



NOAA FORM 77-28 (11-72)	U.S. DEPARTMENT OF COMMERCE NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION	REGISTRY No
<b>HYDROGRAPHIC TITLE SHEET</b>		<b>H12094</b>

<b>State</b>	Virginia	
<b>General Locality</b>	Atlantic Ocean	
<b>Sub Locality</b>	5 NM South East of Chincoteague Inlet	
<b>Scale</b>	1:20,000	
<b>Date of Survey</b>	19 August 2010 – 17 October 2010	
<b>Instructions Dated</b>	01 December 2008 and 18 June 2009	
<b>Project No.</b>	OPR-D302-SA-09	
<b>Vessel</b>	<i>M/V Atlantic Surveyor</i> D582365	
<b>Chief of Party</b>	Evan J. Robertson	
<b>Surveyed by</b>	Alex Bernier, Jediah Bishop, Dan Burgo, Gary Davis, Chuck Holloway, Colette LeBeau, Rick Nadeau, Katie Offerman, Evan Robertson, Eva Rosendale, Andrew Seaman, Deb Smith, and Bridget Williams	
<b>Soundings by Echosounder</b>	Multibeam RESON SeaBat 7125 SV	
<b>Verification by</b>	<i>Atlantic Hydrographic Branch Personnel</i>	
<b>Soundings in</b>	Meters	
<b>Soundings at</b>	MLLW	
<b>Remarks</b>	<b>Contract:</b>	DG133C-08-CQ-0003
	<b>Contractor:</b>	Science Applications International Corporation 221 Third Street, Newport, RI 02840 USA
	<b>Subcontractor:</b>	N/A
	<b>Times:</b>	All times are recorded in UTC
	<b>UTM Zone:</b>	Zone 18 North
	<b>Purpose:</b>	To provide NOAA with modern, accurate hydrographic survey data with which to update the nautical charts of the assigned area: Sheet R (H12094) in Mid-Atlantic Corridor, Coast of Virginia.

Science Applications International Corporation (SAIC) warrants only that the survey data acquired by SAIC and delivered to NOAA under Contract DG-133C-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 H12094  
Scale 1:20,000, Surveyed 2010  
*M/V Atlantic Surveyor*  
Science Applications International Corporation (SAIC)  
Evan J. Robertson, Lead Hydrographer**

**PROJECT****Project Number:** OPR-D302-SA-09**Dates of Instructions:** 01 December 2008 and 18 June 2009**Task Order#:** T002**Dates of Supplemental Instructions:** 21 May 2009, 10 July 2009, 23 September 2009, 23 February 2010, and 15 September 2010**Sheet Letter:** R**Registry Number:** H12094**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 of Virginia, 5 NM SE of Chincoteague Inlet (Figure A-1). H12094 was surveyed in accordance with the Project Instructions, OPR-D302-SA-09 (including D302KR2009\_Rev); provided in Separates III, and the *NOS Hydrographic Surveys Specifications and Deliverables*, April 2009. The line kilometers, bottom samples, item investigations, and other survey statistics are listed in Table A-1. The survey was conducted with set line spacing with multibeam sonar and towed sidescan sonar from 19 August 2010 to 17 October 2010 (Table A-2). H12094 was surveyed with 200% sidescan coverage with resulting multibeam coverage. The CUBE depth range encountered in H12094 was from 3.75 meters (12 feet, 0.27 m uncertainty) to 26.24 meters (86 feet, 0.28 m uncertainty).

Data for H12094 extends approximately 495 to 1259 meters inshore of the OPR-D302-SA-09 Task Order T002 Statement of Work boundary. The survey was extended in an effort to meet the inshore limit of the four-meter depth curve primarily in the northwest corner of the sheet, including the Chincoteague Shoals just outside of Chincoteague Inlet. The inshore limit surveyed contained depths between four and five meters. There were two areas within the Statement of Work bounds that were not fully surveyed due to depth constraints. Along Turners Lump, which is part of the Chincoteague Shoals, starting at the western edge of the survey data in 37° 49' 21.13"N 075° 22' 05.99"W, an approximately 200-meter wide swath of unsurveyed area runs along an azimuth of 80° for 1400 meters to 37° 49' 28.38"N 075° 21' 11.79"W. At this point, the unsurveyed area turns northeast and continues for an additional 1600 meters along an azimuth of 55° tapering off in 37° 49' 59.12"N 075° 20' 19.45"W. The second unsurveyed area was located along Blackfish Bank and covered an area approximately 550 meters by 80 meters, oriented along an azimuth of 58° between 37° 50' 42.96"N 075° 16' 18.02"W and 37° 50' 52.82"N 075° 15' 58.87"W. In all areas where the four-meter depth curve

was not achieved, concerns for the vessel, equipment and crew took precedence over data collection. Figure B-4 depicts the limits of multibeam coverage collected as it relates to the Statement of Work boundary represented as a blue outline, in addition to depicting the crossing analysis locations.

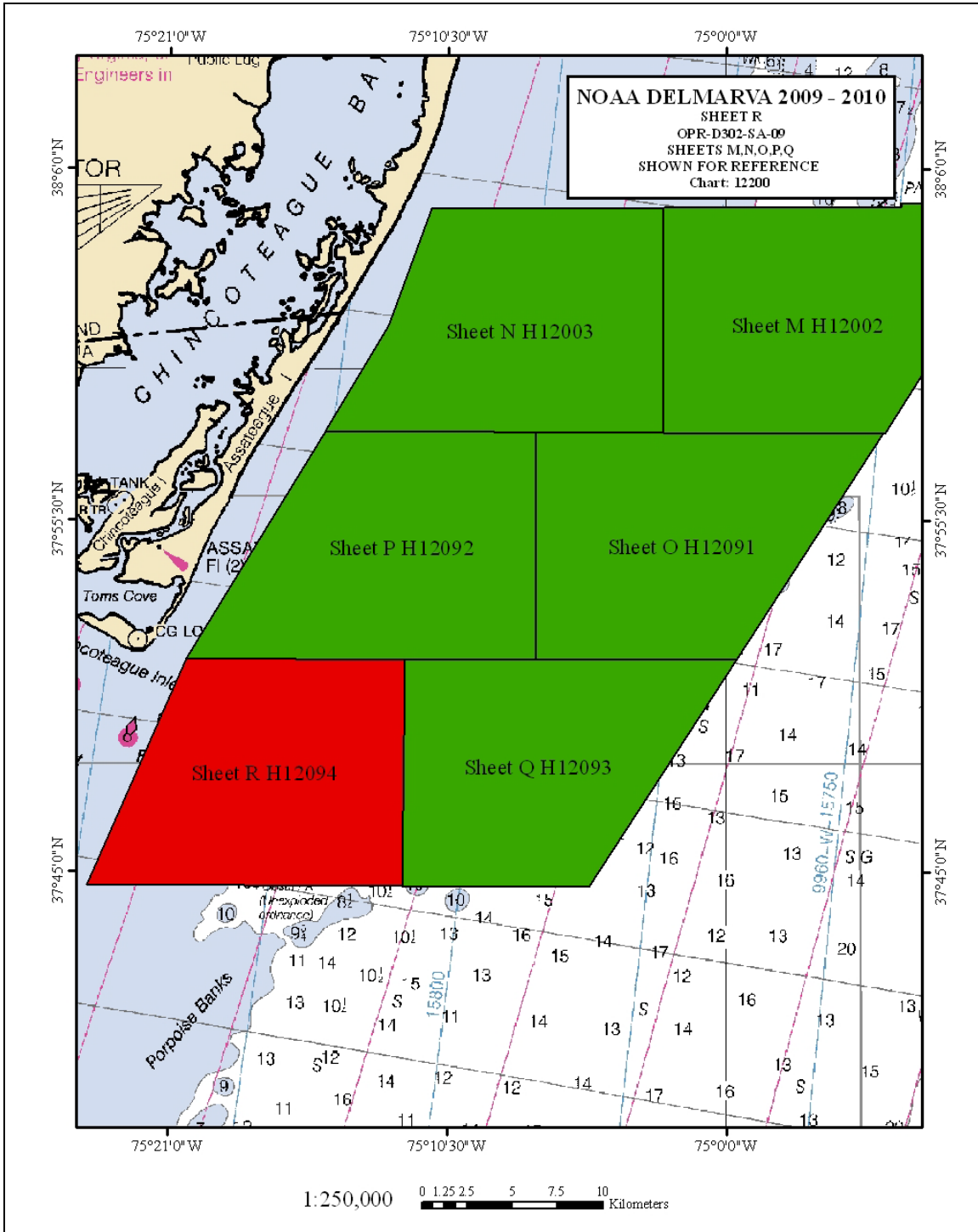


Figure A-1. H12094 Survey Bounds

**Table A-1. Hydrographic Survey Statistics**

<b>M/V Atlantic Surveyor, Sheet R H12094</b>	<b>Value</b>
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)	2697.50
LNM Cross lines from multibeam	108.47
LNM Lidar cross lines	N/A
LNM development lines non main scheme	4
LNM shoreline/nearshore investigations	N/A
Number of Bottom Samples	53
Number of items investigated that required additional time/effort in the field beyond the above operations not developed by sonar	0
Total number of square nautical miles	57

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

<b>Calendar Date</b>	<b>Julian Day</b>
19 August 2010	231
20 August 2010	232
21 August 2010	233
22 August 2010	234
23 August 2010	235
24 August 2010	236
25 August 2010	237
26 August 2010	238
27 August 2010	239
28 August 2010	240
29 August 2010	241
30 August 2010	242
31 August 2010	243
01 September 2010	244

<b>Calendar Date</b>	<b>Julian Day</b>
06 September 2010	249
07 September 2010	250
08 September 2010	251
09 September 2010	252
10 September 2010	253
11 September 2010	254
12 September 2010	255
13 September 2010	256
14 September 2010	257
08 October 2010	281
09 October 2010	282
10 October 2010	283
14 October 2010	287
17 October 2010	290

## B. DATA ACQUISITION AND PROCESSING

### B.1 EQUIPMENT

Detailed descriptions of the systems used to acquire and process these data have been included in the separate Data Acquisition and Processing Report (DAPR) for Task Order #T002 of Project OPR-D302-SA-09, delivered with Descriptive Report (DR) H12091 on 01 October 2010. The information in Table B-1 below summarizes the systems listed in the DAPR. There were no variations from the equipment configuration described in the DAPR.

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

System	Manufacturer / Model Number	Subsystem
Multibeam Sonar	RESON SeaBat 7125 SV	7P Sonar Processor
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 Systems	Brooke Ocean Technology Ltd., Moving Vessel Profiler-30	Applied Microsystems Ltd. Smart SV and Pressure Sensor
	Sea-Bird Electronics, Inc. SBE 19 CTD Profiler	

#### 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 is a list of 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, the second as a data processing office, and the third for spares storage, maintenance, and repairs.

**Table B-2. Survey Vessel Characteristics**

Vessel Name	LOA	Beam	Draft	Max Speed	Gross Tonnage	Power (Hp)	Registration Number
<i>M/V Atlantic Surveyor</i>	110'	26'	9'	14 knots	Displacement 68 Net Tons Deck Load 65 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 and surface sound speed sensor were hull-mounted port of the vessel's keel in close proximity to the POS/MV's IMU. A Brook Ocean Technology Moving Vessel Profiler 30 (MVP-30) was mounted to the starboard stern quarter. The sidescan sonar was towed along the centerline axis from an A-frame mounted on the stern of the vessel. Bottom characteristics were determined from bottom samples taken using a WILDSCO Petite Ponar grab. The location for acquiring bottom samples was determined at a set distance of 2000-meters; samples were evenly distributed throughout the H12094 survey area, in accordance with Section 7.1 of the *NOS Hydrographic Survey Specifications and Deliverables*, April 2009. Samples of the seabed were obtained, characterized, and photographed. Specific details pertaining to the position, depth, and sample characteristics of each sample were saved to a log through SAIC's Integrated Survey System (**ISS-2000**) software. Bottom characteristic results are further detailed in Section D.2.4 and Appendix V.

### **B.1.2 Major Systems**

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. 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. Triton **Isis** was used to review all sidescan data for data quality and bottom tracking. Subsequent processing and the generation of coverage mosaics were done using **SABER** on a Linux platform.

### **B.2 QUALITY CONTROL**

SAIC completes various quality control checks throughout survey operations. In addition to the Data Acquisition and Processing Report delivered 01 October 2010, Figure B-1 also depicts the processing flow SAIC utilizes.

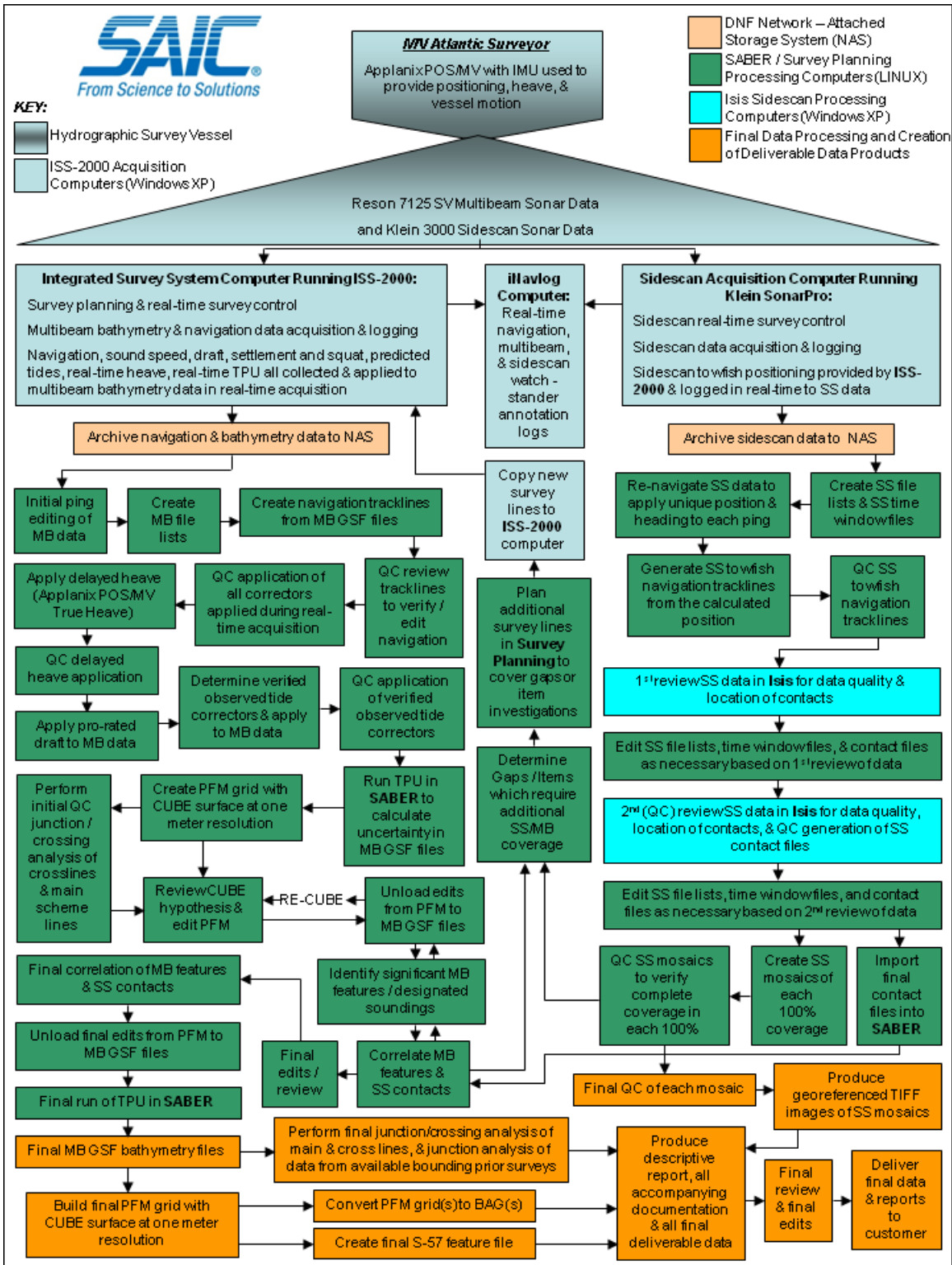


Figure B-1. SAIC Processing Flow Diagram



There were 108.47 linear nautical miles of cross lines and 2697.50 linear nautical miles of main scheme lines surveyed for H12094. This resulted in cross line mileage that represented 4.02 percent of the main scheme mileage which meets Section 5.1.4.3 of the *NOS Hydrographic Survey Specifications and Deliverables*, April 2009, requirement to achieve at least four percent for a multibeam survey. Cross lines were oriented at 114.5°/294.5° and predominately spaced 1000 meters apart, while most of the main scheme lines were oriented at 022°/202° and were spaced 40 meters apart. For safety reasons the main scheme lines in the vicinity of Chincoteague Shoals located in the northwest area of the sheet remained spaced at 40 meters apart but were run at 080°/260° and 055°/235°. Similarly a few of the main scheme survey lines in the vicinity of Blackfish Bank located in the Northern section of the survey area were oriented at 060°/240°. Comparison between cross lines and main scheme data is discussed in Section B.2.3. During main scheme operations, the sidescan sonar range scale of 50 meters provided a consistent 100-meter imagery swath.

The CUBE depth range encountered on H12094 was from 3.75 meters (12 feet, 0.27 m uncertainty) to 26.24 meters (86 feet, 0.28 m uncertainty). Based on this depth range, the CUBE surface was generated at one-meter grid node resolution as defined in Section 5.1.2.2 of the *NOS Hydrographic Survey Specifications and Deliverables*, April 2009. Over significant features that were located in depths less than 23 meters, CUBE surfaces were generated at half-meter grid node resolution as defined in Section 5.1.2.1 of the *NOS Hydrographic Survey Specifications and Deliverables*, April 2009.

A Brooke Ocean Technology Moving Vessel Profiler (MVP) with an Applied Microsystems SV&P Smart Sensor or a Seabird Electronics SBE-19 CTD was used to collect sound speed profile (SSP) data. SSP data were obtained at frequent intervals as defined in Section 5.1.3.3 of the *NOS Hydrographic Survey Specifications and Deliverables*, April 2009. Cast frequency was enough to reduce sound speed errors and varied based on several criteria:

- Observed sound speed changes from previously collected profiles
- Surface sound speed differences between the SSP sensor collocated with the RESON 7125 sonar head and the applied profile obtained from the MVP-30
- The amount of time elapsed since the last profile obtained

At the start of a survey leg or when transiting to a new area, multiple casts were taken along a survey line to identify the rate and location of sound speed changes. Subsequent casts were made based on the observed trend of sound speed changes. As changes in the SSP data occurred, cast frequency and location were modified accordingly. A total of 1011 profiles were applied to online data for H12094. Since SAIC continuously logs both multibeam and sidescan sonar data; the designation of “online data” refers to data which is used for sidescan coverage and bathymetry used for generating the CUBE surface. For information regarding the start and end of online data, please reference the “H12094\_Sidescan\_Review\_Log” and “Watchstander\_Logs” located in Separates I.

Confidence checks of the sound speed profile casts were conducted periodically (6 to 13 survey days) by comparing at least two consecutive casts taken with different SV&P Smart Sensors or with a SV&P Smart Sensor and a Seabird SBE-19 CTD. Nine confidence checks were conducted during H12094, the details can be found in Separates II within file "H12094\_Atlantic\_Surveyor\_Comparison\_Cast\_Log".

Sound speed profiles were obtained for four different survey purposes. These purposes were applying sound speed corrections to online multibeam data, applying sound speed corrections to the offline data of the last multibeam file of a leg for uncertainty computations, applying sound speed corrections to files used for multibeam confidence checks (lead lines), and comparing profiles from at least two sensors for sensor confidence checks. The "H12094\_Atlantic\_Surveyor\_Sound\_Speed\_Profile\_Log", a spreadsheet located in Separates II, is a cumulative spreadsheet detailing each cast associated with H12094. This log is separated by the purpose of the applied cast, with individual tabs for "Used\_for\_MB" (online Multibeam), "Used\_for\_Closing", "Used\_for\_Lead\_Line", and "Used\_for\_Comparison". Additionally in a separate folder within \*Separates II, Caris\_SSP, there are four .svp files. These four files contain concatenated SSP data that has been formatted for use in Caris. The Caris SSP files are designated based on the purpose of the cast and their filenames match the tabs within the sound speed profile log. Sound speed files are delivered with the H12094 delivery in the "H12094\_SSP\_Data" folder. The sound speed files are broken out into sub-folders which correspond to the purpose of that applied cast.

Static draft measurements were taken on each side of the vessel at each port call, both prior to departure and upon arrival. These observed static draft measurements were used to compute and apply a prorated daily static draft during each survey leg to account for small changes in draft as a result of fuel and water consumption. Static draft measurements are presented in "H12094\_Daily\_Drafts" located in \*Separates I. A dynamic draft look-up table was constructed from settlement and squat measurements determined during the pre-survey Sea Acceptance Trials, detailed in the \*DAPR for this project delivered 01 October 2010. The dynamic draft look-up table was used in conjunction with recorded input from shaft RPM (revolutions per minute) counters to calculate and apply a dynamic draft during data collection.

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. Positioning confidence data for H12094 are presented in "H12094\_Daily\_Positioning\_Confidence\_Checks" located in Separates I.

All multibeam files have delayed heave, identified as True Heave 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 POS/MV True Heave file. When delayed heave was not available the real-time heave was used. All cases where delayed

heave were not applied were investigated and the loss of delayed heave application had minimal or no effect on the data. Delayed heave files are included with the H12094 delivery, under the folder "H12094\_Delayed\_Heave\_Files".

Multibeam confidence checks were conducted during port calls (approximately every 10-12 survey days) by performing lead line measurements. Lead line measurements were taken on both port and starboard sides of the vessel in line with the multibeam transducer. Depth measurements obtained with the lead line were compared to collocated depth measurements obtained by the multibeam sonar at the same time. A complete listing of all lead line measurements taken and their comparison to the multibeam data can be found in the "H12094\_Atlantic\_Surveyor\_Lead\_Line\_Comparison" spreadsheet located in Separates I. Of the eight lead lines performed, there was a mean difference of less than 0.056 meters with a standard deviation of sets less than 0.013. Multibeam files used for sonar confidence checks are located in a sub-folder within the multibeam data folder named "Used\_for\_Lead\_Line".

As discussed in the DAPR, sidescan data are collected and maintained in the eXtended Triton Format (XTF) and 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 calculated sidescan towfish position based on 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 of the *NOS Hydrographic Survey Specifications and Deliverables*, April 2009. 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 "H12094\_Sidescan\_Review\_Log" located in Separates I.

### **B.2.1 Survey Systems 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*). The terminology Total Propagated Error (TPE) has been replaced by Total Propagated Uncertainty (TPU). This was adopted by the International Hydrographic Organization in Special Publication No. 44, *IHO Standards for Hydrographic Surveys, 5<sup>th</sup> Edition, February 2008*. The fidelity of any uncertainty model is coupled to the applicability of the equations that are used to estimate each of the components that contribute to the overall uncertainty that is inherent in each sounding. SAIC's approach to quantifying the TPU is to decompose the cumulative uncertainty for each sounding into its individual components and then further decompose those into the horizontal and vertical components. The model then combines the horizontal and vertical uncertainty components to yield an estimate of the system uncertainty as a whole. This cumulative system uncertainty is the Total Propagated Uncertainty. By using this approach, SAIC can easily incorporate future uncertainty

information provided by sensor manufacturers into the model. This also allows SAIC to continuously improve the fidelity of the model as our understanding of the sensors increases or as more sophisticated sensors are added to a system.

The data needed to drive the uncertainty model were captured as parameters taken from the Error Parameter File (EPF), which is created during survey system installation and integration. Some of the required parameters are also obtained from values recorded in the GSF files during data acquisition and processing. While the input units vary, all uncertainty values that contribute to the cumulative TPU estimate are eventually converted to meters by **SABER's Errors** program. The cumulative TPU estimates are recorded as the Horizontal Uncertainty and Vertical Uncertainty at the 95% confidence level in the GSF file. These uncertainty estimates are then used to estimate the accuracy of each individual sounding's position and depth during both data acquisition and data processing. A more detailed discussion on the development of the EPF and application of the TPU was provided in the DAPR for OPR-D302-SA-09 delivered on 01 October 2010.

### **B.2.2 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 Order 1a specifications were flagged as invalid and therefore were not used in the CUBE depth calculations. 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, Order 1a uncertainty. The allowable Order 1a vertical uncertainty is dependent on depth and based on the depths surveyed in H12094, it varied from  $\pm 0.502$  to  $\pm 0.605$  meters. The allowable Order 1a horizontal uncertainty is also depth dependent and defined as 5 meters + 5% of the depth. The CUBE depth is populated as either the node's chosen hypothesis or the depth of a feature or designated sounding set by the Hydrographer, which overrides the chosen hypothesis.

During the creation of the CUBE surface, two separate vertical uncertainty surfaces are also calculated by the **SABER** software, CUBE Standard Deviation and Average Total Propagated Uncertainty (Average TPU). The CUBE Standard Deviation is a measure of the general agreement between all of the soundings that contributed to the selected hypothesis for the node, and is reported at the 95% Confidence Level. The Average TPU is the average of the vertical uncertainty component for each sounding that contributed to the chosen hypothesis for the node. 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.

After creation of the initial one-meter PFM CUBE surface, the **SABER Check PFM Uncertainty** function was used to highlight all of the cases where computed final node vertical uncertainty exceeded IHO Order 1a. Overall, the final one-meter PFM CUBE surface contained vertical uncertainties that ranged from 0.270 to 1.360 meters. The output from the **Check PFM Uncertainty** function highlighted 2048 individual CUBE nodes with Final Uncertainties that exceeded IHO Order 1a. As previously mentioned, all individual soundings used in the final CUBE depth surface had vertical and horizontal uncertainty values which were at or below the IHO Order 1a allowable limits. A review of the areas with Final Uncertainties exceeding IHO Order 1a revealed that 1255 (61%) of these nodes were located on features within the Fish Haven. The high vertical uncertainties observed over the rest of the sheet were surrounding features, such as wrecks and obstructions, or located on slopes where there tended to be much greater variability in the soundings that contributed to a particular node.

The **SABER Check PFM Uncertainty** function was also run on each of the six half-meter feature PFM CUBE surfaces. All Uncertainties exceeding the IHO Order 1a in the half-meter PFM grids were related to the specific wrecks or obstructions within each of the grid areas. Results are listed below.

- Features Area 1 had 407 individual CUBE nodes which exceeded IHO Order 1a.
- Features Area 2 had 298 individual CUBE nodes which exceeded IHO Order 1a.
- Features Area 3 had 97 individual CUBE nodes which exceeded IHO Order 1a.
- Features Area 4 had 903 individual CUBE nodes which exceeded IHO Order 1a.
- Features Area 5 had 85 individual CUBE nodes which exceeded IHO Order 1a.
- Features Area 6 had 1 individual CUBE node which exceeded IHO Order 1a.

The **SABER Frequency Distribution** tool was also used to review vertical uncertainties within the one-meter and six 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 99.99% of all grid nodes in the one-meter PFM contained vertical uncertainties of 0.50 meters or less. When performed on the six half-meter feature PFMs, at least 98.44% of all grid nodes contained vertical uncertainties of 0.50 meters or less.

### **B.2.3 Junction and Crossing Analysis**

Three types of repeatability analyses were performed on H12094 multibeam data; junction analysis of gridded data crossings, junction analysis with adjacent completed sheets, and beam by beam crossing analysis.

#### *B.2.3.1 Junction Analysis*

During data acquisition, comparison of main scheme data to near nadir ( $\pm 5$  degrees) cross line data was done daily 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 from the full valid swath (60° cutoff) of all main scheme multibeam data and one from the class 1 (5° cutoff) cross line data. Reference the “H12094\_Multibeam\_Processing\_Log” spreadsheet, located in Separates I, for delineation between main scheme and cross line data. From the CUBE surfaces of these grids, a depth difference grid was created by subtracting the cross line grid from the main scheme grid at all crossings. Analysis of all data crossings in H12094 showed that 98.09% of comparisons were within 25 centimeters and 99.63% of comparisons were within 30 centimeters (Table B-3). Junction analysis was performed by subtracting the H12094 cross line grid from the H12094 main scheme grid. Therefore, negative values indicate that H12094 main scheme data are shoaler than H12094 cross line data. The main scheme data were shoaler than the cross line data in 37.88% of junctions and the main scheme data were deeper than cross line data in 58.86% of the junctions across the entire survey area. Comparisons larger than 80 centimeters are accounted for by normal small DGPS position variability around wrecks, obstructions and steep slopes of objects located within the Fish Haven located in H12094.

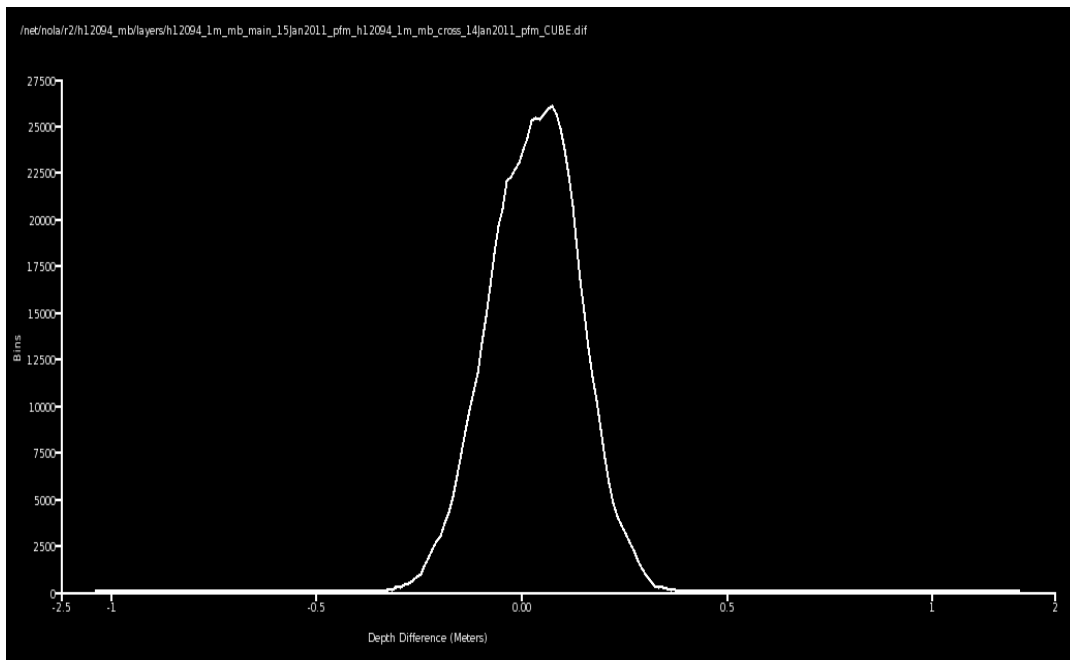
**Table B-3. Junction Analysis, Main Scheme Lines vs. Near Nadir Cross Lines, H12094**

Depth Difference Range (cm)	All		Positive		Negative		Zero	
	Count	Cumulative Percent	Count	Cumulative Percent	Count	Cumulative Percent	Count	Percent
0 - 5	260322	35.74	126019	17.30	110571	15.18	23732	3.26
> 5 - 10	208587	64.39	126238	34.64	82349	26.49		
> 10 - 15	142016	83.89	93669	47.50	48347	33.13		
> 15 - 20	72947	93.90	50734	54.47	22213	36.18		
> 20 - 25	30473	98.09	21303	57.39	9170	37.44		
> 25 - 30	11224	99.63	8716	58.59	2508	37.78		
> 30 - 35	2095	99.92	1543	58.80	552	37.86		
> 35 - 40	455	99.98	302	58.84	153	37.88		
> 40 - 45	69	99.99	65	58.85	4	37.88		
> 45 - 50	41	99.99	40	58.86	1	37.88		
> 50 - 60	31	100	31	58.86	0	37.88		
> 60 - 70	6	100	6	58.86	0	37.88		
> 70 - 80	0	100	0	58.86	0	37.88		
> 80 - 90	1	100	0	58.86	1	37.88		
> 90 - 100	0	100	0	58.86	0	37.88		
> 100 - 110	0	100	0	58.86	0	37.88		
> 110 - 120	0	100	0	58.86	0	37.88		
> 120 - 130	1	100	0	58.86	1	37.88		
> 130 - 140	1	100	0	58.86	1	37.88		

Depth Difference Range (cm)	All		Positive		Negative		Zero	
	Count	Cumulative Percent	Count	Cumulative Percent	Count	Cumulative Percent	Count	Percent
> 140 - 150	0	100	0	58.86	0	37.88		
> 150 - 160	0	100	0	58.86	0	37.88		
> 160 - 170	1	100	1	58.86	0	37.88		
> 170 - 180	0	100	0	58.86	0	37.88		
> 180 - 190	1	100	0	58.86	1	37.88		
> 190 - 200	3	100	1	58.86	2	37.88		
> 200 - 220	2	100	0	58.86	2	37.88		
> 220	1	100	0	58.86	1	37.88		
<b>Totals</b>	728277	100.00%	428668	58.86%	275877	37.88%	23732	3.26%

Reference Grid: h12094\_1m\_mb\_main\_15Jan2011\_pfm\_h12094\_1m\_mb\_cross\_14Jan2011\_pfm\_CUBE.dif

The **SABER Frequency Distribution** tool was used to analyze the H12094 main scheme multibeam data compared to the H12094 near nadir ( $\pm 5$  degrees) cross line multibeam data (Figure B-2). The **Frequency Distribution** was run on the same difference grid used to generate the data in Table B-3. The results from the **Frequency Distribution** tool match those of the Junction analysis, reported in Table B-3.

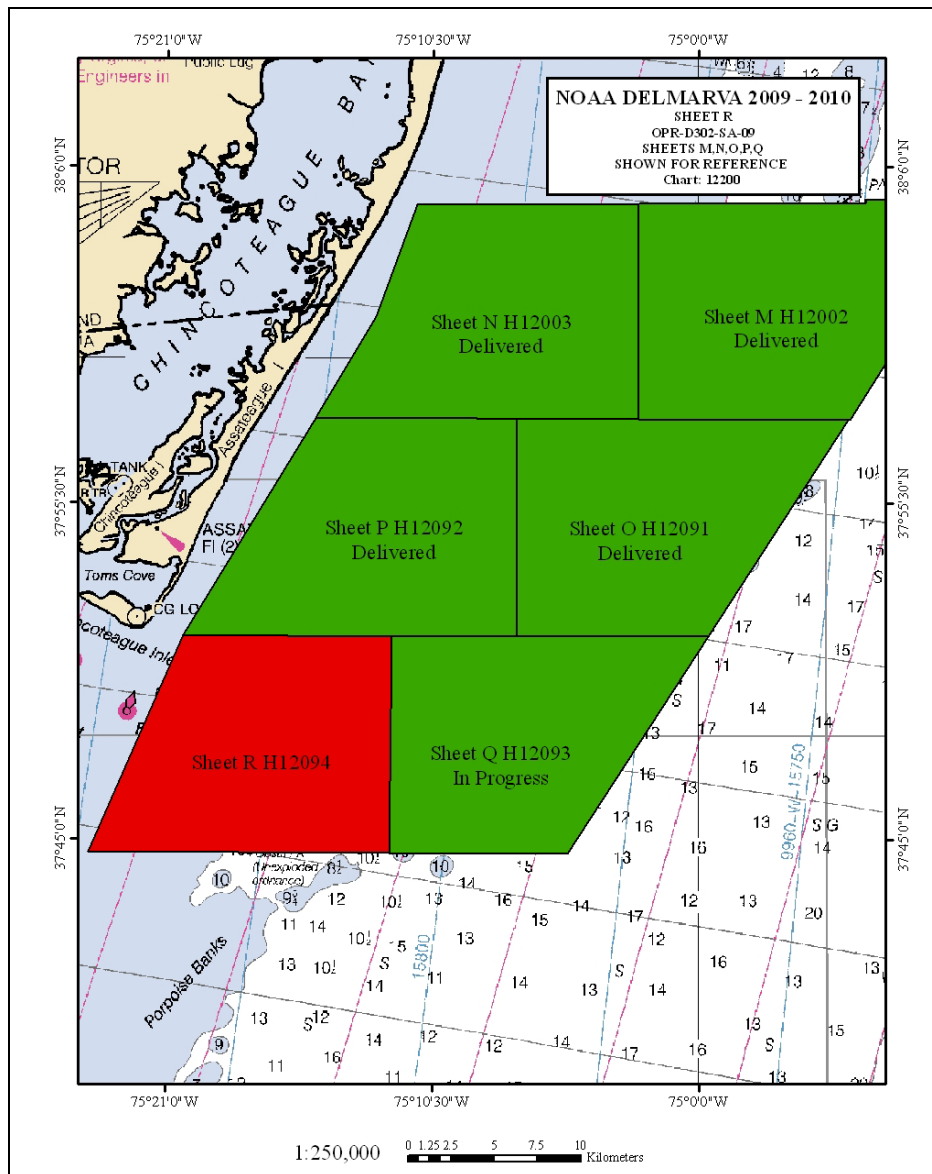


**Figure B-2. Frequency Distribution Plot of Depth Differences for H12094 Main Scheme Lines vs. H12094 Cross lines**

Sheet-to-sheet junction analyses were only performed between adjacent sheets for which data collection has been completed and all edits and final correctors have been applied to the data. Survey sheets with finalized data for junction analysis are listed in Table B-4. Refer to Figure B-3 for the general locality of each sheet. Sheet H12093 is still in progress, therefore the sheet-to-sheet analysis between H12094 and H12093 will be delivered in the Descriptive Report for H12093.

**Table B-4. Surveys for Junction to H12094**

Registry No.	Scale	Year of Acquisition	Field Party	Date Delivered to AHB	Location of Junction
H12092	1:20,000	2010	SAIC	17 December 2010	North



**Figure B-3. General Locality and Status of Sheets in Reference to H12094**



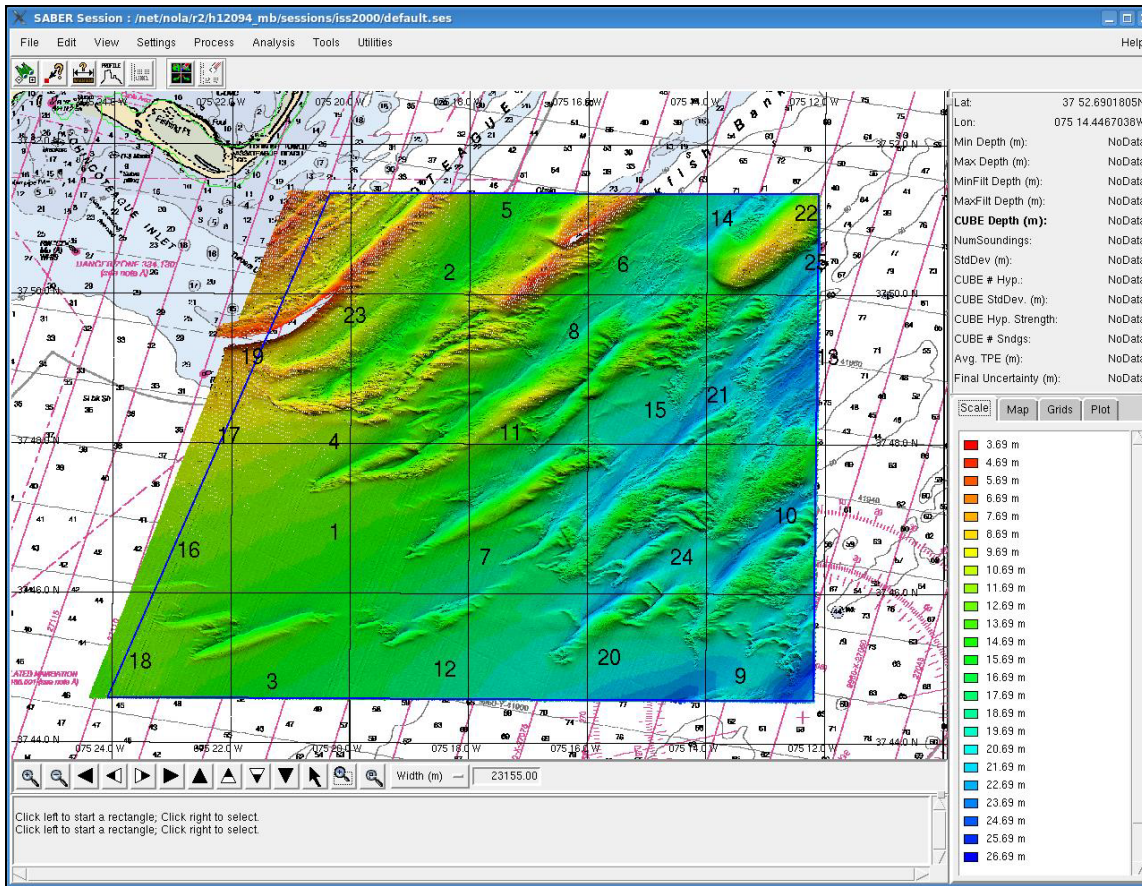
Table B-5 depicts the junction analysis between H12094 and H12092 (Sheet P) of Project OPR-D302-SA-09, surveyed between 22 June 2010 - 17 October 2010. Junction analysis was conducted on the common area between these two sheets, which falls along the northern edge of H12094. Analysis was performed using the H12094 final one-meter PFM CUBE surface, with all data included, and the H12092 final one-meter PFM CUBE surface, with all data included. This analysis showed that 94.02% of the comparisons were within 25 centimeters and 98.05% were within 30 centimeters.

**Table B-5. Junction Analysis, H12094 vs. H12092**

Depth Difference Range (cm)	All		Positive		Negative		Zero	
	Count	Cumulative Percent	Count	Cumulative Percent	Count	Cumulative Percent	Count	Percent
0 - 5	147024	28.68	61669	12.03	71701	13.99	13654	2.66
> 5 - 10	124250	52.92	41894	20.20	82356	30.05		
> 10 - 15	102192	72.85	24290	24.94	77902	45.25		
> 15 - 20	68767	86.27	9602	26.81	59165	56.79		
> 20 - 25	39757	94.02	2533	27.31	37224	64.05		
> 25 - 30	20631	98.05	581	27.42	20050	67.96		
> 30 - 35	6629	99.34	150	27.45	6479	69.23		
> 35 - 40	2371	99.80	22	27.45	2349	69.68		
> 40 - 45	736	99.95	2	27.45	734	69.83		
> 45 - 50	154	99.98	0	27.45	154	69.86		
> 50 - 60	108	100	0	27.45	108	69.88		
> 60 - 70	11	100	0	27.45	11	69.88		
>70	2	100	0	27.45	2	69.88		
<b>Totals</b>	512632	100.00%	140743	27.45%	358235	69.88%	13654	2.66%
Reference Grid: h12094_1m_mb_all_04Jan2011_pfm_H12092_1m_MLLW_pfm.dif								

### B.2.3.2 Crossing Analysis

Twenty-five selected crossings were randomly selected across relatively flat bottom for beam by beam comparison based on spatial and temporal distribution across the H12094 survey area. Figure B-4 depicts the H12094 Statement of Work boundary (in blue) and the 25 crossings. As discussed in Section A, the survey was extended shoreward of the delivered Statement of Work Survey Bounds in order to acquire data as close to the four-meter depth curve as possible in the northwest corner of the survey.



**Figure B-4. Location of 25 Crossings used for Crossing Analysis and the Statement of Work Boundary in Blue**

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 35 centimeters. There were no indications of significant sound speed issues or offset biases observed.

### B.2.4 Multibeam Coverage Analysis

These survey operations were primarily conducted with a consistent 40-meter line spacing optimized 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 coverage multibeam was not required, in depths greater than approximately 14 meters there was sufficient outer beam overlap to provide 100% multibeam bottom coverage.

A one-meter node PFM CUBE surface was used to assess and document multibeam survey coverage. 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 review of the final one-meter coverage showed no areas with four or more contiguous nodes without data and the final CUBE surface contained valid depths in more than 99.99% of the nodes.

There were twenty-six significant multibeam features within the depth range (0-23 meters) for which survey specifications require a half-meter resolution grid for object detection coverage over significant features. To meet this requirement six separate half-meter resolution CUBE PFM grids were created. Each CUBE PFM grid was analyzed for coverage. Data within the six half-meter resolution CUBE PFM grids remains in the one-meter CUBE PFM grid.

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. The CUBE number of soundings layer reports the number of soundings that were used to compute the best hypothesis. Analysis of the H12094 final one-meter PFM grid revealed that 99.73% of all nodes contained five or more CUBE soundings; satisfying the requirements for complete multibeam coverage as specified in Section 5.1.2.2 of the *NOS Hydrographic Survey Specifications and Deliverables*, April 2009. A complete analysis based on the Frequency Distribution routine is provided in Table B-6 for the one-meter PFM grid.

**Table B-6. H12094 Frequency Distribution of the One-Meter PFM Grid's CUBE Number of Soundings Surface**

CUBE No. of Soundings Contributing to Grid Node	Cumulative Grid Node Count	Percentile
3000 - 3149	2	0.00%
2000 - 2999	99	0.00%
1000 - 1999	10095	0.01%
100 - 999	6423986	3.44%
11-99	185273622	99.29%
10	185434491	99.37%
9	185564441	99.44%
8	185692449	99.51%
7	185802848	99.57%
6	185927468	99.64%
5	186093825	99.73%
4	186254740	99.81%
3	186388140	99.88%
2	186500865	99.94%
1	186606105	100%
0	186606105	100%

Analysis of the six half-meter PFM grids indicated that more than 95.68% of the individual nodes contained five or more CUBE soundings as listed below.

**Table B-7. H12094 Frequency Distribution of the Half-Meter Feature PFM Grid's CUBE Number of Soundings Surface**

Feature Number	PFM File Name	% Nodes Containing $\geq 5$ CUBE Soundings	Feature Number	PFM File Name	% Nodes Containing $\geq 5$ Soundings
1	Feature Area 4	99.65	14	Feature Area 4	99.95
2	Feature Area 4	99.81	15	Feature Area 4	99.96
3	Feature Area 5	98.33	16	Feature Area 4	99.95
4	Feature Area 3	99.61	17	Feature Area 3	99.91
5	Feature Area 5	99.93	18	Feature Area 5	99.95
6	Feature Area 2	99.96	19	Feature Area 4	99.90
7	Feature Area 2	99.82	20	Feature Area 1	99.70
8	Feature Area 2	99.97	21	Feature Area 1	99.88
9	Feature Area 5	99.96	22	Feature Area 2	99.98
10	Feature Area 3	99.95	23	Feature Area 1	99.93
11	Feature Area 5	99.98	24	Feature Area 1	99.31
12	Feature Area 2	99.80	25	Feature Area 4	99.29
13	Feature Area 2	99.97	29	Feature Area 6	95.68

### B.2.5 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 *NOS Hydrographic Survey Specifications and Deliverables*, April 2009. 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 for a description of all corrections applied to echo soundings. There were no deviations from the corrections described therein. Please note that the delivered Generic Sensor Format (GSF) multibeam files are in version 3.01 GSF. This version of GSF is compatible with Caris version 6.1.2.8 using the HotFix initially delivered to the Atlantic Hydrographic Branch on 18 December 2009. The Caris version 6.1.2.8 HotFix has also been included with this delivery. Caris version 7.0 is compatible with this new version of GSF with HotFix 5.

### B.4 DATA PROCESSING

Please refer to the DAPR for a description of all data processing steps performed. There were no deviations from the processes described therein.

While H12094 was required in the Statement of Work to meet the *NOS Hydrographic Surveys Specifications and Deliverables*, April 2009; SAIC has received approval to begin delivering to meet specifications detailed differently in the *NOS Hydrographic Survey Specifications and Deliverables*, April 2010. The changes that have been made that specifically meet the April 2010 Specifications include:

- Filename convention of the BAG files
  - Survey registry number\_units of resolution\_vertical datum\_BAG file number of total number (Ex., H12092\_1m\_MLLW\_1of8.bag)
- Reports and Naming Convention
  - Main Body of the DR (Sections A through D) (Ex. H12092\_DRBody.doc)
  - Entire Report Cover Sheet, Title Sheet, Sections A through E, and Appendices (Ex. H12092\_DR.pdf)

Other changes include:

- Updating the NOAA Hydrographic Title Sheet form 77-28
  - New Format/Layout
- Delivery of five Supplemental nonstandard BAG files ( requested by AHB)
  - CUBE Number of Hypotheses
  - CUBE Standard Deviation
  - CUBE Hypothesis Strength
  - CUBE Number of Soundings
  - Average TPU

#### **B.4.1 Bathymetry Data Processing**

When all analysis on the PFM grids is completed, the PFM grids are converted to BAG files. Due to file size restraints, a single PFM will often create multiple BAG files. After the creation of the BAG files, the **SABER Compare PFM to BAG** utility is run on each BAG. This utility performs a direct node-to-node comparison between the gridded surfaces of the PFM and corresponding surfaces of the BAG files. For H12094, the resulting BAG files showed node values that were identical to the PFM grids. Therefore, the results of the previously described uncertainty and coverage analyses performed on the PFM grids directly apply to all of the BAG files delivered for this sheet.

Six BAG files at one-meter grid resolution are submitted for the entire H12094 area. The BAG files were exported from the CUBE Depth Surface and the Final Uncertainty surface within the CUBE PFM grid. The CUBE Depth Surface and the Final Uncertainty surfaces are defined in Section B.2.2. The resulting BAG files (listed in Table B-8 and Table B-9) were limited to 300 MB in size, based on a request by AHB, and therefore multiple BAG files are produced from a single CUBE PFM grid. The BAG file named H12094\_1m\_MLLW\_1of6.bag is the southernmost one-meter BAG while the BAG file named H12094\_1m\_MLLW\_6of6.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 six half-meter BAG files (converted from half-meter CUBE PFM grids) is provided in Table B-8. The CUBE Depth range and Final Uncertainty range for each delivered BAG is detailed in Table B-9.

**Table B-8. Summary of H12094 BAG Files**

BAG File Name	Comments
H12094_1m_MLLW_1of6.bag	Southernmost 1.0-meter BAG
H12094_1m_MLLW_2of6.bag	
H12094_1m_MLLW_3of6.bag	
H12094_1m_MLLW_4of6.bag	
H12094_1m_MLLW_5of6.bag	
H12094_1m_MLLW_6of6.bag	Northernmost 1.0-meter BAG
H12094_features_area_1_50cm_MLLW_1of6.bag	Features 20, 21, 23 and 24; 0.5 meter BAG
H12094_features_area_2_50cm_MLLW_2of6.bag	Features 6, 7, 8, 12, 13 and 22; 0.5 meter BAG
H12094_features_area_3_50cm_MLLW_3of6.bag	Features 4, 10 and 17; 0.5 meter BAG
H12094_features_area_4_50cm_MLLW_4of6.bag	Features 1, 2, 14, 15, 16, 19 and 25; 0.5 meter BAG
H12094_features_area_5_50cm_MLLW_5of6.bag	Features 3, 5, 9, 11 and 18; 0.5 meter BAG
H12094_features_area_6_50cm_MLLW_6of6.bag	Feature 29; 0.5 meter BAG

**Table B-9. Summary of H12094 BAG CUBE Depth and Final Uncertainty Values**

BAG File Name	Depth Range (meters)	Final Uncertainty Range (meters)
H12094_1m_MLLW_1of6.bag	12.42 – 26.24	0.270 – 0.540
H12094_1m_MLLW_2of6.bag	12.44 – 24.23	0.270 – 0.804
H12094_1m_MLLW_3of6.bag	10.58 – 24.06	0.270 – 0.658
H12094_1m_MLLW_4of6.bag	7.49 – 24.34	0.270 – 0.693
H12094_1m_MLLW_5of6.bag	3.75 – 24.41	0.270 – 1.360
H12094_1m_MLLW_6of6.bag	4.14 – 23.20	0.270 – 1.348
H12094_features_area_1_50cm_MLLW_1of6.bag	5.50 – 10.37	0.270 – 1.274
H12094_features_area_2_50cm_MLLW_2of6.bag	7.77 – 14.38	0.270 – 1.426
H12094_features_area_3_50cm_MLLW_3of6.bag	18.16 – 22.46	0.270 – 1.569
H12094_features_area_4_50cm_MLLW_4of6.bag	4.98 – 20.34	0.270 – 1.994
H12094_features_area_5_50cm_MLLW_5of6.bag	19.46 – 23.66	0.270 – 1.718
H12094_features_area_6_50cm_MLLW_6of6.bag	11.13 – 11.99	0.270 – 0.619

As requested by NOAA's AHB, five additional non-standard BAG files corresponding to each of the standard BAG files listed in Table B-8 were generated. These non-standard BAG files were created with a CUBE Depth layer, populating the Depth layer of the BAG, and each of the following CUBE Child layers populating the Uncertainty layer of the BAG:

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

The CUBE Number of Hypotheses BAG contains the number of hypotheses for each node. CUBE Hypothesis Strength estimates how strongly supported the hypothesis depth estimate is. It is calculated as the ratio of the number of samples in the 'best' hypothesis and the number of samples in the next 'best' hypothesis. This ratio is subtracted from an arbitrary limit of 5, and the hypothesis strength is interpreted as the closer this value is to zero; the stronger the hypothesis. When a resulting value is less than zero the hypothesis strength is reported as zero. The CUBE Number of Soundings BAG derives the number of soundings that were used in the chosen CUBE hypothesis for each node. CUBE Standard Deviation is the CUBE algorithm's calculated depth uncertainty for the node, reported at the 95% Confidence Level. Finally, the Average TPU BAG is created from a second uncertainty value calculated in **SABER**, and is not part of the CUBE algorithm. It is computed by taking the average of the vertical component of the TPU for each sounding that contributed to the best hypothesis for the node. It provides an alternative means for describing the likely depth uncertainty for nodes that are thinly populated with data, a condition that may result in poor performance of CUBE's estimated depth uncertainty.

Please note when reviewing these additional, nonstandard, BAG files the filename 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 nonstandard BAGs are provided for review purposes only and are not intended to be used as archival products.

#### **B.4.2 Sidescan Data Processing**

Sidescan sonar contacts were created during sidescan review using Triton **Isis**. The **Isis** contact files can be viewed with **Isis Target**. The positions stored in these contact files are the last click positions as chosen by the hydrographer to represent the position with the least depth, not the position that is calculated by **Isis**. SAIC's **isis2ctv** program, which is part of SAIC's processing pipeline, creates a new file (\*\_n.CON) which overwrites the **Isis** calculated position field within the \*\_n.CON file with the last click position chosen by the hydrographer.

Contacts 1239161251\_n.CON (3SCON030.TIF) and 1240160332\_n.CON (3SCON040.TIF) were observed in between multibeam swaths in 37° 51' 05.94"N 075° 16' 13.96"W. These two contacts were deemed insignificant based on their **Isis** calculated heights and the surrounding depths observed in the gridded CUBE multibeam depths.

The Fish Haven centered in 38° 50' 12.24"N 075° 15' 08.99"W is littered with objects. Most of them are subway or rail cars dumped over the last decade (<http://hamptonroads.com/2008/06/video-new-york-subway-cars-get-new-home-ocean>) and populate the northern and easternmost portions of the Fish Haven. None of these objects observed in the Fish Haven were significant based on their least depth. During the processing effort, seven contacts were created that were located in the Fish Haven but

not correlated to multibeam features. These seven contacts were chosen to represent the spatial distribution of the objects within the Fish Haven.

Sidescan contact information is delivered in several ways. The “H12094\_Sidescan\_Contacts\_List”, located in Appendix II, notes all sidescan contacts that were identified within H12094. Contacts for which an **Isis** contact file was created are delivered in Separates V (\*\_n.CON files). 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 an S-57 file and all contact image files (.tif) are delivered in Separates V.

## C. HORIZONTAL AND VERTICAL CONTROL

Please refer to the Horizontal and Vertical Control Report (HVCR) for detailed descriptions of the procedures and systems used to attain hydrographic positioning. The HVCR will be delivered with the Descriptive Report for the last sheet of this task order. Specifics pertaining to H12094 are discussed below.

### C.1 VERTICAL CONTROL

The vertical datum for H12094 is Mean Lower-Low Water (MLLW). NOAA tide station 8651370 Duck, NC (36° 11'N 075° 44.8'W) was the source of all verified water level heights for determining tidal correctors to the soundings. All data for H12094 were contained within tide zones SA55A and SA46A which were provided by NOAA and summarized in Table C-1.

The adequacy of the preliminary zoning provided by NOAA was accomplished through a number of means. The primary means for analyzing the adequacy of zoning was a comparative analysis of correctors across the zone boundary between SA55A and SA46A. This comparative zone-to-zone analysis (summarized in Table C-2) compared the difference in observed verified water level correctors at 6-minute intervals from 18 August 2010 to 17 October 2010. The results supported the adequacy of the NOAA provided preliminary zone boundaries and zoning parameters based on Duck, NC (8651370). Adequacy of zoning was also carried out by analyzing zone boundary crossings in the navigated swath editor, SAIC's **Multi View Editor (MVE)**, reviewing differences between overlapping swath data as well as cross line versus main scheme data. In addition, sun illuminated coverage grids were viewed within **SABER** and examined for any vertical offsets which may be a result of tidal zoning impacts. SAIC did not revise the delivered tide zones for H12094. The water level zoning parameters provided by NOS, Table C-1, were adequate for application of the observed verified water levels. As a result, they were accepted as final and applied to all H12094 multibeam data.



**Table C-1. Water Level Zoning Parameters Applied on Sheet H12094**

Zone	Time Corrector (minutes)	Range Ratio	Reference Station
SA46A	00:00	1.08	8651370
SA55A	00:00	1.11	8651370

**Table C-2. Comparison of Verified 6 Minute Water Level Data Across Tide Zones SA55A and SA46A for Dates Inclusive of H12094**

Zone Boundary	SA55A – SA46A
Minimum Difference	-0.050
Maximum Difference	0.006
Average Difference	-0.022
Standard Deviation	0.011

Data are in Meters above MLLW

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. SAIC has provided a final tide note in Appendix IV.

## C.2 HORIZONTAL CONTROL

The survey data for sheet H12094 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)

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.

Daily position confidence checks were conducted using an independent Trimble DGPS system. A real-time **ISS-2000** survey monitor also raised an alarm to alert the survey watchstander if the position differences exceeded the maximum allowable distance. All positioning confidence checks were within the 10 meter limit specified in section 5.1.4.2 of the *NOS Hydrographic Surveys Specifications and Deliverables*, April 2009. A summary report, "H12094\_Daily\_Positioning\_Confidence\_Checks", is located in Separates I.

## D. RESULTS AND RECOMMENDATIONS

### D.1 CHART COMPARISON

*See Appendix III of this Report for final charting recommendations.*

For chart comparisons, survey data are compared to the largest scale chart that encompasses the entire area. In the case of H12094, the survey area is fully covered by one Raster Chart (BSB) and one Electronic Navigational Chart (ENC). Details of each chart are listed below.

<b>Chart 12210</b>	<b>Chincoteague Inlet to Great Machipongo Inlet</b>
	Scale 1:80,000
	Edition and Date 38 <sup>th</sup> , 05/01/2008
	Notice to Mariners corrected through 38.130, 12/25/2010
<b>ENC US4VA70M</b>	<b>Chincoteague Inlet to Great Machipongo Inlet; Chincoteague Inlet</b>
	Scale 1:80,000
	Edition and Issue Date 10 <sup>th</sup> , 12/03/2010
	Update and Date 0, 12/03/2010

The chart comparisons were conducted using SAIC's **SABER** software to view the BSB raster charts with overlain layers of H12094 data such as the CUBE gridded surface, selected soundings, contacts, and features. For ENC comparisons, a combination of Jeppesen's **dKart Inspector** and SevenCs **SeeMyDENC** were used in conjunction with **SABER**. Results from the comparisons are described below. Charting recommendations for depths follow section 5.1.2 of the *NOS Hydrographic Survey Specifications and Deliverables*, April 2010, where depths and uncertainties are to be reported in meters rounded to the nearest centimeter by standard arithmetic rounding (round half up). Charted BSB depth units are reported in feet and are rounded using NOAA cartographic rounding (0.75 round up).

H12094 is adequate to supersede common areas and soundings of all affected charts as H12094 data meets data accuracy standards and bottom coverage requirements.

#### D.1.1 Chart 12210 – Chincoteague Inlet to Great Machipongo Inlet (1:80,000)

*See Appendix I and II of this Report for final charting recommendations.*

Charted depths greater than the 30-foot depth curve covered by H12094 were generally within  $\pm 3$  feet of the depths observed during this survey while charted depths less than the 30-foot depth curve varied from as little as  $\pm 1$  foot to as much as  $\pm 15$  feet.

The charted 18-foot depth curve of Turners Lump, which is part of Chincoteague Shoals, charted in 37° 49' 47.47"N 075° 21' 08.96"W was found to have migrated to the south

along the southern portion of the shoal. The isolated 18-foot depth curve to the northeast, charted in 37° 50' 41.38"N 075° 19' 26.54"W, was found to be contiguous with the 18-foot depth curve defining Turners Lump. This southerly migration was also generally true for the shoals in this area defined by charted 30-foot depth curves.

The southern portion of Blackfish Bank, charted in 37° 50' 57.78"N 075° 16' 02.51"W, was found to be very close to its charted location as defined by the 30-foot depth curve. There was a slight migration in the southerly direction which was observed throughout the two 18-foot depth curves.

Feature #1 is a 55-foot (16.803 meters, 0.28 meter uncertainty) obstruction within a fish haven that is charted in 38° 50' 12.24"N 075° 15' 08.99"W. It is the shoalest object in the fish haven which has an authorized minimum depth of 30 feet.

Recommendations:

- None. Currently charted fish haven takes precedence over Feature #1.

Feature #2 is a 57-foot (17.434 meters, 0.27 meter uncertainty) wreck within a fish haven that is charted in 38° 50' 12.24"N 075° 15' 08.99"W and has an authorized minimum depth of 30 feet.

Recommendations:

- None. Currently charted fish haven takes precedence over Feature #2.

Feature #7 is a 30-foot (9.211 meters, 0.27 meter uncertainty) dangerous wreck currently charted in 37° 50' 12.36"N 075° 20' 26.21"W as a dangerous wreck labeled "PA" (AWOIS 996).

Recommendations:

- Remove charted dangerous wreck and label "PA" charted in 37° 50' 12.36"N 075° 20' 26.21"W
- Chart 30-foot dangerous wreck in 37° 50' 10.82"N 075° 20' 23.67"W and label "Wk"

Feature #9 is a 71-foot (21.734 meters, 0.28 meter uncertainty) obstruction currently charted as a dangerous wreck labeled "PA" in 37° 50' 04.52"N 075° 12' 31.93"W (AWOIS 2633).

Recommendations:

- Remove charted dangerous wreck and label "PA" charted in 37° 50' 04.52"N 075° 12' 31.93"W
- Chart 71-foot ~~dangerous~~ obstruction in 37° 50' 02.56"N 075° 12' 31.40"W and label "Obstns"

Feature #10 is a 59-foot (18.157 meters, 0.27 meter uncertainty) obstruction currently charted in 37° 46' 06.75"N 075° 14' 18.65"W as a dangerous obstruction labeled "Obstn (47 ft rep)" (AWOIS 2632).

Recommendations:

- Remove charted dangerous obstruction and label "Obstn (47 ft rep)" charted in 37° 46' 06.75"N 075° 14' 18.65"W

- Feature #10 is not recommended for charting as it is not significant relative to surrounding soundings

Feature #19 is a 16-foot (4.982 meters, 0.27 meter uncertainty) dangerous wreck currently charted in 37° 51' 03.83"N 075° 15' 57.77"W as an 11-foot dangerous wreck labeled "Wk" (AWOIS 997).

Recommendations:

- Remove charted 11-foot dangerous wreck and label "Wk" charted in 37° 51' 03.83"N 075° 15' 57.77"W
- Chart 16-foot dangerous wreck in 37° 51' 02.28"N 075° 15' 57.14"W and label "Wk".

Feature #21 is an 18-foot (5.501 meters, 0.27 meter uncertainty) dangerous obstruction submitted as Danger to Navigation Report #1. It is currently charted in 37° 49' 55.98"N 075° 21' 14.04"W as an 18-foot dangerous obstruction labeled "Obstn".

Recommendations:

- Retain as charted

Feature #25 is a 24-foot (7.354 meters, 0.27 meter uncertainty) obstruction (AWOIS 2775) in 37° 51' 09.38"N 075° 15' 53.61"W. Feature #25 is in the vicinity of the charted label "Obstn Fish Haven (auth min 17 ft)" in 37° 51' 15.42"N 075° 16' 34.79"W. Chart 12210 currently has no area charted indicating the location of the fish haven; however chart 12211, Fenwick Island to Chincoteague Inlet, identifies the fish haven approximately 150 meters west of Feature #25 in 37° 51' 09.57"N 075° 16' 00.33"W.

Recommendations:

- Chart a fish haven as charted on chart 12211 in 37° 51' 09.57"N 075° 16' 00.33"W
- Chart 24-foot dangerous obstruction in 37° 51' 09.38"N 075° 15' 53.61"W and label "Obstn"

Feature #26 is an aid to navigation currently charted in 37° 50' 37.48"N 075° 12' 05.58"W and is labeled "R "8" Fl R 2.5s GONG".

Recommendations:

- Retain as charted

Feature #27 is an aid to navigation currently charted in 37° 50' 25.41"N 075° 15' 52.76"W and is labeled "R N "8A"".

Recommendations:

- Retain as charted

Feature #28 is an aid to navigation currently charted in 37° 48' 54.46"N 075° 19' 25.67"W and is labeled "R N "2"".

Recommendations:

- Retain as charted

Feature #29 is a 36-foot (11.132 meters, 0.27 meter uncertainty) dangerous wreck in 37° 47' 31.79"N 075° 22' 23.60"W currently charted as a dangerous wreck in 37° 47' 31.67"N 075° 22' 27.30"W labeled "Wk PA" (AWOIS 14501).

Recommendations:

- Remove charted dangerous wreck in 37° 47' 31.67"N 075° 22' 27.30"W and label "Wk PA"
- Chart 36-foot dangerous wreck in 37° 47' 31.79"N 075° 22' 23.60"W and label "Wk"

Currently charted items that were not found during H12094 survey are represented in Table D-1. All of these items were covered by AWOIS areas and, since nothing was observed within each AWOIS search radius, are recommended for removal from the chart.

**Table D-1. Charted Items on Chart 12210 Not Found in H12094 Survey Data**

Latitude, North (NAD83)	Longitude, West (NAD83)	Search Method	Description of Item
37° 48' 57.86"	075° 21' 55.68"	200% Sidescan and resulting Multibeam	Dangerous Wreck labeled "PA", AWOIS 994
37° 47' 59.14"	075° 14' 45.95"	200% Sidescan and resulting Multibeam	Dangerous Wreck Labeled "PA", AWOIS 2432
37° 45' 47.69"	075° 13' 51.29"	200% Sidescan and resulting Multibeam	Dangerous Wreck Labeled "ED", AWOIS 2430
37° 45' 00.15"	075° 15' 29.80"	200% Sidescan and resulting Multibeam	Dangerous Obstruction Labeled "Obstn PA (Unexploded ordnance)", AWOIS 14499
37° 44' 59.98"	075° 23' 59.86"	200% Sidescan and resulting Multibeam	Dangerous Obstruction Labeled "Obstn PA (Unexploded ordnance)", AWOIS 14500

Features not previously discussed that were found in H12094 and are recommended for charting are reported in Table D-2. All information regarding these features is available in the Multibeam Features List found in Appendix II.

**Table D-2. Additional Features to be Considered for Charting**

Feature Number	Latitude, North (NAD83)	Longitude, West (NAD83)	Chart Depth (Feet)	Depth (Meters)	Description
4	37° 45' 04.13"	075° 13' 40.94"	68	20.828	Obstruction <i>Chart depth</i>
8	37° 50' 58.84"	075° 19' 58.63"	25	7.766	Obstruction <i>Chart depth</i>

Feature Number	Latitude, North (NAD83)	Longitude, West (NAD83)	Chart Depth (Feet)	Depth (Meters)	Description
13	37° 49' 28.74"	075° 18' 40.12"	40	12.206	Obstruction <i>Chart depth</i>
14	37° 51' 11.55"	075° 16' 34.77"	48	14.733	Obstruction <i>Do not chart</i>
15	37° 50' 35.24"	075° 14' 56.93"	57	17.442	Obstruction <i>Chart depth</i>
16	37° 49' 24.66"	075° 15' 36.43"	47	14.535	Obstruction <i>Do not chart</i>
17	37° 44' 38.49"	075° 15' 51.29"	67	20.610	Obstruction <i>Do not chart</i>
18	37° 48' 00.06"	075° 12' 57.70"	66	20.201	Obstruction <i>Do not chart</i>
20	37° 50' 12.94"	075° 21' 30.04"	25	7.754	Obstruction <i>Do not chart</i>
23	37° 49' 29.72"	075° 22' 12.55"	20	6.033	Obstructions <i>Chart depth</i>

Since chart 12210 (1:80,000) fully encompassed the H12094 survey area, chart comparisons were only reported with reference to that chart. However, other charts exist which have common areas with chart 12210. All chart recommendations should be applied to the common areas of additional charts where applicable. The additional charts which have common area are listed below:

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**Chart 12211 Fenwick Island to Chincoteague Inlet**

Scale 1:80,000  
Edition and Date 43<sup>rd</sup>, 10/01/2007  
Notice to Mariners corrected through 43.163, 12/18/2010

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**Chart 12200 Cape May to Cape Hatteras**

Scale 1:419,706  
Edition and Date 49<sup>th</sup>, 06/01/2007  
Notice to Mariners corrected through 49.178, 01/08/2011

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**Chart 13003 Cape Sable to Cape Hatteras**

Scale 1:1,200,000  
Edition and Date 50<sup>th</sup>, 05/01/2010  
Notice to Mariners corrected through 50.51, 01/08/2011

There were no additional charting recommendations for these charts. Chart 12211 is referenced in the chart comparison section above for chart 12210 as it pertained to Feature #25.

### D.1.2 ENC US4VA70M Chincoteague Inlet to Great Machipongo Inlet (1:80,000)

Charted depths greater than the 9.1-meter depth curve covered by H12094 were generally within  $\pm 1$  meter of the depths observed during this survey while charted depths less than the 9.1-meter depth curve varied from as little as  $\pm 0.5$  meters to as much as  $\pm 5$  meters.

The charted 5.4-meter depth curve of Turners Lump, which is part of Chincoteague Shoals, charted in  $37^{\circ} 49' 47.47''\text{N } 075^{\circ} 21' 08.96''\text{W}$  was found to have migrated to the south along the southern portion of the shoal. The isolated 5.4-meter depth curve to the northeast, charted in  $37^{\circ} 50' 41.0''\text{N } 075^{\circ} 19' 25.33''\text{W}$ , was found to be contiguous with the 5.4-meter depth curve defining Turners Lump. This southerly migration was also generally true for the shoals in this area defined by charted 9.1-meter depth curves.

The southern portion of Blackfish Bank, charted in  $37^{\circ} 50' 57.78''\text{N } 075^{\circ} 16' 02.51''\text{W}$ , was found to be very close to its charted location as defined by the 9.1-meter depth curve. There was a slight migration in the southerly direction which was observed throughout the two 5.4-meter depth curves.

Feature #1 is a 16.803-meter (55.127 feet, 0.28 meter uncertainty) obstruction located 3.5 meters outside of the northern boundary of a fish haven that is charted in  $38^{\circ} 50' 12.24''\text{N } 075^{\circ} 15' 08.99''\text{W}$  and has an authorized minimum depth of 9.1 meters.

Recommendations:

- Feature #1 is not recommended for charting as it is within 3.5 meters of a charted fish haven and has a shoal depth deeper than the 9.1-meter authorized minimum depth. At chart scale for BSB chart 12210, Feature #1 falls within the charted fish haven.

Feature #2 is a 17.434-meter (57.198 feet, 0.27 meter uncertainty) wreck within a fish haven that is charted in  $38^{\circ} 50' 12.24''\text{N } 075^{\circ} 15' 08.99''\text{W}$  and has an authorized minimum depth of 9.1 meters.

Recommendations:

- Feature #2 is not recommended for charting as its depth is deeper than the 9.1-meter authorized minimum depth for the charted fish haven.

Feature #7 is a 9.211-meter (30.219 feet, 0.27 meter uncertainty) dangerous wreck currently charted in  $37^{\circ} 50' 12.09''\text{N } 075^{\circ} 20' 26.15''\text{W}$  as a dangerous wreck with depth unknown (AWOIS 996).

Recommendations:

- Remove charted dangerous wreck charted in  $37^{\circ} 50' 12.09''\text{N } 075^{\circ} 20' 26.15''\text{W}$ .
- Chart 9.211-meter dangerous wreck in  $37^{\circ} 50' 10.82''\text{N } 075^{\circ} 20' 23.67''\text{W}$ .

Feature #9 is a 21.734-meter (71.305 feet, 0.28 meter uncertainty) obstruction currently charted as a dangerous wreck with depth unknown in  $37^{\circ} 50' 04.14''\text{N } 075^{\circ} 12' 32.17''\text{W}$  (AWOIS 2633).

Recommendations:

- Remove charted dangerous wreck charted in 37° 50' 04.14"N 075° 12' 32.17"W.
- Chart a 21.734-meter ~~dangerous~~ obstruction in 37° 50' 02.56"N 075° 12' 31.40"W.

Feature #10 is a 18.157-meter (59.570 feet, 0.27 meter uncertainty) obstruction currently charted as a 14.3-meter obstruction noted as "value reported (not confirmed)" in 37° 46' 06.57"N 075° 14' 18.73"W (AWOIS 2632).

Recommendations:

- Remove charted 14.3-meter obstruction charted in 37° 46' 06.57"N 075° 14' 18.73"W.
- Feature #10 is not recommended for charting as it is not significant relative to surrounding soundings.

Feature #19 is a 4.982-meter (16.345 feet, 0.27 meter uncertainty) dangerous wreck in 37° 51' 02.28"N 075° 15' 57.14"W. Feature #19 falls between a charted 3.3-meter dangerous wreck in 37° 51' 04.06"N 075° 15' 57.96"W (AWOIS 997) and a 5.1-meter fish haven in 37° 51' 00.45"N 075° 15' 58.70"W. The position of the charted wreck and charted fish haven on the US4VA70M ENC are opposite from how these objects are charted on the BSB chart 12211.

Recommendations:

- Remove the charted 3.3-meter dangerous wreck in 37° 51' 04.06"N 075° 15' 57.96"W.
- Remove the charted 5.1-meter fish haven in 37° 51' 00.45"N 075° 15' 58.70"W.
- Resolve the location of the charted 3.3-meter fish haven and chart the 3.3-meter fish haven in its appropriate location.
- Chart 4.982-meter dangerous wreck in 37° 51' 02.28"N 075° 15' 57.14"W.

Feature #21 is a 5.501-meter (18.047 feet, 0.27 meter uncertainty) dangerous obstruction submitted as Danger to Navigation Report #1. It is currently charted in 37° 49' 55.98"N 075° 21' 14.04"W as a 5.4-meter dangerous obstruction.

Recommendations:

- Removing the 5.4-meter dangerous obstruction in 37° 49' 55.98"N 075° 21' 14.04"W.
- Chart a 5.501-meter dangerous obstruction in 37° 49' 55.98"N 075° 21' 14.04"W.

Feature #29 is an **n** 11.132-meter (36.522 feet, 0.27 meter uncertainty) dangerous wreck in 37° 47' 31.79"N 075° 22' 23.60"W. It is currently charted as a dangerous wreck in 37° 47' 31.63"N 075° 22' 27.50"W with depth unknown (AWOIS 14501).

Recommendations:

- Remove charted dangerous wreck in 37° 47' 31.63"N 075° 22' 27.50"W.
- Chart 11.132-meter dangerous wreck in 37° 47' 31.79"N 075° 22' 23.60"W.



Currently charted items that were not found during H12094 survey are represented in Table D-3. All of these items were covered by AWOIS areas and, since nothing was observed within each AWOIS search radius, are recommended for removal from the chart.

**Table D-3. Charted Items on ENC US4VA70M Not Found in H12094 Survey Data**

Latitude, North (NAD83)	Longitude, West (NAD83)	Search Method	Description of Item
37° 48' 57.64"	075° 21' 55.84"	200% Sidescan and resulting Multibeam	Dangerous Wreck, Depth Unknown, AWOIS 994
37° 47' 58.68"	075° 14' 46.02"	200% Sidescan and resulting Multibeam	Dangerous Wreck, Depth Unknown, AWOIS 2432
37° 45' 47.30"	075° 13' 51.54"	200% Sidescan and resulting Multibeam	Dangerous Wreck, Depth Unknown, Existence Doubtful, AWOIS 2430
37° 45' 00.09"	075° 15' 29.82"	200% Sidescan and resulting Multibeam	Dangerous Obstruction, Depth Unknown, Unexploded ordnance, AWOIS 14499
37° 45' 00.14"	075° 23' 59.84"	200% Sidescan and resulting Multibeam	Dangerous Obstruction, Depth Unknown, Unexploded ordnance, AWOIS 14500

Features not previously discussed that were found in H12094 and are recommended for charting are reported in Table D-4. All information regarding these features is available in the Multibeam Features List found in Appendix II.

**Table D-4. Additional Features to be Considered for Charting on ENC US4VA70M**

Feature Number	Latitude, North (NAD83)	Longitude, West (NAD83)	Depth (Feet)	Depth (Meters)	Description
4	37° 45' 04.13"	075° 13' 40.94"	68.333	20.828	Obstruction <i>Chart depth</i>
8	37° 50' 58.84"	075° 19' 58.63"	25.478	7.766	Obstruction <i>Chart depth</i>
13	37° 49' 28.74"	075° 18' 40.12"	40.045	12.206	Obstruction <i>Chart depth</i>
14	37° 51' 11.55"	075° 16' 34.77"	48.336	14.733	Obstruction <i>Do not chart</i>
15	37° 50' 35.24"	075° 14' 56.93"	57.224	17.442	Obstruction <i>Chart depth</i>
16	37° 49' 24.66"	075° 15' 36.43"	47.686	14.535	Obstruction <i>Do not chart</i>
17	37° 44' 38.49"	075° 15' 51.29"	67.617	20.610	Obstruction <i>Do not chart</i>
18	37° 48' 00.06"	075° 12' 57.70"	66.276	20.201	Obstruction <i>Do not chart</i>
20	37° 50' 12.94"	075° 21' 30.04"	25.439	7.754	Obstruction <i>Do not chart</i>
23	37° 49' 29.72"	075° 22' 12.55"	19.793	6.033	Obstruction <i>Chart depth</i>

Feature Number	Latitude, North (NAD83)	Longitude, West (NAD83)	Depth (Feet)	Depth (Meters)	Description
25	37° 51' 09.38"	075° 15' 53.61"	24.127	7.354	Obstruction <i>Do not chart</i>

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

As defined in the Project Instructions, there were a total of 18 AWOIS items assigned for Project OPR-D302-SA-09; eleven of which fell within the survey bounds of H12094. Of these, ten were Full item investigations and one was Informational. Each item is discussed below by presenting the known AWOIS information followed by the results of the survey investigation. AWOIS item investigations were conducted with 200% sidescan sonar coverage and resulting multibeam coverage. A listing of all AWOIS items that fall within the bounds of H12094 is provided in Table D-5 and each is discussed below.

**Table D-5. Complete AWOIS Listings Received from NOAA for H12094**

AWOIS Number	Search Type	Chart 12211	Chart 12210	ENC US4VA70M
994	Full	X	X	X
996	Full	X	X	X
997	Full	X	X	X
2430	Full		X	X
2432	Full	X	X	X
2632	Full		X	X
2633	Full	X	X	X
2775	Informational	X	X	X
14499	Full		X	X
14500	Full		X	X
14501	Full		X	X

\* X denotes that the AWOIS item falls within the limits of the specified Chart or ENC

#### D.1.3.1 AWOIS 994 (Full): E.R. SMITH

**History:** 37° 49' 00.45"N 075° 21' 58.71"W. 20 FTR; SANK 12/5/43; 565 TONS 24 NO.869; CARGO 565 GT SUNK 1/25/43 BY MARINE CASUALTY; POS. ACCURACY 1-3 MILES 61 1/25/43

**Survey Results:** A radius of 200 meters was covered with 200% sidescan and resulting multibeam coverage around AWOIS 994. No obstructions or wrecks were found within the covered area.

*D.1.3.2 AWOIS 996 (Full): P.J. HOOPER*

**History:** 37° 50' 12.45"N 075° 20' 23.70"W. 24 NO.1142; TUG; SUNK 3/26/41; POSITION ACCURACY WITHIN 1 MILE

**Survey Results:** A radius of 100 meters was covered with 200% sidescan and resulting multibeam coverage around AWOIS 996. Feature #7 is a wreck with a least depth of 30 feet (9.211 meters, 0.27 meters uncertainty) was found within the AWOIS radius in 37° 50' 10.82"N 075° 20' 23.67"W and is further discussed in the Chart Comparisons (Section D.1).

*D.1.3.3 AWOIS 997 (Full): UNKNOWN*

**History:** 37° 51' 03.25"N 075° 15' 57.19"W. 24 NO.620; POS. ACCURACY 1 MILE AT POS.37-51-02N 75-15-57W; REPORTED THRU H.O. IN 1950

**Survey Results:** A radius of 200 meters was covered with 200% sidescan and resulting multibeam coverage around AWOIS 997. Feature #19 is a wreck with a least depth of 16 feet (4.982 meters, 0.27 meters uncertainty) that fell within the AWOIS radius in 37° 51' 02.28"N 075° 15' 57.14"W and is further discussed in the Chart Comparisons (Section D.1).

*D.1.3.4 AWOIS 2430 (Full): SNDG*

**History:** 37° 45' 48.45"N 075° 13' 52.69"W. CL1204/59--25 FT. REP. CHARTED IN APPROXIMATE POS. LAT. 37-45-48N LONG. 75-13-54W. CG BROADCAST; POSSIBLE SUBMERGED WRECK 25 FT. LD IN APPROX. 50 FT. MAR--8/27/82

**Survey Results:** A radius of 200 meters was covered with 200% sidescan and complete multibeam coverage around AWOIS 2430. No obstructions or wrecks were found within the covered area.

*D.1.3.5 AWOIS 2432 (Full): UNKNOWN*

**History:** 37° 48' 00.45"N 075° 14' 46.69"W. NM48/69--SUBMERGED DANGEROUS WRECK PA CHARTED IN APPROX. POS. LAT. 37-48-00N LONG. 75-14-48W.

**Survey Results:** A radius of 200 meters radius and was covered with 200% sidescan and complete multibeam coverage around AWOIS 2432. No obstructions or wrecks were found within the covered area.

*D.1.3.6 AWOIS 2632 (Full): OBSTRUCTION*

**History:** 37° 46' 06.55"N 075° 14' 18.90"W. H10044/82-OPR-D103-MI-82; UNCHARTED OBSTRUCTION LOCATED DURING EVALUATION IN LAT.

37-46-06.10N LONG. 75-14-20.21W. APPROX. LD 47 FT. FOUND ON THREE DIFFERENT SIDE SCAN SONAR PASSES.

**Survey Results:** A radius of 200 meters was covered with 200% sidescan and complete multibeam coverage around AWOIS 2632. Feature #10 is an obstruction with a least depth of 59 feet (18.157 meters, 0.27 meters uncertainty) found within the AWOIS radius in 37° 46' 06.75"N 075° 14' 18.93"W and is further discussed in the Chart Comparisons (Section D.1).

*D.1.3.7 AWOIS 2633 (Full): OBSTRUCTION*

**History:** 37° 50' 03.45"N 075° 12' 31.68"W. H10044/82--OPR-D103-MI-82; UNCHARTED OBSTRUCTION (POSSIBLY WRECKAGE) LOCATED DURING EVALUATION IN APPROX. LAT. 37-50-03N LONG. 75-12-33W. FOUND BY SIDE SCAN SONAR (SEEN 2 TIMES ON SONAGRAMS).

**Survey Results:** A radius of 200 meters radius was covered with 200% sidescan and resulting multibeam coverage around AWOIS 2633. The AWOIS area was surrounding a submerged dangerous wreck symbol. Feature #9 is set on the shoalest obstruction with a least depth of 71 feet (21.734 meters, 0.28 meters uncertainty) among multiple obstructions within the AWOIS radius in 37° 50' 02.56"N 075° 12' 31.40"W. Further discussion is located in the Chart Comparisons (Section D.1).

*D.1.3.8 AWOIS 2775 (Information Only): TRECARELL*

**History:** 37° 51' 12.45"N 075° 15' 58.69"W. 20 STR; FOUNDERED 2/25/16 ON BLACKFISH SHOAL WITH A CARGO OF PYRITES; 3874 TONS.

**Survey Results:** A radius of 200 meters was covered with 200% sidescan and resulting multibeam coverage around AWOIS 2775. Feature #25 is an obstruction with a least depth of 24 feet (7.354 meters, 0.27 meters uncertainty) fell within the AWOIS radius in 37° 51' 09.38"N 075° 15' 53.61"W and is fully discussed in the Chart Comparisons (Section D.1).

*D.1.3.9 AWOIS 14499 (Full): OBSTRUCTION*

**History:** 37° 45' 00"N 075° 15' 30"W. USCG 5th - Obstruction PA (unexploded ordinance). (ETR 03/12/2009) LNM30/99

**Survey Results:** A radius of 200 meters was covered with 200% sidescan and complete multibeam coverage around AWOIS 14499. No obstructions or wrecks were found within the covered area.

*D.1.3.10 AWOIS 14500 (Full): OBSTRUCTION*

**History:** 37° 45' 00"N 075° 24' 00"W. USCG 5th - Obstruction PA (unexploded ordinance). (ETR 03/12/2009) LNM30/99

**Survey Results:** A radius of 200 meters was covered with 200% sidescan and complete multibeam coverage around AWOIS 14500. No obstructions or wrecks were found within the covered area.

#### *D.1.3.11 AWOIS 14501 (Full): UNKNOWN*

**History:** 37° 47' 30"N 075° 22' 29"W. USCG 5th - Wreck PA 37/47/30N 75/22/29W reported 12/24/85. (ETR 30/12/2009) LNM52/85

**Survey Results:** A radius of 200 meters was covered with 200% sidescan and resulting multibeam coverage around AWOIS 14501. Feature #29 marks wreckage with a least depth of 36 feet (11.132 meters, 0.27 meters uncertainty) that fell within the AWOIS radius in 37° 47' 31.79"N 075° 22' 23.60"W and is further discussed in the Chart Comparisons (Section D.1).

### **D.1.4 Designated Soundings**

Designated soundings were set across this sheet to help better preserve the shallowest soundings relative to the computed depth surface. In some cases, designated soundings were used to preserve the least depth of small objects that were not significant enough to warrant a feature designation. Designated soundings were also used in conjunction with three features in order to help preserve the shoalest depths that were not selected as the feature. Separate flags exist in the Generic Sensor Format (version 3.01) for designated soundings and features. All of the designated soundings in the final CUBE surface have also been flagged as designated soundings in the GSF files. There were 17 designated soundings set in H12094. 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 that have been set for H12094 are listed within two spreadsheets "H12094\_Multibeam\_Features\_List" and "H12094\_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).

### **D.1.5 Danger to Navigation Reports**

A single Danger to Navigation Report was submitted to AHB by SAIC for this survey and a copy has been included in Appendix V. A corresponding version of the Danger to Navigation Report as AHB submitted it to the Marine Charting Division is provided in Appendix I. The Danger to Navigation Report is also referenced in Chart Comparisons D.1 and corresponds to Feature #21.

## D.2 ADDITIONAL RESULTS

### D.2.1 Shoreline Verification

Shoreline verification was not required for H12094.

### D.2.2 Comparison with Prior Surveys

Comparison with prior surveys was not required under this task order.

### D.2.3 Aids to Navigation

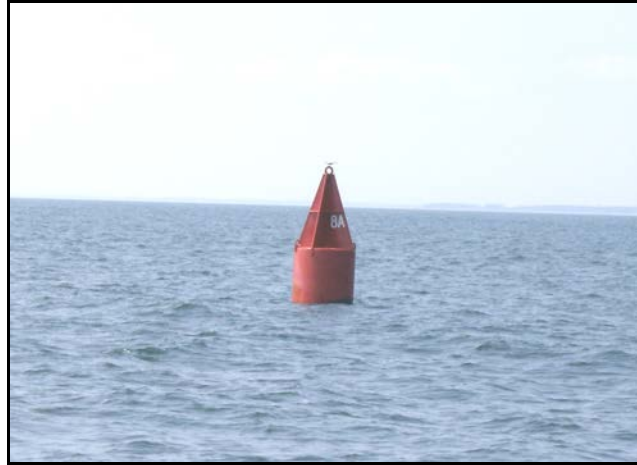
Three charted buoys were found within the data for H12094. Two of them are located along Blackfish Bank and the other on Turners Lump. Each is discussed in detail below.

The charted R N “2” buoy was found (Feature #28) in 37° 48’ 54.46”N 075° 19’ 25.67”W (Figure D-1). This agreed with the description of the Turners Lump Buoy 2 in the United States Coast Guard Light List Volume II Atlantic Coast 2010.



**Figure D-1. Turners Lump Buoy 2**

The charted R N “8A” buoy was found (Feature #27) in 37° 50’ 25.41”N 075° 15’ 52.76”W (Figure D-2). This agreed with the description of the Blackfish Bank Buoy 8A in the United States Coast Guard Light List Volume II Atlantic Coast 2010. It was observed, however, that the buoy is inconsistently labeled. When observing the buoy on our second pass, one of the labels on the buoy contains only an “A” instead of “8A” and is shown in Figure D-3.



**Figure D-2. Blackfish Bank Buoy 8A**



**Figure D-3. Blackfish Bank Buoy 8A Showing Side Labeled A**

The charted R “8” Fl R 2.5s GONG buoy was found (Feature #26) in 37° 50’ 37.48”N 075° 12’ 05.58”W (Figure D-4). The buoy is technically located within the Statement of Work bounds for H12093, but was covered in the overlap data from H12094. The buoy was found to have a flashing light and gong in accordance with its chart description. This agreed with the description of the Blackfish Bank Lighted Gong Buoy 8 in the United States Coast Guard Light List Volume II Atlantic Coast 2010.





**Figure D-4. Blackfish Bank Lighted Gong Buoy 8**

#### **D.2.4 Bottom Characteristics**

In accordance with both the Project Instructions and *NOS Hydrographic Surveys Specifications and Deliverables*, April 2009, bottom characteristics were obtained for H12094. Fifty-three samples were collected. Bottom characteristics are included in the H12094 Feature File, "3S412094.000", within the Seabed Area (SBDARE) object and attributed correctly to the International Hydrographic Organization (IHO) Special Publication 57, the IHO Transfer Standard for Digital Hydrographic Data (S-57) requirements. In addition to the data being maintained within the S-57 feature file, bottom characteristics are also presented in tabular form (Table Appendix V-1) and images in Appendix V. Bottom characteristics obtained for H12094 are sufficient to be used to update the respective raster and vector charts.

#### **D.2.5 S-57 Feature File**

The final S-57 feature file for H12094, "3S412094.000", was made in accordance with the IHO S-57 standards and Section 8.2 of the *NOS Hydrographic Surveys Specifications and Deliverables*, April 2009. SAIC generates the S-57 feature file through **SABER** using the SevenCs Kernel. The software was recently modified to preserve depths (VALSOU attribute) to at least centimeter precision, as opposed to decimeter precision. The S-57 feature file delivered for H12094 contains millimeter precision, although some supporting documents contain centimeter precision (such as the Feature Correlator Sheets). Following specifications, the S-57 feature file is in the WGS84 datum and is unprojected with all units in meters. All features addressed in H12094 are retained within the S-57 feature file (including those features not recommended for charting) except the three U.S. Coast Guard maintained aids to navigation in accordance with Section 8.2 of the *NOS Hydrographic Surveys Specifications and Deliverables*, April 2009. The "H12094\_Multibeam\_Features\_List" provided within Appendix II lists all multibeam features flagged within the GSF records.

The feature file is subjected to ENC validation checks through Jeppesen's **dKart Inspector** and quality control through **dKart Inspector**, **CARIS Easy View**, and **SevenCs SeeMyDENC**.

### **D.2.6 Sidescan Sonar Contacts S-57 File**

As requested from NOAA AHB in addition to the Sidescan Contact list ("H12094\_Sidescan\_Contacts\_List") located in Appendix II, SAIC also generated a supplemental S-57 file to present the sidescan contacts. The supplemental S-57 file was generated through the same process used to create the final H12094 S-57 feature file. Note both of these S-57 files share the same name "3S412904.000". The supplemental sidescan S-57 feature file is located in the directory named "H12094\_Sidescan\_Sonar\_S-57\_File\_as\_Cartographic\_Symbol", while the S-57 final feature file is located in the directory named "H12094\_S-57\_Feature\_File".

Within the sidescan S-57 file, contacts are delivered by using an object from the Cartographic Object Classes, Cartographic Symbol (\$CSYMB). The information field (INFORM) of each cartographic symbol details specifics regarding the contact; the contact name, sequential id, length, width, height, shadow length, range scale, slant range, altitude, and whether or not the contact was correlated to a feature. Contacts that were correlated list the multibeam feature number and least depth. Additionally under picture representation (PICREP), a tiff image for each contact is delivered. Sidescan contact images are delivered in two places, under Separates V and the Sidescan Sonar Contact S-57 file folder. Within Separates V, the images are named according to the contact name and in the Sidescan Sonar Contact S-57 folder; they are named using the sequential id. Contacts correlated to a feature have a linked text file which corresponds to the INFORM field of the correlated feature as it appears in the H12094 S-57 feature file, "3S412904.000". The "H12094\_Sidescan\_Contacts\_List" also provides the same information that is contained in the S-57 file. For spatial reference, the meta-objects provided in the S-57 final feature file are also in the sidescan contact S-57 file.

### **D.2.7 Additional Factors**

The inshore, near coastal areas of the mid-Atlantic are relatively dynamic, and finer-grained sediments (e.g., fine sands and silt) are routinely transported through normal coastal processes. These processes include alongshore transport and seasonal transport towards and away from shore. In addition, periodic large storm events may be capable of re-suspending and transporting coarser-grained bottom sediments. Over the period of these survey operations, small-scale changes in the bottom topography, likely due to normal migration of finer-grained sand waves, were evident around shoals. These changes were most common along Blackfish Bank and the Chincoteague Shoals in depths less than seven meters. These isolated depth differences due to sediment transport accounted for some of the higher CUBE uncertainties observed across H12094. Other factors which contributed to the higher CUBE uncertainties observed in shallow areas

were positional variability of overlapping data and tidal variations created using generalized, large-scale zoning.

## E. APPROVAL SHEET

21 January 2011

### LETTER OF APPROVAL

REGISTRY NUMBER: H12094

This report and the accompanying digital data for project OPR-D302-SA-09 DELMARVA, Virginia Project is respectfully submitted.

Field operations and data processing contributing to the accomplishment of this survey, H12094, 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 previously submitted to NOAA for this project include:

<u>Report</u>	<u>Submission Date</u>
Data Acquisition and Processing Report, SAIC Doc 10-TR-010	01 October 2010
H12091 Descriptive Report, SAIC Doc 10-TR-004	01 October 2010
H12092 Descriptive Report, SAIC Doc 10-TR-030	17 December 2010

SCIENCE APPLICATIONS INTERNATIONAL CORPORATION

**Evan J.  
Robertson**

Digitally signed by Evan J. Robertson  
DN: cn=Evan J. Robertson, o=MSTD,  
ou=SAIC,  
email=Evan.J.Robertson@saic.com, c=US  
Date: 2011.01.21 17:35:30 -05'00'

Evan J. Robertson  
Lead Hydrographer  
Science Applications International Corporation  
21 January 2011

APPENDIX I  
TIDES AND WATER LEVELS

\*\*\*\*\* **TIDES AND WATER LEVELS**

The on-line times for acquisition of valid hydrographic multibeam data are presented in the Abstract Times of Hydrography, H12094 (Table Appendix IV-1).

**Project:** OPR-D302-SA-09

**Registry No.:** H12094

**Contractor Name:** Science Applications International Corporation

**Date:** 17 October 2010

**Sheet Letter:** R

**Inclusive Dates:** 19 August 2010 – 17 October 2010

Field work is complete.

**Table Appendix IV-1. Abstract Times of Hydrography, H12094**

<b>Begin Date</b>	<b>Begin Julian Day</b>	<b>Begin Time (UTC)</b>	<b>End Date</b>	<b>End Julian Day</b>	<b>End Time (UTC)</b>
08/19/2010	231	21:54:49	08/22/2010	234	03:12:15
08/23/2010	235	20:20:31	09/01/2010	244	15:28:00
09/06/2010	249	19:21:43	09/14/2010	257	23:35:51
10/08/2010	281	20:34:48	10/09/2010	282	11:14:42
10/10/2010	283	00:21:33	10/12/2010	283	08:38:47
10/14/2010	287	11:26:52	10/14/2010	287	18:07:35
10/17/2010	290	18:18:22	10/17/2010	290	19:20:43

**Final Tide Note**

Observed verified water levels were downloaded from the [NOAA Tides and Currents](#) web site for the station in Duck, NC (8651370). Water level correctors were prepared for each zone using the **SABER/Tools/Create Water Level Files** software. **SABER/Apply Correctors/Tides** software applied these files to the multibeam data according to the zone containing the nadir beam of each ping.

Analysis of the H12094 multibeam data using **SABER Multi-View Editor** and in depth grids revealed minimal depth jumps across the junction of zones based on Duck, NC (8651370). A spreadsheet analysis also confirmed this adequacy of zoning correctors based on Duck, NC (8651370), refer to the H12094 Descriptive Report Section C.1.1 for details regarding final tides for H12094. The water level zoning correctors based entirely on Duck, NC (8651370) were applied to all multibeam data for H12094.

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.

APPENDIX II

SUPPLEMENTAL SURVEY RECORDS  
AND CORRESPONDENCE

## Danger to Navigation Report 1

Hydrographic Survey Registry Number: H12094

State: Virginia

Locality: Atlantic Ocean

Sub Locality: 5 NM SE of Chincoteague Inlet

Project Number: OPR-D302-SA-09

Survey Date: 14 October 2010 at 14:42:18 UTC

Depths are reduced to Mean Lower Low Water using verified observed tides based on preliminary zoning. Positions are based on NAD-83. Positions were obtained using DGPS from a US Coast Guard Station.

Charts affected:

12210 38<sup>th</sup> Edition 05/01/2008 1:80,000 scale; Corrected through NM 10/23/2010  
 12211 43<sup>rd</sup> Edition 10/01/2007 1:80,000 scale; Corrected through NM 10/23/2010

The following items were found during hydrographic survey operations:

<u>FEATURE</u>	<u>DEPTH</u>	<u>LATITUDE</u>	<u>LONGITUDE</u>
Obstruction	18 ft (5.50 m)	37° 49' 55.98" N	075° 21' 14.04" W

Description:

The submerged dangerous obstruction is a single object found just north of the Turners Lump shoal. The object is approximately one meter by one meter in size with a least depth of 18 feet (5.50 meters) in depths of 30 feet (9.20 meters).

RECOMMENDATIONS:

Chart an 18-foot dangerous obstruction in 37° 49' 55.98" N 075° 21' 14.04" W and label Obstn.



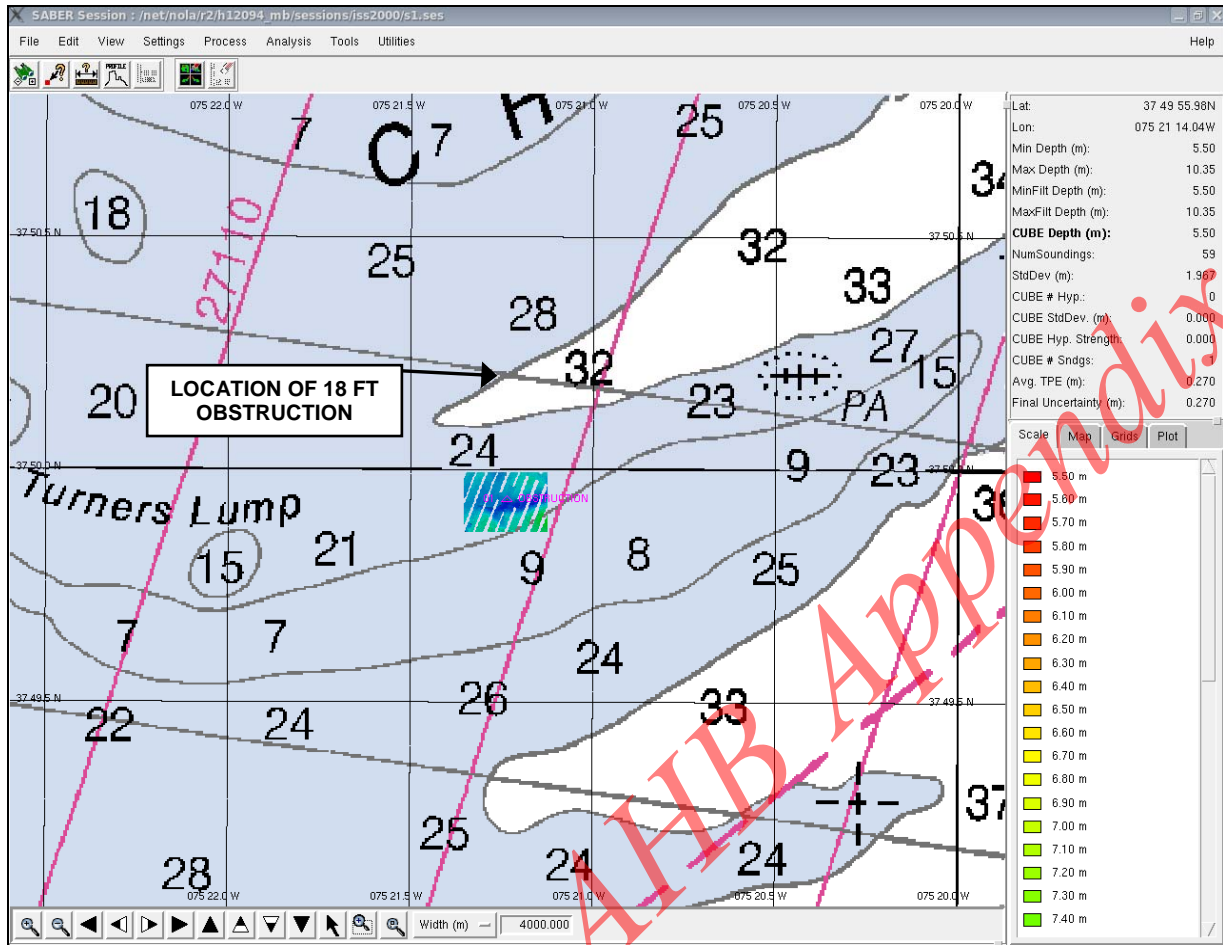


Figure 1. Section of Chart 12211 Showing Location of Obstruction with Least Depth of 18 Feet within H12094.

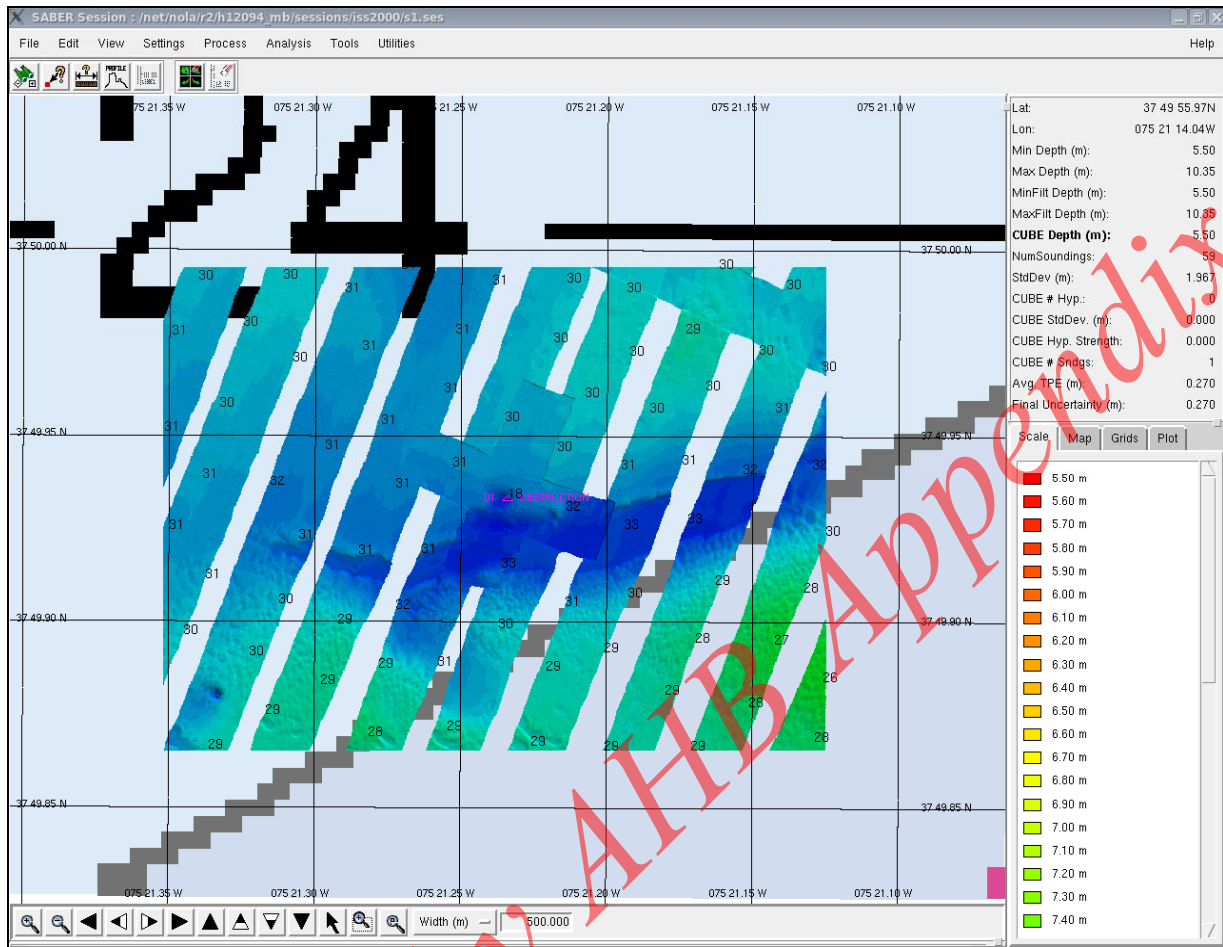


Figure 2. Section of Chart 12210 Showing 0.5-meter PFM and Selected CUBE Soundings around Obstruction with Least Depth of 18 Feet within H12094.

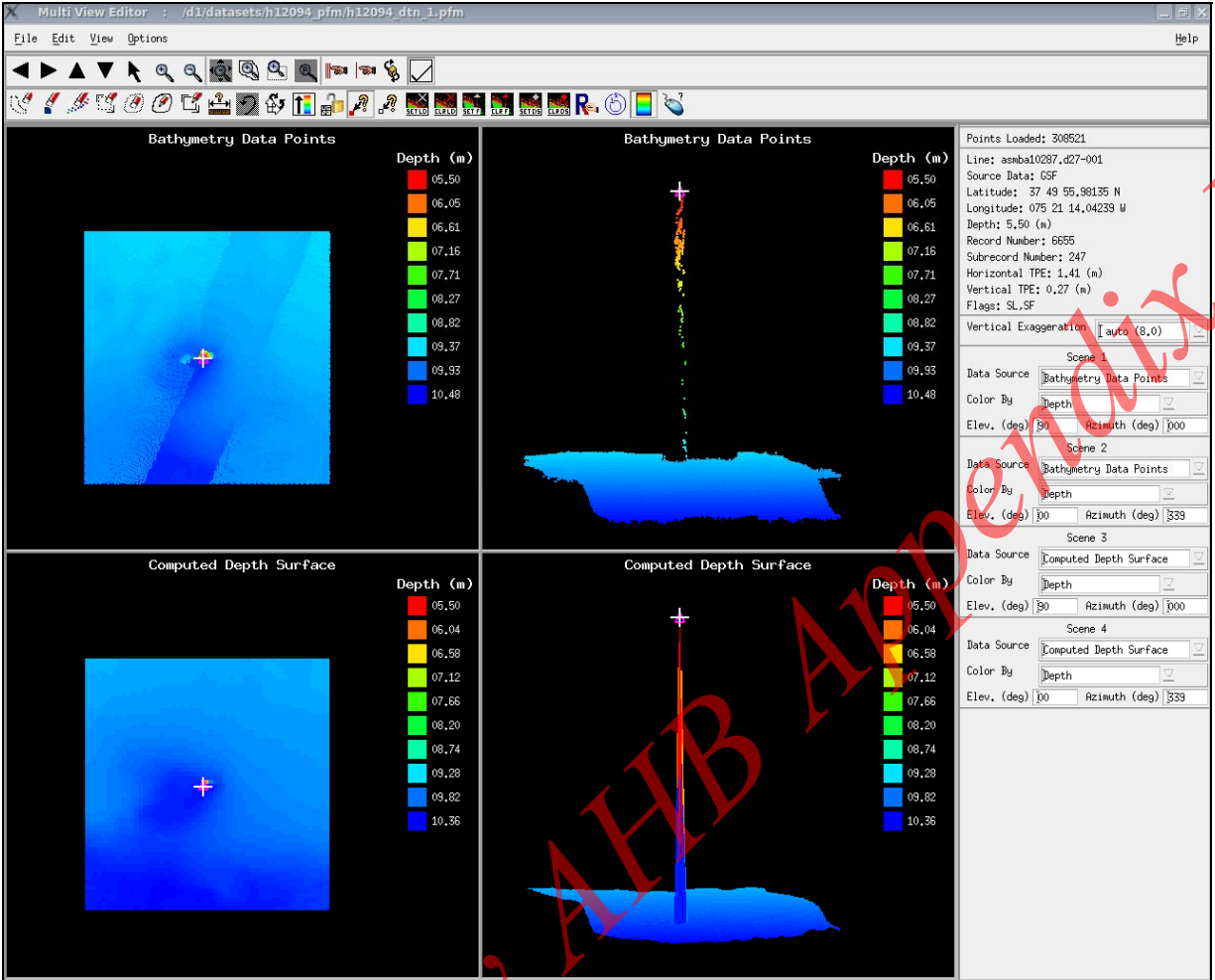


Figure 3. Multiview Editor of 0.5-meter PFM Grid Showing Obstruction with Least Depth of 18 Feet within H12094.

Superseded by AHB AIRM 01/21/11

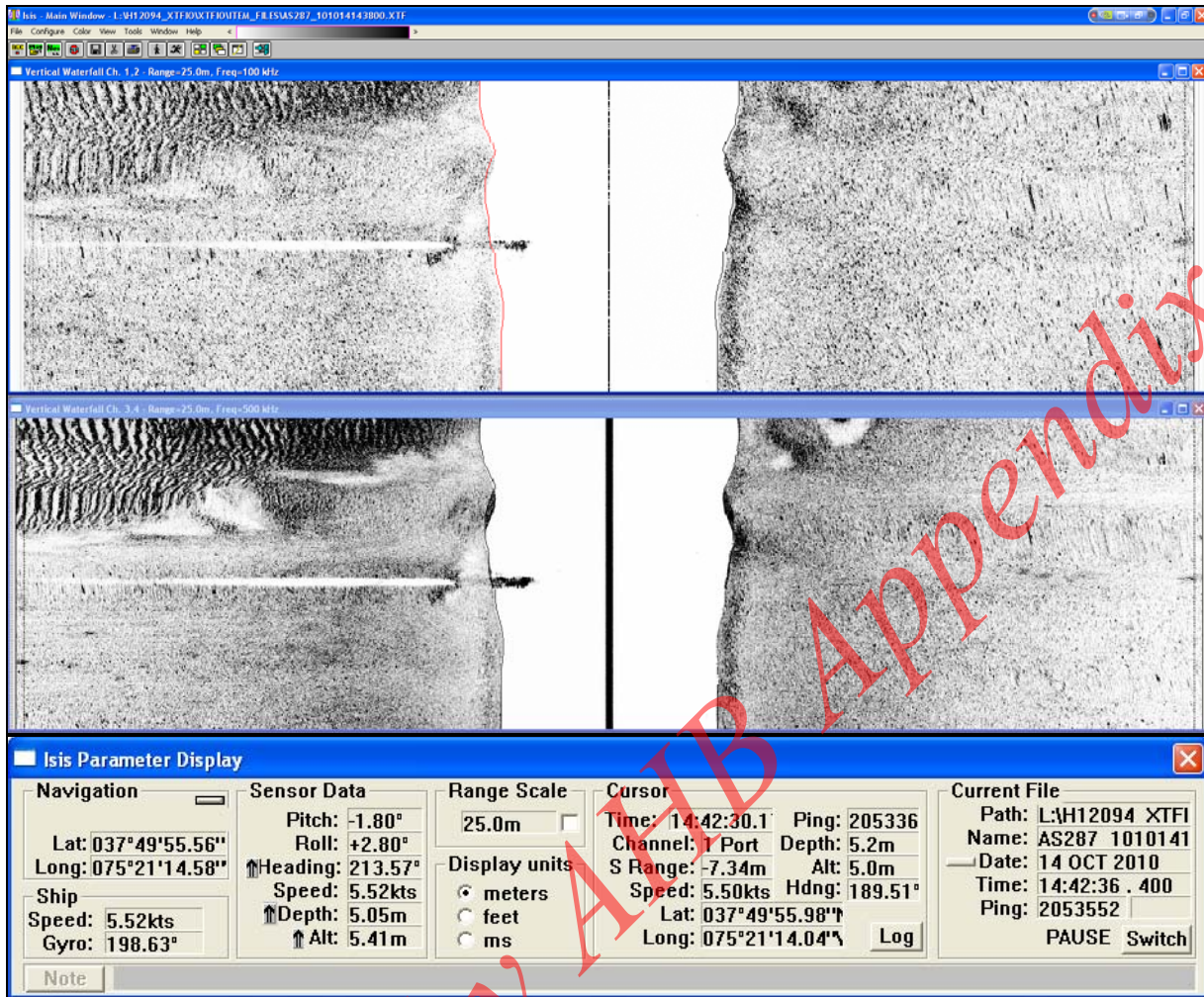


Figure 4. 25-Meter Range Sidescan Image (100 kHz top, 500 kHz bottom) of Obstruction with Least Depth of 18 Feet within H12094.

Superseded by A/B Appendix III



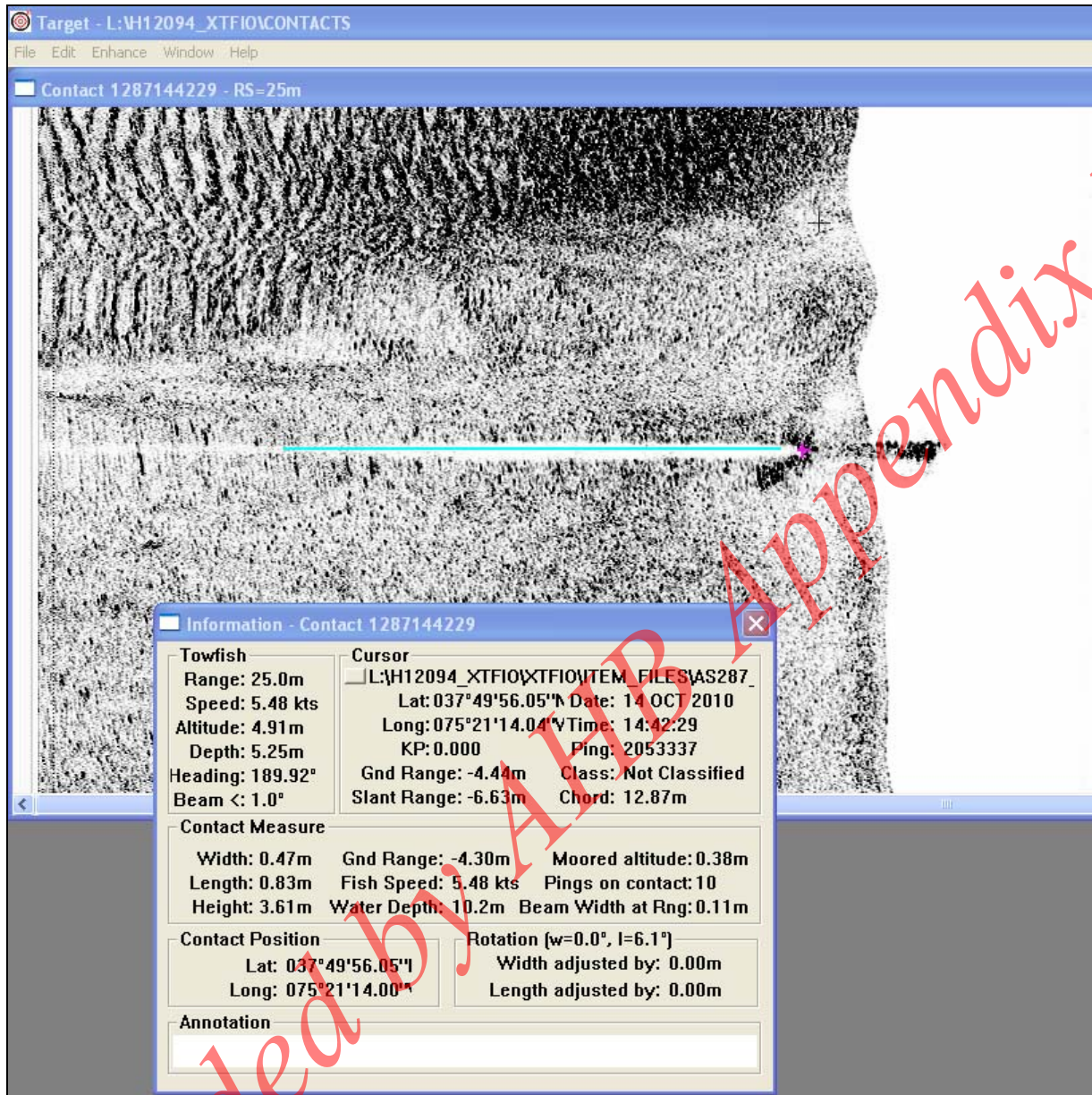


Figure 5. Sidescan Target Image (100 kHz, 25-Meter Range) of Obstruction with Least Depth of 18 Feet within H12094.

Superseded by AIP Appendix III

**CORRESPONDENCE**

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-----Original Message-----

From: Evans, Rhodri E.  
Sent: Thursday, May 21, 2009 11:27 AM  
To: Donaldson, Paul L.; Davis, Gary R.; Quintal, Rebecca T.  
Cc: Infantino, Jason; Simmons, Walter S.  
Subject: RE: NOAA: Science Application Doc

For the record: in discussion with Mark Lathrop this morning he confirmed that we should work to the April 2009 HSSD. Rebecca is conducting the change detention on the HSSD versions.  
Thx, RE.

-----Original Message-----

From: Evans, Rhodri E.  
Sent: Thursday, May 21, 2009 9:10 AM  
To: Donaldson, Paul L.; Davis, Gary R.; Quintal, Rebecca T.  
Subject: NOAA: Science Application Doc  
Importance: High

FYI, the award of Task Order #1. Note the only discrepancy I see is that the award states April 2007 HSSD and the Project Instructions state April 2009 HSSD.

Note that the NOAA website now states: "The April 2009 edition includes new specifications and changes since the previous April 2008 version, including updates to Depth Sounding (Chapter 5) and Deliverables (Chapter 8). As there have been both minor and major edits throughout this new edition, it would be in the best interest to those that expect to acquire hydrographic survey data in accordance to NOS specifications, to use the current version."

See you at 10.

RE.

---

From: Evans, Rhodri E. [mailto:RHODRI.E.EVANS@saic.com]  
Sent: Friday, July 10, 2009 11:32 AM  
To: Davis, Gary R.; Donaldson, Paul L.; Quintal, Rebecca T.; Simmons, Walter S.  
Subject: Fw: [Fwd: Re: [Fwd: RE: Tide Clarification]]

All, resolution on the tide station hot list issue. RE.

-----  
From: Jeffrey Ferguson <Jeffrey.Ferguson@noaa.gov>  
To: Evans, Rhodri E.  
Cc: Mark T Lathrop <Mark.T.Lathrop@noaa.gov>

Sent: Fri Jul 10 11:23:42 2009  
Subject: [Fwd: Re: [Fwd: RE: Tide Clarification]]

Rod,

See below. Let me know if you have any other questions.

Jeff

----- Original Message -----

Subject:  
Re: [Fwd: RE: Tide Clarification]  
Date: Fri, 10 Jul 2009 11:12:16 -0400  
From: Carolyn Lindley [Carolyn.Lindley@noaa.gov](mailto:Carolyn.Lindley@noaa.gov)  
Reply-To: [Carolyn.Lindley@noaa.gov](mailto:Carolyn.Lindley@noaa.gov)  
Organization: National Ocean Service  
To: Kyle.Ward [Kyle.Ward@noaa.gov](mailto:Kyle.Ward@noaa.gov)  
CC: Jeffrey Ferguson <[Jeffrey.Ferguson@noaa.gov](mailto:Jeffrey.Ferguson@noaa.gov)>, William Sweet <[William.Sweet@noaa.gov](mailto:William.Sweet@noaa.gov)>  
References: <[4A57405A.2050208@noaa.gov](mailto:4A57405A.2050208@noaa.gov)> [4A5759CF.4010209@noaa.gov](mailto:4A5759CF.4010209@noaa.gov)

Hi All,  
Duck has been upgraded to priority processing on the HHL.

Thanks,Carolyn

Kyle.Ward wrote:

Jeff,  
I spoke with Billy and Caroline and they confirmed only Duck is needed to control D302, as stated in the instructions from CO-OPS. Atlantic City, NJ (853-4720) and Lewes, DE (863-5750) were inadvertently added to the SOW. Caroline will have Duck added to the Hydro hot list.  
Regards,  
Kyle

Jeffrey Ferguson wrote:

As discussed...

Thanks,  
Jeff

----- Original Message -----

Subject: RE: Tide Clarification  
Date: Thu, 09 Jul 2009 17:46:56 -0400  
From: Evans, Rhodri E. <[RHODRI.E.EVANS@saic.com](mailto:RHODRI.E.EVANS@saic.com)>

To: Davis, Gary R. <GARY.R.DAVIS@saic.com>, Mark.T.Lathrop >>  
<Mark.T.Lathrop@noaa.gov>, [Jeffrey.Ferguson@noaa.gov](mailto:Jeffrey.Ferguson@noaa.gov)>>  
CC: Donaldson, Paul L. <PAUL.L.DONALDSON@saic.com>, Rebecca >> Quintal  
<REBECCA.T.QUINTAL@saic.com>, Walter Simmons >>  
<WALTER.S.SIMMONS@saic.com>>>  
References: >> <4A3253243D8F5B4BB74B27E54334000D051CC164@0015-its-  
exmb04.us.saic.com>>> >> >> >>

Jeff,

I believe Mark is on leave as of this evening. Please see the attached email.

Thanks, RE.

From: Davis, Gary R.  
Sent: Thu 7/9/2009 5:30 PM  
To: Mark.T.Lathrop  
Cc: Rhodri Evans; Donaldson, Paul L.; Rebecca Quintal; Walter Simmons  
Subject: Tide Clarification

Mark,

In a recent response for tide zoning for our upcoming surveys off the DelMarVa coast you indicated that we should use the same zoning as last year's surveys. These zones were based on the tide station at Duck, NC (865-1370). We are currently planning to start survey operations on Sunday 12 July and request that the status of this station be changed to Priority Processing on the COOPS Hot List. The COOPS Hot List currently shows the status of this station as "Priority Processing removed, gauge will be used again in the summer of 2009. We have also noticed that the Project Instructions (OPR-D302-SA-09 Project Instructions.pdf) lists tide stations Atlantic City, NJ (853-4720) and Lewes, DE (863-5750) under the Tide Requirements. It does not mention the Duck, NC tide station. Are these stations required in addition to Duck, NC; or intended as backup tide stations in the event that Duck, NC fails? If so we request that they also be added to the COOPS Hot List.

Regards,  
Gary R. Davis, ACSM Certified Hydrographer  
Chief Hydrographer  
SAIC Marine Science and Technology Division  
221 Third Street  
Building A  
Newport, RI 02840  
Tel (401)847-4210  
Email: [gary.r.davis@saic.com](mailto:gary.r.davis@saic.com)

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-----Original Message-----

From: Mark.T.Lathrop [mailto:Mark.T.Lathrop@noaa.gov]

Sent: Wednesday, September 23, 2009 9:53 AM

To: Davis, Gary R.

Cc: Evans, Rhodri E.; Donaldson, Paul L.; Quintal, Rebecca T.; Simmons, Walter S.

Subject: Re: OPR\_D302\_SA-09 Task Order2 Mod 2

Gary,

Attached is the revised tide zoning for the expanded Delmarva survey.

Mark

Davis, Gary R. wrote:

> Mark,

>

> Thanks for the tide zones for the Georgia sheets A, B, C, D, and E.

> As mentioned in the Status report of 17 September we are planning to

> commence survey operations on these sheets in Late October. Please

> request that CO-OPS place tide station 8720030 (Fernandina Beach) on

> the hot list.

>

> As mentioned in Rod's last Status Report we have commenced survey

> operations on the Virginia O, P, Q, and R Sheets. Please forward ASAP

> additional tide zones based on station 8651370 (Duck, NC). The zones

> we have received do not cover the southwest area of Sheet P nor the

> west half of Sheet R.

>

> The Project Instructions for Sheets OPQR include 17 AWOIS items for

> full investigation and 1 for information only. Please forward the

> AWOIS information as soon as possible.

>

> Thanks

> Gary R. Davis, ACSM Certified Hydrographer Chief Hydrographer SAIC

> Marine Science and Technology Division

> 221 Third Street

> Building A

> Newport, RI 02840

> Tel (401)847-4210

> Email: [gary.r.davis@saic.com](mailto:gary.r.davis@saic.com)

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-----Original Message-----

From: Castle.E.Parker [mailto:Castle.E.Parker@noaa.gov]  
Sent: Tuesday, February 23, 2010 2:44 PM  
To: Mark.T.Lathrop; Quintal, Rebecca T.  
Cc: Evans, Rhodri E.; Donaldson, Paul L.; Davis, Gary R.; Simmons, Walter S.  
Subject: Re: Clarification on Object Detection Coverage

Good Day Everyone,

My comments will be in blue fonts:

Question 1: Yes to 1m resolution grid for the entire area and no to the second part. Object Detection 0.5m resolution grid for AWOIS MB investigations where 200% SS was not acquired and any MB developments that contains a feature. This refers to the output deliverables at 0.5m resolution. Object detection is really covered with the SS 200% for disprovals and detecting features; side scan is the object detection tool in this case, then developed with MB coverage for features that are considered significant or an AWOIS item if located. If the multibeam sonar is a high resolution sonar such a 0.5°x0.5° beam width it is considered object detection capable and considered appropriate for charted feature disapproval without SSS coverage. We don't really need the AWOIS items covered with 200% SSS and then conducting object detection coverage over the same area with MB where the feature was not located within the SS records. This in essence is two object detect coverages. The disapproval of a feature (AWOIS or charted feature) can occur with MB if a high res sonar unit, but that common area should have 200% SSS coverage and that would be the disapproval source. Thus if SS doesn't reveal or contain contacts that represent the AWOIS item, then the AWOIS items does not need 0.5m resolution grid coverage over the entire AWOIS search radius. The 0.5m grid should only contain the MB developments for the feature located.

We don't need a 0.5m resolution grid for the entire area. The 0.5m resolution grid should contain only the feature developments.

Question 2: Yes.

Again, object detection grid resolution would not be applicable for a 200% SSS survey with skunk striped MB (bathy data). the object detection should source the SS.

Submit 1 grid for the entire area at 1m resolution. Submit a grid at 0.5m resolution for all MB developments where applicable.

Clear? If not, please respond.

Gene

Mark.T.Lathrop wrote:

Rebecca,

It makes sense to me to have a 1-meter BAG for the entire sheet including the AWOIS and a separate BAG for those AWOIS items < 23m. I am including Gene in my reply since AHB will be reviewing the data and I'm sure he'll want to weigh in on this.

Mark

Quintal, Rebecca T. wrote:

Mark,

We would like clarification on the requirement for Object Detection Coverage in the Project Instructions for OMNI TO#1 MARYLAND Sheets LMN, TO#2 DELMARVA Sheets OPQR, and TO#3 Georgia ABCDE. For all three projects the Coverage section of the Project Instructions state the following:

**\*REQUIRED COVERAGE TYPES\***

/water depth range or area  
required coverage type(s)/\*\*

all depths 200% SSS with concurrent VBES or MB coverage

Area(s) where object detection is critical  
Object Detection Coverage including AWOIS investigations

We have interpreted the “areas where object detection is critical” to only be the portions of assigned AWOIS investigation areas within our survey bounds since no other areas are specified.

Section \*5.1.2.1 Object Detection Coverage \*in the 2009 Specifications and Deliverables document states that “The following grid-resolution thresholds as a function of depth range; shall be used unless an exception is approved as described in Section 5.1.2.”

\* \*

*Depth** Range** (m)	Resolution (m)*
0-23	0.5
20-40	1

\* \*

\*Question 1 – For water depths between 0-23 meters\*

Our intention is to deliver 1 meter resolution BAG files for the entire sheet to meet the Set Line Spacing Coverage requirement. For the Object Detection Coverage, we have assumed where the assigned AWOIS search radius falls within our SOW area, and the depths range from 0-23 meters, that a separate BAG will be delivered covering this area at 0.5 meter resolution. Please confirm if this is correct?

\*Question 2 – For water depths deeper than 23 meters\*

As our intention is to deliver 1 meter resolution BAG files for the entire sheet, we are assuming that these 1 meter BAGs will meet the Object Detection Coverage requirement for AWOIS areas (with assigned search radii) that fall within our SOW area and the depths are deeper than 23 meters water depth. Therefore no additional deliverables are required. Please confirm this assumption?

-Rebecca

---

\*Rebecca T. Quintal\* | SAIC  
Data Processing Manager | Marine Science and Technology Division  
phone: 401.847.4210 | fax: 401.849.1585  
mobile: 401.829.6242 | email: rebecca.t.quintal@saic.com

---

From: Gene Parker [<mailto:Castle.E.Parker@noaa.gov>]  
Sent: Wednesday, September 15, 2010 2:26 PM  
To: Quintal, Rebecca T.  
Cc: Sarah Eggleston; Richard T Brennan; Mark T Lathrop  
Subject: Re: S57 SSS Contact File

Good Afternoon,

I opened the files you submitted, reviewed, and determine that we can work with what you provided.!!! Yea! It appears normal as any other AHB feature file. I like the way that I can hover the mouse pointer over the Inform field and the whole string of attributes is visible. I can't capture the visible string, but trust me it's readable and will work FINE!

So, deliver as such and we'll take it from there.

Thanks for your additional effort for customized feature objects.

Regards,  
Gene

Quintal, Rebecca T. wrote:

Gene and Sarah,

Please find attached a zip file that contains a .000 file and associated tif images and text files for a sample S-57 file with side scan sonar contacts represented in the \$CSYMB object type. We have followed your lead and used a question mark (\$SCODE QUESMRK1) as the symbol. I

have attached a page from the IHO Publication S-52 Appendix2 which describes the symbol QUESMRK1 as well.

I know you are short on time, but if you can please have a look at this sample file to make sure it comes in to Caris as expected. I have also attached the excel file that describes these contacts (there are 6contacts) which are from Sheet H12096 which was delivered to AHB on August 20, 2010.

If all goes well we will deliver our next sheet with this \$CSYMB object for the SSS S-57 file instead of the OFSPLF object. IF we run into a snag, then you will get one more delivery with this non-standard deliverable. Our next delivery is scheduled for September 29 (H12097) but amazingly this sheet has zero contacts (first time in my career).

The next delivery that has contacts is scheduled for October 1 (H12091).

Please let me know if you have any questions.

Thanks!  
Rebecca

-----Original Message-----

From: Castle.E.Parker [<mailto:Castle.E.Parker@noaa.gov>]

Sent: Wednesday, June 23, 2010 11:22 AM

To: Quintal, Rebecca T.

Cc: Sarah Eggleston; Mark T Lathrop; Richard T Brennan

Subject: Re: S57 SSS Contact File

Hey and good day Rebecca,  
I finally reviewed the files on the disk detailing grid child layers and S57 SS contact file.

I think the S57 SSS contact file will work fine. It's nice to have this in a GIS environment rather than CAD file. I feel that we should transition to the S57 format if you're willing. I think the S57 contact file complies or enables the spec to be met.

NOS HSSD 2010 version states the following: "The contact list should be created such that it can be \*imported into a GIS for office verifier to analyze the distribution of contacts\*. However, if the hydrographer creates any image file showing the distribution of contacts and/or other products to assist with processing and analysis of the data, they may be included with the survey deliverables."

Regarding the grid child layers, this will work as well, I think. AHB will just have to carry a cheat sheet with grid child layer interpretations based upon using the Depth layer to represent different attributes such as density, hypothesis count, etc. Even though it says depth, the layer represents something else. This will have to work based upon SAIC's processing system and procedures. I would suggest providing the "read Me" file with every survey.

So, for the surveys that SAIC is planning on submitting, I think we should transition to the S57 environment and start working through the issues, that is if they exist. The files as existing on the submitted disc for review would comply with the ability to import to a GIS. I wonder if you still plan on submitting a SS contact list or table and if so, we might have to use in conjunction with the S57 SS contact file. I think that AHB would be able to backtrack the SS contact to appropriate line based upon the contact name.

I've passed the disc over to Sarah and she'll review, then bring another perspective to the table.

Rebecca, thanks for your effort with this endeavor and sorry for AHB's delayed response. Overall, good job and look forward to your response and revision within the survey deliverables. Please respond as necessary.

Regards,  
Gene

Quintal, Rebecca T. wrote:

Hello Gene and Sarah,

Today you should receive a DVD from us with a variety of sample files.

We have sample BAGs that have a variety of CUBE child layers in them.

The CUBE child layers that are available in our PFM grids are:

- CUBE Depth
- CUBE Standard Deviation
- CUBE Number of Hypotheses for each node
- CUBE Hypothesis Strength (chosen hypothesis)
- CUBE Number of Soundings contributing to the chosen hypothesis for each node
- Average Propagated Error of soundings contributing to the node
- Final Uncertainty (the larger of the Average Propagated Error and the CUBE Standard Deviation)

We have included these layers in various combinations in BAG files as listed below. It turns out that if you go through the GUI our software prevents us from populating the BAGs with nonstandard data (ex: number of hypotheses in the Depth layer), but if we export from PFM to BAG via command line we can do it. We have also included XYZ files of the layers as well. Does Caris have the capability to display PFM grids? I know there was talk of them supporting the format at one point but never heard what became of it. If Caris can display them, then we could certainly delivery our final PFM grid which has all of these as layers within the single grid.

We have also included two sample s-57 feature files with side scan contacts in them. We populated the contacts into the OFSPLF (Offshore platform) object. One file has only that object in it and the other has the meta objects as well (mcover, mnsys, and mqual). These were produced

with our existing capability. So we can certainly implement the \$csymb object as well once it is implemented.

Please let me know if you have any questions on any of these sample files. Hopefully something in this mix will be beneficial.

Happy Friday!  
Rebecca

Bag and XML files:

- Cube\_#Snds\_depth\_Cube\_stdev\_uncert
  - Depth = Cube number of soundings
  - Uncertainty= Cube Standard Deviation
- Cube\_depth\_Avg\_TPE\_uncert
  - Depth = Cube Depth
  - Uncertainty = Average Total Propagated Error
- Cube\_depth\_Cube\_StdDev\_uncert
  - Depth = Cube Depth
  - Uncertainty = Cube Standard Deviation
- Cube\_depth\_Final\_uncert
  - Depth = Cube Depth
  - Uncertainty = Final Uncertainty
- Cube\_hyp\_depth\_Cube\_stdev\_uncert
  - Depth = Cube number of hypothesis
  - Uncertainty = Cube Standard Deviation
- Cube\_HypStr\_depth\_Cube\_stdev\_uncert
  - Depth = Cube Hypothesis strength
  - Uncertainty = Cube Standard Deviation

XYZ Files:

- Avg\_tpe = Average Total Propagated Error
- Cube\_#hyp = Cube number of hypothesis
- Cube\_#sndgs = Cube number of soundings
- Cube\_depth = Cube depth
- Cube\_hyp\_strth = Cube hypothesis strength
- Cube\_stdev = Cube Standard Deviation
- Final\_unct = Final Uncertainty

-----Original Message-----

From: Castle.E.Parker [<mailto:Castle.E.Parker@noaa.gov>]  
Sent: Friday, April 02, 2010 11:54 AM  
To: Quintal, Rebecca T.  
Cc: Sarah Eggleston  
Subject: Re: S57 SSS Contact File

Good morning Rebecca,

These are the issues that HSD has been dealing with for several years....related to S57 format and trying to fit an international standard to specific uses for a data file transfer format. AHB and PHB deal with this same issue for the H-Cell as well. The S57 format Files we receive are not meant to be an ENC and fit the ENC standards, thus why we want to customized product spec and revising the S57 ENC standards to fit our needs. S57 format is only the deliverable format.

This is why AHB needs to understand the complications of our request... to determine if SAIC can create an S57 feature and SS contact file within the constraints of SAIC's use of the 7 Seas kernel. AHB encounters many ENC standards which are violated within the HCell. The HCell and the deliverable S57 format files are not ENCs and not viewed in that light, so many ENC errors are acceptable.

Modifying the object catalog for Caris users is just editing an XML file. For SAIC the issues may not be possible.... we need to find out.

In the end, depending on your discussions with SAIC programmers, we may have to make exception.

Thanks for your effort and inquiry with these issues.

Gene

Quintal, Rebecca T. wrote:

Gene,

Thanks. A couple of questions/observations.

1. I don't see REMARK as an available attribute for the object \$CSYMB (Cartographic Symbol). S-57 Appendix A IHO Object Catalogue page 230. Can SAIC modify the catalog to include REMARK? What I mean is, can SAIC modify the object catalog that is used in conjunction with the 7 Seas kernel? If for instance, the use of REMARK for \$CSYMB is not possible, we can pick another attribute such as NINFOM and NTXTDS.
2. Do you still want RECDAT populated even though it has been prohibited for any object? Appendix B.1 Section 3.5.3 Prohibited attributes (page 8). Yes, unless the 7 Seas kernel won't allow inclusion of the attribute.
3. okay, I looked into the lowercase attributes a little (to be honest I had never used any non-standard objects or attributes before), so it appears that they can just be added onto an Object. So in your list I only see two (User ID and recomd). Correct. I wanted to spell it all out before I presented it to the programmers.

In the mean time we will produce a sample file with our currently supported attributes.



Thanks,

Rebecca

-----Original Message-----

From: Castle.E.Parker@noaa.gov [<mailto:Castle.E.Parker@noaa.gov>]

Sent: Thursday, April 01, 2010 4:01 PM

To: Quintal, Rebecca T.

Subject: S57 SSS Contact File

Rebecca,

Here's the list of SS contact attributes that AHB (me with Rick's consent) suggested for an S57 SSS contact file. Think about it and discuss with hydro co-workers and programmers. I appreciate your review and comments.

thanks,

Gene

1. SORIND: Source Indication (US,US,graph,H12345)
2. SORDAT: Source Date (last day of hydro) 20091131
3. RECDAT: Record Date (date of contact acquisition)
4. PICREP: SS contact image (image file name)
5. INFORM: Information field for corrected least depth of the correlating SWMB feature (This could be optional and open for discussion)
6. REMARK: contact remark: some sort of description of the SS contact i.e. debris, or Rk
7. User ID: SS Contact Number (unique identifier) list the contact number or could list the SS DN and line number, ping number, offset, and estimated height off the sea floor) some kind of identifying information to point to the bathy data.  
    DN. Line Number, Ping Number, Offset, Est. Contact Height  
    Ex: 056,128\_1202,2261,-21,1.25m
8. recomd: charting recommendation (i.e. significant, insignificant, or chart 32-ft Obstn)
9. TXTDSC: text description of the correlating SWMB feature that Includes line number, ping number, and beam number  
    (2009DN1021920\_103-1175-96) Year 2009; DN 102; Line Start Time  
    1920; Line number 103; Ping 1175; Beam 96)

APPENDIX III  
FEATURES REPORT

# H12094\_AWOIS Items

**Registry Number:** H12094  
**State:** Virginia  
**Locality:** Atlantic Ocean  
**Sub-locality:** 5 NM South East of Chincoteague Inler  
**Project Number:** OPR-D302-SA-09  
**Survey Dates:** 12/01/2008 - 06/18/2009

## Charts Affected

Number	Edition	Date	Scale (RNC)	RNC Correction(s)*
12211	43rd	10/01/2007	1:80,000 (12211_1)	[L]NTM: ?
12210	38th	05/01/2008	1:80,000 (12210_1)	[L]NTM: ?
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	Retain AWOIS 14500 - Charted Obstruction PA	Obstruction	[None]	37° 45' 00.1" N	075° 23' 59.8" W	14500
1.2	AWOIS 14501 - Charted Wreck PA	Wreck	11.13 m	37° 47' 31.8" N	075° 22' 23.6" W	14501
1.3	Retain AWOIS 994 - Charted Wreck PA	Wreck	[None]	37° 48' 57.6" N	075° 21' 55.8" W	994
1.4	AWOIS 996 - Charted Wreck PA	Wreck	9.21 m	37° 50' 10.8" N	075° 20' 23.7" W	996
1.5	Retain AWOIS 2775 - Charted Obstruction Fish Haven	Obstruction	5.10 m	37° 51' 00.4" N	075° 15' 58.7" W	2775
1.6	AWOIS 997 - Charted 11 ft dangerous Wreck	Wreck	4.98 m	37° 51' 02.3" N	075° 15' 57.1" W	997
1.7	Retain AWOIS 14499 - Charted Obstruction PA	Obstruction	[None]	37° 45' 00.1" N	075° 15' 29.8" W	14499
1.8	Delete AWOIS 2432 - Charted Wreck PA	GP	[None]	37° 47' 58.7" N	075° 14' 46.0" W	2432
1.9	Delete AWOIS 2632 - Obstruction (47 ft rep)	GP	[None]	37° 46' 06.8" N	075° 14' 18.7" W	2632

1.10	Delete AWOIS 2430 - Charted Wreck ED	GP	[None]	37° 45' 47.3" N	075° 13' 51.5" W	2430
1.11	Delete AWOIS 2633 - Charted Wreck PA	GP	[None]	37° 50' 03.9" N	075° 12' 31.9" W	2633

## 1.1) Retain AWOIS 14500 - Charted Obstruction PA

### Primary Feature for AWOIS Item #14500

**Search Position:** 37° 45' 00.0" N, 075° 24' 00.0" W  
**Historical Depth:** [None]  
**Search Radius:** 200  
**Search Technique:** S2, MB  
**Technique Notes:** [None]

#### History Notes:

USCG 5th - Obstruction PA (unexploded ordinance). (ETR 03/12/2009)

LN30/99

### Survey Summary

**Survey Position:** 37° 45' 00.1" N, 075° 23' 59.8" W  
**Least Depth:** [None]  
**TPU ( $\pm 1.96\sigma$ ):** THU (TPEh) [None] ; TVU (TPEv) [None]  
**Timestamp:** 2006-001.00:00:00.000 (01/01/2006)  
**Dataset:** H12094\_AWOIS\_for PYDRO\_2.000  
**FOID:** US 0000382034 00001(02260005D4520001)  
**Charts Affected:** 12210\_1, 12200\_1, 13003\_1

#### Remarks:

OBSTRN/remrks: AWOIS 14500 (Full): OBSTRUCTION

History: 37° 45' 00"N 075° 24' 00"W. USCG 5th - Obstruction PA (unexploded ordinance). (ETR 03/12/2009) LN30/99

Survey Results: A radius of 200 meters was covered with 200% sidescan and complete multibeam coverage around AWOIS 14500. No obstructions or wrecks were found within the covered area.

## Feature Correlation

Source	Feature	Range	Azimuth	Status
H12094_AWOIS_for PYDRO_2.000	US 0000382034 00001	0.00	000.0	Primary
AWOIS_EXPORT	AWOIS # 14500	5.92	041.6	Secondary (grouped)

## Hydrographer Recommendations

Recommended for removal from the chart.

### S-57 Data

**Geo object 1:** Obstruction (OBSTRN)  
**Attributes:** INFORM - Unexploded ordnance  
 NINFOM - Retain Obstruction  
 QUASOU - 2:depth unknown  
 SORDAT - 20060100  
 SORIND - US,US,graph,Chart 12210  
 WATLEV - 3:always under water/submerged

### Office Notes

**SAR NOTE:** No evidence of feature in MBES or SSS

**COMPILATION:** Concur with conditions. No indication of feature found, but due to nature of obstruction, unexploded ordnance, it is recommended for retention. Further review and final decision is deferred to MCD.

## 1.2) AWOIS 14501 - Charted Wreck PA

### Primary Feature for AWOIS Item #14501

**Search Position:** 37° 47' 30.0" N, 075° 22' 29.0" W  
**Historical Depth:** [None]  
**Search Radius:** 200  
**Search Technique:** S2, MB  
**Technique Notes:** [None]

#### History Notes:

USCG 5th - Wreck PA 37/47/30N 75/22/29W reported 12/24/85. (ETR 30/12/2009)

LNM52/85

### Survey Summary

**Survey Position:** 37° 47' 31.8" N, 075° 22' 23.6" W  
**Least Depth:** 11.13 m (= 36.52 ft = 6.087 fm = 6 fm 0.52 ft)  
**TPU ( $\pm 1.96\sigma$ ):** THU (TPEh) [None] ; TVU (TPEv) [None]  
**Timestamp:** 2010-290.00:00:00.000 (10/17/2010)  
**Dataset:** H12094\_AWOIS\_for PYDRO\_2.000  
**FOID:** US 0000382090 00001(02260005D48A0001)  
**Charts Affected:** 12210\_1, 12200\_1, 13003\_1

#### Remarks:

WRECKS/remrks: AWOIS 14501 (Full): UNKNOWN

History: 37° 47' 30"N 075° 22' 29"W. USCG 5th - Wreck PA 37/47/30N

75/22/29W reported 12/24/85. (ETR 30/12/2009) LNM52/85

Survey Results: A radius of 200 meters was covered with 200% sidescan and resulting multibeam coverage around AWOIS 14501. Feature #29 marks wreckage with a least depth of 36 feet (11.132 meters, 0.27 meters uncertainty) that fell within the AWOIS radius in 37° 47' 31.79"N 075° 22' 23.60"W and is further discussed in the Chart Comparisons (Section D.1).

Feature #29 is a 36-foot (11.132 meters, 0.27 meter uncertainty) dangerous wreck in 37°47' 31.79"N 075° 22' 23.60"W currently charted as a dangerous wreck in 37° 47'

31.67"N 075° 22' 27.30"W labeled "Wk PA" (AWOIS 14501).

Feature 29 - AWOIS #14501; MB File: asmba10255.d24; Ping: 27136; Beam: 237; Depth: 11.132 m; Time: 15:22:36.187; H Uncert: 1.30 m; V Uncert: 0.27 m.

## Feature Correlation

Source	Feature	Range	Azimuth	Status
H12094_AWOIS_for PYDRO_2.000	US 0000382090 00001	0.00	000.0	Primary
AWOIS_EXPORT	AWOIS # 14501	142.71	067.2	Secondary (grouped)

## Hydrographer Recommendations

Recommendations:

Remove charted dangerous wreck in 37° 47' 31.67"N 075° 22' 27.30"W and label "Wk PA"

Chart 36-foot dangerous wreck in 37° 47' 31.79"N 075° 22' 23.60"W and label "Wk"

### Cartographically-Rounded Depth (Affected Charts):

36ft (12210\_1)

6fm (12200\_1, 13003\_1)

## S-57 Data

**Geo object 1:** Wreck (WRECKS)

**Attributes:** CATWRK - 2:dangerous wreck  
 NINFOM - Add Wreck  
 QUASOU - 6:least depth known  
 SORDAT - 20101017  
 SORIND - US,US,graph,H12094  
 TECSOU - 3,2:found by multi-beam,found by side scan sonar  
 VALSOU - 11.132 m



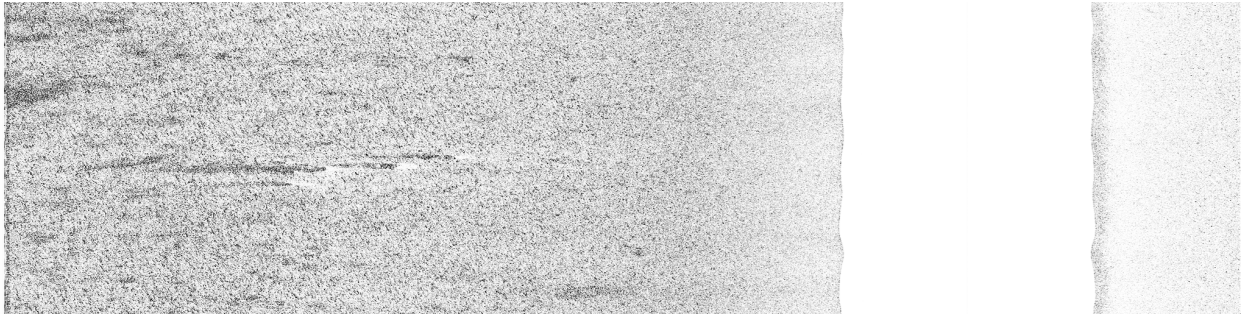
WATLEV - 3:always under water/submerged

## Office Notes

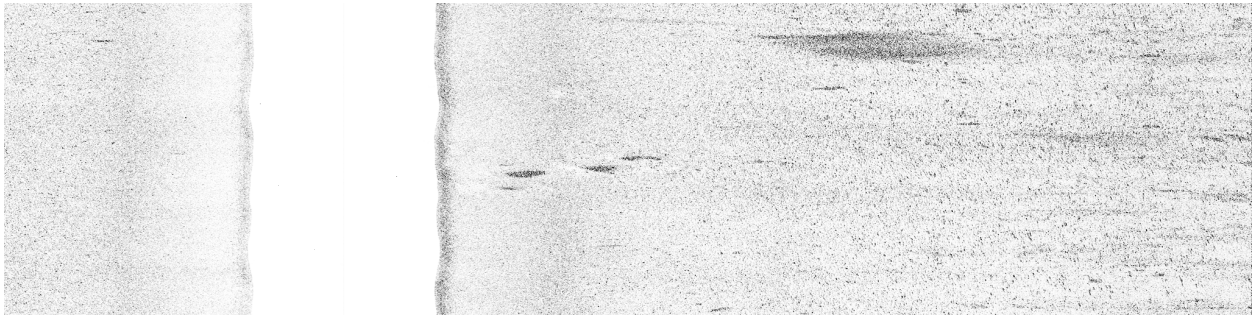
SAR NOTE: Feature is real. Seen in MBES and SSS data.

COMPILATION: Concur with conditions. Delete charted dangerous wreck PA symbol. Add dangerous 36 foot wreck in present survey location.

## Feature Images



*Figure 1.2.1*



*Figure 1.2.2*

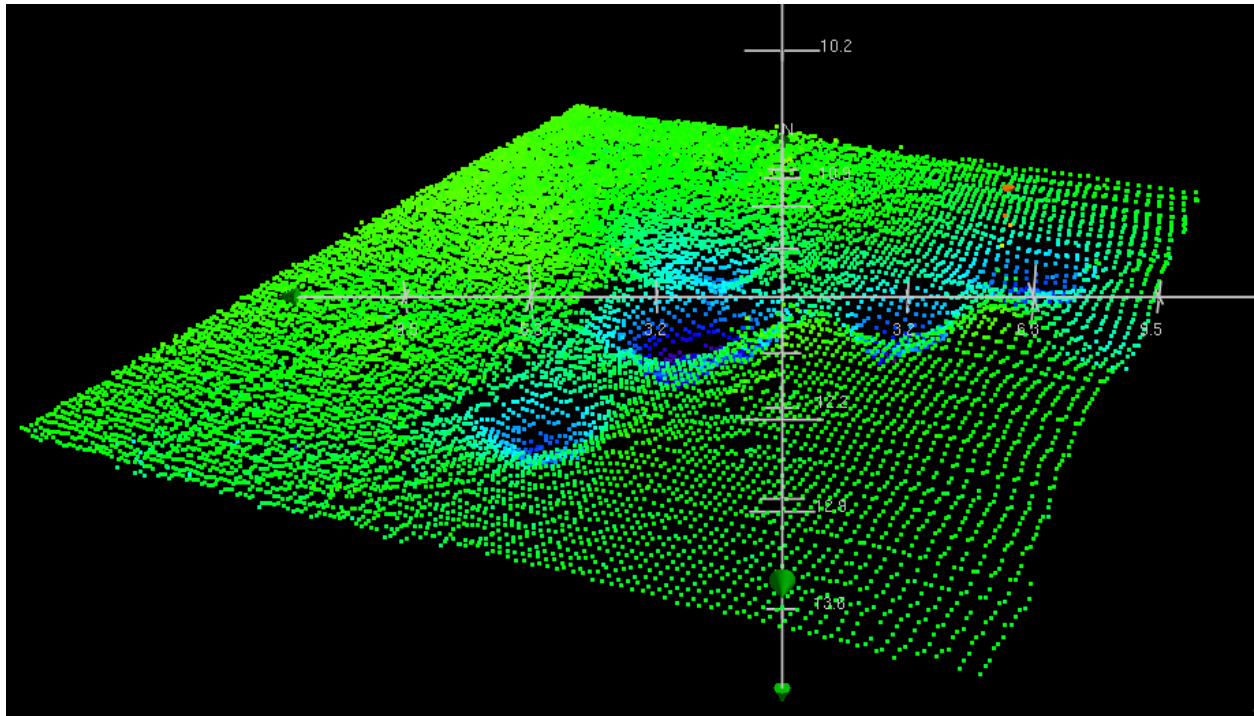


Figure 1.2.3

### 1.3) Delete AWOIS 994 - Charted Wreck PA

#### Primary Feature for AWOIS Item #994

**Search Position:** 37° 49' 00.5" N, 075° 21' 58.7" W  
**Historical Depth:** [None]  
**Search Radius:** 100  
**Search Technique:** S2, MB  
**Technique Notes:** [None]

#### History Notes:

H10045/82--OPR-D103-MI-82; 100M LINE SPACING FOR 1 MILE DIAMETER CENTERED ON CHARTED POSITION; NEGATIVE RESULTS; EVALUATOR RECOMMENDED RETAINING WK AS CHARTED AND CONDUCTING SSS/WIRE DRAG INVESTIGATION AT A LATER TIME TO DISPROVE WK. (UPDATED MSM 11/86)

#### Survey Summary

**Survey Position:** 37° 48' 57.6" N, 075° 21' 55.8" W  
**Least Depth:** [None]  
**TPU ( $\pm 1.96\sigma$ ):** THU (TPEh) [None] ; TVU (TPEv) [None]  
**Timestamp:** 2010-290.00:00:00.000 (10/17/2010)  
**Dataset:** H12094\_AWOIS\_for PYDRO\_2.000  
**FOID:** US 0000382043 00001(02260005D45B0001)  
**Charts Affected:** 12210\_1, 12211\_1, 12200\_1, 13003\_1

#### Remarks:

\$CSYMB/remrks: AWOIS 994 (Full): E.R. SMITH

History: 37° 49' 00.45"N 075° 21' 58.71"W. 20 FTR; SANK 12/5/43; 565 TONS  
24 NO.869; CARGO 565 GT SUNK 1/25/43 BY MARINE CASUALTY; POS.  
ACCURACY 1-3 MILES 61 1/25/43

Survey Results: A radius of 200 meters was covered with 200% sidescan and resulting multibeam coverage around AWOIS 994. No obstructions or wrecks were

found within the covered area.

### Feature Correlation

Source	Feature	Range	Azimuth	Status
H12094_AWOIS_for PYDRO_2.000	US 0000382043 00001	0.00	000.0	Primary
AWOIS_EXPORT	AWOIS # 994	111.48	141.2	Secondary (grouped)

### Hydrographer Recommendations

Recommended for removal from the chart.

### S-57 Data

**Geo object 1:** Cartographic symbol (\$CSYMB)  
**Attributes:** NINFOM - Delete Wreck PA  
 NTXTDS - H12094,ENC#US4VA70M,Ed#11,20090612  
 SORDAT - 20101017  
 SORIND - US,US,graph,H12094

### Office Notes

**SAR NOTE:** No evidence of feature in MBES or SSS mosaic.

**COMPILATION:** Concur with conditions. Feature not found during present survey operations on MBES or SSS mosaic but present survey only did 500m search radius. AWOIS file was incorrect in saying disproval needed 100m radius, it should have been 1000m according to HSD. Feature not found in present survey limits, but it wasn't completely investigated during present survey to disprove existence. Retain as charted.

## 1.4) AWOIS 996 - Charted Wreck PA

### Primary Feature for AWOIS Item #996

**Search Position:** 37° 50' 12.5" N, 075° 20' 23.7" W  
**Historical Depth:** [None]  
**Search Radius:** 100  
**Search Technique:** S2, MB  
**Technique Notes:** [None]

#### History Notes:

LNM DATED 10/10/50

H10045/82--OPR-D103-MI-82; 100M LINE SPACING FATHOMETER SEARCH WITH NEGATIVE RESULTS; EVALUATOR RECOMMENDED RETAINING WK AS CHARTED AND CONDUCTING SSS/WIRE DRAG INVESTIGATION AT A LATER TIME TO DISPROVE WK. (UPDATED MSM 11/86)

### Survey Summary

**Survey Position:** 37° 50' 10.8" N, 075° 20' 23.7" W  
**Least Depth:** 9.21 m (= 30.22 ft = 5.037 fm = 5 fm 0.22 ft)  
**TPU ( $\pm 1.96\sigma$ ):** THU (TPEh) [None] ; TVU (TPEv) [None]  
**Timestamp:** 2010-290.00:00:00.000 (10/17/2010)  
**Dataset:** H12094\_AWOIS\_for PYDRO\_2.000  
**FOID:** US 0000382089 00001(02260005D4890001)  
**Charts Affected:** 12210\_1, 12211\_1, 12200\_1, 13003\_1

#### Remarks:

WRECKS/remrks: AWOIS 996 (Full): P.J. HOOPER

History: 37° 50' 12.45"N 075° 20' 23.70"W. 24 NO.1142; TUG; SUNK 3/26/41;  
POSITION ACCURACY WITHIN 1 MILE

Survey Results: A radius of 100 meters was covered with 200% sidescan and resulting multibeam coverage around AWOIS 996. Feature #7 is a wreck with a

least depth of 30 feet (9.211 meters, 0.27 meters uncertainty) was found within the AWOIS radius in 37° 50' 10.82"N 075° 20' 23.67"W and is further discussed in the Chart Comparisons (Section D.1).

Feature #7 is a 30-foot (9.211 meters, 0.27 meter uncertainty) dangerous wreck currently charted in 37° 50' 12.36"N 075° 20' 26.21"W as a dangerous wreck labeled "PA" (AWOIS 996).

Feature 7 - AWOIS #996; MB File: asmba10254.d42; Ping: 14318; Beam: 172; Depth: 9.211 m; Time: 20:07:12.133; H Uncert: 1.54 m; V Uncert: 0.27 m.

### Feature Correlation

Source	Feature	Range	Azimuth	Status
H12094_AWOIS_for PYDRO_2.000	US 0000382089 00001	0.00	000.0	Primary
AWOIS_EXPORT	AWOIS # 996	50.44	179.1	Secondary (grouped)

### Hydrographer Recommendations

Recommendations:

- Remove charted dangerous wreck and label "PA" charted in 37° 50' 12.36"N 075° 20' 26.21"W
- Chart 30-foot dangerous wreck in 37° 50' 10.82"N 075° 20' 23.67"W and label "Wk"

#### Cartographically-Rounded Depth (Affected Charts):

30ft (12210\_1, 12211\_1)

5fm (12200\_1, 13003\_1)

### S-57 Data

**Geo object 1:** Wreck (WRECKS)  
**Attributes:** CATWRK - 2:dangerous wreck  
 NINFOM - Add Wreck  
 QUASOU - 6:least depth known

SORDAT - 20101017

SORIND - US,US,graph,H12094

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

VALSOU - 9.211 m

WATLEV - 3:always under water/submerged

## Office Notes

SAR NOTE: Feature is real. Seen in MBES and SSS data.

COMPILATION: Concur. Delete charted dangerous wreck PA symbol and note. Add 30 foot dangerous wreck in present survey location.



### Feature Images

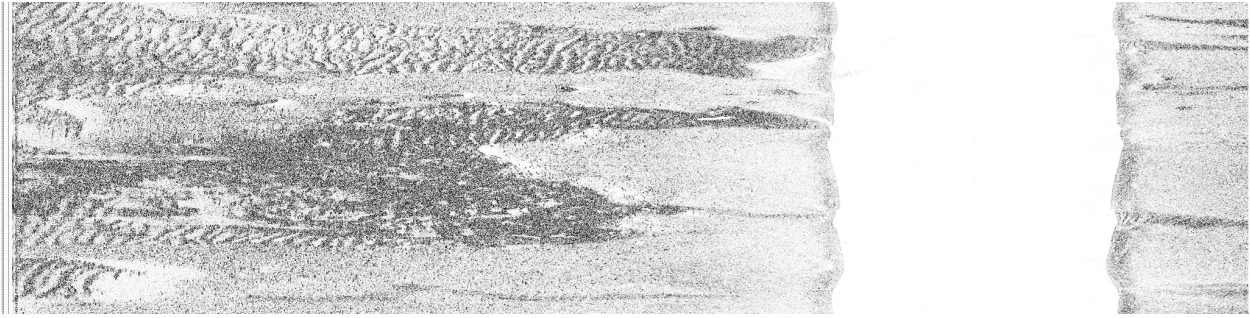


Figure 1.4.1

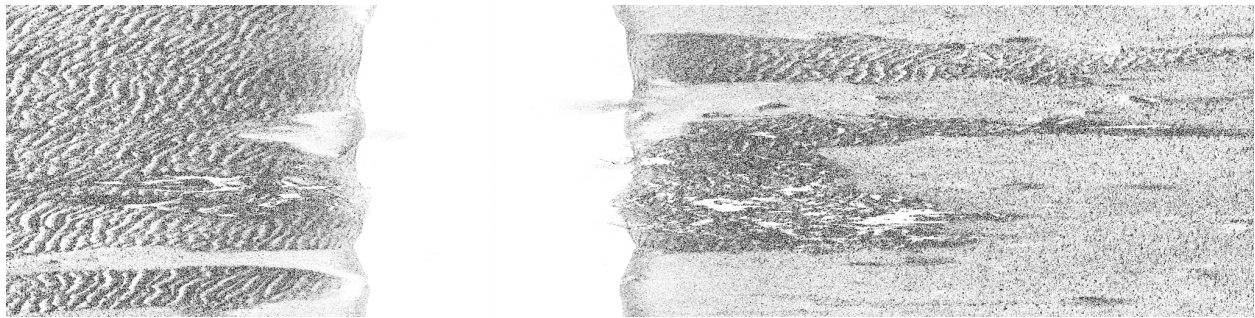


Figure 1.4.2



Figure 1.4.3

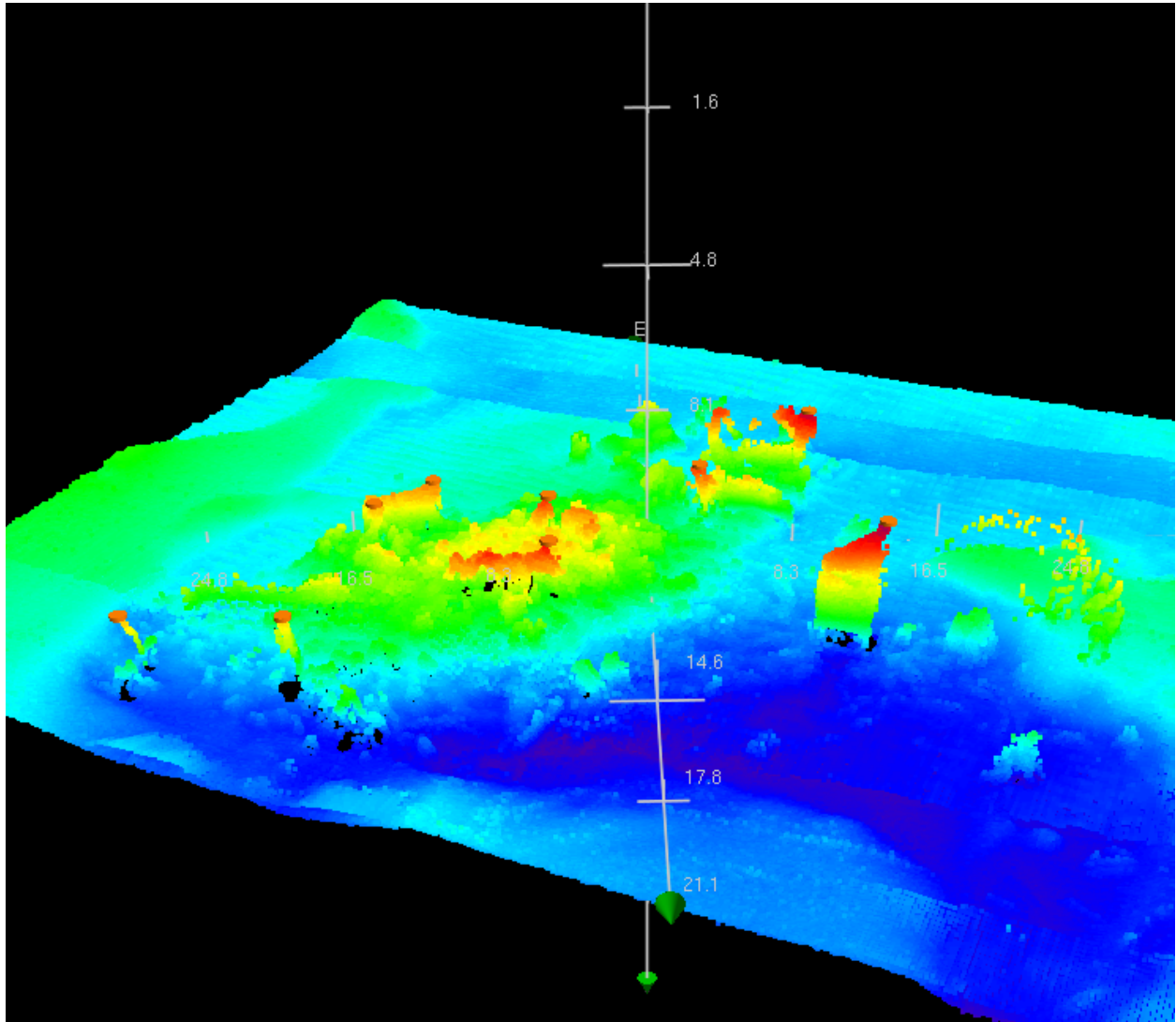


Figure 1.4.4

## 1.5) Retain AWOIS 2775 - Charted Obstruction Fish Haven

### Primary Feature for AWOIS Item #2775

**Search Position:** 37° 51' 12.4" N, 075° 15' 58.7" W  
**Historical Depth:** [None]  
**Search Radius:** 200  
**Search Technique:** S2, MB  
**Technique Notes:** [None]

#### History Notes:

[None]

### Survey Summary

**Survey Position:** 37° 51' 00.4" N, 075° 15' 58.7" W  
**Least Depth:** 5.10 m (= 16.73 ft = 2.789 fm = 2 fm 4.73 ft)  
**TPU ( $\pm 1.96\sigma$ ):** THU (TPEh) [None] ; TVU (TPEv) [None]  
**Timestamp:** 1959-182.00:00:00.000 (07/01/1959)  
**Dataset:** H12094\_AWOIS\_for PYDRO\_2.000  
**FOID:** US 0000382035 00001(02260005D4530001)  
**Charts Affected:** 12210\_1, 12211\_1, 12200\_1, 13003\_1

#### Remarks:

OBSTRN/remrks: AWOIS 2775 (Information Only): TRECARELL

History: 37° 51' 12.45"N 075° 15' 58.69"W. 20 STR; FOUNDERED 2/25/16 ON BLACKFISH SHOAL WITH A CARGO OF PYRITES; 3874 TONS.

Survey Results: A radius of 200 meters was covered with 200% sidescan and resulting multibeam coverage around AWOIS 2775. Feature #25 is an obstruction with a least depth of 24 feet (7.354 meters, 0.27 meters uncertainty) fell within the AWOIS radius in 37° 51' 09.38"N 075° 15' 53.61"W and is fully discussed in the Chart Comparisons (Section D.1).

Feature #25 is a 24-foot (7.354 meters, 0.27 meter uncertainty) obstruction (AWOIS

2775) in 37° 51' 09.38"N 075° 15' 53.61"W. Feature #25 is in the vicinity of the charted label "Obstn Fish Haven (auth min 17 ft)" in 37° 51' 15.42"N 075° 16' 34.79"W. Chart 12210 currently has no area charted indicating the location of the fish haven; however chart 12211, Fenwick Island to Chincoteague Inlet, identifies the fish haven approximately 150 meters west of Feature #25 in 37° 51' 09.57"N 075° 16' 00.33"W.

Feature 25 - AWOIS #2775; MB File: asmba10290.d11; Ping: 4673; Beam: 203; Depth: 7.354 m; Time: 18:23:05.907; H Uncert: 1.48 m; V Uncert: 0.27 m.

### Feature Correlation

Source	Feature	Range	Azimuth	Status
H12094_AWOIS_for PYDRO_2.000	US 0000382035 00001	0.00	000.0	Primary
AWOIS_EXPORT	AWOIS # 2775	370.99	180.0	Secondary (grouped)

### Hydrographer Recommendations

Recommendations:

- Chart a fish haven as charted on chart 12211 in 37° 51' 09.57"N 075° 16' 00.33"W
- Chart 24-foot dangerous obstruction in 37° 51' 09.38"N 075° 15' 53.61"W and label "Obstn"

#### Cartographically-Rounded Depth (Affected Charts):

- 16ft (12210\_1, 12211\_1)
- 2 ¾fm (12200\_1, 13003\_1)

### S-57 Data

**Geo object 1:** Obstruction (OBSTRN)  
**Attributes:** CATOBS - 5:fish haven  
 NATCON - 7:metal  
 NINFOM - Retain Obstruction  
 QUASOU - 7:least depth unknown, safe clearance at value shown  
 SORDAT - 19590701  
 SORIND - US,US,reprt,L-920/59

VALSOU - 5.100 m

WATLEV - 3:always under water/submerged

## Office Notes

SAR NOTE: Feature is real. Seen in MBES and SSS data.

COMPILATION: Concur with conditions. AWOIS 2775 is not shown on the current edition of chart 12210, but it is shown in Latitude 37-51-08.95N, Longitude 75-16-00.82W on the latest edition of chart 12211 and it is shown in Latitude 37-51-00.45N, Longitude 75-15-58.70W on the ENC covering these charts, US4VA70M. The feature found during the present survey in Latitude 37-51-09.380N, Longitude 75-15-53.610W is 24 feet in 24-27 feet of water. There is no indication of the Fish Haven. AWOIS 2775 is considered disproved based on present survey investigation.

It is recommended that AWOIS 2775 on Chart 12211 is brought into agreement with the feature on ENC US4VA70M, or AWOIS 2775 is deleted from the chart and ENC because it was not found by the present survey.

It is recommended that AWOIS 2775 is added to Chart 12210 in the ENC position or that it is not added to the Chart because it was not found by the present survey.

Final charting decision is deferred to MCD.

## 1.6) AWOIS 997 - Charted 11 ft dangerous Wreck

### Primary Feature for AWOIS Item #997

**Search Position:** 37° 51' 03.3" N, 075° 15' 57.2" W  
**Historical Depth:** 3.66 m  
**Search Radius:** 200  
**Search Technique:** S2, MB  
**Technique Notes:** [None]

#### History Notes:

H57O2/34--WRECK COVERED 11 FT. AT POS.37-51-02.8, 75-15-58.5W

H10046/82--OPR-D103-MI-82; PSR ITEM 36; 100 METER LINE SPACING FOR AREA 1/2 MILE SQUARE WITH NEGATIVE RESULTS; IN VICINITY OF A FISH HAVEN; 12 FT LEAST DEPTH IN AREA; EVALUATOR RECOMMENDS RETAINING AS CHARTED WITH ADDITIONAL INVESTIGATION DONE AT A LATER DATE. (UPDATED MSM 11/86)

### Survey Summary

**Survey Position:** 37° 51' 02.3" N, 075° 15' 57.1" W  
**Least Depth:** 4.98 m (= 16.35 ft = 2.724 fm = 2 fm 4.35 ft)  
**TPU ( $\pm 1.96\sigma$ ):** THU (TPEh) [None] ; TVU (TPEv) [None]  
**Timestamp:** 2010-290.00:00:00.000 (10/17/2010)  
**Dataset:** H12094\_AWOIS\_for PYDRO\_2.000  
**FOID:** US 0000382088 00001(02260005D4880001)  
**Charts Affected:** 12210\_1, 12211\_1, 12200\_1, 13003\_1

#### Remarks:

WRECKS/remrks: AWOIS 997 (Full): UNKNOWN

History: 37° 51' 03.25"N 075° 15' 57.19"W. 24 NO.620; POS. ACCURACY 1 MILE AT POS.37-51-02N 75-15-57W; REPORTED THRU H.O. IN 1950

Survey Results: A radius of 200 meters was covered with 200% sidescan and

resulting multibeam coverage around AWOIS 997. Feature #19 is a wreck with a least depth of 16 feet (4.982 meters, 0.27 meters uncertainty) that fell within the AWOIS radius in 37° 51' 02.28"N 075° 15' 57.14"W and is further discussed in the Chart Comparisons (Section D.1).

Feature #19 is a 16-foot (4.982 meters, 0.27 meter uncertainty) dangerous wreck currently charted in 37° 51' 03.83"N 075° 15' 57.77"W as an 11-foot dangerous wreck labeled "Wk" (AWOIS 997).

Feature 19 - AWOIS #997; MB File: asmba10287.d14; Ping: 17304; Beam: 45; Depth: 4.982 m; Time: 12:11:00.879; H Uncert: 1.67 m; V Uncert: 0.27 m.

### Feature Correlation

Source	Feature	Range	Azimuth	Status
H12094_AWOIS_for PYDRO_2.000	US 0000382088 00001	0.00	000.0	Primary
AWOIS_EXPORT	AWOIS # 997	30.05	177.7	Secondary (grouped)

### Hydrographer Recommendations

Recommendations:

- Remove charted 11-foot dangerous wreck and label "Wk" charted in 37° 51' 03.83"N 075° 15' 57.77"W
- Chart 16-foot dangerous wreck in 37° 51' 02.28"N 075° 15' 57.14"W and label "Wk"

#### Cartographically-Rounded Depth (Affected Charts):

16ft (12210\_1, 12211\_1)  
2 ¾fm (12200\_1, 13003\_1)

### S-57 Data

**Geo object 1:** Wreck (WRECKS)  
**Attributes:** CATWRK - 2:dangerous wreck  
NINFOM - Add Wreck

QUASOU - 6:least depth known  
SORDAT - 20101017  
SORIND - US,US,graph,H12094  
TECSOU - 3,2:found by multi-beam,found by side scan sonar  
VALSOU - 4.982 m  
WATLEV - 3:always under water/submerged

## Office Notes

SAR NOTE: Feature is real. Seen in MBES and SSS data.

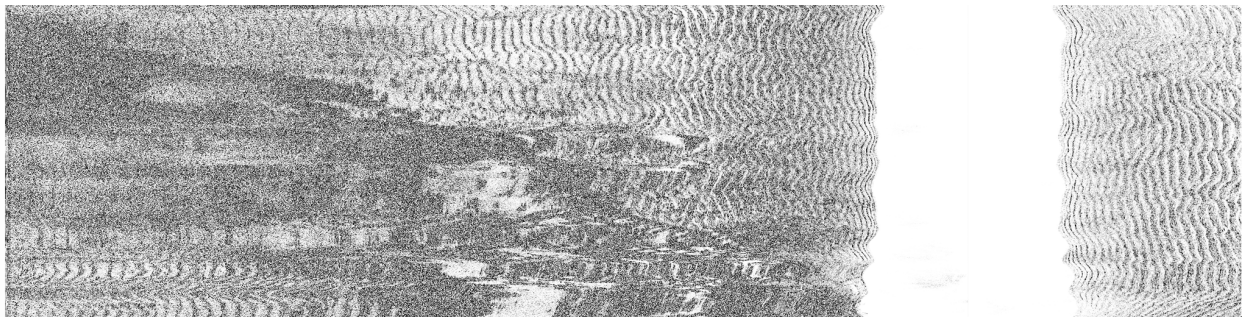
COMPILATION: Concur. Delete charted 11 foot dangerous wreck. Add 16 foot dangerous wreck in present survey location.



### Feature Images



*Figure 1.6.1*



*Figure 1.6.2*



*Figure 1.6.3*

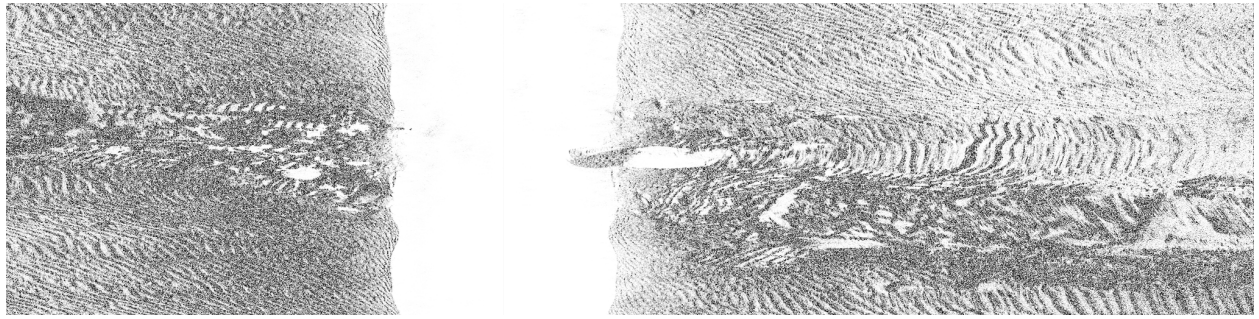


Figure 1.6.4

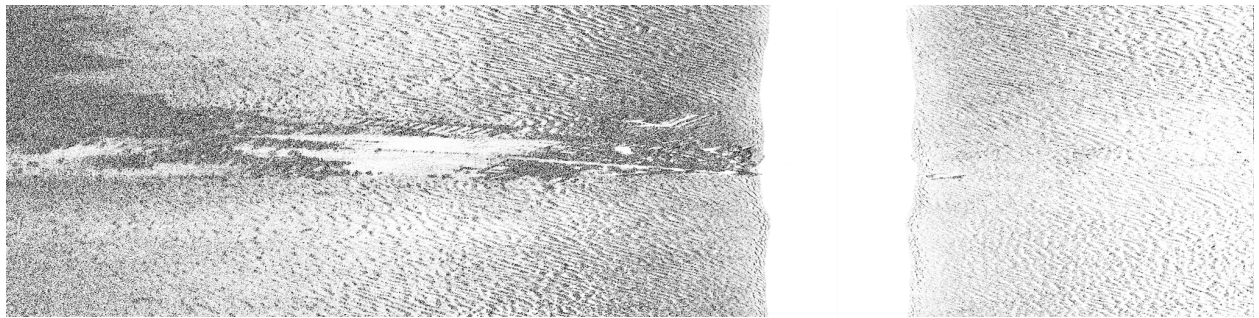


Figure 1.6.5

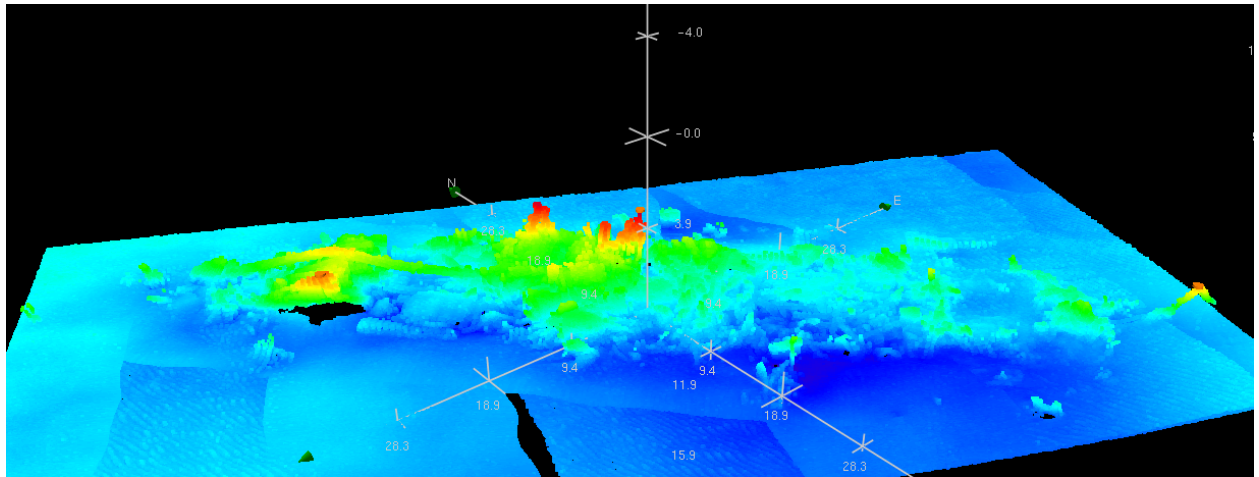


Figure 1.6.6

## 1.7) Retain AWOIS 14499 - Charted Obstruction PA

### Primary Feature for AWOIS Item #14499

**Search Position:** 37° 45' 00.0" N, 075° 15' 30.0" W  
**Historical Depth:** [None]  
**Search Radius:** 200  
**Search Technique:** S2, MB  
**Technique Notes:** [None]

#### History Notes:

USCG 5th - Obstruction PA (unexploded ordinance). (ETR 03/12/2009)

LN30/99

### Survey Summary

**Survey Position:** 37° 45' 00.1" N, 075° 15' 29.8" W  
**Least Depth:** [None]  
**TPU ( $\pm 1.96\sigma$ ):** THU (TPEh) [None] ; TVU (TPEv) [None]  
**Timestamp:** 2006-001.00:00:00.000 (01/01/2006)  
**Dataset:** H12094\_AWOIS\_for PYDRO\_2.000  
**FOID:** US 0000382033 00001(02260005D4510001)  
**Charts Affected:** 12210\_1, 12200\_1, 13003\_1

#### Remarks:

OBSTRN/remrks: AWOIS 14499 (Full): OBSTRUCTION

History: 37° 45' 00"N 075° 15' 30"W. USCG 5th - Obstruction PA (unexploded ordinance). (ETR 03/12/2009) LN30/99

Survey Results: A radius of 200 meters was covered with 200% sidescan and complete multibeam coverage around AWOIS 14499. No obstructions or wrecks were found within the covered area.

## Feature Correlation

Source	Feature	Range	Azimuth	Status
H12094_AWOIS_for PYDRO_2.000	US 0000382033 00001	0.00	000.0	Primary
AWOIS_EXPORT	AWOIS # 14499	5.27	057.0	Secondary (grouped)

## Hydrographer Recommendations

Recommended for removal from the chart.

### S-57 Data

**Geo object 1:** Obstruction (OBSTRN)  
**Attributes:** INFORM - Unexploded ordnance  
 NINFOM - Retain Obstruction  
 QUASOU - 2:depth unknown  
 SORDAT - 20060100  
 SORIND - US,US,graph,Chart 12210  
 WATLEV - 3:always under water/submerged

### Office Notes

**SAR NOTE:** No evidence of feature in MBES or SSS

**COMPILATION:** Concur with conditions. No indication of feature found, but due to nature of obstruction, unexploded ordnance, it is recommended for retention. Further review and final decision is deferred to MCD.

## 1.8) Delete AWOIS 2432 - Charted Wreck PA

### Primary Feature for AWOIS Item #2432

**Search Position:** 37° 48' 00.5" N, 075° 14' 46.7" W  
**Historical Depth:** [None]  
**Search Radius:** 200  
**Search Technique:** S2, MB  
**Technique Notes:** [None]

#### History Notes:

NM48/69--SUBMERGED DANGEROUS WRECK, PA, CHARTED IN APPROX. POS.

LAT. 37-48-00N, LONG. 75-14-48W.

MAR--8/27/82; MA INSCHHEME HYDRO. NEGATIVE.

H10044/82--OPR-D103-MI-82; ITEM 38; 400% SSS SEARCH, 1 SQUARE MILE AREA  
 NEGATIVE. HYDRO. RECOMMENDS DELETING FROM CHART BASED ON SSS SEARCH.  
 EVALUATOR MAKES NO RECOMMENDATION RE. ITEM AS CHARTED, AND NEITHER CONCURS  
 NOR DISAGREES WITH HYDRO'S RECOMMENDATION.

### Survey Summary

**Survey Position:** 37° 47' 58.7" N, 075° 14' 46.0" W  
**Least Depth:** [None]  
**TPU ( $\pm 1.96\sigma$ ):** THU (TPEh) [None] ; TVU (TPEv) [None]  
**Timestamp:** 2010-290.00:00:00.000 (10/17/2010)  
**Dataset:** H12094\_AWOIS\_for PYDRO\_2.000  
**FOID:** US 0000382042 00001(02260005D45A0001)  
**Charts Affected:** 12210\_1, 12200\_1, 13003\_1

#### Remarks:

\$CSYMB/remrks: AWOIS 2432 (Full): UNKNOWN

History: 37° 48' 00.45"N 075° 14' 46.69"W. NM48/69--SUBMERGED

DANGEROUS WRECK PA CHARTED IN APPROX. POS. LAT. 37-48-00N  
LONG. 75-14-48W.

Survey Results: A radius of 200 meters radius and was covered with 200% sidescan and complete multibeam coverage around AWOIS 2432. No obstructions or wrecks were found within the covered area.

### Feature Correlation

Source	Feature	Range	Azimuth	Status
H12094_AWOIS_for PYDRO_2.000	US 0000382042 00001	0.00	000.0	Primary
AWOIS_EXPORT	AWOIS # 2432	57.24	163.5	Secondary (grouped)

### Hydrographer Recommendations

Recommended for removal from the chart.

### S-57 Data

**Geo object 1:** Cartographic symbol (\$CSYMB)  
**Attributes:** NINFOM - Delete Wreck PA  
 NTXTDS - H12094,ENC#US4VA70M,Ed#11,20090612  
 SORDAT - 20101017  
 SORIND - US,US,graph,H12094

### Office Notes

**SAR NOTE:** No evidence of feature in MBES or SSS mosaic.

**COMPILATION:** Concur. Delete charted wreck PA



## 1.9) Delete AWOIS 2632 - Obstruction (47 ft rep)

### Primary Feature for AWOIS Item #2632

**Search Position:** 37° 46' 06.5" N, 075° 14' 18.9" W  
**Historical Depth:** [None]  
**Search Radius:** 200  
**Search Technique:** S2, MB  
**Technique Notes:** [None]

#### History Notes:

H10044/82-OPR-D103-MI-82; UNCHARTED OBSTRUCTION LOCATED DURING EVALUATION IN LAT. 37-46-06.10N, LONG. 75-14-20.21W. APPROX. LD 47 FT. FOUND ON THREE DIFFERENT SIDE SCAN SONAR PASSES. GP DERIVED INDIRECTLY FROM TOWFISH/SHIP/OBSTRUCTION GEOMETRY. LD DERIVED INDIRECTLY FROM SONARGRAM SHADOW AND SURROUNDING DEPTHS. EVALUATOR RECOMMENDS CHARTING AN OBSTRUCTION, 47 FT. REP.

(INFO. SENT TO 5TH CGD FOR LNM 10/19/84).

### Survey Summary

**Survey Position:** 37° 46' 06.8" N, 075° 14' 18.7" W  
**Least Depth:** [None]  
**TPU ( $\pm 1.96\sigma$ ):** THU (TPEh) [None] ; TVU (TPEv) [None]  
**Timestamp:** 2010-290.00:00:00.000 (10/17/2010)  
**Dataset:** H12094\_AWOIS\_for PYDRO\_2.000  
**FOID:** US 0000382057 00001(02260005D4690001)  
**Charts Affected:** 12210\_1, 12200\_1, 13003\_1

#### Remarks:

\$CSYMB/remrks: AWOIS 2632 (Full): OBSTRUCTION

History: 37° 46' 06.55"N 075° 14' 18.90"W. H10044/82-OPR-D103-MI-82;  
 UNCHARTED OBSTRUCTION LOCATED DURING EVALUATION IN LAT.

37-46-06.10N LONG. 75-14-20.21W. APPROX. LD 47 FT. FOUND ON THREE DIFFERENT SIDE SCAN SONAR PASSES.

Survey Results: A radius of 200 meters was covered with 200% sidescan and complete multibeam coverage around AWOIS 2632. Feature #10 is an obstruction with a least depth of 59 feet (18.157 meters, 0.27 meters uncertainty) found within the AWOIS radius in 37° 46' 06.75"N 075° 14' 18.93"W and is further discussed in the Chart Comparisons (Section D.1).

Feature #10 is a 59-foot (18.157 meters, 0.27 meter uncertainty) obstruction currently charted in 37° 46' 06.75"N 075° 14' 18.65"W as a dangerous obstruction labeled "Obstn (47 ft rep)" (AWOIS 2632).

Feature 10 - No chart. AWOIS #2632. Object is not significant relative to surrounding depths; MB File: asmba10257.d03; Ping: 11805; Beam: 189; Depth: 18.157 m; Time: 01:29:47.100; H Uncert: 1.81 m; V Uncert: 0.27 m.

### Feature Correlation

Source	Feature	Range	Azimuth	Status
H12094_AWOIS_for PYDRO_2.000	US 0000382057 00001	0.00	000.0	Primary
AWOIS_EXPORT	AWOIS # 2632	7.98	039.0	Secondary (grouped)

### Hydrographer Recommendations

Recommendations:

- Remove charted dangerous obstruction and label "Obstn (47 ft rep)" charted in 37° 46' 06.75"N 075° 14' 18.65"W
- Feature #10 is not recommended for charting as it is not significant relative to surrounding soundings

### S-57 Data

**Geo object 1:** Cartographic symbol (\$CSYMB)  
**Attributes:** NINFOM - Delete obstruction  
 NTXTDS - H12094,ENC#US4VA70M,Ed#11,20090612



SORDAT - 20101017

SORIND - US,US,graph,H12094

## Office Notes

SAR NOTE: Feature is real. Seen in MBES and SSS data.

COMPILATION: Concur with conditions. Delete charted dangerous obstruction (47 ft rep). New feature insignificant in relation to surrounding soundings. Do not chart.

## 1.10) Delete AWOIS 2430 - Charted Wreck ED

### Primary Feature for AWOIS Item #2430

**Search Position:** 37° 45' 48.4" N, 075° 13' 52.7" W  
**Historical Depth:** 7.62 m  
**Search Radius:** 200  
**Search Technique:** S2, MB  
**Technique Notes:** [None]

#### History Notes:

CL1204/59--25 FT. REP. CHARTED IN APPROXIMATE POS. LAT. 37-45-48N, LONG. 75-13-54W. CG BROADCAST; POSSIBLE SUBMERGED WRECK, 25 FT. LD IN APPROX. 50 FT.

MAR--8/27/82; OPR-D103-MI-82; MAINSCHEME HYDRO. NEGATIVE.

H10044/82--OPR-D103-MI-82; ITEM 39; 400% SIDE SCAN SONAR SEARCH 1 SQUARE MILE AREA NEGATIVE. LEAST DEPTH IN AREA 52 FT. HYDRO. RECOMMENDS DELETING CHARTED 25 FOOT SOUNDING. EVALUATOR RECOMMENDS THE 25 FT. REP. BE DELETED SINCE THERE WAS NO INDICATION OF A BOTTOM FEATURE OF THIS NATURE, AND A DANGEROUS SUNKEN WRECK, ED BE CHARTED BASED ON AVAILABLE INFO.

### Survey Summary

**Survey Position:** 37° 45' 47.3" N, 075° 13' 51.5" W  
**Least Depth:** [None]  
**TPU ( $\pm 1.96\sigma$ ):** THU (TPEh) [None] ; TVU (TPEv) [None]  
**Timestamp:** 2010-290.00:00:00.000 (10/17/2010)  
**Dataset:** H12094\_AWOIS\_for PYDRO\_2.000  
**FOID:** US 0000382060 00001(02260005D46C0001)  
**Charts Affected:** 12210\_1, 12200\_1, 13003\_1

#### Remarks:

\$CSYMB/remrks: AWOIS 2430 (Full): SNDG

History: 37° 45' 48.45"N 075° 13' 52.69"W. CL1204/59--25 FT. REP.

CHARTED IN APPROXIMATE POS. LAT. 37-45-48N LONG. 75-13-54W. CG BROADCAST; POSSIBLE SUBMERGED WRECK 25 FT. LD IN APPROX. 50 FT. MAR--8/27/82

Survey Results: A radius of 200 meters was covered with 200% sidescan and complete multibeam coverage around AWOIS 2430. No obstructions or wrecks were found within the covered area.

### Feature Correlation

Source	Feature	Range	Azimuth	Status
H12094_AWOIS_for PYDRO_2.000	US 0000382060 00001	0.00	000.0	Primary
AWOIS_EXPORT	AWOIS # 2430	45.30	141.8	Secondary (grouped)

### Hydrographer Recommendations

Recommended for removal from the chart.

### S-57 Data

**Geo object 1:** Cartographic symbol (\$CSYMB)  
**Attributes:** NINFOM - Delete Wreck ED  
 NTXTDS - H12094,ENC#US4VA70M,Ed#11,20090612  
 SORDAT - 20101017  
 SORIND - US,US,graph,H12094

### Office Notes

**SAR NOTE:** No evidence of feature in MBES or SSS mosaic.

**COMPILATION:** Concur. Delete charted Wreck ED

## 1.11) Delete AWOIS 2633 - Charted Wreck PA

### Primary Feature for AWOIS Item #2633

**Search Position:** 37° 50' 03.5" N, 075° 12' 31.7" W  
**Historical Depth:** [None]  
**Search Radius:** 200  
**Search Technique:** S2, MB  
**Technique Notes:** [None]

#### History Notes:

H10044/82--OPR-D103-MI-82; UNCHARTED OBSTRUCTION (POSSIBLY WRECKAGE) LOCATED DURING EVALUATION IN APPROX. LAT. 37-50-03N, LONG. 75-12-33W. FOUND BY SIDE SCAN SONAR (SEEN 2 TIMES ON SONAGRAMS). EVALUATOR RECOMMENDS CHARTING A DANGEROUS SUNKEN WRECK, PA. ITEM FALLS APPROX. 5KM NE OF PSR ITEM 38 AND 2.1 KM W OF PSR ITEM 37. ABOUT 75 FT. X 18 FT. IN SIZE. ADDITIONAL SIDE SCAN SONAR/WIRE DRAG/DIVE INVESTIGATION RECOMMENDED TO ASCERTAIN LD, SIZE, AND GP OF ITEM.

### Survey Summary

**Survey Position:** 37° 50' 03.9" N, 075° 12' 31.9" W  
**Least Depth:** [None]  
**TPU ( $\pm 1.96\sigma$ ):** THU (TPEh) [None] ; TVU (TPEv) [None]  
**Timestamp:** 2010-290.00:00:00.000 (10/17/2010)  
**Dataset:** H12094\_AWOIS\_for PYDRO\_2.000  
**FOID:** US 0000382104 00001(02260005D4980001)  
**Charts Affected:** 12210\_1, 12211\_1, 12200\_1, 13003\_1

#### Remarks:

\$CSYMB/remrks: AWOIS 2633 (Full): OBSTRUCTION History: 37° 50' 03.45" N 075° 12' 31.68" W. H10044/82--OPR-D103-MI-82; UNCHARTED OBSTRUCTION (POSSIBLY WRECKAGE) LOCATED DURING EVALUATION IN APPROX. LAT. 37-50-03N LONG. 75-12-33W. FOUND BY SIDE SCAN SONAR (SEEN 2 TIMES ON SONAGRAMS). A radius of 200 meters radius was covered with 200%

sidescan and resulting multibeam coverage around AWOIS 2633. The AWOIS area was surrounding a submerged dangerous wreck symbol. Feature #9 is set on the shoalest obstruction with a least depth of 71 feet(21.734 meters, 0.28 meters uncertainty)among multiple obstructions within the AWOIS radius in 37° 50' 02.5"N 075° 12' 31.40"W. Further discussion is located in the Chart Comparisons (Section D.1). Feature #9 is a 71-foot (21.734 meters, 0.28 meter uncertainty) obstruction currently charted as a dangerous wreck labeled PA in 37° 50' 04.52"N 075° 12' 31.93"W(AWOIS 2633). Feature 9 - AWOIS #2633; MB File: asmba10256.d15; Ping: 35669; Beam: 105; Depth: 21.734 m; Time: 12:42:16.056; H Uncert: 1.60 m; VUncert: 0.28 m

## Feature Correlation

Source	Feature	Range	Azimuth	Status
H12094_AWOIS_for PYDRO_2.000	US 0000382104 00001	0.00	000.0	Primary
AWOIS_EXPORT	AWOIS # 2633	13.99	336.0	Secondary (grouped)

## Hydrographer Recommendations

Remove charted dangerous wreck and label PA charted in 37° 50' 04.52"N 075° 12' 31.93"W · Chart 71-foot dangerous obstruction in 37° 50' 02.5"N 075° 12' 31.40"W and label Obsts

## S-57 Data

**Geo object 1:** Cartographic symbol (\$CSYMB)  
**Attributes:** NINFOM - Delete Wreck PA  
 NTXTDS - H12094,ENC#US4VA70M,Ed#11,20090612  
 SORDAT - 20101017  
 SORIND - US,US,graph,H12094

## Office Notes

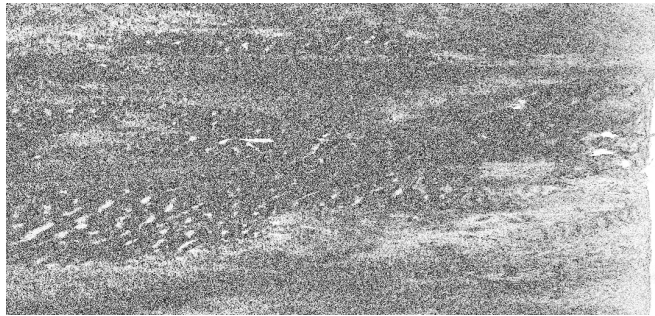
**SAR NOTE:** Feature is real. Seen in MBES and SSS data.

**COMPILATION:** Concur. Delete charted dangerous wreck PA. Add 71 ft depth. Insignificant to chart as feature.

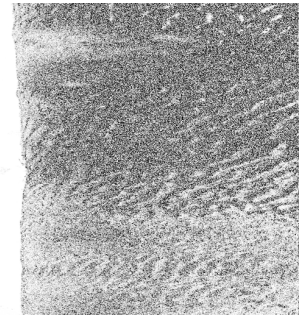
### Feature Images



*Figure 1.11.1*



*Figure 1.11.2*



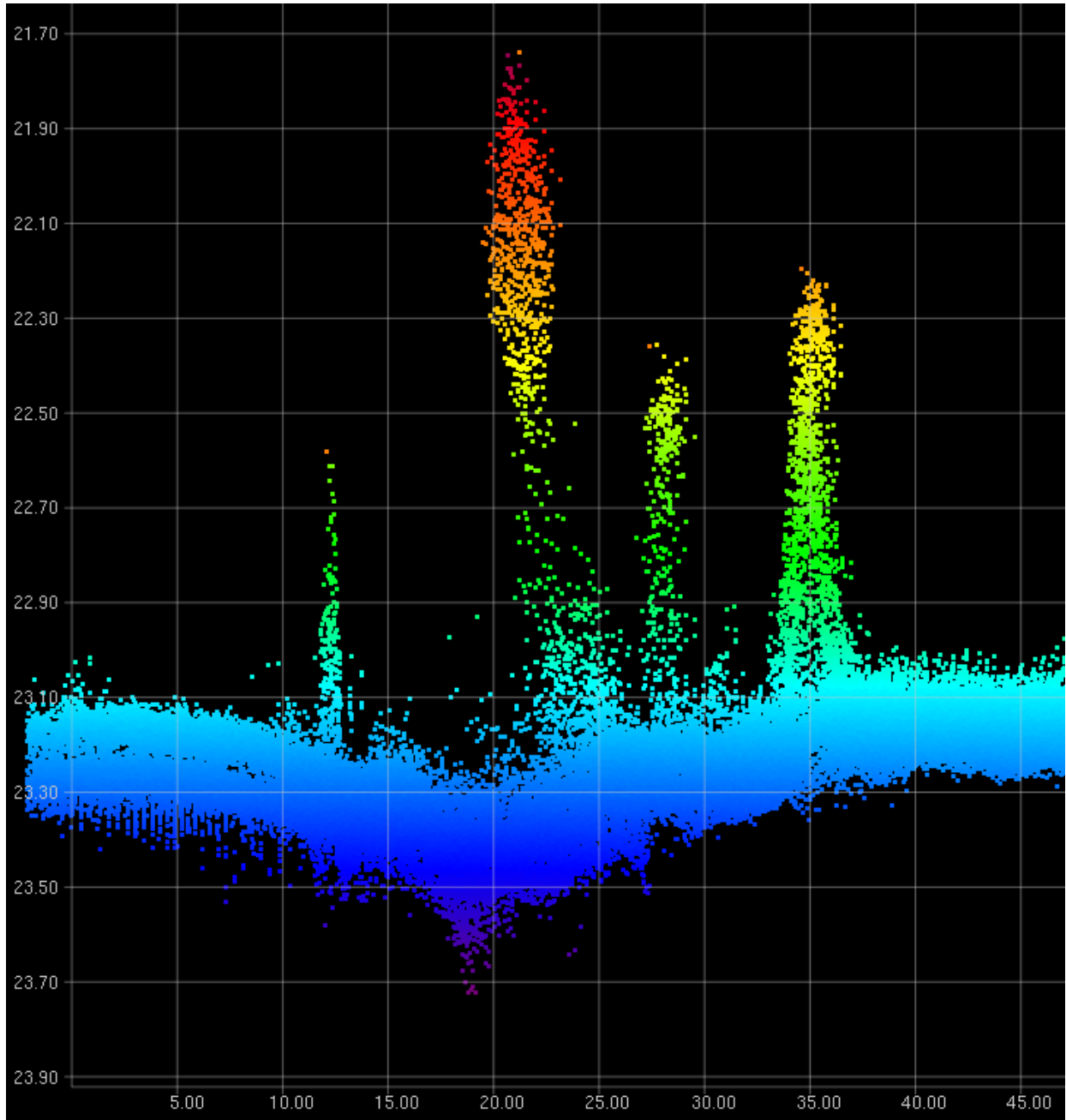


Figure 1.11.3

# H12094\_DTON Report

**Registry Number:** H12094  
**State:** Virginia  
**Locality:** Atlantic Ocean  
**Sub-locality:** 5 NM South East of Chincoteague Inlet  
**Project Number:** OPR-D302-SA-09  
**Survey Date:** 12/01/2008 - 06/18-2009

## Charts Affected

Number	Edition	Date	Scale (RNC)	RNC Correction(s)*
12211	43rd	10/01/2007	1:80,000 (12211_1)	[L]NTM: ?
12210	38th	05/01/2008	1:80,000 (12210_1)	[L]NTM: ?
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 - Add 18ft dangerous Obstruction	Obstruction	5.50 m	37° 49' 56.0" N	075° 21' 14.0" W	---



## 1.1) DTON #1 - Add 18ft dangerous Obstruction

### DANGER TO NAVIGATION

#### Survey Summary

**Survey Position:** 37° 49' 56.0" N, 075° 21' 14.0" W  
**Least Depth:** 5.50 m (= 18.05 ft = 3.008 fm = 3 fm 0.05 ft)  
**TPU ( $\pm 1.96\sigma$ ):** THU (TPEh) [None] ; TVU (TPEv) [None]  
**Timestamp:** 2010-290.00:00:00.000 (10/17/2010)  
**Dataset:** H12094\_DTON\_for PYDRO.000  
**FOID:** US 0000199874 00001(022600030CC20001)  
**Charts Affected:** 12210\_1, 12211\_1, 12200\_1, 13003\_1

#### Remarks:

OBSTRN/remrks: Feature #21 is an 18-foot (5.501 meters, 0.27 meter uncertainty) dangerous obstruction submitted as Danger to Navigation Report #1. It is currently charted in 37° 49' 55.98"N 075° 21' 14.04"W as an 18-foot dangerous obstruction labeled "Obstn".

Feature 21 - DTON #1; MB File: asmba10287.d27; Ping: 6655; Beam: 247; Depth: 5.501 m; Time: 14:42:18.162; H Uncert: 1.41 m; V Uncert: 0.27 m.

#### Feature Correlation

Source	Feature	Range	Azimuth	Status
H12094_DTON_for PYDRO.000	US 0000199874 00001	0.00	000.0	Primary

#### Hydrographer Recommendations

Recommendations:

- Retain as charted

#### Cartographically-Rounded Depth (Affected Charts):

18ft (12210\_1, 12211\_1)

3fm (12200\_1, 13003\_1)

#### S-57 Data

**Geo object 1:** Obstruction (OBSTRN)

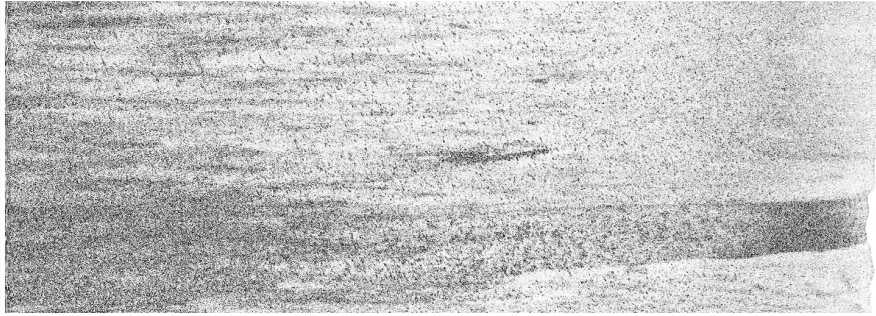
**Attributes:**      INFORM - Feature 21 - DTON #1; MB File: asmba10287.d27; Ping: 6655; Beam: 247; Depth: 5.501 m; Time: 14:42:18.162; H Uncert: 1.41 m; V Uncert: 0.27 m.  
                      NINFOM - Add 18 ft dangerous Obstruction  
                      QUASOU - 6:least depth known  
                      SORDAT - 20101017  
                      SORIND - US,US,graph,H12094  
                      TECSOU - 3,2:found by multi-beam,found by side scan sonar  
                      VALSOU - 5.501 m  
                      WATLEV - 3:always under water/submerged

### Office Notes

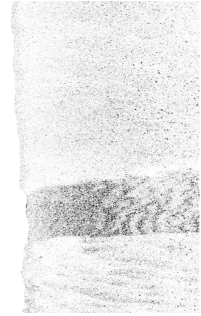
SAR NOTE: Feature is real. Seen in MBES and SSS data. Feature is currently charted on the continual update raster.

COMPILATION: Concur. Delete charted 18 ft dangerous obstruction. Add 18 ft dangerous obstruction.

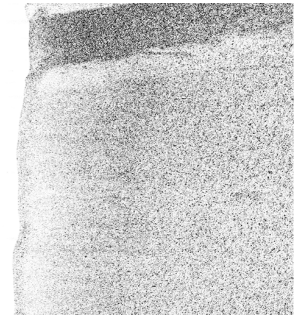
### Feature Images



*Figure 1.1.1*



*Figure 1.1.2*



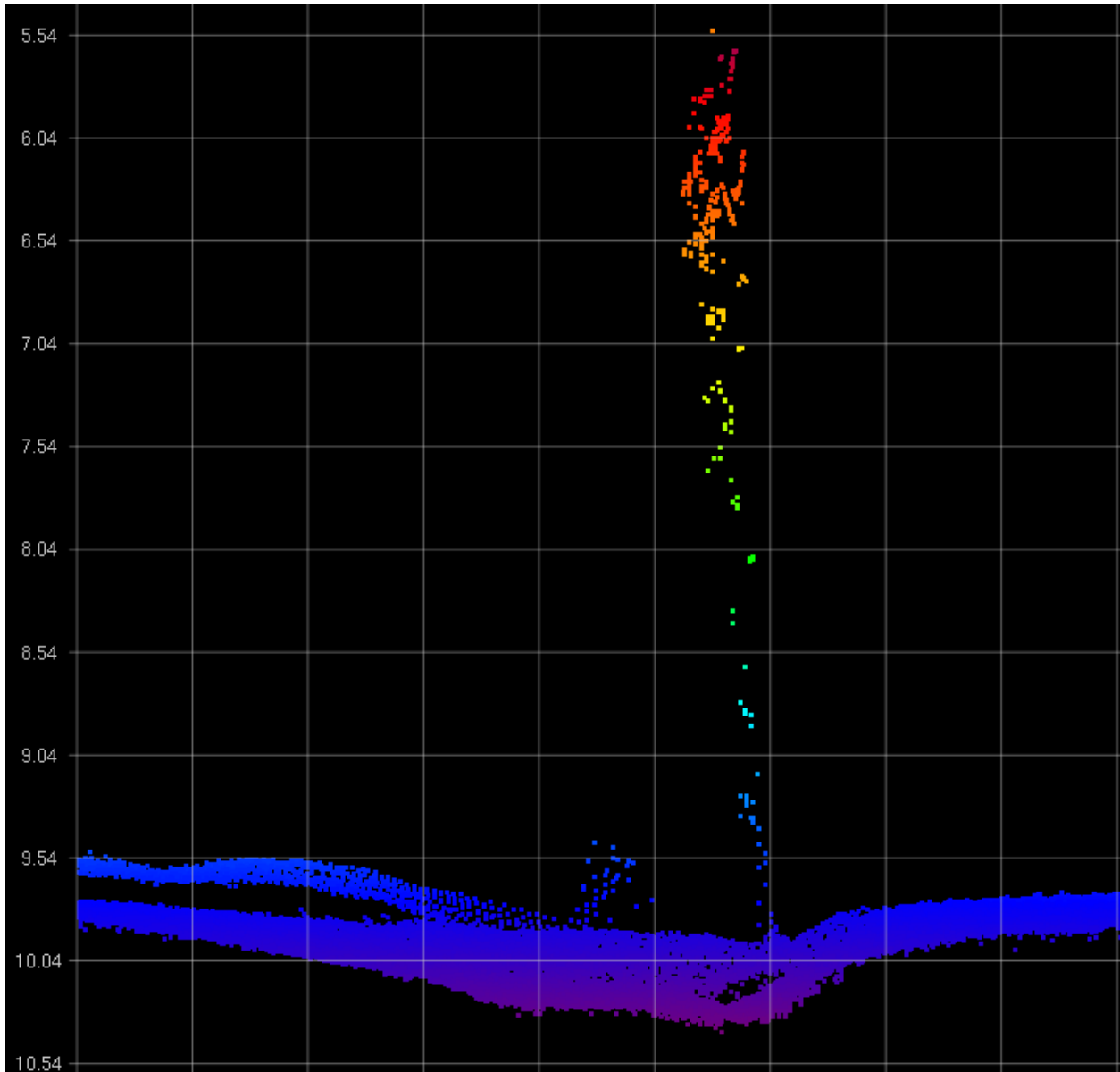


Figure 1.1.3

APPROVAL PAGE

H12094

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

- H12094\_DR.pdf
- Collection of depth varied resolution BAGS
- Processed survey data and records
- H12094\_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: \_\_\_\_\_

**Edward A. Owens**

Cartographic Team Lead

Acting Chief – Cartography, Atlantic Hydrographic Branch