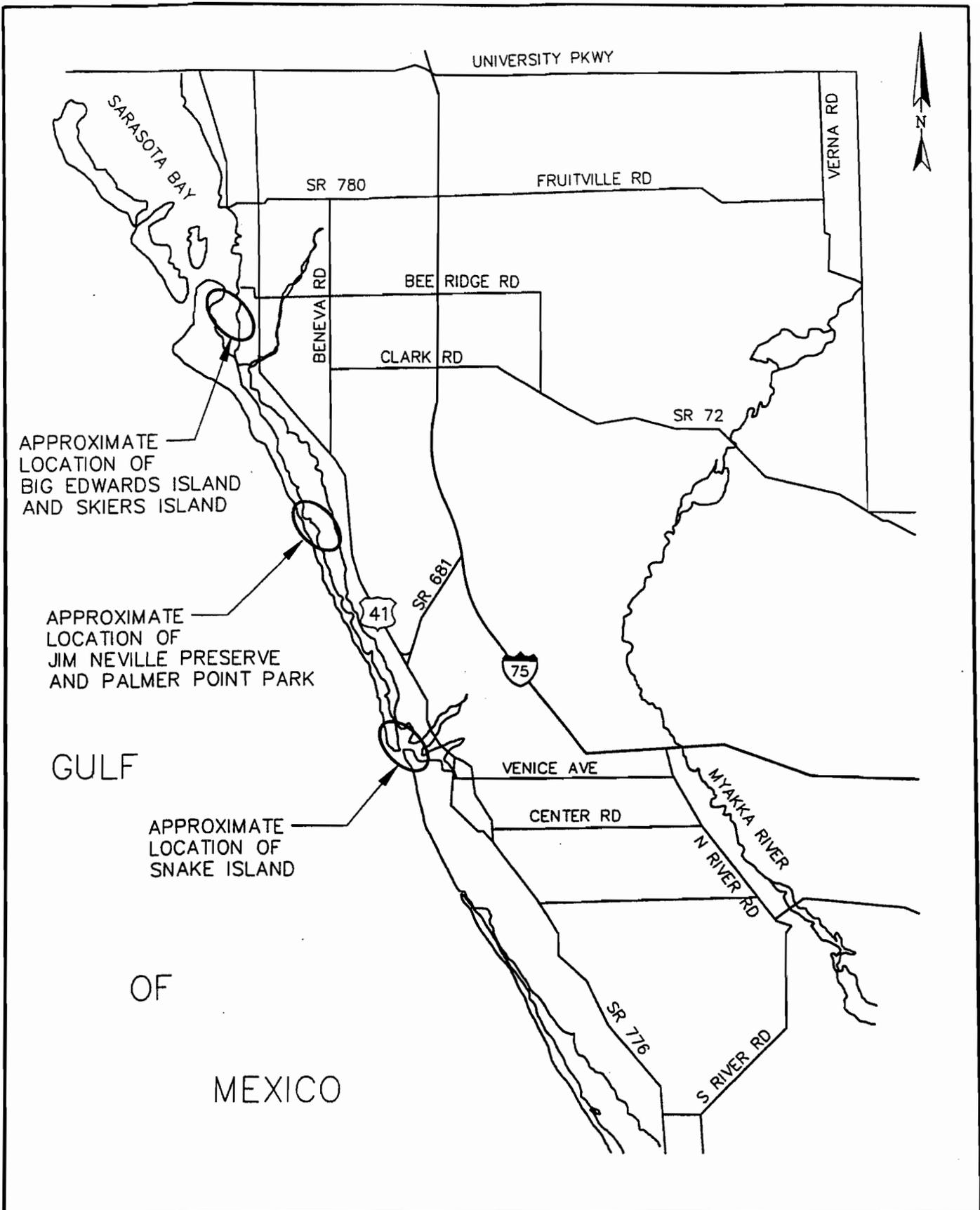


R.B. "Chip" Leadbetter, P.E.  
Senior Geotechnical Engineer  
Florida Registration No. 53182

Distribution: (2) Addressee  
(1) File

Attachments: Site Location Maps  
Report of Auger Borings  
Summary of Laboratory Tests  
Laboratory Test Results

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**SARASOTA BAY ECOSYSTEM RESTORATION  
SARASOTA COUNTY, FLORIDA**

**SITE LOCATION MAP**

Drawn By: TEJ	Date: 1-12-00	Scale: N.T.S.
Checked By: SK	Report No. C399322	Figure No. 1

**SEA GRASS AREAS**

**PALMER POINT**  
**&**  
**JIM NEVILLE PRESERVE**

**WILLIAMS**  
EARTH SCIENCES, INC.

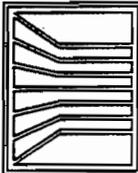
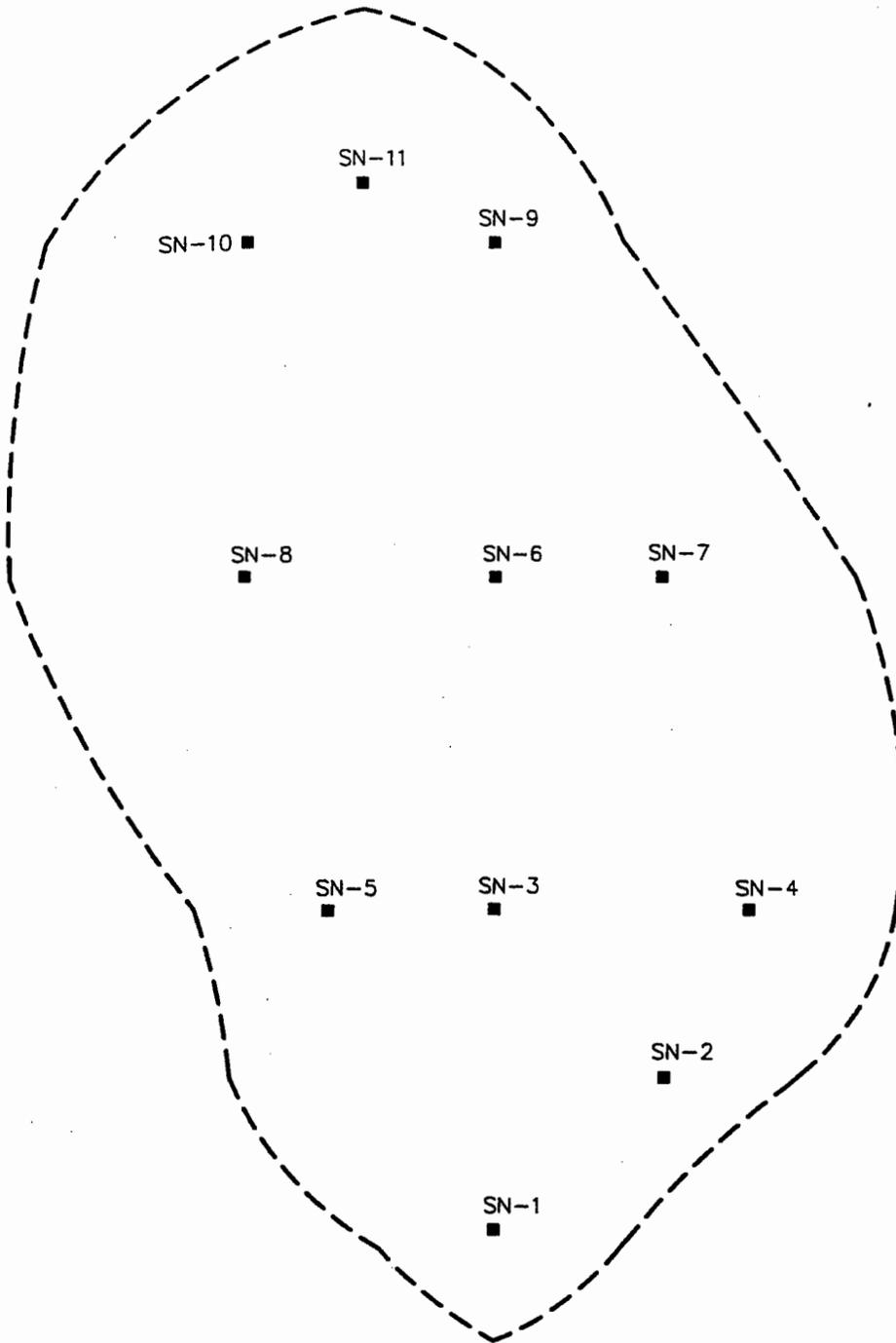
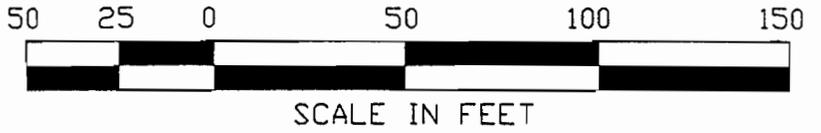
**SUMMARY OF LABORATORY TEST RESULTS**

CLIENT: HDR Engineering, Inc.  
PROJECT: Sarasota Bay Ecosystem Restoration  
LOCATION: Sea Grass Areas (Palmer Point and Jim Neville Preserve)  
WILLIAMS PROJECT NO.: C399322

Boring No. and Date	Depth (ft)	Soil Description	Natural Moisture Content (%)	1 1/2"	1"	3/4"	1/2"	3/8"	#4	#10	#40	#60	#100	#200	Organic Content (%)	Atterberg Limits	
																LL	PI
SG-1 12/99	----	Gray shelly fine sand with grasses (SP) <i>(Sampled off of Palmer Point)</i>		100	96	96	90	90	85	82	74	64	35	2			
SG-2 12/99	----	Dark gray slightly silty slightly shelly fine sand with grasses (SP-SM) <i>(Sampled off of Jim Neville Preserve)</i>				100	99	99	97	93	89	85	59	9			

\*NOTE: Borings SG-1 and SG-2 were completed in sea grass areas.

# SNAKE ISLAND



**WILLIAMS EARTH SCIENCES, INC.**

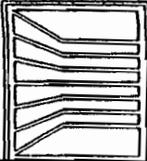
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**SNAKE ISLAND  
SARASOTA BAY ECOSYSTEM RESTORATION  
SARASOTA COUNTY, FLORIDA**

**BORING LOCATION PLAN**

Drawn By: TEJ	Date: 1-12-00	Scale: AS SHOWN
Checked By: SK	Report No. C399322	Figure No. 2

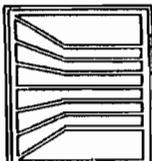
**WILLIAMS EARTH SCIENCES, INC**CORPORATE OFFICE:  
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Jacksonville: (904) 262-8852 Fax: (904) 262-8884  
Panama City: (850) 247-9419 Fax: (850) 263-2454**REPORT OF AUGER BORINGS**

CLIENT: HDR Engineering, Inc.

PROJECT: Sarasota Bay Ecosystem - Snake Island

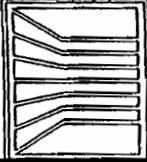
WILLIAMS PROJECT N<sup>o</sup>: C399322

LOCATION	DATE PERFORMED	DEPTH (ft) FROM/TO	SOIL DESCRIPTION	UNIFIED CLASSIF.	*APPROX. SURFACE ELEVATION (MSL)	GROUNDWATER LEVEL (ft)
SN-1	12/10/99	0.0-1.5	Light grayish brown phosphatic fine sand	SP	1.1	1.8
		1.5-2.5	Light gray phosphatic slightly shelly fine sand	SP		
SN-2	12/10/99	0.0-1.0	Light gray fine sand	SP	1.9	2.8
		1.0-2.5	Light grayish brown phosphatic fine sand	SP		
		2.5-3.5	Light grayish brown shelly phosphatic fine sand	SP		
SN-3	12/10/99	0.0-1.8	Light grayish brown slightly shelly fine sand	SP	3.9	4.0
		1.8-3.0	Light brown shelly fine sand	SP		
		3.0-3.5	Light brown slightly shelly fine sand	SP		
		3.5-4.5	Grayish brown slightly shelly fine sand	SP		
SN-4	12/10/99	0.0-1.0	Light brown fine sand	SP	2.2	3.7
		1.0-2.0	Dark grayish brown shelly slightly silty fine sand	SP-SM		
		2.0-3.5	Slightly silty shell hash	SP		
SN-5	12/10/99	0.0-2.5	Light grayish brown shelly fine sand	SP	4.1	4.0
		2.5-3.0	Light brown shelly fine sand with decaying roots	SP		
		3.0-4.5	Grayish brown fine sand	SP		

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Panama City: (850) 747-9419 Fax: (850) 763-2454**REPORT OF AUGER BORINGS**CLIENT: HDR Engineering, Inc.  
PROJECT: Sarasota Bay Ecosystem – Snake Island

WILLIAMS PROJECT Nº: C399322

LOCATION	DATE PERFORMED	DEPTH (ft) FROM/TO	SOIL DESCRIPTION	UNIFIED CLASSIF.	*APPROX. SURFACE ELEVATION (MSL)	GROUNDWATER LEVEL (ft)
SN-6	12/10/99	0.0-1.0	Light brown slightly shelly fine sand	SP	5.6	6.0
		1.0-2.8	Light brown shelly fine sand	SP		
		2.8-5.0	Light brown fine sand	SP		
		5.0-6.0	Interlayered light brown fine sand and dark grayish brown organic silt	PT		
SN-7	12/10/99	0.0-2.5	Grayish brown shelly fine sand	SP	5.0	5.0
		2.5-4.0	Light brown shelly fine sand	SP		
		4.0-5.0	Light brown shelly fine sand with large oyster shells	SP		
		5.0-6.0	Interlayered light gray fine sand and dark brown organic silt	PT		
SN-8	12/10/99	0.0-1.5	Light grayish brown fine sand	SP	6.9	7.0
		1.5-6.0	Light brown shelly fine sand	SP		
		6.0-7.0	Brown slightly shelly fine sand	SP		
		7.0-8.0	Interlayered grayish brown fine sand and dark grayish brown organic silt	PT		
SN-9	12/10/99	0.0-1.8	Light brown fine sand with minor roots	SP	3.0	3.6
		1.8-4.0	Brown fine sand	SP		
		4.0-6.0	Dark brown fine sand	SP		

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Panama City: (850) 747-8419 Fax: (850) 783-2454**REPORT OF AUGER BORINGS**CLIENT: HDR Engineering, Inc.  
PROJECT: Sarasota Bay Ecosystem - Snake IslandWILLIAMS PROJECT N<sup>o</sup>: C399322

LOCATION	DATE PERFORMED	DEPTH (ft) FROM/TO	SOIL DESCRIPTION	UNIFIED CLASSIF.	*APPROX. SURFACE ELEVATION (MSL)	GROUNDWATER LEVEL (ft)
SN-10	12/10/99	0.0-2.5	Light brown fine sand	SP	4.8	5.1
		2.5-4.5	Light brown medium to fine sand	SP		
		4.5-5.5	Light grayish brown shelly fine sand	SP		
		5.5-6.0	Dark brown very silty fine sand with finely divided organic matter	PT		
SN-11	12/10/99	0.0-1.0	Light brown fine sand with minor roots	SP	2.1	2.7
		1.0-2.8	Light brown fine sand	SP		
		2.8-5.5	Dark brown fine sand with minor finely divided organic matter	SP		
		5.5-6.0	Gray silty fine sand with minor finely divided organic matter and shell fragments	SM		

\*Approximate surface elevation noted from topographic maps.

**WILLIAMS**  
EARTH SCIENCES, INC.

**SUMMARY OF LABORATORY TEST RESULTS**

CLIENT: HDR Engineering, Inc.  
PROJECT: Sarasota Bay Ecosystem Restoration  
LOCATION: Snake Island

WILLIAMS PROJECT NO.: C399322

Boring No. and Date	Depth (ft)	Soil Description	Natural Moisture Content (%)	1½"	1"	¾"	½"	⅜"	#4	#10	#40	#60	#100	#200	Organic Content (%)	Atterberg Limits	
																LL	PI
SN-2 12/99	1.0-2.5	Light grayish brown phosphatic fine sand (SP)						100	99	98	96	77	13	0			
SN-3 12/99	0.0-1.8	Light grayish brown slightly shelly fine sand (SP)				100	97	95	93	84	73	37	1				
SN-4 12/99	2.0-3.5	Slightly silty shelly hash (SP)		100	95	84	73	69	59	51	40	37	24	7			
SN-5 12/99	0.0-2.5	Light grayish brown shelly fine sand with decaying roots (SP)					100	99	92	82	63	50	19	1			
SN-6 12/99	5.0-6.0	Interlayered light brown fine sand and dark grayish brown organic silt (PT)	50											13	7		
SN-7 12/99	0.0-2.5	Grayish brown shelly fine sand (SP)				100	88	85	74	63	46	34	11	1			

**WILLIAMS**  
EARTH SCIENCES, INC.

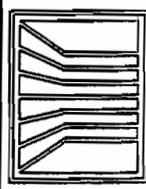
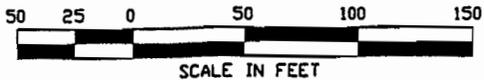
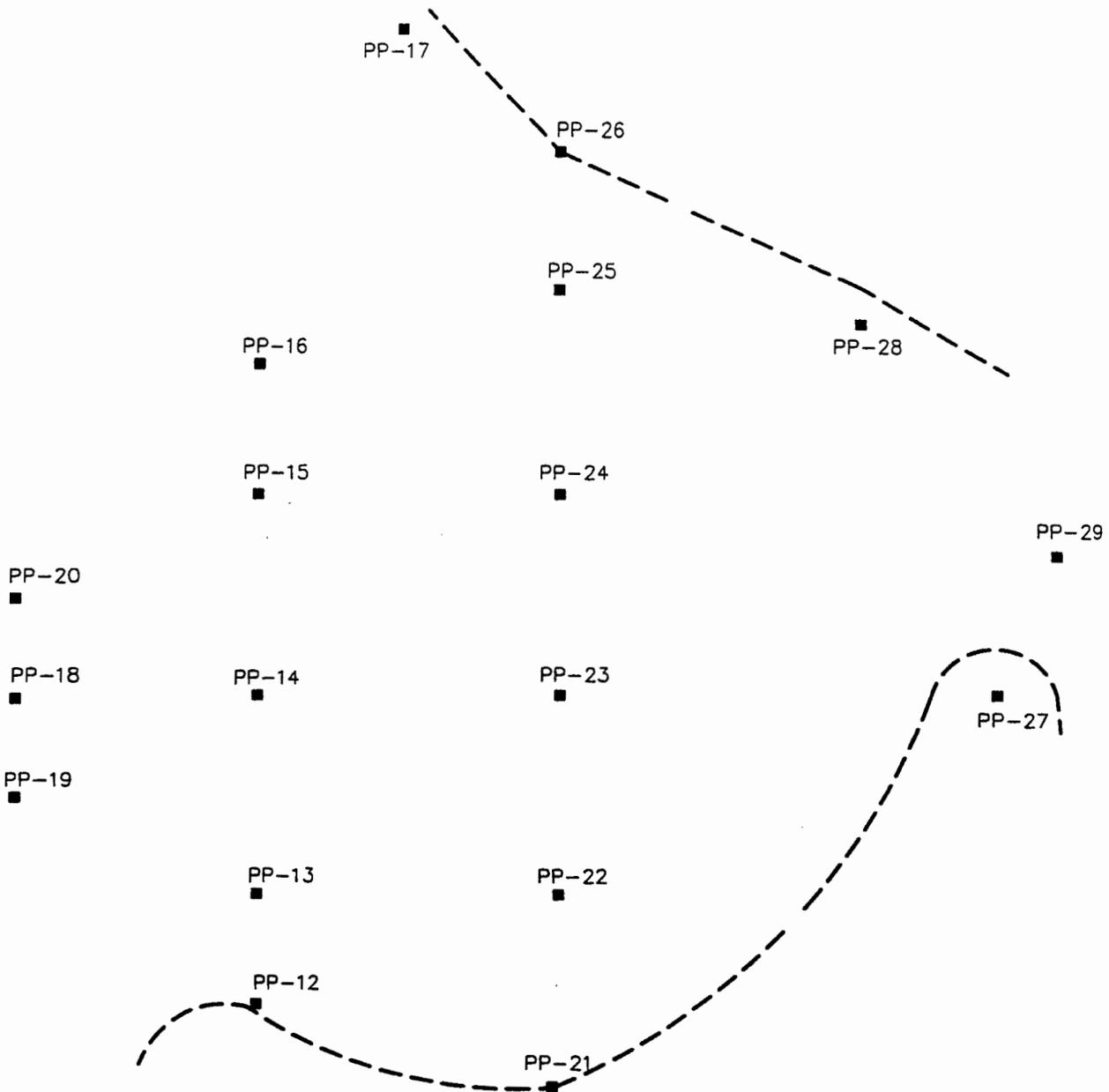
**SUMMARY OF LABORATORY TEST RESULTS**

CLIENT: HDR Engineering, Inc.  
PROJECT: Sarasota Bay Ecosystem Restoration  
LOCATION: Snake Island

WILLIAMS PROJECT NO.: C399322

Boring No. and Date	Depth (ft)	Soil Description	Natural Moisture Content (%)	1½"	1"	¾"	½"	⅜"	#4	#10	#40	#60	#100	#200	Organic Content (%)	Atterberg Limits	
																LL	PI
SN-9 12/99	0.0-1.8	Light brown fine sand with minor roots (SP)								100	99	96	41	1			
SN-9 12/99	4.0-6.0	Dark brown fine sand (SP)						100	99	99	97	90	47	3			
SN-10 12/99	2.5-4.5	Light brown medium to fine sand (SP)					100	99	96	91	53	37	14	1			
SN-11 12/99	2.8-5.5	Dark brown fine sand with minor finely divided organic matter (SP)	46											4	3.8		

# PALMER POINT PARK

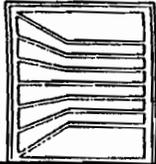


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**PALMER POINT PARK  
 SARASOTA BAY ECOSYSTEM RESTORATION  
 SARASOTA COUNTY, FLORIDA**

**BORING LOCATION PLAN**

Drawn By: TEJ	Date: 1-12-00	Scale: AS SHOWN
Checked By: SK	Report No. C399322	Figure No. 3

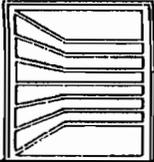
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Panama City: (850) 747-9419 Fax: (850) 763-2454**REPORT OF AUGER BORINGS**

CLIENT: HDR Engineering, Inc.

PROJECT: Sarasota Bay Ecosystem - Palmer Point

WILLIAMS PROJECT Nº: C399322

LOCATION	DATE PERFORMED	DEPTH (ft) FROM/TO	SOIL DESCRIPTION	UNIFIED CLASSIF.	*APPROX. SURFACE ELEVATION (MSL)	GROUNDWATER LEVEL (ft)
PP-12	12/28/99	0.0-0.5	Grayish brown slightly shelly fine sand with minor cementations	SP	0.9	0.5
PP-13	12/28/99	0.0-1.0	Grayish brown slightly shelly slightly silty fine sand with minor roots	SP-SM	1.3	1.0
PP-14	12/28/99	0.0-1.5 1.5-2.0	Light brown fine sand Light grayish brown silty fine sand	SP SM	2.3	2.0
PP-15	12/28/99	0.0-1.5 1.5-2.0	Light brown slightly shelly fine sand Mottled light gray and reddish brown slightly shelly slightly silty fine sand	SP SP-SM	2.0	2.0
PP-16	12/28/99	0.0-0.5	Grayish brown silty fine sand	SM	0.6	0.5
PP-17	12/28/99	0.0-1.0	Light brown slightly shelly medium to fine sand	SP	1.3	1.0
PP-18	12/28/99	0.0-1.0	Light grayish brown slightly silty fine sand with minor roots	SP-SM	2.7	1.0

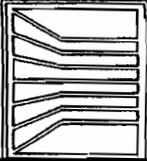
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CLIENT: HDR Engineering, Inc.

PROJECT: Sarasota Bay Ecosystem – Palmer Point

WILLIAMS PROJECT Nº: C399322

LOCATION	DATE PERFORMED	DEPTH (ft) FROM/TO	SOIL DESCRIPTION	UNIFIED CLASSIF.	*APPROX. SURFACE ELEVATION (MSL)	GROUNDWATER LEVEL (ft)
PP-19	12/28/99	0.0-1.0	Brown silty fine sand with minor limerock fragments	SM	2.7	1.0
PP-20	12/28/99	0.0-1.0	Gray shelly fine sand	SP	2.8	1.0
PP-21	12/28/99	0.0-1.0	Light gray fine sand	SP	0.8	1.0
PP-22	12/28/99	0.0-1.5	Light gray fine sand	SP	2.0	1.5
PP-23	12/28/99	0.0-1.5 1.5-3.0 3.0-3.5	Light gray fine sand Light gray shelly fine sand with minor roots Light gray slightly shelly fine sand	SP SP SP	3.5	3.5
PP-24	12/28/99	0.0-2.5 2.5-4.0	Light brown shelly fine sand Light brown slightly shelly fine sand with minor roots	SP SP	3.9	4.0
PP-25	12/28/99	0.0-1.0	Light grayish brown slightly shelly fine sand	SP	1.2	1.0

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Panama City: (850) 747-9419 Fax: (850) 763-7454**REPORT OF AUGER BORINGS**

CLIENT: HDR Engineering, Inc.

PROJECT: Sarasota Bay Ecosystem - Palmer Point

WILLIAMS PROJECT N<sup>o</sup>: C399322

LOCATION	DATE PERFORMED	DEPTH (ft) FROM/TO	SOIL DESCRIPTION	UNIFIED CLASSIF.	*APPROX. SURFACE ELEVATION (MSL)	GROUNDWATER LEVEL (ft)
PP-26	12/28/99	0.0-0.5	Gray shelly fine sand	SP	0.7	0.5
PP-27	12/28/99	0.0-0.5	Light grayish brown fine sand	SP	0.5	0.5
PP-28	12/28/99	0.0-0.5	Brown slightly shelly fine sand with minor roots	SP	0.9	0.5
PP-29	12/28/99	0.0-0.5	Dark brown silty peat	PT	0.2	0.5

\*Approximate surface elevation noted from topographic maps.

**WILLIAMS**  
EARTH SCIENCES, INC.

**SUMMARY OF LABORATORY TEST RESULTS**

CLIENT: HDR Engineering, Inc.  
PROJECT: Sarasota Bay Ecosystem Restoration  
LOCATION: Palmer Point

WILLIAMS PROJECT NO.: C399322

Boring No. and Date	Depth (ft)	Soil Description	Natural Moisture Content (%)	1"	3/4"	1/2"	3/8"	#4	#10	#40	#60	#100	#200	Organic Content (%)	Atterberg Limits	
															LL	PI
PP-13 12/99	0.0-1.0	Grayish brown slightly shelly slightly silty fine sand with minor roots (SP-SM)							100	97	93	63	10			
PP-14 12/99	1.5-2.0	Light grayish brown silty fine sand (SM)							100	99	96	75	12			
PP-15 12/99	1.5-2.0	Mottled light gray and reddish brown slightly shelly slightly silty fine sand (SP-SM)			100	99	99	99	94	86	49	6				
PP-17 12/99	0.0-1.0	Light brown slightly shelly medium to fine sand (SP)				100	98	97	84	51	6	1				
PP-20 12/99	0.0-1.0	Gray shelly fine sand (SP)				100	99	97	87	79	53	4				
PP-22 12/99	0.0-1.5	Light gray fine sand (SP)							100	99	94	38	1			

**WILLIAMS**  
EARTH SCIENCES, INC.

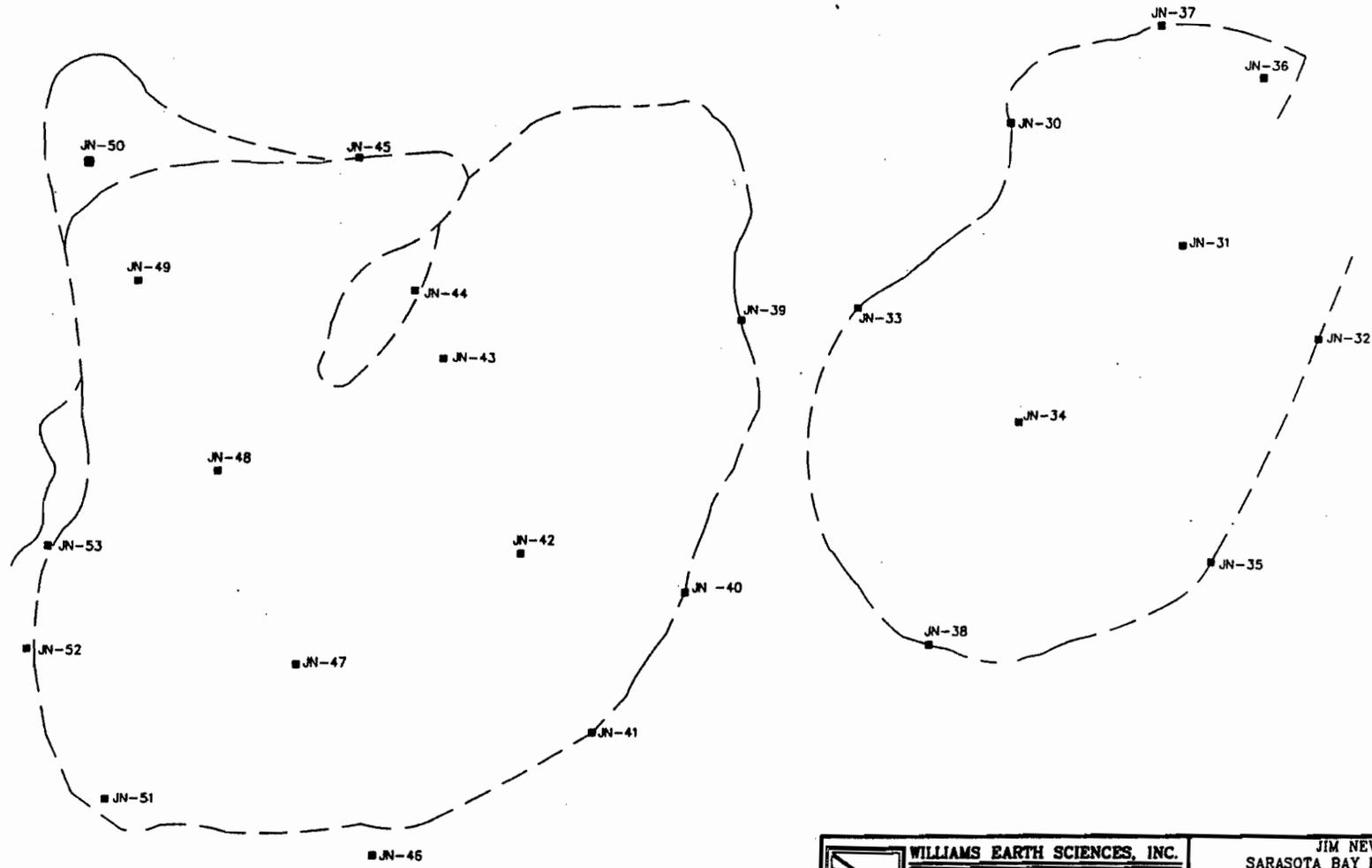
**SUMMARY OF LABORATORY TEST RESULTS**

CLIENT: HDR Engineering, Inc.  
PROJECT: Sarasota Bay Ecosystem Restoration  
LOCATION: Palmer Point

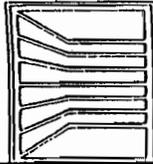
WILLIAMS PROJECT NO.: C399322

Boring No. and Date	Depth (ft)	Soil Description	Natural Moisture Content (%)	1"	3/4"	1/2"	3/8"	#4	#10	#40	#60	#100	#200	Organic Content (%)	Atterberg Limits	
															LL	PI
PP-24 12/99	0.0-2.5	Light brown shelly fine sand (SP)					100	98	95	75	62	16	0			
PP-25 12/99	0.0-1.0	Light grayish brown slightly shelly fine sand (SP)							100	96	92	51	1			
PP-29 12/99	0.0-0.5	Dark brown silty peat (PT)	147											24		

# JIM NEVILLE PRESERVE



	<b>WILLIAMS EARTH SCIENCES, INC.</b>		<b>JIM NEVILLE PRESERVE</b>	
	CORPORATE OFFICE: 10600 Endeavour Way, Largo, FL 33777		SARASOTA BAY ECOSYSTEM RESTORATION SARASOTA COUNTY, FLORIDA	
	Largo: (727) 541-3444      FAX: (727) 541-1510		<b>BORING LOCATION PLAN</b>	
	Jacksonville: (904) 282-8852      FAX: (904) 282-8064		Drawn By: TEJ	Date: 1-12-00
Panama City: (850) 747-9419      FAX: (850) 783-2454		Checked By: SK	Report No. C399322	Figure No. 4



**WILLIAMS EARTH SCIENCES, INC**

CORPORATE OFFICE:  
10600 Endeavour Way, Largo, FL 33777

Largo: (727) 541-3444 Fax: (727) 541-1510  
Jacksonville: (904) 262-8852 Fax: (904) 262-8864  
Panama City: (850) 747-9419 Fax: (850) 763-2454

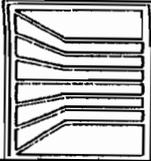
**REPORT OF AUGER BORINGS**

CLIENT: HDR Engineering, Inc.

PROJECT: Sarasota Bay Ecosystem – Jim Neville Preserve

WILLIAMS PROJECT N<sup>o</sup>: C399322

LOCATION	DATE PERFORMED	DEPTH (ft) FROM/TO	SOIL DESCRIPTION	UNIFIED CLASSIF.	*APPROX. SURFACE ELEVATION (MSL)	GROUNDWATER LEVEL (ft)
JN-30	12/28/99	0.0-0.7	Light grayish brown slightly silty fine sand with minor roots	SP-SM	0.6	1.0
		0.7-1.0	Gray slightly silty fine sand	SP-SM		
JN-31	12/28/99	0.0-0.1	Root material	PT	5.6	6.0
		0.1-0.8	Light grayish brown phosphatic shelly fine sand	SP		
		0.8-2.0	Light grayish brown phosphatic shelly silty fine sand	SM		
		2.0-6.0	Light gray phosphatic shelly fine sand	SP		
		6.0-6.4	Gray slightly shelly fine sand with minor roots	SP		
		6.4-6.5	Gray silty fine sand	SM		
		6.5-7.0	Reddish brown peat	PT		
JN-32	12/28/99	0.0-0.7	Light grayish brown slightly shelly fine sand	SP	0.5	1.0
		0.7-1.3	Light gray slightly shelly slightly silty fine sand	SP-SM		
JN-33	12/28/99	0.0-1.0	Gray slightly shelly fine sand	SP	0.5	0.3
JN-34	1/4/00	0.0-2.0	Gray shelly fine sand with limestone gravel	SP-GP	7.5	7.5
		2.0-7.5	Light brown shelly fine sand with limestone fragments	SP-GP		
		7.5-8.0	Light gray fine sand	SP		

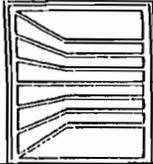
**WILLIAMS EARTH SCIENCES, INC**CORPORATE OFFICE:  
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Jacksonville: (904) 262-8652 Fax: (904) 262-8664  
Panama City: (904) 747-9419 Fax: (904) 743-2454**REPORT OF AUGER BORINGS**

CLIENT: HDR Engineering, Inc.

PROJECT: Sarasota Bay Ecosystem - Jim Neville Preserve

WILLIAMS PROJECT Nº: C399322

LOCATION	DATE PERFORMED	DEPTH (ft) FROM/TO	SOIL DESCRIPTION	UNIFIED CLASSIF.	*APPROX. SURFACE ELEVATION (MSL)	GROUNDWATER LEVEL (ft)
JN-35	12/28/99	0.0-0.8	Light brown fine sand	SP	0.8	1.0
		0.8-2.0	Gray slightly phosphatic slightly silty fine sand	SP-SM		
JN-36	1/4/00	0.0-3.5	Light brown shelly fine sand with limestone fragments	SP	3.7	4.3
		3.5-4.3	Tan shelly slightly silty fine sand with limestone gravel	SP-GP		
		4.3-5.0	Gray very shelly fine sand with limestone gravel	SP-GP		
JN-37	12/29/99	0.0-0.3	Grayish brown shelly fine sand with roots	SP	2.5	1.5
		0.3-1.0	Grayish brown shelly slightly silty fine sand with gravel	SP-SM		
		1.0-1.5	Gray slightly phosphatic fine sand	SP		
JN-38	12/28/99	0.0-0.7	Light brown fine sand	SP	0.7	1.0
		0.7-0.8	Gray sandy clayey silt	MH		
		0.8-2.0	Dark brown peat	PT		
JN-39	12/28/99	0.0-0.8	Grayish brown slightly silty fine sand with minor roots	SP-SM	0.5	1.0
		0.8-1.5	Reddish brown sandy peat	PT		

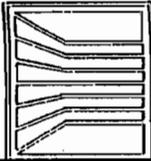
**WILLIAMS EARTH SCIENCES, INC**CORPORATE OFFICE:  
10600 Endeavour Way, Largo, FL 33777Largo: (727) 541-3444 Fax: (727) 541-1510  
Jacksonville: (904) 262-8852 Fax: (904) 262-8864  
Panama City: (850) 747-9419 Fax: (850) 743-2454**REPORT OF AUGER BORINGS**

CLIENT: HDR Engineering, Inc.

PROJECT: Sarasota Bay Ecosystem – Jim Neville Preserve

WILLIAMS PROJECT N<sup>o</sup>: C399322

LOCATION	DATE PERFORMED	DEPTH (ft) FROM/TO	SOIL DESCRIPTION	UNIFIED CLASSIF.	*APPROX. SURFACE ELEVATION (MSL)	GROUNDWATER LEVEL (ft)
JN-40	12/28/99	0.0-0.7 0.7-1.3 1.3-2.0	Light tan fine sand Light gray slightly silty fine sand Reddish brown silty peat	SP SP-SM PT	1.0	1.0
JN-41	12/28/99	0.0-0.5	Light brown silty fine sand	SM	0.6	0.5
JN-42	1/4/00	0.0-4.0 4.0-6.0	Light brown shelly fine sand with limestone gravel Light brown slightly shelly slightly silty fine sand	SP-GP SP-SM	5.6	5.4
JN-43	12/28/99	0.0-1.0 1.0-2.0	Light gray shelly fine sand Gray slightly shelly fine sand	SP SP	2.0	2.0
JN-44	12/28/99	0.0-0.5	Light grayish brown slightly shelly slightly silty fine sand with minor roots	SP-SM	0.4	0.5
JN-45	12/28/99	0.0-0.5	Gray sandy silt with roots	PT	0.5	0.5
JN-46	12/28/99	0.0-0.5	Light brown silty fine sand with minor roots	SM	0.5	0.5

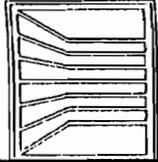
**WILLIAMS EARTH SCIENCES, INC**CORPORATE OFFICE:  
10600 Endeavour Way, Largo, FL 33777Largo: (727) 541-3444 Fax: (727) 541-1510  
Jacksonville: (904) 262-8852 Fax: (904) 262-8864  
Panama City: (850) 747-9419 Fax: (850) 783-2454**REPORT OF AUGER BORINGS**

CLIENT: HDR Engineering, Inc.

PROJECT: Sarasota Bay Ecosystem – Jim Neville Preserve

WILLIAMS PROJECT Nº: C399322

LOCATION	DATE PERFORMED	DEPTH (ft) FROM/TO	SOIL DESCRIPTION	UNIFIED CLASSIF.	*APPROX. SURFACE ELEVATION (MSL)	GROUNDWATER LEVEL (ft)
JN-47	12/28/99	0.0-3.5 3.5-5.0	Light brown shelly fine sand with limestone gravel Light brown slightly shelly fine sand	SP-GP SP	5.2	5.0
JN-48	1/4/00	0.0-6.0	Tan shelly fine sand with limestone gravel Unable to penetrate further due to large rocks	SP-GP	10.6	Not Encountered
JN-49	12/28/99	0.0-3.5 3.5-4.0	Tan shelly slightly silty fine sand with limestone gravel Gray slightly shelly fine sand	SP-GP SP	3.2	3.5
JN-50	12/28/99	0.0-0.5	Light grayish brown slightly silty fine sand with minor roots	SP-SM	0.5	0.5
JN-51	12/28/99	0.0-0.5	Brown silty fine sand with minor roots	SM	0.7	0.5



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Panama City: (850) 747-9419 Fax: (850) 753-2454

**REPORT OF AUGER BORINGS**

CLIENT: HDR Engineering, Inc.  
PROJECT: Sarasota Bay Ecosystem - Jim Neville Preserve

WILLIAMS PROJECT Nº: C399322

LOCATION	DATE PERFORMED	DEPTH (ft) FROM/TO	SOIL DESCRIPTION	UNIFIED CLASSIF.	*APPROX. SURFACE ELEVATION (MSL)	GROUNDWATER LEVEL (ft)
JN-52	12/28/99	0.0-0.5	Grayish brown silty fine sand with minor roots	SM	0.5	0.5
JN-53	12/28/99	0.0-0.5	Grayish brown silty fine sand	SM	0.5	0.5

\*Approximate surface elevation noted from topographic maps.

# WILLIAMS

EARTH SCIENCES, INC.

## SUMMARY OF LABORATORY TEST RESULTS

CLIENT: HDR Engineering, Inc.  
 PROJECT: Sarasota Bay Ecosystem Restoration  
 LOCATION: Jim Neville Preserve

WILLIAMS PROJECT NO.: C399322

Boring No. and Date	Depth (ft)	Soil Description	Natural Moisture Content (%)	1"	3/4"	1/2"	3/8"	#4	#10	#40	#60	#100	#200	Organic Content (%)	Atterberg Limits	
															LL	PI
JN-30 1/00	0.7-1.0	Gray slightly silty fine sand (SP-SM)					100	95	94	93	91	70	9			
JN-31 1/00	2.0-6.0	Light gray phosphatic shelly fine sand (SP)			100	96	94	88	73	64	40	2				
JN-32 1/00	0.7-1.3	Light gray slightly shelly slightly silty fine sand (SP-SM)					100	99	98	96	82	7				
JN-33 1/00	0.0-1.0	Gray slightly shelly fine sand (SP)				100	99	99	96	90	62	5				
JN-35 1/00	0.8-2.0	Gray slightly phosphatic slightly silty fine sand (SP-SM)						100	99	99	80	8				
JN-37 1/00	0.3-1.0	Grayish brown shelly slightly silty fine sand with gravel (SP-SM)		100	88	88	79	69	55	49	33	6				
JN-39 1/00	0.0-0.8	Grayish brown slightly silty fine sand with minor roots (SP-SM)				100	99	99	95	89	60	7				
JN-40 1/00	1.3-2.0	Reddish brown silty peat (PT)	167									22	23			

**WILLIAMS**  
EARTH SCIENCES, INC.

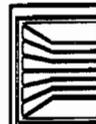
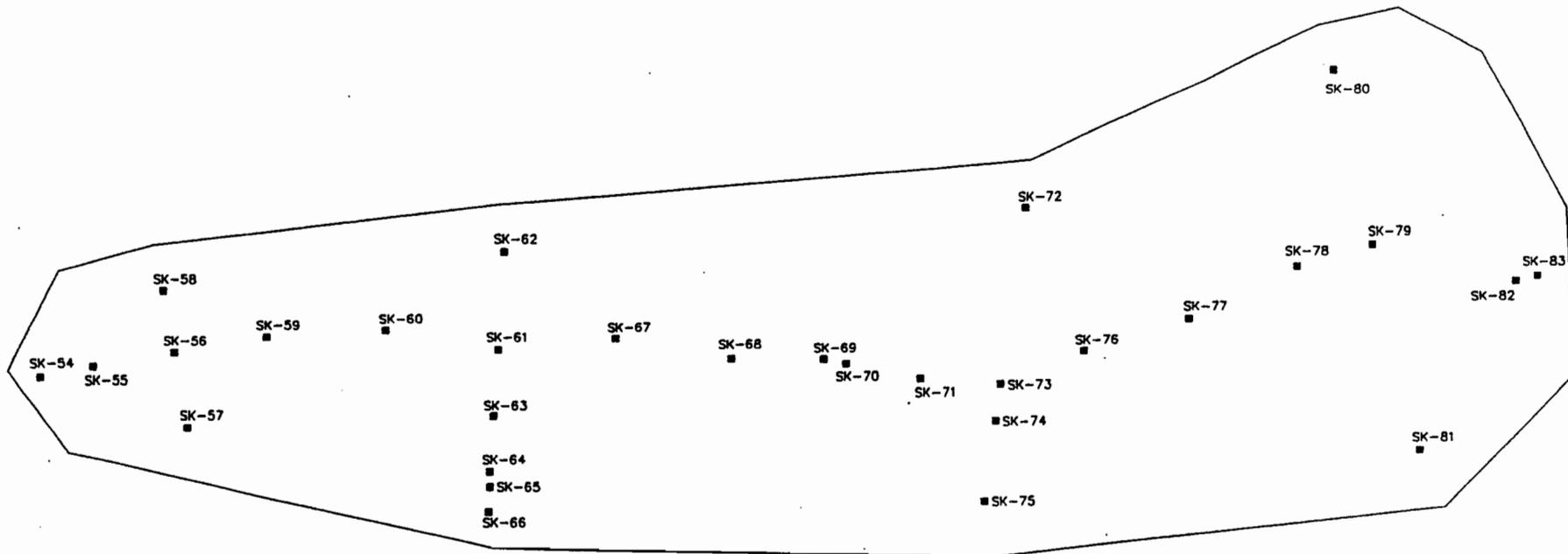
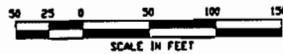
**SUMMARY OF LABORATORY TEST RESULTS**

CLIENT: HDR Engineering, Inc.  
PROJECT: Sarasota Bay Ecosystem Restoration  
LOCATION: Jim Neville Preserve

WILLIAMS PROJECT NO.: C399322

Boring No. and Date	Depth (ft)	Soil Description	Natural Moisture Content (%)	1"	3/4"	1/2"	3/8"	#4	#10	#40	#60	#100	#200	Organic Content (%)	Atterberg Limits	
															LL	PI
JN-42 1/00	4.0-6.0	Light brown slightly shelly slightly silty fine sand (SP-SM)					100	98	96	90	83	49	5			
JN-44 1/00	0.0-0.5	Light grayish brown slightly shelly slightly silty fine sand with minor roots (SP-SM)			100	99	97	93	92	88	79	50	10			
JN-52 1/00	0.0-0.5	Grayish brown silty fine sand with minor roots (SM)					100	99	98	94	90	71	18			

# SKIER'S ISLAND



**WILLIAMS EARTH SCIENCES, INC.**

CORPORATE OFFICE:  
10600 Endeavour Way, Largo, FL 33777

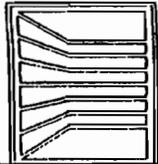
Largo: (727) 541-3444 FAX: (727) 541-1510  
Jacksonville: (904) 262-8852 FAX: (904) 262-8844  
Panama City: (850) 747-8419 FAX: (850) 783-2454

**SKIERS ISLAND  
SARASOTA BAY ECOSYSTEM RESTORATION  
SARASOTA COUNTY, FLORIDA**

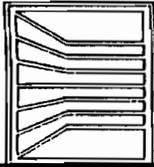
**BORING LOCATION PLAN**

Drawn By: TEJ	Date: 1-12-00	Scale: AS SHD
Checked By: SK	Report No. C399322	Figure No. 5

skit

**WILLIAMS EARTH SCIENCES, INC**CORPORATE OFFICE  
10600 Endeavour Way, Largo, FL 33777Largo: (727) 541-3444 Fax: (727) 541-1510  
Jacksonville: (904) 262-8852 Fax: (904) 262-8884  
Panama City: (904) 747-9419 Fax: (904) 763-2451**REPORT OF AUGER BORINGS**CLIENT: HDR Engineering, Inc.  
PROJECT: Sarasota Bay Ecosystem - Skier's IslandWILLIAMS PROJECT N<sup>o</sup>: C399322

LOCATION	DATE PERFORMED	DEPTH (ft) FROM/TO	SOIL DESCRIPTION	UNIFIED CLASSIF.	*APPROX. SURFACE ELEVATION (MSL)	GROUNDWATER LEVEL (ft)
SK-54	1/5/00	0.0-1.0	Dark gray shelly fine sand	SP	0.0	0.0
SK-55	1/6/00	0.0-4.5	Light brown shelly fine sand with abundant limestone gravel and boulders	GP	3.3	4.2
SK-56	1/6/00	0.0-3.3	Brown shelly fine sand with limestone gravel	SP-GP	2.5	2.9
SK-57	1/6/00	0.0-3.5	Sandy shell hash with limestone boulders and gravel	GP	2.0	3.0
SK-58	1/6/00	0.0-1.0 1.0-1.8 1.8-2.5	Light brown shelly fine sand Light grayish brown shelly fine sand Gray shelly fine sand	SP SP SP	1.6	2.2
SK-59	1/6/00	0.0-6.0	Light brown shelly fine sand with limestone gravel	GP	5.8	5.8
SK-60	1/6/00	0.0-4.0 4.0-5.5 5.5-6.3	Sandy shell hash with limestone boulders and gravel Sandy shell hash with limestone gravel Light brown calcareous very sandy silt with limestone gravel	GP GP ML	5.6	5.8

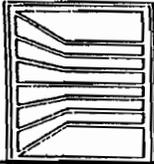
**WILLIAMS EARTH SCIENCES, INC**CORPORATE OFFICE:  
10600 Endeavour Way, Largo, FL 33777Largo: (727) 541-3444 Fax: (727) 541-1510  
Jacksonville: (904) 262-8852 Fax: (904) 262-8864  
Panama City: (850) 747-9419 Fax: (850) 763-2454**REPORT OF AUGER BORINGS**

CLIENT: HDR Engineering, Inc.

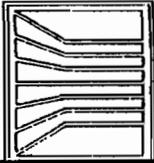
PROJECT: Sarasota Bay Ecosystem - Skier's Island

WILLIAMS PROJECT N<sup>o</sup>: C399322

LOCATION	DATE PERFORMED	DEPTH (ft) FROM/TO	SOIL DESCRIPTION	UNIFIED CLASSIF.	*APPROX. SURFACE ELEVATION (MSL)	GROUNDWATER LEVEL (ft)
SK-61	1/6/00	0.0-4.8	Light brown calcareous very silty fine sand with limestone gravel	SM	4.8	5.7
		4.8-6.0	Light brown calcareous sandy silt with limestone gravel	ML		
SK-62	1/5/00	0.0-1.5	Light brown very shelly silty fine sand	SM	0.4	0.3
SK-63	1/5/00	0.0-2.5	Brown shelly fine sand with large shell fragments and gravel	GP	2.2	3.0
		2.5-3.5	Light brown shelly silty fine sand with limestone fragments	SM		
SK-64	1/5/00	0.0-1.5	Grayish brown shelly fine sand with roots	SP	0.1	0.3
SK-65	1/5/00	0.0-1.5	Shell hash	SP	1.8	2.3
		1.5-2.0	Gray shelly silty fine sand with abundant roots	PT		
		2.0-3.0	Grayish brown slightly shelly fine sand with minor roots	SP		

**WILLIAMS EARTH SCIENCES, INC**CORPORATE OFFICE:  
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Jacksonville: (904) 262-8852 Fax: (904) 262-8864  
Panama City: (850) 747-9419 Fax: (850) 763-2454**REPORT OF AUGER BORINGS**CLIENT: HDR Engineering, Inc.  
PROJECT: Sarasota Bay Ecosystem - Skier's IslandWILLIAMS PROJECT N<sup>o</sup>: C399322

LOCATION	DATE PERFORMED	DEPTH (ft) FROM/TO	SOIL DESCRIPTION	UNIFIED CLASSIF.	*APPROX. SURFACE ELEVATION (MSL)	GROUNDWATER LEVEL (ft)
SK-66	1/5/00	0.0-0.5 0.5-1.0	Light gray shelly fine sand with minor roots Gray shelly fine sand	SP SP	-0.2	0.3
SK-67	1/5/00	0.0-4.0	Light brown fine sand with limestone gravel and large shell fragments	GP	3.4	3.8
SK-68	1/5/00	0.0-2.5	Shell hash with limestone gravel and light brown fine sand	GP	1.7	2.2
SK-69	1/5/00	0.0-2.0 2.0-2.5	Shell hash with brown shelly fine sand Shell hash	GP GP	1.7	2.2
SK-70	1/5/00	0.0-1.8 1.8-2.5	Shell hash with light brown shelly fine sand Gray shelly fine sand	GP SP	0.9	1.6
SK-71	1/5/00	0.0-3.5	Light brown shelly slightly silty fine sand with large shell fragments and limestone gravel	SP-GP	3.5	3.2



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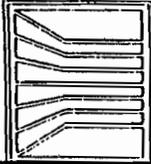
**REPORT OF AUGER BORINGS**

CLIENT: HDR Engineering, Inc.

PROJECT: Sarasota Bay Ecosystem - Skier's Island

WILLIAMS PROJECT Nº: C399322

LOCATION	DATE PERFORMED	DEPTH (ft) FROM/TO	SOIL DESCRIPTION	UNIFIED CLASSIF.	*APPROX. SURFACE ELEVATION (MSL)	GROUNDWATER LEVEL (ft)
SK-72	1/5/00	0.0-0.5	Grayish brown slightly silty fine sand with roots	SP-SM	0.3	0.5
		0.5-1.3	Gray slightly shelly slightly silty fine sand	SP-SM		
SK-73	1/5/00	0.0-4.8	Light brown shelly fine sand	SP	4.6	4.3
SK-74	1/5/00	0.0-2.5	Light brown shelly fine sand with large shell fragments and limestone gravel	SP-GP	1.2	2.2
SK-75	1/7/00	0.0-3.0	Light brown shelly fine sand with limestone gravel	SP	5.2	6.0
		3.0-5.0	Tan shelly silty fine sand with limestone gravel	SM		
		5.0-6.3	Shell hash with limestone gravel and sand	GP		
SK-76	1/7/00	0.0-3.0	Light brown very shelly fine sand	SP	3.4	4.7
		3.0-4.0	Light gray shelly fine sand	SP		
		4.0-4.5	Light brown shelly fine sand	SP		
		4.5-5.8	Gray shelly fine sand	SP		
SK-77	1/7/00	0.0-5.0	Light brown very shelly fine sand	SP	5.7	6.7
		5.0-6.5	Light brown shelly fine sand with limestone gravel	SP		
		6.5-7.5	Light brown shelly silty fine sand	SM		



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Panama City: (850) 747-9419 Fax: (850) 763-7454

**REPORT OF AUGER BORINGS**

CLIENT: HDR Engineering, Inc.  
PROJECT: Sarasota Bay Ecosystem - Skier's Island

WILLIAMS PROJECT Nº: C399322

LOCATION	DATE PERFORMED	DEPTH (ft) FROM/TO	SOIL DESCRIPTION	UNIFIED CLASSIF.	*APPROX. SURFACE ELEVATION (MSL)	GROUNDWATER LEVEL (ft)
SK-78	1/7/00	0.0-5.0	Light brown fine sand with large shell fragments and limestone gravel	GP	7.2	7.7
		5.0-8.0	Light brown shelly silty fine sand with minor limestone gravel	SM		
SK-79	1/7/00	0.0-7.0	Light brown shelly fine sand with limestone gravel	SP	7.0	7.0
		7.0-8.0	Shell hash	GP		
SK-80	1/7/00	0.0-2.0	Light brown shelly silty fine sand with limestone gravel Unable to penetrate further	SM	5.3	Not Encountered
SK-81	1/7/00	0.0-6.3	Light brown silty fine sand with limestone gravel	SM-GP	4.7	5.8
SK-82	1/7/00	0.0-3.0	Shell hash with light gray fine sand	GP	4.8	5.5
		3.0-5.5	Light brown shelly fine sand with limestone gravel	SP-GP		
		5.5-6.0	Tan silty fine sand with limestone gravel	SP-GP		

\*Approximate surface elevation noted from topographic maps.

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# WILLIAMS

EARTH SCIENCES, INC.

## SUMMARY OF LABORATORY TEST RESULTS

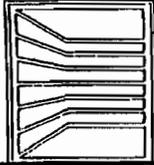
CLIENT: HDR Engineering, Inc.

PROJECT: Sarasota Bay Ecosystem Restoration

LOCATION: Skier's Island

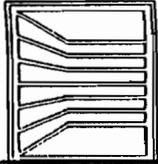
WILLIAMS PROJECT NO.: C399322

Boring No. and Date	Depth (ft)	Soil Description	Natural Moisture Content (%)	1"	¾"	½"	¾"	#4	#10	#40	#60	#100	#200	Organic Content (%)	Atterberg Limits	
															LL	PI
SK-54 1/00	0.0-1.0	Dark gray shelly fine sand (SP)			100	95	92	87	79	58	42	23	4			
SK-62 1/00	0.0-1.5	Light brown very shelly silty fine sand (SM)		100	97	88	83	71	61	49	44	34	22			
SK-65 1/00	0.0-1.5	Shell hash (SP)			100	99	90	77	55	14	4	2	1			
SK-66 1/00	0.5-1.0	Gray shelly fine sand (SP)					100	97	93	83	75	43	4			
SK-72 1/00	0.5-1.3	Gray slightly shelly fine sand (SP)					100	99	96	90	86	64	4			
SK-80 1/00	0.0-2.0	Light brown shelly silty fine sand with gravel (SM)			100	89	84	70	58	40	36	32	24			

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Panama City: (850) 747-9419 Fax: (850) 763-2454**REPORT OF AUGER BORINGS**CLIENT: HDR Engineering, Inc.  
PROJECT: Sarasota Bay Ecosystem - Big Edwards Island

WILLIAMS PROJECT Nº: C399322

LOCATION	DATE PERFORMED	DEPTH (ft) FROM/TO	SOIL DESCRIPTION	UNIFIED CLASSIF.	*APPROX. SURFACE ELEVATION (MSL)	GROUNDWATER LEVEL (ft)
BE-88	1/7/00	0.0-2.5	Light grayish brown slightly shelly fine sand	SP	2.9	4.5
		2.5-3.0	Brown silty fine sand	SM		
		3.0-4.0	Gray sandy silt	ML		
		4.0-5.5	Grayish brown shelly silty fine sand with finely divided organic matter	PT		
BE-89	1/7/00	0.0-2.0	Light brown silty fine sand	SM	4.5	4.5
		2.0-3.5	Light grayish brown fine sand	SP		
		3.5-4.5	Grayish brown sandy silt	ML		
		4.5-5.0	Grayish brown shelly silty fine sand	SM		
BE-90	1/12/00	0.0-6.0	Tan shelly silty fine sand with limestone gravel	SM	8.3	6.6
		6.0-7.0	Brown shelly fine sand	SP		
BE-91	1/12/00	0.0-2.5	Light grayish brown slightly silty fine sand	SP-SM	5.3	4.5
		2.5-4.5	Light brown very shelly fine sand with limestone gravel	SP		
		4.5-5.0	Light gray slightly shelly fine sand	SP		

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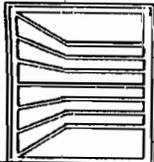
**REPORT OF AUGER BORINGS**

CLIENT: HDR Engineering, Inc.

PROJECT: Sarasota Bay Ecosystem - Big Edwards Island

WILLIAMS PROJECT N<sup>o</sup>: C399322

LOCATION	DATE PERFORMED	DEPTH (ft) FROM/TO	SOIL DESCRIPTION	UNIFIED CLASSIF.	*APPROX. SURFACE ELEVATION (MSL)	GROUNDWATER LEVEL (ft)
BE-84	1/7/00	0.0-1.5	Light brown fine sand with minor roots	SP	2.7	2.0
		1.5-2.0	Grayish brown very silty fine sand	SM		
		2.0-4.0	Light grayish brown very sandy silt	ML		
BE-85	1/7/00	0.0-2.0	Tan calcareous sandy silt	ML	2.4	2.3
		2.0-2.5	Light gray clayey silt	MH		
		2.5-3.0	Gray shelly slightly silty fine sand	SP-SM		
BE-86	1/12/00	0.0-8.0	Shell hash with light brown fine sand	GP	12.5	Not Encountered
		8.0-10.0	Light brown shelly fine sand	SP		
			Unable to penetrate further			
BE-87	1/7/00	0.0-1.5	Light brown slightly shelly fine sand	SP	4.5	5.7
		1.5-3.5	Light brown shelly fine sand	SP		
		3.5-4.5	Tan sandy silt with minor roots	ML		
		4.5-6.0	Gray very shelly fine sand	SP		

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CLIENT: HDR Engineering, Inc.

PROJECT: Sarasota Bay Ecosystem - Big Edwards Island

WILLIAMS PROJECT Nº: C399322

LOCATION	DATE PERFORMED	DEPTH (ft) FROM/TO	SOIL DESCRIPTION	UNIFIED CLASSIF.	*APPROX. SURFACE ELEVATION (MSL)	GROUNDWATER LEVEL (ft)
BE-92	1/12/00	0.0-8.0	Light brown shelly fine sand with minor limestone gravel	SP	12.5	Not Encountered
		8.0-10.0	Light brown shelly fine sand with limestone gravel Unable to penetrate further	SP-GP		
BE-93	1/7/00	0.0-3.0	Light brown slightly shelly slightly silty fine sand with limestone gravel	SP-SM	5.8	5.7
		3.0-5.5	Light brown shelly fine sand	SP		
		5.5-6.0	Light gray fine sand	SP		
BE-94	1/13/00	0.0-7.5	Light brown shelly fine sand with large shell fragments and limestone gravel	SP-GP	10.2	10.7
		7.5-9.0	Light brown fine sand	SP		
		9.0-10.0	Light brown shelly fine sand with large shell fragments and minor limestone gravel	SP		
		10.0-11.0	Dark gray slightly shelly silty fine sand with roots	SM		
BE-95	1/7/00	0.0-1.5	Shell hash with light brown fine sand	GP	2.2	2.2
		1.5-2.5	Light gray slightly shelly fine sand	SP		



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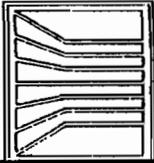
**REPORT OF AUGER BORINGS**

CLIENT: HDR Engineering, Inc.

PROJECT: Sarasota Bay Ecosystem – Big Edwards Island

WILLIAMS PROJECT N<sup>o</sup>: C399322

LOCATION	DATE PERFORMED	DEPTH (ft) FROM/TO	SOIL DESCRIPTION	UNIFIED CLASSIF.	*APPROX. SURFACE ELEVATION (MSL)	GROUNDWATER LEVEL (ft)
BE-96	1/12/00	0.0-8.5	Light grayish brown shelly fine sand with minor limestone gravel	SP	11.7	11.2
		8.5-11.0	Light brown shelly fine sand with limestone gravel	SP		
		11.0-12.0	Gray silty fine sand	SM		
BE-97	1/12/00	0.0-4.5	Light grayish brown fine sand	SP	6.3	6.1
		4.5-5.0	Light brown very silty fine sand	SM		
		5.0-6.3	Brown shelly slightly silty fine sand with limestone gravel	SP-GP		
BE-98	1/12/00	0.0-7.0	Light grayish brown shelly fine sand with limestone gravel	SP	13.7	Not Encountered
		7.0-8.0	Light brown slightly shelly fine sand	SP		
		8.0-9.0	Light brown slightly shelly fine sand with limestone gravel	SP-GP		
			Unable to penetrate further			
BE-99	1/10/00	0.0-1.0	Mottled gray and reddish brown slightly shelly fine sand	SP	1.8	1.0
		1.0-2.0	Grayish brown fine sand	SP		



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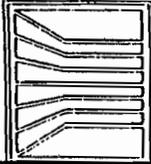
**REPORT OF AUGER BORINGS**

**CLIENT:** HDR Engineering, Inc.

**PROJECT:** Sarasota Bay Ecosystem – Skier’s Island

**WILLIAMS PROJECT N<sup>o</sup>:** C399322

LOCATION	DATE PERFORMED	DEPTH (ft) FROM/TO	SOIL DESCRIPTION	UNIFIED CLASSIF.	*APPROX. SURFACE ELEVATION (MSL)	GROUNDWATER LEVEL (ft)
SK-72	1/5/0	0.0-0.5	Grayish brown slightly silty fine sand with roots	SP-SM	0.3	0.5
		0.5-1.3	Gray slightly shelly slightly silty fine sand	SP-SM		
SK-73	1/5/00	0.0-4.8	Light brown shelly fine sand	SP	4.6	4.3
SK-74	1/5/00	0.0-2.5	Light brown shelly fine sand with large shell fragments and limestone gravel	SP-GP	1.2	2.2
SK-75	1/7/00	0.0-3.0	Light brown shelly fine sand with limestone gravel	SP	5.2	6.0
		3.0-5.0	Tan shelly silty fine sand with limestone gravel	SM		
		5.0-6.3	Shell hash with limestone gravel and sand	GP		
SK-76	1/7/00	0.0-3.0	Light brown very shelly fine sand	SP	3.4	4.7
		3.0-4.0	Light gray shelly fine sand	SP		
		4.0-4.5	Light brown shelly fine sand	SP		
		4.5-5.8	Gray shelly fine sand	SP		
SK-77	1/7/00	0.0-5.0	Light brown very shelly fine sand	SP	5.7	6.7
		5.0-6.5	Light brown shelly fine sand with limestone gravel	SP		
		6.5-7.5	Light brown shelly silty fine sand	SM		



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**REPORT OF AUGER BORINGS**

CLIENT: HDR Engineering, Inc.  
PROJECT: Sarasota Bay Ecosystem - Skier's Island

WILLIAMS PROJECT Nº: C399322

LOCATION	DATE PERFORMED	DEPTH (ft) FROM/TO	SOIL DESCRIPTION	UNIFIED CLASSIF.	*APPROX. SURFACE ELEVATION (MSL)	GROUNDWATER LEVEL (ft)
SK-78	1/7/00	0.0-5.0	Light brown fine sand with large shell fragments and limestone gravel	GP	7.2	7.7
		5.0-8.0	Light brown shelly silty fine sand with minor limestone gravel	SM		
SK-79	1/7/00	0.0-7.0	Light brown shelly fine sand with limestone gravel	SP	7.0	7.0
		7.0-8.0	Shell hash	GP		
SK-80	1/7/00	0.0-2.0	Light brown shelly silty fine sand with limestone gravel Unable to penetrate further	SM	5.3	Not Encountered
SK-81	1/7/00	0.0-6.3	Light brown silty fine sand with limestone gravel	SM-GP	4.7	5.8
SK-82	1/7/00	0.0-3.0	Shell hash with light gray fine sand	GP	4.8	5.5
		3.0-5.5	Light brown shelly fine sand with limestone gravel	SP-GP		
		5.5-6.0	Tan silty fine sand with limestone gravel	SP-GP		

\*Approximate surface elevation noted from topographic maps.

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# WILLIAMS

EARTH SCIENCES, INC.

## SUMMARY OF LABORATORY TEST RESULTS

CLIENT: HDR Engineering, Inc.

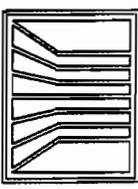
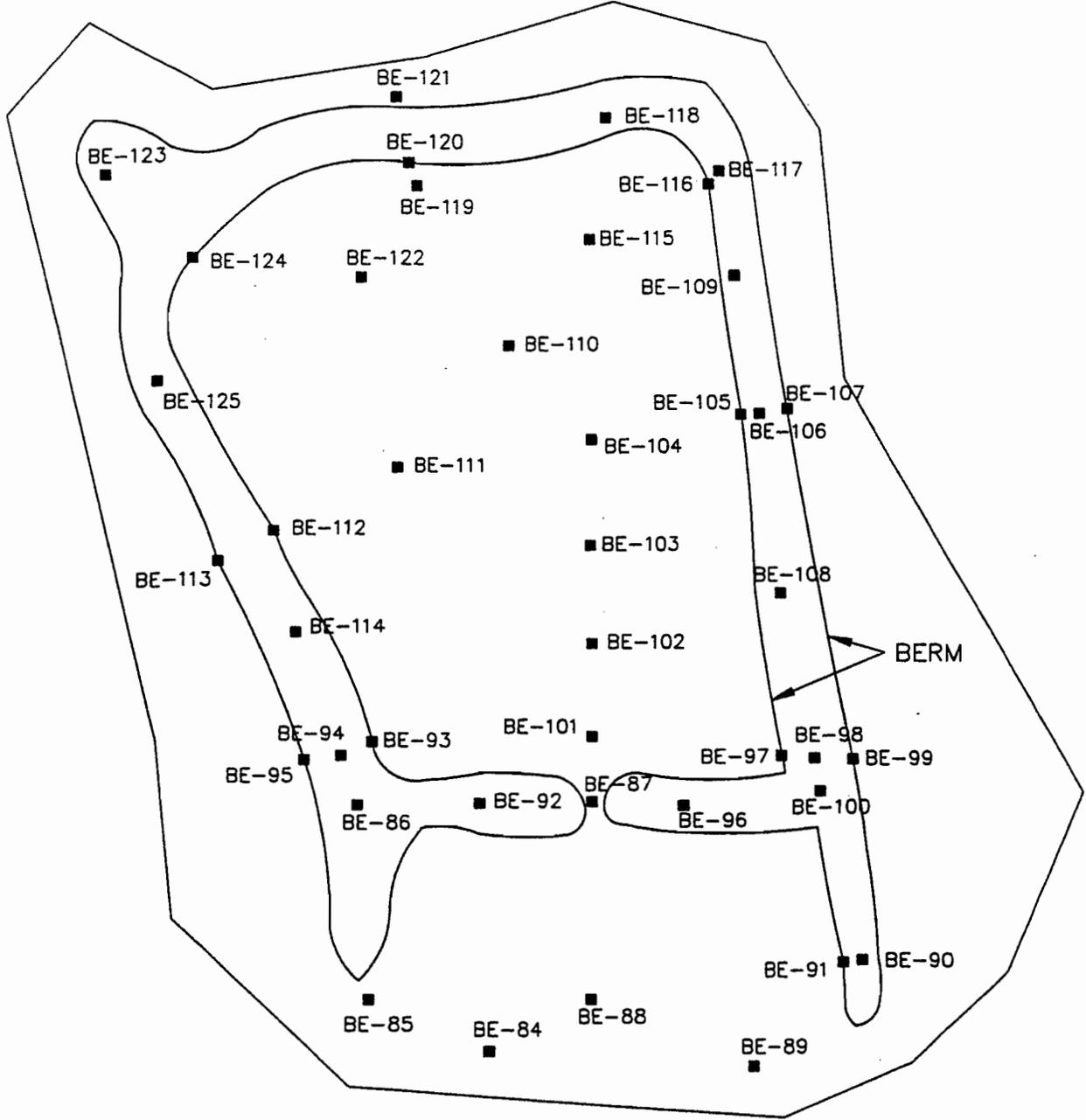
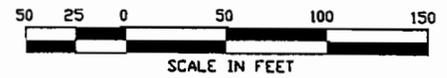
PROJECT: Sarasota Bay Ecosystem Restoration

LOCATION: Skier's Island

WILLIAMS PROJECT NO.: C399322

Boring No. and Date	Depth (ft)	Soil Description	Natural Moisture Content (%)	1"	¾"	½"	¾"	#4	#10	#40	#60	#100	#200	Organic Content (%)	Atterberg Limits	
															LL	PI
SK-54 1/00	0.0-1.0	Dark gray shelly fine sand (SP)			100	95	92	87	79	58	42	23	4			
SK-62 1/00	0.0-1.5	Light brown very shelly silty fine sand (SM)		100	97	88	83	71	61	49	44	34	22			
SK-65 1/00	0.0-1.5	Shell hash (SP)			100	99	90	77	55	14	4	2	1			
SK-66 1/00	0.5-1.0	Gray shelly fine sand (SP)					100	97	93	83	75	43	4			
SK-72 1/00	0.5-1.3	Gray slightly shelly fine sand (SP)					100	99	96	90	86	64	4			
SK-80 1/00	0.0-2.0	Light brown shelly silty fine sand with gravel (SM)			100	89	84	70	58	40	36	32	24			

# BIG EDWARDS ISLAND



**WILLIAMS EARTH SCIENCES, INC.**

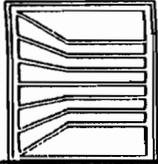
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**BIG EDWARDS ISLAND  
SARASOTA BAY ECOSYSTEM RESTORATION  
SARASOTA COUNTY, FLORIDA**

**BORING LOCATION PLAN**

Drawn By: TEJ	Date: 1-12-00	Scale: AS SHOWN
Checked By: SK	Report No. C399322	Figure No. 6

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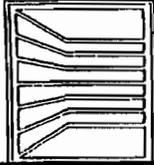
**REPORT OF AUGER BORINGS**

CLIENT: HDR Engineering, Inc.

PROJECT: Sarasota Bay Ecosystem - Big Edwards Island

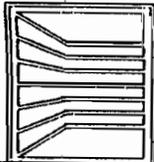
WILLIAMS PROJECT N<sup>o</sup>: C399322

LOCATION	DATE PERFORMED	DEPTH (ft) FROM/TO	SOIL DESCRIPTION	UNIFIED CLASSIF.	*APPROX. SURFACE ELEVATION (MSL)	GROUNDWATER LEVEL (ft)
BE-84	1/7/00	0.0-1.5	Light brown fine sand with minor roots	SP	2.7	2.0
		1.5-2.0	Grayish brown very silty fine sand	SM		
		2.0-4.0	Light grayish brown very sandy silt	ML		
BE-85	1/7/00	0.0-2.0	Tan calcareous sandy silt	ML	2.4	2.3
		2.0-2.5	Light gray clayey silt	MH		
		2.5-3.0	Gray shelly slightly silty fine sand	SP-SM		
BE-86	1/12/00	0.0-8.0	Shell hash with light brown fine sand	GP	12.5	Not Encountered
		8.0-10.0	Light brown shelly fine sand	SP		
			Unable to penetrate further			
BE-87	1/7/00	0.0-1.5	Light brown slightly shelly fine sand	SP	4.5	5.7
		1.5-3.5	Light brown shelly fine sand	SP		
		3.5-4.5	Tan sandy silt with minor roots	ML		
		4.5-6.0	Gray very shelly fine sand	SP		

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PROJECT: Sarasota Bay Ecosystem - Big Edwards Island

WILLIAMS PROJECT Nº: C399322

LOCATION	DATE PERFORMED	DEPTH (ft) FROM/TO	SOIL DESCRIPTION	UNIFIED CLASSIF.	*APPROX. SURFACE ELEVATION (MSL)	GROUNDWATER LEVEL (ft)
BE-88	1/7/00	0.0-2.5	Light grayish brown slightly shelly fine sand	SP	2.9	4.5
		2.5-3.0	Brown silty fine sand	SM		
		3.0-4.0	Gray sandy silt	ML		
		4.0-5.5	Grayish brown shelly silty fine sand with finely divided organic matter	PT		
BE-89	1/7/00	0.0-2.0	Light brown silty fine sand	SM	4.5	4.5
		2.0-3.5	Light grayish brown fine sand	SP		
		3.5-4.5	Grayish brown sandy silt	ML		
		4.5-5.0	Grayish brown shelly silty fine sand	SM		
BE-90	1/12/00	0.0-6.0	Tan shelly silty fine sand with limestone gravel	SM	8.3	6.6
		6.0-7.0	Brown shelly fine sand	SP		
BE-91	1/12/00	0.0-2.5	Light grayish brown slightly silty fine sand	SP-SM	5.3	4.5
		2.5-4.5	Light brown very shelly fine sand with limestone gravel	SP		
		4.5-5.0	Light gray slightly shelly fine sand	SP		

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PROJECT: Sarasota Bay Ecosystem - Big Edwards Island

WILLIAMS PROJECT Nº: C399322

LOCATION	DATE PERFORMED	DEPTH (ft) FROM/TO	SOIL DESCRIPTION	UNIFIED CLASSIF.	*APPROX. SURFACE ELEVATION (MSL)	GROUNDWATER LEVEL (ft)
BE-92	1/12/00	0.0-8.0	Light brown shelly fine sand with minor limestone gravel	SP	12.5	Not Encountered
		8.0-10.0	Light brown shelly fine sand with limestone gravel Unable to penetrate further	SP-GP		
BE-93	1/7/00	0.0-3.0	Light brown slightly shelly slightly silty fine sand with limestone gravel	SP-SM	5.8	5.7
		3.0-5.5	Light brown shelly fine sand	SP		
		5.5-6.0	Light gray fine sand	SP		
BE-94	1/13/00	0.0-7.5	Light brown shelly fine sand with large shell fragments and limestone gravel	SP-GP	10.2	10.7
		7.5-9.0	Light brown fine sand	SP		
		9.0-10.0	Light brown shelly fine sand with large shell fragments and minor limestone gravel	SP		
		10.0-11.0	Dark gray slightly shelly silty fine sand with roots	SM		
BE-95	1/7/00	0.0-1.5	Shell hash with light brown fine sand	GP	2.2	2.2
		1.5-2.5	Light gray slightly shelly fine sand	SP		



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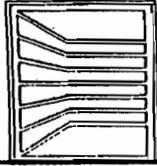
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WILLIAMS PROJECT N<sup>o</sup>: C399322

LOCATION	DATE PERFORMED	DEPTH (ft) FROM/TO	SOIL DESCRIPTION	UNIFIED CLASSIF.	*APPROX. SURFACE ELEVATION (MSL)	GROUNDWATER LEVEL (ft)
BE-96	1/12/00	0.0-8.5	Light grayish brown shelly fine sand with minor limestone gravel	SP	11.7	11.2
		8.5-11.0	Light brown shelly fine sand with limestone gravel	SP		
		11.0-12.0	Gray silty fine sand	SM		
BE-97	1/12/00	0.0-4.5	Light grayish brown fine sand	SP	6.3	6.1
		4.5-5.0	Light brown very silty fine sand	SM		
		5.0-6.3	Brown shelly slightly silty fine sand with limestone gravel	SP-GP		
BE-98	1/12/00	0.0-7.0	Light grayish brown shelly fine sand with limestone gravel	SP	13.7	Not Encountered
		7.0-8.0	Light brown slightly shelly fine sand	SP		
		8.0-9.0	Light brown slightly shelly fine sand with limestone gravel	SP-GP		
			Unable to penetrate further			
BE-99	1/10/00	0.0-1.0	Mottled gray and reddish brown slightly shelly fine sand	SP	1.8	1.0
		1.0-2.0	Grayish brown fine sand	SP		

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PROJECT: Sarasota Bay Ecosystem - Big Edwards Island

WILLIAMS PROJECT Nº: C399322

LOCATION	DATE PERFORMED	DEPTH (ft) FROM/TO	SOIL DESCRIPTION	UNIFIED CLASSIF.	*APPROX. SURFACE ELEVATION (MSL)	GROUNDWATER LEVEL (ft)
BE-100	1/12/00	0.0-12.0	Light brown shelly fine sand with large shell fragments and limestone gravel Unable to penetrate further	SP-GP	13.3	Not Encountered
BE-101	1/7/00	0.0-3.0 3.0-4.0 4.0-5.5 5.5-6.0	Light brown slightly shelly fine sand Light brown silty fine sand Gray very silty fine sand Brown silty fine sand with abundant roots	SP SM SM PT	4.9	5.8
BE-102	1/7/00	0.0-2.0 2.0-5.5 5.5-7.5	Light brown shelly fine sand Light brown slightly shelly fine sand Brown very shelly fine sand	SP SP SP	7.0	7.5
BE-103	1/10/00	0.0-3.0 3.0-5.0 5.0-6.0 6.0-6.4	Light brown shelly fine sand White fine sand Light brown fine sand Grayish brown fine sand	SP SP SP SP	7.1	6.2
BE-104	1/10/00	0.0-6.0 6.0-7.8 7.8-10.0	Light brown shelly fine sand with limestone gravel Light brown fine sand Light grayish brown very sandy silt	SP-GP SP ML	9.9	9.7

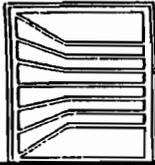
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10600 Endeavour Way, Largo, FL 33777Largo: (727) 541-3444 Fax: (727) 541-1510  
Jacksonville: (904) 262-8852 Fax: (904) 262-8864  
Panama City: (904) 747-9419 Fax: (904) 763-2454**REPORT OF AUGER BORINGS**

CLIENT: HDR Engineering, Inc.

PROJECT: Sarasota Bay Ecosystem – Big Edwards Island

WILLIAMS PROJECT Nº: C399322

LOCATION	DATE PERFORMED	DEPTH (ft) FROM/TO	SOIL DESCRIPTION	UNIFIED CLASSIF.	*APPROX. SURFACE ELEVATION (MSL)	GROUNDWATER LEVEL (ft)
BE-105	1/11/00	0.0-4.5	Light brown shelly fine sand with large shell fragments and limestone gravel	SP-GP	7.9	7.0
		4.5-6.0	Light brown fine sand	SP		
		6.0-7.0	Light brown very sandy silt	ML		
		7.0-8.5	Light gray slightly shelly fine sand	SP		
BE-106	1/11/00	0.0-9.0	Light brown shelly fine sand with large shell fragments and limestone gravel	SP-GP	10.9	9.8
		9.0-10.0	Light brown slightly shelly medium to fine sand	SP		
		10.0-11.0	Gray slightly silty fine sand	SP-SM		
BE-107	1/10/00	0.0-1.0	Grayish brown shelly fine sand	SP	1.1	1.0
		1.0-2.0	Gray shelly silty fine sand with minor roots	SM		
BE-108	1/11/00	0.0-8.0	Light brown slightly shelly fine sand with minor limestone gravel	SP	13.1	12.3
		8.0-11.0	Light grayish brown fine sand	SP		
		11.0-12.0	Light brown slightly shelly fine sand with minor limestone gravel	SP		
		12.0-13.0	Gray fine sand	SP		

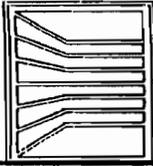
**WILLIAMS EARTH SCIENCES, INC**CORPORATE OFFICE:  
10600 Endeavour Way, Largo, FL 33777Largo: (727) 541-3444 Fax: (727) 541-1510  
Jacksonville: (904) 262-8852 Fax: (904) 262-8864  
Panama City: (850) 747-9419 Fax: (850) 743-2454**REPORT OF AUGER BORINGS**

CLIENT: HDR Engineering, Inc.

PROJECT: Sarasota Bay Ecosystem - Big Edwards Island

WILLIAMS PROJECT Nº: C399322

LOCATION	DATE PERFORMED	DEPTH (ft) FROM/TO	SOIL DESCRIPTION	UNIFIED CLASSIF.	*APPROX. SURFACE ELEVATION (MSL)	GROUNDWATER LEVEL (ft)
BE-109	1/11/00	0.0-9.5	Light grayish brown shelly fine sand with limestone gravel Unable to penetrate further	SP	12.7	Not Encountered
BE-110	1/10/00	0.0-5.0 5.0-8.5	Brown slightly silty fine sand with limestone gravel Light brown slightly shelly fine sand with limestone gravel Unable to penetrate further	SP-SM SP	16.7	Not Encountered
BE-111	1/10/00	0.0-3.0 3.0-4.0 4.0-6.0 6.0-9.0 9.0-10.0	Light brown fine sand with limestone gravel Light brown shelly fine sand Light grayish brown fine sand Light brown shelly fine sand with minor limestone gravel Light grayish brown fine sand	SP-GP SP SP SP SP	9.2	8.5
BE-112	1/10/00	0.0-5.0 5.0-6.2 6.2-7.0	Light brown fine sand with shell and limestone gravel Light grayish brown very shelly fine sand Grayish brown fine sand	SP-GP SP SP	6.7	6.1

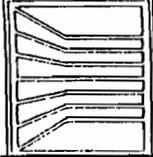
**WILLIAMS EARTH SCIENCES, INC**CORPORATE OFFICE:  
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Jacksonville: (904) 262-8852 Fax: (904) 262-8864  
Panama City: (904) 742-9419 Fax: (904) 742-2454**REPORT OF AUGER BORINGS**

CLIENT: HDR Engineering, Inc.

PROJECT: Sarasota Bay Ecosystem – Big Edwards Island

WILLIAMS PROJECT Nº: C399322

LOCATION	DATE PERFORMED	DEPTH (ft) FROM/TO	SOIL DESCRIPTION	UNIFIED CLASSIF.	*APPROX. SURFACE ELEVATION (MSL)	GROUNDWATER LEVEL (ft)
BE-113	1/10/00	0.0-1.5	Light gray shelly fine sand	SP	2.6	2.7
		1.5-3.0	Light brown shelly slightly silty fine sand	SP-SM		
BE-114	1/13/00	0.0-10.0	Light brown shelly fine sand with large limestone gravel and cobbles	GP	12.4	11.7
		10.0-11.0	Light grayish brown slightly silty fine sand	SP-SM		
		11.0-12.0	Gray shelly slightly silty fine sand	SM		
BE-115	1/10/00	0.0-5.0	Light grayish brown shelly fine sand with limestone gravel (2" to 8" diameter)	SP-GP	13.9	Not Encountered
		5.0-9.0	Shell fragments and light brown very shelly fine sand with limestone gravel Unable to penetrate further	SP-GP		
BE-116	1/11/00	0.0-8.0	Light brown shelly fine sand with limestone gravel	SP	10.6	11.2
		8.0-9.5	Light brown fine sand	SP		
		9.5-10.5	Gray sandy silt	ML		
		10.5-11.5	Light brown limestone gravel	GP		
BE-117	1/11/00	0.0-9.5	Light brown shelly fine sand with limestone gravel Unable to penetrate further	SP	13.0	Not Encountered

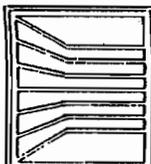
**WILLIAMS EARTH SCIENCES, INC**CORPORATE OFFICE:  
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CLIENT: HDR Engineering, Inc.

PROJECT: Sarasota Bay Ecosystem – Big Edwards Island

WILLIAMS PROJECT N<sup>o</sup>: C399322

LOCATION	DATE PERFORMED	DEPTH (ft) FROM/TO	SOIL DESCRIPTION	UNIFIED CLASSIF.	*APPROX. SURFACE ELEVATION (MSL)	GROUNDWATER LEVEL (ft)
BE-118	1/11/00	0.0-10.5	Light brown fine sand with limestone gravel Unable to penetrate further	SP-GP	12.8	Not Encountered
BE-119	1/12/00	0.0-8.5	Light grayish brown shelly fine sand with limestone gravel	SP	10.2	11.0
		8.5-9.5	Grayish brown fine sand	SP		
		9.5-11.0	Gray sandy silt	ML		
BE-120	1/12/00	0.0-9.0	Light brown shelly fine sand with minor limestone gravel	SP	10.2	11.5
		9.0-10.0	Light brown fine sand	SP		
		10.0-11.5	Gray very silty fine sand	SM		
BE-121	1/12/00	0.0-1.5	Gray shelly fine sand with minor roots	SP	-0.2	0.8
BE-122	1/13/00	0.0-8.0	Light brown slightly shelly slightly silty sand with large shell fragments	SP-GP	10.2	10.10
		8.0-11.0	Limestone gravel with brown fine sand	GP		
		11.0-12.0	Grayish brown slightly silty fine sand	SP-SM		

**WILLIAMS EARTH SCIENCES, INC**CORPORATE OFFICE  
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**REPORT OF AUGER BORINGS**

CLIENT: HDR Engineering, Inc.

PROJECT: Sarasota Bay Ecosystem - Big Edwards Island

WILLIAMS PROJECT Nº: C399322

LOCATION	DATE PERFORMED	DEPTH (ft) FROM/TO	SOIL DESCRIPTION	UNIFIED CLASSIF.	*APPROX. SURFACE ELEVATION (MSL)	GROUNDWATER LEVEL (ft)
BE-123	1/12/00	0.0-4.0	Light grayish brown shelly fine sand	SP	14.3	Not Encountered
		4.0-8.5	Tan silty fine sand with limestone gravel	SM		
		8.5-10.0	Light brown silty fine sand with limestone gravel Unable to penetrate further	SM-GP		
BE-124	1/12/00	0.0-9.2	Light brown fine sand with minor limestone gravel Unable to penetrate further	SP	8.5	Not Encountered
BE-125	1/13/00	0.0-5.0	Light brown slightly shelly silty fine sand with limestone gravel	SM	12.2	9.0
		5.0-11.0	Light brown silty limestone gravel	GM		
		11.0-13.0	Gray very shelly fine sand with limestone gravel	SP-GP		

\*Approximate surface elevation noted from topographic maps.

**WILLIAMS**  
EARTH SCIENCES, INC.

**SUMMARY OF LABORATORY TEST RESULTS**

CLIENT: HDR Engineering, Inc.  
PROJECT: Sarasota Bay Ecosystem Restoration  
LOCATION: Big Edwards Island

WILLIAMS PROJECT NO.: C399322

Boring No. and Date	Depth (ft)	Soil Description	Natural Moisture Content (%)	1"	3/4"	1/2"	3/8"	#4	#10	#40	#60	#100	#200	Organic Content (%)	Atterberg Limits	
															LL	PI
BE-85 1/00	0.0-2.0	Tan calcareous sandy silt (ML)									100	98	96			
BE-88 1/00	3.0-4.0	Gray sandy silt (ML)	50										82		41	16
BE-90 1/00	0.0-6.0	Tan shelly silty fine sand with limestone gravel (SM)			100	89	84	74	63	50	46	30	22			
BE-95 1/00	0.0-1.5	Shell hash with light brown fine sand (GP)				100	99	86	50	13	10	6	3			
BE-104 1/00	7.8-10.0	Light grayish brown very sandy silt (ML)							100	99	99	93	56			
BE-109 1/00	0.0-9.5	Light grayish brown shelly fine sand with limestone gravel (SP)		100	98	94	93	89	80	67	59	30	2			
BE-110 1/00	0.0-5.0	Brown silty fine sand with limestone gravel (SM)		100	87	85	83	71	58	38	34	29	22			
BE-123 1/00	4.0-8.5	Tan silty fine sand with limestone gravel (SM)				100	97	91	81	70	65	44	32			

# **APPENDIX F**

## **REAL ESTATE**

APPENDIX F  
SARASOTA BAY ECOSYSTEM RESTORATION  
SARASOTA COUNTY, FLORIDA

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APPENDIX F  
SARASOTA BAY ECOSYSTEM RESTORATION  
SARASOTA COUNTY, FLORIDA

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APPENDIX F  
SARASOTA BAY ECOSYSTEM RESTORATION  
SARASOTA COUNTY, FLORIDA

**1. STATEMENT OF PURPOSE**

This Real Estate Plan is tentative in nature for planning purposes only and both the final real property acquisition lines and the real estate cost estimates provided are subject to change even after approval of the Feasibility Report.

The Ecosystem Restoration Report was funded and initiated, June 12, 1998. Report will be submitted to South Atlantic Division approximately by the end of July 2000.

**2. AUTHORIZATION**

This feasibility study was performed under the authority of Section 1135 of the Water Resources Development Act (WRDA) of 1986, Public Law (PL) 99-662, as amended by the Water Resources Development Act of 1990. The act reads, in part, as follows:

"The Secretary is authorized to review the operation of water resources projects constructed by the Secretary (Corps built projects) to determine the need for modifications in the structures and operation of such projects for the purpose of improving the quality of the environment in the public interest."

**3. PROJECT LOCATION**

Sarasota Bay is located on the west central coast of Florida between Tampa and Venice, Florida. The system is bordered by a chain of coastal barrier islands (Anna Maria Island, Longboat Key, Lido Key, Siesta Key and Casey Key).

**4. PROJECT DESCRIPTION**

West Coast Inland Navigation District requested Federal assistance from the Corps to participate in achieving their comprehensive long-range goal of environmental restoration for the coastal lagoon system.

Problems within the bay include the loss of approximately 40 percent of historical intertidal wetlands and 30 percent of historical sea grass beds. These habitats are critical nursery and foraging habitats for a variety of economically important fisheries species including snook, red drum, spotted sea trout and mullet.

A portion of the historical wetland and habitat loss in Sarasota Bay is due to the Army Corps of Engineers' placement of dredged fill material from the construction of the Gulf Intracoastal Water Way. The dredged material was placed within the Bay to build islands visible to navigators, preventing dangerous shoals. Dredged material was also placed in mangroves and shallow water bay bottoms creating upland areas.

The remaining wetlands and habitat within and adjacent to the project limits are impacted by non-native nuisance vegetation and an on-gong eroding problem. The presence of exotic plant species inhibits the growth of native species. Erosion is a problem on several of the islands, which impacts both the water quality and the filling of navigational channels.

The primary objective of this project is to ecologically restore the degraded ecosystem structure, function, and dynamic processes by removing exotic vegetation, excavating tidal channels, and planting native vegetation.

Six Islands were evaluated as part of the study. Plans for each of the islands are as follows:

**A. BIG EDWARDS ISLAND**

The restoration plan on Big Edwards Island will provide improved and diverse fish and wildlife habitat through the use of a mix of upland restoration, low marsh/mangroves, high marsh and tidal lagoons. The open water/tidal lagoon system also maximizes the "edge effect" of the adjacent low marsh and mangrove systems, maintains public access and use, and enhances public use with a proposed natural foot trail along the upland areas. Also provided for public use is a boardwalk across the marsh and open water systems, a potential opportunity for educational interpretive signage, promoting and explaining the diverse habitats, maintenance of the existing upland area at the southern portion of the island where the majority of public access occurs. In addition, the Preferred Alternative maintains the eastern upland berm along the island and the existing mature mangrove fringe around the perimeter of the island to provide a

visual buffer for homeowners located on either side of the island. See Figure 23 for Island as it now exists and Figure 5 after restoration.

#### **B. SKIERS' ISLAND**

This plan provides improved and diverse fish and wildlife habitat through the use of a mix of upland restoration, low marsh/mangroves, and tidal lagoons. The open water/tidal lagoon system also maximizes the "edge effect" of the adjacent low marsh and mangrove systems, as well as providing an opportunity for water to circulate through the island. It also allows for the continued use of the deep-water channel surrounding the island for water skiing. The upland restoration area proposed at the northern end of the island would allow for public access for passive recreational uses. No structural recreational facilities are provided, instead the focus is purely habitat restoration. See Figure 24 for Island as it now exists and Figure 9 for after restoration.

#### **C. BIRD COLONY ISLANDS**

The restoration of Bird Colony Islands will provide shoreline armoring along the Intracoastal side of the islands to prevent further erosion. No earthwork is proposed on these islands. The plan protects the existing critical bird-nesting habitat that has been documented on these islands.

#### **D. JIM NEVILLE MARINE PRESERVE**

Will provide improved and diverse fish and wildlife habitat through the use of primarily low marsh/mangroves and tidal lagoons and the opportunity for upland restoration on the higher elevation areas of the island. The open water/tidal lagoon system also maximizes the "edge effect" of the adjacent low marsh and mangrove systems, as well as providing an opportunity for water to circulate between the northern and southern portions of the island. Impacts to the existing mangrove systems and unique saltern areas found on the island are minimized, while optimizing the use of low marsh areas to recreate the opportunity for sheet flow across the island during high tides. See Figure 25 for the Island as it now exists and Figure 14 for after restoration.

### **E. PALMER POINT PARK**

Plan provides for the creation of low marsh/mangroves in the project area and will benefit from the opportunity of diversity of the adjacent upland areas in the park. Impacts to the existing mangroves and salterns located adjacent to the project site are minimized. Also this plan results in minimal maintenance and the elimination of the tidal lagoon will reduce the potential for stagnant water and mosquitoes. See Figure 26 for Island as it now exists and Figure 17 for after restoration.

### **F. SNAKE ISLAND**

Plan provides for additional acreage to the island through the creation of a low marsh reclamation area on the West Side of the island. The plan also provides a large upland enhancement area accessible on the East Side of the island for public use and provides soft-shore stabilization and additional mangroves to reduce the on-going erosion. Also it allows for maintenance of the unconsolidated shore used by the public on the southern end of the island and provides an opportunity to extend this area to the eastern side of the island. See Figure 27 for Island as it now exists and Figure 22 for after restoration.

Both Skier's and Bird Colony Islands are important colonial nesting sites and have suffered substantial erosion primarily from large boat wakes. If feasible, Bird Colony Islands will be armored with native limestone to reduce further erosion and loss of a critical nesting habitat for the birds.

## **5. SPONSOR-OWNED LANDS**

### **a. Federal**

There are no federally-owned lands within the project limits.

### **b. Non-Federal**

The non-federal sponsor is West Coast Inland Navigation District. The islands owned by the Sponsor are:

SNAKE ISLAND is the southernmost project spoil island located in the Venice Inlet. Preliminary planimeter readings indicated that this island was approximately 3.31 acres in 1967 and over a 31-year period, the island has eroded to approximately 1.99 acres (1998).

SKIERS' ISLAND is an 8-acre spoil island located in Roberts Bay.

Islands owned by Sarasota County are:

BIRD COLONY ISLANDS are 4 small islands, approximately 2 acres in size, which constitutes one of the most significant bird colonies along Florida's West Coast. They are located across the GIWW to the northeast of Skiers Island in Roberts Bay.

PALMER POINT PARK is a 33-acre spoil island located in the lower Sarasota Bay toward the north end of Casey Key, the former Midnight Pass. The project limits are approximately 5-acres.

JIM NEVILLE MARINE PRESERVE is a 35-acre preserve located directly north of Palmer Point Park, toward the southern end of Siesta Key. It is anticipated that work at this site will be carefully integrated with Palmer Point Park due to their proximity for economics in design and construction costs.

BIG EDWARDS ISLAND is a 6-acre spoil island located in Roberts Bay south of the Siesta Key Bridge. Historical, this island was a mangrove island utilized for disposal of dredge material from previous channel dredging operations.

#### **6. REAL ESTATE REQUIREMENTS**

Lands required for this project are located in lower Sarasota Bay. They are Snake Island containing approximately 2 acres, Palmer Point Park containing 33 acres, Jim Neville Marine Preserve, containing 35 acres, Skier's Island, containing 8 acres, Big Edwards Island containing 6 acres, and Bird Colony Island consisting of four islands, approximately 2 acres in size. All six of these islands total 86.00 acres, more or less.

#### **7. ESTATES**

No additional interest beyond navigation servitude will be required.

#### **8. NAVIGATION SERVITUDE**

The coastal wetlands and seagrass meadows in the Sarasota Bay region have been significantly impacted from the placement of dredge and fill placement from the Gulf Intracoastal Waterway

(GIWW) during the late 1950s to early 1960s. The spoil areas represented the most economical locations for depositing spoil material and keeping the dredge's floating line to approximately 1,800 feet. The spoil material was placed so as to build islands visible to navigators, thus preventing dangerous shoals. Dredge material was frequently placed in mangroves and shallow water bay bottoms creating upland areas, which were invaded by exotic vegetation. Therefore, the islands are 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.

ER 405-1-12, Chapter 12, paragraph 12-38f, states that "In no event shall credit be afforded for lands that are available to the project through exercise of the navigation servitude." Based on that guidance, the non-Federal sponsor shall not receive credit for the value of lands it provides. A real estate cost is included in the M-CACES to cover administrative costs of \$17,500 to be incurred by Federal and non-Federal sponsors.

#### **9. PROJECT MAP**

Real estate project maps are included in this report the Draft environmental assessment, dated May 2000, Section 7.0, Figure 1, pages 1 to 3.

#### **10. INDUCED FLOODING**

There will be no induced flooding directly associated with this project.

#### **11. REAL ESTATE BASELINE COST ESTIMATE**

Lands and Damages:	\$0
Acquisition/Administrative Costs	
Federal	
Project Planning	\$ 4,000
Review of Acquisitions	\$ 10,000
Non-Federal	
Acquisitions	\$0
Total Acquisition/Administrative Costs	\$14,000

Contingencies (*25%)	\$ 3,500
Total Estimated Real Estate Costs	\$ 17,500

\*Contingencies of 25% are estimated to cover uncertainties associated with such elements as valuation variance, negotiation latitude, condemnation awards and interest, and refinement of boundary lines during ownership verification.

#### **12. RELOCATION ASSISTANCE BENEFITS**

There are no persons or businesses to be relocated as a result of this project.

#### **13. MINERALS**

No known minerals exist in the project area.

#### **14. NON-FEDERAL SPONSOR'S AUTHORITY TO PARTICIPATE**

The non-Federal sponsor is West Coast Inland Navigation District (WCIND), Sarasota County, and Florida. Its principal office is located in Venice, Florida. West Coast Inland Navigation District is an independent, multi-county special taxing district composed of the counties of Manatee, Sarasota, Charlotte and Lee. WCIND is public body created by Chapter 23770, Laws of Florida 1947. WCIND's special acts have been codified in Chapter 98-526, Laws of Florida (1998). Section 5(f) of the codification legislation provides the following:

The District (WCIND) is authorized to assume sponsorship, or to act with other agencies, in environmental restoration and enhancement projects, seeking to protect, restore and enhance water quality, aquatic habitat, and other marine oriented conservation and environmental values in the navigable waters in the district. Such activities may include studies and work to restore damage to the aquatic environment caused by construction or maintenance of navigation channels, harbors, or similar works.

#### **15. REAL ESTATE MILESTONES**

After execution of the Project Cooperation Agreement, acquisition will be initiated. Acquisition of required lands is currently scheduled for six months.

**16. PRESENCE OF CONTAMINANTS (HAZARDOUS, TOXIC AND RADIOACTIVE WASTES)**

A draft environmental assessment, dated May 2000, prepared by Jacksonville District, contains no mention as to the presence of hazardous, toxic or radioactive waste found on the islands.

**17. ATTITUDE OF LANDOWNERS**

West Coast Inland Navigation District and Sarasota County own the project lands. Both agencies fully support the project and will provide the real estate interest required supporting the project at no cost to the non-Federal sponsor.

**18. M-CACES FOR REAL ESTATE**

01	Lands & Damages	\$ 0	
01AA	Project Planning	\$ 4,000	
01B--	Acquisitions		
01B20	By local Sponsor (LS)		
01B30	Review of Local Sponsor	\$10,000	
TOTAL REAL ESTATE COST EXCLUDING CONTINGENCY			\$14,000
REAL ESTATE CONTINGENCY (25% COST)		\$ 3,500	
TOTAL PROJECT REAL ESTATE COST			\$17,500

# **APPENDIX G**

## **AGENCY COORDINATION**

Planning Division  
Environmental Branch

AUG 16 1999

Mr. Tom Olds  
U.S. Fish and Wildlife Service  
Suite 111  
9549 Koger Boulevard, North  
St. Petersburg, Florida 33702-2440

Dear Mr. Olds:

The U.S. Army Corps of Engineers is working with the Sarasota Bay National Estuary Program to do some environmental restoration of some dredged material disposal islands and areas in and around Sarasota Bay. Maps showing the location of those areas are enclosed for identification purposes.

Mr. James Slack of the Vero Beach office of the U.S. Fish and Wildlife Service referred us to you as a point of contact with regard to the development of the Fish and Wildlife Coordination Act report (CAR) and the Section 7 consultation. A description of the work to be done on each of the 5 areas is enclosed to assist you in this work. Also included is a description for each of the sites in order for you to understand how each site will be restored.

The restoration of these disposal islands and areas is being done as an 1135 project. The Fish and Wildlife Service has agreed to be a partner in assisting with this restoration effort. We are asking that your office provide the CAR and Section 7 consultation as part of your partnership in order to keep costs to the project as low as possible.

The point of contact for this project is Mr. Annon I. Bozeman, telephone 904-232-1688.

Sincerely,

James C. Duck  
Chief, Planning Division

Enclosures

*IMP* Bozeman/CESAJ-PD-ER/1688/als *218*  
*W* Digger/CESAJ-PD-ER *8/2/99*  
Smith/CESAJ-PD-E  
*W* Gonzalez/CESAJ-DP-I  
*W* Strain/CESAJ-PD-P  
Duck/CESAJ-PD

L: group/pde/OLDS-FWS.DOC

## STUDY AREA

West Coast Inland Navigation District requested Federal assistance for Sarasota Bay to assist in achieving their comprehensive long-range goal of environmental restoration for the coastal lagoon system. Sarasota Bay is located on the central coast of Florida between Tampa and Venice, Florida. The system is bordered by a chain of coastal barrier islands (Anna Maria Island, Longboat Key, and Casey Key). The five priority habitat restoration sites for this project are located in lower Sarasota Bay.

The coastal wetlands and seagrass meadows in the Sarasota Bay region have been significantly impacted from the placement of dredge and fill placement from the Gulf Intracoastal Waterway (GIWW) during the late 1950s to early 1960s. The spoil areas represented the most economical locations for depositing spoil material and keeping the dredge's floating line to approximately 1,800 feet. The spoil material was placed so as to build islands visible to navigators, thus preventing dangerous shoals. Dredge material was frequently placed in mangroves and shallow water bay bottoms creating upland areas, which were invaded by exotic vegetation.

Past dredge and fill activities has also heavily impacted marine habitat. The loss of wetlands, especially shallow water habitats associated with mangroves and seagrass meadows, has reduced the available habitat for juvenile fisheries. An indicator of baywide impacts over the years is the fact that sea trout landings are 50 percent of that in 1950. Exotic vegetation such as Australian pine and Brazilian pepper has become a major concern particularly in the transitional wetlands and coastal inland.

The West Coast Inland Navigation District requested the U.S. Army Corps of Engineers to partially restore these islands. The restoration effort consists of removing exotic vegetation, excavating tidal channels and planting native vegetation. Select dredge material will be placed to help create beach dunes and coastal strand habitat. Five project sites will be modified.

1. Site #1 – Jim Neville Preserve - Jim Neville Preserve is 35-acre preserve owned by Sarasota County. A series of tidal lagoons will be constructed within the existing dredge disposal areas; an isthmus will connect the two main sectors at this site, see Figure 3. It is anticipated that work at this site will be carefully integrated with Palmer Point Park due to their proximity for economics in design and construction costs. Florida Department of Environmental Protection has identified a water-based access easement for this perimeter of the existing dredge disposal areas.

It is anticipated that most of the work at this site can be self-contained by maintaining or building berm(s) around the perimeter of the existing dredge disposal areas. These berm(s) will be left in place to minimize erosion to the island.

## 2. Site #2 - Palmer Point Park

Palmer Point is a 33-acre park owned by Sarasota County. It is located at the north end of Casey Key, the former site of Midnight Pass. This project involves removing a 5-acre dredge material island placed within the mangroves at Palmer Point. Sand will be moved hydraulically or mechanically and deposited on the beach. Project activities will enhance tidal circulation, restore mangrove and marsh wetlands and re-establish highly productive submerged habitat. Revegetation efforts will be augmented with volunteer assistance.

The work at this site will establish a 2.3-acre tidal lagoon with approximately 0.8-acres of mangrove wetlands and coastal strand habitat. This will assist the efforts being made to restore native plant communities. An estimated 24,000 cubic yards of sand will be removed hydraulically or mechanically and deposited on the beach at Casey Key. Casey Key will be a direct beneficiary of this project since it has been impacted by erosion.

## 3. Site #3 - Skiers' Island and Bird Colony Islands

Skiers' Island and the Bird Colony Islands are important colonial nesting sites. Skiers Island is an 8-acres island owned by West Coast Inland Navigation District. Bird Colony Islands are 4 small islands, approximately 2 acres in size, that constitutes one of the most significant bird colonies along Florida's West Coast. The islands have suffered substantial erosion primarily from large boat wakes. Rocky material dredged from Skiers' Island and Big Edwards Island will be transported to stabilize the islands. As part of the restoration effort, artificial reefs may be placed on a submerged swale to act as a breakwater further reducing erosion. The islands will be restored by stabilizing the shorelines utilizing plantings such as *Spartina alterniflora* and strategically placed riprap if needed. Minor riprap placement will also provide substrate for encrusting species.

Skiers' Island will be recontoured to construct a mangrove lagoon within the southern portion of the island. Dredge material will be deposited in deeper waters to construct grassy shoals adjacent to and east of the existing grass beds. An additional 7,260 cubic yards of material will be used to construct the shoal, creating about 1.8 acres of shallow water habitat for natural colonization of seagrasses. Some material will be consolidated at the north end of the island to create an upland hammock and a mound to provide habitat diversity.

Excavated material from Skiers' Island will be utilized to partially fill in an existing dredge hole, located north of, and adjacent to, Bird Colony Islands (at most one to two hundred feet away). Bird Colony Islands are located east of the GIWW. An approximate one-acre mangrove island will result within this area which will provide additional bird nesting habitat from what once before would have been a non-productive area. An interior lagoon created will provide additional ecotone and forage area for birds. Shoals will be created at elevations which will be conducive to seagrass recruitment and tie into the adjacent tidal flats. Seagrass coverage will be accelerated

via plantings. This will stabilize Bird Colony Islands and the created island will help offset the loss of nesting sites.

4. Site #4 - Big Edwards Island

Big Edwards Island is a 6-acre island owned by Sarasota County. It is located in Roberts Bay just south of the Siesta Key bridge. Historically, Big Edwards Island was a mangrove island utilized for disposal of dredge material from previous channel dredging operations, including construction of the IWW. The island will be recontoured to enhance wetland and native upland habitats, see Figure 8 and 9. Dredge material will be consolidated at the center of the island to facilitate restoration and to provide an overview of the surrounding Bay, Bird Colony islands, and the Little Edwards Island restoration site. Excavated material will be used to fill in the existing dredge hole mentioned in Site #3.

5. Site #5 – Snake Island

Snake Island is a spoil island located near Venice Inlet owned by West Coast Inland Navigation District. It was approximately 7 acres in size but over the years, this island has decreased to approximately 2 acres. This decline was due to the need to stabilize the shoreline and prevent silting in Venice Inlet. WCIND has tasked the Corps to study alternatives which would include preserving the archaeological site located on this island and methods to decrease further deterioration of this island. In addition, as a part of the current feasibility effort for other islands located in Sarasota Bay, the Corps will study the possibility of removing exotics and planting native vegetation to increase this island's habitat value.

A total of 51.1 acres of intertidal wetland habitat and shallow water habitat will be restored. Fisheries in adjacent habitats will be enhanced through the extensive increase in available shoreline and associated tidal circulation.

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## United States Department of the Interior

### FISH AND WILDLIFE SERVICE

South Florida Ecological Services Office

P.O. Box 2676

Vero Beach, Florida 32961-2676



February 24, 2000

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

Log No.: 4-1-00-I-387  
Project: Sarasota Bay Section 1135  
Feasibility Study  
County: Sarasota

Dear Mr. Duck:

The Fish and Wildlife Service (Service) has reviewed the Army Corps of Engineers' (Corps) most recent modified restoration plan for spoil island enhancement in Sarasota Bay. The project is in process under Section 1135 of the Water Resources Development Act of 1992. This draft report represents the Service's opinion on the effects of the proposed action in accordance with section 7 of the Endangered Species Act of 1973 (87 Stat. 884, as amended; 16 U.S.C. 1531 *et seq.*) (ESA) and with the Fish and Wildlife Coordination Act of 1958 (48 Stat. 401, as amended; 16 U.S.C. 661 *et seq.*) (FWCA).

#### PROJECT HISTORY

The Service's assistance was first requested by the Corps by letter on October 21, 1993, for evaluation of habitat improvements in the restoration of three dredge spoil islands in Sarasota Bay, under the Coastal America Program/Section 1135 program. In our December 16, 1993 response, the Service stated that the proposal was an environmental benefit and expressed our willingness to coordinate. On August 22, 1997, we received a modified plan from the Corps including four sites targeted for restoration. We responded by letter on February 23, 1998, supporting the restoration efforts. On August 16, 1999, we received another modified plan from the Corps including five proposed restoration sites and requesting a Fish and Wildlife Coordination Act Report and section 7 consultation. To that end, we have now received and reviewed the January 4, 2000, Corps Memorandum of the October 28, 1998, public workshop, detailing the latest plans for what now entails six spoil island sites. We have also been able to review the recent design alternatives ("concepts") for each of these sites (completed in January)

on the Corps website for the Sarasota Bay project, which included necessary aerial photography and characterizations for a better remote evaluation.

### PROJECT DESCRIPTION

At present, the Sarasota Bay Section 1135 Feasibility Study includes Big Edwards Island, Jim Neville Preserve, Palmer Point Park, Skier's Island, Bird Colony Islands, and Snake Island. Each of these spoil island sites, with the exception of Bird Colony Islands, now has three associated restoration design concepts resulting from workshops including the Corps, Sarasota County, Sarasota Bay National Estuary Program, and Florida West Coast Inland Navigation District. These concepts include various combinations of restoration, enhancement, creation, preservation, and access elements. Specifically, proposed work includes exotic vegetation removal; mangrove and emergent/high marsh species establishment; sculpting tidal channels, lagoons, and mudflats; facilitating seagrass colonization; creating upland hammocks; and stabilizing substrate subject to erosion. Regarding the Bird Colony Islands, it is our understanding that no earthmoving activities will be taking place on these islands due to nesting sensitivity, however, the feasibility of limestone shoreline buffering for erosion control will be considered.

Project progression for Year 2000 includes preliminary design of a preferred alternative, including conceptual design, followed by preparation of an Environmental Assessment (EA). The draft EA will be presented in a public workshop and to commenting agencies, with the final EA and decision expected in late 2000.

### THREATENED AND ENDANGERED SPECIES

We have reviewed information submitted in previous plans as well as other information available to us on the presence of threatened and endangered species and designated critical habitat in the vicinity of the currently proposed project sites. Based on our review, five species have been observed (see assigned site numbers in Fish and Wildlife Resources section). The Corps has determined that the proposed project is not likely to adversely affect any of these species as listed below.

Piping plover (*Charadrius melodus*) - in vicinity of sites 2 and 3

The project may provide benefits to the piping plover through the creation of mudflats for foraging. We concur with the Corps that the proposed project is not likely to adversely affect the piping plover. Currently, there is no critical habitat designated for the piping plover; therefore, none will be affected.

West Indian manatee (*Trichechus manatus*) - in vicinity of all sites

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The Corps has indicated that Standard Manatee Construction Precautions will be implemented during project activity. As such, we concur with the Corps that the proposed project is not likely to adversely affect the West Indian manatee. The project is within designated critical habitat for the manatee. Impacts to seagrasses as a result of vessel routing and maneuvering are expected to be minimal. Island access routes will be designed and coordinated with the Service. Therefore, we conclude that the project is not likely to adversely modify or destroy critical habitat of the West Indian manatee.

Loggerhead sea turtle (*Caretta caretta*) - in vicinity of all sites

Green sea turtle (*Chelonia mydas*) - in vicinity of all sites

Hawksbill sea turtle (*Eretmochelys imbricata*) - in vicinity of sites 1, 4, 5, 6

Sea turtle nesting has not been documented on any of the proposed project spoil islands. It is highly unlikely that turtles use any of these islands for nesting, given location and available sandy beach area. The Corps has indicated that if a sea turtle is observed in an area of project activity, project plans will include avoidance. We concur with the Corps that the proposed project is not likely to adversely affect the sea turtles listed above. Currently, there is no critical habitat designated for the loggerhead or green sea turtle, therefore, none will be affected. Currently, there is no critical habitat designated for the hawksbill sea turtle in the continental United States, therefore, none will be affected.

This written concurrence letter fulfills the requirements of section 7 of the ESA, and no further action is required. If modifications are made to the project, if additional information involving potential effects to listed species becomes available, if a new species is listed, or if designated critical habitat may be adversely affected by the project, reinitiation of consultation may be necessary.

#### FISH AND WILDLIFE RESOURCES

Habitat types associated with environmental enhancement/creation include mangrove wetlands, emergent and high marshes, seagrasses, tidal lagoons, mudflats, seagrass beds, and upland hammocks. Associated fish and wildlife resources would in turn benefit. Due to an increase in desirable structure and feeding opportunities, bird utilization would be expected to increase with respect to individuals and number of species. These include colonial nesters such as herons, ibis, and pelicans as well as other avifauna such as shorebirds, raptors, and neotropical migrants. Fisheries would benefit from both an expansion of desirable detrital sources and benthic shallows for invertebrate growth and food chain support, as well as expanded refugia.

The Service generally supports the environmental enhancement elements as shown for each of the concepts for each of the six subject spoil sites. In light of our focus on trust resources, we would like to see concepts selected for each site which would maximize fish and wildlife utilization in a manner which would best serve the ecosystem of Sarasota Bay. Habitat diversity is a consideration. Another consideration would be to ensure attention to a particular

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habitat/species which has experienced degradation/decline relative to other habitats or species in Sarasota Bay. Special attention to benefits to threatened or endangered species is important; for instance, mudflats for piping plover foraging. We offer the following preferences in site concepts, given the information available to us at this time:

**1. Big Edwards Island**

Concept #2 offers habitat diversity, without an array of boardwalks and outlooks.

**2. Jim Neville Marine Preserve Island**

Concept #1 offers diversity with an interior connection for the lagoon/flats.

**3. Palmer Point Park**

Concepts #1 and #2 incorporate desirable habitat mixes.

**4. Skier's Island**

Concept #3 offers a habitat balance and best lagoon connectivity. An adequate mangrove buffer and/or other shoreline stabilization should be established at the waterward base of the northern upland for erosion control.

**5. Bird Colony Island**

A limerock shoreline buffer may provide protection needed from boat wakes.

**6. Snake Island**

Concept #2 offers adequate diversity without involving island enlargement. Due to the high energy setting, shoreline stabilization will be necessary for preservation.

### SUMMARY AND RECOMMENDATIONS

In summary, the Service supports the Sarasota Bay Section 1135 Ecosystem Restoration Feasibility Study and will continue to participate with the Corps, as resources allow, in project progression.

With respect to all sites reviewed above, we will evaluate new information as this project progresses through planning stages. We will remain flexible with our concept preference in order to accommodate new information and design detail refinements or changes. As the project progresses, we would like to request more detail regarding the following:

- proposed characterizations and species composition of upland enhancement areas. At present, we are assuming primarily maritime hammock.
- sediment/turbidity control details to be associated with earthwork.

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- island perimeter seagrass and bathymetry mapping and dependent construction barge/vessel access routes.
- proposed dredge hole filling and seagrass shelf/mangrove island creation details (vicinity of Skier's Island), including area seagrass and bathymetry mapping, barge routes, and turbidity control.
- monitoring plans and assurances for long term maintenance of all sites.

We are available to meet with project representatives to continue coordination toward the completion of this ecosystem restoration project. If you have any questions, please contact Brad Rieck at (561) 562-3909, extension 231, regarding the findings and recommendations contained in this report.

Sincerely yours,

*Kalani D. Cairns*

*for* James J. Slack  
Project Leader  
South Florida Ecological Services Office

cc:  
NMFS, Panama City, FL  
FWCC, Punta Gorda, FL

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**United States Department of the Interior**

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



February 24, 2000

**James Beaver**  
Florida Fish and Wildlife Conservation Commission  
29200 Tuckers Grade  
Putta Gorda, FL 33955

Dear Mr. Beaver:

The Fish and Wildlife Service is providing you with a Draft Fish and Wildlife Coordination Act Report on the Sarasota Bay Section 1135 Feasibility Study, Sarasota County, Florida. Please review the report and provide us with your comments or concurrence by March 24.

Sincerely yours,

*Kalani D. Cairns*

*for* James J. Slack  
Project Leader  
South Florida Ecological Services Office

cc:  
NMFS, Panama City, FL  
Corps, Jacksonville, FL

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# United States Department of the Interior

## FISH AND WILDLIFE SERVICE

South Florida Ecological Services Office

P.O. Box 2676

Vero Beach, Florida 32961-2676



February 24, 2000

Mark Thompson  
National Marine Fisheries Service  
3500 Dellwood Beach Drive  
Panama City, Florida 32408

Dear Mr. Thompson:

The Fish and Wildlife Service is providing you with a Draft Fish and Wildlife Coordination Act Report on the Sarasota Bay Section 1135 Feasibility Study, Sarasota County, Florida. Please review the report and provide us with your comments or concurrence by March 24, 2000.

Sincerely yours,

*Kalani D. Cairns*

*for*

James J. Slack  
Project Leader  
South Florida Ecological Services Office

cc:  
FWCC, Punta Gorda, FL  
Corps, Jacksonville, FL



**To** File: 09162-004-096  
**From** Jeannie Hunt  
**CC:** Meeting Attendees; Chuck Listowski  
**Date** April 7, 2000

**SUBJECT** **SARASOTA ECOSYSTEM RESTORATION REPORT**  
Meeting Minutes from the April 4, 2000 Environmental Agency  
Coordination Meeting

An environmental agency coordination meeting was held on April 4, 2000 relating to the Sarasota Ecosystem Restoration Project at HDR in Tampa. The meeting was attended by:

Alberto Gonzalez	ACE	Dean Mades	Ed Barber and Associates
Tiphannie Jinks	ACE	Rich Paul	National Audubon Society
Bruce Hasbrouck	HDR	Ann Schnapf	National Audubon Society
Jeannie Hunt	HDR	Alan Burdett	FDEP
Eric Sutton	Sarasota County	Cece Featheringil	FDEP
		Eric Summa	ACE - Regulatory

#### Meeting Notes

The following is a summary of the issues raised during the meeting.

1. Bruce Hasbrouck gave a description and the history of the project, including information regarding the public involvement of the project and the upcoming schedule.
2. HDR presented the concepts that were developed by the HDR team and those developed in response to information received at the public workshops.
3. Rich Paul asked if the tidal lagoons presented on many of the concepts had been modeled to see if they work and will not silt in. Bruce stated that some initial investigations regarding flow have been looked at. However, detailed modeling will be completed during the design phase.
4. Alan Burdett, Rich Paul, and Ann Schnapf all expressed their interest in utilizing excess material to stabilize the bird colonial islands. Alan suggested this should occur on the backside of these islands. He stated that DEP is currently mapping seagrasses around these islands, which should help determine where fill can be placed without impacting sea grass beds.
5. Eric Suma suggested that we coordinate with David Dale from the National Marine Fisheries regarding Essential Fish Habitat.

6. Discussion regarding the disposal of material came up regarding several of the spoil island concepts. Alan Burdett mentioned that he has some contacts that may be able to help provide some solutions.
7. Rich Paul brought up the issue of maintenance on the upland areas. Bruce indicated that maintenance agreements will be identified as part of the 1135 process and specific issues will be resolved during the design phase.
8. In discussing Skier's Island, Alan Burdett suggested that the island be split into two lobes by a tidal lagoon, allowing for public access on the north lobe and keeping the south end as mangroves for bird nesting.
9. Also in discussing Skier's Island, Rich Paul stated that mature mangroves would provide a substantial windbreak for those interested in skiing around the island.
10. In general, Eric Suma suggested that any opportunity for creation of high marsh or saltern is good, since these are unique systems lacking in the Bay. He also recognized that a diversity of systems is also good.
11. In discussing the Jim Neville Marine Preserve, Ann Schnapf discussed the importance of salterns and their unique biological function. Regarding permitability, Eric Suma suggested that since alternatives exist that minimize impacts to mangroves, these alternatives (2 and 5) may be more favorable during the permitting phase, because they minimize impacts to mangroves.
12. A concern was expressed regarding the proposed tidal lagoons in the Jim Neville Marine Preserve regarding motorized watercraft such as jet skis. Alan suggested that things can be done to restrict access to these tidal lagoons for jet skis. He suggested the County create an ordinance prohibiting motorized craft from entering the tidal lagoons.



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