NOAA FORM 76-35A

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

DESCRIPTIVE REPORT

Type of Survey *Multibeam and Sidescan Sonar*

Field No. *P*

Registry No. *H12092*

LOCALITY

State *Virginia*

General Locality *Atlantic Ocean*

Sublocality *5 NM East of Assateague Island*

2010

CHIEF OF PARTY

Paul L. Donaldson

Science Applications International Corporation

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NOAA FORM 77-28 (11-72) U.S. DEPARTMENT OF COMMERCE NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION **HYDROGRAPHIC TITLE SHEET**	REGISTRY No **H12092**

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

State	Virginia
General Locality	Atlantic Ocean
Sub Locality	5 NM East of Assateague Island
Scale	1:20,000
Date of Survey	22 June 2010 – 17 October 2010
Instructions Dated	01 December 2008 and 18 June 2009
Project No.	OPR-D302-SA-09
Vessel	*M/V Atlantic Surveyor* D582365
Chief of Party	Paul L. Donaldson
Surveyed by	Alex Bernier, Jediah Bishop, Daniel Burgo, Gary Davis, Paul Donaldson, Chuck Holloway, Jason Infantino, Colette LeBeau, Rick Nadeau, Katie Offerman, Gary Parker, Evan Robertson, Eva Rosendale, Andrew Seaman, Deb Smith, Bridget Williams
Soundings by echosounder	Multibeam RESON SeaBat 7125 SV and Multibeam RESON SeaBat 8101 ER
Verification by	***Atlantic Hydrographic Branch Personnel***
Soundings in	***Acquired in*** Meters ***compiled in Feet at MLLW.***
Soundings at	MLLW

REMARKS:	**Contract:**	DG133C-08-CQ-0003
	Contractor:	Science Applications International Corporation 221 Third Street, Newport, RI 02840 USA
	Subcontractor:	N/A
	Times:	All times are recorded in UTC
	UTM Zone:	Zone 18 North
	Purpose:	To provide NOAA with modern, accurate hydrographic survey data with which to update the nautical charts of the assigned area: Sheet P (H12092) in Mid–Atlantic Corridor, Coast of Virginia.

Bold, italic, red notes in the Descriptive Report were made during office processing.

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.

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Descriptive Report to Accompany
Hydrographic Survey H12092
Scale 1:20,000, Surveyed 2010
M/V Atlantic Surveyor
Science Applications International Corporation (SAIC)
Paul L. Donaldson, 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, 31 August 2010, 15 September 2010, and 19 October 2010
Sheet Letter: P
Registry Number: H12092
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 East of Assateague Island (Figure A-1). H12092 was surveyed in accordance with the ***Project Instructions, OPR-D302-SA-09 (including D302KR2009_Rev); provided in ***Separates III, and the April 2009 *** "*NOS Hydrographic Surveys Specifications and Deliverables*". 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 22 June 2010 to 17 October 2010 (Table A-2). H12092 was surveyed with 200% side scan coverage with resulting multibeam coverage. The CUBE depth range encountered in H12092 was from 3.64 meters (12 feet, 0.270 meter uncertainty) to 26.11 meters (85 feet, 0.270 meter uncertainty). ***Concur.***

Data for H12092 extends approximately 1,980 to 2,560 meters inshore of the ***OPR-D302-SA-09 Task Order T002 Statement of Work boundary. The survey area was extended in an effort to meet the Project Instructions of surveying to the inshore limit of hydrography, which corresponds to the 4-meter depth contour. The inshore limit obtained was between four and five meters. The four meter depth curve was not achieved in all inshore areas due to safety concerns for the vessel, equipment and crew. Figure B-4 depicts the inshore 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. A shoal area approximately 980 meters by 194 meters in the northwest corner of the survey area was not surveyed as the depths were at or below four meters (Figure B-4). ***Data filed with original field records.***

CUBE depths obtained around this shoal range from 4.30 meters (14 feet, 0.270 meter uncertainty) to 7.11 meters (23 feet, 0.270 meter uncertainty).

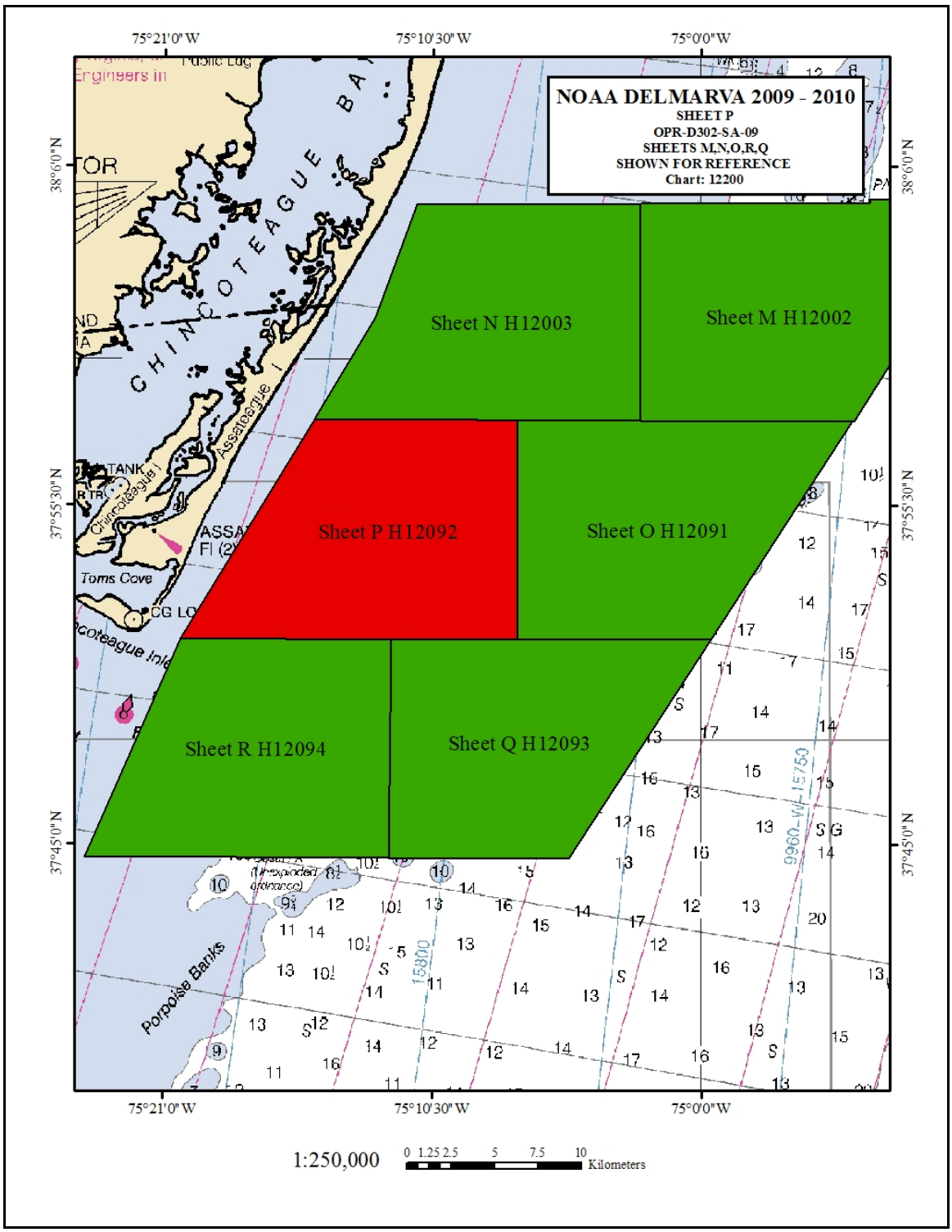


Figure A-1. H12092 Survey Bounds

Table A-1. Hydrographic Survey Statistics

***M/V Atlantic Surveyor*, Sheet P H12092**	**Value**
LNM Single beam only sounding lines (main scheme only)	N/A
LNM Multibeam only sounding lines (main scheme only)	~~N/A~~ ***3787.4***
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)	3155.2
LNM Crosslines from multibeam	~~144.9~~ ***154.1***
LNM Lidar crosslines	N/A
LNM development lines non main scheme	3.0
LNM shoreline/nearshore investigations	N/A
Number of Bottom Samples	62
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	65.56

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

Calendar Date	Julian Day
22 June 2010	173
23 June 2010	174
24 June 2010	175
25 June 2010	176
26 June 2010	177
27 June 2010	178
28 June 2010	179
29 June 2010	180
30 June 2010	181
01 July 2010	182
09 July 2010	190
10 July 2010	191
11 July 2010	192
12 July 2010	193
13 July 2010	194
14 July 2010	195

Calendar Date	Julian Day
15 July 2010	196
16 July 2010	197
17 July 2010	198
21 July 2010	202
03 August 2010	215
04 August 2010	216
16 August 2010	228
17 August 2010	229
18 August 2010	230
19 August 2010	231
08 October 2010	281
09 October 2010	282
10 October 2010	283
11 October 2010	284
12 October 2010	285
17 October 2010	290

B. DATA ACQUISITION AND PROCESSING *SEE ALSO THE H-CELL REPORT.*

B.1 EQUIPMENT

A detailed description of the systems used to acquire and process these data has been included in the separate *Data Acquisition and Processing Report (*DAPR) for OPR-D302-SA-09, delivered with Descriptive Report 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.
Data included with H-Cell Survey deliverables.

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

System	Manufacturer / Model Number	Subsystem
Multibeam Sonar	RESON SeaBat 7125 SV	7P Sonar Processor
	RESON SeaBat 8101 ER	81 P 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*. 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.

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 associated sound velocity sensor were hull-mounted port of the vessel's keel in close proximity to the POS/MV's IMU. The RESON 8101 transducer was hull-mounted to the same mounting plate as the RESON 7125 when installed for survey operations, 19 July 2010 through 11 August 2010. A Brook Ocean Technologies 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. Table B-2 is a list of vessel characteristics for the *M/V Atlantic Surveyor*.

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

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

Bottom characteristics were determined from bottom samples taken using a WILDCO Petite Ponar grab. The location for acquiring bottom samples was determined at a set distance of 2000-meters; samples were evenly distributed throughout the H12092 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 each sample were saved through SAIC’s Integrated Survey System (**ISS-2000**) software; information logged was position, depth, and sample characteristics. Bottom characteristic results are further detailed in Section D.2.4 and ****Appendix V. ***Concur. *Data filed with original field records.***
*****Data appended to this Report.***

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. 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 describes the processing flow SAIC utilizes
******Data included with H-Cell Survey deliverables.***

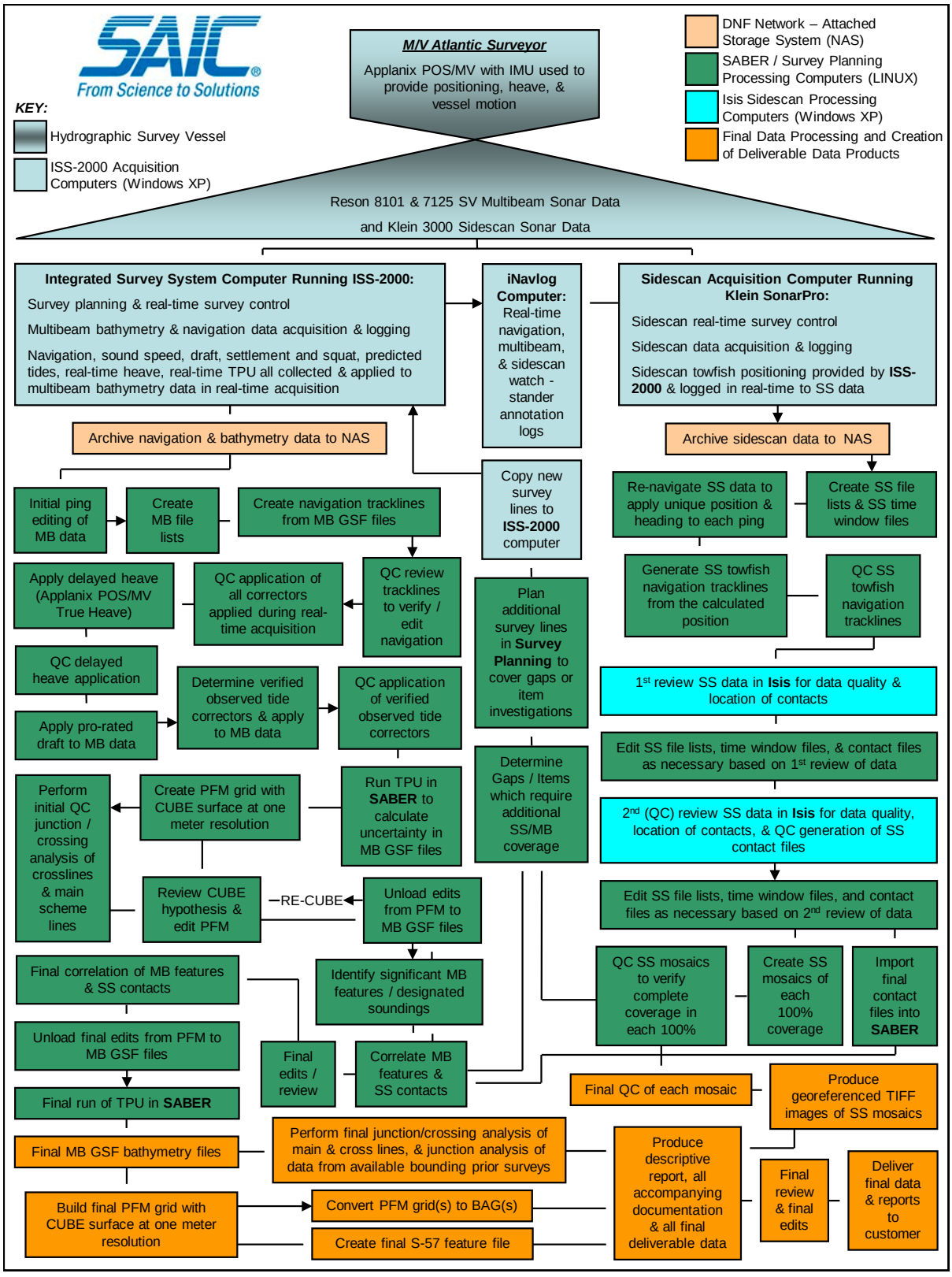


Figure B-1. SAIC Processing Flow Diagram

There were approximately 144.9 linear nautical miles of crosslines and 3,155.2 linear nautical miles of main scheme lines surveyed on H12092. This resulted in crossline mileage that represented approximately 4.6 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. Crosslines were oriented at 090°/270° and were predominately spaced 1000 meters apart, while most of the main scheme lines were oriented at 27°/207° and were spaced 40 meters apart. For safety reasons the main scheme lines in the vicinity of Winter Quarter Shoal remained spaced at 40 meters apart but were run at 090°/270°. Similarly the main scheme survey lines in the vicinity of a finger shoal located in the Northwest corner of the survey area were oriented at 065°/245°. Comparison between crosslines 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.

As noted previously the CUBE depth range encountered was from 3.64 meters (12 feet, 0.27 meters uncertainty) to 26.11 meters (85 feet, 0.27 meters uncertainty). Based on the depth range encountered in H12092, 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 current profile obtained from the MVP-30
- The amount of time elapsed since the last cast

Multiple casts were initially 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 1,149 profiles were applied to online data for H12092. 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 "H12092_Sidescan_Review_Log" and "Watchstander_Logs" located in *Separates I. ***Data filed with original field records.***

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 H12092, the results can be found in *Separates II within file "H12092_Atlantic_Surveyor_Comparison_Cast_Log".

The "H12092_Atlantic_Surveyor_Sound_Speed_Profile_Log", a spreadsheet located in *Separates II, is a cumulative spreadsheet detailing each cast associated with H12092. This log is separated by the purpose of the applied cast; with individual tabs for: "Used_for_MB" (online Multibeam), "Used_for_Comparison_Cast", "Used for Lead Line", and "Used_for_Closing_Casts". Additionally in a separate folder within *Separates II, Caris_SSP, there are four sound speed profile files (.svp). These four files contain concatenated SSP data that has been formatted for use in Caris. The Caris SSP files match the sound speed profile log, such that files are designated based on the purpose of the cast. For example, casts identified in the sound speed profile log on the "Used_for_MB" tab will appear in the file named "H12092_Used_for_MB.svp". Sound speed files are delivered with the H12092 delivery in the "H12092_SSP_Data" folder. The sound speed files are broken out into individual folders which correspond to the purpose of that applied cast; for example the folder named "Used_for_MB" has sound speed files that were applied to online multibeam data.

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 "H12092_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. ***Data included with H-Cell Survey deliverables.***

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 H12092 are presented in "H12092_Daily_Positioning_Confidence_Checks" located in *Separates I.
Data filed with original field records.

All multibeam files have delayed heave, identified as True Heave files (.thv) from the POS/MV, applied during post processing.

All cases where delayed heave were not applied were investigated and the loss of delayed heave application had minimal or no effect to the data. Delayed heave files are included with the H12092 delivery, under folder "H12092_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 with collocated depth measurements obtained by the multibeam sonar. A complete listing of all lead line measurements taken can be found in "H12092_Altantic_Surveyor_Leadline_Comparison" located in *Separates I. Of the fourteen lead lines performed, there was a mean difference of less than 0.034 meters with an average standard deviation of less than 0.030. Multibeam files used for confidence checks are located in a sub folder within the multibeam data folder named "Used_for_Leadline".

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

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 "H12092_Sidescan_Review_Log" located in *Separates I. ***Data filed with original field records.***

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, 5th 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. ***Concur. *Data included with H-Cell Survey deliverables.***

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 varied from approximately ±0.502 to ±0.604 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 best 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 best 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 best 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. The final one-meter PFM CUBE surface had 1,727 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 the high vertical uncertainties surrounded features, such as wrecks and obstructions, and steeper 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 seven half-meter feature PFM CUBE surfaces. Results are listed below.

- Features Area 1 had 149 individual CUBE nodes which exceeded IHO Order 1a.
- Features Area 2 had 1,142 individual CUBE nodes which exceeded IHO Order 1a.
- Features Area 3 had 15 individual CUBE nodes which exceeded IHO Order 1a.
- Features Area 4 had 15 individual CUBE nodes which exceeded IHO Order 1a.
- Features Area 5 had 158 individual CUBE nodes which exceeded IHO Order 1a.
- Features Area 6 had seven individual CUBE nodes that exceeded IHO Order 1a.
- Features Area 7 did not have any nodes exceeding IHO Order 1a.

A complete listing of the Feature Area locations is provided in Table B-9 of Section B.4.

The **SABER Frequency Distribution** tool was also used to review vertical uncertainties within the one-meter and seven half-meter resolution BAGs. 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. Table B-3 lists the distribution of vertical uncertainty within the one-meter PFM CUBE grid.

Table B-3. Frequency Distribution Results for Vertical Uncertainty in the one-meter PFM

Final Uncertainty (meters)	Count	Percent
0.00 - 0.50	205,140,767	99.00%
> 0.50 - 1.00	205,144,472	99.00%
> 1.00 - 1.10	205,144,475	100.00%

Results from the **SABER Frequency Distribution** tool on the seven half-meter PFMs agreed with the results from the one-meter PFM, Table B-3.

Node depth vertical uncertainties for all of H12092, from the final one-meter PFM CUBE grid, ranged from 0.270 to 1.078 meters.

B.2.3 Junction and Crossing Analysis

Three types of repeatability analyses were performed on H12092 multibeam data; junction analysis of gridded crossings data, 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 to crossline near nadir, 5 degrees, 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) crossline data. Reference the "H12092_Multibeam_Processing_Log", spreadsheet located in ***Separates I**, for delineation between main scheme and crossline data. Comparisons of all crossing data in H12092 showed that 97.00% of comparisons were within 25 centimeters and 99.01% of comparisons were within 30 centimeters (Table B-4). Junction analysis was performed by subtracting the H12092 crossline grid from the H12092 main scheme grid. Therefore, negative values indicate that H12092 main scheme data are shoaler than H12092 crossline data. The main scheme data were shoaler than the crossline data in 40.71% of junctions and the main scheme data were deeper than crossline data in 55.73% of the junctions across the entire survey area. Comparisons larger than 50 centimeters are accounted for by normal small DGPS position variability around wrecks, obstructions and steep slopes. ***Data filed with original field records.***

Table B-4. Junction Analysis, Main scheme Lines vs. Near Nadir Crosslines, H12092

Depth Difference Range (cm)	All		Positive		Negative		Zero	
	Count	Percent	Count	Percent	Count	Percent	Count	Percent
0 - 5	330843	37.37	152647	17.24	146681	16.57	31515	3.56
> 5 - 10	233210	63.71	129511	31.87	103699	28.28		
> 10 - 15	155552	81.28	96679	42.79	58873	34.93		
> 15 - 20	93644	91.86	63175	49.93	30469	38.37		
> 20 - 25	45532	97.00	32203	53.56	13329	39.88		
> 25 - 30	17833	99.01	12882	55.02	4951	40.44		
> 30 - 35	6384	99.74	4883	55.57	1501	40.61		
> 35 - 40	1785	99.94	1284	55.71	501	40.66		
> 40 - 45	301	99.97	107	55.73	194	40.68		
> 45 - 50	132	99.99	28	55.73	104	40.70		
> 50 - 60	69	99.99	11	55.73	58	40.70		

Depth Difference Range (cm)	All		Positive		Negative		Zero	
	Count	Percent	Count	Percent	Count	Percent	Count	Percent
> 60 - 70	42	100.00	1	55.73	41	40.71		
> 70	16	100.00	0	55.73	16	40.71		
Totals	885343	100.00%	493411	55.73%	360417	40.71%	31515	3.56%
Reference Grid: h12092_main_1m_29Oct2010_pfm_h12092_cross_c11_1m_29Oct2010.dif								

The **SABER Frequency Distribution** tool was used to analyze the H12092 main scheme multibeam data compared to the H12092 crossline near nadir 5 degree multibeam data (Figure B-2). The **Frequency Distribution** was run on the same difference grid used to generate the data in Table B-4. The results from the **Frequency Distribution** tool match those of the Junction analysis, reported in Table B-4.

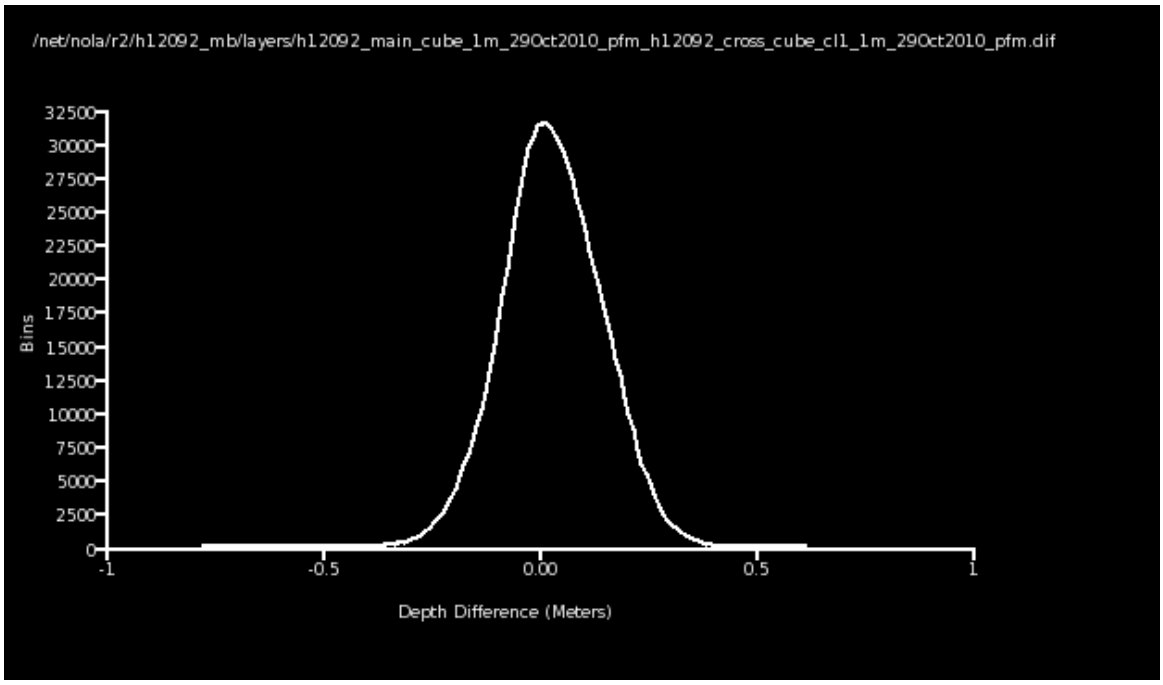


Figure B-2. Frequency Distribution Plot of Depth Differences for H12092 Main Scheme Lines vs. H12092 Crosslines

Sheet-to-sheet junction analyses were only performed between adjacent sheets for which data collection was completed, with all edits and final correctors applied to the data. Survey sheets with finalized data for junction analysis are listed in Table B-5. Refer to Figure B-3 for the general locality of each sheet. Sheets H12093 and H12094 are still in progress.

Table B-5. Surveys for Junction to H12092

Registry No.	Scale	Year of Acquisition	Field Party	Date Delivered to AHB	Location of Junction
H12003	1:20,000	2009-2010	SAIC	14 July 2010	North
H12091	1:20,000	2009-2010	SAIC	01 October 2010	East

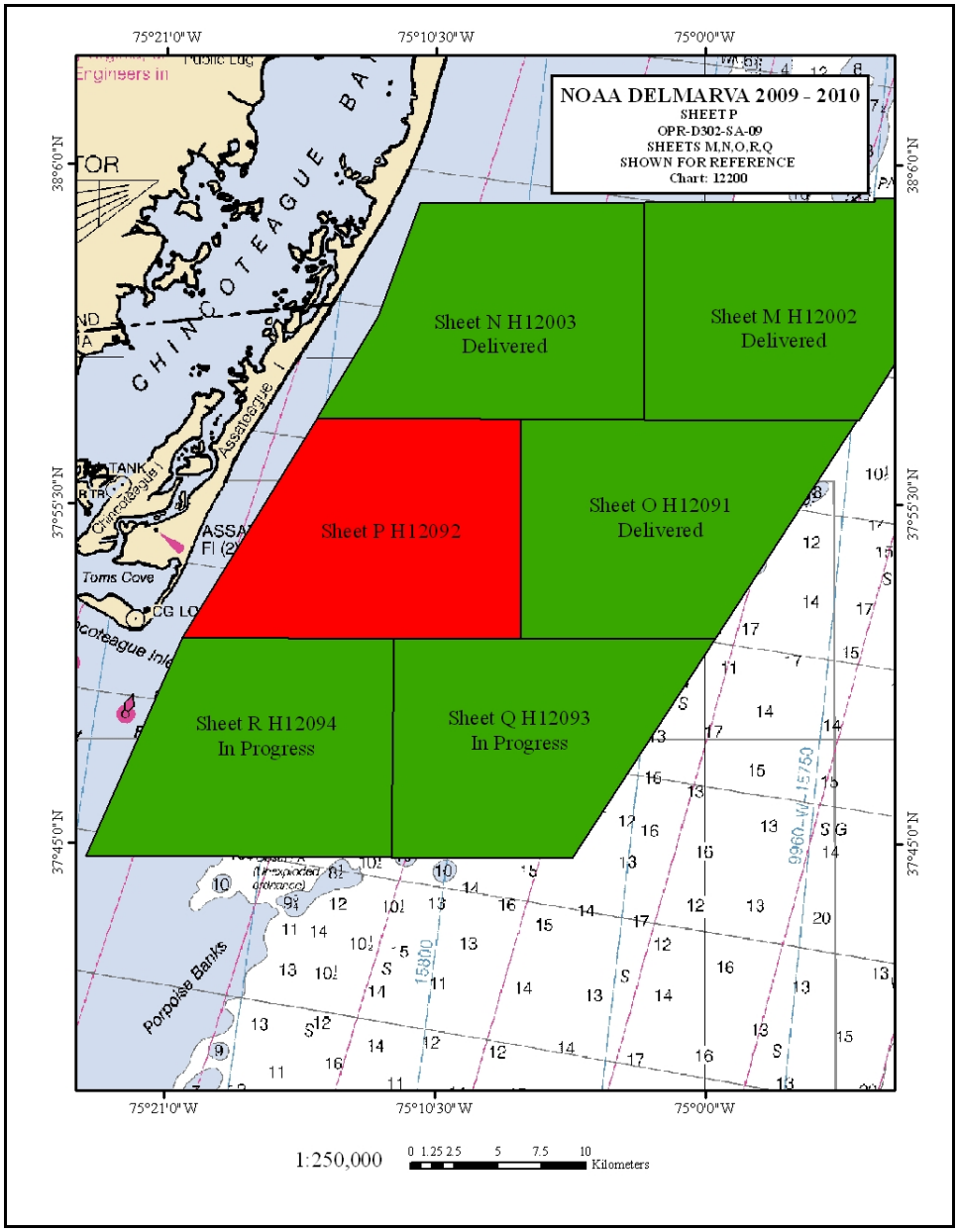


Figure B-3. General Locality and Status of Sheets in Reference to H12092

Table B-6 depicts the junction analysis between H12092 and H12003 (Sheet M) of Project OPR-D302-SA-09, surveyed between 10 August 2009 and 18 April 2010. Junction analysis was conducted on the common area between these two sheets; which falls in the northern area of H12092. Analysis was performed on the H12092 final one-

meter PFM CUBE surface, with all data included, and the H12003 final one-meter PFM CUBE surface, with all data included. This analysis showed that 95.32% of the comparisons were within 50 centimeters and 99.31% were within 110 centimeters. As noted in Section B junction analysis of the H12003 Descriptive Report, delivered July 14, 2010, a large difference in the junction analysis was seen as a result of sediment transport that occurred between 2009 and 2010. Sediment transport across the common areas between H12003, which was surveyed in 2009, and H12092 which was surveyed during 2010, accounted for the larger differences seen between the two sheets junction analysis. Junction analysis was performed by subtracting the H12003 data from the H12092 data. Therefore negative values indicate that H12092, depth data, were shoaler than H12003, depth data. Throughout the common area, H12092 CUBE depths were shoaler than H12003 28.74% of the time and were deeper than H12003 69.25% of the time.

Table B-6. Junction Analysis, H12092 vs. H12003

Depth Difference Range (cm)	All		Positive		Negative		Zero	
	Count	Percent	Count	Percent	Count	Percent	Count	Percent
0 - 5	276192	22.15	150007	12.03	101174	8.11	25011	2.01
> 5 - 10	236592	41.12	166322	25.37	70270	13.75		
> 10 - 15	207842	57.78	158662	38.09	49180	17.69		
> 15 - 20	162541	70.82	131213	48.61	31328	20.20		
> 20 - 25	116689	80.18	92405	56.02	24284	22.15		
> 25 - 30	79651	86.56	59878	60.82	19773	23.74		
> 30 - 35	50303	90.60	34332	63.57	15971	25.02		
> 35 - 40	29913	92.99	19126	65.11	10787	25.88		
> 40 - 45	17105	94.37	9919	65.90	7186	26.46		
> 45 - 50	11853	95.32	6092	66.39	5761	26.92		
> 50 - 60	15669	96.57	7534	67.00	8135	27.57		
> 60 - 70	10668	97.43	5888	67.47	4780	27.96		
> 70 - 80	7828	98.06	4962	67.87	2866	28.19		
> 80 - 90	6613	98.59	4302	68.21	2311	28.37		
> 90 - 100	4791	98.97	3281	68.47	1510	28.49		
> 100 - 110	4283	99.31	2930	68.71	1353	28.60		
> 110 - 120	2908	99.55	2060	68.87	848	28.67		
> 120-130	2152	99.72	1709	69.01	443	28.70		
> 130-140	1499	99.84	1237	69.11	262	28.72		
> 140-150	1169	99.93	989	69.19	180	28.74		
> 150-160	732	99.99	715	69.25	17	28.74		
> 160-170	84	100.00	84	69.25	0	28.74		

Depth Difference Range (cm)	All		Positive		Negative		Zero	
	Count	Percent	Count	Percent	Count	Percent	Count	Percent
> 170	10	100.00	10	69.25	0	28.74		
Totals	1247087	100.00%	863657	69.25%	358419	28.74%	25011	2.01%
Reference Grid: h12092_all_29Oct2010_pfm_h12003_1m_all_02july2010_pfm.dif								

Table B-7 depicts the junction analysis between H12092 and H12091 (Sheet O) that was surveyed between 19 September 2009 and 23 June 2010. Junction analysis was conducted across the common area, the eastern edge of H12092. Analysis was performed on the H12092 final one-meter PFM CUBE surface, with all data included, and the H12091 final one-meter PFM CUBE surface, with all data included. This analysis showed that 98.55% of the depth comparisons were within 25 centimeters and 99.35% were within 30 centimeters. As with H12003, H12091 had indications of sediment transfer occur between 2009 and 2010. The 0.11% of junctions larger than 50 centimeters between H12092 and H12091 were the result of sediment transfer which occurred between H12091, surveyed in 2009, and H12092 which was surveyed in 2010. Junction analysis was performed by subtracting the H12091 data from the H12092 data. Therefore negative values indicate that H12092 was shoaler than H12091. Throughout the common area, H12092 was shoaler than H12091 34.36% of the time and it was deeper than H12091 62.21% of the time.

Table B-7. Junction Analysis, H12092 vs. H12091

Depth Difference Range (cm)	All		Positive		Negative		Zero	
	Count	Percent	Count	Percent	Count	Percent	Count	Percent
0 – 5	322282	36.75	178028	20.30	114174	13.02	30080	3.43
> 5 – 10	252302	65.51	159971	38.54	92331	23.55		
> 10 – 15	168227	84.69	110821	51.17	57406	30.09		
> 15 – 20	90248	94.98	62540	58.3	27708	33.25		
> 20 – 25	31320	98.55	23731	61.01	7589	34.11		
> 25 – 30	6986	99.35	5971	61.69	1015	34.23		
> 30 – 35	2216	99.60	1857	61.90	359	34.27		
> 35 – 40	1121	99.73	906	62.01	215	34.30		
> 40 – 45	821	99.82	609	62.07	212	34.32		
> 45 – 50	585	99.89	405	62.12	180	34.34		
> 50 – 60	611	99.96	476	62.18	135	34.36		
> 60 – 70	235	99.99	217	62.2	18	34.36		
> 70 – 80	106	100.00	105	62.21	1	34.36		
> 80	2	100.00	2	62.21	0	34.36		

Depth Difference Range (cm)	All		Positive		Negative		Zero	
	Count	Percent	Count	Percent	Count	Percent	Count	Percent
Totals	877062	100.00%	545639	62.21%	301343	34.36%	30080	3.43%
Reference Grid: h12092_all_29Oct2010_pfm_h12091_1m_all_18aug2010_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 H12092 survey area (Figure B-4). Multibeam data for H12092 were acquired with a RESON 7125 and a RESON 8101. Twenty-four of the twenty-five crossings were beam by beam comparisons of RESON 7125 main scheme to RESON 7125 cross line data. One crossing, identified as Crossing 23, was the beam to beam comparison of RESON 8101 main scheme to RESON 8101 crossline data. Figure B-4 depicts the H12092 Statement of Work boundary (in blue) and the 25 crossings. For reference, crossings with RESON 7125 data are depicted in black with RESON 8101 data in red. As discussed in Section A the survey was extended shoreward of the delivered Statement of Work Survey Bounds to acquire data as close to the four-meter depth contour as possible.

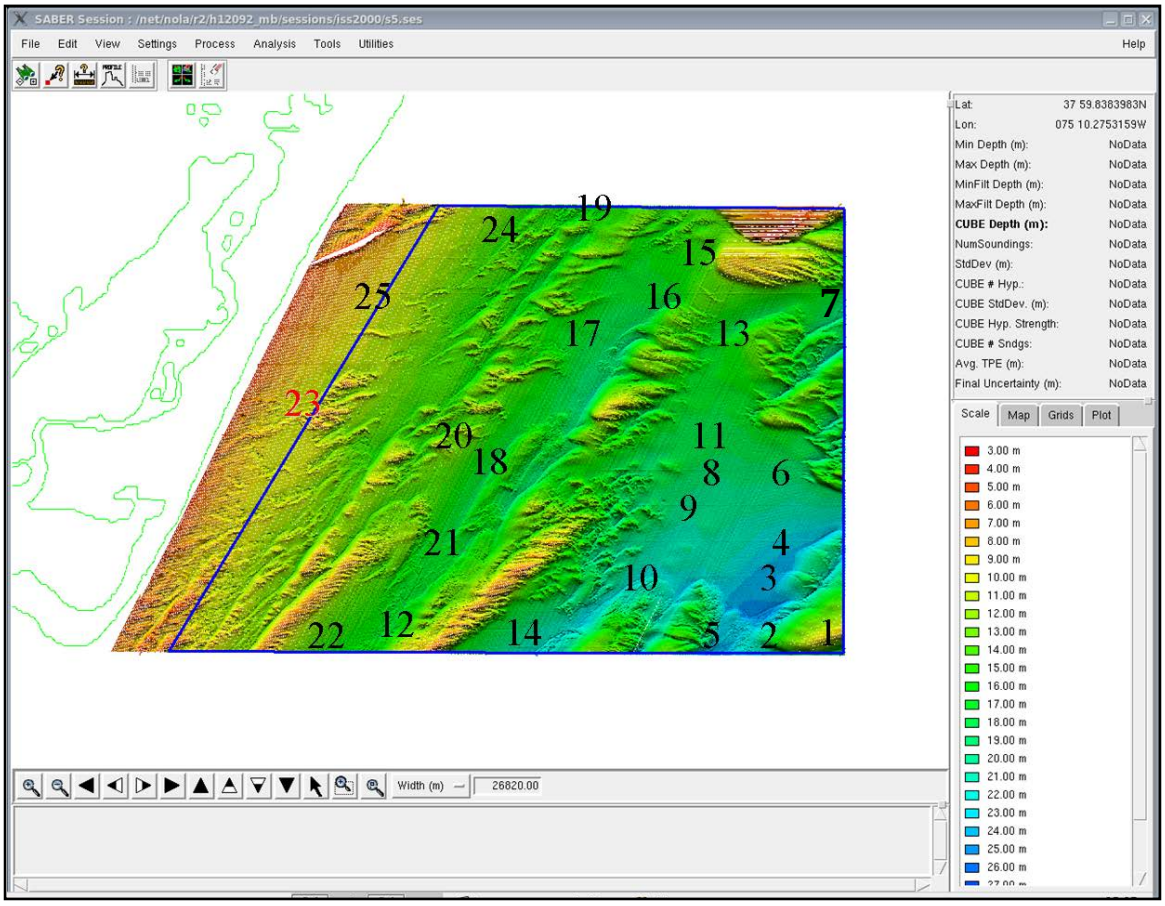


Figure B-4. Location of 25 Crossings used for Crossing Analysis and the Statement of Work Boundary in Blue

B.2.4 Multibeam Coverage Analysis

These survey operations were conducted at 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 13.5 to 13.8 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 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 final review of the coverage shows a few small areas with four or more contiguous nodes without data located in the outer beams of the multibeam swath. They were attributed to noise from bubble sweep along the hull and resulted in a reduced swath width of the multibeam data. In all cases there was 200% sidescan coverage of the areas with no contacts detected. The final CUBE surface had valid depths in more than 99.99% of the nodes.

There were seventeen significant multibeam features within the depth range (0-23 meters) for which the specification requires a half-meter resolution grid for object detection coverage over significant features. Feature 8, while less than 23 meters of depth, was not significant compared to surrounding depths and therefore was not included as part of the half-meter resolution grid generation. To meet this requirement seven separate half-meter resolution CUBE PFM grids were created. Each CUBE PFM grid was analyzed for coverage. Data within the seven 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 H12092 final one-meter PFM grid revealed that 99.49% of all nodes contained five or more 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-8 for the one-meter PFM grid. ***Data filed with original field records.***

Table B-8. Frequency Distribution of the one-meter H12092 CUBE Number of Soundings Layer

CUBE No. of Soundings contributing to Grid Node	Binned Grid Node Count	Percentile
2001 - 2852	416	0.00%
1001 - 2000	4218	0.00%
101 - 1000	8155114	3.97%
11 - 100	201140723	98.03%
10	201857252	98.38%
9	202404943	98.64%
8	202844798	98.86%
7	203287873	99.07%
6	203782479	99.32%
5	204139962	99.49%
4	204431949	99.63%
3	204692044	99.76%
2	204935391	99.88%
1	205186281	100.00%
0	205186281	100.00%

Analysis of the seven half-meter PFM grids indicated that more than 97.78% of the individual nodes contained five or more soundings as listed below.

- Features Area 1 (Features 5, 7, 14, 15, 16, 17, and 18) had 97.78%
- Features Area 2 (Feature 12) had 99.62%
- Features Area 3 (Feature 13) had 99.54%
- Features Area 4 (Features 1 and 2) had 98.44%
- Features Area 5 (Features 4, 9, and 11) had 98.54%
- Features Area 6 (Features 6 and 10) had 97.88% of the individual nodes containing five or more soundings
- Features Area 7 (Feature 3) had 99.63% of the individual nodes containing five or more soundings

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)).

Data filed with original field records.

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 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. ****Data included with H-Cell Survey deliverables.***

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 H12092 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:

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

B.4.1 Bathymetry Data Processing

Eight BAGs at one-meter grid resolution are submitted for the entire H12092 area. The BAGs 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 the CUBE Uncertainty Analysis (Section B.2.2). The resulting BAG files were limited to 300 MB in size, based on a request by AHB, and therefore multiple BAGs are produced from a single CUBE PFM grid. The BAG file named H12092_1m_MLLW_1of8.bag is the southernmost one-meter BAG while the BAG file named H12092_1m_MLLW_8of8.bag is the northernmost one-meter BAG. A summary ****Data filed with original field records.***

of the final one-meter BAG files (converted from the one-meter CUBE PFM grid) and the seven half-meter BAG files (converted from half-meter CUBE PFM grids) is provided in Table B-9. The depth range and uncertainty range for each delivered BAG is detailed in Table B-10.

Table B-9. Summary of H12092 BAG Files

BAG File Name	Comments
H12092_1m_MLLW_1of8.bag	Southern most 1.0-meter BAG
H12092_1m_MLLW_2of8.bag	
H12092_1m_MLLW_3of8.bag	
H12092_1m_MLLW_4of8.bag	
H12092_1m_MLLW_5of8.bag	
H12092_1m_MLLW_6of8.bag	
H12092_1m_MLLW_7of8.bag	
H12092_1m_MLLW_8of8.bag	Northern most 1.0-meter BAG
H12092_features_area_1_50cm_MLLW_1of7.bag	Features 5, 7, 14, 15, 16, 17, and 18; 0.5 meter BAG
H12092_features_area_2_50cm_MLLW_2of7.bag	Feature 12; 0.5 meter BAG
H12092_features_area_3_50cm_MLLW_3of7.bag	Feature 13; 0.5 meter BAG
H12092_features_area_4_50cm_MLLW_4of7.bag	Features 1 and 2; 0.5 meter BAG
H12092_features_area_5_50cm_MLLW_5of7.bag	Features 4, 9, and 11; 0.5 meter BAG
H12092_features_area_6_50cm_MLLW_6of7.bag	Features 6 and 10; 0.5 meter BAG
H12092_features_area_7_50cm_MLLW_7of7.bag	Feature 3; 0.5 meter BAG

Table B-10. Summary of H12092 BAG Depth and Uncertainty Values

BAG File Name	Depth Range (meters)	Uncertainty Range (meters)
H12092_1m_MLLW_1of8.bag	4.42 – 26.11	0.270 – 0.764
H12092_1m_MLLW_2of8.bag	4.51 – 25.26	0.270 – 1.019
H12092_1m_MLLW_3of8.bag	4.53 – 24.78	0.270 – 0.902
H12092_1m_MLLW_4of8.bag	4.33 – 20.91	0.270 – 0.804
H12092_1m_MLLW_5of8.bag	4.90 – 21.26	0.270 – 0.823
H12092_1m_MLLW_6of8.bag	4.77 – 21.83	0.270 – 0.823
H12092_1m_MLLW_7of8.bag	4.30 – 20.35	0.270 – 0.786
H12092_1m_MLLW_8of8.bag	3.64 – 18.14	0.270 – 1.078
H12092_features_area_1_50cm_MLLW_1of7.bag	3.64 – 16.21	0.270 – 1.046
H12092_features_area_2_50cm_MLLW_2of7.bag	4.92 – 9.28	0.270 – 1.317
H12092_features_area_3_50cm_MLLW_3of7.bag	9.01 – 10.80	0.270 – 0.762
H12092_features_area_4_50cm_MLLW_4of7.bag	22.48 – 24.03	0.270 – 1.160
H12092_features_area_5_50cm_MLLW_5of7.bag	12.89 – 20.79	0.270 – 1.673
H12092_features_area_6_50cm_MLLW_6of7.bag	12.64 – 14.16	0.270 – 0.764
H12092_features_area_7_50cm_MLLW_7of7.bag	19.04 – 19.87	0.270 – 0.533

As requested by NOAA's AHB, five additional non-standard BAG files corresponding to each of the standard BAG files listed in Table B-9 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 a 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. 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, BAGs 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 made through Triton **Isis**, details regarding H12092 sidescan contacts are delivered as a standalone spreadsheet in ***Appendix II and in the Sidescan Sonar Contacts S-57 File. ****Data appended to this Report.***

Sidescan contact information is delivered in several ways. The "H12092_Sidescan_Contacts_List", located in ***Appendix II, notes all sidescan contacts that were identified within H12092. Contacts for which an **Isis** contact file was created are delivered in ****Separates V (*_n.CON files). The **Isis** contact files (*_n.CON) can be viewed with **Isis Target**. The contact positions stored in these 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) and uses the last click position chosen ****Data filed with original field records.***

by the hydrographer. When the **isis2ctv** program is run it also overwrites the **Isis** calculated position field within the *_n.CON file with the last click position. 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. Additionally all contact image files (.tif) are delivered in ****Separates V.

Data appended to this Report.

****Data filed with original field records.***

C. VERTICAL AND HORIZONTAL CONTROL *SEE ALSO THE H-CELL REPORT.*

Please refer to the *****Horizontal and Vertical Control Report, for detailed descriptions of the procedures and systems used to attain hydrographic positioning. This report will be delivered with the Descriptive Report for the last sheet of this task order. Specifics pertaining to H12092 are discussed below. *****Data included with H-Cell Survey deliverables.***

C.1 VERTICAL CONTROL

The vertical datum for H12092 is Mean Lower-Low Water (MLLW). NOAA tide station 8651370 Duck, NC (latitude 36° 11'N, longitude 075° 44.8'W) was the source of all verified water level heights for determining correctors to soundings. All data for H12092 were contained within tide zones SA55A and SA46A; which were provided from NOAA.

The primary means for analyzing the adequacy of zoning was by entering the observed verified water level correctors at 6-minute intervals from 22 June 2010 to 17 October 2010 from adjacent zones into a spread sheet. A comparative zone-to-zone analysis (summarized in Table C-1) confirmed 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 crossline 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 H12092. The water level zoning parameters provided by NOS, Table C-2, were adequate for application of the observed verified water levels. As a result, they were accepted as final and applied to all H12092 multibeam data.

Table C-1. H12092 Analysis of Verified 6 Minute Water Level Data Across Tide Zones SA55A and SA46A

Zone Boundary	SA55A – SA46A
Average +2x Standard Deviation	0.043
Minimum Difference	-0.006
Maximum Difference	0.050
Average Difference	0.020
Standard Deviation	0.012

Data are in Meters above MLLW

Table C-2. Water Level Zoning Parameters Applied on Sheet H12092

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

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. ***Data appended to this Report.***

C.2 HORIZONTAL CONTROL

The survey data for sheet H12092 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, "H12092_Daily_Positioning_Confidence_Checks", is located in **Separates I.
Data filed with original field records.

D. RESULTS AND RECOMMENDATIONS *SEE ALSO THE H-CELL REPORT.*

D.1 CHART COMPARISON

H12092 was compared to the largest scale charts which encompassed all of the area, in cases where the survey area was not fully covered by the chart; multiples were used for comparison; as follows:

Chart 12211	**Fenwick Island to Chincoteague Inlet**	
	Scale	1:80,000
	Edition and Date	43rd, 10/01/2007
	Notice to Mariners corrected through	43.159, 10/23/2010
ENC US4VA50M	**Fenwick In to Chincoteague Inlet; Ocean City Inlet**	
	Scale	1:80,000
	Edition and Issue Date	14th, 06/21/2009
	Update and Date	3, 10/22/2010
ENC US4VA70M	**Chincoteague Inlet to Great Machipongo Inlet; Chincoteague Inlet**	
	Scale	1:80,000
	Edition and Issue Date	9th, 10/13/2009
	Update and Date	6, 07/09/2010

The chart comparisons were conducted using SAIC's **SABER** software to view the BSB raster charts with overlain layers of H12092 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 depth units are rounded using NOAA cartographic rounding (0.75 round up).

H12092 is adequate to supersede common areas and soundings of all affected charts as H12092 data meets data accuracy standards and bottom coverage requirements.

D.1.1 Chart 12211 Fenwick Island to Chincoteague Inlet (1:80,000)

Chart 12211 encompasses all of H12092.

Charted depths greater than the 30-foot depth curve covered by H12092 were generally within ± 3 feet of the depths observed during this survey while charted depths less than the 30-foot depth curve varied greatly. Differences in charted and observed depths less than the 30-foot depth curve ranged from as little as ± 2 feet to as much as ± 15 feet.
Concur.

The charted 18-foot depth curve of Winter Quarter Shoal charted in 37° 57’ 53.45”N 075° 08’ 14.01”W was found to have migrated to the north in the northeast boundary and southerly in the southwest boundary while the 12-foot depth ~~curve~~ ***area*** was no longer valid as a least depth of 13 feet (3.99 meters, 0.27 meter uncertainty) was found across the surveyed area of Winter Quarter Shoal. ***Concur.***

Charted shoals less than 30 feet tended to be as charted, such as “Chincoteague Shoals” in 37° 52’ 03.53”N 075° 17’ 47.13”W, or had migrated slightly southeast such as “Blackfish Bank” charted in 37° 52’ 09.77”N 075° 14’ 15.97”W. ***Concur with clarification, shoals have not moved significantly. Chart current survey depths within the common areas.***

The charted 18-foot depth curve depicting the shoal charted in 37° 57’ 51.45”N 075° 16’ 25.00”W, noted earlier as not surveyed due to shoal depths, has migrated south approximately 250 to 300 meters and no longer extends as far northeast as charted. ***Concur.***

The charted 18-foot depth curves over the shoal named "Blackfish Bank" in 37° 52’ 09.77”N 075° 14’ 15.97”W did not have depths shoaler than 21 feet. ***Concur.***

Feature #4 is a 56-foot (17.29 meters, 0.28 meter uncertainty) dangerous wreck submitted as Danger to Navigation Report #1. It is currently charted in 37° 53’ 39.29”N 075° 10’ 41.26”W as a 57-foot dangerous wreck labeled “Wreckage”.

Recommendations:

- Remove charted 57 foot dangerous wreck in 37° 53’ 39.29”N 075° 10’ 41.26”W
- Chart 56 foot dangerous wreck in 37° 53’ 39.29”N 075° 10’ 41.26”W

Concur. See also DtoN#1 in Appendix I.

Feature #12 is a 16-foot (4.92 meters, 0.27 meter uncertainty) dangerous ***obstruction*** ~~wreck submitted as Danger to Navigation Report #2.~~ It is currently charted in 37° 54’ 57.09”N 075° 18’ 54.45”W as a 21-foot dangerous obstruction labeled “Obstn”.

Recommendations:

- Remove charted 21 foot Obstn in 37° 54’ 57.09”N 075° 18’ 54.45”W
- Chart 16-foot dangerous ~~wreck~~ ***obstruction*** in 37° 54’ 57.09”N 075° 18’ 54.45”W

Concur. See also Appendix II and V.

Feature #16 is a 25-foot (7.65 meters, 0.27 meter uncertainty) dangerous obstruction 240 meters northeast of the charted dangerous obstruction in 37° 58’ 00.32”N 075° 09’ 17.30”W labeled “Obstn Fish Haven (auth min 17 ft)” AWOIS 14229.

Recommendations:

- Chart 25-foot dangerous obstruction with label Obstns in 37° 58’ 02.38”N 075° 09’ 08.21”W

Do not concur. Retain charted dangerous obstruction, Fish Haven (auth min 17ft) as charted. See also HCell Report Section D.1.1.a.

Feature #18 is a ~~12-foot~~ ***11.952 ft*** (3.64 meters, 0.27 meter uncertainty) dangerous obstruction submitted as Danger to Navigation Report #3. It is currently charted in 37° 58' 03.49"N 075° 07' 53.02"W as a 12-foot dangerous obstruction labeled "Obstns".

Recommendations:

- Retain as charted

Concur with clarification. This feature is shown on NOS chart 12211, 44th Ed., 02012011 as a dangerous obstruction, least depth 11.811 ft. in Latitude 37-58-03.5N, Longitude 075-07-53.1W. Office processing determined that the position and least depth are different from the initial DToN submission to MCD. Delete the charted dangerous obstruction(s), least depth 12 ft. Chart a dangerous obstruction(s), least depth 11.95 ft in Latitude 37-58-03.49N, Longitude 075-58-03.020W. See also DtoN#3 in Appendix I.

Contact 285/181043 is a charted dangerous wreck labeled "Wk" in 37° 53' 59.03"N 075° 19' 42.38"W. It was covered by one pass of side scan in 37° 53' 59.16"N 075° 19' 43.97"W. No bathymetry or 2nd sidescan coverage was obtained due to safety concerns as the wreck was located very close to shore.

Recommendations:

- Retain as charted

Concur.

Currently charted items that were not found during H12092, and are recommended for removal from the chart are represented in Table D-1.

Table D-1. Charted Items Not Found, Recommended for Removal from Chart 12211

Latitude, North (NAD83)	Longitude, West (NAD83)	Search Method	Description of Item Recommended for Removal
37° 58' 06.16"	075° 08' 28.42"	200% Sidescan and resulting Multibeam	Dangerous Wreck Cleared to 14 feet labeled Wreckage AWOIS 14287
Concur. Delete dangerous 14 ft cleared wreckage. See HCell Report, Section D.1.1.b.			
37° 52' 06.30"	075° 09' 23.84"	200% Sidescan and resulting Multibeam	Dangerous Wreck Labeled PA AWOIS 14498
Concur. Delete dangerous wreck PA, depth unknown.			

Features found in H12092 that are recommended for charting, and were not discussed in the above section, are reported in Table D-2.

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

Feature Number	Latitude, North (NAD83)	Longitude, West (NAD83)	Depth (Feet)	Depth (Meters)	Description

Feature Number	Latitude, North (NAD83)	Longitude, West (NAD83)	Depth (Feet)	Depth (Meters)	Description
1	37° 51’ 49.09”	075° 08’ 34.65”	75	22.90	Obstruction
Do not concur. Insignificant to navigation, update area with present survey depths.					
2	37° 52’ 22.69”	075° 09’ 40.21”	74	22.48	Obstruction
Do not concur. Insignificant to navigation, update area with present survey depths.					
3	37° 56’ 41.73”	075° 07’ 11.21”	62	19.04	Obstruction
Do not concur. Insignificant to navigation, update area with present survey depths.					
5	37° 57’ 56.84”	075° 11’ 59.82”	50	15.27	Obstruction
Do not concur. Insignificant to navigation, update area with present survey depths.					
6	37° 55’ 19.18”	075° 14’ 22.07”	41	12.64	Obstruction
Do not concur. Insignificant to navigation, update area with present survey depths.					
7	37° 57’ ~~49.29~~ ***.23***”	075° 14’ ~~28.39~~ ***.35***”	39	11.89	Obstruction
Concur with clarification. Chart as depth.					
9	37° 53’ 42.08”	075° 17’ 17.19”	42	12.89	Obstruction
Do not concur. Insignificant to navigation, update area with present survey depths.					
10	37° 54’ 34.46”	075° 14’ 38.22”	43	13.23	Obstruction
Do not concur. Insignificant to navigation, update area with present survey depths.					
11	37° 53’ 46.46”	075° 12’ 55.09”	48	14.81	Obstruction
Do not concur. Insignificant to navigation, update area with present survey depths.					
13	37° 51’ 29.42”	075° 19’ 47.77”	30	9.18	Wreck
Concur. Add dangerous 30 ft wreck in present survey location.					

Chart 12211 (1:80,000) fully encompassed the H12092 survey area and as such chart comparisons were only reported with reference to that chart; however other charts which have common areas were compared and are only reported if they differed from the comparisons made on Chart 12211. The additional charts which have common area are listed below: ***Concur.***

Chart 12210 Chincoteague Inlet to Great Machipongo Inlet

Scale 1:80,000

Edition and Date	38th, 05/01/2008
Notice to Mariners corrected through	38.125, 10/23/2010

Chart 12200 Cape May to Cape Hatteras

Scale	1:419,706
Edition and Date	49th, 06/01/2007
Notice to Mariners corrected through	49.175, 10/23/2010

Chart 13003 Cape Sable to Cape Hatteras

Scale	1:1,200,000
Edition and Date	50th, 05/01/2010
Notice to Mariners corrected through	50.46, 11/23/2010

There were no additional charting recommendations for these charts.

D.1.2 ENC US4VA50M Fenwick In to Chincoteague Inlet; Ocean City Inlet (1:80,000)

ENC US4VA50M covers the northern area of the survey area, from 37° 56' 00.47"N to the northern boundary limits of H12092.

Charted depths greater than the 9.1-meter depth curve covered by H12092 were generally within ± 1 meter of the depths observed during this survey while charted depths less than the 9.1-meter depth curve varied greatly. Differences in charted and observed depths less than the 30-foot depth curve ranged from as little as ± 0.5 meters to as much as ± 4 meters. ***Concur.***

The charted 5.4-meter depth curve of Winter Quarter Shoal charted in 37° 57' 53.45"N 075° 08' 14.01"W was found to have migrated to the north in the northeast boundary and southerly in the southwest boundary while the 3.6-meter depth curve was no longer valid as a least depth of 3.99 meters (13.09 feet, 0.27 uncertainty) was found across the surveyed area of Winter Quarter Shoal. ***Concur.***

The charted 5.4-meter depth curve depicting the shoal charted in 37° 57' 51.45"N 075° 16' 25.00"W, noted earlier as not surveyed due to shoal depths, has migrated south approximately 250 to 300 meters and no longer extends as far northeast as charted. ***Concur.***

Feature #16 is a 7.65-meter (25 feet, 0.27 meter uncertainty) dangerous obstruction 240 meters northeast of the 5.1-meter charted dangerous obstruction in 37° 58' 00.15"N 075° 09' 17.04"W listed as fish haven (AWOIS 14229).

Recommendations:

- Remove the 5.1-meter ***(17 ft)*** charted dangerous obstruction in 37° 58' 00.15"N 075° 09' 17.04"W
- Chart a 7.65-meter dangerous obstruction in 37° 58' 02.38"N 075° 09' 08.21"W****See recommendations in Section D.1.1. of this Report.***

Feature #18 is a 3.64-meter (12 feet, 0.27 meter uncertainty) dangerous obstruction submitted as Danger to Navigation Report #3. It is currently charted in 37° 58' 03.50"N 075° 07' 53.10"W as a 3.64-meter dangerous obstruction.

Recommendations:

- Retain as charted.

See recommendations in Section D.1.1. of this Report..

Currently charted items on ENC US4VA50M that were not found during H12092 are represented in Table D-3.

Table D-3. Charted Items Not Found on ENC US4VA50M Recommended for Removal from Chart

Latitude, North (NAD83)	Longitude, West (NAD83)	Search Method	Description of Item Recommended for Removal
37° 58' 05.85"	075° 08' 28.44"	200% Sidescan and resulting Multibeam	Foul ground distributed remains of wreck AWOIS 14287
See recommendations in Section D.1.1. of this Report.			

Features found in H12092 that are recommended for charting, on ENC US4VA50M, and were not discussed in the above section, are reported in Table D-4.

Table D-4. Additional Features to be Considered for Charting on ENC US4VA50M

Feature Number	Latitude, North (NAD83)	Longitude, West (NAD83)	Depth (Feet)	Depth (Meters)	Description
3	37° 56' 41.73"	075° 07' 11.21"	62	19.04	Obstruction
See recommendations in Section D.1.1. of this Report.					
5	37° 57' 56.84"	075° 11' 59.82"	50	15.27	Obstruction
See recommendations in Section D.1.1. of this Report.					
7	37° 57' 49.29"	075° 14' 28.39"	39	11.89	Obstruction
See recommendations in Section D.1.1. of this Report.					

D.1.3 ENC US4VA70M Chincoteague Inlet to Great Machipongo Inlet (1:80,000)

ENC US4VA70M covers the southern area of the survey area, from 37° 56' 00.47"N to the southern boundary limits of H12092.

Charted depths greater than the 9.1-meter depth curve covered by H12092 were generally with in ± 1 meter of the depths observed during this survey while charted depths less than

the 9.1-meter depth curve varied greatly. Differences in charted and observed depths less than the 30-foot depth curve ranged from as little as ± 0.5 meters to as much as ± 4 meters in the vicinity of shoals. ***Concur.***

Charted shoals less than 9.1 meters tended to be as charted, such as "Chincoteague Shoals" in 37° 52' 03.53"N 075° 17' 47.13"W, or had migrated slightly southeast such as the northern edge of "Blackfish Bank" charted in 37° 52' 09.77"N 075° 14' 15.97"W. ***Concur with clarification, shoals have not moved significantly. Chart current survey depths within the common areas.***

The charted 5.4 meter depth curves over the shoal named "Blackfish Bank" in 37° 52' 09.77"N 075° 14' 15.97"W did not have depths shoaler than 6.39 meters. ***Concur.***

Feature #4 is a 17.29-meter (56 feet, 0.28 meter uncertainty) dangerous wreck submitted as Danger to Navigation Report #1. It is currently charted in 37° 53' 39.29"N 075° 10' 41.26"W as a foul area noted as distributed remains of wreck with a least depth of 17.3 meters.

Recommendations:
Retain as charted.
****See recommendations in Section D.1.1. of this Report.***

Feature #12 is a 4.92-meter (16 feet, 0.27 meter uncertainty) dangerous wreck submitted as Danger to Navigation Report #2. It is currently charted in 37° 54' 54.21"N 075° 18' 54.20"W as a 6.4-meter dangerous obstruction.

Recommendations:

- Remove charted 6.4-meter dangerous obstruction in 37° 54' 54.21"N 075° 18' 54.20"W
- Chart 4.92-meter dangerous wreck in 37° 54' 57.09"N 075° 18' 54.45"W

****See recommendations in Section D.1.1. of this Report.***

Contact 285/181043 is a charted dangerous wreck in 37° 53' 57.19"N 075° 19' 42.22"W. It was covered by one pass of side scan in 37° 53' 59.16"N 075° 19' 43.97"W. No bathymetry or 2nd sidescan coverage was obtained due to safety concerns as the wreck was located very close to shore.

Recommendations:

- Remove charted dangerous wreck in 37° 53' 57.19"N 075° 19' 42.22"W
- Chart a charted dangerous wreck in 37° 53' 59.16"N 075° 19' 43.97"W

****See recommendations in Section D.1.1. of this Report.***

Currently charted items on ENC US4VA70M that were not found during H12092, and are recommended for removal, are represented in Table D-5

Table D-5. Charted Items Not Found on ENC US4VA70M Recommended for Removal from Chart

Latitude, North (NAD83)	Longitude, West (NAD83)	Search Method	Description of Item Recommended for Removal
37° 52’ 06.16”	075° 09’ 24.32”	200% Sidescan and resulting Multibeam	Dangerous Wreck depth unknown AWOIS 14498
See recommendations in Section D.1.1. of this Report.			

Features found in H12092 that are recommended for charting on ENC US4VA70M, and were not discussed in the above section, are reported in Table D-6.

Table D-6. Additional Features to be Considered for Charting on ENC US4VA70M

Feature Number	Latitude, North (NAD83)	Longitude, West (NAD83)	Depth (Feet)	Depth (Meters)	Description
1	37° 51’ 49.09”	075° 08’ 34.65”	75	22.90	Obstruction
See recommendations in Section D.1.1. of this Report.					
2	37° 52’ 22.69”	075° 09’ 40.21”	74	22.48	Obstruction
See recommendations in Section D.1.1. of this Report.					
6	37° 55’ 19.18”	075° 14’ 22.07”	41	12.64	Obstruction
See recommendations in Section D.1.1. of this Report.					

Feature Number	Latitude, North (NAD83)	Longitude, West (NAD83)	Depth (Feet)	Depth (Meters)	Description
9	37° 53' 42.08"	075° 17' 17.19"	42	12.89	Obstruction
See recommendations in Section D.1.1. of this Report.					
10	37° 54' 34.46"	075° 14' 38.22"	43	13.23	Obstruction
See recommendations in Section D.1.1. of this Report.					
11	37° 53' 46.46"	075° 12' 55.09"	48	14.81	Obstruction
See recommendations in Section D.1.1. of this Report.					
13	37° 51' 29.42"	075° 19' 47.77"	30	9.18	Wreck
See recommendations in Section D.1.1. of this Report.					

D.1.4 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; three of which fell within the H12092 survey bounds. All AWOIS items within H12092 were identified for full investigation. AWOIS item investigations were conducted with 200% sidescan sonar coverage with resulting multibeam coverage. In conjunction with the 200% sidescan sonar coverage, multibeam coverage is discussed individually for each AWOIS item. A listing of all full AWOIS items that fall within the bounds of H12092 is provided in Table D-7 and each is discussed below.

Table D-7. Complete AWOIS Listings Received from NOAA for H12092

AWOIS Number	Search Type	Chart 12211	ENC US4VA50M	ENC US4VA70M
14229	Full	X	X	
14287	Full	X	X	
14498	Full	X		X

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

D.1.4.1 AWOIS 14229 (Full):

History: --CL920/1959—60 old autos were deposited adjacent to wreck at Winter Quarter Shoal wreck. Permission granted to Baltimore C.E. District by the U.S. Coast Guard Auxiliary. Chincoteague in 1950 to dump material with least depth of 17ft.

Survey Results: AWOIS 14229 was assigned a 400-meter radius. The resulting multibeam for this area was less than 100% coverage with gaps of approximately 20 meters between swaths present. Feature 16 was found to fall within the search radius and is discussed above in the Chart Recommendations. ***Concur. Retain charted dangerous obstruction, Fish Haven (auth min 17ft) as charted. See also HCell Report Section D.1.1.a.***

D.1.4.2 AWOIS 14287 (Full):

History: --F00081/1949: NOS – Wire drag cleared to 14ft at 37/57/1837m N 75/06/920m W. Considered to be wreckage of BARNSTABLE. (ETR 08/12/08). –H09796/1978:NOS – 14ft cleared depth. Wreck charted in lat 37/58.1N lon 75/08.5W originates with FE 7, 1949. Wreck not considered disproved. (ETR 08/12/08).

Survey Results: AWOIS 14287 was assigned a 200-meter radius. The resulting multibeam for this area was less than 100% coverage with gaps of approximately 20 meters between swaths present. No obstructions or wrecks were found within the covered area. ***Concur. Delete dangerous 14 ft cleared wreckage. See HCell Report, Section D.1.1.b.***

D.1.4.3 AWOIS 14498 (Full):

History: USCG 5th – Submerged wreck 44ft F/V TREENA B at 37/52/06N 75/09/24W. LNM27/96.

Survey Results: AWOIS 14498 was assigned a 200-meter radius. The resulting multibeam for this area was 100% coverage with no gaps between swaths present. No obstructions or wrecks were found within the covered area. ***Concur. Delete dangerous wreck PA, depth unknown.***

D.1.5 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 on many large features (e.g., wrecks, obstructions, etc.) to better define the extents of the feature and to help preserve important least depths on that 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 14 designated soundings set in H12092. 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 H12092 are listed within two spreadsheets "H12092_Multibeam_Features_List" and "H12092_Designated_Soundings_List" located in *Appendix II. ***Data appended to this report.*** 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). ***Concur.***

D.1.6 Danger to Navigation Reports

Three Danger to Navigation Reports were submitted to AHB by SAIC for this survey and copies have been included in *Appendix V. Corresponding versions of the *Danger to Navigation Reports as AHB submitted to Marine Charting Division are provided in *Appendix I. The ~~three~~ *Danger to Navigation Reports are also referenced in Chart Comparison, Section D.1 and correspond to Features 4, 12, and 18 respectfully. Of the three SAIC submitted *Danger to Navigation Reports, AHB submitted *Danger to Navigation Reports 1 and 3 to the Marine Charting Division, while *Danger to Navigation Report 2 was not submitted to Marine Charting Division. Please refer to *Appendix V for the supplemental correspondence, dated 31 August 2010 for more details regarding *Danger to Navigation Report 2. ***Concur. *Data appended to this report.***

D.2 ADDITIONAL RESULTS

D.2.1 Shoreline Verification

Shoreline verification was not required for H12092. ***Concur.***

D.2.2 Comparison with Prior Surveys

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

D.2.3 Aids to Navigation

There were no Aids to Navigation that fell within the H12092 survey area. ***Concur.***

D.2.4 Bottom Characteristics

In accordance with both the Project Instructions and NOS Specifications and Deliverables, April 2009, bottom characteristics were obtained for H12092. Sixty-two samples were collected. Bottom characteristics are included within the H12092 Feature File, 3S412092.000, 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 represented within table *Appendix V-1 and are followed by images of the bottom samples. Bottom characteristics obtained for H12092 are sufficient to be used to update the respective raster and vector charts. ***Concur. Present survey bottom samples were***

used to supersede charted bottom samples throughout the survey area except as mentioned in the HCell Report, Section D.2.4.
****Data appended to this report.***

D.2.5 S-57 Feature File

Included with H12092 delivery is a final S-57 feature file, 3S412092.000; this file 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 centimeter precision, as opposed to decimeter precision. The S-57 feature file delivered for H12092 and all other documentation associated with the H12092 delivery retains centimeter precision. Following specifications the S-57 feature file is in the WGS84 datum and is unprojected with all units in meters. All features addressed in H12092 are retained within the S-57 feature file (including those features not recommended for charting). ***Concur.***

"H12092_Multibeam_Features_List" provided within ***Appendix II list all multibeam features flagged within the GSF records. ***Concur. *Data appended to this report.***

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.** ***Concur.***

D.2.6 Sidescan Sonar Contacts S-57 File

As requested from NOAA AHB in addition to the Sidescan Contact list, "H12092_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 H12092 S-57 final feature file. Note both of these S-57 files share the same name "3S412902.000". The supplemental sidescan S-57 feature file is located in the directory named "H12092_Side_Scan_Sonar_S-57_File_as_Cartographic_symbol", while the S-57 final feature file is located in the directory named "H12092_S-57_Feature_File". ****Data appended to this report.***

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 images are named by the contact name and in the Sidescan Sonar Contact S-57 folder by 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 H12092 S-57 feature file, 3S412902.000. The "H12092_Sidescan_Contacts_List" also provides the same information as is in this 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. ***Concur. **Data filed with original field records.***

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. This includes alongshore transport and seasonal to and from shore transport. 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, was evident around shoals from data collected before JD 215 and after JD 282. Examples of these differences can been seen around Chincoteague Shoal, specifically in 37° 51' 41.38"N 075° 19' 59.82"W, and the shoal located in the northwest corner of the survey area, specifically in 37° 57' 56.51"N 075° 15' 54.87"W where differences of 30 cm to 70 cm were seen in very discrete patches. These isolated differences due to sediment transport accounted for some of the higher CUBE uncertainties observed across H12092. Other areas which contributed to the higher CUBE uncertainties observed were along steep slopes and features, and in some cases where there was a slight tidal difference between adjacent overlapping swaths of multibeam data. ***Concur.***

E. APPROVAL SHEET

17 December 2010

LETTER OF APPROVAL

REGISTRY NUMBER: H12092

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, H12092, 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:

Report Submission Date	
Data Acquisition and Processing Report, SAIC Doc 10-TR-010	01 October 2010
H12091 Descriptive Report, SAIC Doc 10-TR-004	01 October 2010

SCIENCE APPLICATIONS INTERNATIONAL CORPORATION

Paul L. Donaldson

Digitally signed by Paul L. Donaldson
DN: cn=Paul L. Donaldson, o=SAIC, ou=MSTD, email=paul.l.donaldson@saic.com, c=US
Date: 2010.12.17 08:41:19 -05'00'

Paul L. Donaldson
Lead Hydrographer
Science Applications International Corporation
17 December 2010

APPENDIX I

DANGERS TO NAVIGATION

APPENDIX I. DANGER TO NAVIGATION REPORTS (AHB SUBMISSIONS TO MCD)

This appendix provides copies of two of the three Danger to Navigation Reports, that SAIC submitted for H12092, as they were prepared by the Atlantic Hydrographic Branch (AHB) and submitted to the Marine Chart Division (MCD). AHB determined not to send Danger to Navigation Report #2 to MCD; see supplemental correspondence in Appendix V dated August 31, 2010. These reports were provided to SAIC by AHB as PDF documents and then converted to JPEG images for inclusion in this Appendix. In addition, Appendix V includes copies of the three Danger to Navigation Reports as originally prepared by SAIC and submitted to AHB. ***Concur.***

H12092 DtoN#1

Registry Number: H12092
State: Virginia
Locality: Atlantic Ocean
Sub-locality: 5 NM East of Assateague Island
Project Number: OPR-D302-SA-09
Survey Date: 06/27/2010

Charts Affected

Number	Edition	Date	Scale (RNC)	RNC Correction(s)*
12211	43rd	10/01/2007	1:80,000 (12211_1)	USCG LNM: 06/15/2010 (06/15/2010) NGA NTM: 05/09/1992 (06/26/2010)
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	57 ft obstruction	Obstruction	17.46 m	37° 53' 39.3" N	075° 10' 41.3" W	---

Generated by Pydro v9.10 (r2824) on Thu Jul 01 14:45:22 2010 [UTC]

1.1) 57 ft obstruction

DANGER TO NAVIGATION

Survey Summary

Survey Position:	37° 53' 39.3" N, 075° 10' 41.3" W
Least Depth:	17.46 m (= 57.28 ft = 9.547 fm = 9 fm 3.28 ft)
TPU (±1.96σ):	**THU (TPEh)** [None] ; **TVU (TPEv)** [None]
Timestamp:	2010-178.14:50:11.000 (06/27/2010)
GP Dataset:	H12092_dton1.txt
GP No.:	1
Charts Affected:	12210_1, 12211_1, 12200_1, 13003_1

Remarks:

wreck; Depths are reduced to Mean Lower Low Water using predicted tides based on preliminary zoning. Positions are based on NAD-83. Positions were obtained using DGPS from a US Coast Guard Station. Charts affected: 12211 43rd Edition 10/01/2007 1:80,000 scale: Corrected through NM 03/27/2010

The deteriorated submerged wreck appears ti be broken in half with two main pieces lying adjacent to each other. There are several smaller pieces of debris from the wreck covering an area approximately 12 by 12 meters. It has a least depth of 57 feet in depths of 65 feet.

Feature Correlation

Address	Feature	Range	Azimuth	Status
H12092_dton1.txt	1	0.00	000.0	Primary

Hydrographer Recommendations

[None]

Cartographically-Rounded Depth (Affected Charts):

57ft (12210_1, 12211_1)

9 ½fm (12200_1, 13003_1)

S-57 Data

Geo object 1:	Obstruction (OBSTRN)
Attributes:	OBJNAM - 57 ft obstruction

Page 3

H12092 DtoN#1 1 - Danger To Navigation

QUASOU - 6:least depth known
SORDAT - 20100627
SORIND - US,US,survy:H12092
TECSOU - 2,3:found by side scan sonar,found by multi-beam
VALSOU - 17.46 m
VERDAT - 12:Mean lower low water
WATLEV - 3:always under water/submerged

Office Notes

Delete charted 57 ft dangerous wreck and add 56 ft dangerous wreck at present survey location

Page 4

H12092 DtoN#1 1 - Danger To Navigation

Feature Images

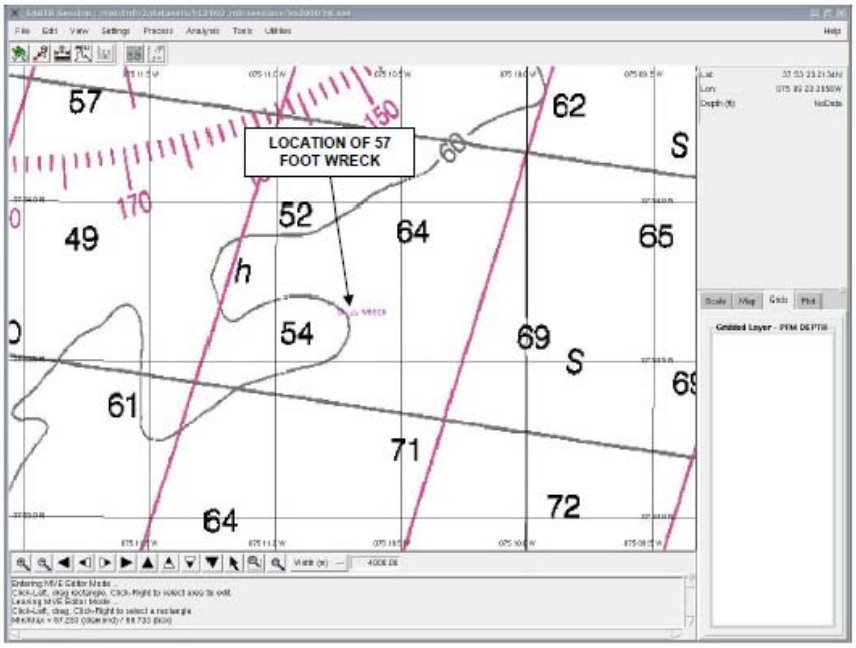


Figure 1. Section of Chart 12211 Showing the Location of Wreck with Least Depth of 57 Feet within H12092.

Figure 1.1.1

H12092 DtoN#1 1 - Danger To Navigation

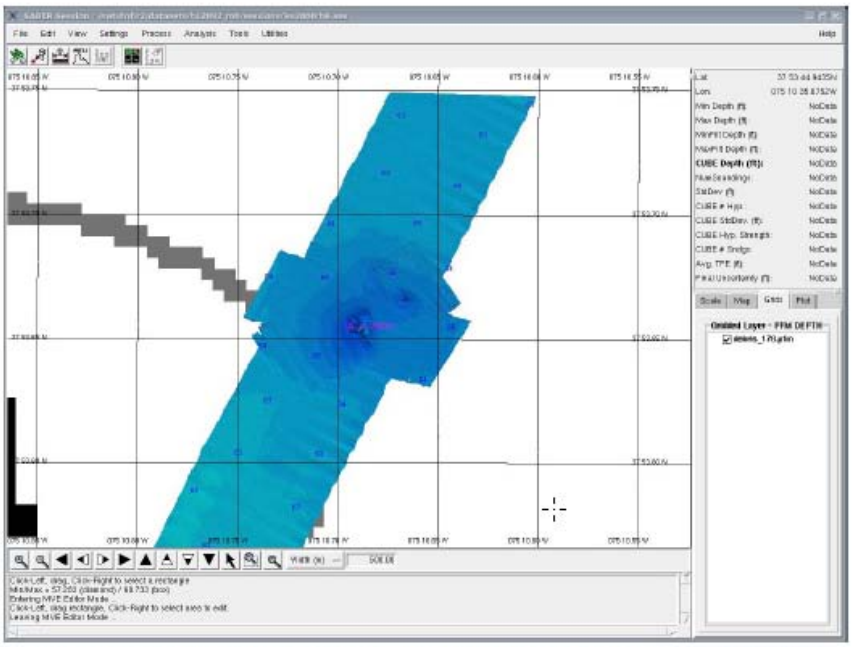


Figure 2. Section of Chart 12211 Showing Cubed Depth Grid and Selected CUBE Soundings around Wreck with Least Depth of 57 Feet within H12092.

Figure 1.1.2

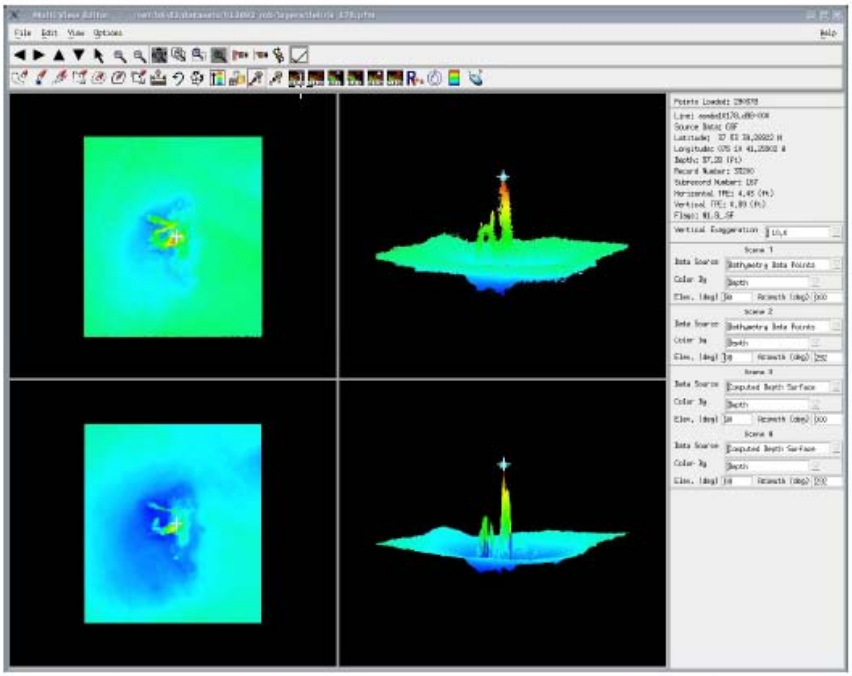


Figure 3. Multiview Editor of PFM Grid of Wreck with Least Depth of 57 Feet within H12092.

Figure 1.1.3

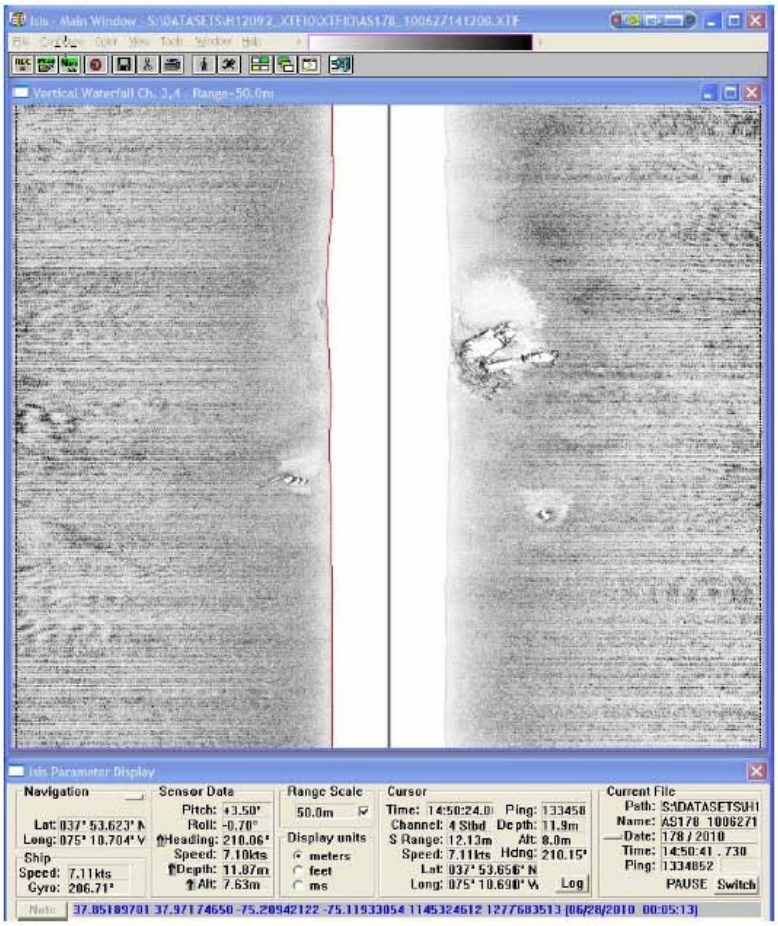


Figure 4. Sidescan Image (100 kHz) of Wreck with Least Depth of 57 Feet within H12092.

Figure 1.1.4

H12092 Danger to Navigation #3.1

Registry Number: H12092
State: Virginia
Locality: Atlantic Ocean
Sub-locality: 5 NM East of Assateague Island
Project Number: OPR-D302-SA-09
Survey Date: 10/12/2010

Charts Affected

Number	Edition	Date	Scale (RNC)	RNC Correction(s)*
12211	43rd	10/01/2007	1:80,000 (12211_1)	USCG LNM: 06/15/2010 (06/15/2010) NGA NTM: 05/09/1992 (06/26/2010)
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	H12092 DtoN #3.1 - Obstructions	Obstruction	3.69 m	37° 58' 03.5" N	075° 07' 53.1" W	---

1.1) H12092 DtoN #3.1 - Obstructions

DANGER TO NAVIGATION

Survey Summary

Survey Position:	37° 58' 03.5" N, 075° 07' 53.1" W
Least Depth:	3.69 m (= 12.11 ft = 2.018 fm = 2 fm 0.11 ft)
TPU (±1.96σ):	**THU (TPEh)** [None] ; **TVU (TPEv)** [None]
Timestamp:	2010-285.13:53:49.000 (10/12/2010)
GP Dataset:	H12092_dton3REVISED.txt
GP No.:	2
Charts Affected:	12211_1, 12200_1, 13003_1

Remarks:

The obstructions consist of three closely spaced large objects covering approximately 14 meters and oriented 015°/195°. The shoalest object is the southernmost rectangular object (6 x 6 meters) with a least depth of 12 feet (3.69 meters). The center circular object has a diameter of approximately 6 meters and a least depth of 12 feet (3.84 meters). The northern object has a rectangular shape approximately 3 by 4 meters and a least depth of 18 feet (5.42 meters).

There is also a***n*** ~~deteriorated wreck~~ ***obstruction*** (approximately 4.5 x 2 meters, with an upright mast) with a least depth of 16 feet (5.02 meters), which is located approximately 50 meters 41° from the group of three objects.

The obstructions ~~and wreck~~ are located on Winter Quarter Shoal approximately 840 meters east of charted wreckage cleared to 14 feet (AWOIS 14287).

Feature Correlation

Address	Feature	Range	Azimuth	Status
H12092_dton3REVISED.txt	2	0.00	000.0	Primary

Hydrographer Recommendations

Recommend charting the ~~three~~ obstructions ~~and wreck~~ as 12 ft dangerous Obstns at 37-58-03.48N, 075-07-53.10W.

This recommendation is based on the largest chart scale (1:80,000), at which the three obstructions and wreck will all be encompassed by a single chart symbol (dangerous 12ft Obstns).

Cartographically-Rounded Depth (Affected Charts):

12ft (12211_1)

2fm (12200_1, 13003_1)

S-57 Data

Geo object 1: Obstruction (OBSTRN)

Attributes:

QUASOU - 6:least depth known

SORDAT - 20101012

SORIND - US,US,graph,H12092

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

VALSOU - 3.69 m

VERDAT - 12:Mean lower low water

WATLEV - 3:always under water/submerged

Office Notes

Concur with clarification. Shown on NOS chart 12211, 44th Ed., 02012011 as a dangerous obstruction, least depth 11.811 ft. in 37-58-03.5N, 075-07-53.1W. Office processing determined that the position and least depth are different from the initial DToN submission to MCD. Delete the charted dangerous obstruction(s), least depth 12 ft. Chart a dangerous obstruction(s), least depth 11.95 ft. in Latitude 37-58-03.49N, Longitude 075-58-03.020W.

Feature Images

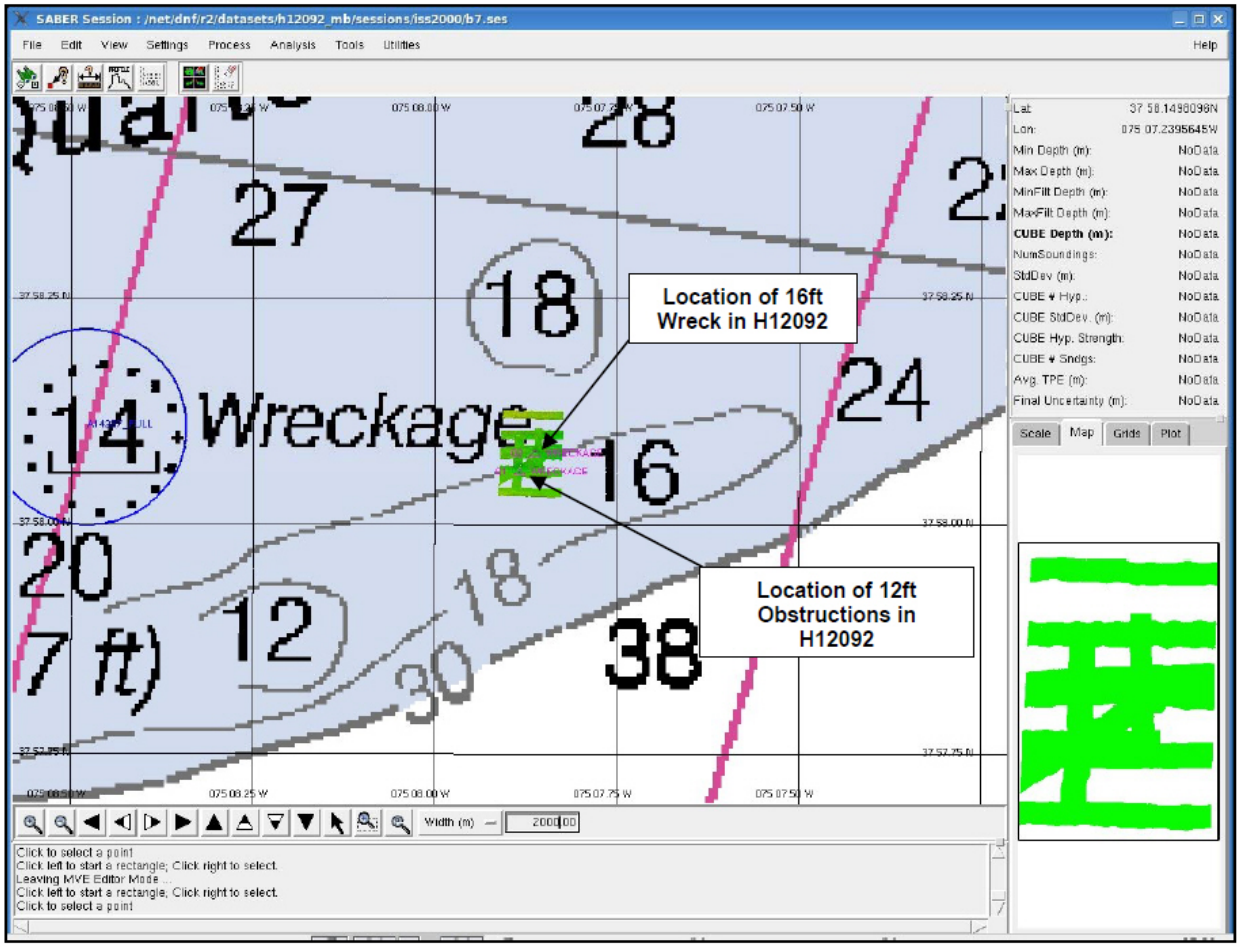


Figure 1. Chart 12211 Showing Location of Obstructions and Wreck in H12092 survey area.

Figure 1.1.1

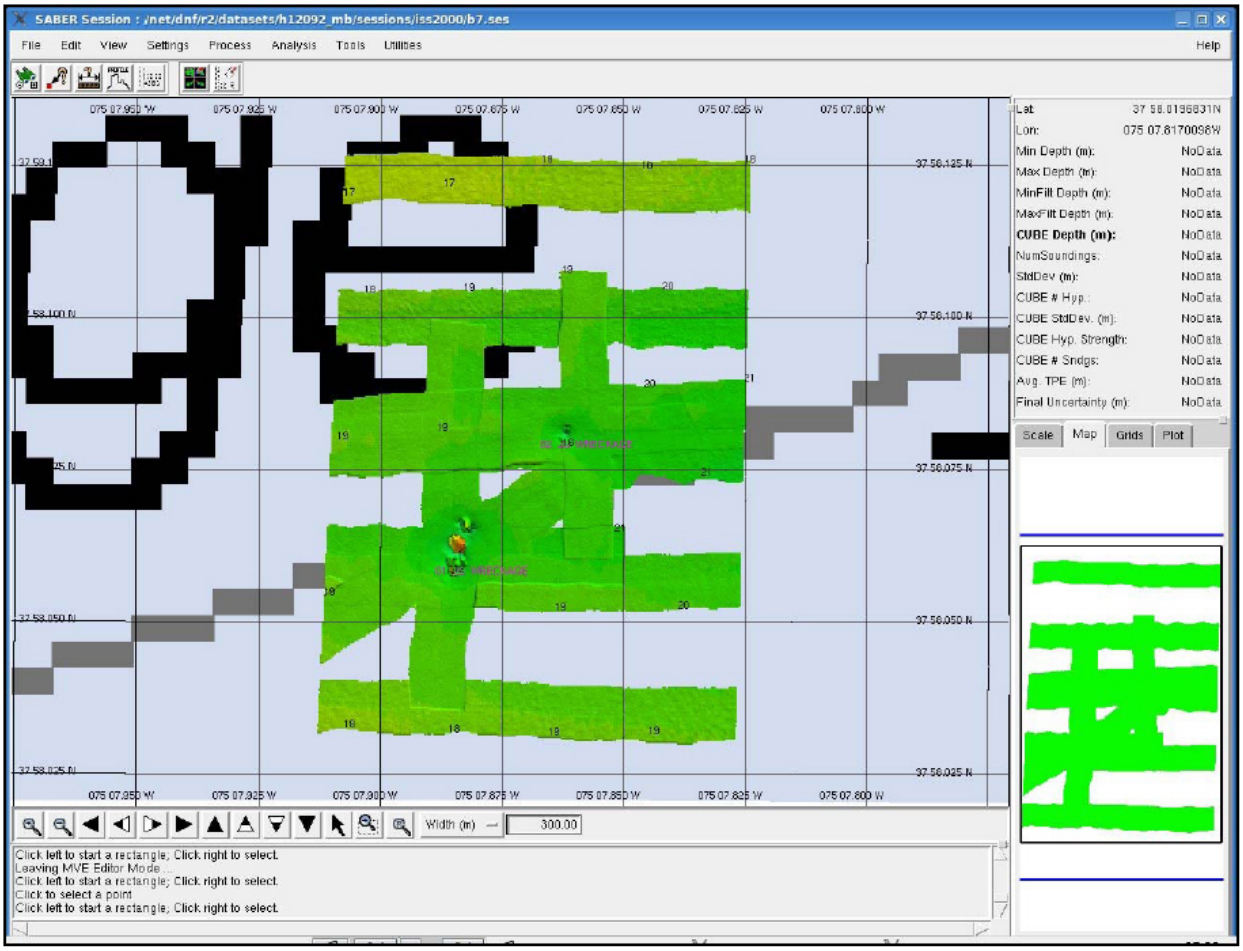


Figure 2. Chart 12211 Showing 0.5-meter PFM and Selected Soundings around 16-foot Wreck and Obstructions with Least Depth of 12 Feet in H12092 survey area.

Figure 1.1.2

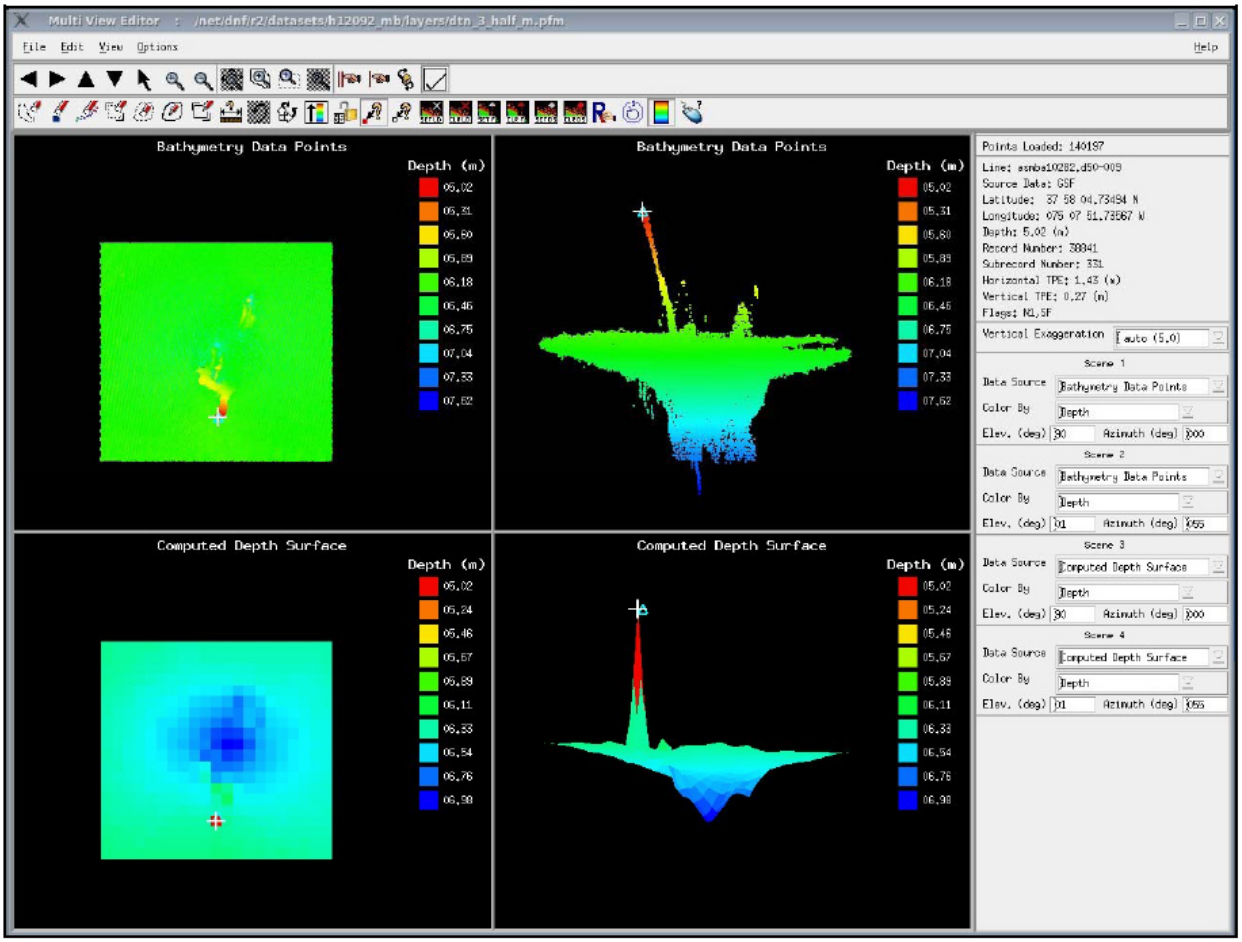


Figure 3. Multiview Editor of 0.5-meter PFM Grid Showing Wreck with Least Depth of 16 Feet in H12092 survey area.

Figure 1.1.3

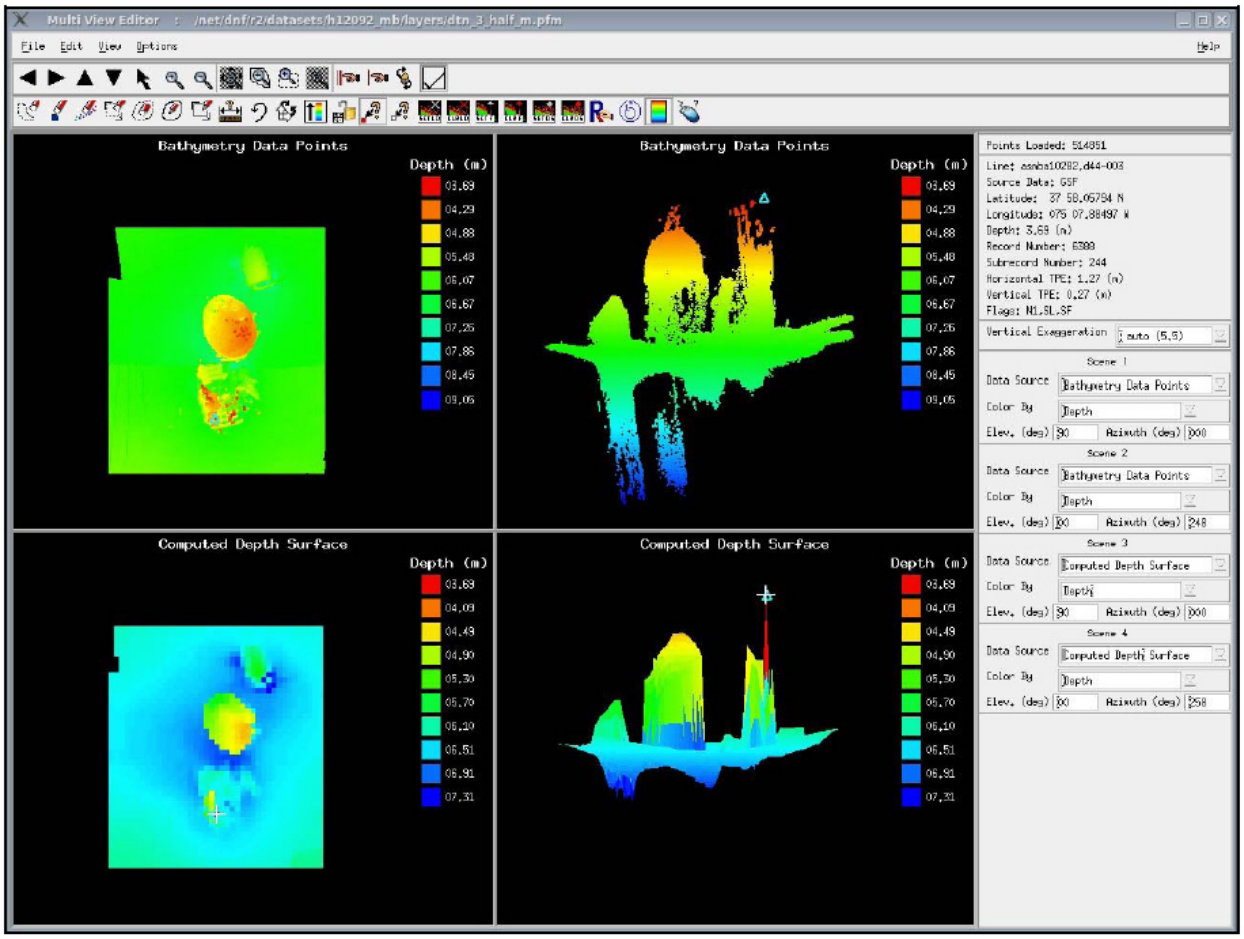


Figure 4. Multiview Editor of 0.5-meter PFM Grid Showing Obstructions with Least Depth of 12 Feet in H12092 survey area.

Figure 1.1.4

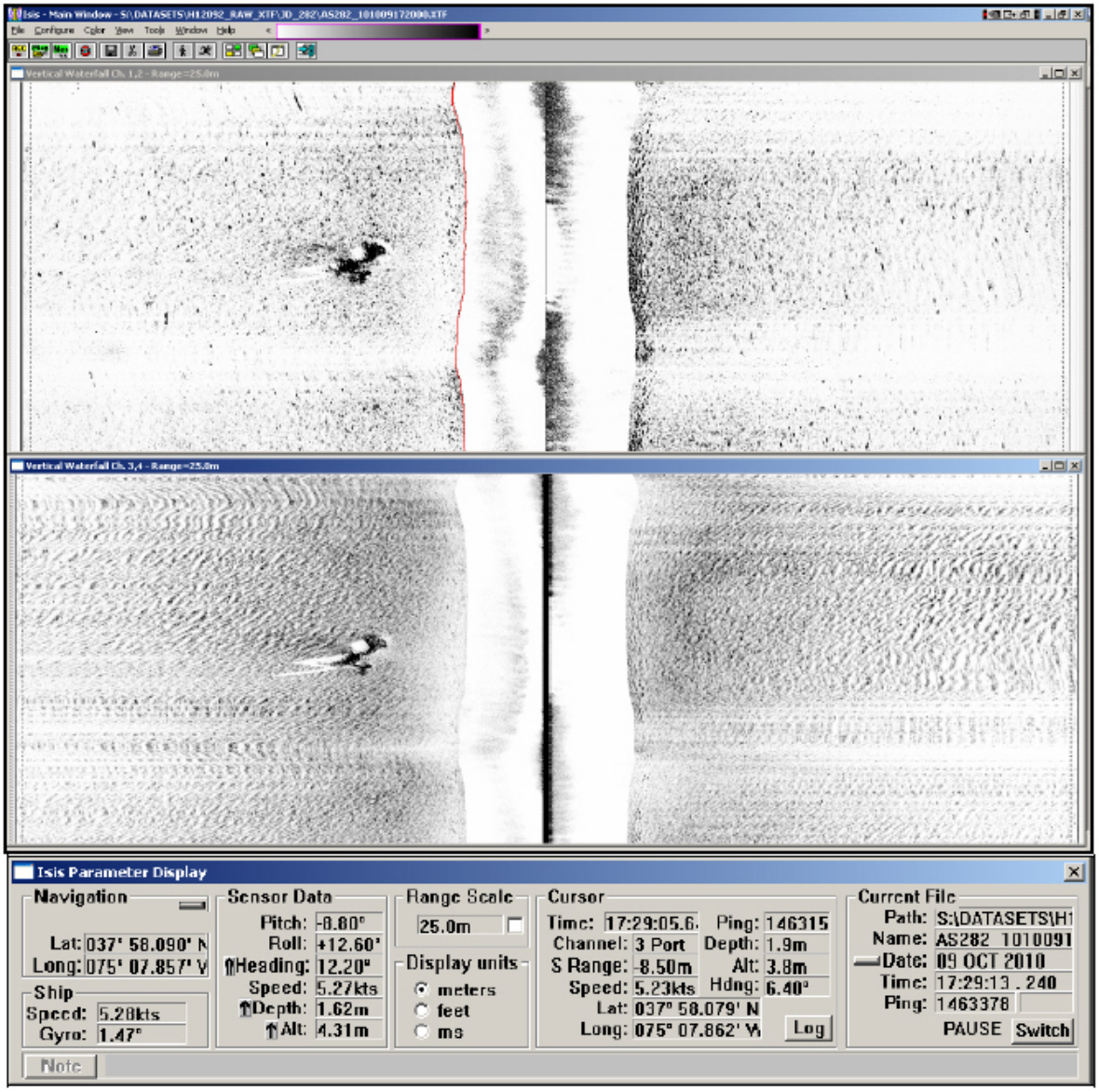


Figure 5. 25-Meter Range Sidescan Image (100 kHz top, 500 kHz bottom) of Wreck with Least Depth of 16 Feet within H12092. Note that the Protruding Mast and Shadow Are Clearly Visible in the 500 kHz image.

Figure 1.1.5

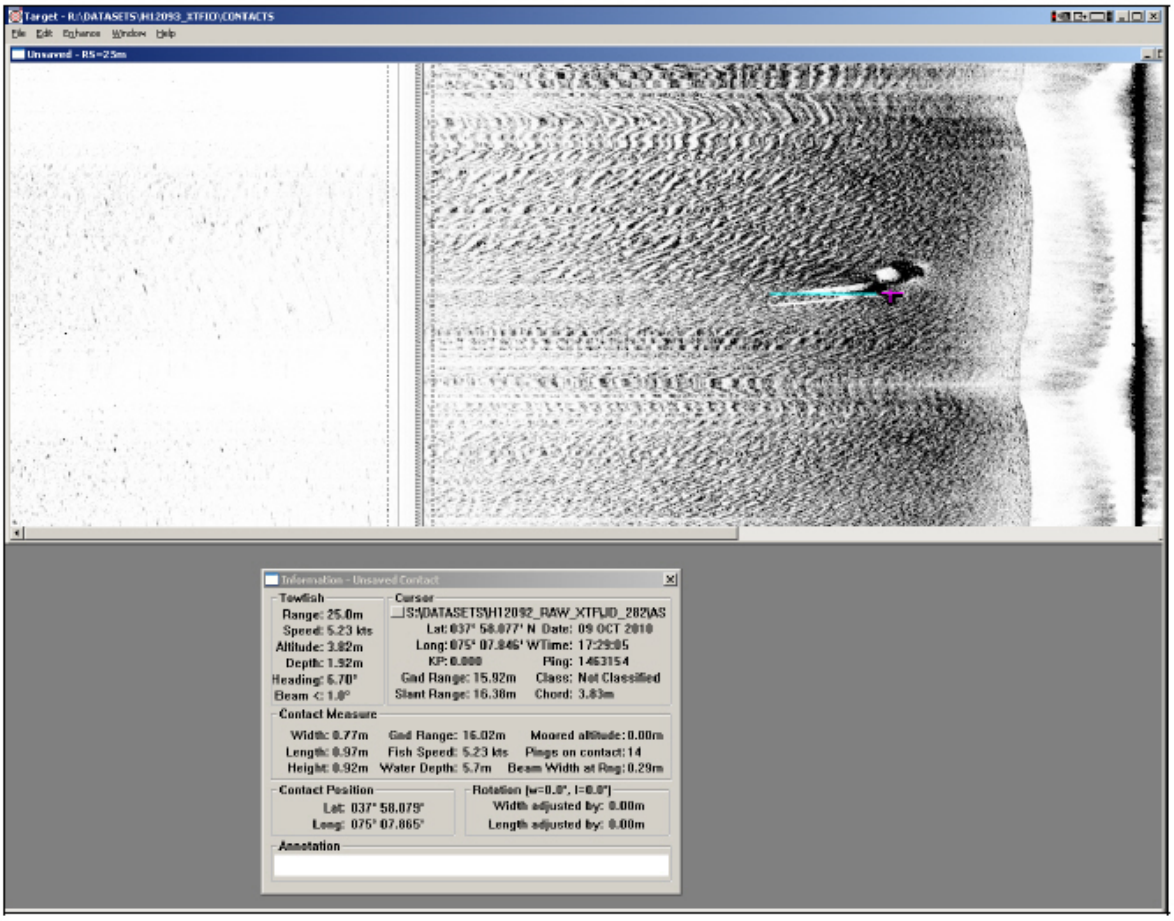


Figure 6. Sidescan Target Image (500 kHz, 25-Meter Range) of Wreck with Least Depth of 16 Feet within H12092 Note That the Protruding Mast and shadow are Clearly Visible.

Figure 1.1.6

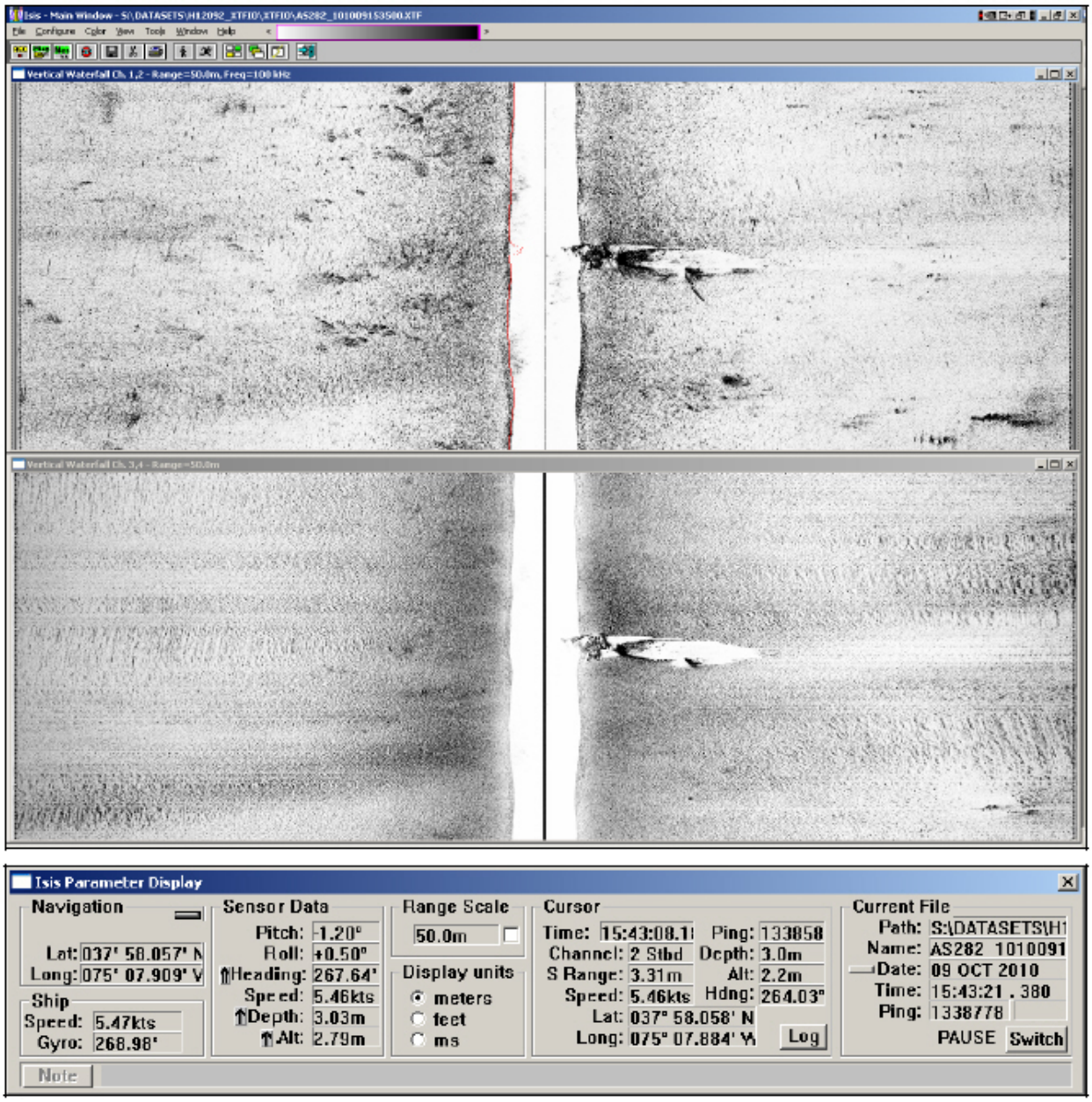
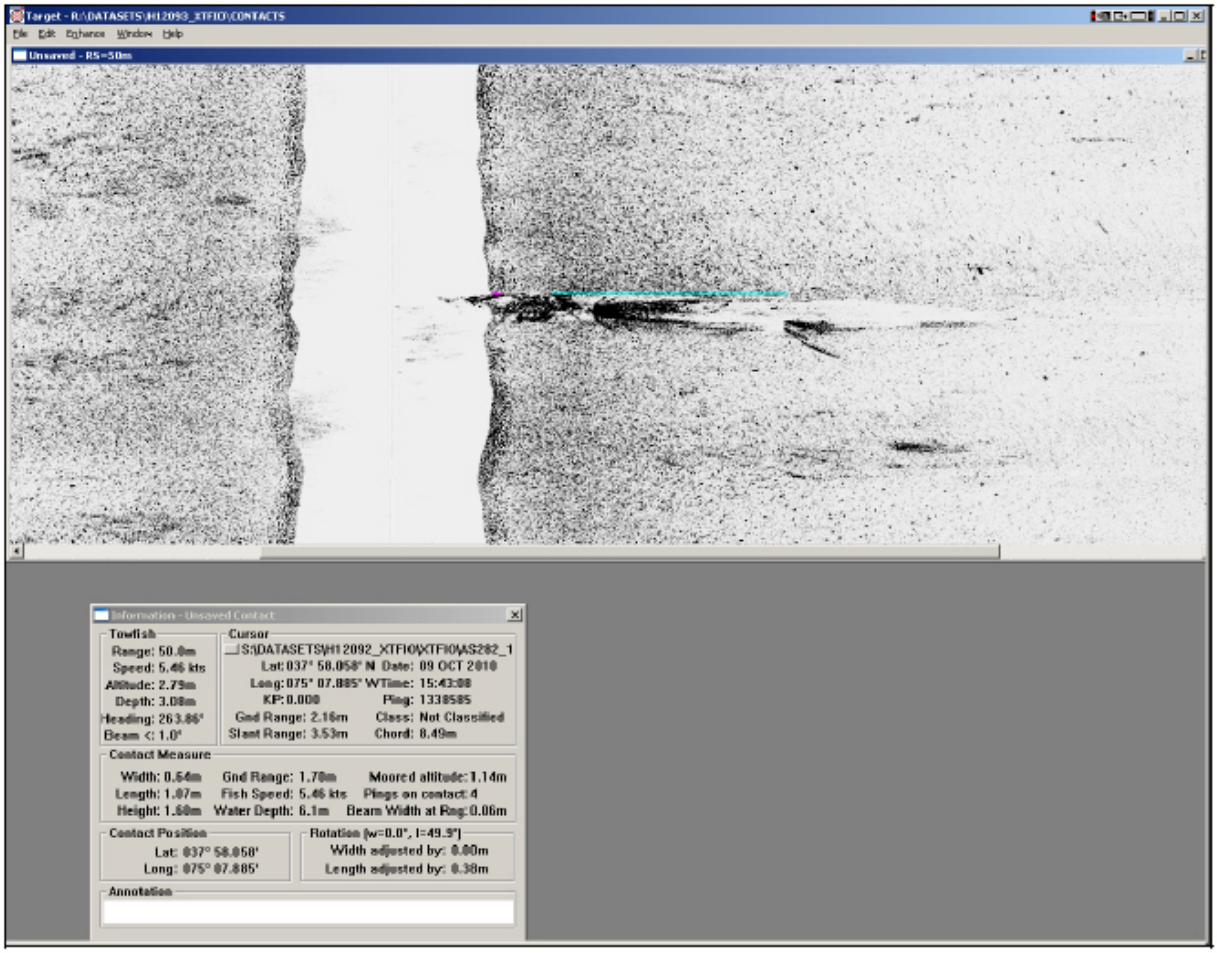


Figure 7. 50-Meter Range Sidescan Image (100 kHz top, 500 kHz bottom) of Obstructions with Least Depth of 12 Feet within H12092.

Figure 1.1.7



igure 8. Sidescan Target Image (100 kHz, 50-Meter Range) of Obstructions with Least Depth of 12 Feet within H12092.

Figure 1.1.8

APPENDIX II

SURVEY FEATURES REPORT

APPENDIX II. SURVEY FEATURE REPORT

This supporting survey feature report consists of three stand alone spreadsheets and associated PDF files listed below and 18 feature correlator sheets.

- One Excel spreadsheet and one corresponding PDF file, titled *H12092_Multibeam_Features_List (.xls and .pdf)*, listing all significant multibeam features that correspond to the objects in the S-57 feature file. Also, all of the features included in this table will override the CUBE best estimate of the depth in the final BAG files.
- One Excel spreadsheet and one corresponding PDF file, titled *H12092_Designated_Soundings_List (.xls and .pdf)*. There were 14 designated soundings set across this sheet to help better preserve the shallowest soundings relative to the computed depth surface in addition to the significant features that were set.
- One Excel spreadsheet and one corresponding PDF file, titled *H12092_Side_Scan_Contacts_List (.xls and .pdf)*, listing all sidescan contacts identified on H12092.

The Feature Correlator Sheets on the following pages are created within **SABER** and provide a concise synopsis of all bathymetric features and the corresponding sidescan contacts. Each sheet shows the feature location at three different scales with different additional survey data for reference. The first image depicts the feature location on a raster chart with correlated contact positions. The second image shows the feature location, contacts, chart, and selected soundings from the bathymetry data. The final image demonstrates the feature location and contacts overlaid on top of a bathymetric grid. The lower portion of the sheet lists all the correlated sidescan contacts, displays images of correlated contacts (up to two correlated contacts), and lists the hydrographer's comments regarding the bathymetric feature. ***Concur***

MULTIBEAM FEATURES LIST

Feature Number	Feature Position (NAD83)		Category	Multibeam File	Ping	Beam	Depth (Meters)	Horizontal Uncertainty (Meters)	Vertical Uncertainty (Meters)	Depth (Feet)	Time (UTC)
	Latitude (N)	Longitude (W)									
1	37.863635	075.142957	OBSTR	asmba10174.d24	15634	66	22.90	1.32	0.28	75.131	08:40:44.789
2	37.872969	075.161170	OBSTR	asmba10175.d30	43494	5	22.48	1.59	0.28	73.753	23:05:24.863
3	37.944926	075.119782	OBSTR	asmba10177.d18	1829	85	19.04	1.37	0.28	62.470	15:14:37.391
4	37.894247	075.178127	WRECK	asmba10178.d98	33200	167	17.29	1.37	0.28	56.722	14:50:11.403
5	37.965789	075.199949	OBSTR	asmba10194.d05	5065	79	15.27	1.47	0.28	50.104	03:24:34.827
6	37.921996	075.239464	OBSTR	asmba10194.d23	31088	188	12.64	1.49	0.27	41.476	23:11:16.423
7	37.963692	075.241220	OBSTR	asmba10198.d03	26265	73	11.89	1.45	0.28	39.015	01:46:18.216
8	37.875944	075.324948	OBSTR	asmba10216.d05	9286	75	09.50	1.70	0.28	31.167	03:41:19.157
9	37.895022	075.288107	OBSTR	asmba10228.d03	79363	21	12.89	1.43	0.28	42.289	02:22:57.731
10	37.909571	075.243950	OBSTR	asmba10231.d06	13647	209	13.23	1.60	0.27	43.389	02:16:30.732
11	37.896238	075.215302	OBSTR	asmba10231.d15	3353	148	14.81	1.35	0.27	48.585	07:27:24.222
12	37.915858	075.315124	WRECK	asmba10231.d39	2454	234	04.92	1.45	0.27	16.154	20:57:50.921
13	37.858173	075.329936	WRECK	asmba10281.d11	13438	237	09.18	1.43	0.27	30.118	20:03:41.864
14	37.967255	075.153035	OBSTR	asmba10282.d47	3794	405	07.75	1.29	0.27	25.439	16:48:36.511
15	37.967302	075.152932	OBSTR	asmba10282.d47	3851	304	07.77	1.29	0.27	25.485	16:48:39.345
16	37.967328	075.152282	OBSTR	asmba10282.d47	4209	255	07.65	1.28	0.27	25.088	16:48:57.165
17	37.967983	075.131037	WRECK	asmba10282.d50	38843	330	04.95	1.44	0.27	16.253	17:40:26.314
18	37.967636	075.131395	OBSTR	asmba10285.d18	16680	406	03.64	1.25	0.27	11.952	13:53:49.217

See also ..\..\Designates_Soundings.doc.

See Descriptive Report for charting recommendations.

DESIGNATED SOUNDINGS

Consecutive Number	Position (NAD83)		Category	Multibeam File	Ping	Beam	Depth (Meters)	Horizontal Uncertainty (Meters)	Vertical Uncertainty (Meters)	Time (UTC)
	Latitude (N)	Logitude (W)								
1	37.858768	075.122841	Designated Sounding	asmba10173.d14	7545	205	11.07	1.54	0.27	10:56:34.463
2	37.867518	075.140583	Designated Sounding	asmba10174.d24	14575	111	24.13	1.32	0.28	08:38:44.396
3	37.879656	075.163806	Designated Sounding	asmba10176.d12	33447	241	21.56	1.68	0.28	10:17:29.705
4	37.919116	075.139957	Designated Sounding	asmba10176.d16	16945	56	15.73	1.32	0.27	13:36:09.205
5	37.894434	075.177783	Designated Sounding	asmba10178.d98	33081	55	19.48	1.38	0.28	14:50:02.250
6	37.896465	075.214840	Designated Sounding	asmba10191.d05	32421	91	14.89	1.34	0.28	04:42:33.501
7	37.936878	075.247780	Designated Sounding	asmba10196.d36	17365	183	14.67	1.49	0.28	20:50:56.959
8	37.890801	075.310339	Designated Sounding	asmba10216.d13	20986	71	10.75	1.35	0.28	10:36:34.445
9	37.933552	075.265581	Designated Sounding	asmba10228.d09	30559	96	11.83	1.36	0.27	06:37:02.066
10	37.942266	075.264555	Designated Sounding	asmba10228.d12	59410	211	10.94	1.51	0.27	10:25:31.687
11	37.967225	075.143469	Designated Sounding	asmba10229.d32	15574	97	06.37	1.49	0.27	18:56:25.666
12	37.896311	075.215236	Designated Sounding	asmba10231.d15	3397	168	15.14	1.35	0.27	07:27:27.584
13	37.885587	075.211311	Designated Sounding	asmba10231.d15	51642	15	11.78	1.31	0.27	08:28:25.014
14	37.967866	075.145639	Designated Sounding	asmba10282.d48	10713	233	06.46	1.29	0.27	17:05:52.891

See also ..\..\Designated_Soundings.doc

See Descriptive Report for charting recommendations.

SIDESCAN CONTACT LIST

Sequential ID	Year / JD	Time (UTC)	Contact Position (NAD83)		Contact Number	Contact Length (M)	Contact Width (M)	Contact Height (M)	Shadow Length (M)	Range Scale (M)	Range (M)	Fish Altitude (M)	Feature Number	Feature Depth (M)	*Is in S-57 File
			Latitude (N)	Longitude (W)											
001	2010/174	06:53:37.93	37.863619	075.142909	1174065337	01.77	01.35	00.96	02.81	50	-24.31	09.10	01	22.90	YES
002	2010/174	08:41:00.63	37.863674	075.142980	1174084100	02.68	01.62	00.84	01.92	50	-14.03	07.09	01	22.90	YES
003	2010/175	17:57:36.17	37.872985	075.161169	1175175736	01.22	01.05	00.48	02.55	50	46.19	09.23	02	22.48	YES
004	2010/175	19:57:31.58	37.872942	075.161143	1175195731	01.14	01.51	01.84	01.56	50	-09.97	09.02	02	22.48	YES
005	2010/175	23:05:44.23	37.872971	075.161196	1175230544	01.08	00.94	00.67	02.86	50	-34.56	08.69	02	22.48	YES
006	2010/176	06:02:30.86	37.944920	075.119778	1176060230	00.75	00.80	00.64	03.41	50	31.00	06.50	03	19.04	YES
007	2010/176	09:33:25.64	37.944929	075.119864	1176093325	00.65	02.26	00.76	00.79	50	07.97	07.00	03	19.04	YES
008	2010/176	11:30:30.24	37.944940	075.119945	1176113030	01.10	02.01	00.54	03.18	50	-40.81	07.91	03	19.04	YES
009	2010/178	05:42:43.96	37.894186	075.178088	1178054243	15.18	04.58	00.22	01.67	50	-42.84	06.27	04	17.29	YES
010	2010/178	14:50:24.40	37.894243	075.178133	1178145024	12.04	04.52	02.11	04.72	50	09.84	08.09	04	17.29	YES
011	2010/178	17:28:38.47	37.894225	075.178167	1178172838	17.94	08.89	02.12	11.67	50	31.09	07.47	04	17.29	YES
012	2010/182	02:10:58.46	37.885559	075.211307	1182021058	02.59	03.02	04.29	07.64	50	11.59	08.38			
013	2010/182	06:48:43.33	37.885610	075.211310	1182064843	03.90	01.95	02.95	17.07	50	25.22	07.10			
014	2010/191	04:42:51.83	37.896250	075.215294	1191044251	05.22	01.46	00.74	02.42	50	18.78	06.13	11	14.81	YES
015	2010/191	07:26:33.66	37.896239	075.215281	1191072633	04.36	01.74	00.55	02.02	50	21.44	06.53	11	14.81	YES
016	2010/193	00:49:37.07	37.934526	075.213227	1193004937	05.49	00.94	00.58	01.72	50	23.81	08.41			
017	2010/193	04:09:24.93	37.934558	075.213216	1193040924	05.16	00.60	00.60	01.29	50	16.28	07.63			
018	2010/194	01:06:29.01	37.965736	075.199968	1194010628	02.25	00.74	00.54	02.56	50	-37.75	08.44	05	15.27	YES
019	2010/194	03:24:46.21	37.965828	075.199970	1194032446	03.34	00.74	00.73	00.80	50	-07.62	05.59	05	15.27	YES
020	2010/194	17:37:36.18	37.909554	075.243961	1194173736	04.99	01.81	00.81	02.65	50	-17.50	06.29	10	13.23	YES
021	2010/194	20:53:49.38	37.909621	075.243917	1194205349	06.89	01.50	00.59	03.28	50	-28.53	05.94	10	13.23	YES
022	2010/194	23:11:28.19	37.922012	075.239428	1194231128	01.19	00.72	00.63	00.94	50	05.12	03.59	06	12.64	YES
023	2010/195	03:04:41.15	37.921995	075.239463	1195030441	01.61	00.39	00.47	02.09	50	31.84	07.56	06	12.64	YES
024	2010/196	15:42:47.48	37.968009	075.130958	1196154247	01.85	02.70	00.61	09.38	50	37.12	03.47	17	04.95	YES
025	2010/196	20:51:05.45	37.936881	075.247789	1196205105	05.62	01.45	00.63	00.84	50	09.59	06.92			
026	2010/197	00:21:39.99	37.936861	075.247796	1197002139	10.22	02.22	00.53	02.47	50	31.81	07.69			
027	2010/198	01:46:26.09	37.963678	075.241232	1198014626	00.65	01.11	00.54	00.63	50	-08.28	06.23	07	11.89	YES
028	2010/202	05:49:08.60	37.963674	075.241226	1202054908	02.54	01.23	00.51	04.00	50	-42.50	05.97	07	11.89	YES
029	2010/202	07:57:15.62	37.963681	075.241214	1202075715	04.03	02.02	00.52	03.98	50	39.53	05.92	07	11.89	YES
030	2010/215	06:32:36.73	37.894989	075.288106	1215063236	05.11	03.30	00.60	02.47	50	25.12	07.25	09	12.89	YES
031	2010/215	09:20:53.63	37.858264	075.329973	1215092053	01.32	00.63	00.55	01.68	50	20.28	06.98	13	09.18	YES
032	2010/215	09:20:54.16	37.858253	075.329907	1215092054	06.31	01.20	00.81	03.48	50	25.75	06.98	13	09.18	YES
033	2010/215	23:46:36.80	37.875822	075.324891	1215234636	12.81	01.89	00.82	04.96	50	24.53	05.13	08	09.50	YES
034	2010/215	23:46:37.06	37.875841	075.325004	1215234637	09.67	05.27	00.63	05.76	50	34.38	05.13	08	09.50	YES
035	2010/216	03:41:27.02	37.876029	075.324920	1216034126	05.57	02.74	01.02	01.27	50	08.09	07.23	08	09.50	YES
036	2010/216	03:41:29.16	37.876020	075.324758	1216034129	10.95	04.63	00.92	03.52	50	18.22	07.09	08	09.50	YES
037	2010/216	12:20:09.88	37.858169	075.329944	1216122009	08.21	01.35	00.72	02.77	50	17.09	05.32	13	09.18	YES
038	2010/216	12:20:10.28	37.858164	075.330027	1216122010	01.67	00.64	00.51	02.43	50	22.94	05.31	13	09.18	YES
039	2010/228	02:23:05.65	37.895002	075.288142	1228022305	03.42	02.44	00.55	01.00	50	-16.69	08.34	09	12.89	YES
040	2010/228	15:56:53.90	37.915460	075.315512	1228155653	33.58	09.79	00.00	00.06	50	-40.69	03.72	12	04.92	YES
041	2010/228	20:45:34.74	37.915417	075.315319	1228204534	13.75	01.32	00.69	03.59	50	22.81	05.31	12	04.92	YES
042	2010/229	06:31:26.13	37.915279	075.315568	1229063126	13.13	08.08	03.52	08.15	50	-09.09	05.56	12	04.92	YES
043	2010/229	18:29:42.69	37.967875	075.145595	1229182942	02.58	00.48	00.39	03.09	50	12.31	02.00			
044	2010/229	18:37:37.43	37.967738	075.131312	1229183737	03.75	01.94	01.07	11.31	50	29.44	03.63	18	03.64	YES
045	2010/229	19:01:28.17	37.967313	075.152358	1229190128	00.75	00.98	00.50	01.09	50	08.34	04.44	16	07.65	YES
046	2010/229	19:01:49.50	37.967288	075.153003	1229190149	01.36	00.54	00.90	01.06	50	06.25	04.83	14	07.75	YES
047	2010/282	15:43:07.98	37.967652	075.131403	1282154307	05.53	09.16	02.52	10.86	50	05.28	03.39	18	03.64	YES
048	2010/282	15:49:42.32	37.967215	075.143481	1282154942	05.09	02.72	00.18	03.07	50	-44.38	02.90			

Sequential ID	Year / JD	Time (UTC)	Contact Position (NAD83)		Contact Number	Contact Length (M)	Contact Width (M)	Contact Height (M)	Shadow Length (M)	Range Scale (M)	Range (M)	Fish Altitude (M)	Feature Number	Feature Depth (M)	*Is in S-57 File
			Latitude (N)	Longitude (W)											
049	2010/282	16:33:08.02	37.967210	075.143501	1282163308	01.78	01.16	00.49	07.08	50	33.84	02.91			
050	2010/285	18:10:43.63	37.899767	075.328879	1285181043	39.94	04.90	00.36	03.13	50	18.00	03.10			
*The value of "YES" indicates that the contact was correlated to a bathymetry feature that is presented in the S-57 Feature file. The contacts are not included in the S-57 Freature file. A supplemental delivery has been made with the side scan sonar contact in a separate non-standard S-57 file.															

FEATURE CORRELATOR SHEETS

FEATURE CORRELATOR SHEET Job: H12092

Feature #: 0001 Least Depth: 75(ft), 22.90(m) Lat: 37 51 49.09N Lon: 075 08 34.65W Ping: 15634 Beam: 66

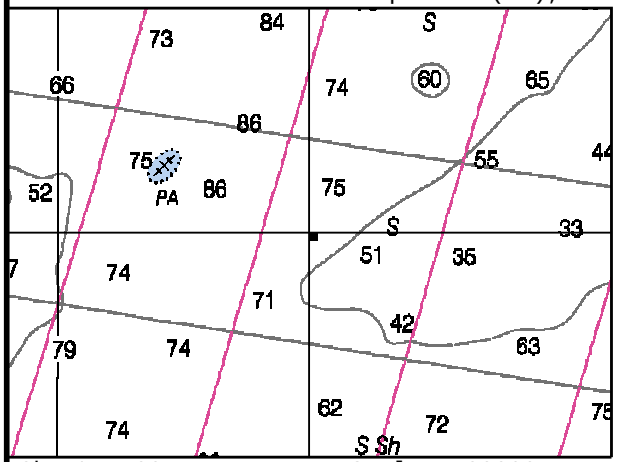


Chart: 12211_1.KAP Scale 1:20000

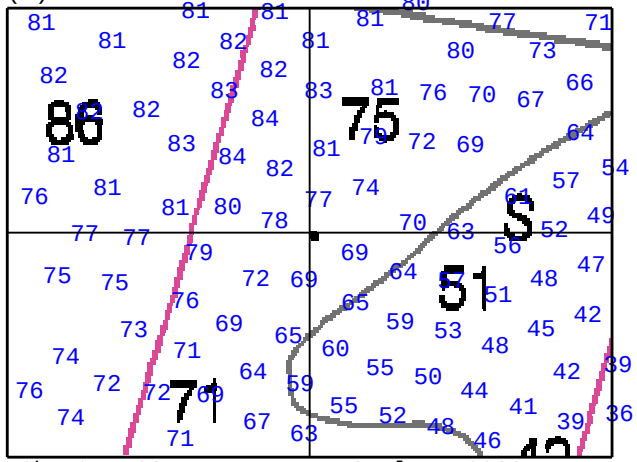
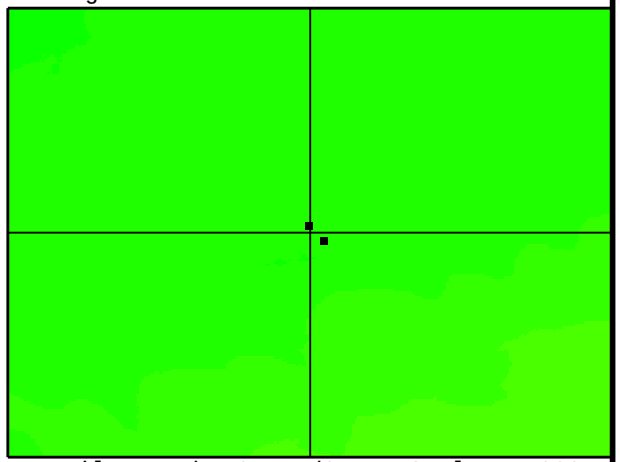
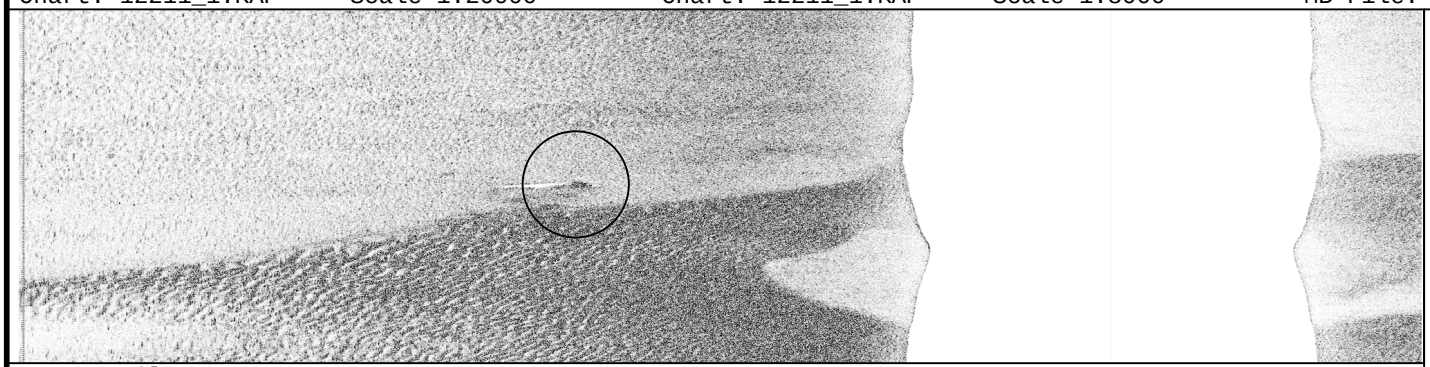


Chart: 12211_1.KAP Scale 1:8000



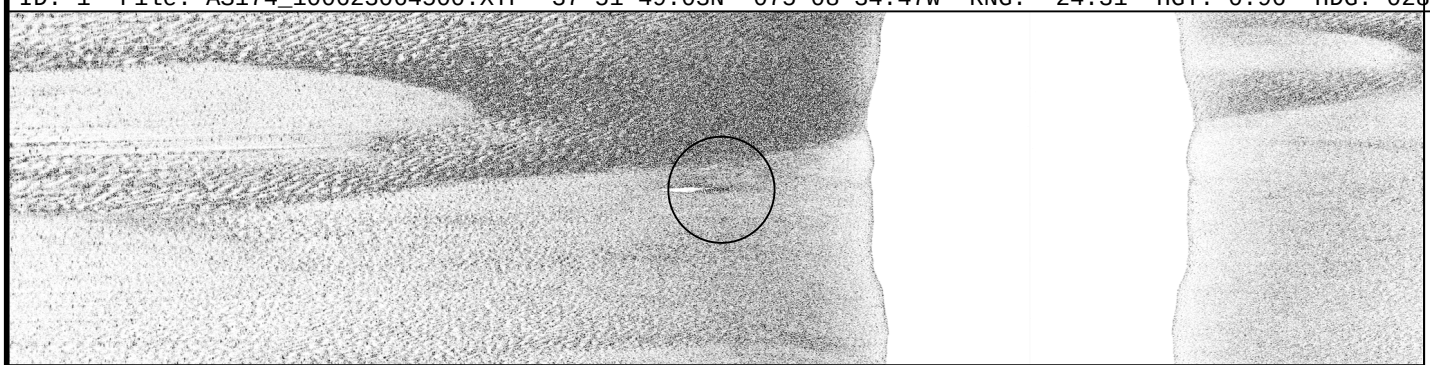
MB File: asmba10174.d24 Scale 1:1000



ID: 1 File: AS174_100623064500.XTF 37 51 49.03N 075 08 34.47W RNG: -24.31 HGT: 0.96 HDG: 028

COMMENT:
OBSTRUCTION. Chart 75 foot dangerous obstruction and label Obstn.

Insig. feature. Update area with present survey soundings.



ID: 2 File: AS174_100623081700.XTF 37 51 49.23N 075 08 34.73W RNG: -14.03 HGT: 0.84 HDG: 209

CORRELATED SS CONTACTS:

Contact	Range/Height
1174065337	-24.31/0.96
1174084100	-14.03/0.84

FEATURE CORRELATOR SHEET Job: H12092

Feature #: 0002 Least Depth: 73(ft), 22.48(m) Lat: 37 52 22.69N Lon: 075 09 40.21W Ping: 43494 Beam: 5

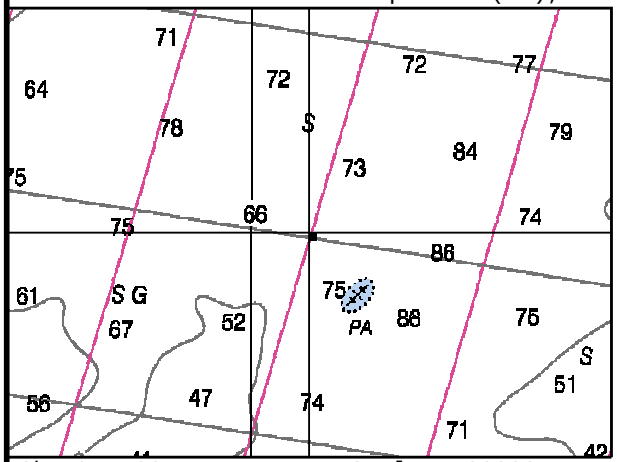


Chart: 12211_1.KAP Scale 1:20000

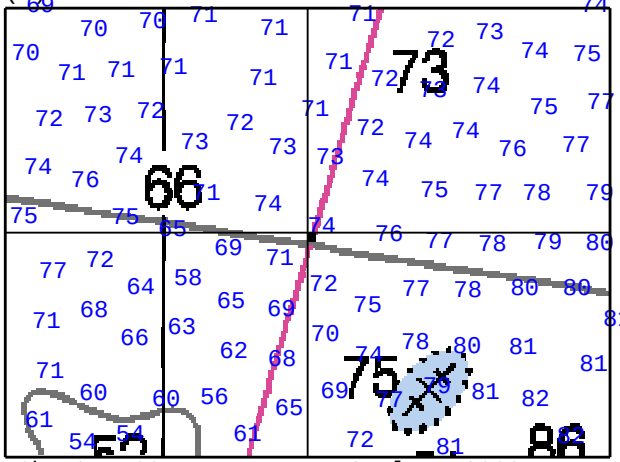
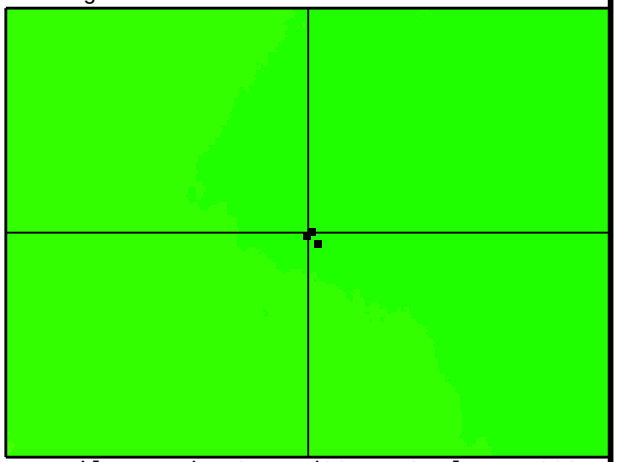
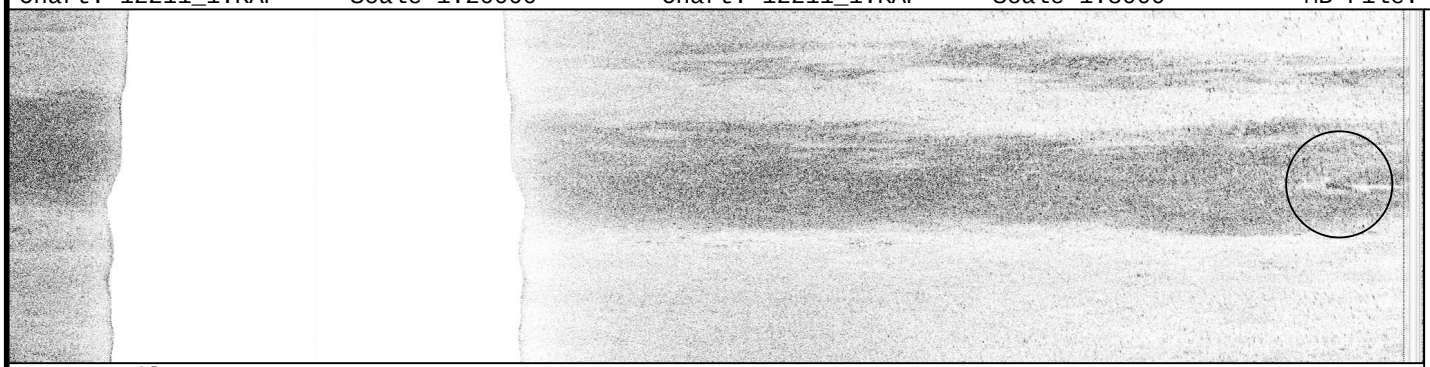


Chart: 12211_1.KAP Scale 1:8000



MB File: asmba10175.d30 Scale 1:1000



ID: 3 File: AS175_100624171700.XTF 37 52 22.74N 075 09 40.21W RNG: 46.19 HGT: 0.48 HDG: 209

COMMENT:
OBSTRUCTION. Chart 74 foot dangerous obstruction and label Obstn.

Insig. feature. Update area with present survey soundings.

ID: 5 File: AS175_100624221500.XTF 37 52 22.70N 075 09 40.30W RNG: -34.56 HGT: 0.67 HDG: 211

CORRELATED SS CONTACTS:

Contact	Range/Height
1175175736	46.19/0.48
1175230544	-34.56/0.67
1175195731	-9.97/1.84

FEATURE CORRELATOR SHEET Job: H12092

Feature #: 0003 Least Depth: 62(ft), 19.04(m) Lat: 37 56 41.73N Lon: 075 07 11.21W Ping: 1829 Beam: 85

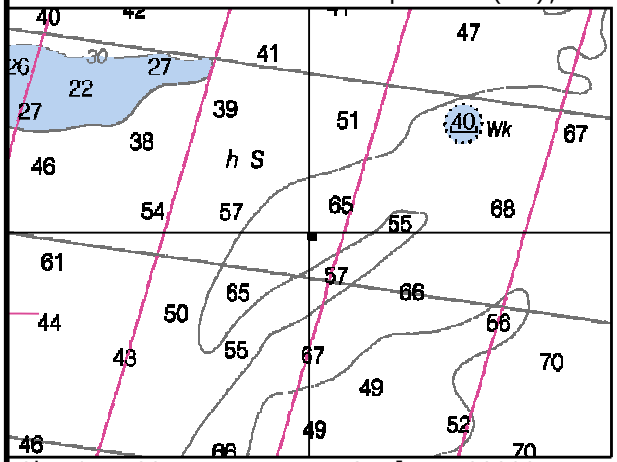


Chart: 12211_1.KAP Scale 1:20000

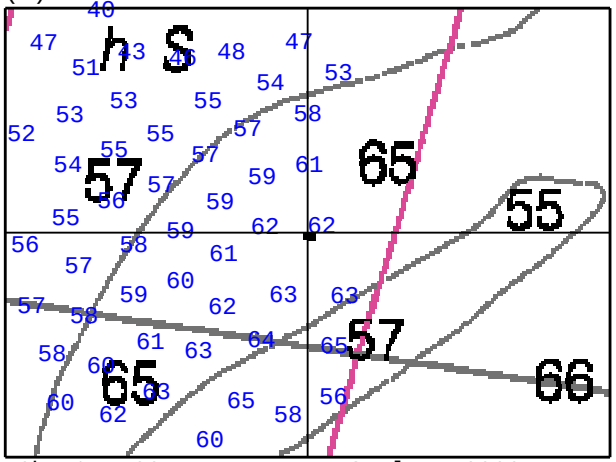
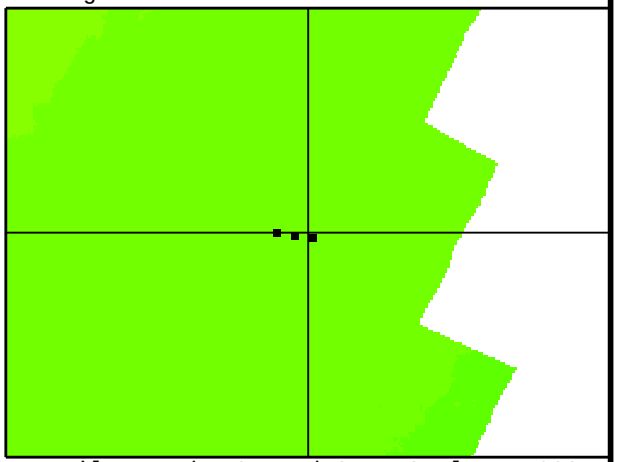


Chart: 12211_1.KAP Scale 1:8000

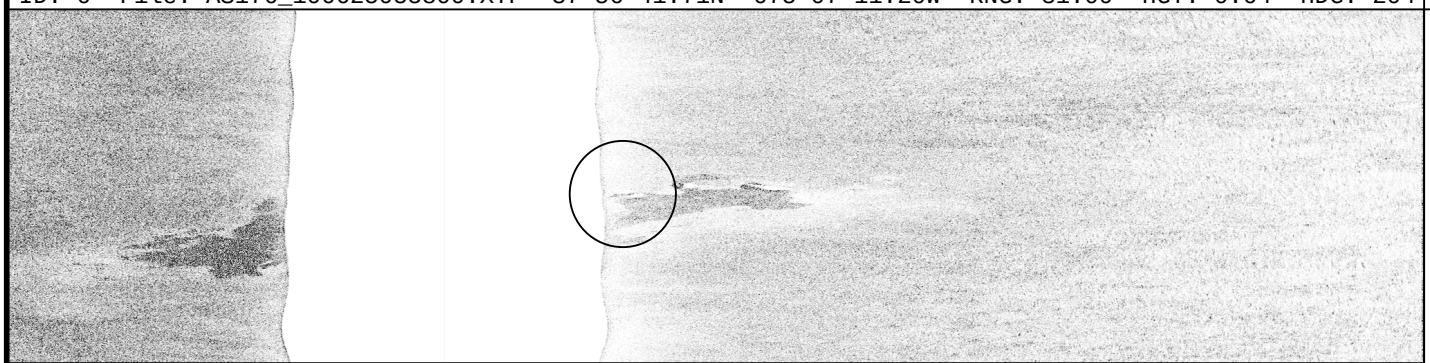


MB File: asmba10177.d18 Scale 1:1000

ID: 6 File: AS176_100625055800.XTF 37 56 41.71N 075 07 11.20W RNG: 31.00 HGT: 0.64 HDG: 204

COMMENT:
OBSTRUCTION. Chart 62 foot dangerous obstruction and label Obstn.

Insig. feature. Update area with present survey soundings.



ID: 7 File: AS176_100625084200.XTF 37 56 41.75N 075 07 11.51W RNG: 7.97 HGT: 0.76 HDG: 028

CORRELATED SS CONTACTS:

Contact	Range/Height
1176060230	31.00/0.64
1176093325	7.97/0.76
1176113030	-40.81/0.54

FEATURE CORRELATOR SHEET Job: H12092

Feature #: 0004 Least Depth: 56(ft), 17.29(m) Lat: 37 53 39.29N Lon: 075 10 41.26W Ping: 33200 Beam: 167

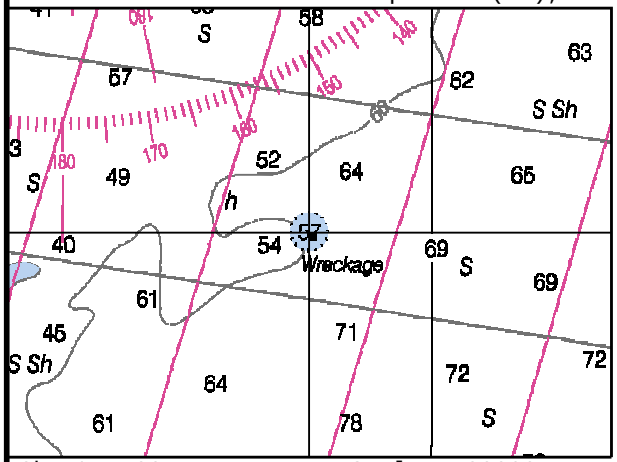


Chart: 12211_1.KAP Scale 1:20000

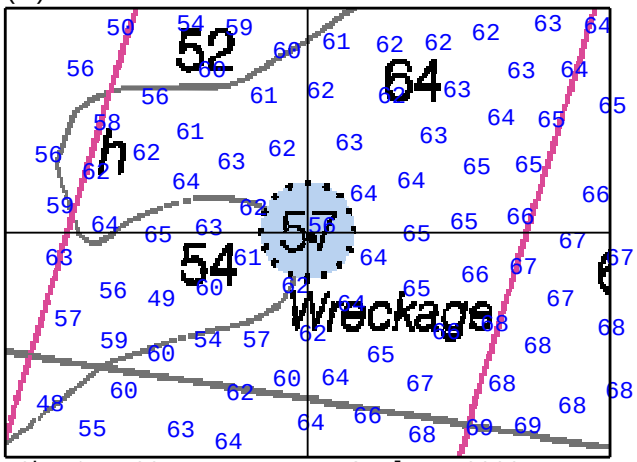
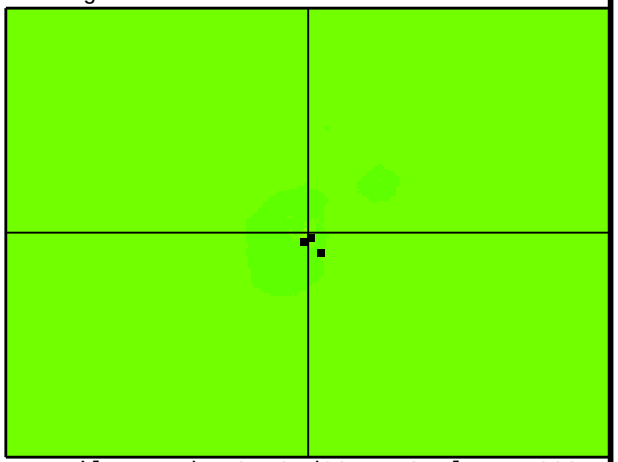
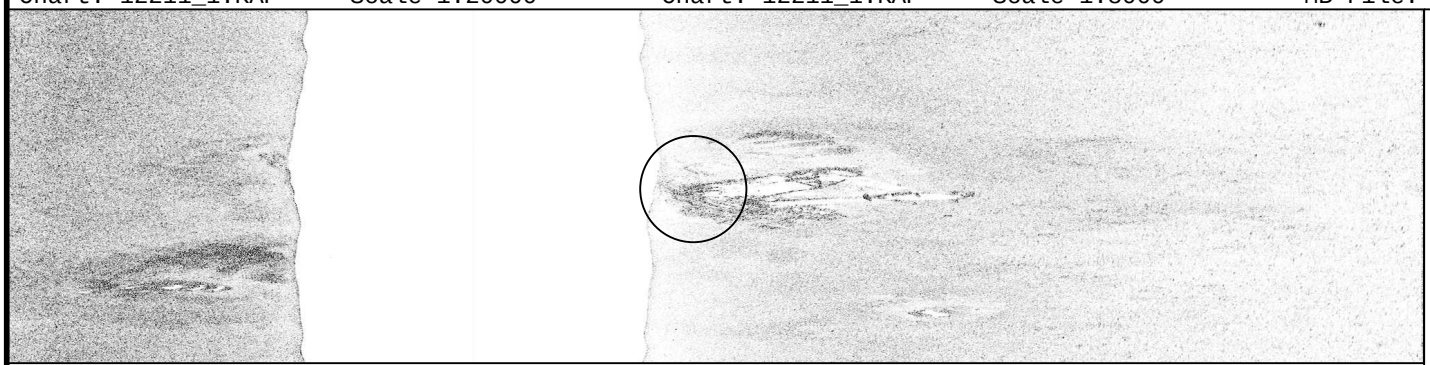


Chart: 12211_1.KAP Scale 1:8000



MB File: asmba10178.d98 Scale 1:1000



ID: 10 File: AS178_100627141200.XTF 37 53 39.27N 075 10 41.28W RNG: 9.84 HGT: 2.11 HDG: 207

COMMENT:
WRECK. Danger to Navigation Report #1. Charted as 57 foot dangerous wreck labeled Wreckage. Recommend removing charted 57 foot sounding and charting a 56 foot sounding.

See DtoN#1 in Appendix I.

ID: 11 File: AS178_100627170500.XTF 37 53 39.21N 075 10 41.40W RNG: 31.09 HGT: 2.12 HDG: 025

CORRELATED SS CONTACTS:

Contact	Range/Height
1178145024	9.84/2.11
1178172838	31.09/2.12
1178054243	-42.84/0.22

FEATURE CORRELATOR SHEET Job: H12092

Feature #: 0005 Least Depth: 50(ft), 15.27(m) Lat: 37 57 56.84N Lon: 075 11 59.82W Ping: 5065 Beam: 79

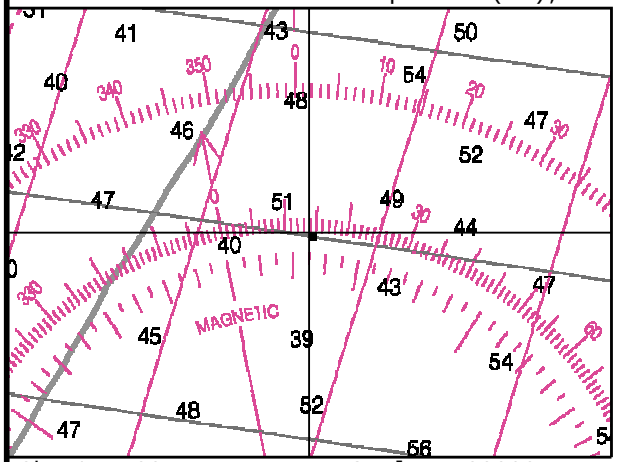


Chart: 12211_1.KAP Scale 1:20000

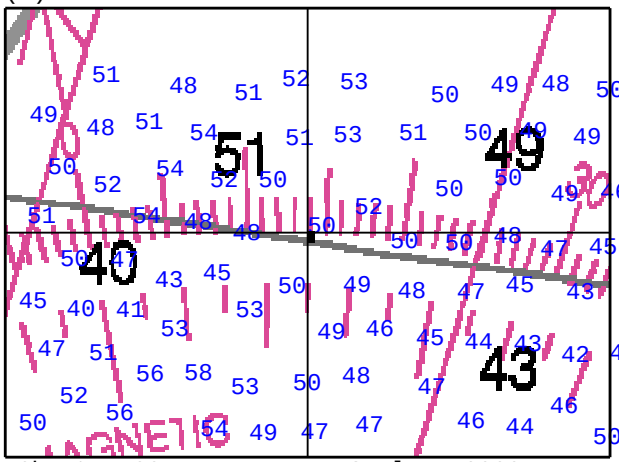
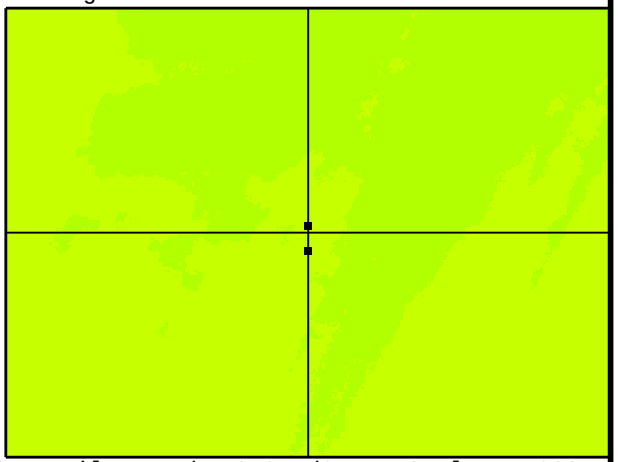
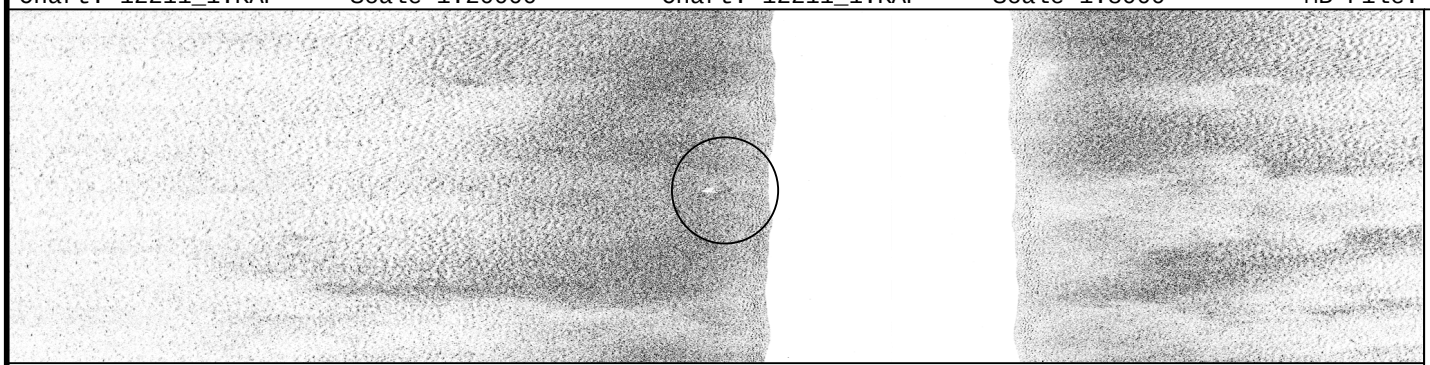


Chart: 12211_1.KAP Scale 1:8000



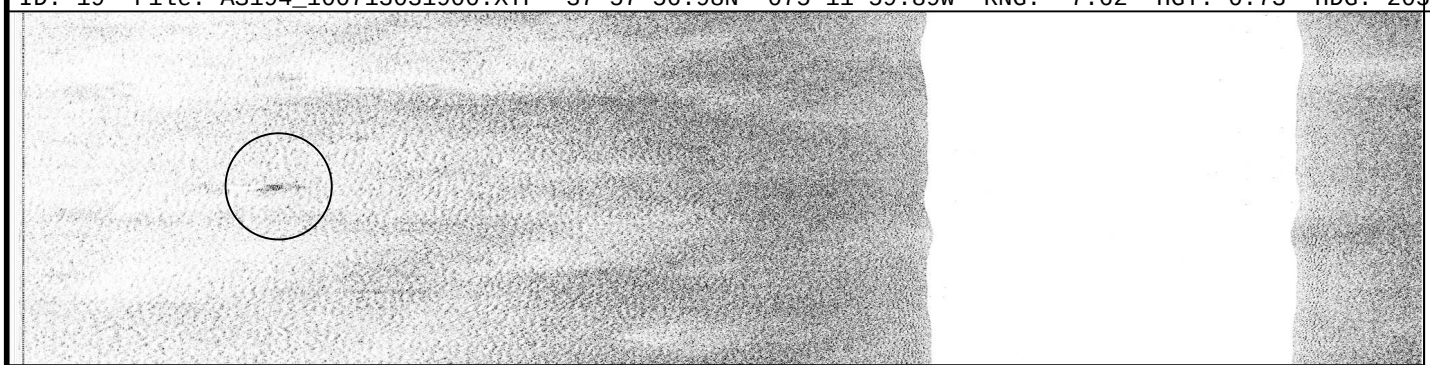
MB File: asmba10194.d05 Scale 1:1000



ID: 19 File: AS194_100713031900.XTF 37 57 56.98N 075 11 59.89W RNG: -7.62 HGT: 0.73 HDG: 205

COMMENT:
OBSTRUCTION. Chart 50 foot dangerous obstruction and label Obstn.

Insig. feature. Update area with present survey soundings.



ID: 18 File: AS194_100713001100.XTF 37 57 56.65N 075 11 59.89W RNG: -37.75 HGT: 0.54 HDG: 025

CORRELATED SS CONTACTS:

Contact	Range/Height
1194032446	-7.62/0.73
1194010628	-37.75/0.54

FEATURE CORRELATOR SHEET Job: H12092

Feature #: 0006 Least Depth: 41(ft), 12.64(m) Lat: 37 55 19.18N Lon: 075 14 22.07W Ping: 31088 Beam: 188

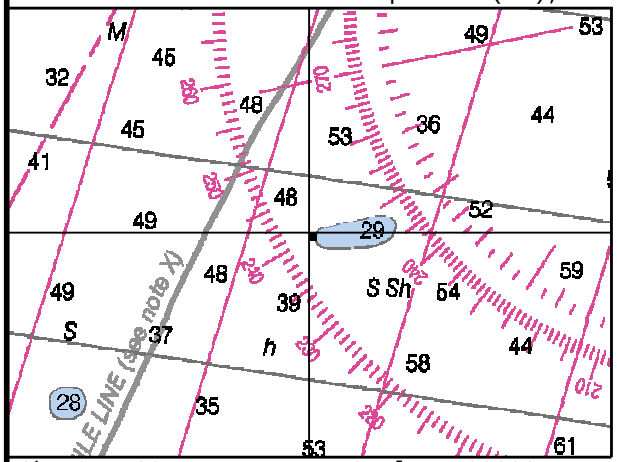


Chart: 12211_1.KAP Scale 1:20000

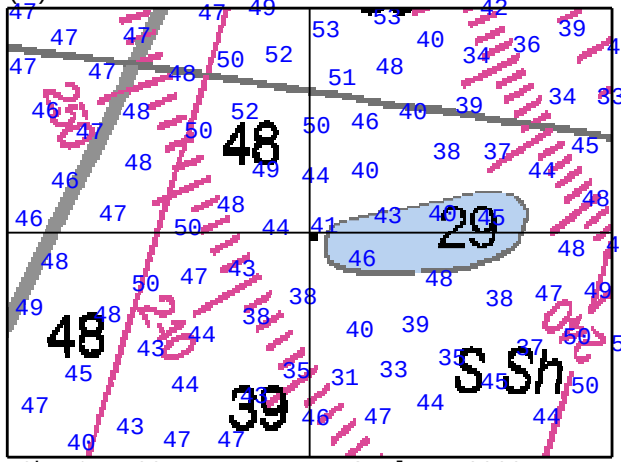
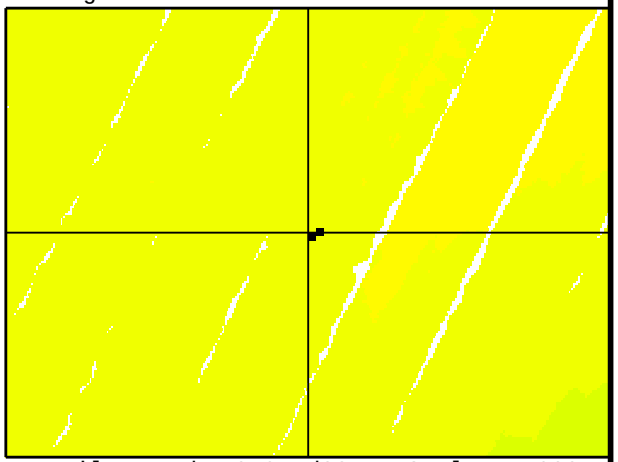
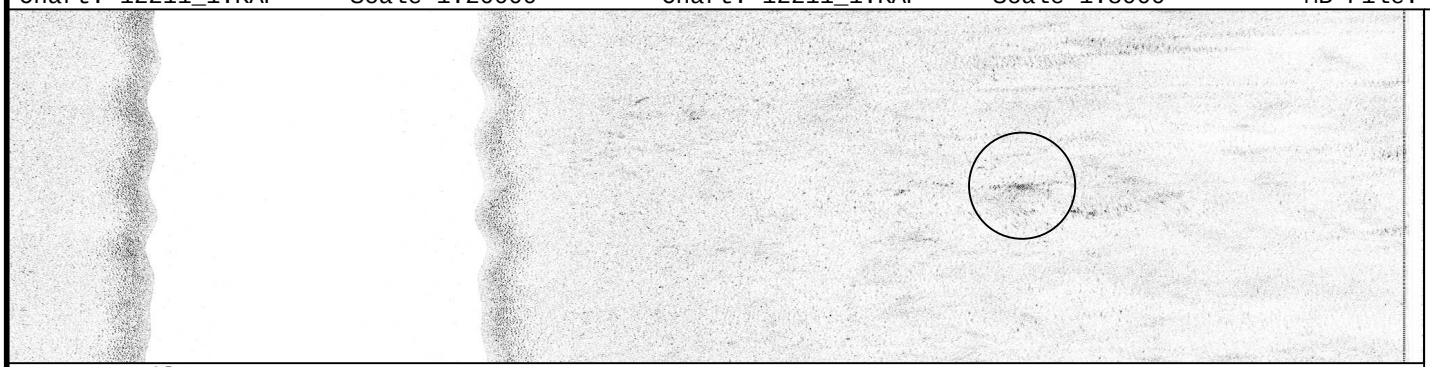


Chart: 12211_1.KAP Scale 1:8000



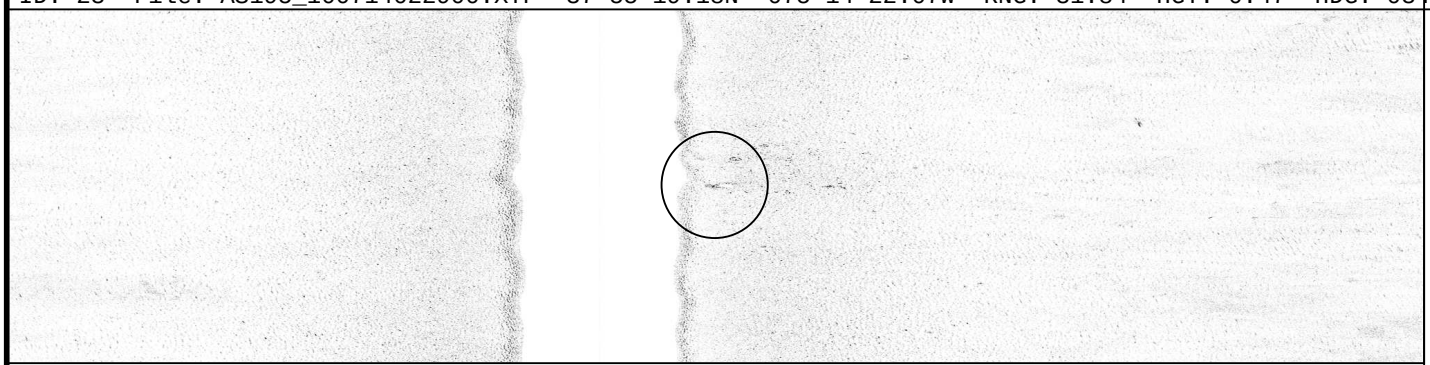
MB File: asmba10194.d23 Scale 1:1000



ID: 23 File: AS195_100714022900.XTF 37 55 19.18N 075 14 22.07W RNG: 31.84 HGT: 0.47 HDG: 034

COMMENT:
OBSTRUCTION. Chart 41 foot dangerous obstruction and label Obstn.

Insig. feature. Update area with present survey soundings.



ID: 22 File: AS194_100713223500.XTF 37 55 19.24N 075 14 21.94W RNG: 5.12 HGT: 0.63 HDG: 206

CORRELATED SS CONTACTS:

Contact	Range/Height
1195030441	31.84/0.47
1194231128	5.12/0.63

FEATURE CORRELATOR SHEET Job: H12092

Feature #: 0007 Least Depth: 39(ft), 11.89(m) Lat: 37 57 49.29N Lon: 075 14 28.39W Ping: 26265 Beam: 73

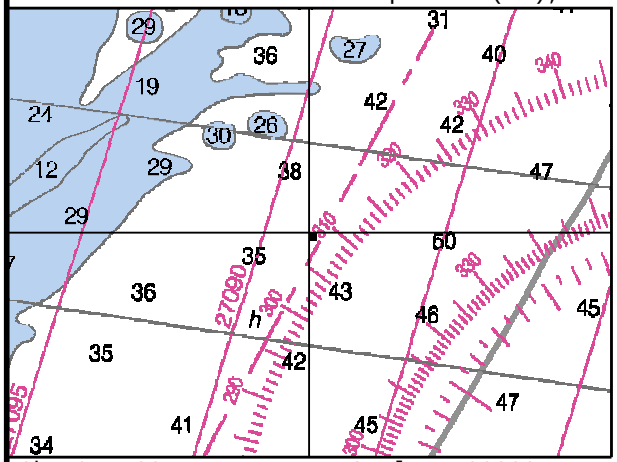


Chart: 12211_1.KAP Scale 1:20000

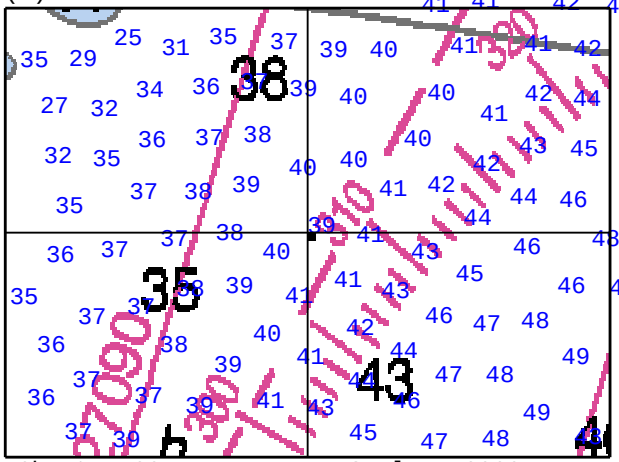
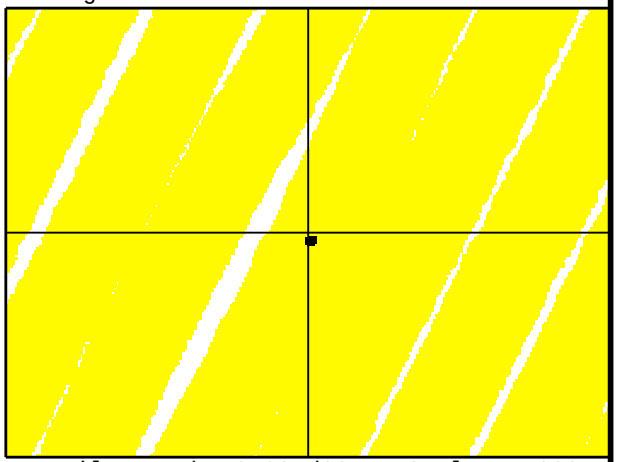
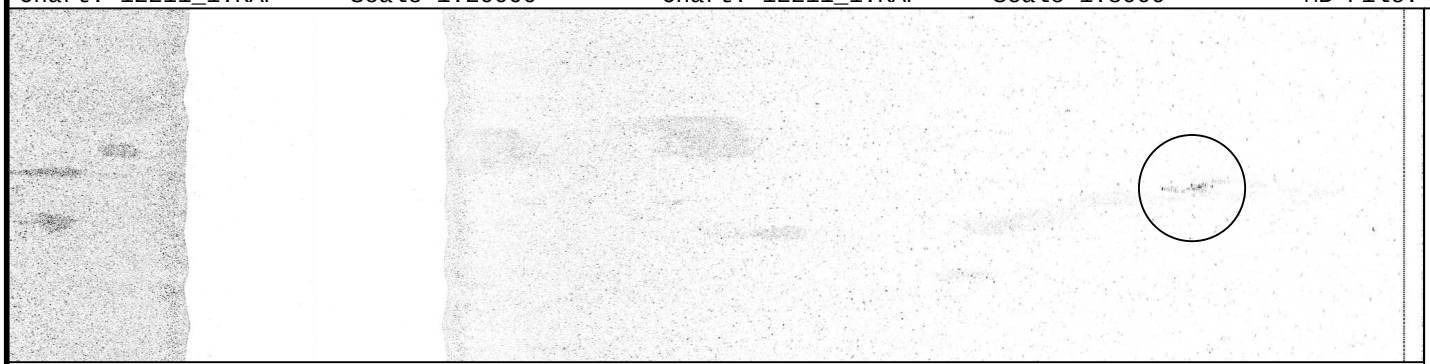


Chart: 12211_1.KAP Scale 1:8000



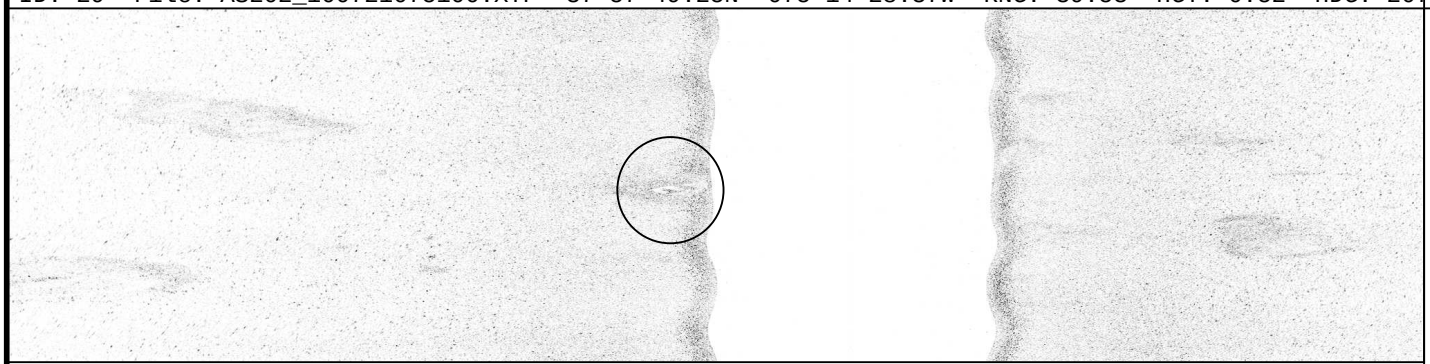
MB File: asmba10198.d03 Scale 1:1000



ID: 29 File: AS202_100721075100.XTF 37 57 49.25N 075 14 28.37W RNG: 39.53 HGT: 0.52 HDG: 207

COMMENT:
OBSTRUCTION. Chart 39 foot dangerous obstruction and label Obstn.

Insig. as feature. Chart as depth.



ID: 27 File: AS198_100717012200.XTF 37 57 49.24N 075 14 28.43W RNG: -8.28 HGT: 0.54 HDG: 025

CORRELATED SS CONTACTS:

Contact	Range/Height
1202075715	39.53/0.52
1198014626	-8.28/0.54
1202054908	-42.50/0.51

FEATURE CORRELATOR SHEET Job: H12092

Feature #: 0008 Least Depth: 31(ft), 9.50(m) Lat: 37 52 33.40N Lon: 075 19 29.81W Ping: 9286 Beam: 75

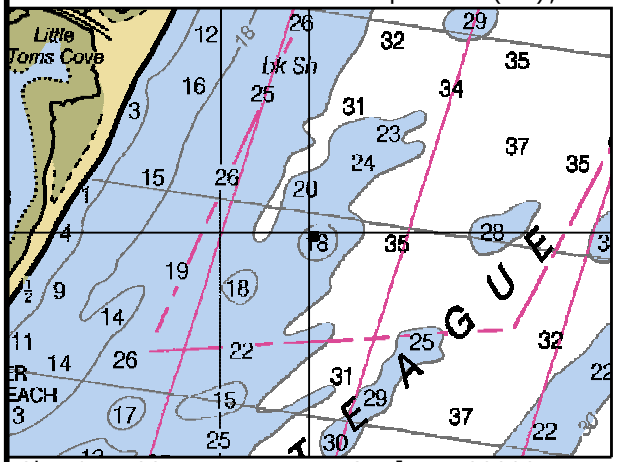


Chart: 12211_1.KAP Scale 1:20000

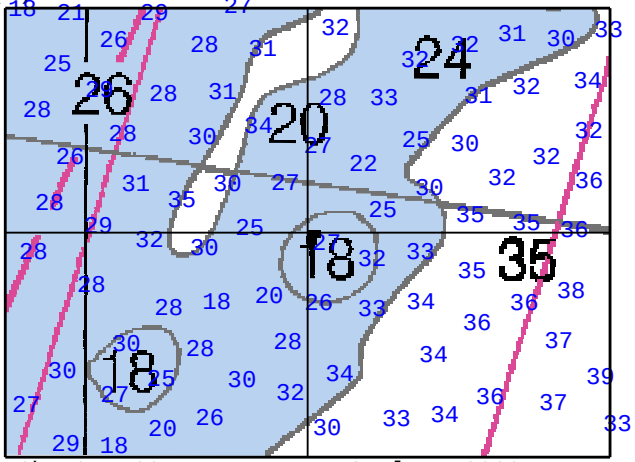
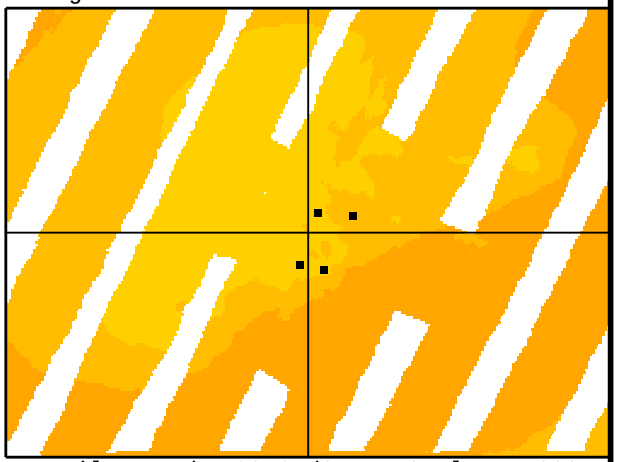
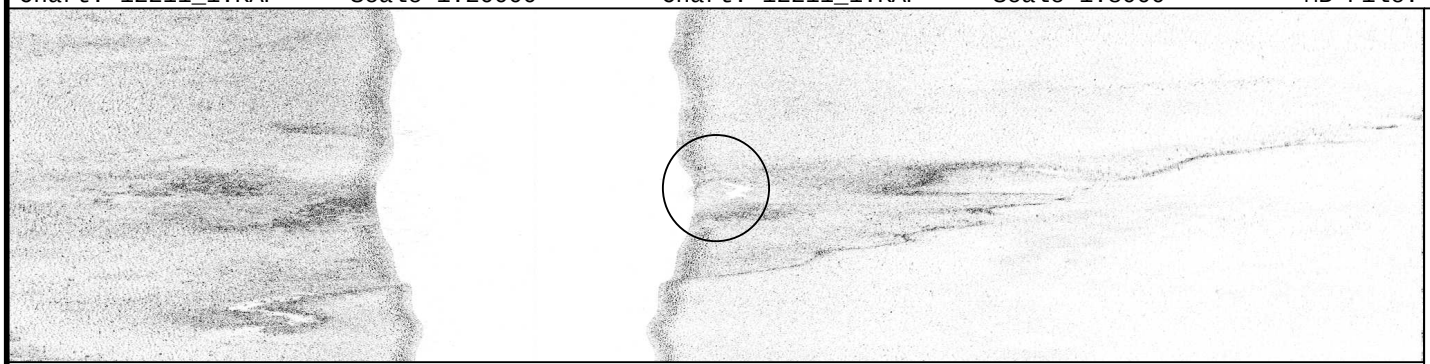


Chart: 12211_1.KAP Scale 1:8000



MB File: asmba10216.d05 Scale 1:1000



ID: 35 File: AS216_100804033500.XTF 37 52 33.70N 075 19 29.71W RNG: 8.09 HGT: 1.02 HDG: 022

COMMENT:
OBSTRUCTION. Non significant compared to surrounding depths. No chart.

Insig. feature. Update area with present survey soundings.

ID: 34 File: AS215_100803225600.XTF 37 52 33.03N 075 19 30.01W RNG: 34.38 HGT: 0.63 HDG: 202

CORRELATED SS CONTACTS:

Contact	Range/Height
1216034126	8.09/1.02
1215234637	34.38/0.63
1215234636	24.53/0.82
1216034129	18.22/0.92

FEATURE CORRELATOR SHEET Job: H12092

Feature #: 0009 Least Depth: 42(ft), 12.89(m) Lat: 37 53 42.08N Lon: 075 17 17.19W Ping: 79363 Beam: 21

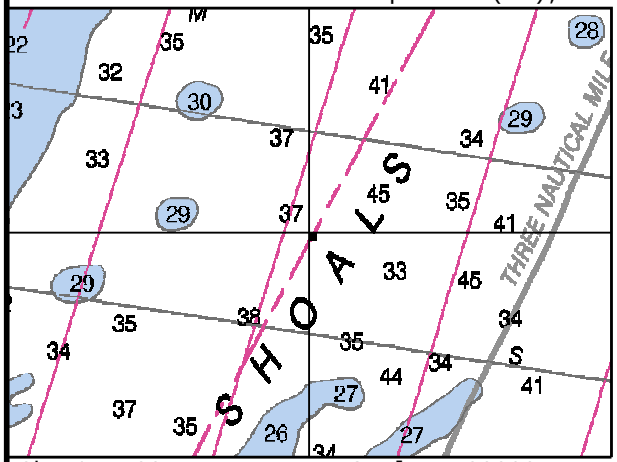


Chart: 12211_1.KAP Scale 1:20000

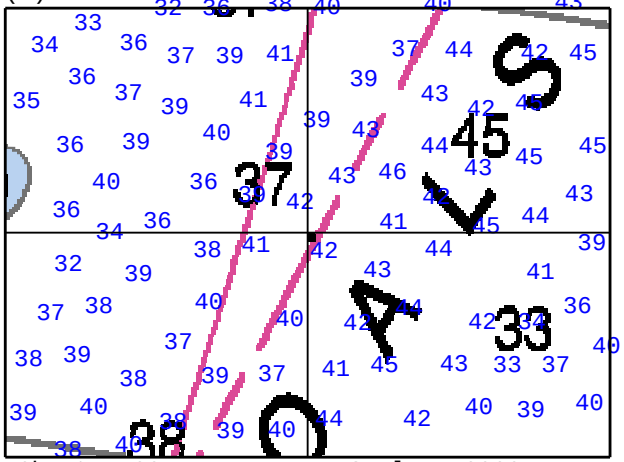
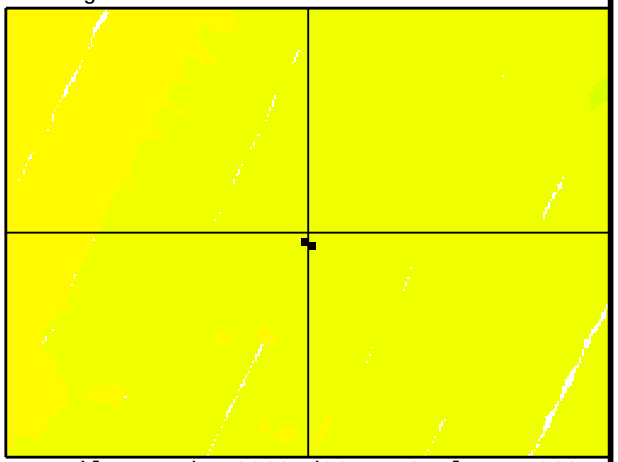
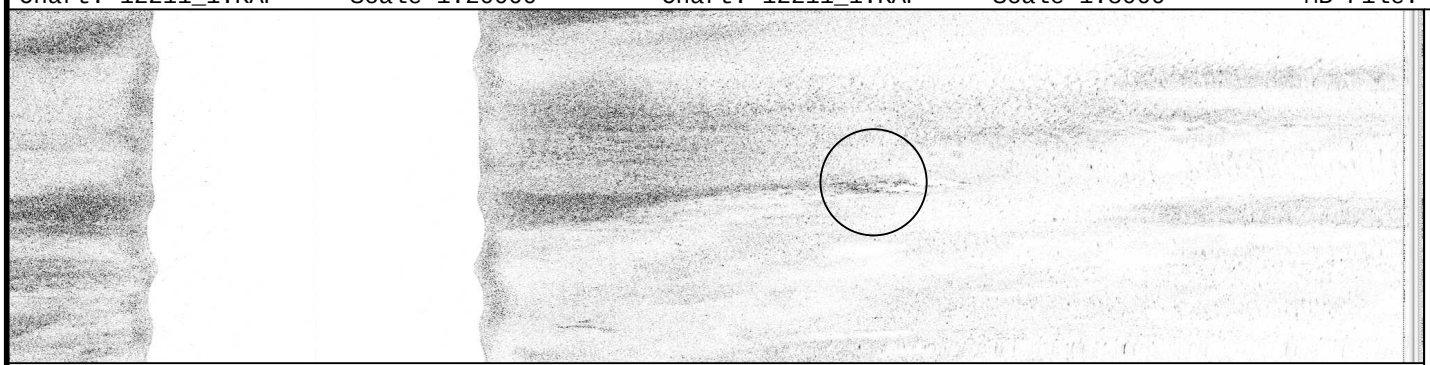


Chart: 12211_1.KAP Scale 1:8000



MB File: asmba10228.d03 Scale 1:1000



ID: 30 File: AS215_100803055000.XTF 37 53 41.96N 075 17 17.18W RNG: 25.12 HGT: 0.60 HDG: 205

COMMENT:
OBSTRUCTION. Chart 42 foot dangerous obstruction and label Obstn.

Insig. feature. Update area with present survey soundings.

ID: 39 File: AS228_100816013800.XTF 37 53 42.01N 075 17 17.31W RNG: -16.69 HGT: 0.55 HDG: 202

CORRELATED SS CONTACTS:

Contact	Range/Height
1215063236	25.12/0.60
1228022305	-16.69/0.55

FEATURE CORRELATOR SHEET Job: H12092

Feature #: 0010 Least Depth: 43(ft), 13.23(m) Lat: 37 54 34.46N Lon: 075 14 38.22W Ping: 13647 Beam: 209

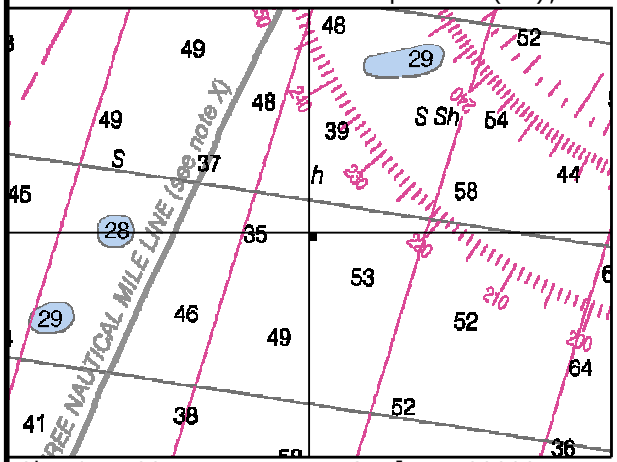


Chart: 12211_1.KAP Scale 1:20000

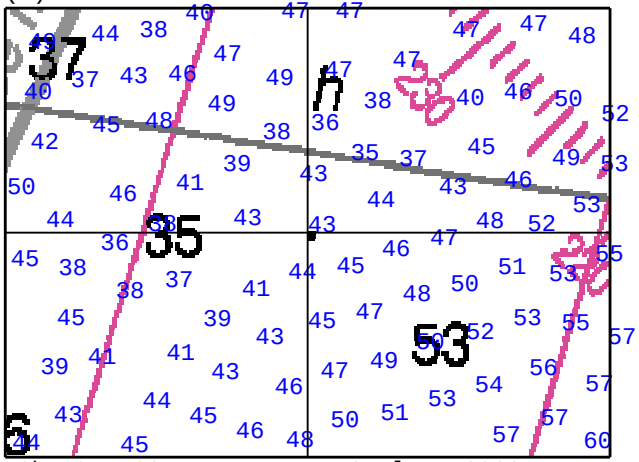
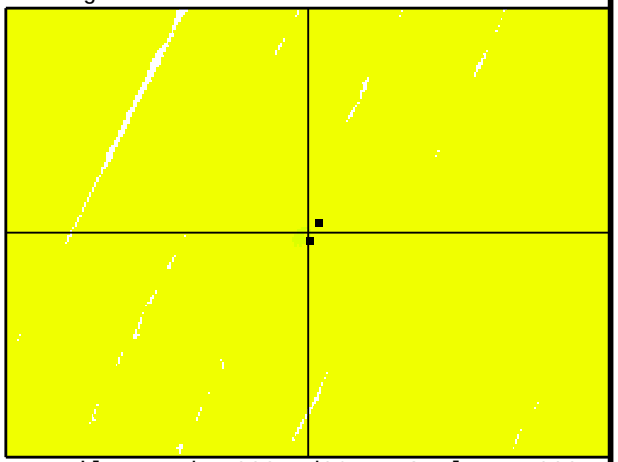
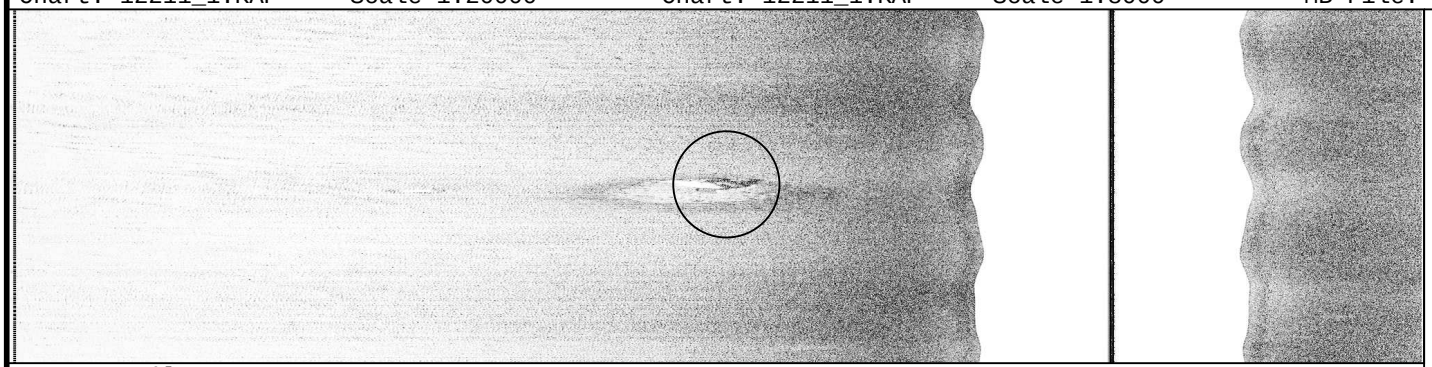


Chart: 12211_1.KAP Scale 1:8000



MB File: asmba10231.d06 Scale 1:1000



ID: 20 File: AS194_100713171000.XTF 37 54 34.39N 075 14 38.26W RNG: -17.50 HGT: 0.81 HDG: 025

COMMENT:
OBSTRUCTION. Chart 43 foot dangerous obstruction and label Obstn.

Insig. feature. Update area with present survey soundings.

ID: 21 File: AS194_100713201700.XTF 37 54 34.64N 075 14 38.10W RNG: -28.53 HGT: 0.59 HDG: 194

CORRELATED SS CONTACTS:

Contact	Range/Height
1194173736	-17.50/0.81
1194205349	-28.53/0.59

FEATURE CORRELATOR SHEET Job: H12092

Feature #: 0011 Least Depth: 48(ft), 14.81(m) Lat: 37 53 46.46N Lon: 075 12 55.09W Ping: 3353 Beam: 148

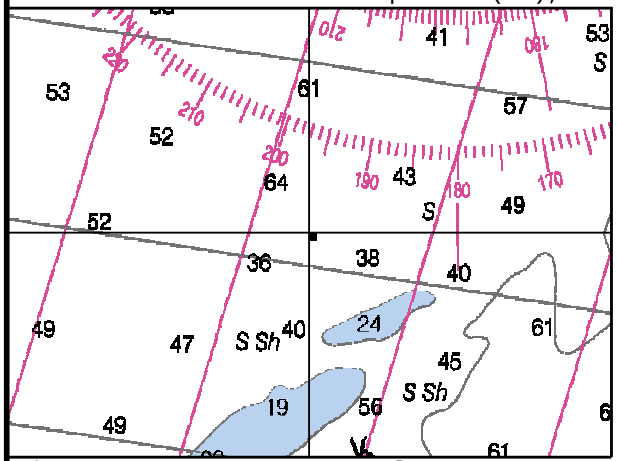


Chart: 12211_1.KAP Scale 1:20000

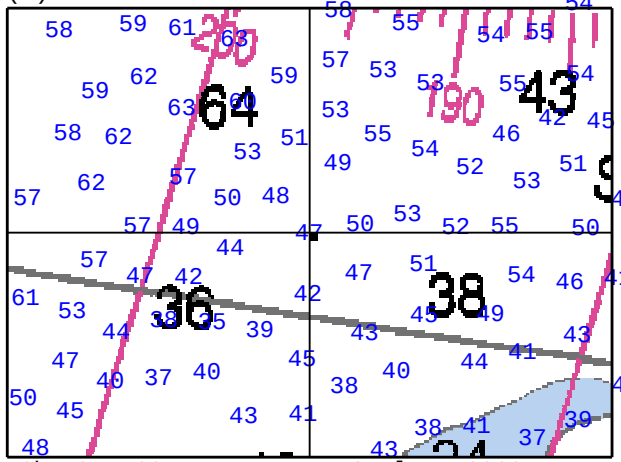
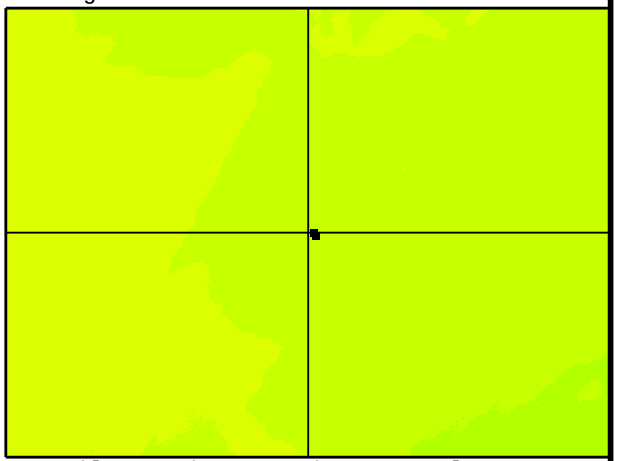
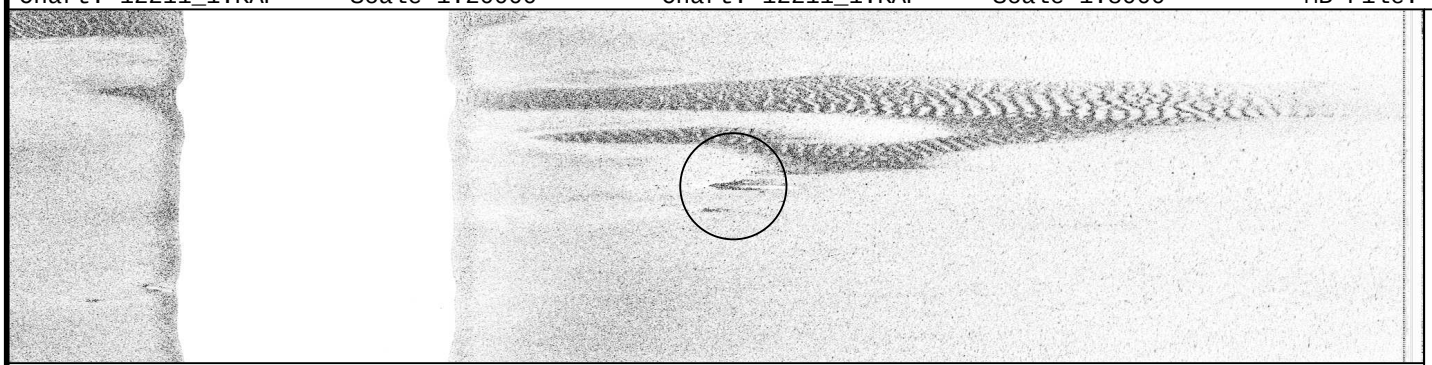


Chart: 12211_1.KAP Scale 1:8000



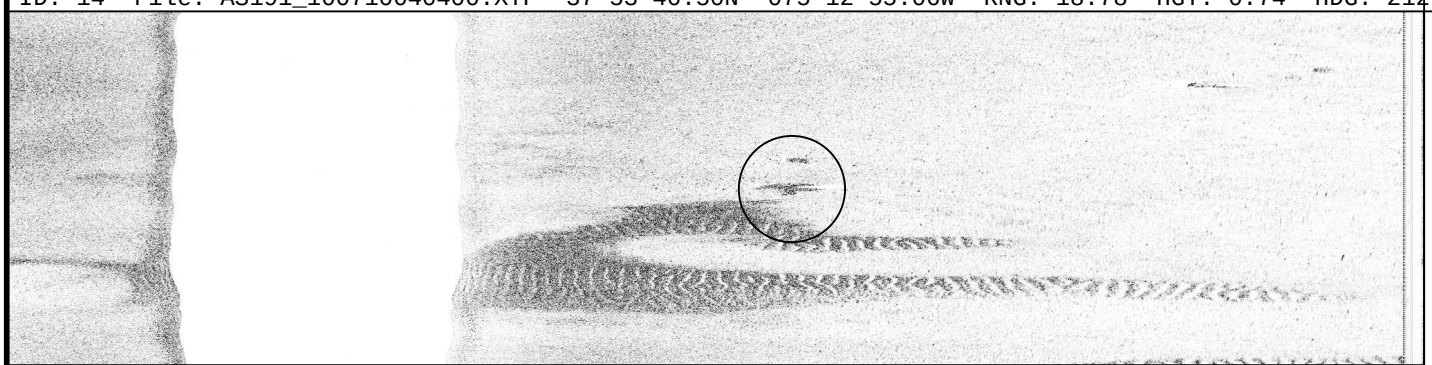
MB File: asmba10231.d15 Scale 1:1000



ID: 14 File: AS191_100710040400.XTF 37 53 46.50N 075 12 55.06W RNG: 18.78 HGT: 0.74 HDG: 212

COMMENT:
OBSTRUCTION. Chart 48 foot dangerous obstruction and label Obstn.

Insig. feature. Update area with present survey soundings.



ID: 15 File: AS191_100710070200.XTF 37 53 46.46N 075 12 55.01W RNG: 21.44 HGT: 0.55 HDG: 028

CORRELATED SS CONTACTS:

Contact	Range/Height
1191044251	18.78/0.74
1191072633	21.44/0.55

FEATURE CORRELATOR SHEET Job: H12092

Feature #: 0012 Least Depth: 16(ft), 4.92(m) Lat: 37 54 57.09N Lon: 075 18 54.45W Ping: 2454 Beam: 234

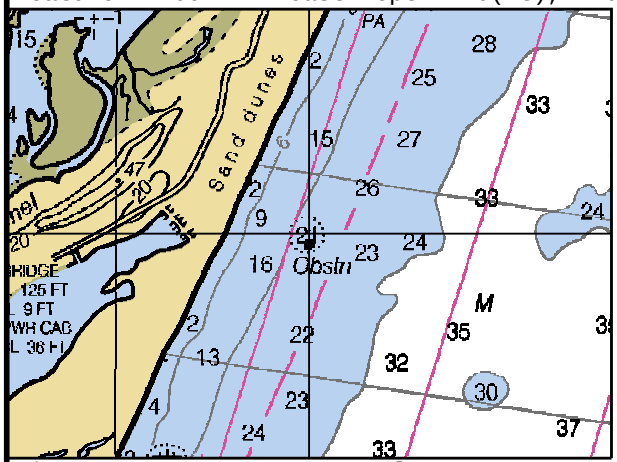


Chart: 12211_1.KAP Scale 1:20000

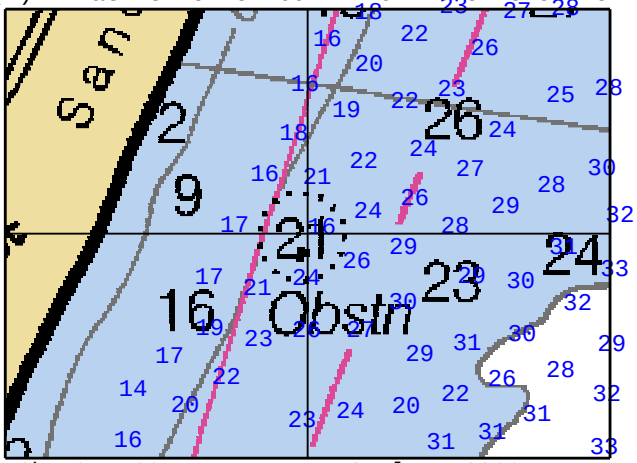
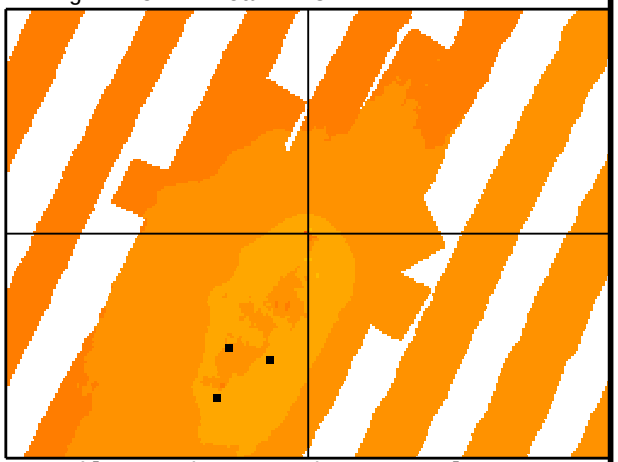
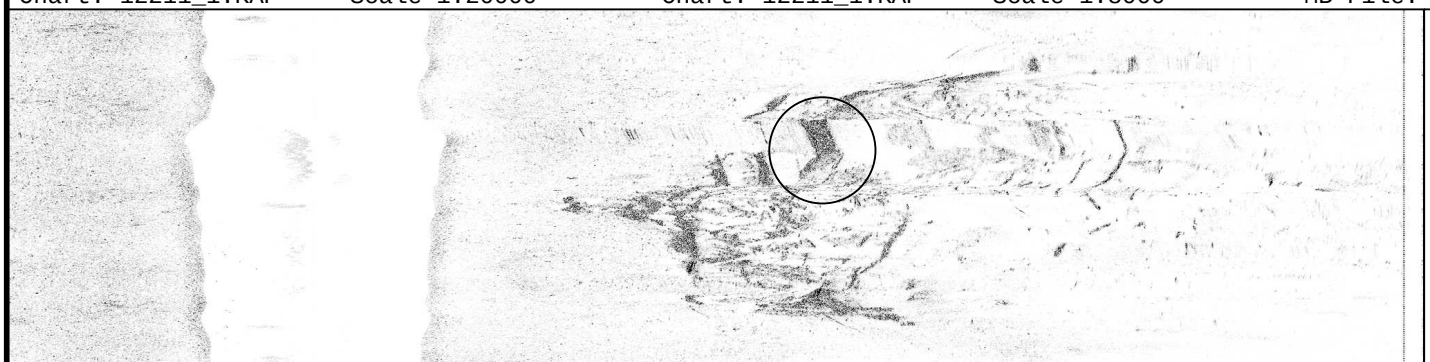


Chart: 12211_1.KAP Scale 1:8000



MB File: asmba10231.d39 Scale 1:1000



ID: 41 File: AS228_100816201300.XTF 37 54 55.50N 075 18 55.15W RNG: 22.81 HGT: 0.69 HDG: 205

COMMENT:
WRECK. Danger to Navigation Report #2. Not submitted by AHB to MCD. Currently charted as a 21 foot dangerous wreck labeled WK. Recommend removing charted 21 foot sounding and charting a 16 foot sounding.

Concur. See also Appendix II and V.

ID: 40 File: AS228_100816152000.XTF 37 54 55.66N 075 18 55.84W RNG: -40.69 HGT: 0.00 HDG: 206

CORRELATED SS CONTACTS:

Contact	Range/Height
1228204534	22.81/0.69
1228155653	-40.69/0.00
1229063126	-9.09/3.52

FEATURE CORRELATOR SHEET Job: H12092

Feature #: 0013 Least Depth: 30(ft), 9.18(m) Lat: 37 51 29.42N Lon: 075 19 47.77W Ping: 13438 Beam: 237

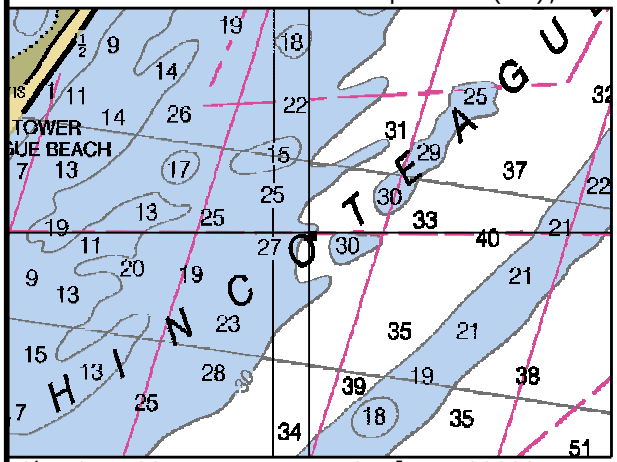


Chart: 12211_1.KAP Scale 1:20000

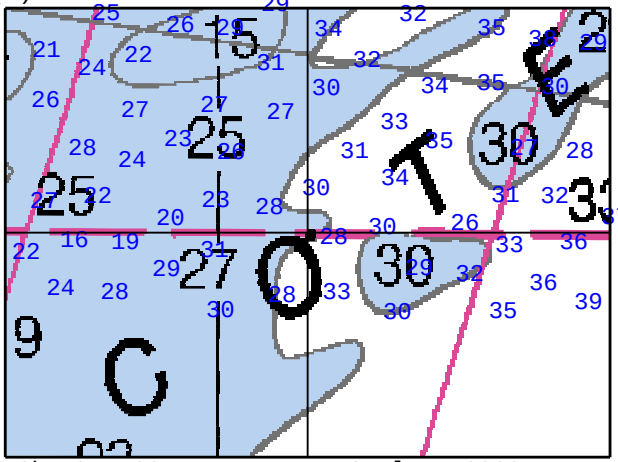
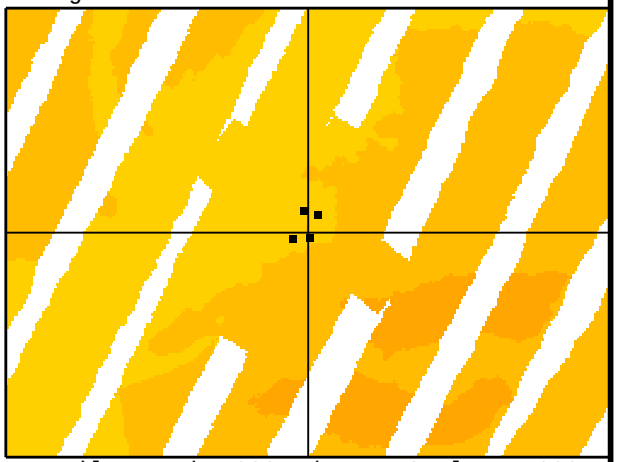


Chart: 12211_1.KAP Scale 1:8000

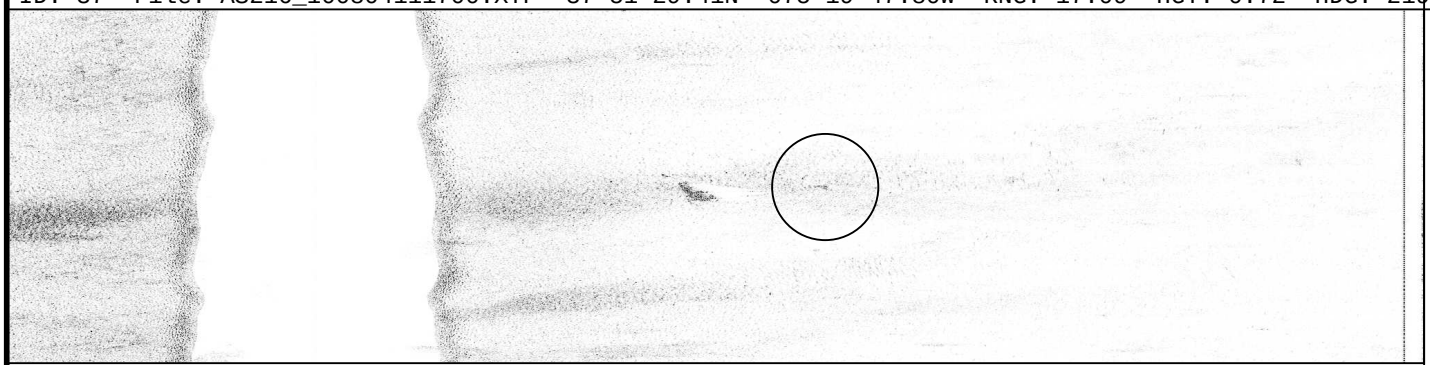


MB File: asmba10281.d11 Scale 1:1000

ID: 37 File: AS216_100804111700.XTF 37 51 29.41N 075 19 47.80W RNG: 17.09 HGT: 0.72 HDG: 219

COMMENT:
WRECK. Chart 30 foot dangerous wreck and label Wk.

Concur. Add 30 ft dangerous wreck in present survey location.



ID: 38 File: AS216_100804111700.XTF 37 51 29.39N 075 19 48.10W RNG: 22.94 HGT: 0.51 HDG: 208

CORRELATED SS CONTACTS:

Contact	Range/Height
1216122009	17.09/0.72
1216122010	22.94/0.51
1215092054	25.75/0.81
1215092053	20.28/0.55

FEATURE CORRELATOR SHEET Job: H12092

Feature #: 0014 Least Depth: 25(ft), 7.75(m) Lat: 37 58 02.12N Lon: 075 09 10.93W Ping: 3794 Beam: 405

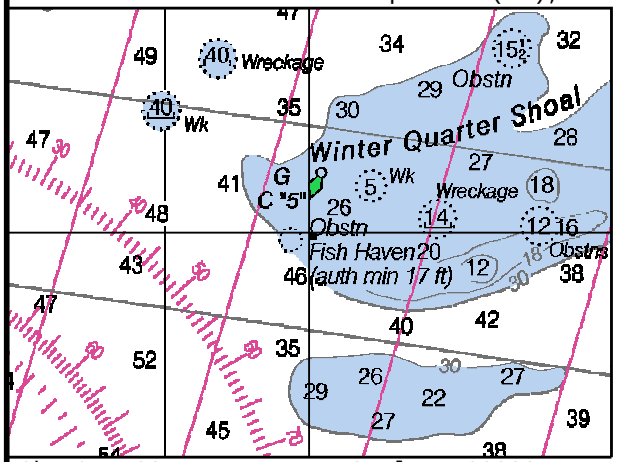


Chart: 12211_1.KAP Scale 1:20000

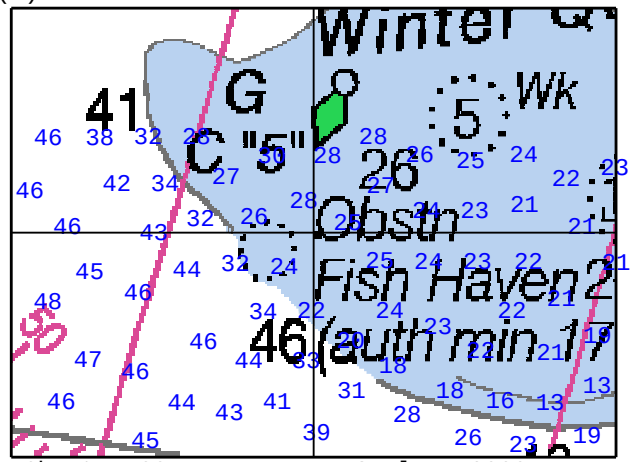
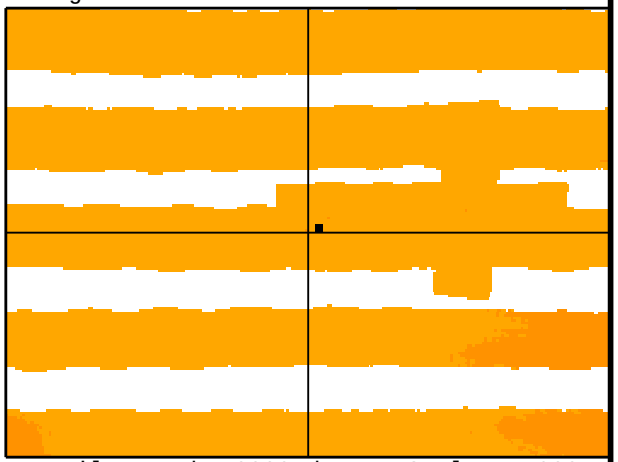
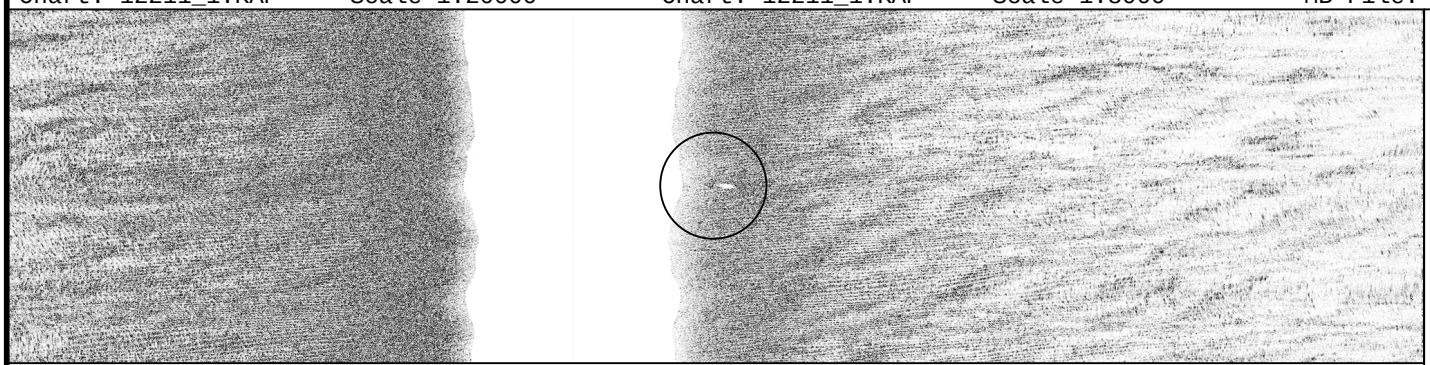


Chart: 12211_1.KAP Scale 1:8000



MB File: asmba10282.d47 Scale 1:1000



ID: 46 File: AS229_100817184201.XTF 37 58 02.24N 075 09 10.81W RNG: 6.25 HGT: 0.90 HDG: 271

COMMENT:
OBSTRUCTION. AWOIS 14229. No chart. See features 15 and 16.

Concur.

CORRELATED SS CONTACTS:

Contact	Range/Height
1229190149	6.25/0.90

FEATURE CORRELATOR SHEET Job: H12092

Feature #: 0015 Least Depth: 25(ft), 7.77(m) Lat: 37 58 02.29N Lon: 075 09 10.56W Ping: 3851 Beam: 304

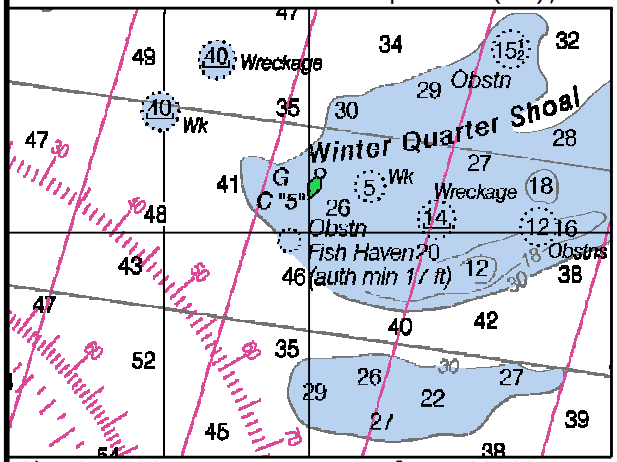


Chart: 12211_1.KAP Scale 1:20000

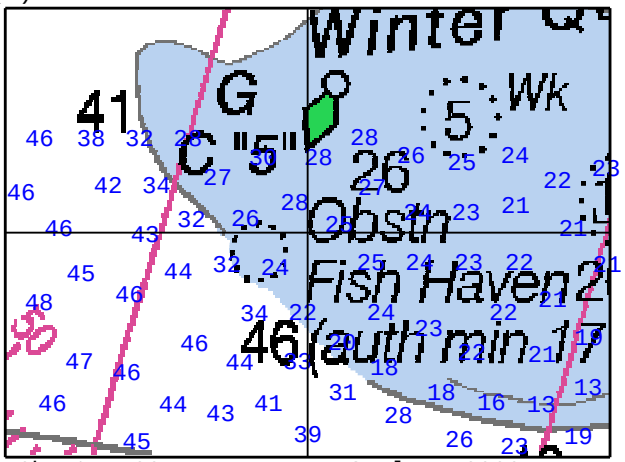
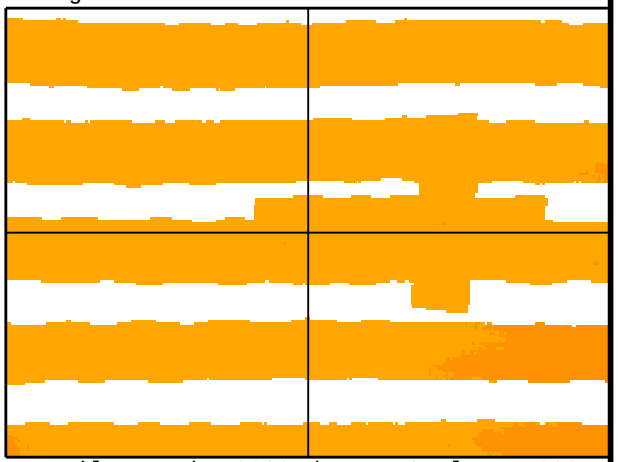


Chart: 12211_1.KAP Scale 1:8000



MB File: asmba10282.d47 Scale 1:1000

COMMENT:
OBSTRUCTION. AWOIS 14229. No chart. See features 14 and 16.

Concur.

CORRELATED SS CONTACTS:
Contact Range/Height

FEATURE CORRELATOR SHEET Job: H12092

Feature #: 0016 Least Depth: 25(ft), 7.65(m) Lat: 37 58 02.38N Lon: 075 09 08.21W Ping: 4209 Beam: 255

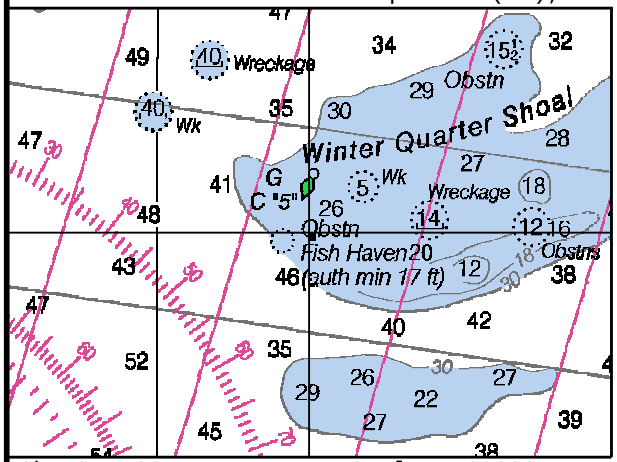


Chart: 12211_1.KAP Scale 1:20000

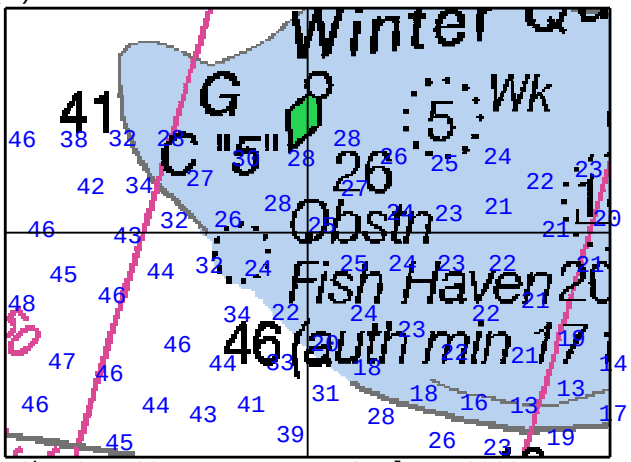
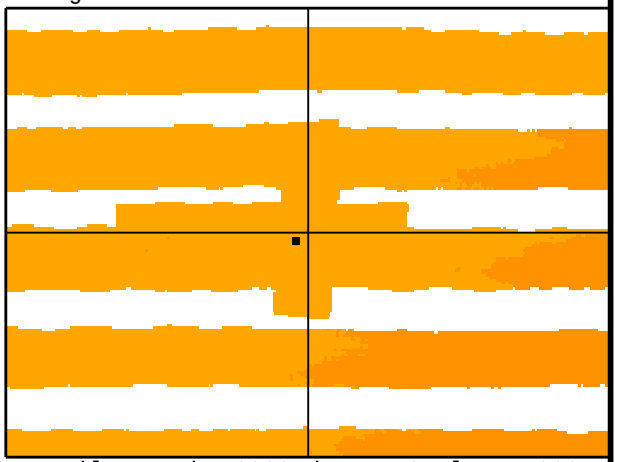
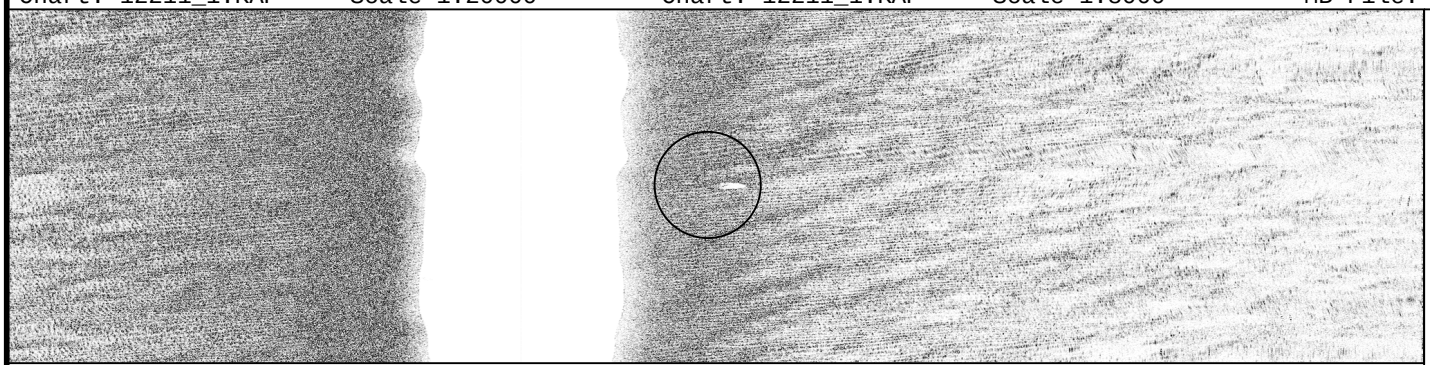


Chart: 12211_1.KAP Scale 1:8000



MB File: asmba10282.d47 Scale 1:1000



ID: 45 File: AS229_100817184201.XTF 37 58 02.33N 075 09 08.49W RNG: 8.34 HGT: 0.50 HDG: 266

COMMENT:
OBSTRUCTION. AWOIS 14229.
Chart 25 foot dangerous obstruction and label Obstns.
See features 14 and 15.

Do not concur. Retain charted dangerous obstruction, Fish Haven (auth min 17ft) as charted. See also HCell Report Section D.1.1.a.

CORRELATED SS CONTACTS:

Contact	Range/Height
1229190128	8.34/0.50

FEATURE CORRELATOR SHEET Job: H12092

Feature #: 0017 Least Depth: 16(ft), 4.95(m) Lat: 37 58 04.74N Lon: 075 07 51.73W Ping: 38843 Beam: 330

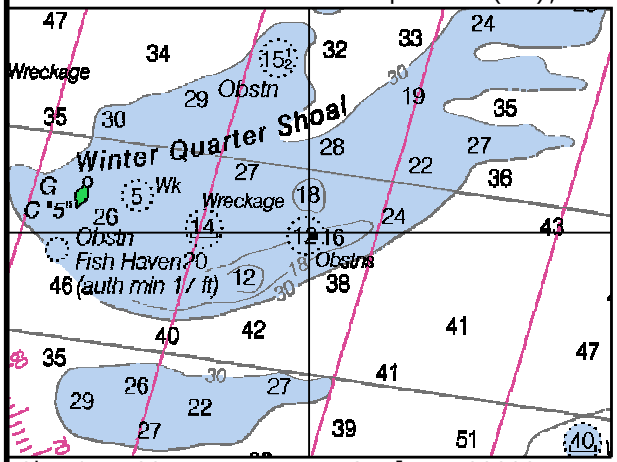


Chart: 12211_1.KAP Scale 1:20000

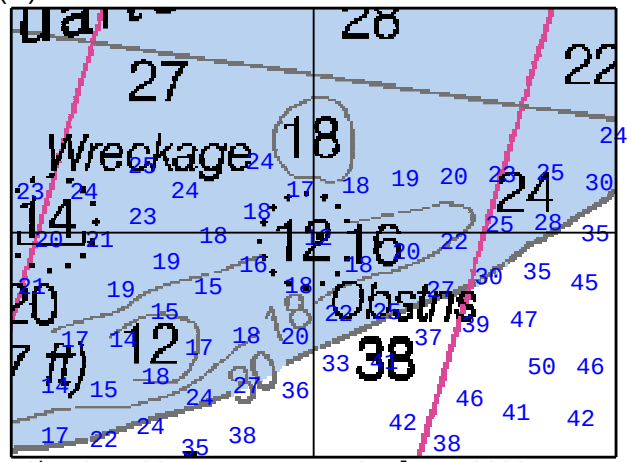
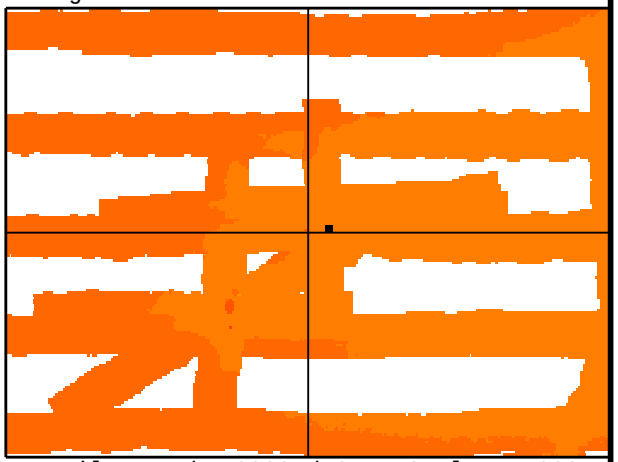
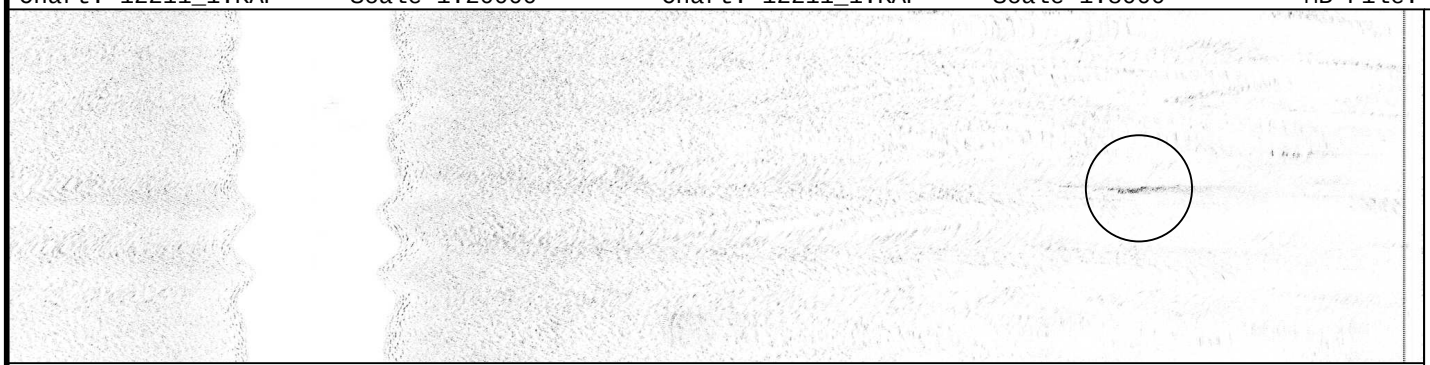


Chart: 12211_1.KAP Scale 1:8000



MB File: asmba10282.d50 Scale 1:1000



ID: 24 File: AS196_100715152600.XTF 37 58 04.83N 075 07 51.45W RNG: 37.12 HGT: 0.61 HDG: 081

COMMENT:
WRECK. Danger to Navigation Report #3. No chart. Depth covered by feature 18 at chart scale. See feature 18.

Concur.

CORRELATED SS CONTACTS:

Contact	Range/Height
1196154247	37.12/0.61

FEATURE CORRELATOR SHEET Job: H12092

Feature #: 0018 Least Depth: 12(ft), 3.64(m) Lat: 37 58 03.49N Lon: 075 07 53.02W Ping: 16680 Beam: 406

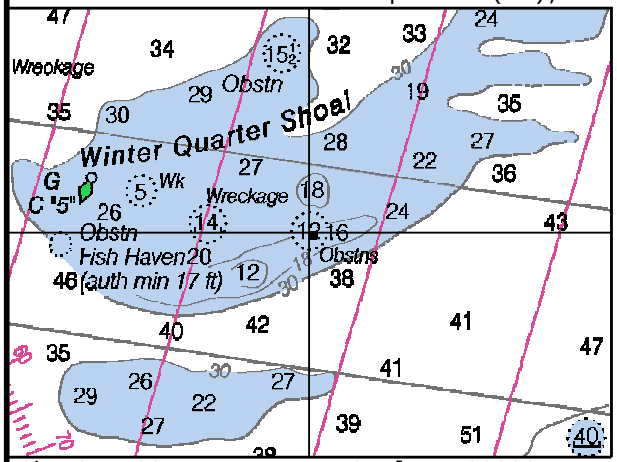


Chart: 12211_1.KAP Scale 1:20000

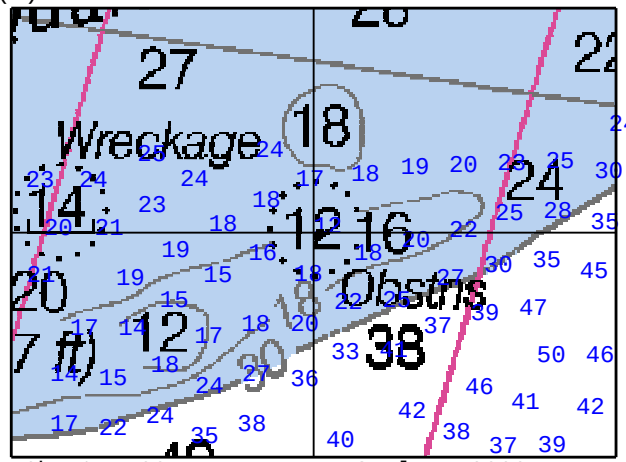
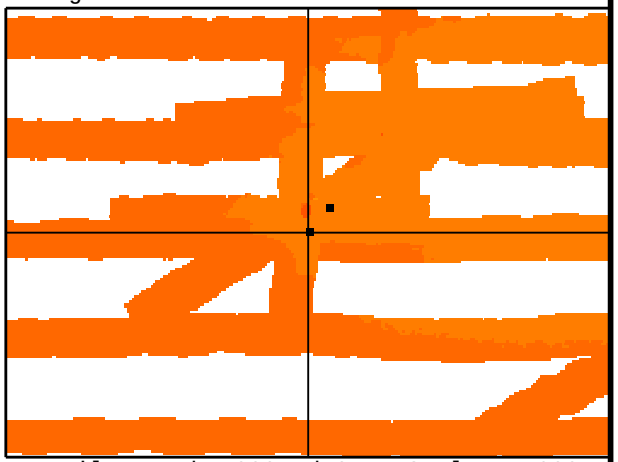
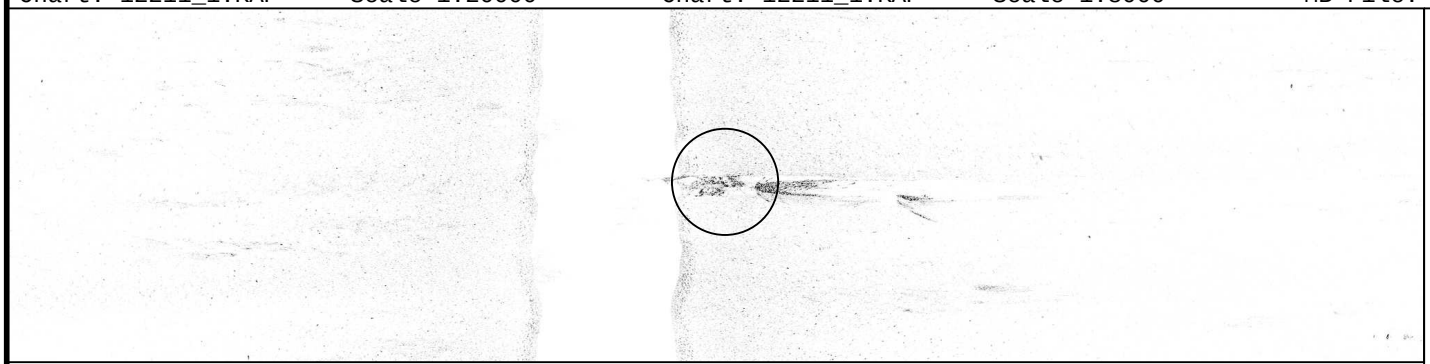


Chart: 12211_1.KAP Scale 1:8000



MB File: asmba10285.d18 Scale 1:1000



ID: 47 File: AS282_101009153500.XTF 37 58 03.55N 075 07 53.05W RNG: 5.28 HGT: 2.52 HDG: 265

COMMENT:
OBSTRUCTION. Danger to Navigation Report #3. Currently charted as 12 foot dangerous obstruction, labeled Obstns. No changes to chart recommended.

See DtoN#3 in Appendix I

ID: 44 File: AS229_100817182100.XTF 37 58 03.86N 075 07 52.72W RNG: 29.44 HGT: 1.07 HDG: 089

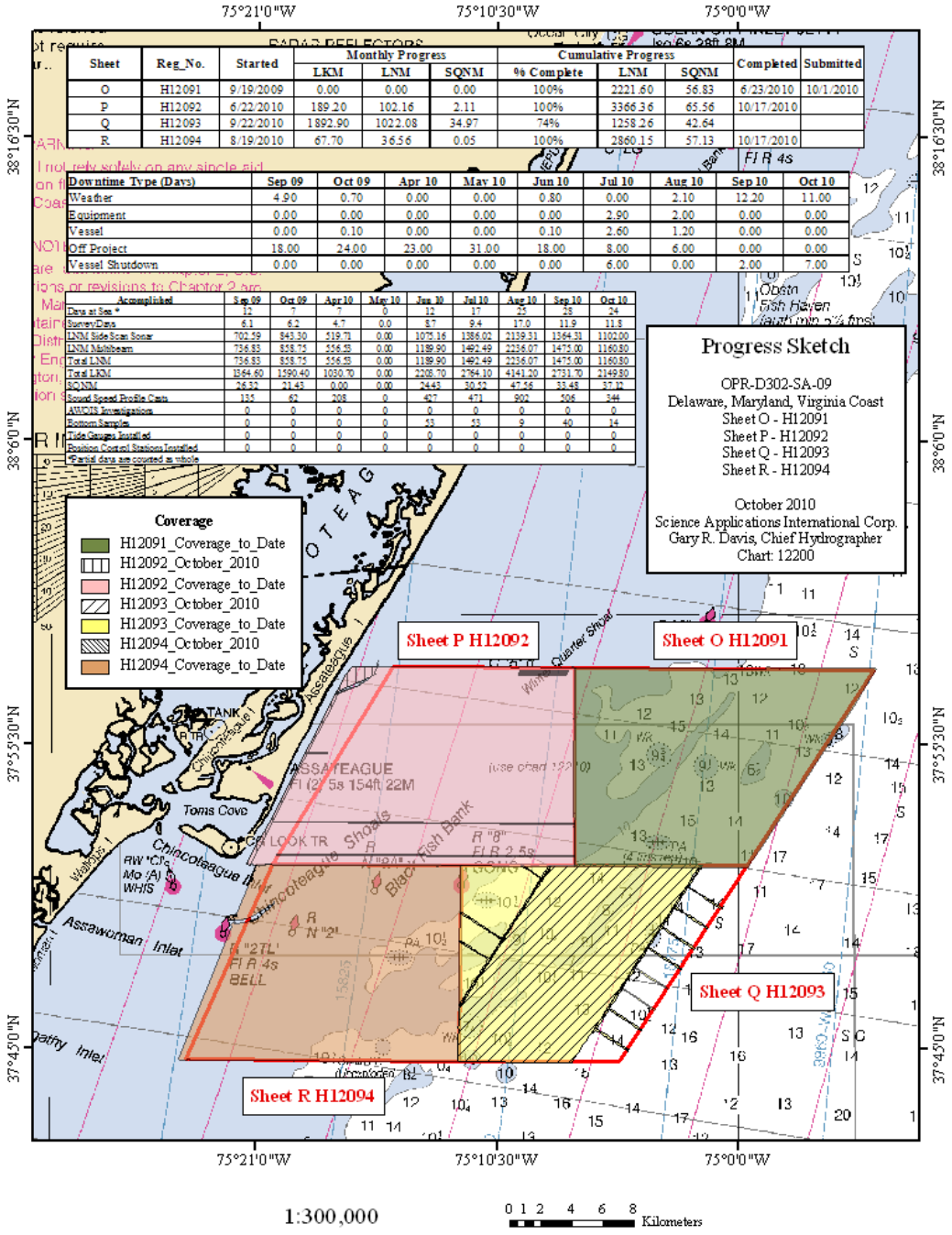
CORRELATED SS CONTACTS:

Contact	Range/Height
1282154307	5.28/2.52
1229183737	29.44/1.07

APPENDIX III

FINAL PROGRESS SKETCH

APPENDIX III. FINAL PROGRESS SKETCH AND SURVEY OUTLINE



Sheet	Reg_No.	Started	Monthly Progress			Cumulative Progress			Completed	Submitted
			LKM	LNM	SQNM	% Complete	LNM	SQNM		
O	H12091	9/19/2009	0.00	0.00	0.00	100%	2221.60	56.83	6/23/2010	10/1/2010
P	H12092	6/22/2010	189.20	102.16	2.11	100%	3366.36	65.56	10/17/2010	
Q	H12093	9/22/2010	1892.90	1022.08	34.97	74%	1258.26	42.64		
R	H12094	8/19/2010	67.70	36.56	0.05	100%	2860.15	57.13	10/17/2010	

Downtime Type (Days)	Sep 09	Oct 09	Apr 10	May 10	Jun 10	Jul 10	Aug 10	Sep 10	Oct 10
Weather	4.90	0.70	0.00	0.00	0.80	0.00	2.10	12.20	11.00
Equipment	0.00	0.00	0.00	0.00	0.00	2.90	2.00	0.00	0.00
Vessel	0.00	0.10	0.00	0.00	0.10	2.60	1.20	0.00	0.00
Off Project	18.00	24.00	23.00	31.00	18.00	8.00	6.00	0.00	0.00
Vessel Shutdown	0.00	0.00	0.00	0.00	0.00	6.00	0.00	2.00	7.00

Accomplished	Sep 09	Oct 09	Apr 10	May 10	Jun 10	Jul 10	Aug 10	Sep 10	Oct 10
Days at Sea *	12	7	7	0	12	17	25	28	24
SurveyDays	6.1	6.2	4.7	0.0	8.7	9.4	17.0	11.9	11.8
LNM Side Scan Sonar	702.59	843.30	519.71	0.00	1075.16	1386.02	2139.31	1364.31	1102.00
LNM Multibeam	736.83	858.75	556.53	0.00	1189.90	1492.49	2236.07	1475.00	1160.80
Total LNM	736.83	858.75	556.53	0.00	1189.90	1492.49	2236.07	1475.00	1160.80
Total LKM	1364.60	1590.40	1030.70	0.00	2208.70	2764.10	4141.20	2731.70	2149.80
SQNM	26.32	21.43	0.00	0.00	24.43	30.52	47.56	33.48	37.12
Sound Speed Profile Casts	135	62	208	0	427	471	902	506	344
AWOIS Investigation	0	0	0	0	0	0	0	0	0
Bottom Samples	0	0	0	0	53	53	9	40	14
Tide Gauges Installed	0	0	0	0	0	0	0	0	0
Position Control Stations Installed	0	0	0	0	0	0	0	0	0

*Partial days are counted as whole

Figure Appendix III-1. Final Progress Sketch for H12092

The Survey Outline for H12092 was delivered to the COTR on 11 November 2010 in the file *H12092_Final_Survey_Outline.zip*. The zip file contained two survey outlines in dxf format. One outline was delivered in a geodetic latitude/longitude coordinate system (*H12092_Final_Survey_Outline_LL_NAD83_R12.dxf*) and the other in a projected UTM coordinate system (*H12092_Final_Survey_Outline_UTM18_NAD83_R12.dxf*). These outline files are also included as a part of this delivery. Figure Appendix III-2 demonstrates the graphical depiction of the DXF.

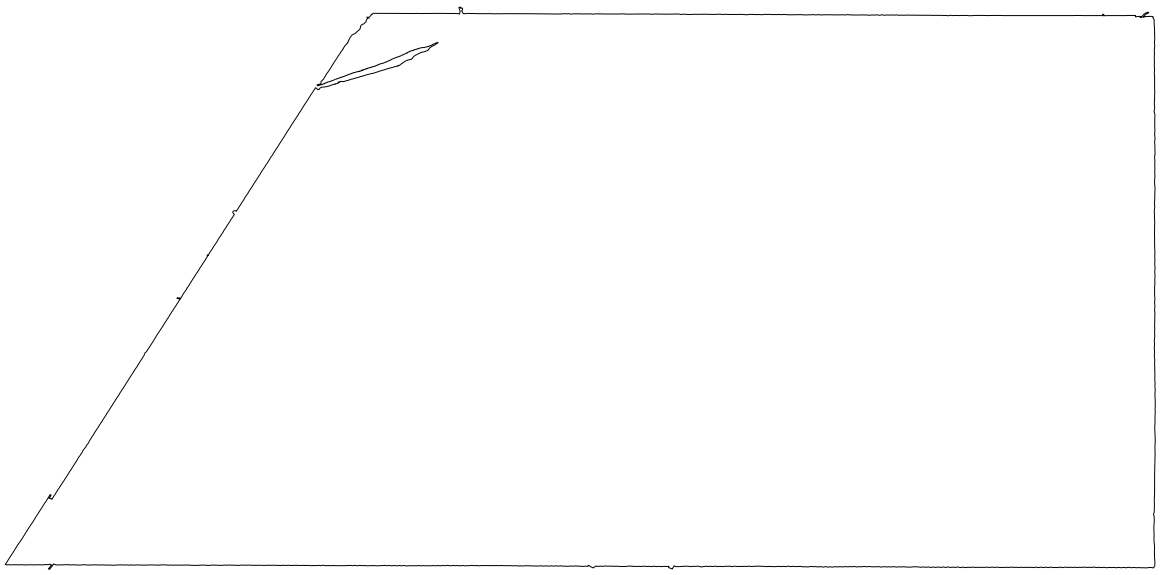


Figure Appendix III-2. Survey Outline for H12092

APPENDIX IV

TIDES AND WATER LEVELS

APPENDIX IV. TIDES AND WATER LEVELS

The on-line times for acquisition of valid hydrographic data are presented in the Abstract of Times of Hydrography, H12092.

Project: OPR-D302-SA-09
Registry No.: H12092
Contractor Name: Science Applications International Corporation
Date: 17 October 2010
Sheet Letter: P
Inclusive Dates: 22 June 2010 – 17 October 2010

Field work is complete.

Table Appendix IV-1. Abstract Times of Hydrography, H12092

Begin Date	Begin Julian Day	Begin Time	End Date	End Julian Day	End Time
06/22/2010	173	09:37:44	06/23/2010	174	16:22:15
06/23/2010	174	21:50:58	06/27/2010	178	18:59:07
06/27/2010	178	20:51:48	07/01/2010	182	07:29:36
07/09/2010	190	11:57:10	07/17/2010	198	01:49:45
07/21/2010	202	02:18:31	07/21/2010	202	22:50:39
08/03/2010	215	05:51:00	08/04/2010	216	17:45:21
08/16/2010	228	01:43:20	08/19/2010	231	21:08:29
10/08/2010	281	17:54:46	10/08/2010	281	20:04:00
10/09/2010	282	12:18:58	10/09/2010	282	23:04:43
10/10/2010	283	12:19:47	10/10/2010	283	19:21:23
10/11/2010	284	10:21:10	10/11/2010	284	19:14:40
10/12/2010	285	13:47:23	10/12/2010	285	20:08:43
10/17/2010	290	17:24:57	10/17/2010	290	17:45:58

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 H12092 multibeam data in the **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 the adequacy of zoning correctors

based on Duck, NC (8651370), refer to the H12092 Descriptive Report Section C.1.1 for details regarding final tides for H12092. The water level zoning correctors based entirely on Duck, NC (865-1370) were applied to all multibeam data for H12092.

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. Concur.

APPENDIX V

SUPPLEMENTAL SURVEY RECORDS AND CORRESPONDENCE

APPENDIX V. SUPPLEMENTAL SURVEY RECORDS & CORRESPONDENCE

This appendix is comprised of three sections. The first section contains the Danger to Navigation Reports as originally prepared by SAIC and submitted to AHB. The second section contains copies of email exchanges between SAIC and NOAA concerning various aspects of the survey, data processing, and submittal topics. The third section contains the tabular summary of the bottom characteristics results for this sheet and 62 images, one image for each of the bottom samples collected.

Danger to Navigation Report 1 See Appendix I for charting recommendations

Hydrographic Survey Registry Number: H12092

State: Virginia

Locality: Atlantic Ocean

Sub Locality: 5 NM East of Assateague Island

Project Number: OPR-D302-SA-09

Survey Date: 27 June 2010 at 14:50:11 UTC

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

Charts affected:
12211 43rd Edition 10/01/2007 1:80,000 scale: Corrected through NM 03/27/2010

The following items were found during hydrographic survey operations:

FEATURE	DEPTH	LATITUDE	LONGITUDE
Wreck	57 ft (17.46 m)	37° 53’ 39.29” N	075°10’ 41.26” W

Description:
The deteriorated submerged wreck appears ti be broken in half with two main pieces lying adjacent to each other. There are several smaller pieces of debris from the wreck covering an area approximately 12 by 12 meters. It has a least depth of 57 feet in depths of 65 feet.

RECOMMENDATIONS:
Chart a 57 foot sounding with danger circle, (K-26) and label Wk in 37° 53’ 39.29”N 074° 10’ 41.26”W.

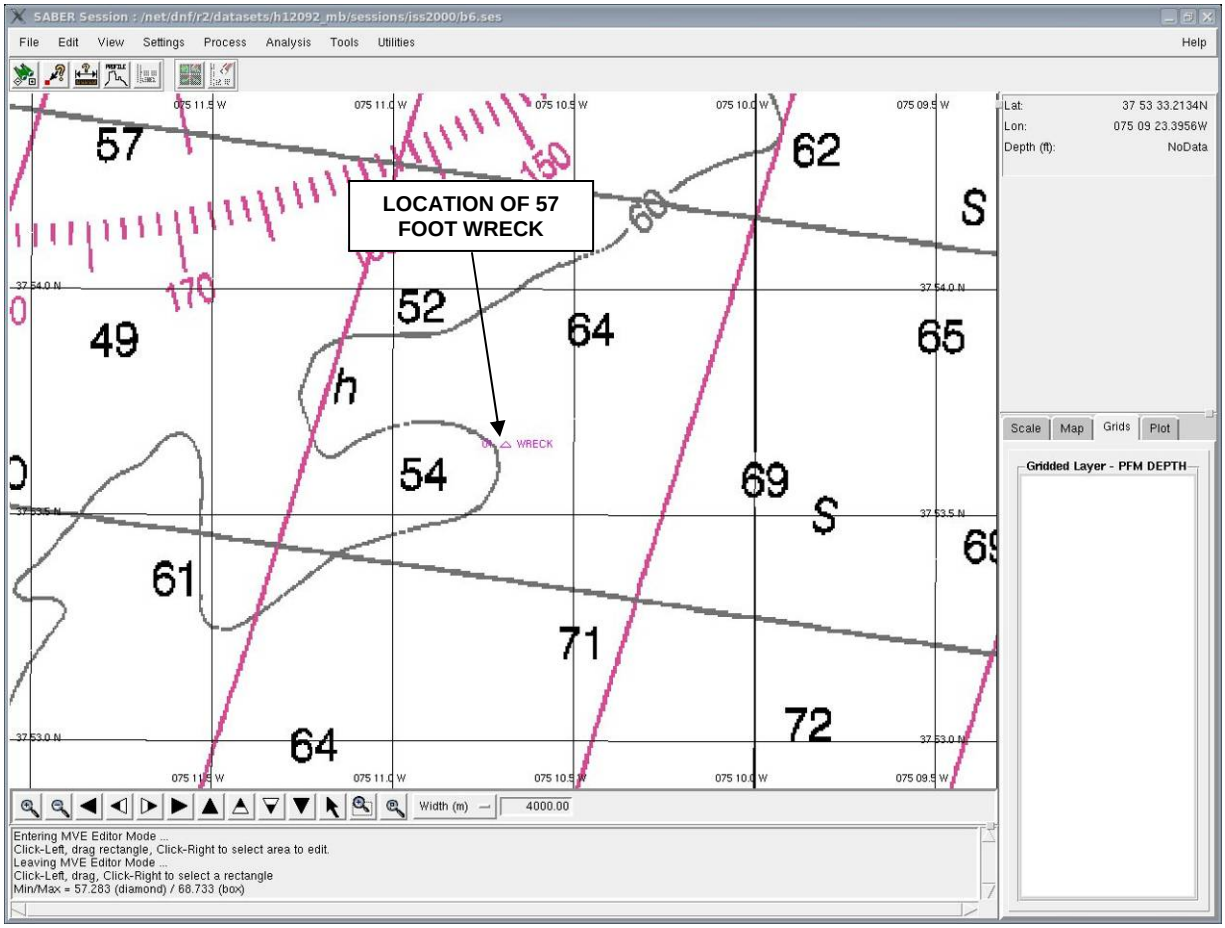


Figure 1. Section of Chart 12211 Showing the Location of Wreck with Least Depth of 57 Feet within H12092.

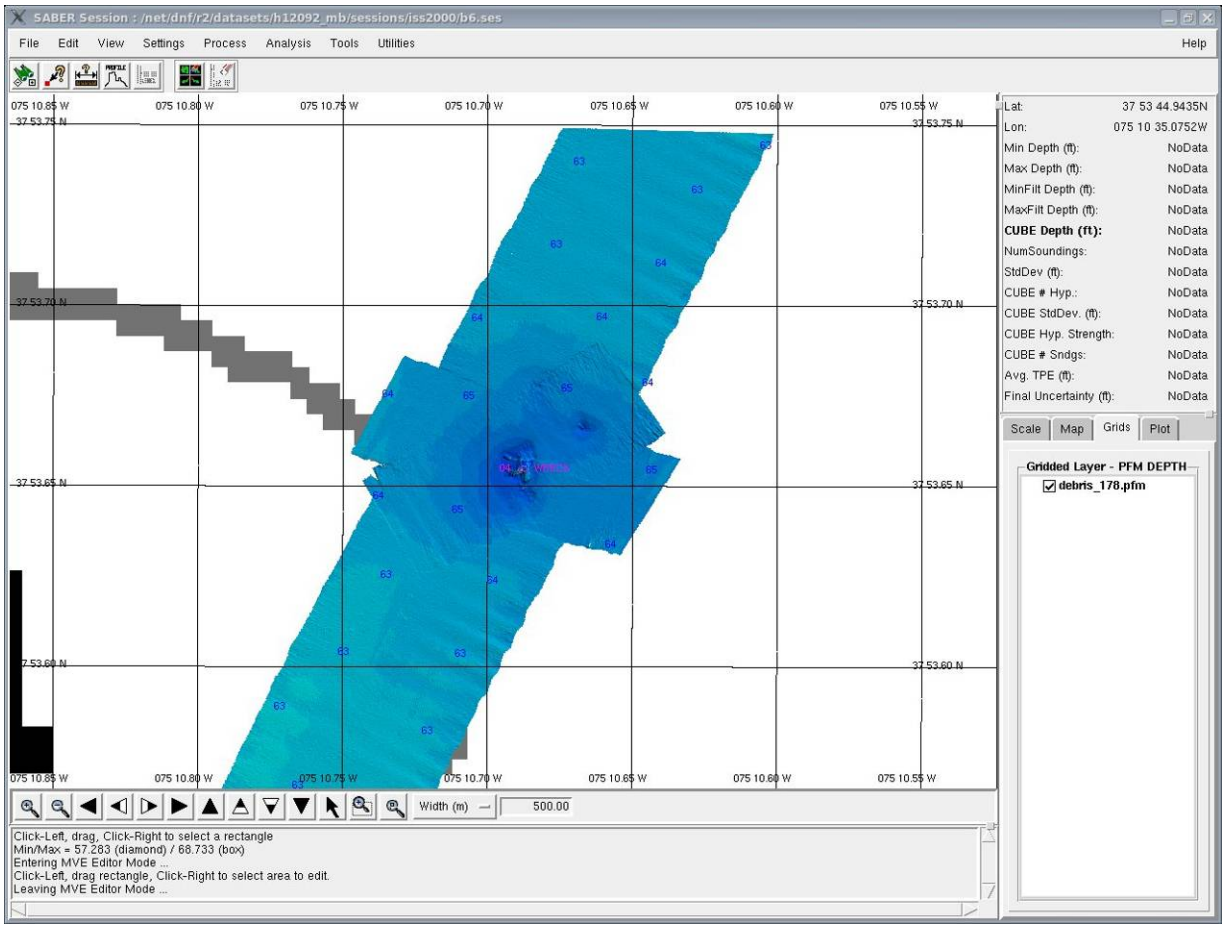


Figure 2. Section of Chart 12211 Showing Cubed Depth Grid and Selected CUBE Soundings around Wreck with Least Depth of 57 Feet within H12092.

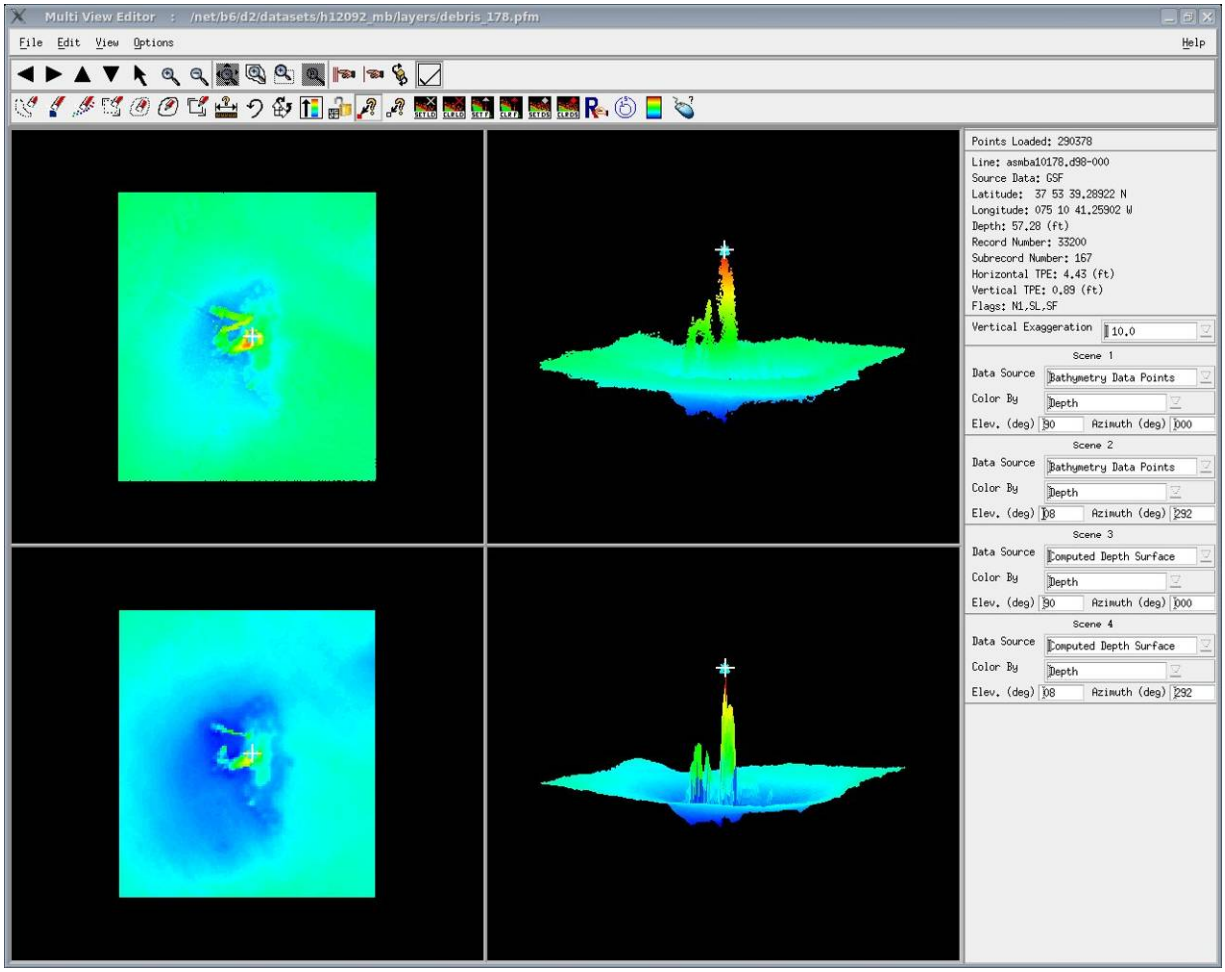


Figure 3. Multiview Editor of PFM Grid of Wreck with Least Depth of 57 Feet within H12092.

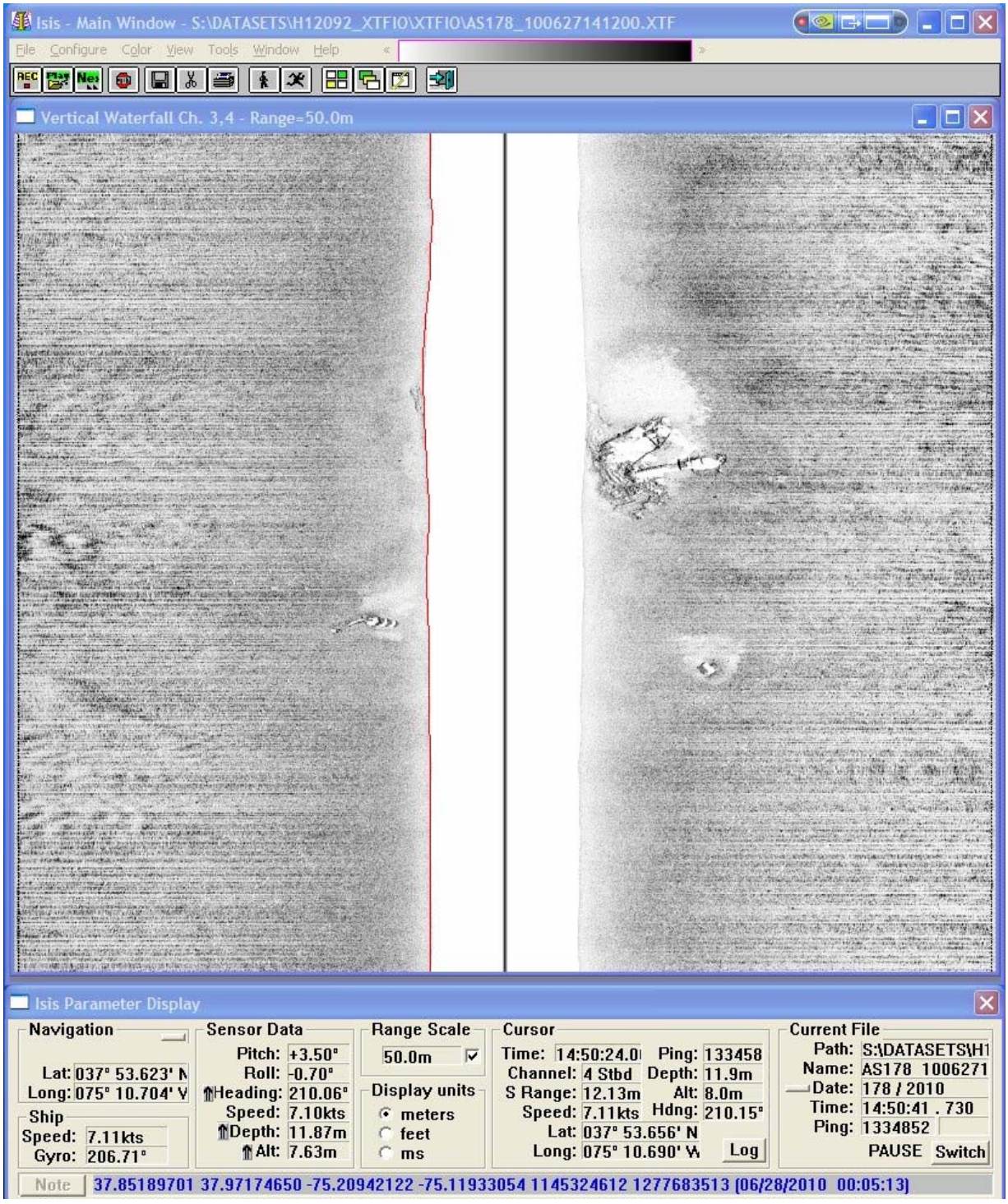


Figure 4. Sidescan Image (100 kHz) of Wreck with Least Depth of 57 Feet within H12092.

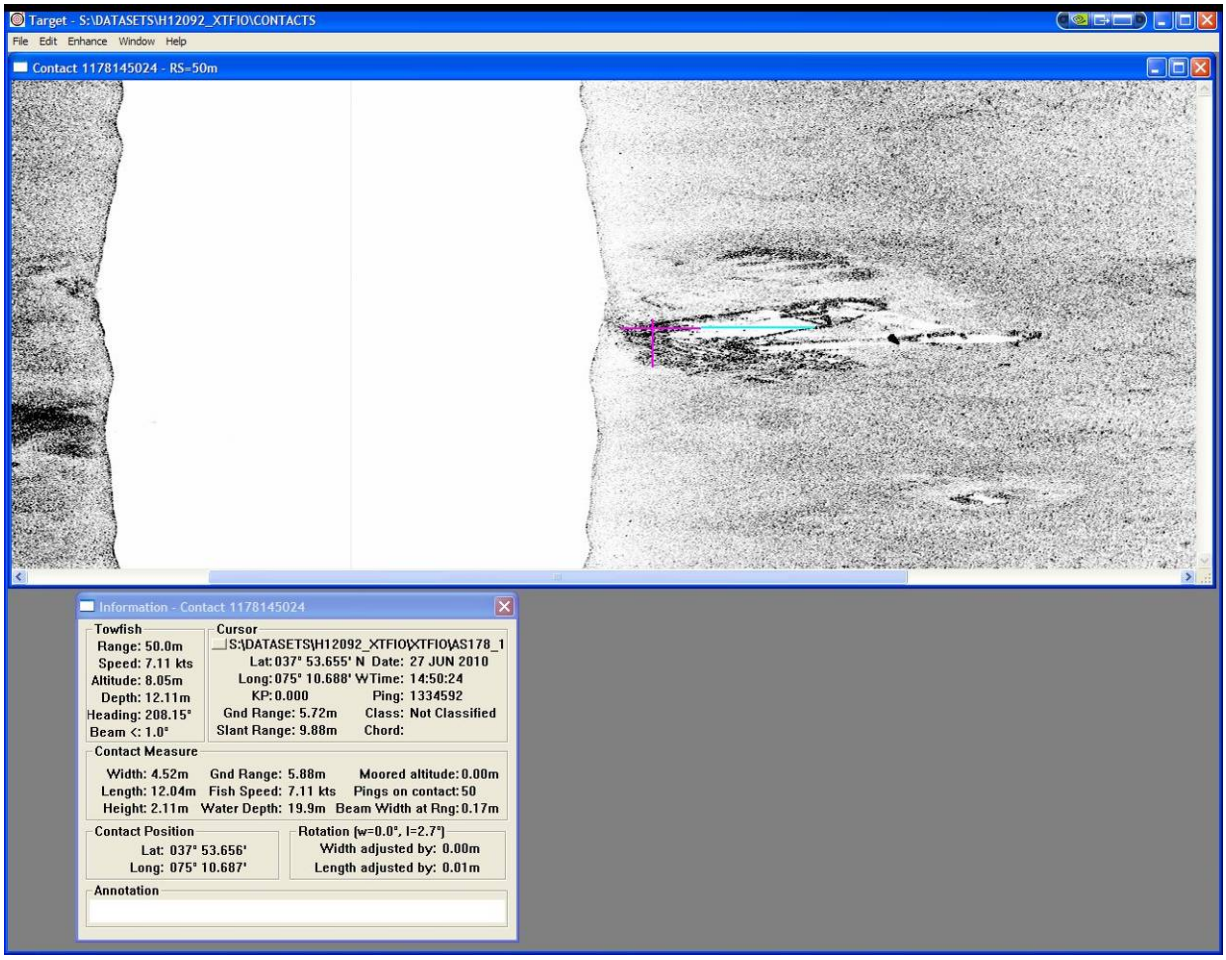


Figure 5. Sidescan Target Image of Wreck with Least Depth of 57 Feet within H12092.

Danger to Navigation Report 2 See appendix II

Hydrographic Survey Registry Number: H12092

State: Virginia

Locality: Atlantic Ocean

Sub Locality: 5 NM East of Assateague Island

Project Number: OPR-D302-SA-09

Survey Date: 19 August 2010 at 20:57:51 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:
12211 43rd Edition 10/01/2007 1:80,000 scale; Corrected through NM 06/26/2010

The following items were found during hydrographic survey operations:

FEATURE	DEPTH	LATITUDE	LONGITUDE
Wreck	16 ft (4.92 m)	37° 54’ 57.09” N	075° 18’ 54.45” W

Description:
The deteriorated wreck debris is approximately 80 meters long by 28 meters wide, and oriented 216° from the listed position. It has a least depth of 16 feet in depths of 26 feet.

RECOMMENDATIONS:
The wreck is located in the position of a charted 21-foot Obstn. Recommend removal of the charted 21 foot Obstn, and charting a 16-foot sounding with danger circle and label Wk in 37° 54’ 57.09” N 075° 18’ 54.45” W .

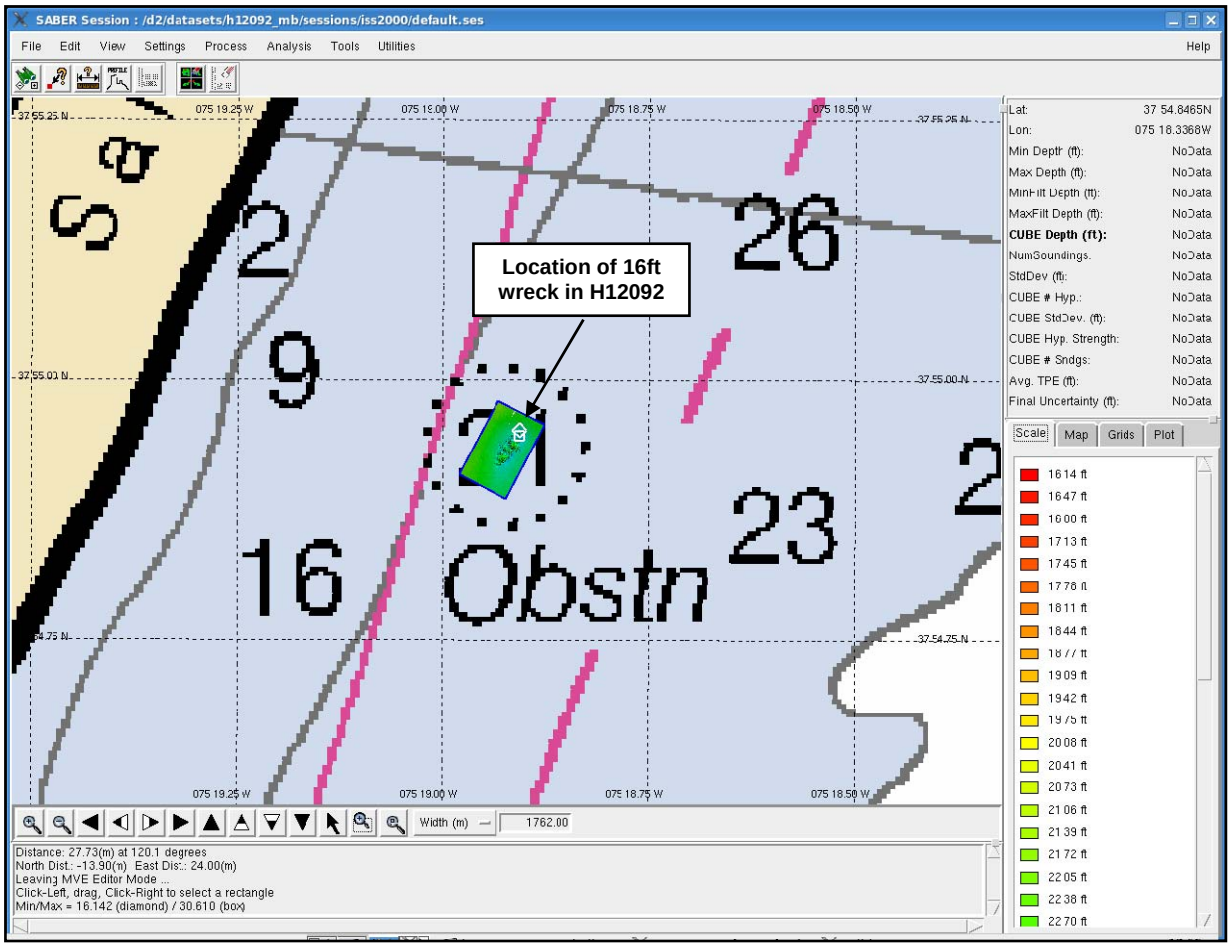


Figure 5. Chart 12211 Showing Location of Wreck with Least Depth of 16 Feet in H12092 survey area.

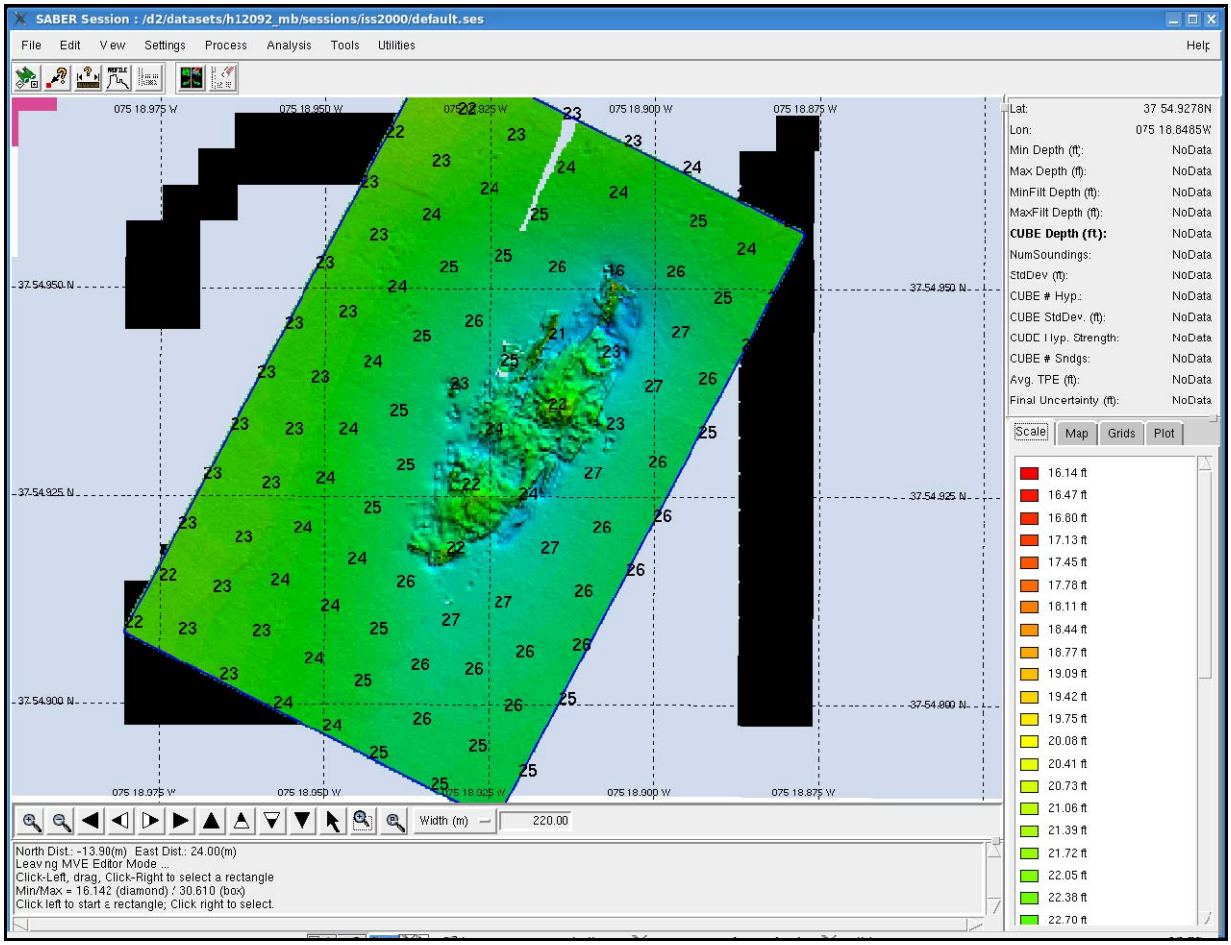


Figure 6. Chart 12211 Showing 0.5-meter PFM and Selected Soundings around Wreck with Least Depth of 16 Feet in H12092 survey area.

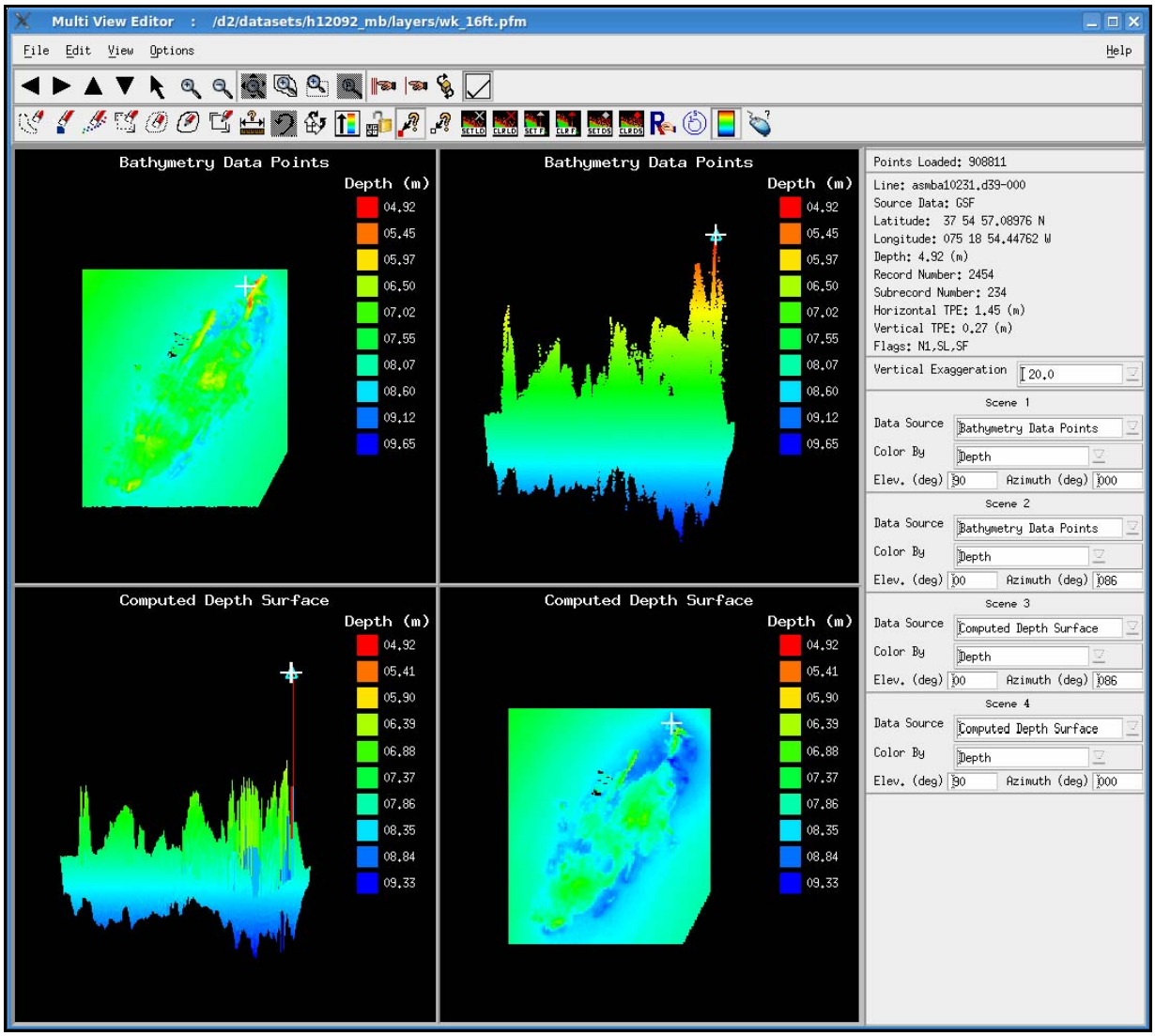


Figure 7. Multiview Editor of 0.5-meter PFM Grid Showing Wreck with Least Depth of 16 Feet in H12092 survey area.

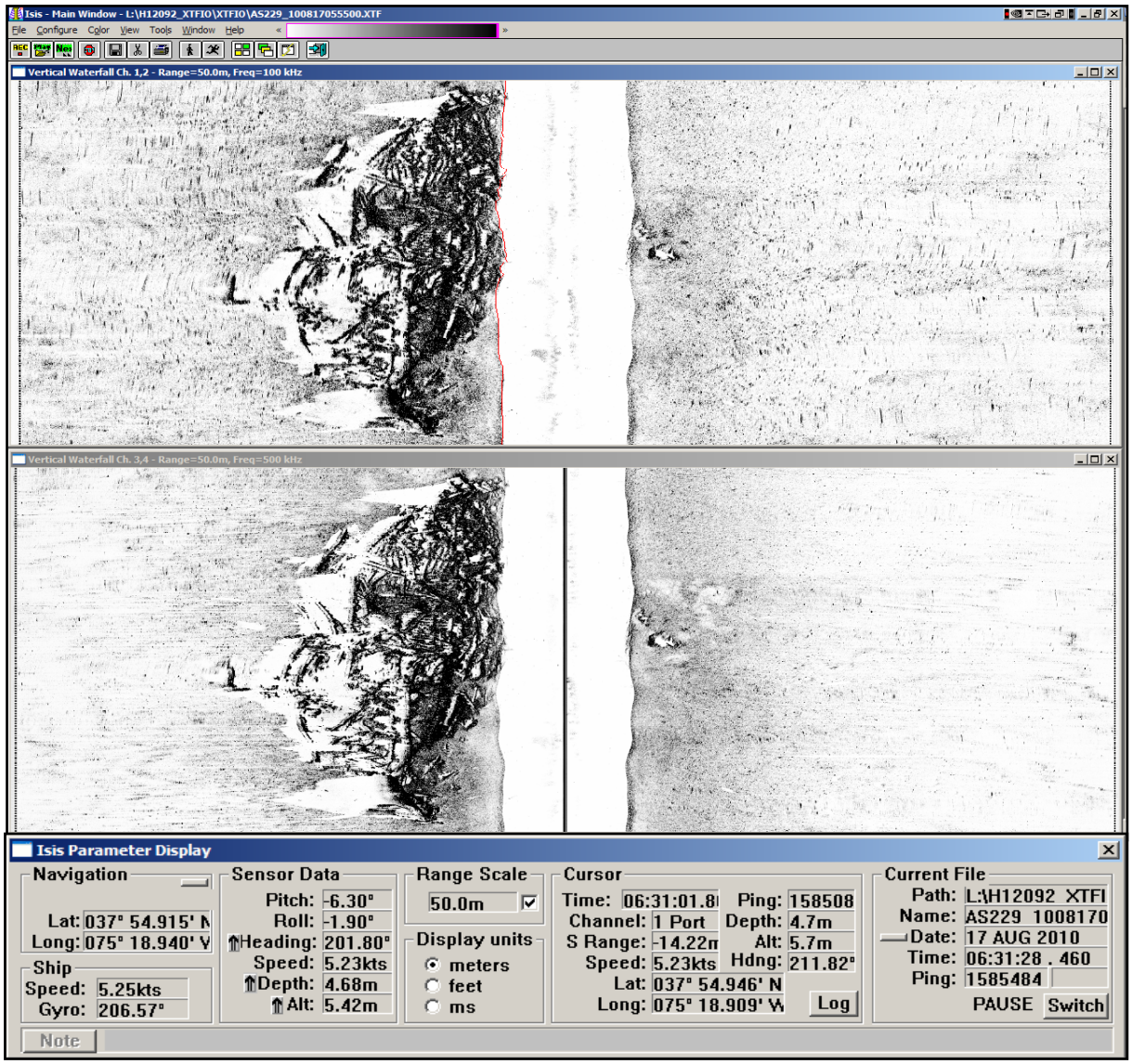


Figure 8. Sidescan Image (100 kHz top, 500 kHz bottom) Wreck with Least Depth of 16 Feet within H12092.

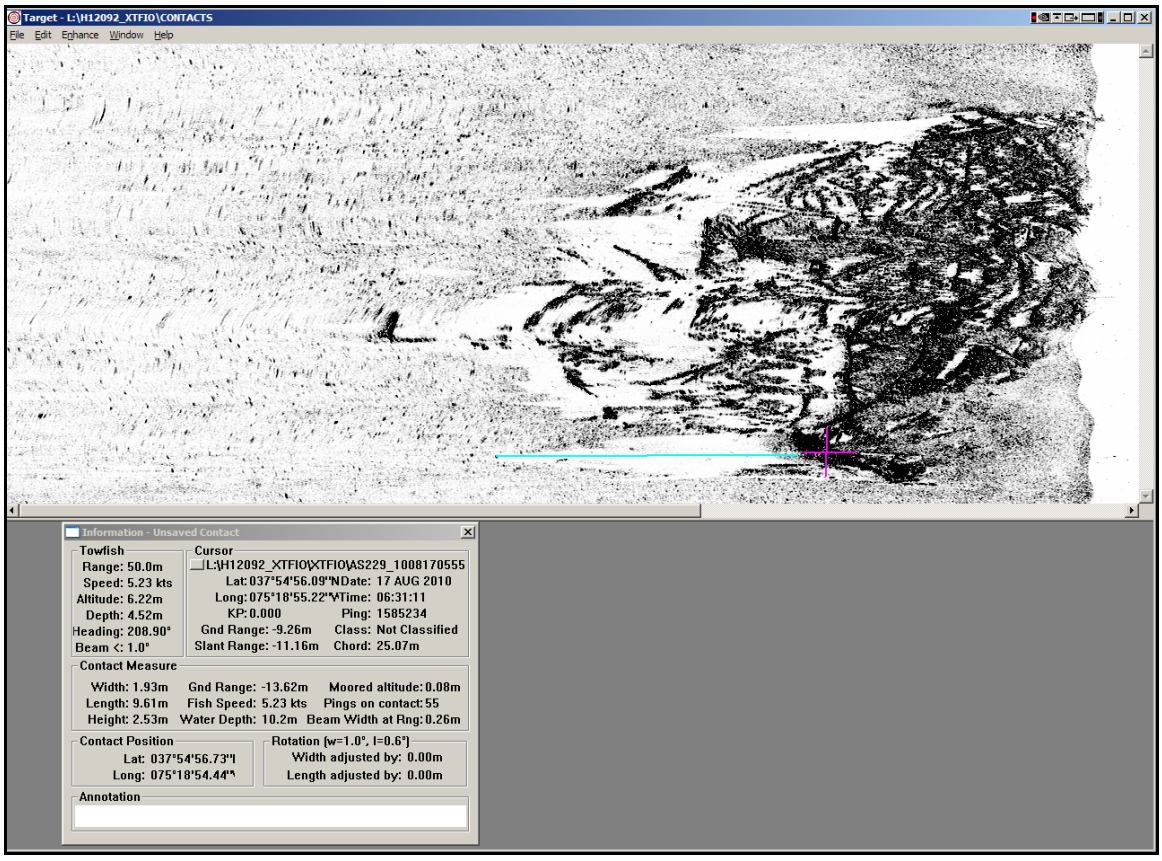


Figure 6. Sidescan Target Image (100kHz) of Wreck with Least Depth of 16 Feet within H12092.

Danger to Navigation Report 3

See Appendix I for charting recommendations

Hydrographic Survey Registry Number: H12092

State: Virginia

Locality: Atlantic Ocean

Sub Locality: 5 NM East of Assateague Island

Project Number: OPR-D302-SA-09

Survey Date: 9 October 2010 at 17:40:26 UTC
12 October 2010 at 13:53:49 UTC

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

Charts affected:
12211 43rd Edition 10/01/2007 1:80,000 scale; Corrected through NM 09/25/2010

The following items were found during hydrographic survey operations:

FEATURE	DEPTH	LATITUDE	LONGITUDE
Wreck	16 ft (5.02 m)	37° 58’ 04.73” N	075° 07’ 51.74” W
Obstructions	12 ft (3.69 m)	37° 58’ 03.48” N	075° 07’ 53.10” W

Description:
The deteriorated wreck is approximately 4.5 meters long by 2 meters wide, and oriented approximately 022° from the listed position. It appears to be a small sailing vessel with part of a mast rising to least depth of 16 feet in depths of 20 feet.

The obstructions consist of three closely spaced large objects covering approximately 14 meters and oriented 015°/195°. The shoalest object is the southernmost rectangular object (6 x 6 meters) with a least depth of 12 feet (3.69 meters). The center circular object has a diameter of approximately 6 meters and a least depth of 12 feet (3.84 meters). The northern object has a rectangular shape approximately 3 by 4 meters and a least depth of 18 feet (5.42 meters). The deteriorated wreck with a least depth of 16 feet, discussed above, is located approximately 50 meters 41° from the group of three objects.

The wreck and obstructions are located on Winter Quarter Shoal approximately 840 meters east of charted wreckage cleared to 14 feet (AWOIS 14287).

RECOMMENDATIONS:
Recommend charting 12-foot sounding with danger circle and label Obstns in 37° 58' 03.48" N 075° 07' 53.10" W.

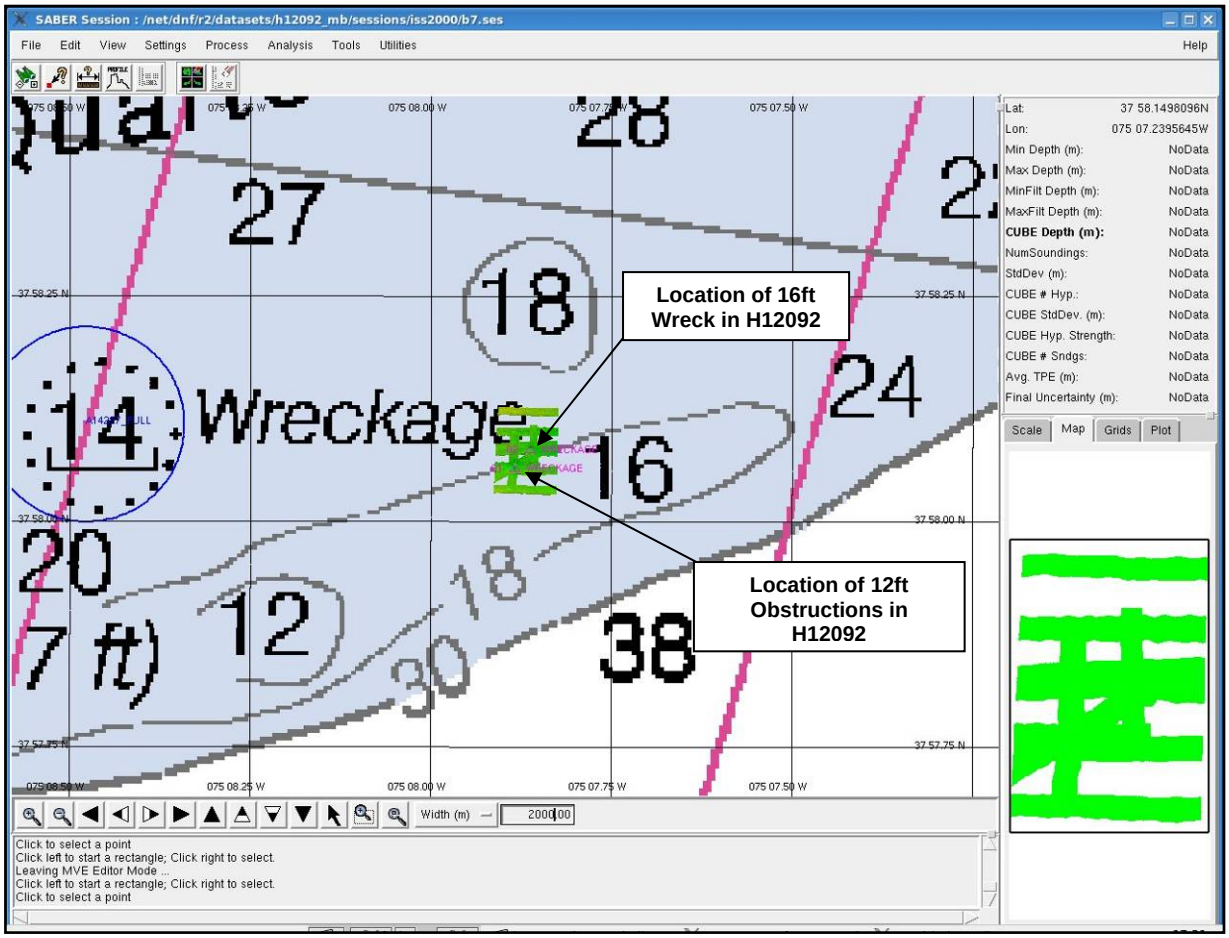


Figure 9. Chart 12211 Showing Location of Obstructions and Wreck in H12092 survey area.

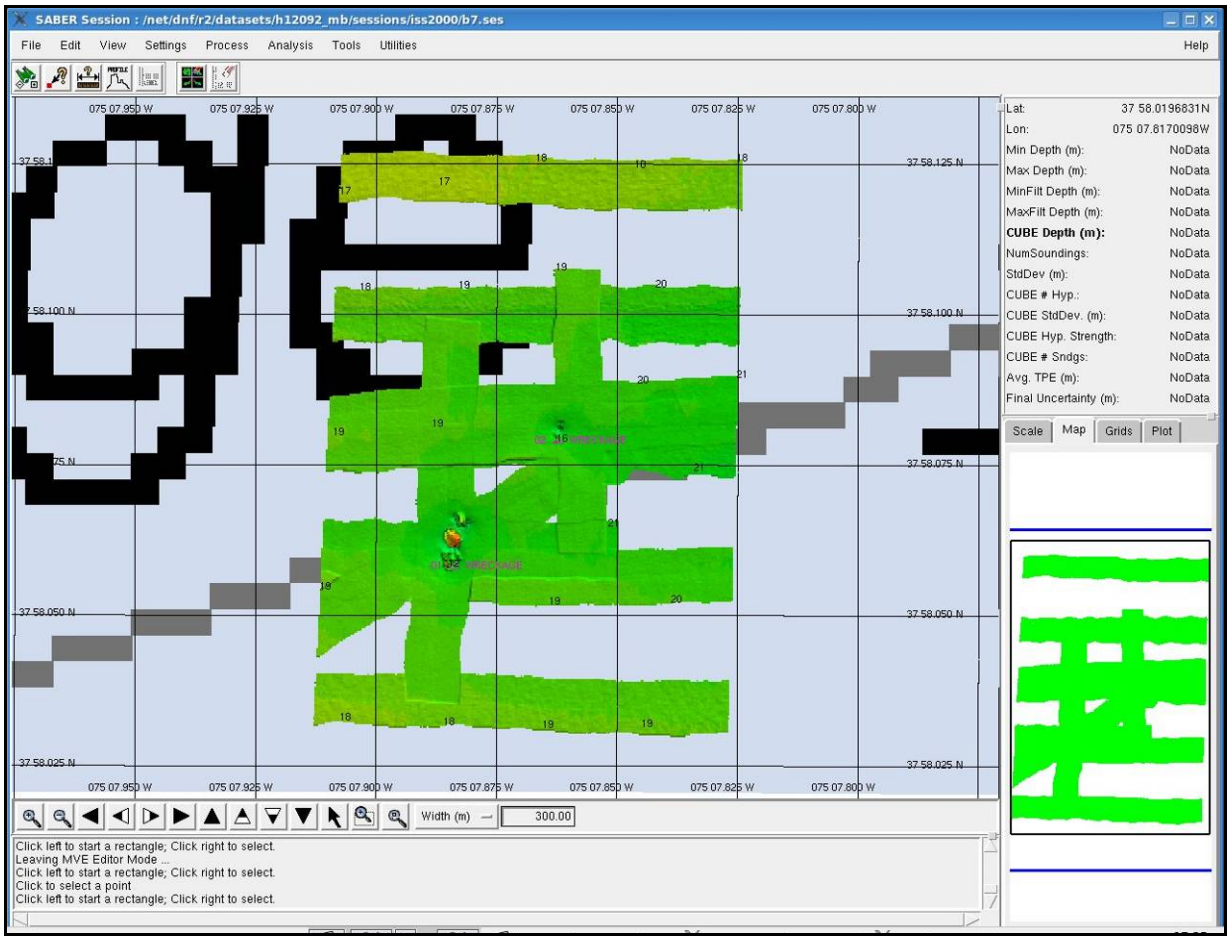


Figure 10. Chart 12211 Showing 0.5-meter PFM and Selected Soundings around 16-foot Wreck and Obstructions with Least Depth of 12 Feet in H12092 survey area.

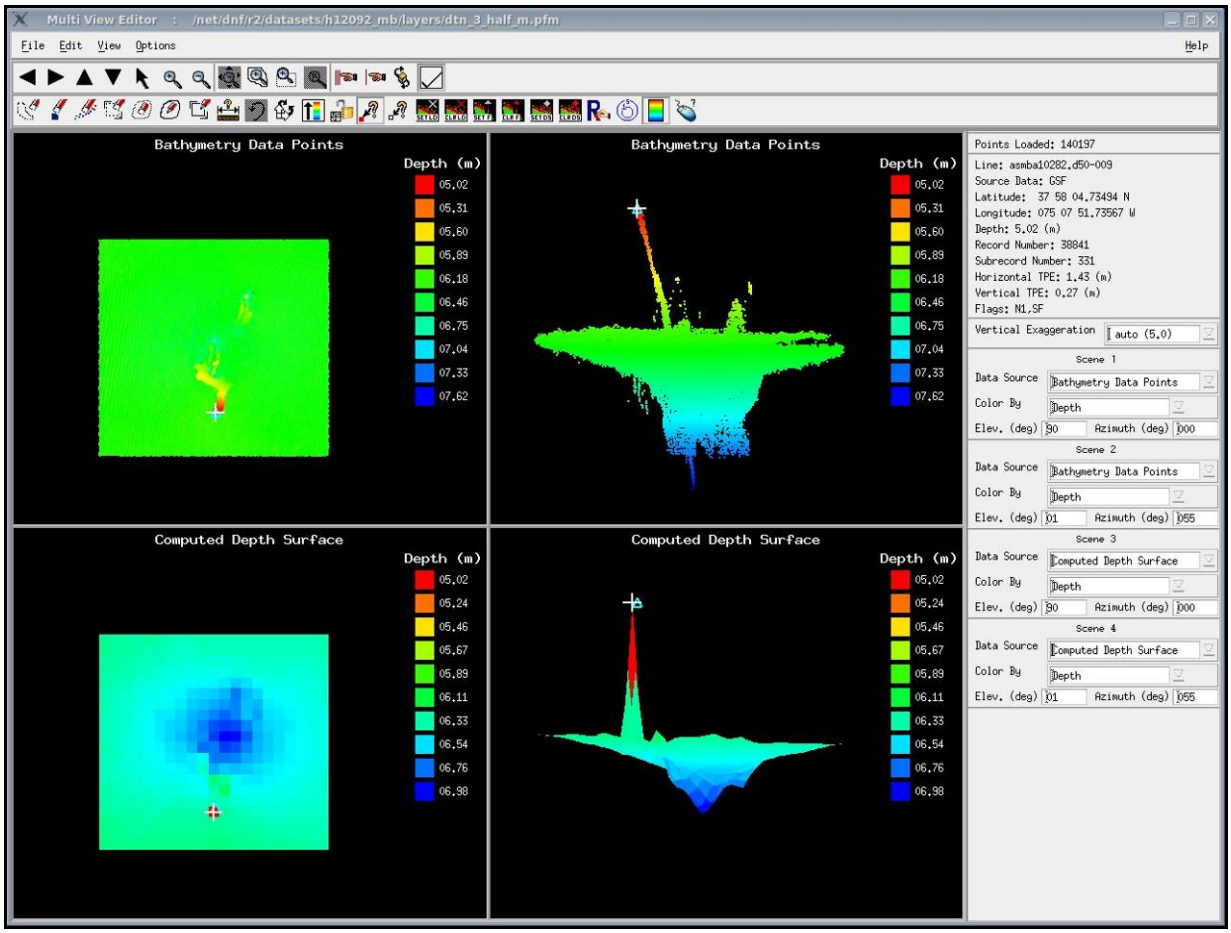


Figure 11. Multiview Editor of 0.5-meter PFM Grid Showing Wreck with Least Depth of 16 Feet in H12092 survey area.

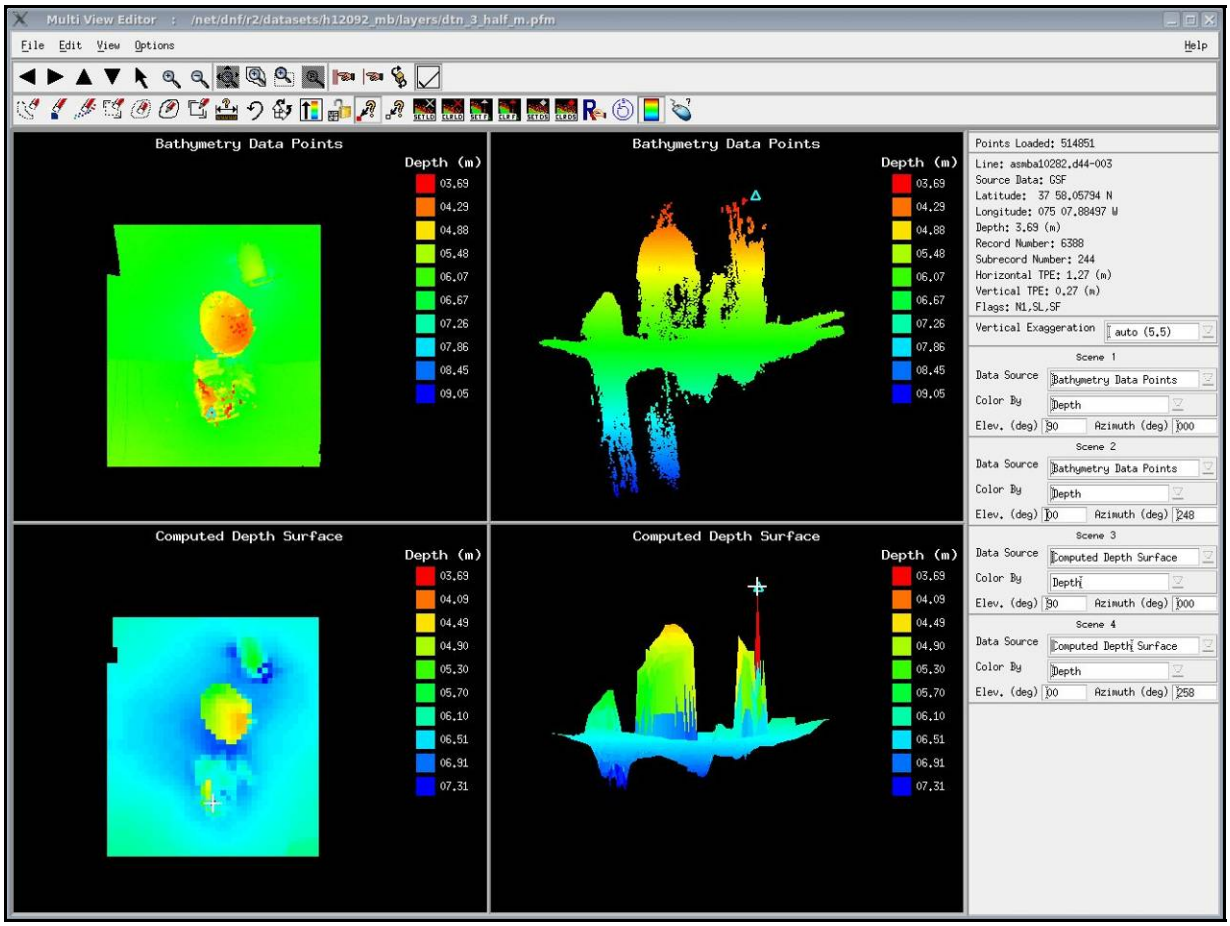


Figure 12. Multiview Editor of 0.5-meter PFM Grid Showing Obstructions with Least Depth of 12 Feet in H12092 survey area.

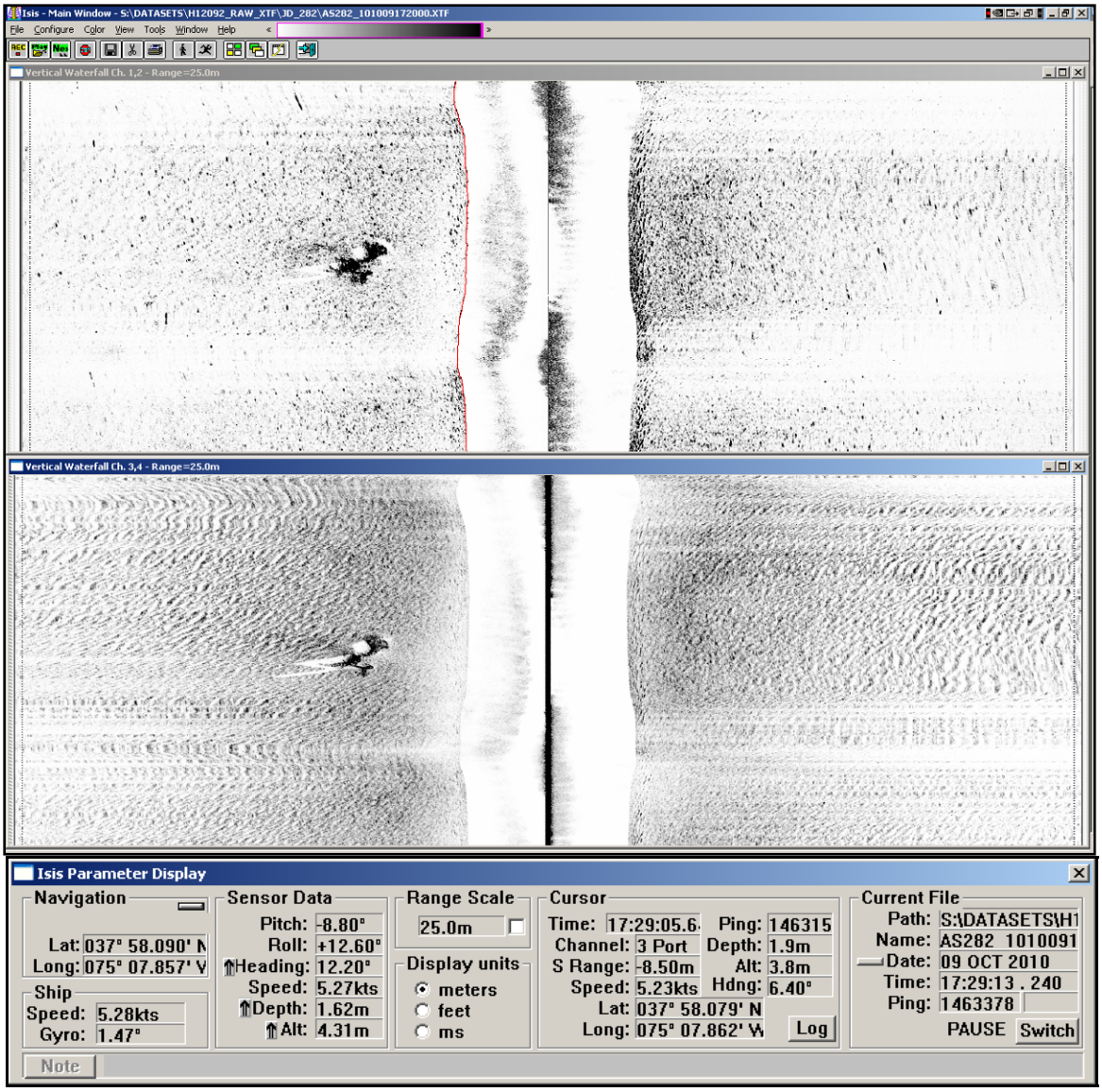


Figure 13. 25-Meter Range Sidescan Image (100 kHz top, 500 kHz bottom) of Wreck with Least Depth of 16 Feet within H12092. Note that the Protruding Mast and Shadow Are Clearly Visible in the 500 kHz image.

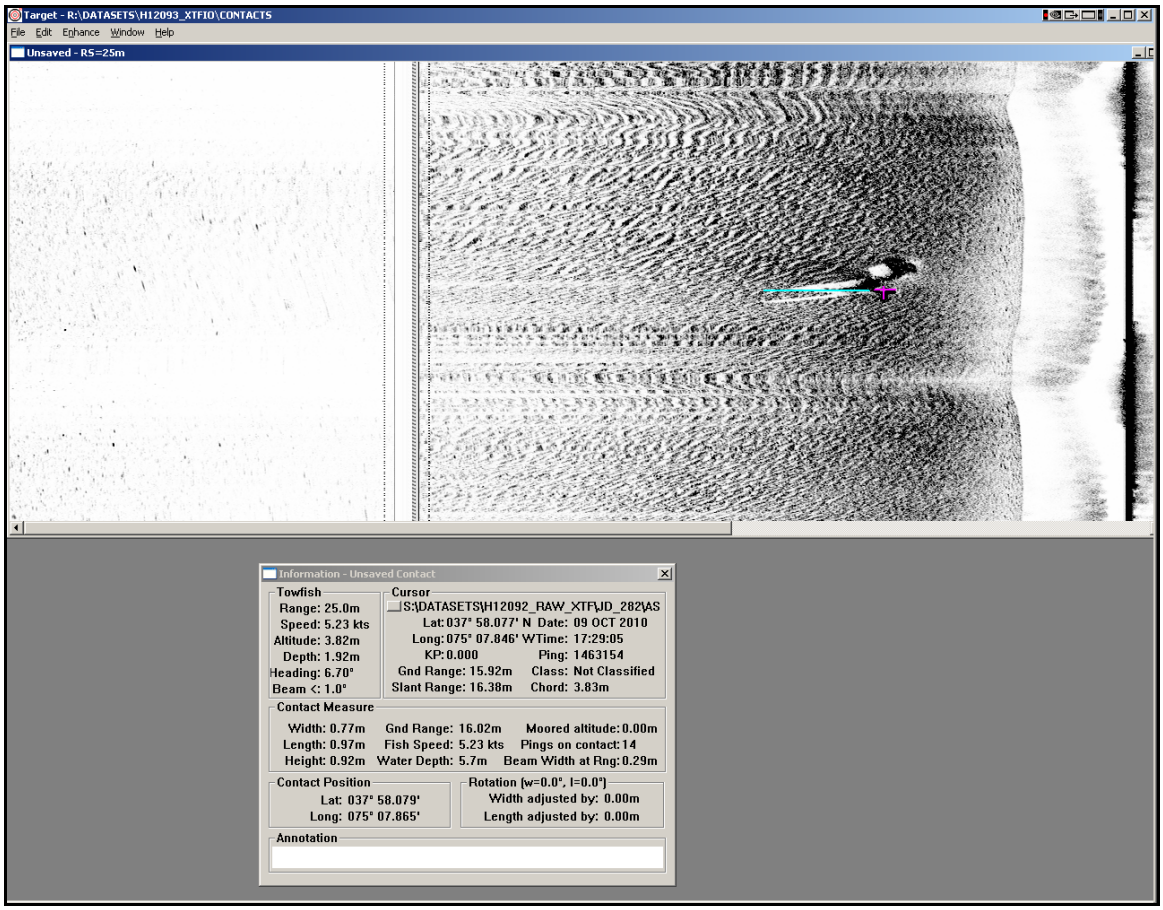


Figure 14. Sidescan Target Image (500 kHz, 25-Meter Range) of Wreck with Least Depth of 16 Feet within H12092 Note That the Protruding Mast and shadow are Clearly Visible.

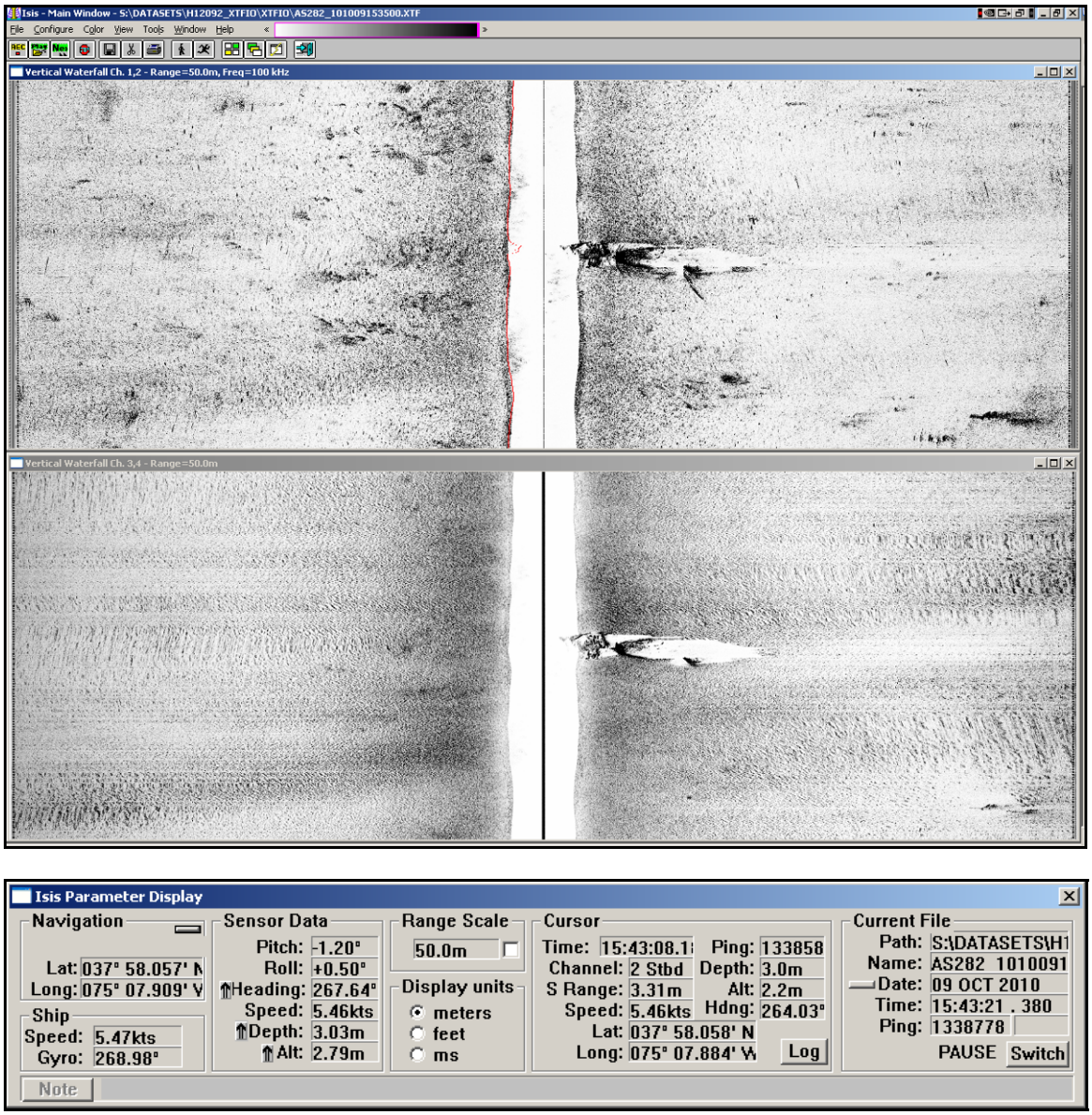


Figure 15. 50-Meter Range Sidescan Image (100 kHz top, 500 kHz bottom) of Obstructions with Least Depth of 12 Feet within H12092.

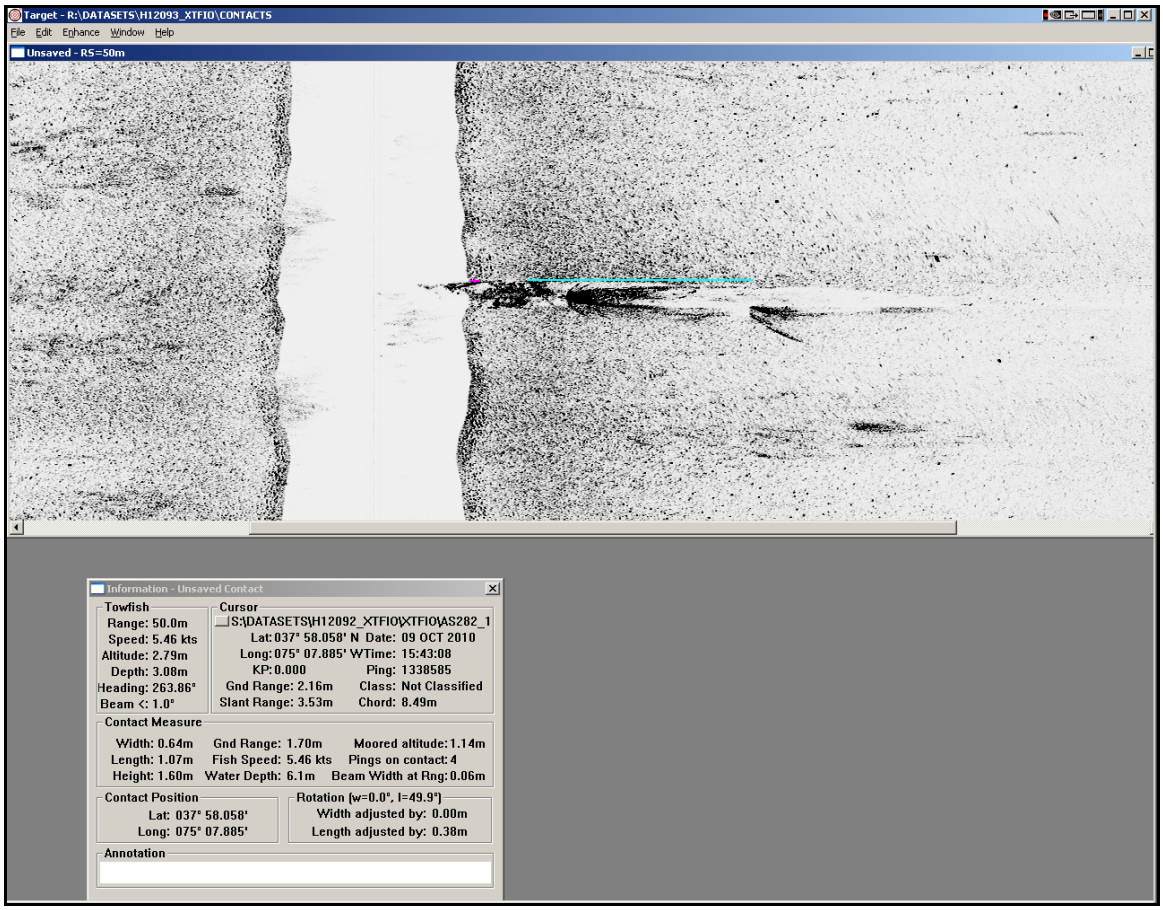


Figure 16. Sidescan Target Image (100 kHz, 50-Meter Range) of Obstructions with Least Depth of 12 Feet within H12092.

Subject: H12092 DtoN #1 Submission to MCD/NDB
From: Kolleen McKenzie <Kolleen.Mckenzie@noaa.gov>
Date: Thu, 01 Jul 2010 11:07:00 -0400
To: "OCS.NDB@noaa.gov" <OCS.NDB@noaa.gov>
CC: "Castle.E.Parker" <Castle.E.Parker@noaa.gov>, "LCDR Rick Brennan, NOAA" <Richard.T.Brennan@noaa.gov>, Tim.Osborn@noaa.gov, Mark Lathrop <Mark.T.Lathrop@noaa.gov>, "james.m.crocker@noaa.gov" <James.M.Crocker@noaa.gov>, Ben Evans <Benjamin.K.Evans@noaa.gov>

Good Day,

Please find attached a zip file for survey H12092 DtoN report #1, one 57 ft obstruction , for submission to Marine Chart Division (MCD).

The contents of the attached WinZip file were generated at Atlantic Hydrographic Branch. The attached zip file contains a DtoN Letter (PDF) and a Pydro XML file.

If you have any questions, please direct them back to me; email me or call 757-441-6746 ext 125.

Thank you for your assistance with this matter,
Kolleen McKenzie

--
Kolleen McKenzie
ERT Hydrographic Survey Intern
NOAA, Atlantic Hydrographic Branch
439 West York St.
Norfolk, VA 23510
757-441-6746 Ext. 125

H12092 DtoN#1.zip	**Content-Type:**	application/x-zip-compressed
	Content-Encoding:	base64

Subject: Re: H12092 DtoN #1 Submission to MCD/NDB
From: "ocs.ndb" <OCS.NDB@noaa.gov>
Date: Thu, 01 Jul 2010 15:03:33 -0400
To: Kolleen McKenzie <Kolleen.Mckenzie@noaa.gov>, Andrew Kampia <Andrew.Kampia@noaa.gov>, Coast Pilot <coast.pilot@noaa.gov>, Ed Martin <Ed.Martin@noaa.gov>, Howard Danley <Howard.Danley@noaa.gov>, John Barber <John.Barber@noaa.gov>, Ken Forster <Ken.Forster@noaa.gov>, Kevin Shaw <Kevin.Shaw@noaa.gov>, Mark Griffin <Mark.Griffin@noaa.gov>, NDB e-Mailbox <OCS.NDB@noaa.gov>, Robert Ramsey <Robert.Ramsey@noaa.gov>, Tara Wallace <Tara.Wallace@noaa.gov>, Travis Newman <Travis.Newman@noaa.gov>
CC: "Castle.E.Parker" <Castle.E.Parker@noaa.gov>, "LCDR Rick Brennan, NOAA" <Richard.T.Brennan@noaa.gov>, Tim.Osborn@noaa.gov, Mark Lathrop <Mark.T.Lathrop@noaa.gov>, "james.m.crocker@noaa.gov" <James.M.Crocker@noaa.gov>, Ben Evans <Benjamin.K.Evans@noaa.gov>

L-812/10 and DD-18054 have been registered by the Nautical Data Branch and directed to PBC for processing.

The DtoN reported is a 57 foot obstruction (wreck) in the Atlantic Ocean, approximately 5 nm east of Assateague Island, VA.

The following charts are affected:
12211 kapp 552
12210 kapp 550

The following ENC is affected:
US4VA70M

References:
H-12092
OPR-D302-SA-09

This information was discovered by a NOAA contractor and was submitted by AHB.

Kolleen McKenzie wrote:

> Good Day,
>
> Please find attached a zip file for survey H12092 DtoN report #1, one 57 ft obstruction , for submission to Marine Chart Division (MCD).
>
> The contents of the attached WinZip file were generated at Atlantic Hydrographic Branch. The attached zip file contains a DtoN Letter (PDF) and a Pydro XML file.
>
> If you have any questions, please direct them back to me; email me or call 757-441-6746 ext 125.
>
> Thank you for your assistance with this matter,
> Kolleen McKenzie

H12092 DtoN#1.zip	**Content-Type:** application/x-zip-compressed **Content-Encoding:** base64

CORRESPONDENCE

-----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
Reply-To: Carolyn.Lindley@noaa.gov
Organization: National Ocean Service
To: Kyle.Ward Kyle.Ward@noaa.gov
CC: Jeffrey Ferguson <Jeffrey.Ferguson@noaa.gov>, William Sweet <William.Sweet@noaa.gov>
References: <4A57405A.2050208@noaa.gov> 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
To: Davis, Gary R. <GARY.R.DAVIS@saic.com>, Mark.T.Lathrop >> <Mark.T.Lathrop@noaa.gov>, 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

-----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

-----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 disproval 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 disproval 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 disproval 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 [Castle.E.Parker@noaa.gov]
Sent: Tuesday, August 31, 2010 12:33 PM
To: Davis, Gary R.; Mark T Lathrop
Subject: Re: H12092 Danger to Navigation Report #2

Attachments: Castle_E_Parker.vcf

Good Day,
AHB has reviewed the DtoN submission and has decided not to process and submit H12092 DtoN #2 to MCD. The feature (wk) with depth of 16ft lies between a charted 9 and 23 ft depth, in an east-west direction.
Granted there is a significant difference in depth (5ft), but the chart already has an obstruction warning mariners that a feature resides at this location. This is an Hcell revision issue.
Please respond as necessary.
Regards,
Gene

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 (mcovr, 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 viewedin 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)

From: Gene Parker [Castle.E.Parker@noaa.gov]
Sent: Tuesday, October 19, 2010 4:16 PM
To: Donaldson, Paul L.
Subject: [Fwd: H12092 DtoN #1 Submission to MCD/NDB]
Attachments: H12092 DtoN #1 Submission to MCD/NDB; Castle_E_Parker.vcf

Good Day Paul,
AHB oversight.... H12092 DtoN #1 was the first DtoN for the AHB processing personnel, and I guess that I failed to notify them to include SAIC contact when we submitted this DtoN to MCD. The attached original NDB submission email should have the document within the attached zip file. If you don't see the zip file let me know.
gene

PS: Be seeing ya on Friday!

From: Donaldson, Paul L.
Sent: Tuesday, October 19, 2010 3:46 PM
To: 'ahb.dton@noaa.gov'; Gene Parker
Cc: 'Mark.T.Lathrop'
Subject: RE: H12092 Danger to Navigation Report #1

Gene,

Hope all is well. I am working up the data for H12092 (Sheet P) and noticed that on June 30, 2010 Gary Davis submitted Danger to Navigation Report #1. It appears we have not had further correspondence indicating that this DTON was either submitted to MCD or if a decision was made not to submit it as a DTON. Could you please confirm the status of H12092 DTON #1? If you have any questions about this DTON please feel free to contact me.

Thank you for any information you have of the status.

Paul Donaldson
Operations Manager/Lead Hydrographer(ACSM Certified)
221 Third Street
Building A
Newport, RI 02840
Telephone: (401) 847-4210
Mobile: (401) 855-5909
Fax: (401) 849-1585
Email; paul.l.donaldson@saic.com
https://www.saic.com

-----Original Message-----
From: Davis, Gary R.
Sent: Wednesday, June 30, 2010 10:59 AM
To: Mark.T.Lathrop; ahb.dton@noaa.gov
Cc: Gene Parker; Evans, Rhodri E.; Donaldson, Paul L.; Simmons, Walter S.; Quintal, Rebecca T.; Infantino, Jason
Subject: H12092 Danger to Navigation Report #1

Mark,

The attached zip file contains the First Danger to Navigation Report for H12092.

Please contact SAIC, Newport if there are any questions or concerns with the attachment.

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

-----Original Message-----
From: Bland, Deborah
Sent: Thursday, May 19, 2011 1:14 PM
To: Tara Wallace; Tara.Wallace@noaa.gov
Cc: LCDR Rick Brennan, NOAA
Subject: Survey H12092 - Fish Haven

Good Morning Tara,

As per your conversation with CDR Rick Brennan, this is what the survey found:

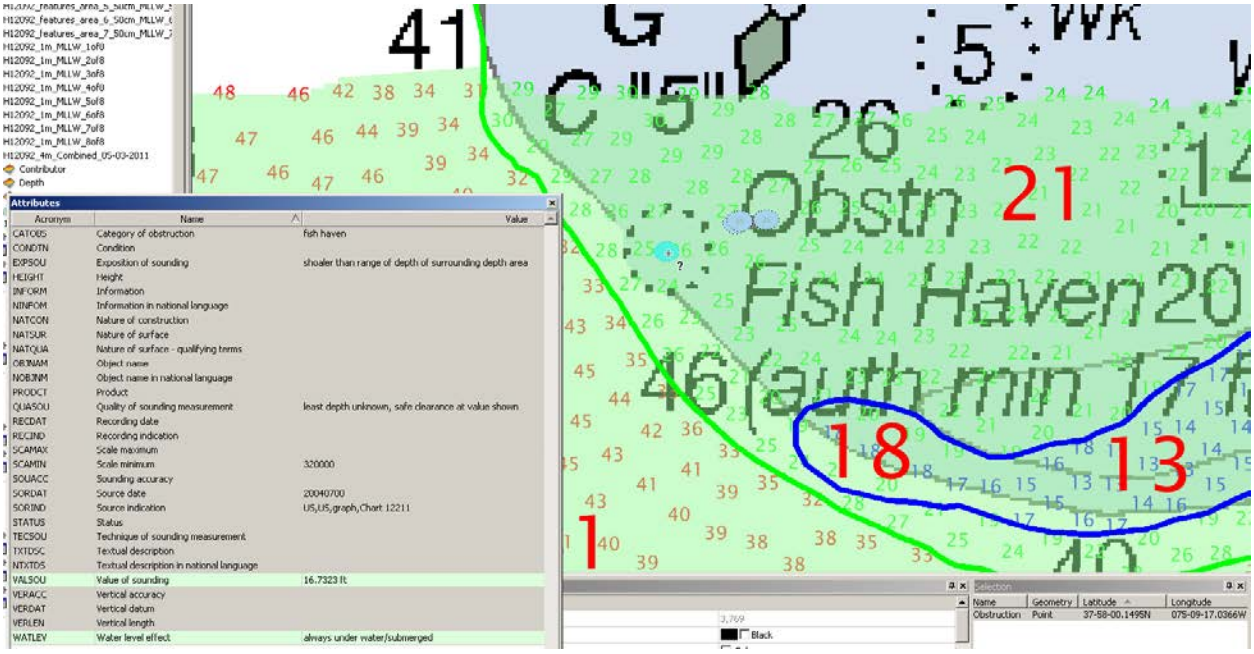
AWOIS 14229 is an "Obstn Fish Haven (auth min 17 ft)" charted in Latitude 37-58-00.15N, Longitude 075-09-17.04W on NOS chart 12211.

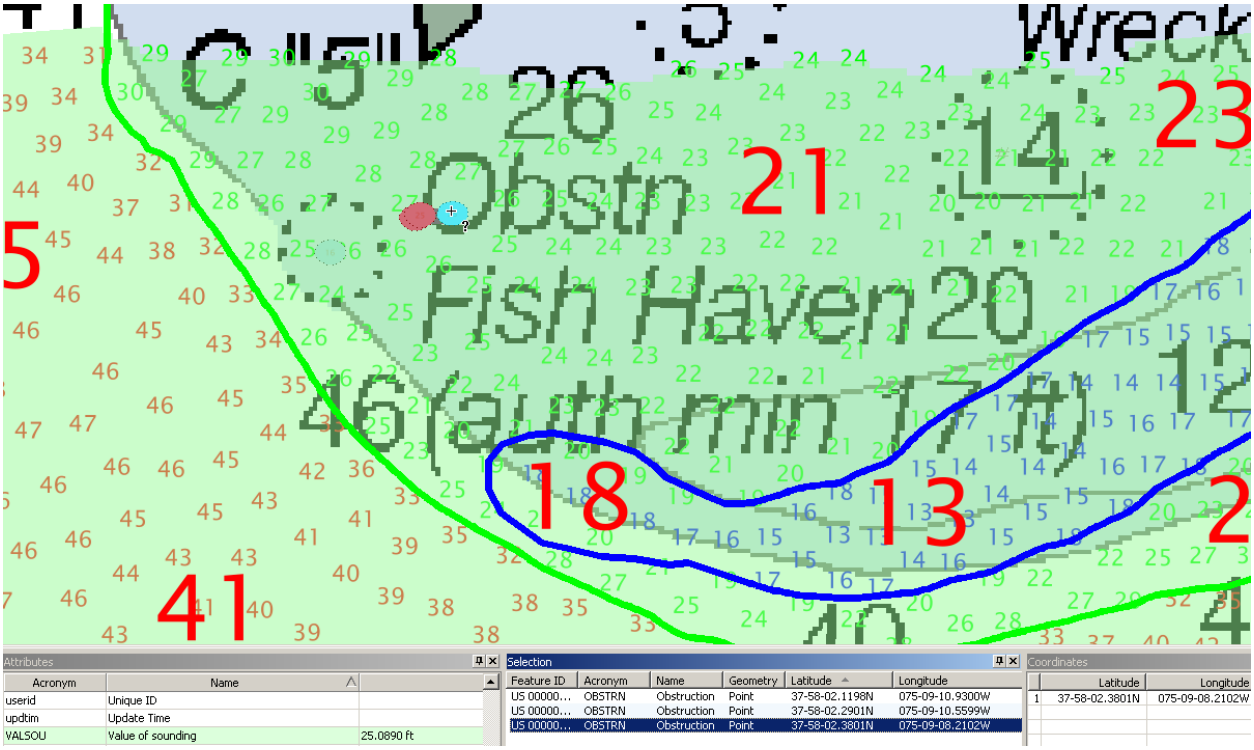
The present survey found three (3) obstructions to the east of the charted Obstruction Fish Haven. The least depth of the present survey obstructions is 25.089 feet in Latitude 37-58-02.38N, Longitude 075-09-08.21W, but nothing in the charted position of the Obstruction.

We believe the Obstruction is charted in the incorrect position and believe that the fish haven is centered east of where its charted.

Thank you for your assistance with this issue.

Deborah Bland
Cartographer, AHB
757-441-6746 EXT. 207


Obstn
Fish Haven
46(auth min 17 ft)
Attributes
Acronym
Name
Value
CATOBS
Category of obstruction
fish haven
CONDTN
Condition
EXPSOU
Exposition of sounding
shoaler than range of depth of surrounding depth area
HEIGHT
Height
INFORM
Information
NINFOM
Information in national language
NATCON
Nature of construction
NATSUR
Nature of surface
NATQUA
Nature of surface - qualifying terms
OBJNAM
Object name
NOBJNM
Object name in national language
PRODCT
Product
QUASOU
Quality of sounding measurement
least depth unknown, safe clearance at value shown
RECDAT
Recording date
RECIND
Recording indication
SCAMAX
Scale maximum
SCAMIN
Scale minimum
320000
SOUACC
Sounding accuracy
SORDAT
Source date
20040700
SORIND
Source indication
US,US,graph,Chart 12211
STATUS
Status
TECSOU
Technique of sounding measurement
TXTDSC
Textual description
NTXTDS
Textual description in national language
VALSOU
Value of sounding
16.7323 ft
VERACC
Vertical accuracy
VERDAT
Vertical datum
VERLEN
Vertical length
WATLEV
Water level effect
always under water/submerged
Selection
Name
Geometry
Latitude
Longitude
Obstruction
Point
37-58-00.1495N
075-09-17.0366W


Obstn
Fish Haven
46(auth min 17 ft)
Wreck
Attributes
Acronym
Name
userid
Unique ID
updtim
Update Time
VALSOU
Value of sounding
25.0890 ft
Selection
Feature ID
Acronym
Name
Geometry
Latitude
Longitude
US 00000...
OBSTRN
Obstruction
Point
37-58-02.1198N
075-09-10.9300W
US 00000...
OBSTRN
Obstruction
Point
37-58-02.2901N
075-09-10.5599W
US 00000...
OBSTRN
Obstruction
Point
37-58-02.3801N
075-09-08.2102W
Coordinates
Latitude
Longitude
37-58-02.3801N
075-09-08.2102W

BOTTOM CHARACTERISTICS

There were 62 bottom samples taken to verify the bottom types charted for H 12092. Table Appendix V-1 compares information for each sample collected to the charted bottom type within 2000 meters. A photograph of each bottom sample is provided in this document. Photographs filed with original field records.

**** Concur. Add seabed areas characteristics to chart in present survey location.***

Table Appendix V-1. H12092 Bottom Characteristics

JD	Sample Number	Bottom Sample Position (NAD83)		Observed Bottom Type	Depth of Bottom Sample (m)	Depth Uncertainty (m)	Charted Bottom Type
		Latitude (N)	Longitude (W)				Chart # 12211_1
229	H12092_BS_01	37° 57' 33.6"	075° 07' 38.3"	fneS brkSh	12.76	0.27	h S
*229	H12092_BS_02	37° 57' 32.6"	075° 09' 02.2"	fneS	10.99	0.27	S
203	H12092_BS_03	37° 57' 32.0"	075° 10' 23.2"	fneS	15.95	0.27	S
*229	H12092_BS_04	37° 57' 32.4"	075° 11' 43.4"	mS brkSh	14.11	0.27	
203	H12092_BS_05	37° 57' 32.3"	075° 13' 07.4"	gyM	17.33	0.28	S
*203	H12092_BS_06	37° 57' 31.6"	075° 14' 28.6"	fneS	13.25	0.28	h
230	H12902_BS_07	37° 57' 30.8"	075° 15' 50.9"	fneS	09.32	0.28	h
*284	H12092_BS_08	37° 57' 29.1"	075° 17' 19.8"	mS brkSh	07.67	0.27	
*231	H12092_BS_09	37° 56' 35.8"	075° 17' 53.8"	fneS brkSh	05.82	0.27	
230	H12092_BS_10	37° 56' 36.5"	075° 16' 29.9"	fneS Si	10.00	0.28	M
*203	H12092_BS_11	37° 56' 36.1"	075° 15' 09.4"	fneS brkSh	13.10	0.28	M
203	H12092_BS_12	37° 56' 35.5"	075° 13' 48.7"	fneS	15.07	0.27	S
203	H12092_BS_13	37° 56' 36.0"	075° 12' 27.0"	fneS brkSh	13.45	0.27	S
*203	H12092_BS_14	37° 56' 35.9"	075° 11' 05.2"	fneS Si	18.29	0.28	S
*203	H12092_BS_15	37° 56' 35.9"	075° 09' 41.9"	fneS Sh	15.17	0.27	
203	H12092_BS_16	37° 56' 36.3"	075° 08' 20.2"	mS	18.13	0.27	h S
*203	H12092_BS_17	37° 55' 40.2"	075° 07' 39.3"	fneS brkSh	18.83	0.27	S
203	H12092_BS_18	37° 55' 40.0"	075° 09' 01.8"	fneS	15.96	0.27	S
*203	H12092_BS_19	37° 55' 40.3"	075° 10' 22.8"	mS	15.24	0.28	S
203	H12092_BS_20	37° 55' 39.5"	075° 11' 45.0"	mS	19.30	0.28	h
203	H12092_BS_21	37° 55' 39.2"	075° 13' 05.9"	fneS brkSh	15.02	0.28	S Sh
*203	H12092_BS_22	37° 55' 38.4"	075° 14' 29.6"	fneS Sh	15.91	0.28	S Sh
203	H12092_BS_23	37° 55' 40.1"	075° 15' 50.5"	fneS M	12.94	0.28	M
*231	H12092_BS_24	37° 55' 38.8"	075° 17' 11.3"	fneS Si	10.98	0.28	
231	H12092_BS_25	37° 55' 40.9"	075° 18' 30.7"	fneS	05.99	0.27	
*231	H12092_BS_26	37° 54' 42.2"	075° 19' 07.9"	fneS	06.57	0.27	M
*203	H12092_BS_27	37° 54' 43.1"	075° 17' 52.6"	fneS brkSh	10.49	0.28	M
203	H12092_BS_28	37° 54' 43.8"	075° 16' 30.8"	fneS brkSh	13.01	0.28	S
203	H12092_BS_29	37° 54' 42.9"	075° 15' 09.2"	fneS brkSh	14.28	0.27	S
*203	H12092_BS_30	37° 54' 44.3"	075° 13' 45.9"	gyM	17.17	0.27	S Sh
203	H12092_BS_31	37° 54' 43.7"	075° 12' 25.2"	crsS brkSh	17.33	0.28	S
*203	H12092_BS_32	37° 54' 43.9"	075° 11' 04.6"	mS	15.12	0.27	S
203	H12092_BS_33	37° 54' 44.5"	075° 09' 42.1"	fneS brkSh	18.27	0.28	S Sh
*203	H12092_BS_34	37° 54' 43.4"	075° 08' 20.2"	fneS brkSh	17.09	0.28	S

JD	Sample Number	Bottom Sample Position (NAD83)		Observed Bottom Type	Depth of Bottom Sample (m)	Depth Uncertainty (m)	Charted Bottom Type
		Latitude (N)	Longitude (W)				Chart # 12211_1
*203	H12092_BS_35	37° 53’ 46.9”	075° 07’ 38.7”	fneS brkSh	19.84	0.27	S Sh
203	H12092_BS_36	37° 53’ 47.9”	075° 09’ 02.4”	fneS brkSh	20.26	0.27	S Sh
*203	H12092_BS_37	37° 53’ 47.6”	075° 10’ 23.0”	fneS brkSh	19.68	0.28	S
203	H12092_BS_38	37° 53’ 47.8”	075° 11’ 45.2”	fneS brkSh	17.36	0.28	S
*203	H12092_BS_39	37° 53’ 46.7”	075° 13’ 04.7”	fneS brkSh	14.89	0.27	S Sh
203	H12092_BS_40	37° 53’ 47.6”	075° 14’ 29.2”	fneS Si	17.72	0.28	M
*203	H12092_BS_41	37° 53’ 47.1”	075° 15’ 50.9”	fneS	13.84	0.27	S
203	H12092_BS_42	37° 53’ 46.8”	075° 17’ 12.7”	fneS	13.43	0.28	S
*203	H12092_BS_43	37° 53’ 47.2”	075° 18’ 32.8”	fneS	10.16	0.28	bk Sh
203	H12092_BS_44	37° 52’ 51.0”	075° 19’ 13.2”	fneS Si	10.19	0.28	bk Sh
*203	H12092_BS_45	37° 52’ 51.6”	075° 17’ 52.6”	fneS	12.17	0.27	
203	H12092_BS_46	37° 52’ 52.1”	075° 16’ 30.8”	fneS	09.65	0.28	S
203	H12092_BS_47	37° 52’ 51.3”	075° 15’ 12.2”	fneS Si	17.41	0.28	M
*203	H12092_BS_48	37° 52’ 51.8”	075° 13’ 46.3”	fneS brkSh	13.92	0.27	S Sh
203	H12092_BS_49	37° 52’ 51.6”	075° 12’ 25.1”	fneS brkSh	16.44	0.28	S Sh
*203	H12092_BS_50	37° 52’ 51.9”	075° 11’ 03.0”	fneS Si	21.25	0.28	S
203	H12092_BS_51	37° 52’ 52.0”	075° 09’ 41.9”	fneS	21.59	0.27	S
*203	H12092_BS_52	37° 52’ 51.5”	075° 08’ 20.0”	M fneS	24.15	0.27	S
*203	H12092_BS_53	37° 51’ 55.4”	075° 07’ 39.8”	mS brkSh	14.50	0.27	S
203	H12092_BS_54	37° 51’ 55.2”	075° 09’ 00.8”	fneS brkSh	25.65	0.28	S
*203	H12092_BS_55	37° 51’ 55.7”	075° 10’ 22.7”	fneS	19.48	0.28	S G
203	H12092_BS_56	37° 51’ 55.0”	075° 11’ 43.5”	fneS brkSh	18.35	0.27	S G
*203	H12092_BS_57	37° 51’ 54.9”	075° 13’ 05.4”	fneS brkSh	19.66	0.28	S
203	H12092_BS_58	37° 51’ 58.6”	075° 14’ 27.2”	fneS	08.95 *	0.27	S
*203	H12092_BS_59	37° 51’ 55.0”	075° 15’ 49.3”	brkSh fneS	17.54	0.27	M
*203	H12092_BS_60	37° 51’ 54.6”	075° 17’ 11.2”	fneS	13.56	0.27	M
203	H12092_BS_61	37° 51’ 53.9”	075° 18’ 33.3”	fneS Si	12.73	0.27	
*203	H12092_BS_62	37° 51’ 54.6”	075° 19’ 54.7”	fneS brkSh	09.13	0.28	

It is recommended that the bottom type charted be updated where necessary based on the information collected during the latest survey.

**** Concur. Add seabed areas characteristics to chart in present survey location.***

AHB COMPILATION LOG

General Survey Information	
REGISTRY No.	H12092
PROJECT No.	OPR-D302-SA-09
FIELD UNIT	*Science Applications International Corporation* *M/V Atlantic Surveyor*
DATE OF SURVEY	20100622 – 20101017
LARGEST SCALE CHART	***12211, edition 44, 20110201, 1:80,000***
ADDITIONAL CHARTS	***12210, edition 38, 20080501, 1:80,000***
SOUNDING UNITS	**FEET**
COMPILER	DEBORAH A. BLAND

Source Grids	**File Name** H:\Compilation\H12092_D302_SAIC\AHB_H12092\SAR Final Products\GRIDS
	H12092_1m_MLLW_1of8.bag **H12092_1m_MLLW_2of8.bag** **H12092_1m_MLLW_3of8.bag** **H12092_1m_MLLW_4of8.bag** **H12092_1m_MLLW_5of8.bag** **H12092_1m_MLLW_6of8.bag** **H12092_1m_MLLW_7of8.bag** **H12092_1m_MLLW_8of8.bag** **H12092_features_area_1_50cm_MLLW_1of7.bag** **H12092_features_area_2_50cm_MLLW_2of7.bag** **H12092_features_area_3_50cm_MLLW_3of7.bag** **H12092_features_area_4_50cm_MLLW_4of7.bag** **H12092_features_area_5_50cm_MLLW_5of7.bag** **H12092_features_area_6_50cm_MLLW_6of7.bag** **H12092_features_area_7_50cm_MLLW_7of7.bag**
Surfaces	**File Name** H:\Compilation\H12092_D302_SAIC\AHB_H12092\COMPILE\Working
Combined	**H12092_4m_Combined.csar**
Interpolated TIN	\Interpolated TIN\ ***H12092_12m_InterpTIN.csar***
Shifted Interpolated TIN	\Shifted Surface\ ***H12092_12m_InterpTIN _-0.75ft.csar***
Final HOBs	**File Name** H:\Compilation\H12092_D302_SAIC\AHB_H12092\COMPILE\Final_Hobs
Survey Scale Soundings	**H12092_SS_Soundings.hob**
Chart Scale Soundings	**H12092_CS_Soundings.hob**
Contour Layer	**H12092_Contours.hob**
Feature Layer	**H12092_Features.hob**
Meta-Objects Layer	**H12092_MetaObjects.hob**
Blue Notes	**H12092_BlueNotes.hob**
ENC Retain Soundings	**H12092_ENC_Retain.hob**

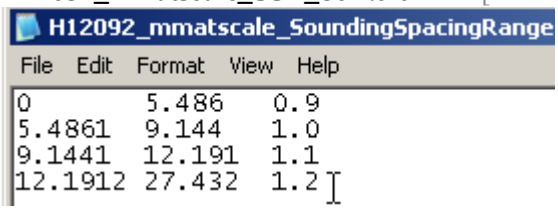
Meta-Objects Attribution	
Acronym	**Value**
M_COVR	
CATCOV	1 – coverage available
SORDAT	20101017
SORIND	US,US,graph,H12092

M_QUAL	
CATZOC	6 – zone of confidence U (data not assessed)
INFORM	*M/V Atlantic Surveyor*
POSACC	10.0 m
SORDAT	20101017
SORIND	US,US,graph,H12092
SUREND	20101017
SURSTA	20100622
DEPARE	
DRVALV 1	11.9423 ft
DRVALV2	84.2848 ft
SORDAT	20101017
SORIND	US,US,graph,H12092
M_CSCL	
CSCALE	
SORDAT	
SORIND	

SPECIFICATIONS:

I. COMBINED SURFACE:
- a. Number of SAR Final Grids: ***15***
- b. Resolution of Combined (m): ***4 m***

II. SURVEY SCALE SOUNDINGS (SS):
- a. Attribute Name: Depth
- b. Selection criteria: Radius, Shoal bias
- c. Radius value is: mm at map scale ***1:80K***
  - i. Use single-defined radius: X.XX
  - ii. And/Or use radius table file: ***H12092_mmatscale_SSR_80K.txt*** [*XXk = chart scale*]



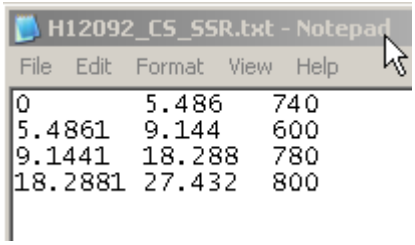
- d. Queried Depth of All Soundings
  - i. Minimum: ***3.640 m***
  - ii. Maximum: ***25.690 m***

III. INTERPOLATED TIN SURFACE:
- a. Resolution (m): ***12 m***
- b. Interpolation method: Natural Neighbor
- c. Shift value: ***-0.75 ft*** [*only include applicable shift values*] [*-0.75 feet* (And/Or) *-0.75 fathoms*]

IV. CONTOURS:
- a. Attribute Name: Depth
- b. Use a Depth List: ***H12092_depth_contours.txt***
- c. Output Options: Create contour lines
  - i. Line Object: DEPCNT
  - ii. Value Attribute: VALDCO

d. FEATURES: ***83***
e. Number of Chart Features: ***39*** *[all features included in H-Cell]*
f. Number of Non-Chart Features: ***44*** [*all features submitted by field & not included in H-Cell*]

V. CHART SURVEY SOUNDINGS (CS):
a. Number of ENC CS Soundings: ***376***
b. Attribute Name: Depth
c. Selection criteria: Radius, Shoal bias
d. Radius value is: Distance on the ground (m)
i. Use single-defined radius: X.XX m
ii. And/Or use radius table file: H12092_CS_SSR_XXk.txt



iii. Enable Filter: Interpolated !=1
e. Number Survey CS Soundings: ***437***

VI. NOTES:
[*Type text*]

ATLANTIC HYDROGRAPHIC BRANCH
H-CELL REPORT to ACCOMPANY
SURVEY H12092 (2010)

This H-Cell Report has been written to supplement and/or clarify the original Descriptive Report (DR) and pass critical compilation information to the cartographers in the Marine Chart Division. Sections in this report refer to the corresponding sections of the Descriptive Report.

B. DATA ACQUISITION AND PROCESSING

B.2 QUALITY CONTROL

The AHB source depth grids for the survey's nautical chart update were 50cm and 1m resolution BAG surfaces (*.CSAR), which were combined at 4m resolution. The survey scale soundings were created from the combined surface using a sounding spacing range (SSR) file. A TIN was created from the survey scale soundings, from which an interpolated surface of 12m resolution was generated. The chart scale soundings were derived from only the non-interpolated nodes of this surface to preserve absolute continuity between the charted depths, the survey scale soundings, and the original source grid. The chart scale soundings were selected using a sounding spacing range (SSR) file for the 1:80,000 scale map. The chart scale soundings are a subset of the survey scale soundings. The surface model was referenced when selecting the chart scale soundings, to ensure that the selected soundings portray the bathymetry within the common area.

The interpolated TIN surface of 12m resolution was shifted by the NOAA sounding rounding value of -0.75 feet. The shifted interpolated TIN was used to generate depth contours in feet (18, 30 and 60 feet). The depth contours are forwarded to MCD for reference only. The contours were utilized during chart scale sounding selection and quality assurance efforts at AHB. The depth contours are incorporated into the SS H-Cell product as per 2009 H-Cell Specifications.

The compilation products (Final *.HOB files) for this survey are detailed in the H12092 AHB Compilation Log contained within this document. The Final HOB files include depth areas (DEPARE), depth contours (DEPCNT), soundings (SOUNDG), meta-objects (M_COVR and M_QUAL), cartographic Blue Notes ($CSYMB), and features (OBSTRN, SBDARE, and WRECKS).

As dictated by Hydrographic Technical Directive 2008-8, the Final HOB files were combined into two separate H-Cell files in S-57 format. Both S-57 files were exported from CARIS Bathy DataBASE in meters, and then converted from metric units into feet using CARIS S-57 Composer 2.2. Quality assurance and topology checks were conducted using CARIS S-57 Composer 2.2 and DKART Inspector 5.1 validation tests.

The final H-Cell products are two S-57 files, in Lat/Long NAD-83. The contents of these two H-Cell deliverables are listed in the table below:

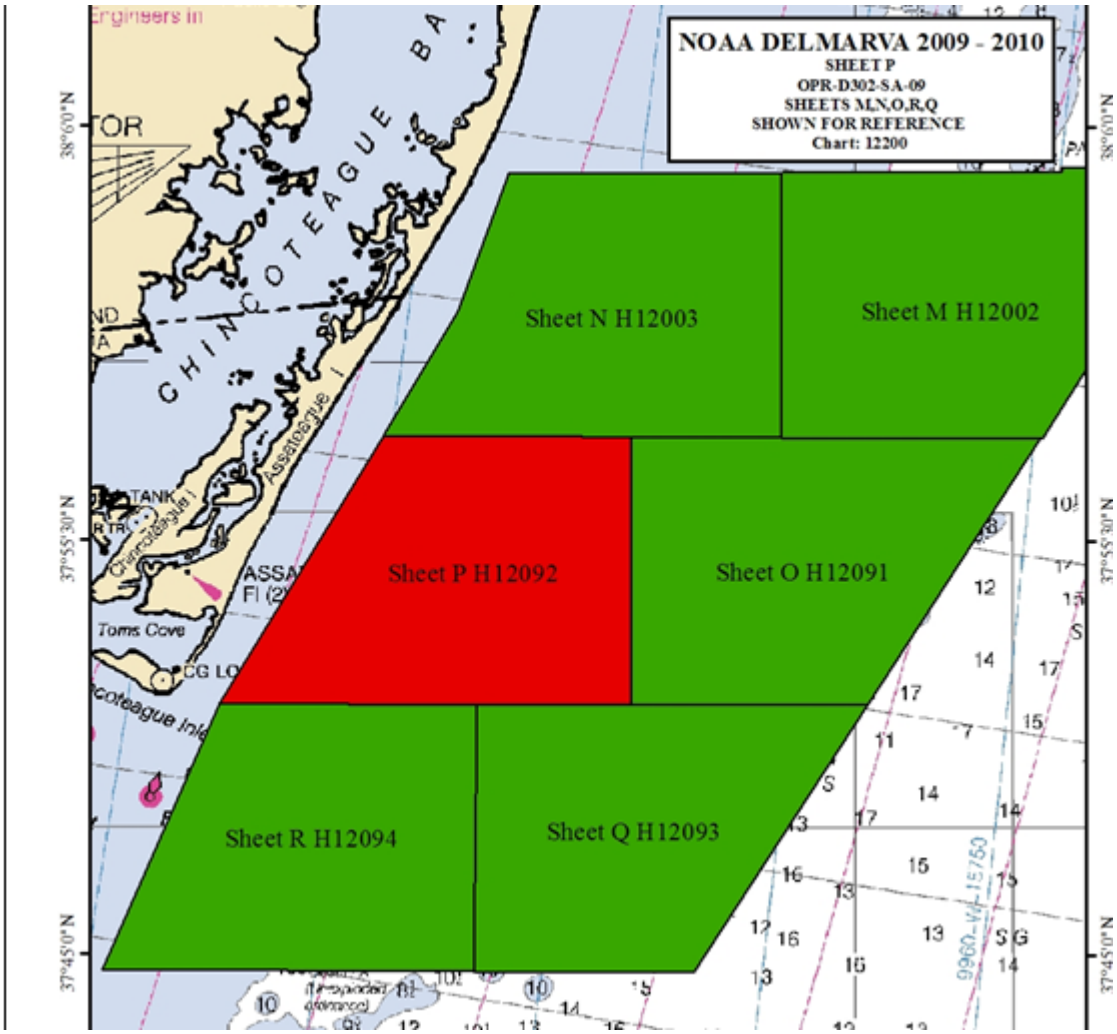
TABLE 1 - Contents of H-Cell Files

H12092_CS.000			Scale 1:80,000
Object Class Types	**Geographic**	**Cartographic**	**Meta**
S-57 Object Acronyms	DEPARE	$CSYMB	M_COVR
	OBSTRN		M_QUAL
	SBDARE		
	SOUNDG		
	WRECKS		

H12092_SS.000		
Object Class Types	**Geographic**	
S-57 Object Acronyms	DEPCNT	
	SOUNDG	

B.2.3 Junctions and Prior Surveys

Survey H12092 (2009) junctions with surveys H12003 (2010) to the north, H12091 (2010) to the east, H12093 (2010) to the south east and H12094 (2010) to the south west. The junctional surveys have not been processed at this time. Junctional comparisons will have to be performed during processing of the above surveys. Present survey depths are in harmony with charted hydrography to north, south, east and west.



B.4 DATA PROCESSING

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

CARIS Bathy DataBASE version 3.0/HF9
CARIS HIPS/SIPS version 7.0/SP2/HF5
CARIS Bathy Manager version 2.3 Build 192 HF 1-16
CARIS S-57 Composer version 2.1/HF4
CARIS HOM ENC version 3.3/SP3/HF8
dKART Inspector version 5.1

C. HORIZONTAL AND VERTICAL CONTROL

The hydrographer makes adequate mention of horizontal and vertical control used for this survey in section C. of the DR. The sounding datum for this survey is Mean Lower Low Water

(MLLW), and the vertical datum is Mean High Water (MHW). Horizontal control used for this survey during data acquisition is based upon the North American Datum of 1983 (NAD83), UTM projection zone 18 North.

D. RESULTS AND RECOMMENDATIONS

D.1 CHART COMPARISON

12211 (44th Edition, Feb/11)
FENWICK ISLAND to
CHINCOTEAGUE INLET
Corrected through NM 04/30/2011
Corrected through LNM 04/26/2011
Scale 1:80,000

12210 (38th Edition, May/08)
CHINCOTEAGUE INLET to
GREAT MACHIPONGO INLET
Corrected through NM 05/07/2011
Corrected through LNM 04/26/2011
Scale 1:80,000

ENC COMPARISON

US4VA50M
FENWICK ISLAND
TO CHINCOTEAGUE INLET
Edition 16
Application Date 2011/04/26
Issue Date 2011/04/26

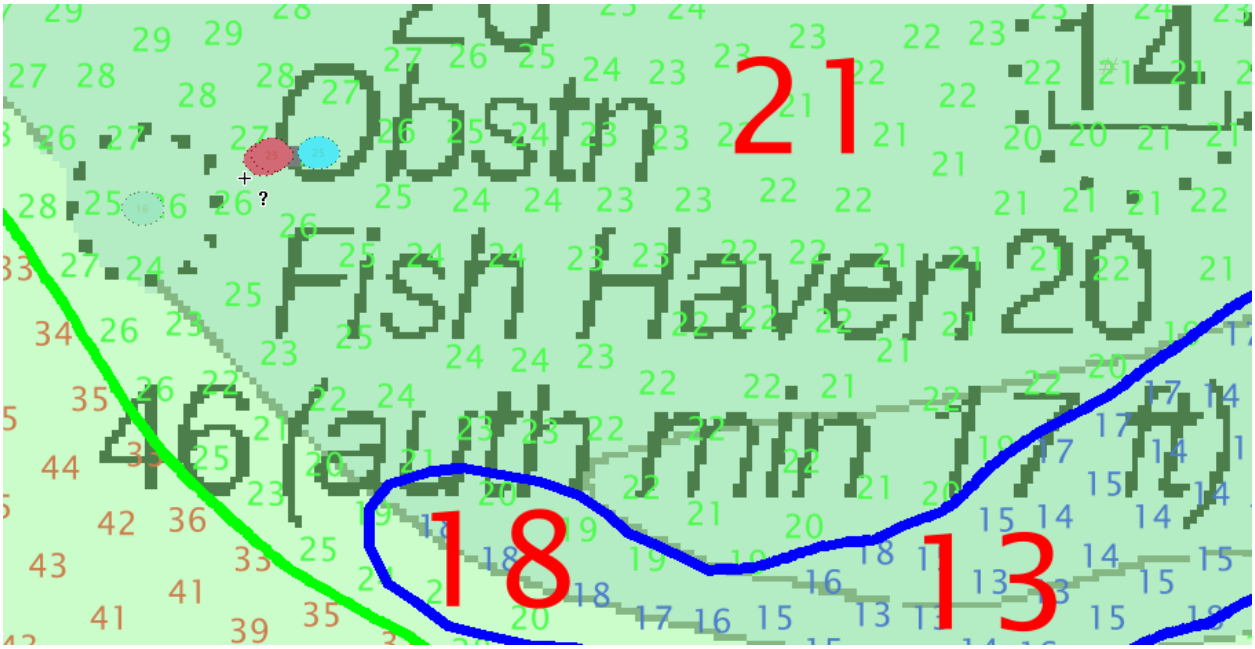
US4VA70M
CHINCOTEAGUE INLET
TO GREAT MACHIPONGO INLET
Edition 11
Application Date 2011/03/03
Issue Date 2011/04/27

D.1.1. ADDITIONAL RESULTS

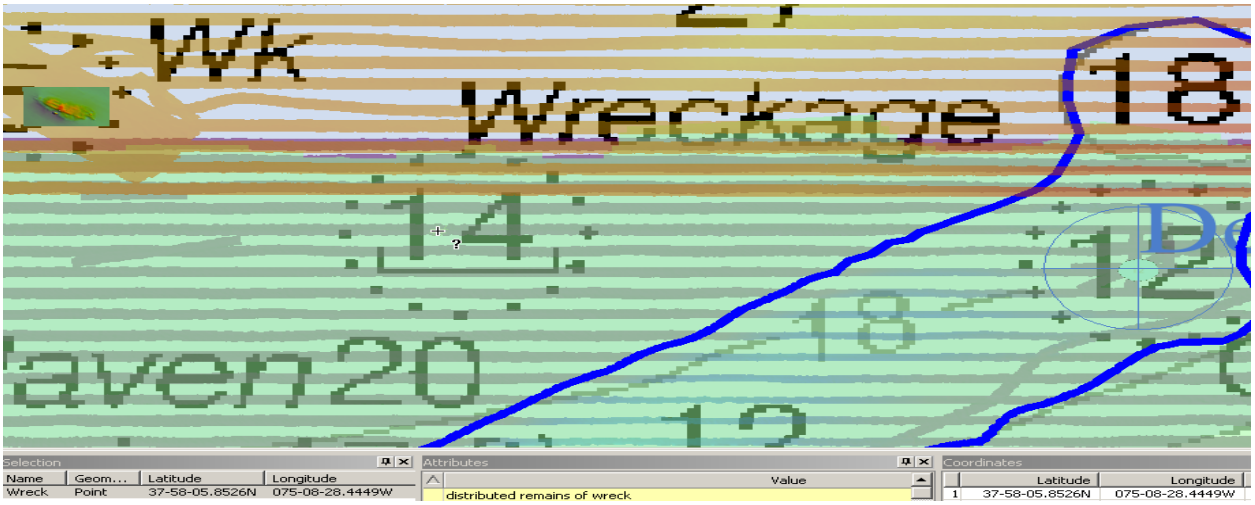
The charted hydrography originates with prior surveys and requires no further consideration. The hydrographer makes adequate chart comparisons in section D and Appendix I and II of the DR. The hydrographer recommends that any charted features not specifically addressed either in the H-Cell files or the Blue Notes should be retained as charted. The following exceptions are noted:

a. The charted "Obstruction – Fish Haven" (Feature #16) found in Latitude 37° 58' 00.32"N, Longitude 075° 09' 17.30"W was found to have no features within its charted danger circle. It appears that the features meant to be the source of the fish haven ("reef

balls") were found approximately 240 meters to the northeast in position 37° 58' 02.38"N, 075° 09' 08.21"W. While these objects do not warrant charting as there are other more significant depths within the region, it points out that the current charting of this Fish Haven is incorrect. This issue is referred to the Nautical Data Branch for investigation with the permitting agency. See also correspondence in Appendix V.



b. AWOIS Item 14287 is a Dangerous wreck (wreckage) cleared to 14 feet charted in Latitude 37-58-05.853N, Longitude 75-08-28.445W. The southern 75% of the wreckage was investigated during the present survey and the northern 25% of the wreckage was investigated by junctional survey H12003 (2010). Coverage of the wreck on both surveys was with 200% sidescan sonar and Multibeam. The wreckage was not found on either survey; it is considered disproved. No mention of the item was made in survey H12003 (2010). It is recommended that the charted dangerous wreck (wreckage) cleared to 14 feet is deleted from the chart.



c. The present survey area is completely covered by 80K NOS chart 12211, and the southern 65% of the survey area is also covered by 80K NOS chart 12210. There is a lot of overlap between the two charts and there is major discrepancy between the two charts in the overlapping areas. Features, contours and soundings are not charted in the same place on both charts which made the compilation of this survey very difficult. The discrepancy is great at the seaward limit of the survey, less at the shoreward survey limits and less in the center of the survey area. One or both of the charts should be adjusted so that the two charts are in agreement in the overlapping areas.

Figure 1: NOS Chart 12211(80K) Survey Area

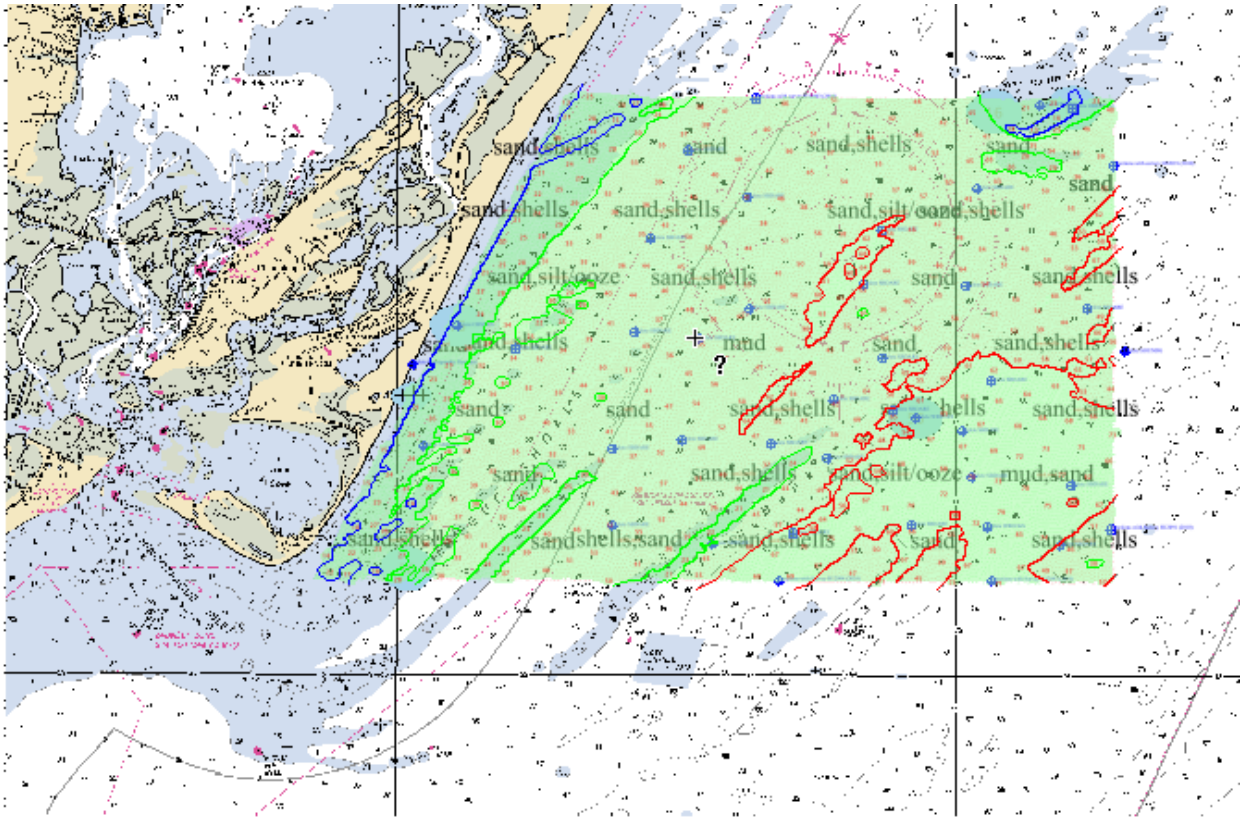


Figure 2: NOS Chart 12210 (80K) Survey Area

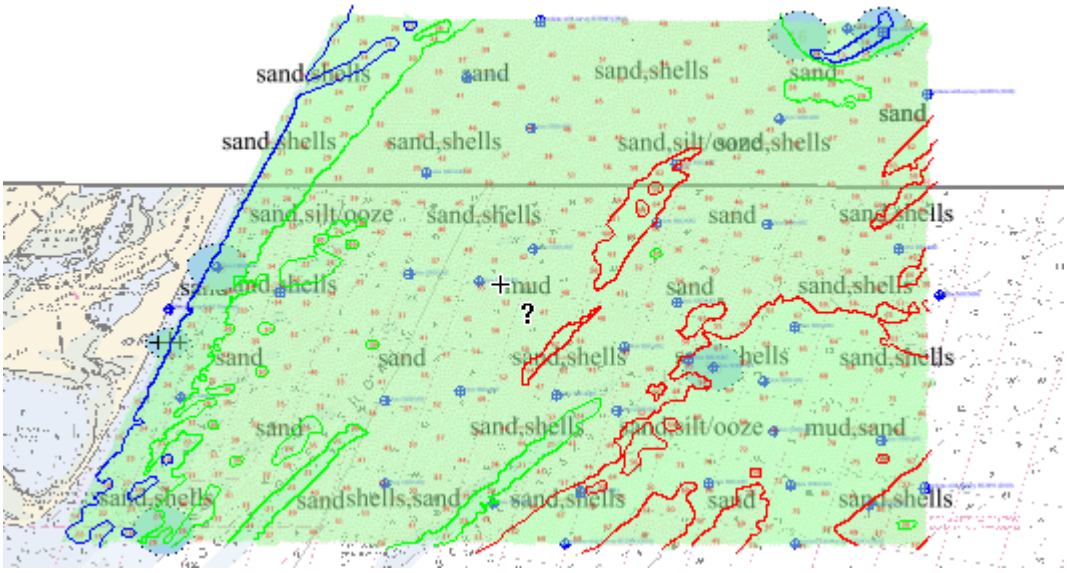


Figure 3: Overlap of Charts 12211(entire area) and 12210 (south from the cursor)

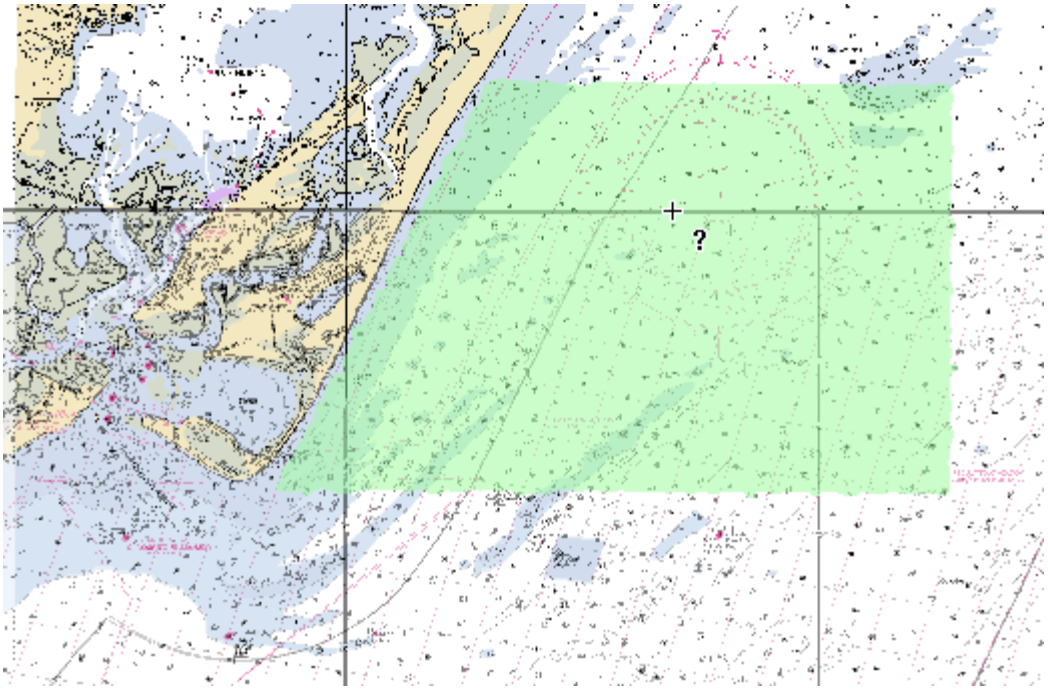


Figure 4: Distortion between the two charts near shore

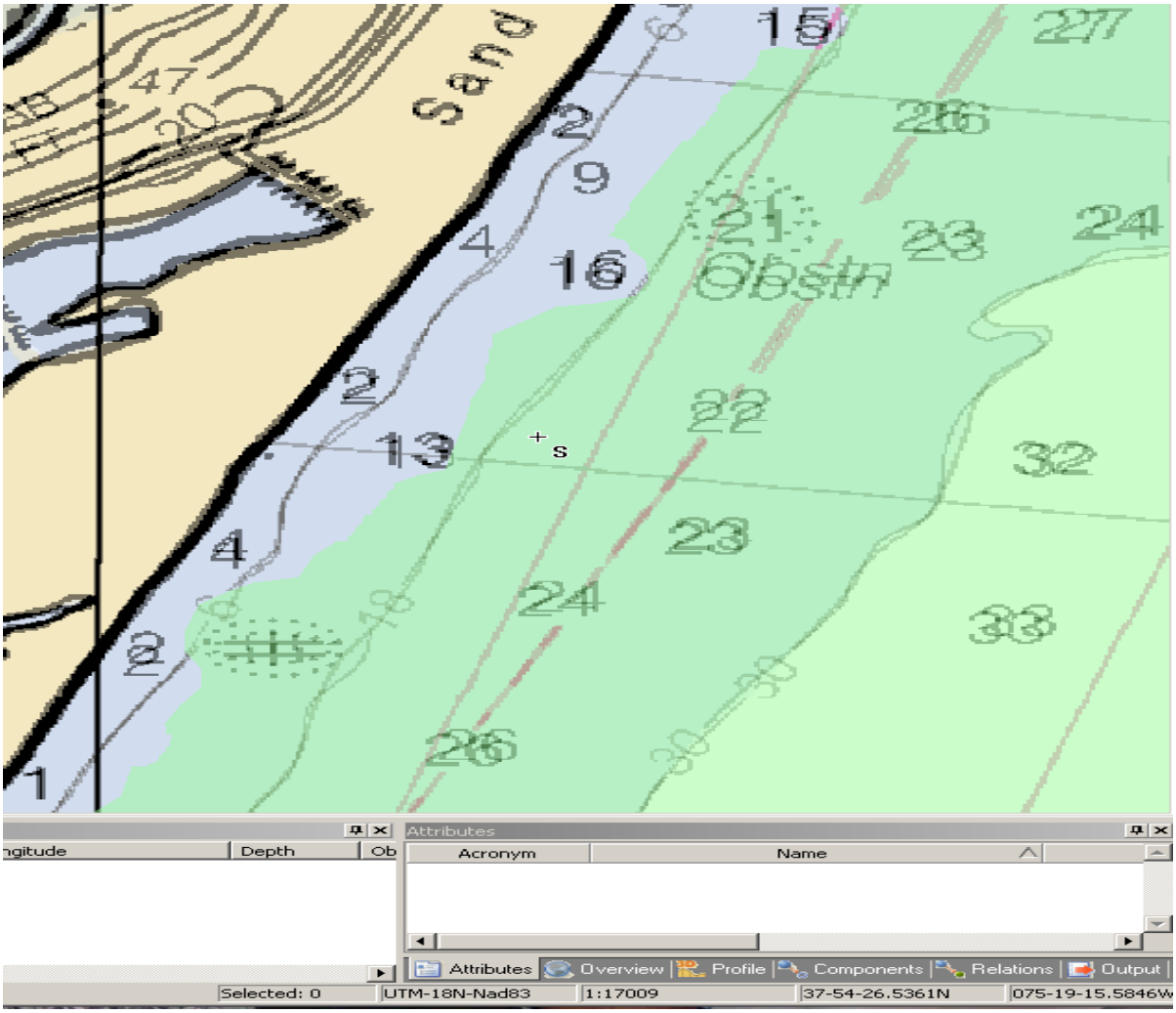


Figure 5: Distortion between the charts in central area

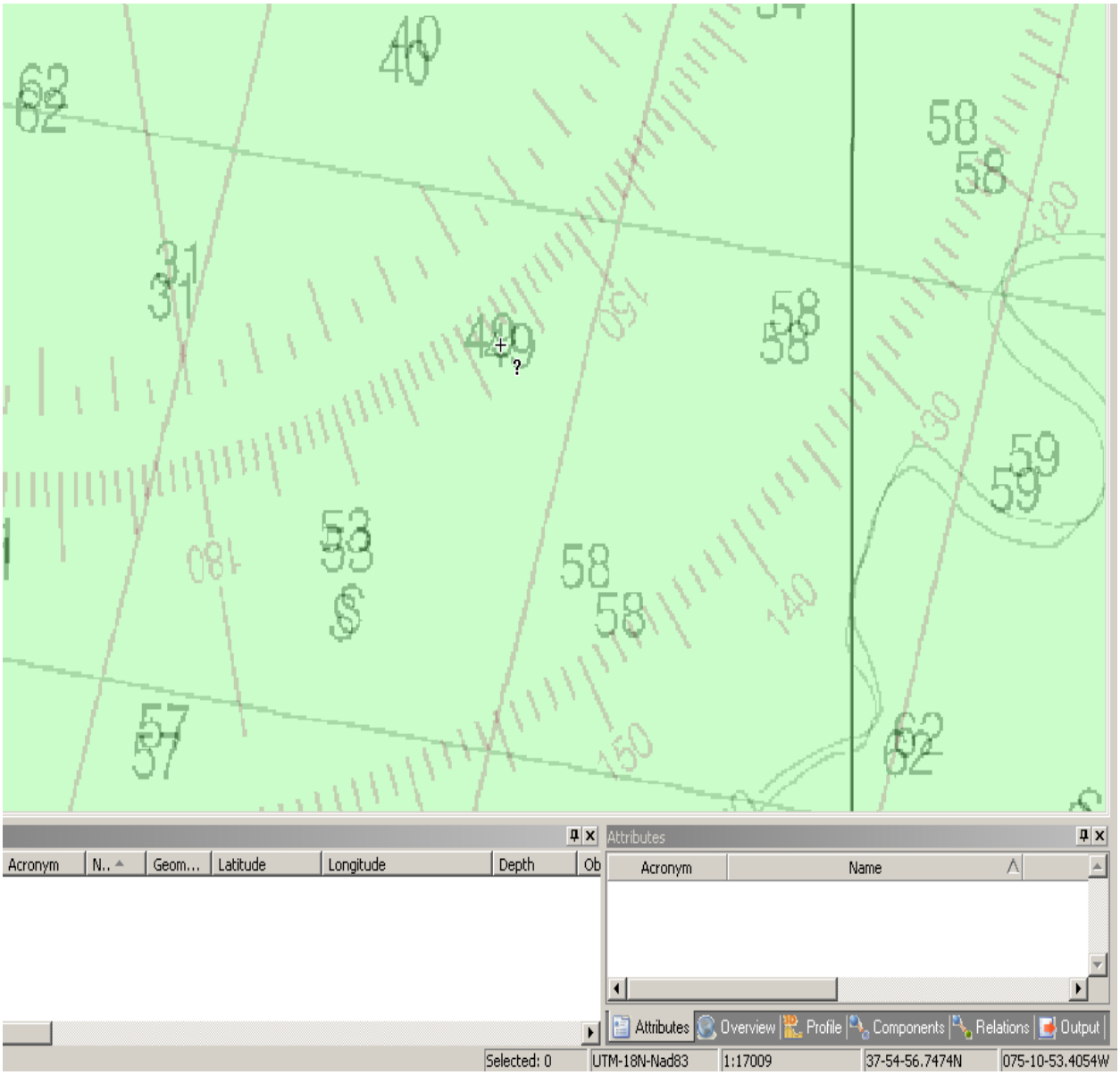
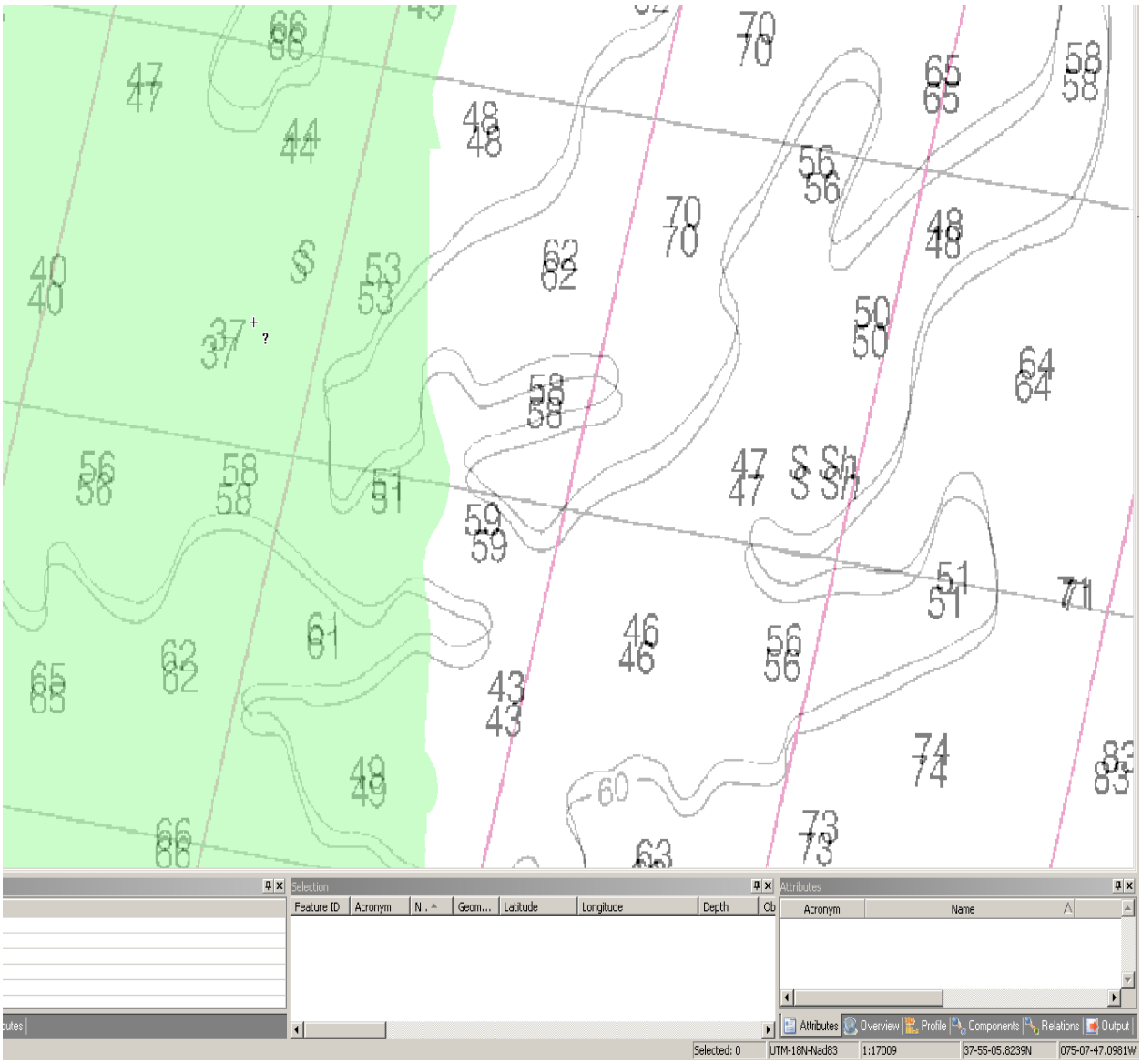


Figure 6: Distortion between the charts toward the east



D.2.4. Bottom Characteristics

The following feature was neither verified nor disproved by the present survey. It is recommended that it is retained as charted:

FEATURE	LATITUDE (N)	LONGITUDE (W)
SBDARE	37-57-00.6174	75-07-33.3696

D.6 MISCELLANEOUS

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

D.7 ADEQUACY OF SURVEY

The present survey is adequate to supersede the charted bathymetry within the common area. Any features not specifically addressed either in the H-Cell files or the Blue Notes should be retained as charted. Refer to section D and Appendix I and II of the DR for further recommendations by the hydrographer.

APPROVAL SHEET
H12092

Initial Approvals:

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

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

Deborah A. Bland

Digitally signed by Deborah A. Bland
DN: cn=Deborah A. Bland, o=National Ocean Service, ou=Atlantic Hydrographic Branch, email=Deborah.A.Bland@NOAA.gov, c=US
Date: 2011.05.23 11:31:20 -04'00'

Deborah A. Bland
Cartographer
Atlantic Hydrographic Branch

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

Richard T. Brennan

Richard T. Brennan
2011.05.27 02:20:23 -04'00'

Approved: _____

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