H11897

NOAA FORM 76-35A

U.S. DEPARTMENT OF COMMERCE

NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION
NATIONAL OCEAN SERVICE

Descriptive Report

Type of Survey *Shallow Water Multibeam Hydrographic and Side Scan Sonar Survey*
Field No. *OPR-H328-OS-08-B*
Registry No. *H11897*

Locality

State *Florida*
General Locality *Atlantic Ocean*
Sub locality *East of Miami Beach*

2009

CHIEF OF PARTY

George G. Reynolds

Library & Archives

Date……..

NOAA FORM 77-28 [11-72]

U.S. DEPARTMENT OF COMMERCE
NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION

HYDROGRAPHIC TITLE SHEET

REGISTRY NO. *H11897*

INSTRUCTIONS – The Hydrographic Sheet should be accompanied by this form, filled in as completely as possible, when the sheet is forwarded to the office

FIELD NO. *OPR-H328-OS-08-B*

State *Florida*

General Locality *Atlantic Ocean*

Locality *East of Miami Beach*

Scale *N/A* Date of Survey *March 13, 2009 - July 5, 2009*

Instructions Dated *May 7, 2008* Project No. *OPR-H328-OS-08-B*

Vessel *R.V. Able II - Registration Number CT4788BB*

Chief of Party *George G. Reynolds*

Surveyed By *John G. Wetmur, Robert M, Wallace*

Soundings taken by (*Echo Sounder*) *Reson Seabat 8101*

Graphic Record Scaled by *N/A*

Graphic Record Checked by *N/A*

Protracted by *N/A* Automated Plot by *Angela M. Rizzo*

Verification by *Michael J. Engels*

Soundings in ~~*Meters*~~ ***Feet*** (*MLLW*)

REMARKS: *All Times Recorded in UTC*

Data Recorded and Presented relative to NAD83 UTM Zone 17 North

Original SOW modified by Oct 28, 2008 e-mail from COTR Mark Lathrop. (Refer to Separate III of the Descriptive Report.)
Red, bold, italic comments made during office review.
Contractor: *Ocean Surveys, Inc.*
91 Sheffield St.
Old Saybrook, CT. 06475

THE INFORMATION PRESENTED IN THIS REPORT AND THE ACCOMPANYING BASE SURFACE REPRESENTS THE RESULTS OF A SURVEY PERFORMED BY OCEAN SURVEYS, INC. DURING THE PERIOD OF 13 MARCH 2009 TO 5 JULY 2009 AND CAN ONLY BE CONSIDERED AS INDICATING THE CONDITIONS EXISTING AT THAT TIME. REUSE OF THIS INFORMATION BY CLIENT OR OTHERS BEYOND THE SPECIFIC SCOPE OF WORK FOR WHICH IT WAS ACQUIRED SHALL BE AT THE SOLE RISK OF THE USER AND WITHOUT LIABILITY TO OSI.

TABLE OF CONTENTS

Page

TABLE OF CONTENTS (Continued)

Page

APPENDICES

SEPARATES

DESCRIPTIVE REPORT
TO ACCOMPANY
HYDROGRAPHIC SURVEY H11897

Field Number OPR-H328-OS-08-B
July 5, 2009
Ocean Surveys, Inc. – R.V. Able II
Chief of Party: George G. Reynolds

INTRODUCTION

The purpose of this survey is to provide NOAA with modern, accurate hydrographic survey data to update the nautical charts of the Atlantic Ocean east of Miami Beach, Florida.

A. AREA SURVEYED

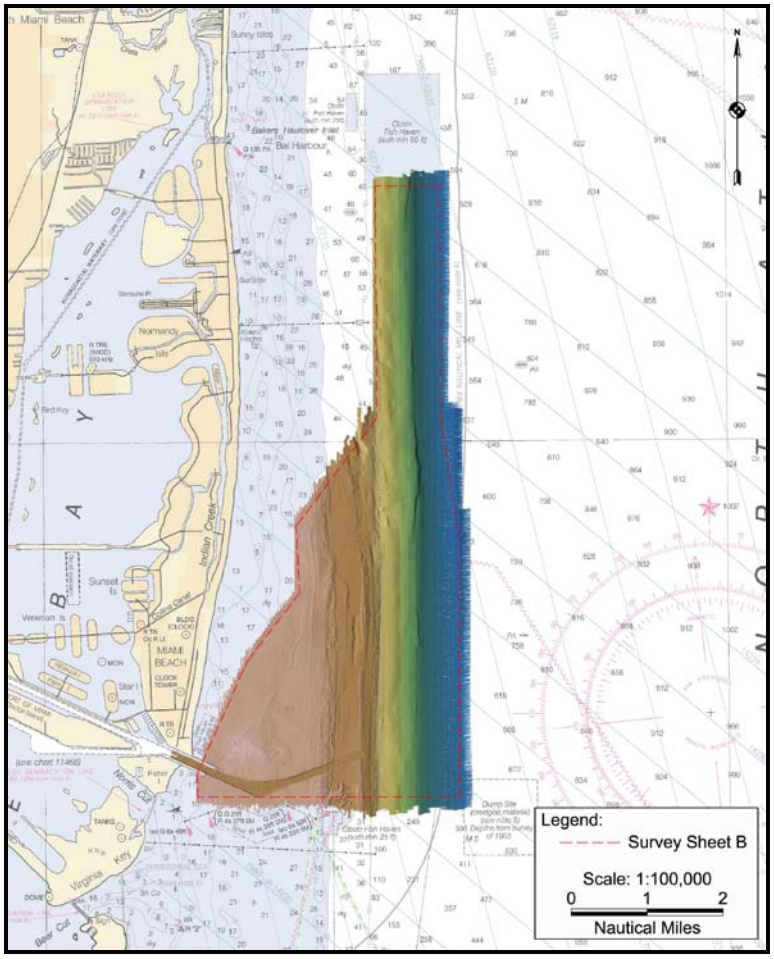


Figure 1. H11897 multibeam coverage area developed from a 2m surface colored by depth overlain on Chart 11466. The NOAA project limits are shown in red.

This survey provides hydrographic data for the Atlantic Ocean waters east of Miami Beach, Florida. The survey limits are defined by the sheet limits provided in the contract Statement of Work (SOW, May 7, 2008; amended Oct 28, 2008)* and extend offshore approximately 4 nautical miles. The general location of the survey limits is presented in Table 1. The survey area includes the Outer Bar Cut, Bar Cut and a portion of the Government Cut of the entrance channel, the primary offshore anchorage area for the Port, and several offshore fish havens. Survey data were acquired to meet requirements specified in the contract SOW*, and NOS Hydrographic Surveys Specifications and Deliverables, April 2007 (HSSD 2007). Two hundred percent (200%) side scan sonar (SSS) coverage, with concurrent shallow water multibeam echo sounder (SWMB) coverage were acquired with set line spacing to water depths of approximately 20 meters. One hundred percent (100%) SWMB coverage was acquired for the survey area in deep water (i.e. greater than approximately 20 meters) where 200% SSS imagery was not obtained. Although not required by the SOW*, nearly full SWMB coverage was acquired for the survey area in depths greater than 10 meters. Additional SWMB coverage was obtained as necessary to provide a least depth for all significant SSS contacts. The final survey area covers 16.68 square nautical miles (Figure 1).
Submitted with original field records

Table 1
General Location of Survey H11897

Northern Limit	Southern Limit	Western Limit	Eastern Limit
25° 53’ 40” N	25° 45’ 05” N	80° 08’ 05” W	80° 03’ 40” W

The mainscheme SSS/SWMB tracklines were generally oriented parallel to charted depth contours (Figure 2). Trackline offset and accompanying SSS range scale settings are presented in Table 2. SSS tracklines were separated by one-half the distance required for 100% coverage. The tracklines used to generate 100% and 200% coverage were generally separated by an odd/even numbering convention. Survey trackline statistics are indicated in Table 3.

On-location system integration began on March 13, 2009. System calibration (patch test) data for the H11897 survey were acquired on March 13 and March 18, 2009. Calibration data, mainscheme data, cross line data, significant target development, and bottom samples were acquired on the following dates: March 13, 16, 18-20, 29-31, April 4-7, 9, 11-12, 15, 21, May 26, 28-29, and July 5, 2009. (Calendar day numbers 072, 075, 077-079, 088-090, 094-097, 099, 101-102, 105, 111, 146, 148-149, 186). Twenty-one (21) bottom samples were acquired.

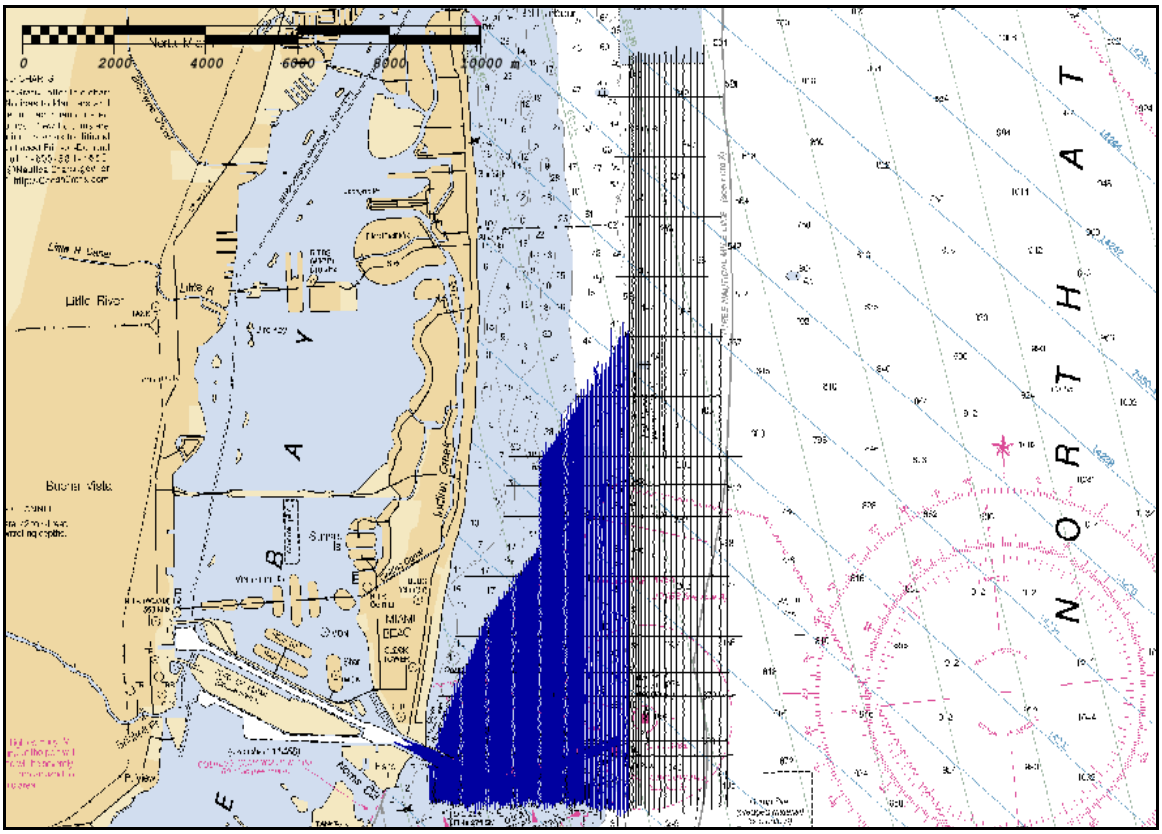


Figure 2. H11897 survey area with SSS/SWMB tracklines in blue and SWMB only tracklines in black.

Table 2
H11897 Survey Line Spacing

Water Depths (meters)	Trackline Offset (meters)	SSS Range Scale (meters)
<10	30	37.5
10-25	40	50
> ≈25	60-150	SWMB only

Table 3
H11897 Survey Trackline Statistics

Concurrent MB/SSS Lineal NM	Multibeam Only Lineal NM	Additional Developments Lineal NM	Cross Lines Lineal NM	Square Nautical Miles Covered	Bottom Samples Acquired
466.7	151.9	10.3	36.3	16.68	21

B. DATA ACQUISITION AND PROCESSING

Refer to the OPR-H328-OS-08 Data Acquisition and Processing Report (DAPR) ** for a complete description of data acquisition and processing systems, survey vessels, quality control procedures and data processing methods. Additional information to supplement sounding and survey data, and any deviations from the DAPR** are included in this descriptive report.

B.1 Equipment

All survey operations were conducted from OSI's R/V "Able II," a 7.6-meter fiberglass vessel, with a 3-meter beam and 0.8-meter draft. The vessel is powered by twin 150 HP outboard engines. Table 4 summarizes the primary equipment used to acquire SWMB and SSS data. All equipment was installed, calibrated and operated in accordance with the DAPR**.

Submitted with H-Cell deliverable

Table 4
H11897 Primary Survey Equipment

System	Manufacturer	Model/Version No.
Multibeam Echo sounder	Reson	8101
Side Scan Sonar	Klein	3000
Sound Speed Profiler	Sea-Bird	SeaCAT SBE 19+
Sound Speed Profiler	Sea-Bird	SeaCAT SBE 19
Sound Speed Sensor (Real-Time Surface Water Sound Speed)	Sea-Bird	MicroCAT SBE37
Primary Navigation DGPS	Applanix/Trimble	POS MV 320 V.4
Secondary Navigation DGPS (Position Integrity Alarm)	Trimble	MS750
Motion Compensation	Applanix/Trimble	POS MV 320 V.4
Heading Compensation	Applanix/Trimble	POS MV 320 V.4
Multibeam acquisition, trackline control, position fixing	HYPACK, Inc.	2008
SSS acquisition	Chesapeake Technology, Inc.	SonarWiz Map
U.S.C.G. Differential Beacon Receivers (2)	Trimble	Probeacon
Bar Check	OSI	Lead Disk
SSS Cable Payout Indicator	Hydrographic Consultants	SCC16"

B.2 Quality Control (QC)

B.2.1 System Calibration

A SSS calibration survey was performed on February 12 (DN 043) to verify object detection and towfish positioning accuracy of the SSS system. Calibration results are presented in the DAPR**.

A SWMB system calibration survey (patch test) was performed on February 13 (DN 044) to measure sensor alignments and to verify offset, tide, and sound velocity corrections. Patch test data were acquired in the Miami survey area on March 13 (DN 072) and March 18 (DN 077) to verify the sensor alignment values. Calibration survey data were also acquired on the final day of operations to verify sensor alignment stability. A SWMB system calibration report is included in the DAPR**. The CARIS vessel configuration file (HVF) was updated with all appropriate time stamps, correctors, and error estimates.

B.2.2 SWMB Cross Lines

A total of 36.3 nautical miles of cross lines were acquired on March 16 (DN075) comprising 5.77% of the 628.9 nautical miles (nm) of mainscheme SWMB lines.

Cross lines were generally run perpendicular to the mainscheme lines. Statistical quality control information was generated by comparing each of the cross lines to the final combined 4m x 4m CARIS BASE (Bathymetry Associated with Statistical Error) surface. Cross line comparisons generated with the CARIS QC Report utility are presented in Separate IV*. In general, cross line comparisons showed excellent agreement with mainscheme SWMB data and in general, 98% of cross line soundings considered in the analysis meet IHO Order 1 uncertainty standards. There was good agreement between overlapping line and day-to-day sounding coverage as observed in the BASE surface depth and standard deviation surfaces.

B.2.3 Data Quality Review

B.2.3.1 CARIS BASE Surface Standard Deviation and Uncertainty

The standard deviation and uncertainty BASE surfaces were reviewed in order to identify areas with excessive noise, systematic artifacts, and bathymetric features that warranted additional investigation. In general, the final combined uncertainty BASE surfaces with grid values generated from the higher of the standard deviation or uncertainty values were appropriate for the bathymetric relief observed in the survey area. The CARIS QC BASE surface report utility was used to evaluate IHO uncertainty for the final combined surface (Table 5). QC BASE surface reports are included for all final surfaces in Separate IV*. Higher standard deviation was observed along steep slopes of the channel and reefs, on fish haven features, and in the deepest water of the survey area.

Submitted with original field records **Submitted with H-Cell deliverable

Table 5
H11897 Combined Final BASE Surface Uncertainty

IHO Order	I (0-100m)	II (> 100m)	III (> 100m)
Combined Final 4m Surface Nodes Within Specifications	99.74%	99.99%	99.99%

B.2.3.2 SSS Imagery and Contacts

Contacts with approximately 1-meter heights and greater were identified in 2 x 100% coverage SSS imagery data and attributed with feature classifications and descriptive remarks if applicable. Contacts with greater than 0.5-meter heights were identified in 2 x 100% SSS imagery within the channel. A custom CARIS ContactFeatures.hcf* was created for feature classification when positioning contacts and is submitted with the session data. Contacts were classified according to SSS shadow height and surrounding depths as specified in the SOW* and HSSD (Table 6). All contacts were correlated and evaluated in the CARIS HIPS/SIPS map window with respect to BASE surfaces, contours and charted information. Each significant contact was examined in the CARIS subset editor and a sounding was designated for the representative least depth of each contact (or Primary/Secondary contact pair). All significant contacts that were not developed with mainscheme SWMB coverage were investigated with additional coverage. A list of all side scan sonar contacts is contained in Separate V*. Isolated shoal features that were outstanding or navigationally significant with respect to the surrounding depths are represented and attributed in the S-57 feature file * (i.e. OBSTRN, WRECKS).

Submitted with original field records

Table 6
Significant Contact Selection Criteria

Surrounding Depth or Area (meters)	Significant Contact Height (meters)
0-5	0.5 - 1
5-20	1
>20	10% of surrounding depth

B.2.4 Survey Junctions

There were no junctions assigned for this survey. Survey H11897 is located conterminously at the southern limits and was surveyed concurrently with Survey H11898. Depths from Survey H11898 were compared to depths from Survey H11897 by viewing the two sounding sets in CARIS HIPS and Notebook. Survey H11898 junctions well with this survey; a general comparison indicated good agreement between the two sounding sets. ***Concur.***

B.2.5 Unusual Conditions/Factors Affecting Soundings/Imagery

Survey data for H11897 revealed numerous fish haven features, wrecks, coral reefs, debris areas and spoil areas. Significant survey features are represented in the final BASE surfaces and the S-57 feature file.

There were spatial and temporal variations in the water-column sound speed that were observed progressively during the survey period (Figure 3), and as a result sound speed profiles were applied using a nearest in distance algorithm for the entire survey. The changing sound speed could be attributed to differences between shallow and deep water bodies, increasingly warm and sunny weather conditions, strong prevailing currents and upwelling currents. The planned survey lines were organized in separate zones to limit spatial variation. Outer swath soundings were filtered to minimize sound speed errors while maintaining full multibeam coverage in deep water and areas with features. Standard deviation and depth uncertainty in the final BASE surfaces do not exceed tolerances for IHO Order 1 or HSSD accuracies.

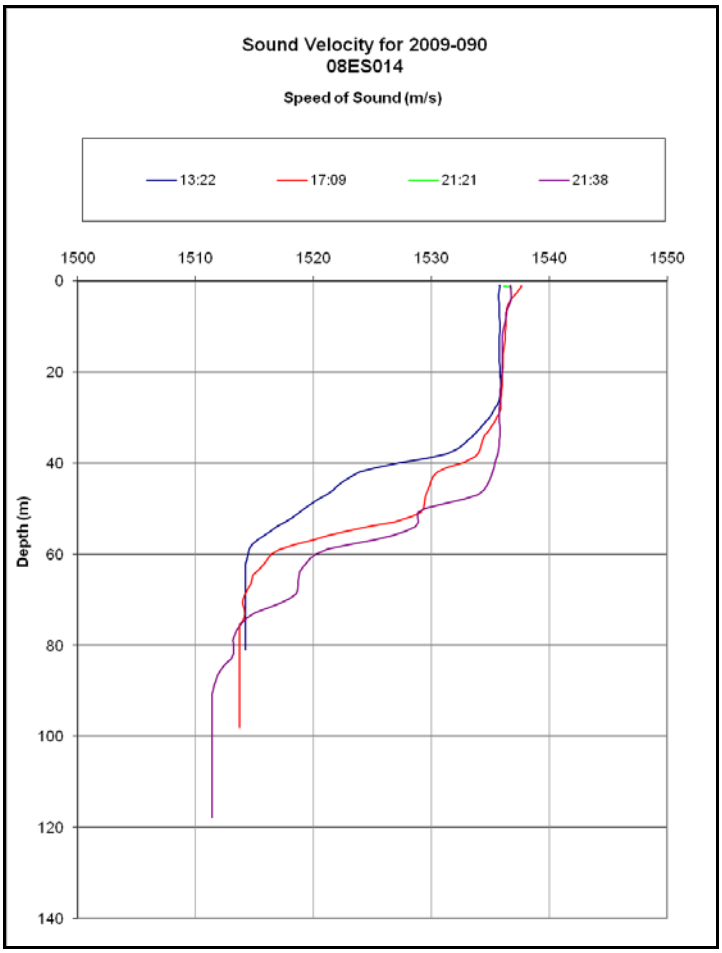


Figure 3. Typical deep water sound speed casts.

The tide zone definition file (.ZDF) provided to OSI with the SOW* was modified to include a small area at the east side of the survey limits and part of the Miami Government Cut Channel which extended outside the project limits. The tide zone modification was necessary to process CARIS HDCS line data which extended slightly east of the zoning. Tide zones FSE1 and FSE6 were adjusted according to Table 7 to include the aforementioned area (Figure 4). ***Submitted with original field records***

Table 7
Tide Zone Definition Adjustments

Original Definition (DD)		Adjusted Definition (DD)	
FSE1,10		FSE1,9	
25.760235	-80.128733	25.779277	-80.132715
25.744181	-80.130199	25.744181	-80.130199
25.723097	-80.129745	25.723097	-80.129745
25.702660	-80.129005	25.702660	-80.129005
25.671152	-80.126820	25.671152	-80.126820
25.670702	-80.093295	25.670702	-80.093295
25.714435	-80.100784	25.714435	-80.100784
25.761766	-80.125065	25.761766	-80.125065
25.762795	-80.127588	25.779277	-80.132715
25.760235	-80.128733		
FSE6,13		FSE6,13	
25.723891	-80.147213	25.723891	-80.147213
25.704360	-80.147926	25.704360	-80.147926
25.671189	-80.147541	25.671189	-80.147541
25.671152	-80.126820	25.671152	-80.126820
25.702660	-80.129005	25.702660	-80.129005
25.723097	-80.129745	25.723097	-80.129745
25.744181	-80.130199	25.744181	-80.130199
25.760235	-80.128733	25.779277	-80.132715
25.762708	-80.134717	25.762708	-80.134717
25.756376	-80.139127	25.756376	-80.139127
25.747166	-80.142398	25.747166	-80.142398
25.742506	-80.144333	25.742506	-80.144333
25.723891	-80.147213	25.723891	-80.147213

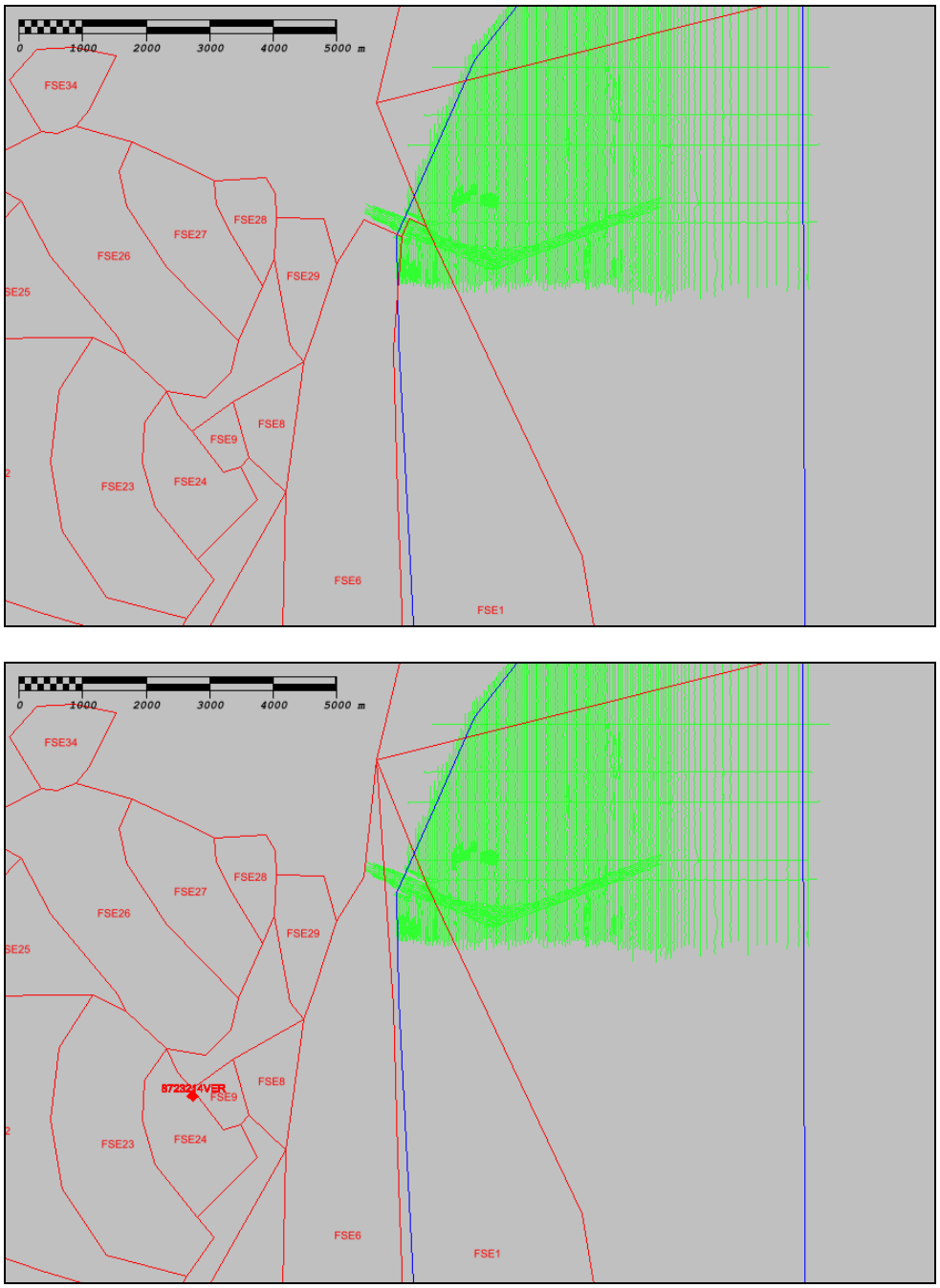


Figure 4. Original tide zone definitions (top) and adjusted tide zone definitions (bottom); SOW survey limits are shown in blue.

In deeper water, the outer beam bottom detection exhibited higher noise near the range limits of the Reson 8101 echo sounder system. Signal attenuation was probably increased because of low sonar return in areas of deeper water with soft sediments. Outer swath soundings were filtered to minimize noise while maintaining full coverage. Ping rates were maximized to increase along track sounding density.

There were very brief outages of Applanix TrueHeave data during survey operations. All outages were evaluated and soundings were rejected if heave amplitudes exceeded tolerances for IHO Order 1 or HSSD accuracies. There were no indications of significant heave error observed in standard deviation and depth uncertainty in the final BASE surfaces. ***Concur.***

There was a gap in verified water level data during survey operations between May 21 (DN 141) at approximately 23:18 UTC and May 27 (DN 147) at approximately 20:18 UTC. According to email correspondence, the gap in water level data was the result of a lightning strike. Verified water level data for the data gap was made available on July 21 (DN 202). A text copy of the email correspondence is included in Appendix IV* (Verified_Tide_Outage_DN141-DN147_Email.txt). ***Appended to this report***

On May 28 (DN 148) a tide offset of approximately 0.1 meter to 0.2 meter was observed when SWMB lines were completed to develop a shoal area north of the channel (Figure 5). The lines were completed between approximately 22:16 UTC and 23:23 UTC when there was an approximate 0.07 meter difference between predicted and verified water levels (Figure 6), possibly caused by meteorological effects.

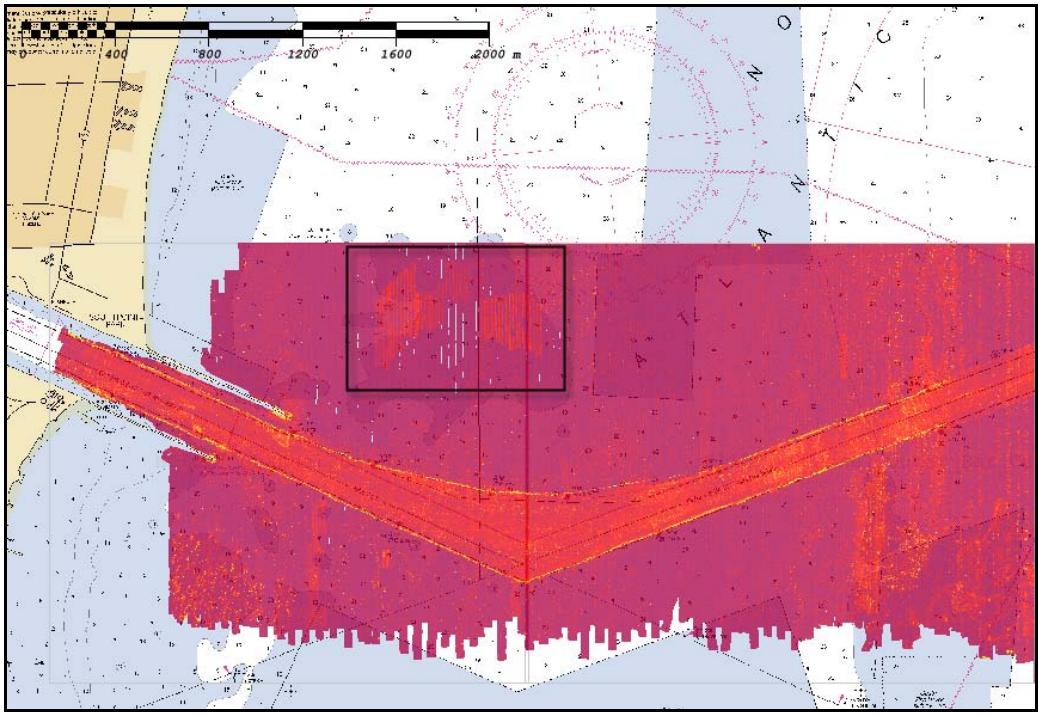


Figure 5. Standard deviation BASE surface depicting effects of tide offset in the area north of the channel.

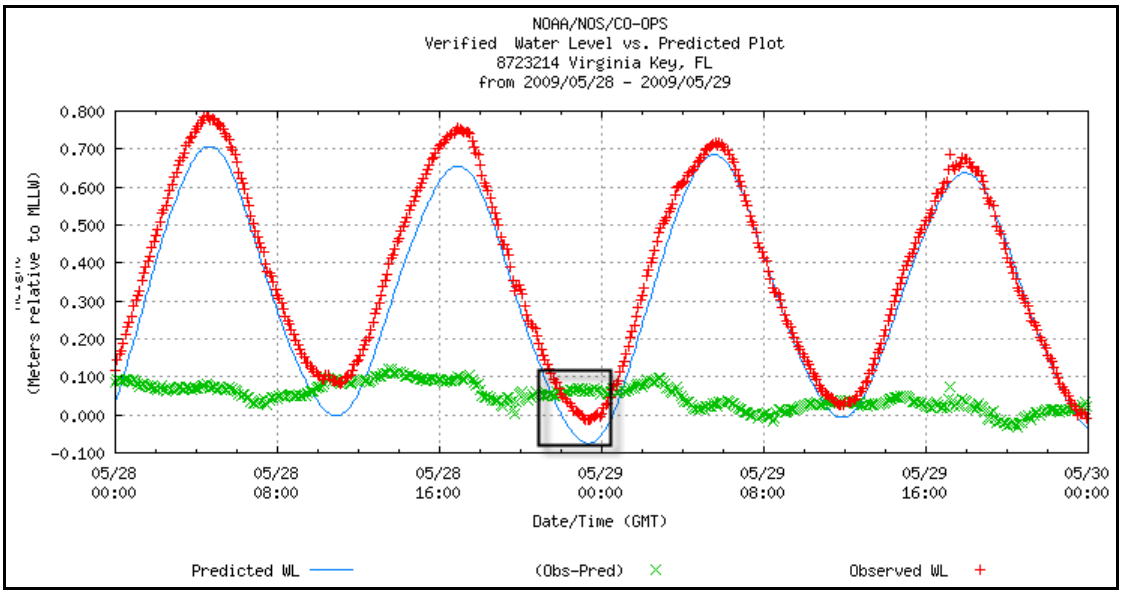


Figure 6. Water level data. Box highlights approximate time of SWMB data collection.

B.3 Corrections to Echo Soundings

Corrections to echo soundings were performed in accordance with the DAPR*.
Submitted with H-Cell deliverable
The Reson 8101 SWMB transducer head was removed from service on April 30 (DN 119) and re-installed on May 14 (DN 134). A SWMB system calibration survey (patch test) was performed on May 14 (DN 134) in the Miami survey area after re-installation of the Reson 8101 transducer and prior to H11897 survey data acquisition. The CARIS vessel configuration file (HVF) was updated with all appropriate time stamps, correctors, and error estimates.

B.3.1 Static Draft Corrections

Static draft measurements were measured daily, prior to survey operations and recorded in the acquisition log. The static draft value was also measured after each fueling. The CARIS vessel configuration file was updated with daily time tags and static draft values. Static draft corrections were applied during the CARIS merge process. Generally, the static draft values did not vary more than 0.02 meter.

B.4 Data Processing

B 4.1 Survey Coverage

This survey was conducted to develop 200% SSS coverage of the survey area along with set line spacing SWMB bathymetry for depths of less than approximately 20 meters. High-resolution multibeam developments were acquired over significant features. SSS coverage

was verified with 100% and 200% 1-meter resolution mosaics. In water depths greater than approximately 25 meters, 100% multibeam echo sounder coverage was acquired in accordance with the SOW* and HSSD. ***Submitted with original field records***

B 4.2 Coverage BASE Surfaces and Mosaics

Survey H11897 was divided into several field sheets (Figure 7 and Table 8) based upon depth ranges and final BASE surface resolutions. BASE surface resolutions were created to meet corresponding IHO Order I object detection standards. For example, in 0-20 meter depths, a 1-meter resolution BASE surface was created to resolve 2-meter objects. Half-meter (0.5) resolution surfaces were created for the channel to resolve 1-meter objects. In deeper water, BASE surface resolutions were created at the highest resolution supported by the data, and at least the minimum resolution required to demonstrate coverage in accordance with the HSSD. A 1-meter resolution coverage mosaic field sheet was created for each 100% SSS coverage.

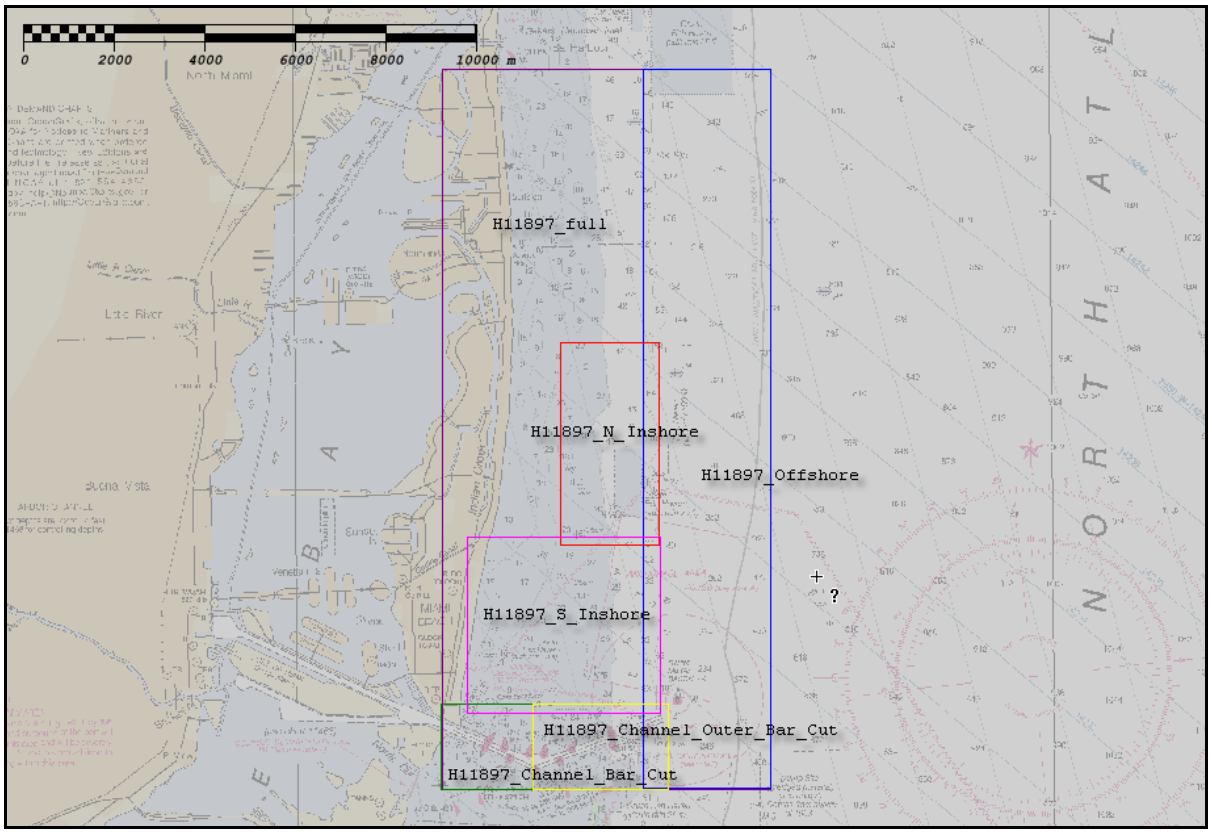


Figure 7. H11897 final HIPS field sheet layout.

Table 8
H11897 Field Sheets

Field Sheet Name	Resolution (meters)	Depth Range (meters)	Type
H11897_Channel_Bar_Cut	0.5	0-20	SWMB coverage
H11897_Channel_Outer_Bar_Cut	0.5	3-35	SWMB coverage
H11897_N_Inshore	1	4-30	SWMB coverage
H11897_S_Inshore	1	2-30	SWMB coverage
H11897_Offshore	2	20-160	SWMB coverage
	4	20-160	SWMB coverage
H11897_full	4	all	Combined final SWMB coverage
H11897_SSS_100	1	< 25	100% SSS mosaic
H11897_SSS_200	1	<25	100% SSS mosaic

C. VERTICAL AND HORIZONTAL CONTROL

C.1 Vertical Control

The vertical datum for this project is Mean Lower Low Water (MLLW). The operating National Water Level Observation Network (NWLON) station at Virginia Key, FL (872-3214) serves as datum control for Survey H1897.

The survey area is located within Zones FSE1, FSE6, SA227 and SA228 as provided by preliminary tidal zoning data included with the SOW*. Verified tides with final tide zoning were applied by OSI. There were no significant water level errors or uncertainty observed in cross line data or final BASE surfaces. ***Submitted with original field records***

As mentioned in Section B.2.5 (Table 7 and Figure 4), Zones FSE1 and FSE6 were adjusted to include a small portion of the survey near the Government Cut section of the channel.

C.2 Horizontal Control

The horizontal datum for this project is the North American Datum of 1983 (NAD83). All data products are referenced to Latitude/Longitude or Universal Transverse Mercator (UTM) Zone 17, meters.

All position data were acquired using a POS MV inertial measurement unit (IMU) Differential GPS (DGPS) positioning system. Differential beacon correctors from the U.S. Coast Guard station in Miami were used for the primary position system. Differential beacon correctors from the U.S. Coast Guard station in Cape Canaveral were used by a secondary navigation system as a horizontal control confidence check.

OSI established a horizontal control point, "CG2," adjacent to the survey vessel's berth at the U.S. Coast Guard Station, Miami, FL, using the National Geodetic Survey's Online Positioning Users Service (OPUS) technology. The OPUS position was used as a reference for daily navigation system confidence checks. Refer to the DAPR and Vertical and Horizontal Control Report (VHCR) for additional details.

D. RESULTS AND RECOMMENDATIONS

D.1 Chart Comparison

Chart comparisons were performed in CARIS HIPS/SIPS, Notebook and Easy View using surface models, contours and soundings generated from the combined final BASE surface. The latest editions of the NOAA NOS Raster Nautical Charts (RNC) and Electronic Nautical Charts (ENC) were downloaded from the NOAA Coast Survey WWW site (http://www.nauticalcharts.noaa.gov/) weekly during survey operations, and when the survey was completed for final comparisons. The RNC and ENC used for final comparisons, summarized in Table 9, were downloaded on August 10, 2009 and are submitted with the survey data.

The Local Notice to Mariners (LNM) and Notice to Mariners (NM) issued during the survey period (March 13, 2009 to July 5, 2009) were reviewed for significant updates. Coast Guard District 7 LNM 27/09 (July 7, 2009) was the last notice reviewed for this project.

LNM/NM changes affecting aids to navigation (ATON) are discussed in Section D.2.3.

Table 9
H11897 Affected Charts

Chart Number	Scale	Edition	Issue Date	ENC
11013	1:1,200,000	47th, Feb./08	8-1-2009	US2EC01M
11451	1:80,000	33rd, Sep./07	8-1-2009	US4FL27M
11460	1:466,940	41st, Jul./08	8-1-2009	US3FL30M
11465	1:40,000	38th, Nov./07	8-1-2009	US5FL21M
11466	1:80,000	38th, Jun./08	8-1-2009	US4FL34M
11467	1:40,000	41st, Jun./08	8-1-2009	US5FL33M
11468	1:10,000	41st, May/07	8-1-2009	US5FL22M
11469	1:100,000	8th, Dec./07	8-1-2009	US4FL23M

D.1.1 General Chart Comparison

Charted depths and depth areas differed with survey depths and contours on the small scale charts of the area, 11013 (US2ES01M) and 11460 (US3FL30M). Specific differences are discussed in the detailed chart comparisons.

- High-resolution data from this survey provide more detailed delineations of depth areas, reefs, spoil areas and individual features.
- The limits of a spoil area, surveyed north of the channel, are not defined by the charted spoil area. The extent of the spoil area within the survey limits was delineated from the BASE surfaces and submitted with the S-57 feature file.
- Many fish haven features exist outside of charted obstruction boundaries. The extents of debris and features were delineated from SSS contacts and BASE surfaces and are submitted with the S-57 feature file.
- Several uncharted wrecks were surveyed. Positions and least depths were developed and are submitted with the S-57 feature file.
- In general, the 18-foot, 30-foot and 60-foot contours are consistent with the charted depth curve, but should be updated with detailed depths from this survey.
- Some scale-dependent and feature discrepancies exist between the RNC, ENC, and survey data.

D.1.2 Detailed Chart Comparison and Charted Features

Charts 11013 (US2EC01M) and 11460 (US3FL30M)

Charts 11013 and 11460 are small scale RNC coastal approach charts with very little detail of the survey area. The ENC US2EC01M does not cover the survey area.

- H11897-1: An Obstruction Fish Haven (10 ¾ fathoms) is located at the northern limit of the survey. A debris area was developed with 100% SWMB and extends beyond the southern boundary of the Obstruction Fish Haven. The extent of the debris area is included in the S-57 feature file (H11897_Features.hob). ***Concur with clarification. Retain fish haven as charted. Do not chart features within fish haven boundary. Debris south of fish haven is not navigationally significant. No charting action is recommended.***
- H11897-2: An Obstruction Fish Haven (16 fathoms) centered at approximate position 25-49-34.51N, 080-04-52.63W was covered with 100% SWMB data. A least depth of 11.2 fathoms (20.5***3*** meters) was developed on a submerged wreck at 25-49-15.59~~9~~***6***N, 080-05-04.73~~6~~***9***W. Areas of debris and submerged wrecks extend outside the fish haven boundary to the west and to the east. The extent of the obstruction area was delineated from the final BASE surfaces and the area is included in the S-57 feature file (H11897_Features.hob). ***Concur with clarification. Recommend to retain fish haven as charted. Wrecks areas to the east and west of the fish haven extents will be included in the H-Cell separately. Do not chart features within fish haven boundary.***

Chart 11469 (US4FL23M). The ENC US4FL23M does not cover the survey area.

- H11897-3: Uncharted wrecks are located within an Anchorage Area centered at approximate position 25-47-16.01N, 080-04-59.36W. The wrecks are developed with

100% SWMB and are included in the S-57 feature file (H11897_Features.hob). ***Concur. Chart the uncharted wrecks.***

- H11897-4: A Spoil Area centered at approximate position 25-45-50.35N, 080-06-36.43W was covered with 200% SSS and all contacts within were developed with 100% SWMB. The spoils observed in SWMB extend beyond the charted limits. The extent of the spoil area was delineated from the final BASE surfaces and is included in the S-57 feature file (H11897_Features.hob). ***Defer final charting disposition to MCD.***
- H11897-5: A Spoil Area centered at approximate position 25-45-12.81N, 080-05-49.02W was partially covered by H11897 and was completely covered by H11897 and concurrent Survey H11898 with 200% SSS and all contacts within were developed with 100% SWMB. The spoils observed in SWMB extend beyond the charted limits. The extent of the spoil area was delineated from the final BASE surfaces and is included in the S-57 feature file (H11897_Features.hob). ***Defer final charting disposition to MCD.***
- A charted wreck PA at position 25-49-57.92N, 080-04-58.56W is addressed with item H11897-7. ***Concur.***

Chart 11451 and Small Craft Inset #8 (US4FL27M), Chart 11465 (US5FL21M), Chart 11466 (US4FL34M), Chart 11467 Small Craft Insets #6 and #9 (US5FL33M) and Chart 11468 (US5FL22M). The ENC US4FL27M does not cover the survey area.

- H11897-6: The terminus of a pipeline enters the survey limits within the northwestern portion of the survey. SWMB data position the pipeline approximately 420 feet (130 meters) north of the charted location. ***Concur. Defer final charting disposition to MCD.***
- H11897-7: A charted wreck PA at position 25-49-57.92N, 080-04-58.56W was disproved with 100% SWMB data. A submerged wreck was surveyed approximately 820 feet (250 meters) north at position 25-50-09~~.02~~***01***N, 080-04-56.~~30~~***31***W with a least depth of 132***.228*** feet (40.3***03*** meters) and is included in the S-57 feature file (H11897_Features.hob). ***Concur. Disprove charted wreck PA. Do not chart survey wreck 250m north of charted wreck PA because it is within fish haven boundary.***
- H11897-8: An Obstruction (31 feet) positioned at 25-48-43.~~90~~***84***N, 080-05-23.80W was covered with 200% and developed with 100% SWMB. A least depth of 29.~~8~~***764*** feet (9.~~1~~***072*** meters) was developed at 25-48-43.3~~4~~***2***N, 080-05-23.~~90~~***88***W. See Section D.1.5 Danger to Navigation Reports. ***Concur. Chart survey location as least depth for digitized Wreck area (see H11897-9). Remove text "Obstn (rep 2009)".***
- H11897-9: An Obstruction Fish Haven (auth min 25 feet) centered at approximate position 25-48-45.27N, 080-05-39.90W was covered with 200% SSS and all contacts within the charted area were developed with 100% SWMB. A least depth of 29.~~8~~***764*** feet (9.~~1~~***072*** meters) was developed at 25-48-43.3~~4~~***2***N, 080-05-23.~~90~~***88***W. Areas of debris and submerged wrecks extend outside the Fish Haven boundary to the west and to the east. The areas of debris were covered with 200% SSS and 100% SWMB data. The extent of debris was delineated from the final BASE surfaces and is

included in the S-57 feature file (H11897_Features.hob). ***Concur with clarification. Recommend to retain fish haven as charted. Wrecks to west of fish haven extents deemed navigationally insignificant. Wrecks to east of fish haven extents will be included within a digitized Wreck area with least depth of 29.764 ft (see H11897-8). Do not chart features within fish haven boundary.***

- H11897-10: An Obstruction (15 feet) positioned at 25-48-45.00N, 080-06-17.80W was covered with 200% SSS and developed with 100% SWMB. A least depth of 15.7***61*** feet (4.8***04*** meters) was developed at 25-48-44.9~~7~~***6***N, 080-06-17.~~79~~***81***W. See Section D.1.5 Danger to Navigation Reports. ***Concur. Chart as 16ft sounding.***
- H11897-11: An Obstruction (16 feet) positioned at 25-48-07.80N, 080-06-15.70W was covered with 200% SSS and developed with 100% SWMB. A least depth of 16.3***16*** feet (~~5.0~~***4.973***meters) was developed at 25-48-07.~~80~~***79***N, 080-06-15.6~~9~~***8***W. See Section D.1.5 Danger to Navigation Reports. ***Concur.***
- H11897-12: An Obstruction (19 feet) positioned at 25-47-2~~0~~***3***.98N, 080-06-1~~9~~***4***.29W was covered with 200% SSS and developed with 100% SWMB. A least depth of 17.8***792*** feet (5.4***23*** meters) was developed at 25-47-23.88***9***N, 080-06-14.9~~6~~***5***W. See Section D.1.4 AWOIS Items. ***Concur. Revise depth of charted obstruction. Update AWOIS database.***
- H11897-13: An Obstruction (15 feet) positioned at 25-46-43.20N, 080-07-15.90W was covered with 200% SSS and developed with 100% SWMB. A least depth of 15.3***25*** feet (4.~~7~~***671*** meters) was developed at 25-46-43.2~~0~~***1***N, 080-07-15.9~~5~~***6***W. See Section D.1.5 Danger to Navigation Reports. ***Concur. Revise obstruction least depth.***
- H11897-14: An Obstruction Fish Haven (auth min 18 feet) centered at approximate position 25-46-25.47N, 080-06-23.41W was covered with 200% SSS and all contacts within were developed with 100% SWMB. A least depth of 19***.065*** feet (5.8***11*** meters) was developed at 25-46-05.21N, 080-06-16.62W. Areas of debris within the Obstruction Fish Haven were delineated from the final BASE surfaces and are included in the S-57 feature file (H11897_Features.hob). ***Concur with clarification. Recommend to retain fish haven as charted. Do not chart features within fish haven boundary.***
- H11897-15: An Obstruction Submerged Transducer PA positioned at 25-46-07.30N, 080-07-22.03W was disproved with 200% SSS and 100% SWMB. No significant contacts were observed within approximately 800 feet (250 meters) of the charted position. ***Concur. Recommend to remove obstruction and text from chart.***
- H11897-16: An Obstruction Fish Haven (auth min 6 feet) is located along the western limit of the survey and extends beyond the survey limits. A debris area was developed by 200% SSS and all contacts within the area were developed with 100% SWMB. The debris area extends beyond the eastern boundary of the Obstruction Fish Haven. An obstruction area digitized from the contacts and BASE surfaces is included in the S-57 feature file (H11897_Features.hob). ***Concur with clarification. Retain fish haven as charted. Do not chart features within fish haven boundary. Chart obstructions located outside of fish haven.***

- H11897-17: A Spoil Area is located at the western limit of the survey and extends beyond the survey limits. Spoil piles were developed with 200% SSS and 100% SWMB. The spoil area was digitized from contacts and BASE surfaces and is included in the S-57 feature file (H11897_Features.hob). ***Concur with clarification. The spoil area at 25-45-48.3312N, 080-07-37.1681W is recommended to be retained as charted. There is no feature in the H11897_Features.hob file that delineates a different limit. No cartographic action required.***
- H11897-18: An Obstruction (33 feet) positioned at 25-45-49.70N, 080-05-*40*.60W was disproved with 200% SSS and 100% SWMB coverage. See Section D.1.4 AWOIS Items. ***Concur, remove obstruction. Update AWOIS database.***
- H11897-19: An Underwater Rock positioned at 25-45-41.66N, 080-07-28.69W is charted at the end of the northern jetty. A shoal sounding of 2.~~6~~***815*** feet (0.~~79~~***858*** meter) was observed at 25-45-42.~~20~~***19***N, 080-07-29.1~~9~~***3***W. The extent of the northern jetty was delineated from the final BASE surfaces and is included in the S-57 feature file as an obstruction with the observed least depth (H11897_Features.hob). ***Concur. Recommend to chart the partially submerged extents of rip rap as shoreline construction associated with the jetty. See also H-Cell Report (appended to this report).***
- H11897-20: An Obstruction area centered at approximate position 25-45-41.94N, 080-07-29.41W is charted at the end of the northern jetty. A shoal sounding of 2.~~6~~***815***feet (0.~~79~~***858***meter) was observed at 25-45-42.~~20~~***19***N, 080-07-29.1~~9~~***3***W. The extent of the northern jetty was delineated from the final BASE surfaces and is included in the S-57 feature file as an obstruction with the observed least depth (H11897_Features.hob). ***See above comment.***
- H11897-21: An Obstruction (28 feet) positioned at 25-45-40.00N, 080-05-48.70W was covered with 200% SSS and developed with 100% SWMB. A least depth of 31.6***70*** feet (9.6***53*** meters) was developed at 25-45-39.83N, 080-05-49.01W. See Section D.1.4 AWOIS Items. ***Concur. Revise depth and position of obstruction. Update AWOIS database.***
- H11897-22: A charted Wreck PA at 25-45-36.02N, 080-07-42.02W at the south side of the jetty was not visible at the surface and was disproved with 200% SSS and 200% SWMB. ***Concur with clarification. Wreck is considered disproved. The SWMB indicates an extra 100m of the jetty extent.***

D.1.3 Controlling and Tabulated Depths (Table 10): Chart 11468(US5FL22M)

The portion of the Miami Harbor Channel within the survey limits was covered with 200% SSS and developed with 200% SWMB. The controlling depths were obtained from ENC US5FL22M and are summarized in Table 10.

Shoals were observed encroaching along the northern and southern edges of the channel. The shoaling is consistent with the 40th edition of Coast Pilot 4 (Chapter 10 Section 319) which states “Mariners are advised that abrupt shoaling may be encountered along the northerly and southerly edges of the dredged channel.” Areas of shoaling were evaluated in

the BASE surfaces and included in the S-57 feature file (H11897_Features.hob) when appropriate.

Significant contacts, equal to or greater than 2 feet (0.6 meters) shoaler than the controlling channel depth, are included in the S-57 feature file as obstructions (H11897_Features.hob). ***Information regarding the 15 shoal soundings in the Miami Harbor Channel was reported by AHB to the Navigation Manager for notification (see Appendix V for correspondence). Of these 15 shoal soundings, only 9 were included in the H-Cell as soundings within the Miami Harbor Channel. See H-Cell Report section D.1.1 for further clarification.***

Table 10
Miami Harbor Channel Controlling Depths (from ENC US5FL22M)

Channel Depths feet (meters)	Left Outside Quarter	Left Inside Quarter	Right Inside Quarter	Right Outside Quarter	Date of Survey
Outer Bar Cut	40.4 (12.3) ***39.698***	44 (13.4) ***44.291***	44 (13.4) ***43.963***	42 (12.8) ***41.339***	July 2008 ***Oct 2009***
Widener	44 (13.4) ***44.948***	44 (13.4) ***44.619***	44 (13.4) ***44.291***	40 (12.2) ***40.354***	July 2008 ***Oct 2009***
Bar Cut	43.6 (13.3) ***44.291***	43.6 (13.3) ***44.291***	41.7 (12.7) ***44.619***	37.4 (11.4) ***38.058***	July 2008 ***Oct 2009***
Government Cut	41.7 (12.7) ***41.667***	41.3 (12.6) ***42.651***	41.7 (12.7) ***41.339***	40.4 (12.3) ***44.291***	July 2008 ***Oct 2009***

- A shoal sounding of ~~41.3~~***42.415***feet (12.9***28*** meters) was observed at 25-45-~~23.00~~***22.99***N, 080-06-51.88W, within the Outer Bar Cut Right Inside Quarter. ***Concur. There was no obstruction included in the feature file so during SAR review an obstruction point was created for this shoal sounding and included in the AHB feature file***
- A shoal sounding of 42.0***67*** feet (12.8***22*** meters) was observed at 25-45-31.25N, 080-06-20.81W, within the Outer Bar Cut Left Inside Quarter. ***Concur***
- A shoal sounding of 39.7***34*** feet (12.1***11*** meters) was observed at 25-45-33.2~~7~~***8***N, 080-06-19.1~~1~~***0***W, within the Outer Bar Cut Right Inside Quarter. ***Concur***
- A shoal sounding of 40.~~0~~***115*** feet (12.2***27*** meters) was observed at 25-45-33.29N, 080-06-18.4~~5~~***4***W, within the Outer Bar Cut Right Inside Quarter. ***Concur***
- A shoal sounding of 41.7***26*** feet (12.7***18*** meters) was observed at 25-45-36.14N, 080-06-12.2~~4~~***5***W, within the Outer Bar Cut Right Inside Quarter. ***Concur***
- A shoal sounding of 41.~~7~~***827*** feet (12.7***49*** meters) was observed at 25-45-44.69N, 080-05-44.99W, within the Outer Bar Cut Right Inside Quarter. ***Concur***
- A shoal sounding of 41.~~0~~***257*** feet (12.~~6~~***575*** meters) was observed at 25-45-44.6~~1~~***7***N, 080-05-44.4~~8~~***9***W, within the Outer Bar Cut Right Inside Quarter. ***Concur***

- A shoal in the western portions of the Widener is encroaching on the channel in the vicinity of the east end of the north jetty. A shoal sounding of 36.1 feet (11.0 meters) was observed at position 25-45-39.43N, 080-07-29.29W, within the western corner of the Widener Right Inside Quarter. ***Concur***
- A shoal sounding of 40.8***40*** feet (12.4***48*** meters) was observed at 25-45-19.21N, 080-06-53.35W, within the Bar Cut Left Outside Quarter. ***Concur***
- A shoal sounding of 42.~~0~~***280*** feet (12.~~9~~***887*** meters) was observed at 25-45-22.85N, 080-06-56.59W, within the Bar Cut Left Inside Quarter. ***Concur. There was no obstruction included in the feature file so during SAR review an obstruction point was created for this shoal sounding and included in the AHB feature file***
- A shoal sounding of 41.~~7~~***650*** feet (12.~~7~~***695*** meters) was observed at 25-45-23.91N, 080-07-05.23W, within the Bar Cut Left Outside Quarter. ***Concur***
- A shoal sounding of 41.~~2~~***086*** feet (12.5***23*** meters) was observed at 25-45-26.80N, 080-07-12.3~~6~~***5***W, within the Bar Cut Left Outside Quarter. This object appears to be a buoy block within the channel limits. ***Concur***
- A shoal sounding of 41.~~6~~***348*** feet (12.6***03*** meters) was observed at 25-45-33.62N, 080-07-28.3~~0~~***1***N, within the Bar Cut Left Outside Quarter. ***Concur***
- A shoal sounding of ~~41.0~~ ***40.971***feet (12.5~~4~~***88*** meters) was observed at 24-45-34.8~~5~~***6***N, 080-07-31.4~~7~~***8***W, within the Bar Cut Left Outside Quarter. This object appears to be a buoy block within the channel limits. ***Concur***
- A shoal in the southeastern corner of the Government Cut Left Outside Quarter is encroaching on the channel near the junction of the Government Cut Left Outside Quarter and the Bar Cut Left Outside Quarter. An approximate shoal sounding of 33.~~4~~***317*** feet (10.~~2~~***115*** meters) was observed at approximate position 25-45-38.0~~5~~***4***N, 080-07-39.~~21~~***19***W, within the Government Cut Left Outside Quarter (Figure 8). ***Concur.***

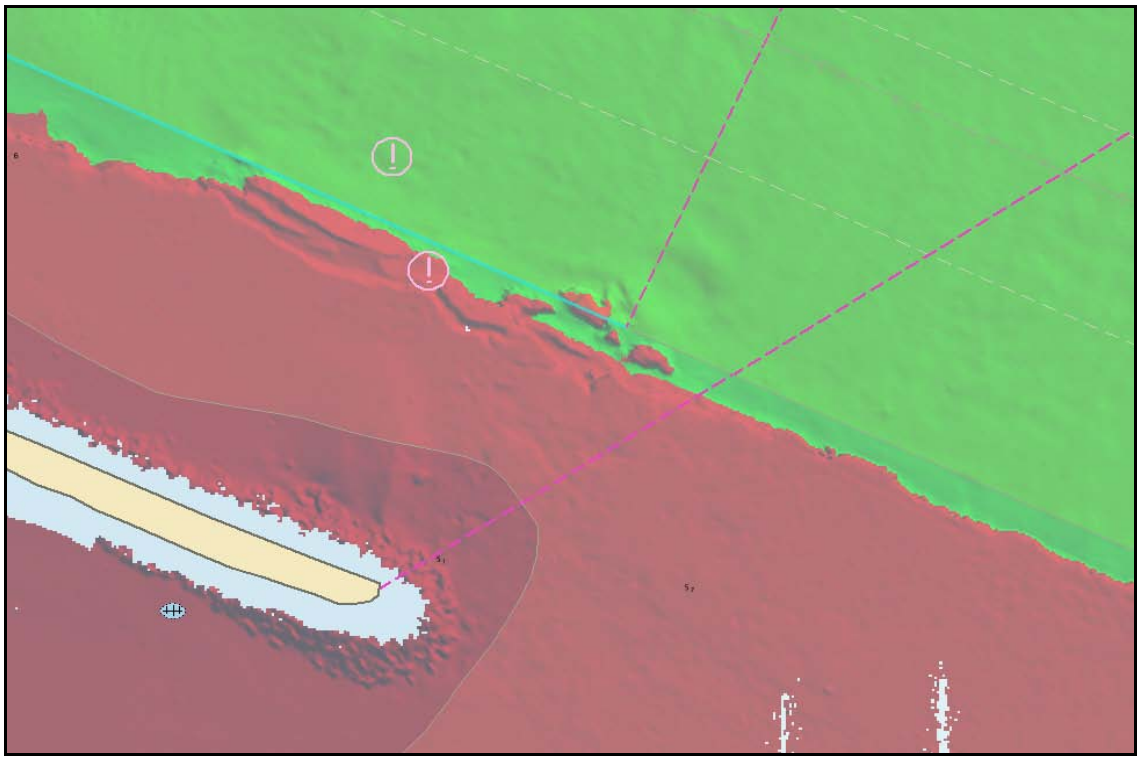


Figure 8. Shoal encroaching on Government Cut. Red is shown as less than 41.7 feet (12.7 meters) deep and green is shown as greater than 41.7 feet (12.7 meters) deep. The boundary of the Miami Harbor Channel, Government Cut, LOQ is shown in light blue.

- A linear feature resembling a submerged pipe was observed in SSS and SWMB data on the slope of the Miami Harbor Channel (Figures 9 and 10). The obstruction is approximately 60 feet in length and lies north of the Right Outside Quarter of the Government Cut, approximately 1,400 feet (425 meters) inside of the entrance marker R "12". Refer to section D1.5 Danger to Navigation Reports**** *AHB has no record of processing this DTON (see D.1.5).*** The inshore end of the pipe, middle bend of pipe at the channel edge and the end of the pipe are included as obstructions in the S-57 feature file (H11897_Features.hob). ***Concur, chart linear obstruction with least depth of 5.281m.***

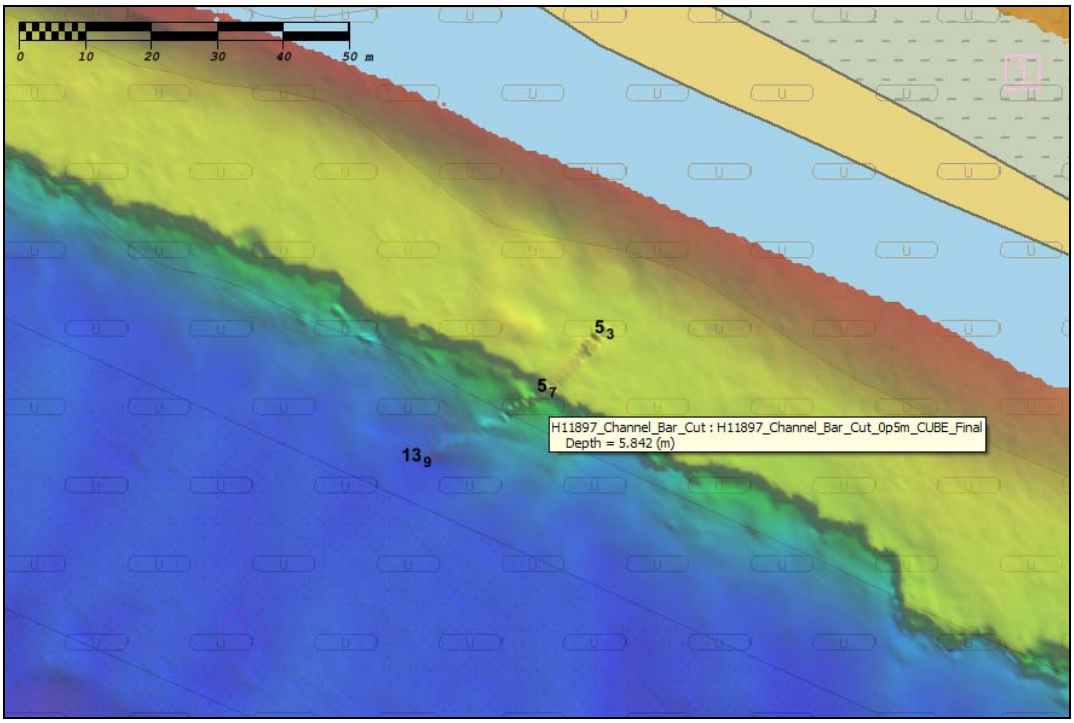


Figure 9. Linear feature located north of Right Outside Quarter of Government Cut.

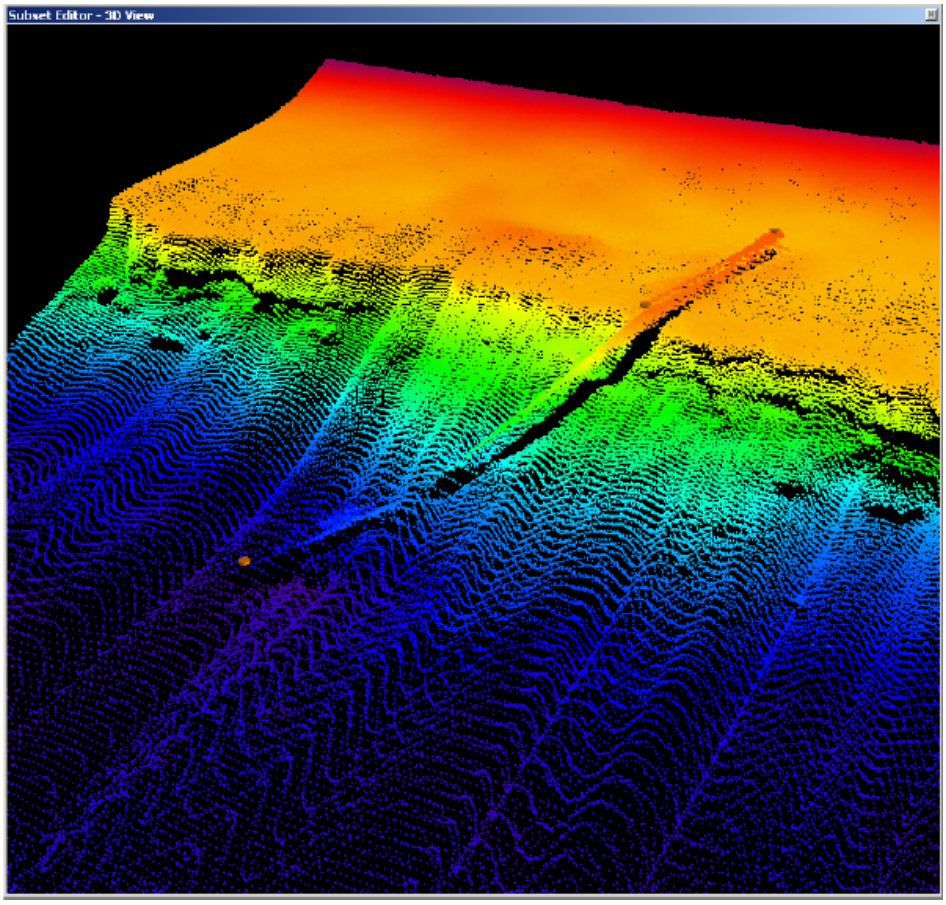


Figure 10: Linear feature located north of Right Outside Quarter of Government Cut.

D.1.4 AWOIS Items

There were four AWOIS item investigations assigned within the survey limits (Table 11). Refer to Appendix II* for Reports on AWOIS Items.
Appended to this report

Table 11
H11897 AWOIS Investigations

AWOIS Record	Latitude (DMS)	Longitude (DMS)	Description
11706	25-45-49.68 N	80-05-40.60 W	Charted 33-foot Obstruction
10460	25-45-40.03 N	80-05-48.70 W	Old Buoy Anchor
10461	25-47-23.83 N	80-06-14.87 W	Uncharted Obstruction
93	25-48-39.74 N	80-05-08.15 W	Wreck of Cargo Ship

AWOIS Item #11706 was reported as an Obstruction with a least depth of 33 feet. The area surrounding the charted obstruction was surveyed with 200% SSS and 100% 100 SWMB. No obstruction was found in the vicinity of the specified position. ***Concur, remove obstruction. Update AWOIS database.***

> AWOIS History: H10748/97--OPR-H300-KR-97; LOCATED AN OBSTRUCTION IN 25/45/49.68N, 080/05/40.60W (NAD83) WITH A LEAST DEPTH OF 33' MLLW. (ENTERED 10/02 BY MBH) S00008/03 -- 200% Side Scan Sonar coverage was conducted. This item was identified. Updated 12/1/2006 J

AWOIS Item #10460 was reported as an old buoy anchor/concrete block located with LIDAR with a least depth of 31 feet. This item was verified with 200% SSS and 100% SWMB with a least depth of 31.6***70*** feet (9.6***5***3 meters) surveyed at 25-45-39.82~~2~~***3***N, 80-05-49.01W. ***Concur, revise depth and position of feature. Update AWOIS database.***

> AWOIS History: H-10748 & A; OPR-H300-AHP; LIDAR CONTACT INVESTIGATED AND FOUND TO BE AN OLD BUOY ANCHOR CONCRETE BLOCK WITH A LEAST DEPTH OF 31 FT IN POS. 25 45 40.03N, 080 05 48.7W. ENTERED 9/99 MCR

AWOIS Item #10461 was reported as an uncharted obstruction and the surrounding area was covered with 200% SSS and 100% SWMB. An obstruction was surveyed at 25-47-23.86~~9~~***9***N, 80-06-14.96~~5~~***5***W with a least depth of 17.8***792*** feet (5.4***2***3 meters). ***Concur, revise obstruction depth. Update AWOIS database.***

> AWOIS History: HISTORY H-10748A; OPR-H300-AHP; AN UNCHARTED OBSTRUCTION WAS FOUND IN POS.25 47 23.83N, 080 06 14.87W, NO DESCRIPTION GIVEN. ENTERED 9/99 MCR

AWOIS Item #93 was reported as a cargo vessel with a position accuracy of approximately 1 mile. The area was surrounding the AWOIS item was surveyed with 200% SSS and SWMB with several wrecks observed within the specified 1 mile radius. A wreck positioned approximately 2500 feet (750 meters) northwest of the record 93 could possibly be a sunken cargo ship; it is positioned at 25-48-57.16~~4~~***4***N, 80-04-54***1***.70W with a least depth of 13~~1~~***0.879*** feet (39. ***8***9***2*** meters). ***Concur. Wreck interpreted to be AWOIS 93. Update AWOIS database. Wreck is within fish haven limits, do not chart.***

> AWOIS History: 01 1936 24 NO.8380; CARGO, 3482 GT,SUNK 11/4/35 BY MARINE CASUALTY; POSITION ACCURACY WITHIN 1 MILE

D.1.5 Danger to Navigation Reports

Three Danger to Navigation Reports were generated for 8 features. A summary is presented in Table 12 and copies of the reports are included in Appendix I*.
AHB has no record of processing the third DTON and submitting it through MCD. This pipeline (last three obstructions in the table) does not appear on the latest raster charts. It will be submitted with the H-Cell deliverable.

****Appended to this report.***

Table 12
Dangers to Navigation

Item #	Feature	Depth Feet	Depth Meters	Latitude	Longitude	Description
1	Obstruction	31.1	9.47	25-48-43.85	080-05-23.81	Shoal sounding on debris
2	Obstruction	16.3	4.96	25-48-07.81	080-06-15.69	Shoal sounding on rock
3	Obstruction	16.4	5.02	25-48-08.33	080-06-12.84	Shoal sounding on rock
4	Obstruction	15.7	4.80	25-48-44.98	080-06-17.79	Shoal sounding on rock
5	Obstruction	15.3	4.66	25-46-43.19	080-07-15.95	Shoal sounding on rock
6	Obstruction	17.8	5.5	25-45-46.04	080-07-42.23	Inshore end of pipe
7	Obstruction	19.0	5.8	25-45-45.76	080-07-42.54	Middle bend of pipe at channel edge
8	Obstruction	46.0	14.0	25-45-45.42	080-07-43.25	End of pipe in channel

D.2 Additional Results

D.2.1 Shoreline Verification

Shoreline verification was not required for this survey. ***Concur.***

D.2.2 Comparison with Prior Surveys

A comparison with prior surveys was not required for this survey. ***Concur.***

D.2.3 Aids to Navigation (ATON)

D.2.3.1 United States Coast Guard (USCG) ATON

The positions and condition of all charted ATON were verified by visual inspection and detached positions. The surveyed positions and descriptions were compared to the most recent version of the USCG Light List, downloaded from the USCG WWW site (http://www.navcen.uscg.gov/pubs/LightLists/LightLists.htm). Charted ATONs were verified for the largest scale, most recent release of RNC and ENC during chart comparisons.

All ATONs located within the survey limits were on station and determined to adequately serve the intended purpose for which they were established. ***Concur.***
Positions and images were acquired for the ATONs and are included as a separate S-57 feature file (H11897_ATON.hob). ****Submitted with original field records***

D.2.3.2 Private Aids to Navigation

No private aids to navigation were observed in the survey area. ***Concur.***

D.2.4 Restricted Data

Not applicable for this survey. ***Concur.***

D.2.5 Other Data

D.2.5.1 Bottom Characteristics

Twenty-one (21) bottom samples were acquired to determine bottom characteristics. Bottom samples were spaced at approximately 2000-meter intervals in accordance with the SOW*. A table listing the positions and descriptions of the bottom samples obtained is included in Appendix V **. A position and description of each sample are provided as attributed SBDARE objects in a separate S-57 feature file (H11897_Bottom_Samples.hob). Digital images with identification reference numbers are submitted with the survey data and referenced in the S-57 PICREP attribute.
****Submitted with original field records** ****Appended to this report***

D.2.6 S-57 Feature File

D.2.6.1 S-57 Chart Features File

Several uncharted obstructions, wrecks and foul areas were identified and delineated in the SSS data, SWMB data, and BASE surfaces. An S-57 feature file (H11897_ Features.hob) was created to emphasize navigationally significant objects discovered during the survey, update charted objects and to provide information for these objects that could not be portrayed in the BASE surfaces. All S-57 features were attributed in accordance with guidance provided in the SOW* and HSSD. Table 13 describes the attribute mapping for the S-57 feature file.
****Submitted with original field records***

Table 13
S-57 Chart Features Attribute Mapping

S-57 Attribute	Value
VALSOU	Corrected least depth
TECSOU	Technique used to develop VALSOU
INFORM	Unique Critical Sounding ID
SORDAT	Survey Date
SORIND	Survey reference – registry ID
PICREP	Contact image file name
userid*	Unique Contact ID
remrks*	Acquisition or processing remarks
recomd*	Charting recommendations

*These attributes are available in the CARIS Notebook HOB file format.

D.2.6.2 S-57 Contact File

All contacts are submitted in an attributed S-57 feature file of $CSYMB objects. Table 14 describes the attribute mapping for the S-57 contact file.

Table 14
S-57 Contact Attribute Mapping

S-57 Attribute	Value
INFORM	Corrected least depth
SORDAT	Survey Date
SORIND	Survey reference – registry ID
PICREP	Contact image file name
TXTDSC	Unique Critical Sounding ID (Line-beam-ping)
userid*	Unique Contact ID (Line-ping-offset)
remrks*	Acquisition or processing remarks
recomd*	Charting recommendations

*These attributes are available in the CARIS Notebook HOB file format.

D.2.6.3 S-57 Critical Sounding File

All critical soundings are submitted in an attributed S-57 feature file of $CSYMB objects. Table 15 describes the attribute mapping for the S-57 critical soundings file.

Table 15
S-57 Critical Soundings Attribute Mapping

S-57 Attribute	Value
INFORM	Corrected least depth
SORDAT	Survey Date
SORIND	Survey reference – registry ID
PICREP	Contact or feature image file name
TXTDSC	Unique Contact ID (Line-ping-offset)
userid*	Unique Critical Sounding ID (Line-beam-ping)
remrks*	Acquisition or processing remarks
recomd*	Charting recommendations

*These attributes are available in the CARIS Notebook HOB file format.

E. APPROVAL SHEET

LETTER OF APPROVAL

REGISTRY NO. H11897

This report and the accompanying data are respectfully submitted.

Field operations contributing to the accomplishment of Survey H11897 were conducted under my direct supervision with frequent personal checks of progress and adequacy. This report and associated data have been closely reviewed and are considered complete and adequate as per the Statement of Work.

George G. Reynolds
Ocean Surveys, Inc.
Chief of Party – H11897
October 5, 2009

Appendix I

Danger to Navigation Report

Registry Number: H11897

State: Florida

Locality: Atlantic Ocean

Sub-locality: East of Miami Beach

Project Number: OPR-H328-OS-08

Survey Date: 04/21/2009

Charts Affected

Number	Edition	Date	Scale (RNC)	RNC Correction(s)*
11467	41st	06/01/2008	1:40,000 (11467_6)	NGA NTM: 02/28/1998 (05/16/2009)
11466	38th	06/01/2008	1:80,000 (11466_1)	[L]NTM: ?
11469	8th	12/01/2007	1:100,000 (11469_1)	[L]NTM: ?
11460	41st	07/01/2008	1:466,940 (11460_1)	[L]NTM: ?
11451	33rd	09/01/2007	1:495,362 (11451_17) 1:495,362 (11451_16)	[L]NTM: ?
11013	47th	02/01/2008	1:1,200,000 (11013_1)	[L]NTM: ?
411	52nd	09/01/2007	1:2,160,000 (411_1)	[L]NTM: ?

* Correction(s) - *source: last correction applied (last correction reviewed--"cleared date")*

Features

No.	Name	Feature Type	Survey Depth	Survey Latitude	Survey Longitude	AWOIS Item
1.1	31ft Obstruction	Obstruction	9.48 m	25° 48' 43.9" N	080° 05' 23.8" W	---

1 - Dangers to Navigation

1.1) 31ft Obstruction

DANGER TO NAVIGATION

Survey Summary

Survey Position: 25° 48' 43.9" N, 080° 05' 23.8" W

Least Depth: 9.48 m (= 31.10 ft = 5.183 fm = 5 fm 1.10 ft)

TPU (±1.96σ): **THU (TPEh)** [None] ; **TVU (TPEv)** [None]

Timestamp: 2009-111.00:00:00.000 (04/21/2009)

GP Dataset: H11897_DtoN#1.xls

GP No.: 1

Charts Affected: 11467_6, 11466_1, 11469_1, 11460_1, 11451_16, 11451_17, 11013_1, 411_1

Remarks:

Feature depths are corrected to Mean Lower Low Water datum using verified zoned tides. Horizontal positions are referenced to the North American Datum of 1983 (NAD83).

Feature Correlation

Address	Feature	Range	Azimuth	Status
H11897_DtoN#1.xls	1	0.00	000.0	Primary

Hydrographer Recommendations

Recommend charting 31ft obstruction at surveyed location.

Cartographically-Rounded Depth (Affected Charts):

31ft (11467_6, 11466_1, 11451_16, 11451_17)

5fm (11460_1, 11013_1, 411_1)

5fm 1ft (11469_1)

S-57 Data

Geo object 1: Obstruction (OBSTRN)

Attributes: OBJNAM - 31ft obstruction

QUASOU - 6:least depth known

SORDAT - 20090421

SORIND - US,US,nsurf,H11897

TECSOU - 2,3:found by side scan sonar,found by multi-beam

VALSOU - 9.479 m

VERDAT - 12:Mean lower low water

WATLEV - 3:always under water/submerged

Office Notes

Delete reported obstruction from chart (see DR section D.1.2, notes H11897-8 and H11897-9).

Feature Images

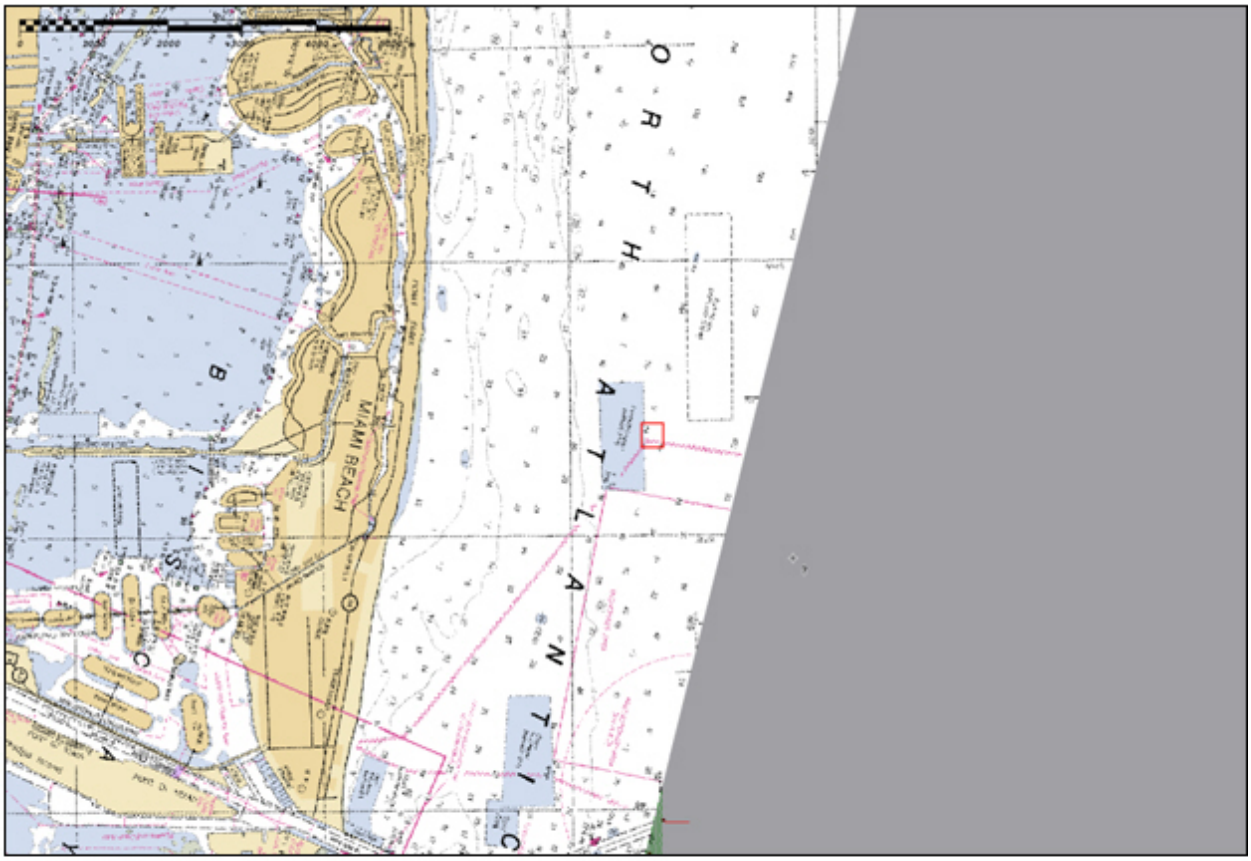


Figure 1 Red box depicting relative location of obstruction.

Figure 1.1.1

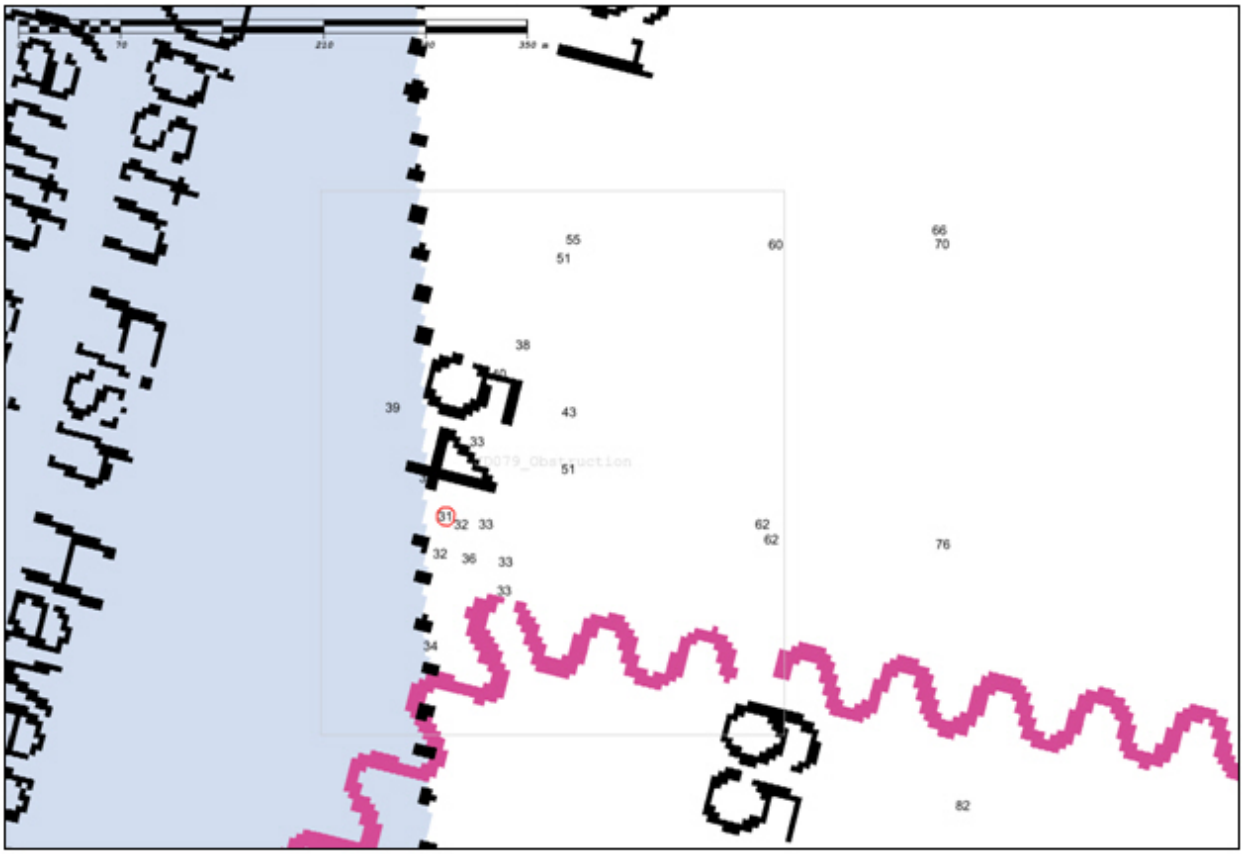


Figure 2 Debris field with 31 feet least depth sounding.

Feature: Debris east of the obstruction fish haven with authorized minimum of 25 feet and located adjacent to charted depth of 54 feet. A least depth sounding of 31.1 feet (9.47 meters) was observed at 080-05-23.81, 25-48-43.85. Surrounding depths are approximately 51 feet. The area of debris has the approximate following dimensions 750x360x20 (LxWxH feet).

Figure 1.1.2

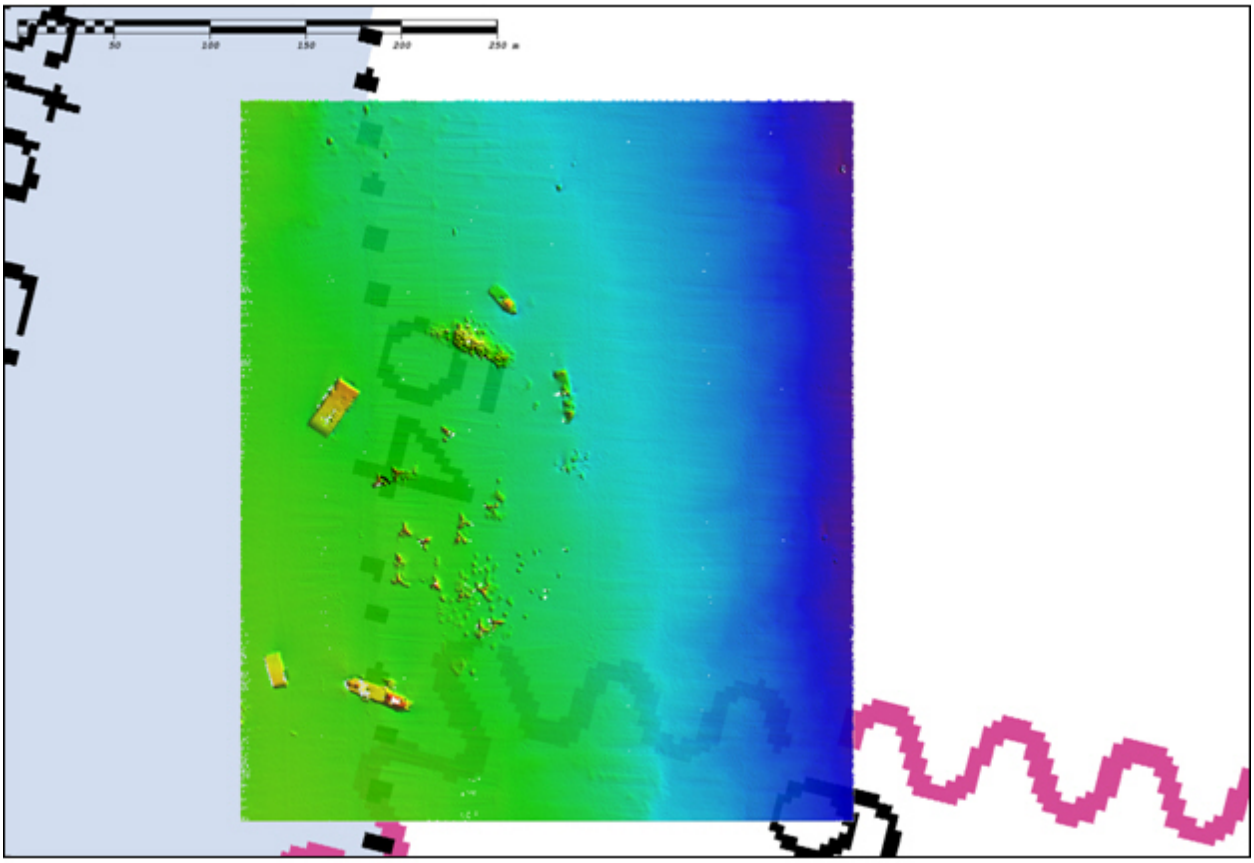


Figure 3 Digital terrain model of debris with chart background

Figure 1.1.3

Registry Number: H11897

State: Florida

Locality: Atlantic Ocean

Sub-locality: East of Miami Beach

Project Number: OPR-H328-OS-08

Survey Date: 04/21/2009

Charts Affected

Number	Edition	Date	Scale (RNC)	RNC Correction(s)*
11468	41st	05/01/2007	1:10,000 (11468_1)	USCG LNM: 05/12/2009 (06/09/2009) NGA NTM: 02/28/1998 (06/13/2009)
11451	33rd	09/01/2007	1:24,000 (11451_8)	[L]NTM: ?
11467	41st	06/01/2008	1:40,000 (11467_6)	[L]NTM: ?
11466	38th	06/01/2008	1:80,000 (11466_1)	USCG LNM: 10/21/2008 (06/09/2009) NGA NTM: 06/07/2008 (06/13/2009)
11451	33rd	09/01/2007	1:80,000 (11451_1)	USCG LNM: 05/12/2009 (06/09/2009) NGA NTM: 03/07/1998 (06/13/2009)
11469	8th	12/01/2007	1:100,000 (11469_1)	USCG LNM: 10/21/2008 (06/09/2009) NGA NTM: 06/07/2008 (06/13/2009)
11460	41st	07/01/2008	1:466,940 (11460_1)	USCG LNM: 10/21/2008 (06/09/2009) NGA NTM: 05/30/2009 (06/13/2009)
11451	33rd	09/01/2007	1:495,362 (11451_17) 1:495,362 (11451_16)	[L]NTM: ?
11013	47th	02/01/2008	1:1,200,000 (11013_1)	[L]NTM: ?
411	52nd	09/01/2007	1:2,160,000 (411_1)	[L]NTM: ?

* Correction(s) - *source: last correction applied (last correction reviewed--"cleared date")*

Features

No.	Name	Feature Type	Survey Depth	Survey Latitude	Survey Longitude	AWOIS Item
1.1	16 ft Obstruction	Obstruction	4.96 m	25° 48' 07.8" N	080° 06' 15.7" W	---
1.2	15 ft Obstruction	Obstruction	4.80 m	25° 48' 45.0" N	080° 06' 17.8" W	---
1.3	15 ft Obstruction	Obstruction	4.66 m	25° 46' 43.2" N	080° 07' 15.9" W	---

1 - Dangers to Navigation

1.1) 16 ft Obstruction

DANGER TO NAVIGATION

Survey Summary

Survey Position: 25° 48' 07.8" N, 080° 06' 15.7" W

Least Depth: 4.96 m (= 16.27 ft = 2.712 fm = 2 fm 4.27 ft)

TPU (±1.96σ): **THU (TPEh)** [None] ; **TVU (TPEv)** [None]

Timestamp: 2009-111.00:00:00.000 (04/21/2009)

GP Dataset: H11897_DtoN#2.xls

GP No.: 1

Charts Affected: 11467_6, 11466_1, 11469_1, 11460_1, 11451_16, 11451_17, 11013_1, 411_1

Remarks:

Feature depths are corrected to Mean Lower Low Water datum using verified zoned tides. Horizontal positions are referenced to the North American Datum of 1983 (NAD83).

Obstruction located adjacent to charted depth of 24 feet. A least depth sounding of 16.3 feet(4.97 meters) was observed at 25-48-07.81, 080-06-15.69. Surrounding depths are approximately 22 feet. The obstruction has the approximate following dimensions 12x12x6 (LxWxH feet).

Feature Correlation

Address	Feature	Range	Azimuth	Status
H11897_DtoN#2.xls	1	0.00	000.0	Primary

Hydrographer Recommendations

Recommend charting 16ft obstruction at surveyed location

Cartographically-Rounded Depth (Affected Charts):

16ft (11467_6, 11466_1, 11451_16, 11451_17)

2 ¾fm (11460_1, 11013_1, 411_1)

2fm 4ft (11469_1)

S-57 Data

Geo object 1: Obstruction (OBSTRN)

Attributes: OBJNAM - 16ft Obstn

QUASOU - 6:least depth known

SORDAT - 20090421

SORIND - US,US,nsurf,H11897

TECSOU - 3:found by multi-beam

VALSOU - 4.96 m

VERDAT - 12:Mean lower low water

WATLEV - 3:always under water/submerged

Office Notes

Delete reported obstruction from chart (see DR section D.1.2, note H11897-11).

Feature Images

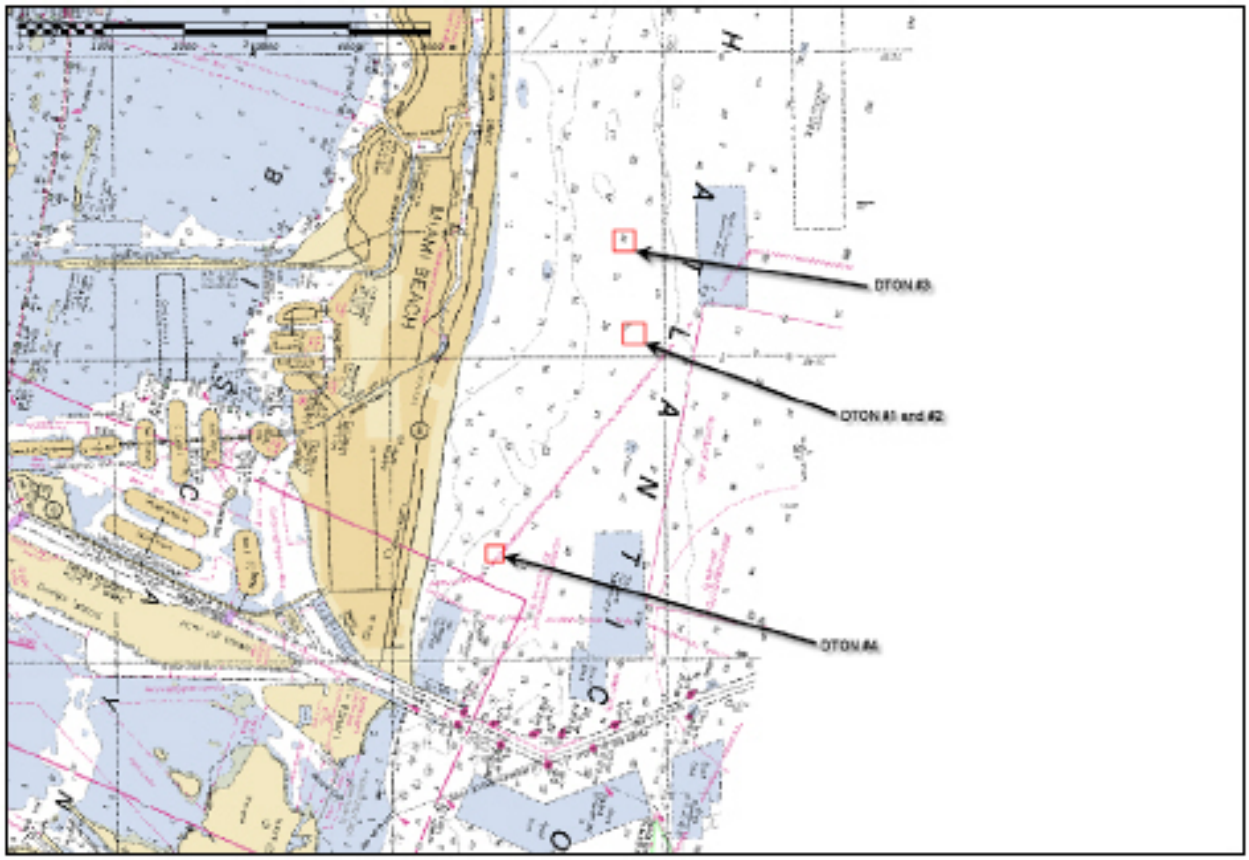


Figure 1 Red box depicting relative locations of obstructions.

Figure 1.1.1

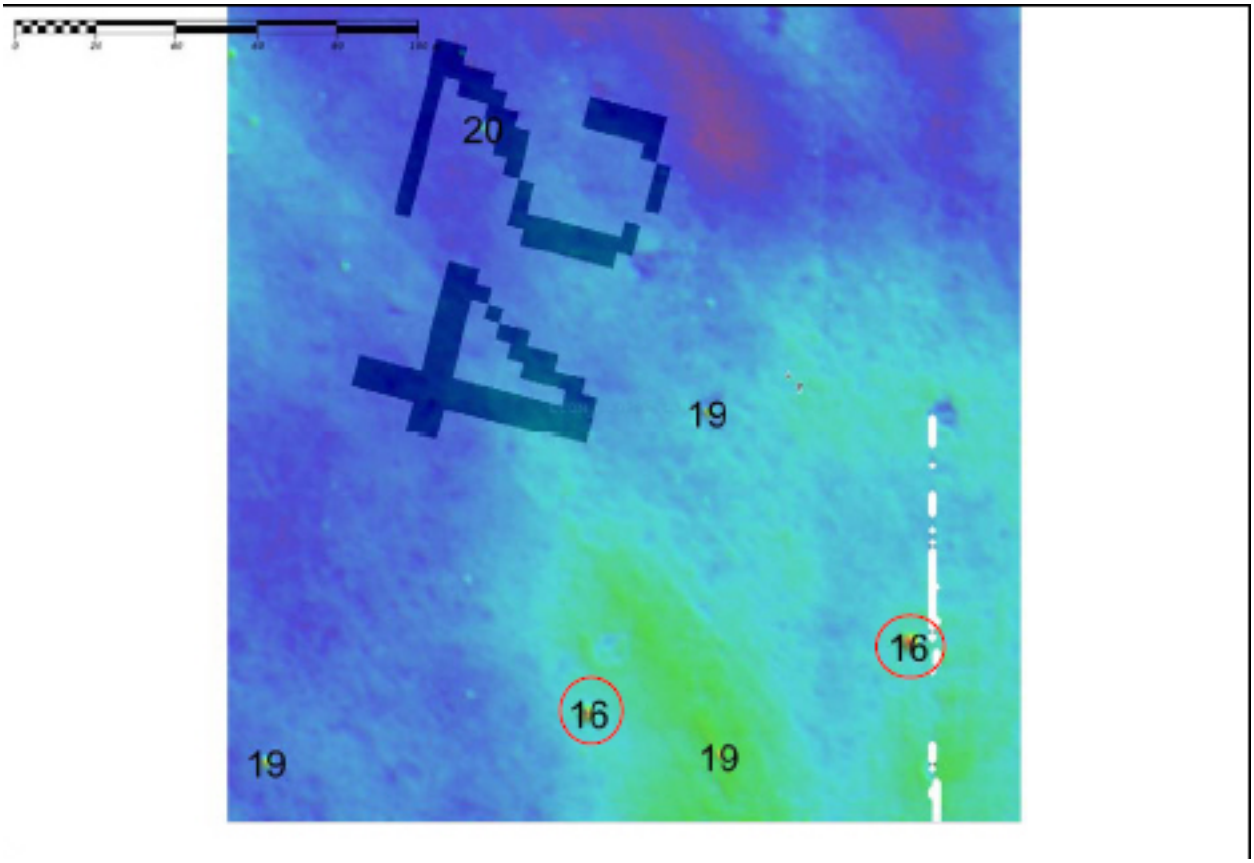


Figure 1.1.2

1.2) 15 ft Obstruction

DANGER TO NAVIGATION

Survey Summary

Survey Position: 25° 48' 45.0" N, 080° 06' 17.8" W

Least Depth: 4.80 m (= 15.75 ft = 2.625 fm = 2 fm 3.75 ft)

TPU (±1.96σ): **THU (TPEh)** [None] ; **TVU (TPEv)** [None]

Timestamp: 2009-111.00:00:00.000 (04/21/2009)

GP Dataset: H11897_DtoN#2.xls

GP No.: 2

Charts Affected: 11467_6, 11466_1, 11469_1, 11460_1, 11451_16, 11451_17, 11013_1, 411_1

Remarks:

Feature depths are corrected to Mean Lower Low Water datum using verified zoned tides. Horizontal positions are referenced to the North American Datum of 1983 (NAD83).

Obstruction located adjacent to charted depth of 22 feet. A least depth sounding of 15.7 feet (4.80 meters) was observed at 25-48-44.98, 080-06-17.79. Surrounding depths are approximately 22 feet. The obstruction has the approximate following dimensions 12x10x6 (LxWxH feet).

Feature Correlation

Address	Feature	Range	Azimuth	Status
H11897_DtoN#2.xls	2	0.00	000.0	Primary

Hydrographer Recommendations

Recommend charting 15ft obstruction at surveyed location

Cartographically-Rounded Depth (Affected Charts):

15ft (11467_6, 11466_1, 11451_16, 11451_17)

2 ½fm (11460_1, 11013_1, 411_1)

2fm 3ft (11469_1)

S-57 Data

Geo object 1: Obstruction (OBSTRN)

Attributes: OBJNAM - 15ft Obstn

QUASOU - 6:least depth known

SORDAT - 20090421

SORIND - US,US,nsurf,H11897

TECSOU - 3:found by multi-beam

VALSOU - 4.8 m

VERDAT - 12:Mean lower low water

WATLEV - 3:always under water/submerged

Office Notes

Delete reported obstruction from chart (see DR section D.1.2, note H11897-10).

Feature Images

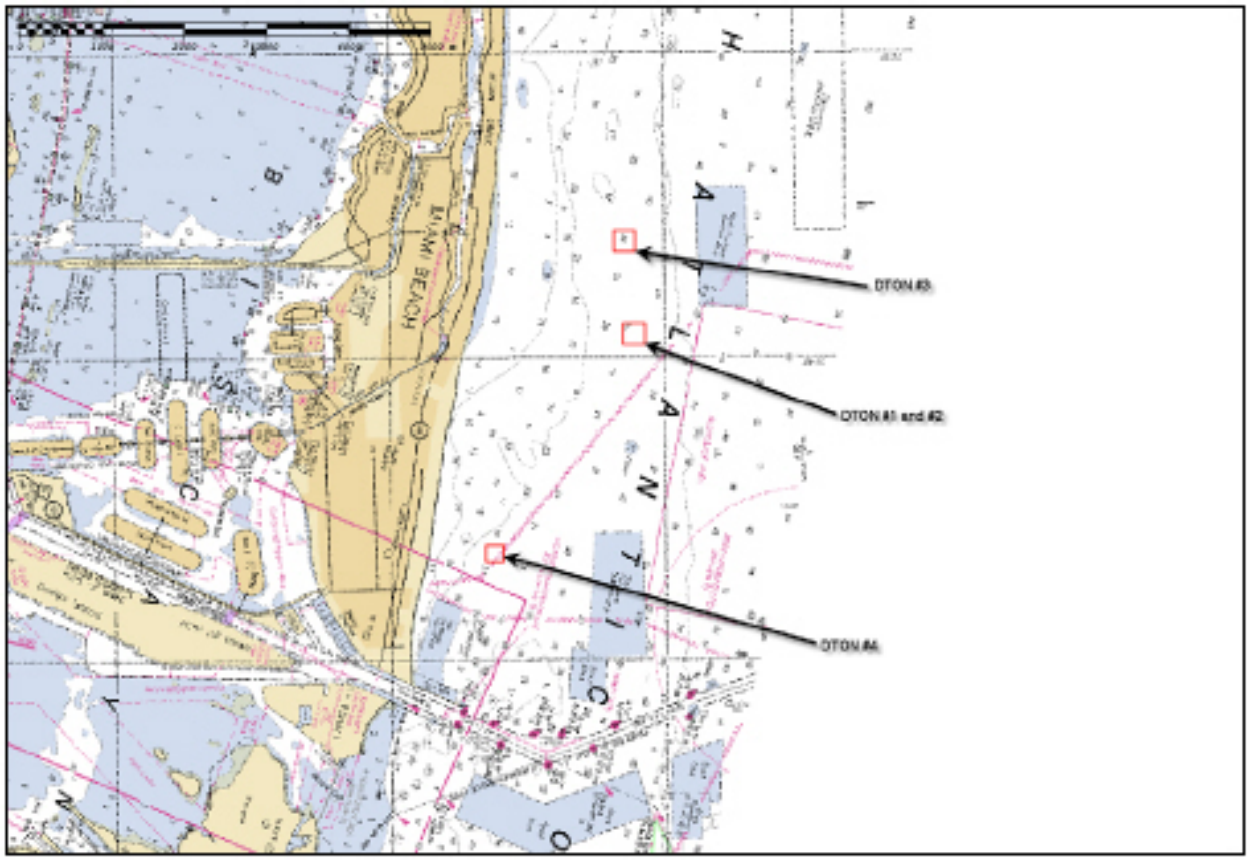


Figure 1 Red box depicting relative locations of obstructions.

Figure 1.2.1

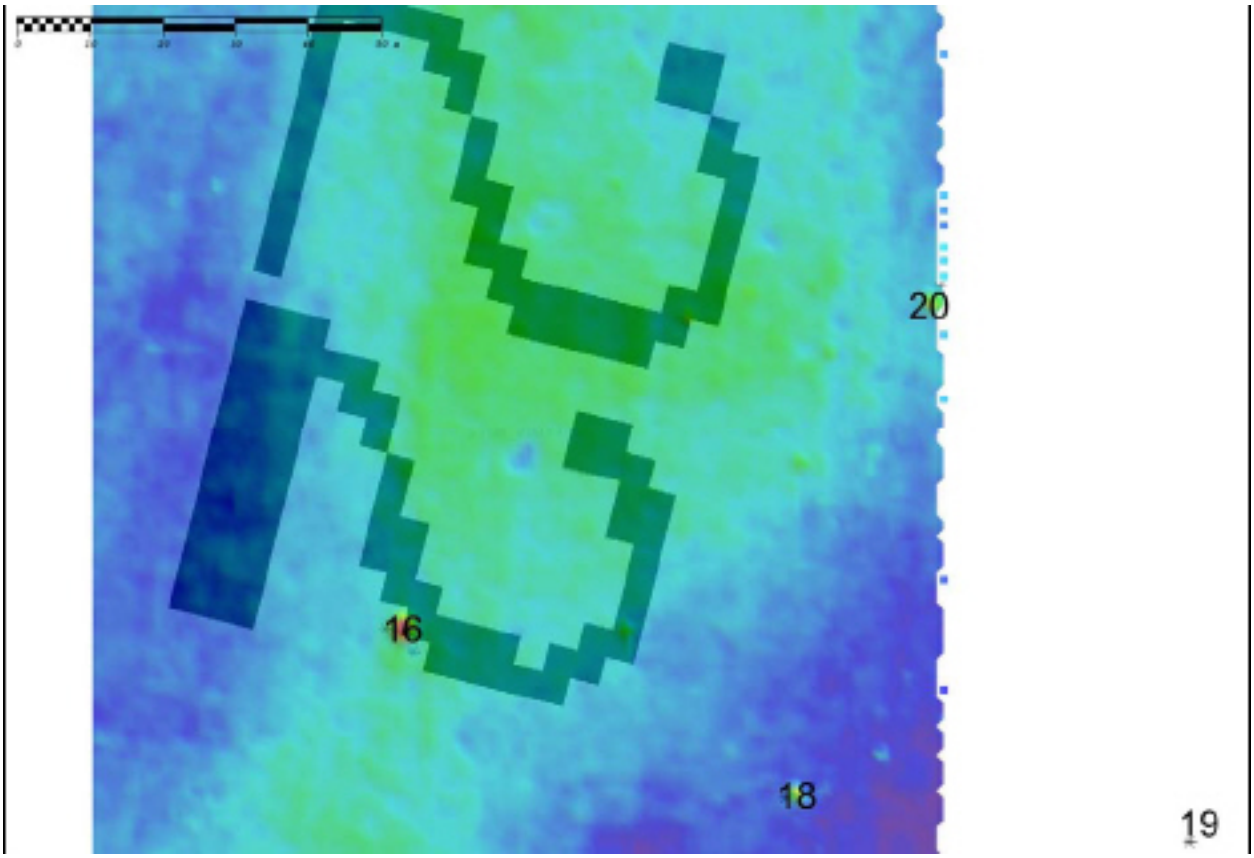


Figure 1.2.2

1.3) 15 ft Obstruction

DANGER TO NAVIGATION

Survey Summary

Survey Position: 25° 46' 43.2" N, 080° 07' 15.9" W

Least Depth: 4.66 m (= 15.29 ft = 2.548 fm = 2 fm 3.29 ft)

TPU (±1.96σ): **THU (TPEh)** [None] ; **TVU (TPEv)** [None]

Timestamp: 2009-111.00:00:00.000 (04/21/2009)

GP Dataset: H11897_DtoN#2.xls

GP No.: 3

Charts Affected: 11468_1, 11451_8, 11467_6, 11451_1, 11466_1, 11469_1, 11460_1, 11451_16, 11451_17, 11013_1, 411_1

Remarks:

Feature depths are corrected to Mean Lower Low Water datum using verified zoned tides. Horizontal positions are referenced to the North American Datum of 1983 (NAD83).

Obstruction located approximately 200 meters south of charted depth of 21 feet, and approximately 200 meters seaward of 18 feet depth contour. A least depth sounding of 15.3 feet (4.66 meters) was observed at 25-46-43.19, 080-07-15.95. Surrounding depths are approximately 22 feet. The obstruction has the approximate following dimensions 10x10x6.5 (LxWxH feet).

Feature Correlation

Address	Feature	Range	Azimuth	Status
H11897_DtoN#2.xls	3	0.00	000.0	Primary

Hydrographer Recommendations

Recommend charting 15ft obstruction at surveyed location

Cartographically-Rounded Depth (Affected Charts):

15ft (11468_1, 11451_8, 11467_6, 11451_1, 11466_1, 11451_16, 11451_17)

2 ½fm (11460_1, 11013_1, 411_1)

2fm 3ft (11469_1)

S-57 Data

Geo object 1: Obstruction (OBSTRN)

Attributes:

OBJNAM - 15ft Obstn

QUASOU - 6:least depth known

SORDAT - 20090421

SORIND - US,US,nsurf,H11897

TECSOU - 3:found by multi-beam

VALSOU - 4.66 m

VERDAT - 12:Mean lower low water

WATLEV - 3:always under water/submerged

Office Notes

Revise depth and position of reported Obstruction (see DR section D.1.2, note H11897-13).

Feature Images

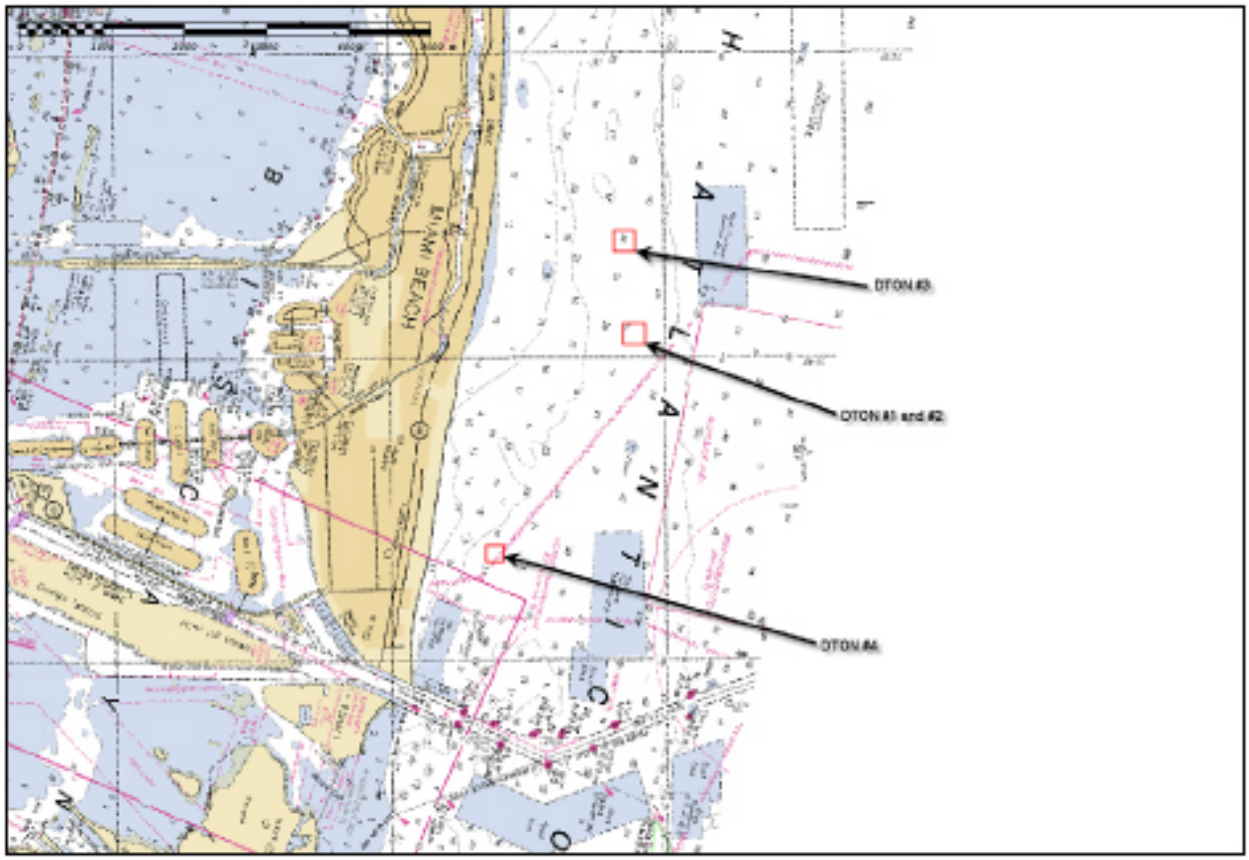


Figure 1 Red box depicting relative locations of obstructions.

Figure 1.3.1

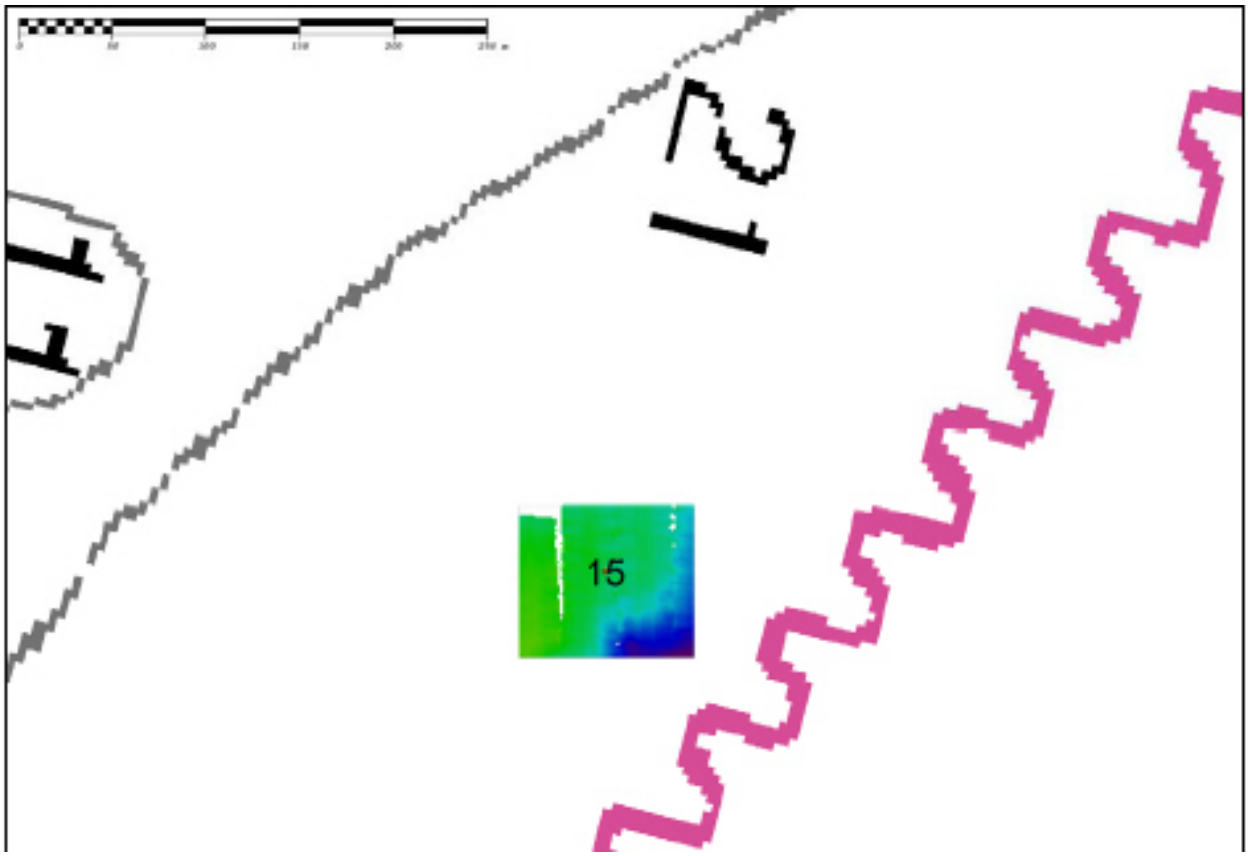


Figure 1.3.2

Appendix II

Survey Feature Report

H11897 AWOIS Report

Hydrographic Survey Registry Number: H11897

State: Florida

General Locality: Atlantic Ocean

Sub Locality: East of Miami Beach

Project Number OPR-H328-OS-08-B

Survey Dates: March 13, 2009 – July 5, 2009

Record: 11706

Lat/Long: 25-45-49.68N, 80-05-40.60W

Description: H10748/97--OPR-H300-KR-97; LOCATED AN OBSTRUCTION IN 25/45/49.68N, 080/05/40.60W (NAD83) WITH A LEAST DEPTH OF 33' MLLW. (ENTERED 10/02 BY MBH) S00008/03 -- 200% Side Scan Sonar coverage was conducted. This item was identified. Updated 12/1/2006 J

Status: Area surveyed with 200% SSS and SWMB. No object within 50m of specified position was observed. A least depth of 40.6 feet (12.4 meters) was observed in the vicinity of Record 11706.

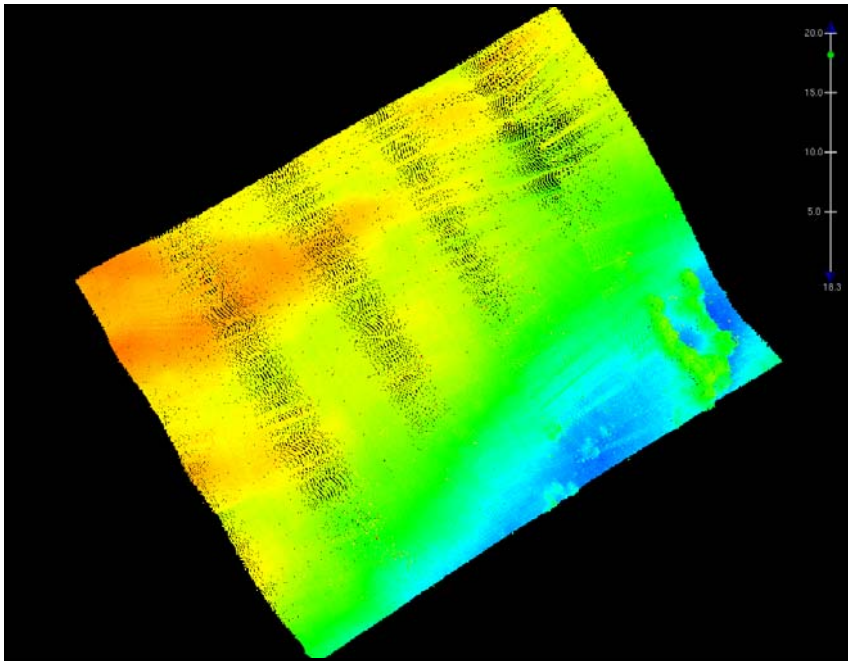


Figure 1. Three-dimensional subset view disproving Record 11706.

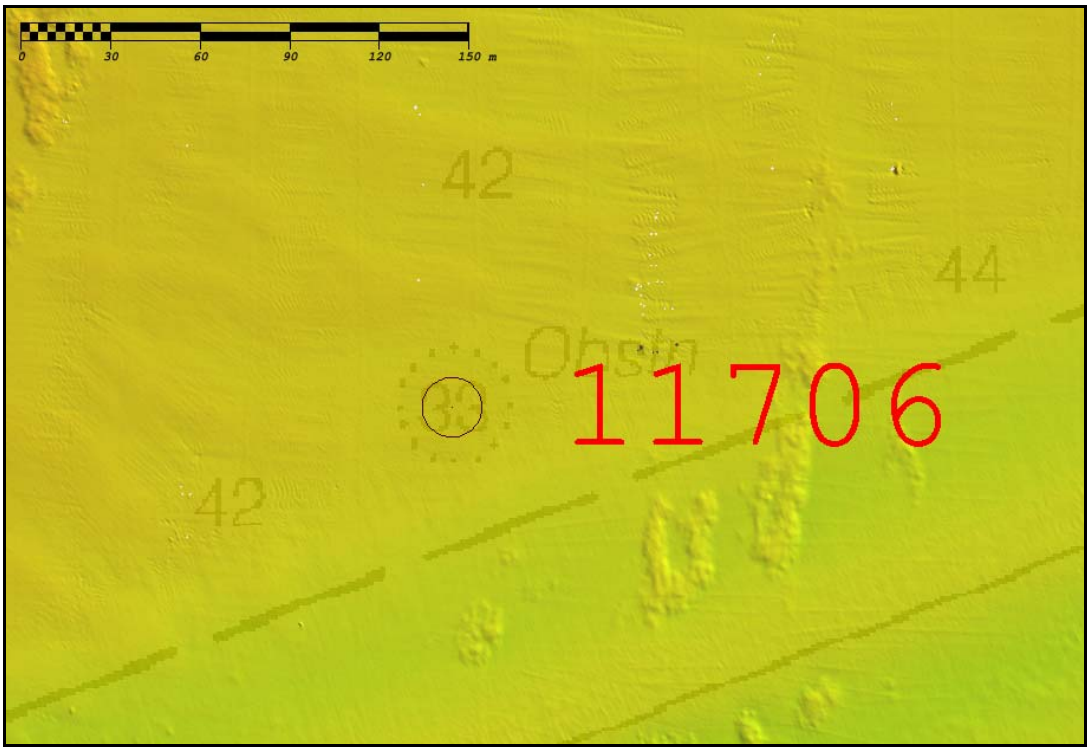


Figure 2. DTM disproving Record 11706.

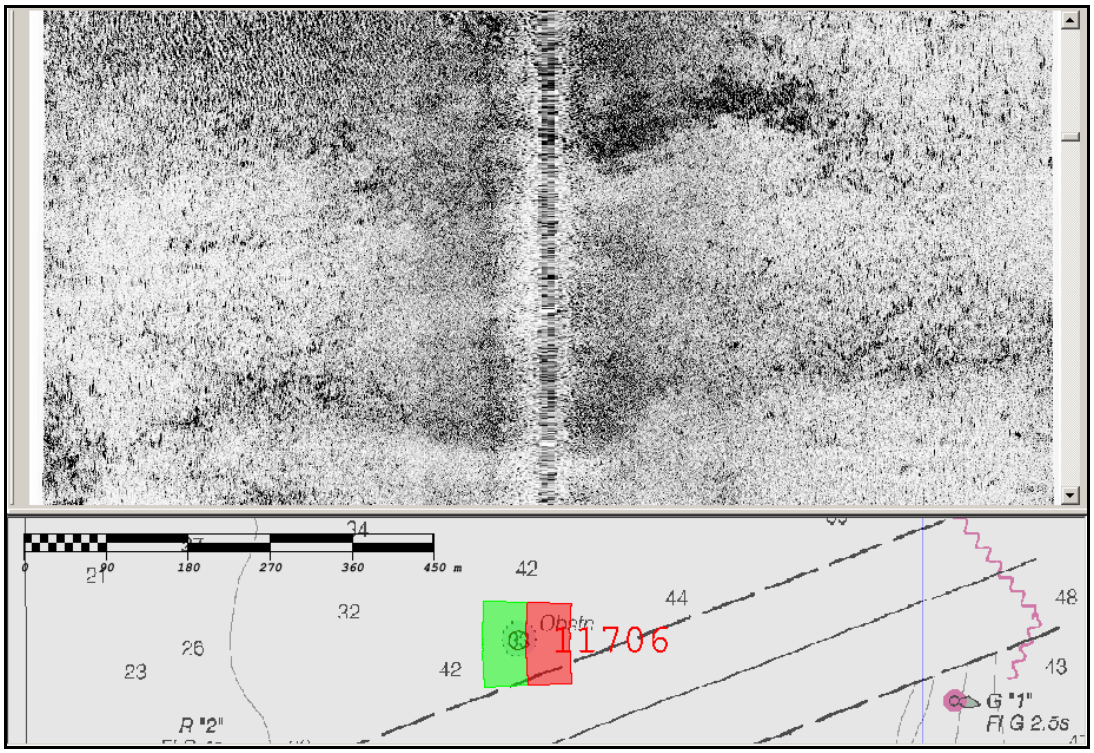


Figure 3. SSS Line 095-123514-404 disproving Record 11706.

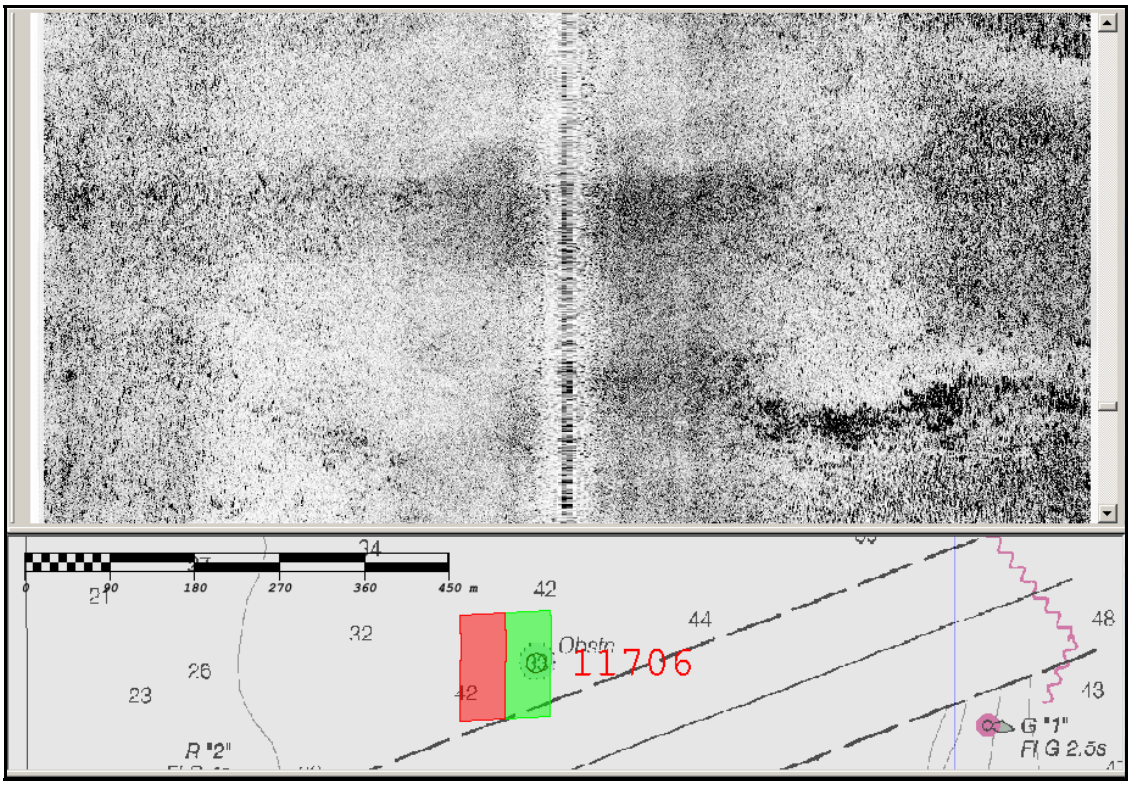


Figure 4. SSS Line 095-130415-403 disproving Record 11706.

Record: 10460

Lat/Long: 25-45-40.03N, 80-05-48.70W

Description: H-10748 & A; OPR-H300-AHP; LIDAR CONTACT INVESTIGATED AND FOUND TO BE A OLD BUOY ANCHOR CONCRETE BLOCK WITH A LEAST DEPTH OF 31 FT IN POS. 25 45 40.03N, 080 05 48.7W. ENTERED 9/99 MCR

Status: Area surveyed with 200% SSS and SWMB. A least depth sounding of 31.6 feet (9.6 meters) was observed at 25-45-39.823N, 080-05-49.006W.

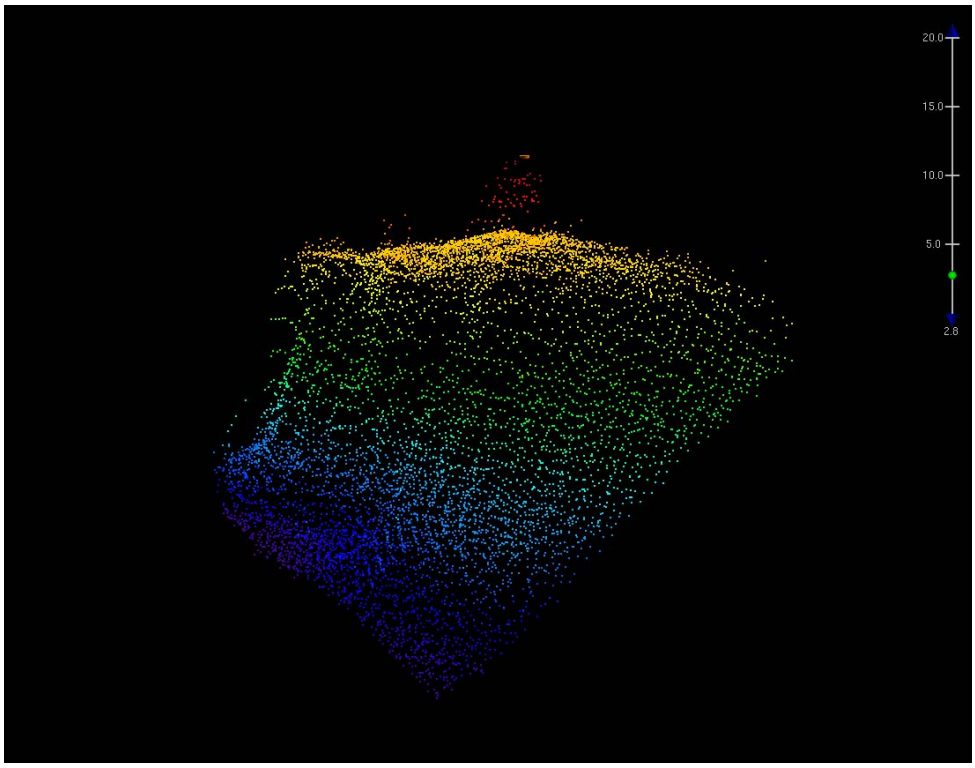


Figure 5. A Three-dimensional subset view of Record 10460

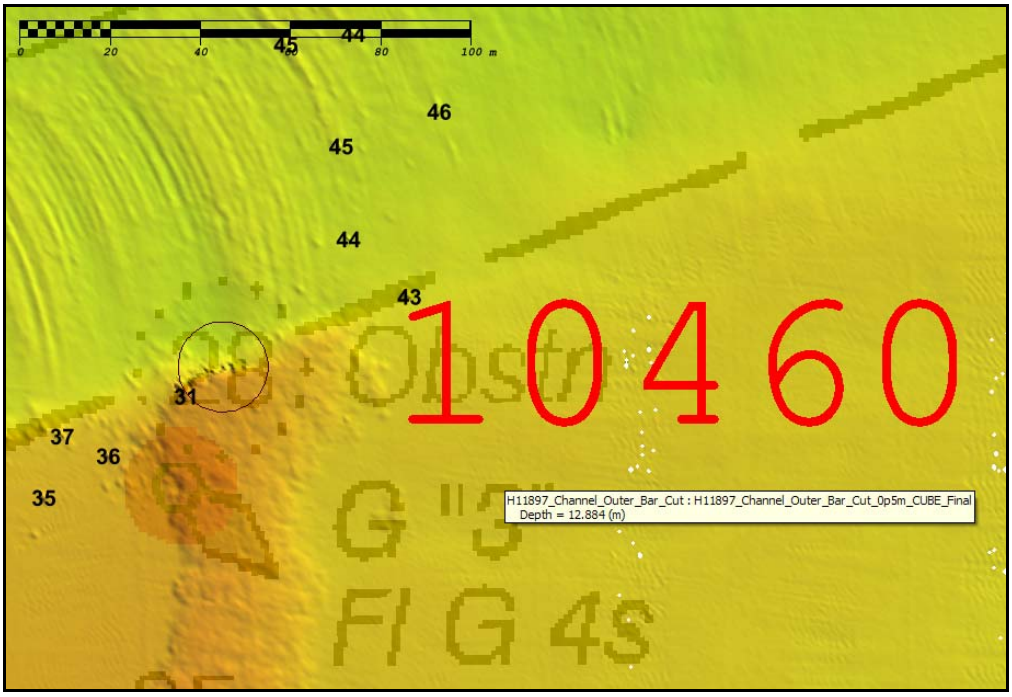


Figure 6. DTM of Record 10460

Record: 10461

Lat/Long: 25-47-23.83N, 80-06-14.87W

Description: HISTORY H-10748A; OPR-H300-AHP; AN UNCHARTED OBSTRUCTION WAS FOUND IN POS.25 47 23.83N, 080 06 14.87W, NO DESCRITION GIVEN. ENTERED 9/99 MCR

Status: Area surveyed with 200% SSS and SWMB. A least depth sounding of 17.8 feet (5.44 meters) was observed at 25-47-23.860N, 080-06-14.957W.

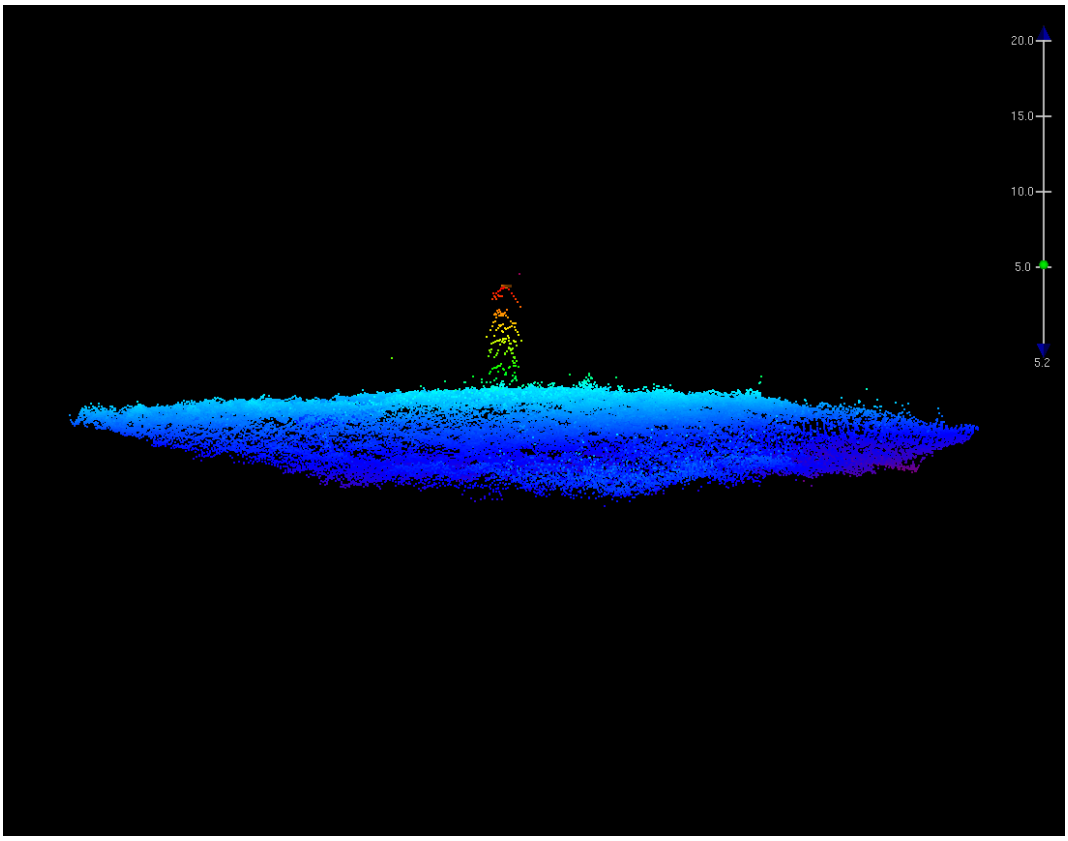


Figure 7. Three-dimensional subset view of Record 10461.

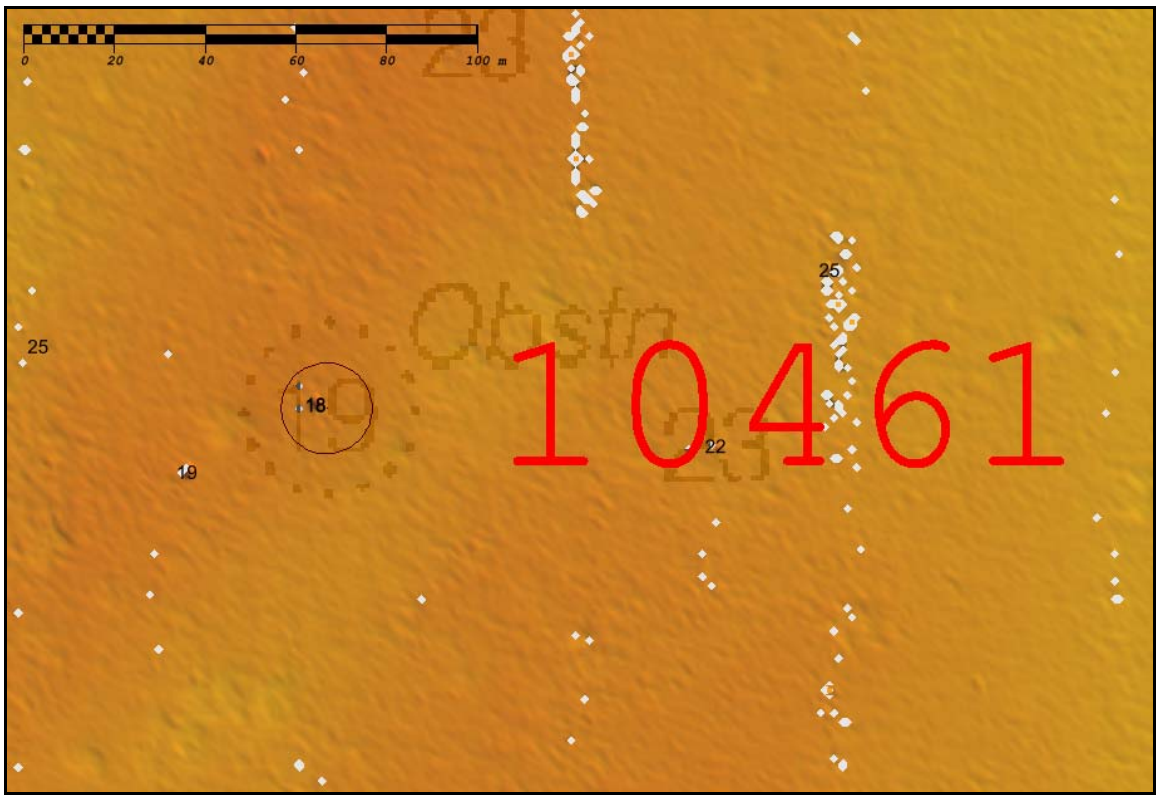


Figure 8. DTM of Record 10461.

Record: 93

Lat/Long: 25-48-37.35N, 80-05-08.15W

Description: 01 1936 24 NO.8380; CARGO, 3482 GT,SUNK 11/4/35 BY MARINE CASUALTY; POSITION ACCURACY WITHIN 1 MILE

Status: Area surveyed with 200% SSS and SWMB. Several wrecks were observed within specified radius, but record 93 could not be identified. A wreck was located approximately 750 meters northwest of record 93 that could possibly be a sunken cargo ship. A least depth sounding of 131 feet (39.9 meters) was observed at 25-48-57.156N, 080-04-51.700W.

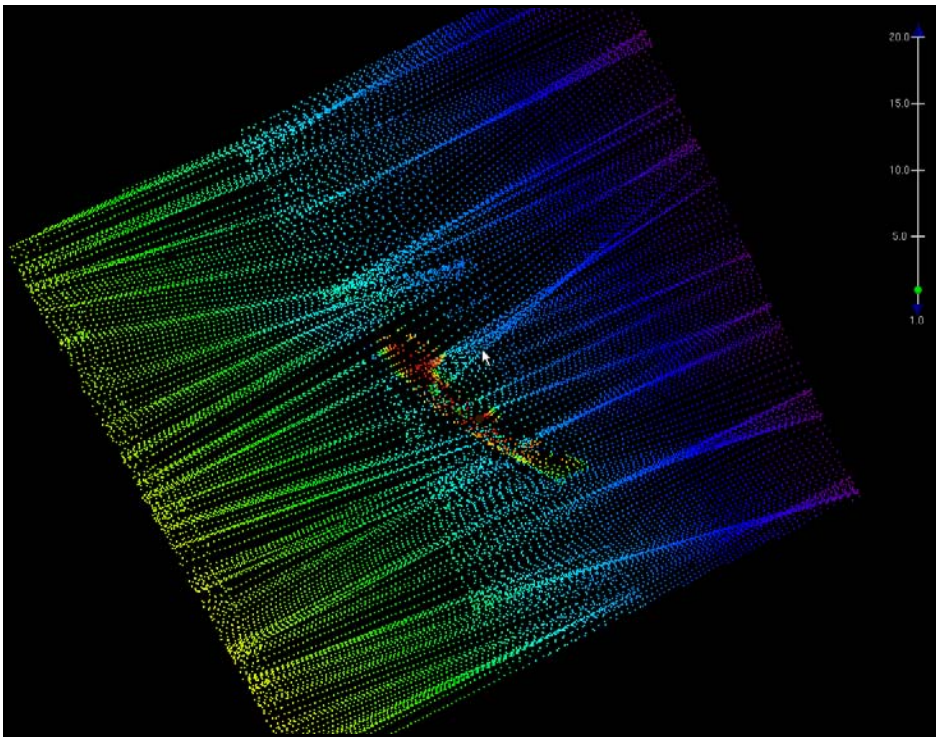


Figure 9. Three-dimensional subset view of possible sunken cargo ship.

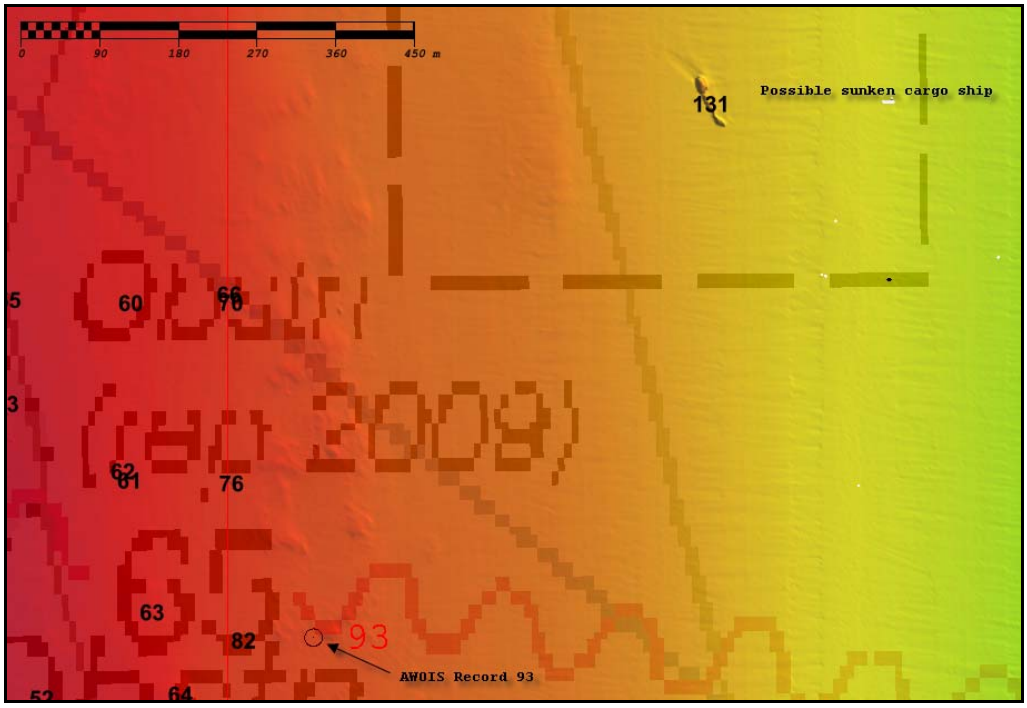


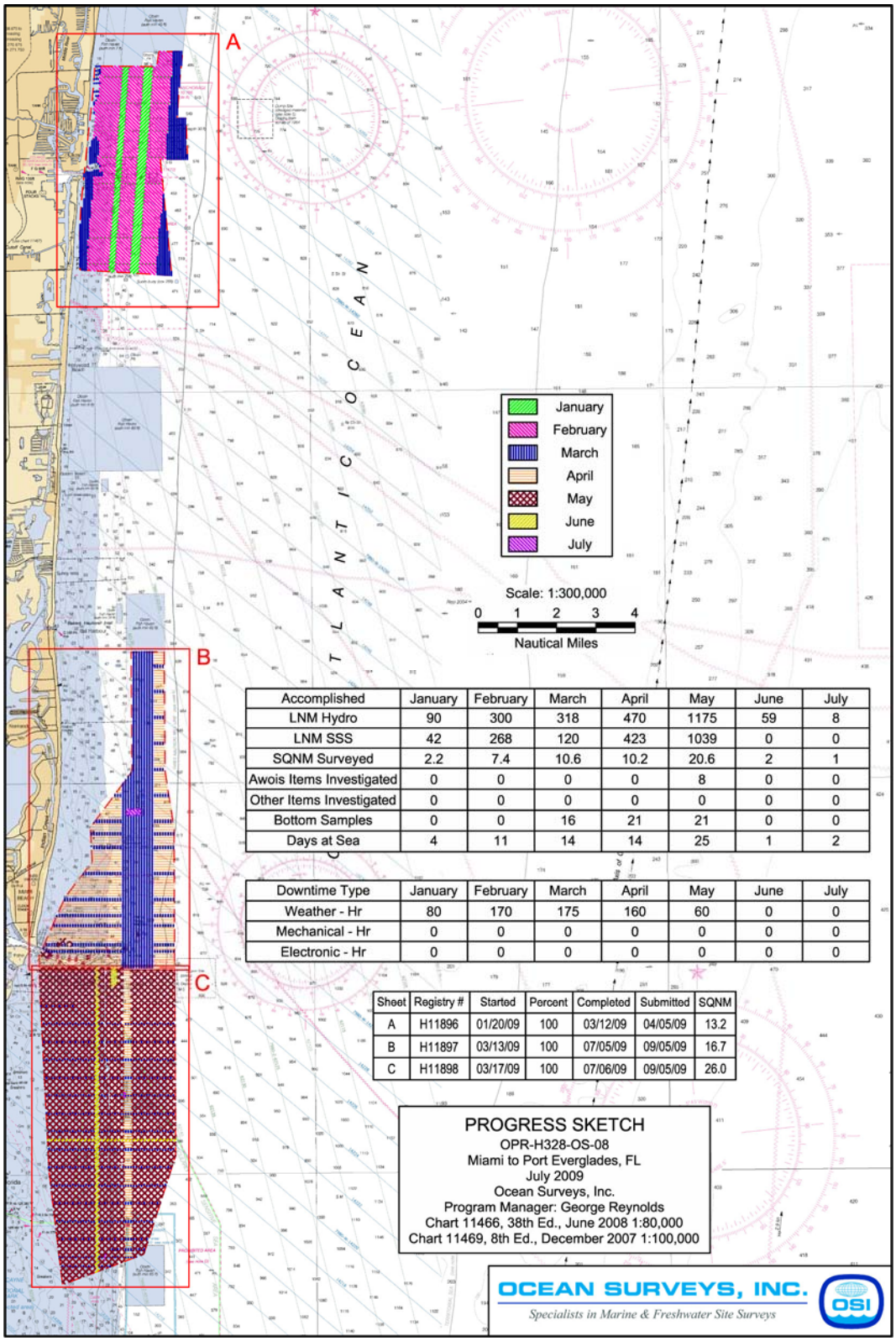
Figure 10. DTM of possible sunken cargo ship (top right) in relation to AWOIS Record 93 (Bottom).

Appendix III

Final Progress Sketch

And

Survey Outline



Accomplished	January	February	March	April	May	June	July
LNM Hydro	90	300	318	470	1175	59	8
LNM SSS	42	268	120	423	1039	0	0
SQNM Surveyed	2.2	7.4	10.6	10.2	20.6	2	1
Awois Items Investigated	0	0	0	0	8	0	0
Other Items Investigated	0	0	0	0	0	0	0
Bottom Samples	0	0	16	21	21	0	0
Days at Sea	4	11	14	14	25	1	2

Downtime Type	January	February	March	April	May	June	July
Weather - Hr	80	170	175	160	60	0	0
Mechanical - Hr	0	0	0	0	0	0	0
Electronic - Hr	0	0	0	0	0	0	0

Sheet	Registry #	Started	Percent	Completed	Submitted	SQNM
A	H11896	01/20/09	100	03/12/09	04/05/09	13.2
B	H11897	03/13/09	100	07/05/09	09/05/09	16.7
C	H11898	03/17/09	100	07/06/09	09/05/09	26.0

Figure 1. Final Progress Sketch Inclusive of Survey H11897.

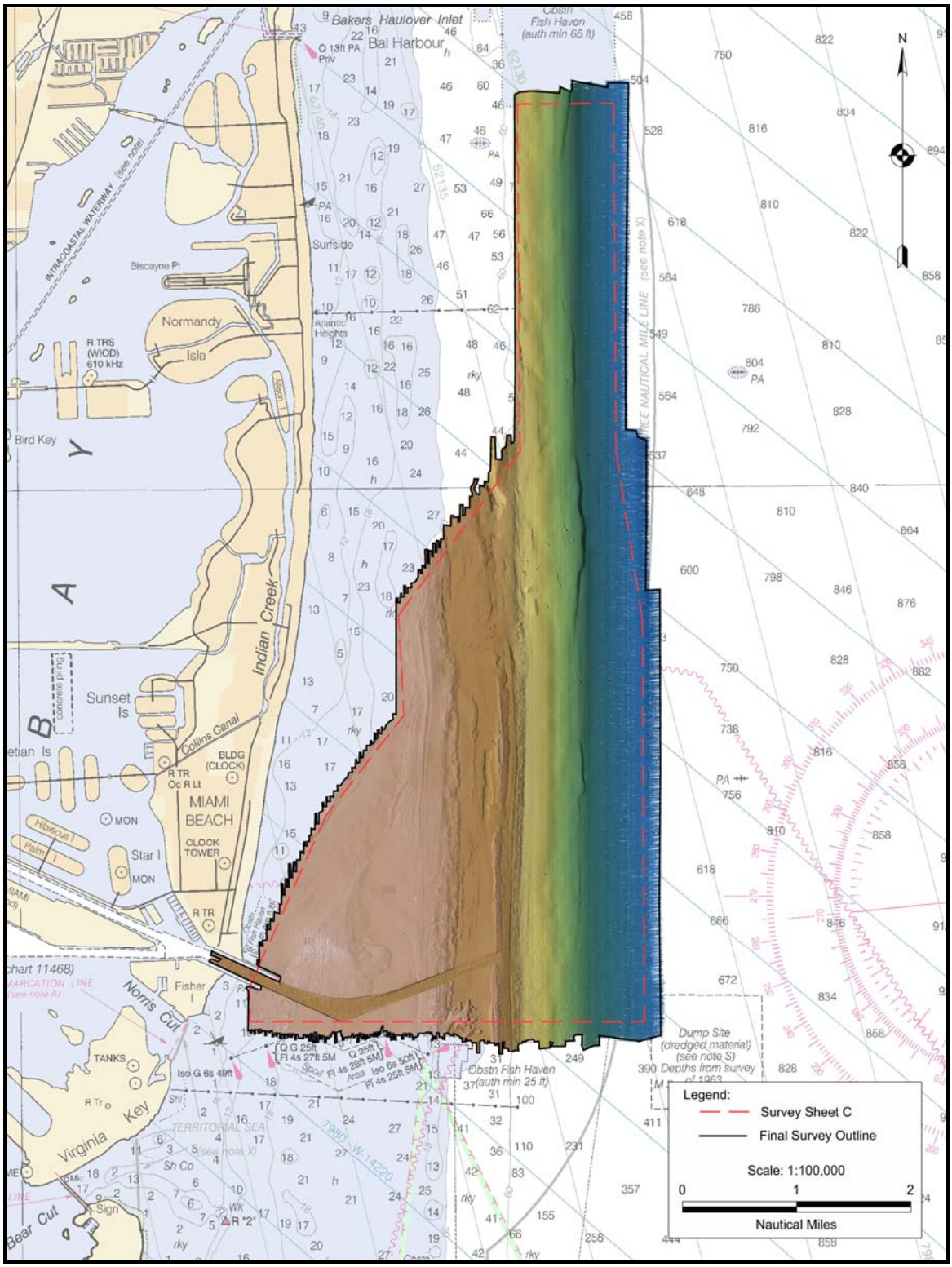


Figure 2. Final Survey Outline.

Appendix IV

Tides and Water Levels

Abstract of Times of Hydrography

The following table, "Abstract of Times of Hydrography," summarizes the days in which data were collected that contribute to the final accepted data set.

Date	Day Number	Min. Time UTC	Max. Time UTC
3/13/09	72	15:21:06	16:50:10
3/16/09	75	13:19:39	22:16:28
3/18/09	77	13:46:25	14:37:25
3/19/09	78	13:43:08	16:02:04
3/20/09	79	11:54:05	18:40:26
3/29/09	88	13:56:38	16:20:49
3/30/09	89	12:51:52	0:00:00
3/31/09	90	0:00:00	0:11:06
3/31/09	90	13:48:57	22:38:45
4/4/09	94	12:31:20	23:07:46
4/5/09	95	12:34:52	23:41:22
4/6/09	96	12:52:46	16:51:09
4/7/09	97	12:43:51	19:30:59
4/9/09	99	11:30:19	23:14:10
4/11/09	101	11:36:01	17:38:47
4/12/09	102	11:23:18	22:12:02
4/15/09	105	11:52:18	22:38:32
4/21/09	111	11:27:33	0:00:00
4/22/09	112	0:00:00	0:12:57
5/26/09	146	11:21:00	16:11:19
5/28/09	148	12:35:11	23:24:22
5/29/09	149	18:17:37	18:46:50
7/5/09	186	14:14:36	14:17:25

The COTR was notified via e-mail and telephone communications that the OSI field team was ready to commence survey operations. The COTR subsequently instructed CO-OPS to begin providing OSI with verified tides.

From: Manoj Samant [mailto:Manoj.Samant@noaa.gov]
Sent: Thursday, June 25, 2009 7:02 PM
To: Mark.T.Lathrop
Cc: _NOS CO-OPS FDCC; _NOS CO-OPS Hydro; DMAT; Brad Wynn; Marty Welch
Subject: Re: [Fwd: Re: Virginia Key verified tides]

Hi Mark:

We heard that there was lightning strike and that might have caused this problem. We are investigating and will get back to you.

Brad/Marty/Seth/Larry: I understand Air Sea Systems has taken a trip or taking a trip. Please request a complete download of the data so that if the data is available, we can fill the data gap between 5/21/2009 to 5/27/2009. Thanks.

Manoj

_____

Mark.T.Lathrop wrote:
CO-OPS,

Has there been any progress on the missing Virginia Key tide data?

Thanks,

Mark

_____

Subject:
RE: Virginia Key verified tides
From:
George Reynolds <ggr@oceansurveys.com>

Date:
Fri, 19 Jun 2009 11:42:49 -0400
To:
'"Mark.T.Lathrop"' <Mark.T.Lathrop@noaa.gov>

To:
'"Mark.T.Lathrop"' <Mark.T.Lathrop@noaa.gov>

Hi Mark,

Any word from Co-OPs regarding the status of the missing tide data?

Regards
George

_____
From: George Reynolds [mailto:ggr@oceansurveys.com]
Sent: Friday, June 05, 2009 2:54 PM
To: 'Mark.T.Lathrop'
Subject: Virginia Key verified tides

Mark,

Just following up on the Virginia Key tide gauge outage. There appears to be a one week gap (5/21/09 thru 5/27/09) in the Co_Ops verified tide data.

8723214 2009/05/21 23:12 0.763 0.020 0 0 0 0
8723214 2009/05/21 23:18 0.764 0.018 0 0 0 0

8723214 2009/05/27 17:18 0.640 0.008 0 0 0 0
8723214 2009/05/27 17:24 0.649 0.009 0 0 0 0

Regards
George

Appendix V

Supplemental Survey Records and Correspondence

Bottom Samples

Bottom samples were obtained at required grid node locations (i.e. 2000 meters across site and 1200 meters in anchorages in water depth less than 100 feet per an e-mail modification to the SOW on October 28, 2008. The field team elected to collect a number of supplemental samples. The table below summarizes the sediment grabs collected during Survey H11897. Sediment grab locations are included as a separate S-57 feature file (H11897_Bottom_Samples.hob).

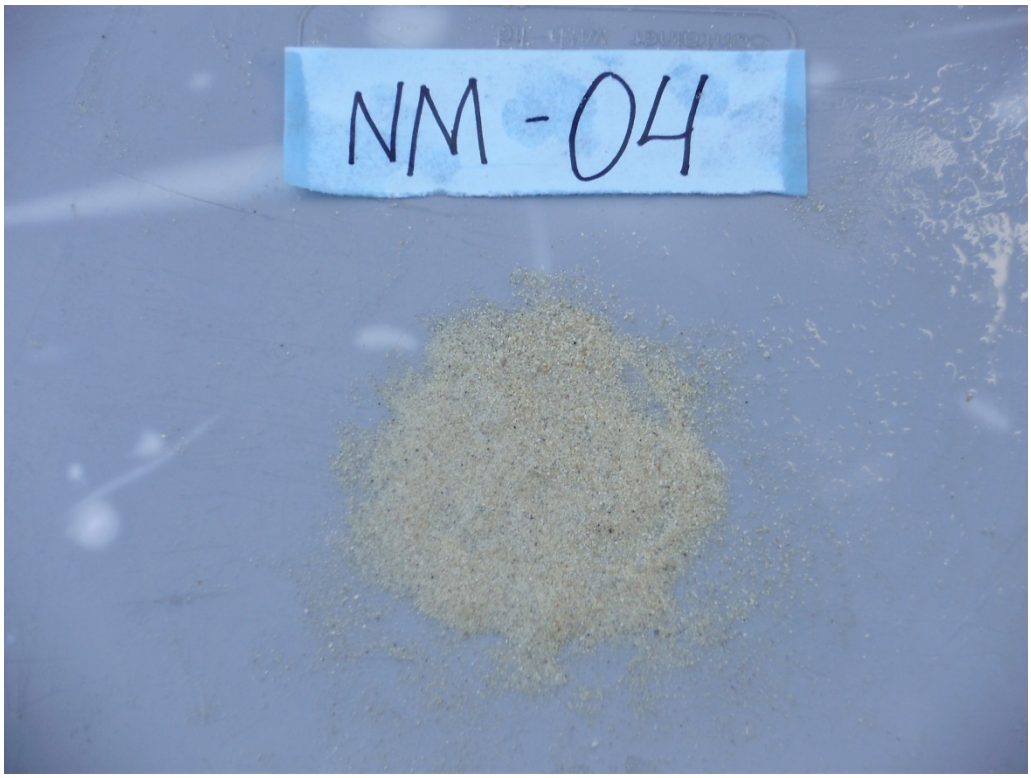
OSI Bottom Sample Designation	Latitude, N (NAD83)	Longitude, W (NAD83)	Depth (meters)	Description
NM-01	25-52-52.00	080-04-41.84	70.9	Fine, Yellowish to Light Brown, Sand
NM-02	25-51-48.97	080-04-42.12	69.4	Fine, Yellowish to Light Brown, Sand with Shell
NM-03	25-50-45.52	080-04-42.65	65.8	Fine, Yellowish to Light Brown, Sand with Shell
NM-04	25-49-42.38	080-04-40.31	66.5	Fine, Yellowish, Sand
NM-05	25-49-38.92	080-05-27.67	17.7	Fine-Medium, Light Gray, Sand with Shell
NM-06	25-48-48.87	080-06-10.71	6.5	Medium, Light Gray, Sand with Coral and Vegetation
NM-07	25-48-48.37	080-05-16.95	18.7	Fine, Light Brown, Sand with Shell
NM-08	25-48-48.28	080-04-35.79	72.0	Fine-Medium, Light Gray, Sand with Shell
NM -09	25-47-44.67	080-04-36.26	72.4	Fine-Medium, Light Gray, Sand with Shell
NM -10	25-47-45.17	080-05-17.72	11.6	Fine-Medium, Yellowish to Light Gray, Sand with Coral and Vegetation
NM -11	25-47-45.50	080-06-20.43	8.0	Medium, Yellowish to Light Gray, Sand
NM -12	25-47-08.03	080-06-27.87	8.6	Medium, Yellowish to Light Gray, Sand with Shell
NM -13	25-47-07.74	080-05-17.65	15.2	Fine, Yellowish, Sand and Coral
NM -14	25-47-07.44	080-04-36.39	73.4	Fine-Medium, Light Gray, Sand

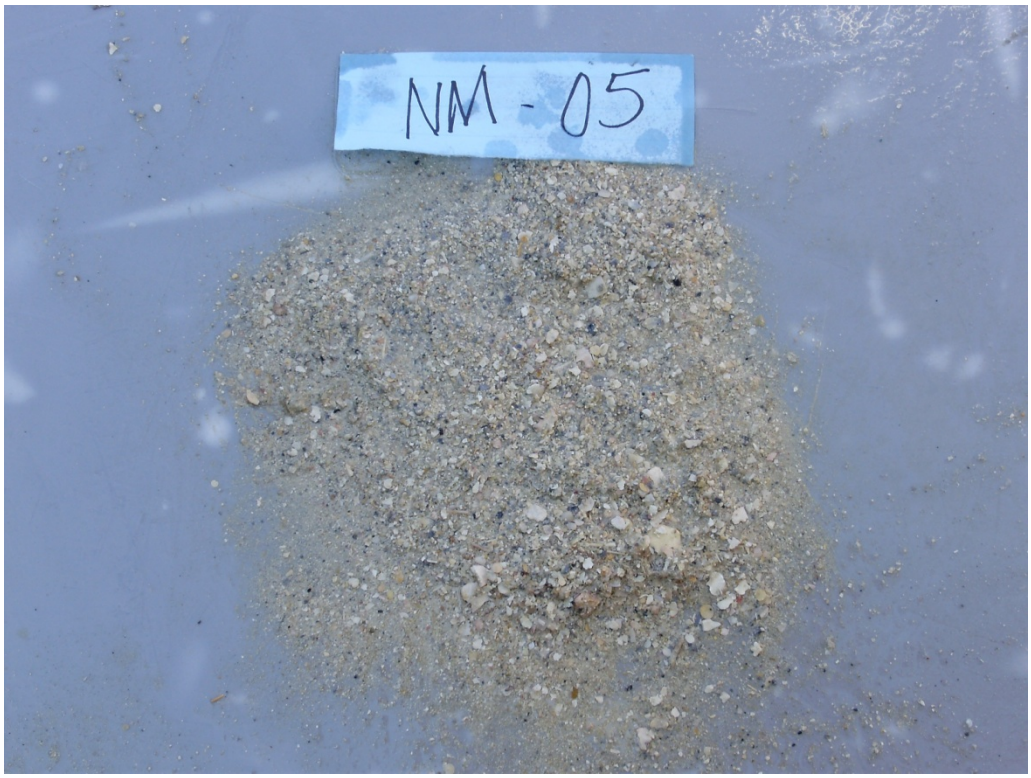
OSI Bottom Sample Designation	Latitude, N (NAD83)	Longitude, W (NAD83)	Depth (meters)	Description
NM -15	25-46-29.96	080-04-36.58	73.1	Fine-Medium, Yellowish Sand with Shell
NM -16	25-46-30.32	080-05-18.29	15.7	Fine-Medium, Light Gray, Sand
NM -17	25-46-30.60	080-05-59.33	8.4	Fine, Light Brown, Sand
NM -18	25-46-30.99	080-07-09.53	7.7	Fine-Medium, Light Gray, Sand with Vegetation
NM -19	25-45-32.30	080-06-57.27	6.8	Fine-Medium, Yellowish to Light Gray, Sand with Shell
NM -20	25-45-32.07	080-05-47.27	12.9	Fine, Light Gray, Sand
NM -21	25-45-31.66	080-04-37.33	71.7	Fine-Medium, Light Gray, Sand


NM-01


NM-02


NM-03


NM-04

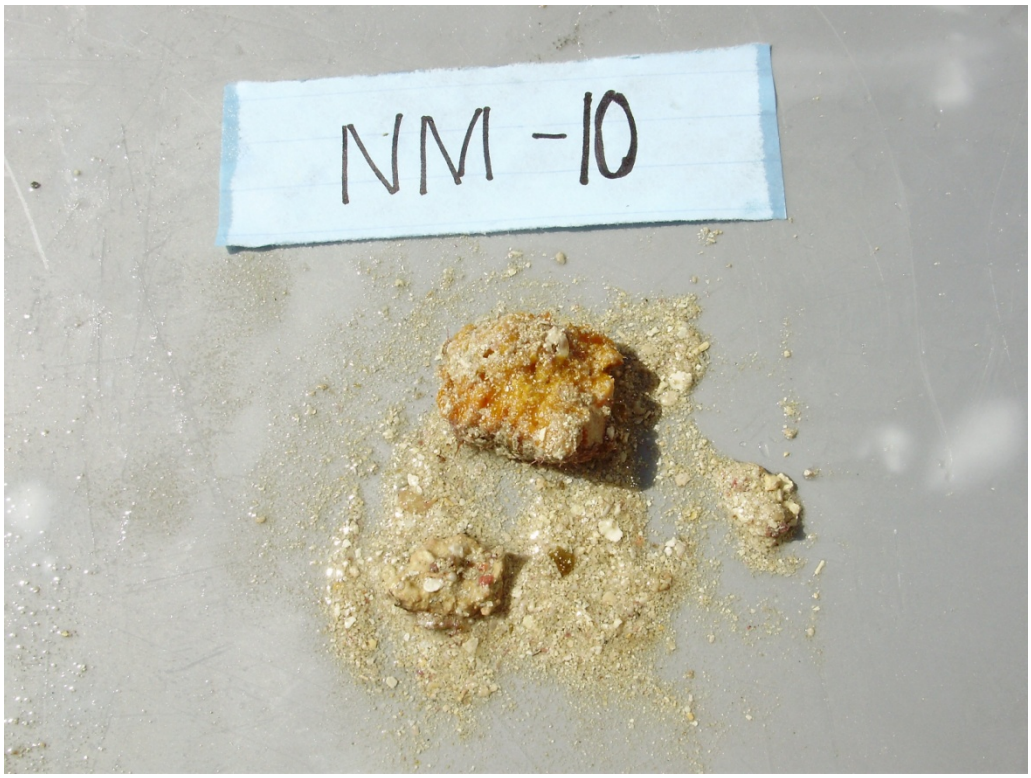

NM-05

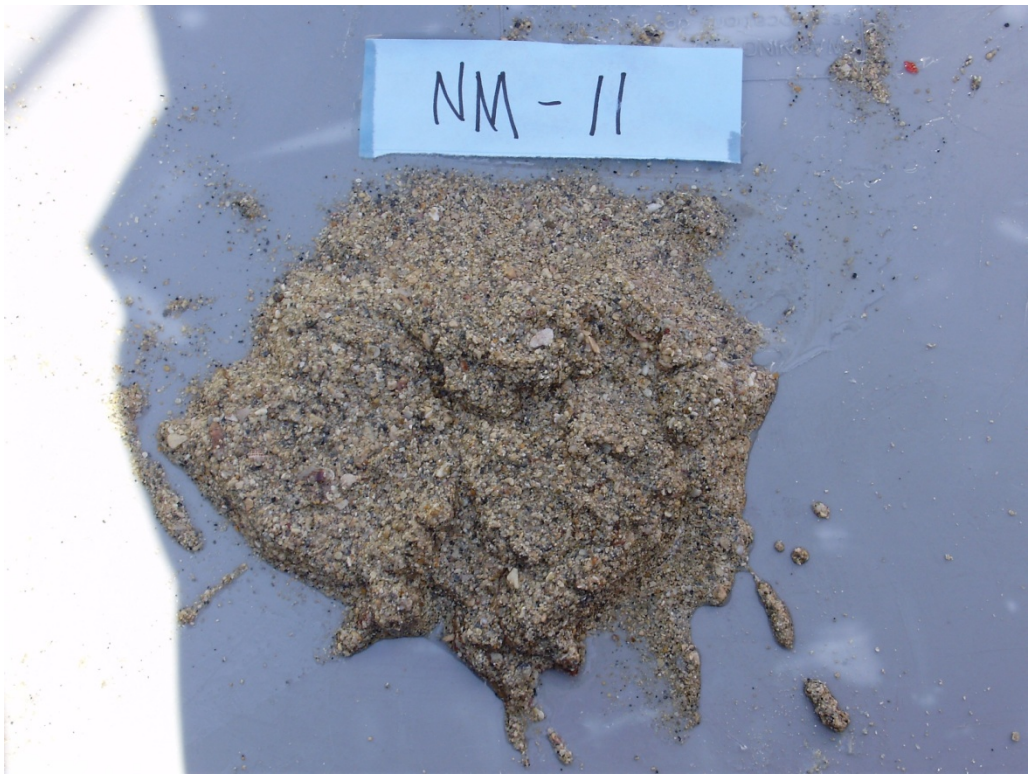

NM-06


NM-07

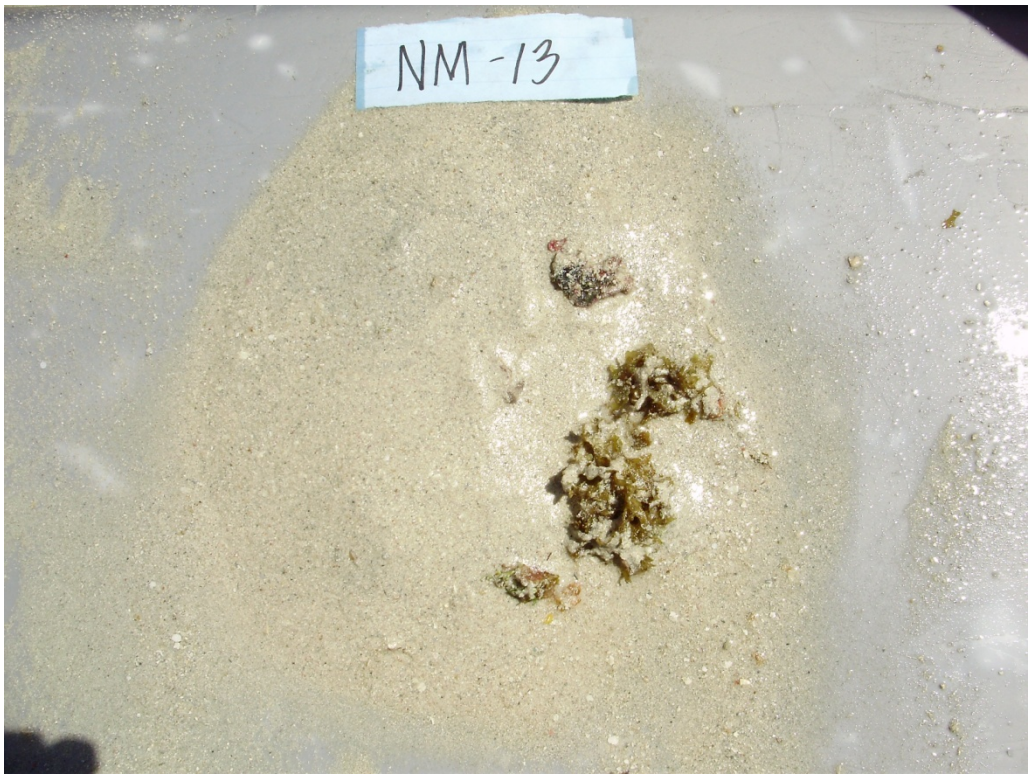

NM-08


NM-09


NM-10

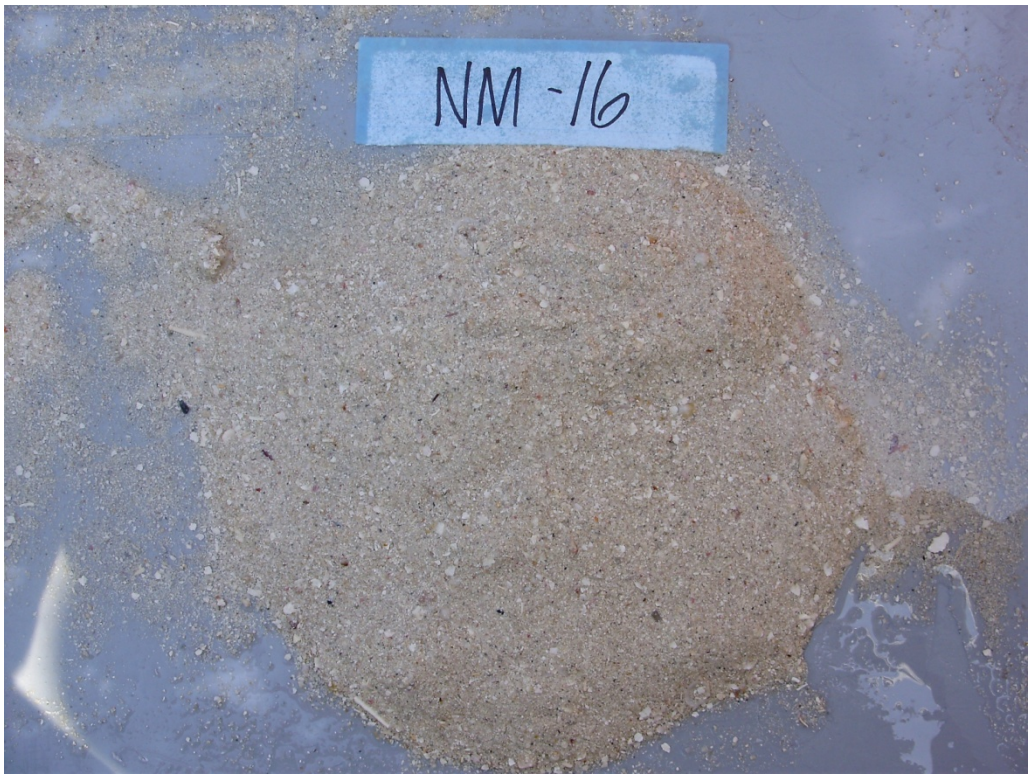

NM - 11

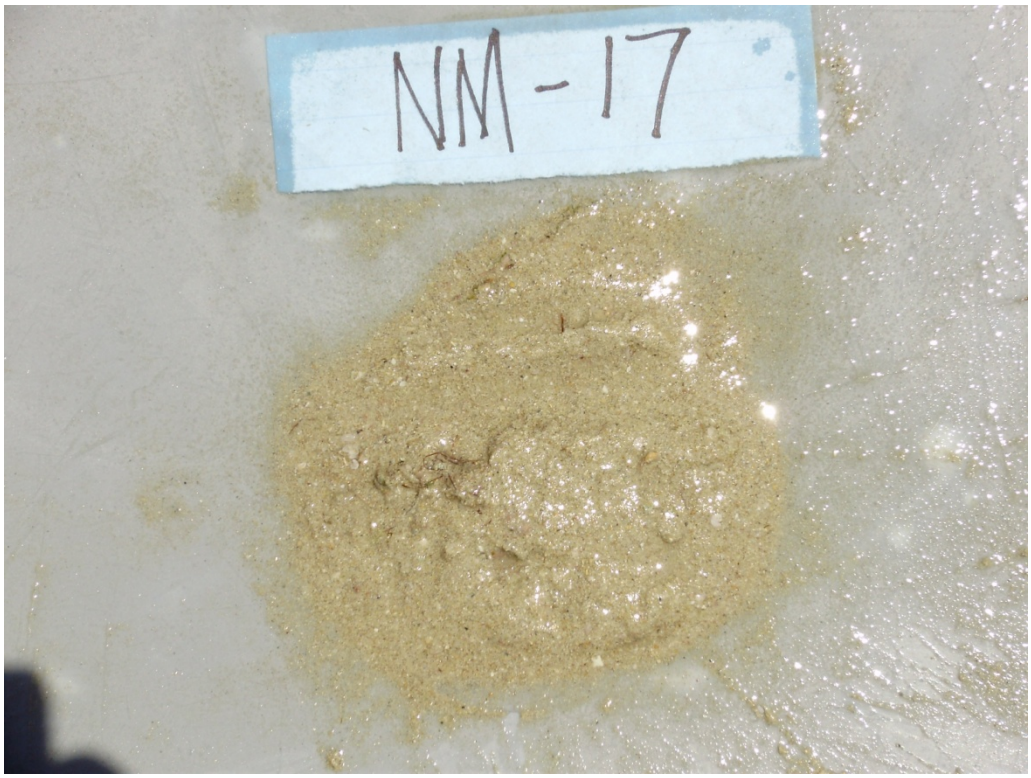

NM-12


NM-13

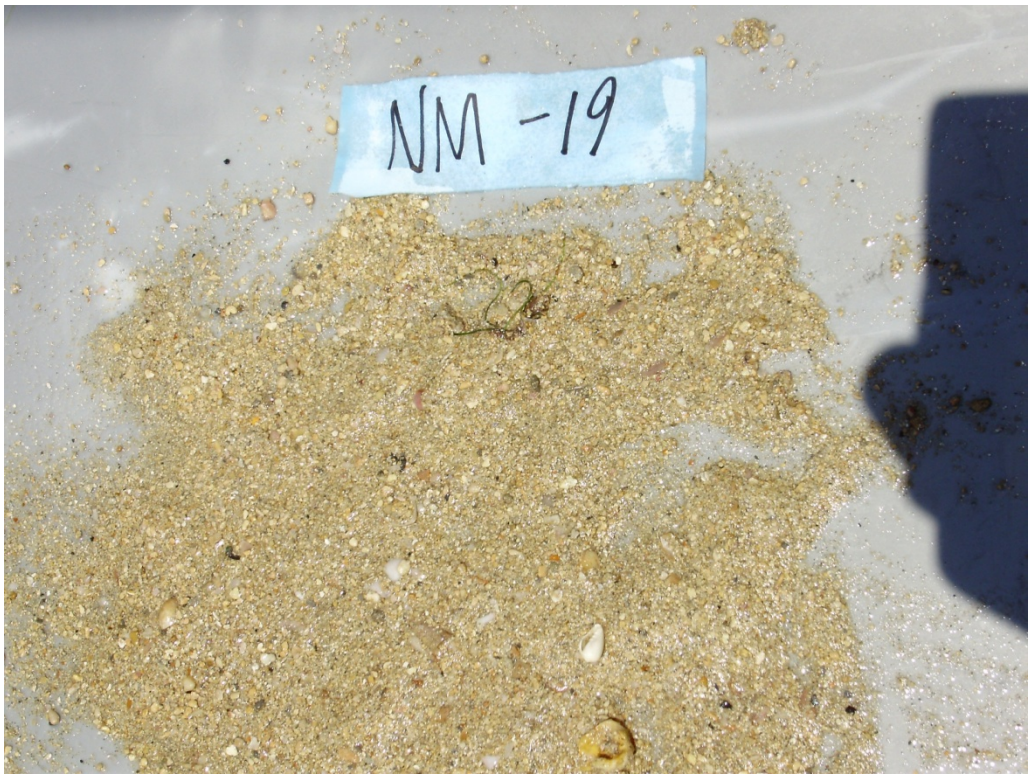

NM-14

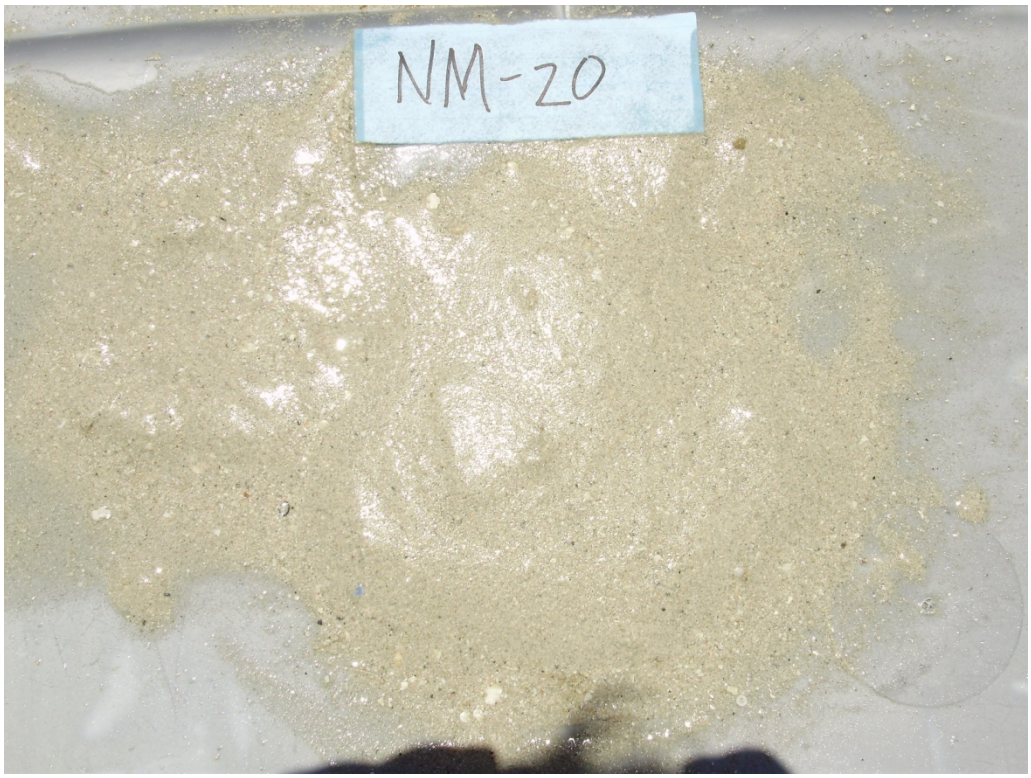

NM-15


NM-16


NM-17


NM-18


NM -19


NM-20


NM-21

Correspondence

E-mail correspondence between OSI and the COTR follows.

From: George Reynolds [ggr@oceansurveys.com]
Sent: Saturday, March 21, 2009 8:05 PM
To: 'Mark.T.Lathrop'
Subject: Weekly Report OPR-J364-KR-09 - March 20, 2009

Hi Mark,

Our field team acquired data on 3 full days and 2 partial days this week and was
weathered out on the remaining days. We acquired the Miami cross line data and started
main scheme line survey operations.
Please give me a call if you have any questions or need additional information.

Regards
George

George Reynolds
Ocean Surveys, Inc.
91 Sheffield St.
Old Saybrook, CT 06475
Phone 860 388 4631
Fax 860 388 5879
http://www.oceansurveys.com

From: George Reynolds [ggr@oceansurveys.com]
Sent: Saturday, March 28, 2009 10:19 PM
To: 'Mark.T.Lathrop'
Subject: Weekly Report OPR-J364-KR-09 - March 27, 2009

Hi Mark,

We were weather out all week.

Please give me a call if you have any questions or need additional information.

Regards
George

George Reynolds
Ocean Surveys, Inc.
91 Sheffield St.
Old Saybrook, CT 06475
Phone 860 388 4631
Fax 860 388 5879
http://www.oceansurveys.com

From: George Reynolds [ggr@oceansurveys.com]
Sent: Sunday, April 05, 2009 8:40 PM
To: 'Mark.T.Lathrop'
Subject: Weekly Report OPR-J364-KR-09 - April 3, 2009

Hi Mark,

Our field team acquired data on 2 full days and 1 partial day this week and was
weathered out on the remaining days.

Please give me a call if you have any questions or need additional information.

Regards
George

George Reynolds
Ocean Surveys, Inc.
91 Sheffield St.
Old Saybrook, CT 06475
Phone 860 388 4631
Fax 860 388 5879
http://www.oceansurveys.com

From: George Reynolds [ggr@oceansurveys.com]
Sent: Saturday, April 11, 2009 7:31 AM
To: 'Mark.T.Lathrop'
Subject: Weekly Report OPR-J364-KR-09 - April 10, 2009

Hi Mark,

Our field team acquired data on 4 full days this week and was weathered out on the
remaining days.

Please give me a call if you have any questions or need additional information.

Regards
George

From: George Reynolds [ggr@oceansurveys.com]
Sent: Friday, April 17, 2009 11:29 PM
To: 'Mark.T.Lathrop'
Subject: Weekly Report OPR-J364-KR-09 - April 17, 2009

Hi Mark,

Our field team acquired data on 4 days this week and was weathered out on the
remaining days.

Please give me a call if you have any questions or need additional information.

Regards
George

George Reynolds
Ocean Surveys, Inc.
91 Sheffield St.
Old Saybrook, CT 06475
Phone 860 388 4631
Fax 860 388 5879
http://www.oceansurveys.com

From: George Reynolds [ggr@oceansurveys.com]
Sent: Friday, April 24, 2009 5:56 PM
To: 'Mark.T.Lathrop'
Subject: Weekly Report OPR-J364-KR-09 - April 24, 2009

Hi Mark,

Our field team acquired data on 2 ½ days this week and was weathered out on the
remaining days.

Please give me a call if you have any questions or need additional information.

Regards
George

George Reynolds
Ocean Surveys, Inc.
91 Sheffield St.
Old Saybrook, CT 06475
Phone 860 388 4631
Fax 860 388 5879
http://www.oceansurveys.com

From: Mark.T.Lathrop [Mark.T.Lathrop@noaa.gov]
Sent: Friday, May 29, 2009 1:09 PM
To: George Reynolds
Cc: mje@oceansurveys.com
Subject: Re: AWOS items OPR-H328-OS-08

George,

Looking at your AWOIS database I see that you just have those 8 items. Please disregard the 20.

Mark

George Reynolds wrote:
Mark,

The SOW discusses a total of 20 AWOS items assigned to OPR-H328-OS-08 for investigation.
The data base information supplied includes information for 8 AWOS items. Please forward the
database information for any additional items beyond the 8 listed below?

RECR
D
VESSLTERMS
CHAR
T

11706
OBSTRUCTION
11468
10460
OBSTRUCTION
11468
10461
OBSTRUCTION
11468
91
POLAR
11466
93
ELIZABETH
11466
8439
OBSTRUCTION
11465
7419
ADAMELIA
11465
7425
MYSTIC ISLE
11465

Thanks
George

From: Mark.T.Lathrop [Mark.T.Lathrop@noaa.gov]
Sent: Friday, June 26, 2009 10:52 AM
To: George Reynolds
Subject: [Fwd: Re: [Fwd: Re: Virginia Key verified tides]]
Attachments: Re: [Fwd: Re: Virginia Key verified tides] (9.87 KB)

FYI

From: George Reynolds [ggr@oceansurveys.com]
Sent: Sunday, July 12, 2009 9:23 PM
To: 'Mark.T.Lathrop'
Subject: Weekly Report OPR-J364-KR-09 - July 10, 2009

Hi Mark,

We have completed contact development in Miami. At this point all planned fieldwork is
complete and we have demobilized our field team back to Connecticut. .

As of today, the missing tide data (5/21/09 thru 5/27/09) has not been posted on the Co-
Ops web site.

Please give me a call if you have any questions or need additional information.

Regards
George

George Reynolds
Ocean Surveys, Inc.
91 Sheffield St.
Old Saybrook, CT 06475
Phone 860 388 4631
Fax 860 388 5879
http://www.oceansurveys.com

Subject: Re: [Fwd: Shoal Soundings in Miami Channel]
From: Michael Henderson <Michael.Henderson@noaa.gov>
Date: Tue, 27 Jul 2010 10:10:25 -0400
To: "LCDR Rick Brennan, NOAA" <Richard.T.Brennan@noaa.gov>

Rick: caught up on another call re: S Coast Puerto Rico.
But yep, I did send info to Lisa/ACOE and haven't heard anything. We've talked 3-4 times but she doesn't see any probs. I'll be in meeting with her in Miami, but it'll be about 3 weeks.
I'd say press on at this point. cheers, MEH

LCDR Rick Brennan, NOAA wrote:

> Mike,
>
> We thought we had sent this to you back in February, but after a second look - I realized it got sent to "Mike.Henderson". We are working on compiling this survey right now and have several soundings that fall within the ACOE channel that are shoaler than the October 2009 tabulated limits. Do you know if there has been any dredging in the Miami Entrance Channel since October 2009? Also, could you pass this info to the ACOE for their acknowledgment as well?
>
> Rick
> --

LCDR Rick Brennan, NOAA
Chief, Atlantic Hydrographic Branch
439 West York Street
Norfolk, VA 23510
Office: 757-441-6746
Cell: 443-994-3301

Learn about "America's Seventh Service":
www.noaacorps.noaa.gov
Learn about NOAA's Office of Coast Survey:
www.nauticalcharts.noaa.gov

Subject:
Shoal Soundings in Miami Channel
From: Katrina Wyllie <Katrina.Wyllie@noaa.gov>
Date: Fri, 12 Feb 2010 15:11:34 -0500
To: Mike Henderson <Mike.Henderson@noaa.gov>
To: Mike Henderson <Mike.Henderson@noaa.gov>
CC: Richard Brennan <Richard.T.Brennan@noaa.gov>, "Castle.E.Parker" <Castle.E.Parker@noaa.gov>, Ed Martin <Ed.Martin@noaa.gov>, Benjamin K Evans <Benjamin.K.Evans@noaa.gov>

Mike,

Please find attached information regarding the Miami Harbor Channel. There is quite a bit of shoaling occurring within all four of the channels (Government Cut, Bar Cut, Outer Bar Cut, and Widener). The Coast Pilot for the area (40th Edition, Chapter 10, Section 319) states "Mariners are advised that abrupt shoaling may be encountered along the northerly and southerly edges of the dredges channel." This statement does not include the shoaling seen in the middle of the channel.

The first document highlights the location and depth of the shoal soundings. A summary is provided in an excel format. The third document (Pages from AHB_H11897-DR.pdf) is extracted from the Descriptive Report provided by the contractor and marked up in red by AHB. This documents any sounding in the channel that is at least 2 feet shoaler than tabulated depths as an obstruction.

The DR also discusses a linear feature (submarine pipe) found north of the Right Outside Quarter of Government Cut. This feature was not submitted to MCD as a DtoN. The Contractor's Danger to Navigation report that would have been submitted is also attached. Currently, there is nothing charted at this location. Please contact the USACE and notify them of the pipe's existence so they can salvage the pipe before it is compiled to the chart.

Any information you would be able to provide back to AHB about the shoaling in the channels and the possibility of removing the submarine pipe feature is appreciated. If I can provide any further information, please do not hesitate to contact me by email or phone. 757.441.6746 x128.

Thank you,

Katrina Wyllie

Michael Henderson <Michael.Henderson@noaa.gov>
NOAA

cgslogo_lg.jpg

Part 1.1.1.3

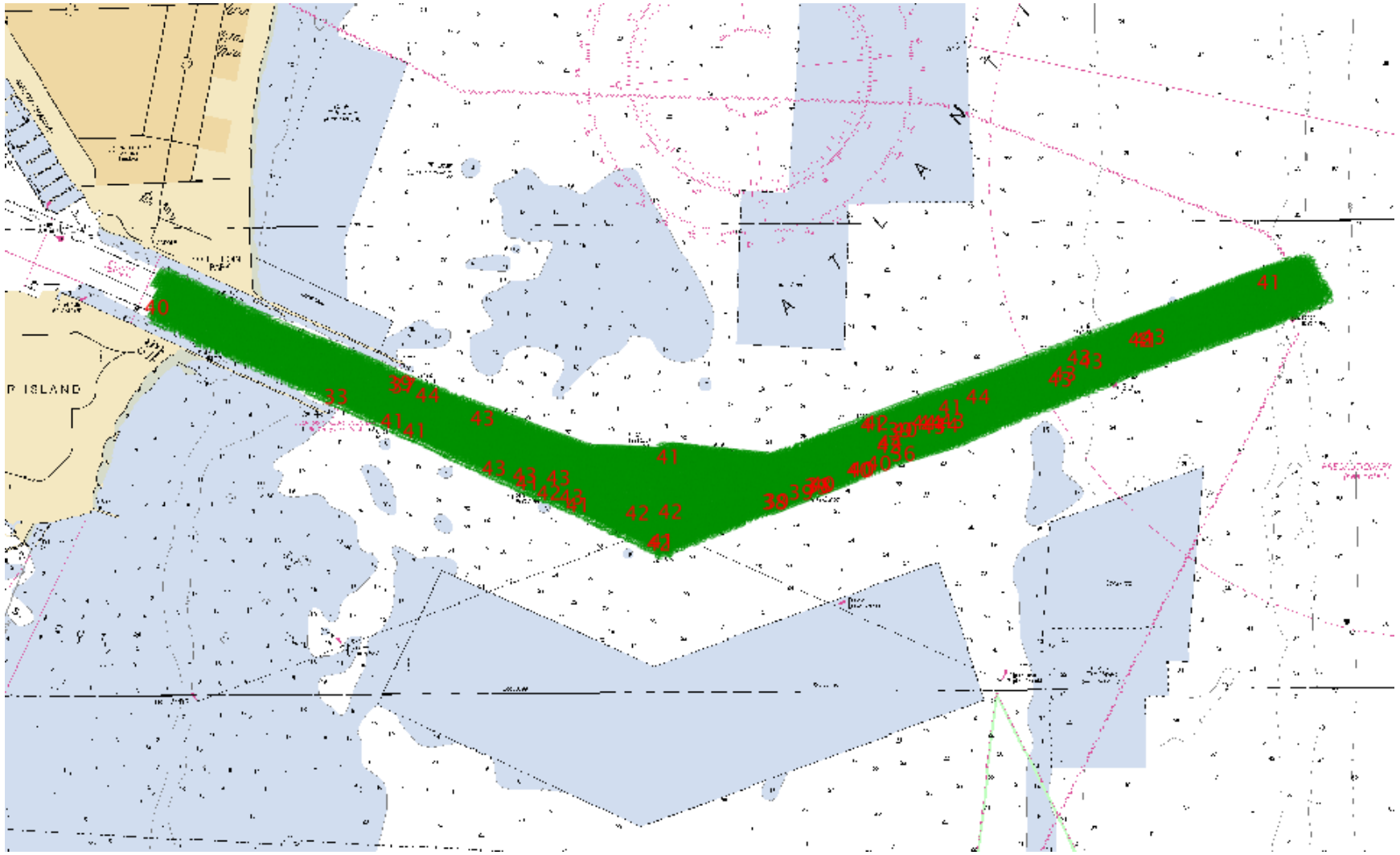


Figure 1: **Raster Chart 11468_1 (1:10,000). Coverage of the Miami Harbor Channel from OSI survey H11897. Green soundings are within channel limits and red soundings are shoaler than channel limits. There are four channels shown: Government Cut, Bar Cut, Outer Bar Cut, and Widener.**

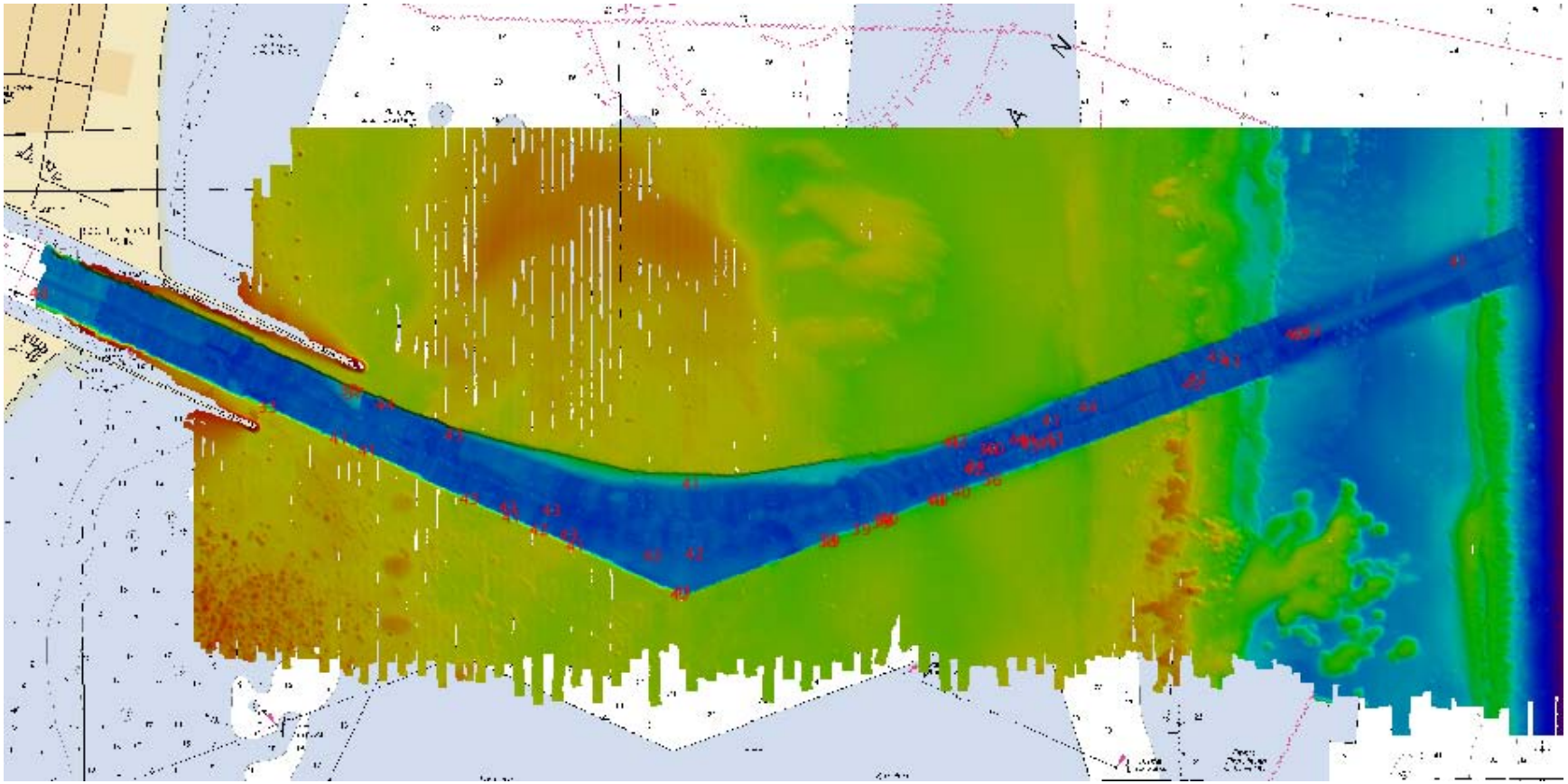


Figure 2: Multibeam data collected of Miami Harbor Channel. Shoal soundings shown in red.

Miami Harbor Channel Controlling Depths (from ENC US5FL22M)

Channel Depths feet (meters)	Left Outside Quarter	Left Inside Quarter	Right Inside Quarter	Right Outside Quarter	Date of Survey
Outer Bar Cut	40.4 (12.3) *40.354*	44 (13.4) *43.963*	44 (13.4) *43.963*	42 (12.8) *41.995*	July 2008
Widener	44 (13.4) *43.963*	44 (13.4) *43.963*	44 (13.4) *43.963*	40 (12.2) *40.026*	July 2008
Bar Cut	43.6 (13.3) *43.635*	43.6 (13.3) *43.635*	41.7 (12.7) *41.667*	37.4 (11.4) *37.402*	July 2008
Government Cut	41.7 (12.7) *41.667*	41.3 (12.6) *41.339*	41.7 (12.7) *41.667*	40.4 (12.3) *40.354*	July 2008

Figure 3: **Tabulated channel depths for the four channels that make up the Miami Harbor Channel. Red values are in feet.**

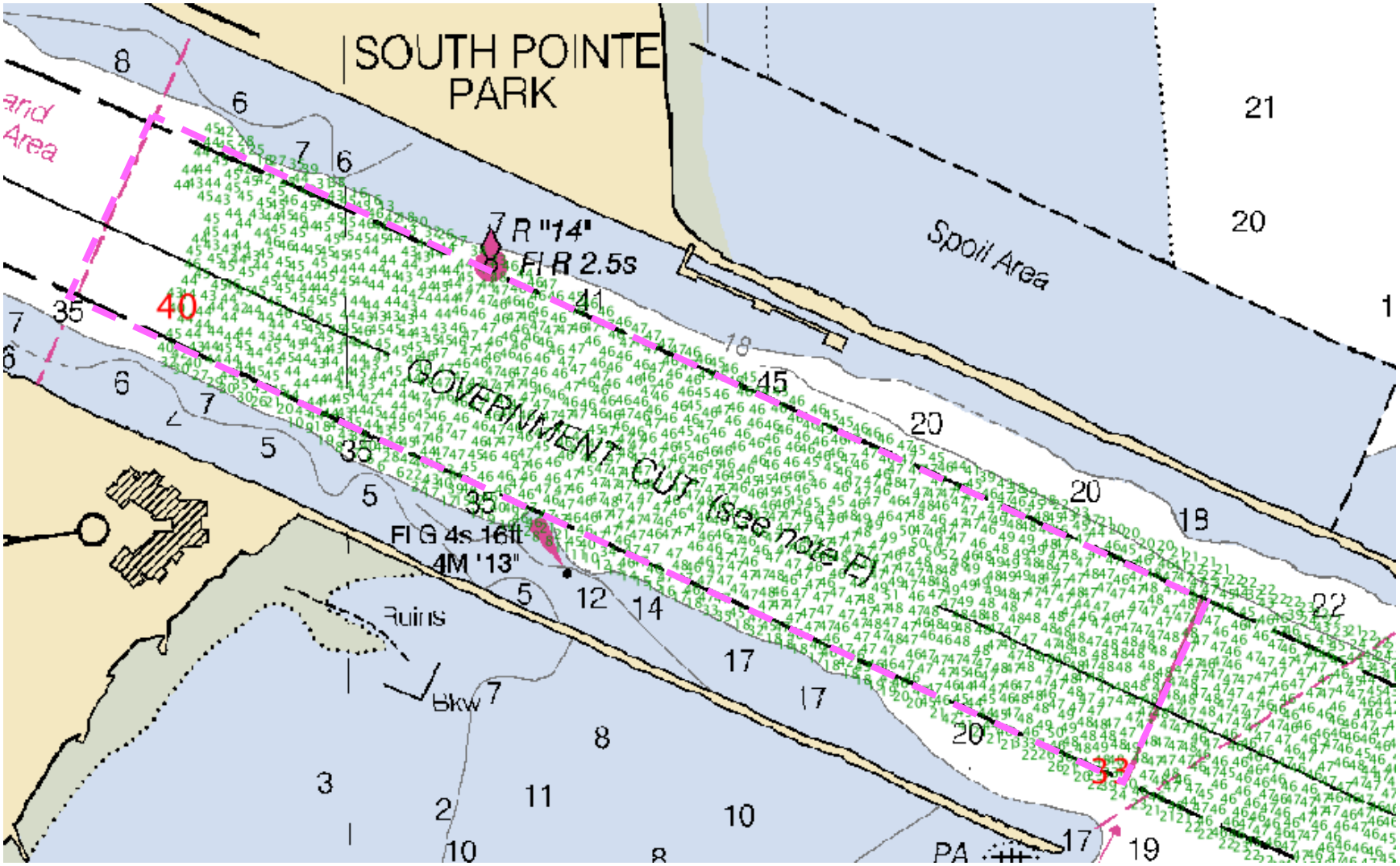


Figure 4: **Zoomed in view of Government Cut Channel with two red soundings that are shoaler than tabulated limits.**

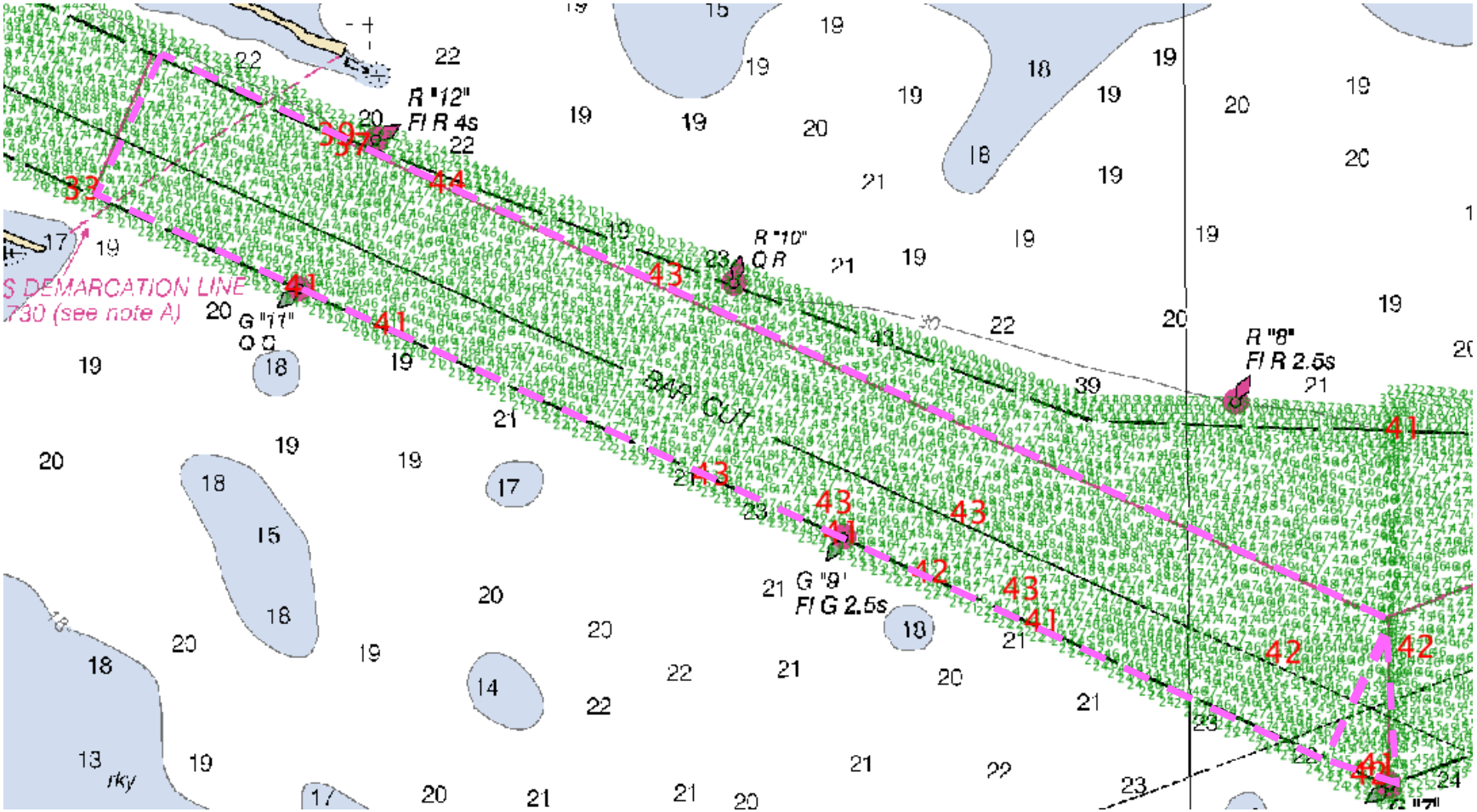


Figure 5: **Zoomed in view of Bar Cut Channel with thirteen red soundings that are shoaler than tabulated limits.**

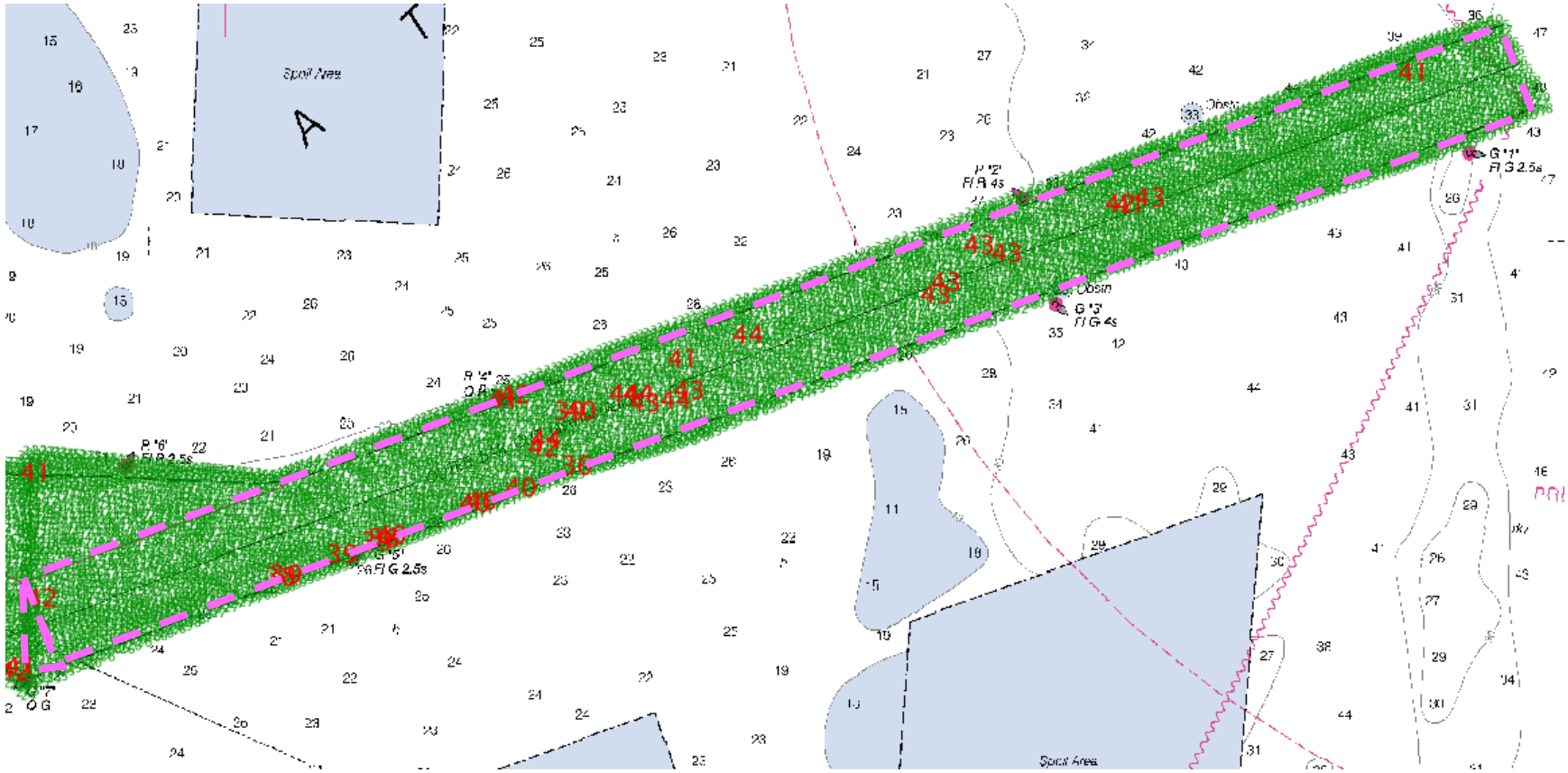


Figure 6: Zoomed in view of Outer Bar Cut Channel with thirty-two red soundings that are shoaler than tabulated limits.

Table 1: Summary of all soundings shoaler than tabulated depths (51 soundings total)

Name	Latitude	Longitude	Depth(ft)	Channel	Section
Sounding	25-45-18.9252N	080-06-53.5752W	42.001	Bar Cut	LOQ
Sounding	25-45-19.2002N	080-06-53.3398W	40.840	Bar Cut	LOQ
Sounding	25-45-22.8442N	080-06-56.5794W	42.280	Bar Cut	LIQ
Sounding	25-45-23.9044N	080-07-05.2223W	41.650	Bar Cut	LOQ
Sounding	25-45-24.9487N	080-07-05.8966W	43.087	Bar Cut	LOQ
Sounding	25-45-25.5208N	080-07-09.1229W	42.677	Bar Cut	LOQ
Sounding	25-45-26.7998N	080-07-12.3499W	41.086	Bar Cut	LOQ
Sounding	25-45-27.4140N	080-07-07.7452W	43.494	Bar Cut	LIQ
Sounding	25-45-27.7679N	080-07-12.5346W	43.005	Bar Cut	LOQ
Sounding	25-45-28.7046N	080-07-16.8892W	42.923	Bar Cut	LOQ
Sounding	25-45-33.6168N	080-07-28.3037W	41.348	Bar Cut	LOQ
Sounding	25-45-34.8548N	080-07-31.4717W	40.971	Bar Cut	LOQ
Sounding	25-45-39.3941N	080-07-29.5536W	37.257	Bar Cut	ROQ
Sounding	25-45-38.0380N	080-07-39.1840W	33.317	Government Cut	LOQ
Sounding	25-45-49.6642N	080-08-04.5686W	40.128	Government Cut	LOQ
Sounding	25-45-22.9943N	080-06-51.8760W	42.415	Outer Bar Cut	RIQ
Sounding	25-45-24.1067N	080-06-37.0246W	38.645	Outer Bar Cut	LOQ
Sounding	25-45-24.2345N	080-06-36.6649W	39.367	Outer Bar Cut	LOQ
Sounding	25-45-25.3508N	080-06-33.2104W	39.626	Outer Bar Cut	LOQ
Sounding	25-45-26.0528N	080-06-31.0334W	39.610	Outer Bar Cut	LOQ
Sounding	25-45-26.2289N	080-06-30.6194W	38.570	Outer Bar Cut	LOQ
Sounding	25-45-26.3891N	080-06-30.2054W	39.839	Outer Bar Cut	LOQ
Sounding	25-45-28.1452N	080-06-25.0232W	40.220	Outer Bar Cut	LOQ
Sounding	25-45-28.2726N	080-06-24.5916W	39.843	Outer Bar Cut	LOQ
Sounding	25-45-29.0052N	080-06-22.1630W	39.780	Outer Bar Cut	LOQ
Sounding	25-45-30.2188N	080-06-18.6541W	36.138	Outer Bar Cut	LOQ
Sounding	25-45-31.2559N	080-06-20.8001W	42.067	Outer Bar Cut	LIQ

Sounding	25-45-31.6937N	080-06-20.5816W	43.934	Outer Bar Cut	LIQ
Sounding	25-45-33.2773N	080-06-19.0980W	39.734	Outer Bar Cut	RIQ
Sounding	25-45-33.2896N	080-06-18.4338W	40.115	Outer Bar Cut	RIQ
Sounding	25-45-33.7039N	080-06-14.4821W	42.989	Outer Bar Cut	LIQ
Sounding	25-45-33.8544N	080-06-12.5424W	43.921	Outer Bar Cut	LIQ
Sounding	25-45-33.9534N	080-06-23.3287W	41.453	Outer Bar Cut	ROQ
Sounding	25-45-34.2155N	080-06-15.7345W	43.904	Outer Bar Cut	RIQ
Sounding	25-45-34.2248N	080-06-22.5367W	41.903	Outer Bar Cut	ROQ
Sounding	25-45-34.2263N	080-06-14.8550W	43.806	Outer Bar Cut	RIQ
Sounding	25-45-34.3858N	080-06-11.7306W	43.684	Outer Bar Cut	LIQ
Sounding	25-45-36.1444N	080-06-12.2382W	41.726	Outer Bar Cut	RIQ
Sounding	25-45-37.4674N	080-06-08.0460W	43.852	Outer Bar Cut	RIQ
Sounding	25-45-39.6385N	080-05-56.4349W	43.327	Outer Bar Cut	LIQ
Sounding	25-45-40.3499N	080-05-55.8017W	42.963	Outer Bar Cut	LIQ
Sounding	25-45-41.9515N	080-05-52.0022W	43.136	Outer Bar Cut	RIQ
Sounding	25-45-42.4174N	080-05-53.7040W	43.714	Outer Bar Cut	RIQ
Sounding	25-45-44.6191N	080-05-44.4797W	41.257	Outer Bar Cut	RIQ
Sounding	25-45-44.6872N	080-05-44.9815W	41.827	Outer Bar Cut	RIQ
Sounding	25-45-45.0173N	080-05-43.1304W	42.844	Outer Bar Cut	RIQ
Sounding	25-45-51.9210N	080-05-26.8879W	41.575	Outer Bar Cut	ROQ
Sounding	25-45-30.0348N	080-06-52.3440W	41.650	Widener	ROQ
Sounding	25-45-35.1342N	080-07-18.4930W	43.392	Widener	LIQ
Sounding	25-45-38.1550N	080-07-26.1887W	43.950	Widener	LIQ
Sounding	25-45-39.7224N	080-07-30.1076W	38.766	Widener	LIQ

northerly and southerly edges of the dredged channel." Areas of shoaling were evaluated in the BASE surfaces and included in the S-57 feature file (H11897_Features.hob) when appropriate.

Significant contacts, equal to or greater than 2 feet (0.6 meters) shoaler than the controlling channel depth, are included in the S-57 feature file as obstructions (H11897_Features.hob).

Table 10
Miami Harbor Channel Controlling Depths (from ENC US5FL22M)

Channel Depths feet (meters)	Left Outside Quarter	Left Inside Quarter	Right Inside Quarter	Right Outside Quarter	Date of Survey
Outer Bar Cut	40.4 (12.3) ***40.354***	44 (13.4) ***43.963***	44 (13.4) ***43.963***	42 (12.8) ***41.995***	July 2008
Widener	44 (13.4) ***43.963***	44 (13.4) ***43.963***	44 (13.4) ***43.963***	40 (12.2) ***40.026***	July 2008
Bar Cut	43.6 (13.3) ***43.635***	43.6 (13.3) ***43.635***	41.7 (12.7) ***41.667***	37.4 (11.4) ***37.402***	July 2008
Government Cut	41.7 (12.7) ***41.667***	41.3 (12.6) ***41.339***	41.7 (12.7) ***41.667***	40.4 (12.3) ***40.354***	July 2008

- A shoal sounding of ~~41.3~~***42.415***feet (12.9***28*** meters) was observed at 25-45-~~23.00~~***22.99***N, 080-06-51.88W, within the Outer Bar Cut Right Inside Quarter. ***Concur. There was no obstruction included in the feature file so during SAR review an obstruction point was created for this shoal sounding and included in the AHB feature file***
- A shoal sounding of 42.0***67*** feet (12.8***22*** meters) was observed at 25-45-31.25N, 080-06-20.81W, within the Outer Bar Cut Left Inside Quarter. ***Concur***
- A shoal sounding of 39.7***34*** feet (12.1***11*** meters) was observed at 25-45-33.2~~7~~***8***N, 080-06-19.1~~1~~***0***W, within the Outer Bar Cut Right Inside Quarter. ***Concur***
- A shoal sounding of 40.~~0~~***115*** feet (12.2***27*** meters) was observed at 25-45-33.29N, 080-06-18.4~~5~~***4***W, within the Outer Bar Cut Right Inside Quarter. ***Concur***
- A shoal sounding of 41.7***26*** feet (12.7***18*** meters) was observed at 25-45-36.14N, 080-06-12.2~~4~~***5***W, within the Outer Bar Cut Right Inside Quarter. ***Concur***
- A shoal sounding of 41.~~7~~***827*** feet (12.7***49*** meters) was observed at 25-45-44.69N, 080-05-44.99W, within the Outer Bar Cut Right Inside Quarter. ***Concur***
- A shoal sounding of 41.~~0~~***257*** feet (12.~~6~~***575*** meters) was observed at 25-45-44.6~~1~~***7***N, 080-05-44.4~~8~~***9***W, within the Outer Bar Cut Right Inside Quarter. ***Concur***
- A shoal in the western portions of the Widener is encroaching on the channel in the vicinity of the east end of the north jetty. A shoal sounding of 36.1 feet (11.0 meters) was observed at position 25-45-39.43N, 080-07-29.29W, within the western corner of the Widener Right Inside Quarter. ***Concur***

- A shoal sounding of 40.8~~40~~ ***40*** feet (12.4~~48~~ ***48*** meters) was observed at 25-45-19.21N, 080-06-53.35W, within the Bar Cut Left Outside Quarter. ***Concur***
- A shoal sounding of 42.0~~280~~ ***280*** feet (12.9~~887~~ ***887*** meters) was observed at 25-45-22.85N, 080-06-56.59W, within the Bar Cut Left Inside Quarter. ***Concur. There was no obstruction included in the feature file so during SAR review an obstruction point was created for this shoal sounding and included in the AHB feature file***
- A shoal sounding of 41.7~~650~~ ***650*** feet (12.7~~695~~ ***695*** meters) was observed at 25-45-23.91N, 080-07-05.23W, within the Bar Cut Left Outside Quarter. ***Concur***
- A shoal sounding of 41.2~~086~~ ***086*** feet (12.5~~23~~ ***23*** meters) was observed at 25-45-26.80N, 080-07-12.36~~5~~ ***5***W, within the Bar Cut Left Outside Quarter. This object appears to be a buoy block within the channel limits. ***Concur***
- A shoal sounding of 41.6~~348~~ ***348*** feet (12.6~~03~~ ***03*** meters) was observed at 25-45-33.62N, 080-07-28.30~~1~~ ***1***N, within the Bar Cut Left Outside Quarter. ***Concur***
- A shoal sounding of ~~41.0~~ ***40.971***feet (12.5~~488~~ ***488*** meters) was observed at 24-45-34.85~~6~~ ***6***N, 080-07-31.47~~8~~ ***8***W, within the Bar Cut Left Outside Quarter. This object appears to be a buoy block within the channel limits. ***Concur***
- A shoal in the southeastern corner of the Government Cut Left Outside Quarter is encroaching on the channel near the junction of the Government Cut Left Outside Quarter and the Bar Cut Left Outside Quarter. An approximate shoal sounding of 33.4~~317~~ ***317*** feet (10.2~~115~~ ***115*** meters) was observed at approximate position 25-45-38.05~~4~~ ***4***N, 080-07-39.21~~19~~ ***19***W, within the Government Cut Left Outside Quarter (Figure 8). ***Concur.***

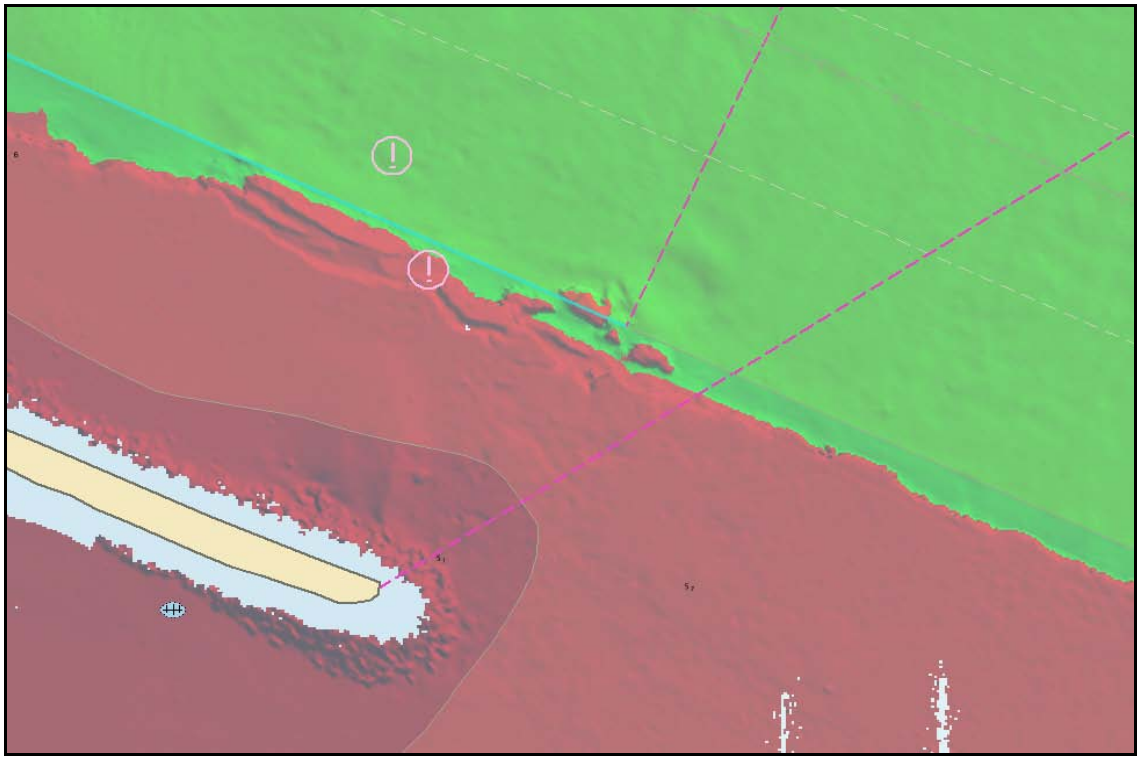


Figure 8. Shoal encroaching on Government Cut. Red is shown as less than 41.7 feet (12.7 meters) deep and green is shown as greater than 41.7 feet (12.7 meters) deep. The boundary of the Miami Harbor Channel, Government Cut, LOQ is shown in light blue.

- A linear feature resembling a submerged pipe was observed in SSS and SWMB data on the slope of the Miami Harbor Channel (Figure 9). The obstruction is approximately 60 feet in length and lies north of the Right Outside Quarter of the Government Cut, approximately 1,400 feet (425 meters) inside of the entrance marker R "12". Refer to section D1.5 Danger to Navigation Reports. The inshore end of the pipe, middle bend of pipe at the channel edge and the end of the pipe are included as obstructions in the S-57 feature file (H11897_Features.hob). ***Concur, chart linear obstruction.***

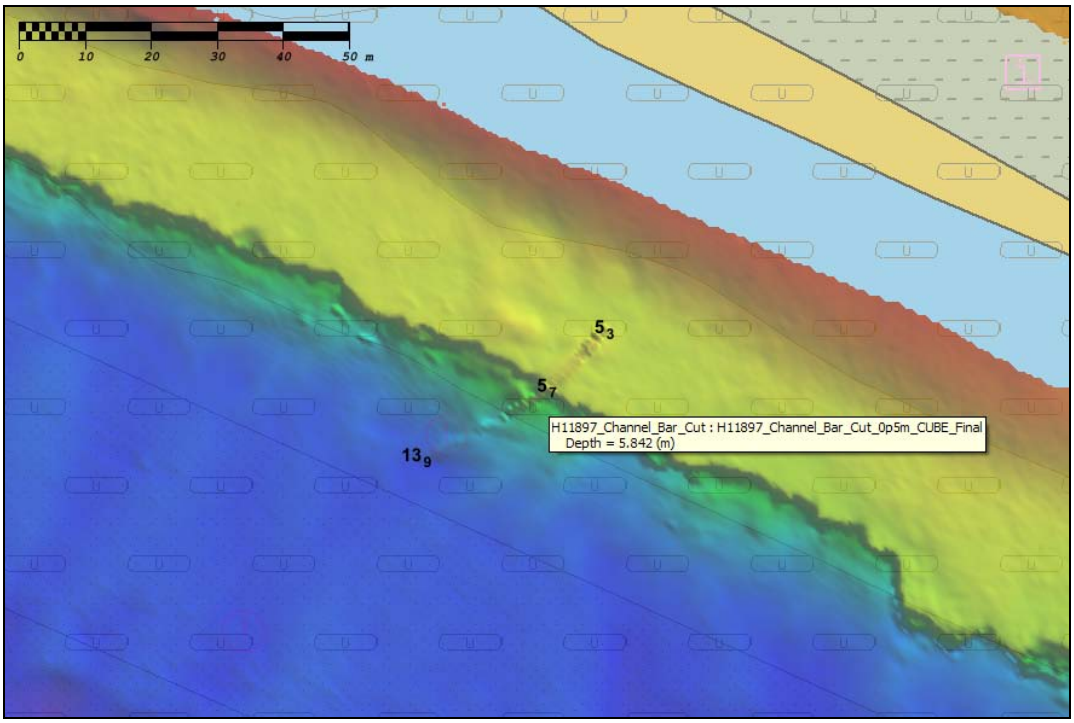


Figure 9. Linear feature located north of Right Outside Quarter of Government Cut.

D.1.4 AWOIS Items

There were four AWOIS item investigations assigned within the survey limits (Table 11). Refer to Appendix II* for Reports on AWOIS Items.
Appended to this report

Table 11

Report of Dangers to Navigation

Hydrographic Survey Registry Number: H11897
State: Florida
General Locality: Atlantic Ocean
Sub Locality: East of Miami Beach
Project Number OPR-H328-OS-08
Survey Dates: May 26, 2009
Feature depths are corrected to Mean Lower Low Water datum using predicted zoned tides.
Horizontal positions are referenced to the North American Datum of 1983 (NAD83).
Charts Affected:

Chart Number	Scale	Edition	ENC
11466	1:80,000	38th, Jun./08	US4FL31M
11467	1:40,000	41st, Jun./08	US5FL33M
11468	1:10,000	41st, May/07	US5FL22M
11469	1:100,000	8th, Dec./07	US4FL23M

Dangers to Navigation

	Feature	Depth Feet	Depth Meters	Latitude	Longitude	Description
1	Obstruction	17.8	5.5	25-45-46.04	080-07-42.23	Inshore end of pipe
1	Obstruction	19.0	5.8	25-45-45.76	080-07-42.54	Middle bend of pipe at channel edge
1	Obstruction	46.0	14.0	25-45-45.42	080-07-43.25	End of pipe in channel

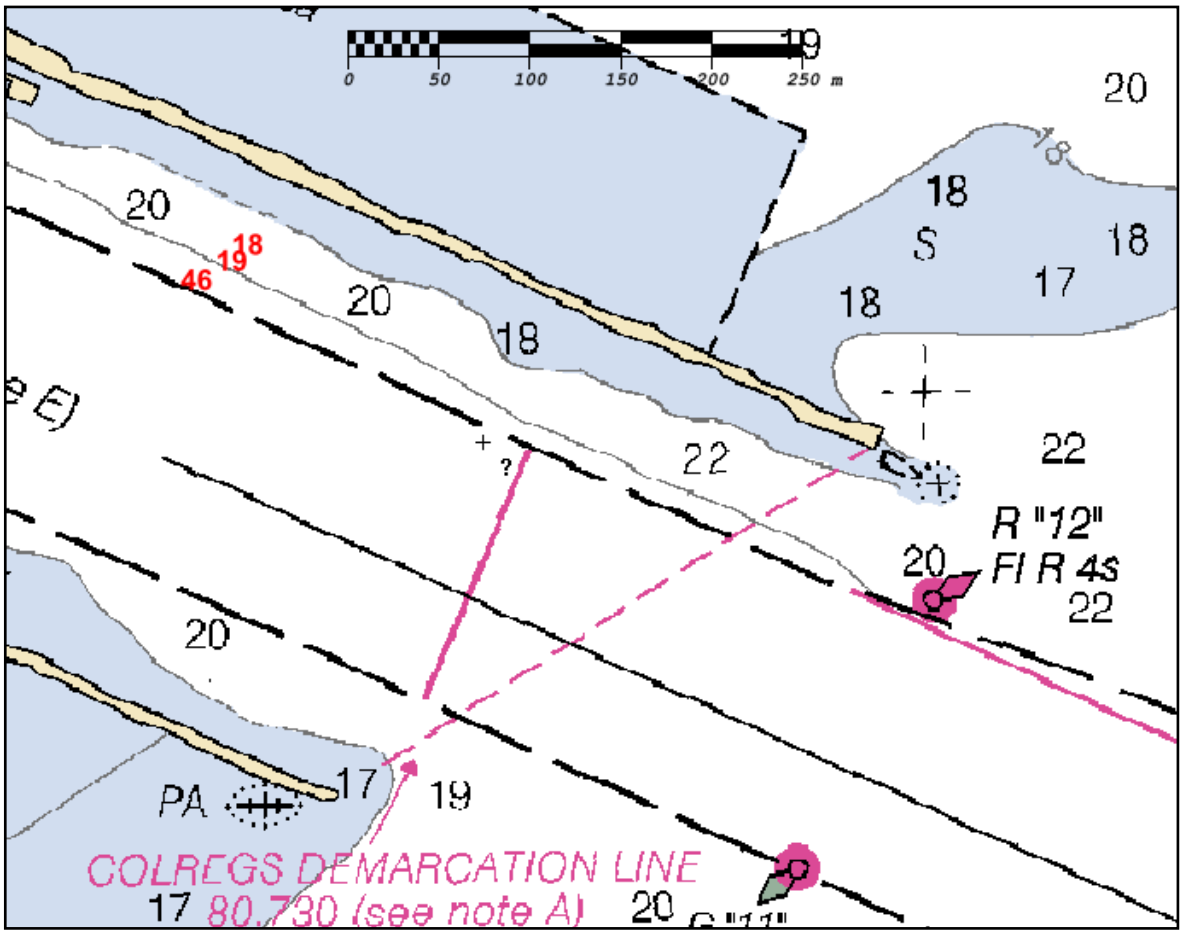


Figure 1. Soundings depicting relative location of obstruction.

Feature 1: A linear feature resembling a submerged pipe was observed in side scan sonar and multibeam echo sounder data on the slope of the Miami Entrance Channel. The obstruction is approximately 60 feet in length and lies north of the Government Cut, approximately 1,400 feet inside of the entrance marker R "12." Positions listed in the above table describe the location and orientation of the obstruction from multibeam soundings.

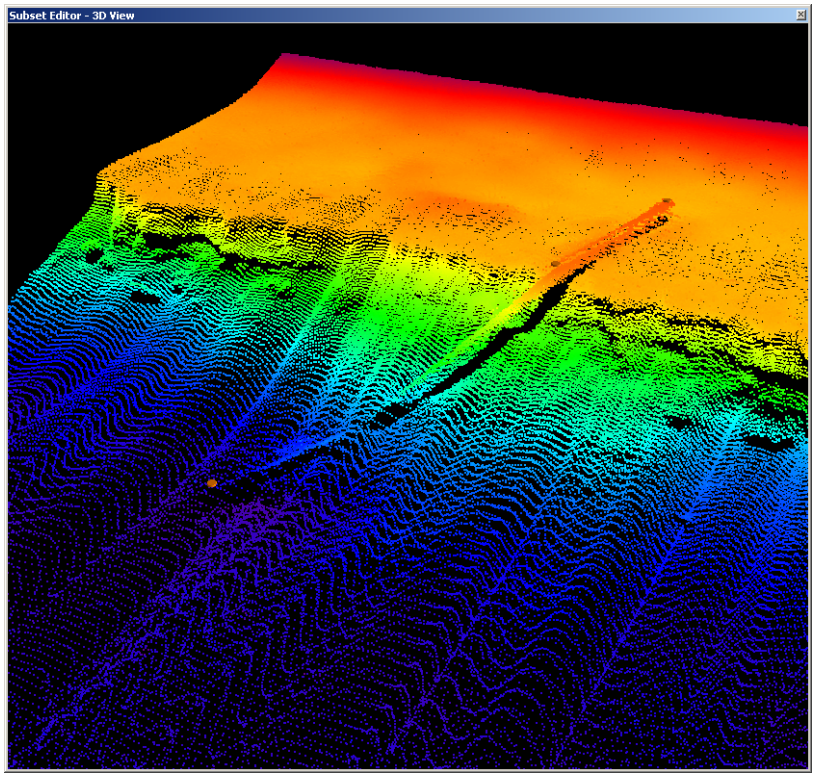


Figure 2. Soundings on obstruction.

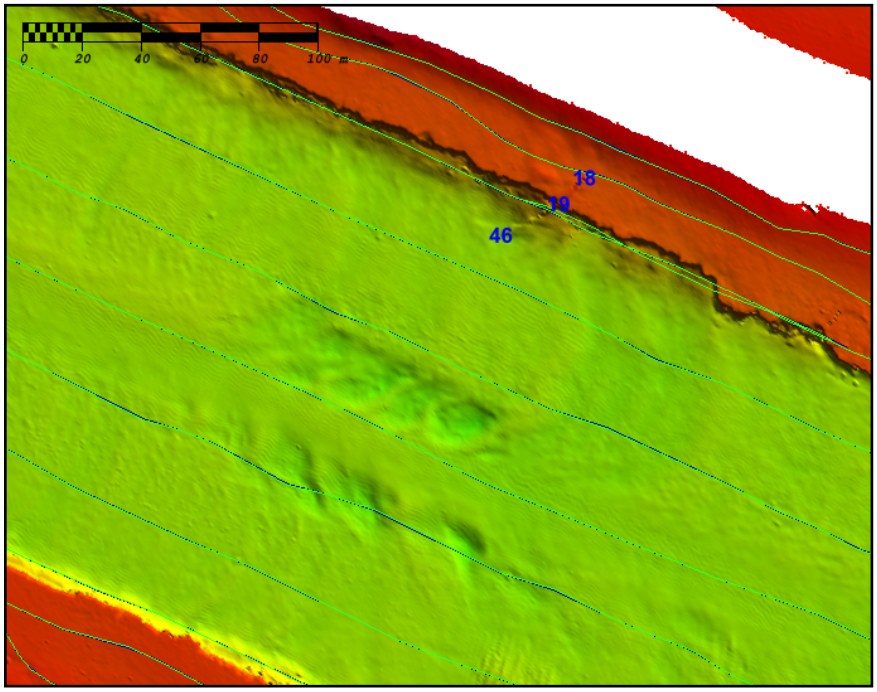


Figure 3. Depth surface; obstruction location marked with soundings.

This Document is for Office Process use only and is intended to supplement, not supersede or replace, information/recommendations in the Descriptive or Evaluation Reports

AHB COMPILATION LOG

General Survey Information	
REGISTRY No.	H11897
PROJECT No.	OPR-H328-OS-08-B
FIELD UNIT	OSI – OCEAN SURVEYS, INC.
DATE OF SURVEY	03/13/2009 - 07/05/2009
LARGEST SCALE CHART	***11468_1, edition 42, 20100101 , 1:10,000***
ADDITIONAL CHARTS	***11467_6, edition 41, 20080601, 1:40,000*** ***11465_1, edition 38, 20071101, 1:40,000*** ***11466_1, edition 38, 20080601, 1:80,000***
SOUNDING UNITS	**FEET**
COMPILER	James J Miller

Source Grids	**File Name** H:\Compilation\H11897_H328_OSI\AHB_H11897\E-SAR Final Products\GRIDS\
	H11897_Channel_Bar_Cut_0p5m_CUBE_Final.csar **H11897_Channel_Outer_Bar_Cut_0p5m_CUBE_Final.csar** **H11897_N_Inshore_1m_CUBE_Final.csar** **H11897_Offshore_2m_CUBE_Final.csar** **H11897_Offshore_4m_CUBE_Final.csar** **H11897_S_Inshore_1M_CUBE_Final.csar**
Surfaces	**File Name** H:\Compilation\H11897_H328_OSI\AHB_H11897\COMPILE\Working
Combined	**H11897_4m_Combined.csar**
Interpolated TIN	\Interpolated TIN**H11897_8m_InterpTIN.csar**
Shifted Interpolated TIN	\Shifted Surface**H11897_8m_InterpTIN_Shifted.csar**
Final HOBs	**File Name** H:\Compilation\H11897_H328_OSI\AHB_H11897\COMPILE\Final_Hobs\
Survey Scale Soundings	**H11897_SS_Soundings.hob**
Chart Scale Soundings	**H11897_CS_Soundings.hob**
Contour Layer	**H11897_Contours.hob**
Feature Layer	**H11897_Features**
Meta-Objects Layer	**H11897_MetaObjects.hob**
Blue Notes	**H11897_BlueNotes.hob**
Contractor Submitted Features	**H11897_KR_Features.hob**

Meta-Objects Attribution	
Acronym	**Value**
M_COVR	
CATCOV	1 – coverage available
SORDAT	20090705
SORIND	US,US,graph,H11897
M_QUAL	
CATZOC	6 – zone of confidence U (data not assessed)
INFORM	R/V Able II - CT4788BB
POSACC	10m
SORDAT	20090705
SORIND	US,US,graph,H11897
SUREND	20090705
SURSTA	20090313
DEPARE	

DRVALV 1	0.858m
DRVALV2	154.045m
SORDAT	20090705
SORIND	US,US,graph,H11897
M_CSCL	
CSCALE	40,000 (and 80,000)
SORDAT	20090705
SORIND	US,US,graph,H11897

SPECIFICATIONS:

I. COMBINED SURFACE:
- a. Number of ESAR Final Grids: 6
- b. Resolution of Combined (m): 4m

II. SURVEY SCALE SOUNDINGS (SS):
- a. Attribute Name: Depth
- b. Selection criteria: Radius, Shoal bias
- c. Radius value is: mm at map scale
  - i. Use single-defined radius: N/A
  - ii. Or use radius table file: H11897_SSR_mmat10k.txt
- d. Queried Depth of All Soundings
  - i. Minimum: 0.858m
  - ii. Maximum: 154.045m

III. INTERPOLATED TIN SURFACE:
- a. Resolution (m): 8m
- b. Interpolation method: Natural Neighbor
- c. Shift value: -0.229m (-0.75ft)

IV. CONTOURS:
- a. Attribute Name: Depth
- b. Use a Depth List: H11897_depth_curves.txt
- c. Output Options: Create contour lines
  - i. Line Object: DEPCNT
  - ii. Value Attribute: VALDCO

V. FEATURES:
- a. Total Number of Features: 70
- b. Number of Insignificant Features: 71

VI. CHART SURVEY SOUNDINGS (CS):
- a. Number of ENC CS Soundings: 835
- b. Attribute Name: Depth
- c. Selection criteria: Radius, Shoal bias
- d. Radius value is: Distance on the ground (m)
  - i. Use single-defined radius: N/A
  - ii. Or use radius table file: H11897_CS_Spacing_10k.txt
- e. Enable Filter: Interpolated != 1
- f. Number Survey CS Soundings: 910

VII. Notes:

ATLANTIC HYDROGRAPHIC BRANCH
H-CELL REPORT to ACCOMPANY
SURVEY H11897 (2009)

This H-Cell Report has been written to supplement and/or clarify the original Descriptive Report and pass critical compilation information to the cartographers in the Marine Chart Division.

B. DATA ACQUISITION AND PROCESSING

B.1 DATA PROCESSING

The following software was used to process data at the Atlantic Hydrographic Branch:

CARIS Bathy DataBASE version 2.1/SP1/HF10
CARIS Bathy DataBASE version 2.3/HF16
CARIS HIPS/SIPS version 7.0/SP1/HF5
CARIS S-57 Composer version 2.1/HF4
CARIS HOM version 3.3/SP3/HF8
DKART Inspector 5.0

B.2 QUALITY CONTROL

B.2.1 H-Cell

The AHB source depth grid for the survey's nautical chart update product was a combined 4m resolution BASE surface (*.CSAR) derived from the AHB-generated BASE surfaces of multiple resolutions (0.5m, 1m, 2m, and 4m). The survey scale soundings were created from the surface at a single defined radius of one millimeter (at chart scale) for the 1:40,000 and 1:80,000 chart scales, as well as from a sounding spacing range file for the 1:10,000 chart scale. A TIN was created from the survey scale soundings, from which an interpolated surface was generated. The chart scale soundings were selected from the filtered interpolated surface using single defined radii at the 1:40,000 and 1:80,000 chart scales, and using a sounding spacing range file at the 1:10,000 chart scales. The chart scale soundings are a subset of the survey scale soundings. The surface model was referenced when selecting the chart scale soundings, to ensure that the selected soundings portrayed the bathymetry within the common area.

Depth contours were created from a shifted interpolated TIN surface of 8m resolution, with the contours in feet (6, 12, 18, 30, 36, and 60 feet). The depth contours are forwarded to MCD for reference only. The contours were utilized during chart scale sounding selection and quality assurance efforts at AHB. The depth contours are incorporated into the SS H-Cell product as per 2009 H-Cell Specifications.

The pre-compilation products or components (Stand Alone *.HOB files, or SAHOB) are detailed in the H11897 Compile Log contained within this document. The SAHOB files included depth areas (DEPARE), depth contours (DEPCNT), soundings (SOUNDG), meta-objects (M_QUAL, M_COVR, M_CSCL), cartographic Blue Notes ($CSYMB), and features (BOYSPP, OBSTRN, PIPSOL, SBDARE, SLCONS, UWTROC, and WRECKS).

As dictated by Hydrographic Technical Directive 2008-8, these SAHOB files were combined into two separate files in S-57 format. Both S-57 files were exported from CARIS Bathy DataBASE in meters and then processed in CARIS HOM to convert the metric units to feet. The final products are two S-57 files, in Lat/Long NAD-83. One S-57 file contains the chart scale soundings, the meta-objects, the Blue Notes, and the features (H11897_CS.000), and the other S-57 file contains the depth contours and the survey scale soundings (H11897_SS.000). Finally, quality assurance and topology checks were made utilizing CARIS S-57 Composer 2.1 validation checks and DKART Inspector 5.0 validation tests.

H11897 CARIS H-Cell final deliverables include the following products:

H11897_CS.000	1:10,000 Scale	H-Cell with chart scale soundings, meta-objects, blue notes, and features
H11897_SS.000	1:10,000 Scale	H-Cell with survey scale soundings and depth contours

B.2.2. Junctions

Survey H11897 (2009) junctions with surveys H11869 (2008) to the west and H11870 (2008) to the south. Most present survey soundings compare within 2 feet of junctioning survey soundings. Present survey depths are in harmony with the charted hydrography to the east and north.

The present survey, which has 100% multibeam and 200% sidescan coverage, supercedes all chart and previous survey soundings within its coverage area. Accordingly, the present survey's coverage supercedes the LIDAR coverage from survey H11869 (2008) in areas where these coverages overlap.

In addition, the present survey junctions with survey H11898 (2009) to the south, which is awaiting compilation.

C. VERTICAL AND HORIZONTAL CONTROL

The OPR-H328-OS-08-B Horizontal and Vertical Control Report (HVCR) was submitted with survey H11897.

Horizontal control used for this survey during data acquisition is based upon the North American Datum of 1983 (NAD83), UTM Projection Zone 17 North.

D. RESULTS AND RECOMMENDATIONS

D.1 CHART COMPARISON

11468 (42nd Edition, Jan/2010)
Miami Harbor
Corrected through NM 06/08/2010
Corrected through LNM 06/19/2010
Scale 1:10,000

11467 (41st Edition, Jun/2008)
West Palm Beach to Miami Florida
Corrected through NM 06/08/2010
Corrected through LNM 06/19/2010
Scale 1:40,000

11465 (38th Edition, Nov/2007)
Intracoastal Waterway Miami to Elliott Key
Corrected through NM 06/08/2010
Corrected through LNM 06/19/2010
Scale 1:40,000

11466 (38th Edition, Jun/2008)
Jupiter Inlet to Fowey Rocks
Corrected through NM 06/08/2010
Corrected through LNM 06/19/2010
Scale 1:80,000

ENC Comparison

US5FL22M
Miami Harbor
Edition 23
Application Date 2010/05/14
Issue Date 2010/06/14
Chart 11468

US5FL33M
Intracoastal Waterway West Palm Beach to Miami
Edition 17
Application Date 2010/05/04
Issue Date 2010/05/04
Chart 11467

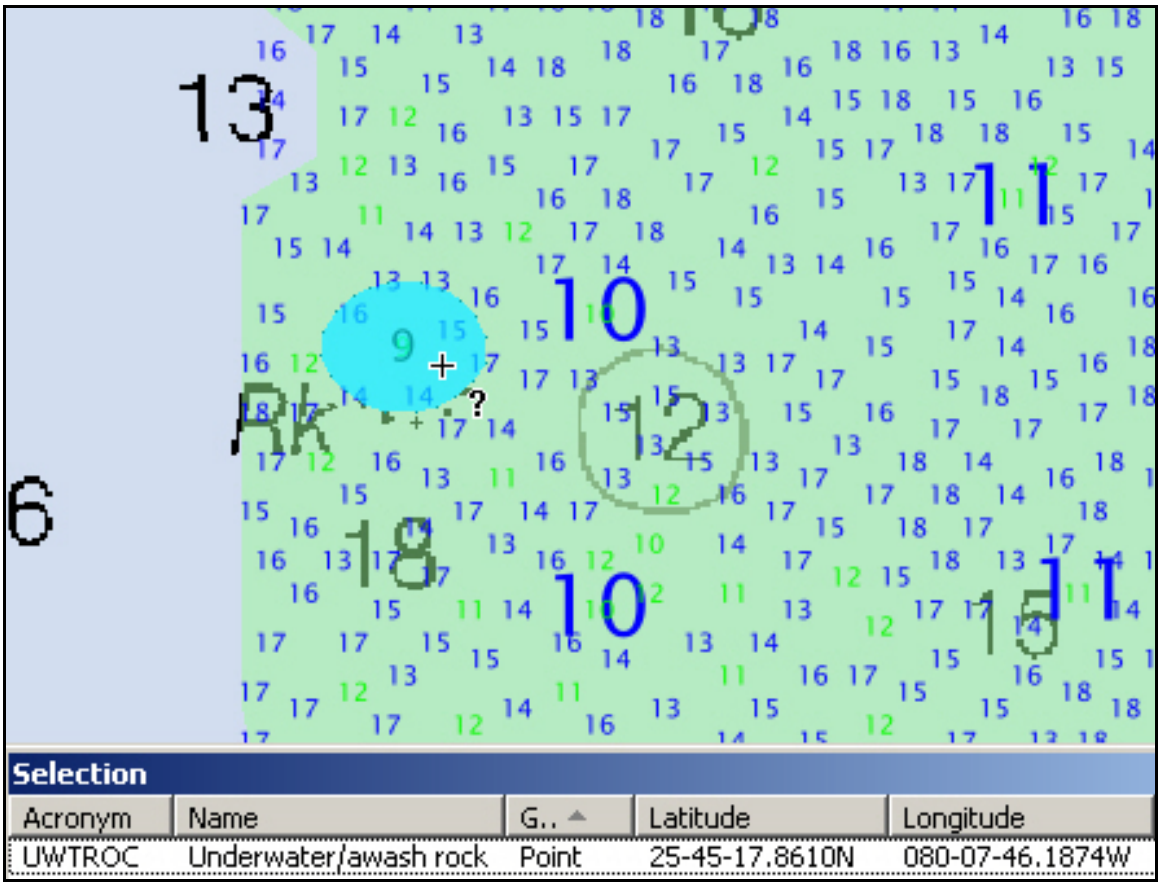
US5FL21M
Intracoastal Waterway Miami to Elliott Key
Edition 17
Application Date 2010/06/11
Issue Date 2010/06/11
Chart 11465

US4FL34M
Jupiter Inlet to Fowey Rocks; Lake Worth Inlet
Edition 7
Application Date 2009/07/01
Issue Date 2009/07/01
Chart 11466

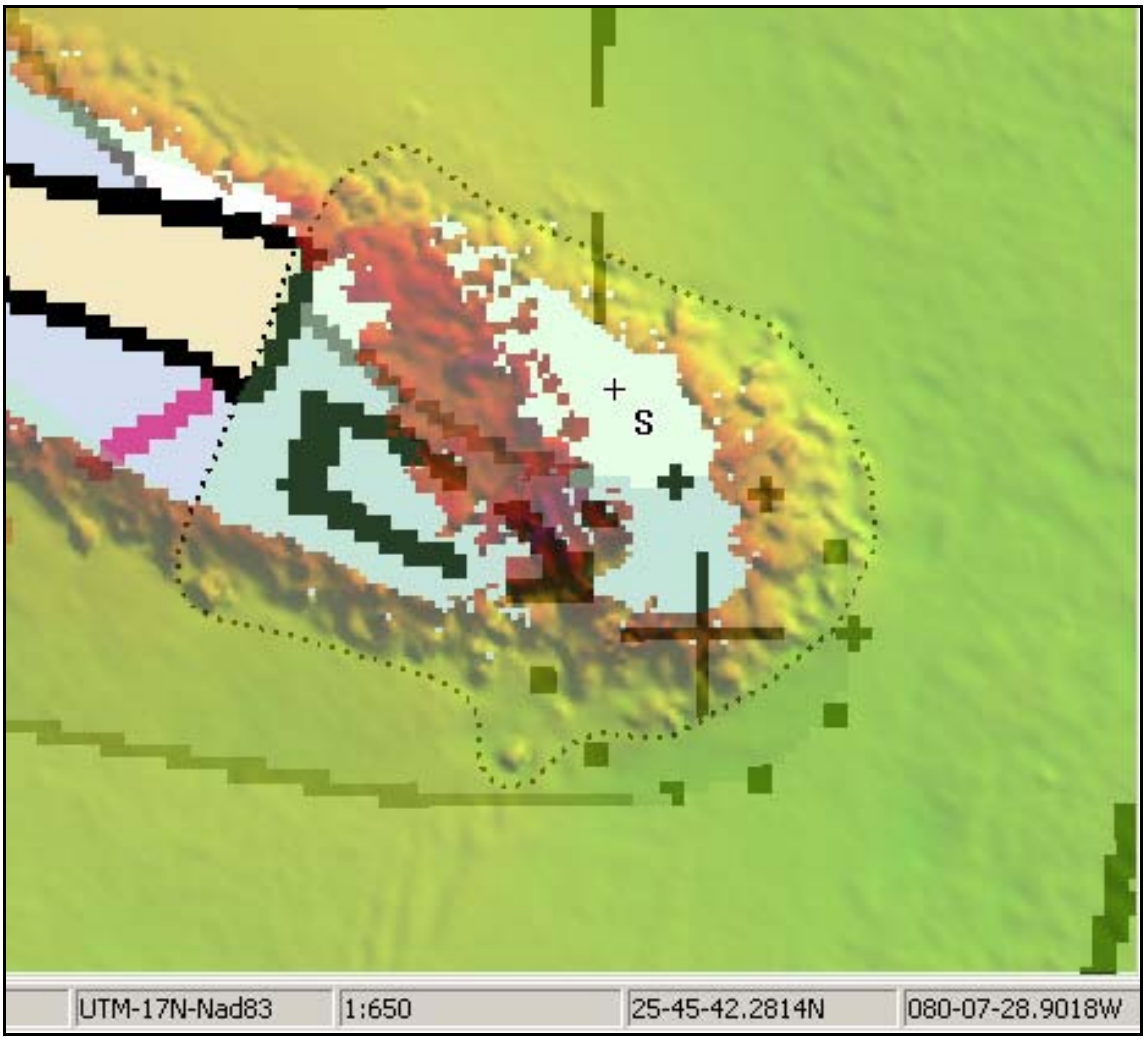
D.1.1 Hydrography

The charted hydrography originates with prior surveys and requires no further consideration. The hydrographer makes adequate chart comparisons and recommendations in section "D" and Appendix I and II of the Descriptive Report. The hydrographer recommends retaining all features as charted, including all Aids to Navigation (ATONs) and seabed characteristic point features. The following exceptions are noted:

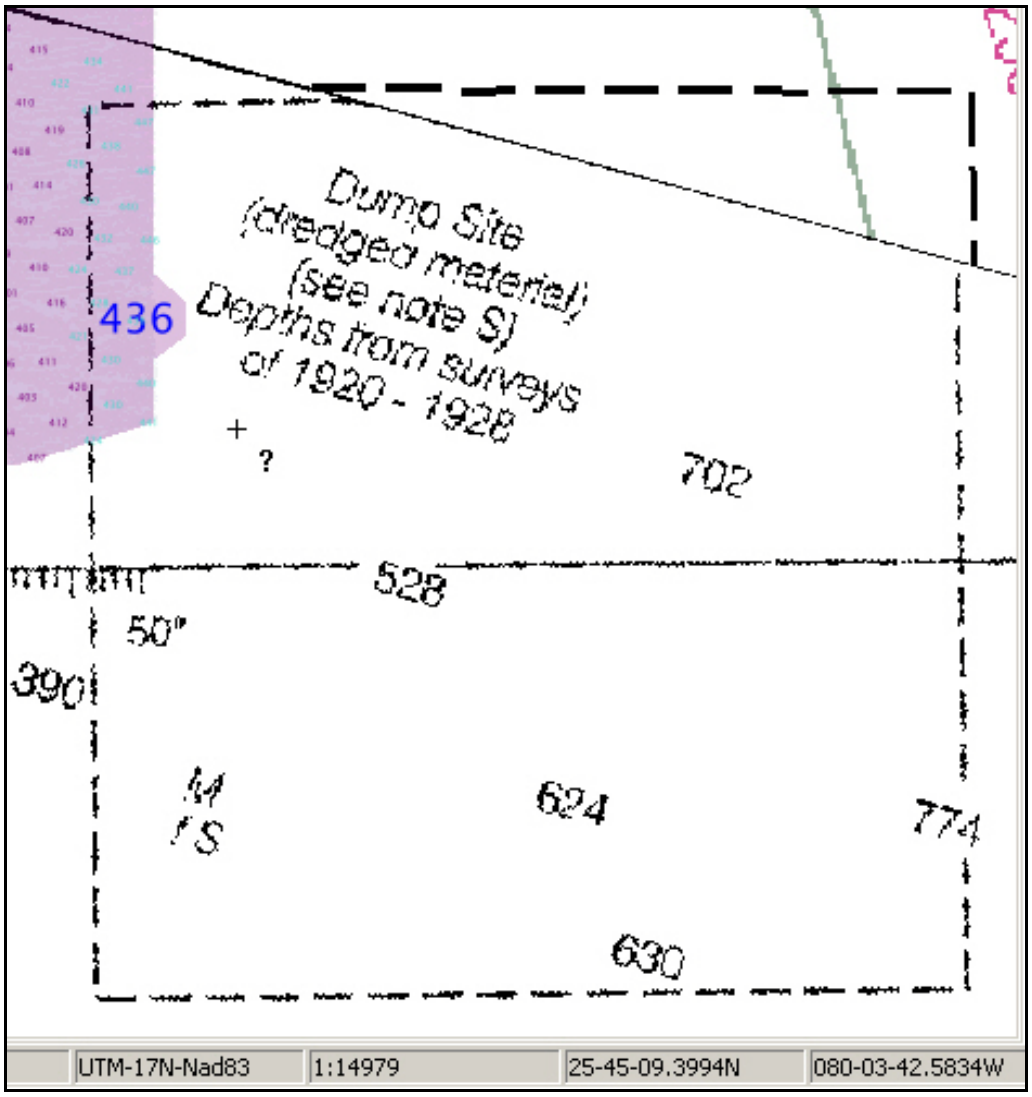
a. An underwater rock (UWTROC), positioned at 25-45-17.861N, 080-07-46.187W with a least depth of 9.232 feet (2.814 meters), was covered with 200% SSS and developed with 100% SWMB. This rock was reported as a Danger to Navigation (DTON #3) by survey H11898. Recommend to revise the depth and position of the reported rock.



b. At approximate position 25-45-42.281N, 080-07-28.902W, the terminus of the northern jetty (for Bar Cut Channel) extends below the water and poses a danger to navigation. Recommend to chart this partially submerged area of riprap as a shoreline construction (SLCONS) feature associated with the northern jetty.

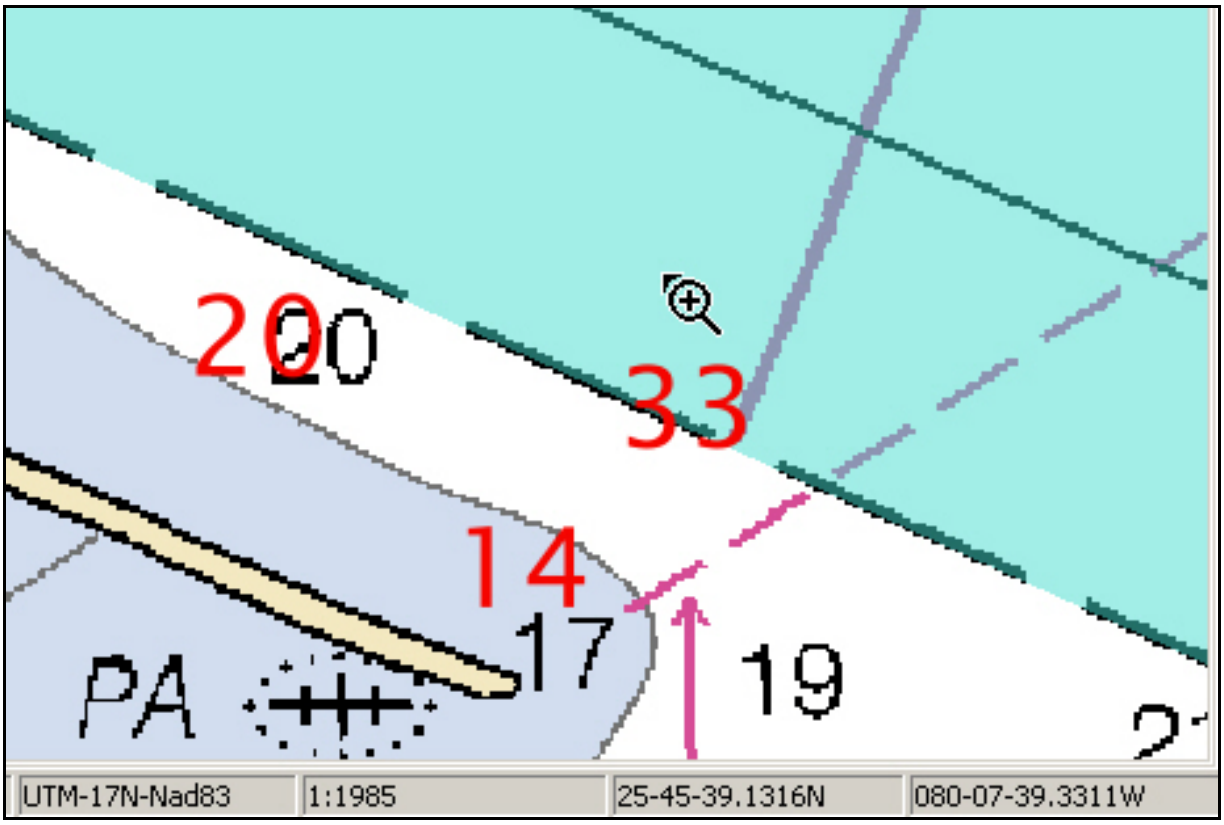


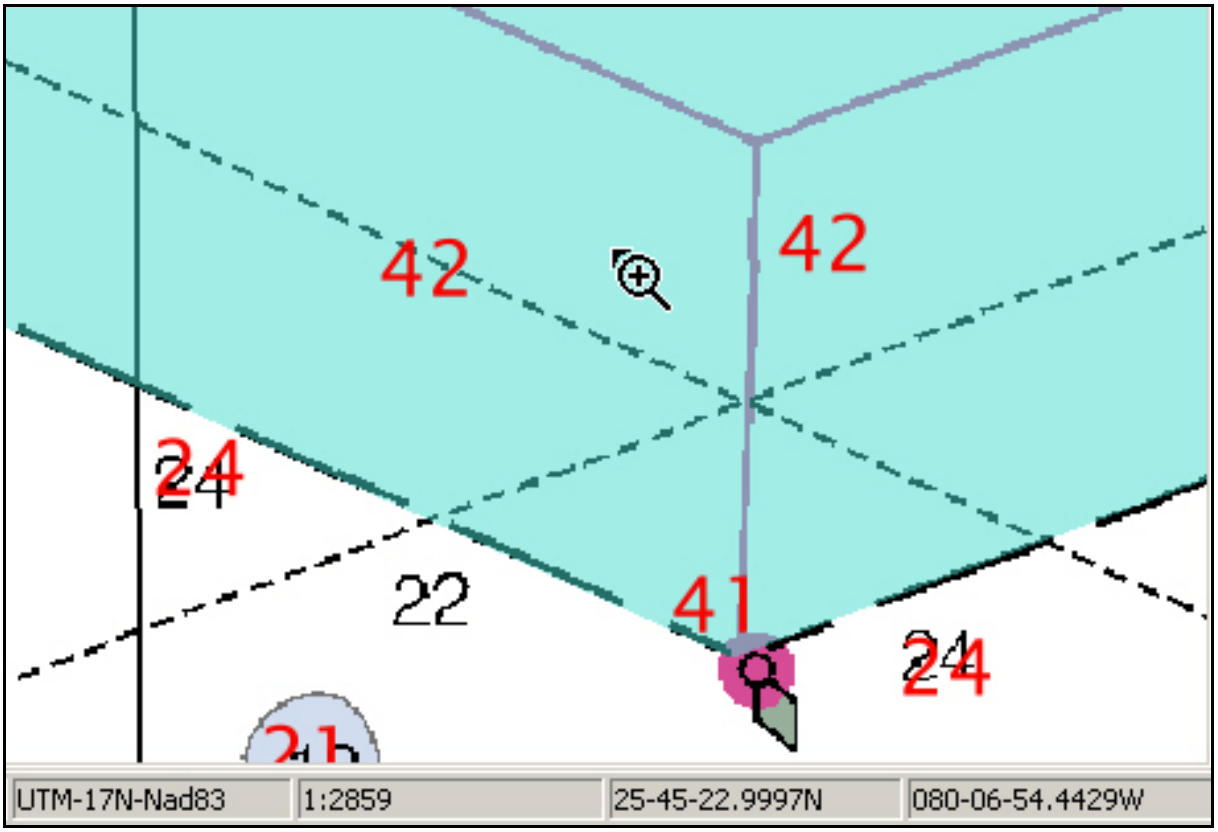
c. At the southeastern corner of the survey area, a dump site is positioned at approximately 25-45-09.399N, 080-03-42.583W (see figure below). The legend for the dump site does not specify its status (active or discontinued). Recommend to revise the legend to include depths from 2009, and to state its status as active or discontinued.

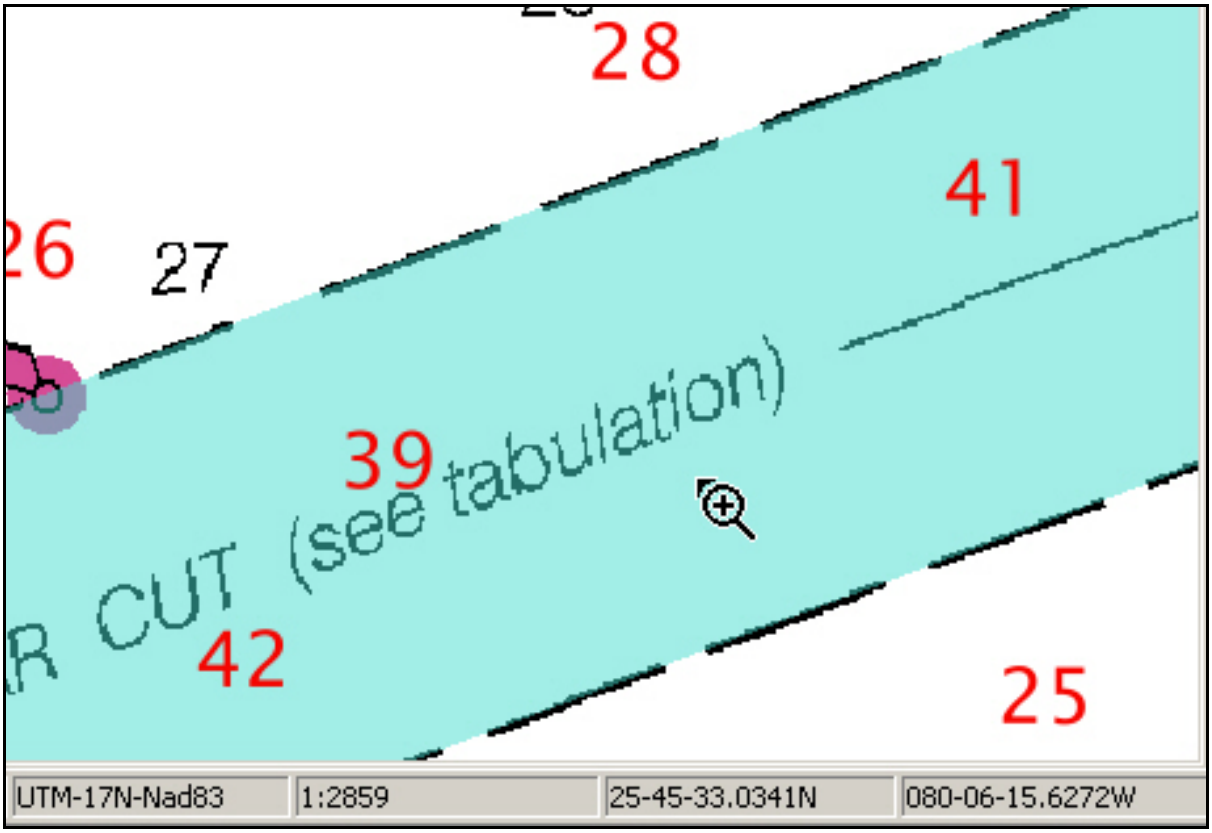


d. Significant shoaling was observed at multiple locations in the portion of the Miami Harbor Channel that lies within the survey limits (see DR section D.1.3). The controlling channel depths were obtained from ENC US5FL22M (Ed 23, Jun 2010). A total of 15 significant contacts, equal to or greater than 2 feet (0.6 meters) shoaler than the controlling channel depth, were included in the contractor's S-57 feature file as "obstructions" (H11897_Features.hob).

Information regarding these 15 shoal soundings in the Miami Harbor Channel was reported by AHB to the Navigation Manager for notification (see DR Appendix V for correspondence). Of these 15 shoal soundings that were submitted, only 9 were deemed navigationally significant during office review and included in the H-Cell as soundings within the Miami Harbor Channel. Below are three figures showing examples of the 9 shoal soundings (shown in red) within the channel limits (shown in turquoise).


20
33
14
17
19
PA
UTM-17N-Nad83
1:1985
25-45-39.1316N
080-07-39.3311W


42
42
24
22
41
24
UTM-17N-Nad83
1:2859
25-45-22.9997N
080-06-54.4429W



D.3 MISCELLANEOUS

Chart compilation was completed by Atlantic Hydrographic Branch personnel in Norfolk, Virginia. Compilation data will be forwarded to the Marine Chart Division in Silver Spring, Maryland. See Section D.1 of this report for a list of the Raster Charts and Electronic Navigation Charts (ENC) used for compiling the present survey.

D.4 ADEQUACY OF SURVEY

The present survey is adequate to supersede the charted bathymetry within the common area. Any features not specifically addressed either in the H-Cell files or the Blue Notes should be retained as charted. Refer to the Descriptive Report for further recommendations by the hydrographer.

APPROVAL SHEET
H11897

Initial Approvals:

The completed survey has been inspected with regard to survey coverage, delineation of depth contours, disposition of critical depths, cartographic symbolization, and verification or disproval of charted data. All revisions and additions made to the H-Cell files during survey processing have been entered in the digital data for this survey. The survey records and digital data comply with National Ocean Service and Office of Coast Survey requirements except where noted in the Descriptive Report and the Evaluation Report.

All final products have undergone a comprehensive review per the Hydrographic Surveys Division Office Processing Manual and are verified to be accurate and complete except where noted.

James J. Miller II
2010.07.27
16:33:29 -04'00'

James J. Miller II
Hydrographic Survey Intern
Atlantic Hydrographic Branch

I have reviewed the H-Cell files, accompanying data, and reports. This survey and accompanying Marine Chart Division deliverables meet National Ocean Service requirements and standards for products in support of nautical charting except where noted.

Richard T. Brennan
I am approving this document
2010.07.31 18:07:42 -04'00'

Approved: _____

Richard T. Brennan
Lieutenant Commander, NOAA
Chief, Atlantic Hydrographic Branch

Digitally signed by Mark Lathrop
DN: cn=Mark Lathrop, o=NOAA, ou=HSD, email=mark.t.lathrop@noaa.gov, c=US
Reason: AWOIS/Surf Check
Date: 2010.08.17 13:38:46 -04'00'