

H12316

NOAA FORM 76-35A

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

DESCRIPTIVE REPORT

Type of Survey: Navigable Area

Registry Number: H12316

LOCALITY

State: Virginia

General Locality: Approaches to Chesapeake Bay, VA

Sub-locality: Rudee Inlet to Sandbridge Beach

2011

CHIEF OF PARTY
CDR Lawrence T. Krepp
NOAA

LIBRARY & ARCHIVES
DATE

HYDROGRAPHIC TITLE SHEET

H12316

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: **Approaches to Chesapeake Bay, VA**

Sub-Locality: **Rudee Inlet to Sandbridge Beach**

Scale: **1:20,000** Date of Survey: **05/13/11 to 06/14/11**

Instructions Dated: **06 April, 2011** Project Number: **OPR-D304-TJ-11**

Vessel: **NOAA Ship *Thomas Jefferson***

Chief of Party: **CDR Lawrence T. Krepp , NOAA**

Surveyed by: ***Thomas Jefferson* Personnel**

Soundings by: **Reson 7125 MBES and Odom CV200 VBES**

Graphic record scaled by: **N/A**

Graphic record checked by: **N/A**

Protracted by: **N/A** Automated Plot: **N/A**

Verification by:

Soundings in: **Meters at MLLW**

Remarks:
1) All Times are in UTC.
2) This is a Navigable Area Hydrographic Survey.
3) Projection is NAD83, UTM Zone 18.

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

Table of Contents

A. AREA SURVEYED.....4

B. DATA ACQUISITION AND PROCESSING.....6

 B.1 EQUIPMENT.....6

 B.2 QUALITY CONTROL.....6

 B.3 CORRECTIONS TO ECHO SOUNDINGS.....12

 B.4 DATA PROCESSING.....13

C. HORIZONTAL AND VERTICAL CONTROL.....15

D. RESULTS AND RECOMMENDATIONS.....16

 D.1 CHART COMPARISON.....16

 D.2 ADDITIONAL RESULTS.....17

E. APPROVAL SHEETS.....20

Appendix I DANGER TO NAVIGATION REPORTS

Appendix II SURVEY FEATURES REPORT

Appendix III FINAL PROGRESS SKETCH AND SURVEY OUTLINE

Appendix IV TIDES AND WATER LEVELS

Appendix V SUPPLEMENTAL SURVEY RECORDS & CORRESPONDENCE

List of Tables

Table 1. Hydrographic Survey Statistics.....4

Table 2. MB and SSS Acquisition Dates.....5

Table 3. Lines with True Heave error.....12

Table 4. TPE Parameters.....14

Table 5. BASE Surfaces.....14

Table 5. CORS Stations.....14

List of Figures

Fig. 1. H12316 Survey Area5

Fig. 2. VBES Holiday Locations.....7

Fig. 3. Side Scan Holiday.....8

Fig. 4. Color Range for 6m Curve.....8

Fig. 5. Color Range for 6m Curve (2).....9

Fig. 6. Junction Surveys.....10

Fig. 7. SVP Artifacts.....10

Fig. 8: Data Thinning.....11

Fig. 9: Roll Artifacts.....12

Fig. 10. Final Tide Zoning13

Fig. 11. Shifting of Shoals16

Fig. 12. Shift of the 30ft Contour.....17

Descriptive Report to Accompany Hydrographic Survey H12316

Project OPR-D304-TJ-11
 Approaches to Chesapeake Bay, VA
 Rudee Inlet to Sandbridge Beach
 Scale 1:20,000
 May 13, 2011 – June 14, 2011
NOAA Ship *Thomas Jefferson*

A. AREA SURVEYED

This hydrographic survey was completed as specified by Hydrographic Survey Letter Instructions OPR-D304-TJ-11, dated 23 March, 2011; Change1 to Final Instructions OPR-D304-TJ-11 Approaches to Chesapeake Bay dated 6 April, 2011; and in accordance with NOS Hydrographic Surveys Specifications and Deliverables, 2011, and NOS Field Procedures Manual, 2010.

Northern limit	Southern limit	Eastern limit	Western limit
36°49'00"	36°44'53"	-075°46'16"	-075°57'45"

Data acquisition was conducted from May 13, 2011 to June 14, 2011.

The purpose of this project is to provide contemporary surveys to update National Ocean Service (NOS) nautical charting products. The project will address the concerns raised by the Virginia Pilots about the under keel clearance of deep draft coal ships transiting through the area southeast of the deep draft lane sea buoy. The project will also provide data in the area of two potential new shipping access areas, proposed by the Virginia Maritime Association. This project covers approximately 364 nm² of which 170 nm² are critical survey areas designated in NOAA Hydrographic Survey Priorities, 2010 edition. This survey, H12316, covers approximately 32 nm².

	Linear Nautical Miles
LNM Single beam mainscheme only	459.83
LNM Multibeam mainscheme only	411.26
LNM Lidar mainscheme only	N/A
LNM Side Scan Sonar mainscheme only	N/A
Lineal nautical miles of any combination of the above techniques (MBES,SBES)	
LNM Crosslines singlebeam and multibeam combined	72.9
LNM Lidar Crosslines	N/A
LNM development lines non mainscheme	14.52
LNM shoreline/nearshore investigations	N/A
Number of Bottom Samples	N/A

Number of items investigated that required additional time/effort in the field beyond the above survey operations	N/A
Total number of square nautical miles	34.4

Table 1: Hydrographic Survey Statistics

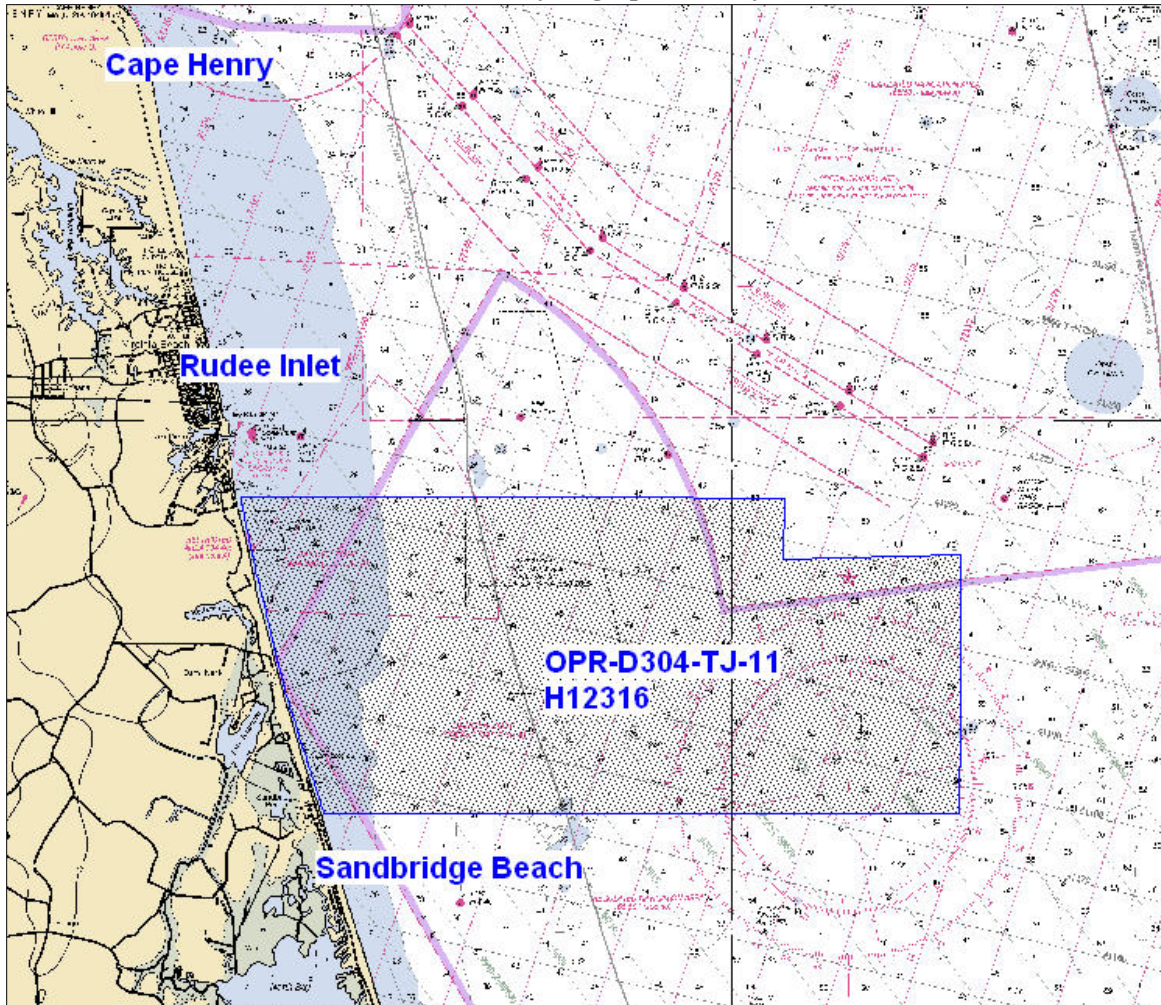


Figure 1: H12316 Survey Area.

Calendar Date	Julian Day
13-May-2011	133
14-May-2011	134
16-May-2011	136
18-May-2011	138
19-May-2011	139
21-May-2011	141
22-May-2011	142
23-May-2011	143
01-June-2011	152
02-June-2011	153

03-June-2011	154
04-June-2011	155
05-June-2011	156
07-June-2011	158
08-June-2011	159
12-June-2011	163
13-June-2011	164
14-June-2011	165

Table 2: SSS/ MBES/SBES Acquisition Dates

B. DATA ACQUISITION AND PROCESSING

Refer to *OPR-D304-TJ-11 Data Acquisition and Processing Report (DAPR)* for a complete description of data acquisition and processing systems, survey vessels, quality control procedures and data processing methods. Additional information to supplement sounding and survey data, and any deviations from the DAPR are included in this descriptive report.

B 1. EQUIPMENT AND VESSELS

Data were acquired by NOAA Ship *Thomas Jefferson*, HSL 3101, and HSL 3102. NOAA Ship *Thomas Jefferson* acquired Reson 7125 multibeam echo sounder (MBES) soundings, Klein 5000 Side Scan Sonar (SSS) imagery and sound velocity profiles. Both HSLs acquired Odom vertical beam echo sounder soundings and Klein 5000 Side Scan Sonar (SSS) imagery. HSL 3102 acquired Reson 7125 multibeam echo sounder (MBES) soundings. Vessel configurations, equipment operation and data acquisition and processing were consistent with specifications described in the *DAPR*.

B 2. QUALITY CONTROL

B.2.1 System Certification and Calibration

Refer to NOAA Ship *Thomas Jefferson's* *DAPR* and for a complete description of system integration and initial calibration results for equipment and sensors used for this survey.

B.2.2 Sounding Coverage

As per the Project Instructions, this survey was conducted using 200% SSS coverage with concurrent VBES or MBES. Object detection MBES developments were acquired over navigationally significant features.

Two partial lines of ship MBES data (DN136 line 188_1926 and DN139 line 308_2112) are unaccounted for. It is unknown if there was an issue with logging the file, or if the files were mismanaged during transfer from the acquisition computer. These missing lines created a coverage gap in the set line spacing MBES data, refer to the southeast section of the survey area as depicted on Figure 2. On DN163, 3102 acquired VBES data to fill in the holidays. The

VBES lines, 188_1949 and 308_2016, are not included in the CUBE surface for the ship's MBES. Instead, an uncertainty surface was created for each of the lines. No significant depth differences exist between the 2m MBES CUBE surface and the 4m VBES uncertainty surfaces.

There are 16 holidays in the 4m VBES uncertainty surfaces of H12316. These were caused by removing erroneous soundings from data blowouts during the cleaning process or from delayed write to the Hypack .raw file during acquisition. Of the 16 holidays, 8 occur on crosslines, 5 occur near the northern or southern limits of the sheet, and 3 occur mid-line in the western section of the survey area. Areas around the holidays have been examined and no evidence of shoaling is indicated and therefore, the existing bathymetry is deemed adequate. Holidays have been marked with cartographic symbols and saved in *H12316_VBES_holidays.hob* included in the *S57_Features* folder of this survey submission. See Figure 2 for locations of VBES holidays with respect to the survey area.

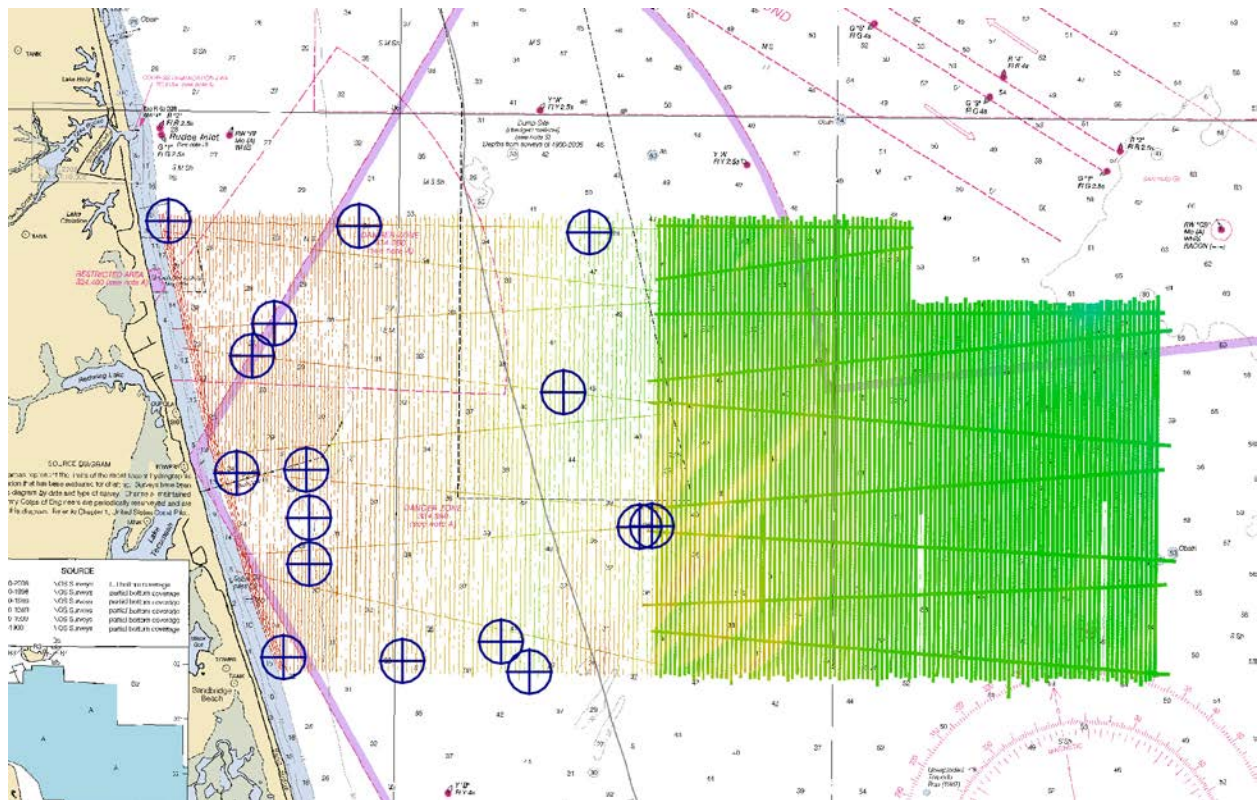


Figure 2: VBES holiday locations

There are 11 holidays in the 100% side scan mosaic and 5 holidays in the 200% side scan mosaic. These holidays are all small along-track holidays created by over cleaning navigation data or slight delays in writing to file when the line automatically breaks after a defined period of time (typically 20 minutes). Holidays have been marked with cartographic symbols and saved in *H12316_SSS100_holidays.hob* included in the *S57_Features* folder of this survey submission. In Figure 3, Green symbols are the 100% holidays and the orange symbols are the 200% holidays. In all instances, holiday areas had good imagery from the other set of side scan lines. There are no indications of significant contacts where holidays exist. See Figure 3 for side scan holiday locations.

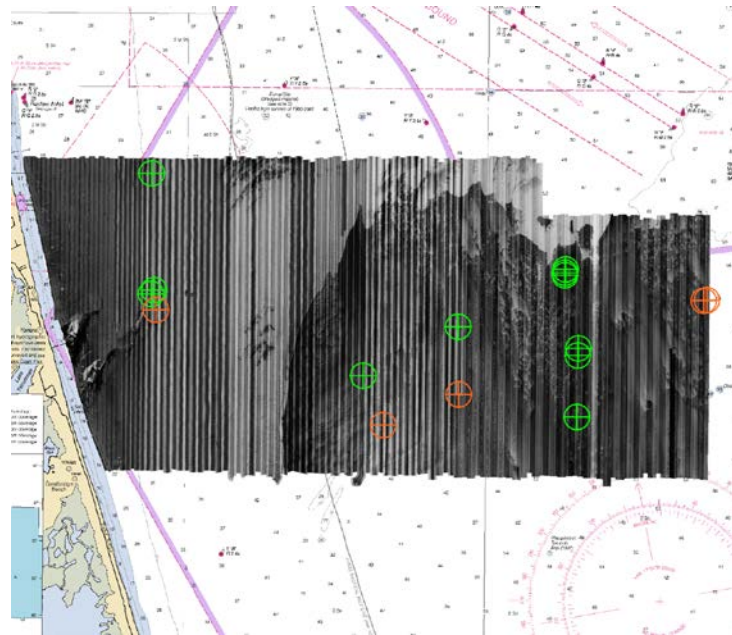


Figure 3: Side scan holidays – Green symbols mark holidays in the 100% side scan mosaic and orange symbols mark holidays in the 200% side scan mosaic.

Data acquired on H12316 failed to reach the extent of the 6-meter depth contour as required by the project instructions. In general the 6m contour follows fairly closely to the charted 18ft contour except near the southern end of the survey where there appears to be more variation. A color range file was created for the 6m contour and used to color the nearshore bathymetry. See Figures 4 and 5, below. Areas where the 6m curve was achieved are colored red, the yellow to green range indicates depths between 6m – 7m, and blue indicates depths greater than 7m.

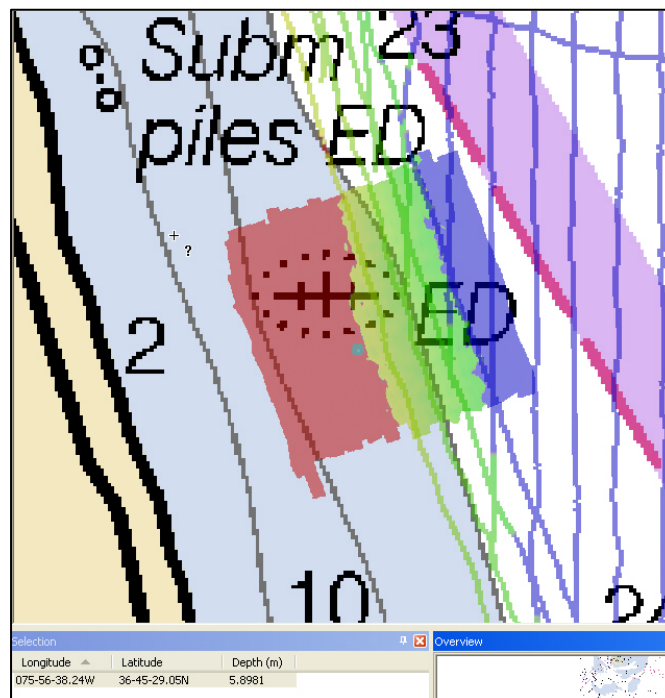


Figure 4: Color range for 6m curve – Red indicates depths of 6m or less. Yellow to green indicates depths from 6.0m to 7m. Blue indicates depths greater than 7m.

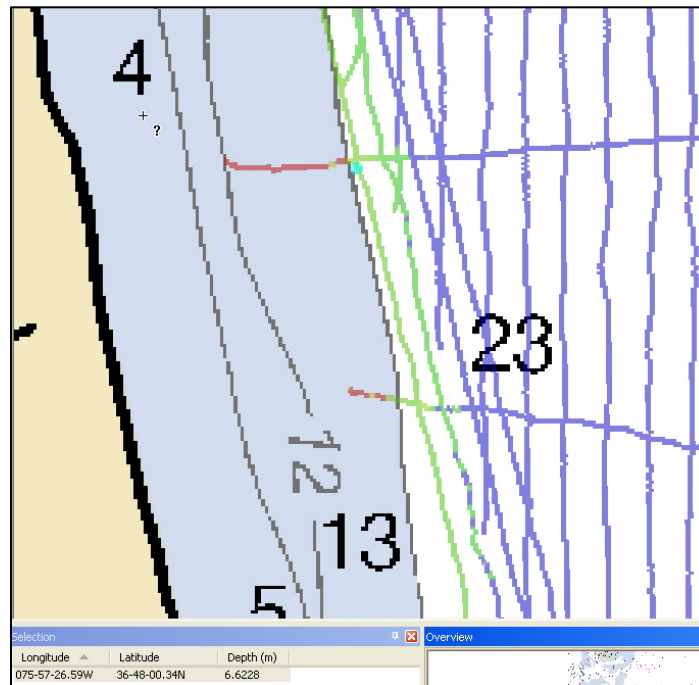


Figure 5: Color range for 6m curve – Red indicates depths of 6m or less. Yellow to green indicates depths from 6.0m1 to 7m. Blue indicates depths greater than 7m.

B 2.3 Crosslines

Multibeam echosounder cross-lines totaling 38.4 LNM, approximately 9.8% of the total mainscheme multibeam hydrography, and 34.5 LNM of singlebeam echosounder cross-lines, approximately 7.5% of the total singlebeam hydrography, were acquired during the course of the survey. As per email dated 10 Sept, 2009 from AHB located in the Descriptive Report, Appendix 5, quality control was performed using the standard deviation layer of the survey’s CUBE surface. Refer to section B 4.3 Data Cleaning of this report for further discussion on data quality and quality control.

B 2.4 Junctions and Prior Surveys

The following contemporary surveys junction with H12316, see Figure 6.

Registry #	Scale	Date	Field Party	Junction side
H12315	1:20,000	2011	<i>Thomas Jefferson</i>	North
H12343	1:20,000	2011	<i>Thomas Jefferson</i>	South
H12342	1:20,000	2011	<i>Thomas Jefferson</i>	Southeast
H11401	1:10,000	2005	<i>Rude</i>	North
H11301	1:10,000	2005	<i>Thomas Jefferson</i>	Northeast
H11568	1:10,000	2006	<i>Thomas Jefferson</i>	East

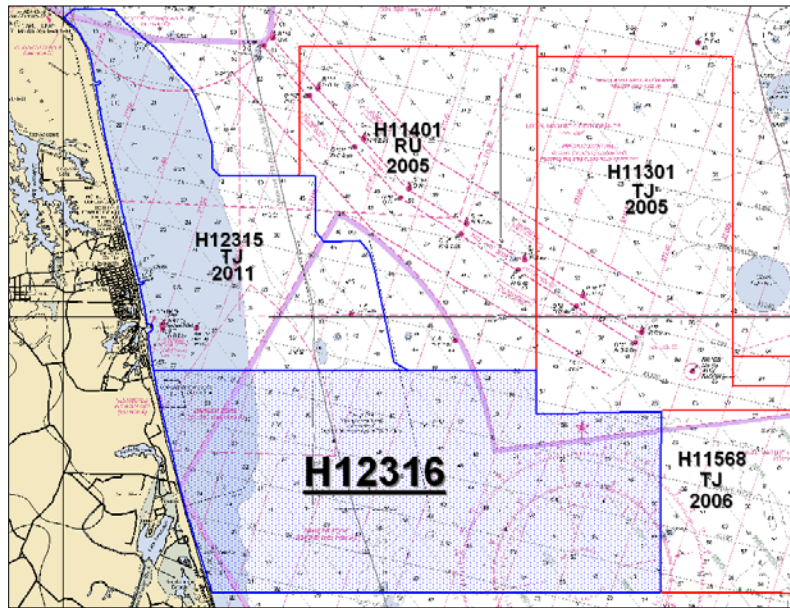


Figure 6: Junction Surveys.

The soundings of all junction surveys agree with the soundings in H12316 within 50cm.

B 2.5 Systematic Errors

On DN159, 3102 conducted an object detection MBES investigation over a charted wreck, existence doubtful, which was detected in sides scan imagery inshore of the assigned survey limits. During the investigation, SVP data were insufficient, and the resulting MBES surface has sound velocity refraction issues on the order of approximately 20 – 30 cm. While the artifacts are evident in the 50cm surface, the uncertainty in the finalized grids meets the IHO Order 1 requirements in greater than 95% of the nodes in the surface. Refer to Figure7, below.

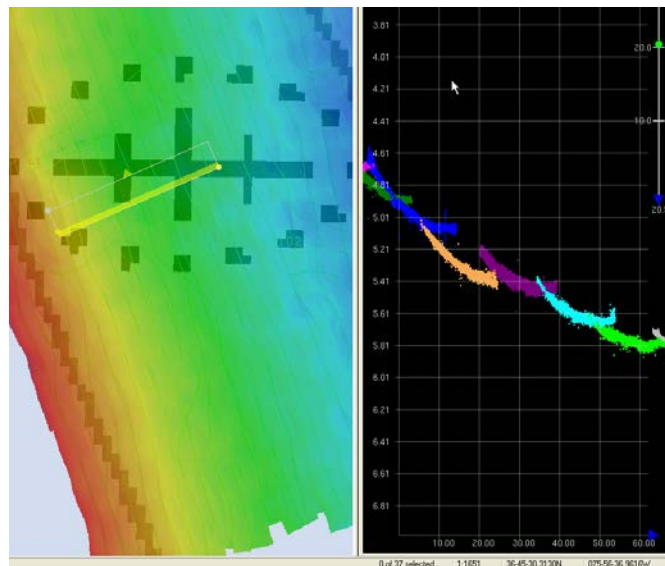


Figure 7: SVP artifacts from 3102 MBES investigation on DN159. The depth surface on the left has no vertical exaggeration; the subset window on the right has 20x vertical exaggeration.

The MBES developments run by 3102 on day 164 experienced data thinning as a result of rough seas. As the boat pitched or yawed significantly, the distance between soundings was increased and decreased accordingly. While the individual surfaces exhibit some data thinning to less than 5 soundings per node, the items being investigated all received adequate sounding density to meet object detection standards.

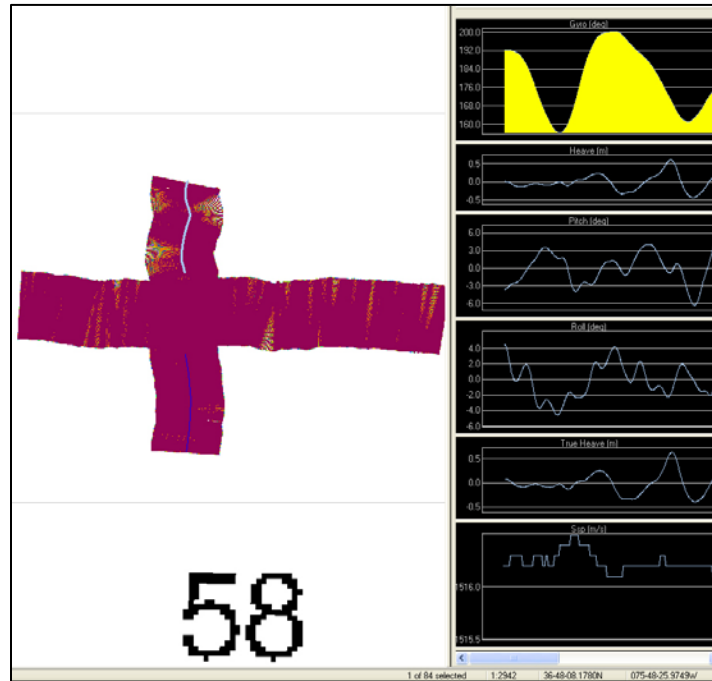


Figure 8: Data thinning in 3102 MBES developments on DN 164 – In this example, magenta represents a sounding density of >5 soundings per node, all other colors indicate lower sounding densities. The light blue section of the track line on the left is the area displayed in the sensor layout window on the right. Note the data thinning associated with the rapid change in heading (highlighted in yellow).

Also on DN164, 3012 MBES data contains roll artifacts on the order of approximately 20cm – 30cm. The roll artifact is a result of the way that the RESON 7125 SV1 multibeam system performs roll stabilization. Instead of logging the real-time roll data from the POS/MV and applying it in post-processing, the system applies an approximated roll value to the observed depths. When seas get rough and the vessel experiences abrupt roll motion, artifacts are present in the data because the approximated roll values diverge from the roll actually experienced by the vessel. When data was being logged with roll stabilization turned on, the details of how RESON was utilizing the roll stabilization was not well disseminated. A better approach would be to log data without the roll stabilization feature enabled. While there are roll artifacts in the data, feature developments from this data are minimally impacted because the roll artifact is negligible near nadir where least depths for the features were obtained. See Figure 9, below.

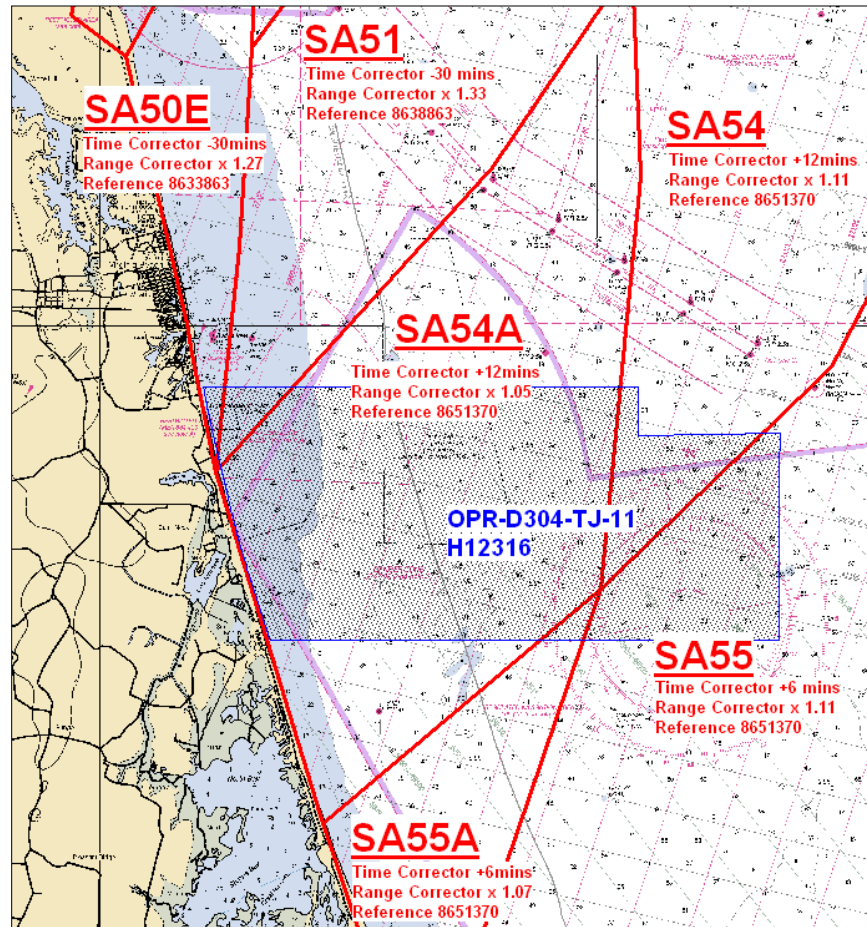


Figure 10: Final Tide Zoning

All datum reduction procedures conform to those outlined in the DAPR for ERS and Discrete Zoning. Multibeam data from the ship was reduced to MLLW via ERS/VDATUM methods. All bathymetry from the launches were reduced via discrete zoned tides. Refer to Section C Horizontal and Vertical Control for further discussion on datum reduction methods used during this survey.

All methods and instruments used for sound velocity correction were as described in the DAPR. A spreadsheet detailing all sound velocity casts is located in Separate II of this Descriptive Report.

Sound velocity corrections for this survey were applied in CARIS HIPS/SIPS using Nearest in Time.

B 4. DATA PROCESSING

B 4.1 Total Propagated Uncertainty

For the 2011 field season, Total Propagated Uncertainty (TPU) parameters for sound, speed, and tides are calculated separately for each project. The project-specific parameters for OPR-D304-TJ-11, Survey H12316 are as follows:

Project	Vessel	Tide Values Combined Measured & Zoning	Sound Velocity Values		
			CTD	MVP	Surface
D304	S222	0.085	4	1	0.2
D304	3101	0.085	4	N/A	0.2
D304	3102	0.085	4	N/A	0.2

Table 4: TPE Parameters

These values were calculated for all MBES/SBES data following CARIS Merge.

B 4.2 BASE Surfaces and Mosaics

The following table describes all BASE Surfaces submitted as part of Survey H12316:

<i>Name of Surface</i>	<i>Resolution</i>	<i>Type</i>	<i>Purpose</i>
H12316_S222_MB_2m_Final	2m	CUBE	MBES Soundings
H12316_3102_MBDEV1of4_Final	0.5m	CUBE	Object Detection
H12316_3102_DEV2of4_Final	0.5m	CUBE	Object Detection
H12316_3102_DEV3of4_Final	0.5m	CUBE	Object Detection
H12316_MBES_50cm_Dev_4_Final	0.5m	CUBE	Object Detection
H12316_A_CUBE_NOAA_50cm_Final	0.5m	CUBE	Object Detection
H12316_B_CUBE_NOAA_50cm_Final	0.5m	CUBE	Object Detection
H12316_C_CUBE_NOAA_50cm_Final	0.5m	CUBE	Object Detection
H12316_D_CUBE_NOAA_50cm_Final	0.5m	CUBE	Object Detection
H12316_E_CUBE_NOAA_50cm_Final	0.5m	CUBE	Object Detection
H12316_F_CUBE_NOAA_50cm_Final	0.5m	CUBE	Object Detection
H12316_G_CUBE_NOAA_50cm_Final	0.5m	CUBE	Object Detection
H12316_H_CUBE_NOAA_50cm_Final	0.5m	CUBE	Object Detection
H12316_I_CUBE_NOAA_50cm_Final	0.5m	CUBE	Object Detection
H12316_J_CUBE_NOAA_50cm_Final	0.5m	CUBE	Object Detection
H12316_K_CUBE_NOAA_50cm_Final	0.5m	CUBE	Object Detection
H12316_L_CUBE_NOAA_50cm_Final	0.5m	CUBE	Object Detection
H12316_M_CUBE_NOAA_50cm_Final	0.5m	CUBE	Object Detection
H12316_VB_4m_1of3_Final	4m	Uncertainty	VBES Soundings
H12316_VB_Uncert_2of3_Final	4m	Uncertainty	VBES Soundings
H12316_VB_Uncert_3of3_Final	4m	Uncertainty	VBES Soundings
H12316_SSS_100	1m	Mosaic	100% SSS Coverage
H12316_SSS_200	1m	Mosaic	200% SSS Coverage

Table 5: BASE Surfaces

This survey was processed using the Combined Uncertainty and Bathymetry Estimator (CUBE) algorithm and Uncertainty surfaces. The CUBE configuration was set to NOAA_0.5m for object detection surfaces, NOAA_2m for all main scheme MBES surfaces. VBES main scheme surfaces were created as 4m Uncertainty surfaces. Refer to the *2011 Data Acquisition and Processing Report, 2011 Field Procedures Manual*, and *CARIS HIPS and SIPS User Guide* for further discussion.

B 4.3 Data Cleaning

The survey data was cleaned using the swath and subset editor tools in CARIS. Areas of the surfaces that indicated high standard deviation (>50cm) were examined and cleaned as necessary. Following surface finalization, surfaces were consolidated into a 4m combined surface. 99.97% of nodes in this combined surface meet the IHO order 1 accuracy requirements for total vertical uncertainty (TVU).

C. HORIZONTAL AND VERTICAL CONTROL

As per FPM section 5.2.3.2.3 an HVCR report was not filed as no horizontal and vertical control stations were established by the field party for this survey. A summary of horizontal and vertical control for this survey follows.

C 1.1 Horizontal Control

The horizontal datum for this project is the North American Datum of 1983 (NAD83). Differential corrections from the U.S. Coast Guard beacon at Driver, VA (289 kHz) were used during this survey. The ship's MBES data were processed via Ellipsoid Referenced Survey (ERS) methods. As such, Inertially Aided Post Processed Kinematic (IAPPK) positioning replaced the DGPS positioning. The Continuously Operating Reference Stations (CORS) used to process Smooth Best Estimate Trajectory (SBET) files during this survey are listed in Table 6. Refer to this project's DAPR for further discussion on ERS/IAPPK methods of Horizontal Control.

No horizontal control stations were established by the field party for this survey.

C 1.2 Vertical Control

The vertical datum for this project is Mean Lower-Low Water (MLLW). The stations at the Chesapeake Bay Bridge Tunnel, VA (863-8863), and Duck, NC (865-1370) serve as datum control for H12316 for all HSL VBES and MBES. A request for delivery of final approved (verified) tides for this survey was forwarded to N/OPS1 on 16 June 2011 in accordance with the FPM and project instructions.

Ship MBES data were processed via ERS methods and reduced to MLLW using the VDATUM separation model (SEP Model) provided in the Project Instructions and included in the Tide folder along with the processed data for this survey submission. Refer to this project's DAPR for additional discussion of ERS/IAPPK methods and datum reduction using the VDATUM SEP Model for Vertical Control. Table 6 lists the CORS stations used to process SBET files during this survey.

CORS Stations
ACU6
LOY1
LOY2
LOYZ
LS03
MOR5
NCCI
NCDU
NCEL
URIL
VIMS

Table 6: CORS Stations - used to process SBETs for ship MBES data

D. RESULTS AND RECOMMENDATIONS

D.1 Chart Comparison

D 1.1 Chart 12208 Comparison

Survey H12316 was compared to Chart 12208, (15nd edition , 11/2011, 1:50000), the largest scale chart covering the survey area. Generally, soundings agreed with the chart to within 2 feet throughout the survey area. Several of the currently charted depths were placed over areas of minor shoaling compared to the surrounding depths. Many of these shoal areas have migrated to the south-southeast by a few hundred meters (Figure 11). Also, there is an apparent shift in the 30ft contour along the western edge of the survey area (Figure 12).

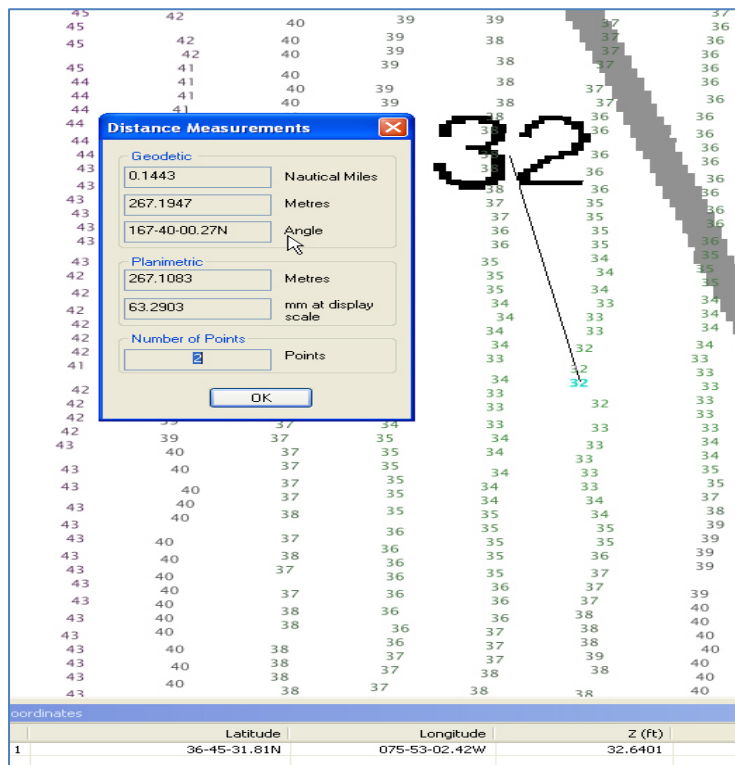


Figure 11 – Shifting of shoals to the SSE

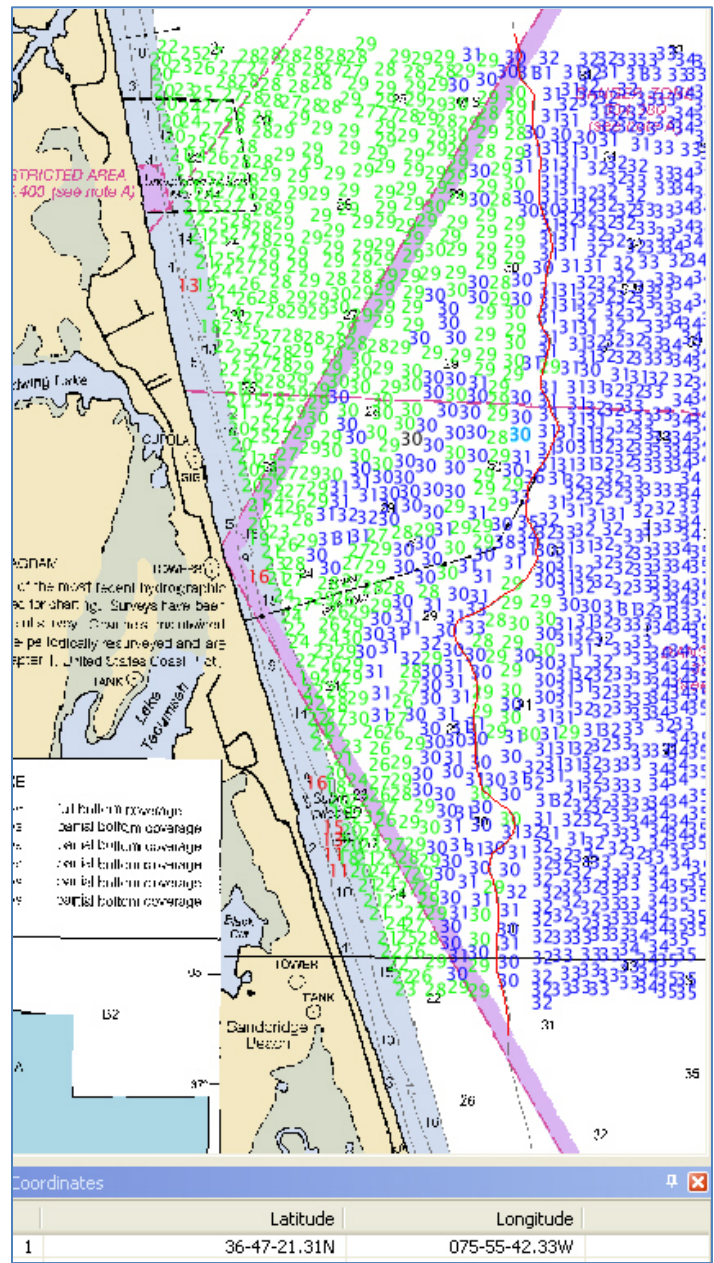


Figure 12: Shift of the 30ft contour compared to chart 12208 – The 30ft contour as charted on NOS Chart 12208 is digitized in red, depths less than 30ft are green and depths greater than 30 feet are blue.

D 1.2 ENC US5VA11M Comparison

Soundings are generally comparable with charted depths, with differences in charted and survey soundings of approximately 50cm or less.

D.2 Additional Results

D.2.1 Automated Wreck and Obstruction Information Service (AWOIS) Items

AWOIS item #12994 (TIGER) lies within the survey limits of H12316 and was investigated with object detection MBES to find a least depth. See the Feature Report in Appendix II for details.

AWOIS items #14887 and #14902 (Unexploded rockets May 1954) also lay within the survey limits of H12316. Part of the area was investigated with 200% side scan, but the field unit was unable to search the entire polygon defined in the AWOIS database for #14902. AWOIS #14902 should be retained. AWOIS #14887 should be deleted as it is redundant to #14902, but contains less information about the search area. See the Feature Report in Appendix II.

D.2.2 Shoreline

Three items in the project's Composite Source File (CSF), excluding the AWOIS items above, were located within the H12316 sheet limits and were assigned for investigation. All three of these items were inshore of the 6m curve. The two "subm piles ED" in charted positions, 36-45-42.71N, 075-56-53.58W, and 36-45-40.56NN, 075-56-52.60W, were not addressed. The "Wreck ED" in charted position 36-45-31.44N, 075-56-40.45W was observed during a turn on the side scan, but was not recorded in the imagery. The area was investigated with Object Detection MBES and the wreck was confirmed. See the Feature Report in Appendix II of this report.

D.2.3 Charted Features

D.2.4 Charted Pipelines and Cables

There is a charted sewer line near Dam Neck (36-46'-32.28"N, 065-57-15.79"W). Sewer line is observed in the 100% and 200% SSS imagery along the eastern extent of the charted sewer. The western section of the charted sewer line does not show up in SSS imagery, so it is assumed to be buried. The hydrographer recommends retaining the feature as charted.

D.2.5 Bridges, Ferry Routes, and Overhead Cables

There are no ferry routes, bridges, or overhead cable crossings within the limits of the survey.

D.3 Dangers to Navigation and Shoals

D 3.1 Dangers to Navigation

No dangers to navigation were found during this survey.

D 3.2 Shoals

There were no significant uncharted shoals discovered during this survey.

D.4 Aids to Navigation

No Aids to Navigation (ATON) were assigned within the limits of H12136.

D.5 Coast Pilot Information

The hydrographer has no recommendations for changes or addenda to the Coast Pilot.

D.6 Bottom Samples

Bottom samples were not required for this survey.

D.7 Environmental Conditions and Notes

There were periods of marginal weather during this survey which degraded data quality. The added noise and bubbles in the water resulted in poorer quality imagery and periodic blowouts in the vertical beam data. Data submitted with this survey are still considered to be adequate for charting purposes.

D.8 Adequacy of Survey

This survey is considered complete and adequate to supersede charted depths and features within the common areas of the affected charts.

D.9 Summary and Recommendations for Additional Work

No additional work is needed to complete this survey. No changes significant to navigation have been noted and it is recommended that this survey receive normal processing priority.

D.10 Miscellaneous

E. APPROVAL

As Lead Hydrographer, I have ensured that standard field surveying and processing procedures were followed in producing this examination in accordance with the Office of Coast Survey Hydrographic Surveys Division’s *Field Procedures Manual*, and NOS *Hydrographic Surveys Specifications and Deliverables*. Field operations for this basic hydrographic survey were conducted under my daily supervision with frequent checks of progress and adequacy.

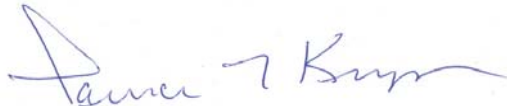
All field sheets, this Descriptive Report, and all accompanying records and data are approved. All records are forwarded for final review and processing to N/CS33, Atlantic Hydrographic Branch.

The Data Acquisition and Processing Report for OPR-D304-TJ-11 is submitted separately and contains additional information relevant to this survey.

Approved and Forwarded:


 Digitally signed by
Michael C. Davidson
Date: 2012.05.24
22:15:46 -04'00'

LT Michael C. Davidson, NOAA
Operations Officer



CDR Lawrence T. Krepp, NOAA
Commanding Officer

In addition, the following individuals were also responsible for overseeing data acquisition and processing of this survey:

 Digitally signed by Lindsey Norman
DN: cn=Lindsey Norman, o, ou=NOAA Ship
THOMAS JEFFERSON,
email=lindsey.l.norman@noaa.gov, c=US
Date: 2012.05.25 10:57:50 -04'00'

ENS Lindsey L. Norman, NOAA
Survey Manager

APPENDIX I
TIDES AND WATER LEVEL



UNITED STATES DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration
National Ocean Service
Silver Spring, Maryland 20910

TIDE NOTE FOR HYDROGRAPHIC SURVEY

DATE : June 28, 2011

HYDROGRAPHIC BRANCH: Atlantic
HYDROGRAPHIC PROJECT: OPR-D304-TJ-2011_Rev
HYDROGRAPHIC SHEET: H12316

LOCALITY: Rudee Inlet to Sandbridge Beach, Appr. to Ches. Bay, VA
TIME PERIOD: May 13 - June 14, 2011

TIDE STATION USED: 865-1370 Duck, NC
Lat. 36° 11.0' N Long. 75° 44.8' W
PLANE OF REFERENCE (MEAN LOWER LOW WATER): 0.000 meters
HEIGHT OF HIGH WATER ABOVE PLANE OF REFERENCE: 1.027 meters

TIDE STATION USED: 863-8863 Chesapeake Bay Bridge Tunnel, VA
Lat. 36° 58.0' N Long. 76° 06.8' W
PLANE OF REFERENCE (MEAN LOWER LOW WATER): 0.000 meters
HEIGHT OF HIGH WATER ABOVE PLANE OF REFERENCE: 0.814 meters

REMARKS: RECOMMENDED ZONING

Preliminary zoning is accepted as the final zoning for project OPR-D304-TJ-2011_Rev, H12316, during the time period between May 13 and June 14, 2011.

Please use the zoning file "D304TJ2011CORP_Rev" submitted with the project instructions for OPR-D304-TJ-11_Rev. Zones SA50E, SA51, SA54, SA54A, SA55, and SA55A are the applicable zones for H12316.

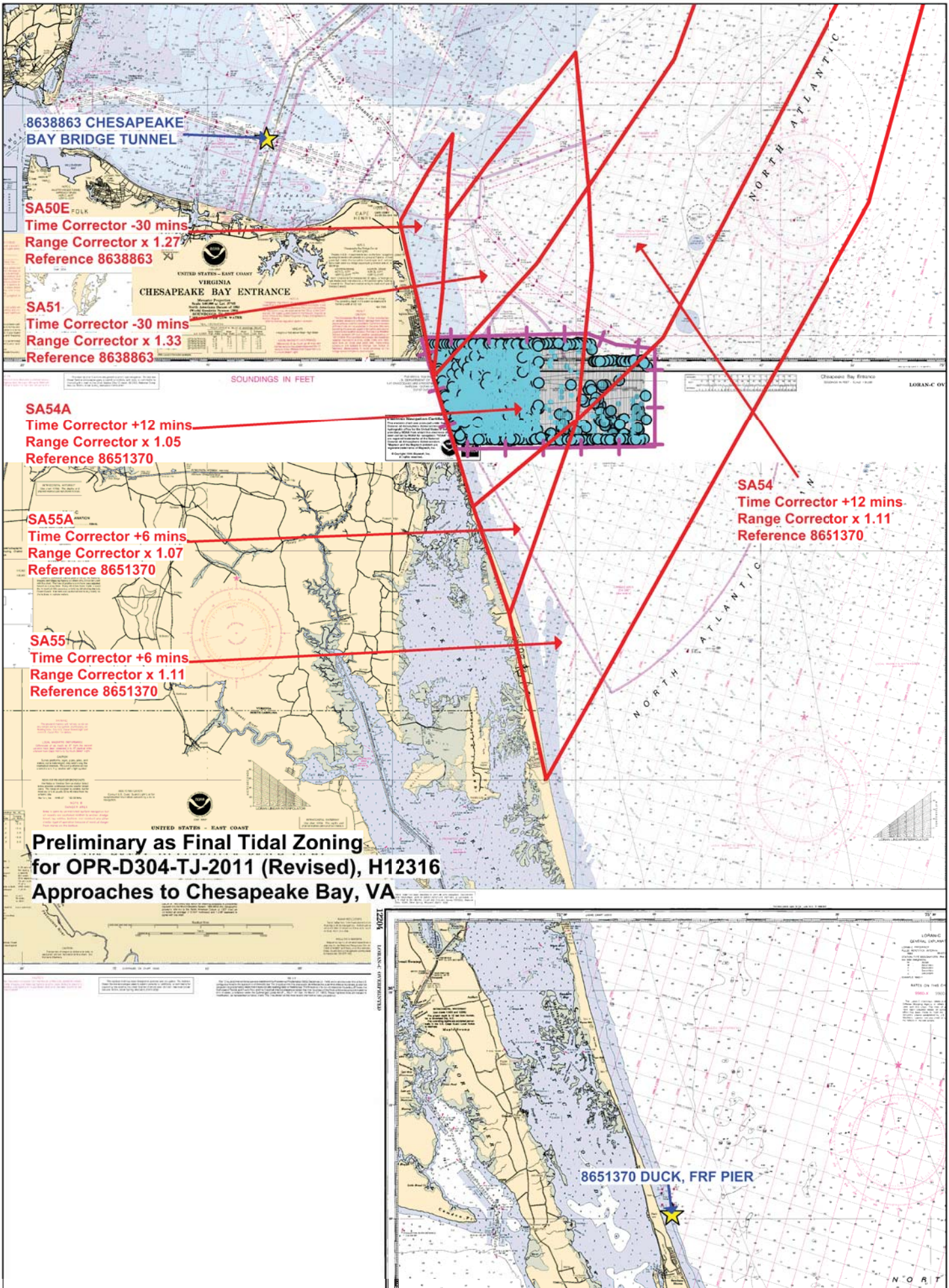
Note 1: Provided time series data are tabulated in metric units (meters), relative to MLLW and on Greenwich Mean Time on the 1983-2001 National Tidal Datum Epoch (NTDE).

Peter J. Stone

Digitally signed by Peter J. Stone
DN: cn=Peter J. Stone, o=NOAA/NOS/
CO-OPS, ou=Oceanographic Division,
email=peter.stone@noaa.gov, c=US
Date: 2011.06.30 15:20:42 -04'00'

CHIEF, OCEANOGRAPHIC DIVISION





APPENDIX II

SUPPLEMENTAL SURVEY RECORDS
AND CORRESPONDENCE

Castle Parker

From: Castle Parker
Sent: Thursday, May 10, 2012 3:23 PM
To: Michael Davidson
Subject: RE: Survey Submission Structure for passback surveys

Mike,

I concur. Speaking for AHB, I will accept this deviation from the deliverable specifications. I think that it's important for the directory structure to be consistent at the time of survey submission. Please include this accepted spec deviation in DR Appendix 5.

Thanks for your consideration with this subject and I completely agree with you.

Regards,
Gene

From: Michael Davidson [<mailto:michael.davidson@noaa.gov>]
Sent: Thursday, May 10, 2012 3:01 PM
To: Castle Parker
Subject: Survey Submission Structure for passback surveys

Gene,

TJ has a few surveys that were passed back for additional work. In the next several weeks, we will be submitting surveys from 2009, 2010, 2011, followed soon there after by current surveys from 2012. In an attempt to make things consistent, I would like to submit all the surveys according to the 2012 Specs and Deliverables. Before doing this, I wanted to check with you to see if this would be considered non-compliant with S&D for the prior year surveys.

If AHB agrees with our proposal to submit all surveys in the 2012 Directory Structure, please email back concurrence and I will include this email thread in Appendix V for documentation.

Thank you for your time.

V/R,
Mike

--

LT Michael C. Davidson
Operations Officer
NOAA Ship Thomas Jefferson

439 W York St
Norfolk, VA 23510
757-647-0187 (ship's cell)
808-434-2706 (ship's Iridium)
301-713-7782 (ship's VOIP)
ops.thomas.jefferson@noaa.gov

APPENDIX III
FEATURES REPORT
No DTONs or
Maritime Boundaries

H12316_AWOIS Items

Registry Number: H12309

State: Virginia

Locality: Approaches to Chesapeake Bay

Sub-locality: 29 NM East of Cape Henry

Project Number: OPR-D304-TJ-11

Survey Date: 04/15/2011 to 05/10/2011

Charts Affected

Number	Edition	Date	Scale (RNC)	RNC Correction(s)*
12208	13th	08/01/2008	1:50,000 (12208_1)	[L]NTM: ?
12205	31st	12/01/2007	1:80,000 (12205_1)	[L]NTM: ?
12207	21st	03/01/2004	1:80,000 (12207_1)	[L]NTM: ?
12280	8th	03/01/2008	1:200,000 (12280_2)	[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	AWOIS #14902 Dump site	AWOIS	[no data]	[no data]	[no data]	14902
1.2	AWOIS #12994 - Charted dangerous 38 foot wreck	Wreck	13.06 m	36° 45' 57.8" N	075° 46' 16.8" W	12994
1.3	AWOIS #14887- Dump site	AWOIS	[no data]	[no data]	[no data]	14887

1.1) AWOIS #14902 - AWOIS #14902 Dump site

No Primary Survey Feature for this AWOIS Item

Search Position: 36° 48' 32.1" N, 075° 57' 35.0" W
Historical Depth: [None]
Search Radius: 0
Search Technique: [None]
Technique Notes: [None]

History Notes:

Unknown Source -- Unexploded rockets May 1954 scaled from NOS Chart 12208. Boundary of Unexploded rockets is defined by a polygon with the following (NAD83) vertices:

36/48/50.313 N, 75/57/56.851 W

36/48/50.313 N, 75/57/19.627 W

36/48/19.976 N, 75/57/48.802 W

36/48/19.976 N, 75/57/11.578 W

(LAH 3/23/2011)

Survey Summary

Charts Affected: 12208_1, 12205_1, 12207_1, 12280_2, 12200_1, 13003_1

Remarks:

A partial investigation of the search area polygon was conducted using 200% side scan imagery with concurrent VBES. No features were found in the area searched. However, the field unit could not search the entire dashed line box defining the AWOIS position.

Further, AWOIS item #14887 and #14902 appear to be the same item entered twice. AWOIS #14902 provides greater detail as to the limits of the search area. AWOIS #14887 is redundant.

Feature Correlation

Source	Feature	Range	Azimuth	Status
AWOIS_EXPORT	AWOIS # 14902	0.00	000.0	Primary

Hydrographer Recommendations

Delete AWOIS #14887 but retain #14902.

[None]

Office Notes

AHB SAR: Survey coverage does not meet disproval requirements. Feature not found, nor disproved. The entire search polygon limit was not covered as the field unit covered search area up to the 18ft depth curve as prescribed as the inshore hydro limits in the Letter Instructions.

COMPILATION: Concur. Retain the active dumping site as charted. It is further recommended that the area is updated with present survey depths.

AWOIS#14902 is the same feature as AWOIS 14887. Only one feature is charted. One of the items needs to be deleted and the AWOIS database updated. Defer to HSD on which AWOIS item to keep and which one to delete.

AREA
ote A)

Unexploded rockets
May 1954

Obtain AWOIS #14902

3

11

17

3

23

28

14

61

1.2) AWOIS #12994 - Charted dangerous 38 foot wreck

Primary Feature for AWOIS Item #12994

Search Position: 36° 45' 54.5" N, 075° 46' 16.7" W
Historical Depth: 13.41 m
Search Radius: 0
Search Technique: [None]
Technique Notes: [None]

History Notes:

F0077 WD (1948) -- A WRECK REPORTED TO BE THE "TIGER" WAS HUNG AT 41 FEET AND WAS CLEARED BY 39 FEET IN LATITUDE 36-45-15.0, LONGITUDE 75-46-18.6 (NAD 27). (UPDATED 2/16/2005 JCM)

H09871 WD (1976) -- ITEM 4, AS IDENTIFIED IN THE DESCRIPTIVE REPORT AS THE "TIGER", WAS LOCATED IN POSITION: LATITUDE 36-45.9, LONGITUDE 75-46.3 (NAD 27). THE ITEM SEEMS TO HAVE SETTLED SINCE IT WAS FOUND IN F0077 (1948), AS IT CAUSED A HANG AT 44 FEET AND WAS CLEARED BY 43 FEET. (UPDATED 2/16/2005 JCM)

H09948 (1981) -- A WRECK, IDENTIFIED AS THE "TIGER" IN THE DESCRIPTIVE REPORT, WAS CARRIED FORWARD FROM H08971 (1976). THE HYDROGRAPHER RECOMMENDED CHARTING THE WRECK IN THE SAME POSITION AND WITH THE SAME 43 FT CLEARANCE DEPTH. (UPDATED 2/16/2005 JCM)

Survey Summary

Survey Position: 36° 45' 57.8" N, 075° 46' 16.8" W
Least Depth: 13.06 m (= 42.84 ft = 7.140 fm = 7 fm 0.84 ft)
TPU ($\pm 1.96\sigma$): THU (TPEh) [None] ; TVU (TPEv) [None]
Timestamp: 2011-165.00:00:00.000 (06/14/2011)
Dataset: H12316_AWOIS.000
FOID: US 0001340291 00001(0226001473830001)
Charts Affected: 12208_1, 12207_1, 12200_1, 13003_1

Remarks:

WRECKS/remrks: Found with SSS and MBES.

Feature Correlation

Source	Feature	Range	Azimuth	Status
H12316_AWOIS.000	US 0001340291 00001	0.00	000.0	Primary
AWOIS_EXPORT	AWOIS # 12994	100.89	358.4	Secondary (grouped)

Hydrographer Recommendations

Update least depth.

Cartographically-Rounded Depth (Affected Charts):

43ft (12208_1, 12207_1)

7fm (12200_1, 13003_1)

S-57 Data

Geo object 1: Wreck (WRECKS)
Attributes: CATWRK - 2:dangerous wreck
EXPSOU - 2:shoaler than range of depth of the surrounding depth area
NINFOM - Add wreck
QUASOU - 6:least depth known
SORDAT - 20110614
SORIND - US,US,graph,H12316
TECSOU - 2,3:found by side scan sonar,found by multi-beam
VALSOU - 13.058 m
WATLEV - 3:always under water/submerged

Office Notes

AHB SAR: Charted AWOIS feature located at survey position with ODMB.

COMPILATION: Concur with conditions. Delete charted dangerous 38 foot wreck. Add dangerous sunken wreck, least depth 43 feet, in present survey position.

Feature Images

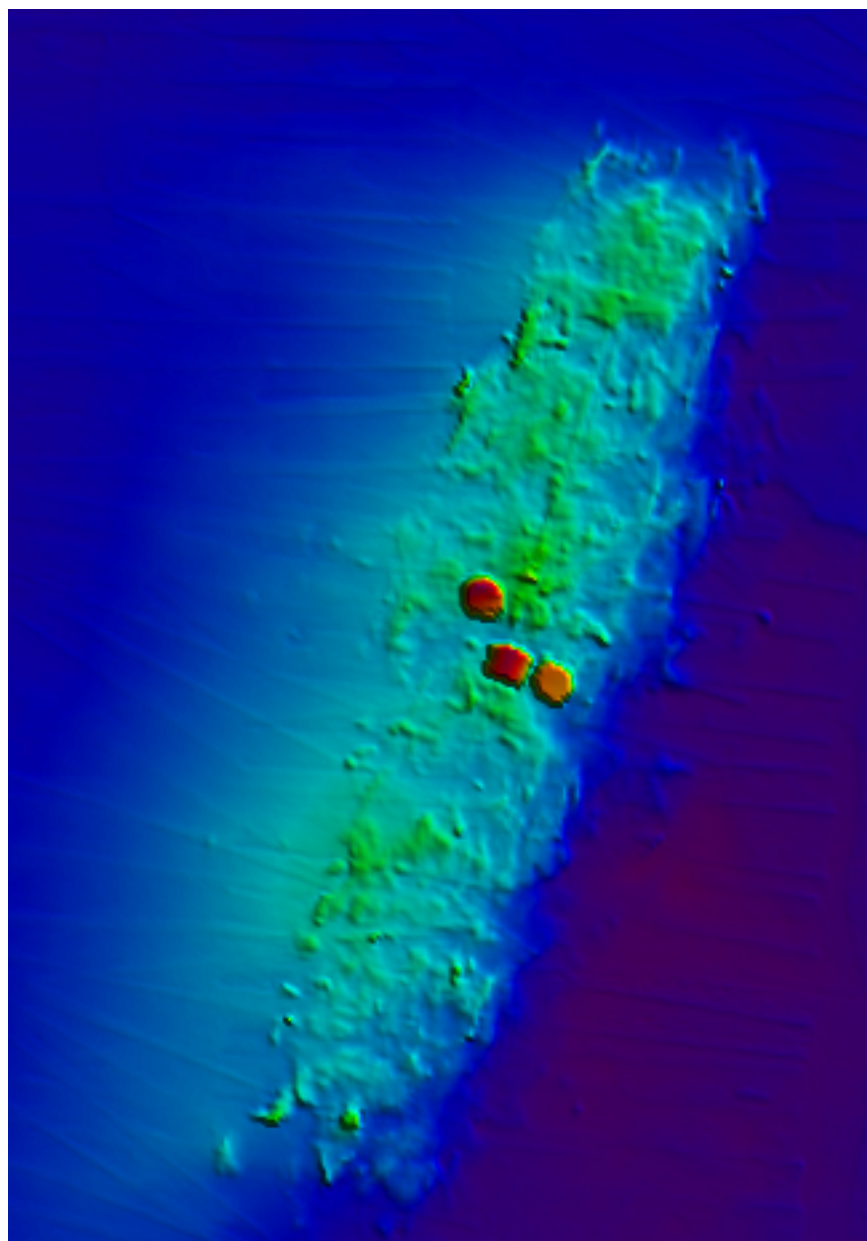


Figure 1.2.1

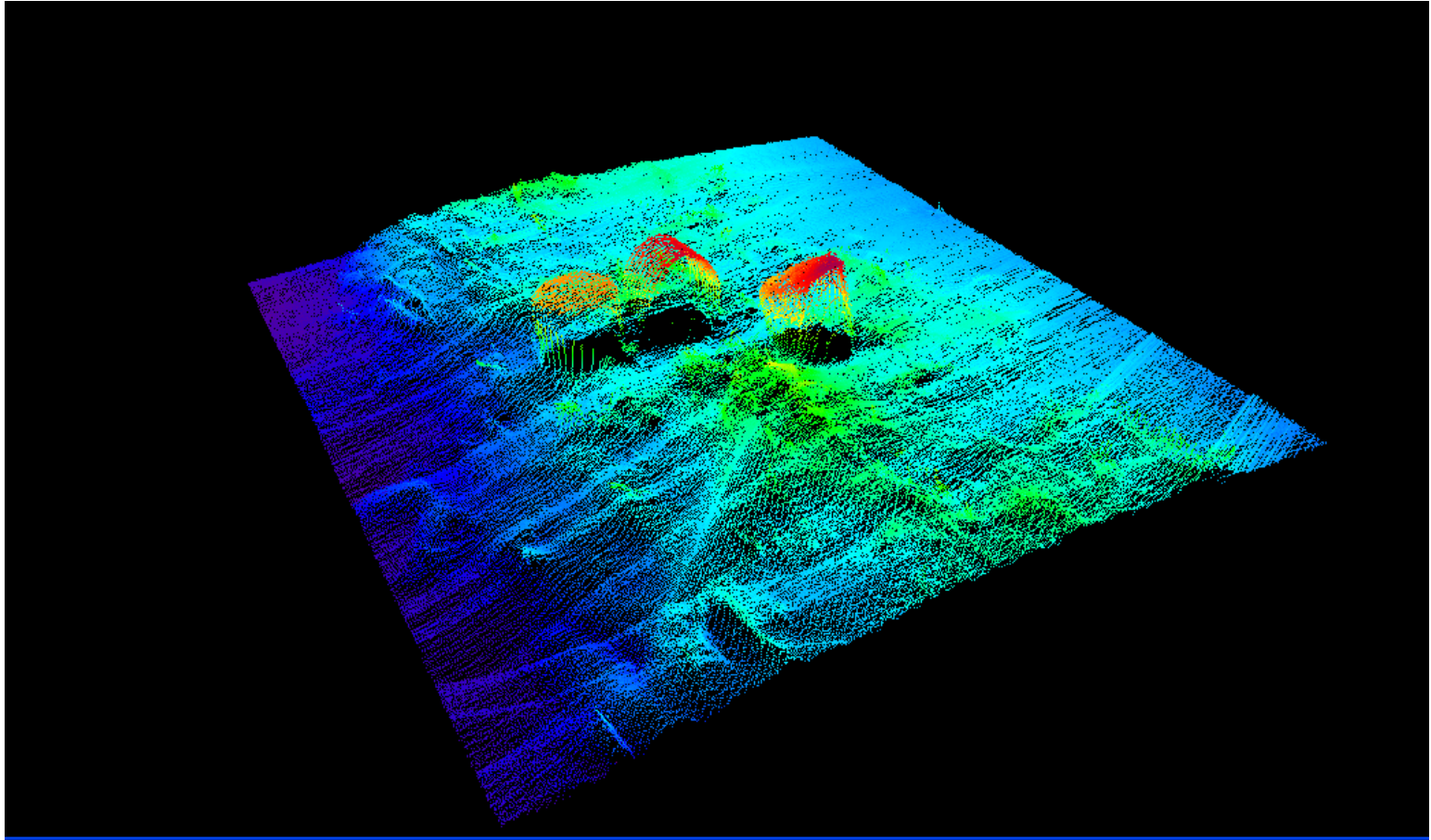


Figure 1.2.2

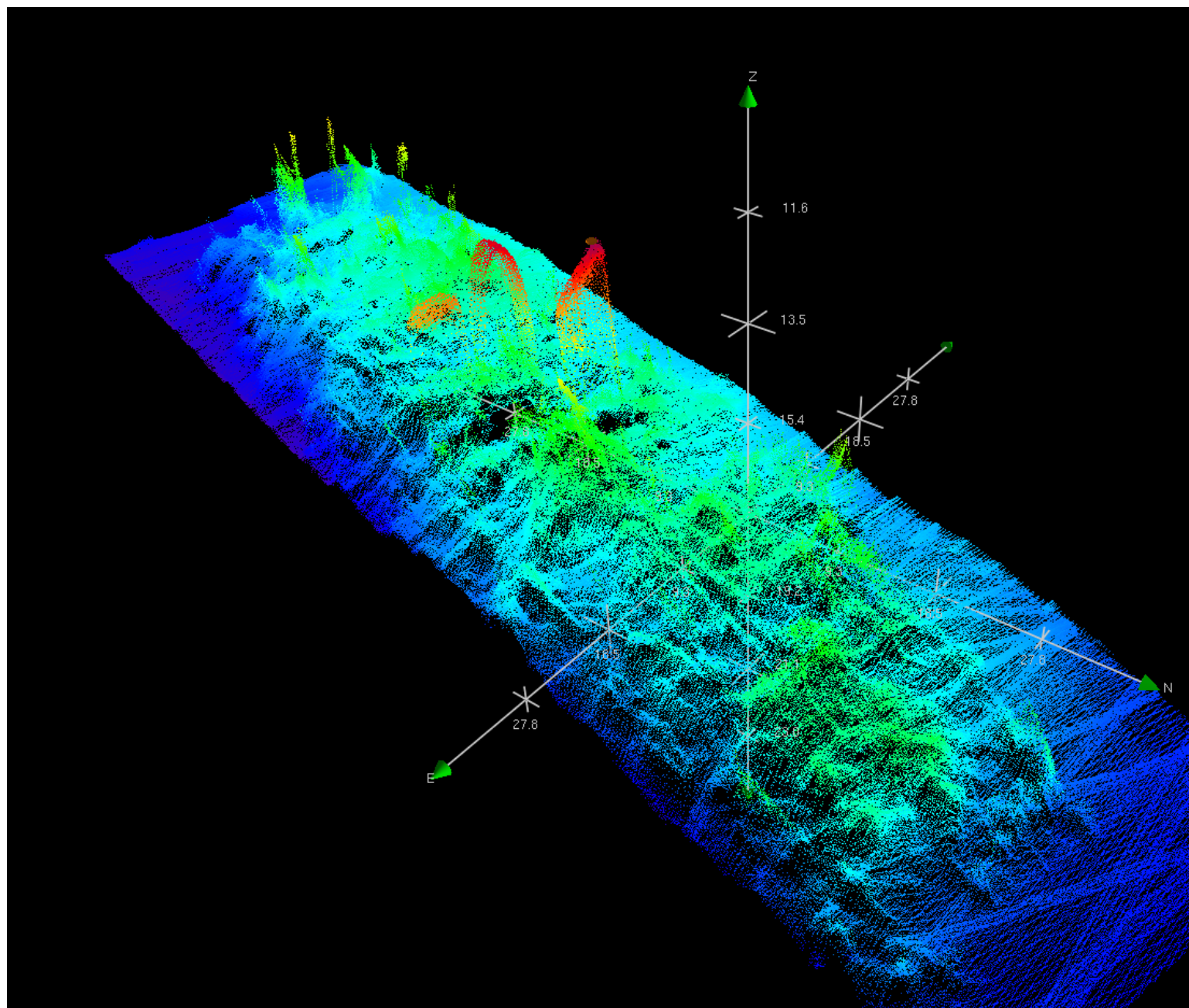


Figure 1.2.3

1.3) AWOIS #14, , + - AWOIS #14, , + Dump site

No Primary Survey Feature for this AWOIS Item

Search Position: 36° 48' 35.654" N, 075° 57' 35.178" W
Historical Depth: [None]
Search Radius: 0
Search Technique: [None]
Technique Notes: [None]

History Notes:

Unknown Source -- UNKNOWN SOURCE -- AREA OF UNEXPLODED ROCKETS MAY 1954. SCALED FROM NOS CHART 12208. (LAH 3/22/2010)

Survey Summary

Charts Affected: 12208_1, 12205_1, 12207_1, 12280_2, 12200_1, 13003_1

Remarks:

A partial investigation of the search area polygon was conducted using 200% side scan imagery with concurrent VBES. No features were found in the area searched. However, the field unit could not search the entire dashed line box defining the AWOIS position.

Further, AWOIS item #14887 and #14902 appear to be the same item entered twice. AWOIS #14902 provides greater detail as to the limits of the search area. AWOIS #14887 is redundant.

Feature Correlation

Source	Feature	Range	Azimuth	Status
AWOIS_EXPORT	AWOIS # 14887	0.00	000.0	Primary

Hydrographer Recommendations

Delete AWOIS #14887 but retain #14902.

[None]

Office Notes

AHB SAR: Survey coverage does not meet disproval requirements. Feature not found, nor disproved. The entire search polygon limit was not covered as the field unit covered search area up to the 18ft depth curve as prescribed as the inshore hydro limits in the Letter Instructions.

COMPILATION: Concur. Retain the active dumping site as charted. It is further recommended that the area is updated with present survey depths.

AWOIS#14902 is the same feature as AWOIS 14887. Only one feature is charted. One of the items needs to be deleted and the AWOIS database updated. Defer to HSD on which AWOIS item to keep and which one to delete.

Also, in the AWOIS database this item has a NE rather than NW GP. I had to manipulate the feature to get it into Pydro for this report. The GP needs to be corrected if the item is going to be retained.

AREA
(note A)

Unexploded rockets
May 1954

Obtain AWOIS #14902

3

11

17

3

23

28

14

61

H12316_Wrecks

Registry Number:

State:

Locality:

Sub-locality:

Project Number:

Survey Date: 06/14/2011

Charts Affected

Number	Edition	Date	Scale (RNC)	RNC Correction(s)*
12208	13th	08/01/2008	1:50,000 (12208_1)	[L]NTM: ?
12207	21st	03/01/2004	1:80,000 (12207_1)	[L]NTM: ?
12205	31st	12/01/2007	1:80,000 (12205_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	Charted dangerous wreck ED, depth unknown	Wreck	4.00 m	36° 45' 31.6" N	075° 56' 43.6" W	---

1.1) Charted dangerous wreck ED, depth unknown

Survey Summary

Survey Position: 36° 45' 31.6" N, 075° 56' 43.6" W
Least Depth: 4.00 m (= 13.13 ft = 2.189 fm = 2 fm 1.13 ft)
TPU ($\pm 1.96\sigma$): **THU (TPEh)** [None] ; **TVU (TPEv)** [None]
Timestamp: 2011-165.00:00:00.000 (06/14/2011)
Dataset: H12316_Wrecks.000
FOID: US 0001340284 00001(02260014737C0001)
Charts Affected: 12208_1, 12205_1, 12207_1, 12200_1, 13003_1

Remarks:

WRECKS/remrks: Found with Side scan and MBES. Wreck is badly deteriorated and there is little structure left.

Feature Correlation

Source	Feature	Range	Azimuth	Status
H12316_Wrecks.000	US 0001340284 00001	0.00	000.0	Primary

Hydrographer Recommendations

Refer to SHPO for potential historical significance and either update wreck or delete wreck and chart obstructions.

Cartographically-Rounded Depth (Affected Charts):

13ft (12208_1, 12205_1, 12207_1)

2 ¼fm (12200_1, 13003_1)

S-57 Data

Geo object 1: Wreck (WRECKS)
Attributes: CATWRK - 3:distributed remains of wreck
 EXPSOU - 2:shoaler than range of depth of the surrounding depth area
 NINFOM - Add wreck
 QUASOU - 6:least depth known
 SORDAT - 20110614
 SORIND - US,US,graph,H12316
 TECSOU - 2,3:found by side scan sonar,found by multi-beam

VALSOU - 4.003 m

WATLEV - 3:always under water/submerged

Office Notes

AHB SAR: Charted feature was found with 200% SSS and ODMB. Feature is deteriorated. Defer to compiler for final charting diposition.

COMPILATION: Concur with conditions. Delete charted dangerous sunken wreck ED, depth unknown. Add dangerous sunken wreck least depth 13 feet, in present survey position.

Feature Images

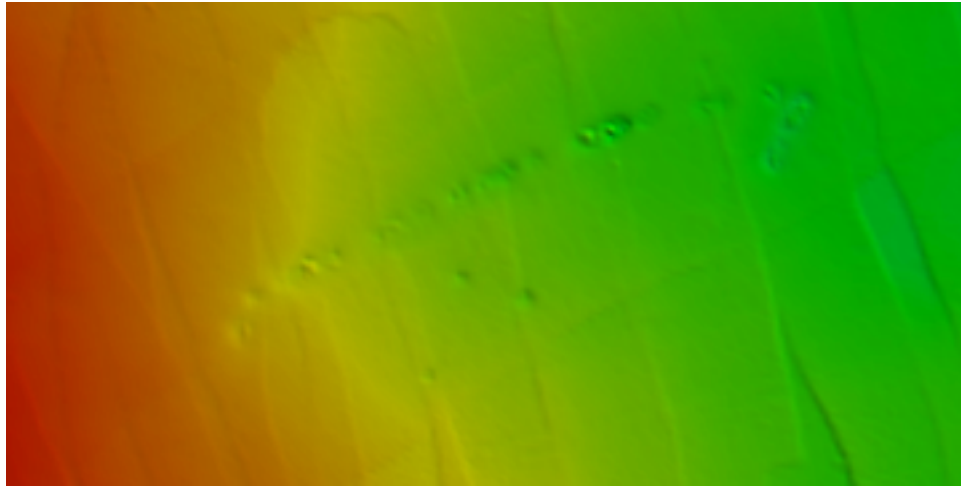


Figure 1.1.1

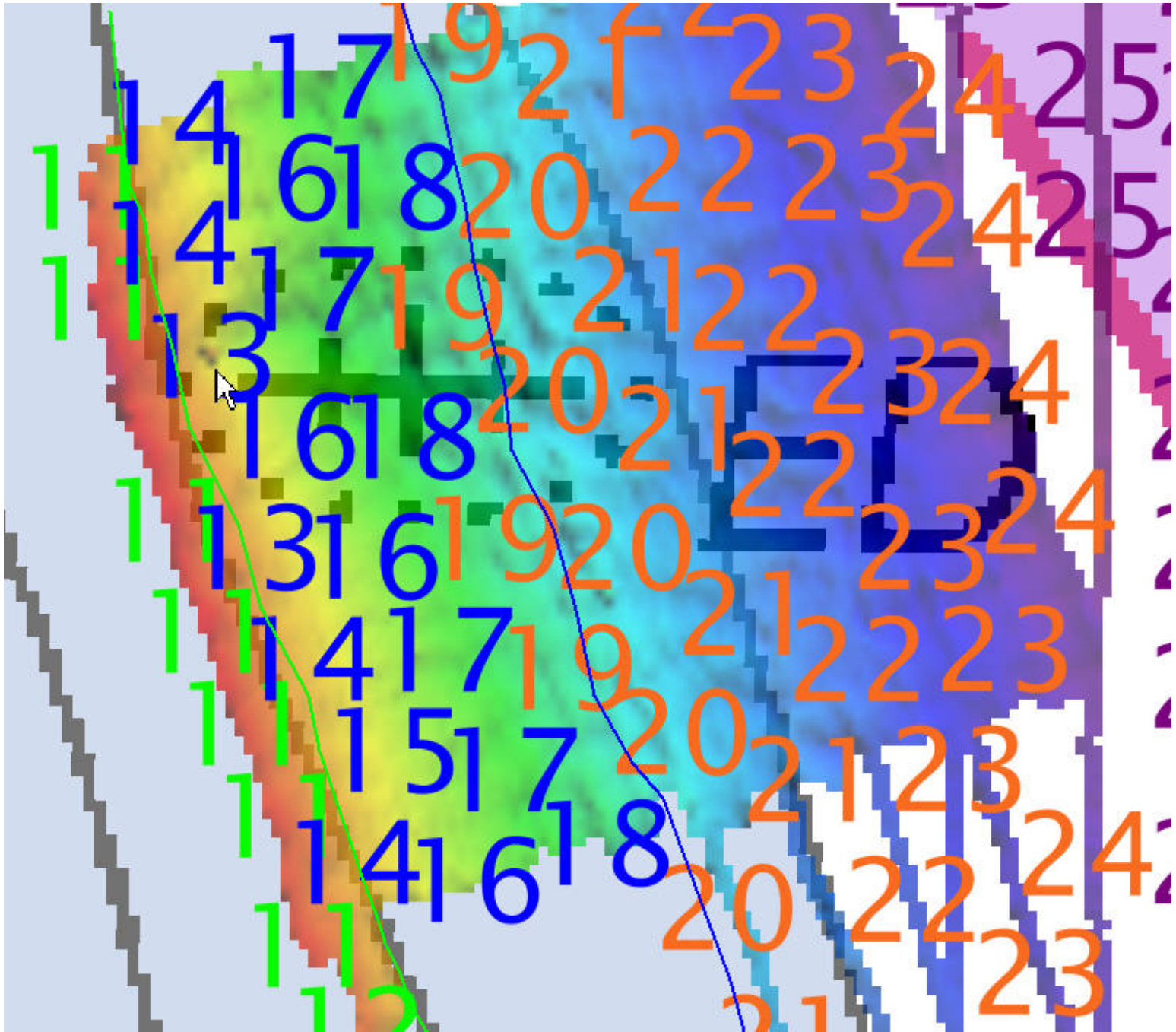


Figure 1.1.2

APPROVAL PAGE

H12316

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

The following products will be sent to NGDC for archive

- H12316_DR.pdf
- Collection of depth varied resolution BAGS
- Processed survey data and records
- H12316_GeoImage.pdf

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

Approved: _____

LT Abigail Higgins
Chief, Atlantic Hydrographic Branch