Synopsis of the Bayport Channel Monitoring

Synopsis of the Bayport Channel Monitoring
FDEP Permit No. 271422133
ACOE Permit No. 90IPF-03355

A channel maintenance-dredging project was conducted in Bayport, Florida in May of 1996. As part of the permit provisions, a five-year monitoring program was established to quantify seagrass recovery following project completion. Information was collected in 1995 by Berryman & Henigar to serve as the baseline data for seagrasses prior to construction. Surveys were then conducted post-construction to access seagrass recovery within the project boundaries. This synopsis is based on a report completed by Biological Research Associates for the Hernando County Parks and Recreation Department and submitted on January 25, 2001.

The last field monitoring was completed on November 13, 2000 by Biological Research Associates. They identified *Halodule wrightii* and *Thalassia testudinum* as being the two dominant seagrass species within the monitoring area. *Syringodium filiforme* was also identified, but comprised only one clump observed outside of the sample plots. Percent cover in 2000 for *H. wrightii* ranged from 0-25%, while *T. testudinum* percent cover ranged from 0-100%. Baseline data from 1995 for *H. wrightii* ranged from 0-75%, while *T. testudinum* ranged from 0-70%.

Shoot density for both seagrasses ranged from 0-869 shoots/m^2 as recorded during the 2000 monitoring event. In comparison, shoot density during the baseline survey in 1995 ranged from 27-1227 shoots/m^2.

Based on the 2000 report, seagrass percent cover and stem density appear to be recovering to pre-maintenance construction conditions prior to the Bayport channel maintenance construction. Continued monitoring of that site should demonstrate continued seagrass recovery.

3.1.2.3 Proposed 500-Foot Channel Extension

The proposed channel extension survey area was located 500 feet north of the existing channel and is covered by approximately 0.41 acres of marine seagrass species. Within this area, 0.13 acres was covered by *H. wrightii* and 0.28 acres was covered by a mixture of *H. wrightii* and *T. testudinum* (Table 1).

3.1.2.4 Proposed Channel Realignment

Creation of the proposed 85-foot wide channel in this area will impact approximately 3.08 acres of seagrasses (Table 1). *Halodule wrightii* is the dominant seagrass identified with this survey area, comprising 3.08 acres. The remaining 0.01 acres is a mixed assemblage of *H. wrightii* and *T. testudinum*. Sand and rock covered with algae were the other resources observed within this survey area.

3.1.3 Oyster Bed Occurrence

An oyster bed was identified in one survey area only. The oyster bed covered less than 0.2 acres and was located along the southern most portion of the perimeter channel survey area (Figure 4).

3.2 Seagrass Frequency of Occurrence, Abundance, and Density - Snorkel Surveys

Snorkel surveys were conducted to ascertain the frequency of occurrence, abundance and density of marine seagrass species. The results from each survey area are described below.

3.2.1 Main Channel

All three marine seagrass species were observed within the main channel (Table 2). Frequency of occurrence was greater for *Halodule wrightii* (0.37) than for *T. testudinum* (0.31) and *S. filiforme* (0.018). Abundance and density were greater for *H. wrightii* (0.43), than *T. testudinum* (0.29) and *S. filiforme* (0.036).

Submerged Aquatic Vegetation and Oyster Bed Survey 2001

SUBMERGED AQUATIC VEGETATION AND OYSTER BED SURVEY FOR CHANNELS IN THE VICINITY OF HERNANDO BEACH HERNANDO COUNTY, FLORIDA

October 2001

Prepared for:
U.S. Army Corps of Engineers
Jacksonville District
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Jacksonville, FL 32202

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1.0 INTRODUCTION

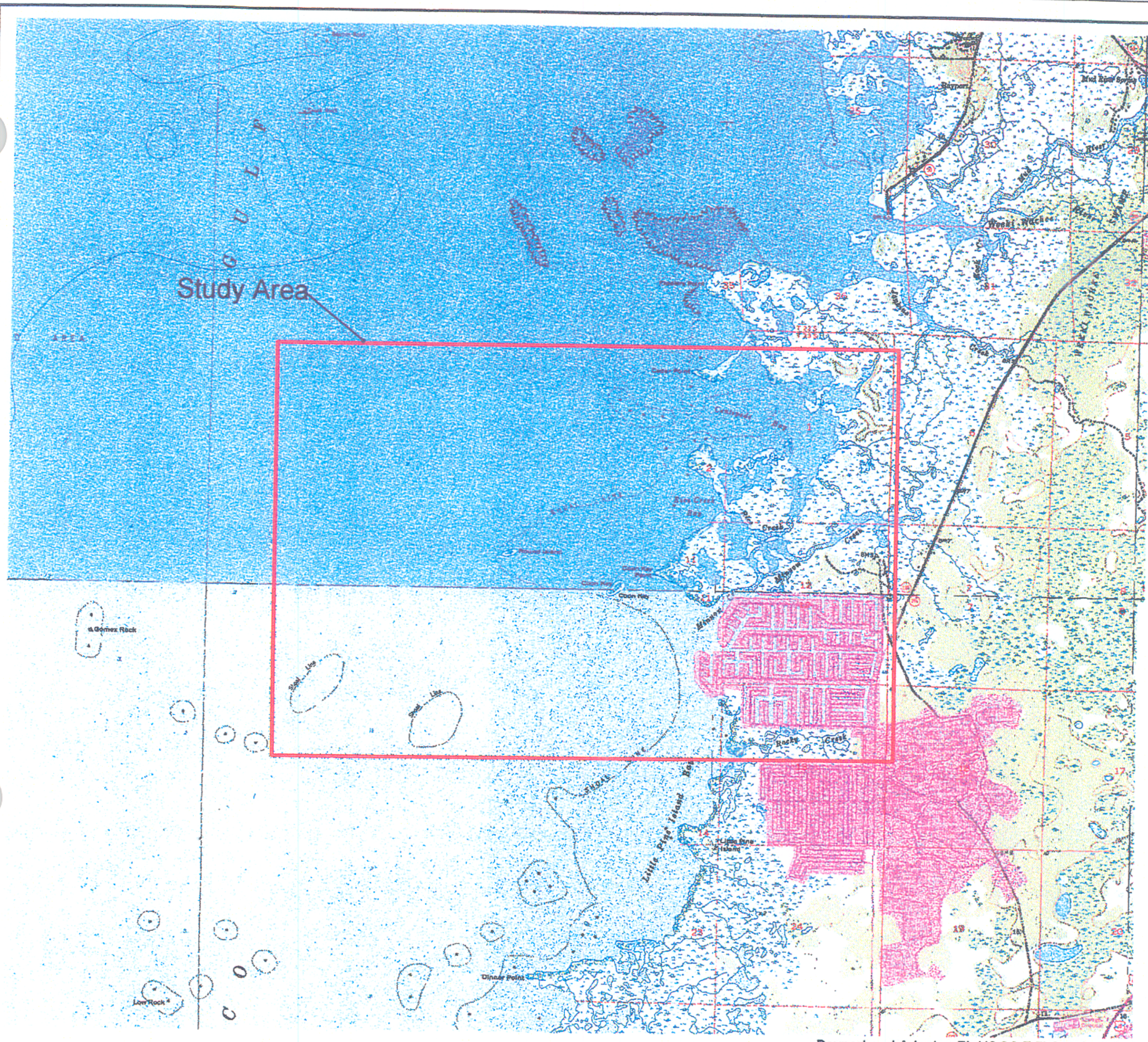
Dial Cordy and Associates Inc. (DC&A) was contracted by the Jacksonville District Army Corps of Engineers (Corps) under contract DACW 17-99-D-0057 0018 to conduct a marine seagrass/oyster bed survey (survey) for channels located in the vicinity of Hernando Beach within Hernando County, Florida (Figure 1).

1.1 Project Purpose

The objective of this project was to document the presence or absence of marine seagrass and oyster beds in five survey areas within the Hernando Beach vicinity. Three of the survey areas are existing features and include the main channel, three entrance channels, and a perimeter channel. These three survey areas are scheduled for maintenance dredging (Figure 2). The two remaining survey areas consist of a proposed 500-foot extension of the northwest section of the main channel and a proposed channel realignment area (Figure 2). Within these five areas, this study documented the location, abundance, density, and frequency of occurrence of *Halodule wrightii* (Cuban shoal grass), *Thalassia testudinum* (turtle grass), *Syringodium filiforme* (manatee grass), and oyster beds along survey transects.

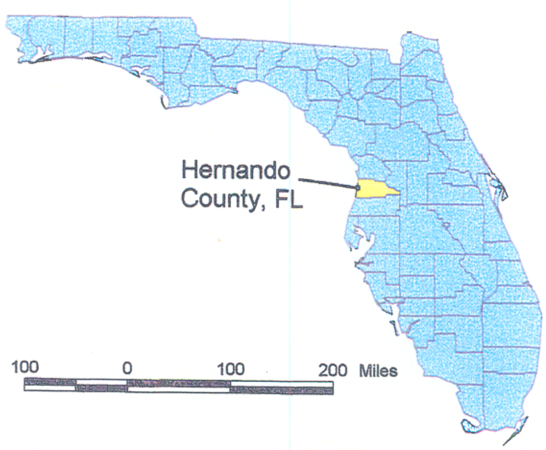
1.2 Background

The goal for this project is to improve safety and widen the existing channels at Hernando Beach. Currently, channel conditions are not adequate for boaters, especially commercial vessels, to safely navigate to the Gulf of Mexico. Commercial vessels, especially live bait shrimpers, are able to navigate the channel only during high tides due to shallow channel conditions at low tides and submerged rocks that could potentially damage the vessels or their propellers due to insufficient depths. These time constraints can cost the live bait shrimpers both time and money. The condition of the Hernando Beach channels has

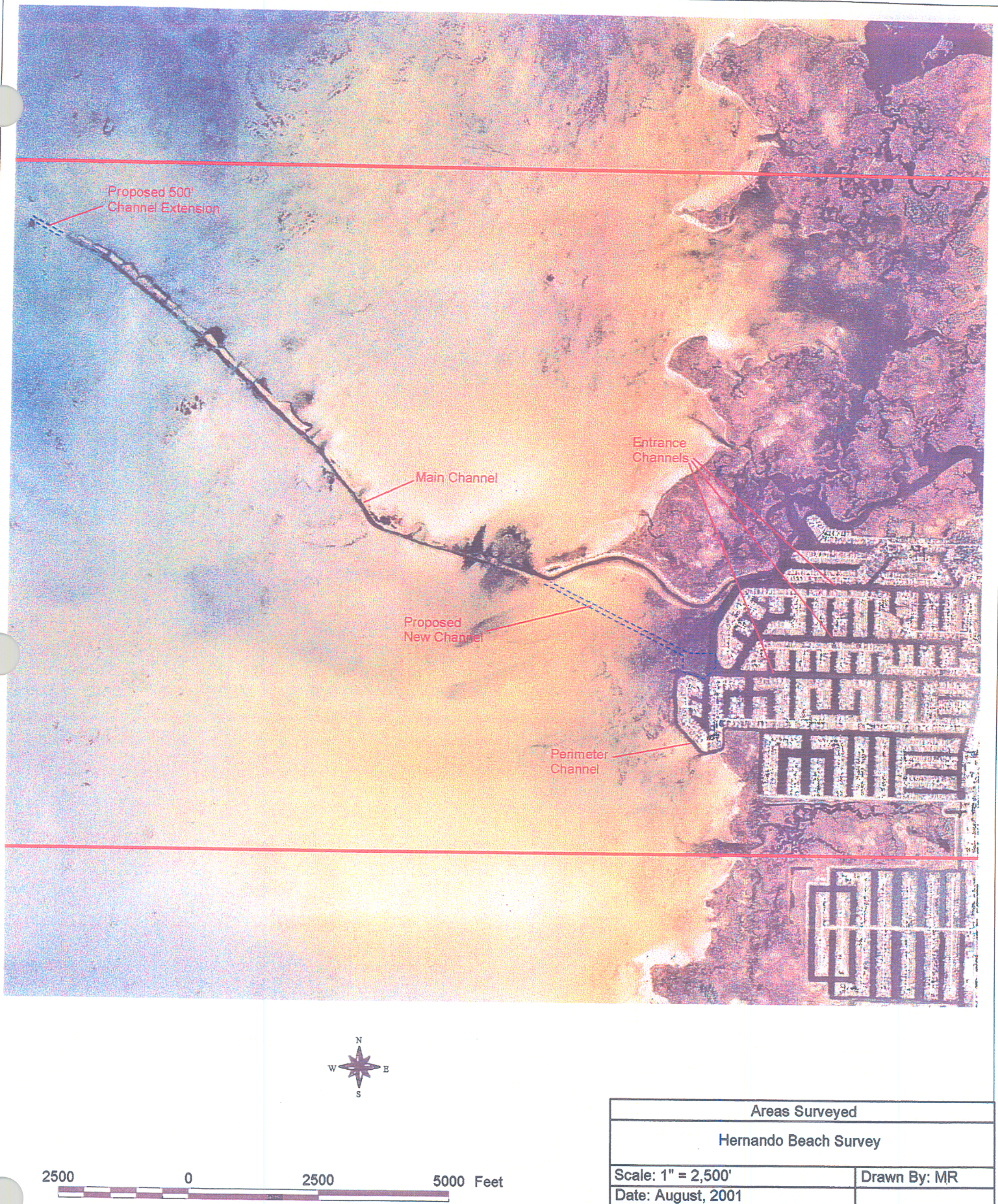


Bayport and Aripeka, FL USGS 7.5' Quadrangles

5000 0 5000 10000 Feet



Location Map	
Hernando Beach Survey	
Scale: 1" = 5,000'	Drawn By: MR
Date: August, 2001	
DIAL CORDY AND ASSOCIATES INC Environmental Consultants	J01-488
	Figure 1



Areas Surveyed	
Hernando Beach Survey	
Scale: 1" = 2,500'	Drawn By: MR
Date: August, 2001	
DIAL CORDY AND ASSOCIATES INC Environmental Consultants	J01-488
	Figure 2

narrowed to the point that recreational and commercial boats have encountered increased difficulty departing and returning within the main channel as a result of the channel width. The current 60-foot width does not provide safe passage for boat traffic at times, depending on the tide cycle and the size of the vessel. Widening the channel to the proposed eighty-five feet would allow safer passage for commercial and larger recreational boats within the main channel.

A second problem is that the channel depth is inadequate at some locations within the main channel, the perimeter channel, and the entrance channels, which restricts large drafting boats from access. Larger fishing vessels, as well as commercial boats, must plan excursions during the higher tide cycle in order to depart and return to the inland waters without damaging their boats or engine propellers. Rocks and shallow, sandy bottom areas can inflict serious boat damage to larger boats that draft more water, especially during the low tide cycle.

Dredging for the project will involve the removal of approximately 420,000 cubic yards of material, of which about 210,000 cubic yards will consists of rock and the remaining 210,000 cubic yards will consists of sand.

2.0 TECHNICAL APPROACH

A description of the methods utilized to document the distribution, occurrence, abundance, and density of marine seagrass along with oyster bed locations within the study area is described below. Although the focus of this study involved mapping marine seagrasses and oyster beds, occurrences of other resource types within the survey area were also recorded. The additional resource types include rocks, sand, marine algae, and mixed assemblages of these types. Surveys were conducted June 18-20, 2001.

2.1 Location of Survey Transects

Survey transects were located within three existing channels: the main channel, the three entrance channels, and the perimeter channel (Figure 3). In addition to the existing areas, survey transects were located within the proposed 500-foot main channel extension and within the proposed channel realignment area. Transects for the perimeter channel and the main channel were 200 feet long; 100-foot transects on either side of the channel centerline, and spaced 500 feet part (Figure 3). Distances were shortened along some main and perimeter channel transects due to shallow water (< 1 foot), rock structure, and/or residential structures. For the proposed 500-foot main channel extension and the proposed channel realignment area, three transects paralleled the proposed centerlines in addition to the 300-foot perpendicular transects surveyed at 100-foot intervals. Transects within the entrance channels were confined to the centerline, due to the limited channel width and the occurrence of boats and boat docks.

Hernando Beach Resource Survey Transects

N
W E
S

2500 0 2500 5000 Feet

Transect Locations	
Hernando Beach Survey	
Scale: 1" = 2,500'	Drawn By: MR
Date: August, 2001	
DIAL CORDY AND ASSOCIATES INC Environmental Consultants	J01-488
	Figure 3

2.2 Video Survey Methodology

The beginnings and ends of each transect were located using a Trimble Differential Global Positioning System (DGPS). Once the beginning of each transect was located, an underwater video camera was lowered to within one-foot of the bottom and towed along the transect line using Hypack® Max software to maintain the vessel's course. The underwater video camera was viewed onboard while being towed and the occurrence of seagrass, rocks, oysters, sand, algae, and assemblages of types were documented. The documentation was used later when reviewing the video to denote the resource description and DGPS location. For mapping purposes, the following resource type classification system was used:

Bottom Resources	Description
Thalassia testudinum	Turtle grass was the dominant resource
Halodule wrightii	Shoal grass was the dominant resource
Oysters	Oyster beds were the dominant resource
Sand	Sand was the dominant resource
Mixed grasses	A mixture of *Thalassia testudinum* and *Halodule wrightii* were the dominant resource
Algae	Marine algae was the dominant resource
Rock	Rock was the dominant resource
Rock/Algae	A mixture of rock and algae were the dominant resource

Following compilation of resource type distribution, a spreadsheet was developed incorporating the resource classification system. Resource types were superimposed over an aerial map using ArcView® GIS. This approach allows the resource types located within the project area to be seen.

2.3 Biological Data Collection

To obtain biological data regarding the location, occurrence, abundance, and density of marine seagrass, a snorkel point intercept survey was performed along every third transect line. For each transect line surveyed, the average percent (percent of 16, 25 x 25 cm sub-units within a 1 m^2 quadrat that contains at least one seagrass shoot) was estimated in 1 m^2 quadrats at 20-foot intervals along the transect line (Fonseca et al., 1998; Virnstein 1995;

Braun-Blanquet, 1965). Specific data recorded within each 1 m^2 quadrat for each marine seagrass species present included the number of sub-units containing at least one shoot, an average cover abundance score (Braun-Blanquet, 1965), a description of the substrate type, and any other observations considered useful. Field data were entered into a spreadsheet for analysis. Along transects where no marine seagrasses were identified, snorkel point intercepts were not conducted. The cover abundance scale is discussed below.

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

The scale values are:

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

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

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

2.4 Analysis and Interpretation

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

3.0 RESULTS

The survey areas were divided into five sections: the main channel, the entrance channels, the perimeter channel, the proposed 500-foot main channel extension, and the proposed channel realignment area. Video surveys were conducted in each of the five sections. In addition to the video surveys, snorkel surveys collected information on the frequency of occurrence, abundance, and density of marine seagrasses. Marine seagrasses were not observed within the entrance channels and along portions of the perimeter channel, therefore, snorkel point intercept surveys were not conducted.

3.1 Seagrass and Oyster Bed Occurrence and Distribution Patterns - Video Surveys

The occurrence and distribution patterns of marine seagrasses and oyster beds in the video survey areas are described below. Three marine seagrasses were identified during the video survey. These grasses occurred in single and mixed species assemblages within the survey area (Figure 4).

3.1.1 General Occurrence Patterns

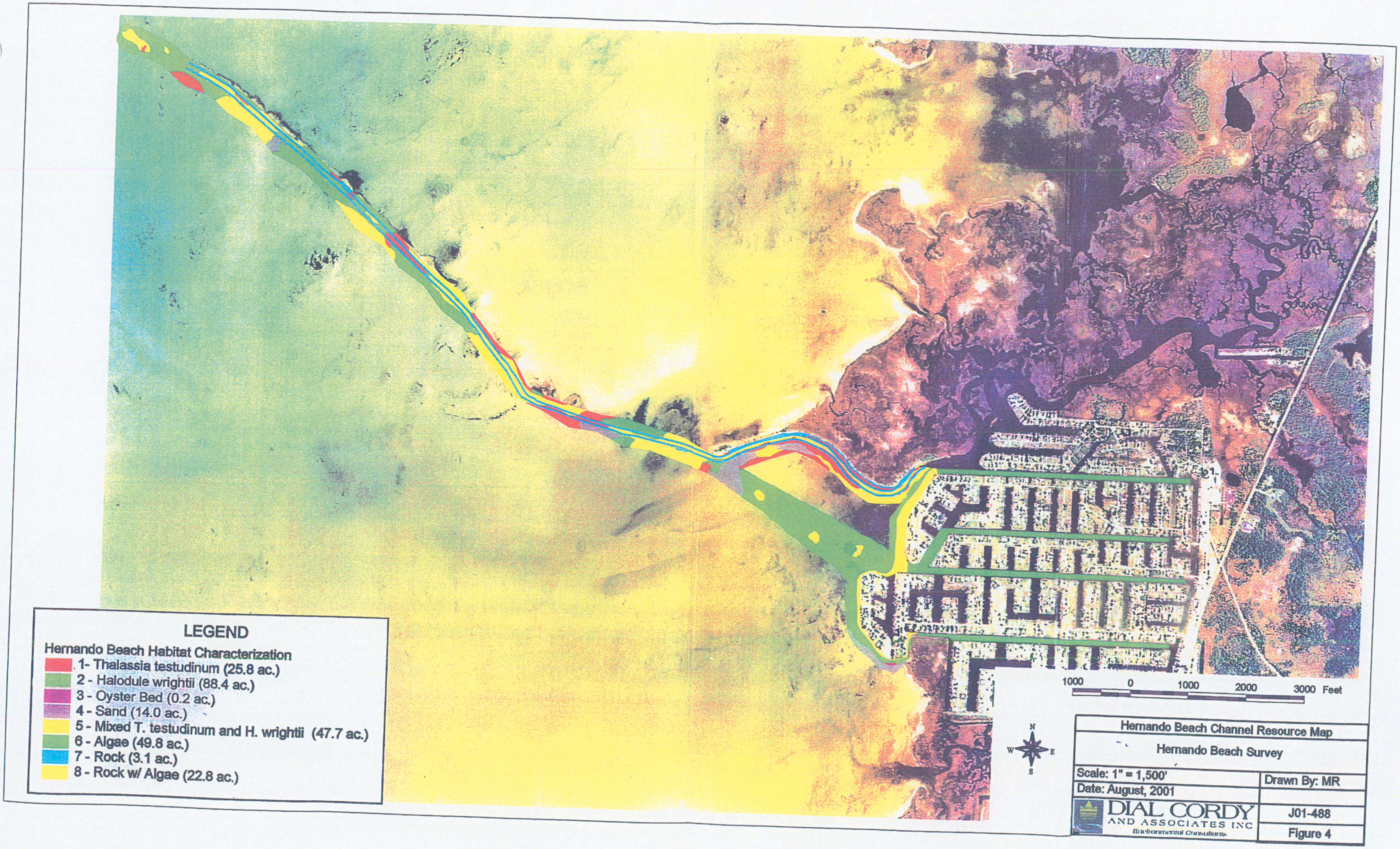
Marine seagrass species observed within the survey area included *H. wrightii, T. testudinum,* and *S. filiforme*. Of the 89 video transects, marine seagrasses were observed along 84 transects. Marine seagrasses were most dense within and immediately adjacent to the existing main channel and the western portion of the perimeter channel survey area. Of the three marine seagrass species observed, *T. testudinum* and *H. wrightii* were the most prevalent along the transects, while *S. filiforme* was observed at only one transect location.

3.1.2 Seagrass Distribution

The survey area was divided into four sections, since marine seagrasses were identified in four of the five survey areas. The four sections include the main channel, the proposed 500-foot channel extension area, the perimeter channel, and the proposed channel realignment area. Graphic illustration of seagrass communities observed is shown in Figure 4. A description of seagrass distribution by survey area is provided below.

3.1.2.1 Main Channel

Seagrass within the main channel survey area is divided into two sections. The first section is comprised of the area from the south end of the proposed channel extension to the northern section of the proposed channel realignment area. The second section consists of the proposed fill area. This area is proposed for fill as part of mitigation efforts (see Section 5.2.2). The first section contains approximately 7.93 acres of seagrass within the existing 60' channel area (Table 1) (see next page). *Thalassia testudinum* comprises approximately 1.89 acres, *H. wrightii* covers approximately 3.29 acres, and a mixed assemblage of the two seagrass species comprises approximately 2.75 acres. Seagrass acreage within the proposed 25' channel widening area of the first section consists of approximately 3.41 acres of seagrass. Approximately 0.70 acres of this area consists of *T. testudinum*, 1.83 acres consists of *H. wrightii*, and the remaining 0.88 acres of a mixture of the two seagrasses. Acreage for the second section, the proposed fill area, amounts to 5.51 acres. Approximately 2.81 acres of this area consists of *T. testudinum*, 0.65 acres of *H. wrightii*, and the remaining 2.05 acres of a mixture of these two seagrass species. *Syringodium filiforme* was identified along one portion of one transect and covered less than 0.01 acres. The bottom type in the remaining main channel area was comprised of mixed assemblages of rock, algae, rock and algae, and sand.


LEGEND
Hernando Beach Habitat Characterization
1- Thalassia testudinum (25.8 ac.)
2 - Halodule wrightii (88.4 ac.)
3 - Oyster Bed (0.2 ac.)
4 - Sand (14.0 ac.)
5 - Mixed T. testudinum and H. wrightii (47.7 ac.)
6 - Algae (49.8 ac.)
7 - Rock (3.1 ac.)
8 - Rock w/ Algae (22.8 ac.)
1000 0 1000 2000 3000 Feet
N
W E
S
Hernando Beach Channel Resource Map
Hernando Beach Survey
Scale: 1" = 1,500'
Drawn By: MR
Date: August, 2001
DIAL CORDY AND ASSOCIATES INC
Environmental Consultants
J01-488
Figure 4

3.1.2.2 Perimeter Channel

Within the existing 60-foot wide perimeter channel, approximately 2.06 acres is comprised of *H. wrightii* (Table 1). Approximately 1.94 acres of *H. wrightii* were identified within the proposed 25-foot channel widening area. No other marine seagrass species were observed. Sand, algae, rocks with algae and oyster beds were the other resources identified within this survey area.

Table 1 Cover Type Acreages within the Existing 60-Foot Channel and within the 25-Foot Proposed Channel Extension at Hernando Beach, Florida.

Location	Resource Type	60-Foot Channel Width (Acres)	25-Foot Proposed Extension Width (Acres)	85-Foot Total Channel Width (Acres)
Main Channel	*Thalassia testudinum*	1.89	0.70	2.59
Main Channel	*Halodule wrightii*	3.29	1.83	5.12
Main Channel	Sand	-	0.02	0.02
Main Channel	Mixed Seagrass	2.75	0.88	3.63
Main Channel	Algae	1.14	0.33	1.47
Main Channel	Rock	0.26	-	0.26
Main Channel	Rock w/algae	2.80	0.66	3.46
Main Channel - Proposed Fill Area	*Thalassia testudinum*	2.81	NA	NA
Main Channel - Proposed Fill Area	*Halodule wrightii*	0.65	NA	NA
Main Channel - Proposed Fill Area	Sand	0.89	NA	NA
Main Channel - Proposed Fill Area	Mixed Seagrass	2.05	NA	NA
Main Channel - Proposed Fill Area	Rock	<0.01	NA	NA
Main Channel - Proposed Fill Area	Rock w/algae	2.80	NA	NA
Perimeter Channel Area	*Halodule wrightii*	2.06	1.94	4.00
Perimeter Channel Area	Oyster Bed	0.04	0.16	0.20
Perimeter Channel Area	Sand	0.01	0.01	0.02
Perimeter Channel Area	Algae	0.19	0.06	0.25
Perimeter Channel Area	Rock w/algae	3.64	1.37	5.01
Proposed Channel Extension Area	*Halodule wrightii*	-	-	0.13
Proposed Channel Extension Area	Mixed Seagrass	-	-	0.28
Proposed Channel Realignment Area	*Halodule wrightii*	-	-	3.08
Proposed Channel Realignment Area	Sand	-	-	0.80
Proposed Channel Realignment Area	Mixed Seagrass	-	-	0.01
Proposed Channel Realignment Area	Rock w/algae	-	-	0.03

3.1.2.3 Proposed 500-Foot Channel Extension

The proposed channel extension survey area was located 500 feet north of the existing channel and is covered by approximately 0.41 acres of marine seagrass species. Within this area, 0.13 acres was covered by *H. wrightii* and 0.28 acres was covered by a mixture of *H. wrightii* and *T. testudinum* (Table 1).

3.1.2.4 Proposed Channel Realignment

Creation of the proposed 85-foot wide channel in this area will impact approximately 3.08 acres of seagrasses (Table 1). *Halodule wrightii* is the dominant seagrass identified with this survey area, comprising 3.08 acres. The remaining 0.01 acres is a mixed assemblage of *H. wrightii* and *T. testudinum*. Sand and rock covered with algae were the other resources observed within this survey area.

3.1.3 Oyster Bed Occurrence

An oyster bed was identified in one survey area only. The oyster bed covered less than 0.2 acres and was located along the southern most portion of the perimeter channel survey area (Figure 4).

3.2 Seagrass Frequency of Occurrence, Abundance, and Density - Snorkel Surveys

Snorkel surveys were conducted to ascertain the frequency of occurrence, abundance and density of marine seagrass species. The results from each survey area are described below.

3.2.1 Main Channel

All three marine seagrass species were observed within the main channel (Table 2). Frequency of occurrence was greater for *Halodule wrightii* (0.37) than for *T. testudinum* (0.31) and *S. filiforme* (0.018). Abundance and density were greater for *H. wrightii* (0.43), than *T. testudinum* (0.29) and *S. filiforme* (0.036).

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

	Frequency			Abundance			Density		
Location	HW*	TT⁺	SF#	HW	TT	SF	HW	TT	SF
Main Channel	0.37	0.31	0.018	0.43	0.29	0.036	0.43	0.29	0.036
Perimeter	0.27	0.20	NA	0.29	0.005	NA	0.29	0.004	NA
500' Extension	0.22	0.84	NA	0.70	0.60	NA	0.32	0.73	NA
Channel Realignment	0.43	0.44	NA	0.64	1.0	NA	0.23	0.70	NA

*HW = *Halodule wrightii* ⁺TT = *Thalassia testudinum* #SF = *Syringodium filiforme*

3.2.2 Perimeter Channel

Frequency of occurrence was higher for *H. wrightii* (0.27) than *T. testidinum* (0.20) in this survey area (Table 2). Abundance was much greater for *H. wrightii* (0.29) than *T. testidinum* (0.005). *Thalassia testudinum* density (0.004) was much lower than *H. wrightii* (0.29). No *S. filiforme* was observed within this survey area.

3.2.3 Proposed 500-Foot Channel Extension

Thalassia testudinum (0.84) had a higher frequency of occurrence than *H. wrightii* (0.22) within this survey area (Table 2). Density was also higher for *T. testudinum* (0.73) than *H. wrightii* (0.32). However, abundance was greater for *H. wrightii* (0.70) than *T. testidinum* (0.60). No *S. filiforme* was observed within this survey area.

3.2.4 Proposed Channel Realignment

Frequency of occurrence was approximately the same for *H. wrightii* (0.43) and *T. testidinum* (0.44) within the proposed channel realignment area (Table 2). Abundance and density for *T. testudinum* (1.0 and 0.70, respectively) were greater than *H. wrightii* (0.64, and 0.23, respectively).

4.0 IMPACT ASSESSMENT

A discussion of impacts to the resource types within the project area, as well as ways to minimize impacts is provided below.

4.1 Resource Impacts

Impacts to the main channel due to dredging and additional channel widening would affect approximately 11.34 acres of marine seagrasses (Table 1). About 45 percent of those impacts would be to *H. wrightii*, 23 percent to *T. testudinum*, and the remaining 32 percent would affect a mixture of the two marine seagrass species. Impacts to *S. filiforme* would be negligible. Within the perimeter channel survey area, approximately 4.0 acres of *H. wrightii* would be impacted by this project. Approximately 0.41 acres of *Halodule wrightii* (0.13 acres) and a mixed species assemblage of *H. wrightii* and *T. testudinum* (0.28 acres) would be impacted due to the dredging and channel widening at the proposed 500' channel extension location. Within the proposed channel realignment area, 3.08 acres of *H. wrightii* would be impacted, and only 0.01 acres of mixed seagrass species would be impacted. The proposed fill area within the main channel at the mouth of Minnow Creek would impact approximately 5.51 acres. Approximately 50 percent (2.81 acres) of the impacts would affect *T. testudinum*, 11 percent (0.65 acres) would impact *H. wrightii*, and 39 percent (2.05 acres) would impact a mixture of the two species.

4.2 Channel Alignment Modifications

Potential modifications to the channel alignment which may assist in minimizing and avoiding adverse impacts is described below.

Main Channel Area

The main channel expansion will consist of widening the channel from sixty to eighty-five feet, extending along the southern portion of the existing channel. Extending the channel to the north is not an option as these spoil islands are utilized, at times, by various bird species to rest and forage on the islands and within the shallow water habitat. The area north of the existing channel also provides recreational value to people utilizing the area for swimming, fishing and picnicking. Excavating the spoil islands would involve removing more material than would be removed by widening to the south side of the channel which is at a lower elevation. Additionally, removing the spoil islands would be too costly.

Perimeter Channel Area

The dominant features of this area consists of rock and rock/algae along the eastern portion of the channel. Minor channel modification within the eastern portion of this area could be limited, since the rocks features are located immediately adjacent to seawalls and residential properties. Seagrasses align the western portion of the perimeter channel area. Minor modifications to the proposed channel improvements would still impact the seagrasses located on the western side of the channel. Therefore, any channel modifications should occur to the west of the channel. Minor modifications from the design plans would not reduce impacts to seagrasses.

In addition to seagrasses, the perimeter channel was the only location that an oyster bed was observed. The oyster bed was located in shallow water, adjacent to the marsh grass. In order to avoid and minimize impacts, minor modifications to design plans could include reducing the amount of dredging in the shallow water where the oyster bed is located.

Proposed 500-Foot Channel Extension Area

Due to the relative uniformity of seagrasses in the surrounding area, minor modifications to the alignment would not reduce seagrass impacts.

Proposed Channel Realignment Area

This area is similar to the channel extension area, with fairly uniform seagrass coverage located throughout this survey area. Minor modifications to the basic alignment would not avoid or reduce seagrass impacts.

5.0 MITIGATION REQUIREMENTS AND OPTIONS

Mitigation requirements and options are assessed in this section.

5.1 Mitigation Requirements

Mitigation will likely be required by federal and state resource agencies as compensation for adverse impacts to seagrass communities, which are considered Essential Fish Habitat (EFH) by the National Marine Fisheries Service. Mitigation ratios for seagrass impacts could range from 1:1 to 3:1. It is recommended that no mitigation be offered for dredging within the existing channel footprint, as seagrass will recolonize the previously dredged channel within 2-3 years. A breakdown of seagrass impacts in undisturbed areas is provided in Table 3. A similar construction project involving channel extension and maintenance channel dredging recently occurred north of Hernando Beach at Bayport. As part of this project, permit stipulations required pre- and post- seagrass data to be taken to ensure that these features would naturally recover following construction (Biological Research and Associates, 2001). One year following construction, seagrass recovery met or exceeded the percent cover required by the permit. Natural recovery was permitted, and the seagrasses identified prior to dredging continue to return to the dredged area (Biological Research and Associates, 2001). The success criteria, monitoring protocol, and monitoring schedule used for Bayport Channel could be utilized for this project.

Table 3 Impacts to Marine Seagrasses and Potential Mitigation Requirements for Areas not Previously Disturbed, Hernando Beach, Florida

Area of Impact	Seagrass Impacted	Acreage	Mitigation 1:1 Ratio	Mitigation 3:1 Ratio
500-foot main channel extension	*Halodule wrightii*	0.13	0.13	0.39
	Mixed seagrasses	0.28	0.28	0.84
Proposed Channel Realignment	*Halodule wrightii*	0.80	0.80	2.40
	Mixed seagrasses	0.01	0.01	0.03
	Totals	1.21	1.21	3.66

Mitigation for channel improvements outside the existing footprint should include options which result in enhancing or restoring EFH of equal or greater value. As discussed below, mitigation options are limited to creating shallow offshore reefs with rock aggregate from the excavated channels, filling in the old channel and creating a littoral zone in a local lake. No other reasonable alternatives, other than excavating the spoil islands adjacent to the existing channel to depths which support marine seagrass, are apparent. If no options are suitable to directly mitigate in-kind it is recommended that out-of-kind mitigation be proposed, such as creating or enhancing oyster beds, artificial reefs, or saltmarshes.

5.2 Mitigation Options

The U.S. Fish and Wildlife Service (Service) believes that mitigation for marine seagrass impacts should be required, according to the Hernando Beach Navigation Channel Improvements, Coordination Act Report (USFWS 1997). The Corps, in addition to the recommendations provided from the Service's report, has prepared a comprehensive list of mitigation options. These options concentrate on utilizing the spoil material collected from dredging activities to assist in mitigation efforts. From this comprehensive list, six options were selected that were most feasible. These six options include: 1) placement of spoil material in Little Lake, Weekiwachee Preserve, to raise bottom surface; 2) raising the bottom surface of the abandoned channel section at the mouth of Minnow Creek; 3) placement of spoil material along abandoned channel section at mouth of Minnow Creek, to create a beach; 4) creating or expanding artificial reefs off of the Hernando Beach area with rock spoil material; 5) purchasing and conservation of Coon Key Point, located within the project boundaries, and 6) transplanting/or establishing new seagrass beds. All of these options are currently viable, except for creating a beach at the mouth of Minnow Creek. This option has been eliminated by the Corps, due to environmental concerns and swimming/boating safety concerns that could arise from increased boat traffic within that area (Tracy Leeser, personal communication, July 2001). Mitigation options are detailed below.

5.2.1 Little Lake Improvements

Little Lake is approximately four acres in size and is located within the Weekiwachee Preserve, Hernando County, Florida. This abandoned mining lake has few littoral shelves due to past excavation techniques. Mitigation would include placing dredge spoil material in Little Lake to create littoral shelves. In addition, creating shallow water habitat (within the photic zone) and creating marsh and a cypress dome are being considered. Improving and restoring these areas, especially within the photic zone, would provide a more productive habitat that currently does not exist. These options are currently being considered, since beneficiaries to this project would include plants, fish, and birds. Also, creating the littoral zones is included in the Weekiwachee Preserve's Management Plan (Tracy Lesser, personal communication, June 2001).

Monitoring of this project site could include recording baseline information with regards to pre-construction conditions of the Lake with emphasis on fish, flora, and avian species utilizing the Lake. Post-construction activities could include annual monitoring of the site for up to five years to identify what fish, floral, and avian species that occur once the littoral shelves are created. This mitigation effort could be considered successful when vegetative cover and faunal utilization meet or exceed pre-construction conditions.

5.2.2 Raise Bottom Level of Minnow Creek Abandoned Channel Section

Placing dredge spoil material within the project boundaries of the main channel at the mouth of Minnow Creek could be beneficial to submerged aquatic vegetation and their associated fauna. The spoil material could restore the area to historic conditions. Since seagrasses already occur in this area, this option may not be preferred by National Marine Fisheries Service since temporal impacts to existing seagrasses would occur.

5.2.3 Create or Expand Artificial Reefs offshore of Hernando Beach

The rock spoil material removed could be utilized to create or expand artificial reefs located offshore of Hernando Beach. Projected estimates of 210,000 cubic yards will be removed as part of this project. To mitigate for this, this material can be placed in areas offshore to provide artificial reef habitat. In addition to the creation of this habitat, a monitoring component can be added to the artificial reef construction to assess the effectiveness of the material in creating habitat. Monitoring of the artificial reef creation or expansion and adjacent reefs will gauge the effectiveness of this option and could occur annually for up to five years.

5.2.4 Purchase of Coon Key Point

Coon Key Point is privately-owned nature/spoil areas located within the project area (Figure 1). These areas could be purchased and utilized as out-of-kind mitigation as conservation areas to offset any impacts associated with this project.

5.2.5 Transplanting or Establishing Seagrass Beds

This option would involve transplanting seagrass beds that would be impacted by construction activities to areas that are not covered as extensively or that could be created by removal of the spoil islands. One possible area to transplant the seagrass is on either side of the proposed channel realignment area (See Figure 2 for the general location). Additionally, propeller-scared areas could be replanted or filled-in using transplanted seagrasses. Excavation of the spoil islands is not deemed appropriate due to other issues discussed (See Section 4.2).

6.0 SUMMARY AND CONCLUSIONS

This study was conducted to map and document the frequency of occurrence, abundance, and density of marine seagrasses and oyster beds within the Hernando Beach area. Results are summarized as follows for seagrass distribution, frequency of occurrence, abundance, and density as well as the distribution of oyster beds.

6.1 Marine Seagrass Distribution

Marine seagrasses were distributed throughout the survey area. Within the proposed channel extension area, *H. wrightii* and *T. testudinum* were observed at all snorkel survey transects. *Halodule wrightii* and *T. testudinum* occurred along 75 percent and 25 percent, respectively, of the perimeter channel survey area snorkel transects. The main channel supported three marine grasses; *H. wrightii*, *T. testudinum,* and *S. filiforme,* identified at 91 percent, 82 percent and 9 percent of the snorkel transects, respectively. *Thalassia testudinum* comprised 71 percent of the transects within the proposed channel realignment, while *H. wrightii* was observed at all snorkel transects. No marine seagrasses were observed within the entrance channels.

6.2 Seagrass Frequency of Occurrence, Abundance and Density

The frequency of occurrence varied for both *H. wrightii* and *T. testudinum* within the four survey areas, but was slightly greater for *T. testudinum*. Frequency of occurrence for *S. filiforme* was extremely low, given that this marine seagrass was identified along only one transect within the main channel. Cover abundance varied for the two predominant seagrass species over the survey area. Although low abundance values were recorded for both *H. wrightii* and *T. testudinum*, the average values were similar. Over the entire survey area, density was relatively low. Average density was slightly lower for *H. wrightii* than *T.*

testudinum. Density for *S. filiforme* was negligible, since this species was observed at one transect only within the main channel.

6.3 Oyster Bed Occurrence

The project area does not support a large quantity of oysters. This survey identified only one area that contained an oyster bed. This occurrence is along the channel slope and within the shallow water sections of the southern-most portion of the perimeter channel survey area.

6.4 Mitigation Options

Mitigation should not be required for temporary impacts associated with dredging the existing channel, as recent monitoring efforts at Bayport have shown natural recruitment to be successful. Mitigation options, which appear reasonable, include the creation of artificial reefs and enhancement to existing oyster beds, as well as other out-of-kind options deemed appropriate by resource agencies. Future coordination with state and federal agencies is needed to agree on satisfactory mitigation for this project.

7.0 LITERATURE CITED

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APPENDIX A

Field Data

Transect	Area	Total Quadrats	Occupied Quadrats	Sub Units	Occupied Sub Units	Sum Cover Score	Species	Frequency	Abundance	Density
42S	Main	1	1	16	16	0.5	HW	1.0000	0.5000	0.5000
42R	Main	1	1	16	13	1	HW	0.8125	1.0000	1.0000
42R	Main	1	1	16	14	1	TT	0.8750	1.0000	1.0000
42M	Main	1	1	16	14	0.1	TT	0.8750	0.1000	0.1000
42G	Main	1	1	16						
42N	Main	1	1	16	16	1	TT	1.0000	1.0000	1.0000
42N	Main	1	1	16	16	2	HW	1.0000	2.0000	2.0000
39S	Main	1	1	16	16	1	TT	1.0000	1.0000	1.0000
39R	Main	1	1	16	16	1	TT	1.0000	1.0000	1.0000
39R	Main	1	1	16	16	1	HW	1.0000	1.0000	1.0000
39M	Main	1	1	16				0.0000	0.0000	0.0000
39G	Main	1	1	16	16	4	HW	1.0000	4.0000	4.0000
39N	Main	1	1	16	16	5	TT	1.0000	5.0000	5.0000
39N	Main	1	1	16	16	2	SF	1.0000	2.0000	2.0000
36S	Main	1	1	16	16	1	TT	1.0000	1.0000	1.0000
36R	Main	1	1	16	16	0.1	TT	1.0000	0.1000	0.1000
39R	Main	1	1	16	16	0.1	HW	1.0000	0.1000	0.1000
36M	Main	1	1	16						
36G	Main	1	1	16	16	1	TT	1.0000	1.0000	1.0000
36N	Main	1	1	16				0.0000	0.0000	0.0000
33S	Main	1	1	16	12	0.1	TT	0.7500	0.1000	0.1000
33S	Main	1	1	16	16	0.1	HW	1.0000	0.1000	0.1000
33R	Main	1	1	16	16	0.1	HW	1.0000	0.1000	0.1000
33M	Main	1	1	16	3	0.1	HW	0.1875	0.1000	0.1000
33G	Main	1	1	16				0.0000	0.0000	0.0000
33N	Main	1	1	16	16	0.1	HW	1.0000	0.1000	0.1000
30S	Main	1	1	16	1	0.1	HW	0.0625	0.1000	0.1000
30R	Main	1	1	16				0.0000	0.0000	0.0000
30M	Main	1	1	16	2	0.1	HW	0.1250	0.1000	0.1000
30G	Main	1	1	16				0.0000	0.0000	0.0000
30N	Main	1	1	16				0.0000	0.0000	0.0000
27S	Main	1	1	16	16	0.1	TT	1.0000	0.1000	0.1000

Transect	Area	Total Quadrats	Occupied Quadrats	Sub Units	Occupied Sub Units	Sum Cover Score	Species	Frequency	Abundance	Density
27R	Main	1	1	16	8	0.1	TT	0.5000	0.1000	0.1000
27M	Main	1	1	16				0.0000	0.0000	0.0000
27G	Main	1	1	16				0.0000	0.0000	0.0000
27N	Main	1	1	16				0.0000	0.0000	0.0000
24S	Main	1	1	16	13	0.1	HW	0.8125	0.1000	0.1000
24R	Main	1	1	16	7	0.1	HW	0.4375	0.1000	0.1000
24R	Main	1	1	16	2	0.1	TT	0.1250	0.1000	0.1000
24M	Main	1	1	16				0.0000	0.0000	0.0000
24G	Main	1	1	16	5	0.1	HW	0.3125	0.1000	0.1000
24N	Main	1	1	16				0.0000	0.0000	0.0000
21S	Main	1	1	16	16	0.1	TT	1.0000	0.1000	0.1000
21S	Main	1	1	16	16	1	HW	1.0000	1.0000	1.0000
21R	Main	1	1	16	16	3	HW	1.0000	3.0000	3.0000
21R	Main	1	1	16	1	0.1	TT	0.0625	0.1000	0.1000
21M	Main	1	1	16				0.0000	0.0000	0.0000
21G	Main	1	1	16	16	1	TT	1.0000	1.0000	1.0000
21N	Main	1	1	16				0.0000	0.0000	0.0000
18S	Main	1	1	16	16	1	TT	1.0000	1.0000	1.0000
18R	Main	1	1	16	13	0.5	TT	0.8125	0.5000	0.5000
18R	Main	1	1	16	11	0.1	HW	0.6875	0.1000	0.1000
18M	Main	1	1	16				0.0000	0.0000	0.0000
18G	Main	1	1	16	16	1	HW	1.0000	1.0000	1.0000
18N	Main	1	1	16				0.0000	0.0000	0.0000
15S	Main	1	1	16	16	0.5	HW	1.0000	0.5000	0.5000
15R	Main	1	1	16	16	1	HW	1.0000	1.0000	1.0000
15M	Main	1	1	16				0.0000	0.0000	0.0000
15G	Main	1	1	16	16	3	HW	1.0000	3.0000	3.0000
15N	Main	1	1	16				0.0000	0.0000	0.0000
12S	Main	1	1	16	16	0.5	TT	1.0000	0.5000	0.5000
12S	Main	1	1	16	16	0.5	HW	1.0000	0.5000	0.5000
12R	Main	1	1	16	16	2	TT	1.0000	2.0000	2.0000
12M	Main	1	1	16	16	3	HW	1.0000	3.0000	3.0000

Transect	Area	Total Quadrats	Occupied Quadrats	Sub Units	Occupied Sub Units	Sum Cover Score	Species	Frequency	Abundance	Density
12G	Main	1	1	16	16	1	HW	1.0000	1.0000	1.0000
12N	Main	1	1	16				0.0000	0.0000	0.0000
10S	Perimeter	1	1	16	16	1	HW	1.0000	1.0000	1.0000
10R	Perimeter	1	1	16	8	0.5	HW	0.5000	0.5000	0.5000
10M	Perimeter	1	1	16	16	1	HW	1.0000	1.0000	1.0000
10G	Perimeter	1	1	16	11	1	HW	0.6875	1.0000	1.0000
10N	Perimeter	1	1	16	4	0.5	HW	0.2500	0.5000	0.5000
7S	Perimeter	1	1	16	7	0.1	TT	0.4375	0.1000	0.1000
7R	Perimeter	1	1	16				0.0000	0.0000	0.0000
7M	Perimeter	1	1	16	2	0.1	HW	0.1250	0.1000	0.1000
7G	Perimeter	1	1	16	9	0.5	HW	0.5625	0.5000	0.5000
7N	Perimeter	1	1	16				0.0000	0.0000	0.0000
4S	Perimeter	1	1	16	3	0.1	HW	0.1875	0.1000	0.1000
4R	Perimeter	1	1	16				0.0000	0.0000	0.0000
4M	Perimeter	1	1	16				0.0000	0.0000	0.0000
4G	Perimeter	1	1	16	16	1	HW	1.0000	1.0000	1.0000
4N	Perimeter	1	1	16				0.0000	0.0000	0.0000
1S	Perimeter	1	1	16				0.0000	0.0000	0.0000
1R	Perimeter	1	1	16				0.0000	0.0000	0.0000
1M	Perimeter	1	1	16				0.0000	0.0000	0.0000
1G	Perimeter	1	1	16				0.0000	0.0000	0.0000
1N	Perimeter	1	1	16				0.0000	0.0000	0.0000
PE1	500' Exten	5	5	80	80	5.5	TT	1.0000	1.1000	1.1000
PE1	500' Exten	5	1	80	8	1	TT	0.1000	1.0000	0.2000
PE2	500' Exten	5	5	80	78	3.5	TT	0.9750	0.7000	0.7000
PE2	500' Exten	5	4	80	23	2	HW	0.2875	0.5000	0.4000
PE3	500' Exten	5	5	80	56	2.7	TT	0.7000	0.5400	0.5400
PE3	500' Exten	5	4	80	28	1.7	HW	0.3500	0.4250	0.3400
PE4	500' Exten	5	5	80	42	1.4	TT	0.5250	0.2800	0.2800
PE4	500' Exten	5	2	80	10	0.2	HW	0.1250	0.1000	0.0400
PE5	500' Exten	5	5	80	79	5.2	TT	0.9875	1.0400	1.0400
PE5	500' Exten	5	2	80	17	3.1	HW	0.2125	1.5500	0.6200

Hernando Beach Field Data

Transect	Area	Total Quadrats	Occupied Quadrats	Sub Units	Occupied Sub Units	Sum Cover Score	Species	Frequency	Abundance	Density
PC1	New Chan	5	3	80	26	2.2	TT	0.3250	0.7333	0.4400
PC1	New Chan	5	3	80	20	0.3	HW	0.2500	0.1000	0.0600
PC2	New Chan	5	4	80	24	0.4	HW	0.3000	0.1000	0.0800
PC3	New Chan	5	5	80	56	0.5	HW	0.7000	0.1000	0.1000
PC4	New Chan	5	5	80	55	0.5	HW	0.6875	0.1000	0.1000
PC4	New Chan	5	5	80	52	0.5	TT	0.6500	0.1000	0.1000
PC5	New Chan	5	5	80	54	1.7	TT	0.6750	0.3400	0.3400
PC5	New Chan	5	4	80	33	0.4	HW	0.4125	0.1000	0.0800
PC6	New Chan	5	5	80	80	14	TT	1.0000	2.8000	2.8000
PC6	New Chan	5	2	80	19	2.1	HW	0.2375	1.0500	0.4200
PC7	New Chan	5	2	80	32	6	TT	0.4000	3.0000	1.2000
PC7	New Chan	5	2	80	32	4	HW	0.4000	2.0000	0.8000

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