H11899

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-H324-OS-08-A*
Registry No. *H11899*

Locality

State *Florida*
General Locality *Atlantic Ocean*
Sub locality *East of Palm 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. *H11899*

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-H324-OS-08-A*

State *Florida*

General Locality *Atlantic Ocean*

Locality *East of Palm Beach*

Scale *N/A* Date of Survey *June 3, 2009 through July 3, 2009*

Instructions Dated *May 7, 2008* Project No. *OPR-H324-OS-08-A*

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

Chief of Party *George G. Reynolds*

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

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*~~ ***Atlantic Hydrographic Branch***

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 Appendix V of the Descriptive Report.)

Contractor: *Ocean Surveys, Inc.*
91 Sheffield St.
Old Saybrook, CT. 06475

All comments in red, bold italic were made during AHB verification and processing.

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 3 JUNE 2009 TO 3 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

INTRODUCTION 1

A. AREA SURVEYED 1

B. DATA ACQUISITION AND PROCESSING 4

B.1 Equipment 4
B.2 Quality Control 5

B.2.1 System Calibration 5
B.2.2 SWMB Cross Lines 5
B.2.3 Data Quality Review 6

B.2.3.1 CARIS BASE Surface Standard Deviation and Uncertainty 6
B.2.3.2 SSS Imagery and Contracts 6

B.2.4 Survey Junctions 7
B.2.5 Unusual Conditions/Factors Affecting Soundings/Imagery 7

B.3 Corrections to Echo Soundings 8

B.3.1 Static Draft Corrections 9

B.4 Data Processing 9

B.4.1 Survey Coverage 9
B.4.2 Coverage BASE Surfaces and Mosaics 9

C. VERTICAL AND HORIZONTAL CONTROL 11

C.1 Vertical Control 11
C.2 Horizontal Control 11

D. RESULTS AND RECOMMENDATIONS 11

D.1 Chart Comparison 11

D.1.1 General Chart Comparison 12
D.1.2 Detailed Chart Comparison and Charted Features 13
D.1.3 AWOIS Items 16
D.1.4 Danger to Navigation Reports 17

D.2 Additional Results 17

D.2.1 Shoreline Verification 17
D.2.2 Comparison with Prior Surveys 17
D.2.3 Aids to Navigation (ATON) 18

D.2.3.1 United States Coast Guard (USCG) ATON 18
D.2.3.2 Private Aids to Navigation 19

TABLE OF CONTENTS (Continued)

Page

D.2.4 Restricted Data 19
D.2.5 Other Data 19

D.2.5.1 Bottom Characteristics 19

D.2.6 S-57 Feature File 19

D.2.6.1 S-57 Chart Features File 19
D.2.6.2 S-57 Contact File 20
D.2.6.3 S-57 Critical Sounding File 20

E. APPROVAL SHEET

APPENDICES **** Included witin this report.***

I Danger to Navigation Reports
II Survey Feature Report
III Final Progress Sketch
IV Tides and Water Levels
V Supplemental Survey Records and Correspondence

SEPARATES *****File with original field records.***

I Acquisition and Processing Log
II Sound Speed Data
III Statement of Work
IV Cross Line Comparisons
V Side Scan Contact Listing

DESCRIPTIVE REPORT
TO ACCOMPANY
HYDROGRAPHIC SURVEY H11899

Field Number OPR-H324-OS-08-A
July 3, 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 Palm Beach, Florida.

A. AREA SURVEYED

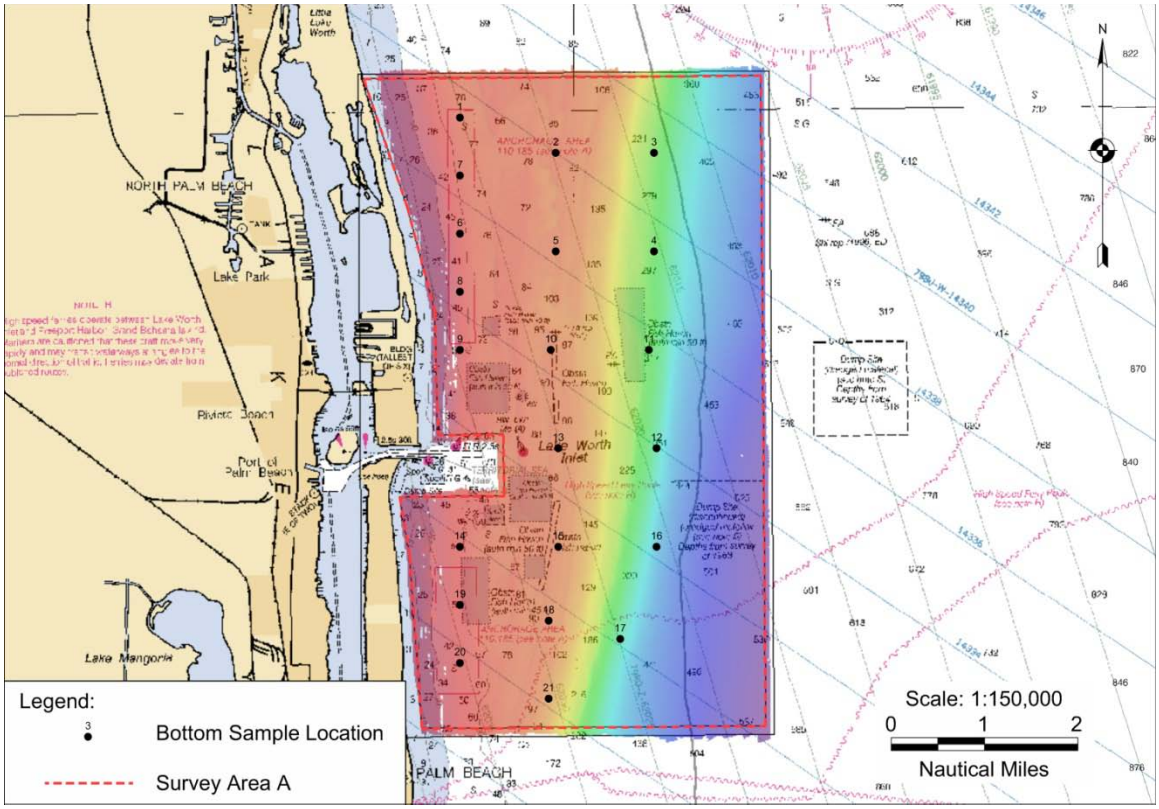


Figure 1. H11899 multibeam coverage area developed from a 4m surface colored by depth overlain on Chart 11466. The NOAA project limits are shown in red.

This survey provides hydrographic data for the Atlantic Ocean waters east of Palm Beach, Florida. The survey limits define the inshore 18-foot contour and extend offshore approximately 4 nautical miles. The general location of the survey limits is presented in Table 1. The survey area includes 2 anchorage areas for the Port and several offshore fish havens. Survey data were acquired to meet requirements specified in the contract Statement of Work* (SOW, May 7, 2008; amended Oct 28, 2008), 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 65 feet. One hundred percent (100%) SWMB coverage was acquired for the survey area in deep water (i.e. greater than approximately 65 feet) 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 30 feet. Additional SWMB coverage was obtained as necessary to provide a least depth for all significant SSS contacts. The final survey area covers 26.72 square nautical miles (Figure 1). ***Concur.***

Table 1
General Location of Survey H11899

Northern Limit	Southern Limit	Western Limit	Eastern Limit
26° 50’ 30” N	26° 43’ 10” N	80° 02’ 45” W	79° 57’ 30” 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’s were generally separated by an odd/even numbering convention. Survey trackline statistics are indicated in Table 3. ***Concur.***

On-location system calibration verification was performed on June 3, 2009. Mainscheme data, cross line data, significant target development, and bottom samples were acquired on the following dates: June 3-12, 14-22, 24-30 and July 2-3, 2009. (Calendar day numbers 154-163, 165-173, 175-181, 183-184). Twenty-one (21) bottom samples were acquired.

**** File with original field records.***
***** Filed digitally at AHB.***

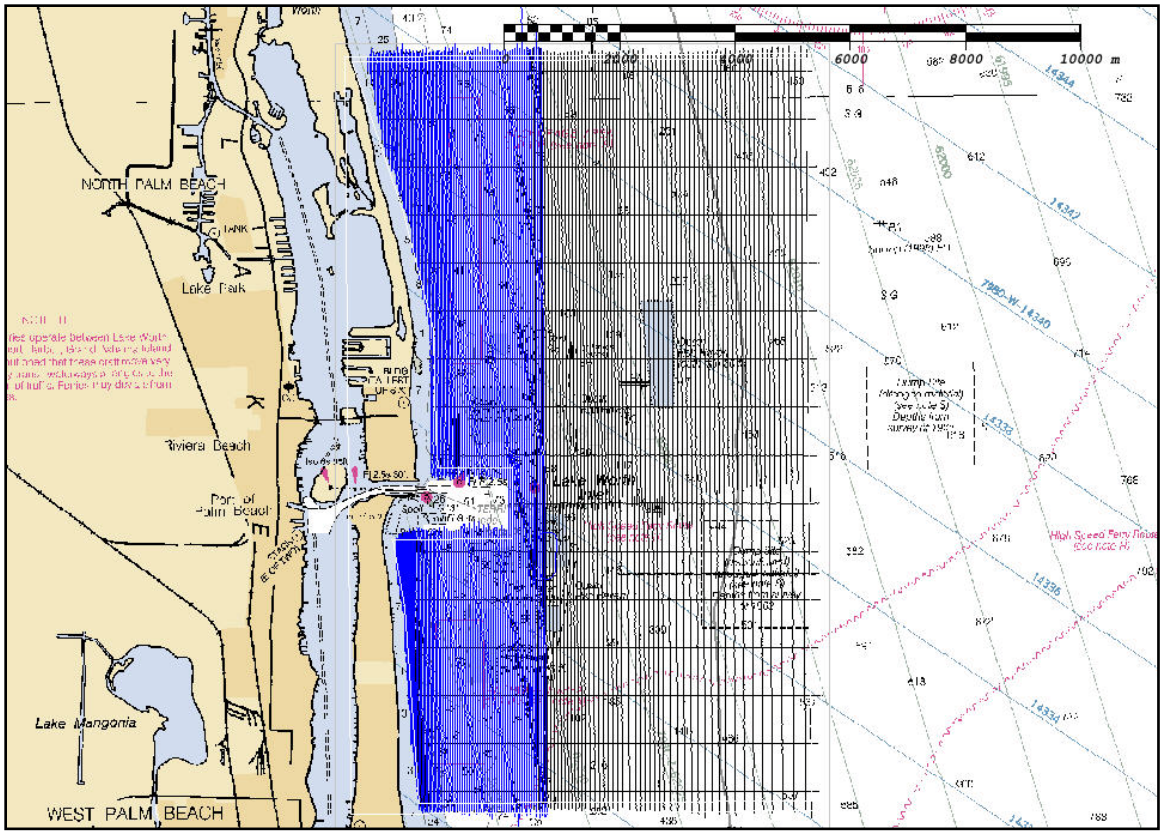


Figure 2. H11899 survey area with SSS/SWMB tracklines in blue and SWMB only tracklines in black.

Table 2
H11899 Survey Line Spacing

Water Depths (meters)	Trackline Offset (meters)	SSS Range Scale (meters)
1-10	30	37.5
10-25	40	50
> ≈25	60-150	SWMB only

Table 3
H11899 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
462.3	408.6	10.0	66.3	26.72	21

B. DATA ACQUISITION AND PROCESSING

Refer to OPR-H324-OS-08-A 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 survey data as well as any deviations from the DAPR* is 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*. ***Concur.***

Table 4
H11899 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"

****H11899 DAPR is on file at AHB and submitted to OCS Hydrographic Surveys Division with H11899 deliverables.***

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 ***** ***Concur.***

A SWMB system calibration survey (patch test) was performed on May 14 (DN 134) to measure sensor alignments and to verify offsets. A calibration survey performed within the survey area on June 3 (DN 155) verified the existing alignment values and no changes were made to the CARIS vessel configuration file (VCF). The CARIS vessel configuration file (HVF) was updated with all appropriate time stamps, offset values, and error estimates. Calibration survey data were also acquired on the final day of operations to verify the stability of the sensor alignment. ***Concur.***

B.2.2 SWMB Cross Lines

A total of 66.3 nautical miles of cross line data were acquired on June 27, and July 2-3 (DN178, DN183, DN184) and comprised 7.6% of the 880.9 nautical miles (nm) of mainscheme SWMB data. ***Concur.***

Cross line data were acquired along transects oriented generally perpendicular to the depth contours. Sound speed (SS) variations were observed between the deep and the shallow portions of the survey area. This was particularly the case along six cross lines (910-915) located in the northern section of the survey. To account for these regional differences, during data processing, HDCS cross line data for the six lines were split into two sections (deep and shallow) at approximately the 30-meter depth. ***Concur.***

The cross lines were split in the navigation editor. To create a shallow section, the navigation data for the deep section of each line was rejected with break interpolation, and vice versa to create a deep section. The cross lines were split according to the following table. ***Concur.***

Cross Line #	Deep Section (time)	Shallow Section (time)
910	18:06:04.311 to EOL	BOL to 18:06:04.271
911	BOL to 17:31:39.257	17:31:39.297 to EOL
912	16:20:19.270 to EOL	BOL to 16:20:19.230
913	BOL to 16:39:44.220	15:39:44.240 to EOL
914	14:55:18.331 to EOL	BOL to 14:55:18.271
915	BOL to 13:55:00.334	13:55:00.354 to EOL

The shallow SS cast (collected at 14:33) was applied to the shallow portions of the cross lines while the deep SS cast (collected at 16:36) was applied to the deep portions of the cross lines. ***Concur. *H11896 DAPR is on file at AHB and submitted to OCS Hydrographic Surveys Division with H11896 deliverables.***

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, 99% of cross line soundings considered in the analysis meet IHO Order 1 uncertainty standards.

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 generated from the higher of the standard deviation or uncertainty values were appropriate for the bathymetric relief observed in the survey area. Highest standard deviation values were observed where soundings were designated on shoal features. 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 reefs, on fish haven features, on wrecks and in the deepest water of the survey area. ***Concur.***

Table 5
H11899 Combined Final BASE Surface Uncertainty

IHO Order	I (0-100m)	II (> 100m)	III (> 100m)
Combined Final 4m Surface Nodes Within Specifications	99.85%	100%	100%

B.2.3.2 SSS Imagery and Contacts

Contacts with approximately 1-meter heights and greater were identified in 2x 100% coverage SSS imagery and attributed with feature classifications and descriptive remarks if applicable. 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). ***Concur.***

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

Concur.

B.2.4 Survey Junctions

There were no junctions assigned for this survey.

Concur.

B.2.5 Unusual Conditions/Factors Affecting Soundings/Imagery

Survey data for H11899 revealed numerous fish haven features, wrecks, debris areas and spoil areas. Significant survey features are represented in the final BASE surfaces and the S-57 feature file. ***Concur.***

There were areas of changing sand waves observed in the survey area, generally north of the inlet. Changes in depths were observed in the BASE surfaces when operations were separated by time; however, local depth variations were generally less than 0.2 meters and overall depths were consistent. These variations are not navigationally significant and do not exceed error tolerances for IHO Order 1 accuracies observed in the BASE surfaces. ***Concur.***

There were currents observed in offshore areas during the survey. Drift measurements estimated during CTD deployments ranged from 1 to 4 knots. Although vessel speed through the water, and therefore dynamic draft, may have been slightly affected by the current, no significant along-track water level offsets were observed in the sounding data or BASE surfaces. ***Concur.***

There were spatial and temporal variations in the water-column sound speed that were observed during the survey (Figure 3). The changing sound speed could be attributed to differences between shallow and deep water bodies, increasingly warm and sunny weather conditions, strong prevailing currents, proximity to the Gulf Stream, and upwelling currents. The planned survey lines were organized in separate zones to minimize the effects of spatial variation. Line spacing was reduced and outer swath soundings were filtered to minimize SS errors while maintaining full coverage. Standard deviation and depth uncertainty in the final BASE surfaces do not exceed tolerances for IHO Order 1 or HSSD accuracies. ***Concur.***

In deep 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 due to low sonar return from deep, soft sediments. Line spacing was reduced and outer swath soundings were filtered to minimize noise while maintaining full coverage. Ping rates were maximized to increase along track sounding density. ***Concur.***

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.***

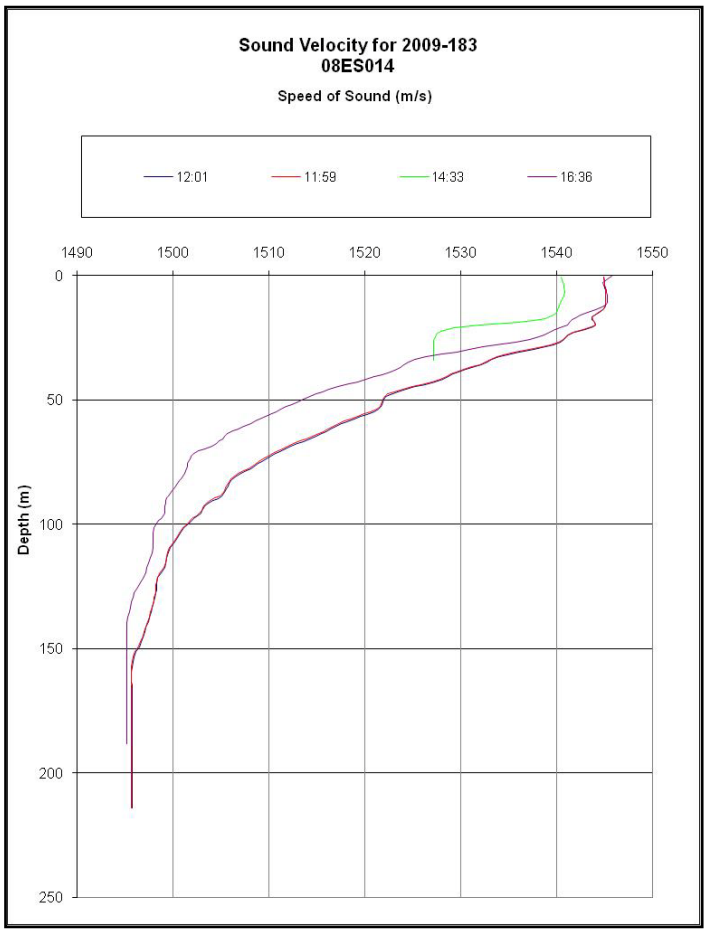


Figure 3. Typical deep water sound speed casts.

B.3 Corrections to Echo Soundings

Corrections to echo soundings were performed in accordance with the DAPR*. No changes to the echo sounder or vessel configuration, other than minimal static draft changes, occurred during the survey and no systematic errors were observed in the data to warrant additional echo sounder calibration. ***Concur.***

****H11896 DAPR is on file at AHB and submitted to OCS Hydrographic Surveys Division with H11896 deliverables.***

A pressure sensor on the primary CTD (SN 2864) developed an air bubble which degraded the depth measurement accuracy. The CTD malfunction was observed during the regular weekly DQA check/CTD comparison. The secondary CTD (SN 1801) was used on DN 178 and the primary CTD was replaced on DN 179 (SN 6107). ***Concur.***

Line spacing was reduced and outer swath soundings were filtered to minimize SS errors while maintaining full coverage. Standard deviation and depth uncertainty in the final BASE surfaces do not exceed tolerances for IHO Order 1 or HSSD accuracies. ***Concur.***

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 merge process. Generally, the static draft values did not vary more than 0.02 meter. ***Concur.***

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 25 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 HSSD. ***Concur.***

B 4.2 Coverage BASE Surfaces and Mosaics

Survey H 11899 was divided into several field sheets (Figure 4 and Table 7) 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 spoil area 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. ***Concur.***

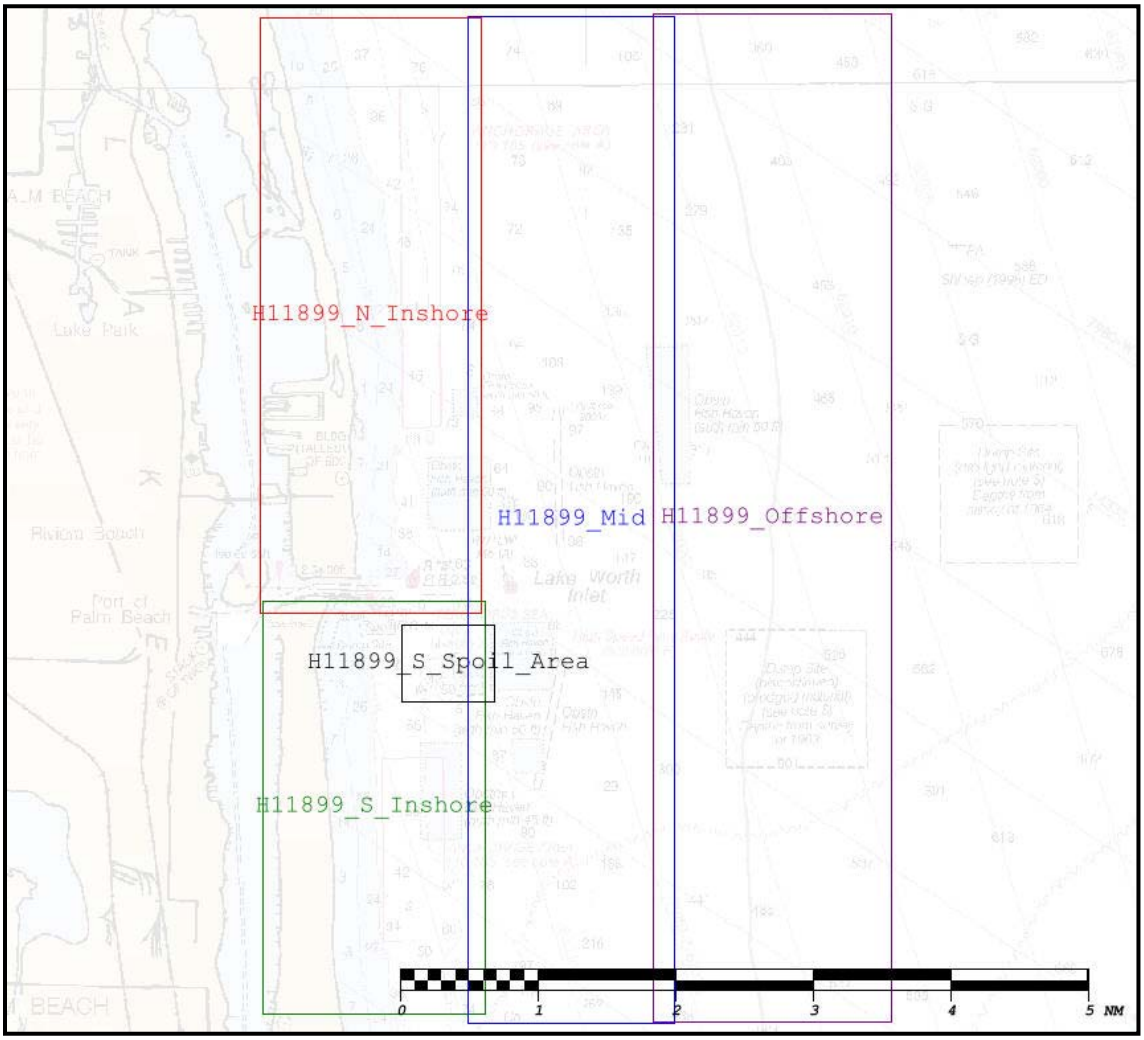


Figure 4. H11899 final HIPS field sheet layout.

Table 7
H11899 Field Sheets

Not considered a source grid.

Field Sheet Name	Resolution (meters)	Depth Range (meters)	Type
H11899_S_Spoil_Area	0.5	10-30	SWMB coverage
H11899_N_Inshore	1	3-30	SWMB coverage
H11899_S_Inshore	1	3-30	SWMB coverage
H11899_mid	2	15-130	SWMB coverage
H11899_Offshore	4	30-170	SWMB coverage
H11899_full*	4	all	Combined final SWMB coverage
H11899_SSS_Coverage	1	< 25	2 x 100% SSS mosaics

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 H1899. ***Concur.***

The survey area is located entirely within Zones SA220 and SA225 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. ***Concur.***

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. ***Concur.***

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. ***Concur.***

OSI established a horizontal control point, "Slip 112 Side Cleat," adjacent to the survey vessel's berth at the Riviera Beach Marina in West Palm Beach, FL with a Trimble MS750 DGPS system using U.S. Coast Guard Key West DGPS beacon correctors. The 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. ***Concur.***

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 8, were downloaded on August 4, 2009 and are submitted with the survey data.

The Local Notice to Mariners (LNM) and Notice to Mariners (NM) issued during the survey period (June 3, 2009 to July 3, 2009) were reviewed for significant updates. Coast Guard District 7 LNM 27/09 (7 July 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 8
H11899 Affected Charts

Chart Number	Scale	Edition	Issue Date	ENC
11009	1:1,200,000	38th, Dec./06	8-1-2009	US2EC02M
11013	1:1,200,000	47th, Feb./08	8-1-2009	US2EC01M
11460	1:466,940	41st, Jul./08	8-1-2009	US3FL30M
11466	1:80,000	38th, Jun./08	8-1-2009	US4FL31M
11469	1:100,000	8th, Dec./07	8-1-2009	US4FL23M
11472	1:24,000	34th, Jul./09	8-1-2009	US5FL40M

D.1.1 General Chart Comparison

Charted depths and depth areas differed with survey depths and contours on the large scale charts of the area, 11472 (US5FL40M) and 11466 (US4FL31M). Specific survey 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. ***Concur.***
- There is shoaling north of the inlet, and the surveyed 30-foot depth contour is generally seaward of the charted depth curve. ***Concur.***
- South of the inlet, there is deepening, partially associated with observed borrow pits, and the surveyed 30-foot contour is generally inshore of the charted depth curve. ***Concur.***
- The limits of a spoil area, surveyed south of the inlet, 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. ***Concu.***
- 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. ***Concur.***
- Several uncharted wrecks were surveyed. Positions and least depths were developed and are submitted with the S-57 feature file. ***Concur.***
- In general, the 60-foot contour is consistent with the charted depth curve, but should be updated with detailed depths from this survey. ***Concur.***
- Some scale-dependent and feature discrepancies exist between the RNC, ENC, and survey data. ***Concur.***

D.1.2 Detailed Chart Comparison and Charted Features

Charts 11009 (US2EC02M), 11013 (US2EC01M) are small scale RNC coastal approach charts with very little detail of the survey area. The ENC US2EC02M and US2EC01M do not cover the survey area.

- H11899-1: An Obstruction Fish Haven centered at approximate position 26-47-47N, 79-59-10W was covered with 100% SWMB data. The least depth in this area is an 18.7 fathoms (34.3 meters) sounding on a submerged wreck at 26-47-17.81N, 079-59-33.03W. ***Concur with clarification. Delete charted wreck "PA". Chart nondangerous wreck, least depth 112 ft at survey position. Chart# 11466_3.***
- H11899-2: An Obstruction Fish Haven centered at approximate position 26-46-00N, 80-00-23W was covered with 100% SWMB data. ***Concur.***
- H11899-3: A Dump Site (discontinued) (dredged material) was covered with 100% SWMB data to the eastern survey limits. No spoils were observed in the 4 meter BASE surface. ***Concur.***

Chart 11460 (US3FL30M), Chart 11466 (US4FL31M) and Chart 11472 (US5FL40M, Small craft insets #7, #9, #10). The ENC ~~US4FL31M and~~ US5FL40M do not cover the survey area.

- H11899-4: A charted wreck location (RNC 11460 - 13 fathoms rep 2003) at position 26-47-37.80N, 80-00-13.80W was surveyed with 200% SWMB data. A least depth of 11.5 fathoms (21.1 meters) was developed at 26-47-36.51N, 80-00-14.23W. See section D.1.4 AWOIS Items. ***Concur. Chart (subm wreck, remove note "79ft rep 2003") Chart# 11466_3.***
- H11899-5: An Obstruction (auth min 8 1/4 fms) centered at approximate position 26-47-42N, 80-00-59W was covered with 100% SWMB data. A least depth of 9.4 fathoms (17.3 meters) was developed on a submerged wreck at position 26-47-45.88N, 80-01-3.89W. An area of debris and submerged wrecks extends outside the fish haven boundary to the south. A least depth of 9.7 fathoms (17.~~8~~7 meters) was developed on a submerged wreck at position 26-47-30.42N, 80-00-54.47W. The area of debris was developed with 100% SWMB data and the extents were delineated from the final BASE surfaces. ***Concur with clarification. 56ft sounding In Fish Haven, min depth of Fish haven is 50ft. No charting action required. Chart#11472_9***
- H11899-6: An obstruction area (foul area) centered at 26-46-57N, 80-01-01W was surveyed with 100% SWMB data. A least depth of 9.0 fathoms (16.6 meters) was developed at position 26-46-38.17N, 80-01-13.89W in the southwest corner of the area. ***Concur.***
- H11899-7: An obstruction area (foul area) centered at 26-47-06N, 80-00-16W was surveyed with 100% SWMB data. A least depth of 14.0 fathoms (25.7 meters) was developed at position 26-46-46.75N, 80-00-17.76W in the southern area. ***Concur.***
- H11899-8: A charted wreck PA at position 26-47-17.59N, 079-59-33.28Wwas surveyed with 200 % SWMB data. A least depth of 18.7 fathoms (34.3 meters) was

developed at position 26-47-17.81N, 79-59-33.03W. ***Chart (Subm wreck, remove note "PA") Chart# 11466_3***

- H11899-9: An Obstruction Fish Haven (auth min 8 fm) centered at approximate position 26-47-38N, 79-59-20W was covered with 100% SWMB data. A least depth of 25.7 fathoms (47 meters) was developed on a submerged wreck at position 26-47-54.96N, 79-59-23.11W. ***Concur with clarification. 154ft sounding on wreck In Fish Haven, min depth of Fish haven is 50ft. Remove 154ft sounding. No charting action required. Chart# 11466_3***
- H11899-10: A Dump Site (discontinued) (dredged material) was covered with 100% SWMB data. No spoils were observed in the 4 meter BASE surface. ***Concur.***
- H11899-11: An Obstruction Fish Haven centered at approximate position 26-45-50N, 80-00-35W was covered with 100% SWMB data. The least depth in this area is a 9.9 fathoms (18.1 meters) sounding on a submerged wreck at 26-45-57.44N, 80-00-44.94W. ***Concur with clarification. 59ft sounding on wreck In Fish Haven, min depth of Fish haven is 50ft. No charting action required. Chart# 11466_3***
- H11899-12: Spoil area centered at approximate position 26-45-34N, 80-00-59W was covered with 100% SWMB data. The spoils observed in SWMB data extend beyond the charted limits (Figure 5). The extent of the spoils was delineated from the final BASE surfaces. The least depth in this area is a 7 fathoms (12.9 meters) sounding on a submerged wreck at 26-45-42.02N, 80-01-15.24W. The wreck has been charted through a DTON report from this survey. ***Concur. Retain as charted. 42W kw/danger curve. Chart# 11472_9***

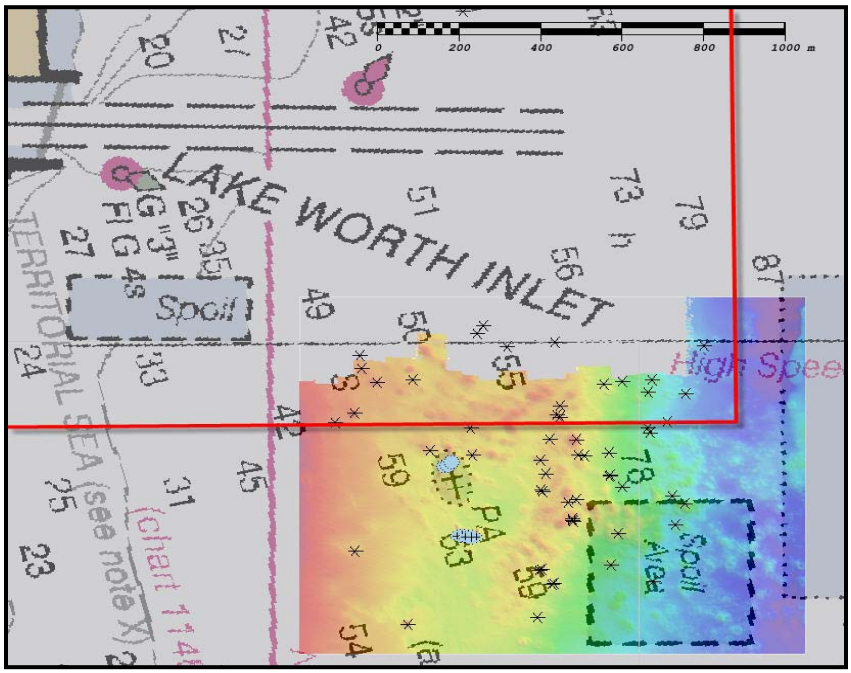


Figure 5. Spoil area extending outside charted limits.

- H11899-13: An Obstruction Fish Haven (auth min 45 feet) centered at approximate position 26-44-53N, 80-01-15W was covered with 200% SSS and 100% SWMB data.

The least depth observed was a sounding of 53.8 feet (16.4 meter) at position 26-44-31.60N, 80-01-22.22W. ***Concur.***

- H11899-14: An Obstruction Fish Haven (auth min 50 feet) centered at approximate position 26-45-06-5N, 80-00-33W and a narrow Obstruction Fish Haven extending north-to-south was covered with 100% SWMB data. The least depth in this area is a 57.4 feet (17.5 meters) sounding on debris at position 26-45-08.23N, 80-00-34.95W. The extent of the debris area was delineated from the final BASE surfaces. ***Concur with clarification. 57ft sounding on debris in Fish Haven, min depth of Fish Haven is 50ft. No charting action required. Chart# 11466_3***
- H11899-15: The location of a WRECKS object included in ENC US3FL30M at position 26-45-48.32N, 80-01-18.06W was disproved with 200% SWMB and 200% SSS data. A submerged wreck was surveyed approximately 200 meters south at position 26-45-42.0~~0~~2N, 80-01-15.2~~0~~4W. The surveyed wreck was charted from a DTON submitted with this survey. ***Concur. See above H 11899-12 for more information. See also Anti-DToN report in Appendix I of this document.***
- H11899-16: The extent of shoaling on the north side of the Lake Worth Inlet was developed with SWMB data. The 18- and 30-foot contours extend seaward of the charted 18- and 30-foot depth curves (Figure 6). ***Concur.***

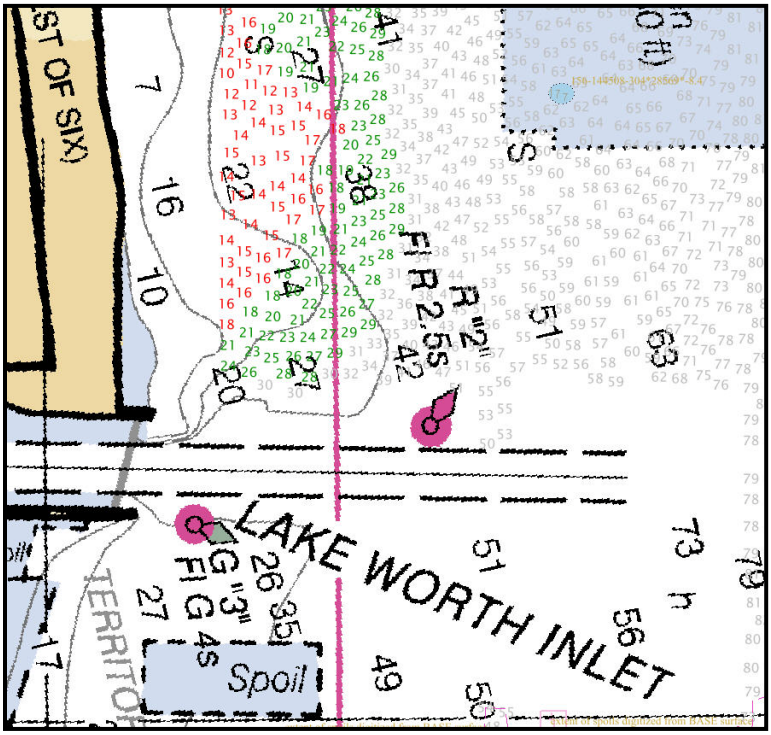


Figure 6. Inshore shoaling north of the Lake Worth Inlet.

- H11899-17: A narrow Obstruction Fish Haven extending north-to-south, centered at approximate position 26-47-09N, 80-00-14.3W was covered with 100% SWMB data. ***Concur.***

D.1.3 AWOIS Items

There was one AWOIS item investigation assigned within the survey area.

AWOIS Item #11708 is the sunken 340-foot ferry boat, “Princess Anne” (Figure 7).

ENC US3FL30M WRECKS object

- SORDAT: US,US,reprt,L-911/03
- INFORM: 103.6 meters/340-foot ferry boat, Princess Anne

AWOIS History: CL1587/93--USPS REPORT DATED 5/29/93 AND 6/24/93. ARTIFICIAL REEF REPORT. ON SUNDAY, MAY 23, 1993 A 340-FOOT RUSTED OLD FERRY BOAT WAS SUNK BY THE ENVIRONMENTAL RESOURCES MANAGEMENT (PALM BEACH COUNTY.

A charted wreck location (RNC 11460 - 13 fathoms rep 2003) at position 26-47-37.80N, 80-00-13.80W was surveyed with 200% SWMB data. A least depth of 11.5 fathoms (21.1 meters) was developed at position 26-47-36.51N, 80-00-14.23W

Concur with clarification. Delete charted non-dangerous submerged wreck, least depth 79 feet report, and text “(79 ft rep 2003)”. Chart non-dangerous submerged wreck, least depth 69 feet at the survey position. Chart# 11466_3.

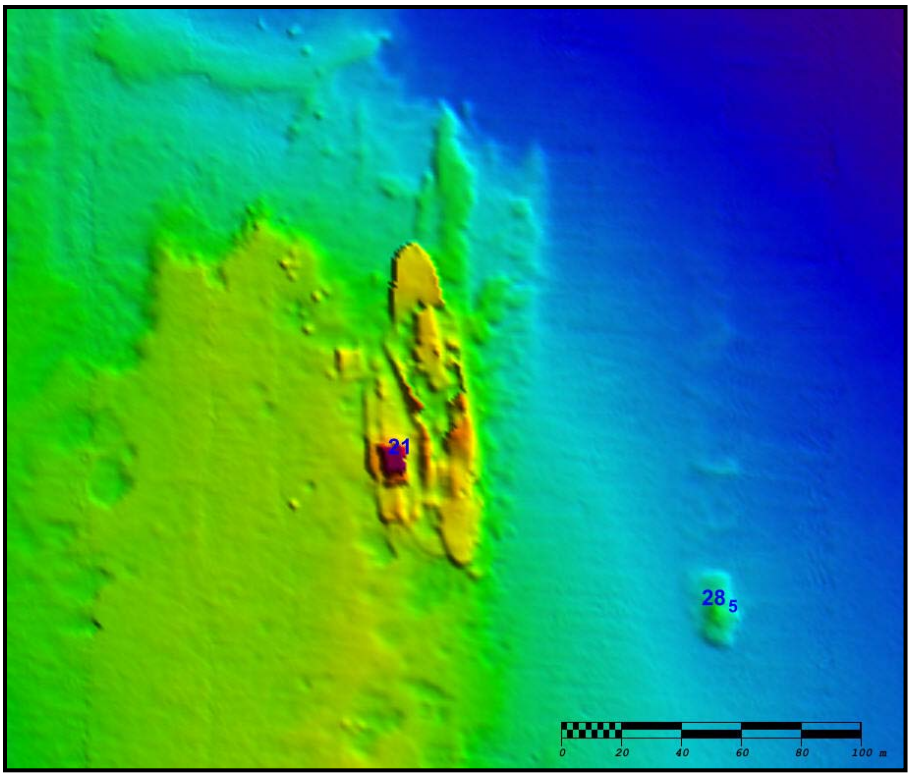


Figure 7. AWOIS #11708, “Princess Anne” ferry boat artificial reef site.

D.1.4 Danger to Navigation Reports

A Danger to Navigation Report was generated for 6 features. A summary is presented in Table 9 and a copy of the report is included in Appendix I.

Table 9
Dangers to Navigation

Item #	Feature	Depth Feet	Depth Meters	Latitude	Longitude	Description
1	Wreck	42.3	12.9	26-45-42.02	080-01-15.24	Submerged wreck ***Concur***
2	Obstruction	45.6	13.9	26-45-50.92	080-01-06.53	Shoal sounding on spoils ***Concur***
3	Obstruction	42.6	13.0	26-45-50.14	080-01-17.48	Shoal sounding on spoils ***Concur, chart 42ft shoal sounding.***
4	Wreck	61.4	18.7	26-46-57.17	080-00-38.86	Submerged wreck ***Concur***
5	Obstruction	64.1	19.5	26-46-51.90	080-00-39.35	Shoal sounding on reef ***Concur with clarification. DToN was deemed insignificant by AHB and was not submitted to MCD. See Appendix I.***
6	Wreck PA	N/A	N/A	26-45-48.23	080-01-18.06	Disproved Wreck PA ***Concur***

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 ATON were verified for the largest scale, most recent release of RNC and ENC during chart comparisons. ***Concur***

One USCG ATON (Table 10, Lake Worth Lighted Buoy LW Mo (A) W) was located within the survey limits at the eastern entrance to the Lake Worth Inlet and was accurately represented on the largest scale raster Chart 11472 _***9***. The vector position on ENC US3FL30M is approximately 300 meters northwest of the light list and surveyed positions. ***Concur***

Table 10
Lake Worth Lighted Buoy LW Mo(A) W

Position Source	Latitude	Longitude
Light list #10175	26-46-21.577N	80-00-36.215W
Survey Position	26-46-23.10N	80-00-35.82W
US3FL30M	26-46-27.48N	80-00-43.97W

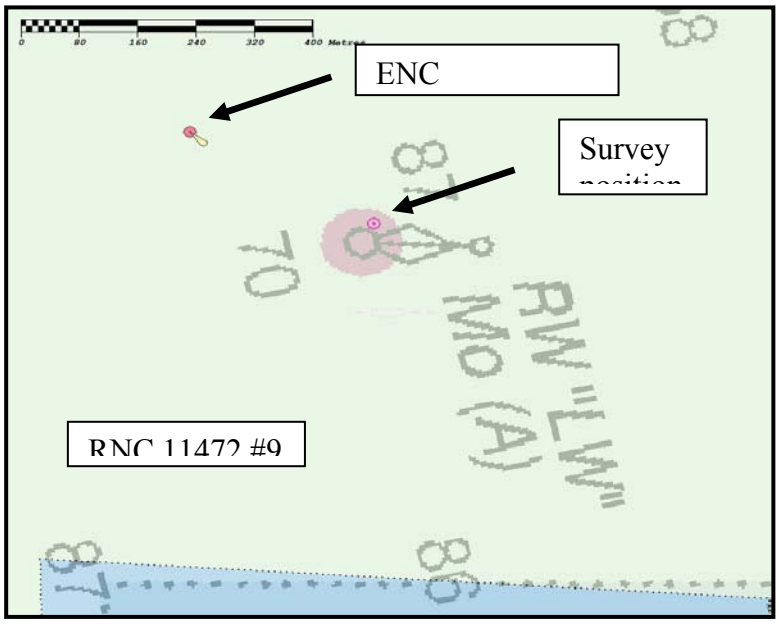


Figure 8. LW MoA W at the entrance to the Lake Worth Inlet.

Positions and images were acquired for the Lake Worth Inlet ATON and are included as a separate S-57 feature file (H11899_ATON.hob). ***Concur***

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. Additional bottom samples were acquired at approximately 1200-meter intervals within the charted anchorages. 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 the S-57 feature file. Digital images with identification reference numbers are submitted with the survey data and referenced in the S-57 PICREP attribute. ***Concur***

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 (H11899_S57_Features.000/.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 HSSM. Table 11 describes the attribute mapping for the S-57 feature file. ***Concur***

Table 11
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. ***Concur***

D.2.6.2 S-57 Contact File

All contacts are submitted in an attributed S-57 feature file of $CSYMB objects. Table 12 describes the attribute mapping for the S-57 contact file. ***Concur***

Table 12
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 13 describes the attribute mapping for the S-57 critical soundings file. ***Concur***

Table 13
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. H11899

This report and the accompanying data are respectfully submitted.

Field operations contributing to the accomplishment of Survey H11899 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 – H11899
September 15, 2009

H11899 Anti-DtoN Wreck PA

Registry Number: H11899

State: Florida

Locality: Atlantic Ocean

Sub-locality: East of Palm Beach/East of Singer Island

Project Number: OPR-H324-OS-08

Survey Date: 06/14/2009

Charts Affected

Number	Edition	Date	Scale (RNC)	RNC Correction(s)*
11472	33rd	09/01/2007	1:40,000 (11472_9)	[L]NTM: ?
11466	38th	06/01/2008	1:80,000 (11466_3)	USCG LNM: None (06/09/2009) NGA NTM: None (06/13/2009)
11460	41st	07/01/2008	1:466,940 (11460_1)	[L]NTM: ?
11451	33rd	09/01/2007	1:495,362 (11451_17)	[L]NTM: ?
11009	38th	12/01/2006	1:1,200,000 (11009_1)	[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	Disproved Wreck PA	GP	[None]	26° 45' 48.2" N	080° 01' 18.1" W	---

1 - Danger To Navigation

1.1) Disproved Wreck PA

DANGER TO NAVIGATION

Survey Summary

Survey Position: 26° 45' 48.2" N, 080° 01' 18.1" W

Least Depth: [None]

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

Timestamp: 2009-165.00:00:00.000 (06/14/2009)

GP Dataset: H11899 AntiDtoN#1 Charted Wk PA.xls

GP No.: 1

Charts Affected: 11472_9, 11466_3, 11460_1, 11451_17, 11009_1, 11013_1, 411_1

Remarks:

The charted wreck at approximate position 26-45-48.23N, 80-01-18.06W was disproved with 200% sidescan sonar and 100% shallow water multibeam echosounder data.

Feature Correlation

Address	Feature	Range	Azimuth	Status
H11899 AntiDtoN#1 Charted Wk PA.xls	1	0.00	000.0	Primary

Hydrographer Recommendations

Remove charted Wreck PA.

S-57 Data

[None]

Office Notes

Concur. Wreck PA disproved; recommend Delete from chart.

Feature Images

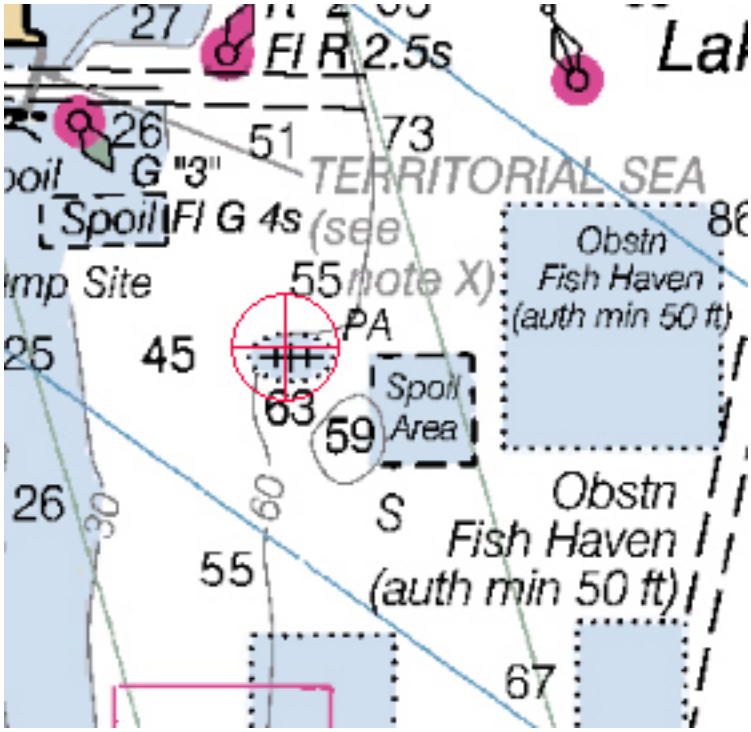


Figure 1.1.1

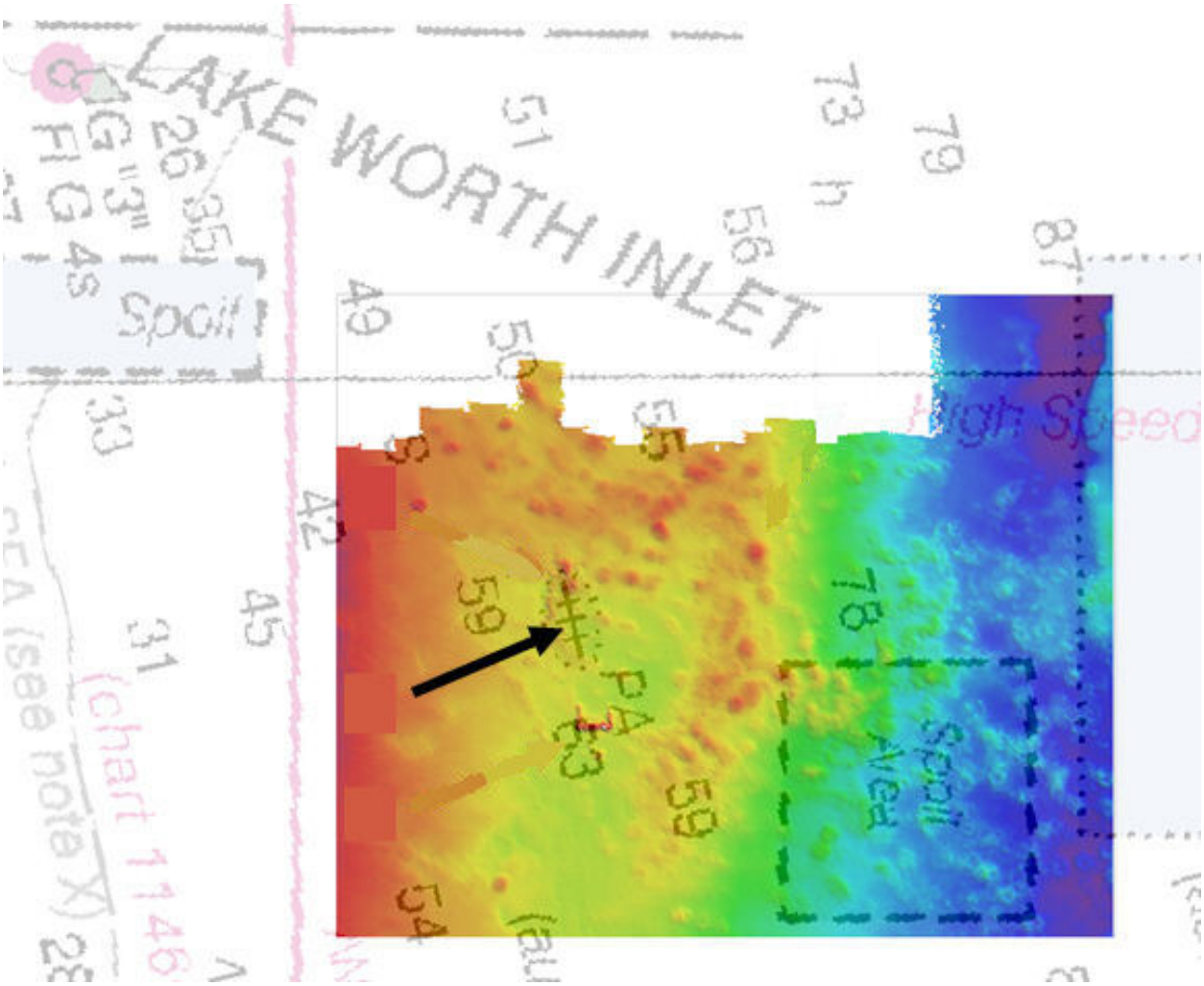

79
87
73
56
51
LAKE WORTH INLET
49
50
55
High Speed
42
45
31
33
59
DA
23
58
54
18
Scoll
Area
(chart 1146
(see note X)
CFA
Scoll
26
35
G
3
FI G 4s

Figure 1.1.2

H11899 DtoN#1

Registry Number: H11899

State: Florida

Locality: Atlantic Ocean

Sub-locality: East of Palm Beach/East of Singer Island

Project Number: OPR-H324-OS-08

Survey Date: 06/14/2009

Charts Affected

Number	Edition	Date	Scale (RNC)	RNC Correction(s)*
11472	33rd	09/01/2007	1:40,000 (11472_9)	[L]NTM: ?
11466	38th	06/01/2008	1:80,000 (11466_3)	USCG LNM: None (06/09/2009) NGA NTM: None (06/13/2009)
11460	41st	07/01/2008	1:466,940 (11460_1)	[L]NTM: ?
11451	33rd	09/01/2007	1:495,362 (11451_17)	[L]NTM: ?
11009	38th	12/01/2006	1:1,200,000 (11009_1)	[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	42 ft Wreck	Wreck	12.90 m	26° 45' 42.0" N	080° 01' 15.2" W	---
1.2	45 ft Shoal sounding	Shoal	13.90 m	26° 45' 50.9" N	080° 01' 06.5" W	---
1.3	42 ft Shoal sounding	Shoal	13.00 m	26° 45' 50.1" N	080° 01' 17.5" W	---
1.4	61 ft Wreck	Wreck	18.70 m	26° 46' 57.2" N	080° 00' 38.9" W	---

1 - Danger To Navigation

1.1) 42 ft Wreck

DANGER TO NAVIGATION

Survey Summary

Survey Position: 26° 45' 42.0" N, 080° 01' 15.2" W

Least Depth: 12.90 m (= 42.32 ft = 7.054 fm = 7 fm 0.32 ft)

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

Timestamp: 2009-165.00:00:00.000 (06/14/2009)

GP Dataset: H11899 DtoN#1.xls

GP No.: 1

Charts Affected: 11472_9, 11466_3, 11460_1, 11451_17, 11009_1, 11013_1, 411_1

Remarks:

A 42 ft (12.9m) submerged wreck was located in charted 63 feet water depth, south of a charted Wreck PA symbol.

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
H11899 DtoN#1.xls	1	0.00	000.0	Primary

Hydrographer Recommendations

Chart a 42 ft Wreck at surveyed location.

Cartographically-Rounded Depth (Affected Charts):

42ft (11472_9, 11466_3, 11451_17)

7fm (11460_1, 11009_1, 11013_1, 411_1)

S-57 Data

Geo object 1: Wreck (WRECKS)

Attributes: CATWRK - 2:dangerous wreck

OBJNAM - Wreck

QUASOU - 6:least depth known

SORDAT - 20090614

SORIND - US,US,survy,H11899

TECSOU - 3:found by multi-beam

VALSOU - 12.9 m

VERDAT - 12:Mean lower low water

WATLEV - 3:always under water/submerged

Office Notes

Concur. Recommend charting: Retain dangerous 42ft Wreck as charted.

Feature Images

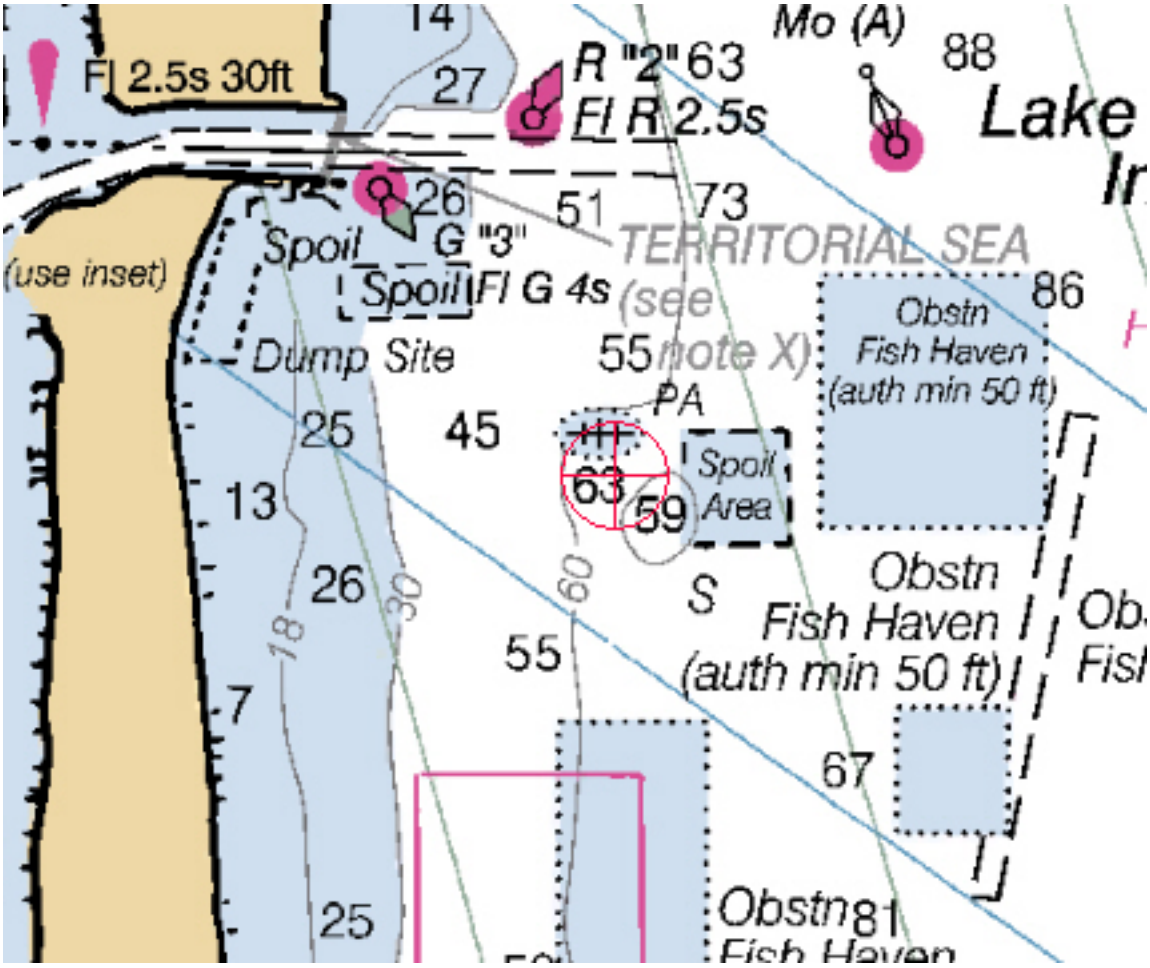


Figure 1.1.1

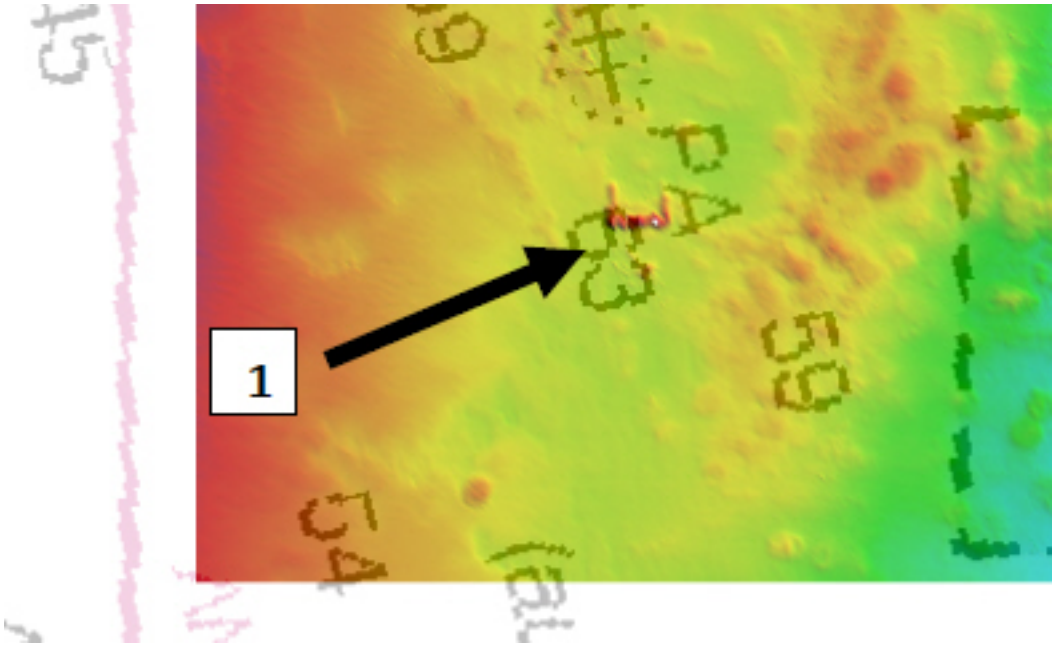


Figure 1.1.2

1.2) 45 ft Shoal sounding

DANGER TO NAVIGATION

Survey Summary

Survey Position: 26° 45' 50.9" N, 080° 01' 06.5" W

Least Depth: 13.90 m (= 45.60 ft = 7.601 fm = 7 fm 3.60 ft)

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

Timestamp: 2009-165.00:00:00.000 (06/14/2009)

GP Dataset: H11899 DtoN#1.xls

GP No.: 2

Charts Affected: 11472_9, 11466_3, 11460_1, 11451_17, 11009_1, 11013_1, 411_1

Remarks:

45 ft (13.9 m) Shoal sounding surveyed outside of the charted Spoil Area. Reported shoal soundings represent least depths in the survey area.

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
H11899 DtoN#1.xls	2	0.00	000.0	Primary

Hydrographer Recommendations

Chart a 45 ft Sounding at surveyed location

Cartographically-Rounded Depth (Affected Charts):

45ft (11472_9, 11466_3, 11451_17)

7 ½fm (11460_1, 11009_1, 11013_1, 411_1)

S-57 Data

Geo object 1: Sounding (SOUNDG)

Attributes: EXPSOU - 2:shoaler than range of depth of the surrounding depth area

OBJNAM - Sounding

QUASOU - 6:least depth known

SORDAT - 20090614

SORIND - US,US,survy,H11899

TECSOU - 3:found by multi-beam

VERDAT - 12:Mean lower low water

Office Notes

Concur, Recommend Charting: Add 45ft shoal sounding at the current surveyed location.

Feature Images

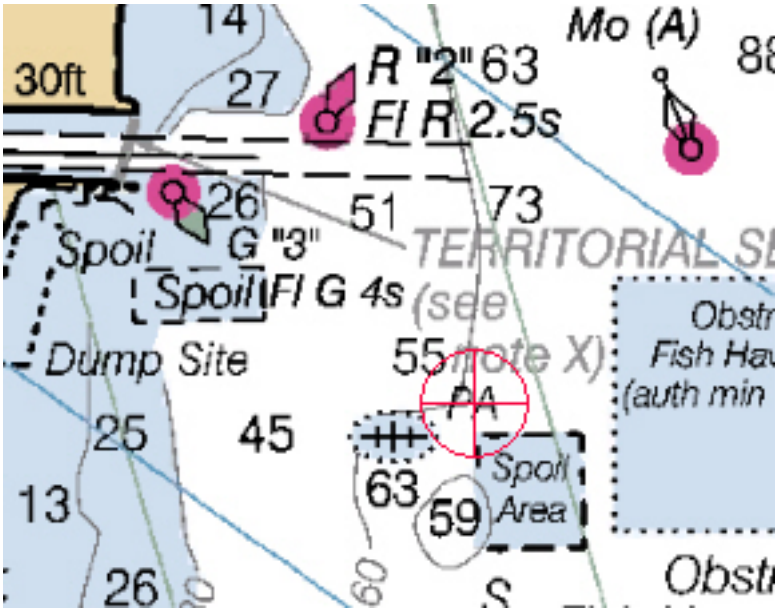


Figure 1.2.1

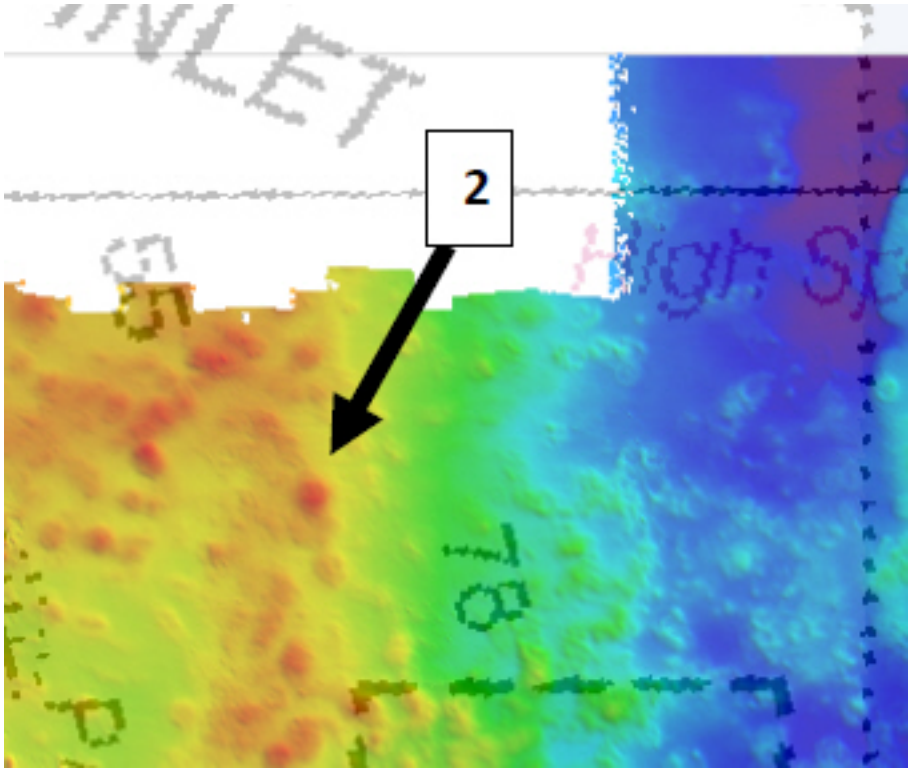


Figure 1.2.2

1.3) 42 ft Shoal sounding

DANGER TO NAVIGATION

Survey Summary

Survey Position: 26° 45' 50.1" N, 080° 01' 17.5" W

Least Depth: 13.00 m (= 42.65 ft = 7.108 fm = 7 fm 0.65 ft)

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

Timestamp: 2009-165.00:00:00.000 (06/14/2009)

GP Dataset: H11899 DtoN#1.xls

GP No.: 3

Charts Affected: 11472_9, 11466_3, 11460_1, 11451_17, 11009_1, 11013_1, 411_1

Remarks:

42 ft (13.0 m) Shoal sounding surveyed outside of the charted Spoil Area. Reported shoal soundings represent least depths in the survey area.

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
H11899 DtoN#1.xls	3	0.00	000.0	Primary

Hydrographer Recommendations

Chart a 42 ft Sounding at surveyed location.

Cartographically-Rounded Depth (Affected Charts):

42ft (11472_9, 11466_3, 11451_17)

7fm (11460_1, 11009_1, 11013_1, 411_1)

S-57 Data

Geo object 1: Sounding (SOUNDG)

Attributes: EXPSOU - 2:shoaler than range of depth of the surrounding depth area

OBJNAM - Sounding

QUASOU - 6:least depth known

SORDAT - 20090614

SORIND - US,US,survy,H11899

TECSOU - 3:found by multi-beam

VERDAT - 12:Mean lower low water

Office Notes

Concur. Shown on chart 11472_9, 34 edition and smaller scale charts as a 42 ft shoal sounding. Retain as charted.

Feature Images

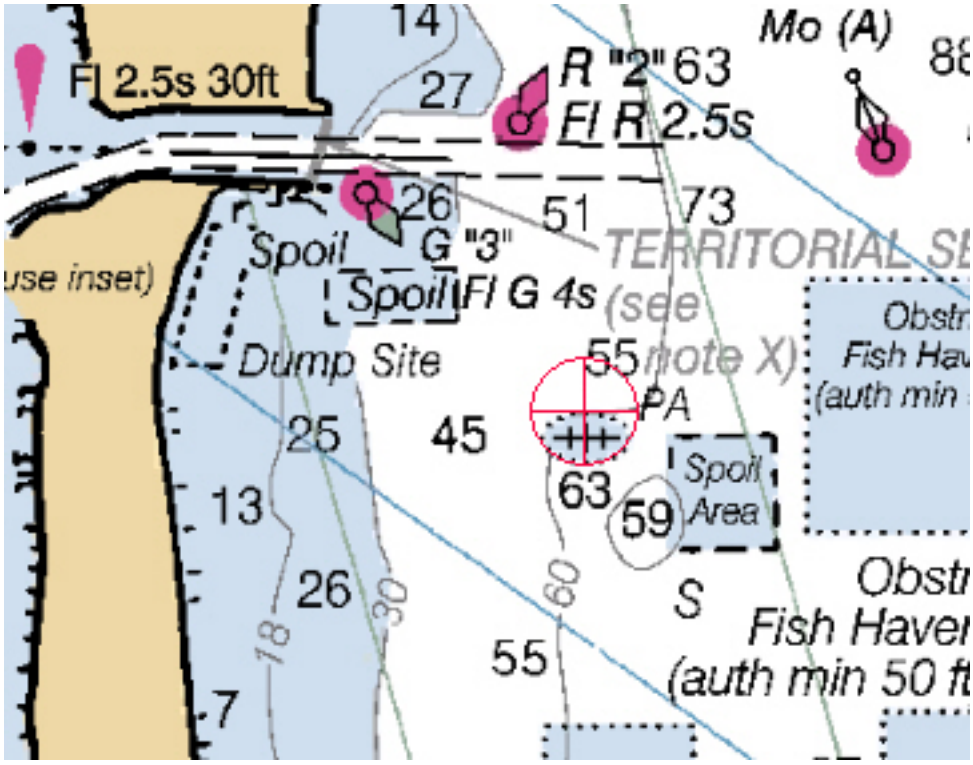


Figure 1.3.1

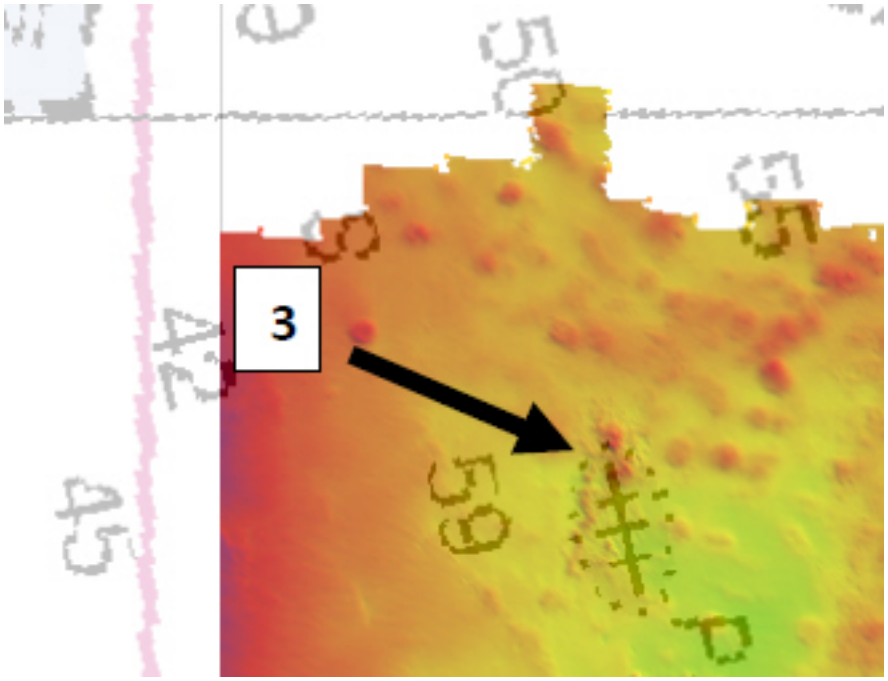


Figure 1.3.2

1.4) 61 ft Wreck

DANGER TO NAVIGATION

Survey Summary

Survey Position: 26° 46' 57.2" N, 080° 00' 38.9" W

Least Depth: 18.70 m (= 61.35 ft = 10.225 fm = 10 fm 1.35 ft)

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

Timestamp: 2009-165.00:00:00.000 (06/14/2009)

GP Dataset: H11899 DtoN#1.xls

GP No.: 4

Charts Affected: 11472_9, 11466_3, 11460_1, 11451_17, 11009_1, 11013_1, 411_1

Remarks:

An uncharted 61 ft (18.7 m) submerged wreck was located in charted 73 feet water depth approximately 800 feet east of a charted Obstruction Fish Haven symbol.

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
H11899 DtoN#1.xls	4	0.00	000.0	Primary

Hydrographer Recommendations

Chart a 61 ft Wreck at surveyed location.

Cartographically-Rounded Depth (Affected Charts):

61ft (11472_9, 11466_3, 11451_17)

10 ¼fm (11460_1, 11009_1, 11013_1, 411_1)

S-57 Data

Geo object 1: Wreck (WRECKS)

Attributes: CATWRK - 2:dangerous wreck

OBJNAM - Wreck

QUASOU - 6:least depth known

SORDAT - 20090614

SORIND - US,US,survy,H11899

TECSOU - 3:found by multi-beam

VALSOU - 18.7 m

VERDAT - 12:Mean lower low water

WATLEV - 3:always under water/submerged

Office Notes

Concur, Recommend Charting: Retain 61ft dangerous wreck as charted.

Feature Images

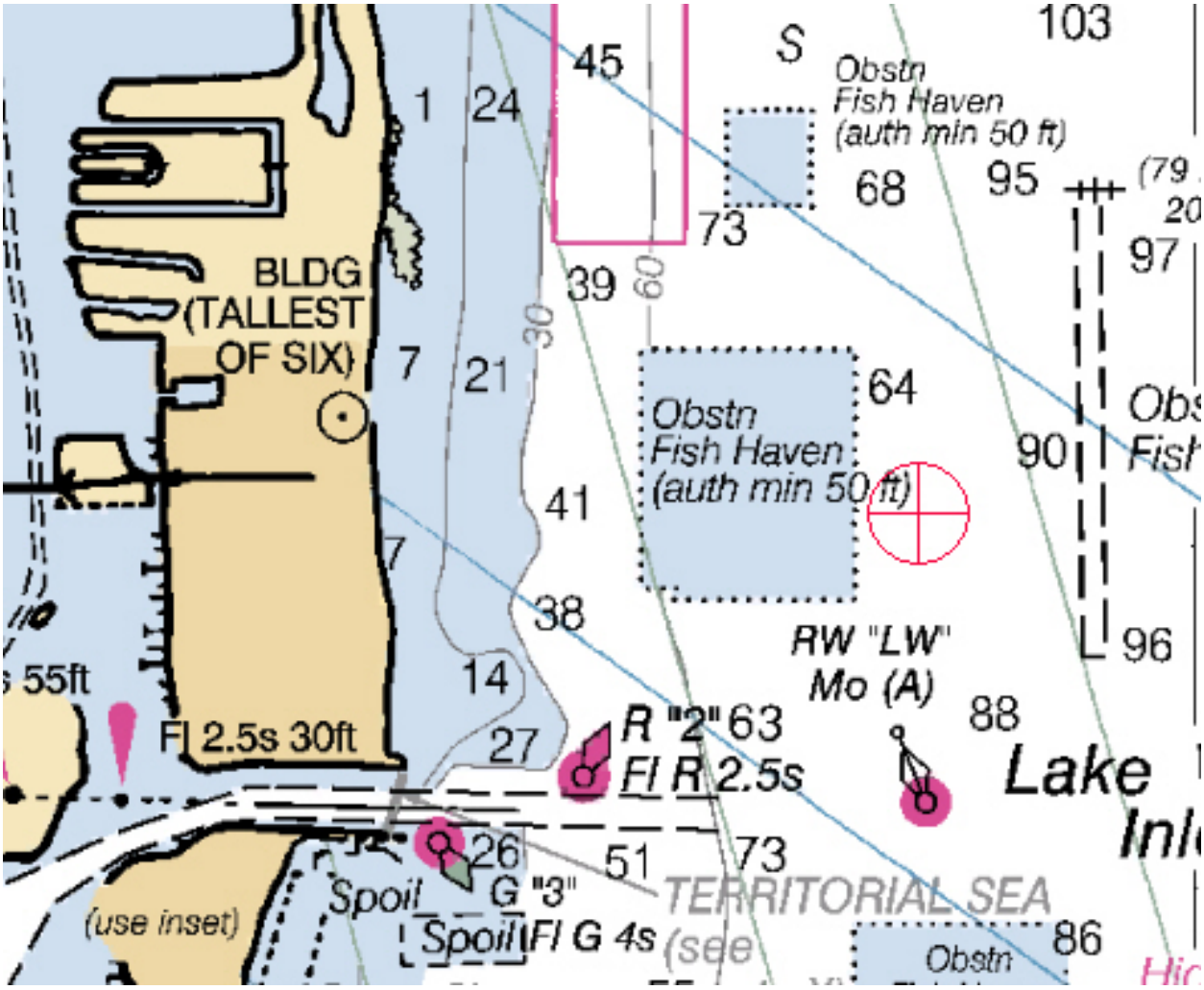


Figure 1.4.1

Appendix I

Danger to Navigation Report

Original submission of DToN Report to AHB.

Report of Dangers to Navigation

Hydrographic Survey Registry Number: H11899
State: Florida
General Locality: Atlantic Ocean
Sub Locality: East of Palm Beach/East of Singer Island
Project Number OPR-H324-OS-08
Survey Dates: June 4 – June 14, 2009
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).
Charts Affected:

Chart Number	Scale	Edition	ENC
11009	1:200,000	38th, Dec./06	US2EC02M
11013	1:200,000	47th, Feb./08	US2EC01M
11460	1:466,940	41st, Jul./08	US3FL30M
11466	1:80,000	38th, Jun./08	US4FL31M
11472	1:40,000	33rd, Sep./07	US5FL40M

Dangers to Navigation

	Feature	Depth Feet	Depth Meters	Latitude	Longitude	Description
1	Wreck	42.3	12.9	26-45-42.02	080-01-15.24	Submerged wreck
2	Obstruction	45.6	13.9	26-45-50.92	080-01-06.53	Shoal sounding on spoils
3	Obstruction	42.6	13.0	26-45-50.14	080-01-17.48	Shoal sounding on spoils
4	Wreck	61.4	18.7	26-46-57.17	080-00-38.86	Submerged wreck
5	Obstruction	64.1	19.5	26-46-51.90	080-00-39.35	Shoal sounding on reef
6	Wreck PA	N/A	N/A	26-45-48.23	80-01-18.06	Disproved Wreck PA

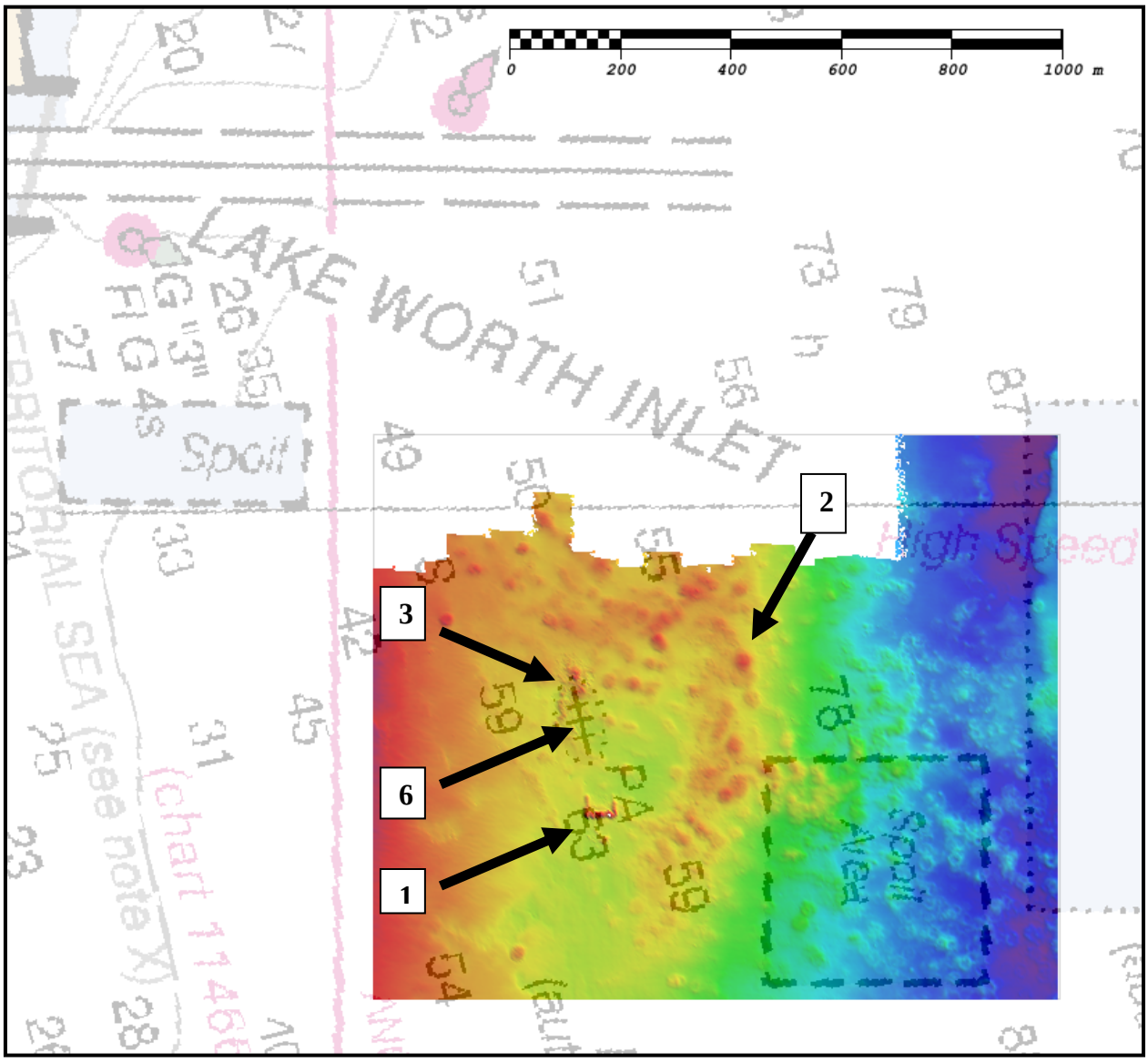


Figure 1. Charted Wreck PA and Spoil Area.

Features 1–3 and 6: A submerged wreck was located in charted 63 feet water depth; approximately 900 feet south of a charted Wreck PA symbol. The charted wreck at approximate position 26-45-48.23N, 80-01-18.06 W was disproved with 200% side scan sonar and 100% shallow water multibeam echo sounder data. Extensive debris and spoil piles were surveyed outside of the charted Spoil Area. Reported shoal soundings represent least depths in the survey area.

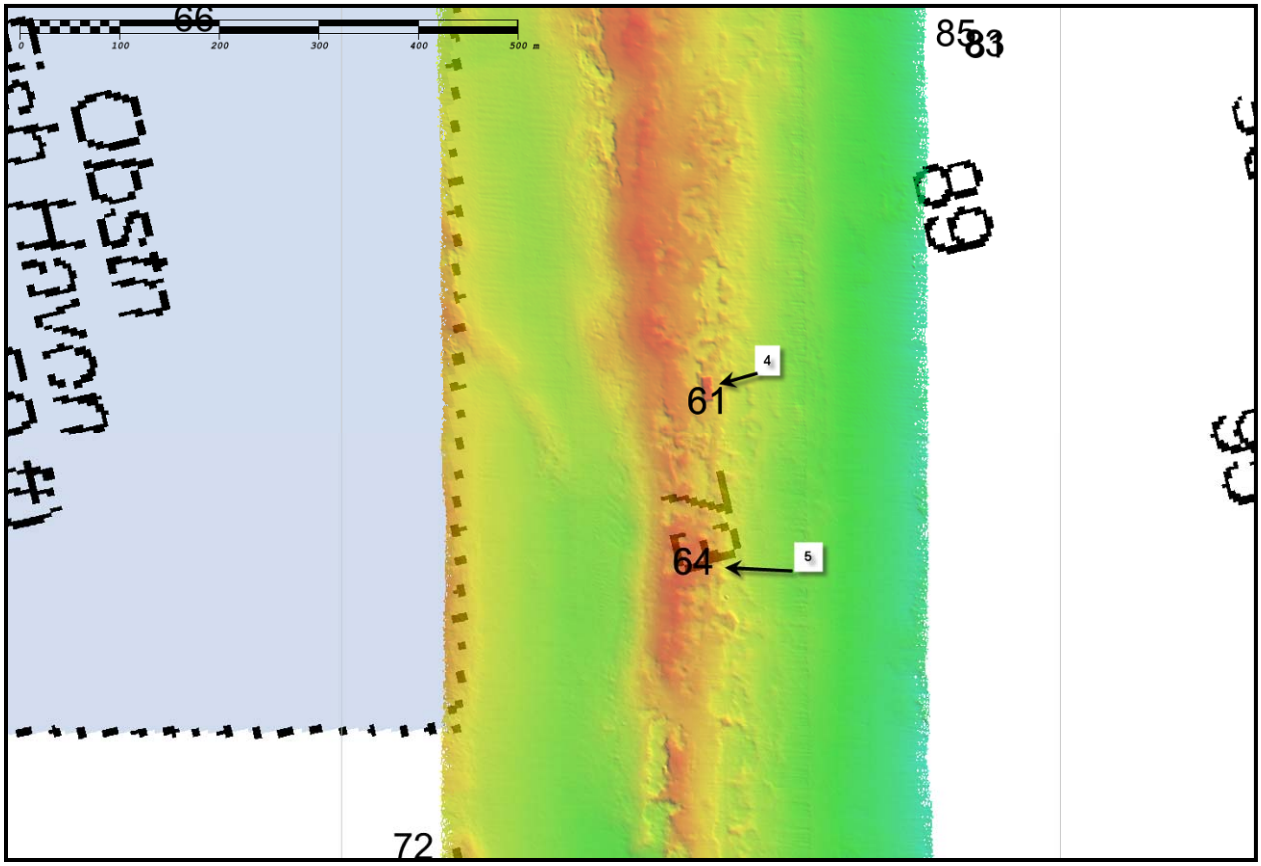


Figure 2. Uncharted Wreck and Shoal Sounding on Reef.

Features 4–5: An uncharted submerged wreck was located in charted 73 feet water depth, approximately 800 feet east of a charted Obstruction Fish Haven area. A shoal sounding of 61.4 feet was surveyed on the wreck. A 64.1-foot sounding was surveyed on a reef in charted 73 feet water depth.

Appendix II

Survey Feature Report

Survey Feature Report

Several uncharted obstructions, wrecks and foul ground areas were identified and delineated in the SSS data, SWMB data, and BASE surfaces. An S-57 feature file (H11899_S57_Features.000) was created to emphasize navigationally significant objects discovered during the survey 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.

All S-57 features were attributed in accordance with guidance provided in the SOW and HSSD using the following conventions:

- INFORM was used for survey descriptive information to aid in chart application. SBDARE bottom sample object INFORM attributes contain the original field descriptions of the sediment samples.
- SORDAT was attributed with the final date of the survey.
- SORIND was attributed with the country codes and survey registry (e.g. US, US, survey, H11899).

H11899 AWOIS Report

Hydrographic Survey Registry Number: H11899

State: Florida

General Locality: Atlantic Ocean

Sub Locality: East of Palm Beach/East of Singer Island

Project Number: OPR-H324-OS-08

Survey Dates: June 4 – June 14, 2009

Record: 11708

Lat/Long: 26-47-37.80N, 80-00-13.80W

AWOIS Item #11708 is the sunken 340-foot ferry boat "Princess Anne" (Figure 1).

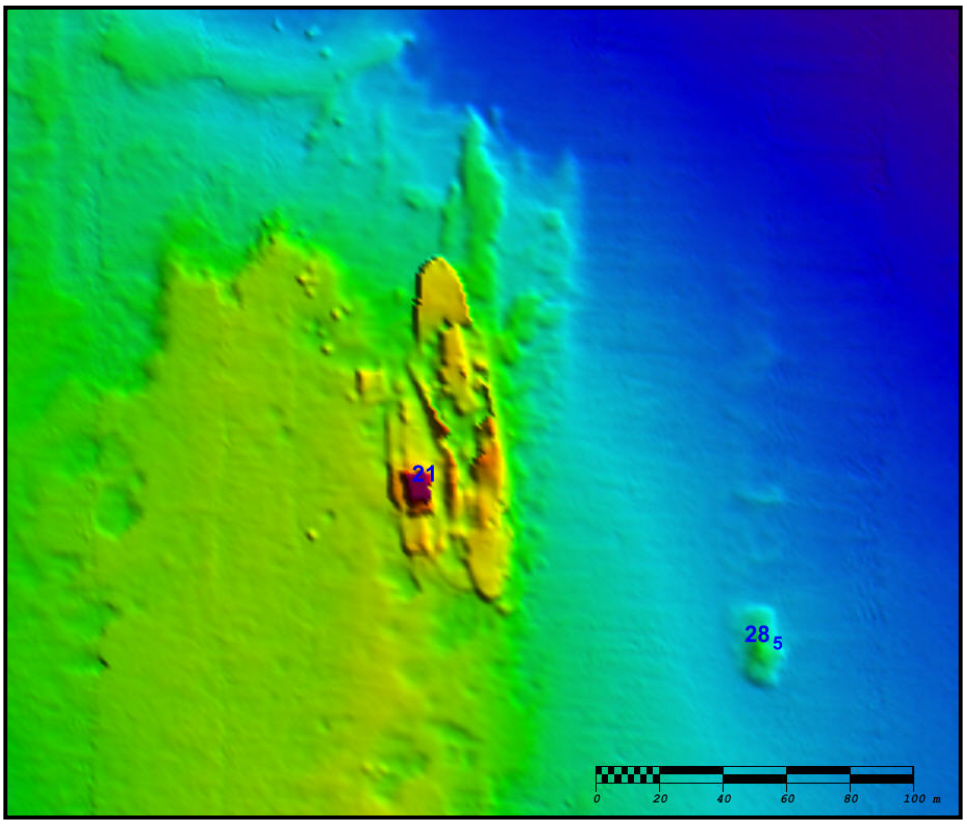


Figure 1. AWOIS #11708, "Princess Anne" ferry boat artificial reef site.

ENC US3FL30M WRECKS object

- SORDAT: US,US,reprt,L-911/03
- INFORM: 103.6 meters/340 feet ferry boat Princess Anne

AWOIS History: CL1587/93--US PS REPO RT DATED 5/29/93 A ND 6/24/93. ARTIFICIAL REEF REPORT. ON SUNDAY, MAY 23, 1993 A340-FOOT RUSTED OLD FER RY BOAT " W AS SUNK B Y THE E NVIRONMENTAL RESOURCES MANAGEMENT (PALM BEACH COUNTY

A charted wreck location (RNC 11460 - 13 f athoms rep 2003) at po sition 26-47 - 37.80N, 80-00-13.80W was surveyed with 200% SW MB data. A least depth of 11.5 fathoms (21.1 meters) was developed at position 26-47-36.51N, 80-00-14.23W.

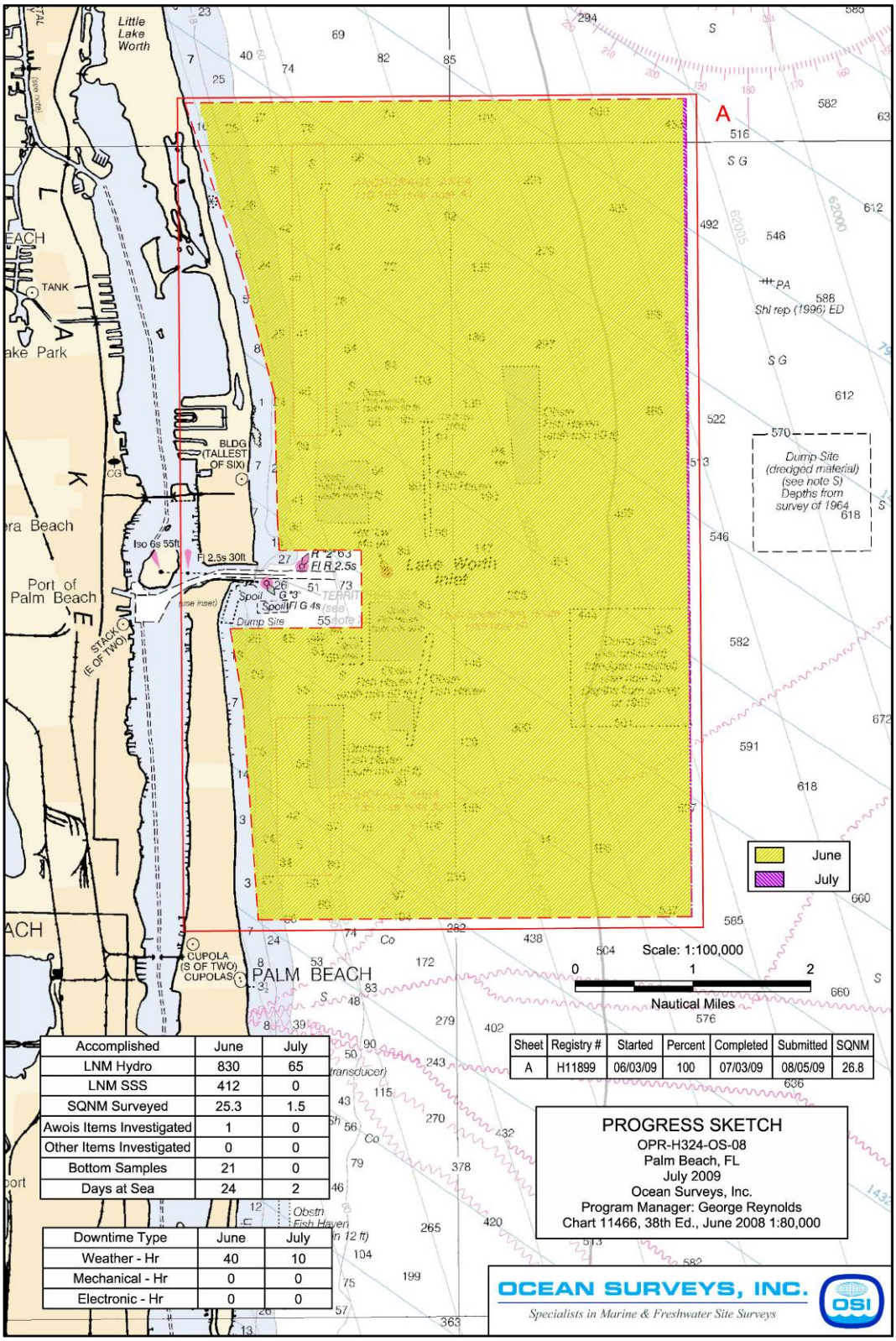
Refer to discussion section D.1.3 AWOIS Items (page 21) in the main body of this Descriptive Report.

Appendix III

Final Progress Sketch

And

Survey Outline



Accomplished	June	July
LNM Hydro	830	65
LNM SSS	412	0
SQNM Surveyed	25.3	1.5
Awois Items Investigated	1	0
Other Items Investigated	0	0
Bottom Samples	21	0
Days at Sea	24	2

Downtime Type	June	July
Weather - Hr	40	10
Mechanical - Hr	0	0
Electronic - Hr	0	0

Sheet	Registry #	Started	Percent	Completed	Submitted	SQNM
A	H11899	06/03/09	100	07/03/09	08/05/09	26.8

Figure 1. Final Progress Sketch.

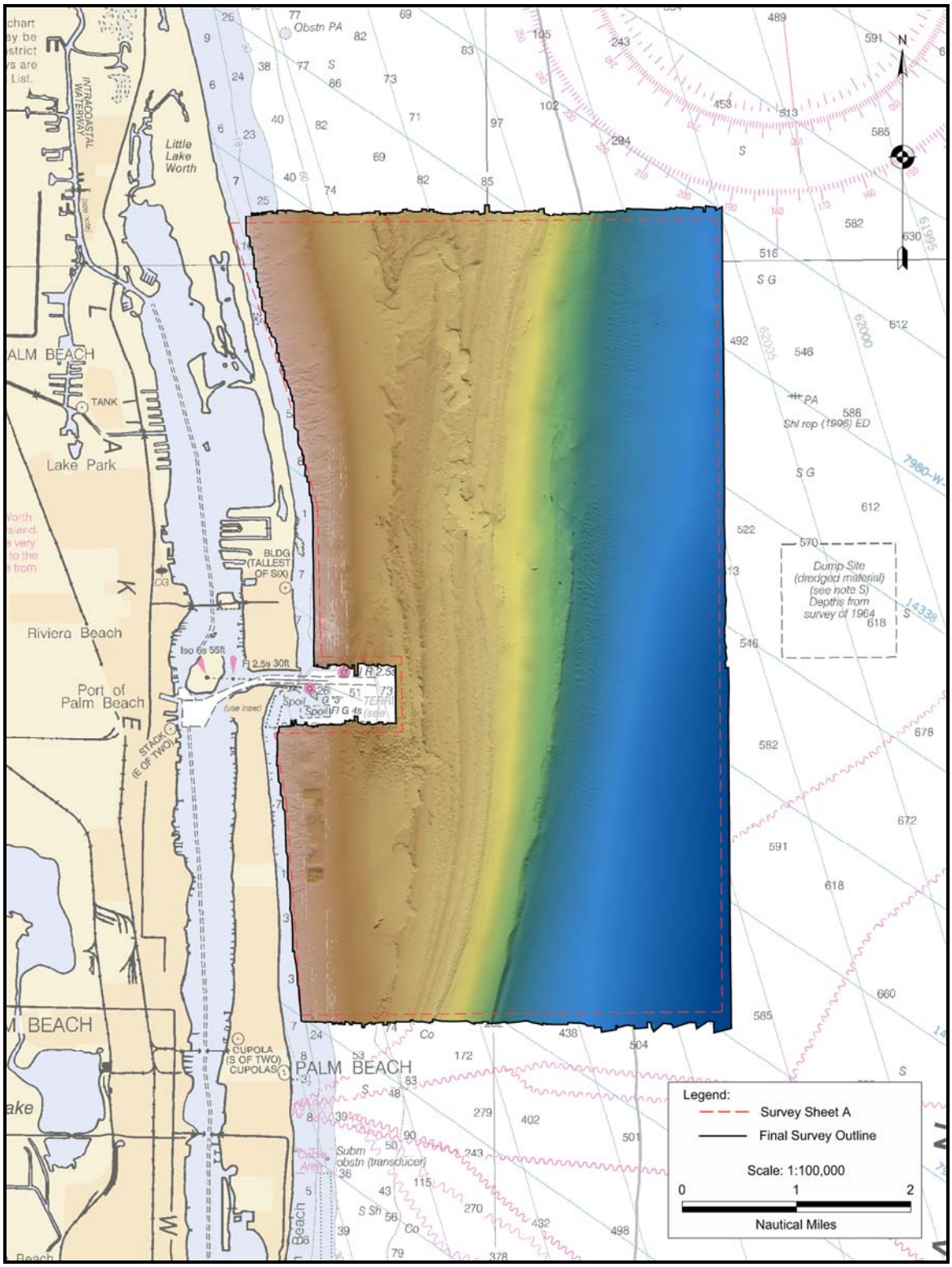


Figure 2. Final Survey Outline.

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	Max. Time
6/3/09 154		20:57:22	21:40:54
6/4/09 155		13:22:13	22:17:30
6/5/09 156		12:47:31	18:20:27
6/6/09 157		12:06:40	18:35:22
6/7/09 158		11:16:45	19:58:21
6/8/09 159		11:38:31	22:38:37
6/9/09 160		12:43:30	23:03:18
6/10/09 161		12:25:20	23:04:14
6/11/09 162		13:07:45	23:21:30
6/12/09 163		12:56:26	22:57:04
6/14/09 165		12:10:56	23:45:46
6/15/09 166		13:14:54	22:07:55
6/16/09 167		12:45:38	23:38:40
6/17/09 168		12:44:17	22:25:52
6/19/09 170		18:25:24	23:38:15
6/20/09 171		13:12:25	21:09:36
6/21/09 172		13:53:01	22:52:17
6/22/09 173		13:12:46	19:46:00
6/23/09 175		12:14:34	21:55:00
6/27/09 178		18:33:46	19:56:08
6/28/09 179		14:01:10	20:31:43
6/29/09 180		12:53:07	13:31:20
7/2/09 183		12:38:13	18:28:04
7/3/09 184		11:37:41	21:43:40

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.

Appendix V

Supplemental Survey Records and Correspondence

Bottom Samples

Bottom samples were obtained in accordance with the Statement of Work (SOW), 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 table below summarizes the sediment grabs collected during Survey H11899. Sediment grab samples are submitted as an S-57 feature file accompanied by image files in jpg format. Figure 1 shows the locations of the grab samples.

OSI Bottom Sample Designation	Latitude, N (NAD83)	Longitude, W (NAD83)	Depth (meters)	Description
PB-1	26-49-56.85	080-01-21.10	22.5	PB-1 fine/medium gray/yellow sand
PB-2	26-49-33.47	080-00-13.02	26.7	PB 2 medium yellow sand and red coral
PB-3	26-49-33.52	079-59-02.27	83.8	PB-3 fine yellow sand and shells
PB-4	26-48-29.32	079-59-03.06	89.3	PB 4 yellow/gray fine sand with shells
PB-5	26-48-30.03	080-00-13.59	28.2	PB-5 –medium/coarse yellow sand with coral
PB-6	26-48-41.81	080-01-22.27	16.0	PB-6 fine gray sand
PB-7	26-49-19.19	080-01-21.90	20.3	PB-7 medium/fine gray sand
PB-8	26-48-04.30	080-01-22.61	14.0	PB-8 fine gray sand
PB-9	26-47-27.08	080-01-22.88	12.3	PB-9 fine gray sand
PB-10	26-47-26.59	080-00-17.97	28.2	PB-10 3rd attempt medium yellow sand/coral/shells
PB-11	26-47-26.20	079-59-07.25	90.6	PB-11 medium yellow/gray sand with shells
PB-12	26-46-22.81	079-59-02.22	102.6	PB-12 medium gray sand with shells
PB-13	26-46-23.24	080-00-12.92	28.6	PB-13 medium sand and coral
PB-14	26-45-20.29	080-01-24.01	16.6	PB-14 fine gray sand
PB-15	26-45-19.80	080-00-13.63	28.6	PB-15 3 attempts, coral
PB-16	26-45-19.35	079-59-02.90	121.7	PB-16 3rd attempt medium/fine gray sand with olive gray clay
PB-17	26-44-20.05	079-59-29.39	106.3	PB-17 medium yellowish sand with coral

OSI Bottom Sample Designation	Latitude, N (NAD83)	Longitude, W (NAD83)	Depth (meters)	Description
PB-18	26-44-32.56	080-00-20.71	29.7	PB-18 3 attempts, coral
PB-19	26-44-42.62	080-01-24.27	16.4	PB-19 fine gray sand
PB-20	26-44-05.55	080-01-24.60	15.3	PB-20 fine gray sand
PB-21	26-43-42.24	080-00-21.15	36.8	PB-21 3 attempts, coral

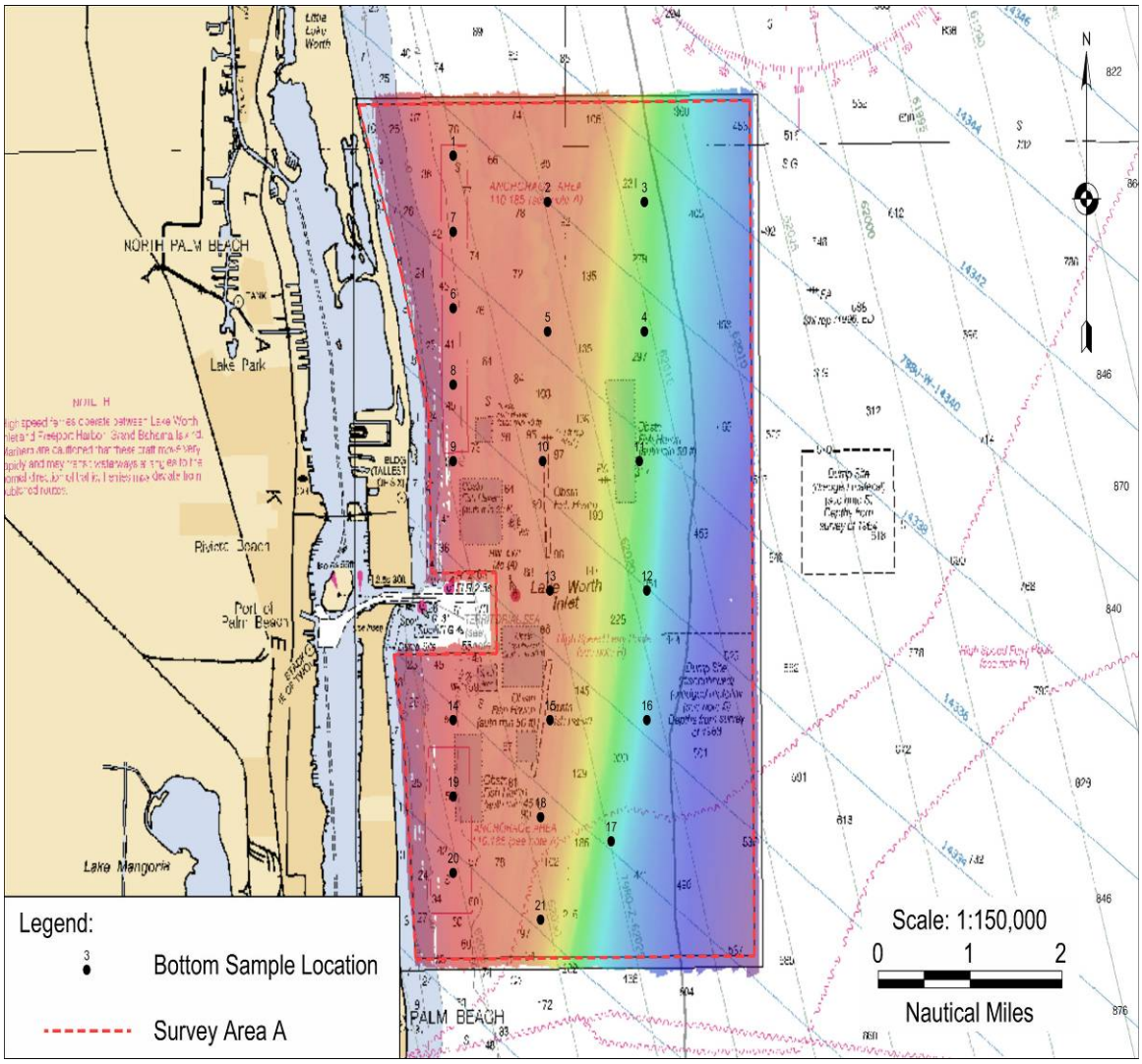
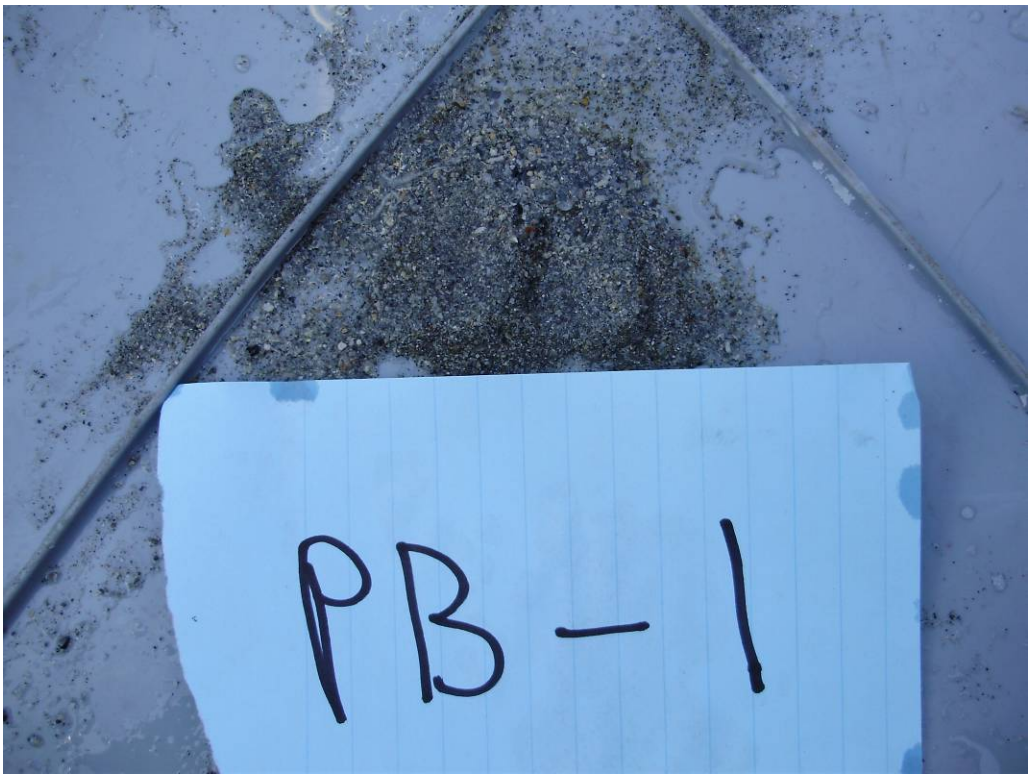
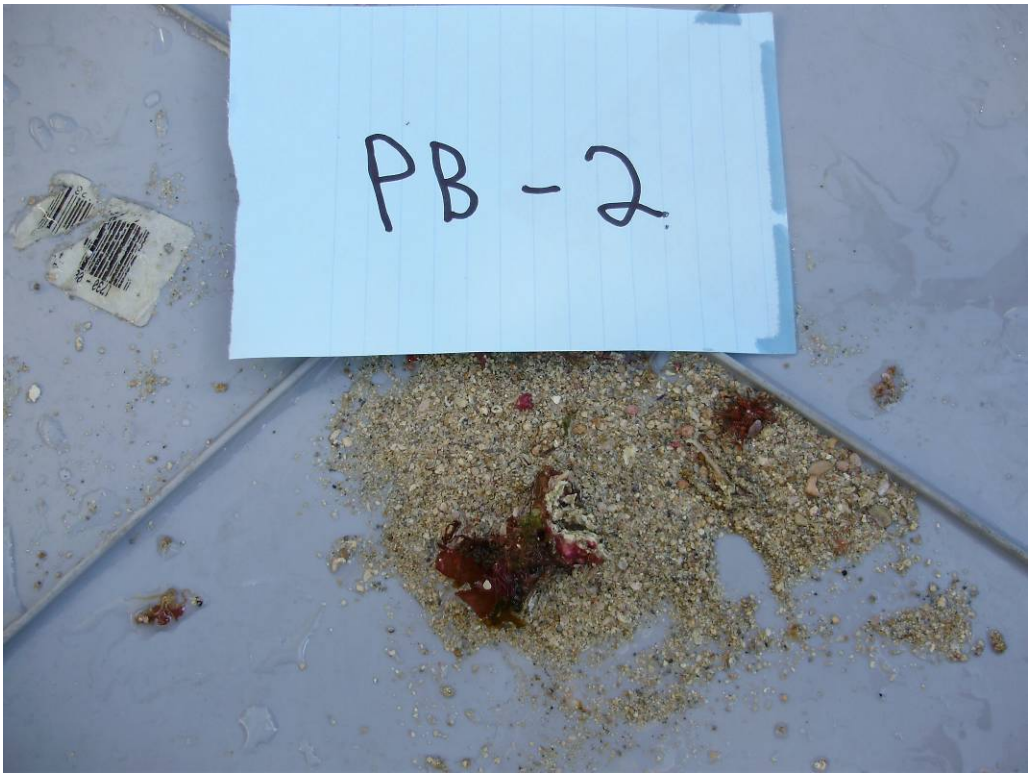
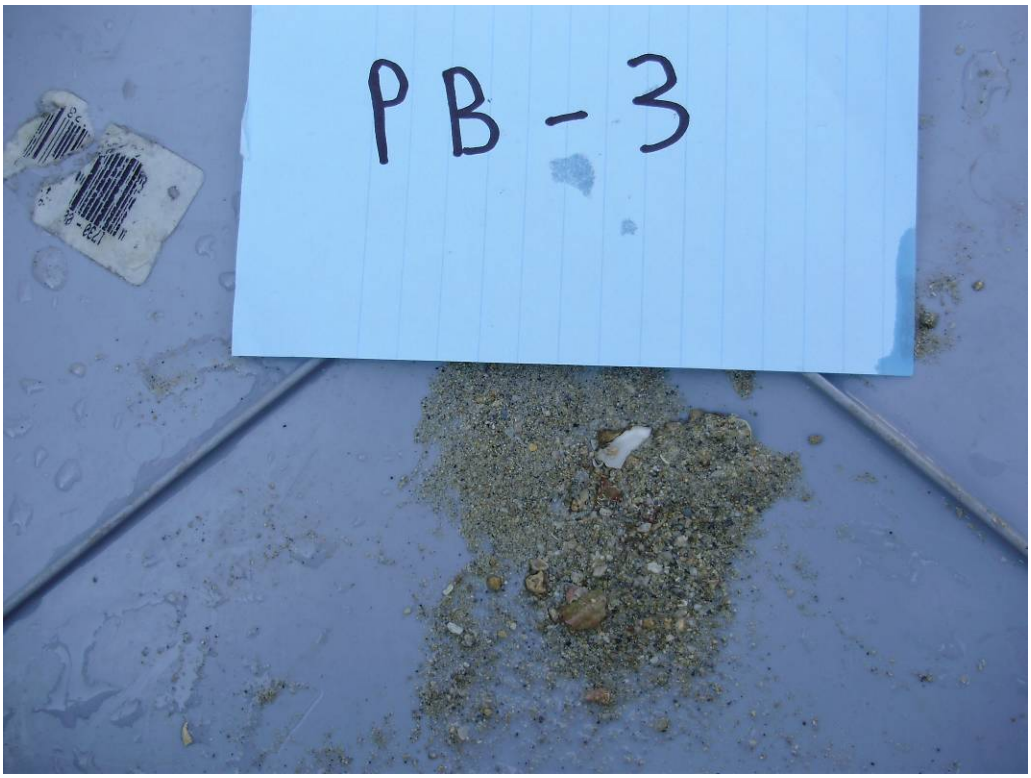


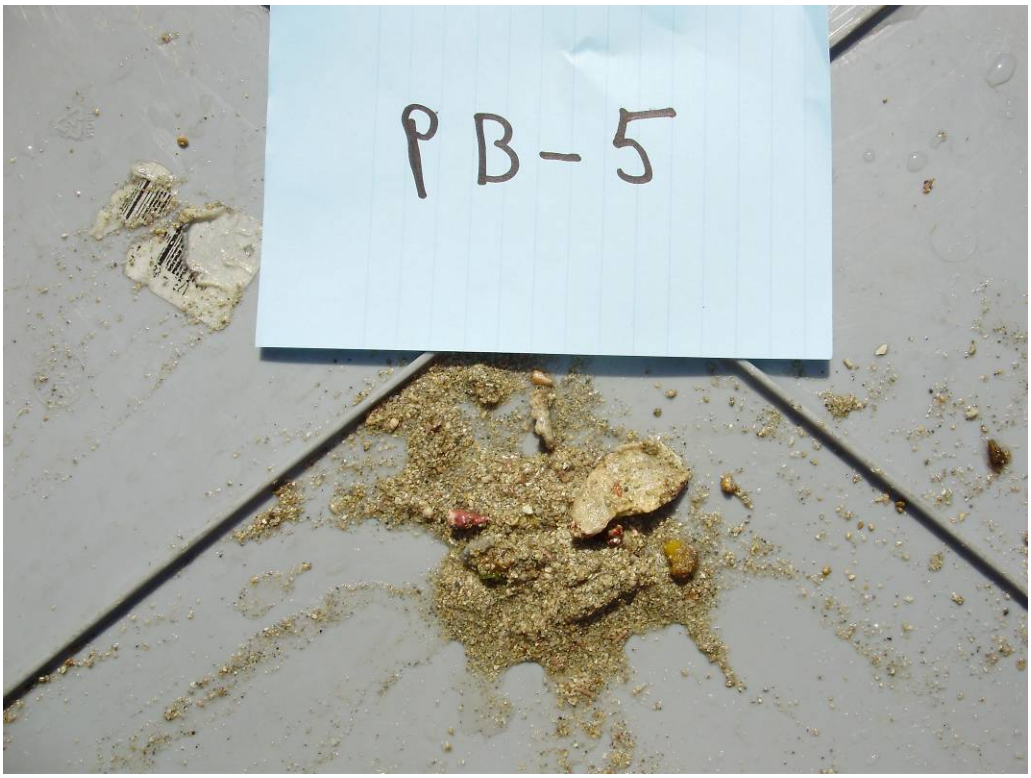
Figure 1. Locations of the grab samples collected for Survey A, H11899.


PB-1


PB-2

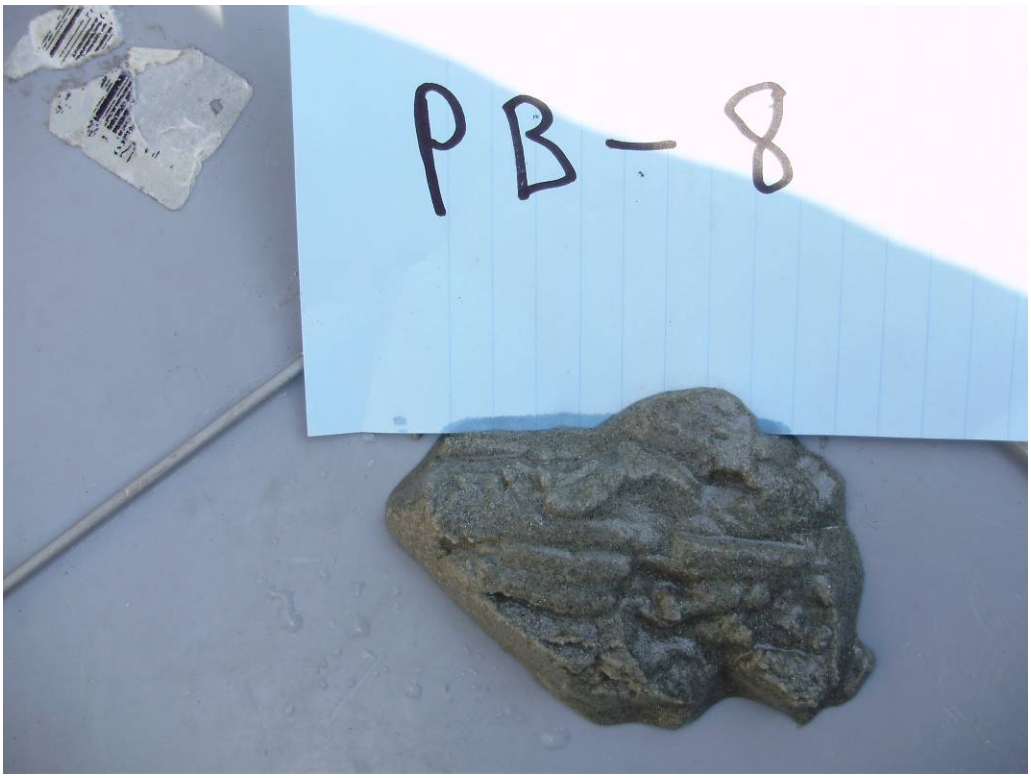

PB-3

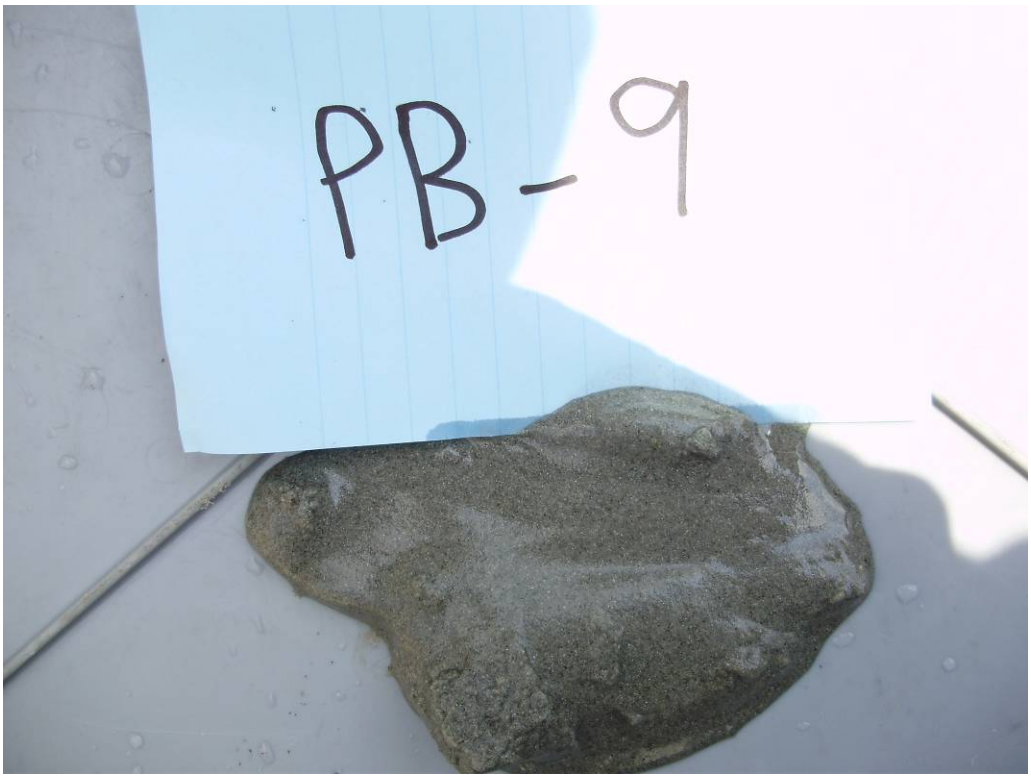
PB-4

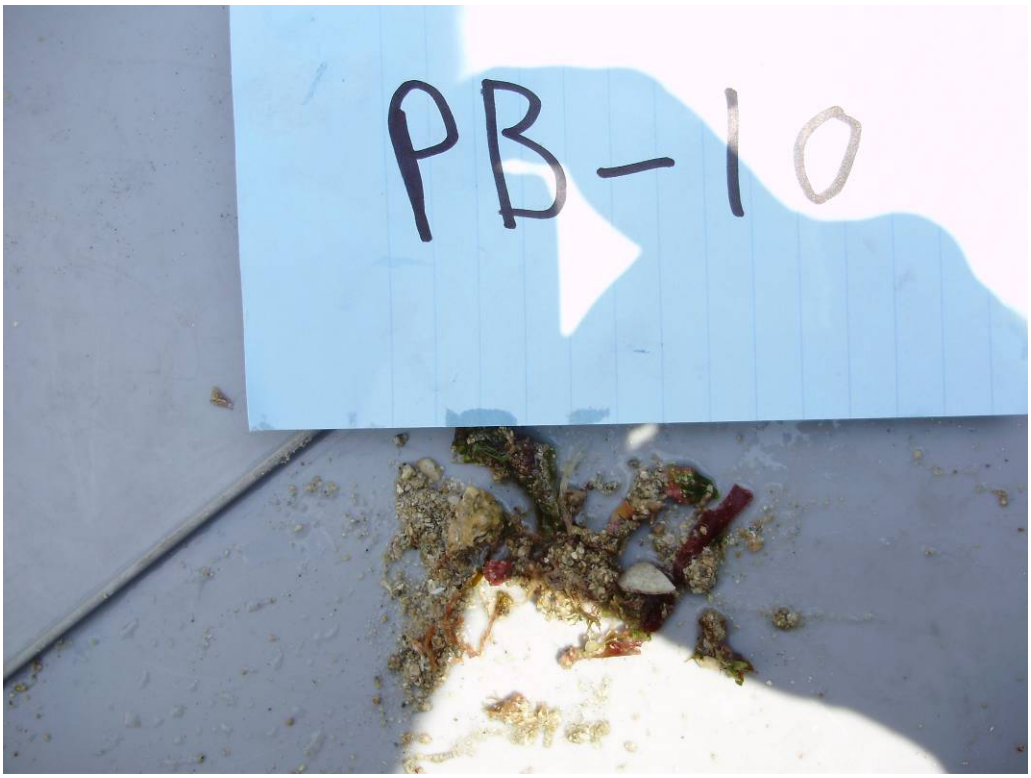

PB-5

PB-6

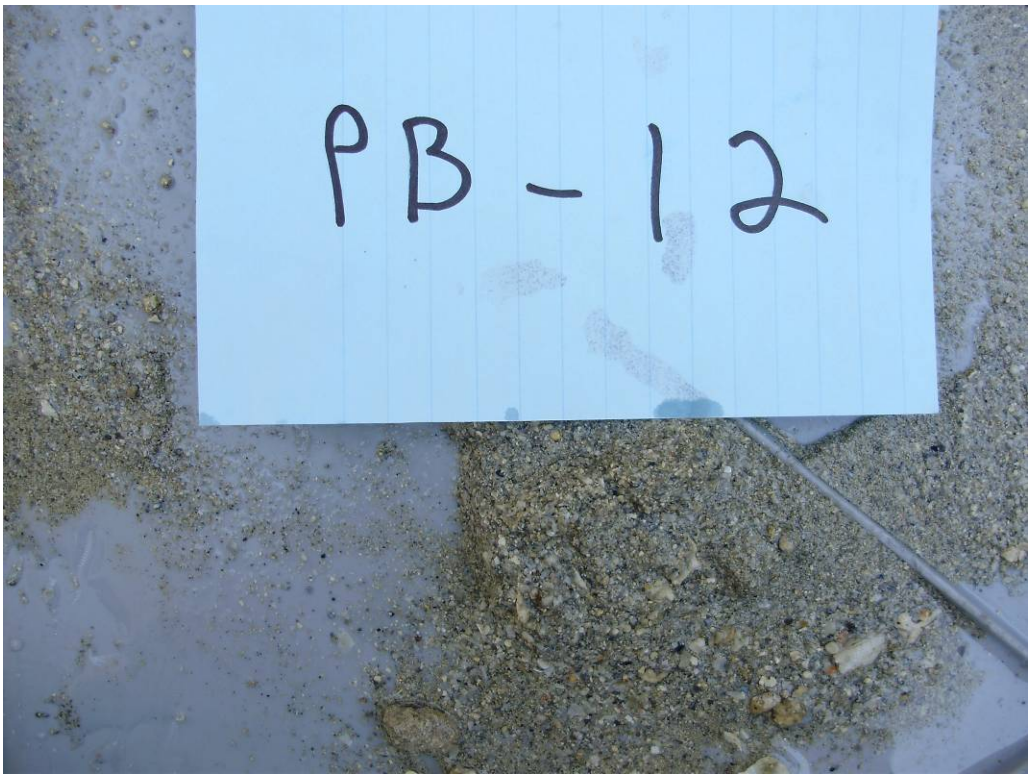
PB-7

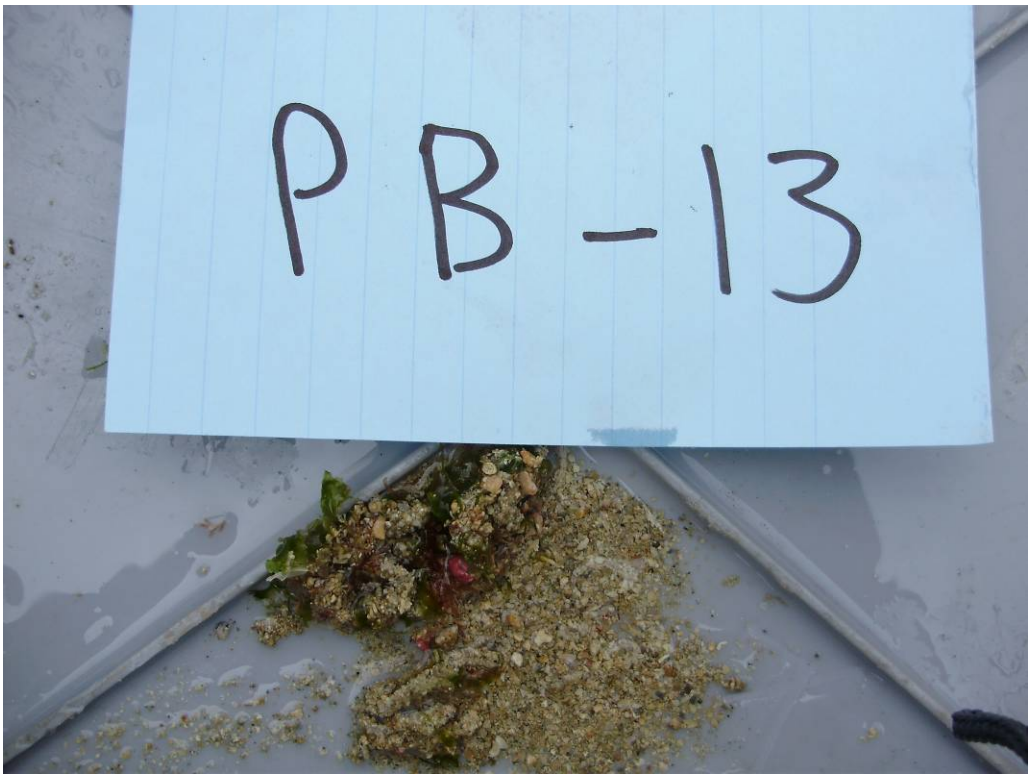

PB-8

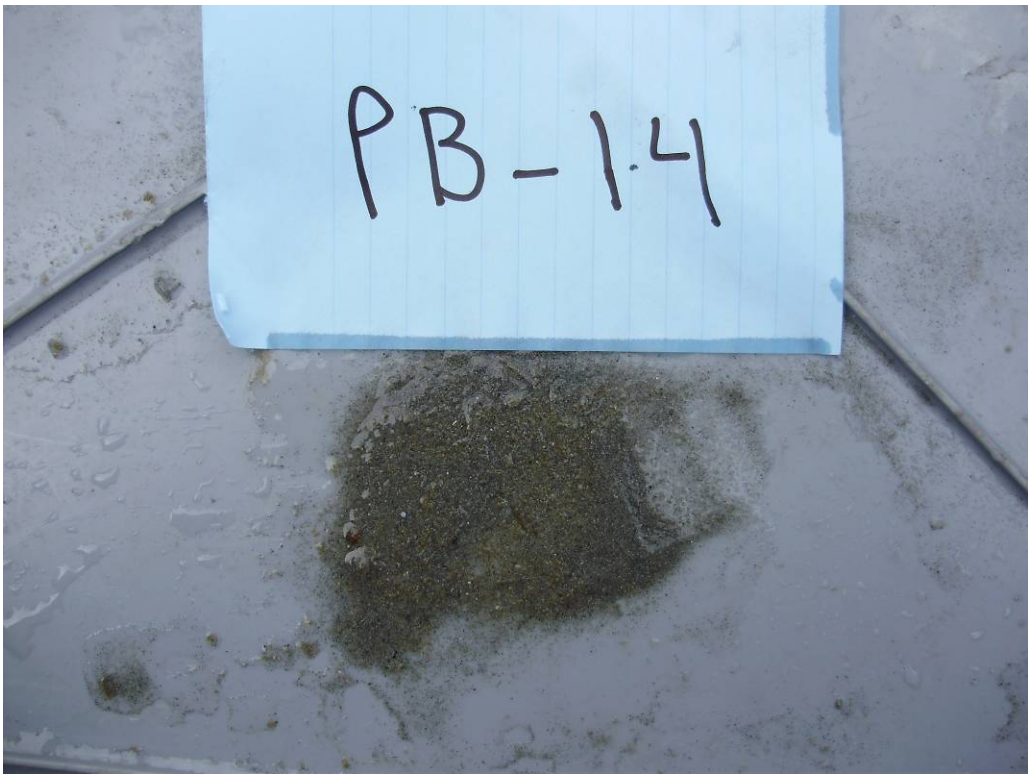

PB-9


PB-10

PB-11

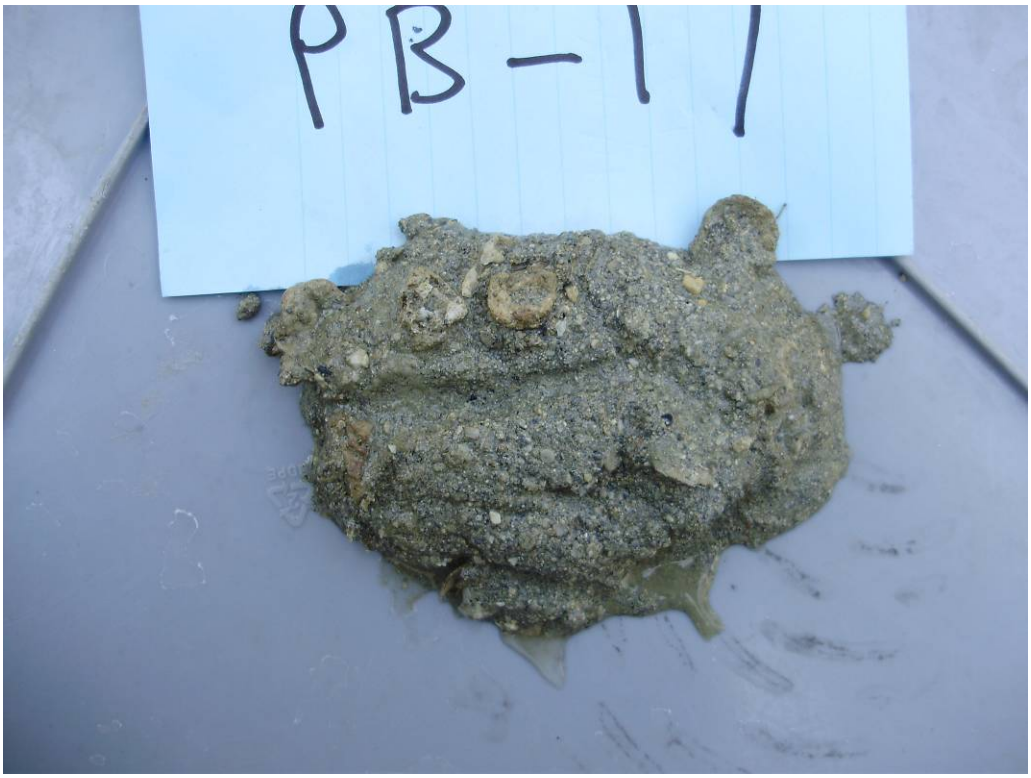

PB-12

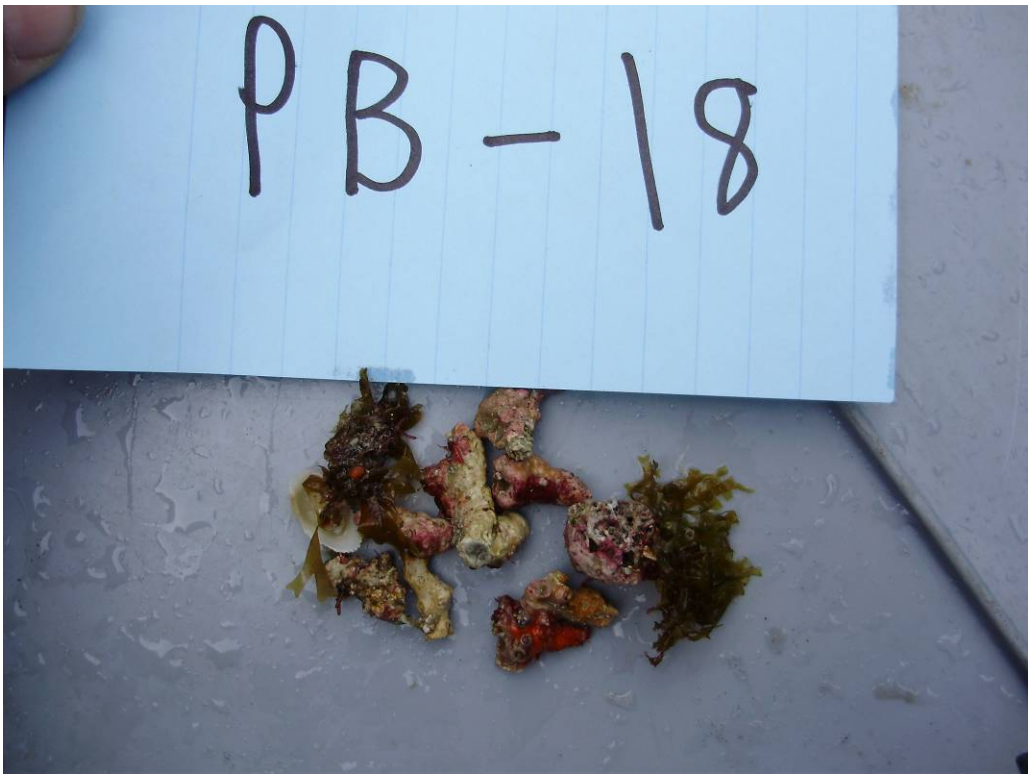

PB-13

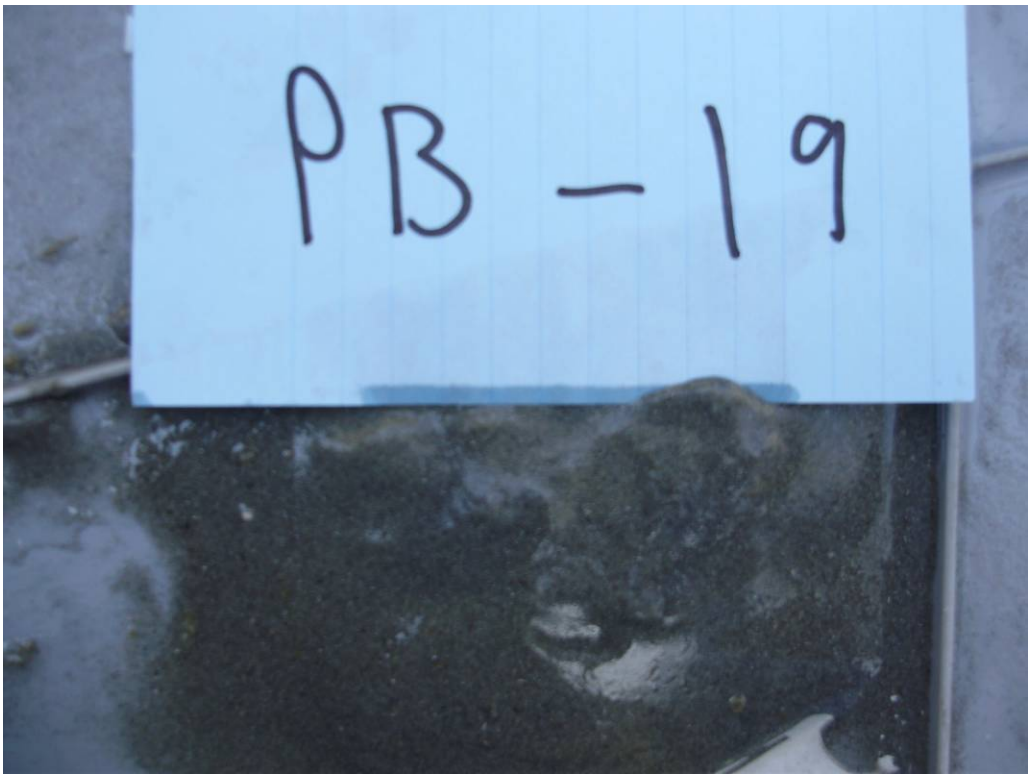

PB-14

PB 15

PB-16


PB-17


PB-18


PB-19

B-20

PB-21

Correspondence

E-mail correspondence between OSI and the COTR follows.

From: George Reynolds [ggr@oceansurveys.com]
Sent: Saturday, June 06, 2009 9:21 PM
To: 'Mark.T.Lathrop'
Subject: Weekly Report OPR-J364-KR-09 - June 5, 2009

Hi Mark,

We completed the Miami file-in lines and moved operations to West Palm (WP). We will review the Miami SSS data while the crew is working in WP. Once we complete the West Palm main scheme lines we will return to Miami and fill-in multibeam coverage as need to develop indentified contacts on Sheet C.

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, June 20, 2009 4:27 PM
To: 'Mark.T.Lathrop'
Subject: Weekly Report OPR-J364-KR-09 - June 19, 2009

Hi Mark,

The weather cooperated and we were able to work every day this week. If all goes as planned, we should finish up the West Palm survey this week and then move back to Miami where we will pick up a few least depth measurements.

Any word from Co-Ops regarding the missing tide data?

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, June 28, 2009 12:11 PM
To: 'Mark.T.Lathrop'
Subject: Weekly Report OPR-J364-KR-09 - June 26, 2009

Hi Mark,

We lost 2 ½ days to weather this week. We are now predicting that our field team will move operations back to Miami to pick up a few least depth measurements towards the end of this 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, July 05, 2009 8:56 PM
To: 'Mark.T.Lathrop'
Subject: Weekly Report OPR-J364-KR-09 - July 5, 2009

Hi Mark,

We have completed the West Palm field work and will move operations back to Miami to develop a few contacts. If the weather cooperates, we should finish the Miami work by mid week and demobilize the survey vessel.

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

From George Reynolds <ggr@oceansurveys.com>
Sent Friday, October 30, 2009 3:01 pm
To 'Wesley Kitt' <Wesley.Kitt@noaa.gov>
Cc "'Castle.E.Parker'" <Castle.E.Parker@noaa.gov> , Casie.Carrott@noaa.gov
Subject RE: OPR-H328-OS-08

Hi Wes,

Your kind words regarding the DR and DAPR are appreciated. Thanks

Regarding your "Z" value question:

The transducer phase center values shown in Table 5 were generated during the vessel sensor survey which was carried out while the boat was on the trailer. In order to rotate the transducer pole to the vertical position with the launch on the trailer, the transducer pole needs to be raised ½ foot (to allow clearance between the bottom of the transducer and the surface of the parking lot). Note: The vessel's transducer pole is configured to facilitate adjustable draft offsets in ½-foot increments. Once the vessel was launched the pole was lowered a ½ ft below the "parking lot draft." The lower draft was verified to be 1.110 meters prior to the commencement of survey operations.

Please let me know if you have any questions or need additional information.

Regards,
George

From: Wesley Kitt [mailto:Wesley.Kitt@noaa.gov]
Sent: Friday, October 30, 2009 9:43 AM
To: ggr@oceansurveys.com
Cc: Castle.E.Parker; Casie.Carrott@noaa.gov
Subject: OPR-H328-OS-08

Good morning,

We are currently reviewing surveys H11896 and H11899 (Florida). The Descriptive Reports and DAPR are very well-written! One snag we have run across may be seen in the attached jpeg. The hard offset "Z" values do not compare between the DAPR and .hvf for the multibeam specifications. All other values match.

Please clarify which value is the correct value. The discrepancy is relatively small but would influence rounded soundings.

Respectfully,
Wes Kitt, Physical Scientist, AHB

Table 5
Sensor Offsets (see Figure 12)

R/V Able II Offsets via Topcon Total Station Survey. Offsets are relative to Reference Point (R/P) or Waterline	Forward Positive (m)	Starboard Positive (m)	Up Positive w.r.t R/P (m)	Up Positive w.r.t. waterline (m)
R/P Washer On deck Vessel 0,0,0	0.000	0.000	0.000	0.069
GPS POS Antenna Phase center Port	-0.388	-0.484	2.344	2.413
GPS POS Antenna Phase center Starboard	-0.381	1.113	2.343	2.412
GPS Antenna Phase center	-0.372	0.635	2.368	2.437
Transducer Phase Center	-0.638	1.504	-0.957	-0.888
Top Of Sheave (Wire at top of sheave)	-5.151	-0.518	2.065	2.134
IMU Center	0.000	1.128	0.358	0.427
Top Center of Winch Drum	-1.442	-0.538	0.846	0.915

	Date	Time	Time Correction (s)	X (m)	Y (m)	Z (m)	Pitch (deg)	Roll (deg)	Yaw (deg)	Manufacturer
1	2009-043	00:00	0.000	1.504	-0.638	1.110	-0.870	0.410	0.680	
2										

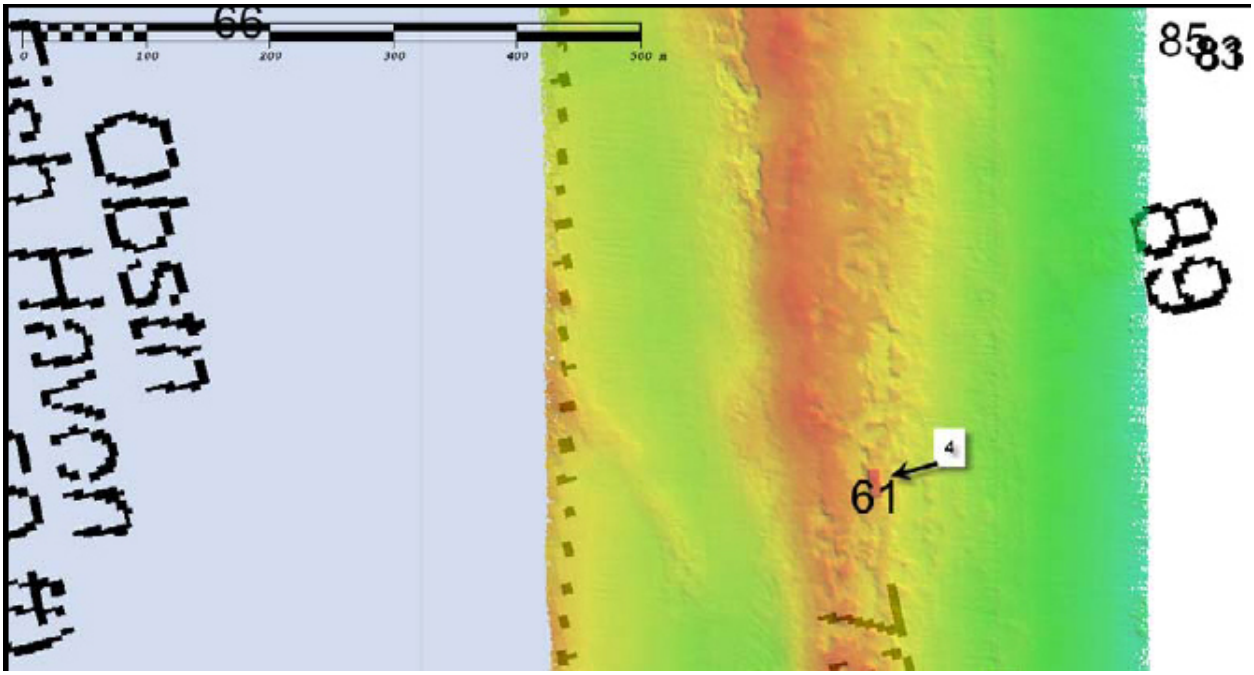


Figure 1.4.2

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.	H11899
PROJECT No.	*OPR-H324-OS-08-A*
FIELD UNIT	*Ocean Surveys, Inc*
DATE OF SURVEY	*June 3, 2009 through July 3, 2009*
LARGEST SCALE CHART	***11466-2, edition 38th, 20080601, 1:10,000***
ADDITIONAL CHARTS	***11472-7, edition 34th, 20090701 , 1:24,000*** ***11472-9, edition 34th, 20090701, 1:40,000*** ***11472-10, edition 34th, 20090701, 1:40,000*** ***11466-3, edition 38th, 20080601, 1:80,000***
SOUNDING UNITS	**(feet)**
COMPILER	Reginald L. Keene Sr.

Source Grids	**File Name** H:\Compilation\H11899_H324_OSI\AHB_H11899\SAR Final Products\GRIDS
	H11899_Inshore_1m_CUBE_Final_Final.hns
	H11899_Mid_2m_CUBE_Final.hns
	H11899_N_Inshore_1m_CUBE_Final.hns
	H11899_S_Spoil_Area_Op5m_CUBE_Final.hns
Surfaces	**File Name** H:\Compilation\H11899_H324_OSI\AHB_H11899\COMPILE\Working
Combined	**H11899_4m_Combined.hns**
Interpolated TIN	**H11899_10m_InterpTIN_30mres.csar**
Shifted Interpolated TIN	**H11899_10m_InterpTIN_30mres_Shifed.csar**
Product Surface	**N/A**
Final HOBs	**File Name** H:\Compilation\H11899_H324_OSI\AHB_H11899\COMPILE\Working\HOB's
Survey Scale Soundings	**H11899_SS_Soundings.hob**
Chart Scale Soundings	**H11899_CS_Soundings.hob**
Contour Layer	**H11899_Contours.hob**
Feature Layer	**H11899_Features.hob**
Meta-Objects Layer	**H11899_MetaObjects.hob**
Blue Notes	**H11899_BlueNotes.hob**
ENC Retain Soundings	**H11899_ENC_Retain_Soundings.hob**

Meta-Objects Attribution	
Acronym	**Value**
M_COVR	
CATCOV	Coverage available
SORDAT	20090703
SORIND	US,US,graph,H11899
M_QUAL	
CATZOC	zone of confidence U (data not assessed)
INFORM	H11899, OPR-H324-OS-08-A, R.V. Able II
POSACC	10.00m
SORDAT	20090603

[Type text]

SORIND	US,US,graph,H11899
SUREND	20090703
SURSTA	N/A
DEPARE	
DRVALV 1	9.00 ft
DRVALV2	558.00 ft
SORDAT	20090603
SORIND	US,US,graph,H11899
M_CSCL	
CSCALE	24000, 40000, 40000, 80000
SORDAT	20090603
SORIND	US,US,graph,H11899

SPECIFICATIONS:

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

II. SURVEY SCALE SOUNDINGS (SS):
   a. Radius
   b. Shoal biased
   c. Use Single-Defined Radius (mm at Map Scale): ; Radius Value = 1
   d. Queried Depth of All Soundings
      i. Minimum: 9.50 ft 10k
      ii. Maximum: 558.00 ft 80k There are 4 different chart scales

III. INTERPOLATED TIN SURFACE:
   a. Resolution (m): 4m
   b. Linear
   c. Shifted value: *[-0.229m (feet)*

IV. CONTOURS:
   a. Use a Depth List: H11899_NOAA_depth_curves_list.txt
   b. Line Object: DEPCNT; Yes
   c. Value Attribute: VALDCO; Yes

V. FEATURES:
   a. Total Number of Features: 26
   b. Number of Insignificant Features: 0

VI. CHART SURVEY SOUNDINGS (CS):
   a. Number of ENC CS Soundings: 51
   b. Radius
   c. Shoal biased
   d. Use Single-Defined Radius: m on the ground
      i. Radius Value (m):
      ii. Or use a Sounding Space Range Table (if applicable): Yes; H11899_CS_SSR-Table
   e. Filter: Interpolated != 1
   f. Number Survey CS Soundings: 329

VII. Notes:

[Type text]

ATLANTIC HYDROGRAPHIC BRANCH
H-CELL REPORT to ACCOMPANY
SURVEY H11899 (2009)

This H-Cell Report has been written to supplement and/or clarify the original Descriptive Report. Sections in this report refer to the corresponding sections of the Descriptive Report.

B. DATA ACQUISITION AND PROCESSING

B.1 EQUIPMENT

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

CARIS HIPS/SIPS version 6.1 SP2 HF 1-8
CARIS Bathy DataBASE 2.1 SP1 HF 1-10 and 2.3 SP1 HF 1-16
CARIS S-57 Composer version 2.1 HF 4
DKART INSPECTOR, version 5.0 Build 732 SP1
CARIS HOM version 3.3 SP3 HF 8

B.2. QUALITY CONTROL

B.2.1. H-Cell

The AHB source depth grids for the survey's H-Cell nautical chart update product entailed the field's original, four grids. The four grid's resolutions are 1m for the H11899_Inshore_1m_CUBE_Final.hns and H11899_N_Inshore_1m_CUBE_Final.hns, 2m for H11899_Mid_2m_CUBE_Final.hns, and 5m for H11899_S_Spoil_Area_Op5m_CUBE_Final.hns. These source grids were combined at four meters (4m) resolution. The survey scale soundings were created from the combined surface at four unique densities corresponding to 1mm at the effected charts scales of 1:10,000, 1:24,000, 1:40,000, and 1:80,000. Each of the individual sounding selection files were edited to eliminate all soundings that fell outside of the appropriate chart's neat line. The four edited sounding files were then combined into the final survey scale sounding file H11899_SS_Soundings.hob. A TIN was then created from the survey scale soundings from which a 10m, 24m, 40m, and 80meters resolution interpolated surface was generated. The chart scale soundings were selected from the filtered interpolated surface for the 1:12,000 chart scale and by using a Sounding Space Range file for the four 1:10,000, 1:24,000, 1:40,000 and 1:80,000 chart scales. The chart scale selected soundings are a subset of the survey scale selected 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 4 meter resolution. 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 H11899 Compile Log contained within this document. The SAHOB files included depth areas (DEPARE), depth contours (DEPCNT), soundings (SOUNDG), metaobjects (M_QUAL, M_COVR, M_CSCL), dumping ground (DMPGRD), cartographic Blue Notes ($CSYMB), and features (OBSTRN, SBDARE, and WRECKS).

All of the components with the exception of the sounding selection and depth contours were inserted into one feature layer, this layer was exported into S-57 format in order to create the H-Cell deliverable. Similarly, the sounding selection and depth contours were exported into S-57 format separately, and then both S-57 files were processed in CARIS HOM to convert the metric units to NOAA feet units. The final products are two S-57 files, in Lat/Lon NAD-83, one that contains the chart scale soundings, all the features, depth areas, Meta objects, (H11899_CS.000), and one that contains the survey scale sounding selection and depth contours (H11899_SS.000). Finally, quality assurance checks were made utilizing CARIS S-57 Composer version 2.1validation checks and DKART INSPECTOR, version 5.0, tests.

Chart compilation was performed by Atlantic Hydrographic Branch personnel in Norfolk, Virginia. Compilation data will be forwarded to Marine Chart Division, Silver Spring, Maryland.

H11899 CARIS H-Cell final deliverables include the following products:

H11899_CS.000	1:10,000 Scale 1:24,000 Scale 1:40,000 Scale 1:80,000 Scale	H11899 H-Cell with Chart Scale Selected Soundings
H11899_SS.000	1:10,000 Scale 1:24,000 Scale 1:40,000 Scale 1:80,000 Scale	H11899 Selected Soundings (Survey Scale)

D. RESULTS AND RECOMMENDATIONS

D.1 CHART COMPARISON

11466-2 (38th Edition, June./08)
Corrected through NM 10/24/2009
Corrected through LNM 10/13/2009
Scale 1:10,000

11472-7 (34th Edition, July./09)
Corrected through NM 10/24/2009
Corrected through LNM 10/13/2009
Scale 1:24,000

11472-9 (34th Edition, July./09)
Corrected through NM 10/24/2009
Corrected through LNM 10/13/2009

Scale 1:40,000

11472-10 (34th Edition, July./09)
Corrected through NM 10/24/2009
Corrected through LNM 10/13/2009
Scale 1:40,000

11466-3 (38th Edition, June./08)
Corrected through NM 10/24/2008
Corrected through LNM 10/13/2008
Scale 1:80,000

ENC Comparison

US3FL30M
Cape Canaveral To Key West
Edition 17
Application Date 2010-03-03
Issue Date 2010-03-03
Chart 11460

US4FL31M
Jupiter Inlet To Fowey Rocks;
Lake Worth Inlet
Edition 26
Application Date 2010-05-26
Issue Date 2010-05-26
Chart 11466

US5FL40M
Intracoastal Waterway Palm Shores to
West Palm Beach; Loxahatchee River
Edition 23
Application Date 2010-06-25
Issue Date 2010-06-25
Chart 11472

US5FL41M
Intracoastal Waterway Palm Shores to
West Palm Beach; Loxahatchee River
Edition 30
Application Date 2010-06-30
Issue Date 2010-07-28
Chart 11472

D.1.1 Hydrography

The charted hydrography originates with prior surveys and requires no further consideration. The hydrographer makes adequate chart comparisons in section "D" and Appendix 1&2 of the Descriptive Report. The following exceptions are noted:

a. The field unit found 145 ft nondangerous wreck in Latitude 26° 47' 25.731" N, Longitude 079°59'43.538"W. Charting recommendation: Add nondangerous wreck to charts 1: 40,000 scale, chart# 11472-9 (34th Edition, July./09) and, 1 : 80,000 scale, chart# 11466-3 (38th Edition, June./08).

b. The field unit found 395 ft nondangerous wreck in Latitude 26° 47' 27.326" N, Longitude 079°58'21.421"W. Charting recommendation: Add 395 ft nondangerous wreck to chart, 1 : 80,000 scale, chart# 11466-3 (38th Edition, June./08).

D.3. MISCELLANEOUS

Chart compilation was done by Atlantic Hydrographic Branch personnel, in Norfolk, Virginia. Compilation data will be forwarded to Marine Chart Division, 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 BASE Cell File or the Blue Notes should be retained as charted. Refer to the Descriptive Report for further recommendations by the hydrographer.

APPROVAL SHEET
H11899

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 reviews per the Hydrographic surveys Division Office Processing Manual and are verified to be accurate and complete except where noted.

2010.10.06
14:02:18 -04'00'

Reginald L. Keene Sr.
Cartographer
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
2010.10.06 16:09:59 -04'00'

Approved: _____

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

Digitally signed by Lori Knell
DN: cn=Lori Knell, o=NOAA, ou=NOAA HSD, email=lori.knell@noaa.gov, c=US
Reason: AWOIS/Surf Check
Date: 2010.10.13 08:42:48 -04'00'