

INTRODUCTION

1. In April 1991 the Ponce DeLeon Inlet Port Authority working through the House Public Works and Transportation Committee requested the Corps study the feasibility of improving navigation in Ponce DeLeon Inlet. Local interests believe the existing navigation project could be improved for operational efficiency and safety of charter, commercial fishing, as well as recreational boats, by providing a more stable inlet. Such stabilization could also reduce existing maintenance costs for the current project. A reconnaissance study and report completed in January 1993 indicated sufficient justification for investigations to continue in more detail assessing project feasibility. Funding to initiate the study was received in April 1994. Additional funding enabled completion of the feasibility study with the results provided in this report.

STUDY AUTHORITY

2. A resolution from the Committee on Public Works and Transportation, United States House of Representatives, dated May 21, 1991, provides the study authority as follows:

Resolved by the Committee on Public Works and Transportation of the United States House of Representatives, That the Board of Engineers for Rivers and Harbors, is requested to review the report of the Chief of Engineers on Ponce DeLeon Inlet, Florida published as House Document 74, Eighty-ninth Congress, First Session, and other pertinent reports, to determine whether modifications of the recommendations contained therein are advisable at the present time, in the interest of navigation and other purposes.

3. Approval of the reconnaissance report in December 1993 and receipt of funds in April 1994 enabled the continuation of the study process to determine the feasibility of a Federal navigation improvement for that area.

STUDY PURPOSE AND SCOPE

4. The study involved an evaluation of stability, maintenance, and related navigation problems in the Ponce DeLeon Inlet area. Specifically, the study reviewed the needs of the Port Authority, charter boat operators, commercial fishermen, and concerns of the United States Coast Guard (U.S.C.G) and general recreational boaters. Overall environmental, social, and economic concerns were evaluated in the study area and identified to the extent possible within the limits of available technology and study funding restrictions.

5. Alternative solutions for satisfying inlet stability needs in the study area were identified for evaluation of costs, benefits, and environmental impacts associated with

implementation. Base data for that evaluation came from existing survey and maintenance work records of the inlet channels and jetties as well as information from the sponsor, charter boat operators, commercial fishermen, U.S.C.G., Federal and State agencies. Field work provided core borings, hydrographic surveys, shoreline surveys, and aerial photography along with tidal data and velocity profile data in support of numerical and physical modeling work.

6. Economic investigations provided tangible navigation and maintenance reduction benefits. An environmental assessment included U.S. Fish and Wildlife Service Coordination, cultural resource investigations as well as aesthetic and recreational resource investigations. The study resulted in the formulation of a plan that appears to safely, effectively, and economically resolve the inlet stability problems with a minimum impact on the environment.

PRIOR STUDIES AND REPORTS

7. Federal interest in navigation at Ponce DeLeon Inlet started as early as 1884. Interest in improving the stability of Ponce DeLeon Inlet continued through World War II to the present. Table 1 contains the prior studies and reports on Ponce DeLeon Inlet (known as Mosquito Inlet prior to 1931, figure 1).

8. Another study currently in progress involves a special research program. The U.S. Army Engineer Waterways Experiment Station, Coastal Engineering Research Center's, Coastal Inlets Research Program (CIRP) selected Ponce DeLeon Inlet for intensive study in support of the research and development needs of CIRP. The inlet was selected from a nation wide list. The purpose of the study is to improve the fundamental knowledge of inlet systems so that Federal water resources studies, construction and operation practices and procedures can be improved. The data gathering portion of that study began in April 1995.

ATLANTIC OCEAN

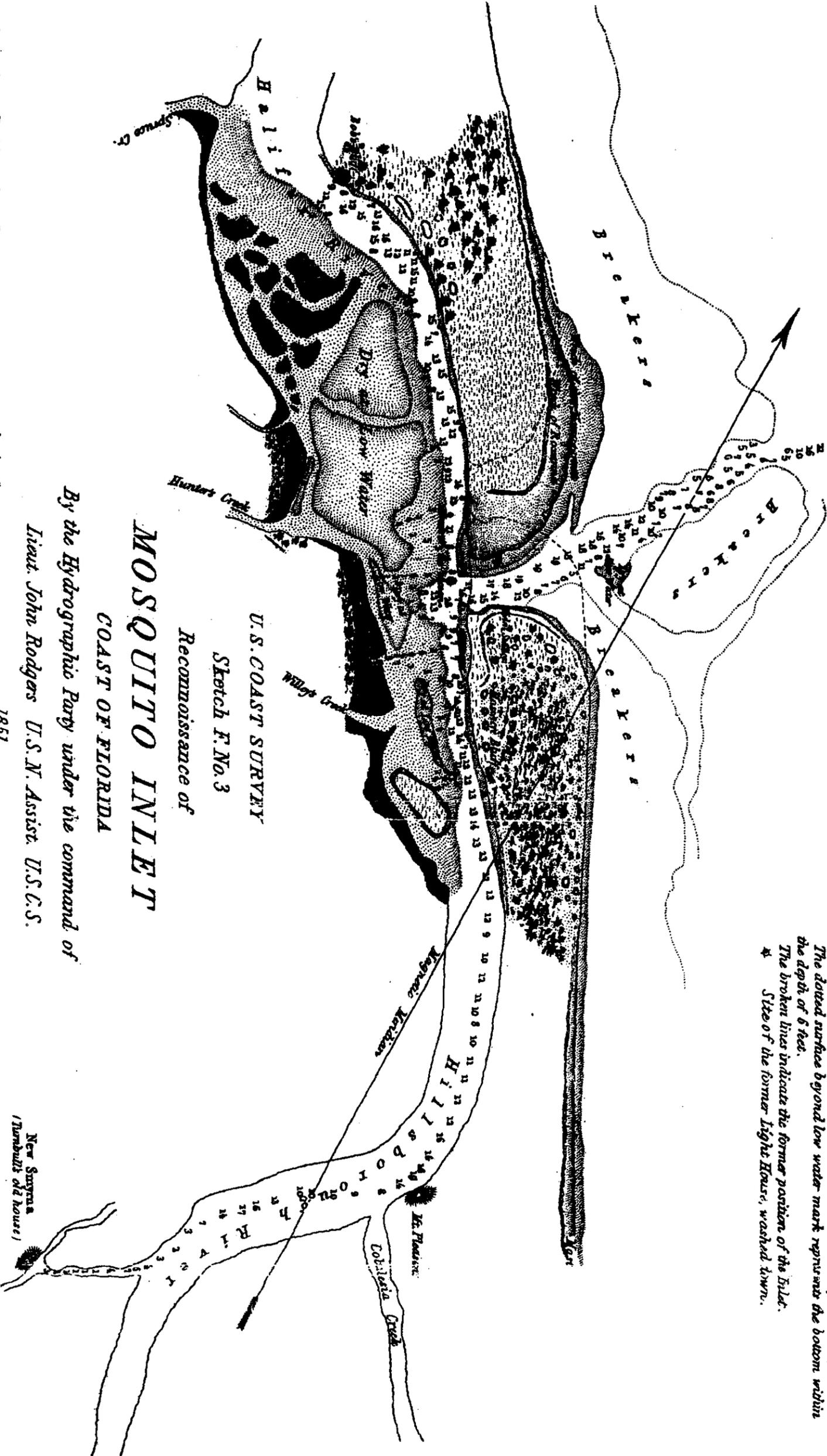
NOTES

The bar at the entrance of Mosquito Inlet is said to shift with every gale, no leading marks or courses can be given for crossing it. According to local information the depth has varied from 15 feet at high water to 8 feet. At the time of this reconnaissance June 23rd to June 17th, 1851 there was a depth on the bar of 8 feet. Also, vessels run in between the breakers, judging by the marks the more water is to be found.

The soundings are expressed in feet, and show the depth at mean low water. The dotted surface beyond low water mark represents the bottom within the depth of 8 feet.

The broken lines indicate the former position of the Inlet.

* Site of the former Light House, washed down.



U.S. COAST SURVEY Sketch F. No. 3 Reconnaissance of MOSQUITO INLET COAST OF FLORIDA

By the Hydrographic Party under the command of
Lieut. John Rodgers U.S.N. Assist. U.S.C.S.
1851

Approximate Position of Bar. Latitude..... 28° 59' 20"
do..... Longitude W. from Greenwich 80° 50' 30"
Time of High Water at full and change..... 7^h 45^m
Observed Rise of Tides (by 3 observations)..... 3^{ft}. 5ⁱⁿ.

A.D. BACHE Sup't.
Scale 40 000

FIGURE 1 (MOSQUITO INLET SURVEY 1851)

Table 1

Prior Studies and Reports

		CHIEF OF ENGINEERS RECOMMENDATIONS	PUBLISHED DOCUMENTS				
TYPE OF STUDY ¹	REPORT DATE		CONGRESSIONAL DOCUMENTS				OTHER
			TYPE ²	NO.	CONGRESS	SESSION	
PE	11/03/1884	Favorable					3
S	01/31/1885	Unfavorable					3
PE	06/03/1909	Unfavorable	H	362	61	2	
PE	04/30/1913	Unfavorable	H	219	63	1	
PE	06/30/1927	Unfavorable					4
PE	02/14/1931	Unfavorable					4
PE	07/09/1935	Unfavorable					4
S	02/14/1955	Unfavorable					4
S	06/19/1964	Favorable	H	74	89	1	
UF	09/1973	N/A					5
UF	07/1977	N/A					6
T	02/1992	N/A					7
R	12/1993	Favorable					

1 Abbreviations are: PE = Preliminary Evaluation; R = Reconnaissance Report; S = Surveys; T = Taylor Engineering; UF = University of Florida

2 Symbols are: H = U.S. House of Representative Document

3 Annual Report of the Chief of Engineers, 1885, page 1287.

4 Report not published.

5 Coastal and Oceanographic Engineering Laboratory. Florida Engineering and Industrial Experiment Station. "Report on the Performance of the Ponce DeLeon Inlet, Florida Improvement System." University of Florida. Gainesville, Florida. September 1973.

6 Purpura, J.A., and Chiu, T.Y., "Second Report on the Performance Ponce DeLeon Inlet, Florida Improvement System." UFL/COEL-77/004. Coastal and Oceanographic Engineering Laboratory. University of Florida. Gainesville, Florida. July 1977.

7 Taylor, R.B. M.A. Yanez. and T.J. Hull. "Port District Inlet Management Program, Phase III Technical Addendum." Taylor Engineering, Inc. Jacksonville, FL. February, 1992.

WATER PROJECTS

PRIOR INLET HISTORY

9. In 1935 the Corps of Engineers awarded a contract for deepening the ocean bar channel by experimental dragging and propeller wash. After repeated unsuccessful attempts the contractor abandoned that work.

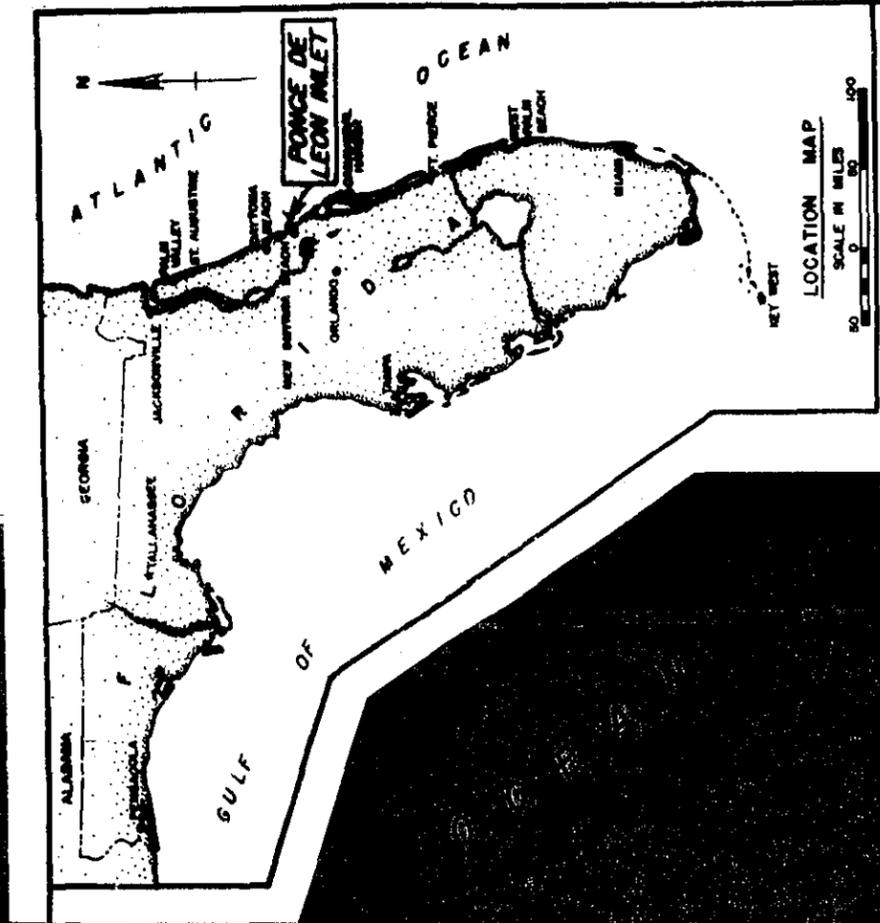
10. In 1943 the Corps of Engineers dredged the inlet and interior connecting channels. That was done as a war measure with U. S. Navy funds, to aid passage of Navy and Coast Guard craft. About 860,000 cubic yards of material were removed by a 22-inch pipeline dredge at a cost of \$209,000. The dredging resulted in a 14-foot-deep channel across the seaward bar. Within a year, shoaling severely restricted use of the inlet. The Navy Department provided \$175,000 additional to redredge the inlet. About 317,000 cubic yards of material were removed by a 26-inch pipeline dredge to provide a 16-foot depth. Subsequent surveys in 1944 and 1945 revealed rapid and continued shoaling of the dredged channel.

EXISTING INLET PROJECT

11. *The existing navigation project was authorized in the Rivers and Harbors Act of October 1965. That project, figure 2, consists of an entrance channel which provides access to a northwesterly channel along the Halifax River and a southeasterly channel along the Indian River. Both inner harbor channels connect with the Intracoastal Waterway. The authorized project includes:*

- a. An entrance channel 15 by 200 feet across the ocean bar;
- b. A channel 12 by 200 feet in the inlet;
- c. A channel 12 by 100 feet inside the inlet and southward in the Indian River to the Intracoastal Waterway;
- d. A channel 7 by 100 feet northward in the Halifax River;
- e. Ocean jetties about 4,200 feet long and about 2,700 feet long on the north and south sides, respectively;
- f. A weir in the north jetty with an impoundment basin just to the south for accumulating littoral drift material for transport across the inlet to the south by use of a conventional pipeline dredge (U.S. House of Representatives, 1965).

PROJECT: An entrance channel 15 feet deep and 200 feet wide across the ocean bar and thence 12 by 200 feet and 12 by 100 feet to Indian River North; thence 12 by 100 feet southward to the Intracoastal Waterway, 7 by 100 feet in Halifax River northward to the I.W.; ocean jetties about 4,200 feet long and about 2,700 feet long on the north and south sides of the inlet, respectively; a weir in the north jetty and an impoundment basin inside the weir for transfer of littoral drift across the inlet by use of a pipeline dredge. Length of the project is about 5 miles.



**PONCE DE LEON INLET
FLORIDA**

SCALE IN FEET
0 1000 2000 3000

DEPARTMENT OF THE ARMY
JACKSONVILLE DISTRICT, CORPS OF ENGINEERS
JACKSONVILLE, FLORIDA 9-30-83



FIGURE 2 (EXISTING PROJECT)

12. In the preparation of the General and Detailed Design Memorandum (GDDM- November 1967) the field work for soundings, probings, and core borings showed significant change from the condition surveys done prior to project authorization. The subsequent plan for construction of the project was somewhat different from the authorization. The latter fieldwork indicated different design conditions were necessary for the project prior to preparing plans and specifications and showed that the channel and jetties needed to be realigned (U.S. Army Corps of Engineers, 1967)

13. Construction started on the south jetty in July 1968 and was completed in October 1969. Work on the north jetty began in September 1968 and was complete in July 1971. Construction of the north jetty and final channel dredging occurred in the following sequence (University of Florida, 1973):

- a. Sheet piling installation started in September 1968 and ended in March 1969;
- b. Driving of king piles for the weir section started in October 1968 and was completed in March 1969;
- c. The 1800-foot rubble-mound section began January 1970 and was completed in July 1971;
- d. The horizontal beam placement in the weir occurred between March and July 1971. The elevation of the first 300 feet of the 1,800-foot long weir is +4.00 feet and that of the remaining 1,500 feet is +0.00 feet referenced to a mean low water datum;
- e. Small riprap placed adjacent to concrete weir sections to prevent scour occurred in mid-1972;
- f. Impoundment Basin dredging began in August 1971 but bad weather interrupted work in February 1972;
- g. Interior channel (Indian River) dredging of a 100-foot channel started in September 1971 and ended in February 1972; and
- h. The entrance channel dredging started in July 1971 but stopped in February 1972 due to bad weather conditions. General dredging and construction of the north and south jetties was considered completed by July 27, 1972 (U.S. Army Corps of Engineers, 1973).

OTHER NAVIGATION PROJECTS

14. The Intracoastal Waterway section, Jacksonville to Miami, generally traverses lagoons along the east coast of Florida. It is an important tributary of the Intracoastal Waterway system which reaches northward to Trenton, N.J., New York City, and

Boston, Mass. Commercial and recreational boat traffic share the waterway. The waterway carries large numbers of yachts between the populous upper east coast of the Nation and the vacation areas of south Florida. Numerous side channels and basins with attendant berthing and service facilities have been developed, largely by local efforts, along the Florida section of the waterway.

15. In the area of Ponce DeLeon Inlet, the Intracoastal Waterway traverses the Halifax River to the north and the Indian River to the south except near Ponce DeLeon Inlet. At the inlet the waterway follows a cut through the marshes about a mile to the west. The waterway along those sections provides a depth of 12 feet with a width of 125 feet.