NOAA FORM 76-35A

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

DESCRIPTIVE REPORT

Type of Survey *Multibeam and Sidescan Sonar*

Field No. *3*

Registry No *H12338*

LOCALITY

State *Virginia*

General Locality *Atlantic Ocean*

Sublocality *6NM East of Parramore Island*

2011

CHIEF OF PARTY

Deborah M. Smith

Science Applications International Corporation

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DATE

NOAA FORM 77-28 (11-72)	U.S. DEPARTMENT OF COMMERCE NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION	REGISTRY No
HYDROGRAPHIC TITLE SHEET		**H12338**

State	Virginia
General Locality	Atlantic Ocean
Sub Locality	6 NM East of Parramore Island
Scale	1:40,000
Date of Survey	22 July 2011 – 03 October 2011
Instructions Dated	07 February 2011
Project No.	OPR-D302-KR-11
Vessel	*M/V Atlantic Surveyor* D582365
Chief of Party	Deborah M. Smith
Surveyed by	Alex Bernier, Jediah Bishop, Gary Davis, Paul Donaldson, Chuck Holloway, Colette LeBeau, Katie Offerman, Evan Robertson, Eva Rosendale, Andrew Seaman, Deborah Smith, Blake Walker, Bridget Williams
Soundings by echosounder	Multibeam RESON SeaBat 7125 SV
Verification by	***Atlantic Hydrographic Branch***
Soundings in	Meters
Soundings at	MLLW

REMARKS:		
	Contract:	DG133C-08-CQ-0003
	Contractor:	Science Applications International Corporation 221 Third Street, Newport, RI 02840 USA
	Subcontractor:	N/A
	Times:	All times are recorded in UTC
	UTM Zone:	Zone 18 North
	Purpose:	To provide NOAA with modern, accurate hydrographic survey data with which to update the nautical charts of the assigned area: Sheet 3 (H12338) in the Atlantic Ocean, Coast of Virginia.

DESCRIPTIVE REPORT

H12338

SAIC Document Number: 12-TR-004

Changes in this document shall be recorded in the following table in accordance ISO9001:2008 Procedures.

Revisions				
Rev	**Date**	**Pages Affected**	**Approved By**	**Remarks**
0	17 Feb 2012	All	D. M. Smith	Initial Document
1	30 May 2012	All	D. M. Smith	Updated sections dealing with BAGs. Updated scale of sheet. Updated header and footer on all pages.

Science Applications International Corporation (SAIC) warrants only that the survey data acquired by SAIC and delivered to NOAA under Contract DG133C-08-CQ-0003 reflects the state of the sea floor in existence on the day and at the time the survey was conducted.

The purpose of this survey is to provide contemporary surveys to update National Ocean Service (NOS) nautical charts. All separates are filed with the hydrographic data. Revisions and Rednotes were generated during office processing. The processing branch concurs with all information and recommendations in the DR unless otherwise noted. Page numbering may be interrupted or non-sequential. All pertinent records for this survey, including the Descriptive Report, are archived at the National Geophysical Data Center (NGDC) and can be retrieved via http://www.ngdc.noaa.gov/.

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Descriptive Report to Accompany
Hydrographic Survey H12338
Scale 1:40,000, Surveyed 2011
M/V Atlantic Surveyor
Science Applications International Corporation (SAIC)
Deborah M. Smith, Lead Hydrographer

PROJECT
Project Number: OPR-D302-KR-11
Dates of Instructions: 07 February 2011 **Task Order#:** T006

Dates of Supplemental Instructions: 13 April 2011, 20 April 2011, 19 July 2011, 04 August 2011, 11 October 2011, and 21 March 2012
Sheet Designation: 3
Registry Number: H12338
Purpose: To provide NOAA with modern, accurate hydrographic survey data with which to update the nautical charts of the assigned area.

A. AREA SURVEYED

The area surveyed was a section of the Atlantic Ocean off the coast of Virginia, 6 nautical miles (NM) East of Parramore Island (Figure A-1). H12338 was surveyed in accordance with the following documents:

1. Project Instructions, OPR-D302-KR-11, dated 07 February 2011
2. Statement of Work, Hydrographic Survey Services, SAIC, DG133C-08-CQ-003, dated 12 May 2011
3. Tides and Water Levels Statement of Work OPR-D302-KR-2011 Delaware, Maryland, Virginia Coast, dated 09 February 2011
4. *NOS Hydrographic Surveys Specifications and Deliverables,* April 2011, Revised 05 October 2011 (HSSD)

Documents 1, 2, and 3 above are provided in Separates III.

The final line kilometers, bottom samples, item investigations, and other survey statistics are listed in Table A-1. The survey was conducted utilizing multibeam sonar and towed sidescan sonar from 22 July to 03 October 2011 (Table A-2). H12338 was surveyed using set line spacing in order to achieve 200% sidescan coverage with resulting multibeam coverage. The CUBE depth range in the one-meter grid observed for H12338 was from 5.370 meters (17 feet, 0.280-meter uncertainty) to 28.858 meters (83 feet, 0.028-meter uncertainty).

Data for H12338 extends approximately up to 2,550 meters inshore of the OPR-D302-SA-11 Task Order T006 Statement of Work boundary. The survey area was extended to meet the Project Instructions which state "*Inshore Limit: The inshore limit of hydrography will be the farthest offshore of the following: (1) the 8-meter depth contour."* The inshore limit obtained was between five and eight meters. Figure A-2 depicts the inshore limits of multibeam coverage collected as it relates to the Statement of

Work boundary represented as a blue outline. Two fish haven areas and two AWOIS areas are also shown for reference. The survey bounds were extended to the north 200 meters in a small area to cover the northern boundary of the diamond shaped fish haven. The survey bounds were also extended to the south 330 meters to encompass the obstruction charted in 37° 29' 29.17"N 075° 34' 57.16"W delivered within the Assigned Feature File (Red Circle).

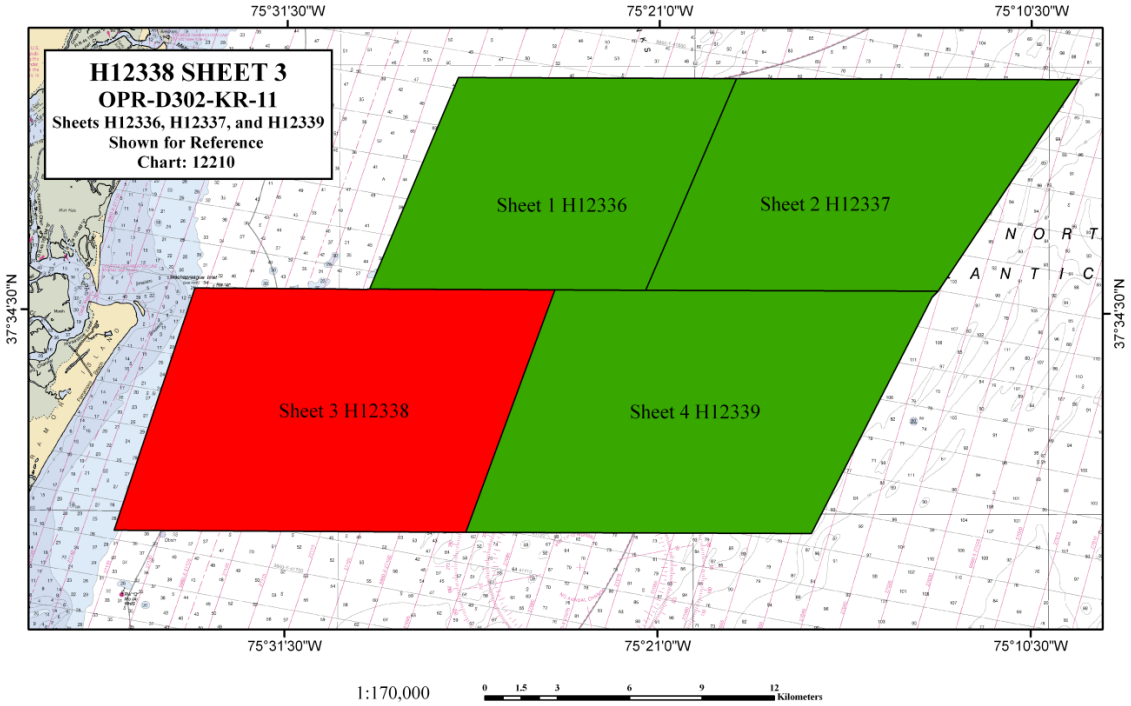

Figure A-1. H12338 Survey Bounds

Table A-1. Hydrographic Survey Statistics

***M/V Atlantic Surveyor*, Sheet 1 H12338**	**Value**
LNM Single beam only sounding lines (main scheme only)	N/A
LNM Multibeam only sounding lines (main scheme only)	N/A
LNM Lidar sounding lines (main scheme only)	N/A
LNM Sidescan sonar only lines (main scheme only)	N/A
LNM Main scheme lines (multibeam and sidescan)	2360.921
LNM Crosslines from multibeam	191.145
LNM Lidar crosslines	N/A
LNM development lines non main scheme	N/A
LNM shoreline/nearshore investigations	N/A
Number of Bottom Samples	46
Number of items investigated that required additional time/effort in the field beyond the above operations not developed by sonar	N/A
Total number of square nautical miles	47.59

Table A-2. Dates of Multibeam Data Acquisition in Calendar and Julian Days

Calendar Date	Julian Day
22 July 2011	203
23 July 2011	204
24 July 2011	205
25 July 2011	206
26 July 2011	207
27 July 2011	208
28 July 2011	209
29 July 2011	210
30 July 2011	211
31 July 2011	212
01 August 2011	213
02 August 2011	214
03 August 2011	215

Calendar Date	Julian Day
07 August 2011	219
08 August 2011	220
09 August 2011	221
10 August 2011	222
11 August 2011	223
12 August 2011	224
17 August 2011	229
18 August 2011	230
30 September 2011	273
01 October 2011	274
02 October 2011	275
03 October 2011	276

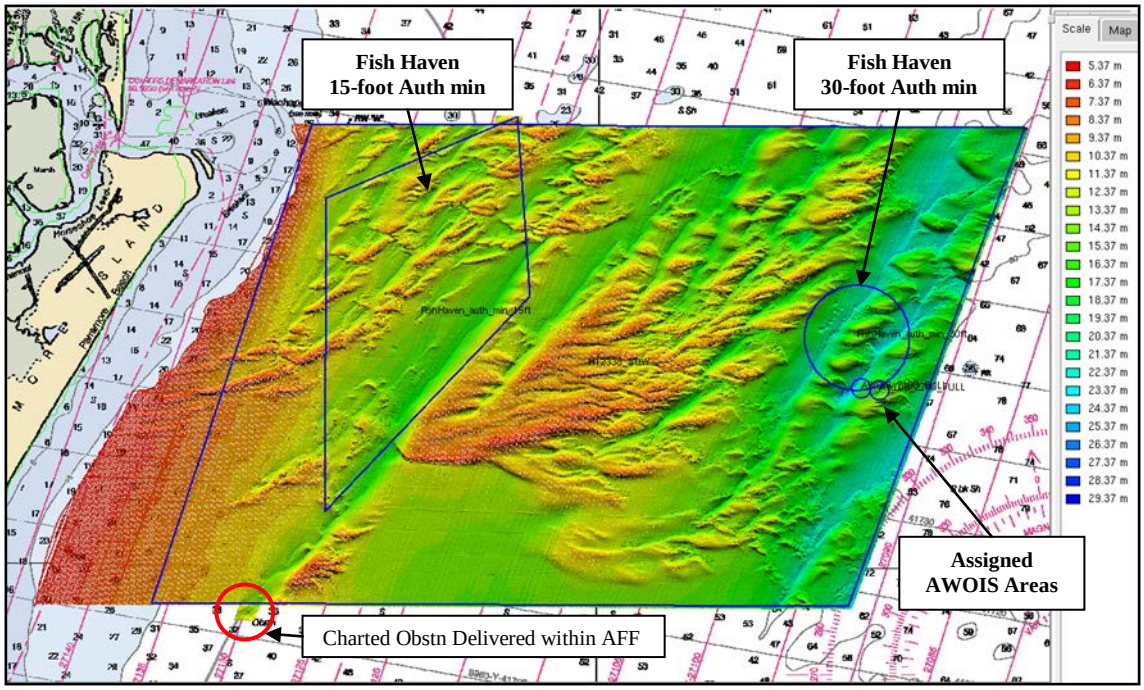

Figure A-2. H12338 Statement of Work Bounds (Fish Haven and AWOIS Areas Shown for Reference)

B. DATA ACQUISITION AND PROCESSING

B.1 EQUIPMENT

SAIC used their **ISS-2000** software on a Windows XP platform to acquire these survey data. Survey planning and data analysis were conducted using SAIC's **SABER** software on Red Hat Enterprise 5 Linux platforms. Klein 3000 sidescan data were collected on a Windows XP platform using Klein's **SonarPro** software. Triton **Isis** was used to review all sidescan data. Subsequent processing and the generation of coverage mosaics were accomplished using **SABER** on a Linux platform.

A detailed description of the systems used to acquire and process these data has been included in Section A of the Data Acquisition and Processing Report, Revision 1 (DAPR REV 1) for OPR-D302-KR-11; concurrently delivered with this DR. The originally submitted DAPR was delivered with the original H12336 Descriptive Report (DR) submitted on 16 December 2011. The information in Table B-1 below summarizes the systems listed in the DAPR REV 1. There were no deviations from the equipment configuration described in the DAPR REV 1.

Table B-1. Major Systems by Manufacturer and Model Number

System	Manufacturer / Model Number	Subsystem
Multibeam Sonar	RESON SeaBat 7125 SV	7P Sonar Processor
		RESON SVP 70
Sidescan Sonar	Klein 3000 Towfish	K-1 K-Wing Depressor
		Transceiver/Processing Unit
Vessel Attitude System	Applanix POS/MV Inertial Navigation System	
Positioning Systems	Applanix POS/MV 320	
	Trimble 7400 GPS Receiver	
	Trimble Probeacon Differential Beacon Receiver	
Sound Speed System	Brooke Ocean Technology Ltd. Moving Vessel Profiler-30	Applied Microsystems Ltd. Smart SV and Pressure Sensor
Bottom Sample System	WILDCO Petite Ponar Grab (7128-G40)	

B.1.1 Survey Vessel

The platform for multibeam sonar, sidescan sonar, and sound speed data collection was the *M/V Atlantic Surveyor*. Table B-2 provides vessel characteristics for the *M/V Atlantic Surveyor*. Three 20-foot ISO containers were secured on the aft deck. One was used as the real-time data acquisition office; another as the data processing office; the third for spares storage, maintenance, and repairs. A 10-foot ISO container housed a 80 kW generator that provided dedicated power to the sidescan winch, ISO containers, and all survey equipment.

Table B-2. Survey Vessel Characteristics *M/V Atlantic Surveyor*

Vessel Name	LOA	Beam	Draft	Max Speed	Gross Tonnage	Power (Hp)	Registration Number
M/V Atlantic Surveyor	110’	26’	9’	14 knots	Displacement 68.0 Net Tons Deck Load 65.0 Long Tons	900	D582365

The Position Orientation System/Marine Vessels (POS/MV) Inertial Measurement Unit (IMU) was mounted below the main deck of the vessel, port of the keel. The RESON 7125 transducer was hull-mounted port of the vessel’s keel in close proximity to the IMU. The Brooke Ocean Technology Moving Vessel Profiler 30 (MVP-30) was mounted to the starboard stern quarter. The Klein 3000 sidescan sonar was towed along the centerline axis from an A-frame mounted on the stern of the vessel. A J-frame mounted on the starboard rail of the ship served as the location for bottom sample collection.

B.2 QUALITY CONTROL

SAIC performs various quality control checks throughout survey operations and data processing. Refer to the Section B of the DAPR REV 1 for further details regarding the processing flow SAIC utilizes and details for each process.

There were 191.145 linear nautical miles of crosslines and 2360.921 linear nautical miles of main scheme lines surveyed on H12338. This resulted in crossline mileage that represented approximately 8.0 percent of the main scheme mileage which meets the requirement in Section 5.2.4.3 of the HSSD, to achieve at least eight percent for a multibeam survey. Crosslines were oriented at 92°/272° and were predominately spaced 450 meters apart, while the main scheme lines were typically oriented at 20.2°/200.2° and were spaced 40 meters apart. Comparison between crosslines and main scheme data is discussed in Section B.2.5. Refer to the "Multibeam Processing Log" section within Separates I for information on the delineation of main scheme and crossline data files. During main scheme operations, the sidescan sonar range scale of 50 meters provided a consistent 100-meter imagery swath.

B.2.1 Sonar System Quality Checks

Specific details regarding each of the multibeam sonar system quality checks can be found throughout the DAPR REV 1.

A Brooke Ocean Technology Moving Vessel Profiler (MVP) with an Applied Microsystems SV&P Smart Sensor was used to collect sound speed profile (SSP) data. SSP data were obtained at frequent intervals as defined in Section 5.2.3.3 of the HSSD. Please refer to Section A.8 of the DAPR REV 1 for details regarding acquisition of sound speed profiles. Details regarding application of sound speed profiles can be found in Section C.1.3 of the DAPR REV 1. A total of 952 profiles were applied to online data

for H12338. For information regarding the start and end of online data, please reference the "Sidescan Review Log" and "Watchstander Logs" sections within in Separates I.

Confidence checks of the sound speed profile casts were conducted periodically (generally every seven survey days) by comparing at least two consecutive casts taken with different SV&P Smart Sensors. Nine confidence checks were conducted during H12338, the results can be found in Separates II within the "Atlantic Surveyor Comparison Cast Log" section. The calibration reports for each sensor used are also documented under "Certificate of Calibration Records" within Separates II.

Sound speed profiles were obtained for four different survey purposes. The "Atlantic Surveyor Sound Speed Profile Log", located in Separates II, is a cumulative report detailing each cast associated with H12338. This log is separated by the purpose of the applied cast; with individual tables for "Used for MB" (online Multibeam), "Used for Comparison", "Used for Lead Line", and "Used for Closing". Additionally in a separate folder on the delivery drive, in the “H12338\Data\Processed\SVP\CARIS_SSP” folder, there are four sound speed profile files (.svp). These four files contain concatenated SSP data that has been formatted for use in CARIS. The CARIS SSP filenames are the registry number and the purpose of the cast (i.e. H12338 Used for MB). Sound speed files are delivered with the H12338 delivery in the “H12338\Data\Processed\SVP” folder. The sound speed files are broken out into sub-folders which correspond to the purpose of that applied cast.

Details regarding how and when static draft measurements are taken can be found in Section C.1.1 of the DAPR REV 1. The static draft values applied for each day of data collection are presented in the “Daily Draft Log” section within Separates I. Please refer to Section C.1.2 of the DAPR REV 1 for details regarding the dynamic draft look-up table and application of dynamic draft.

Horizontal positioning of the multibeam transducer by the POS/MV was verified by daily comparison checks against an independent Trimble DGPS system. These daily positional checks are presented in Separates I, “Daily Positioning Confidence Checks”. Further details can be found in Section C.2 of this Descriptive Report.

All multibeam files have delayed heave, (Applanix *TrueHeave*™) files (.thv) from the POS/MV, applied during post processing. There were a few instances where delayed heave was not applied due to short time gaps in the delayed heave file. When delayed heave was not available, the real-time heave was used. All cases where delayed heave was not applied were investigated and the loss of delayed heave application had no effect on the data. For specific details on delayed heave collection and application, see sections B.2 and C.3 of the DAPR REV 1. Delayed heave files are included with the H12338 data delivery in "H12338\Data\Processed\Delayed_Heave" folder.

Multibeam confidence checks were conducted during port calls (approximately every 10 survey days) by performing lead line measurements. Details regarding lead line comparisons can be found in Section A.6 of the DAPR REV 1. Of the seven lead lines

performed, there were mean differences of less than 0.037 meters per set with the standard deviation of the means from all sets less than 0.015 meters. A complete listing of all lead line measurements can be found in Separates I in the section titled "Atlantic Surveyor Lead Line Comparison". Multibeam files used for confidence checks are located in a sub folder within the multibeam data folder named "Used for Lead Line".

As discussed in Section A.7 of the DAPR REV 1, sidescan data are collected and maintained in eXtended Triton Format (XTF), and are preserved at full resolution. Towfish navigation is recomputed using the **SABER** Navup routine. The Navup routine populates the sensor X and sensor Y fields within the XTF files with the final sidescan position contained within the catenary data files recorded by **ISS-2000**.

Sidescan sonar confidence checks were performed at least once per day, as specified in Section 6.3.1 of the HSSD. Sidescan data reviewers verified that distinct bottom features or objects were visible to the outer edges of the sonar record. Confidence checks are included in the "Sidescan Review Log" located in Separates I.

B.2.2 Multibeam Coverage Analysis

These survey operations were conducted at a set 40-meter line spacing to achieve 200% sidescan sonar coverage at the 50-meter range scale setting. Based on the 60° beam angle used as the cutoff for acceptable multibeam data, the effective swath width for the multibeam coverage was approximately 3.5 times the water depth. Though full bottom multibeam coverage was not required, in depths greater than approximately 15 meters there was sufficient outer beam overlap to provide 100% multibeam bottom coverage.

A PFM CUBE surface was used to assess and document multibeam survey coverage. The CUBE depth is populated as either the node's chosen hypothesis or the depth of a selected feature or designated sounding set by the hydrographer, which overrides the chosen hypothesis. As noted previously, the range of CUBE depths encountered was from 5.370 meters (17 feet, 0.280-meter uncertainty) to 29.858 meters (98 feet, 0.280-meter uncertainty). Based on this depth range encountered in H12338 and Section 5.2.2.3 of the HSSD, the final CUBE surface was generated at one-meter grid node resolution. Over significant features, that were located in depths less than 20 meters, CUBE surfaces were generated at half-meter grid node resolution as defined in Section 5.2.2.1 of the HSSD. Eleven significant features were identified in H12338 and four separate half-meter resolution PFM grids were generated to cover these eleven features. Data within the four half-meter resolution CUBE PFM grids also remains in the one-meter CUBE PFM grid.

The **SABER** Gapchecker routine flagged multibeam data gaps exceeding the allowable limit of three contiguous nodes. In addition, the entire surface was visually scanned for holidays at various points during the data processing effort. Additional survey lines were run to fill any holidays that were detected while the survey operations were still underway. A final review of the coverage showed no areas with four or more contiguous nodes without data. The final one-meter CUBE surface had valid depths in 100% of the

nodes. Of the four half-meter feature PFM grids only one, feature area 4, contained empty nodes. The 17 empty nodes were found within the center of feature 12, the southern end of a large wreck split in two parts. The empty nodes are found along the inside edge of a "hold" within the wreck.

All grids were examined for the number of soundings contributing to the chosen CUBE hypotheses for each node by running **SABER's Frequency Distribution** tool on the CUBE Number of Soundings layer of the PFM grid. The CUBE Number of Soundings layer reports the number of soundings that were used to compute the chosen hypothesis. Analysis of the H12338 final one-meter PFM grid, revealed that more than 99% of all nodes contained five or more soundings, for the original submitted data as well as the supplemental PFM grid; satisfying the requirements for complete multibeam coverage of set line spacing surveys, as specified in Section 5.2.2.2 of the HSSD. A complete analysis based on the **Frequency Distribution** routine is provided in Table B-3 for the original submitted one-meter PFM grid. As a result of the upgraded PFM library, there are slight differences between the original submitted one-meter PFM and the supplemental delivered PFM, refer to Section B.4.1 for specifics about the PFM library. Therefore, while the number of nodes that had a particular number of CUBE soundings contributing to the node differed slightly between the original submitted one-meter PFM and the supplemental delivered PFM, the cumulative percentage did not change.

Table B-3. Frequency Distribution of the H12338 One-Meter CUBE Number of Soundings Layer

CUBE No. of Soundings contributing to Grid Node	Binned Grid Node Count	Percent
1	120269	100.00%
2	108848	99.92%
3	84045	99.84%
4	82147	99.79%
5	77511	99.73%
6	72240	99.68%
7	70245	99.63%
8	66502	99.58%
9	66550	99.54%
10	64112	99.49%
11-1746	146332492	99.45%

Analysis of both the original submitted and supplemental delivered four half-meter PFM grids indicated that all feature PFMs maintained a minimum of 98.83% of all individual nodes containing five or more soundings as listed below.

- **Features Area 1**
  - Feature 5 had 99.96% nodes containing 5 or more soundings
  - Feature 16 had 99.59% nodes containing 5 or more soundings
- **Features Area 2**
  - Feature 1 had 99.70% nodes containing 5 or more soundings
  - Feature 4 had a minimum of 99.36% nodes containing 5 or more soundings
- **Features Area 3**

- Feature 2 had 100% nodes containing 5 or more soundings

- **Features Area 4**
  - Feature 3 had 99.74% nodes containing 5 or more soundings
  - Feature 7 had 98.83% nodes containing 5 or more soundings
  - Feature 8 had 99.24% nodes containing 5 or more soundings
  - Feature 11 had 99.43% nodes containing 5 or more soundings
  - Feature 12 had 99.15% nodes containing 5 or more soundings
  - Feature 14 had 99.43% nodes containing 5 or more soundings

B.2.3 Survey System Uncertainty Model

The Total Propagated Uncertainty (TPU) model that SAIC has adopted has its genesis at the Naval Oceanographic Office (NAVOCEANO), and is based on the work by Rob Hare and others ("Error Budget Analysis for NAVOCEANO Hydrographic Survey Systems, Task 2 FY 01", 2001, *HSRC FY01 Task 2 Final Report*). Once the TPU model is applied to the GSF bathymetry data, each beam is attributed with the horizontal uncertainty and the vertical uncertainty at the 95% confidence level. For specific details on SAIC's use and application of the **SABER** Total Propagated Uncertainty model, see Section B.1 in the DAPR REV 1.

B.2.4 CUBE Uncertainty Analysis

The vertical and horizontal uncertainty values that were estimated by the TPU model for individual multibeam soundings varied little across the dataset, tending to be most affected by beam angle. During application of horizontal and vertical uncertainties to the GSF files, individual beams where either the horizontal or vertical uncertainty exceeded the maximum allowable IHO S-44 5th edition Order 1a specifications were flagged as invalid. As a result, all individual soundings used in development of the final CUBE depth surface had modeled vertical and horizontal uncertainty values at or below the allowable IHO S-44 5th edition, Order 1a uncertainty. The allowable Order 1a horizontal uncertainty is depth dependent and defined as 5 meters + 5% of the depth. The allowable Order 1a vertical uncertainty is also dependent on depth and defined by the equation:

$$\pm\sqrt{a^2 + (b \times d)^2}$$

Where, for Order 1a surveys:
a = 0.5 meters
b = 0.013
d = depth

During the creation of the CUBE surface, two separate vertical uncertainty surfaces are calculated by the **SABER** software, CUBE Standard Deviation and Average Total Propagated Uncertainty (Average TPU). A third vertical uncertainty surface is generated from the larger of these two uncertainties at each node and is referred to as the Final Uncertainty. For specific details on this process see Section B.2 of the DAPR REV 1.

The IHO Order 1a maximum allowable vertical uncertainty was calculated to vary between 0.505 to 0.633 meters for the depth range (5.370 to 29.858 meters) observed in

H12338. The **SABER Check PFM Uncertainty** function was used to highlight all of the cases where computed final node vertical uncertainty exceeded IHO Order 1a. The final one-meter PFM CUBE surface (from both deliveries) contained 27712 individual CUBE nodes with final uncertainties that exceeded IHO Order 1a. A review of the areas with final uncertainties exceeding IHO Order 1a revealed that nodes with high vertical uncertainties generally surrounded features. Contained within this survey area were two large fish havens with many features found within them. Also, areas with high vertical uncertainties tended to be associated with shoals where data were collected before and after JD 239 when Hurricane Irene passed over the survey area. The remaining areas of high vertical uncertainties were associated with two files, asmba11223.d28 and asmba11223.d29, particularly where these files covered shoals. These two multibeam files were found to be slightly deeper than adjacent lines due to a possible tidal event at the survey area that was not seen at the tide gauge. These two files fall at the high tide. Areas along these lines where there are shoals, and also holiday lines collected after Hurricane Irene, have nodes with vertical uncertainties that exceeded IHO Order 1a.

The **SABER Check PFM Uncertainty** function was also run on each of the four half-meter feature PFM CUBE surfaces. Results listed in Table B-4 are for the original submitted half-meter feature PFM CUBE surfaces as well as the supplemental delivered half-meter feature PFM grids.

Table B-4. Feature Area PFM Nodes Exceeding the Allowable IHO Order 1a Uncertainty

Feature Area	Number of CUBE nodes which exceed IHO Order 1a
1	30
2	74
3	98
4	2427

The **SABER Frequency Distribution** tool was also used to review vertical uncertainties within the one-meter and four half-meter resolution PFM grids. This tool creates statistical data about the distribution of values within a selected surface. To examine the vertical uncertainty, the routine was run on the Final Uncertainty layer of each PFM. The results from the routine show that more than 99.97% of all grid nodes in the one-meter PFM contained vertical uncertainties of 0.50 meters or less (Table B-5). While the number of nodes that fell within the vertical uncertainty range differ slightly between the original submitted one-meter data and the supplemental delivered PFM, the cumulative percentages did not change. When performed on the four individual features PFMs, at least 96.14% of all grid nodes contained vertical uncertainties of 0.50 meters or less, for the original submitted half-meter PFM grids and the supplemental delivered half-meter PFM grids (Table B-6).

Table B-5. Frequency Distribution Results for Vertical Uncertainty in the One-meter PFM

Final Uncertainty (meters)	Count	Cumulative Percent
0.000 - 0.500	147106552	99.97%
0.500 – 1.000	38363	100.00%
1.000 – 1.301	46	100.00%

Table B-6. Frequency Distribution Results for Vertical Uncertainty in the half-meter PFMs

Feature	Final Uncertainty (meters)	Count	Cumulative Percent
Features Area 1			
5	0.00 - 0.50	12069	99.74%
16	0.00 - 0.50	7096	99.99%
Features Area 2			
1	0.00 - 0.50	19106	99.62%
4	0.00 - 0.50	10085	99.97%
Features Area 3			
2	0.00 - 0.50	39888	99.72%
Features Area 4			
3	0.00 - 0.50	39983	99.46%
7	0.00 - 0.50	40328	99.85%
8	0.00 - 0.50	40275	99.95%
11	0.00 - 0.50	39452	97.20%
12	0.00 - 0.50	39036	96.14%
14	0.00 - 0.50	40158	99.77%

B.2.5 Junction and Crossing Analysis

Three types of repeatability analyses were performed on H12338 multibeam data; junction analysis of gridded crossings within H12338, junction analysis with adjacent completed sheets, and beam-by-beam crossing analysis.

B.2.5.1 Junction Analysis

The **SABER Junction Analysis** tool was used during the survey to conduct a daily comparison of main scheme to near nadir crossline data to ensure that no systematic errors were introduced and to identify potential problems with the survey system. After the application of all correctors and completion of final processing, separate one-meter CUBE PFM grids were built. One grid contained the full valid swath (±60° cutoff) of all main scheme multibeam data and the other included only the Class 1 (±5° cutoff) crossline data. The **SABER Frequency Distribution** tool was used to analyze the resulting difference grid. Comparisons of all final crossing data in H12338 showed that 96.14% of comparisons were within 20 centimeters and 99.78% of comparisons were

within 30 centimeters (Table B-7). These comparisons fall within the requirement defined in Section 5.2.4.3 of the HSSD stating that at least 95% of the depth difference values be within the maximum allowable total vertical uncertainty (calculated to be between 0.505 and 0.633 meters for H12338).

The difference grid was created by subtracting the H12338 crossline CUBE depths from the H12338 main scheme CUBE depths; therefore positive values indicate that H12338 main scheme data were deeper than H12338 crossline data. The main scheme data were deeper than the crossline data in 49.68% of the junctions and the main scheme data were shoaler than the crossline data in 46.19% of the junctions across the entire survey area (Table B-7). The distribution is fairly well spread about zero, as visualized in Figure B-1.

Table B-7. Junction Analysis, Main Scheme Lines vs. Crosslines, H12338

Depth Difference Range (m)	All		Positive		Negative		Zero	
	Count	Cumulative Percent	Count	Cumulative Percent	Count	Cumulative Percent	Count	Cumulative Percent
0-0.1	806585	72.63	387240	34.87	373396	33.62	45949	4.14
0.1-0.2	261064	96.14	134633	46.99	126431	45.01		
0.2-0.3	40379	99.78	27727	49.49	12652	46.15		
0.3-0.4	2284	99.98	1951	49.67	333	46.18		
0.4-0.5	158	100	82	49.67	76	46.18		
0.5-0.6	26	100	10	49.67	16	46.19		
0.6-0.7	11	100	10	49.68	1	46.19		
0.7-0.8	9	100	9	49.68	0	46.19		
0.8-0.9	5	100	5	49.68	0	46.19		
0.9-1.66	3	100	2	49.68	1	46.19		
Totals	1110524	100%	551669	49.68%	512906	46.19%	45949	4.14%
Reference Grid: H12338_mb_main_1m_12Jan12_pfm_H12338_mb_Cross_class1_1m_12Jan12_pfm_CUBE.dif								

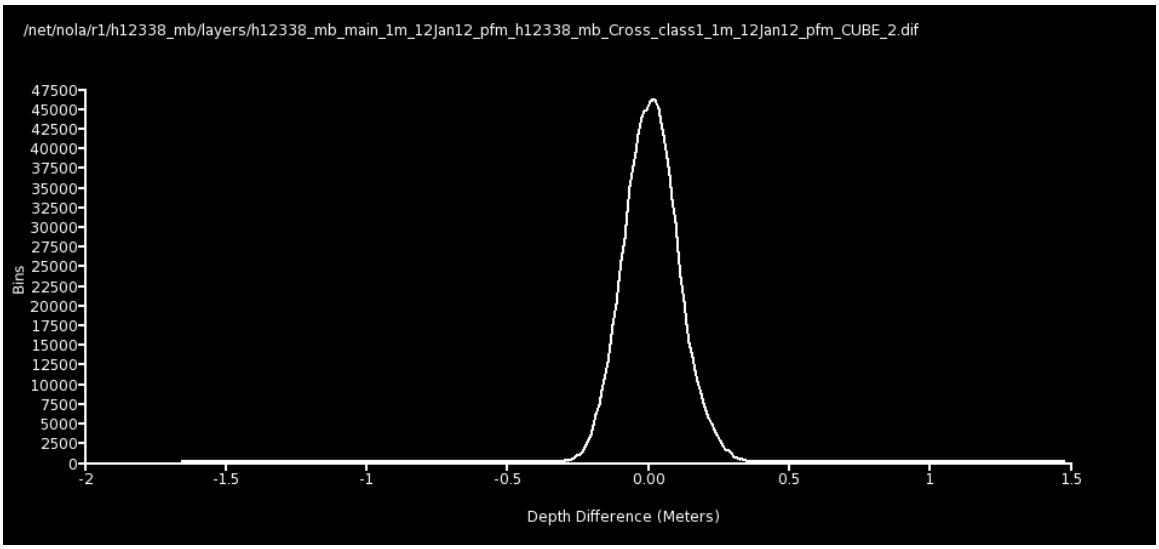

Figure B-1. Frequency Distribution Plot of Depth Differences for H12338 Main Scheme Lines vs. H12338 Crosslines

Sheet-to-sheet junction analyses were performed between H12338 and adjacent sheets for which all edits and final correctors were applied to the data. Adjacent survey sheets with finalized data for junction analysis are listed in Table B-8. Refer to Figure B-2 for the general locality of each sheet.

Table B-8. Surveys for Junction to H12338

Registry No.	Scale	Year of Acquisition	Field Party	Date Delivered to AHB	Location of Junction
H12336	1:40,000	2011	SAIC	16 December 2011; Supplemental delivery on 30 May 2012	North

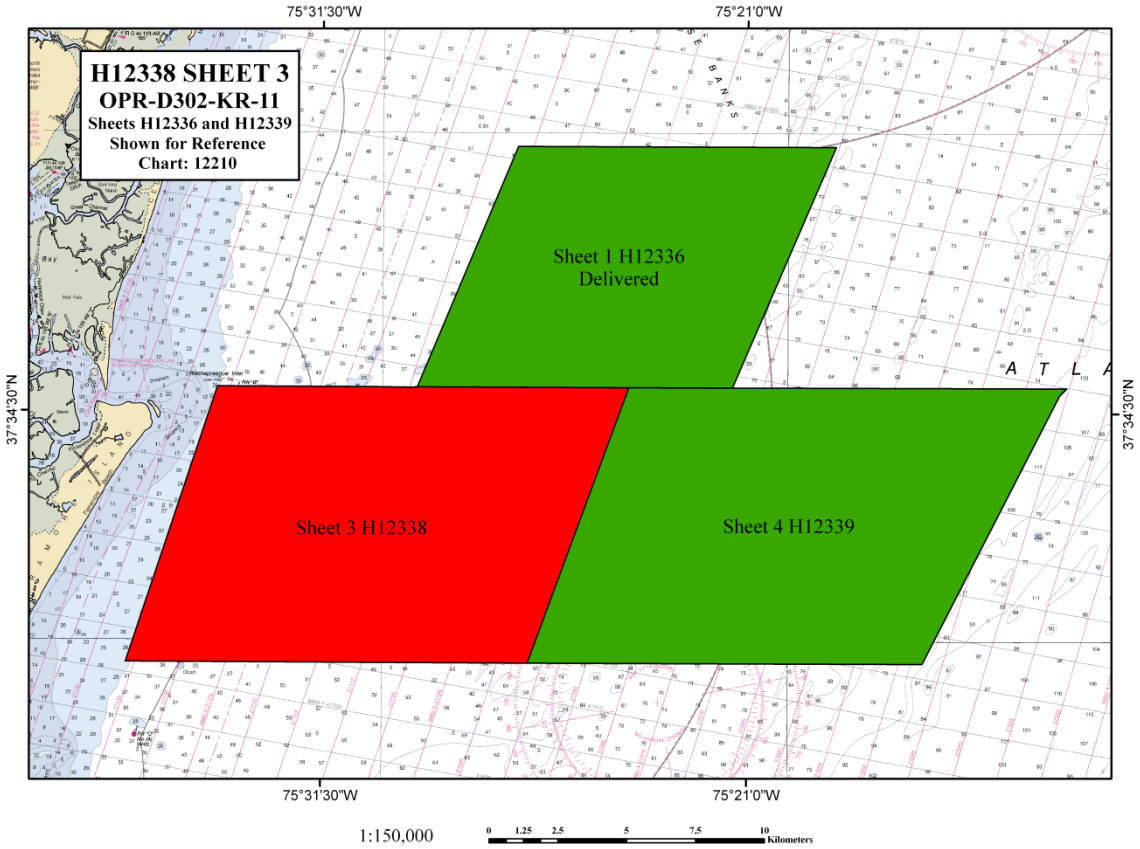

Figure B-2. General Locality and Status of Sheets in Reference to H12338

Table B-9 depicts the junction analysis between H12338 and H12336 (Sheet 1, Project Number OPR-D302-KR-11) that was surveyed between 25 June 2011 and 18 August 2011 and borders H12338 to the north.

Frequency distribution of differences was conducted on the differences between the CUBE depths in the common area from the final one-meter PFM grid of these two sheets. The H12338 CUBE depths within the overlap area of the two sheets varied from 11.34 meters to 22.51 meters resulting in allowable vertical uncertainties between 0.521 and 0.579 meters. The results showed that 97.55% of the comparisons were within 20 centimeters and 99.35% were within 25 centimeters. The difference grids were generated by subtracting the H12336 data from the H12338 data. Therefore positive values indicate that H12338 depth data were deeper than H12336 depth data. Throughout the common area, H12338 CUBE depths were shoaler than H12336 45.14% of the time and were deeper than H12336 50.39% of the time (Table B-9). The distributions are fairly well spread about zero, as visualized in Figure B-3.

Table B-9. Junction Analysis, H12338 vs. H12336

Depth Difference Range (m)	All		Positive		Negative		Zero	
	Count	Cumulative Percent	Count	Cumulative Percent	Count	Cumulative Percent	Count	Cumulative Percent
0-0.05	187834	46.19%	86949	21.38%	82739	20.35%	18146	4.46%
0.05-0.1	120720	75.88%	63074	36.9%	57646	34.52%		
0.1-0.15	62229	91.19%	34932	45.49%	27297	41.24%		
0.15-0.2	25892	97.55%	13241	48.74%	12651	44.35%		
0.2-0.25	7314	99.35%	4498	49.85%	2816	45.04%		
0.25-0.3	1963	99.84%	1582	50.24%	381	45.14%		
0.3-0.35	350	99.92%	327	50.32%	23	45.14%		
0.35-0.4	173	99.96%	173	50.36%	0	45.14%		
0.4-0.45	67	99.98%	67	50.38%	0	45.14%		
0.45-0.5	23	99.99%	23	50.38%	0	45.14%		
0.5-0.55	26	99.99%	26	50.39%	0	45.14%		
0.55-0.59	29	100%	29	50.39%	0	45.14%		
Totals	406620	100%	29	50.39%	0	45.14%	18146	4.46%
Reference Grid: H12338_mb_all_1m_12Jan12_pfm_H12336_1m_MLLW_pfm.dif								

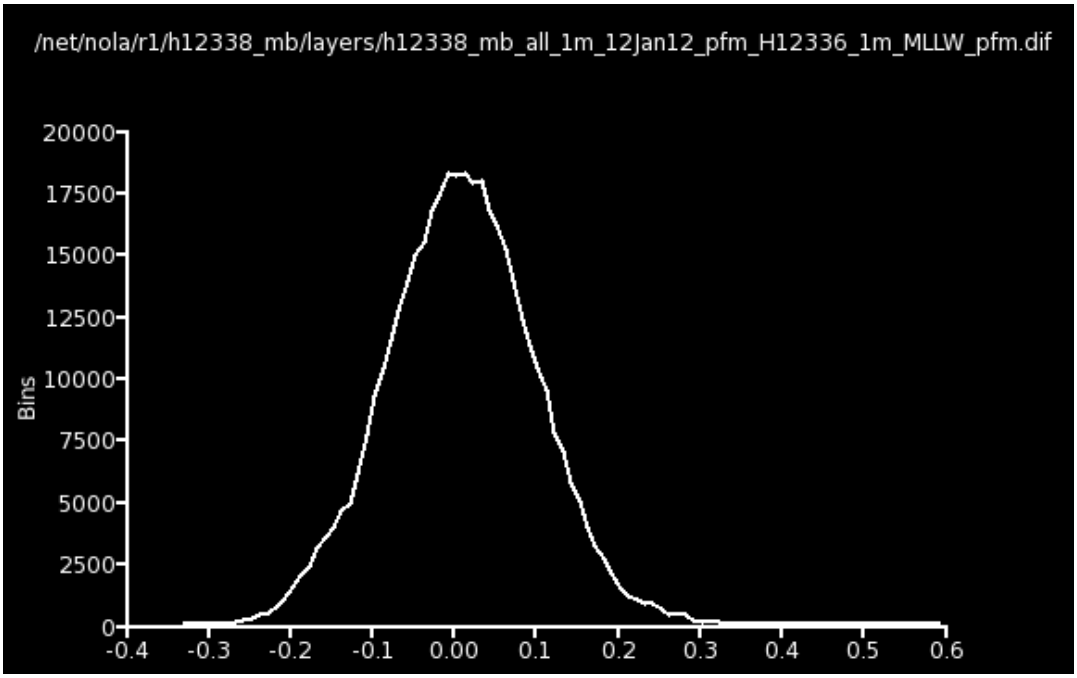

Figure B-3. Frequency Distribution Plot of Depth Differences for H12338 vs. H12336

B.2.5.2 Crossing Analysis

Twenty-five crossings were selected from areas consisting of a relatively flat bottom for beam-by-beam comparison (Figure B-4). The chosen crossings were confirmed to encompass the H12338 survey area both spatially and temporally. The results of the comparisons are presented in Separates IV of this report. The crossings show a general trend of uniform differences in beam depths across the swaths of the files with the majority of the differences less than 20 centimeters. Sound speed artifacts were observed in a few of the crossings; however none of these artifacts were outside of the data quality specifications or had a significant effect on the final gridded surface. There were no offset biases observed.

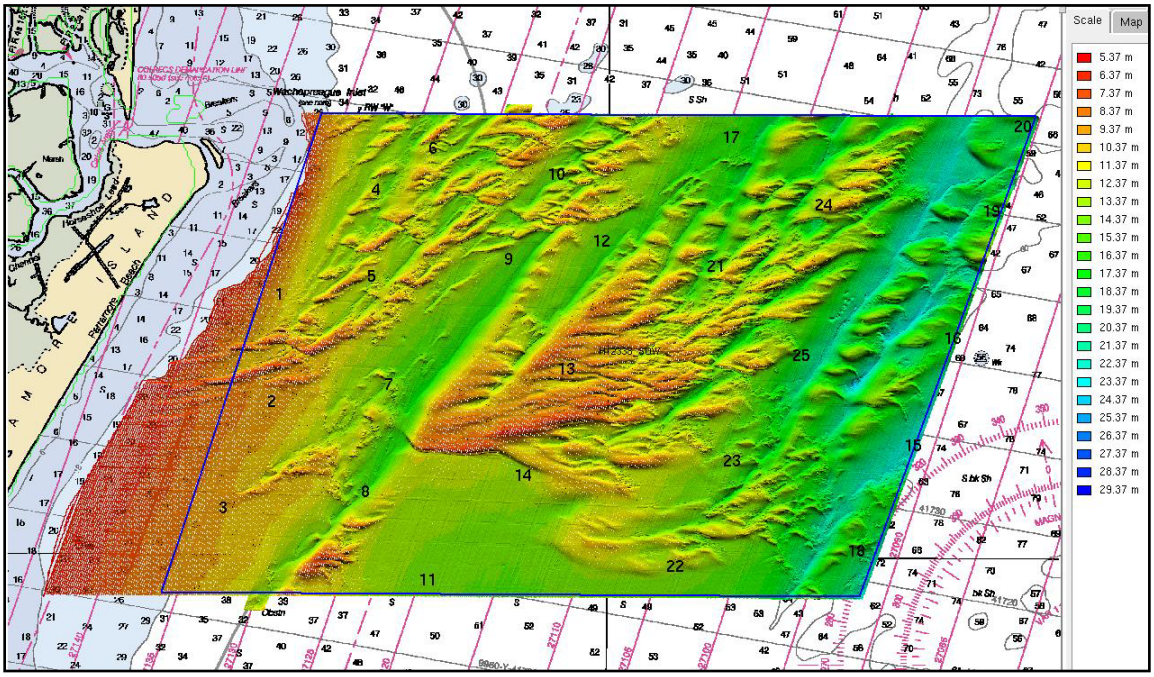

Figure B-4. Location of 25 Crossings Used in the Crossing Analysis for H12338

B.2.6 Sidescan Coverage Analysis

The Project Instructions required 200% sidescan coverage for all depths. The 200% sidescan coverage was verified by generating two separate 100% coverage mosaics at one-meter cell size resolution as specified in Section 8.3.1 of the HSSD. The first and second 100% coverage mosaics were reviewed using tools in **SABER** to verify data quality and swath coverage. The first and second 100% coverage mosaics are determined to be complete and sufficient to meet the Project Instructions, for 200% sidescan sonar coverage.

Each 100% coverage mosaic is delivered as a geo-referenced image (image file [.tif] and a corresponding world file [.tfw]).

B.3 CORRECTIONS TO ECHO SOUNDINGS

Please refer to the DAPR REV 1 for a description of all corrections applied to echo soundings. There were no deviations from the corrections described therein.

B.4 DATA PROCESSING

Please refer to Sections B.2 and B.3 of the DAPR REV 1 for a description of all data processing steps performed. During the processing of H12338 the SABER version was upgraded to version 5.0.1.4.0.

B.4.1 Bathymetry Data Processing

The final gridded multibeam data are delivered as Bathymetric Attributed Grids (BAGs). The BAGs were exported from the CUBE Depth and Final Uncertainty surfaces within the CUBE PFM grid, which are defined in Section B.2.4 of the DAPR REV 1. Based on a request by NOAA's Atlantic Hydrographic Branch (AHB), SAIC limited the resulting BAG file size to approximately 300 megabytes (MB). Therefore, multiple BAGs were produced from the single CUBE PFM grid of the sheet. For the original submission for this sheet, seven BAGs at one-meter grid resolution were submitted for the entire H12338 area. The BAG file named H12338_1m_MLLW_1of7.bag is the southernmost one-meter BAG, while the BAG file named H12338_1m_MLLW_7of7.bag is the northernmost one-meter BAG. A summary of the final one-meter BAG files (converted from the one-meter CUBE PFM grid) and the four half-meter BAG files (converted from four half-meter feature area CUBE PFM grids) is provided in Table B-10. The depth range and uncertainty range for each delivered BAG is detailed in Table B-11.

Table B-10. Summary of H12338 BAG Files

BAG File Name	Comments
H12338_1m_MLLW_1of7.bag	Southernmost 1.0-meter BAG
H12338_1m_MLLW_2of7.bag	
H12338_1m_MLLW_3of7.bag	
H12338_1m_MLLW_4of7.bag	
H12338_1m_MLLW_5of7.bag	
H12338_1m_MLLW_6of7.bag	
H12338_1m_MLLW_7of7.bag	Northernmost 1.0-meter BAG
H12338_features_area_1_50cm_MLLW_1of4.bag	Features 5 and 16; 0.5-meter BAG
H12338_features_area_2_50cm_MLLW_2of4.bag	Features 1 and 4; 0.5-meter BAG
H12338_features_area_3_50cm_MLLW_3of4.bag	Feature 2; 0.5-meter BAG
H12338_features_area_4_50cm_MLLW_4of4.bag	Features 3, 7, 8, 11, 12, and 14; 0.5-meter BAG

Table B-11. Summary of H12338 BAG Depth and Uncertainty Values

BAG File Name	Depth Range (meters)	Uncertainty Range (meters)
H12338_1m_MLLW_1of7.bag	6.078 – 22.825	0.270 – 0.747
H12338_1m_MLLW_2of7.bag	5.370 – 22.754	0.270 – 0.774
H12338_1m_MLLW_3of7.bag	6.137 – 23.427	0.270 – 0.832
H12338_1m_MLLW_4of7.bag	5.993 – 28.858	0.270 – 1.301
H12338_1m_MLLW_5of7.bag	6.141 – 24.051	0.270 – 1.228
H12338_1m_MLLW_6of7.bag	5.735 – 23.565	0.270 – 1.001
H12338_1m_MLLW_7of7.bag	6.163 – 22.757	0.270 – 0.783
H12338_features_area_1_50cm_MLLW_1of4.bag	8.070 – 12.197	0.270 – 0.761
H12338_features_area_2_50cm_MLLW_2of4.bag	5.370 – 9.457	0.270 – 1.393
H12338_features_area_3_50cm_MLLW_3of4.bag	13.024 – 16.585	0.280 – 1.493
H12338_features_area_4_50cm_MLLW_4of4.bag	14.179 – 28.900	0.280 – 2.148

As requested by NOAA's AHB, six additional non-standard BAG files corresponding to each of the standard BAG files listed in Table B-10 were generated. These additional BAG files were generated through the same process as the standard BAG files. Currently the BAG format only allows for two layers to be defined within the BAG, a Depth layer and an Uncertainty layer. Therefore, each of the non-standard BAG files were created with the CUBE Depth layer, populating the Depth layer of the BAG and each of the following surfaces populating the Uncertainty layer of the BAG:

- CUBE Number of Hypotheses
- CUBE Standard Deviation
- CUBE Hypothesis Strength
- CUBE Number of Soundings
- Average TPU
- Standard Deviation

A detailed description of these layers can be found in Section B.2.5 of the DAPR REV 1.

Please note when reviewing these additional, non-standard BAGs the file name designates the layer which populates the Uncertainty layer of the BAG. Please also note that when displayed the two layers of the BAG remain named Depth and Uncertainty. These non-standard BAGs are provided for review purposes only and are not intended to be used as archival products.

As discussed in the DAPR REV 1, the BAG version was updated in April 2012. SAIC re-generated BAGs to version 1.5.0 and is submitting them as a supplemental delivery along with this revision to the descriptive report. These new BAG files include not only the Depth and Uncertainty layers but also the Depth Solution Group Surfaces and Node Group Surfaces which include the following surfaces:

- Depth

- Uncertainty
- Standard Deviation
- Number of Soundings
- Shoal Depth
- Hypothesis Strength
- Number of Hypotheses

Please refer to Section B 2.5 of the DAPR REV 1 for details about the optional surfaces. With the inclusion of additional surfaces into one BAG file, the total number of BAG files built from the single CUBE PFM grid of the sheet is different from the originally submitted data. Fifteen BAG version 1.5.0 files at one-meter grid resolution are submitted for the entire H12338 area. However, with version 1.5.0 BAGs that include the optional surfaces contained in the Depth Solution Group and Node Group, non-standard BAG files are no longer required. Therefore non-standard BAG files are not included with this supplemental delivery. Refer to the DAPR REV 1, for a discussion of the layers included within each BAG file.

Please note however, when the BAG 1.5.0 support was added to **SABER**, the PFM library was also upgraded. The precision of the positions of the min/max X/Y values in the PFM header and the precision of the offsets saved in the PFM depth records were increased in this version of PFM and thus the positions of depth records (soundings) read from the PFM may be slightly different from previous versions of the PFM library. Some depth records that were very close to the extreme of the CUBE capture radius may or may not be included in a CUBE node when compared to the same PFM created with the previous PFM library. This resulted in slightly different CUBE depth and uncertainty values in a small number of nodes evenly distributed throughout the BAG, when comparing the original delivered version 1.1.0 BAGs. When differences were observed, they were generally on the scale of one centimeter or smaller.

A summary of the version 1.5.0 one-meter BAG files (converted from the one-meter CUBE PFM grid) and the four half-meter BAG files (converted from four half-meter feature area CUBE PFM grids) is provided in Table B-12. The depth range and uncertainty range for each delivered BAG is detailed in Table B-13 Please disregard Table B-10 and Table B-11 as well as the originally submitted BAG files for H12338 if there is a CARIS version available which supports version 1.5.0 BAG files at the time of review of this sheet. SAIC has inquired with CARIS on the timeframe for support of version 1.5.0 BAGs and as of the date of delivery of this report we have only heard back that it will likely be summer of 2012. SAIC will notify AHB once a release date is announced. If an updated version of CARIS is not available when review of this sheet begins, the original delivered BAGs (both standard and non-standard) provide the information required to perform the review, just as in past year's deliveries.

Table B-12. Summary of Supplemental Delivery of H12338 BAG Files

BAG File Name	Comments
H12238_1m_MLLW_1of15.bag	Southernmost 1.0-meter BAG
H12238_1m_MLLW_2of15.bag	
H12238_1m_MLLW_3of15.bag	
H12238_1m_MLLW_4of15.bag	
H12238_1m_MLLW_5of15.bag	
H12238_1m_MLLW_6of15.bag	
H12238_1m_MLLW_7of15.bag	
H12238_1m_MLLW_8of15.bag	
H12238_1m_MLLW_9of15.bag	
H12238_1m_MLLW_10of15.bag	
H12238_1m_MLLW_11of15.bag	
H12238_1m_MLLW_12of15.bag	
H12238_1m_MLLW_13of15.bag	
H12238_1m_MLLW_14of15.bag	
H12238_1m_MLLW_15of15.bag	Northernmost 1.0-meter BAG
H12338_features_area_1_50cm_MLLW_1of4.bag	Features 5 and 16; 0.5-meter BAG
H12338_features_area_2_50cm_MLLW_2of4.bag	Features 1 and 4; 0.5-meter BAG
H12338_features_area_3_50cm_MLLW_3of4.bag	Feature 2; 0.5-meter BAG
H12338_features_area_4_50cm_MLLW_4of4.bag	Features 3, 7, 8, 11, 12, and 14; 0.5-meter BAG

Table B-13. Summary of Supplemental Delivery H12338 BAG Depth and Uncertainty Values

BAG File Name	Depth Range (meters)	Uncertainty Range (meters)
H12238_1m_MLLW_1of15.bag	10.420 - 14.015	0.270 - 0.280
H12238_1m_MLLW_2of15.bag	6.093 - 22.825	0.270 - 0.558
H12238_1m_MLLW_3of15.bag	5.370 - 22.590	0.270 - 0.747
H12238_1m_MLLW_4of15.bag	6.082 - 22.601	0.270 - 0.774
H12238_1m_MLLW_5of15.bag	6.084 - 23.427	0.270 - 0.775
H12238_1m_MLLW_6of15.bag	6.222 - 23.348	0.270 - 0.970
H12238_1m_MLLW_7of15.bag	5.993 - 28.858	0.270 - 0.970
H12238_1m_MLLW_8of15.bag	6.053 - 26.669	0.270 - 1.301
H12238_1m_MLLW_9of15.bag	6.141 - 23.861	0.270 - 1.200
H12238_1m_MLLW_10of15.bag	6.145 - 24.051	0.270 - 1.228
H12238_1m_MLLW_11of15.bag	6.494 - 23.369	0.270 - 0.915
H12238_1m_MLLW_12of15.bag	5.805 - 23.470	0.270 - 1.001
H12238_1m_MLLW_13of15.bag	5.735 - 23.565	0.270 - 0.670
H12238_1m_MLLW_14of15.bag	6.163 - 22.724	0.270 - 0.783
H12238_1m_MLLW_15of15.bag	6.494 - 22.556	0.270 - 0.651
H12338_features_area_1_50cm_MLLW_1of4.bag	8.070 – 12.197	0.270 – 0.761

BAG File Name	Depth Range (meters)	Uncertainty Range (meters)
H12338_features_area_2_50cm_MLLW_2of4.bag	5.370 – 9.457	0.270 – 1.393
H12338_features_area_3_50cm_MLLW_3of4.bag	13.024 – 16.585	0.280 – 1.493
H12338_features_area_4_50cm_MLLW_4of4.bag	14.179 – 28.900	0.280 – 2.148

B.4.2 Sidescan Data Processing

The Klein 3000 sidescan sonar data were collected in eXtended Triton Format (XTF) and maintained at full resolution, with no conversion or down sampling techniques applied. Sidescan sonar contacts were made through Triton **Isis**. Sidescan contact information is delivered in several ways. The spreadsheet "Sidescan Contacts List", located in Appendix II, notes all sidescan contacts that were identified within H12338. Contacts for which an **Isis** contact file was created are delivered in Separates V (*_n.CON files) for which details regarding these files can be found in Section B.3.3 of the DAPR REV 1. Sidescan contacts that have been correlated to a multibeam feature are included in the Feature Correlator Sheets, found in Appendix II. Sidescan sonar contacts are also delivered as a Sidescan Sonar Contacts S-57 file with an image of each contact populated in the NOAA Extended Attribute "images". Additionally all contact image files (.tif) are delivered in Separates V.

C. VERTICAL AND HORIZONTAL CONTROL

No vertical or horizontal controls were established, recovered, or occupied during OPR-D302-KR-11 data acquisition, which includes H12338. Therefore a Horizontal and Vertical Control Report is not required. Vertical and horizontal control specifics pertaining to H12338 are discussed below.

C.1 VERTICAL CONTROL

The vertical datum for H12338 is Mean Lower Low Water (MLLW). The Project Instructions specified NOAA tide station 8631044 Wachapreague, VA as the source for water level correctors. A full explanation of the tide zone assessment is detailed in Section C.4 of the DAPR REV 1 delivered concurrently with this report. For H12338, 8631044 Wachapreague, VA was the source of all final verified water level heights for determining correctors to soundings. All data for H12338 were contained within three tide zones which were provided from NOAA and are summarized in Table C-1.

Table C-1. Water Level Zoning Parameters Applied on Sheet H12338

Zone	Time Corrector (minutes)	Range Ratio	Reference Station
SA53	-54	0.95	8631044
SA54	-60	0.90	8631044
SA55	-66	0.90	8631044

SAIC did not revise the delivered tide zones for tide station 8631044 Wachapreague, VA as the water level zoning parameters provided by National Ocean Service (NOS), Table C-1, were deemed adequate for the application of observed verified water levels. As a result, they were accepted as final and applied to all H12338 multibeam data.

No final tide note was provided by the NOAA Center for Operational Oceanographic Products and Services (CO-OPS). SAIC is not required to have a final tide note from CO-OPS for H12338. SAIC has provided a final tide note in Appendix IV.

A small adjacent line offset was seen in the data on JD 223. See section B.2.4 CUBE Uncertainty Analysis for details on this offset.

C.2 HORIZONTAL CONTROL

The survey data for sheet H12338 were collected in horizontal datum North American Datum of 1983 (NAD-83), using geodetic coordinates, while data display and products used the UTM Zone 18, North projection. The following equipment was used for positioning on the *M/V Atlantic Surveyor*:

- POS/MV Model 320 Version 4, Serial Number 2575 with a Trimble Probeacon Differential Receiver (primary sensor)
- Trimble 7400 RSi GPS Receiver with a Trimble Probeacon Differential Receiver (secondary sensor)

Please refer to the DAPR REV 1 for details regarding all antenna and transducer offsets.

Differential correctors used for online data were from the U.S. Coast Guard Stations at Driver, VA, Annapolis, MD, Reedy Point, DE, and New Bern, NC. The differential receivers were programmed to only receive differential corrector data from these four stations.

Horizontal positioning of the multibeam transducer by the POS/MV was verified by frequent comparison checks against an independent Trimble DGPS system. During survey data acquisition, the **ISS-2000** real-time system provided a continuous view of the positioning comparison between the POS/MV and the Trimble DGPS. An alarm was triggered within **ISS-2000** if the comparisons were not within an acceptable range. All daily positioning confidence checks for H12338, were within 0.67 meters. These daily positional checks are presented in a standalone table within Separates I, "Daily Positioning Confidence Checks". All soundings with total horizontal uncertainties which exceeded the maximum allowable IHO S-44 5th edition Order 1a specifications were flagged as invalid and therefore were not used in the CUBE depth calculations.

D. RESULTS AND RECOMMENDATIONS

D.1 CHART COMPARISON

For chart comparisons, survey data are compared to the largest scale chart that encompasses the entire area. In the case of H12338, the survey area is fully covered by one Raster Chart (BSB) and one Electronic Navigational Chart (ENC). Details of each chart are listed below.

Chart 12210	**Chincoteague Inlet to Great Machipongo Inlet**	
	Scale	1:80,000
	Edition and Date	38th, 05/01/2008
	Notice to Mariners corrected through	38.168, 01/28/2012

ENC US4VA70M	**Chincoteague Inlet to Great Machipongo Inlet**	
	Scale	1:80,000
	Edition and Application Date	11th, 03/03/2011
	Update and Issue Date	9, 11/10/2011

The chart comparisons were conducted using SAIC's **SABER** software to view the BSB raster charts with overlain layers of H12338 data such as the CUBE gridded surface, selected soundings, contacts, and features. For ENC comparisons, a combination of Jeppesen's **dKart Inspector**, SevenCs' **SeeMyDENC**, and CARIS' **EasyView** were used in conjunction with **SABER**. Results from the comparisons are described below. Charting recommendations for depths follow Section 5.1.2 of the HSSD where depths and uncertainties are to be reported in meters rounded to the nearest millimeter by standard arithmetic rounding (round half up). Chart depth units are rounded using NOAA cartographic rounding (0.75 round up).

Local Notice to Mariners publications from the United States Coast Guard (USCG) District 5 were reviewed for changes subsequent to the date of the Hydrographic Survey Project Instructions or Statement of Work and before the end of survey that affect the area within H12338 as requested in Section 8.1.4 of the HSSD. There were no additional LNM that affected the charts described below within the survey area.

H12338 data meets data accuracy standards and bottom coverage requirements. Recommend updating the common areas of all charts using data from this survey. All charting recommendations for all features except the navigational aids are provided under Appendix II, Survey Feature Report.

D.1.1 Chart 12210 Chincoteague Inlet to Great Machipongo Inlet

Chart 12210 encompasses all of H12338.

CUBE depths within sheet H12338 generally agreed within ±6 feet of the charted depths. The 30-foot and 60-foot depth curves across H12338 were within 500 meters of their charted position, and showed a general shift to the southwest. The main discrepancies in the charted depth curves were with isolated soundings and associated depth curves. The following identifies one example of such discrepancies.

The charted 30-foot sounding and discrete 30-meter depth curve in 37° 31’ 07.08”N 075° 30’ 43.75”W were found in CUBE depths of 35 to 40 feet.

Recommendation:

- Remove 30-foot depth curve and update sounding.

The charted dangerous obstruction in 37° 29' 28.57"N 075° 34' 56.09"W was not found. The charted obstruction was delivered to SAIC by NOAA as part of the Assigned Feature File however as noted within the supplemental correspondence dated 04 August 2011 from Mark T. Lathrop (Appendix V), no special investigation was required. SAIC decided to extend survey lines by 330 meters creating an area of coverage around the charted object of approximately 200 meters.

Recommendations:

- Remove the charted dangerous obstruction.

There were five features identified within the H12338 survey area which were not charted and are recommended for charting. Refer to Appendix II for further details concerning new features recommended for charting.

D.1.2 ENC US4VA70M Chincoteague Inlet to Great Machipongo Inlet

US4VA70M encompasses all of H12338.

CUBE depths within sheet H12338 generally agreed within ±2.6 meters of the charted depths.

The 9.1-meter and 18.2-meter depth curves across H12338 were within 100 - 500 meters of their charted position, and showed a general shift to the southwest. The main discrepancies in the charted depth curves were with isolated soundings and associated depth curves. The following identifies one example of such discrepancies.

The charted 9.1-meter sounding and discrete 9.1-meter depth curve in 37° 31’ 06.71”N 075° 30’ 43.43”W were found in CUBE depths of 10.691 to 12.409 meters.

Recommendation:

- Remove 9.1-meter depth curve and update sounding.

The charted dangerous obstruction in 37° 29' 29.17"N 075° 34' 57.16"W was not found. The charted obstruction was delivered to SAIC by NOAA as part of the Assigned Feature File however as noted within the supplemental correspondence dated 04 August 2011 from Mark T. Lathrop (Appendix V), no special investigation was required. SAIC decided to extend survey lines by 330 meters creating an area of coverage around the charted object of approximately 200 meters.

Recommendations:

- Remove the charted dangerous obstruction.

There were six features identified within the H12338 survey area which were not charted and are recommended for charting. Refer to Appendix II for further details concerning new features recommended for charting.

D.1.3 Automated Wreck and Obstruction Information Service (AWOIS) Item Investigations

As defined in the Project Instructions, there were a total of four AWOIS items assigned for project OPR-D302-KR-11; two of which fell within the H12338 survey bounds (Table D-1). The AWOIS items which fell within H12338 were identified for full investigation. Detailed AWOIS item investigation reports for H12338 can be found in Appendix II Section I of this Descriptive Report.

Table D-1. AWOIS Listings Received from NOAA for H12338

AWOIS Number	Search Type	Chart 12210	ENC US4VA70M
2783	Full	X	X
7190	Full	X	X

D.1.4 Designated Soundings

Designated soundings are used to help better preserve the shallowest sounding relative to the computed depth surface. Separate flags exist in the Generic Sensor Format (version 3.01) for designated soundings and features. The designated sounding in the final CUBE surface has also been flagged as a designated sounding in the GSF files. All depths flagged as features and designated soundings will override the CUBE best estimate of the depth in the final BAG files. All of the features and designated soundings for H12338 are listed within two spreadsheets “H12338 Multibeam Features List” and “H12338 Designated Soundings List” located in Appendix II. Both the designated soundings and features flags as defined within GSF are mapped to the same HDCS flag when ingested into CARIS (PD_DEPTH_DESIGNATED_MASK). The following pages discuss the three designated soundings that were set in the H12338 survey data.

D.1.4.1 Designated Sounding 1

Designated Sounding 1 is a small non-significant object found within a fish haven with a least depth of 13.460 meters in 37° 33' 10.49"N 075° 33' 41.80"W. The object is approximately 0.60 meters high lying in a shallow 0.25 meter depression. A designated

sounding was set because the CUBE depth at this position was 14.034 meters, 0.574 meters deeper than the least depth of the object. Thus setting the designated sounding preserved the least depth of the object (Figure D-1 and Figure D-2). Two sidescan contacts were made on this object, contact number 205222812 and contact number 206004104.

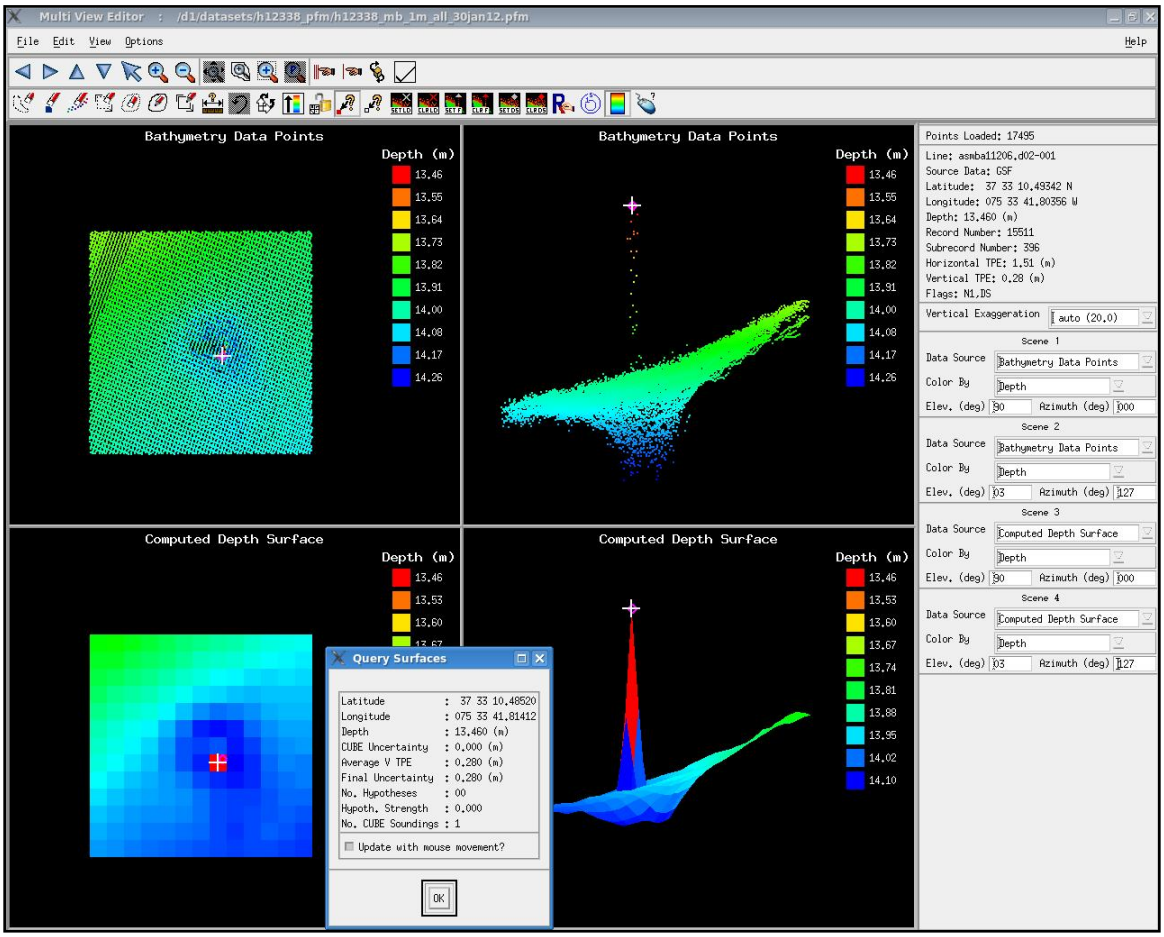

Figure D-1. Designated Sounding 1 CUBE Surface when Set in MVE

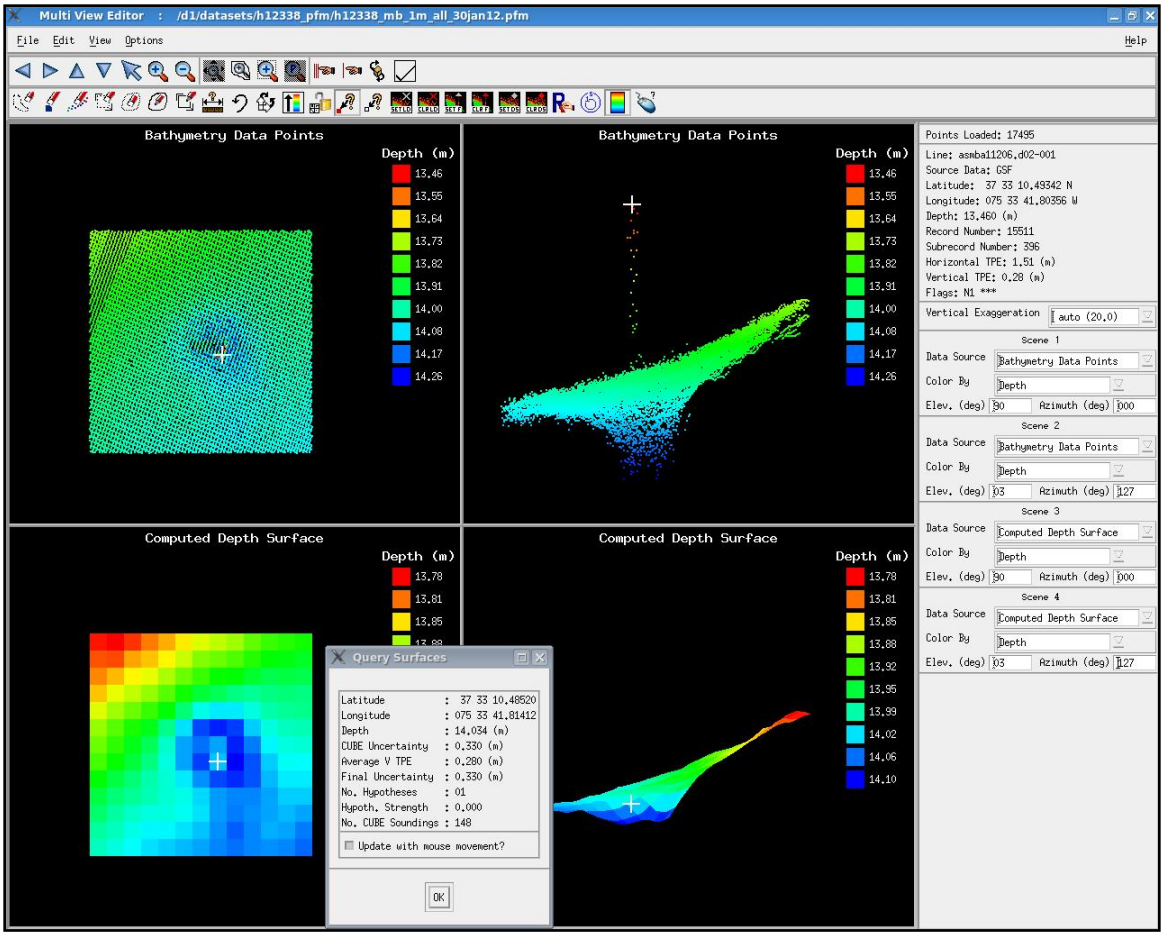

Figure D-2. Designated Sounding 1 CUBE Surface when Not Set in MVE

D.1.4.2 Designated Sounding 2

Designated Sounding 2 is a small non-significant object found within a fish haven with a least depth of 22.376 meters in 37° 32' 32.92"N 075° 25' 52.08"W. The object is approximately 0.96 meters high lying in a shallow 0.25 meter depression in approximately 23.34 meters of water. A designated sounding was set because the CUBE depth at this position was 23.569 meters, 1.193 meters deeper than the least depth of the object. Thus setting the designated sounding preserved the least depth of the object (Figure D-3 and Figure D-4). Two sidescan contacts were made on this object, contact number 220071616 and contact number 220144034.

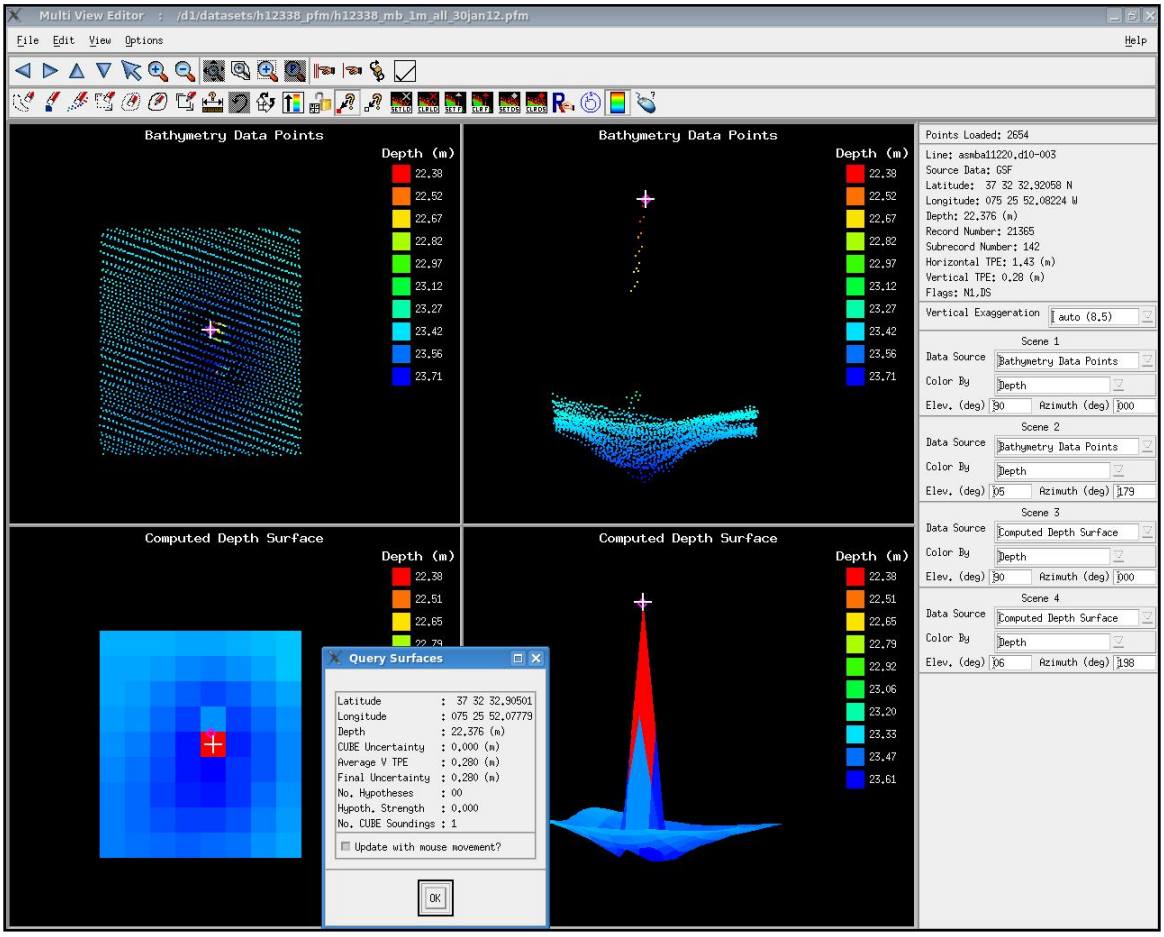

Figure D-3. Designated Sounding 2 CUBE Surface when Set in MVE

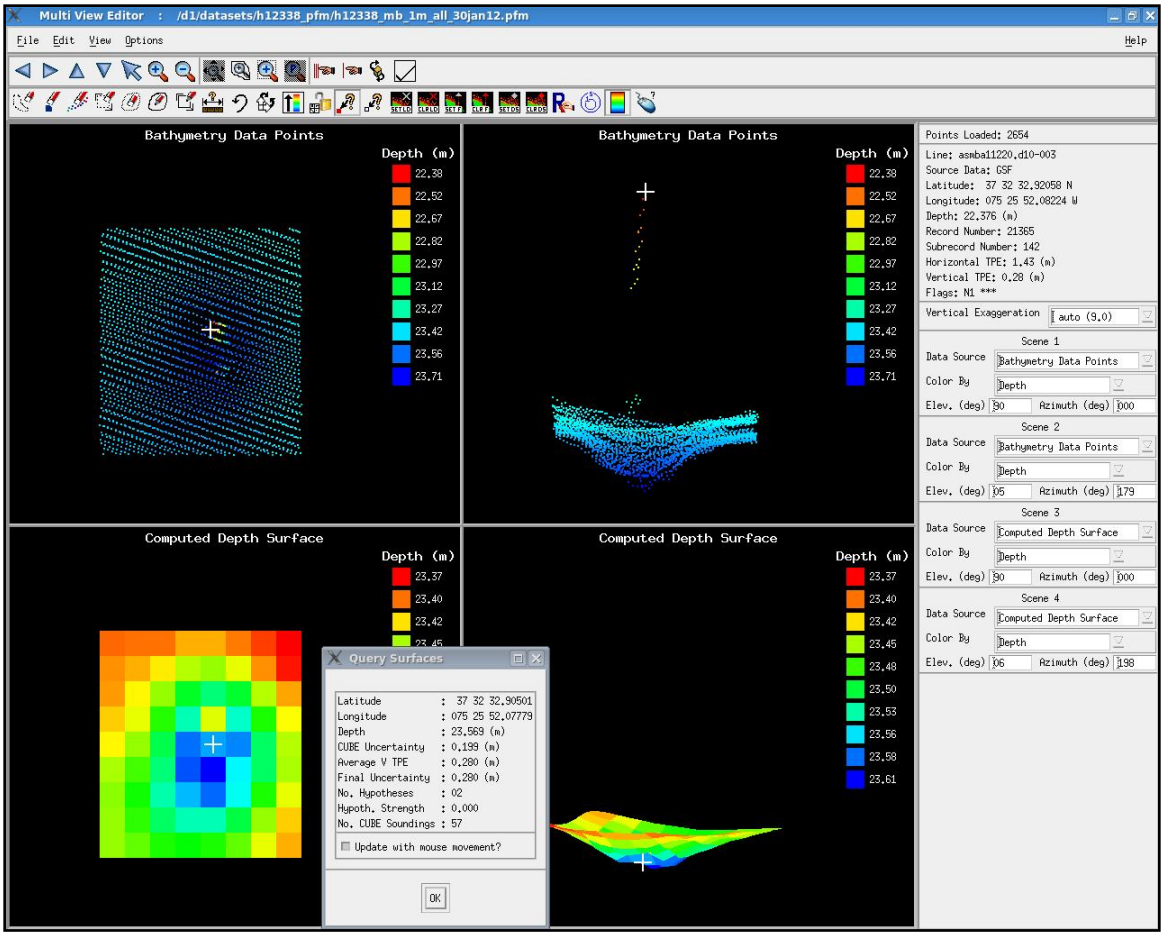

Figure D-4. Designated Sounding 2 CUBE Surface when Not Set in MVE

D.1.4.3 Designated Soundings3

Designated Sounding 3 is an object found within a fish haven with a least depth of 10.595 meters in 37° 33' 02.08"N 075° 31' 53.28"W. The object is approximately 4.29 meters high in approximately 14.89 meters of water. A designated sounding was set because the CUBE depth at this position was 14.942 meters, 4.347 meters deeper than the least depth of the object. Thus setting a designated sounding preserved the least depth of the object (Figure D-5 and Figure D-6). Two sidescan contacts were made on this object, contact number 210051906 and contact number 210092255.

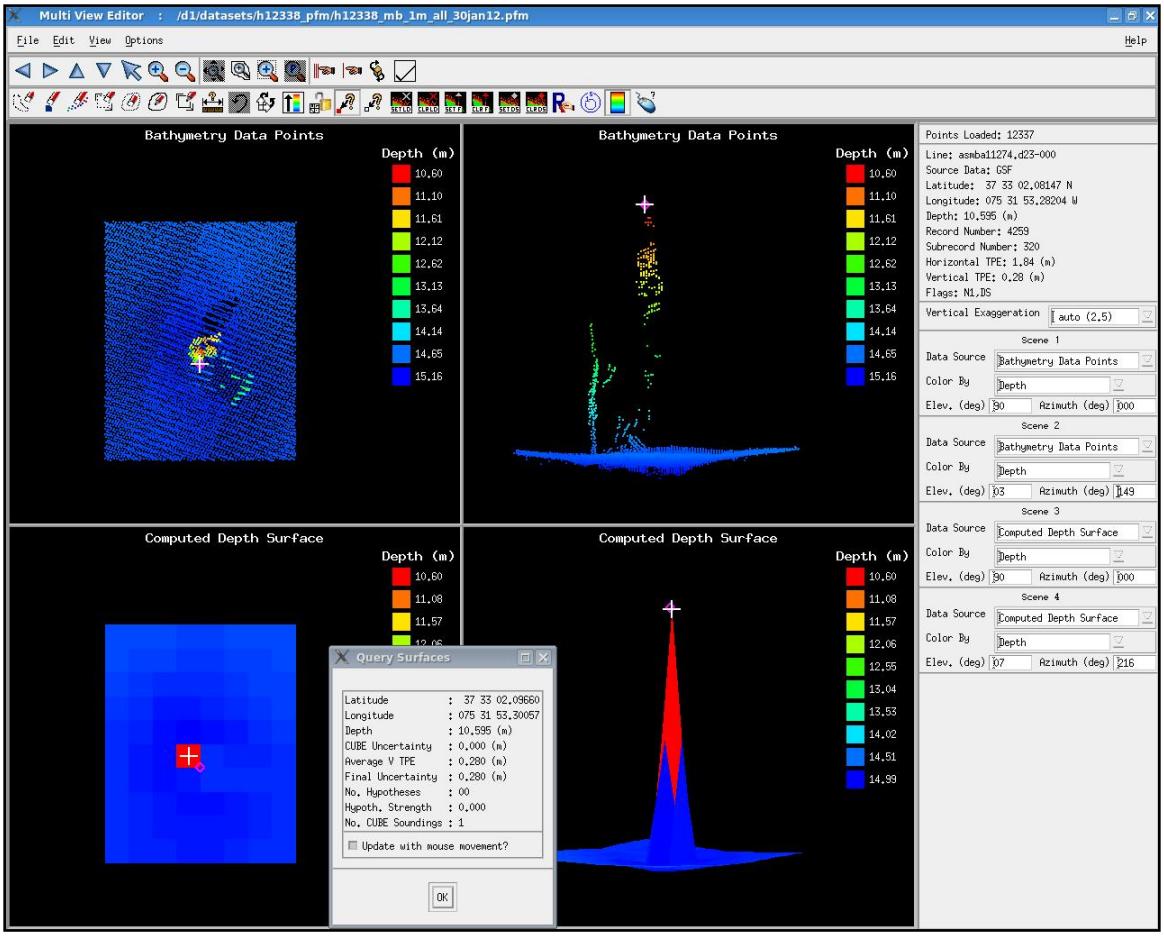

Figure D-5. Designated Sounding 3 CUBE Surface when Set in MVE

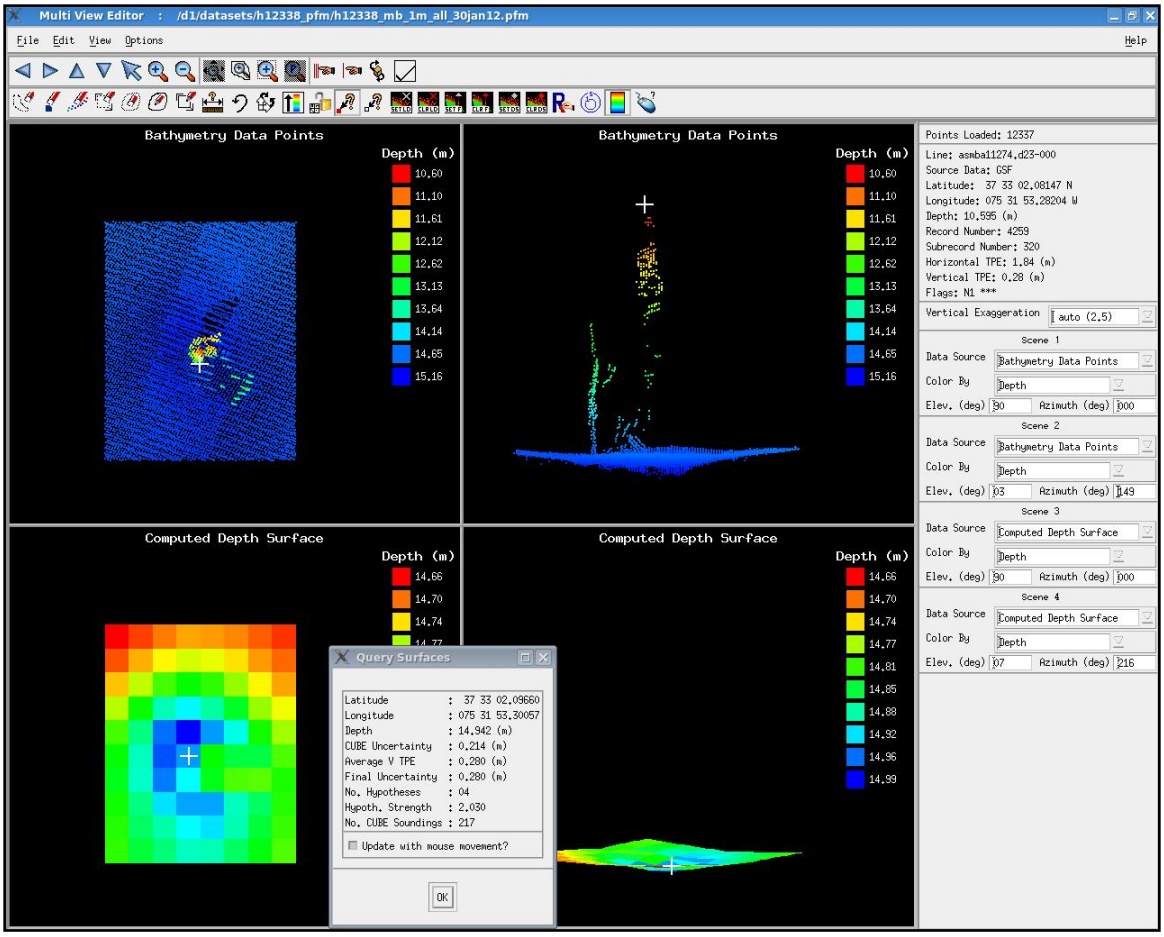

Figure D-6. Designated Sounding 3 CUBE Surface when Not Set in MVE

D.1.5 Danger to Navigation Reports

Two Danger to Navigation Reports were submitted for this survey and copies are included in Appendix V. The Atlantic Hydrographic Branch's corresponding versions as they were submitted to Marine Charting Division is included in Appendix I. Charting recommendations for features that were previously submitted as DTONs can be found in Appendix II Section 2.2 Updated Features.

D.2 ADDITIONAL RESULTS

D.2.1 Shoreline Verification

Shoreline verification was not required for H12338.

D.2.2 Comparison with Prior Surveys

Comparison with prior surveys was not required under this Task Order.

D.2.3 Aids to Navigation

Two charted Aids to Navigation were found within the data for H12338. One is located at the entrance to Wachapreague Inlet, the other on Parramore Bank. Each is discussed in detail below.

The charted RW "W" Mo (A) WHIS buoy was found (Feature #17) in its charted location 37° 34' 53.41"N 075° 33' 36.82"W (Figure D-7). This agreed with the description of the Wachapreague Inlet Lighted Whistle Buoy W (305/6600) in the United States Coast Guard Light List Volume II Atlantic Coast updated through LNM week: 01/12.

Figure D-7. Wachapreague Inlet Buoy W

The charted R "10" Fl R 4s GONG buoy was found (Feature #18) in its charted location 37° 32' 03.89"N 075° 25' 52.56"W (Figure D-8). This agreed with the description of the Parramore Bank Lighted Gong Buoy 10 (315) in the United States Coast Guard Light List Volume II Atlantic Coast updated through LNM week: 01/12.

Figure D-8. Parramore Bank Buoy 10

D.2.4 S-57 Feature File

Included with H12338 delivery is the S-57 feature file, 3S412338.000. Details on how this file is generated and quality reviewed can be found in Section B.2.6 of the DAPR REV 1. The **SABER** software was recently modified to allow the value of sounding (VALSOU) attribute be at least millimeter precision and to allow for the NOAA Extended Attributes, as defined in the HSSD. The S-57 feature file delivered for H12338 contains millimeter precision for depth. Following specifications, the S-57 feature file is in the WGS84 datum and is unprojected with all units in meters. All sixteen of the eighteen features addressed in H12338 are retained within the S-57 feature file. As defined in the HSSD Section 8.2, the two features not included in the S-57 feature file (feature 17 and 18), are the two U.S. Coast Guard maintained aids to navigation.

Feature Correlator sheets are presented in Appendix II. At the request of AHB, the Feature Correlator sheet was exported as an image file (.jpg) and is included under the NOAA Extended Attribute field "images" with the S-57 feature file for all features.

D.2.5 Sidescan Sonar Contacts S-57 File

As requested by AHB, SAIC also generated a supplemental S-57 file to present the sidescan contacts. Details on how this file was generated, attributed, and quality reviewed can be found in Section B.3.4 of the DAPR REV 1. Note that both the feature and sidescan S-57 files share the same name "3S412338.000". The supplemental sidescan S-57 feature file is located in the directory named "H12338\Data\Processed\S-57_Features\Side_Scan_Sonar_S-57_File_as_Cartographic_symbol", while the S-57 final feature file is located in the directory named "H12338\Data\Processed\S-57_Features".

The "Sidescan Contacts List", located in Appendix II of this report, also provides the same information as the sidescan S-57 file.

D.2.6 Bottom Characteristics

In accordance with both the Project Instructions and Section 7.1 of the HSSD, bottom characteristics were obtained for H12338. Bottom characteristics were determined at a set distance of approximately 2000 meters, evenly distributed throughout the H12338 survey area. Forty-five of the forty-six planned samples were collected; one sample was not collected for due to safety concerns as it was located within a fish haven. Bottom characteristics are included in the H12338 S-57 feature file, 3S412338.000, within the Seabed Area (SBDARE) object and are classified according to the requirements set forth in Appendix 10 of the HSSD. In addition to being maintained within the S-57 feature file, bottom characteristic results are represented in Appendix V of this document. Table Appendix V-1 presents the findings and is followed by images of each bottom sample. Bottom characteristics obtained for H12338 are sufficient to be used to update the respective raster and vector charts.

E. APPROVAL SHEET

30 May 2012

LETTER OF APPROVAL

REGISTRY NUMBER: H12338

This report and the accompanying digital data for project OPR-D302-KR-11 DELMARVA, Virginia Project is respectfully submitted.

Field operations and data processing contributing to the accomplishment of this survey, H12338, were conducted under supervision of myself and other SAIC lead hydrographers with frequent personal checks of progress and adequacy. This report and accompanying deliverable data items have been closely reviewed and are considered complete and adequate as per the Statement of Work.

Reports concurrently submitted to NOAA for this project include:

Report	Submission Date
Data Acquisition and Processing Report, REV 1	30 May 2012
H12336 Descriptive Report, REV 1	30 May 2012
H12337 Descriptive Report, REV 1	30 May 2012
H12339 Descriptive Report, REV 1	30 May 2012

SCIENCE APPLICATIONS INTERNATIONAL CORPORATION

Deborah M. Smith

Digitally signed by Deborah M. Smith
DN: cn=Deborah M. Smith, o=Marine Survey and Engineering Solutions, ou=SAIC, email=deborah.m.smith@saic.com, c=US
Date: 2012.05.30 13:47:38 -04'00'

Deborah M. Smith
Lead Hydrographer
Science Applications International Corporation
30 May 2012

APPENDIX I

TIDES AND WATER LEVELS

APPENDIX IV. TIDES AND WATER LEVELS

Field Tide Note
A field tide note was not required for H12338.

Final Tide Note
Observed verified water levels for the station in Wachapreague, VA (8631044) were downloaded from the NOAA Tides and Currents web site. Water Level correctors were prepared for each zone using the **SABER Create Water Level Files** software. The **SABER Apply Correctors** software applied the water level data to the multibeam data according to the zone containing the nadir beam of each ping.

Please refer to the H12338 Descriptive Report Section C.1 for details regarding final tides for H12338. The water level zoning correctors, based entirely on Wachapreague, VA (8631044), were applied to all multibeam data for H12338.

No final tide note was provided by NOAA Center for Operational Oceanographic Products and Services (CO-OPS), SAIC is not required to have a final tide note from CO-OPS.

The on-line times for acquisition of valid hydrographic data are presented in the Abstract Times of Hydrography, H12338 (Table Appendix IV-1).

Abstract Times of Hydrography
Project: OPR-D302-KR-11
Registry No.: H12338
Contractor Name: Science Applications International Corporation
Date: 17 February 2012
Sheet Designation: 3
Inclusive Dates: 22 July 2011 – 03 October 2011
Field work is complete.

Table Appendix IV-1. Abstract Times of Hydrography, H12338

Begin Date	Begin Julian Day	Begin Time	End Date	End Julian Day	End Time
07/22/2011	203	06:19:48	07/25/2011	206	04:27:01
07/26/2011	207	19:36:50	08/03/2011	215	06:01:42
08/07/2011	219	18:02:21	08/12/2011	224	20:30:00
08/17/2011	229	10:05:44	08/18/2011	230	03:55:51
09/30/2011	273	02:58:41	10/02/2011	275	01:10:03
10/02/2011	275	14:43:36	10/03/2011	276	04:10:39

Transmittal Letter to CO-OPS
A transmittal letter to CO-OPS was not required for H12338.

Other Correspondence Relating to Tides
There is no other correspondence relating to tides and/or water levels.

APPENDIX II

SUPPLEMENTAL SURVEY RECORDS AND CORRESPONDENCE

CORRESPONDENCE

From: Mark.T.Lathrop [mailto:Mark.T.Lathrop@noaa.gov]
Sent: Wednesday, April 13, 2011 1:34 PM
To: Evans, Rhodri E.
Cc: Jeffrey Ferguson; James.M.Crocker@noaa.gov
Subject: Re: 2011 HSSD

Rod,

Yes, all FY11 task orders will use the new Specs.

Mark

On 4/13/2011 1:26 PM, Evans, Rhodri E. wrote:
Mark,

We see that the April 2011 version of the NOS Specifications and Deliverables Document is now posted on NOAA's website. We are doing a thorough comparison to last year's version this week.

Are you able to advise me if any Task Orders that may be awarded this Government fiscal year will be required to adhere to the 2011 HSSD document?

Thanks and Regards, RE.

From: Mark.T.Lathrop [mailto:Mark.T.Lathrop@noaa.gov]
Sent: Wednesday, April 20, 2011 1:12 PM
To: Evans, Rhodri E.
Cc: Jeffrey Ferguson; James.M.Crocker@noaa.gov
Subject: Re: 2011 HSSD

Rod,

The following should answer your questions regarding the 2011 HSSD:

1) The change section is in error. We will be happy to receive millimeter precision, but centimeter precision is the minimum level acceptable.

2) Your assumption is correct.

3) It is our intention to have AFF files created and provided for all projects this year.

Mark

On 4/20/2011 11:13 AM, Evans, Rhodri E. wrote:
Mark,

We have completed our review of the new HSSD 2011 document. In order for us to fully understand the potential impact of some of the changes

on our survey data acquisition and processing/deliverables going forward would you please advise us on the following questions:

Questions on the April 2011 Specifications and Deliverables

In Section 1.2 Changes from April 2010 it states that Section 5.1.2 Units and Rounding is updated for millimeter precision, but Section 5.1.2 Units and Rounding still states “Depth values shall be recorded in meters, with a precision of at least centimeters.” Please confirm the precision for depth values.

In 5.2.1.2 General Requirement Management of Multiple Grids it states “The following additional attributes shall be included if supported by the hydrographer’s data processing software:” and then is followed by “Standard Deviation: Standard deviation of the depths within the capture radius of the node”. We assume this means any sounding that contributed to any hypothesis for a given node. Please confirm.

In Section 8.1.4 D.1 Chart Comparisons it states “An Assigned Feature File (AFF), in .000 format incorporating the NOAA Extended Attributes defined in Section 8.2, may be provided by HSD Ops along with the project instruction to assist the contractor or NOAA field unit with this requirement”. Will SAIC receive an Assigned Feature File (AFF)?

Thanks and Regards, RE.

From: Mark.T.Lathrop [mailto:Mark.T.Lathrop@noaa.gov]
Sent: Tuesday, July 19, 2011 2:14 PM
To: Evans, Rhodri E.
Subject: AFF for OPR-D302-KR-11

Rod,

Attached are the Assigned Feature File and Prior Reference File for OPR-D302-KR-11. We are providing these S57 files to contractors this year as a courtesy.

Mark

From: Mark.T.Lathrop [mailto:Mark.T.Lathrop@noaa.gov]
Sent: Thursday, August 04, 2011 9:48 AM
To: Evans, Rhodri E.
Subject: Re: AFF for OPR-D302-KR-11

Rod,

The AFF is just a file we are providing to the contractors this year as a courtesy. AWOIS items are not included. There are no special investigations associated with this file.

Mark

On 8/3/2011 1:15 PM, Evans, Rhodri E. wrote:
Mark,

We request a clarification regarding the Assigned Feature Files that were sent in your e-mail (see below dated July 19 2001).

The Project Instructions dated February 7, 2011 (OPR-D302-KR-11.pdf), listed 4 AWOIS Items for full investigation. We also received an Excel spreadsheet (AWOIS D302-D302-KR-11.xls) and a PDF file (OPR-D302-KR-11 AWOIS.pdf) listing the four AWOIS Items: 987 (Wreck Alleghany), 2783 (Wreck Menominee), 2888 (Obstruction), and 7190 (Obstruction).

The AFF file has 6 assigned items:
Record ID 0 1AFF01.000/FE1, Obstruction (Fish Haven). Not in the original spreadsheet
Record ID 0 1AFF01.000/FE2, Obstruction (Fish Haven). Not in the original spreadsheet
Record ID 0 1AFF01.000/FE3, Obstruction in 37 29.486N 075 34.951W. Not in the original spreadsheet.
Record ID 0 1AFF01.000/FE4, Obstruction. AWOIS 2888 in the original Spreadsheet.
Record ID 0 1AFF01.000/FE5, Wreck AWOIS 987 in the original spreadsheet
Record ID 0 1AFF01.000/FE6, Wreck in 37 35.716N 075 14.810W. Not in the original spreadsheet

So the Assigned Feature File contains 4 additional items that were not in the original spreadsheet, and does not include the two AWOIS items 2783 and 7190.

The surveys cover all items in the Assigned Feature File so there is no impact on the survey estimate though we had to modified the H12338 survey to cover the FE1 (Fish Haven) and FE3 (Obstruction) items extending 15 lines by 200 meters. They both fell outside the original survey bounds in the SOW.
We request clarification regarding the assigned items:

1. 4 or 6?
2. Spreadsheet or AFF files?

Regards, RE.

From: Mark.T.Lathrop [mailto:Mark.T.Lathrop@noaa.gov]
Sent: Tuesday, October 11, 2011 10:34 AM
To: Evans, Rhodri E.
Subject: Re: SAIC Status Report

Rod,

A staggered delivery is preferable as that eases the burden on the processing branch, hence the 120 days after completion of field work stated in the Project Instructions.

However, March 31, 2012 is the official delivery requirement for Task Order 6.

Mark

On 10/11/2011 9:40 AM, Evans, Rhodri E. wrote:
Mark,

Can you please confirm that it is acceptable that the last 2 sheets fall outside of the 120 days delivery stated in the Project Instructions? All deliveries fall within the Task Order PoP ending 3/31/2012. We believe that our delivery schedule provides a better spacing of deliveries to the AHB.

Regards, RE.

From: Evans, Rhodri E.
Sent: Tuesday, October 11, 2011 9:07 AM
To: 'Mark.T.Lathrop'
Subject: SAIC Status Report

Mark,

Status Report via email reference: Task Order OMNI TO#6 DELMARVA Sheets 1-4:

The ship “Atlantic Surveyor” is now in home port (Point Pleasant, NJ). This week SAIC will fully demobilize the ship.

Our preliminary AHB delivery schedule is as follows:

H12336 – 12/16/2011
H12337 – 01/20/2012
H12338 – 02/17/2011
H12339 – 03/16/2012

The next status report will be on Monday 17 October 2011.

Regards, RE.
Rod Evans Ph.D | SAIC
Assistant Vice President & Hydrographic Survey Services Manager
Maritime Operations Division-Marine Survey and Engineering Services
ph: 401.848.4783 | cell: 401.439.1037 | e: evansrh@saic.com

Science Applications International Corporation
221 Third Street, Building A
Newport, RI 02840 USA.
www.saic.com

BOTTOM CHARACTERISTICS

There were 45 bottom samples taken of 46 planned to verify the bottom types charted for H12338. Due to its proximity to large objects in a fish haven, planned bottom sample 16 was not taken. Table Appendix V-1 compares information from each sample collected to the charted bottom type within 2000 meters if available. Chart 12210 was used for comparison; this chart is the largest scale chart that covers the entire survey area. A photograph of each bottom sample is included following the table. It is recommended that the bottom types charted be updated where necessary based on the information collected during the latest survey.

Table Appendix V-1. H12338 Bottom Characteristics

JD	Sample Number	Bottom Sample Position (NAD83)		Observed Bottom Type	CUBE Depth of Bottom Sample (m)	Depth Uncertainty (m)	Charted Bottom Type Chart # 12210
		Latitude (N)	Longitude (W)				
229	H12338-BS-01	37° 34’ 41.74”	075° 26’ 24.52”	mbrS Sh	16.508	0.280	M
229	H12338-BS-02	37° 34’ 41.68”	075° 25’ 04.62”	fnebrS	21.922	0.280	
229	H12338-BS-03	37° 34’ 39.92”	075° 27’ 45.35”	mbrS Sh	16.699	0.280	M
229	H12338-BS-04	37° 34’ 41.79”	075° 29’ 07.61”	fnebrS brkSh	11.382	0.280	S Sh
229	H12338-BS-05	37° 34’ 42.38”	075° 30’ 30.52”	fnebrS brkSh	13.474	0.280	
229	H12338-BS-06	37° 34’ 42.16”	075° 31’ 48.87”	fnegyS Si	13.836	0.280	
229	H12338-BS-07	37° 34’ 39.93”	075° 33’ 08.52”	fnebrS brkSh	10.204	0.280	S M
230	H12338-BS-08	37° 33’ 42.29”	075° 33’ 55.25”	brM	13.485	0.280	S M
229	H12338-BS-09	37° 33’ 46.31”	075° 32’ 32.33”	brkSh fnebrS	13.000	0.342	
229	H12338-BS-10	37° 33’ 45.76”	075° 31’ 10.93”	fnebrS Sh	15.243	0.280	S
229	H12338-BS-11	37° 33’ 46.12”	075° 29’ 48.88”	fnebrS M	15.409	0.280	S
229	H12338-BS-12	37° 33’ 43.39”	075° 28’ 27.37”	fnebrS brkSh	15.145	0.280	S
229	H12338-BS-13	37° 33’ 45.72”	075° 27’ 04.93”	fnebrS Sh	19.483	0.280	S
229	H12338-BS-14	37° 33’ 45.40”	075° 25’ 44.03”	brSi fneS	22.135	0.280	
229	H12338-BS-15	37° 32’ 50.16”	075° 25’ 04.27”	fnebrS	16.854	0.280	

JD	Sample Number	Bottom Sample Position (NAD83)		Observed Bottom Type	CUBE Depth of Bottom Sample (m)	Depth Uncertainty (m)	Charted Bottom Type Chart # 12210
		Latitude (N)	Longitude (W)				
229	H12338-BS-17	37° 32’ 50.26”	075° 27’ 47.15”	mbrS Sh	17.849	0.280	S
229	H12338-BS-18	37° 32’ 51.69”	075° 29’ 08.34”	fnebrS brkSh	13.197	0.280	S
229	H12338-BS-19	37° 32’ 49.01”	075° 30’ 28.15”	fnebrS brkSh	13.657	0.300	S Si
229	H12338-BS-20	37° 32’ 49.02”	075° 31’ 50.39”	fnebrS M brkSh	16.183	0.280	S Si
229	H12338-BS-21	37° 32’ 50.20”	075° 33’ 16.20”	brkSh crsbrS	13.074	0.275	
230	H12338-BS-22	37° 32’ 50.17”	075° 34’ 34.74”	fnebrS M	11.531	0.280	S Si
230	H12338-BS-23	37° 31’ 54.21”	075° 35’ 10.59”	fnebrS brkSh	9.334	0.280	S
230	H12338-BS-24	37° 31’ 52.00”	075° 33’ 51.37”	bkM fneS	12.941	0.280	S
229	H12338-BS-25	37° 31’ 50.55”	075° 32’ 30.08”	mbrS brkSh	14.723	0.280	S
229	H12338-BS-26	37° 31’ 51.70”	075° 31’ 08.83”	fnebrS Sh	10.134	0.280	S
229	H12338-BS-27	37° 31’ 52.43”	075° 29’ 47.37”	fnebrS brkSh	10.813	0.280	S
229	H12338-BS-28	37° 31’ 51.74”	075° 28’ 25.99”	fnebrS brkSh	12.341	0.280	S
229	H12338-BS-29	37° 31’ 53.75”	075° 27’ 05.36”	mbrS brkSh	15.768	0.280	S
229	H12338-BS-30	37° 31’ 54.94”	075° 25’ 40.84”	fnebrS brkSh	16.716	0.280	S
229	H12338-BS-31	37° 30’ 59.27”	075° 26’ 22.30”	fnebrS brkSh	21.610	0.280	S
229	H12338-BS-32	37° 30’ 58.42”	075° 27’ 43.80”	brkSh mbrS	15.993	0.280	S
229	H12338-BS-33	37° 30’ 56.62”	075° 29’ 07.06”	fnebrS brkSh	13.175	0.280	S
229	H12338-BS-34	37° 30’ 55.84”	075° 30’ 24.66”	fnebrS	10.908	0.280	S
229	H12338-BS-35	37° 30’ 56.89”	075° 31’ 50.13”	fnebrS	12.933	0.280	S
229	H12338-BS-36	37° 30’ 55.80”	075° 33’ 10.47”	fnebrS brkSh	16.248	0.280	S
230	H12338-BS-37	37° 30’ 55.89”	075° 34’ 32.07”	mbrS brkSh	9.470	0.280	S
230	H12338-BS-38	37° 30’ 01.75”	075° 35’ 12.12”	fnebrS brkSh	10.958	0.280	S

JD	Sample Number	Bottom Sample Position (NAD83)		Observed Bottom Type	CUBE Depth of Bottom Sample (m)	Depth Uncertainty (m)	Charted Bottom Type Chart # 12210
		Latitude (N)	Longitude (W)				
229	H12338-BS-39	37° 30’ 00.96”	075° 33’ 53.48”	fnebrS brkSh	8.590	0.270	S
229	H12338-BS-40	37° 29’ 59.45”	075° 32’ 29.79”	fnebrS	14.621	0.280	S
229	H12338-BS-41	37° 29’ 57.84”	075° 31’ 07.89”	fnebrS Sh	15.122	0.280	S
229	H12338-BS-42	37° 29’ 59.77”	075° 29’ 48.24”	fnebrS	12.537	0.280	S
229	H12338-BS-43	37° 29’ 58.94”	075° 28’ 25.77”	fnebrS brkSh	13.506	0.280	S
229	H12338-BS-44	37° 30’ 01.03”	075° 27’ 05.80”	fnebrS brkSh	21.295	0.280	S
230	H12338-BS-45	37° 30’ 55.58”	075° 35’ 53.13”	mbrS brkSh	8.892	0.280	S
230	H12338-BS-46	37° 30’ 02.05”	075° 36’ 33.71”	fnebrS brkSh	8.432	0.270	S

APPENDIX III

SURVEY FEATURES REPORT

Appendix III - Dangers to Navigation

Registry Number: H12338
State: Virginia
Locality: Atlantic Ocean
Sub-locality: 6 NM East of Parramore Island
Project Number: OPR-D302-KR-11
Survey Dates: 22 Jul 2011 - 3 Oct 2011

Charts Affected

Number	Edition	Date	Scale (RNC)	RNC Correction(s)*
12210	38th	05/01/2008	1:80,000 (12210_1)	USCG LNM: 4/17/2012 (5/1/2012) NGA NTM: None (5/5/2012)
12200	49th	06/01/2007	1:419,706 (12200_1)	[L]NTM: ?
13003	49th	04/01/2007	1:1,200,000 (13003_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	DTON #1 - 17ft WRECK	Wreck	5.37 m	37° 30' 07.6" N	075° 37' 30.4" W	---
1.2	DTON #2 - 42ft OBSTRN	Obstruction	13.02 m	37° 29' 53.0" N	075° 31' 27.4" W	---

1 - Dangers To Navigation

1.1) DTON #1 - 17ft WRECK

DANGER TO NAVIGATION

Survey Summary

Survey Position:	37° 30' 07.6" N, 075° 37' 30.4" W
Least Depth:	5.37 m (= 17.62 ft = 2.936 fm = 2 fm 5.62 ft)
TPU (±1.96σ):	**THU (TPEh)** [None] ; **TVU (TPEv)** [None]
Timestamp:	2011-276.00:00:00.000 (10/03/2011)
Dataset:	H12338_Feature_Import.000
FOID:	US 0000099819 00001(0226000185EB0001)
Charts Affected:	12210_1, 12200_1, 13003_1

Remarks:

Wreck is lying upside down oriented approximately 140 degrees and is approximately 22m by 7m with a height of 1.82m. There is 0.3 to 0.4 meters of scour around the edges.

Feature Correlation

Source	Feature	Range	Azimuth	Status
H12338_Feature_Import.000	US 0000099819 00001	0.00	000.0	Primary

Hydrographer Recommendations

DTON 1. Update depth.

Cartographically-Rounded Depth (Affected Charts):

17ft (12210_1)

2 ¾fm (12200_1, 13003_1)

S-57 Data

Geo object 1:	Wreck (WRECKS)
Attributes:	CATWRK - 2:dangerous wreck
	QUASOU - 6:least depth known
	SORDAT - 20111003
	SORIND - US,US,graph,H12338

VALSOU - 5.370 m

WATLEV - 3:always under water/submerged

Office Notes

SAR: Feature located at survey position by 200% SSS and ODMB. Feature reported as DTON and applied to chart as 18ft Wreck based on predicted tides. Updated feature least depth is 17ft based on verified tides.

Compile: Delete charted 18ft wreck. Add 17ft wreck at survey position.

Feature Images

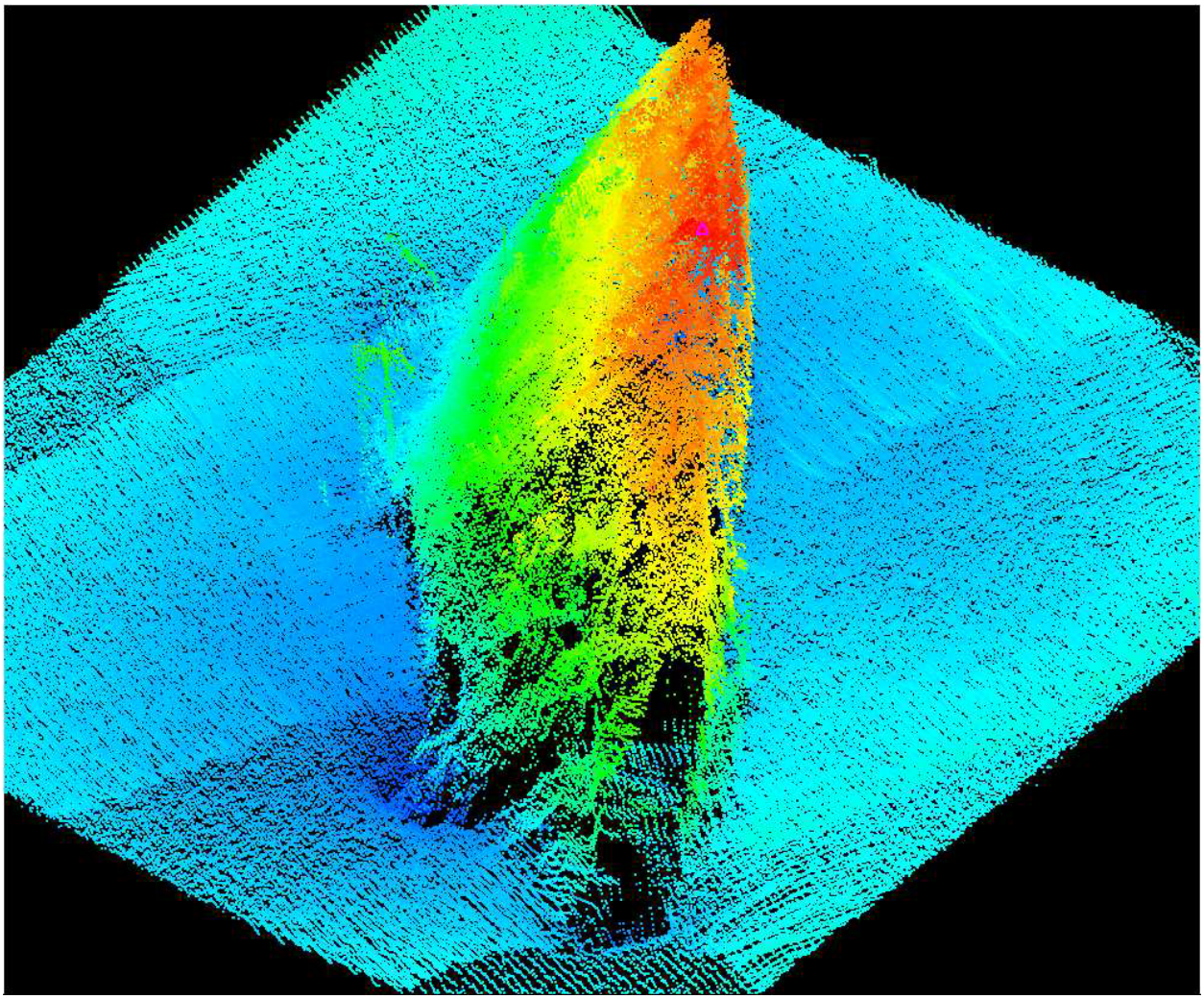

Figure 1.1.1

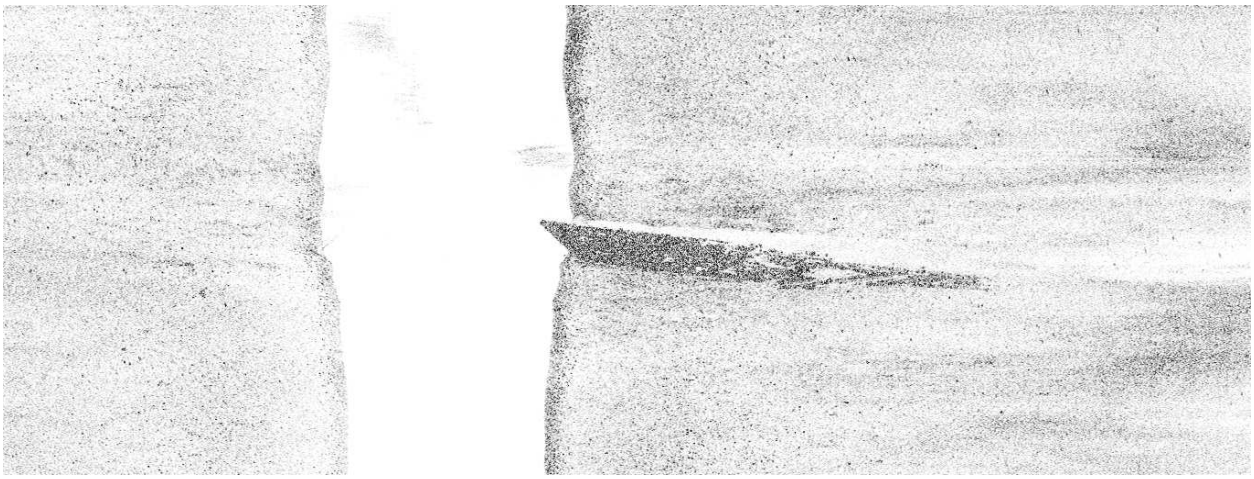

Figure 1.1.2

1.2) DTON #2 - 42ft OBSTRN

DANGER TO NAVIGATION

Survey Summary

Survey Position:	37° 29' 53.0" N, 075° 31' 27.4" W
Least Depth:	13.02 m (= 42.73 ft = 7.122 fm = 7 fm 0.73 ft)
TPU (±1.96σ):	**THU (TPEh)** [None] ; **TVU (TPEv)** [None]
Timestamp:	2011-276.00:00:00.000 (10/03/2011)
Dataset:	H12338_Feature_Import.000
FOID:	US 0000099766 00001(0226000185B60001)
Charts Affected:	12210_1, 12200_1, 13003_1

Remarks:

Five objects in an area approximately 14 by 5 meters. The shoalest object is near the center and is rectangular in shape approximately 1.2 by 1.3 meters with a height of 3.5 meters. There is approximately 0.6 meters of scour around the objects.

Feature Correlation

Source	Feature	Range	Azimuth	Status
H12338_Feature_Import.000	US 0000099766 00001	0.00	000.0	Primary

Hydrographer Recommendations

DTON 2. Update Depth.

Cartographically-Rounded Depth (Affected Charts):

42ft (12210_1)

7fm (12200_1, 13003_1)

S-57 Data

Geo object 1:	Obstruction (OBSTRN)
Attributes:	QUASOU - 6:least depth known
	SORDAT - 20111003
	SORIND - US,US,graph,H12338
	VALSOU - 13.024 m

WATLEV - 3:always under water/submerged

Office Notes

SAR: Feature located at survey position by 200% SSS and ODMB. Feature reported as DTON and applied to chart as 43ft Obstruction based on predicted tides. Updated feature least depth is 42ft based on verified tides.

Compile: Delete charted 43ft obstruction. Add 42ft obstruction at survey position.

Feature Images

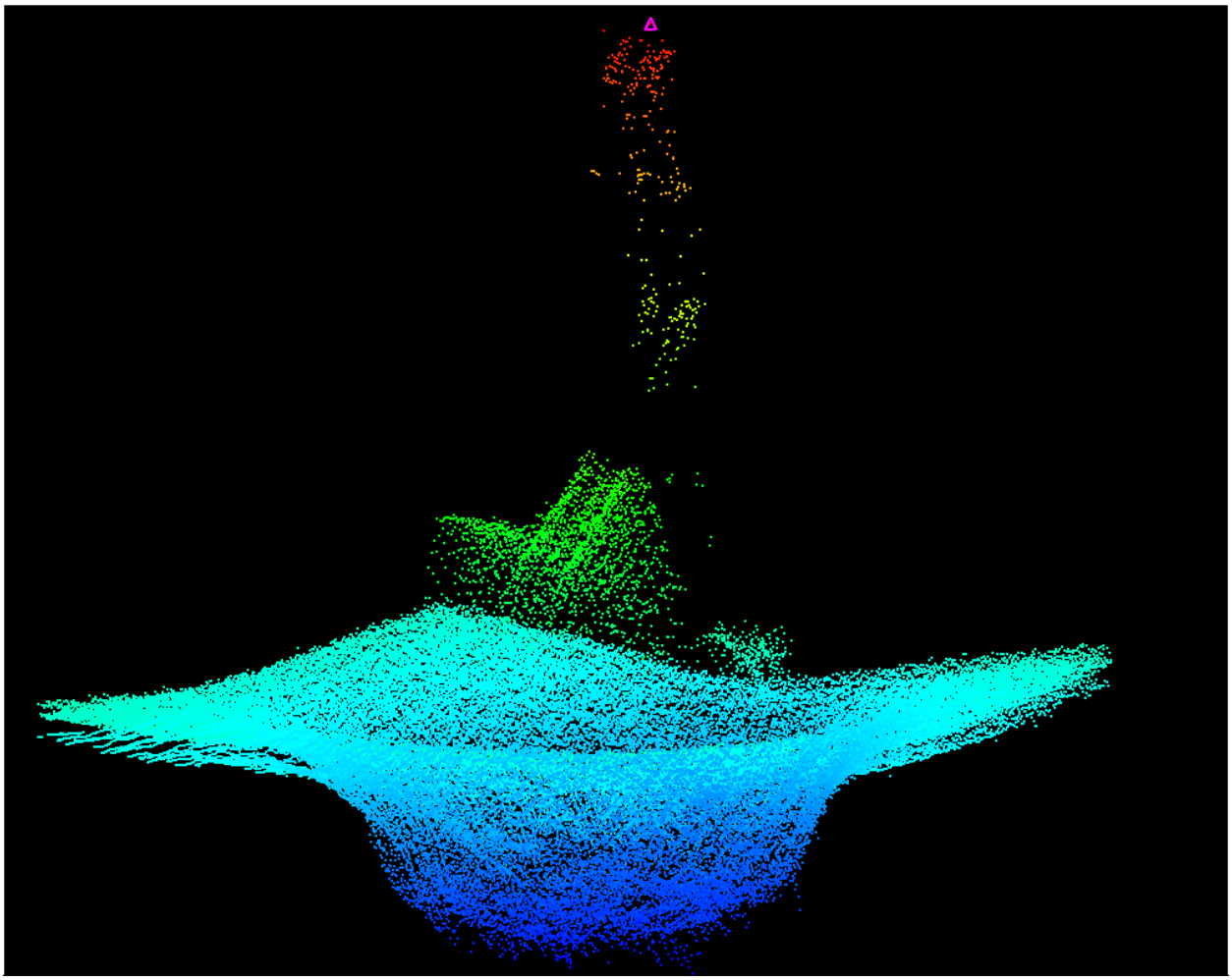

Figure 1.2.1

Figure 1.2.2

Appendix III - AWOIS

Registry Number: H12338
State: Virginia
Locality: Atlantic Ocean
Sub-locality: 6 NM East of Parramore Island
Project Number: OPR-D302-KR-11
Survey Dates: 22 Jul 2011 - 3 Oct 2011

Charts Affected

Number	Edition	Date	Scale (RNC)	RNC Correction(s)*
12210	38th	05/01/2008	1:80,000 (12210_1)	USCG LNM: 4/17/2012 (5/1/2012) NGA NTM: None (5/5/2012)
12200	49th	06/01/2007	1:419,706 (12200_1)	[L]NTM: ?
13003	49th	04/01/2007	1:1,200,000 (13003_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	AWOIS #7189 - Retain Obstruction	GP	[None]	37° 29' 29.2" N	075° 34' 57.2" W	7189
1.2	AWOIS #7190 - Delete Obstruction	GP	[None]	37° 31' 58.7" N	075° 26' 21.4" W	7190
1.3	AWOIS #2783 - Delete Wreck	GP	[None]	37° 32' 00.6" N	075° 26' 02.5" W	2783

1 - DR_AWOIS

1.1) AWOIS #7189 - Retain Obstruction

Primary Feature for AWOIS Item #7189

Search Position: 37° 29' 30.5" N, 075° 34' 58.7" W
Historical Depth: [None]
Search Radius: 200
Search Technique: [None]
Technique Notes: [None]

History Notes:

HISTORY
H10034/82--OPR-D103-MI-82; SUBM OBSTRUCTION, LAT 37-29-30N, LONG 75-35-00W. REPORTED BY LOCAL MARINERS (EARL PARKER AND JIM WALLACE, WACHAPREAQUE VA) TO BE A SUNKEN BARGE. NO INVESTIGATION CONDUCTED. (ENTERED 2/89 SRB)

Survey Summary

Survey Position: 37° 29' 29.2" N, 075° 34' 57.2" W
Least Depth: [None]
TPU (±1.96σ): **THU (TPEh)** [None] ; **TVU (TPEv)** [None]
Timestamp: 1981-001.00:00:00.000 (01/01/1981)
Dataset: H12338_Feature_Import_02.000
FOID: US 0000173403 00001(02260002A55B0001)
Charts Affected: 12210_1, 12200_1, 13003_1

Remarks:

Feature Correlation

Source	Feature	Range	Azimuth	Status
H12338_Feature_Import_02.000	US 0000173403 00001	0.00	000.0	Primary
AWOIS_EXPORT	AWOIS # 7189	56.34	136.7	Secondary (grouped)

Hydrographer Recommendations

S-57 Data

Geo object 1: Cartographic symbol ($CSYMB)

Attributes: NINFOM - Retain undisproved obstruction

NTXTDS - Chart 12210, ED38, NTM 20120630

Office Notes

Compile: Retain undisproved obstruction.

1.2) AWOIS #7190 - Delete Obstruction

Primary Feature for AWOIS Item #7190

Search Position: 37° 32' 02.2" N, 075° 26' 22.4" W
Historical Depth: [None]
Search Radius: 200
Search Technique: [None]
Technique Notes: [None]

History Notes:

HISTORY
H10034/82--OPR-D103-MI-82; 58FT OBSTRUCTION, LOCATED IN LAT 37-32-01.69N, LONG 75-26-23.73W. OBSTRUCTION IS A 58FT ECHO SOUNDER DEPTH OBTAINED WHILE CONDUCTING BASIC HYDRO AND WAS NOT FURTHER INVESTIGATED. DESCRIBED AS A WK IN SDG VOLUMES. (ENTERED 2/89 SRB)

Survey Summary

Survey Position: 37° 31' 58.7" N, 075° 26' 21.4" W
Least Depth: [None]
TPU (±1.96σ): **THU (TPEh)** [None] ; **TVU (TPEv)** [None]
Timestamp: 1981-001.00:00:00.000 (01/01/1981)
Dataset: H12338_Feature_Import_03.000
FOID: US 0000265696 00001(022600040DE00001)
Charts Affected: 12210_1, 12200_1, 13003_1

Remarks:

[None]

Feature Correlation

Source	Feature	Range	Azimuth	Status
H12338_Feature_Import_03.000	US 0000265696 00001	0.00	000.0	Primary
AWOIS_EXPORT	AWOIS # 7190	109.38	166.1	Secondary (grouped)

Hydrographer Recommendations

[None]

S-57 Data

Geo object 1:	Cartographic symbol ($CSYMB)
Attributes:	NINFOM - Delete obstruction
	NTXTDS - Chart 12210, ED38, NTM 20120630

Office Notes

SAR: AWOIS item identified as wreck by 200% SSS and ODMB. Feature is positioned completely inside of charted Fish Haven. Least depth of feature is 57ft, which is deeper than the Fish Haven Authorized Minimum of 30ft.

Compile: AWOIS item is located inside charted Fish Haven. Delete charted obstruction.

1.3) AWOIS #2783 - Delete Wreck

Primary Feature for AWOIS Item #2783

Search Position: 37° 32' 00.5" N, 075° 25' 58.7" W
Historical Depth: 12.19 m
Search Radius: 200
Search Technique: [None]
Technique Notes: [None]

History Notes:

HISTORY
NM16/42--BUOY ESTABLISHED 4/9/42 12 FT ABOVE WATER
FE70/48WD--HUNG 41FT, CLEARED 40FT IN LAT 37-32-00N, LONG 75-26-OOW.
H10034/82--OPR-D103-MI-82; NOT INVESTIGATED, CARRIED FORWARD FROM FE30/48WD.
RETAIN AS CHARTED.(UP 2/89 SRB)

DESCRIPTION
27 NO.262; TUG, SUNK 3/31/42; THE ALLEGHENEY AND BARNEGAT BARGE SUNK SAME
DATE 1/2 MILE FROM MENOMINEE

Survey Summary

Survey Position: 37° 32' 00.6" N, 075° 26' 02.5" W
Least Depth: [None]
TPU (±1.96σ): **THU (TPEh)** [None] ; **TVU (TPEv)** [None]
Timestamp: 1981-001.00:00:00.000 (01/01/1981)
Dataset: H12338_Feature_Import_03.000
FOID: US 0000265697 00001(022600040DE10001)
Charts Affected: 12210_1, 12200_1, 13003_1

Remarks:

[None]

Feature Correlation

Source	Feature	Range	Azimuth	Status
H12338_Feature_Import_03.000	US 0000265697 00001	0.00	000.0	Primary

AWOIS_EXPORT	AWOIS # 2783	93.07	271.5	Secondary (grouped)

Hydrographer Recommendations

[None]

S-57 Data

Geo object 1: Cartographic symbol ($CSYMB)

Attributes: NINFOM - Delete wreck

NTXTDS - Chart 12210, ED38, NTM 20120630

Office Notes

SAR: AWOIS item identified as wreck by 200% SSS and ODMB. Feature is positioned completely inside of charted Fish Haven. Least depth of feature is 46ft, which is deeper than the Fish Haven Authorized Minimum of 30ft.

Compile: AWOIS item is located inside charted Fish Haven. Delete charted wreck.

Appendix III - Wrecks

Registry Number: H12338
State: Virginia
Locality: Atlantic Ocean
Sub-locality: 6 NM East of Parramore Island
Project Number: OPR-D302-KR-11
Survey Dates: 22 Jul 2011 - 3 Oct 2011

Charts Affected

Number	Edition	Date	Scale (RNC)	RNC Correction(s)*
12210	38th	05/01/2008	1:80,000 (12210_1)	USCG LNM: 4/17/2012 (5/1/2012) NGA NTM: None (5/5/2012)
12200	49th	06/01/2007	1:419,706 (12200_1)	[L]NTM: ?
13003	49th	04/01/2007	1:1,200,000 (13003_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	35ft WRECK	Wreck	10.60 m	37° 32' 26.0" N	075° 34' 05.8" W	---
1.2	59ft WRECK	Wreck	18.02 m	37° 31' 55.6" N	075° 26' 31.8" W	---
1.3	59ft WRECK	Wreck	18.10 m	37° 31' 50.7" N	075° 25' 37.2" W	2783

1 - WRECKS

1.1) 35ft WRECK

Survey Summary

Survey Position:	37° 32' 26.0" N, 075° 34' 05.8" W
Least Depth:	10.60 m (= 34.78 ft = 5.797 fm = 5 fm 4.78 ft)
TPU (±1.96σ):	**THU (TPEh)** [None] ; **TVU (TPEv)** [None]
Timestamp:	2011-276.00:00:00.000 (10/03/2011)
Dataset:	H12338_Feature_Import.000
FOID:	US 0000100070 00001(0226000186E60001)
Charts Affected:	12210_1, 12200_1, 13003_1

Remarks:

Wreck measuring approximately 9 by 3 meters with a height of 1.34 meters high orientated 033 degrees. There is approximately 0.3 meters of scour around the north and west sides.

Feature Correlation

Source	Feature	Range	Azimuth	Status
H12338_Feature_Import.000	US 0000100070 00001	0.00	000.0	Primary

Hydrographer Recommendations

Chart wreck.

Cartographically-Rounded Depth (Affected Charts):

35ft (12210_1)

5 ¾fm (12200_1, 13003_1)

S-57 Data

Geo object 1:	Wreck (WRECKS)
Attributes:	CATWRK - 2:dangerous wreck
	QUASOU - 6:least depth known
	VALSOU - 10.602 m
	WATLEV - 3:always under water/submerged

Office Notes

SAR: Feature located at survey position by 200% SSS and ODMB.

Compile: Add wreck at survey position.

Feature Images

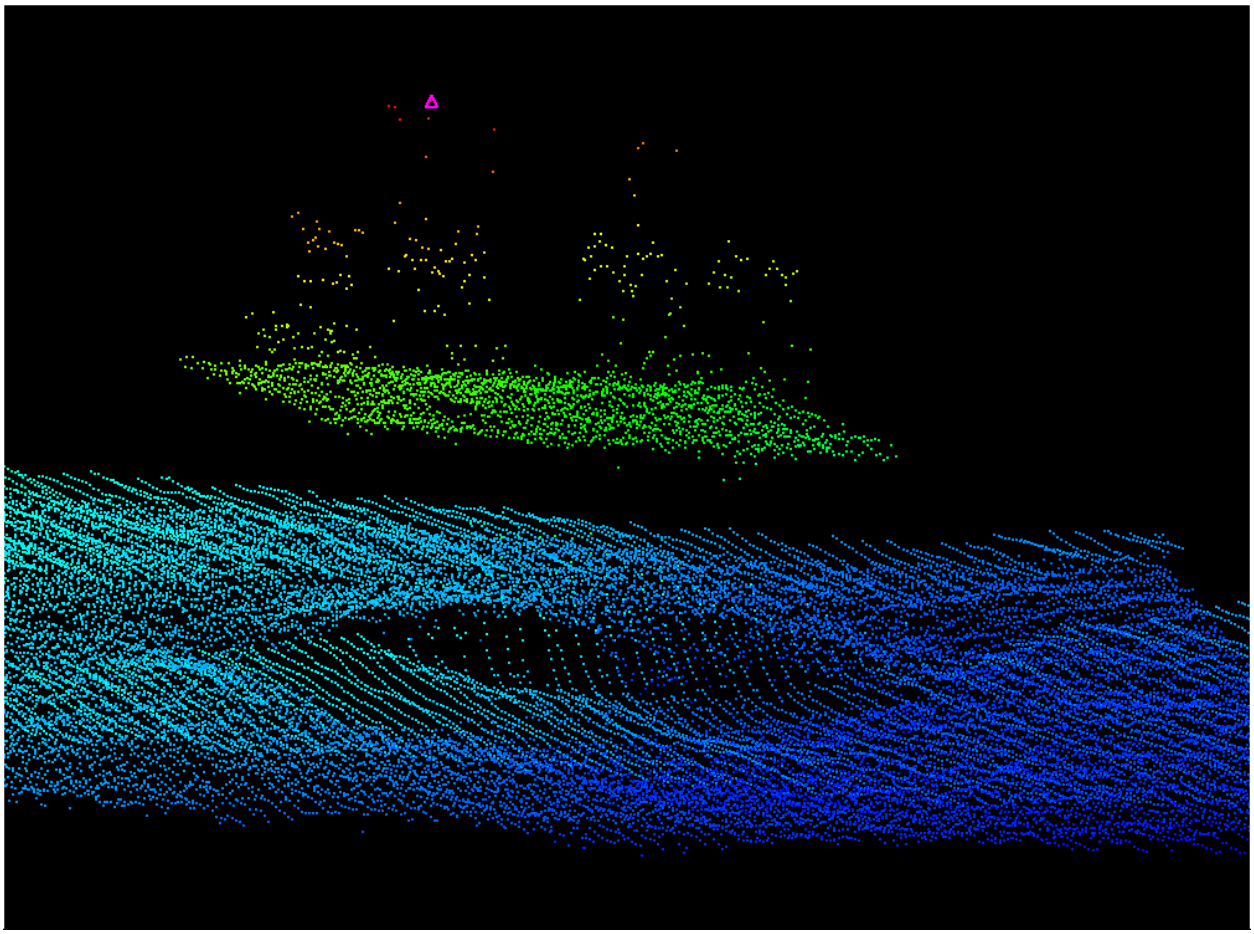

Figure 1.1.1

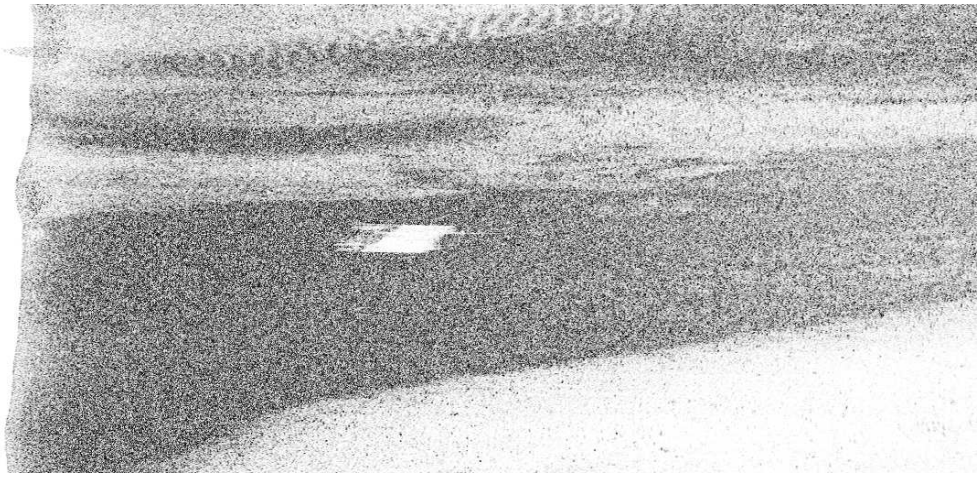

Figure 1.1.2

1.2) 59ft WRECK

Survey Summary

Survey Position:	37° 31' 55.6" N, 075° 26' 31.8" W
Least Depth:	18.02 m (= 59.12 ft = 9.854 fm = 9 fm 5.12 ft)
TPU (±1.96σ):	**THU (TPEh)** [None] ; **TVU (TPEv)** [None]
Timestamp:	2011-276.00:00:00.000 (10/03/2011)
Dataset:	H12338_Feature_Import.000
FOID:	US 0000099825 00001(0226000185F10001)
Charts Affected:	12210_1, 12200_1, 13003_1

Remarks:

Southern half of a large wreck. Wreck is approximately 58.5 by 19.4 meters with a height of 5.9 meters and oriented 035 degrees. There is approximately 5.0 meters of scour in the northeast part.

Feature Correlation

Source	Feature	Range	Azimuth	Status
H12338_Feature_Import.000	US 0000099825 00001	0.00	000.0	Primary

Hydrographer Recommendations

Cartographically-Rounded Depth (Affected Charts):

59ft (12210_1)

9 ¾fm (12200_1, 13003_1)

S-57 Data

Geo object 1:	Wreck (WRECKS)
Attributes:	CATWRK - 2:dangerous wreck
	QUASOU - 6:least depth known
	SORDAT - 20111003
	SORIND - US,US,graph,H12338
	VALSOU - 18.021 m
	WATLEV - 3:always under water/submerged

Office Notes

SAR: Feature located at survey position by 200% SSS and ODMB. Feature is the southern half of a large wreck. Feature interpreted as being not corrlelated to AWOIS 7190.

Compile: Add 59ft wreck at survey position.

Feature Images

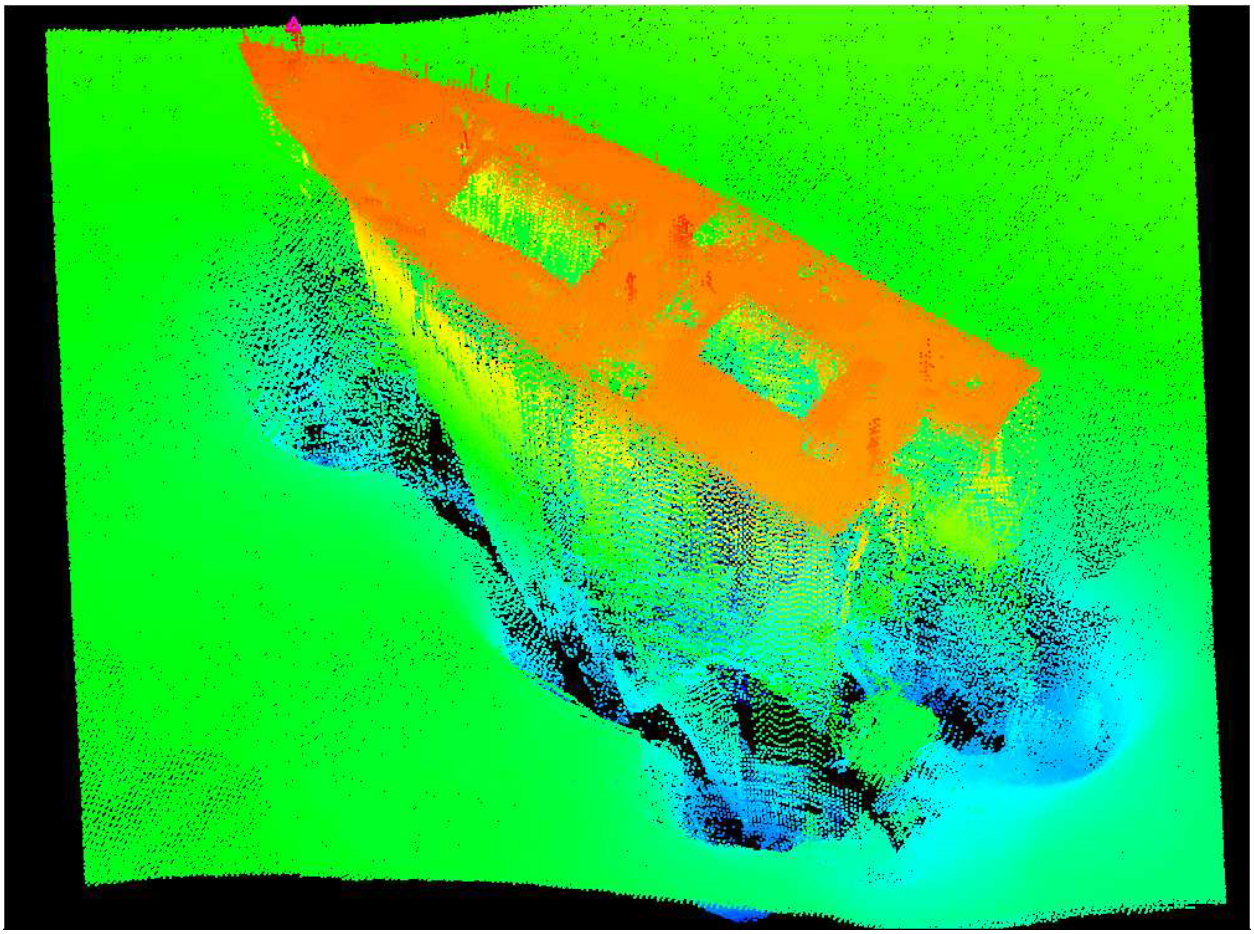

Figure 1.2.1

Figure 1.2.2

1.3) 59ft WRECK

Primary Feature for AWOIS Item #2783

Search Position:	37° 32' 00.5" N, 075° 25' 58.7" W
Historical Depth:	12.19 m
Search Radius:	200
Search Technique:	[None]
Technique Notes:	[None]

History Notes:

HISTORY

NM16/42--BUOY ESTABLISHED 4/9/42 12 FT ABOVE WATER

FE70/48WD--HUNG 41FT, CLEARED 40FT IN LAT 37-32-00N, LONG 75-26-OOW.

H10034/82--OPR-D103-MI-82; NOT INVESTIGATED, CARRIED FORWARD FROM FE30/48WD.

RETAIN AS CHARTED.(UP 2/89 SRB)

DESCRIPTION

27 NO.262; TUG, SUNK 3/31/42; THE ALLEGHENEY AND BARNEGAT BARGE SUNK SAME

DATE 1/2 MILE FROM MENOMINEE

Survey Summary

Survey Position:	37° 31' 50.7" N, 075° 25' 37.2" W
Least Depth:	18.10 m (= 59.39 ft = 9.898 fm = 9 fm 5.39 ft)
TPU (±1.96σ):	**THU (TPEh)** [None] ; **TVU (TPEv)** [None]
Timestamp:	2011-276.00:00:00.000 (10/03/2011)
Dataset:	H12338_Feature_Import.000
FOID:	US 0000099767 00001(0226000185B70001)
Charts Affected:	12210_1, 12200_1, 13003_1

Remarks:

Feature Correlation

Source	Feature	Range	Azimuth	Status
H12338_Feature_Import.000	US 0000099767 00001	0.00	000.0	Primary
AWOIS_EXPORT	AWOIS # 2783	604.76	120.1	Secondary (grouped)

AWOIS_EXPORT2	AWOIS # 987	1533.73	243.9	Secondary (grouped)

Hydrographer Recommendations

Cartographically-Rounded Depth (Affected Charts):

59ft (12210_1)

9 ¾fm (12200_1, 13003_1)

S-57 Data

Geo object 1: Wreck (WRECKS)

Attributes:
CATWRK - 2:dangerous wreck
QUASOU - 6:least depth known
SORDAT - 20111003
SORIND - US,US,graph,H12338
VALSOU - 18.101 m
WATLEV - 3:always under water/submerged

Office Notes

SAR: Uncharted wreck located at survey position by 200% SSS and ODMB.

Compile: Wreck is unidentifiable but is possibly associated with AWOIS #2783 (wreck of tug "Menominee") or AWOIS #987 (wreck of barge "Alleghany"). Add 59ft wreck at survey position.

Feature Images

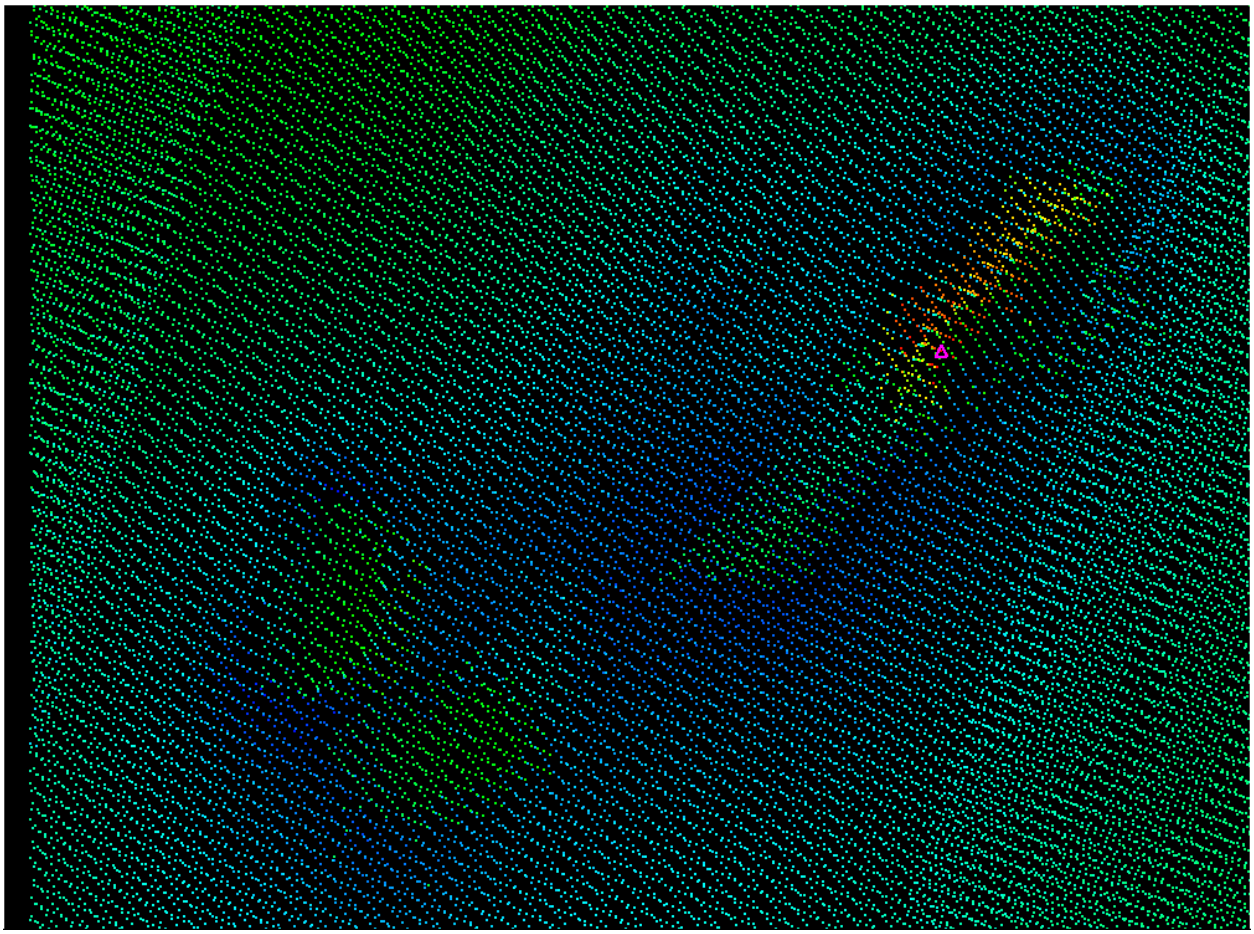

Figure 1.3.1

Figure 1.3.2

APPROVAL PAGE

H12338

Data meet or exceed current specifications as certified by the OCS survey acceptance review process. Descriptive Report and survey data except where noted are adequate to supersede prior surveys and nautical charts in the common area.

The following products will be sent to NGDC for archive

- H12338_DR_rev1.pdf
- Collection of depth varied resolution BAGS
- Processed survey data and records
- H12338_GeoImage.pdf

The survey evaluation and verification has been conducted according current OCS Specifications, and the survey has been approved for dissemination and usage of updating NOAA's suite of nautical charts.

Approved for: 

Digitally signed by Edward Owens
DN: cn=Edward Owens, o=NOAA, ou=AHB, email=Edward.Owens@noaa.gov, c=US
Date: 2012.07.31 10:17:14 -04'00'

LT Abigail Higgins, NOAA
Chief, Atlantic Hydrographic Branch