

Planning Division  
Environmental Branch

MAR 21 2006

Mr. David Bernhart  
National Marine Fisheries Service  
Southeast Regional Office  
Protected Species Resources Division  
263 13<sup>th</sup> Avenue South  
St. Petersburg, Florida 33701

Dear Mr. Bernhart:

The U.S. Army Corps of Engineers (Corps), Jacksonville District, proposes to approve the use of a bed-leveling device to perform clean up operations during Operations and Maintenance and Construction activities at the Port of Palm Beach, in Palm Beach County, Florida.

This letter and enclosed Biological Assessment (BA) serves to initiate consultation under the Section 7 of the Endangered Species Act. After preparing this BA of the impacts of the proposed use of a bed leveling device in Palm Beach Harbor, the Corps has determined that the proposed project may affect, but is not likely to adversely affect the green turtle (*Chelonia mydas*), loggerhead turtle (*Caretta caretta*), Kemp's ridley turtle (*Lepidochelys kempii*), Hawksbill sea turtle (*Eretmochelys imbricata*), leatherback turtle (*Dermochelys coriacea*).

Additionally the Corps finds that the use of a bed-leveling device will not effect Johnson's seagrass (*Halophila johnsonii*), blue (*Balaenoptera musculus*), humpback, (*Balaenoptera physalus*), sei (*Balaenoptera borealis*), fin (*Balaenoptera physalus*), northern right (*Eubalaena glacialis*) and sperm (*Physeter macrocephalus*) whales and smalltooth sawfish (*Pristis pectinata*), and is not likely to adversely modify designated critical habitat for Johnson's seagrass. We request that you concur with this finding.

If you have any questions, please contact Ms. Terri Jordan at 904-232-1817 or [terri.l.jordan@saj02.usace.army.mil](mailto:terri.l.jordan@saj02.usace.army.mil).

Sincerely,

Marie G. Burns  
Chief, Environmental Branch

Enclosure



Jordan/CESAJ-PD-EC/1817/als  
Dugger/CESAJ-PD-EC  
Burns/CESAJ-PD-E

Rep 21 Mar 06  
21 Mar 06

# **Biological Assessment for Research and Compilation of Baseline Data for the Use of Bed-leveling Devices at Port of Palm Beach, Palm Beach County, Florida**

**Submitted to:**  
U.S. Army Corps of Engineers  
Jacksonville District  
701 San Marco Boulevard  
Jacksonville, FL 32207

**Submitted by:**  
ANAMAR Environmental Consulting, Inc.  
2106 NW 67<sup>th</sup> Place, Suite 5  
Gainesville, FL 23653-1658

**In Cooperation with:**  
CH2M HILL  
9428 Baymeadows Road, Suite 200  
Jacksonville, FL 32256



**January 2006**



# **Biological Assessment for Research and Compilation of Baseline Data for the Use of Bed-Leveling Devices at Port of Palm Beach Palm Beach County, Florida**

**PREPARED BY:** ANAMAR ENVIRONMENTAL CONSULTING, INC.

**IN COOPERATION WITH:** CH2M HILL

**PREPARED FOR:** U.S. ARMY CORPS OF ENGINEERS, JACKSONVILLE DISTRICT

**DATE:** JANUARY 2006

---

This document has been saved as a PDF file. Excel, Word, and other files have been provided in the CD whenever applicable. Links between sections have been established. To return to the previous page press the “previous view” button displayed in the toolbar at the top of the document. To view the full document sequentially, use the scroll bar at the right side of the document or the navigation buttons at the top of the document.

**Biological Assessment for  
Research and Compilation of Baseline Data for the  
Use of Bed-Leveling Devices at Port of Palm Beach  
Palm Beach County, Florida**

**Submitted to:  
U.S. Army Corps of Engineers  
Jacksonville District  
701 San Marco Boulevard  
Jacksonville, FL 32207**

**Submitted by:  
ANAMAR Environmental Consulting, Inc.  
2106 NW 67<sup>th</sup> Place, Suite 5  
Gainesville, FL 32653**

**In cooperation with:  
CH2M HILL  
9428 Baymeadows Road, Suite 200  
Jacksonville, FL 32256**



**January 2006**

## TABLE OF CONTENTS

<u>Section</u>	<u>Page</u>
<b>DESCRIPTION OF PROPOSED ACTION</b> .....	1
<b>1.0 INTRODUCTION</b> .....	2
<b>2.0 BACKGROUND AND CONSULTATION HISTORY</b> .....	3
<b>3.0 ACTION AREA</b> .....	5
3.1 Site Description.....	5
3.2 Environmental Windows, Incidental Takes, and Monitoring.....	5
<b>4.0 PROTECTED SPECIES INCLUDED IN THIS ASSESSMENT</b> .....	7
4.1 Loggerhead Sea Turtle ( <i>Caretta caretta</i> ).....	7
4.2 Green Sea Turtle ( <i>Chelonia mydas</i> ).....	12
4.3 Hawksbill Sea Turtle ( <i>Eretmochelys imbricata</i> ).....	14
4.4 Kemp’s Ridley Sea Turtle ( <i>Lepidochelys kempii</i> ).....	15
4.5 Leatherback Sea Turtle ( <i>Dermochelys coriacea</i> ).....	18
<b>5.0 RESEARCH AND COMPILATION OF BASELINE DATA</b> .....	20
5.1 Dredging Documentation, Sea Turtle Takes, and Sea Turtle Strandings.....	20
5.2 Interviews with Dredging Professionals and USACE SAD District.....	21
<b>6.0 COMPOSITE FINDINGS OF RESEARCH AND DATA COMPILATION</b> .....	22
6.1 Dredging Documentation, Sea Turtle Takes, and Sea Turtle Strandings.....	22
6.2 Industry Survey.....	22
6.3 USACE SAD Survey.....	24
<b>7.0 SUMMARY AND CONCLUSIONS</b> .....	26
<b>8.0 REFERENCES</b> .....	28

## **TABLES**

- 1 Description of Turtle Stranding Injuries During the Brunswick Harbor Deepening Project, 2003, Brunswick, GA
- 2 Summary of Dredging History Reports, Turtle Take Reports, and Turtle Stranding Reports for Dredging Projects Conducted from January 1990-2005 in Palm Beach Harbor, Palm Beach County, Florida

## **FIGURES**

- 1 SFWMD Land Use/Land Cover 1999, Port of Palm Beach, Palm Beach County, Florida
- 2 Sea Turtle Strandings 1990-2005 by Contractor and Dredge Type, Port of Palm Beach, Palm Beach County, Florida
- 3 1996 Sea Turtle Strandings
- 4 2002 Sea Turtle Strandings
- 5 Monthly Turtle Strandings with Non-Propeller Type Injuries Occurring within a 4-Mile Radius of the Palm Beach Harbor Entrance Channel from 1990-2005
- 6 Photographs of Bed-Leveling Devices Provided to USACE ERDC by Dredging Industry Professionals (Compiled from Hales *et al.*, 2005)
- 7 Photographs of a Drag Barge (Courtesy of Great Lakes Dredge and Dock, Nov. 2005)

## **APPENDICES**

- A. Palm Beach Harbor Dredging History Reports from 1990-2005
- B. Palm Beach Harbor Turtle Take Reports from 1990-2005
- C. Palm Beach Harbor Sea Turtle Stranding Reports
- D. USACE ERDC Survey Questionnaire
- E. Schematic and Additional Photographs of Bed-Leveling Devices Provided Courtesy of Bean Stuyvesant, Inc.
- F. Jacksonville District Contract Language

## LIST OF ACRONYMS AND ABBREVIATIONS

BA	Biological Assessment
ERDC	Engineer Research and Development Center
ESA	Endangered Species Act
FWC	Florida Fish and Wildlife Conservation Commission
GA DNR	Georgia Department of Natural Resources
GRBO	Gulf Regional Biological Opinion
NMFS	National Marine Fisheries Service
NRC	National Research Council
QCR	Quality Control Report
RBO	Regional Biological Opinion
SARBO	South Atlantic Regional Biological Opinion
SAD	South Atlantic Division
SEFSC	Southeast Fisheries Science Center
STSSN	Sea Turtle Stranding and Salvage Network
TED	Turtle Excluder Device
TEWG	Turtle Expert Working Group
USACE	U.S. Army Corps of Engineers
USFWS	U.S. Fish and Wildlife Service

## **DESCRIPTION OF PROPOSED ACTION**

The U.S. Army Corps of Engineers (USACE), Jacksonville District initiated a review of the use of bed-leveling devices in the major channels and basins within Port of Palm Beach, Palm Beach County, Florida. The purpose of this effort is to research, collect, and compile baseline information through interviews and document and database searches regarding the use of bed-leveling devices and the potential effects on sea turtles during dredging operations in Port of Palm Beach. The data gathered is compiled into a Biological Assessment (BA) to initiate consultation under the Endangered Species Act of 1973. This BA includes results from (1) research of existing documents and data regarding the use of bed-leveling devices and the amount of hopper and bucket dredging conducted in Port of Palm Beach over the last 15 years; (2) compiled stranding reports for turtles stranded within a 4-mile radius of the entrance channel for dates coinciding with dredging projects; and (3) interviews conducted with dredging industry professionals concerning bed-leveling devices used by their companies and how these devices are used.

## 1.0 INTRODUCTION

A “bed-leveler” is considered to be any type of dragged device used to smooth sediment bottom irregularities left by a dredge. These bed-levelers are suspended from work-barges by winches on A-frames to control the operating depth of the device. A 1,000- to 3,000-hp tug is generally used to push or pull the barge-mounted bed-leveler at towing speeds ranging from 1 to 2 knots. A typical bed-leveler varies from 30 to 50 feet in width and weighs anywhere from 25 to 50 tons. They are frequently used by dredge contractors following new work and maintenance dredging primarily to level out ridges and trenches created by dredging equipment or to reduce the height of dredged material disposal mounds that have reached an excessively high elevation. In various parts of the United States this process is known as “barring” or “knockdown” (Hales *et al.*, 2005). In certain cases, bed-levelers are used to redistribute sediments to maintain navigable depths rather than removing them by dredging with conventional methods. Dredge types using bed-levelers include clamshell (excavator), bucket, hydraulic cutterhead, and hopper dredges. Bed-levelers are not a new dredging technique and can be documented as far back as 1565 (van de Graaf 1987).

Typically, a bed-leveler consists of a large customized plow, I-beam, or old spud that is slowly dragged across the sediment to smooth out peaks and trenches during the final cleanup phase of the dredging activity. Another variant is for the hopper dredge to dig trenches along the channel below the project depth, and then a plow/I-beam bed-leveling device suspended from a barge is dragged along the bottom of the channel by a tugboat to knock material from high spots into deeper trenches dug along the channel bottom in order to achieve final project depth and an even grade. Bed-leveling has also been used by cutterhead dredge contractors for reducing heights of disposal mounds. According to hopper dredge, bucket dredge, and clamshell dredge contractors, bed-leveling is the preferred and least expensive method for achieving the final grade as compared to re-dredging (ERDC 2003).

A barge and workboat performing bed-leveling by trailing where a hopper dredge has been excavating is a relatively inconspicuous activity; accordingly, the utilization of bed-levelers by contractors in U. S. waters has previously received benign neglect (ERDC 2003). Further, since dragging the bottom (bed-leveling) is not a specific pay item, tugs and drag beams for bed-leveling have not previously been included in the plant and equipment lists of contractor’s bids. Contract language and dredging company daily operation logs typically do not document specific dates and corresponding locations where this technique is used (Hales *et al.*, 2005). Currently, there is no prohibition on bed-leveler use in Florida or within the boundaries of the Jacksonville District; hence, the District is not required to document that its use is in compliance with any environmental laws or regulations (ERDC 2003). The lack of documentation makes it difficult to assess what affect, if any, bed-leveler use may have on sea turtles. However, it has been determined that bed-leveling has been used periodically (not frequently) during dredging projects throughout the sea turtle’s range in the U.S. (Dickerson and Clausner 2003).

Both turtle take data and turtle stranding data were compiled for this BA. A turtle take is defined as a turtle that has been entrained and killed by a hopper dredge. A turtle stranding is defined as a turtle that has been found either washed up on the beach or floating in the water.

## 2.0 BACKGROUND AND CONSULTATION HISTORY

Bed-leveling was mentioned in passing in some of the early (1984-1987) Canaveral observer reports but has not been an issue of concern until recently. Early in 2003, USACE Division and District personnel became aware that regulatory agencies were concerned about the potential impact of bed-levelers on sea turtles. The question of bed-leveler use and its potential impact on sea turtles was raised during a COE-permitted bed-leveling project in Brunswick Harbor, when the Georgia Department of Natural Resources (GA DNR) reported to the Savannah District that six sea turtle strandings with odd, traumatic injuries were found along the Georgia coast at about the same time a dredging contractor was employing a bed-leveling device (NMFS 2003). All were found in the vicinity of the Brunswick bar channel. The injuries exhibited by the strandings were crushing type injuries that did not appear to be consistent with those produced by hopper dredges (Table 1). Although no conclusive evidence was found to link the bed-leveler with any of the reported sea turtle strandings, it raises the possibility that operation of a bed-leveler at Brunswick Harbor under certain conditions may result in takes of sea turtles (NMFS 2003a). For example, Brunswick Harbor is one of the sites where sea turtles captured by relocation trawlers sometimes show evidence of brumating (burying themselves in the bottom mud with reduced metabolic processes) in the muddy channel bottom, which could explain why, if they were crushed by a bed-leveling dredge, they failed to react quickly enough to avoid the bed-leveler (NMFS 2003b). Therefore, the potential danger to sea turtles from bed-leveler type dredges is that the heavy beam or bar may be dragged over a sea turtle resting or asleep on the channel bottom and crush it (Roy Crabtree 2005, personal correspondence).

After consultation and coordination with NMFS, subsequent bed-leveling at Brunswick Harbor was authorized and conducted in an attempt to corroborate or refute the suspicion that the bed-leveler was causing sea turtle takes. A sea turtle relocation trawler pulling nets was used behind the bed-leveler on all days the bed-leveler worked. This study yielded negative results (i.e., no turtles were captured by the relocation trawler, and no further crushed turtles were stranded on nearby beaches.) (*Bed-leveler Use in the Brunswick Harbor Deepening Project, Brunswick, GA. Data Summary Report, Savannah District Planning Division Environmental Branch, June 29, 2004*).

Subsequently, in November 2003, NMFS issued a hopper dredging opinion (GRBO) to the USACE's Gulf of Mexico Districts stating that, although bed-levelers were suspected of having the potential to take turtles, the use of bed-levelers for cleanup operations is probably preferable to use of hopper dredges, since turtles that are foraging/resting/brumating on irregular bottoms are probably more likely to be entrained by suction dragheads because: (1) sea turtle deflectors on hopper dredge suction dragheads are less effective on uneven bottoms at deflecting sea turtles away from the suction dragheads; (2) hopper dredges operate considerably faster than bed-leveler dredges (5 knots vs. 2 knots); and (3) bed-levelers do not use suction (NMFS 2003b). However, the NMFS (2003b) also acknowledges in the 2003 Opinion that takes by bed-leveler type dredges will be more difficult to ascertain and determine responsibility for because bed-levelers do not entrain turtle parts, and no dredged materials come aboard for observers to monitor; furthermore, turtles impacted by bed-leveling devices may not float ashore for several days, if at all. NMFS goes on to say that if compelling Sea Turtle Stranding and Salvage Network (STSSN) observer reports and evidence indicate that a turtle was killed by a bed-leveler

associated with a hopper dredging project covered by this Opinion, that take will be deducted from the Incidental Take Statement's anticipated take level for the USACE District where the take occurred. However, in a June 2005 letter, NMFS revised its opinion to remove the counting of strandings as takes due to the way that the analysis of takes was conducted. If NMFS counts stranded turtles as takes, it results in double counting of taken turtles. In 2005, USACE-South Atlantic Division (SAD) reinitiated consultation with NMFS on the NMFS 2003 Gulf Regional Biological Opinion (GRBO). Results of the re-initiated consultation are pending.

In March 2005, the Navy submitted a letter to NMFS to initiate an informal consultation under the ESA for the use of bed-leveling devices in the Key West Channel. In this letter, the Navy sought NMFS concurrence with the determination that the use of bed-leveling devices (including proposed mitigation measures) in the Key West Channel and Harbor may affect, but is not likely to adversely affect sea turtles that may be present in the project area (R. E. Courtright 2005, personal correspondence). NMFS agreed with the Navy's determination, stating that the Key West situation varies significantly from the Brunswick situation (Roy Crabtree 2005, personal correspondence). The key differences include: (1) warmer water temperatures (i.e., no brumation) compared to Brunswick; thus Key West turtles should be much more active and able to detect and avoid approaching dredging equipment; (2) lack of foraging habitat within the project location; (3) differences in bed-leveling operations which will avoid creating deep furrows that may attract sea turtles; and (4) no land mass obstructions that limit sea turtle's exit and entry routes. The essential difference is that at Key West, turtles can traverse through the harbor without having to go through the dredged channel, which further reduces the turtle-dredge encounter probability.

Prior to the 2003 bed-leveling incident in Brunswick Harbor, resource agencies were apparently unaware of the routine use of bed-levelers during dredging activities, particularly in the cleanup phase (Hales *et al.*, 2005; NMFS 2003a). This constitutes new information not considered in consultations with the SAD, including the 1997 Regional Biological Opinion (SARBO) concerning hopper dredging. Districts within SAD had not previously assessed potential effects of bed-leveler use on sea turtles, and acknowledged that this information would be difficult to ascertain (Hales *et al.*, 2005). The need to better describe the bed-leveling process, including gear types and ranges of applications, was identified as an initial step toward a balanced evaluation of this sediment management practice (Hales *et al.*, 2005).

In March 2003 and February 2005, the USACE Engineer Research and Development Center (ERDC) conducted a survey of Corps Districts within SAD and industry hopper dredge contractors to ascertain the extent of utilization of bed-levelers following dredging activities by hopper and other dredge types. The request arose from questions pertaining to whether bed-leveling activities could adversely impact sea turtles and/or other marine life. USACE ERDC prepared two documents for SAD (ERDC 2003; Hales *et al.*, 2005) summarizing the use of bed-levelers during dredging projects.

This BA is the next step in reviewing potential affects of bed-levelers on sea turtles in Palm Beach Harbor. This BA initiates consultation under the ESA for the use of bed-leveling devices during dredging operations and their potential to affect sea turtles.

### **3.0 ACTION AREA**

#### **3.1 Site Description**

The Port of Palm Beach, a man-made harbor facility, is located in Palm Beach County on southeast Atlantic Coast of Florida (Figure 1). The Port of Palm Beach is located 80 miles north of Miami and 135 miles south of Port Canaveral. The entrance channel was developed by making an artificial cut across the Palm Beach barrier island into the Lake Worth Intracoastal Waterway (ICW). The Lake Worth ICW is primarily a shallow, tidal lagoon, except for the areas maintained for navigational purposes.

The Port of Palm Beach is a major deepwater port of entry with berthing facilities and a foreign trade zone. The Port was constructed along the mainland southwest of Peanut Island Park. Peanut Island is located due west of the channel entrance. The turning basin is located south of Peanut Island and east of the Port. The Port supports primarily the cruise and cargo industries. The Florida East Coast Railway Company (FEC) services the docks and piers through the Port's industrial rail switching operations.

The Port is surrounded primarily by high-, medium-, and low-density housing and supporting commercial facilities, including marinas. Limited natural communities exist in the vicinity with the exception of Peanut Island Park and thin strip of coastal scrub along the beach both north and south of the channel entrance. Benthic habitats within the project area include primarily sand- and silt-bottom habitats. Limited fine- to medium-grained sand beaches occur within the immediate project area on Peanut Island and coarse-grained sand beaches occur along the Atlantic coast.

Shoaling within the Palm Beach Harbor and adjacent turning basins is addressed by an ongoing maintenance dredging program. The USACE is responsible for maintenance dredging in the federal portions of the harbor (the entrance channel, interior channel, and main turning basin). The Port of Palm Beach is responsible for maintenance of the approximately 100 foot area adjacent to the Port's berths. Approximately 75,000 to 100,000 cubic yards of material are removed annually from the harbor (Port of Palm Beach Master Plan 2005-2015).

#### **3.2 Environmental Windows, Incidental Takes, and Monitoring**

The construction and maintenance of federal navigation channels utilizing hopper dredges has been identified as a source of turtle mortality since turtle takes were first documented in 1980 during hopper dredging operations in Canaveral Channel, Florida. A total of 71 turtle takes by hopper dredge was documented in the Canaveral Channel over the period of July 11 through November 13, 1980 (NMFS 1991). Hopper dredges, which are frequently used in ocean bar channels and sometimes in harbor channels and offshore sand mining areas, move relatively rapidly and can entrain and kill sea turtles, presumably as the drag arm of the moving dredge overtakes the slower-moving turtles and sucks them into the hopper.

For several decades, state and federal resource agencies have routinely requested that various aspects of dredging projects be restricted to specified time periods known as environmental windows. Environmental windows are routinely recommended by resource agencies with the

intent to protect sensitive biological species or their habitats from potentially detrimental effects of dredging and disposal operations (Reine *et al.*, 1998). Hopper dredging along the southeastern U.S. potentially affects five species of threatened or endangered sea turtles (Dickerson *et al.*, 2004). Three species of sea turtles (loggerhead, green, and Kemp's ridley) have been determined by NMFS to be put at risk by hopper dredging activities (a fact well documented since 1980) (Reine *et al.*, 1998). Generally, the environmental windows for turtle-safe dredging have targeted the winter months since sea turtle abundance is dramatically reduced when water temperatures are below 16°C (Dickerson *et al.*, 2004). As a result, USACE Districts along most of the Atlantic Coast are prohibited from hopper dredging from April through November (when turtle abundance is high). During the hopper dredging window from December through March, 100% observer coverage is required. However, from Titusville to Key West, Florida water temperatures generally do not drop below 16°C; therefore turtles are present year-round. In these areas, year-round windows exist for hopper dredging, but 100% observer coverage is required.

No restrictions related to sea turtles are currently imposed on channel dredging operations if mechanical and/or cutterhead dredge types are used, except when performing projects that place material on nesting beaches like sand bypasses and beach nourishment. These restrictions often prohibit channel dredging between May 1 and October 31 because of the turtle nesting season. Restrictions for beach placement activities are conducted under separate consultations with the US Fish and Wildlife Service and will not be reviewed further.

The 1997 Biological Opinion that covers civil works hopper dredging projects within the boundaries of SAD (Wilmington, Charleston, Savannah and Jacksonville (Atlantic Coast only) Districts), sets current annual incidental take levels for sea turtles at: 35 loggerheads, 7 Kemp's ridleys, 7 greens, and 2 hawksbills (NMFS 1997).

Monitoring for incidental takes of sea turtles began as soon as the earliest incidents were reported from the hopper dredging activities at Canaveral Harbor, Florida in 1980 (Rudloe 1981; Joyce 1982). As a result, the Endangered Species Observer Program was established in 1980 and evolved through consultation between the NMFS and the USACE, as mandated by the ESA. In addition to hopper dredges, monitoring has been conducted periodically over the past 24 years on clamshell and cutterhead dredging projects; however, no incidental takes of sea turtles have been reported from dredges other than from hopper dredges, which use trailing suction dragheads (Dickerson *et al.*, 2004).

Typically, multiple NMFS-approved observers work 8- to 12-hour shifts to cover the 24-hour monitoring. The observers work closely with the dredge crew to record all dredging incidents with endangered species. A reported sea turtle incident represents one sea turtle which was entrained either whole or in parts. Sampling for whole turtles and parts is done through observation and inspection of the hopper, the draghead, and screening of the intake structures or hopper overflow (Dickerson *et al.*, 1990).

## 4.0 PROTECTED SPECIES INCLUDED IN THIS ASSESSMENT

Of the listed and protected species under NMFS jurisdiction occurring in the action area, the loggerhead sea turtle (*Caretta caretta*), green sea turtle (*Chelonia mydas*), Kemp's ridley sea turtle (*Lepidochelys kempii*), hawksbill sea turtle (*Eretmochelys imbricata*), and leatherback sea turtle (*Dermochelys coriacea*) could potentially be adversely affected by the use of bed-leveling devices. This is the initial consultation in accordance with Section 7 of the Endangered Species Act for marine turtle species. Upon reviewing the biological, status, threats, and distribution information presented in this assessment, it has been determined that these five sea turtle species are likely to be in or near the action area and thus may be affected by bed-leveling activities.

This report has relied heavily upon the Biological Assessment (BA) to NMFS for the Miami Harbor General Reevaluation Report Study that was completed by the USACE, Jacksonville District for the biological information concerning the biology, life history, and status for the five sea turtle species discussed in this assessment (USACE 2003). This BA document was accessed from the USACE Threatened, Endangered, and Sensitive Species Protection and Management System website at: <http://www.saj.usace.army.mil/pd/envdocs/Miami-Dade/MiamiHarbor/DEIS.htm>

### 4.1 Loggerhead Sea Turtle (*Caretta caretta*)

Distribution. Loggerhead turtles occur throughout the temperate and tropical regions of the Atlantic, Pacific, and Indian Oceans and are the most abundant species of sea turtle occurring in U.S. waters. Loggerheads concentrate their nesting in the north and south temperate zones and subtropics, but generally avoid nesting in tropical areas of Central America, northern South America, and the Old World (NRC 1990). The largest known nesting aggregation of loggerhead turtles occurs on Masirah and Kuria Muria Islands in Oman (Ross and Barwani 1982). In the western Atlantic, most loggerhead turtles nest from North Carolina to Florida and along the Gulf coast of Florida. The best scientific and commercial data available on the genetics of loggerhead turtles suggest there are four major subpopulations of loggerheads in the northwest Atlantic: (1) a northern nesting subpopulation occurring from North Carolina to northeast Florida, about 29°N (approximately 7,500 nests in 1998); (2) a South Florida nesting subpopulation, occurring from 29°N on the east coast to Sarasota on the west coast (approximately 83,400 nests in 1998); (3) a Florida Panhandle nesting subpopulation occurring at Eglin Air Force Base and the beaches near Panama City (approximately 1,200 nests in 1998); and (4) a Yucatan nesting subpopulation occurring on the eastern Yucatan Peninsula, Mexico (Marquez 1990) (approximately 1,000 nests in 1998, according to TEWG 2000). This biological assessment will focus on the northwest Atlantic subpopulations of loggerhead turtles that occur in the action area. The majority of sea turtle nesting activity occurs during the summer months of June, July, and August, with nesting activity occurring as early as March and as late as September (Miami-Dade County 2000).

Although NMFS and FWS have not completed the administrative processes necessary to formally recognize populations or subpopulations of loggerhead turtles, these sea turtles are generally grouped by nesting locations. Based on the most recent reviews of the best scientific and commercial data on the population genetics of loggerhead sea turtles and analyses of their population trends (TEWG 1998; TEWG 2000), NMFS and FWS treat these loggerhead turtle nesting aggregations as distinct subpopulations whose survival and recovery are critical to the

survival and recovery of the species. Further, any action that would appreciably reduce the likelihood that one or more of these nesting aggregations would survive and recover would appreciably reduce the species likelihood of survival and recovery in the wild. Consequently, this biological assessment will focus on the four nesting aggregations of loggerhead turtles identified in the preceding paragraph (which occur in the action area) and treat them as subpopulations for the purposes of this analysis. Natal homing to the nesting beach provides the genetic barrier between these subpopulations, preventing re-colonization from turtles from other nesting beaches. The importance of maintaining these subpopulations in the wild is shown by the many examples of nesting assemblages in the world that have been extirpated. In addition, recent fine-scale analysis of mitochondrial DNA work from Florida rookeries indicates that population separations begin to appear between nesting beaches separated by more than 50-100 km of coastline that does not host nesting (Francisco *et al.*, 2000) and tagging studies are consistent with this result (Richardson 1982; Ehrhart 1979; NMFS SEFSC 2001). Nest site relocations greater than 100 km occur, but generally are rare (Ehrhart 1979; NMFS SEFSC 2001).

Loggerhead turtles in the action area are likely to represent differing proportions of the four western Atlantic subpopulations. Although the northern nesting subpopulation produces about 9% of the loggerhead nests, they comprise more of the loggerhead sea turtles found in foraging areas from the northeastern U.S. to Georgia: between 25% and 59% of the loggerhead turtles in this area are from the northern subpopulation (NMFS SEFSC 2001; Bass *et al.*, 1998; Norrgard 1995; Rankin-Baransky 1997; Sears 1994; Sears *et al.*, 1995). In the Carolinas, the northern subpopulation is estimated to make up from 25% to 28% of the loggerheads (NMFS SEFSC 2001; Bass *et al.*, 1998, 1999). About 10% of the loggerhead turtles in foraging areas off the Atlantic coast of central Florida are from the northern subpopulation (Witzell *et al.*, in prep). In the Gulf of Mexico, most of the loggerhead turtles in foraging areas will be from the South Florida subpopulation, although the northern subpopulation may represent about 10% of the loggerhead sea turtles in the Gulf (Bass, pers. comm.). In the Mediterranean Sea, about 45% to 47% of the pelagic loggerheads are from the South Florida subpopulation and about 2% are from the northern subpopulation, while only about 51% originated from Mediterranean nesting beaches (Laurent *et al.*, 1998). In the vicinity of the Azores and Madeira Archipelagoes, about 19% of the pelagic loggerheads are from the northern subpopulation, about 71% are from the South Florida subpopulation, and about 11% are from the Yucatan subpopulation (Bolten *et al.*, 1998).

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

Benthic immatures have been found from Cape Cod, Massachusetts, to southern Texas, and occasionally strand on beaches in northeastern Mexico (R. Marquez-M., pers. comm.). Large benthic immature loggerheads (70-91 cm) represent a larger proportion of the strandings and in-

water captures (Schroeder *et al.*, 1998) along the south and western coasts of Florida as compared with the rest of the coast, but it is not known whether the larger animals actually are more abundant in these areas or just more abundant within the area relative to the smaller turtles. Benthic immature loggerheads foraging in northeastern U.S. waters are known to migrate southward in the fall as water temperatures cool (Epperly *et al.*, 1995; Keinath 1993; Morreale and Standora 1999; Shoop and Kenney 1992), and migrate northward in the spring. Given an estimated age at maturity of 21-35 years (Frazer and Ehrhart 1985; Frazer and Limpus 1998), the benthic immature stage must be at least 10-25 years long. NMFS SEFSC 2001 analyses conclude that juvenile stages have the highest elasticity and maintaining or decreasing current sources of mortality in those stages will have the greatest impact on maintaining or increasing population growth rates.

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

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

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

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

follow this developmental model would be adversely affected by shark gill nets and shark bottom longlines set in coastal waters, in addition to pelagic longlines.

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

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

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

Several published reports have presented the problems facing long-lived species that delay sexual maturity in a world replete with threats from a modern human population (Crouse *et al.*,

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

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

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

In waters off the coastal U.S., a suite of fisheries in federal and state waters threatens the survival of juvenile loggerhead sea turtles. Loggerhead turtles are captured, injured, or killed in shrimp fisheries off the U.S. Atlantic coast. Along the southeastern Atlantic coast, loggerhead turtle populations are declining where shrimp fishing is intense off the nesting beaches (NRC 1990). Conversely, these nesting populations do not appear to be declining where nearshore shrimping effort is low or absent. The management of shrimp harvest in the Gulf of Mexico demonstrates the correlation between shrimp trawling and impacts to sea turtles. Waters out to 200 nm are closed to shrimp fishing off the Gulf Coast of Texas each year for approximately a three-month period (mid-May through mid-July) to allow shrimp to migrate out of estuarine waters; sea turtle strandings decline dramatically during this period (NMFS, STSSN unpublished data). Loggerhead sea turtles are captured in fixed pound-net gear in the Long Island Sound, in pound-

net gear and trawls in summer flounder and other finfish fisheries in the mid-Atlantic and Chesapeake Bay, in gill net fisheries in the mid-Atlantic and elsewhere, in fisheries for monkfish and spiny dogfish, and in northeast sink gillnet fisheries. Witzell (1999) compiled data on capture rates of loggerhead and leatherback turtles in U.S. longline fisheries in the Caribbean and northwest Atlantic; the cumulative takes of these fisheries approach those of the U.S. shrimp fishing fleet (Crouse 1999; NRC 1990).

Based on the data available, it is not possible to estimate the size of the loggerhead population in the U.S. or its territorial waters. There is, however, general agreement that the number of nesting females provides a useful index of the species' population size and stability at this life stage. Nesting data collected on index nesting beaches in the U.S. from 1989-1998 represent the best dataset available to index the population size of loggerhead turtles. However, an important caveat for population trends analysis based on nesting beach data is that this may reflect trends in adult nesting females, but it may not reflect overall population growth rates. Given this, between 1989 and 1998 the total number of nests laid along the U.S. Atlantic and Gulf coasts ranged from 53,016 to 89,034 annually, representing, on average, an adult female population of 44,780 [(nests/4.1) \* 2.5]. On average, 90.7% of the nests were from the South Florida subpopulation, 8.5% were from the northern subpopulation, and 0.8% were from the Florida Panhandle subpopulation. There is limited nesting throughout the Gulf of Mexico west of Florida, but it is not known to what subpopulation they belong. Based on the above, there are only an estimated 3,800 nesting females in the northern loggerhead subpopulation. The status of this population, based on number of loggerhead nests, has been classified as stable or declining (TEWG 2000). Another consideration adding to the vulnerability of the northern subpopulation is that NMFS scientists estimate, using genetics data from Texas, South Carolina, and North Carolina in combination with juvenile sex ratios from those states, that the northern subpopulation produces 65% males, while the Florida subpopulation is estimated to produce 80% females (NMFS SEFSC 2001, Part I).

Critical Habitat. No critical habitat has been designated for loggerhead turtles.

#### **4.2 Green Sea Turtle (*Chelonia mydas*)**

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

Green turtles have a more tropical distribution than loggerhead turtles; they are generally found in waters between the northern and southern 20°C isotherms (Hirth 1971). Green turtles, like most other sea turtles, are distributed more widely in the summer when warmer water temperatures allow them to migrate north along the Atlantic coast of North America. In the

summer, green turtles are found around the U.S. Virgin Islands, Puerto Rico, and continental North America from Texas to Massachusetts. Immature greens can be distributed in estuarine and coastal waters from Long Island Sound, Chesapeake Bay, and the North Carolina sounds south throughout the tropics (Musick and Limpus 1997). In the United States, green turtles nest primarily along the Atlantic coast of Florida, the U.S. Virgin Islands, and Puerto Rico. In the winter, as water temperatures decline, green turtles found north of Florida begin to migrate south into subtropical and tropical water.

*Status and Population Trends.* The green turtle was protected under the ESA in 1978, breeding populations off the coast of Florida and the Pacific coast of Mexico are listed as endangered, and all other populations are listed as threatened. Recent population estimates for the western Atlantic area are not available. However, there is evidence that green turtle nesting has been on the increase during the past decade. Recently, green turtle nesting occurred on Bald Head Island, North Carolina just east of the mouth of the Cape Fear River, on Onslow Island, and on Cape Hatteras National Seashore. Increased nesting has also been observed along the Atlantic coast of Florida on beaches where only loggerhead nesting was observed in the past (Pritchard 1997). Certain Florida nesting beaches where most green turtle nesting activity occurs have been designated index beaches, which were established to standardize data collection methods and effort on key nesting beaches. Since establishment of the index beaches in 1989, the pattern of green turtle nesting shows biennial peaks in abundance with a generally positive trend during the six years of regular monitoring. The majority of sea turtle nesting activity occurred during the summer months of June, July, and August, with nesting activity occurring as early as March and as late as September (Miami-Dade County 2000).

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

*Threats.* The greatest threat to this species is the loss of its nesting habitat. Throughout the tropical and subtropical distribution of this species, beaches are eroded, armored, renourished, or converted for residential or commercial purposes. Green turtles are also threatened by fibropapilloma disease, incidental takes in commercial or recreational fishing gear, and poaching

(although poaching is infrequent in the United States). Green turtles are harvested in some nations for food, leather, and jewelry. Green turtles are also threatened by natural causes including hurricanes; predation by fire ants, raccoons, and opossums; and poaching of eggs and nesting females.

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

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

### **4.3 Hawksbill Sea Turtle (*Eretmochelys imbricata*)**

*Distribution.* Hawksbill turtles occur in tropical and subtropical waters of the Atlantic, Pacific, and Indian Oceans. Recognized subspecies occupy the Atlantic Ocean (ssp. *imbricata*) and the Pacific Ocean (ssp. *squamata*). Richardson *et al.* (1989) estimated that the Caribbean and Atlantic portions of the U.S. support a minimum of 650 hawksbill turtle nests each year. In the United States, hawksbill turtles have been recorded in all states along the Gulf of Mexico and along the Atlantic coast from Florida to Massachusetts. United States populations nest primarily in the U.S. Virgin Islands and Puerto Rico, but occasionally on the Atlantic coast of Florida.

*Natural History.* Hawksbill turtles use different habitats for different stages in their life cycles. Post-hatchling hawksbill turtles remain in pelagic environments to take shelter in weedlines that accumulate at convergence points. Juvenile hawksbill turtles (those with carapace lengths of 20-25 cm) re-enter coastal waters where they become residents of coral reefs, which provide sponges for food, and ledges and caves for shelter. Hawksbill turtles are also found around rocky outcrops, high-energy shoals, and mangrove-fringed bays and estuaries (particularly in areas where coral reefs do not occur). Hawksbill turtles remain in coastal waters until they develop into sub-adults and adults.

Status and Threats. The hawksbill turtle was listed as an endangered species on June 2, 1970 (35 FR 8491). Populations are threatened by significant modifications of coastal habitats throughout its range. The National Research Council (1990) and NMFS/FWS (1993) have published general overviews of the effects of habitat alteration on hawksbill turtles. In the U.S. Virgin Islands, problems such as egg poaching, domestic animals, beach driving, litter, and recreational use of beaches have presented problems for nesting hawksbill turtles. In addition, beachfront lights appear to pose a serious problem for hatchling hawksbill (and other) turtles in the U.S. Virgin Islands. At sea, activities that damage coral reefs and other habitats important to the hawksbill turtle threaten the continued existence of this species. Hawksbill turtles are also threatened by stochastic events (e.g., hurricanes); predation by fire ants, raccoons and opossums; and by poaching of eggs and nesting females by humans.

Critical Habitat. In 1998, NMFS designated the waters surrounding Mona and Monito Islands, Puerto Rico as critical habitat for the hawksbill turtle. The designated critical habitat for the species does not occur in the action area.

#### **4.4 Kemp's Ridley Sea Turtle (*Lepidochelys kempii*)**

Status and Population Trends. Of the seven existing species of sea turtles of the world, the Kemp's ridley has declined to the lowest population level. The Recovery Plan for the Kemp's Ridley Sea Turtle (USFWS and NMFS 1992) contains a description of the natural history, taxonomy, and distribution of the Kemp's ridley turtle. Kemp's ridleys nest in daytime aggregations known as *arribadas*. The primary *arribada* in the Gulf of Mexico is at Rancho Nuevo, a stretch of beach in Mexico. Most of the population of adult females nest in this single locality (Pritchard 1969). When nesting aggregations at Rancho Nuevo were discovered in 1947, adult female populations were estimated to be in excess of 40,000 individuals (Hildebrand 1963). By the early 1970's, the world population estimate of mature female Kemp's ridleys had been reduced to 2,500-5,000 individuals. The population declined further through the mid-1980s. Recent observations of increased nesting suggest that the decline in the ridley population has stopped and there is cautious optimism that the population is now increasing.

After unprecedented numbers of Kemp's ridley carcasses were reported from Texas and Louisiana beaches during periods of high levels of shrimping effort, NMFS established a team of population biologists, sea turtle scientists, and managers, known as the Turtle Expert Working Group (TEWG) to conduct a status assessment of sea turtle populations. Analyses conducted by the group have indicated that the Kemp's ridley population is in the early stages of recovery; however, strandings in some years have increased at rates higher than the rate of increase in the Kemp's population (TEWG 1998).

TEWG (1998) developed a population model to evaluate trends in the Kemp's ridley population through the application of empirical data and life history parameter estimates chosen by TEWG. Model results identified three trends in benthic immature Kemp's ridleys. Benthic immatures are those turtles that are not yet reproductively mature but have recruited to feed in the nearshore benthic environment where they are available to nearshore mortality sources that often result in strandings. Benthic immature Kemp's ridleys are estimated to be 2-9 years of age and 20-60 cm in length. Increased production of hatchlings from the nesting beach beginning in 1966 resulted

in an increase in benthic Kemp's ridleys that leveled off in the late 1970s. A second period of increase followed by leveling occurred between 1978 and 1989 as hatchling production was further enhanced by the cooperative program between USFWS and Mexico's Instituto Nacional de Pesca to increase the nest protection and relocation program in 1978. A third period of steady increase, which has not leveled off to date, has occurred since 1990 and appears to be due to the greatly increased hatchling production and an apparent increase in survival rates of immature turtles beginning in 1990 due, in part, to the introduction of turtle excluder devices (TEDs). Adult Kemp's ridley numbers have now grown from a low of approximately 1,050 adults producing 702 nests in 1985 to greater than 3,000 adults producing 1,940 nests in 1995 and about 3,400 nests in 1999.

TEWG (1998) was unable to estimate the total population size and current mortality rates for the Kemp's ridley population; however, they listed a number of preliminary conclusions. TEWG indicated that the Kemp's ridley population appears to be in the early stage of exponential expansion. Over the period 1987 to 1995, the rate of increase in the annual number of nests accelerated in a trend that would continue with enhanced hatchling production and the use of TEDs. Nesting data indicated that the number of adults declined from a population that produced 6,000 nests in 1966 to a population that produced 924 nests in 1978 and a low of 702 nests in 1985. This trajectory of adult abundance tracks with trends in nest abundance from an estimate of 9,600 in 1966 to 1,050 in 1985. TEWG estimated that in 1995 there were 3,000 adult Kemp's ridleys. The increased recruitment of new adults is illustrated in the proportion of neophytes, or first time nesters, which increased from 6% to 28% from 1981 to 1989 and from 23% to 41% from 1990 to 1994. The population model in the TEWG plan projected that Kemp's ridleys could reach the intermediate recovery goal identified in the Recovery Plan of 10,000 nesters by the year 2020 if the assumptions of age to sexual maturity and age-specific survivorship rates plugged into their model are correct. It determined that the data reviewed suggested that adult Kemp's ridley turtles were restricted somewhat to the Gulf of Mexico in shallow nearshore waters, and benthic immature turtles of 20-60 cm straight line carapace length are found in nearshore coastal waters, including estuaries of the Gulf of Mexico and the Atlantic.

TEWG (1998) identified an average Kemp's ridley population growth rate of 13% per year between 1991 and 1995. Total nest numbers have continued to increase. However, the 1996 and 1997 nest numbers reflected a slower rate of growth, while the increase in the 1998 nesting level was much higher and decreased in 1999. The population growth rate does not appear as steady as originally forecasted by TEWG, but annual fluctuations, due in part to irregular inter-nesting periods, are normal for other sea turtle populations. Also, as populations increase and expand, nesting activity would be expected to be more variable.

The area surveyed for ridley nests in Mexico was expanded in 1990 due to destruction of the primary nesting beach by Hurricane Gilbert. TEWG (1998) assumed that the increased nesting observed particularly since 1990 was a true increase rather than the result of expanded beach coverage. Because systematic surveys of the adjacent beaches were not conducted prior to 1990, there is no way to determine what proportion of the nesting increase documented since that time is due to the increased survey effort rather than an expanding ridley nesting range. As noted by TEWG, trends in Kemp's ridley nesting even on the Rancho Nuevo beaches alone suggest that

recovery of this population has begun but continued caution is necessary to ensure recovery and to meet the goals identified in the Kemp's Ridley Recovery Plan.

Natural History. Juvenile Kemp's ridleys use northeastern and mid-Atlantic coastal waters of the U.S. Atlantic coastline as primary developmental habitat during summer months, with shallow coastal embayments serving as important foraging grounds. Post-pelagic Kemp's ridleys feed primarily on crabs, consuming a variety of species, including *Callinectes* sp., *Ovalipes* sp., *Libinia* sp., and *Cancer* sp. Mollusks, shrimp, and fish are consumed less frequently (Bjorndal 1997). Juvenile Kemp's ridleys migrate south as water temperatures cool in fall, and are predominantly found in shallow coastal embayments along the Gulf Coast during fall and winter months. Kemp's ridleys found in mid-Atlantic waters are primarily post-pelagic juveniles averaging 40 cm in carapace length, and weighing less than 20 kg (Klinger and Musick 1995). Next to loggerheads, they are the second most abundant sea turtle in Virginia and Maryland waters, arriving in these areas during May and June, and migrating to more southerly waters from September to November (Keinath *et al.*, 1987; Musick and Limpus 1997). In the Chesapeake Bay, Kemp's ridleys frequently forage in shallow embayments, particularly in areas supporting submerged aquatic vegetation (Lutcavage and Musick 1985; Bellmund *et al.*, 1987; Keinath *et al.*, 1987; Musick and Limpus 1997). The juvenile population in Chesapeake Bay is estimated to be 211 to 1,083 turtles (Musick and Limpus 1997).

Research being conducted by Texas A&M University has resulted in the intentional live-capture of hundreds of Kemp's ridleys at Sabine Pass and the entrance to Galveston Bay. Between 1989 and 1993, Galveston NMFS Laboratory staff tracked 50 of these turtles using satellite and radio telemetry. The tracking study was designed to characterize sea turtle habitat and to identify small- and large-scale migration patterns. Preliminary analysis of the data collected during these studies suggests that sub-adult Kemp's ridleys stay in shallow, warm, nearshore waters in the northern Gulf of Mexico until cooling waters force them offshore or south along the Florida coast (Renaud, NMFS Galveston Laboratory, pers. comm.).

Threats. Observations in the northeast otter trawl fishery, pelagic longline fishery, and southeast shrimp and summer flounder bottom trawl fisheries have recorded takes of Kemp's ridley turtles. As with loggerheads, a large number of Kemp's ridleys are taken in the southeast shrimp fishery each year. Kemp's ridleys were also affected by the apparent large-mesh gillnet interaction that occurs in the spring off the North Carolina coast. A total of five Kemp's ridley carcasses were recovered from the same North Carolina beaches where 277 loggerhead carcasses were found. This is expected to be a minimum count of the number of Kemp's ridleys that were killed or seriously injured as a result of the fishery interaction since it is unlikely that all carcasses washed ashore. Stranding events illustrate the vulnerability of Kemp's ridley and loggerhead turtles to the impacts of human activities in nearshore Gulf of Mexico waters as well (TEWG 1998). While many of the stranded turtles observed in recent years in Texas and Louisiana have been incidentally taken in the shrimp fishery, other sources of mortality, such as those observed in the northeastern and southeastern Atlantic zones, exist in these waters.

Critical Habitat. No critical habitat has been designated for the Kemp's ridley turtle.

#### 4.5 Leatherback Sea Turtle (*Dermochelys coriacea*)

Species Description and Distribution. The leatherback is the largest living turtle species. Leatherback sea turtles are widely distributed throughout the oceans of the world, and are found throughout waters of the Atlantic, Pacific, Caribbean, and the Gulf of Mexico (Ernst and Barbour 1972).

Leatherback turtles undertake the longest migrations of any other sea turtle and exhibit the broadest thermal tolerances (NMFS and USFWS 1998). Leatherback turtles are able to inhabit intensely cold waters for a prolonged period of time because they are able to maintain body temperatures several degrees above ambient temperatures. Leatherback turtles are typically associated with continental shelf habitats and pelagic environments. Leatherback turtles regularly occur in deep waters (> 328 ft), and an aerial survey study in the north Atlantic Ocean sighted leatherback turtles in water depths ranging from 3 to 13,618 feet, with a median sighting depth of 131.6 feet (CeTAP 1982). This same study found leatherbacks in waters ranging from 7 to 27.2°C.

Life History Information. Although leatherbacks are a long-lived species (> 30 years), they are somewhat faster to mature than loggerheads, with an estimated age at sexual maturity reported as about 13-14 years for females, and an estimated minimum age at sexual maturity of 5-6 years, with 9 years reported as a likely minimum (Zug and Parham 1996).

Leatherback sea turtles are predominantly distributed pelagically where they feed on jellyfish such as *Stomolophus* sp., *Chryaora* sp., and *Morelia* sp. (Rebel 1974). Leatherbacks are deep divers, with recorded dives to depths in excess of 1000 m, but they may come into shallow waters if there is an abundance of jellyfish nearshore. They also occur annually in places such as Cape Cod and Narragansett Bays during certain times of the year, particularly the fall.

Listing Status. The leatherback was listed as endangered on June 2, 1970 and a recovery plan was issued in 1998. Leatherback turtles are included in Appendix 1 of the Convention on International Trade in Endangered Species of Wild Fauna and Flora, which effectively bans the trade of this species.

Population Status and Trends. Globally, leatherback turtle populations have been decimated worldwide. The global leatherback turtle population was estimated to number approximately 115,000 adult females in 1980 (Pritchard 1982), but only 34,500 in 1995 (Spotila *et al.*, 1996). The decline can be attributed to many factors including fisheries as well as intense exploitation of the eggs (Ross 1979). On some beaches nearly 100% of the eggs laid have been harvested (Eckert 1996). Eckert (1996) and Spotila *et al.* (1996), record that adult mortality has also increased significantly, particularly as a result of driftnet and longline fisheries.

The status of the Atlantic population is not clear. In 1996, it was reported to be stable, at best (Spotila 1996), but numbers in the Western Atlantic at that writing were reported to be on the order of 18,800 nesting females. According to Spotila (pers. comm.), the Western Atlantic population currently numbers about 15,000 nesting females, whereas current estimates for the Caribbean (4,000) and the Eastern Atlantic (i.e. off Africa, numbering - 4,700) have remained

consistent with numbers reported by Spotila *et al.* in 1996. Between 1989 and 1995, marked leatherback returns to the nesting beach at St. Croix averaged only 48.5%, but the overall nesting population grew (McDonald *et al.*, 1993). This is in contrast to a Pacific nesting beach at Playa Grande, Costa Rica, where only 11.9% of turtles tagged in 1993-94 and 19.0% of turtles tagged in 1994-95 returned to nest over the next 5 years. Characterizations of this population suggest that it has a very low likelihood of survival and recovery in the wild under current conditions.

Spotila *et al.* (1996) describes a hypothetical life table model based on estimated ages of sexual maturity at both ends of the species' natural range (5 and 15 years). The model concluded that leatherbacks maturing in 5 years would exhibit much greater population fluctuations in response to external factors than would turtles maturing in 15 years. Furthermore, the simulations indicated that leatherbacks could maintain a stable population only if both juvenile and adult survivorship remained high and if other life history stages (i.e., egg, hatchling, and juvenile) remained static. Stable leatherback populations could not withstand an increase in adult mortality above natural background levels.

Threats. The primary threats to leatherback turtles are entanglement in fishing gear (e.g., gillnets, longlines, lobster pots, weirs), boat collisions, and ingestion of marine debris (NMFS and USFWS 1997). The foremost threat is the number of leatherback turtles killed or injured in fisheries. Spotila (2000) states that a conservative estimate of annual leatherback fishery-related mortality (from longlines, trawls, and gillnets) in the Pacific during the 1990s is 1,500 animals. He estimates that this represented about a 23% mortality rate (or 33% if most mortality was focused in the East Pacific population). As noted above, leatherbacks normally live at least 30 years, usually maturing at about 12-13 years of age. This long-lived species cannot withstand such high rates of anthropogenic mortality.

Critical Habitat. Critical habitat for the leatherback turtle includes the waters adjacent to Sandy Point, St. Croix, U.S. Virgin Islands, up to and inclusive of the waters from the hundred fathom curve shoreward to the level of mean high tide with boundaries at 17°42'12" N and 64°50'00" W.

## **5.0 RESEARCH AND COMPILATION OF BASELINE DATA**

### **5.1 Dredging Documentation, Sea Turtle Takes, and Sea Turtle Strandings**

Dredging history reports for dredging projects conducted from January 1990 to present within Port of Palm Beach were requested and provided by USACE, Jacksonville District. These reports were reviewed to determine if information about the use of bed-leveling devices was included in the documentation and to determine how much bucket and hopper dredging has been conducted in the last 15 years. A document and database search was also conducted regarding hopper dredging and the use of bed-leveling devices as a component of dredging projects. A summary of this information is provided in Table 2. Data compiled include dates of dredging projects, contractor, contract number, location of dredging event, project type, dredge type (i.e., hopper, clamshell, bucket), name of the dredge used, total pay volume dredged (cubic yards), material type dredged (i.e., sand, silt, clay), and whether a bed-leveler was used (if known). Copies of dredging history reports are provided in Appendix A.

Data regarding sea turtle mortality (takes) directly attributable to the dredging operations occurring during dredging projects were also compiled from the USACE Sea Turtle Warehouse website. This internet-based database was created to centralize and archive historical and future data regarding sea turtle impacts from hopper dredging activities for long-term continuity and evaluation of these data. These data are summarized in Table 2. Copies of turtle take reports are provided in Appendix B.

In addition, a sea turtle stranding search was conducted using the Florida Fish and Wildlife Conservation Commission (FWC) STSSN databases. The STSSN documents dead or injured sea turtles along the coasts of the eastern United States (Schroeder 1989). The STSSN relies on a trained group of volunteers, including state and federal employees and private individuals, to collect basic biological data on each turtle located (Epperly and Teas 1999). Each animal is identified to species; the condition or state of decomposition is determined; standard carapace measurements are taken; and any obvious wounds, injuries, or abnormalities are noted and described. Volunteers who have additional training may also perform necropsies, or internal exams, on a carcass to determine the general state of health of the animal prior to death, determine sex, and locate any obvious internal abnormalities. Data are recorded on standardized report forms that are submitted first to a state coordinator and then to the national STSSN coordinator at NMFS, Southeast Fisheries Science Center, Miami, Florida.

The sea turtle stranding reports of interest include those involving impact- or crushing- (non-propeller) type injuries coinciding with dredging project timeframes (i.e., during each dredging project and within two weeks after a dredging project had been completed) and occurring within a 4-mile radius of the Port of Palm Beach entrance channel. In order to identify the reports of interest, the STSSN database was sorted in several steps. FWC provided an initial database file that included all sea turtle strandings occurring in Palm Beach County during 1990-2005 that involved non-propeller type injuries. These data were converted to GIS format (ArcView shapefile) and clipped geographically to include only those strandings occurring within the designated 4-mile radius of the entrance channel. Finally, strandings that occurred during the specific dredging timeframes of interest (i.e., during each dredging project and 2 weeks after each dredging project) were identified. These stranding reports along with associated photos and

necropsy reports were requested from FWC. Copies of the sea turtle stranding reports and associated photos are provided in Appendix C.

The number of sea turtle strandings occurring during the dredging timeframes was determined (Table 2). For comparison purposes, the number of sea turtle strandings occurring outside the dredging timeframes but within the 4-mile radius was also determined. These data were mapped and developed into graphics using ArcView GIS to depict the number of sea turtle strandings that occurred between 1990 and 2005 and their proximity to the Port of Palm Beach entrance channel (Figures 2-4).

## **5.2 Interviews with Dredging Professionals and USACE SAD District**

In May 2003 and February 2005, USACE ERDC distributed questionnaire surveys about bed-leveler use during USACE dredging projects to Charleston, Wilmington, Savannah, Jacksonville, and Mobile District personnel and selected dredging industry contractors (Bean Dredging Corporation, New Orleans, LA; Great Lakes Dredge and Dock Company, Oak Brook, IL; Manson Construction Company, Seattle, WA; Weeks Marine Incorporated, Kenner, LA). These four contractors represent the predominant hopper dredging capability in the United States. The survey questions presented to the dredging industry and SAD Districts are included in Appendix D. The data compiled include information regarding the variety of bed-leveling devices currently utilized by the industry and how the devices are used. Additional information collected includes drawings, schematics, and photos of these devices. ERDC (2003) and Hales *et al.* (2005) summarize composite findings of the industry survey and USACE SAD District survey.

To supplement information from the USACE ERDC survey and to gather specific information regarding the extent of bed-leveler use in Palm Beach Harbor, additional interviews were conducted with dredging professionals at companies that performed dredging operations in Port of Palm Beach between 1990 and 2005. The additional companies contacted include Hendry Corporation, Atkinson Dredging, Cavo Development, NATCO (North American Trailing Company) Limited Partnership, Gulf Coast Trailing Company, and B + B Dredging Company. The Area Engineer for USACE, Jacksonville District was also contacted to see if any journals or logs exist that may contain information or notes regarding dredging activities and equipment used during dredging projects.

## **6.0 COMPOSITE FINDINGS OF RESEARCH AND DATA COMPILATION**

### **6.1 Dredging Documentation, Sea Turtle Takes, and Sea Turtle Strandings**

Information compiled from dredging history reports, turtle take reports, and turtle stranding reports for turtles with impact- or crushing-type injuries (non-propeller) for dredging projects conducted within Palm Beach Harbor from 1990 to 2005 is summarized in Table 2. Some of the data in the dredging history reports do not match what is recorded in the turtle take reports. Dredging dates, contractors, and cubic yards dredged were the most common discrepancies noted. When data did not correspond, information contained in the dredging history reports was reported. There was no information in any of the dredging history reports or turtle take reports regarding the use of bed-leveling devices during these dredging projects.

Since 1990, dredging has been conducted annually in the Palm Beach Harbor channels and turning basins, and there are 17 dredging projects total. Of those 17 dredging projects, 15 involved hopper dredges and 2 involved cutterhead/suction dredges. The amount of material dredged per project ranges from 14,391 to 302,007 cubic yards (cu yds). Three emergency maintenance dredging projects were conducted using hopper dredges between 2004 and 2005. In May 2004, emergency maintenance dredging was required due to late winter shoaling. In September-October 2004, post-hurricane emergency maintenance dredging was performed. In April-July 2005, emergency maintenance dredging of the entrance channel was performed.

Between 1990 and 2005, sea turtle takes were reported by observers during 6 of the 17 dredging projects resulting in a total of 12 takes (3 greens, 9 loggerheads). All turtle takes occurred during projects involving hopper dredges. It is thought that turtle takes of the green sea turtle have occurred during the final stages of dredging at Palm Beach Harbors because the draghead was not firmly engaged with the bottom (<http://www.saj.usace.army.mil/pd/turtle.htm>, Dec. 2005).

According to the STSSN database, there was a total of 15 turtle strandings that were described as having impact- or crushing-type injuries within the designated 4-mile radius of the Palm Beach Harbor entrance channel between 1990 and 2005. Of these 15 strandings, 2 either occurred during a dredging project or within two weeks after a dredging project had been completed (Figure 2). These 2 strandings coincided with two different dredging projects over the 15-year period. One stranding occurred in April 1996 and another occurred in January 2002 while the hopper dredge named the *Atchafalaya* was conducting dredging (Figure 3 and 4). Regardless of whether dredging activities are being conducted within the harbor, it appears that strandings occur much more frequently in the spring and summer months (Figure 5). It is also important to emphasize that while strandings may have occurred within the window of time evaluated during a dredging project; there is no evidence to link the strandings to the dredging operations.

### **6.2 Industry Survey**

Eight dredging contractors have conducted dredging within Palm Beach Harbor since 1990. They are Hendry Corporation, Atkinson Dredging, Cavo Development, NATCO Limited Partnership, Gulf Coast Trailing Company, Manson Construction Company, B + B Dredging Company, and Great Lakes Dredge and Dock Company. USACE ERDC previously surveyed two of those companies (Manson Construction Company and Great Lakes Dredge and Dock

Company). The following information is a summary of results from the 2003 and 2005 USACE ERDC survey questionnaires (ERDC 2003; Hales *et al.*, 2005).

Bed-levelers are used most often in soft sediments such as silts and clays, and less frequently in sandy sediments such as typically occur in bar entrance channels. They are routinely used following new work and maintenance dredging by conventional dredging methods (i.e., clamshell, bucket, hydraulic cutterhead, and hopper dredges) to relocate sediment from high spots into adjacent low areas. A hopper dredge draghead, especially one equipped with a Turtle Excluder Device (TED), will tend to fall off ridges, dig deep, and follow the same path with successive passes. This tends to dredge trenches and leave ridges. Clamshell and bucket dredges typically leave high spots between lifts. If the contractor is required to bring the high spots down to desired grade, bed-leveling is a far more efficient and cost-effective method for lowering these high spots than using conventional dredging methods. Bed-leveling operations can also efficiently locate target areas in tandem with multi-beam precision bathymetry survey systems.

Historically, drag bars first used as bed-levelers were probably sections of spuds or fabricated from I-beams. Bed-levelers are custom-fabricated devices resembling a bulldozer blade or a box-beam reinforced with added weight to facilitate penetration into soft or hard substrates, occasionally including small grades of rock (Figures 6 and 7). These bed-levelers are suspended from work-barges by winches on A-frames to control the operating depth of the device. A 1,000- to 3,000-hp tug is generally used to push or pull the barge-mounted bed-leveler at towing speeds ranging from 1 to 2 knots. A typical bed-leveler varies from 30 to 50 feet in width and weighs anywhere from 25 to 50 tons. Additional photographs and a schematic are provided courtesy of Bean Stuyvesant, Inc. in Appendix E.

The vertical amount of material moved per pass is dependent on the type of material being moved. In very soft mud, up to 1 foot or more of surficial sediment can be moved in a single pass, whereas in stiffer material like clay, much less would be moved per pass (2 to 4 inches per pass is a representative depth). The number of passes required depends on the type of material being moved, the height of the ridge to be leveled, and the performance characteristics (e.g., weight) of the bed leveler. In soft materials, a 1- to 2-foot high ridge may be created by passage of a draghead, whereas in clay materials the ridge may be only ½ to 1 foot high. At a 2- to 4-inch height reduction per pass, multiple passes may be required to obtain overlap of passes and complete coverage of the area.

Within the dredging industry, the H-beam method of bed-leveling is typically used following cutterhead or excavator dredge operations. Drag bar bed-leveling is used following hopper dredging operations. The H-beam method was used by Bean Stuyvesant in Houston, Texas in 2003-2004 and in New York Harbor from 2000 to present with no impact to endangered species (R.E. Courtright 2005, personal correspondence). Both projects utilized an excavator dredge.

Results from interviews with the other six companies not included in the USACE ERDC survey are presented below. They include Hendry Corporation, Atkinson Dredging, Cavo Development, NATCO Limited Partnership, Gulf Coast Trailing Company, and B + B Dredging Company.

According to the dredging reports, Hendry Corporation was involved in one dredging project in Palm Beach Harbor in 1990-1991. A representative from Hendry Corporation was contacted. When asked if the company used any bed-leveling devices during their dredging operations in the last 15 years, he stated the Hendry Corporation is not in the dredging business anymore and has not done any dredging for the past 12 years. The representative did not have any information regarding previous dredging projects and suggested sending a fax with the survey questions directly to Mr. Hendry, the president of the company. No response to the survey was received, and Mr. Hendry was not available when several follow-up calls were made. No contact information could be found for Atkinson Dredging or Cavo Development on the internet or on the Dredging Contractors of America website (<http://www.dredgingcontractors.org/>). Each of these companies conducted one maintenance dredging operation in Palm Beach Harbor in the early 1990's. It is possible that since then both companies have gone out of business or were acquired by other companies. NATCO Limited Partnership was contacted and it was discovered that they are a subsidiary of Great Lakes Dredge and Dock Company. Since Great Lakes Dredge and Dock Company was previously interviewed by USACE ERDC, NATCO Limited Partnership was not interviewed for this BA. NATCO Limited Partnership was involved in three dredging projects in Palm Beach Harbor between 1990 and 2005. They used the Great Lakes Dredge and Dock dredges named *Sugar Island* and *Northerly Island* for those projects. No contact information could be found for Gulf Coast Trailing Company on the internet or on the Dredging Contractors of America website. Gulf Coast Trailing Company was involved in four annual dredging projects from 1995 to 1998. It appears they may have been sub-contractors to Weeks Marine, Inc. and B + B Dredging Company since the dredges used during those projects, *Mermentau* and *Atchafalaya*, are owned by Weeks Marine, Inc. and B + B Dredging Company, respectively. B + B Dredging Company was involved in three additional dredging projects in Palm Beach Harbor between 2002 and 2005. The dredge named *Atchafalaya* was used for all three projects. Several attempts were made to contact and interview Mr. Steve Taylor, a Dredging Operations Manager at B + B Dredging Company, but messages and e-mails were not returned.

### **6.3 USACE SAD Survey**

The results of the USACE SAD survey concluded that bed-levelers are used to a limited extent in the Jacksonville District because much of the hopper dredging is performed in entrance channels with sandy materials and wave activity that smoothes the bottom and eradicates any ridges left by the dredge. However, bed-levelers have been used effectively in the Tampa Bay entrance channel where the wave climate is mild and within Canaveral Harbor in areas of stiff materials (Hales *et al.*, 2005).

Because bed-leveling has been a common and accepted dredging practice, contract language and dredging company daily operation logs typically do not require specific dates and corresponding locations where this technique was used (Hales *et al.*, 2005). Although bed-leveling is thought to have occurred in Palm Beach Harbor, no records could be found to document the extent or locations of use since 1990. The Area Engineer from the Jacksonville District was contacted regarding whether there were any journals or logs kept by USACE Resident Engineers regarding bed-leveling use by dredge contractors. He stated the Resident Engineers were instructed either

by regulation or by guidance from the Chief of Engineer's office about 15+ years ago to not keep "Resident Engineer journals" (John G. Cooper, personal communication, Nov. 8, 2005). However, contract language has been written and used by the Jacksonville District to help clarify specifications and document bed-leveler use in that District. The most recent version of the Jacksonville District Local Master Guide Specifications contains language that requires the contractor to submit drawings and one photograph showing drag bar equipment used for final leveling work. In addition, it states that bed-leveling by dragging the bottom with a drag bar or other apparatus shall be allowed only in the designated dredging areas shown on the drawings. Dragging in areas outside of the designated dredging areas shown on the drawings is specifically prohibited without written approval of the Contracting Officer. The contractor shall fully document all bed-leveling activity including date and time for initiation and completion of bed-leveling. All bed-leveling activity shall be documented on the Contractor's Quality Control Report (QCR). This language is provided in Appendix F.

## 7.0 SUMMARY AND CONCLUSIONS

Since 1990, dredging has been conducted annually in the Palm Beach Harbor channels and turning basins, and there are 17 dredging projects total. Of those 17 dredging projects, 15 involved hopper dredges and 2 involved cutterhead/suction dredges. Between 1990 and 2005, sea turtle takes were reported by observers during 6 of the 17 dredging projects resulting in a total of 12 takes (3 greens, 9 loggerheads). According to the STSSN database, there was a total of 15 turtle strandings that were described as having impact- or crushing-type injuries within the designated 4-mile radius of the Palm Beach Harbor entrance channel between 1990 and 2005. Of these 15 strandings, 2 either occurred during a dredging project or within two weeks after a dredging project had been completed. Regardless of whether dredging activities are being conducted within the harbor, it appears that strandings occur much more frequently in the spring and summer months. It is also important to emphasize that while strandings may have occurred within the window of time evaluated during a dredging project; there is no evidence to link the strandings to the dredging or bed-leveling operations.

Bed-leveling is a technique that has been used periodically (not frequently) during dredging projects throughout the sea turtles' U.S. range (Dickerson and Clausner 2003). Bed-levelers consist of a large customized plow, I-beam, or old spud that is slowly dragged across the sediment to smooth out the peaks and trenches during the final cleanup of the dredging activity. This technique was mentioned in passing in some of the early (1984-1987) Canaveral observer reports but has never been an issue of concern until a recent dredging project at Brunswick Harbor. During this project, six sea turtles were found stranded nearby with questionable injuries not consistent with those produced by hopper dredges. Although no conclusive evidence was found to directly link the bed-leveler with any of the reported sea turtle strandings, this incident raised the issue that the bed-leveler operation during the cleanup phase of this project was a possible cause of sea turtle mortalities. The concern is that brumating/resting/foraging sea turtles may be crushed as the leveling device passes over a turtle which fails to move out of the way or is not pushed out of the way by the sediment wedge "wave" which is generated by and moves ahead of the device (NMFS 2003b). In Palm Beach Harbor, the water is much warmer in the winter months compared to Brunswick; therefore, turtles should be much more active and able to detect and avoid approaching dredging equipment.

Although there are concerns regarding bed-leveling and its potential to affect sea turtles, one argument has been made in support of bed-leveler use during the clean-up phase of projects using hopper dredges. It is thought that sea turtles may rest in trenches created by repetitive transits of the dragheads then become susceptible to entrainment when the dredge attempts to level the remaining high spots during the clean-up phase of the project (Hales *et al.*, 2005). Therefore, the use of bed-levelers for cleanup operations is probably preferable to use of hopper dredges since turtles which are foraging/resting/brumating on irregular bottoms are probably more likely to be entrained by suction dragheads because (1) sea turtle deflector dragheads are less effective on uneven bottom; (2) hopper dredges move considerably faster than bed-leveler "dredges"; and (3) bed-levelers do not use suction (NMFS 2003b). The rationale is if bed-levelers are used during hopper dredging projects to minimize trench formation and perform clean-up operations, the actual duration of dredging can conceivably be shortened and the potential turtle take reduced (Hales *et al.*, 2005). Furthermore, a bed-leveler that works more on

the tops of the trenches with no hydraulic suction capabilities could potentially impact fewer sea turtles than a draghead with entraining flow fields exposed as it skips over bottom trenches (Hales *et al.*, 2005).

Since bed-leveling is not a specific pay item, tugs and drag beams for bed-leveling have not previously been included in the plan and equipment lists of contractor's bids. Contract language and dredging company daily operation logs typically do not require specific dates and corresponding locations where this technique is used (Hales *et al.*, 2005). The recent USACE ERDC survey confirmed that little or no information exists about the use of bed-leveling devices during dredging projects. USACE ERDC and SAD have proposed devising studies to evaluate the potential impacts of bed-levelers on sea turtles during cleanup dredging activities (Dickerson and Clausner 2003). In addition, USACE Jacksonville District has responded to the issue by including language in its dredging contracts to help clarify specifications and to document bed-leveler use in that District. Other USACE Districts are using this language as a potential model to help clarify contracts that utilize bed-levelers. This information will be crucial in fully assessing whether bed-leveling activities adversely affect sea turtle populations.

### ***Determination***

Although NMFS has, on two separate occasions, made the determination that bed leveling is a cause of injurious or lethal take to sea turtles (NMFS 2003a and 2003b), a review of the data from the use of bed leveling devices at the Port of Palm Beach over the last 15-years does not support this belief. The area around the Port of Palm Beach is known to have high concentrations of sea turtles utilizing the offshore reefs and nesting on county beaches. After reviewing numbers and locations of stranded turtles within a 4-mile radius of the port's entrance channel, the dates that the strandings were recorded, and the types of injuries exhibited on the carcasses, the Corps can not find a link between bed-leveling and crushing/impact injuries on stranded sea turtles, nor can we find that a significant difference exists in stranding numbers and locations between dredging event time periods and non-dredging event time periods.

Based on a review of all of the information provided in this Biological Assessment, the Jacksonville District of the US Army Corps of Engineers has determined that the proposed use of bed-leveling devices in the Port of Palm Beach may affect, but is not likely to adversely affect listed marine turtle species within the action area, and requests concurrence with this determination.

## 8.0 REFERENCES

- Aguilar, R., J. Mas, and X. Pastor. 1995. Impact of Spanish swordfish longline fisheries on the loggerhead sea turtle, *Caretta caretta*, population in the western Mediterranean. U.S. Dep. Commer. NOAA Tech. Memo. NMFS-SEFSC. 361:1-6.
- Bargo, T. and W. Parks. 2002. Sea Turtle Relocation Trawling: Port Canaveral Harbor Channel, Cape Canaveral, Florida, Brevard County. Final Report submitted by REMSA, Inc. March 2002.
- Bargo, T. 2004. Port Canaveral Emergency Dredging Sea Turtle Relocation Trawling. Final Report submitted by REMSA, Inc. September/October 2004.
- Bass, A.L., S.P. Epperly, J. Braun, D.W. Owens, and R.M. Patterson. 1998. Natal origin and sex ratios of foraging sea turtles in Pamlico-Albemarle Estuarine Complex. U.S. Dep. Commer. NOAA Tech. Memo. NMFS-SEFSC. 415:137-138.
- Bellmund, S.A., J.A. Musick, R.C. Klinger, R.A. Byles, J.A. Keinath, and D.E. Barnard. 1987. Ecology of sea turtles in Virginia. The Virginia Institute of Marine Science, College of William and Mary, Gloucester Point, VA. Special Scientific Report No. 119, 48p.
- Bjorndal, K.A., A.B. Bolten, J. Gordon, and J.A. Caminas. 1994. *Caretta caretta* (loggerhead) growth and pelagic movement. *Herp. Rev.* 25:23-24.
- Bjorndal, K.A. 1997. Foraging ecology and nutrition of sea turtles. Pages 199-233. *In*: Lutz, P.L. and J.A. Musick (eds.). *The Biology of Sea Turtles*. CRC Press, New York. 432 pp.
- Bolten, A.B., K.A. Bjorndal, and H.R. Martins. 1994. Life history model for the loggerhead sea turtle (*Caretta caretta*) populations in the Atlantic: Potential impacts of a longline fishery. U.S. Dep. Commer. NOAA Tech. Memo. NMFS-SWFSC. 201:48-55.
- Bolten, A.B., K.A. Bjorndal, H.R. Martins, T. Dellinger, M.J. Bischoff, S.E. Encalada, and B.W. Bowen. 1998. Transatlantic development migrations of loggerhead sea turtles demonstrated by mtDNA sequence analysis. *Ecol. Applic.* 8:1-7.
- Bulter, R.W., W.A. Nelson, and T.A. Henwood. 1987. A trawl survey method for estimating loggerhead turtle, *Caretta caretta*, abundance in five eastern Florida channels and inlets. *Fishery Bulletin*. 85(3).
- Carr, A. 1987. New perspectives on the pelagic stage of sea turtle development. *Conserv. Biol.* 1: 103-121.
- Carr, A.F. and L. Ogren. 1960. The ecology and migrations of sea turtles. The green turtle in the Caribbean Sea. *Bull. Amer. Mus. Nat. Hist.* 131(1): 1-48.

- Carr, A.F., M.H. Carr, and A.B. Meylan. 1978. The ecology and migrations of sea turtles: The western Caribbean green turtle colony. *Bull. Amer. Mus. Nat. Hist.* 162(1): 1-46.
- Crouse, D.T., L.B. Crowder, and H. Caswell. 1987. A stage-based population model for loggerhead sea turtles and implications for conservation. *Ecol.* 68:1412-1423.
- Crowder, L.B., D.J. Crouse, S.S. Heppell, and T.H. Martin. 1994. Predicting the impact of turtle excluder devices on loggerhead sea turtle populations. *Ecol. Applic.* 4:437-445.
- Crouse, D.T. 1999. The consequences of delayed maturity in a human-dominated world. Pages 195-202. *In: Musick, J. A. (ed.). Life in the Slow Lane: Ecology and Conservation of Long-Lived Marine Animals. American Fisheries Society Symposium 23. American Fisheries Society, Bethesda, MD.*
- Dickerson, D.D., D.A. Nelson, G. Banks, and R.M. Engler. 1990. Alternative dredging equipment and operational methods to minimize sea turtle mortalities. Environmental Effects of Dredging Technical Notes, EEDP-09-6. U.S. Army Engineer Waterways Experiment Station, Vicksburg, MS.
- Dickerson, D.D. and J.E. Clausner, PE. 2003. Summary of Sea Turtle/Dredging Issues and Recommended Action Tasks Generated by the Improved Draghead Design Meeting, 4 Sep 2003, Atlanta, GA.
- Dickerson, D., M. Wolters, C. Theriot, and C. Slay. 2004. Dredging impacts on sea turtles in the southeastern USA: A historical review of protection. *In: Proceedings of WODCON XVII, World Dredging Congress, Hamburg, Germany.*
- Eckert, S.A. and K.L. Eckert, P. Ponganis, and G.L. Kooyman. 1989. Diving and foraging behavior of leatherback sea turtles (*Dermochelys coriacea*). *Can. J. Zool.* 67:2834-2840.
- Ehrhart, L.M. 1979. A survey of marine turtle nesting at Kennedy Space Center, Cape Canaveral Air Force Station, North Brevard County, Florida. Unpublished report to the Division of Marine Fisheries, St. Petersburg, Florida. Florida Department of Natural Resources. 122 pp.
- Epperly, S.P., J. Braun, A.J. Chester, F.A. Cross, J. Merriner, and P.A. Tester. 1995. Winter distribution of sea turtles in the vicinity of Cape Hatteras and their interactions with the summer flounder trawl fishery. *Bull. Mar. Sci.* 56(2): 519-540.
- USACE Engineer Research and Development Center (ERDC). 2003. Bed-Leveling Following Dredging Operations. Dredging Operations Technical Support (DOTS) Program South Atlantic Division Request for Technical Assistance. 25 August 2003.
- Ernst, L.H. and R.W. Barbour. 1972. Turtles of the United States. Univ. Kentucky Press, Lexington, Kentucky.

- Frazer, N.B., C.J. Limpus, and J.L. Greene. 1994. Growth and age at maturity of Queensland loggerheads. U.S. Dep. of Commer. NOAA Tech. Mem. NMFS-SEFSC. 351:42-45.
- Frazer, N.B., and L.M. Ehrhart. 1985. Preliminary growth models for green, *Chelonia mydas*, and loggerhead, *Caretta caretta*, turtles in the wild. *Copeia* 1985:73-79.
- Hildebrand, H. 1963. Hallazgo del area de anidacion de la tortuga "lora" *Lepidochelys kempii* (Garman), en la costa occidental del Golfo de Mexico (Rept., Chel.). *Ciencia Mex.* 22(a):105-112.
- Hirth, H.F. 1971. Synopsis of biological data on the green sea turtle, *Chelonia rnydas*. FAO Fisheries Synopsis No. 85:1-77.
- Keinath, J.A. 1993. Movements and behavior of wild and head-started sea turtles. Ph.D. Diss. College of William and Mary, Gloucester Point, VA. 206 pp.
- Keinath, J.A., J.A. Musick, and R.A. Bytes. 1987. Aspects of the biology of Virginia's sea turtles: 1979-1986. *Virginia J. Sci.* 38(2):81.
- Klinger, R. C.; Musick, J. A. 1985. Age and growth of loggerhead turtles (*Caretta caretta*) from Chesapeake Bay. *Copeia*. 1:204-209.
- Hales, L., D. Dickerson, and D. Clarke. 2005. Bed Leveling as a Component of Dredging Projects. USACE Engineer Research and Development Center. Vicksburg, MS.
- Laurent, L., P. Casale, M.N. Bradai, S.J. Godley, G. Gerosa, A.C. Broderick, W. Schroth, B. Schierwater, A.M. Levy, D. Freggii, E.M. Abd El-Mawla, D.A. Hadoud, H.E. Gomati, M. Domingo, M. Hadjichristophorou, L. Kornaraky, F. Demirayak, and Ch. Gautier. 1998. Molecular resolution of marine turtle stock composition in fishery bycatch: a case study in the Mediterranean. *Molecular Ecol.* 7:1529-1542.
- Lutcavage, M. and J.A. Musick. 1985. Aspects of the biology of sea turtles in Virginia. *Copeia*. 2:449-456.
- Marquez, M.R. 1990. Sea Turtles of the World: An Annotated and Illustrated Catalogue of Sea Turtle Species Known to Date. FAO Fisheries Synopsis. 125(11): 81.
- Meylan, A., B. Schroeder, and A. Mosier. 1995. Sea turtle nesting activity in the state of Florida. *Fla. Mar. Res. Publ.* 52:1-51.
- Miami-Dade County. 2000. Sea Turtle Nesting Data 2000. Park & Recreation Department. Miami, Florida.

- Morreale, S.J. and E.A. Standora. 1998. Vying for the same resources: potential conflict along migratory corridors. U.S. Dep. Commer. NOAA Tech. Memo. NMFS-SEFSC. 415:69.
- Musick, J.A. and C.J. Limpus. 1997. Habitat utilization and migration in juvenile sea turtles. Pages 137-164. *In*: Lutz, P.L. and J.A. Musick (eds.). *The Biology of Sea Turtles*. CRC Press, New York. 432 pp.
- National Research Council (NRC). 1990. *Decline of the Sea Turtles: Causes and Prevention*. Committee on Sea Turtle Conservation. Natl. Academy Press, Washington, D.C. 259 pp.
- NMFS. 1991. Biological Opinion to the U.S. Army Corps of Engineers on Dredging of Channels in the Southeastern United States from North Carolina through Cape Canaveral, Florida. NOAA National Marine Fisheries Service, Southeast Regional Office. November 25, 1991.
- NMFS. 1997. Biological Opinion to the U.S. Army Corps of Engineers, South Atlantic Division, on the Continued Hopper Dredging of Channels and Borrow Areas in the Southeastern United States. National Marine Fisheries Service, Southeast Regional Office. September 25, 1997.
- NMFS. 2003a. Biological Opinion to the U.S. Army Corps of Engineers on the Use of Bed-Leveling Equipment During the Brunswick Harbor Deepening Project (Consultation Number I/SER/2003/01048). NOAA National Marine Fisheries Service, Southeast Regional Office.
- NMFS. 2003b. Biological Opinion to the U.S. Army Corps of Engineers on Dredging of Gulf of Mexico Navigation Channels and Sand Mining (“Borrow”) Areas Using Hopper Dredges by USACE Galveston, New Orleans, Mobile, and Jacksonville Districts (Consultation Number F/SER/2000/01287). NOAA National Marine Fisheries Service, Southeast Regional Office. November 19, 2003.
- NMFS and USFWS. 1991. Recovery plan for U.S. population of loggerhead turtles. National Marine Fisheries Service. Washington, D.C. 64 pp.
- NMFS and USFWS. 1992a. Recovery Plan for Kemp's Ridley Sea Turtle (*Lepidochelys kempii*). National Marine Fisheries Service, Washington, D.C. 40pp.
- NMFS and USFWS. 1992b. Recovery Plan for Leatherback Sea Turtle (*Dermochelys coriacea*). National Marine Fisheries Service, Washington, D.C. 66pp.
- NMFS and USFWS. 1993. Recovery Plan for Hawksbill Turtles in the U.S. Caribbean, Atlantic and Gulf of Mexico. National Marine Fisheries Service. Washington, D.C. 52pp.

- Norrgard, J. 1995. Determination of stock composition and natal origin of a juvenile loggerhead sea turtle population (*Caretta caretta*) in Chesapeake Bay using mitochondria DNA analysis. M.A. Thesis. College of William and Mary, Williamsburg, VA. 47pp.
- Peters, J.A. 1954. The amphibians and reptiles of the coast and coastal sierra of Michoacan, Mexico. Occ. Pap. Mus. Zool. 554:1-37.
- Pritchard, P.C.H. 1997. Evolution, phylogeny and current status. Pages 1-28. *In: The Biology of Sea Turtles*. Lutz, P. and J.A. Musick (eds.). CRC Press, New York. 432 pp.
- Pritchard, P.C.H. 1969. Sea turtles of the Guianas. Bull. Fla. State Mus. 13(2):1-139.
- Rankin-Baransky, K.C. 1997. Origin of loggerhead turtles (*Caretta caretta*) in the western North Atlantic as determined by mt DNA analysis. M.S. Thesis, Drexel University, Philadelphia, PA.
- Rebel, T.P. 1974. Sea turtles and the turtle industry of the West Indies, Florida and the Gulf of Mexico. Univ. Miami Press, Coral Gables, Florida.
- Reine, K.J., D.D. Dickerson, and D.G. Clarke. 1998. Environmental Windows Associated with Dredge Operations. DOER Technical Notes Collection (TN DOER-E2). U.S. Army Engineer Research and Development Center, Vicksburg, MS.  
[www.wes.army.mil/el/dots/doer](http://www.wes.army.mil/el/dots/doer)
- Richardson, J. 1990. The sea turtles of the King's Bay area and the endangered species program associated with construction dredging of the St. Marys entrance ship channel. Proceedings of the National Workshop on Methods to Minimize Dredging Impacts on Sea Turtles. D.D. Dickerson and D.A. Nelson (eds.). Miscellaneous Paper EL-90-5. U.S. Army Engineer Waterways Experiment Station, Vicksburg, MS.
- Richardson, J.I., L.A. Corliss, C. Ryder, and R. Bell. 1989. Demographic patterns of Caribbean hawksbill, Jumby Bay, Antigua. Pages 253-256. *In: S.A. Eckert, K.L. Rckert, and T.I.I. Richardson (compilers). Proceedings of the Ninth Annual Workshop on Sea Turtle Conservation and Biology*. NOAA Technical Memorandum NMFS-SEFC-232. National Marine Fisheries Service, Miami, Florida.
- Ross, J.P. and M.A. Barwani. 1982. Historical decline of loggerhead, ridley, and leatherback sea turtles. *In: K.A. Bjorndal (ed.). Biology and Conservation of Sea Turtles*. Smithsonian Inst. Press, Washington, D.C. 583 pp.
- Ross, J.P. 1979. Historical decline of loggerhead, ridley, and leatherback sea turtles. Pages 189-195. *In: Bjorndal, K.A. (ed). Biology and Conservation of Sea Turtles*. Smithsonian Institution Press, Washington, D.C.

- Rudloe, J. 1981. From the Jaws of Death. *Sports Illustrated*. 54(13):60-70.
- Schroeder, B.A. 1989. Marine turtle database management: National Marine Fisheries Service – Miami Laboratory. Pages 153-156. *In*: C.W. Caillouet and A.M. Landry, Jr. (eds.). Proceedings of the First International Symposium on Kemp's Ridley Sea Turtle Biology, Conservation and Management. Texas A&M University Sea Grant Publication TAMU-SG-89-105.
- Schroeder, B.A., A.M. Foley, B.E. Witherington, and A.E. Mosier. 1998. Ecology of marine turtles in Florida Bay: Population structure, distribution, and occurrence of fibropapilloma. U.S. Dep. Commer. NOAA Tech. Memo. NMFS-SEFSC. 415:265-267.
- Sears, C.J. 1994. Preliminary genetic analysis of the population structure of Georgia loggerhead sea turtles. U.S. Dept. Commerce. NOAA Tech. Memo. NMFS-SEFSC. 351:135-139.
- Sears, C.J., B.W. Bowen, R.W. Chapman, S. B. Galloway, S.R. Hopkins-Murohy, and C.M. Woodley. 1995. Demographic composition of the feeding population of juvenile loggerhead sea turtles (*Caretta caretta*) off Charleston, South Carolina: Evidence from mitochondrial DNA markers. *Mar. Biol.* 123:869-874.
- Shoop, C.R. and R.D. Kenney. 1992. Seasonal distributions and abundance of loggerhead and leatherback sea turtles in waters of the northeastern United States. *Herpetol. Monogr.* 6:43-67.
- Spotila, J.R., A.E. Dunham, A.J. Leslie, A.C. Steyermark, P.T. Plotkin, and F.V. Paladino. 1996. Worldwide Population Decline of *Denrochelys coriacea*: Are Leatherback Turtles Going Extinct? *Chelonian Conservation and Biology*. 2(2): 209-222.
- Spotila, J.R., R.D. Reina, A.C. Steyermark, P.T. Plotkin, and F.V. Paladino. 2000. *Nature*. 405: 529-530.
- NMFS Southeast Fisheries Science Center (SEFSC). 2001. Stock assessments of loggerhead and leatherback sea turtles and an assessment of the impact of the pelagic longline fishery on the loggerhead and leatherback sea turtles of the Western North Atlantic. U.S. Department of Commerce National Marine Fisheries Service, Miami, FL, SEFSC Contribution PRD-00101-08; Parts I-NI and Appendices I-VI.
- Turtle Expert Working Group (TEWG). 1998. An assessment of the Kemp's ridley (*Lepidochelys kempii*) and loggerhead (*Caretta caretta*) sea turtle populations in the Western North Atlantic. NOAA Tech. Mem. NMFS-SEFSC. 409:96 pp.
- Turtle Expert Working Group (TEWG). 2000. Assessment update for the Kemp's ridley and loggerhead sea turtle populations in the western North Atlantic. U.S. Dep. Commer. NOAA Tech. Mem. NMFS-SEFSC. 444:115 pp.

Jacksonville District, U.S. Army Corps of Engineers (USACE). 2003. Miami Harbor General Reevaluation Report Study. Dade County, Florida.

USACE ERDC. 2005. USACE Sea Turtle Database Warehouse.  
<http://el.ercd.usace.army.mil/seaturtles/index.cfm>. Dated 13 Nov 2005.

van de Graaf, C.J. 1987. The Use of Ploughs or Bed-Levelers in Maintenance Dredging. Maintenance Dredging. Thomas Telford, London, England. pp. 177-195.

Witzell, W.N. 2002. Immature Atlantic loggerhead turtles (*Caretta caretta*): Suggested changes to the life history model. *Herpetological Review*. 33(4):266-269.

Witzell, W.N. 1999. Distribution and relative abundance of sea turtles caught incidentally by the U.S. pelagic longline fleet in the western North Atlantic Ocean, 1992-1995. *Fisheries Bulletin*. 97:200-211.

Wynne, K. and M. Schwartz. 1999. Guide to marine mammals and turtles of the U.S. Atlantic and Gulf of Mexico. Rhode Island Sea Grant, Narragansett. 115pp.

Zug, G.R. and J.F. Parham. 1996. Age and growth in leatherback turtles, *Deruiacleaelys coriacea* (Testudines: Dermochelyidae): a skeletochronological analysis. *Chel. Conserv. Biol.* 2(2):244-249.

Table 1. Description of Turtle Stranding Injuries during the Brunswick Harbor Deepening Project, 2003, Brunswick, GA\*

<b>Date</b>	<b>Island</b>	<b>Species</b>	<b>Size</b>	<b>Injury</b>
29-Mar-03	Brunswick Ship Channel	Kemp's Ridley	38.2 x 39.1	Crushed skull
2-Apr-03	Jekyll Island	Loggerhead	69.1 x 64.4	Crushed/scraped skull
25-Apr-03	St. Simons Island	Loggerhead	no measurements	Head, right front flipper and piece of plastron; no photo
28-Apr-03	Jekyll Island	Loggerhead	no measurements	Front half of carapace only
6-May-03	Jekyll Island	Kemp's Ridley	no measurements	Front half of carapace only
9-May-03	St. Simons Island	Loggerhead	no measurements	Crushed, but badly decomposed

\* This information was taken from the 2004 Study on Bed-Leveler Use in Brunswick Harbor Deepening Project, Brunswick, GA.

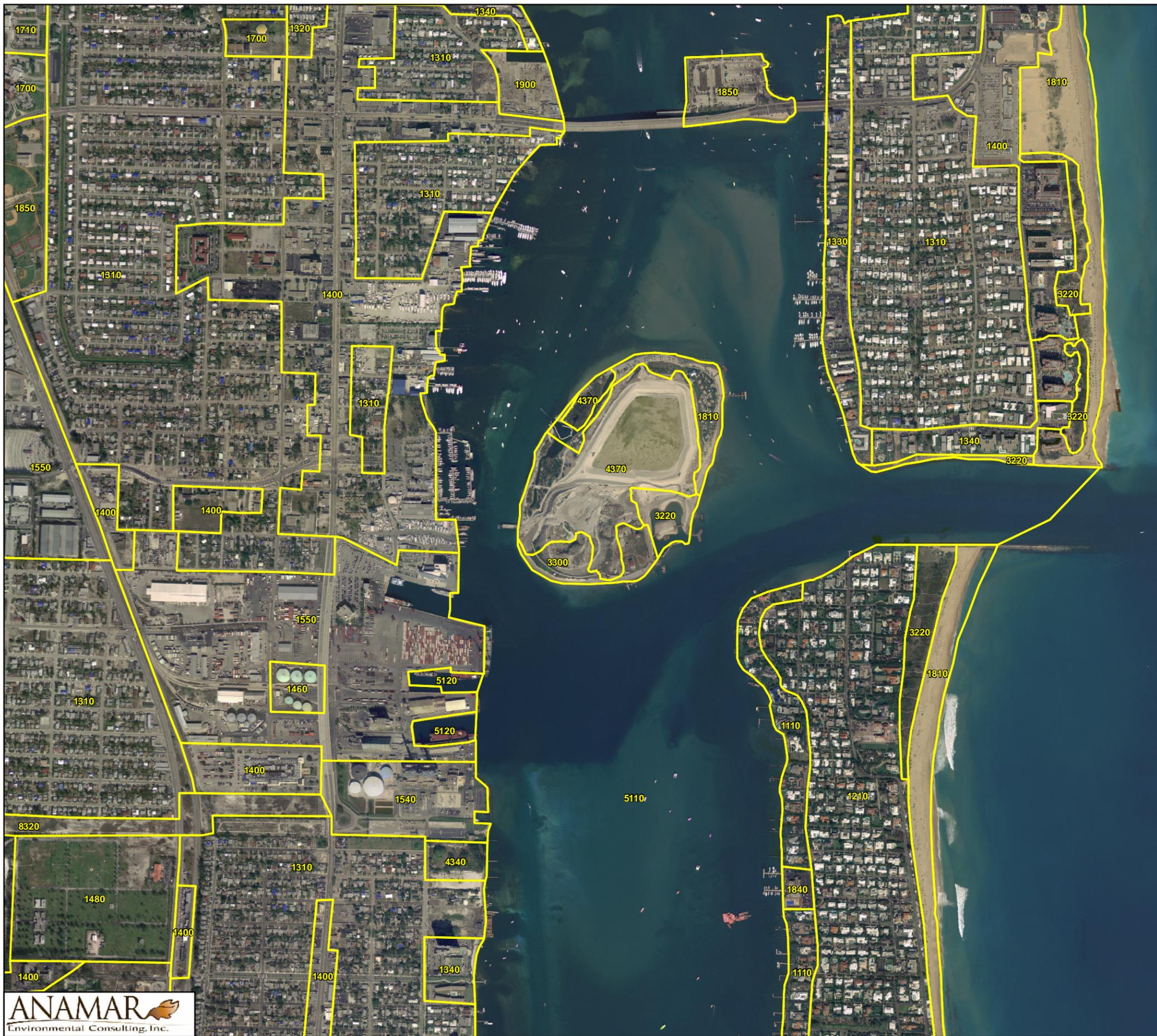
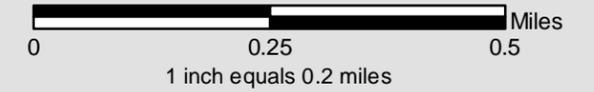
Table 2. Summary of Dredging History Reports, Turtle Take Reports, and Turtle Strandings Reports for Dredging Projects Conducted from 1990-2005 Palm Beach Harbor, Palm Beach County, Florida

Start Date	Finish Date	Contractor	Contract Number	Project Type*	Location of Dredging Event	Dredge Type	Dredge	Total Pay Volume <sup>x</sup> (cubic yds)	Material Dredged	Bed-leveler used?	Sea Turtle Takes <sup>^</sup>	Strandings <sup>#</sup>
1/29/1990	3/4/1991	Hendry Corporation	DACW17-90-C-0050	M	Palm Beach Entrance Channel	Cutterhead/Suction	<i>Savannah</i>	75,351		Unknown		
12/4/1991	1/16/1992	Atkinson Dredging	DACW17-91-C-0062	M	Palm Beach Turning Basin	Cutterhead/Suction	<i>Hampton Roads</i>	89,000	Sand/Silt	Unknown		
6/1/1993	unknown	U.S. Government		M	Palm Beach Entrance Channel	Hopper	<i>McFarland</i>	40,000	Sand	Unknown		
12/10/1993	1/28/1994	Cavo Development Inc.	DACW17-94-C-0027	M	Palm Beach Entrance Channel			14,391	Sand	Unknown		
				M	Settling Basin				Sand			
2/3/1994	3/18/1994	NATCO Limited Partnership	DACW17-94-C-0042	M	Palm Beach Entrance Channel	Hopper	<i>Sugar Island</i>	155,310	Sand	Unknown		
1/31/1995	4/5/1995	Gulf Coast Trailing Co.	DACW17-95-C-0008	M	Palm Beach Entrance Channel	Hopper	<i>Mermentau</i>	179,330	Sand			
				M	Cut 1				Sand	Unknown	2 green 3 loggerhead	1 green
				M	Settling Basin				Sand			
4/10/1996	6/1/1996	Gulf Coast Trailing Co.	DACW17-96-C-0018	M	Palm Beach Entrance Channel	Hopper	<i>Atchafalaya</i>	150,110	Sand			
				M	Cut 1				Sand	Unknown	1 green 1 loggerhead	
				M	Settling Basin				Sand			
12/19/1996	3/27/1997	Gulf Coast Trailing Co.	DACW17-97-C-0030	M	Palm Beach Entrance Channel	Hopper	<i>Atchafalaya</i>	175,496	Sand	Unknown		
1/16/1998	2/14/1998	Gulf Coast Trailing Co.	DACW17-98-C-0002	M	Palm Beach Entrance Channel	Hopper	<i>Mermentau</i>	55,148	Sand			
				M	Cut 1				Sand	Unknown		
				M	Palm Beach Turning Basin				Sand			
3/23/1999	4/2/1999	NATCO Limited Partnership	DACW17-99-C-0035	M	Palm Beach Entrance Channel	Hopper/pipeline	<i>Northerly Island</i>	0	Sand			
				M	Palm Beach Turning Basin				Sand/Silt	Unknown		
2/24/2000	3/18/2000	NATCO Limited Partnership	DACW17-00-C-0004	M	Palm Beach Entrance Channel	Hopper	<i>Northerly Island</i>	124,236	Sand			
				M	Palm Beach Turning Basin				Sand	Unknown	1 loggerhead	
12/11/2000	1/11/2001	Manson Construction Company	DACW17-01-C-0002	M	Palm Beach Entrance Channel	Hopper	<i>Newport</i>	57,332	Sand			
				M	Palm Beach Settling Basin				Sand	Unknown		
1/12/2002	3/19/2002	B + B Dredging Company	DACW17-02-C-0006	M	Palm Beach Entrance Channel	Hopper	<i>Atchafalaya</i>	138,384	Sand			
				N	Palm Beach Settling Basin				Sand	Unknown		1 green
				M	Palm Beach Turning Basin				Sand			
4/7/2003	4/23/2003	Great Lakes Dredge and Dock	DACW17-03-C-0006	M	Palm Beach Entrance Channel	Hopper	<i>Northerly Island</i>	79,248	Sand			
				M	Palm Beach Turning Basin				Sand	Unknown	1 loggerhead	
5/19/2004	5/24/2004	B + B Dredging Company	W912EP-04-C-0026	EM	Palm Beach Entrance Channel	Hopper	<i>Atchafalaya</i>	41,763	Sand	Unknown		
9/18/2004	10/9/2004	Manson Construction Company	W912EP-04-C-0037	EM	Palm Beach Entrance Channel	Hopper	<i>Bayport</i>	302,007	Sand	Unknown	1 loggerhead	
4/21/2005	7/2/2005	B + B Dredging Company	W912EP-05-C-0012	EM	Palm Beach Entrance Channel	Hopper	<i>Atchafalaya</i>	245,054	Sand	Unknown	2 loggerhead	

\* E=Emergency, M=Maintenance

<sup>x</sup> Volumes are taken from USACE Dredging History Reports, in many cases different volumes for cubic yards dredged are reported in the Sea Turtle Take Reports from STSSN.<sup>^</sup> Information Compiled from the Sea Turtle Stranding and Salvage Network (STSSN)<sup>#</sup> The number of strandings that occurred within a 4-mile radius of the entrance channel during the dredging project or within 2 weeks after dredging project was completed.

**FIGURE 1**  
**SFWMD LAND USE/LAND COVER 1999**  
**PORT OF PALM BEACH**  
**PALM BEACH COUNTY, FLORIDA**

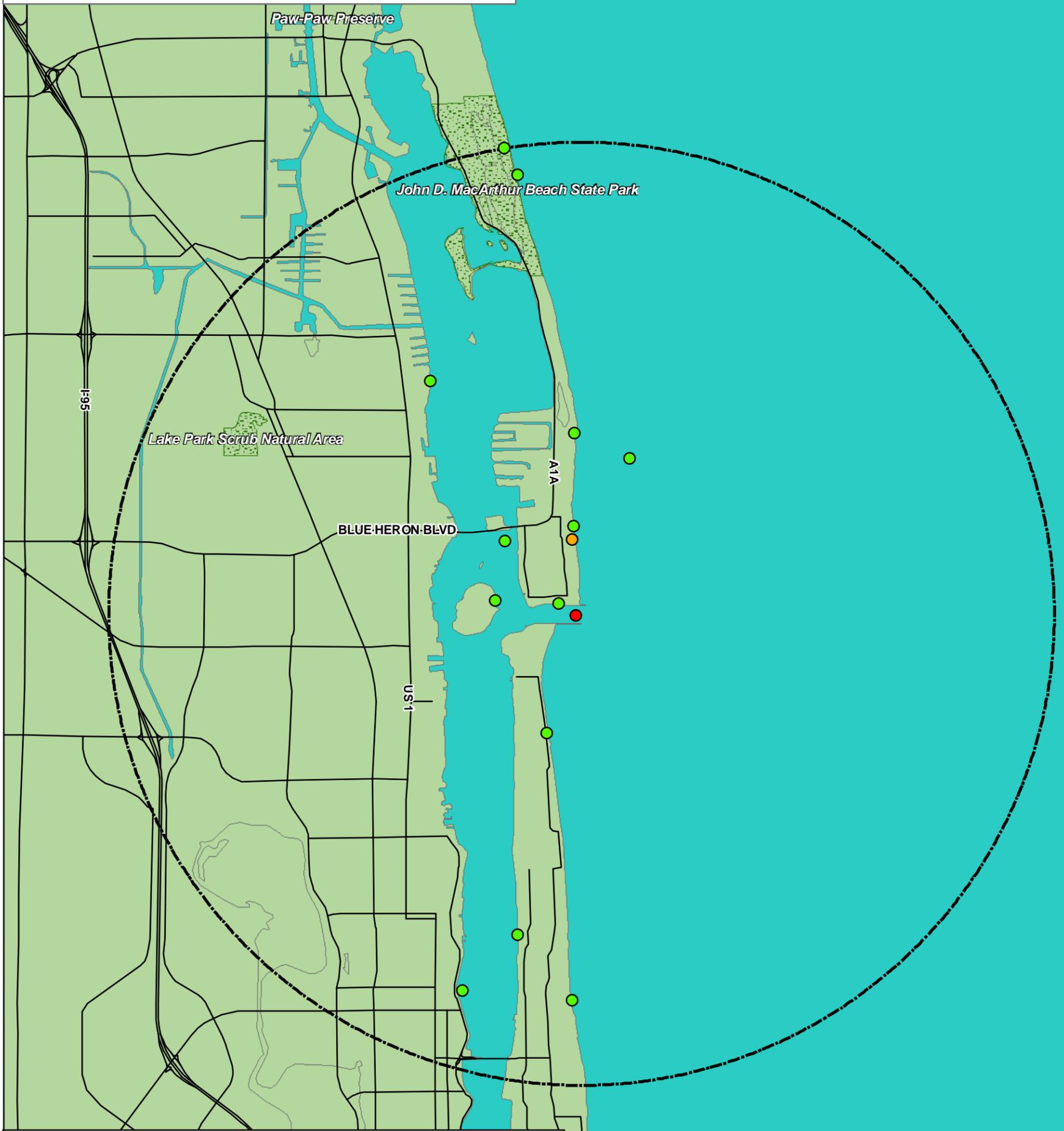
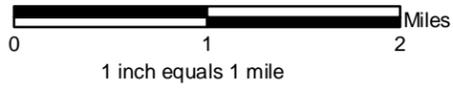


5710

- LEGEND**
- 1110 - Low Density: Fixed Single Family Units
  - 1210 - Medium Density: Fixed Single Family Units
  - 1310 - High Density: Fixed Single Family Units
  - 1320 - High Density: Mobile Home Units
  - 1330 - Multiple Dwelling Units, Low Rise
  - 1340 - Multiple Dwelling Units, High Rise
  - 1400 - Commercial and Services
  - 1460 - Oil and Gas Storage - not Industrial or Manufacturing
  - 1480 - Cemeteries
  - 1540 - Oil and gas processing
  - 1550 - Other light industry
  - 1700 - Institutional
  - 1710 - Educational Facilities
  - 1810 - Swimming beach
  - 1840 - Marinas and fish camps
  - 1850 - Parks and zoos
  - 1900 - Open Land
  - 3220 - Coastal Scrub
  - 3300 - Mixed Rangeland
  - 4340 - Hardwood / Coniferous Mixed
  - 4370 - Australian Pine
  - 5110 - Natural River, Stream, Waterway
  - 5120 - Channelized Waterways, Canals
  - 5710 - Atlantic Ocean
  - 8320 - Electrical power transmission lines



**FIGURE 2  
SEA TURTLE STRANDINGS 1990-2005  
BY CONTRACTOR AND DREDGE TYPE  
PORT OF PALM BEACH  
PALM BEACH COUNTY, FLORIDA**



**LEGEND**

**Sea Turtle Strandings (Non-propeller Injuries) 1990-2005**

2 Within Dredge Timeframe  
13 Outside Dredge Timeframe  
15 Total

**CONTRACTOR, TYPE, DREDGE NAME, DREDGING DATES**

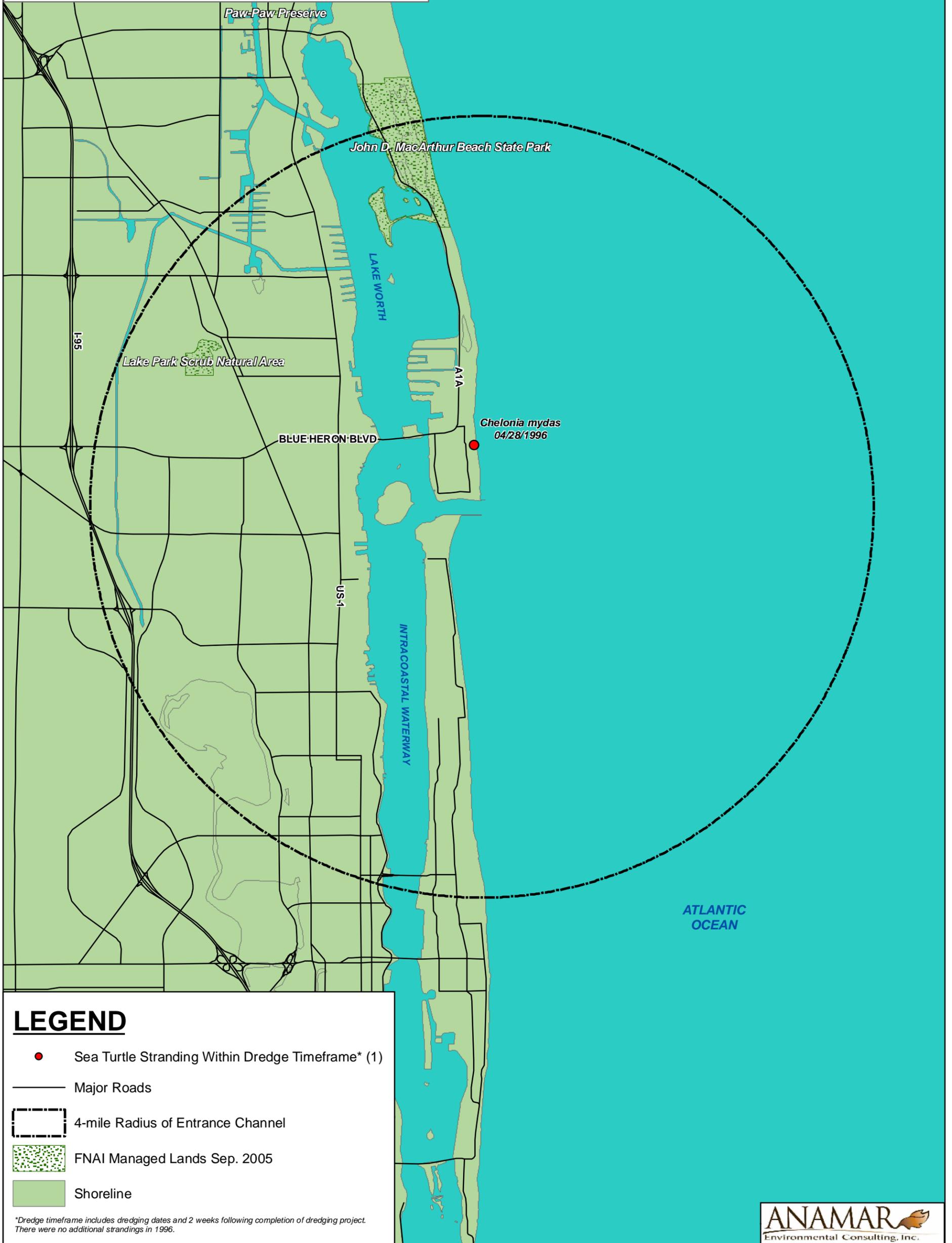
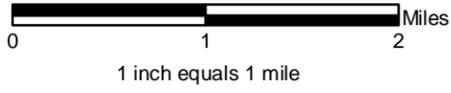
- Strandings Outside Dredging Timeframe (13 Strandings)
- Great Lakes Dredge and Dock / B & B Dredging Co., Hopper, Atchafalaya (1 Stranding)  
1/12/2002 - 3/22/2002
- Gulf Coast Trailing Co. / B & B Dredging Co., Hopper, Atchafalaya (1 Stranding)  
4/10/1996 - 6/1/1996

- Major Roads
- ⊘ 4-mile Radius of Entrance Channel
- ▨ FNAI Managed Lands Sep. 2005
- ▭ Shoreline

ATLANTIC OCEAN



**FIGURE 3**  
**1996 SEA TURTLE STRANDINGS**  
**DREDGING DATES: 4/10/1996 - 6/11/1996**  
**CONTRACTOR: GULF COAST TRAILING CO.**  
**DREDGE TYPE: HOPPER**  
**DREDGE: ATCHAFALAYA**  
**PORT OF PALM BEACH**  
**PALM BEACH COUNTY, FLORIDA**



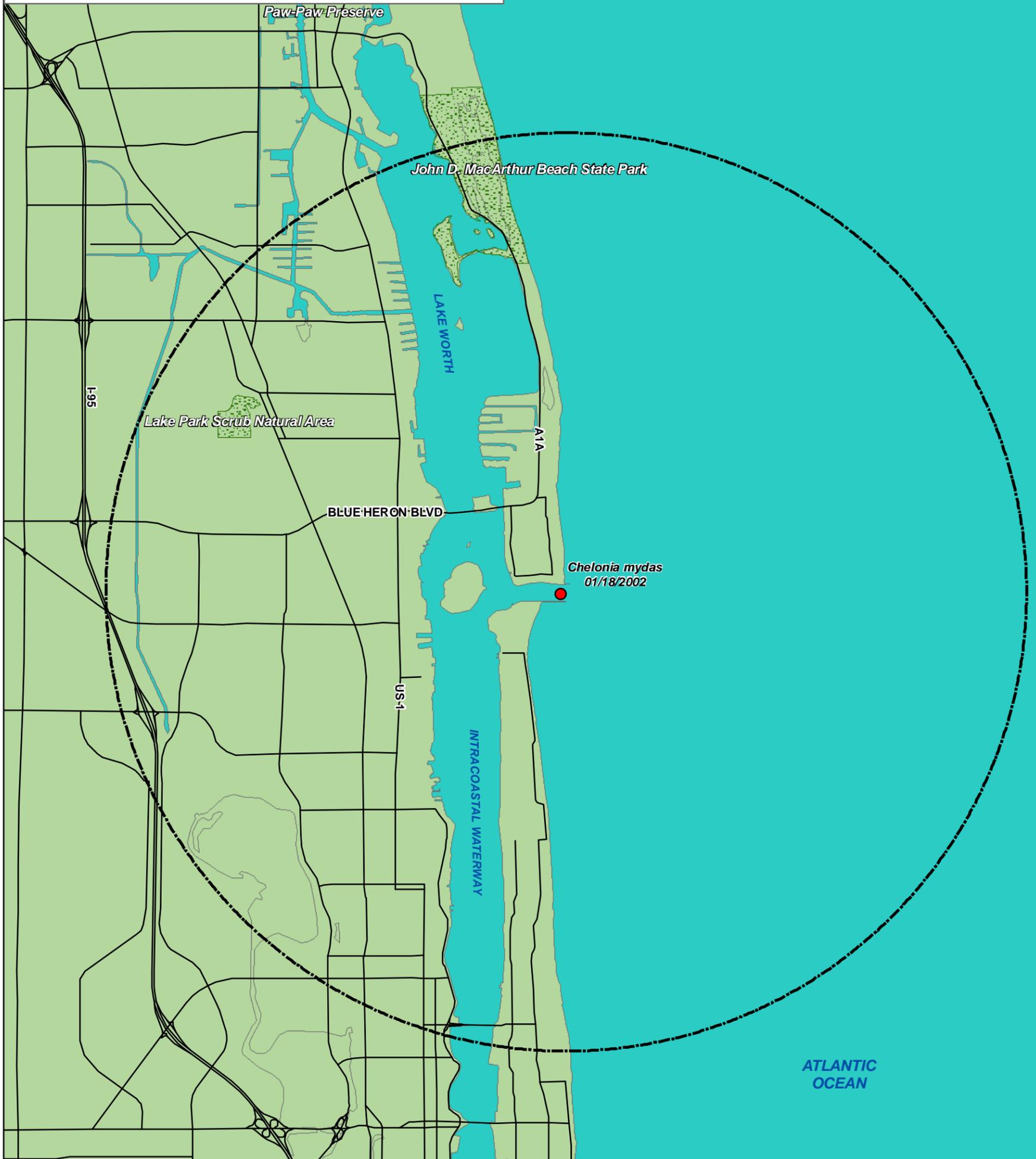
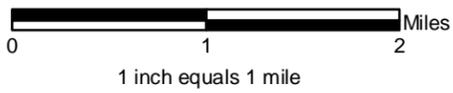
**LEGEND**

- Sea Turtle Stranding Within Dredge Timeframe\* (1)
- Major Roads
- ⊠ 4-mile Radius of Entrance Channel
- ▨ FNAI Managed Lands Sep. 2005
- Shoreline

\*Dredge timeframe includes dredging dates and 2 weeks following completion of dredging project. There were no additional strandings in 1996.



**FIGURE 4**  
**2002 SEA TURTLE STRANDINGS**  
**DREDGING DATES: 1/12/2002 - 3/22/2002**  
**CONTRACTOR: B & B DREDGING CO.**  
**DREDGE TYPE: HOPPER**  
**DREDGE: ATCHAFALAYA**  
**PORT OF PALM BEACH**  
**PALM BEACH COUNTY, FLORIDA**



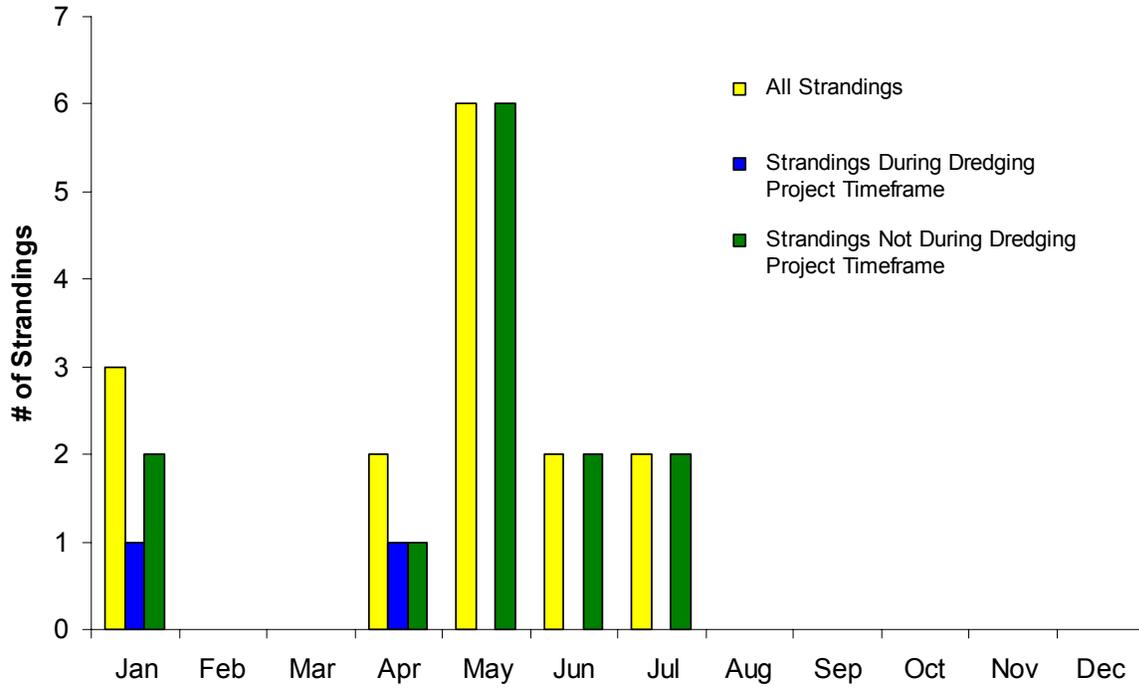
**LEGEND**

- Sea Turtle Stranding Within Dredge Timeframe\* (1)
- Major Roads
- ⊠ 4-mile Radius of Entrance Channel
- ▨ FNAI Managed Lands Sep. 2005
- Shoreline

\*Dredge timeframe includes dredging dates and 2 weeks following completion of dredging project. There were no additional strandings in 2002.



Figure 5. Monthly Turtle Strandings with Non-Propeller Type Injuries Occurring within a 4-Mile Radius of the Palm Beach Harbor Entrance Channel from 1990-2005



Note: The dredging project timeframe means the stranding occurred during a dredging project or within two weeks after a dredging project had been completed.

Figure 6. Photographs of Bed-Leveling Devices Provided to USACE ERDC by Dredging Industry Professionals (Compiled from Hales *et al.*, 2005)



Bed-leveler (photo courtesy of Bean Dredging Corporation)



Close-up of bed-leveler beam (photo courtesy of Bean Dredging Corporation)



Bed-leveler suspended by A-frame on work-barge (photo courtesy of Bean Dredging Company)



Bed-leveler on work-barge being pushed by tug (photo courtesy of Bean Dredging Company)



Bed-leveler (photo courtesy of Great Lakes Dredge and Dock Company)



Close-up of bed-leveler beam (photo courtesy of Great Lakes Dredge and Dock Company)



Bed-leveler suspended by A-frame on work-barge (photo courtesy of Great Lakes Dredge and Dock Company)

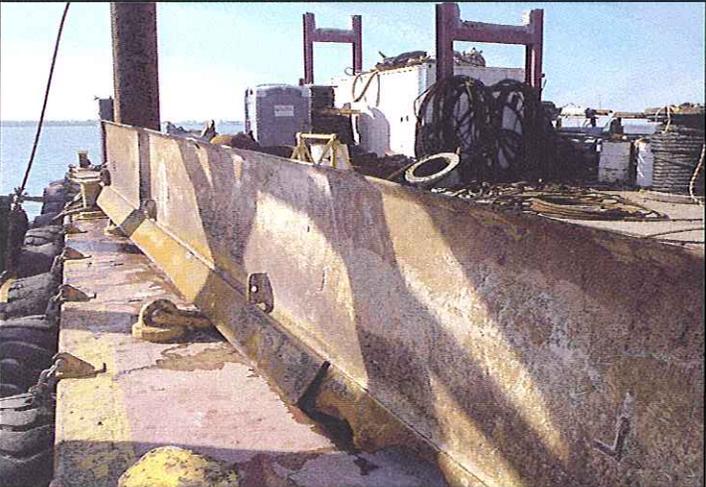


Bed-leveler (photo courtesy of Weeks Marine Incorporated)



Bed-leveler suspended from work-barge (photo courtesy of Weeks Marine Incorporated)

Figure 7. Photographs of a Drag Barge (Courtesy of Great Lakes Dredge and Dock, Nov. 2005)



10/2005

Palm Beach Harbor

# Dredging History Full Report

Page 2

P. 03

<b>Project Description:</b> Entrance Channel comb w/ Ft. Pierce Harbor		<b>Fiscal Year:</b> 1990		<b>Bid Open Date:</b> / /	
<b>Contract No:</b> DACW17-90-C-0050		<b>Award Date:</b> / /			
<b>OPS Project Engineer:</b> Fletcher	<b>Ext:</b> 2530	<b>D.O. File No:</b>	<b>Start Date:</b> 01/29/1990		
<b>DP Project Manager:</b> Murphy	<b>Ext:</b> 3847	<b>IFB No:</b>	<b>Finish Date:</b> 03/04/1991		

Bid Item	Description	Location	Stationing	Cut	Work Type	Material Type	Disposal Location	Unit	Bid Volume	Pay Volume	Contractor Bid Price	Unit Price	Final Cost
	Mob&Demob								0	0	\$480,000	\$0.00	\$480,000
	Excavation Unclassified	Palm Bch Ent Channel	Harbor			MD	Beach		75,351	75,351	\$376,755	\$0.00	\$376,755
	Excavation Unclassified	Ft Pierce Ent Ch, Cut 1	Harbor			MD	Beach		28,606	28,606	\$161,910	\$0.00	\$161,910
	Turbidity Monitoring								0	0	\$9,000	\$0.00	\$9,000
	P00002		(Underrun)						11,473	11,473	\$94,483	\$0.00	\$94,483
	CREDIT:		Add Survey						0	0	\$3,000	\$0.00	\$3,000
<b>Total:</b>									<b>115,430</b>	<b>115,430</b>	<b>\$1,125,148</b>		<b>\$1,125,148</b>

<b>Contractor:</b> Hendry Corp.	<b>Plant:</b> Savannah	<b>Type:</b> Cutterhead/suction
---------------------------------	------------------------	---------------------------------

FAX NO.

OCT-19-2005 WED 03:05 PM

# Dredging History Full Report

P. 04

FAX NO.

<b>Project Description:</b> PB Entrance Channel & Turning Basin		<b>Fiscal Year:</b> 1991	<b>Bid Open Date:</b> / /
<b>OPS Project Engineer:</b> Fletcher		<b>Contract No:</b> DACW17-91-C0062	<b>Award Date:</b> / /
<b>Ext:</b> 2530	<b>D.O. File No:</b>	<b>Start Date:</b> 12/04/1991	
<b>DP Project Manager:</b> Murphy	<b>Ext:</b> 3847	<b>IFB No:</b> DACW17-91-B-00XX	<b>Finish Date:</b> 01/16/1992

Bid Item	Description	Location	Stationing	Cut	Work Material Type	Disposal Location	Unit	Bid Volume	Pay Volume	Contractor Bid Price	Unit Price	Final Cost
0001	Mob & Demob							0	0	\$265,600	\$0.00	\$265,600
0002	Dredging	Palm Bch Turning Basin			MD Sand/silt	Beach		28,000	89,000	\$137,200	\$4.90	\$436,100
0003	Turbidity Monitoring							0	0	\$50,000	\$0.00	\$50,000
<b>Total:</b>								28,000	89,000	\$452,800		\$751,700

**Contractor:** Atkinson Dredging      **Plant:** Hampton Roads      **Type:** Cutterhead/suction      18"

**Remarks:** o Last day of dredging on 1/16/02. Last day of demob on 1/21/92. Severe weather delays.  
o Contractor equipment later bought by Wright Dredging.

OCT-19-2005 WED 03:05 PM

# Dredging History Full Report

P. 05

<b>Project Description:</b> Entrance Channel (McFarland)		<b>Fiscal Year:</b> 1993		<b>Bid Open Date:</b> 1/1	
<b>Contract No:</b> Government		<b>Award Date:</b> 1/1			
<b>OPS Project Engineer:</b> Fletcher	<b>Ext:</b> 2530	<b>D.O. File No:</b>	<b>Start Date:</b> 06/01/1993		
<b>DP Project Manager:</b> Murphy	<b>Ext:</b> 3847	<b>IFB No:</b>	<b>Finish Date:</b> 06/01/1993 dates unknown at this point?		

Bid Item	Description	Location	Stationing	Cut	Work Type	Material Type	Disposal Location	Unit	Bid Volume	Pay Volume	Contractor Bid Price	Unit Price	Final Cost
	Excavation Unclassified	Palm Bch Ent Channel				MD Sand	Nearshore		400,000	40,000	\$0	\$0.00	\$0
									<b>Total:</b>	400,000	40,000	\$0	\$0

**Contractor:** US Government      **Plant:** McFarland      **Type:** Hopper

**Remarks:**

- o McFarland job limited to 40,000 CY in total.
- o Material placed within the 28' contour

FAX NO.

OCT-19-2005 WED 03:05 PM

# Dredging History Full Report

P. 06

<b>Project Description</b> Entrance Channel & Settling Basin		<b>Fiscal Year:</b> 1994		<b>Bid Open Date:</b> //	
<b>OPS Project Engineer:</b> Fletcher		<b>Contract No:</b> DACW17-94-C-0027		<b>Award Date:</b> //	
<b>DP Project Manager:</b> Murphy		<b>D.O. File No:</b>		<b>Start Date:</b> 12/10/1993	
Ext: 2530		<b>IFB No:</b> DACW17-93-B-0113		<b>Finish Date:</b> 01/28/1994	
Ext: 3847					

Bid Item	Description	Location	Stationing	Cut	Work Material Type	Disposal Location	Unit	Bid Volume	Pay Volume	Contractor Bid Price	Unit Price	Final Cost
	Mob&Demob							0	0	\$120,000	\$0.00	\$120,000
	Add Mob							0	0	\$200,000	\$0.00	\$200,000
	Excavation Unclassified				MD Sand	Beach		14,391	14,391	\$57,564	\$0.00	\$57,564
	Monitor							0	0	\$1,600	\$0.00	\$1,600
<b>Total:</b>								14,391	14,391	\$379,164		\$379,164

**Contractor:** Cavo Development Inc.

FAX NO.

OCT-19-2005 WED 03:05 PM

# Dredging History Full Report

P. 07

<b>Project Description</b> Entrance Channel - Hopper w/Pump-off on Beach		<b>Fiscal Year:</b> 1994		<b>Bid Open Date:</b> / /	
		<b>Contract No:</b> DACW17-94-C-0042		<b>Award Date:</b> / /	
<b>OPS Project Engineer</b> Fletcher		<b>Ext:</b> 2530		<b>D.O. File No:</b> 16-36,478	
<b>DP Project Manager</b> Murphy		<b>Ext:</b> 3847		<b>IFB No:</b> DACW17-93-B-0113	
				<b>Start Date:</b> 02/03/1994	
				<b>Finish Date:</b> 03/18/1994	

Bid Item	Description	Location	Stationing	Cut	Work Material Type	Disposal Location	Unit	Bid Volume	Pay Volume	Contractor Bid Price	Unit Price	Final Cost
1	Mob&Demob				MD		JB	0	0	\$300,000	\$0.00	\$393,000
2	Excavation Unclassified	Palm Bch Ent Channel	ec/60 - SB 32		MD Sand	Beach	CY	1,800,000	155,310	\$0	\$5.40	\$838,674
3	Endgr Species Monitoring						Jb	0	0	\$50,000	\$0.00	\$50,000
<b>Total:</b>								<b>1,800,000</b>	<b>155,310</b>	<b>\$350,000</b>		<b>\$1,281,674</b>

**Contractor:** NATCO Limited Part.

FAX NO.

OCT-19-2005 WED 03:06 PM

# Dredging History Full Report

P. 08

FAX NO.

OCT-19-2005 WED 03:06 PM

<b>Project Description:</b> Entrance Channel, Settling Basin & Cut-1		<b>Fiscal Year:</b> 1995	<b>Bid Open Date:</b> 11/22/1994
<b>OPS Project Engineer:</b> Fletcher		<b>Contract No.:</b> DACW17-95-C-0008	<b>Award Date:</b> 12/06/1994
<b>Ext:</b> 2530	<b>D.O. File No.:</b> 16-36,694	<b>Start Date:</b> 01/31/1995	
<b>DP Project Manager:</b> Murphy	<b>Ext:</b> 3847	<b>IFB No.:</b> DACW17-94-B-0065	<b>Finish Date:</b> 04/05/1995

Bid Item	Description	Location	Stationing	Cut	Work Type	Material Type	Disposal Location	Unit	Bid Volume	Pay Volume	Contractor Bid Price	Unit Price	Final Cost
1	Mob & Demob								0	0	\$495,000	\$0.00	\$495,000
2	Dredging	Palm Bch - Cut 1	& Sett. Basin		MD	Sand	Beach		50,000	50,000	\$437,000	\$8.74	\$437,000
2a	Dredging	Palm Bch Ent Channel			MD	Sand	Beach		0	7,500	\$0	\$8.74	\$65,550
2b	Dredging	Palm Bch Ent Channel			MD	Sand	Beach		0	54,830	\$0	\$9.59	\$526,002
3	Endg Species Observer								0	0	\$9,650	\$0.00	\$9,650
4a	Dredging	Palm Bch Ent Channel			MD	Sand	Beach		50,000	52,890	\$173,000	\$3.46	\$182,999
4b	Endg Species Observer								0	0	\$5,000	\$0.00	\$5,000
5a	Dredging	Palm Bch Ent Channel			MD	Sand	Beach		46,000	14,110	\$160,546	\$3.49	\$49,244
5b	Endg Species Observer								0	0	\$5,000	\$0.00	\$5,000
6	Endg Species Observer								0	0	\$0	\$0.00	\$21,000
7	Differing Site Conditions								0	0	\$0	\$0.00	\$148,000
<b>Total:</b>									146,000	179,330	\$1,285,190		\$1,944,445

**Contractor:** Gulf Coast Trailing Co.      **Plant:** Mermentau      **Type:** Hopper

**Remarks:** o Scope of Work: Remove shoals from entrance channel to 36' required depth and in Cut-1 to 34' depth and the North Settling basin to 34' required depth.  
o Material was placed on 2,500 feet of beach starting 500' south of the south jetty.

# Dredging History Full Report

P. 09

<b>Project Description:</b> Entrance Channel, Settling Basin & Cut 1		<b>Fiscal Year:</b> 1996	<b>Bid Open Date:</b> 01/04/1996
<b>OPS Project Engineer:</b> Fletcher		<b>Contract No:</b> DACW17-96-C-0018	<b>Award Date:</b> 01/16/1996
<b>DP Project Manager:</b> Murphy		<b>D.O. File No:</b> 16-37,029	<b>Start Date:</b> 04/10/1996
<b>Ext:</b> 2530	<b>Ext:</b> 3847	<b>IFB No:</b> DACW17-96-B-0004	<b>Finish Date:</b> 06/01/1996

FAX NO.

Bid Item	Description	Location	Stationing	Cut	Work Type	Material Type	Disposal Location	Unit	Bid Volume	Pay Volume	Contractor Bid Price	Unit Price	Final Cost
1	Mob & Demob								0	0	\$150,000	\$0.00	\$150,000
2	Excavation Unclassified	Palm Bch - Cut 1	34+00 - 76+93	1	MD	Sand	Beach		88,000	88,000	\$596,640	\$5.78	\$596,640
2A	Overrun to 115%	Palm Bch - Cut 1	34+00 - 76+93	1	MD	Sand	Beach		0	13,200	\$0	\$6.78	\$89,496
2B	Overrun above 115%	Palm Bch - Cut 1	34+00 - 76+93	1	MD	Sand	Beach		0	48,910	\$0	\$8.31	\$406,442
3	Turbidity Monitoring								0	0	\$6,000	\$0.00	\$6,000
4	Endg Species Observer								0	0	\$25,000	\$0.00	\$25,000
<b>Total:</b>									88,000	150,110	\$777,640		\$1,273,578

**Contractor:** Gulf Coast Trailing      **Plant:** Atchafalaya      **Type:** Hopper      w/ pumpout capability.

**Remarks:** o Scope: Remove material from Sta. 30+00 to 56+00 to a required depth of 37'+1' allowable; from the north settling basin from Sta. 32+00 to Sta. 40+50 to a required depth of 34' +1' allowable; from Cut 1 from Sta. 67+00 to 76+94 to a required depth of 34'+1' allowable. The dredge material was placed below MHW on 2,500 feet of beach starting 500' south of the south jetty.

# Dredging History Full Report

P. 10

FAX NO.

OCT-19-2005 WED 03:06 PM

<b>Project Description:</b> Palm Beach comb w/ Ft Pierce Hbr		<b>Fiscal Year:</b> 1997		<b>Bid Open Date:</b> 11/08/1996	
<b>OPS Project Engineer:</b> Fletcher		<b>Ext:</b> 2530		<b>Contract No:</b> DACW17-97-C-0030	
<b>DP Project Manager:</b> Murphy		<b>Ext:</b> 3847		<b>Award Date:</b> 11/26/1996	
		<b>D.O. File No:</b> 16-37,249		<b>Start Date:</b> 12/19/1996	
		<b>IFB No:</b> DACW17-96-B-0048		<b>Finish Date:</b> 03/27/1997	
Release of claims on 7/14/97					

Bid Item	Description	Location	Stationing	Cut	Work Material Type	Disposal Location	Unit	Bid Volume	Pay Volume	Contractor Bid Price	Unit Price	Final Cost
0001	Mob & Demob							0	0	\$390,000	\$0.00	\$390,000
0002A	Dredging	Palm Bch Ent Channel	EC/25 - 1/76+93	ec-1	MD Sand	Beach		100,000	100,000	\$782,000	\$7.82	\$782,000
0002AA	Overrun to 115%	Palm Bch Ent Channel			MD Sand	Beach		0	15,000	\$0	\$7.82	\$117,300
0002AB	Overrun above 115%	Palm Bch Ent Channel			MD Sand	Beach		0	60,496	\$0	\$7.82	\$473,079
0002B	Dredging	Ft Pierce Ent Ch, Cut 1	1/0 - 2/69+01	1-2	MD Sand	Beach		32,000	19,368	\$236,480	\$7.39	\$143,133
0003	Turbidity Monitoring							0	0	\$15,000	\$0.00	\$19,900
0004	Endg Species Observer							0	0	\$20,000	\$0.00	\$35,331
0005	Bonding							0	0	\$5,000	\$0.00	\$5,000
<b>Total:</b>								132,000	194,864	\$1,448,480		\$1,965,743

**Contractor:** Gulf Coast Trailing      **Plant:** Atchafalaya      **Type:** Hopper  
**Sub Contractor:** Lake Michigan Contr.  
 Hopper with pumpout to beach

**Remarks:**

- o Scope: Only base bid awarded to remove approximately 175,000 cy (mod included additional 75,000 cy) from Palm Beach entrance channel, sta. 25+00 - Cut 1 sta. 76+93, and the settling basin to a depth of 33 feet. The beach disposal area is located adjacent to the south jetty and extends 25,000 south. Fort Pierce included 32,000 cy, between Cut 1 sta. 0+00 - Cut 2 sta. 69+01 to depths of 28' and 30', with placement on the beach between 1,000 and 2,600 feet south of the jetty.
- o Optional Items 6-10 were not awarded this contract.
- o 2 mods issued: P00005 for a decrease of \$186,246.24 for a reduction in total quantities dredged; P00006 for \$20,231.00 for additional turbidity and endangered species monitoring.
- o Field QA was Luis Lopez.

# Dredging History Full Report

P. 11

FAX NO.

OCT-19-2005 WED 03:07 PM

Project Description		Entrance Ch. comb. w/ Ft. Pierce Harbor		Fiscal Year: 1998	Bid Open Date: 10/28/1997								
OPS Project Engineer: Fletcher		Ext: 2530		Contract No: DACW17-98-C-0002	Award Date: 11/14/1998								
DP Project Manager: Murphy		Ext: 3847		D.O. File No: 16-37,415**	Start Date: 01/16/1998								
				IFB No: DACW17-97-B-0023	Finish Date: 02/14/1998								
Bid Item	Description	Location	Stationing	Cut	Work Type	Material Type	Disposal Location	Unit	Bid Volume	Pay Volume	Contractor Bid Price	Unit Price	Final Cost
	Base Bid								0	0	\$0	\$0.00	\$0
0001	Mob & Demob								0	0	\$600,000	\$0.00	\$600,000
0002	Excavation Unclassified	Palm Bch Ent Channel	25+00-56+00	E.C.	MD	Sand	Beach		110,000	33,039	\$1,061,500	\$9.65	\$318,830
	Dredging	Palm Bch - Cut 1	68+00-80+00	1	MD	Sand	Beach		0	0	\$0	\$0.00	\$0
0003	Excavation Unclassified	Ft Pierce Ent Ch, Cut 1	70+00-126+03	1	MD	Sand	Beach		30,000	23,252	\$532,500	\$17.75	\$412,732
	Dredging	Ft Pierce Ent Ch, Cut 2	0+00-11+00	2	MD	Sand	Beach		0	0	\$0	\$0.00	\$0
0004	Turbidity Monitoring								0	0	\$22,000	\$0.00	\$25,000
0005	Endg Species Observer								0	0	\$35,000	\$0.00	\$35,000
	BID OPTION A (1)								0	0	\$0	\$0.00	\$0
0006	Mob & Demob								0	0	\$150,000	\$0.00	\$150,000
0007	Excavation Unclassified	Palm Bch Turning Basin	0+00-19+00	T.B.	MD	Sand	Beach		40,000	22,109	\$240,000	\$6.00	\$132,653
0008	Turbidity Monitoring								0	0	\$10,000	\$0.00	\$10,000
0009	Endg Species Observer								0	0	\$15,000	\$0.00	\$15,000
	BID OPTION B (2)		Not Awarded						0	0	\$0	\$0.00	\$0
0010	Mob & Demob								0	0	\$150,000	\$0.00	\$0
0011	Exca Add Quantities								0	0	\$250,000	\$0.00	\$0
0012	Turbidity Monitoring								0	0	\$5,000	\$0.00	\$0
0013	Endg Species Observer								0	0	\$5,000	\$0.00	\$0
0014	Underrun		Var. in Qty.						0	0	\$0	\$0.00	\$93,611
<b>Total:</b>									180,000	78,400	\$3,076,000		\$1,792,826

Contractor: Gulf Coast Trailing, Co. Plant: Mermentau Type: Hopper

Remarks: \*\*See D.O. file number 14-37,414 for the Ft. Pierce plan sheets.

- o Scope of Work: Ft. Pierce Hbr, MD, 30,000 cy with beach disposal 1000' fouth of inlet extending southward about 1,800 feet. Palm Beach Hbr, MD, 110,000 cy from Entrance Channel, Settling Basin, and 40,000 cy from Turning Basin (Option A) with beach placement adjacent to the south jetty and extending southerly approximately 3,000 feet. Optional beach disposal location is located 25,000 feet south of south jetty at Midtown Beach extending 5,500 feet.
- o See disposal area report for additional information on disposal areas.
- o Contractors dredging daily reports show bin measure of 73,349 CY pumped to beach d/a.
- o VEQ A/S#1 and A/S#2. Final Pay Estimate dated 9/8/98 J.G.Cooper, presented for payment 7/20/98.

# Dredging History Full Report

P. 12

FAX NO.

OCT-19-2005 WED 03:07 PM

Project Description		Ent. Ch. (Cut 1&2) Settling Basin & Turn Basin		Fiscal Year: 1999		Bid Open Date: 12/11/1998		Award Date: 12/28/1998		Start Date: 03/23/1999		Estimated date.	
OPS Project Engineer: Fletcher		Ext: 2530		D.O. File No: 16-37,621		IFB No: DACW17-98-B-0029		Finish Date: 04/02/1999					
DP Project Manager: Murphy		Ext: 3847											
Bid Item	Description	Location	Stationing	Cut Type	Work Material Type	Disposal Location	Unit	Bid Volume	Pay Volume	Contractor Bid Price	Unit Price	Final Cost	
	BASE BID							0	0	\$0	\$0.00	\$0	
0001	Mob & Demob						LS	0	0	\$500,000	\$0.00	\$500,000	
0002	Dredging	Palm Bch Ent Channel			MD Sand	Beach	CY	95,000	0	\$950,000	\$10.00	\$325,017	
0002aa	ADD Surveys & Layout							0	0	\$6,000	\$0.00	\$6,000	
0003	Turbidity Monitoring						LS	0	0	\$3,600	\$0.00	\$3,600	
0004	Endgr Species Monitoring						LS	0	0	\$11,000	\$0.00	\$11,000	
	BID OPTION A (1)							0	0	\$0	\$0.00	\$0	
0005	Mob & Demob						LS	0	0	\$50,000	\$0.00	\$50,000	
0006	Dredging	Palm Bch Turning Basin			MD Sand/silt	Beach	CY	8,000	0	\$136,000	\$17.00	\$347,252	
0007	Turbidity Monitoring						LS	0	0	\$500	\$0.00	\$500	
0008	Endgr Species Monitoring						LS	0	0	\$1,600	\$0.00	\$1,600	
Not Awd	BID OPTION NOT AWARDED							0	0	\$0	\$0.00	\$0	
0009	Additional Mob/DeMob						LS	0	0	\$205,000	\$0.00	\$0	
0010	Additional Dredging	Palm Bch Ent Channel			MD Sand	Beach	CY	10,000	0	\$90,000	\$10.00	\$0	
0011	Turbidity Monitoring						LS	0	0	\$1,000	\$0.00	\$0	
0012	Endgr Species Monitoring						LS	0	0	\$1,000	\$0.00	\$0	
0013	See Remarks for Details							0	0	\$37,560	\$0.00	\$37,560	
<b>Total:</b>								113,000	0	\$1,993,260		\$1,282,529	
<b>Contractor:</b> NATCO Limited Part.		<b>Plant:</b> Northerly Isle		<b>Type:</b> Hopper/pipeline		<b>Material pumped to beach.</b>							
<b>Remarks:</b> o Option B was not awarded for ... o 0013 Repair of Water Line to Peanut Island.													

# Dredging History Full Report

<b>Project Description:</b> Entrance Channel and Turning Basin	<b>Fiscal Year:</b> 2000	<b>Bid Open Date:</b> 12/23/1999 3 bidders
<b>OPS Project Engineer:</b> Fletcher	<b>Ext:</b> 2530	<b>Contract No:</b> 00-C-0004
<b>DP Project Manager:</b> Murphy	<b>Ext:</b> 3847	<b>D.O. File No:</b> 16-36,852
		<b>Award Date:</b> 01/24/2000
		<b>Start Date:</b> 02/24/2000
		<b>Finish Date:</b> 03/18/2000
		<b>IFB No:</b> 99-B-0050

Bid Item	Description	Location	Stationing	Cut	Work Type	Material Type	Disposal Location	Unit	Bid Volume	Pay Volume	Contractor Bid Price	Unit Price	Final Cost
0001	Mob & Demob							JB	0	0	\$562,602	\$0.00	\$562,602
0002AA	Excavation Unclassified	Palm Bch Ent Channel			MD	Sand		CY	35,000	35,000	\$312,900	\$8.94	\$312,900
0002AB	Excavation Unclassified				MD	Sand			0	5,250	\$46,935	\$0.00	\$46,935
0002AC	Excavation Unclassified				MD	Sand			0	83,986	\$750,834	\$0.00	\$750,834
0003	Turbidity Monitoring							JB	0	0	\$4,455	\$0.00	\$4,455
0004	Endg Species Observer							JB	0	0	\$5,885	\$0.00	\$5,885
0005	Mob & Demob							LS	0	0	\$0	\$0.00	\$0
0006	Contingency Dredging	Palm Bch Turning Basin			MD	Sand		DY	0	0	\$41,701	\$0.00	\$223,934
0007	Turbidity Monitoring							JB	0	0	\$314	\$0.00	\$1,686
0008	Endgr Species Monitoring							JB	0	0	\$1,871	\$0.00	\$10,047
<b>Total:</b>									35,000	124,236	\$1,727,497		\$1,919,278

**Contractor:** NATCO Limited Partnership      **Plant:** Northerly Islan      **Type:** Hopper

- Remarks:**
- o 2 Days turning area. 2 Days Settling basin.
  - o Bid Item 0006 was for contingency daily dredging at a rate of \$41,701/day for 5.37 days.
  - o 8,000 cy/day dredged.

# Dredging History Full Report

P. 13

FAX NO.

OCT-19-2005 WED 03:07 PM

<b>Project Description:</b> Entrance Channel and Turning Basin		<b>Fiscal Year:</b> 2000		<b>Bid Open Date:</b> / /	
<b>OPS Project Engineer:</b> Fletcher		<b>Contract No.:</b> 00-C-0004		<b>Award Date:</b> 01/24/2000	
<b>DP Project Manager:</b> Murphy		<b>D.O. File No.:</b> 16-36,852		<b>Start Date:</b> / /	
<b>Ext:</b> 2530		<b>IFB No.:</b> 99-B-0050		<b>Finish Date:</b> 03/27/2000	
<b>Ext:</b> 3847					

Bid Item	Description	Location	Stationing	Cut	Work Type	Material Type	Disposal Location	Unit	Bid Volume	Pay Volume	Contractor Bid Price	Unit Price	Final Cost
0001	Mob & Demob							JB	0	0	\$562,602	\$0.00	\$562,602
0002AA	Excavation Unclassified	Palm Bch Ent Channel				MD Sand		CY	35,000	35,000	\$312,900	\$8.94	\$312,900
0002AB	Excavation Unclassified					MD Sand			0	5,250	\$46,935	\$0.00	\$46,935
0002AC	Excavation Unclassified					MD Sand			0	83,986	\$750,834	\$0.00	\$750,834
0003	Turbidity Monitoring							JB	0	0	\$4,455	\$0.00	\$4,455
0004	Endg Species Observer							JB	0	0	\$5,885	\$0.00	\$5,885
0005	Mob & Demob							Is	0	0	\$0	\$0.00	\$0
0006	Contingency Dredging	Palm Bch Turning Basin				MD			0	0	\$41,701	\$0.00	\$223,934
0007	Turbidity Monitoring							JB	0	0	\$314	\$0.00	\$1,686
0008	Endgr Species Monitoring							JB	0	0	\$1,871	\$0.00	\$10,047
<b>Total:</b>									35,000	124,236	\$1,727,497		\$1,919,278

**Contractor:** NATCO Limited Partnership      **Plant:** Northerly Islan      **Type:** Hopper

**Remarks:** 2 Days turning area. 2 Days Settling basin.

# Dredging History Full Report

<b>Project Description:</b> Entrance Channel and Turning Basin		<b>Fiscal Year:</b> 2001	<b>Bid Open Date:</b> 10/26/2000
<b>OPS Project Engineer:</b> Fletcher		<b>Contract No:</b> DACW17-01-C-0002	<b>Award Date:</b> 11/14/2000
<b>Ext:</b> 2530	<b>D.O. File No:</b>	<b>Start Date:</b> 12/11/2000	
<b>DP Project Manager:</b> Murphy	<b>Ext:</b> 3847	<b>IFB No:</b> 00-B-0038	<b>Finish Date:</b> 01/11/2001

Bid Item	Description	Location	Stationing	Cut	Work Type	Material Type	Disposal Location	Unit	Bid Volume	Pay Volume	Contractor Bid Price	Unit Price	Final Cost
0001	BASE BID	Palm Bch Ent Channel			MD	Sand	Beach		0	0	\$0	\$0.00	\$0
0001AA	Mob & Demob							LS	0	0	\$0	\$0.00	\$450,000
0001AB	Dredging							CY	40,250	40,250	\$0	\$0.00	\$362,250
0001AC	Turbidity Monitoring							LS	0	0	\$0	\$0.00	\$5,000
0001AD	Endg Species Observer							LS	0	0	\$0	\$0.00	\$5,000
0001AE	Overrun to 115%		DSC		MD	Sand		CY	17,082	17,082	\$0	\$0.00	\$327,974
0002	BID OPTION A (1)								0	0	\$0	\$0.00	\$0
0002AA	Mob & Demob							LS	0	0	\$0	\$0.00	\$0
0002AB	Contingency Dredging				MD	Sand		DY	0	0	\$33,000	\$0.00	\$33,000
0002AC	Turbidity Monitoring							LS	0	0	\$0	\$0.00	\$1,500
0002AD	Endg Species Observer				MD	Sand		LS	0	0	\$0	\$0.00	\$1,500
0002AE	Contingency Dredging							DY	0	0	\$0	\$0.00	\$87,361
0003	Settling Basin								0	0	\$0	\$0.00	\$0
0003AA	Mob & Demob							LS	0	0	\$0	\$0.00	\$0
0003AB	Contingency Dredging	Palm Bch Settling Basin			MD	Sand		DY	0	0	\$43,680	\$0.00	\$87,361
0003AC	Turbidity Monitoring							LS	0	0	\$0	\$0.00	\$1,000
0003AD	Endg Species Observer							LS	0	0	\$0	\$0.00	\$1,000
<b>Total:</b>									57,332	57,332	\$76,680		\$1,362,946

**Contractor:** Manson Construction Co.      **Plant:** Newport      **Type:** Hopper

- Remarks:**
- o Contingency dredging and the settling basin were added to the contract by modification.
  - o Mod Suffix A to increase contingency dredging from 2 to 3 days and to add 2 days for the expanded settling basin.
  - o Contractor submitted a request for equitable adjustment for the settling basin.

# Dredging History Full Report

<b>Project Description:</b> Entrance Channel And Turnng Basin	<b>Fiscal Year:</b> 2002	<b>Bid Open Date:</b> 11/06/2001
<b>OPS Project Engineer:</b> Fletcher	<b>Ext:</b> 2530	<b>Contract No:</b> DACW17-02-C-0006
<b>DP Project Manager:</b> Murphy	<b>Ext:</b> 3847	<b>Award Date:</b> 11/17/2001
	<b>D.O. File No:</b>	<b>Start Date:</b> 01/12/2002
	<b>IFB No:</b> 01-B-0019	<b>Finish Date:</b> 03/19/2002

Bid Item	Description	Location	Stationing	Cut	Work Type	Material Type	Disposal Location	Unit	Bid Volume	Pay Volume	Contractor Bid Price	Unit Price	Final Cost
0001	Mob & Demob							JB	0	0	\$624,000	\$0.00	\$624,000
0002	Dredging	Palm Bch Ent Channel			MD	Sand		CY	0	63,250	\$412,500	\$7.50	\$474,375
0002A	Dredging	Palm Bch Settling Basin			NW	Sand		CY	0	55,200	\$444,000	\$9.25	\$510,600
0003	Turbidity Monitoring							JB	0	0	\$12,500	\$0.00	\$12,500
0004	Endg Species Observer							JB	0	0	\$22,500	\$0.00	\$22,500
0005	BID OPTION A (1)								0	0	\$0	\$0.00	\$0
0005AA	Mob & Demob							JB	0	0	\$0	\$0.00	\$0
0005AB	Contingency Dredging	Palm Bch Turning Basins	Rental					DY	0	0	\$27,500	\$0.00	\$255,750
0005AC	Turbidity Monitoring							DY	0	0	\$750	\$0.00	\$6,975
0005AD	Endg Species Observer							DY	0	0	\$750	\$0.00	\$6,975
0007	Overrun above 115%							JB	0	19,934	\$0	\$0.00	\$201,725
0008	Claim (see Remarks)							LS	0	0	\$0	\$0.00	\$325,000
0009	Interest on Claim							LS	0	0	\$0	\$0.00	\$2,738
<b>Total:</b>									0	138,384	\$1,544,500		\$2,443,138

**Contractor:** B&B Dredging Company      **Plant:** Atchafalaya      **Type:** Hopper

- Remarks:**
- o Base bid was for dredging the entrance channel from Sta. 25+00 to 87+92 (Cut-2) with placement on the beach.
  - o Option A was for contingency rental dredging inside the north and south turning basins.
  - o Option B was not awarded. It was to place 45,000 cy at Midtown beach.
  - o Bid item 7 was a unilateral settlement for equitable adjustment and includes overrun dredging and other items from bid itme 2 and 2A.
  - o Bid Item 0008 was the claim settlement.
  - o Bid Item 0009 was interest on the claim.
  - o Bid item 5AB was for 1 day of rental "contingency" dredging.
  - o 3,700 cy/day dredged.

# Dredging History Full Report

<b>Project Description:</b> Entrance Channel And Turning Basin		<b>Fiscal Year:</b> 2003	<b>Bid Open Date:</b> 01/03/2003
<b>OPS Project Engineer:</b> Fletcher	<b>Ext:</b> 2530	<b>Contract No:</b> DACW17-03-C-0006	<b>Award Date:</b> 02/05/2003
<b>DP Project Manager:</b> Murphy	<b>Ext:</b> 3847	<b>D.O. File No:</b> D.O. 16-341	<b>Start Date:</b> 04/07/2003
		<b>IFB No:</b> 03-B-0002	<b>Finish Date:</b> 04/23/2003

Bid Item	Description	Location	Stationing	Cut	Work Type	Material Type	Disposal Location	Unit	Bid Volume	Pay Volume	Contractor Bid Price	Unit Price	Final Cost
	BASE BID								0	0	\$0	\$0.00	\$0
0001	Mob & Demob								0	0	\$620,000	\$0.00	\$620,000
0002	Dredging	Palm Bch Ent Channel			MD	Sand			74,000	76,624	\$629,000	\$8.50	\$651,304
0003	Endgr Species Monitoring								0	0	\$7,860	\$0.00	\$7,860
0004	Turbidity Monitoring								0	0	\$14,409	\$0.00	\$14,409
0005	Sea Turtle - Trawling								0	0	\$38,920	\$0.00	\$0
0007	BID OPTION B (2)								0	0	\$0	\$0.00	\$0
0007AA	Contingency Dredging	Palm Bch Turning Basins	See Remarks		MD	Sand			0	2,624	\$41,921	\$0.00	\$178,164
0007AB	Endgr Species Monitoring								0	0	\$668	\$0.00	\$668
0007AC	Turbidity Monitoring								0	0	\$1,223	\$0.00	\$1,223
0007AD	Sea Turtle - Trawling								0	0	\$2,780	\$0.00	\$0
<b>Total:</b>									74,000	79,248	\$1,356,781		\$1,473,628

**Contractor:** Great Lakes D&D

**Plant:** Northerly Isle

**Type:** Hopper

- Remarks:**
- o Contingency dredging includes rental dredging in the north and south turning basins totalling 2,624 cy and 6 hours of dredging.
  - o Was a protest by B+B which delayed NTP. Pre-con held 20 Feb.
  - o Option A was NOT awarded and was for unanticipated shoal removals up to 45,000 cy.
  - o Option C was NOT awarded and was for advance maintenance dredging in the settling basin.
  - o Sea turtle trawling was later deleted from the work.
  - o 8,200 cy/day.

# Dredging History Full Report

P. 14

FAX NO.

OCT-19-2005 WED 03:07 PM

<b>Project Description</b> Entrance Channel And Turning Basin		<b>Fiscal Year:</b> 2003		<b>Bid Open Date:</b> / /	
<b>OPS Project Engineer</b> Fletcher		<b>Contract No:</b> DACW17-03-C-0006		<b>Award Date:</b> / /	
<b>DP Project Manager</b> Murphy		<b>D.O. File No:</b>		<b>Start Date:</b> / /	
Ext: 2530		<b>IFB No:</b>		<b>Finish Date:</b> / /	
Ext: 3847					

Bid Item	Description	Location	Stationing	Cut	Work Material Type	Disposal Location	Unit	Bid Volume	Pay Volume	Contractor Bid Price	Unit Price	Final Cost
	BASE BID							0	0	\$0	\$0.00	\$0
0001	Mob & Demob							0	0	\$0	\$0.00	\$620,000
0002	Dredging				MD Sand			0	76,624	\$0	\$8.50	\$651,304
0003	Endgr Species Monitoring							0	0	\$0	\$0.00	\$7,860
0004	Turbidity Monitoring							0	0	\$0	\$0.00	\$14,409
0005	Sea Turtle - Trawling							0	0	\$0	\$0.00	\$0
0007	BID OPTION B (2)							0	0	\$0	\$0.00	\$0
0007AA	Contingency Dredging		See Remarks		MD Sand			0	2,624	\$0	\$0.00	\$178,164
0007AB	Endgr Species Monitoring							0	0	\$0	\$0.00	\$668
0007AC	Turbidity Monitoring							0	0	\$0	\$0.00	\$1,223
0007AD	Sea Turtle - Trawling							0	0	\$0	\$0.00	\$0
<b>Total:</b>								0	79,248	\$0		\$1,473,628

**Contractor:** Great Lakes D&D

**Remarks:**

- Contingency dredging includes rental dredging in the north and south turning basins totalling 2,624 cy and 6 hours of dredging.
- Sea turtle trawling was later deleted from the work.

11/08 05

Palm Beach Harbor

# Dredging History Full Report

<b>Project Description:</b> Emergency MD: B+B Rental (Hub Zone)		<b>Fiscal Year:</b> 2004		<b>Bid Open Date:</b> 05/07/2004	
<b>OPS Project Engineer:</b> Fletcher		<b>Contract No:</b> W912EP-04-C-0026		<b>Award Date:</b> 05/12/2004	
<b>DP Project Manager:</b> Murphy		<b>D.O. File No:</b> 16-38,446		<b>Start Date:</b> 05/19/2004	
<b>Ext:</b> 2530		<b>IFB No:</b> 04-R-0019		<b>Finish Date:</b> 05/24/2004	
<b>Ext:</b> 3847					

Bid Item	Description	Location	Stationing	Cut	Work Type	Material Type	Disposal Location	Unit	Bid Volume	Pay Volume	Contractor Bid Price	Unit Price	Final Cost
0001	Mob & Demob								0	0	\$128,919	\$0.00	\$128,919
0002	Dredge Rental	Palm Bch Ent Channel	see remarks		MD	Sand	In Channel	hr	0	0	\$123,960	\$0.00	\$173,265
<b>Total:</b>									0	0	\$252,879		\$302,184

**Contractor:** B+B Dredging Co.

**Remarks:** This job was an emergency dredging requirement due to late winter shoaling. The annual MD event was not performed in FY04.  
 Scope of work: dredge the entrance channel to 37-feet using 5-day dredge rental contract. Order of work 1. Shoals STA. 43+00 to 51+00; 2. Shoals from Sta. 34+00 to 40+50, rge 0-100. Material was placed into the navigation channel, entrance channel from Sta. 7+00 to 18+00, rge 0-300. Endangered species and turbidity monitoring was done.  
 Bid Item 0002:  
 Rental for 120 hrs + 48 hrs overrun for a total of 168 hrs.  
 Unit price was \$1,033/hr.  
 B+B is a hub zone contractor and contract was sole source.

# Dredging History Full Report

<b>Project Description:</b> Emergency MD: Post Hurricane		<b>Fiscal Year:</b> 2004		<b>Bid Open Date:</b> / /	
<b>OPS Project Engineer:</b> Fletcher		<b>Ext:</b> 2530		<b>Contract No:</b> W912EP-04-C-0037	
<b>DP Project Manager:</b> Murphy		<b>Ext:</b> 3847		<b>Award Date:</b> / /	
		<b>D.O. File No:</b>		<b>Start Date:</b> 09/18/2004	
		<b>IFB No:</b> 04-C-0037		<b>Finish Date:</b> 10/09/2004	

Bid Item	Description	Location	Stationing	Cut	Work Type	Material Type	Disposal Location	Unit	Bid Volume	Pay Volume	Contractor Bid Price	Unit Price	Final Cost
0001	Mob & Demob							HR	0	0	\$175,000	\$0.00	\$175,000
00002A	Rental at 100% Pay Time	Palm Bch Ent Channel			MD	Sand		JB	0	0	\$356,400	\$0.00	\$680,157
00002B	Rental at 70% Pay Time	Palm Bch Ent Channel			MD	Sand		HR	0	0	\$0	\$0.00	\$0
00002C	Rental at 40% Pay Time	Palm Bch Ent Channel			MD	Sand		HR	0	0	\$0	\$0.00	\$0
0003	Sea Turtle Monitoring							DY	0	0	\$4,950	\$0.00	\$9,450
0004	Turbidity Monitoring							DY	0	0	\$5,500	\$0.00	\$10,500
<b>Total:</b>									0	0	\$541,850		\$875,107

**Contractor:** Manson                      **Plant:** Bayport                      **Type:** Hopper

**Remarks:**

- o Contract W912EP-04-C-0037, for Emergency Maintenance Dredging, Entrance Channel, Palm Beach, Florida, has been awarded to Manson Construction Company in the amount of \$541,850.
- o Material placed into the Nearshore Area and borrow site for the Town of Palm Beach.
- o Total dredging hours was 503.82 hrs at 100% pay time. Unit price was \$1,350/day; 70% pay time was \$945/day; and 40% pay time was \$540/day.
- o Total sea turtle observer days was 21 days.

# Dredging History Full Report

Project Description: Entrance Channel Emergency Dredging	Fiscal Year: 2005	Bid Open Date: / /
OPS Project Engineer: Fletcher	Contract No: W912EP-05-C-0012	Award Date: / /
DP Project Manager: Murphy	D.O. File No:	Start Date: 04/21/2005
Ext: 2530	IFB No: 04-R-0021	Finish Date: 07/02/2005
Ext: 3847		

Bid Item	Description	Location	Stationing	Cut	Work Type	Material Type	Disposal Location	Unit	Bid Volume	Pay Volume	Contractor Bid Price	Unit Price	Final Cost
0001AA	Mob & Demob								0	0	\$564,980	\$0.00	\$564,980
0001AB	Dredging	Palm Bch Ent Channel			MD	Sand	Beach		51,000	74,193	\$749,700	\$14.70	\$1,090,637
0001AC	Dredging	Palm Bch Ent Channel			MD	Sand	Nearshore		49,000	170,861	\$307,230	\$6.27	\$1,071,298
0001AD	Turbidity Monitoring								0	0	\$26,295	\$0.00	\$30,856
0001AE	Endg Species Observer								0	0	\$35,760	\$0.00	\$35,760
0002	BID OPTION A (1)								0	0	\$0	\$0.00	\$0
0002AA	Contingency Dredging				MD	Sand			0	0	\$26,095	\$0.00	\$182,665
0002AB	Turbidity Monitoring								0	0	\$650	\$0.00	\$4,550
0002AC	Endg Species Observer								0	0	\$860	\$0.00	\$6,020
0003	Sea Turtle Monitoring		Additional Mon.						0	0	\$0	\$0.00	\$9,850
<b>Total:</b>									100,000	245,054	\$1,711,570		\$2,996,616

Contractor: B+B Dredging Co.      Plant: Atchafalaya      Type: Hopper

- Remarks:**
- o Annual MD event. for dredging the entrance channel and settling basin.
  - o 6,800 cy/day dredged.
  - o Bid Item 0003 is for 25 days of additional sea turtle monitoring.
  - o Bid Item 0002AA, 0002AB, 0002AC was for a total of 7 days each.



US Army Corps  
of Engineers

# USACE Sea Turtle Data Warehouse

## Palm Beach Harbor - Jacksonville District

### Project Information

**Fiscal Year:** 1994

**Project Dates:** 2/15/94 - 3/11/94

**Project Description:** Dredging Palm Beach Entrance Channel.

**Maintenance / New Work:** Maintenance

**Federal / Regulatory:** Federal

**Total Project Cubic Yards:**  
181338

**Total Days of Dredging:** 19

**Total Hours of Dredging:** 144.5

**Type of Material:** Sand

**Disposal Method(s) for Material:** Beach disposal

**Total Turtle Takes:** 0

### Predredge Trawling

**Predredge Trawling Company:** N/A

**Predredge Trawling?** No  
N/A

**Are Predredge Reports Available?** No

**Loggerheads:** 0

**Greens:** 0

**Kemp's Ridley:** 0

**Other:** 0

### Relocation Trawling

**Relocation Trawling?** No  
N/A

**Relocation Company:** N/A

**Loggerheads:** 0

**Greens:** 0

**Kemp's Ridley:** 0

**Other:** 0

**Total number turtles relocated:** 0

**Are Relocation Reports Available?** No

**Are Dredging Records Available?** Yes

**Are original turtle take data still available?**  
No

**Description of mitigation measures/dates used:** Deflectors NOT tested yet (see Canaveral

9/14/94)

**Other Remarks:** N/A

---

## Sugar Island Dredge

**Project:** Palm Beach Harbor

**Dredging Company:** Great Lakes Dredge & Dock Company

**Dates Dredge Worked:** 2/15/94-3/11/94

**Total cubic yards this dredge:**  
181338

**Total days this dredge worked:**  
19

**Total hours this dredge worked:** 144.5

**Draghead Type:** California

**Draghead Size:** N/A

**Number of Dragheads:** N/A

**Silent Inspector:** No

**Dredge Logs Available?** Yes

**Screening Type:** None

**Screening Coverage:** N/A

**Percent Observer Monitoring:**  
N/A

**Bycatch:** Unknown

**Other Remarks:** Deflectors not yet tested.

*Webdate: January 14, 2005*

[Close Window](#)



US Army Corps  
of Engineers

# USACE Sea Turtle Data Warehouse

## Palm Beach Harbor - Jacksonville District

### Project Information

**Fiscal Year:** 1995

**Project Dates:** 12/30/94 - 2/14/95

**Project Description:** Removal of shoals along entrance channel to 36-ft plus 1-ft allowable overdepth; North Settling Basin dredged to 34-ft plus 1-ft allowable overdepth.

**Maintenace / New Work:** Maintenance

**Federal / Regulatory:** Federal

**Total Project Cubic Yards:**  
179330

**Total Days of Dredging:** 46

**Total Hours of Dredging:** 0

**Type of Material:** Sand

**Disposal Method(s) for Material:** Beach disposal placed south of the South Jetty & pipeline

**Total Turtle Takes:** 5

### Predredge Trawling

**Predredge Trawling Company:** WES

**Predredge Trawling?** Yes

Point survey 13-14 Dec 1994 (see D. Shafer et al. 1995), 1 unknown turtle sighted, no trawl completed due to potential damage from rocky bottom, lack of trawler, time restrictions

**Are Predredge Reports Available?** Yes

**Loggerheads:** 0

**Greens:** 0

**Kemp's Ridley:** 0

**Other:** 0

### Relocation Trawling

**Relocation Trawling?** No  
N/A

**Relocation Company:** N/A

**Loggerheads:** 0

**Greens:** 0

**Kemp's Ridley:** 0

**Other:** 0

**Total number turtles relocated:** 0**Are Relocation Reports Available?** No**Are Dredging Records Available?** No**Are original turtle take data still available?**  
Yes**Description of mitigation measures/dates used:** Deflectors, steel was welded over openings located along back edge (see dredge data for more information).**Other Remarks:** Water temperature range during this project 21.6°-22.7°C. Manatees sighted daily.

## Mermentau Dredge

**Project:** Palm Beach Harbor**Dredging Company:** Weeks Marine**Dates Dredge Worked:** 12/30/94-2/14/95**Total cubic yards this dredge:**  
179330**Total days this dredge worked:**  
46**Total hours this dredge worked:** N/A**Draghead Type:** California**Draghead Size:** N/A**Number of Dragheads:** 2**Silent Inspector:** No**Dredge Logs Available?** No**Screening Type:** Inflow**Screening Coverage:** 76-100**Percent Observer Monitoring:**  
100%**Bycatch:** Seagrass & small crabs (day of turtle take)**Other Remarks:** Deflectors inspected 1/5/95 and voids were noted on each side along back edge (2" wide, 1' high). Steel was welded over the openings to prevent turtles and materials from being sucked up. Also re-emphasized not to pump when lifting the dragarm. 167 loads total.

## Turtle Take Information:

**Take:** 01/03/95**Dredge:** Mermentau**Observer Name:** Phil Tonne**Obersver Company:** Coastwise Consulting**Are observer reports available?** Yes**Cubic yards:** N/A**Days worked:** 4**Hours worked:** N/A**Species:** Green**Age:** Sub Adult**Live / Dead:** Dead**Genetic Samples?** No**Photos Available?** No

**Dredge Load:** 31                      **Load Time:** 0538-0744                      **Time Recovered:** 0745

**Channel Location:** Lakeworth Inlet

**Latitude:** 26 46.09    **Longitude:** 80 01.82

**Water Surface Temp:** 22.2 °C    **Water Column Temp:** N/A                      **Air Temp:** N/A

**Weather:** Partly cloudy, light winds 0-10 knots, calm seas                      **Bycatch associated with take:** seagrass, small crabs

**Location Part Recovered:** Starboard draghead between draghead & deflector (see diagram in incidental report)

**Description of Part Recovered:** Head & carapace badly fractured, portion of right flipper missing.

**Head Width:** 0    **Plastron Length:** 0

**Carapace S.L. Length:** 0 cm    **Carapace S.L. Width:** 0 cm

**Carapace O.C. Length:** 0 cm    **Carapace O.C. Width:** 0 cm

**Deflector in use?** Yes    **Condition of Screen/Deflector:** Good

**Relocation Trawling?** No    **Windows?** No

**Other Protection Methods in Place:** N/A

**Data Source:** Observer incident report

**Other Remarks:** Turtle fell overboard before inspection. Observers stated need that noth dragarms be raised as soon as possible after a load and left in place until observer arrived for turtle removal & photographs.

## Take: 02/10/95

**Dredge:** Mermentau    **Observer Name:** Eric Westerman

**Obersver Company:** Coastwise Consulting                      **Are observer reports available?** Yes

**Cubic yards:** N/A                      **Days worked:** 42                      **Hours worked:** N/A

**Species:** Green                      **Age:** Juvenile                      **Live / Dead:** Dead

**Genetic Samples?** No    **Photos Available?** No

**Dredge Load:** 159                      **Load Time:** 1359-2014                      **Time Recovered:** 1530

**Channel Location:** Lakeworth Inlet, inner channel 67+00-76+93

**Latitude:** 26 46.15    **Longitude:** 80 02.24

**Water Surface Temp:** 22.2 °C    **Water Column Temp:** N/A                      **Air Temp:** N/A

**Weather:** Clear, winds S 20 knots, seas 2-4'

**Bycatch associated with take:** Grass

**Location Part Recovered:** Starboard lander

**Description of Part Recovered:** Carapace cut off at the 5th or 6th marginal scute from the rear (25 cm in length), no internal organs remaining, rear flippers attached (5x10 cm)

**Head Width:** 0

**Plastron Length:** 0

**Carapace S.L. Length:** 0 cm

**Carapace S.L. Width:** 20 cm

**Carapace O.C. Length:** 0 cm

**Carapace O.C. Width:** 0 cm

**Deflector in use?** Yes

**Condition of Screen/Deflector:** Deflector good (new style)

**Relocation Trawling?** No

**Windows?** No

**Other Protection Methods in Place:** N/A

**Data Source:** Observer incident report

**Other Remarks:** New dragtender. Only digging with starboard dragarm during load #159. Photographs taken.

## Take:

```
</PLAINTEXT><PRE></PRE></Q></S></SAMP></SCRIPT></SELECT></SMALL></STRIKE></STRONG></
<UL></UL></VAR></WBR><XMP></XMP><FONT face=arial></FONT>
<SCRIPT language=JavaScript>
```

```
function showHide(targetName) {
    if( document.getElementById ) { // NS6+
        target = document.getElementById(targetName);
    } else if( document.all ) { // IE4+
        target = document.all[targetName];
    }

    if( target ) {
        if( target.style.display == "none" ) {
            target.style.display = "inline";
        } else {
            target.style.display = "none";
        }
    }
}
```









US Army Corps  
of Engineers

# USACE Sea Turtle Data Warehouse

## Palm Beach Harbor - Jacksonville District

### Project Information

**Fiscal Year:** 1996

**Project Dates:** 3/24/96 - 3/26/96; 4/10/96 - 6/1/96

**Project Description:** Dredging of Entrance channel, Settling Basin, and Cut 1.

**Maintenace / New Work:** Maintenance

**Federal / Regulatory:** Federal

**Total Project Cubic Yards:**  
154847

**Total Days of Dredging:** 61

**Total Hours of Dredging:** 427.7

**Type of Material:** Sand

**Disposal Method(s) for Material:** Beach disposal south of South Jetty & pipeline

**Total Turtle Takes:** 2

### Predredge Trawling

**Predredge Trawling Company:** N/A

**Predredge Trawling?** No  
N/A

**Are Predredge Reports Available?** No

**Loggerheads:** 0

**Greens:** 0

**Kemp's Ridley:** 0

**Other:** 0

### Relocation Trawling

**Relocation Trawling?** No  
N/A

**Relocation Company:** N/A

**Loggerheads:** 0

**Greens:** 0

**Kemp's Ridley:** 0

**Other:** 0

**Total number turtles relocated:** 0

**Are Relocation Reports Available?** No

**Are Dredging Records Available?** Yes

**Are original turtle take data still available?**  
Yes

**Description of mitigation measures/dates used:** Deflectors

**Other Remarks:** Water temperature range during this project 22.2°-26.6°C. Data available for only 1 take. Project ceased 3/27/96-4/9/96 for major repairs.

---

## Atchafalaya Dredge

**Project:** Palm Beach Harbor

**Dredging Company:** B & B Dredging Company      **Dates Dredge Worked:** 3/24/96-3/26/94;  
4/10/96-6/1/96

**Total cubic yards this dredge:** 154847      **Total days this dredge worked:** 61      **Total hours this dredge worked:** 427.7

**Draghead Type:** California      **Draghead Size:** N/A      **Number of Dragheads:** 2

**Silent Inspector:** No      **Dredge Logs Available?** Yes

**Screening Type:** Inflow      **Screening Coverage:** N/A      **Percent Observer Monitoring:**  
N/A

**Bycatch:** Unknown

**Other Remarks:** 172 loads total. Dredge grounded 3/27/96-4/9/96 for major repairs.

---

## Turtle Take Information:

### Take: 05/12/96

**Dredge:** Atchafalaya

**Observer Name:** Gagnon/Spellman

**Observer Company:** N/A

**Are observer reports available?** Yes

**Cubic yards:** N/A

**Days worked:** 33

**Hours worked:** N/A

**Species:** Loggerheads

**Age:** Juvenile

**Live / Dead:** Dead

**Genetic Samples?** No

**Photos Available?** No

**Dredge Load:** 102, 103

**Load Time:** 0147-0533, 0728-  
1300

**Time Recovered:** 0431, 0945,  
1300

**Channel Location:** Lake Worth Inlet, STA 56+00-30+00

**Latitude:** N/A

**Longitude:** N/A

**Water Surface Temp:** N/A      **Water Column Temp:** N/A      **Air Temp:** N/A

**Weather:** Partly cloudy, winds SE 5 knots, seas 1', tide flood-high      **Bycatch associated with take:** Unknown

**Location Part Recovered:** Starboard draghead, port fore, mid, & aft discharge

**Description of Part Recovered:** Load #102: partial carapace (central & marginal scutes), partial plastron (inframarginals), & intestines. Load #103: 2/3 plastron & partial shell (central & marginal scutes)

**Head Width:** 0

**Plastron Length:** 32

**Carapace S.L. Length:** 48 cm

**Carapace S.L. Width:** 39 cm

**Carapace O.C. Length:** 0 cm

**Carapace O.C. Width:** 0 cm

**Deflector in use?** Yes

**Condition of Screen/Deflector:** N/A

**Relocation Trawling?** No

**Windows?** No

**Other Protection Methods in Place:** N/A

**Data Source:** Observer report

**Other Remarks:** Measurements are of fragments.

## Take:

```
</PLAINTEXT><PRE></PRE></Q></S></SAMP></SCRIPT></SELECT></SMALL></STRIKE></STRONG></
<UL></UL></VAR></WBR><XMP></XMP><FONT face=arial></FONT>
<SCRIPT language=JavaScript>
```

```
function showHide(targetName) {
    if( document.getElementById ) { // NS6+
        target = document.getElementById(targetName);
    } else if( document.all ) { // IE4+
        target = document.all[targetName];
    }

    if( target ) {
        if( target.style.display == "none" ) {
            target.style.display = "inline";
        } else {
            target.style.display = "none";
        }
    }
}
```

## Palm Beach Harbor - Jacksonville District

### Turtle Take Information:

**Turtle Take Date:** N/A

**Project:** Palm Beach Harbor

**Dredge:** Atchafalaya

**Observer Name:** N/A

**Observer Company:** N/A

**Are observer reports available?** No

**Cubic yards:** N/A

**Days worked:** N/A

**Hours worked:** N/A

**Species:** Green

**Age:** Unknown

**Live / Dead:** Dead

**Genetic Samples?** No

**Photos Available?** No

**Dredge Load:** 0

**Load Time:** N/A

**Time Recovered:** N/A

**Channel Location:** N/A

**Latitude:** N/A

**Longitude:** N/A

**Water Surface Temp:** N/A

**Water Column Temp:** N/A

**Air Temp:** N/A

**Weather:** N/A

**Bycatch associated with take:** N/A

**Location Part Recovered:** N/A

**Description of Part Recovered:** N/A

**Head Width:** 0

**Plastron Length:** 0

**Carapace S.L. Length:** 0 cm

**Carapace S.L. Width:** 0 cm

**Carapace O.C. Length:** 0 cm

**Carapace O.C. Width:** 0 cm

**Deflector in use?** No

**Condition of Screen/Deflector:** N/A

**Relocation Trawling?** No

**Windows?** No

**Other Protection Methods in Place:** N/A

**Data Source:** 1997 SAD Regional Biological Opinion (Table 2a)

**Other Remarks:** No information on this take.

### Other Turtle Takes:

Atchafalaya 5/12/96



US Army Corps  
of Engineers

# USACE Sea Turtle Data Warehouse

## Palm Beach Harbor - Jacksonville District

### Project Information

**Fiscal Year:** 1999

**Project Dates:** 3/17/99 - 3/29/99

**Project Description:** Dredging of Entrance Channel, settling basin, Cut-1 & Cut-2; Option A dredging of northern & southern turning basins.

**Maintenace / New Work:** Maintenance

**Federal / Regulatory:** Federal

**Total Project Cubic Yards:**  
64779

**Total Days of Dredging:** 13

**Total Hours of Dredging:** 113

**Type of Material:** Sand

**Disposal Method(s) for Material:** Beach disposal & scow (Midtown Beach Placement Area)

**Total Turtle Takes:** 0

### Predredge Trawling

**Predredge Trawling Company:** N/A

**Predredge Trawling?** No  
N/A

**Are Predredge Reports Available?** No

**Loggerheads:** 0

**Greens:** 0

**Kemp's Ridley:** 0

**Other:** 0

### Relocation Trawling

**Relocation Trawling?** No  
N/A

**Relocation Company:** N/A

**Loggerheads:** 0

**Greens:** 0

**Kemp's Ridley:** 0

**Other:** 0

**Total number turtles relocated:** 0

**Are Relocation Reports Available?** No

**Are Dredging Records Available?** Yes

**Are original turtle take data still available?**  
No

**Description of mitigation measures/dates used:** Deflectors (?)

**Other Remarks:** N/A

---

## Northerly Island Dredge

**Project:** Palm Beach Harbor

**Dredging Company:** Great Lakes Dredge & Dock Company

**Dates Dredge Worked:** 3/17/99-3/29/99

**Total cubic yards this dredge:**  
64779

**Total days this dredge worked:**  
13

**Total hours this dredge worked:** 113

**Draghead Type:** California

**Draghead Size:** N/A

**Number of Dragheads:** N/A

**Silent Inspector:** No

**Dredge Logs Available?** Yes

**Screening Type:** N/A

**Screening Coverage:** N/A

**Percent Observer Monitoring:**  
N/A

**Bycatch:** Unknown

**Other Remarks:** N/A

*Webdate: January 14, 2005*

[Close Window](#)



US Army Corps  
of Engineers

# USACE Sea Turtle Data Warehouse

## Palm Beach Harbor - Jacksonville District

### Project Information

**Fiscal Year:** 2000

**Project Dates:** 2/24/00 - 3/18/00

**Project Description:** Entrance channel dredging

**Maintenace / New Work:** Maintenance

**Federal / Regulatory:** Federal

**Total Project Cubic Yards:**  
167582

**Total Days of Dredging:** 21

**Total Hours of Dredging:** 222.4

**Type of Material:** Sand

**Disposal Method(s) for Material:** Beach  
disposal adjacent to south jetty

**Total Turtle Takes:** 1

### Predredge Trawling

**Predredge Trawling Company:** N/A

**Predredge Trawling?** No  
N/A

**Are Predredge Reports Available?** No

**Loggerheads:** 0

**Greens:** 0

**Kemp's Ridley:** 0

**Other:** 0

### Relocation Trawling

**Relocation Trawling?** No  
N/A

**Relocation Company:** N/A

**Loggerheads:** 0

**Greens:** 0

**Kemp's Ridley:** 0

**Other:** 0

**Total number turtles relocated:** 0

**Are Relocation Reports Available?** No

**Are Dredging Records Available?** Yes

**Are original turtle take data still available?**  
Yes

**Description of mitigation measures/dates used:** Deflectors

**Other Remarks:** N/A

---

## Northerly Island Dredge

**Project:** Palm Beach Harbor

**Dredging Company:** Great Lakes Dredge & Dock Company

**Dates Dredge Worked:** 2/24/00-3/18/00

**Total cubic yards this dredge:** 167582    **Total days this dredge worked:** 21    **Total hours this dredge worked:** 222.4

**Draghead Type:**                      **Draghead Size:** N/A                      **Number of Dragheads:** N/A

**Silent Inspector:** No

**Dredge Logs Available?** No

**Screening Type:** Inflow

**Screening Coverage:** 76-100

**Percent Observer Monitoring:** 100%

**Bycatch:** Of concern: horseshoe crabs (7); sea stars, cushion star, channelled whelk, queen helmet, conch, channelled whelk, pink shrimp, lady crab, calico crab, southern stingray, windowpane, Atlantic torpedo

**Other Remarks:** 55 loads total.

---

## Turtle Take Information:

**Take:** 03/01/00

**Dredge:** Northerly Island

**Observer Name:** Chad Leedy

**Observer Company:** Coastwise Consulting (?)

**Are observer reports available?** Yes

**Cubic yards:** N/A

**Days worked:** 7

**Hours worked:** N/A

**Species:** Loggerheads

**Age:** Juvenile

**Live / Dead:** Dead

**Genetic Samples?** No

**Photos Available?** No

**Dredge Load:** 36

**Load Time:** 0011-0259

**Time Recovered:** 0205

**Channel Location:** Lake Worth Inlet

**Latitude:** 26 46.18

**Longitude:** 80 02.15

**Water Surface Temp:** 23.3 °C

**Water Column Temp:** 23 °C

**Air Temp:** N/A

**Weather:** Partly cloudy/clear, tide 2.0 rising      **Bycatch associated with take:** Unknown  
**Location Part Recovered:** Port forward inflow  
**Description of Part Recovered:** 3 fragments (28/23/21 cm x 11/19.5/17.5 cm)  
**Head Width:** 0      **Plastron Length:** 0  
**Carapace S.L. Length:** 0 cm      **Carapace S.L. Width:** 0 cm  
**Carapace O.C. Length:** 0 cm      **Carapace O.C. Width:** 0 cm  
**Deflector in use?** Yes      **Condition of Screen/Deflector:** Good  
**Relocation Trawling?** No      **Windows?** No  
**Other Protection Methods in Place:** N/A  
**Data Source:** Observer report  
**Other Remarks:** Age from old data sheet, not on observer report.

---

*Webdate: January 14, 2005*

[Close Window](#)



US Army Corps  
of Engineers

# USACE Sea Turtle Data Warehouse

## Palm Beach Harbor - Jacksonville District

### Project Information

**Fiscal Year:** 2001

**Project Dates:** 12/11/00 - 1/11/01

**Project Description:** N/A

**Maintenance / New Work:** Maintenance

**Federal / Regulatory:** Federal

**Total Project Cubic Yards:**  
112446

**Total Days of Dredging:** 31

**Total Hours of Dredging:** 150

**Type of Material:** N/A

**Disposal Method(s) for Material:** Beach,  
nearshore, & ocean disposal

**Total Turtle Takes:** 0

### Predredge Trawling

**Predredge Trawling Company:** N/A

**Predredge Trawling?** No  
N/A

**Are Predredge Reports Available?** No

**Loggerheads:** 0

**Greens:** 0

**Kemp's Ridley:** 0

**Other:** 0

### Relocation Trawling

**Relocation Trawling?** Yes  
N/A

**Relocation Company:** Remsa (?)

**Loggerheads:** 0

**Greens:** 0

**Kemp's Ridley:** 0

**Other:** 0

**Total number turtles relocated:** 0

**Are Relocation Reports Available?** No

**Are Dredging Records Available?** Yes

**Are original turtle take data still available?**  
Yes

**Description of mitigation measures/dates used:** Deflectors, relocation trawling

**Other Remarks:** Old turtle bones sampled 12/20, 12/24, & 12/27

## Reports

- [Load Sheets](#)
  - [Other Related Reports](#)
- 

## Newport Dredge

**Project:** Palm Beach Harbor

**Dredging Company:** Manson Construction & Engineering

**Dates Dredge Worked:** 12/11/00-1/11/01

**Total cubic yards this dredge:** 112446      **Total days this dredge worked:** 31      **Total hours this dredge worked:** 150

**Draghead Type:** California

**Draghead Size:** N/A

**Number of Dragheads:** 2

**Silent Inspector:** No

**Dredge Logs Available?** Yes

**Screening Type:** Inflow

**Screening Coverage:** 76-100

**Percent Observer Monitoring:** 100% assumed

**Bycatch:** Cushion star only known bycatch

**Other Remarks:** Pumps shut down on 1/4/00 due to approaching manatees; turtle hypoplastron bone found on 12/20, rib bones and carapace fragment found on 12/24 and 12/27

*Webdate: January 14, 2005*

[Close Window](#)

## INCIDENT REPORT OF SEA TURTLE TAKE BY DREDGING ACTIVITY

Date 12/20/00 Time (24 hr) 0820  
 Species of Turtle Taken Unknown (possible loggerhead) Cc  
 Dredging Site (channel, port, etc.) Palm Beach Harbor, Ship Channel  
 Location of Take: Latitude 26°46.4' N Longitude 80°01.8' W  
 Vessel Name and Company Dredge Newport ~ Manson Construction Co.  
 Type of Dredging Activity Hopper ~ Maintenance Dredging  
 Load # 043 Times: Start 0609 End 0815 Dump 0830  
 Sampling Method (overflow, inflow, etc.) 4" x 4" inflow + overflow screens  
 Samples Recovered From Port discharge chute  
 Condition of Screening good ~ operational  
 Draghead Deflector? Yes  No   
 Condition of Deflector: good ~ operational  
 Weather Conditions: Cool Winds: NE 15-20 knots Tide strong ebb current  
 Water Temperature: Surface 72° F Column \_\_\_\_\_ °C or °F (circle one)  
 Condition of specimen(s) sampled hypo-plastron bone only  
\* No other parts/bones found

19

Measurements (metric if possible): 1' 21.5 cm Length ~~21.5~~ cm L  
 Give estimate of entire carapace dimensions, as well as fragments samples:

Head Width \_\_\_\_\_  
 Plastron Length N/A Width N/A  
 Carapace \*S.L. Length N/A S.L. Width N/A  
 Carapace \*\*O.C. Length \_\_\_\_\_ O.C. Width \_\_\_\_\_

Turtle Tagged? Yes \_\_\_\_\_ No \_\_\_\_\_ Tag# \_\_\_\_\_ Date 1/1

Comments: see pg. 2 for diagram  
~~no other parts found~~

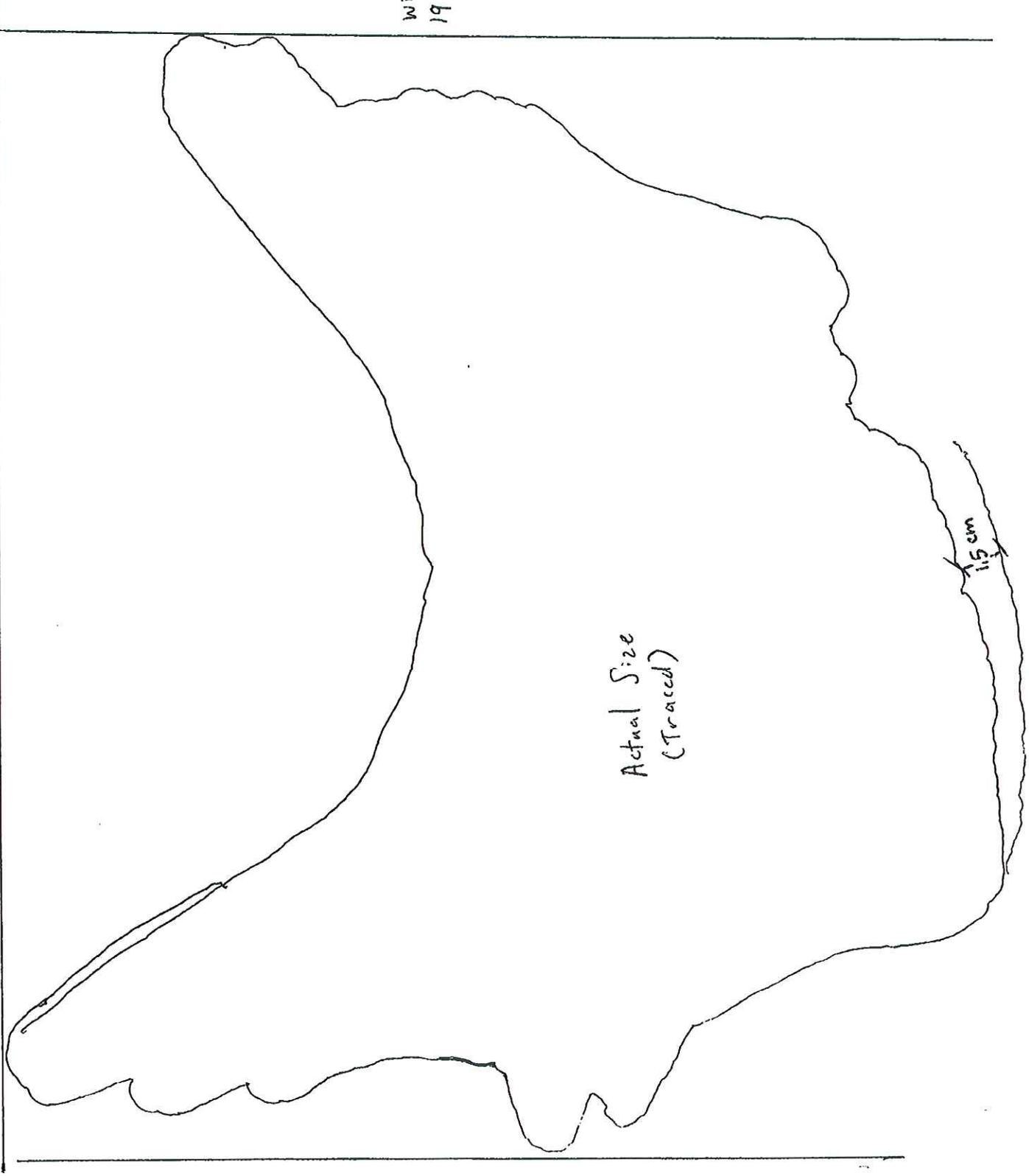
Observer's Name Irish Barger

\* S.L. = straight line

\*\*O.C. = overall curved

Length 21.5 cm

width  
19 cm



Actual Size  
(Traced)

1.5 cm

INCIDENT REPORT OF SEA TURTLE TAKE BY DREDGING ACTIVITY

Date 12/24/00 Time (24 hr) 0810

Species of Turtle Taken unknown

Dredging Site (channel, port, etc.) Palm Beach Harbor Ship Channel, FL

Location of Take: Latitude 26° 46.4' N Longitude 80° 01.8' W

Vessel Name and Company Dredge Newport ~ Manson Construction

Type of Dredging Activity Maintenance dredging - hopper

Load # 057 Times: Start 0525 End 0810 Dump 0820

Sampling Method (overflow, inflow, etc.) 4" x 4" screens inflow + overflow

Samples Recovered From Port inflow screen (discharge chute)

Condition of Screening Good ~ operational

Draghead Deflector? Yes  No

Condition of Deflector: Good ~ operational

Weather Conditions: NE 30-34 knots Tide 8-10 ft.

Water Temperature: Surface 74° Column \_\_\_\_\_ °C or °F (circle one)

Condition of specimen(s) sampled No tissue attached to bones

- one sea turtle rib bone
- one carapace fragment (bone)
- one marginal bone (possible pygal)

Measurements (metric if possible): \_\_\_\_\_

Give estimate of entire carapace dimensions, as well as fragments samples:

Head Width \_\_\_\_\_

Plastron Length \_\_\_\_\_

Carapace \*S.L. Length \_\_\_\_\_

Carapace \*\*O.C. Length \_\_\_\_\_

Width \_\_\_\_\_

S.L. Width \_\_\_\_\_

O.C. Width \_\_\_\_\_

Turtle Tagged? Yes  No  Tag# \_\_\_\_\_ Date \_\_\_/\_\_\_/\_\_\_

Comments: photos taken

Observer's Name Irish Bango

\* S.L. = straight line

\*\*O.C. = overall curved

INCIDENT REPORT OF SEA TURTLE TAKE BY DREDGING ACTIVITY

Date 12, 27, 00, Time (24 hr) 13:12

Species of Turtle Taken Unknown

Dredging Site (channel, port, etc.) Palm Beach Harbor Ship Channel, FL

Location of Take: Latitude 26° 46.4 N Longitude 80° 01.8 W

Vessel Name and Company Dredge Newport - Manson Construction

Type of Dredging Activity Maintenance dredging - hopper

Load # 001 002 Times: Start 0815 End 13:12 Dump 13:20

Sampling Method (overflow, inflow, etc.) 4x4' screens inflow + overflow

Samples Recovered From Port inflow screen (discharge chuted)

Condition of Screening Good ~ Operational

Draghead Deflector? Yes  No

Condition of Deflector: NE 30 knots good

Weather Conditions: ptly sunny NE 30 knots Tide 8 Ft

Water Temperature: Surface 74 Column \_\_\_\_\_ °C or °F (circle one)

Condition of specimen(s) sampled No tissue attached to bone

one sea turtle - ~~carapace~~ rib bone

Measurements (metric if possible): \_\_\_\_\_

Give estimate of entire carapace dimensions, as well as fragments samples:

Head Width \_\_\_\_\_

Plastron Length N/A

Width N/A

Carapace \*S.L. Length \_\_\_\_\_

S.L. Width N/A

Carapace \*\*O.C. Length \_\_\_\_\_

O.C. Width \_\_\_\_\_

Turtle Tagged? Yes \_\_\_\_\_ No \_\_\_\_\_ Tag# \_\_\_\_\_ Date 1/1

Comments: photos taken

Observer's Name Juan Saenz

\* S.L. = straight line

\*\*O.C. = overall curved



US Army Corps  
of Engineers

# USACE Sea Turtle Data Warehouse

## Palm Beach Harbor - Jacksonville District

### Project Information

**Fiscal Year:** 2002

**Project Dates:** 1/12/02 - 3/22/02

**Project Description:** Dredging of material from Entrance Channel, settling basin, Cut-1 & Cut-2. Construction dredging of scattered shoals in northern & southern turning basins.

**Maintenace / New Work:** Maintenance

**Federal / Regulatory:** Federal

**Total Project Cubic Yards:**  
179748

**Total Days of Dredging:** 91

**Total Hours of Dredging:** 423.4

**Type of Material:** N/A

**Disposal Method(s) for Material:** Disposal area adjacent to south jetty 3130 ft

**Total Turtle Takes:** 0

### Predredge Trawling

**Predredge Trawling Company:** N/A

**Predredge Trawling?** No  
N/A

**Are Predredge Reports Available?** No

**Loggerheads:** 0

**Greens:** 0

**Kemp's Ridley:** 0

**Other:** 0

### Relocation Trawling

**Relocation Trawling?** Yes  
N/A

**Relocation Company:** N/A

**Loggerheads:** 0

**Greens:** 0

**Kemp's Ridley:** 0

**Other:** 0

**Total number turtles relocated:** 0

**Are Relocation Reports Available?** No

**Are Dredging Records Available?** Yes

**Are original turtle take data still available?**  
No

**Description of mitigation measures/dates used:** Deflectors (?), trawling

**Other Remarks:** N/A

---

## Atchafalaya Dredge

**Project:** Palm Beach Harbor

**Dredging Company:** B & B Dredging Company    **Dates Dredge Worked:** 1/12/02-3/22/02

**Total cubic yards this dredge:** 179748    **Total days this dredge worked:** 91    **Total hours this dredge worked:** 423.4

**Draghead Type:** California    **Draghead Size:** N/A    **Number of Dragheads:** 1

**Silent Inspector:** No    **Dredge Logs Available?** Yes

**Screening Type:** N/A    **Screening Coverage:** N/A    **Percent Observer Monitoring:** N/A

**Bycatch:** Unknown

**Other Remarks:** N/A

*Webdate: January 14, 2005*

[Close Window](#)



US Army Corps  
of Engineers

# USACE Sea Turtle Data Warehouse

## Palm Beach Harbor - Jacksonville District

### Project Information

**Fiscal Year:** 2003

**Project Dates:** 4/7/03 - 4/23/03

**Project Description:** Annual dredging of entrance channel, settling basin, extended settling basin, cut-1, cut-2, and removal of anticipated shoaling.

**Maintenace / New Work:** Maintenance

**Federal / Regulatory:** Federal

**Total Project Cubic Yards:**  
116575

**Total Days of Dredging:** 16

**Total Hours of Dredging:** 0

**Type of Material:** Sand

**Disposal Method(s) for Material:** Beach disposal

**Total Turtle Takes:** 1

### Predredge Trawling

**Predredge Trawling Company:** N/A

**Predredge Trawling?** No  
N/A

**Are Predredge Reports Available?** No

**Loggerheads:** 0

**Greens:** 0

**Kemp's Ridley:** 0

**Other:** 0

### Relocation Trawling

**Relocation Trawling?** No  
N/A

**Relocation Company:** N/A

**Loggerheads:** 0

**Greens:** 0

**Kemp's Ridley:** 0

**Other:** 0

**Total number turtles relocated:** 0

**Are Relocation Reports Available?** No

**Are Dredging Records Available?** No

**Are original turtle take data still available?**  
Yes

**Description of mitigation measures/dates used:** Deflectors

**Other Remarks:** N/A

---

## Northerly Island Dredge

**Project:** Palm Beach Harbor

**Dredging Company:** Great Lakes Dredge & Dock Company

**Dates Dredge Worked:** 4/7/03-4/23/03

**Total cubic yards this dredge:** 116575  
**Total days this dredge worked:** 16  
**Total hours this dredge worked:** N/A

**Draghead Type:** California

**Draghead Size:** N/A

**Number of Dragheads:** N/A

**Silent Inspector:** No

**Dredge Logs Available?** No

**Screening Type:** Inflow

**Screening Coverage:** 76-100

**Percent Observer Monitoring:** 100% assumed

**Bycatch:** Unknown

**Other Remarks:** N/A

---

## Turtle Take Information:

**Take:** 04/08/03

**Dredge:** Northerly Island

**Observer Name:** N/A

**Observer Company:** Remsa

**Are observer reports available?** Yes

**Cubic yards:** N/A

**Days worked:** 1

**Hours worked:** N/A

**Species:** Loggerheads

**Age:** Unknown

**Live / Dead:** Dead

**Genetic Samples?** No

**Photos Available?** No

**Dredge Load:** 6

**Load Time:** 0135-0243

**Time Recovered:** 0243

**Channel Location:** Lake Worth Inlet

**Latitude:** 26 46.19

**Longitude:** 80 02.09

**Water Surface Temp:** 24.5 °C

**Water Column Temp:** N/A

**Air Temp:** 24 °C

**Weather:** Partly cloudy, slight breeze

**Bycatch associated with take:** Unknown

**Location Part Recovered:** Port draghead

**Description of Part Recovered:** 75% of carapace present but in pieces, 90% of plastron sampled, appendages intact, partial viscera, blood and pink tissues present.

**Head Width:** 17

**Plastron Length:** 68

**Carapace S.L. Length:** 0 cm

**Carapace S.L. Width:** 0 cm

**Carapace O.C. Length:** 86 cm

**Carapace O.C. Width:** 60 cm

**Deflector in use?** Yes

**Condition of Screen/Deflector:** Excellent

**Relocation Trawling?** No

**Windows?** No

**Other Protection Methods in Place:** N/A

**Data Source:** Observer report

**Other Remarks:** N/A

---

*Webdate: January 14, 2005*

**[Close Window](#)**



US Army Corps  
of Engineers

# USACE Sea Turtle Data Warehouse

## Palm Beach Harbor - Jacksonville District

### Project Information

**Fiscal Year:** 2004

**Project Dates:** 5/17/04 - 5/24/04

**Project Description:** Emergency dredging project; required depth of dredging was 35 ft below MLW with 2 ft allowable overdepth inside Entrance Channel.

**Maintenace / New Work:** Maintenance

**Federal / Regulatory:** Federal

**Total Project Cubic Yards:**  
41763

**Total Days of Dredging:** 8

**Total Hours of Dredging:** 90.7

**Type of Material:** N/A

**Disposal Method(s) for Material:** In Channel  
placement disposal area

**Total Turtle Takes:** 0

### Predredge Trawling

**Predredge Trawling Company:** N/A

**Predredge Trawling?** No  
N/A

**Are Predredge Reports Available?** No

**Loggerheads:** 0

**Greens:** 0

**Kemp's Ridley:** 0

**Other:** 0

### Relocation Trawling

**Relocation Trawling?** No  
N/A

**Relocation Company:** N/A

**Loggerheads:** 0

**Greens:** 0

**Kemp's Ridley:** 0

**Other:** 0

**Total number turtles relocated:** 0

**Are Relocation Reports Available?** No

**Are Dredging Records Available?** Yes

**Are original turtle take data still available?**  
No

**Description of mitigation measures/dates used:** Deflectors

**Other Remarks:** Surface water temperatures during this project ranged from 25.5° to 26.6°C.

---

## Atchafalaya Dredge

**Project:** Palm Beach Harbor

**Dredging Company:** B & B Construction  
Company

**Dates Dredge Worked:** 5/17/04-5/24/04

**Total cubic yards this dredge:** 41763  
**Total days this dredge worked:** 8  
**Total hours this dredge worked:** 90.7

**Draghead Type:** N/A

**Draghead Size:** N/A

**Number of Dragheads:** 1

**Silent Inspector:** Yes

**Dredge Logs Available?** Yes

**Screening Type:** Inflow

**Screening Coverage:** 76-100

**Percent Observer Monitoring:**  
100%

**Bycatch:** N/A

**Other Remarks:** Screening and percent observer coverage assumed.

*Webdate: January 14, 2005*

[Close Window](#)



US Army Corps  
of Engineers

# USACE Sea Turtle Data Warehouse

## Palm Beach Harbor - Jacksonville District

### Project Information

**Fiscal Year:** 2004

**Project Dates:** 9/22/04 - 10/14/04

**Project Description:** Palm Beach/Lake Worth Inlet Emergency Response after Hurricanes Frances and Jeanne. Required depth of dredging was 35 ft below MLW with 2 ft allowable overdepth inside Entrance Channel;

**Maintenace / New Work:** Maintenance

**Federal / Regulatory:** Federal

**Total Project Cubic Yards:**  
302007

**Total Days of Dredging:** 20

**Total Hours of Dredging:** 265

**Type of Material:** Sand

**Disposal Method(s) for Material:** 158,707 CY placed in former borrow area 3 miles NNE from center point of Mid-town Beach south of Palm Beach Harbor; 143,300 CY placed in nearshore disposal site

**Total Turtle Takes:** 1

### Predredge Trawling

**Predredge Trawling Company:** N/A

**Predredge Trawling?** No  
N/A

**Are Predredge Reports Available?** No

**Loggerheads:** 0

**Greens:** 0

**Kemp's Ridley:** 0

**Other:** 0

### Relocation Trawling

**Relocation Trawling?** No  
N/A

**Relocation Company:** N/A

**Loggerheads:** 0

**Greens:** 0

**Kemp's Ridley:** 0

**Other:** 0

**Total number turtles relocated:** 0**Are Relocation Reports Available?** No**Are Dredging Records Available?** Yes**Are original turtle take data still available?**  
Yes**Description of mitigation measures/dates used:** Deflectors**Other Remarks:** Surface water temperatures during project ranged from 27.7° to 28.3°C.

## Bayport Dredge

**Project:** Palm Beach Harbor**Dredging Company:** Manson Construction**Dates Dredge Worked:** 9/22/04-10/14/04**Total cubic yards this dredge:**  
302007**Total days this dredge worked:**  
20**Total hours this dredge worked:** 265**Draghead Type:** New style**Draghead Size:** 8'**Number of Dragheads:** 2**Silent Inspector:** Yes**Dredge Logs Available?** Yes**Screening Type:** Inflow**Screening Coverage:** 76-100**Percent Observer Monitoring:**  
100%**Bycatch:** N/A**Other Remarks:** N/A

## Turtle Take Information:

### Take: 10/08/04

**Dredge:** Bayport**Observer Name:** Eric Westerman**Observer Company:** Coastwise**Are observer reports available?** Yes**Cubic yards:** 224458**Days worked:** 17**Hours worked:** 179**Species:** Loggerheads**Age:** Sub Adult**Live / Dead:** Dead**Genetic Samples?** Yes**Photos Available?** No**Dredge Load:** 127**Load Time:** 0851-1206**Time Recovered:** 1208**Channel Location:** North side of channel, red side between buoys 2-4 next to pumpout station

**Latitude:** 26 96.370**Longitude:** 80 01.793**Water Surface Temp:** 27.2 °C **Water Column Temp:** 26 °C **Air Temp:** 29 °C**Weather:** BSS 4, partly cloudy, winds E-NE 15 knots, seas 2-4'**Bycatch associated with take:** Grass, sponge, speckled crab**Location Part Recovered:** Starboard draghead**Description of Part Recovered:** 43 cm x 28 cm posterior section of cracked carapace recovered**Head Width:** 0**Plastron Length:** 0**Carapace S.L. Length:** 0 cm**Carapace S.L. Width:** 0 cm**Carapace O.C. Length:** 0 cm**Carapace O.C. Width:** 0 cm**Deflector in use?** Yes**Condition of Screen/Deflector:** Good**Relocation Trawling?** No**Windows?** No**Other Protection Methods in Place:** N/A**Data Source:** Incident Report**Other Remarks:** Water bottom temperature 26.1 C. Portion of turtle fell off draghead as it was coming out of water

---

*Webdate: January 14, 2005*

**[Close Window](#)**



US Army Corps  
of Engineers

# USACE Sea Turtle Data Warehouse

## Palm Beach Harbor - Jacksonville District

### Project Information

**Fiscal Year:** 2005

**Project Dates:** 4/20/05 - 6/1/05

**Project Description:** N/A

**Maintenace / New Work:** Maintenance

**Federal / Regulatory:** Federal

**Total Project Cubic Yards:** 0    **Total Days of Dredging:** 0    **Total Hours of Dredging:** 0

**Type of Material:** Sand

**Disposal Method(s) for Material:** Pump out

**Total Turtle Takes:** 2

### Predredge Trawling

**Predredge Trawling Company:** N/A

**Predredge Trawling?** No  
N/A

**Are Predredge Reports Available?** No

**Loggerheads:** 0

**Greens:** 0

**Kemp's Ridley:** 0

**Other:** 0

### Relocation Trawling

**Relocation Trawling?** No  
N/A

**Relocation Company:** N/A

**Loggerheads:** 0

**Greens:** 0

**Kemp's Ridley:** 0

**Other:** 0

**Total number turtles relocated:** 0

**Are Relocation Reports Available?** No

**Are Dredging Records Available?** No

**Are original turtle take data still available?**  
Yes

**Description of mitigation measures/dates used:** Deflectors

**Other Remarks:** Dates estimated

## Atchafalaya Dredge

**Project:** Palm Beach Harbor

**Dredging Company:** B & B Dredging

**Dates Dredge Worked:** 4/20/05-6/1/05

**Total cubic yards this dredge:** N/A      **Total days this dredge worked:** N/A      **Total hours this dredge worked:** N/A

**Draghead Type:** IHC

**Draghead Size:** 5'

**Number of Dragheads:** 1

**Silent Inspector:** Yes

**Dredge Logs Available?**

**Screening Type:** Inflow

**Screening Coverage:** 76-100

**Percent Observer Monitoring:**  
100%

**Bycatch:** N/A

**Other Remarks:** Dragarm had to cut sideways due to difficulty dredging north side of shoal. Dates estimated.

## Turtle Take Information:

**Take:** 04/26/05

**Dredge:** Atchafalaya

**Observer Name:** Brad Davis, Erik Rolly

**Observer Company:** REMSA

**Are observer reports available?** Yes

**Cubic yards:** N/A

**Days worked:** N/A

**Hours worked:** N/A

**Species:** Loggerheads

**Age:** Unknown

**Live / Dead:** Dead

**Genetic Samples?** No

**Photos Available?** No

**Dredge Load:** 21

**Load Time:** 1600-1855

**Time Recovered:** 1810

**Channel Location:** Lake Worth Inlet buoy #7-#9-#4

**Latitude:** 26 46.27

**Longitude:** 80 7.13

**Water Surface Temp:** 23.3 °C      **Water Column Temp:** N/A      **Air Temp:** 26 °C

**Weather:** BSS 3-4, seas 2-3 ft, SE 25 knots

**Bycatch associated with take:** N/A

**Location Part Recovered:** Port side lander

**Description of Part Recovered:** Portion of carapace with light barnacle and algae growth recovered;

10 samples of tube-like entrail tissue also recovered with 2 samples packed with sand

**Head Width:** 0

**Plastron Length:** 0

**Carapace S.L. Length:** 0 cm

**Carapace S.L. Width:** 0 cm

**Carapace O.C. Length:** 0 cm

**Carapace O.C. Width:** 0 cm

**Deflector in use?** Yes

**Condition of Screen/Deflector:** Good

**Relocation Trawling?** No

**Windows?** No

**Other Protection Methods in Place:** N/A

**Data Source:** Incident Report

**Other Remarks:** Dragarm had to cut sideways due to difficulty dredging north side of shoal.

---

*Webdate: January 14, 2005*

**Close Window**

# SEA TURTLE STRANDING AND SALVAGE NETWORK - STRANDING REPORT

PLEASE PRINT CLEARLY AND FILL IN ALL APPLICABLE BLANKS. Use codes below. Measurements may be straight line (caliper) and/or over the curve (tape measure). Measure length from the center of the nuchal notch to the tip of the most posterior marginal. Measure width at the widest point of carapace. **CIRCLE THE UNITS USED.** See diagram below. Please give a specific location description. **INCLUDE LATITUDE AND LONGITUDE.**

Observer's Full Name PATRICK T. RICHARDS Stranding Date 96-04-28  
year month day

Address / Affiliation DEP. JOHN D. MACARTHUR BEACH STATE PARK

Area Code / Phone Number 407(624-6950)

Species GREEN (CM) JUVENILE Turtle Number By Day 1

Reliability of I.D.: (CIRCLE) Unsure Probable Positive Species Verified by State Coordinator? Yes  No

Sex: (CIRCLE) Female Male Undetermined How was sex determined? N/A

State FLORIDA (FA) County PALM BEACH (10) Region = 5  
 Zone = 26

Location (be specific and include closest town) RIVIERA MUNICIPAL BEACH (OCEAN MALL)

Latitude 26° 46' 55" 9' N Longitude 80° 02' 05" 1' W

Condition of Turtle (use codes) 2 Final Disposition of Turtle (use codes) 2

Tag Number(s) (include tag return address and disposition of tag) NONE

Remarks (note if turtle was involved with tar or oil, gear or debris entanglement, wounds or mutilations, propellor damage, papillomas, epizoa, etc.) continue on back if necessary notes: 53.71, 88

WOUNDS ARE SEVERE ENOUGH TO KILL TURTLE. CAUSE OF DEATH IS EITHER THOUGHT TO BE BOAT PROPELLER OR SHARK BITE.  
Turtle first observed 4-28-96

**MEASUREMENTS: CIRCLE UNITS**

Straight Length 12 1/2 31.8 cm cm/ID

Straight Width 10" 25.4 cm cm/ID

Curved Length 13" 30.02 cm cm/ID 33.02

Curved Width 12" 30.5 cm cm/ID

Mark wounds, abnormalities, and tag locations

FDEP Entered # 493

- CODES:** 3.1
- SPECIES:**
- CC = Loggerhead
  - CA = Green
  - LC = Leatherback
  - EI = Hawksbill
  - LK = Kemp's ridley
  - UN = Unidentified
- CONDITION OF TURTLE:**
- 0 = Alive
  - 1 = Fresh dead
  - 2 = Moderately decomposed
  - 3 = Severely decomposed
  - 4 = Dried carcass
  - 5 = Skeleton, bones only
- FINAL DISPOSITION OF TURTLE:**
- 1 = Painted, left on beach
  - 2 = Buried: on beach off beach
  - 3 = Salvaged specimen: all / part
  - 4 = Pulled up on beach or dune
  - 5 = Unpainted, left on beach
  - 6 = Alive, released
  - 7 = Alive, taken to a holding facility

**OBSERVER'S NAME / ADDRESS / PHONE:**  
 First REUBIN M.I. J Last Bishop <sup>(RJB)</sup>  
 Affiliation Palm Beach County ERM  
 Address 3323 Belvedere Rd Bldg 502  
West Palm Beach FL 33406  
 Area code/Phone number (561) 233-2441

**STRANDING DATE:** <sup>LATE MICE</sup>  
 Year 2002 Month 01 Day 18  
 Turtle number by day 01  
 State coordinator must be notified within 24 hrs;  
 this was done by  phone (561)575-5407  
 email  fax (561)743-6228  
 FWC Turtle Pager 1-800-241-4653 ID#274-4867

**SPECIES: (check one)**  
 CC = Loggerhead  
 CM = Green  
 DC = Leatherback  
 EI = Hawksbill  
 LK = Kemp's ridley  
 UN = Unidentified  
**Check Unidentified if not positive. Do Not Guess.**  
 Photos taken?  Yes  No  
 Species verified by state coordinator?  Yes  No

**STRANDING LOCATION:**  Offshore (Atlantic or Gulf beach)  Inshore (bay, river, sound, inlet, etc)  
 State Florida (FA) County Palm Beach (10)  
 Descriptive location (be specific) Found floating in the mouth of the Lake worth Inlet.  
 Latitude \_\_\_\_\_ Longitude \_\_\_\_\_

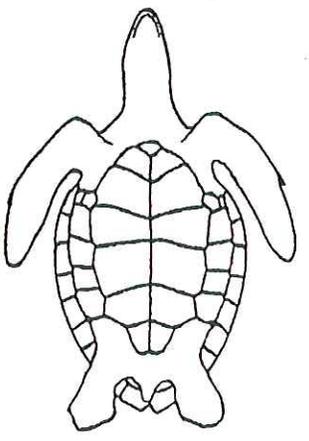
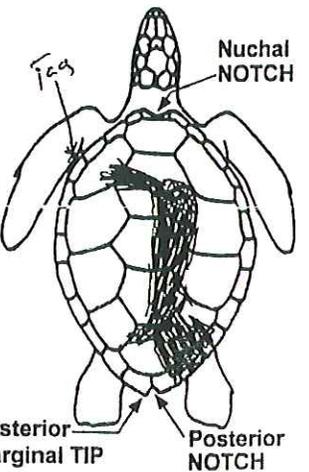
**CONDITION: (check one)**  
 0 = Alive  
 1 = Fresh dead  
 2 = Moderately decomposed  
 3 = Severely decomposed  
 4 = Dried carcass  
 5 = Skeleton, bones only

**FINAL DISPOSITION: (check one)**  
 1 = Left on beach where found; painted?  Yes\*  No(5)  
 2 = Buried:  on beach /  off beach; carcass painted before buried?  Yes\*  No  
 3 = Salvaged:  all /  part(s), what/why?  
Buried on Peanut Island  
 4 = Pulled up on beach/dune; painted?  Yes\*  No  
 6 = Alive, released  
 7 = Alive, taken to rehab. facility, where? \_\_\_\_\_  
 8 = Left floating, not recovered; painted?  Yes\*  No  
 9 = Disposition unknown, explain \_\_\_\_\_  
 \*If painted, what color? Orange

**SEX: (check one)**  
 Immature, undetermined  
 Female  Male  
 How was sex determined?  
 Necropsy  
 Tail length (adult only)  
 Length of tail beyond carapace \_\_\_\_\_ cm / in

**TAGS: Contact state coordinator before disposing of any tagged animal!**  
 Flipper tags present?  Yes  No  
**Check all 4 flippers.** If found, record tag number(s) / tag location / return address  
XXD 216  
NMFS Virginia Key field laboratory  
 PIT tag scan?  Yes  No  
 If found, record number / tag location \_\_\_\_\_  
 Coded wire tag scan?  Yes  No  
 If positive response, record location (flipper) \_\_\_\_\_  
 Checked for living tag?  Yes  No  
 If found, record location (scute number & side) \_\_\_\_\_

**CARAPACE MEASUREMENTS: (see drawing)**  
**Using calipers** Circle unit  
 Straight length (NOTCH-TIP) \_\_\_\_\_ cm / in  
 Minimum length (NOTCH-NOTCH) \_\_\_\_\_ cm / in  
 Straight width (Widest Point) \_\_\_\_\_ cm / in  
**Using non-metal measuring tape** Circle unit  
 Curved length (NOTCH-TIP) 20.5 cm <sup>52.</sup>  
 Minimum length (NOTCH-NOTCH) \_\_\_\_\_ cm / in  
 Curved width (Widest Point) 15 cm <sup>38-</sup>  
 Circle unit  
 Weight  actual /  est. \_\_\_\_\_ kg / lb



Mark wounds / abnormalities on diagrams at left and describe below (note tar or oil, gear or debris entanglement, propeller damage, epibiota, papillomas, emaciation, etc.). Please note if no wounds / abnormalities are found. Notes: 88, AA  
Entire Carapace was Cracked. Some was missing. No internal organs present. Looked like Boat impact.  
Hopper dredge working in inlet but extent of decomposition makes it unlikely that dredge caused impacts.  
\* caught @ St Lucie PP on 3/2/99 - originally tagged \*

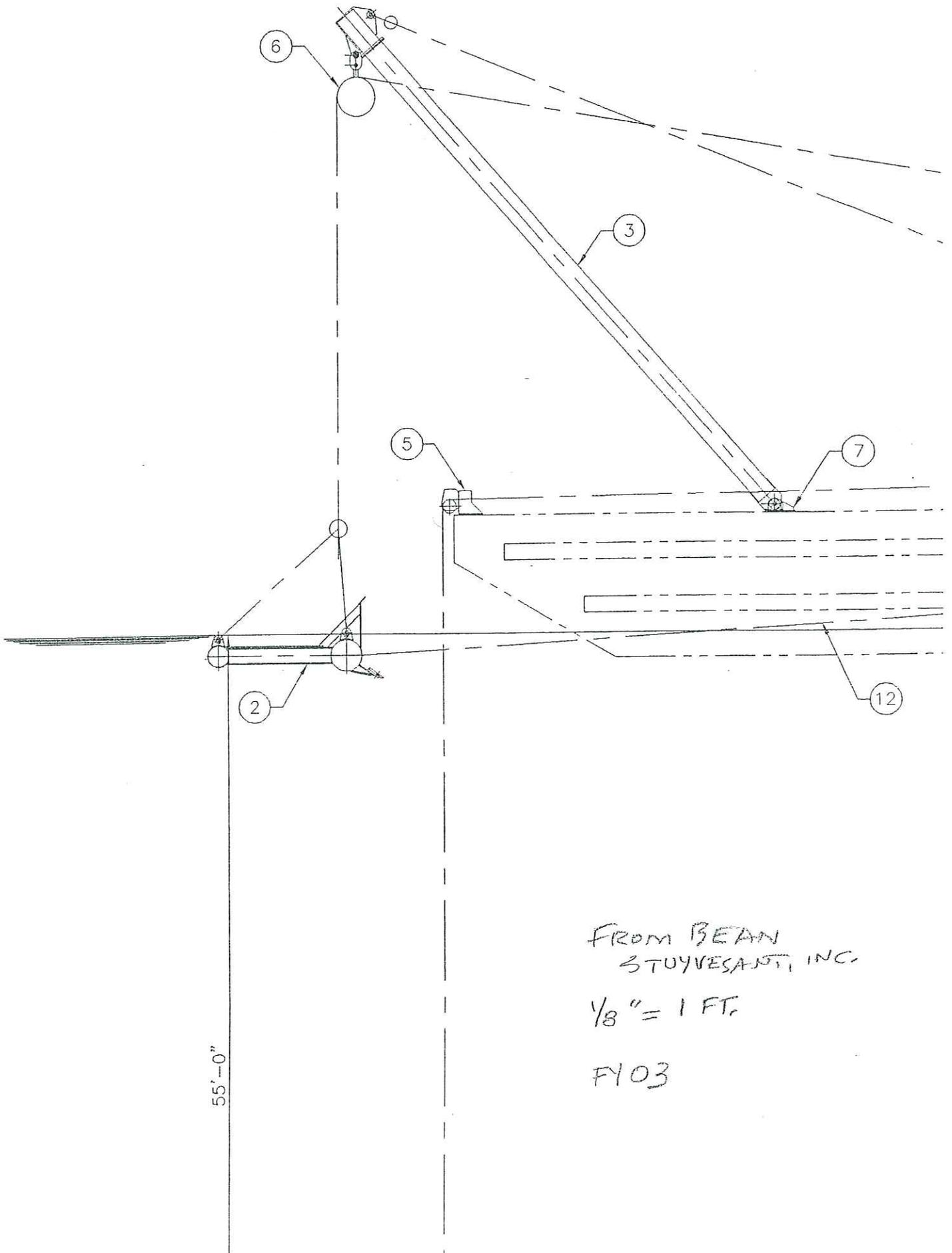
## **APPENDIX D: USACE ERDC SURVEY QUESTIONNAIRE**

### **Industry Query**

- (a) Where has a bed-leveler been used by your company in the past in U.S. waters?
- (b) Why was the bed-leveler used?
- (c) Please describe the bed-levelers used by your company?
- (d) Are photos available of the devices?
- (e) What are the dimensions and weights of these devices?
- (f) What kind of vessel is used to deploy these devices?
- (g) How much horsepower is typically required to deploy these devices?
- (h) In what current and wave conditions have you operated these devices?
- (i) What vessel speeds are typical for towing or pushing the bed-leveler barge?
- (j) What kind of material (sand, clay, etc.) is usually leveled?
- (k) How much vertical leveling is typically achieved per pass of the bed-leveler?
- (l) How many passes are typically required to achieve desired grade?
- (m) Does your company use these devices in association with any dredging equipment other than hopper dredges?

### **District Query**

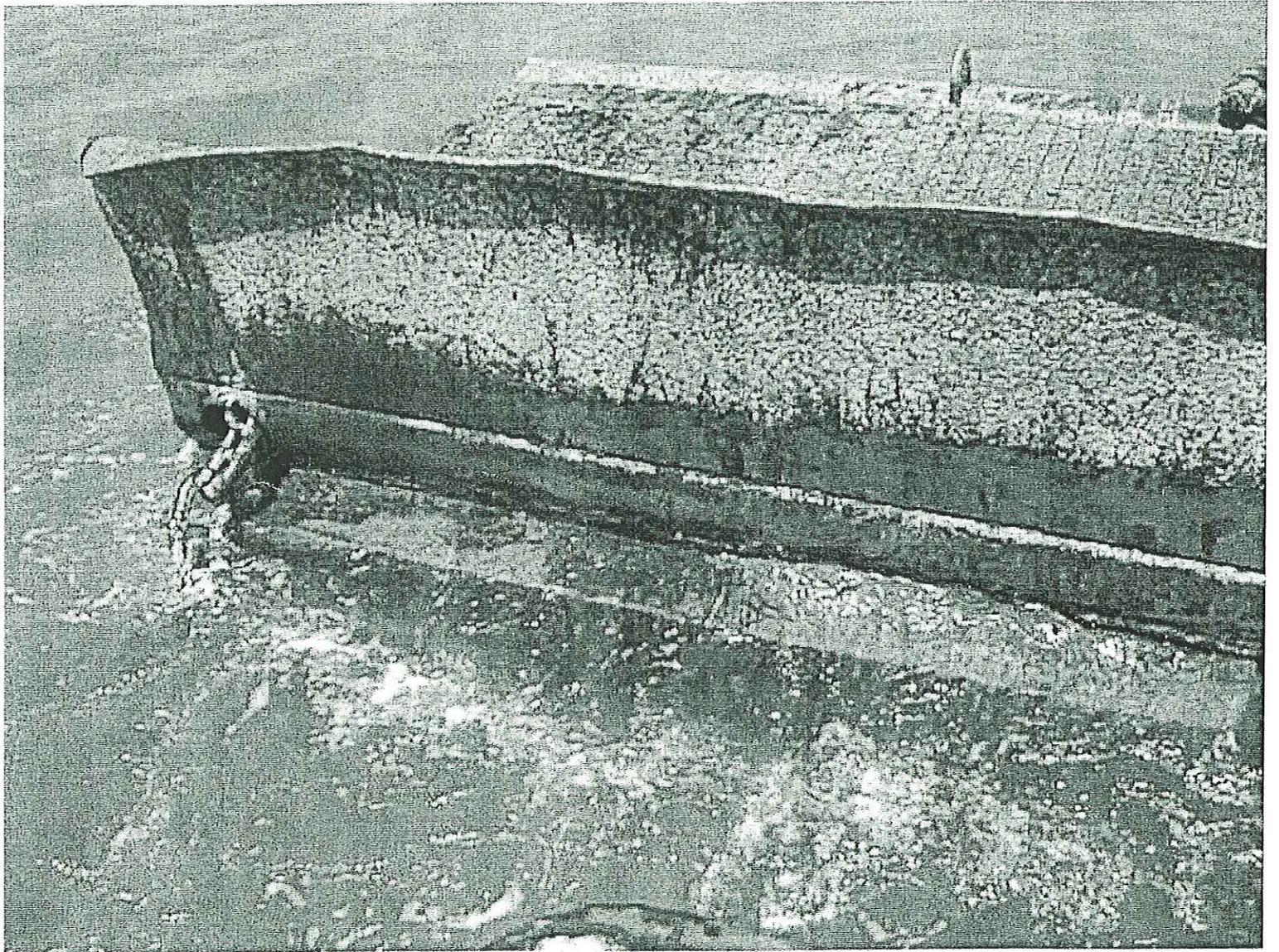
- (a) What locations along the project were bed-levelers used (entrance channel, inlet, interior channel, harbor, etc.)?
- (b) When (date) were bed-leveler operations first used at this project location?
- (c) When (date) were bed-leveler operations last used at this project location?
- (d) Was this new work, maintenance dredging, or some combination (please specify)?
- (e) What kind of material was being dredged (consolidated material, sand, silt, mud, shell, or some combination) (please specify)?
- (f) What type of dredge was used (hopper, pipeline, dustpan, clamshell, bucket, etc.)?
- (g) What is the frequency of bed-leveler usage at this project location?
- (h) Are bed-levelers typically used during each dredging event at this project location?
- (i) What was the estimated volume of material leveled at this project location (cu yd)?
- (j) What was the linear extent of bed-leveler usage at this project location (ft)?
- (k) What type of bed-leveler was used at this project location (blade, box beam, etc.)?
- (l) Does this District's dredging contracts contain any language regarding use of bed-levelers at this project location?
- (m) Were any environmental concerns identified during bed-leveling at this project location?
- (n) Who was the contractor, and what was the contract number during this dredging event at this dredging location?
- (o) Other comments?



FROM BEAN  
STUYVESANT, INC.

$\frac{1}{8}'' = 1 \text{ FT.}$

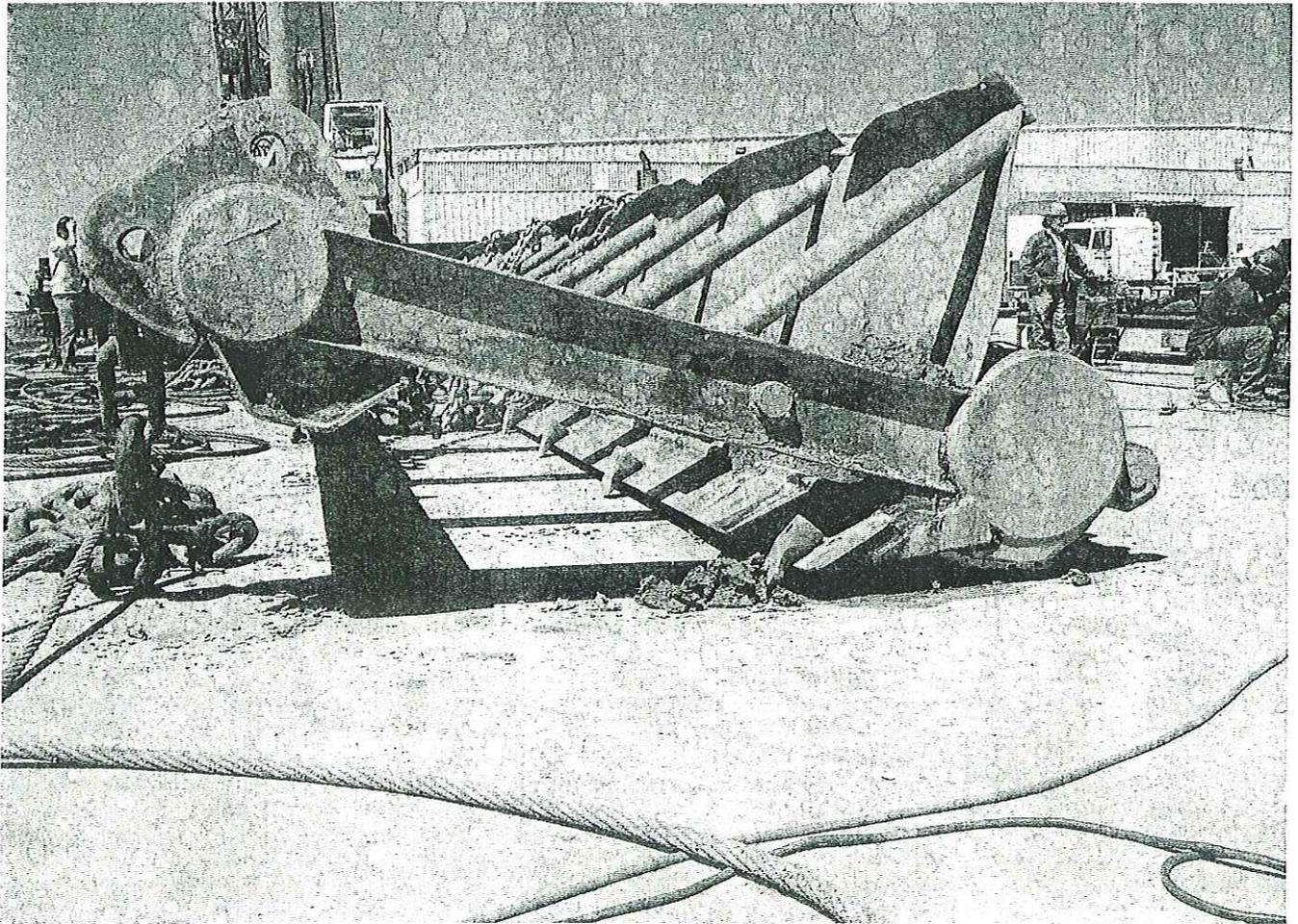
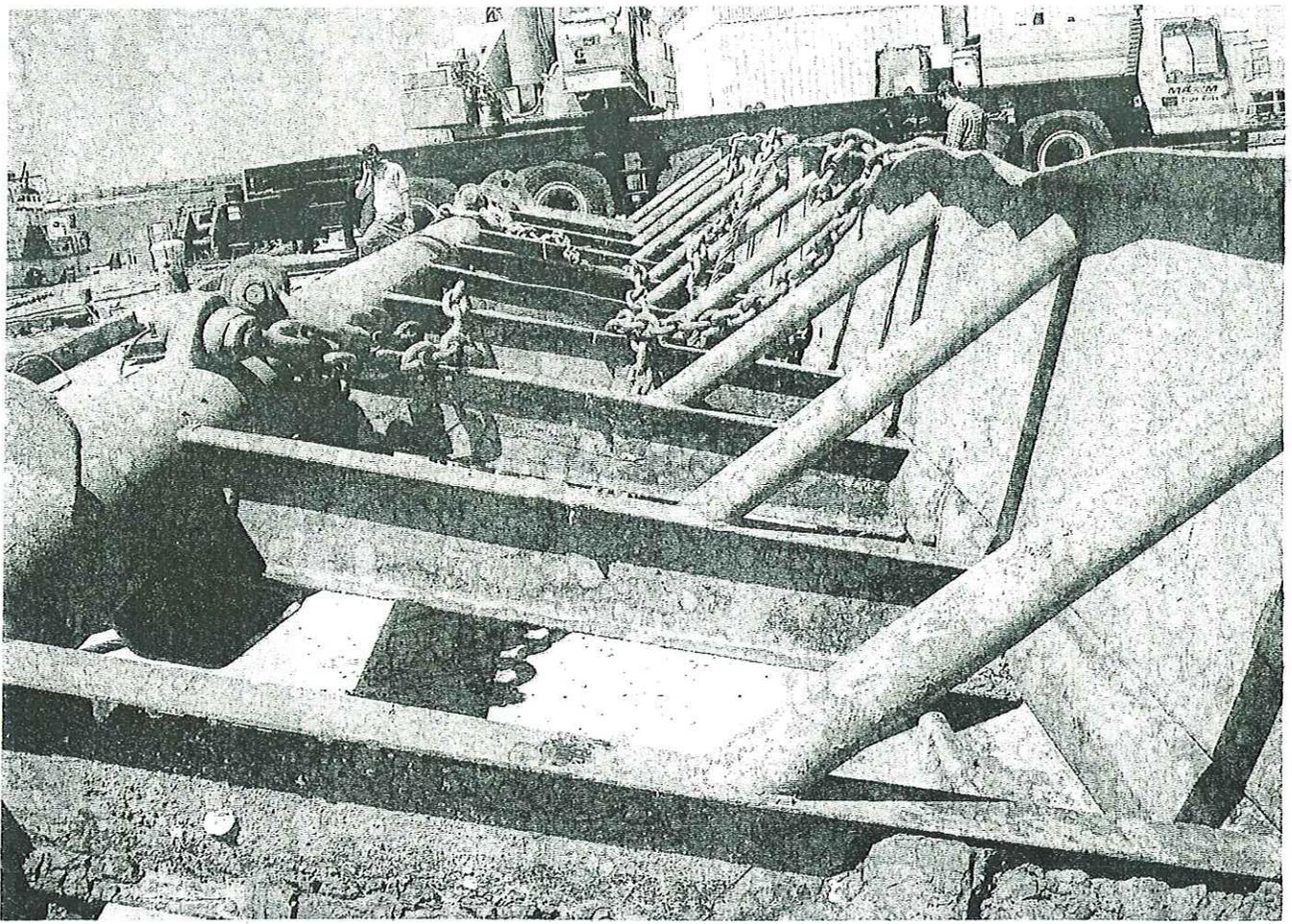
F103



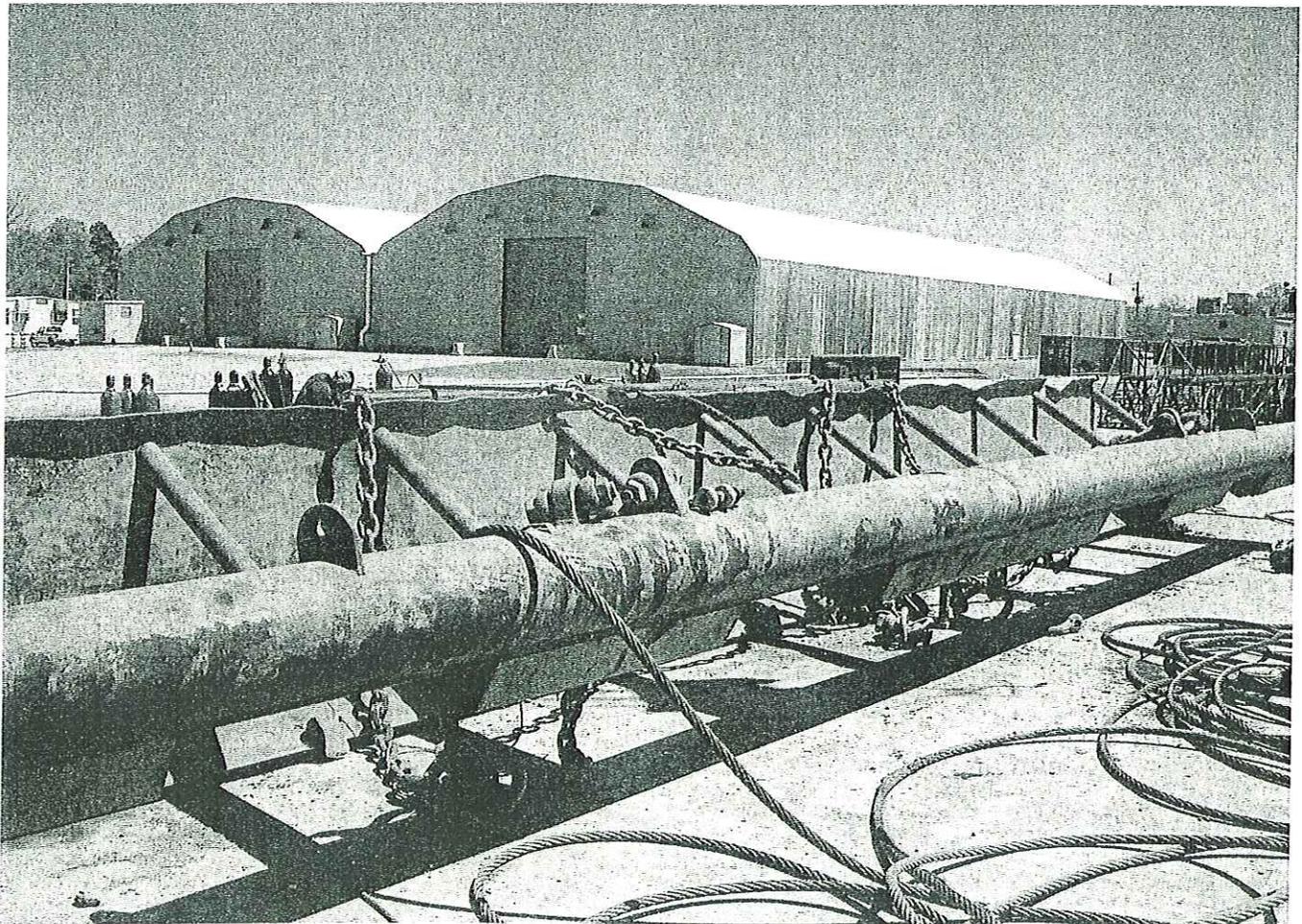
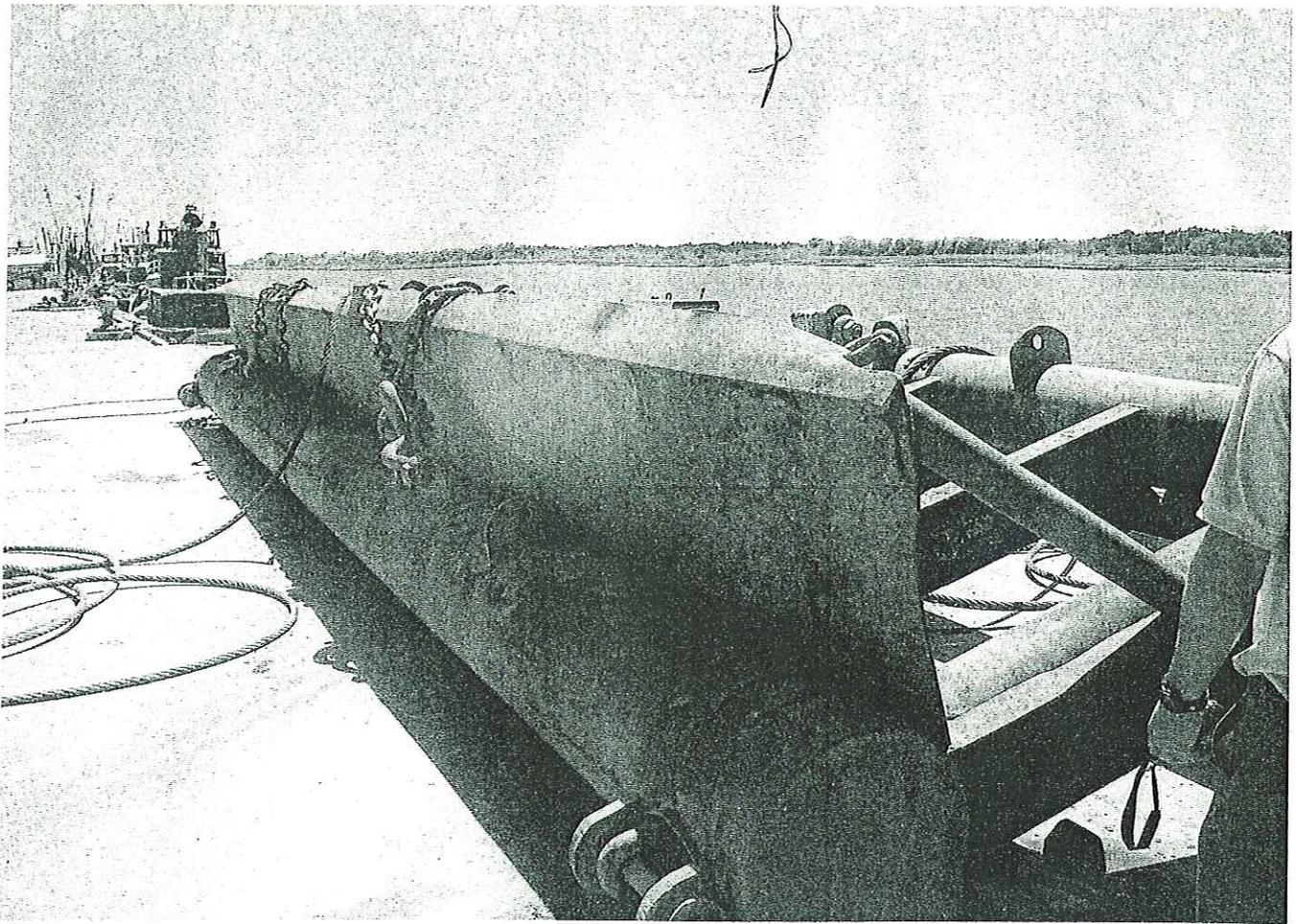
FY03



FY04



FY04



FY04

## APPENDIX F: JACKSONVILLE DISTRICT CONTRACT LANGUAGE

The Jacksonville District will include the following bed leveler specification language in future dredging contracts.

### 3.7 FINAL EXAMINATION AND ACCEPTANCE

#### 3.7.1 Final Examination of Work

As soon as practicable and no later than three (3) weeks after the completion of the entire work or any section thereof (if the work is divided into sections) as in the opinion of the Contracting Officer will not be subject to damage by further operations under the contract, such work will be thoroughly examined at the cost and expense of the Government by sounding or by sweeping, or both, as determined by the Contracting Officer. Should any shoals, lumps, or other lack of contract depth be disclosed by this examination, the Contractor will be required to remove same by dragging the bottom in accordance with the subparagraph Bed Leveling below or by dredging at the contract rate of dredging. The Contractor or his authorized representative will be notified when soundings and/or sweepings are to be made and will be permitted to accompany the survey party. When the area is found to be in a satisfactory condition, it will be accepted finally. Should more than two sounding or sweeping operations by the Government over an area be necessary by reason of work for the removal of shoals disclosed at a prior sounding or sweeping, the cost of such third and any subsequent soundings or sweeping operations will be charged against the Contractor at the rate of \$5,500 per day for each day in which the Government plant is engaged in sounding or sweeping and/or is enroute to or from the site or held at or near the said site for such operation.

#### 3.7.2 Bed Leveling

Bed leveling by dragging the bottom with a drag bar or other apparatus shall be allowed only in the designated dredging areas shown on the drawings. Dragging in areas outside of the designated dredging areas shown on the drawings is specifically prohibited without written approval of the Contracting Officer.

#### 3.7.3 Bed Leveling—Reporting and Documenting

The contractor shall fully document all bed leveling activity, including date and time for initiation and completion of bed leveling. All bed leveling activity shall be documented on the Contractor's Quality Control Report (QCR).

#### 3.7.4 Shop Drawings

**The contractor shall submit shop drawings and one photograph showing drag bar equipment used for final bed leveling work indicated in subparagraph 3.7.1 Final Examination of Work above.**