H12100

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: H12100

LOCALITY

State: Virginia

General Locality: Approaches to Chesapeake Bay, VA

Sub-locality: 17 NM NE of Cape Henry

2009

CHIEF OF PARTY
CDR SHEPARD M. SMITH, NOAA

LIBRARY & ARCHIVES

DATE

NOAA FORM 77-28 (11-72)	U.S. DEPARTMENT OF COMMERCE NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION	REGISTRY NUMBER:
HYDROGRAPHIC TITLE SHEET		**H12100**

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**		
Sub-Locality:	**17 NM NE of Chesapeake Bay**		
Scale:	**1:25,000**	Date of Survey:	**27 May 2009 to 14 July 2009**
Instructions Dated:	**6 Apr 2009**	Project Number:	**OPR-D304-TJ-09**
Vessel:	**NOAA Ship *Thomas Jefferson***		
Chief of Party:	**CDR Shepard M. Smith, NOAA**		
Surveyed by:	***Thomas Jefferson* Personnel**		
Soundings by:	**Reson 7125 echosounder**		
Graphic record scaled by:	**N/A**		
Graphic record checked by:	**N/A**		
Protracted by:	**N/A**	Automated Plot:	**N/A**
Verification by:	***Atlantic Hydrographic Branch***		
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.

Red, bold, italic notes made during office processing.

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Descriptive Report to Accompany Hydrographic Survey H12100

Project OPR-D304-TJ-09
17 NM NE of Cape Henry
Approaches to Chesapeake Bay, VA
Scale 1:25,000
27 May 2009 to 14 July 2009
NOAA Ship THOMAS JEFFERSON

A. AREA SURVEYED

This hydrographic survey was completed as specified by Hydrographic Survey Letter Instructions OPR-D304-TJ-09*, dated 6 April 2009. The survey area includes the Approaches to Chesapeake Bay, VA, approximately 17 NM NE of Cape Henry.
Submitted with original field records

Northern Limit	Southern Limit	Western Limit	Eastern Limit
37°05'26.37" N 075°44'40.49" W	36°59'12.95" N 075°45'18.87" W	37°02'33.59" N 075°48'19.46" W	37°02'25.36" N 075°42'02.01" W

Data acquisition was conducted from 27 May 2009 to 14 July 2009

This project responds to a request from the Maryland and Virginia Pilots Associations for modern hydrographic data in the approaches to the Chesapeake Bay. Over the next several years, there are plans for vessels with increasingly deeper drafts to be transiting the area. These plans have created a critical need for updated bathymetry and object detection in the approaches to the Chesapeake Bay.

Lineal Nautical Miles	
Single Beam Only	0
Multibeam Only	82.65
Side Scan Sonar Only	0
MBES & SSS Combo	988.4
Crosslines	61.12
Multibeam Developments	18.43
Side Scan Developments	0
Shoreline Investigation	0
Data acquired from 27 May 2009 to 14 July 2009	
Bottom samples collected	11
No AWOIS items investigated	0

Table 1: Hydrographic Survey Statistics

Survey limits of H12100 are shown in Figure 1.

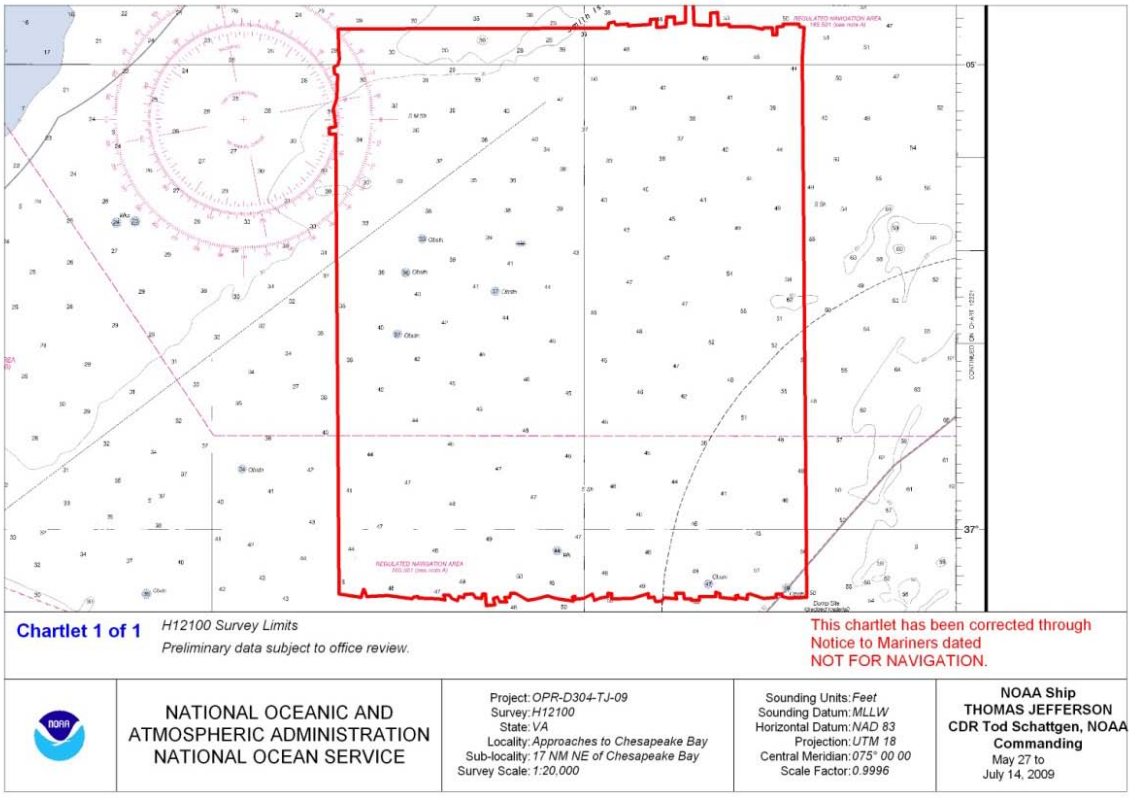


Figure 1: H12100 Sheet Limits

Calendar Date	Julian Day	Calendar Date	Julian Day
27 May 2009	147	16 June 2009	167
28 May 2009	148	17 June 2009	168
29 May 2009	149	18 June 2009	169
30 May 2009	150	7 July 2009	188
31 May 2009	151	8 July 2009	189
3 June 2009	154	9 July 2009	190
9 June 2009	160	10 July 2009	191
10 June 2009	161	11 July 2009	192
11 June 2009	162	12 July 2009	193
13 June 2009	164	14 July 2009	195

Table 2: Dates of Multibeam Data Acquisition in Calendar and Julian Days

B. DATA ACQUISTION AND PROCESSING

Refer to ***OPR-D304-TJ-09 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.
Submitted with H-Cell deliverable

B 1. EQUIPMENT AND VESSELS

Data was acquired by *Thomas Jefferson* and Hydro Survey Launch 3102. *Thomas Jefferson* acquired side-scan imagery, multibeam echosounder soundings, and sound velocity profiles. Hydro Survey Launch 3102 acquired side-scan imagery, multibeam echosounder soundings, and sound velocity profiles. Vessel configurations, equipment operation and data acquisition and processing were consistent with specifications described in the DAPR. *
Concur with clarification, some deviations between vessel configurations and specifications described in DAPR exist. *Submitted with H-Cell deliverable

B 2. QUALITY CONTROL

B 2.1 System Certification and Calibration

Refer to NOAA Ship THOMAS JEFFERSON DAPR* and Hydrographic Systems Readiness Report (HSRR) ** for a complete description of system integration and initial calibration results for equipment and sensors used for this survey.
Submitted with original field records. **HSSR Memo on file at AHB

B.2.2 Sounding Coverage

As per the Letter Instructions**, this survey was conducted using 200% SSS with concurrent bathymetry from multibeam. Side Scan Sonar coverage was monitored by creation of 100% and 200% coverage mosaics, each with 1m resolution. Multibeam developments were acquired over side scan contacts. A list of all side-scan sonar contacts is contained in Separates V**.

Concur. **Submitted with original field records

This sheet, H12100 was created to complete the remainder of sheet H12037 not completed during acquisition of that sheet.

Multibeam data collected during Side Scan holiday acquisition was rejected in processing and not included in final grids. ***Concur.***

B 2.3 Crosslines

Multibeam echosounder cross-lines totaling 61.12 lineal nautical miles, comprising 6.18 percent of main scheme hydrography, were acquired during the course of the survey.

Concur.

An evaluation of the Standard Deviation layer of the BASE surfaces was performed and these results indicate systematic errors primarily due to refraction from rapidly changing sound velocity profiles. A crossline to mainsheme statistical analysis was not performed in lieu of an evaluation of the BASE standard deviation layer in Section B2.5 Systematic errors, as per guidance from AHB (See Separates V).

Do not concur. No "guidance from AHB" is present in either Separates V or Appendix V.

B 2.4 Junctions and Prior Surveys

The following contemporary surveys junction with H12100:

Registry #	Scale	Date	Field Party	Junction side
H12038	1:20,000	2009	*Thomas Jefferson*	North West
H12037	1:25,000	2009	*Thomas Jefferson*	South West
H11652	1:10,000	2007	*Thomas Jefferson*	East

Survey H12100 junctions with H12038 in the North West. A comparison was made between H12100 and the concurrently acquired survey data from H12038. The difference in soundings between the two surveys is no greater 0.2 meter. ***Concur with clarification, difference in soundings between +/- 1 ft.***

Survey H12100 junctions with H12037 in the East. A comparison was made between H12100 and the recently acquired survey data from H120~~38~~*37*. The difference in soundings between the two surveys is no greater than 0.2 meter. ***Concur with clarification, difference in soundings between +/- 1 ft.***

Survey H12100 junctions with H11652 in the South West. Although this was a recent Thomas Jefferson survey, no sounding sets were available from AHB or HSD/OPS for comparison.

Do not concur. Selected soundings HOB files have been available since January 2008. A review of the junction shows H12100 soundings to be 1-2 ft deeper than H11652 in their common area.

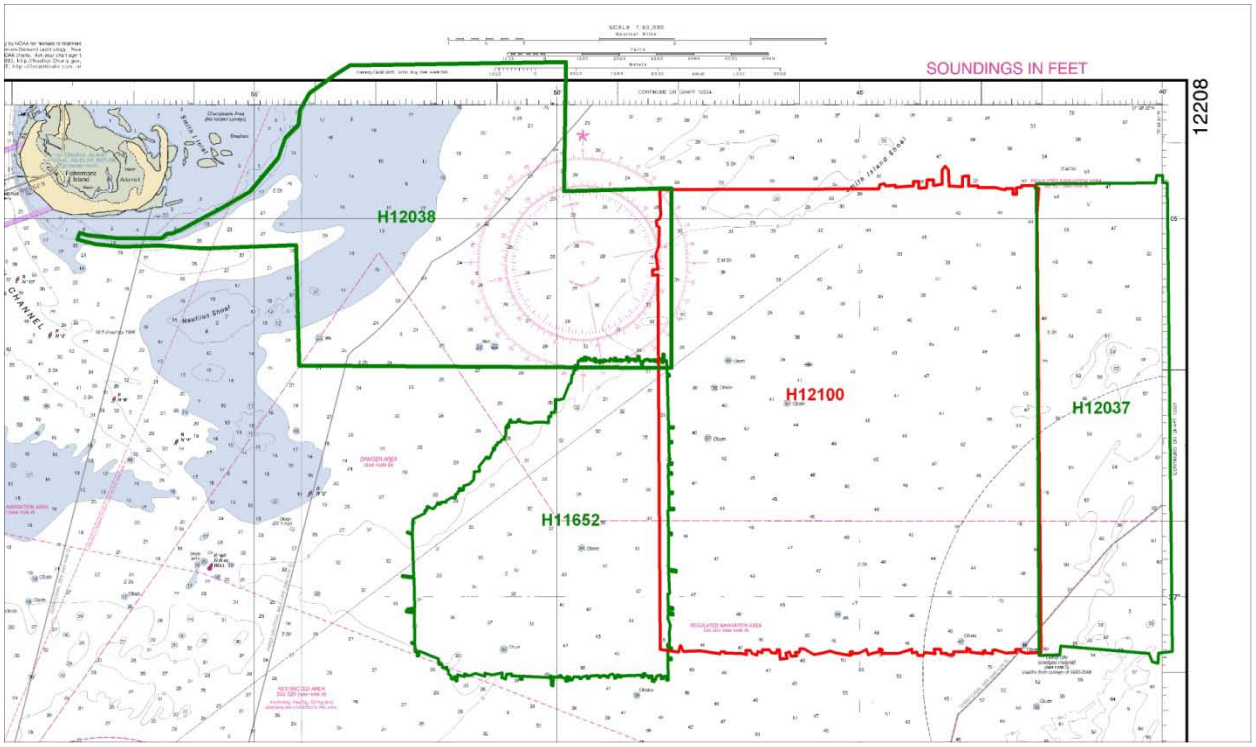


Figure 2: H12100 Junction Surveys

B 2.5 Systematic Errors

Due to a faulty RESON 7125 multibeam receiver on the TJ, which was replaced after this survey, a systematic artifact appears throughout the data as dual along track striping near nadir, ranging in height from 10cm to 20cm. This error is accounted for in the CARIS vessel configuration (TJ_S222_RESON7125.hvf) by adding a 0.200 m value for the Total Propagated Error for the delta draft. The problem was mitigated to a negligible amount upon installation of a new sonar head on 5 June, 2009. After the installation a new patch test was performed.

Explanation of how adding the 0.200 m value for TPE delta draft corrects the problem is missing.

A roll of 10°-15° was observed in the side scan towfish attitude during 200% acquisition. Attempts were made to correct this problem during acquisition by inducing counter strain on the tow cable, but little improvement was achieved. The artifact is predominantly in the starboard beams and affects only the 200% coverage.

Concur.

A thermocline was observed in shallower areas of the survey which caused distortion in some of the side scan imagery. To reduce this effect, the side scan towfish was operated at the lowest safe height above the seafloor, but in some areas this did not mitigate the problem.

Concur with clarification. Use of 200% coverage ensured good side scan image analysis.

Although not apparent in the standard deviation layer, there is a vertical offset of up to 45 cm between multibeam data collected during 100% and 200% main scheme acquisition. The cause of this is undetermined, but may include insufficient tidal correctors, inadequate frequency of static draft measurements or unknown dynamic draft effects due to strong currents in the area see figure ~~2~~*3*).

Concur. This problem occurs throughout survey H12100.

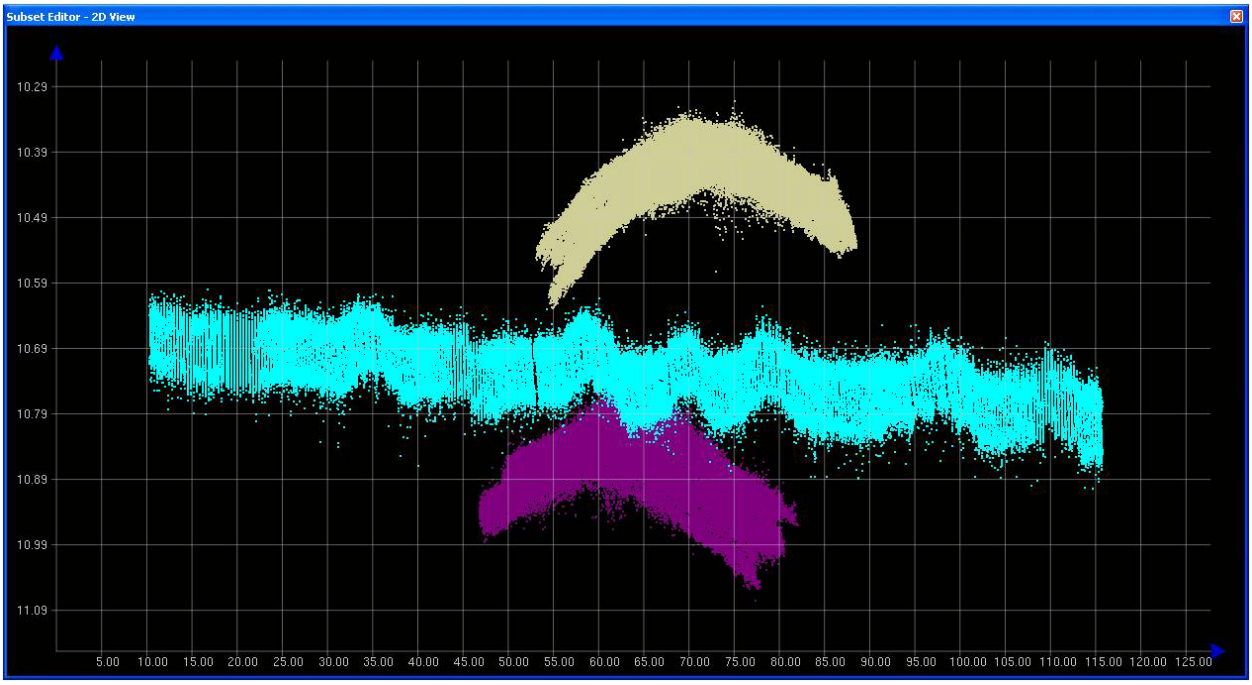


Figure 3: 100% to 200% Offset

Due to an inoperable MVP, sound velocity profiles were collected by CTD at the minimum 4 hour intervals throughout much of the acquisition period. As a result, a persistent sound velocity problem exists in most multibeam data collected by S-222. This is seen in the standard deviation layer as “bowties” at mainscheme/crosslines junctions (Figure 4).

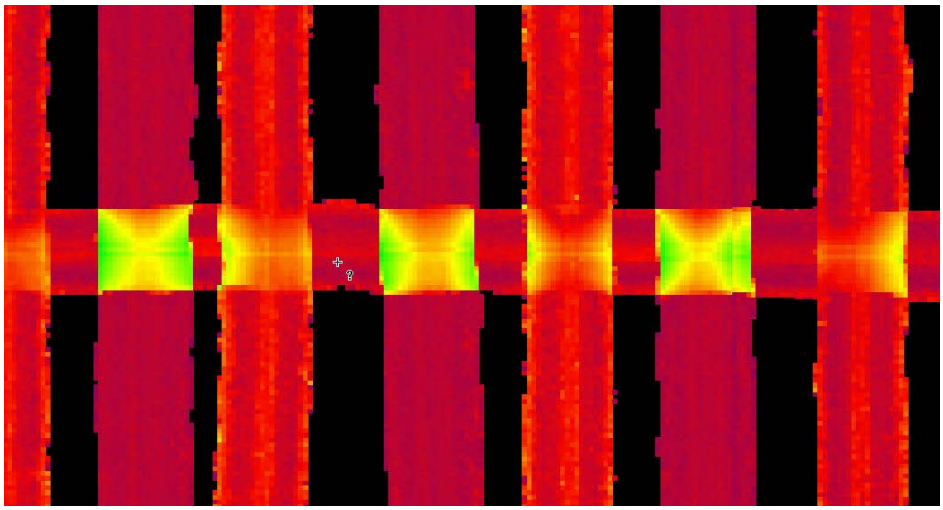


Figure 4: SVP errors

B 3. CORRECTIONS TO ECHO SOUNDING

HDCS sounding data were reduced to mean lower-low water (MLLW) using approved tides from the primary station at Chesapeake Bay Bridge Tunnel, VA (8638863) and secondary station at Kiptopeke, VA (8632200), adjusted for tidal constituents and residuals provided by CO-OPS as specified in the Letter Instructions** and illustrated in Figure 5.

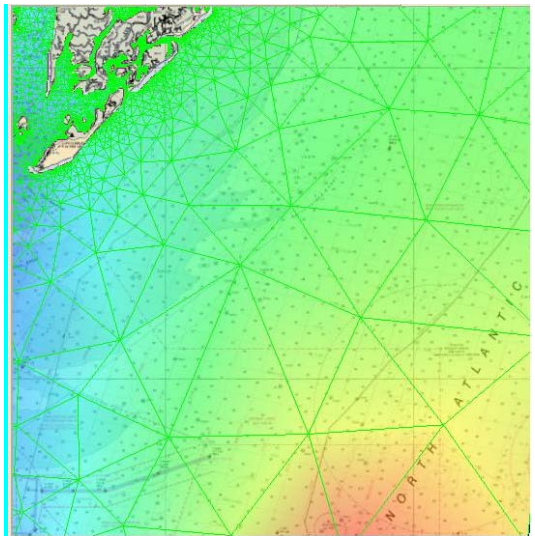


Figure 5: H12100 Final TCARI Zoning

All other datum reduction procedures conform to those outlined in the ***DAPR*.** All methods and instruments used for sound velocity correction were as described in the ***DAPR****. A table detailing all sound velocity casts is located in Separate II** of this Descriptive Report.

Concur with clarification. Separate II contains the calibration and configuration files for all sound speed devices and describes the method for comparisons but does not actually provide any cast information. *Submitted with H-Cell deliverable. **Submitted with original field records

B 4. DATA PROCESSING

B 4.1 Total Propagated Error

For the 2009 field season, Total Propagated Error (TPE) parameters for sound speed and tides are calculated separately for each project. The project-specific parameters for OPR-D304-TJ-09, Survey H12100 are as follows:

Project	Vessel	Tide Values		Sound Speed Values		
		Measured	Zoning	CTD	MVP	Surface
H12100	3102	TCARI	TCARI	4	NA	0.2
	S222	TCARI	TCARI	4	1	0.2

Table 3: TPE Parameters

These values were calculated for all MBES data immediately following CARIS Merge. ***Concur.***

B 4.2 BASE Surfaces and Mosaics

The following table describes all BASE Surfaces and Mosaics submitted as part of Survey H12100:

Name of Fieldsheet	Resolution	Type	Purpose
H12100_SSS_100_mosaic_final	1 meter	SSS	100% SSS Coverage
H12100_SSS_200_mosaic_final	1 meter	SSS	200% SSS Coverage
H12100_2m_NW_final	2 meter	cube	Sounding coverage
H12100_2m_NE_final	2 meter	cube	Sounding coverage
H12100_2m_SW_final	2 meter	cube	Sounding coverage
H12100_2m_SE_final	2 meter	cube	Sounding coverage
H12100_p5m_charted_object	0.5 meter	cube	Object Detection
H12100_p5m_charted_wreck1	0.5 meter	cube	Object Detection
H12100_p5m_charted_wreck2	0.5 meter	cube	Object Detection
H12100_p5m_uncharted_object1	0.5 meter	cube	Object Detection
H12100_p5m_uncharted_object2	0.5 meter	cube	Object Detection
H12100_p5m_uncharted_object3	0.5 meter	cube	Object Detection
H12100_p5m_uncharted_object4	0.5 meter	cube	Object Detection
H12100_p5m_uncharted_wreck	0.5 meter	cube	Object Detection

Table 4: Fieldsheets

This survey was processed using the Combined Uncertainty and Bathymetry Estimator (CUBE) algorithm. As per NOAA HTD 02-2009, The CUBE configuration was set to NOAA_2m for the two meter coverage surface for this entire survey. The CUBE configuration was set to

NOAA_.5m for the object detection surfaces. Refer to the 2009 Data Acquisition and Processing Report*, 2009 Field Procedures Manual, and CARIS HIPS/SIPS manual for further discussion. ***Concur. *Submitted with H-Cell deliverable***

B 4.3 Data cleaning

The survey data was cleaned using the swath and subset editor tools in CARIS. All areas of the BASE surface that indicated a high standard deviation were examined and cleaned as required such that no residual errors exist in the surface that exceed the IHO order 1 depth accuracy requirements. ***Concur with clarification. Survey data was inspected and cleaned by the reviewer at the Branch.***

C. VERTICAL AND HORIZONTAL CONTROL

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

C 1.1 Horizontal Control

The horizontal datum for this project is the North American Datum of 1983 (NAD83), zone 18N. Differential GPS (DGPS) was the sole method of positioning. The differential corrections from U.S. Coast Guard beacon at Annapolis, MD (301 kHz) was used during this survey. The proximal DGPS station at Driver, VA (289 kHz) was down due to maintenance at the time of survey. ***Concur.***

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

C 1.2 Vertical Control

The vertical datum for this project is Mean Lower-Low Water (MLLW). The operating National Water Level Observation Network (NWLON) station at Chesapeake Bay Bridge Tunnel, VA (8638863) and secondary station at Kiptopeke, VA (8632200) ~~will serve~~ ***served*** as datum control for H12100. Verified tides with final TCARI constituents and residuals were applied to all sounding data.

A request for delivery of final approved (verified) tides for this survey was forwarded to N/OPS1 on 17 July 2009 in accordance with the FPM and project letter instructions. Verified tides were applied on 8/22/2009 using approved TCARI zoning. ***Concur.***

D. RESULTS AND RECOMMENDATIONS

D.1 Chart Comparison

Survey H12100 was compared with chart 12208 (13th Ed.; August 2008, 1:50,000, Corrected through NM Mar 21, 2009), chart 12221 (80th Ed.; January 2009, 1:80,000, Corrected through LNM Jan 13, 2009, Corrected through NM Jan 17 ,2009), and ENC US5VA11M Chart

comparisons were performed in CARIS BASE Editor using a sounding layer from a combined, finalized 5 meter grid of the survey.

D 1.1 Chart 12208 Comparison

Depths from charts 12208 generally agree with the current survey, with differences generally 1-2 feet shoaler than charted depths. ***Concur with clarification, in the northern area, current soundings are consistently deeper by 1-2 ft.***

D 1.2 Chart 12221 Comparison

Depths from charts 12221 generally agree with the current survey, with differences generally 1-2 feet shoaler than charted depths. ***Concur with clarification. Soundings vary evenly throughout the survey area, shoaler and deeper than charted.***

D 1.3 ENC US5VA11M Comparison

Depths from ENC US5VA11M generally agree with the current survey, with differences generally 0.6 Meters shoaler than charted depths. ***Concur with clarification. Soundings vary evenly throughout the survey area +/- .6m.***

D.2 Additional Results

D.2.1 Charted Pipelines and Cables

There are no charted pipelines or cables in the survey area. ***Concur.***

D.2.2 Bridges, Ferry Routes, and Overhead Cables

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

D.3 Dangers to Navigation and Shoals

D 3.1 Dangers to Navigation

There are no dangers to navigation within the survey limits. ***Concur.***

D 3.2 Shoals

There Western portion of Smith Island Shoal has migrated approximately 200 meters to the south. See Figure 6 below. ***Concur.***

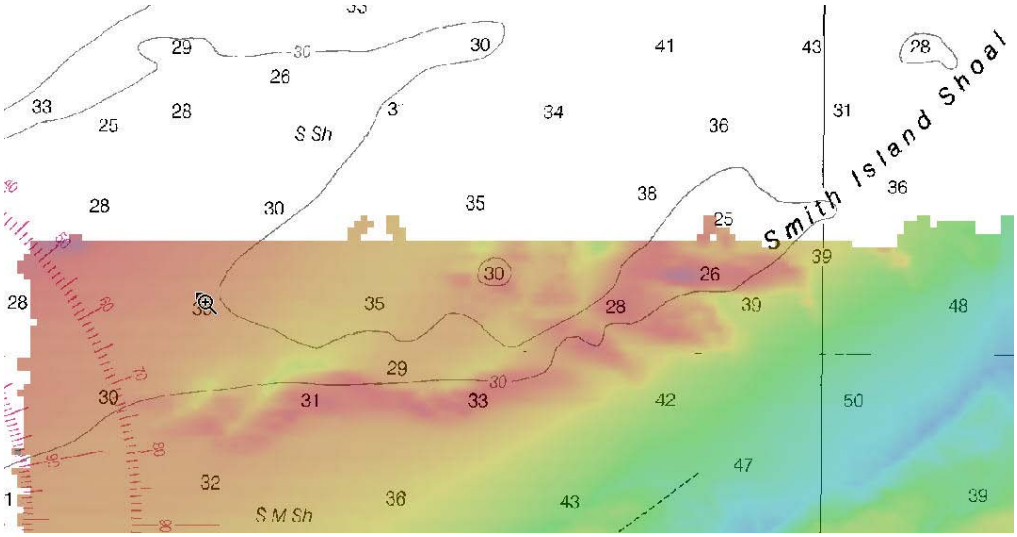


Figure 6: Smith Island Shoal

D.4 Aids to Navigation

There are no charted Aids to Navigation (ATON) within the limits of H12100. ***Concur.***

D.5 Coast Pilot Information

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

D.6 Miscellaneous

Bottom Samples

~~Twelve~~ ***Eleven*** bottom samples were collected within the survey area and a table is contained in Appendix V*** of this report.

****Appended to this report***

D.7 Adequacy of Survey

This survey is adequate to supersede charted depths and features within the common area.

Concur with clarification. Significant processing was performed by branch personnel.

D.8 Summary and Recommendations for Additional Work

This ~~is~~ survey is complete. No further work is required.

Concur with clarification. See D.7.

E. APPROVAL

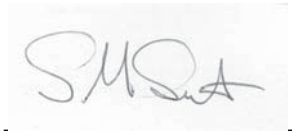
As Lead Hydrographer, I have ensured that standard field surveying and processing procedures were followed in producing this examination in accordance with the Office of Coast Survey Hydrographic Surveys Division's *Field Procedures Manual*, and NOS *Hydrographic Surveys Specifications and Deliverables*. 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-09 is submitted separately and contains additional information relevant to this survey.

Approved and Forwarded:

LT Jasper D. Schaer, NOAA
Field Operations Officer



CDR Shepard M. Smith, NOAA
Commanding Officer

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

Survey Managers:

ENS Ryan A. Watrtick, NOAA
Junior Officer

Daniel B. Wright
Chief Hydrographic Survey Technician

Appendix I

Dangers to Navigation

*No Dangers to Navigation were found during survey H12100.

Appendix II

Survey Feature Report

There were no AWOIS items assigned to survey H12100.

Charted Features

Registry Number: H12100

State: Virginia

Locality: Approaches to Chesapeake Bay, VA

Sub-locality: 16 NM NE of Cape Henry

Project Number: OPR-D304-TJ-09

Survey Dates: 05/31/2009 - 08/31/2009

Charts Affected

Number	Edition	Date	Scale (RNC)	RNC Correction(s)*
12208	13th	08/01/2008	1:50,000 (12208_1)	USCG LNM: 02/24/2009 (03/17/2009) NGA NTM: 06/09/2007 (03/21/2009)
12221	80th	01/01/2009	1:80,000 (12221_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	Charted 37ft Obstrn	GP	[None]	37° 02' 33.4" N	075° 46' 11.3" W	---
1.2	Charted Dangerous Wreck	GP	[None]	37° 03' 04.2" N	075° 45' 50.7" W	---
1.3	Charted 44ft Wk	Wreck	13.85 m	36° 59' 46.1" N	075° 45' 21.9" W	---
1.4	Charted 49ft Obstrn	Obstruction	16.75 m	36° 59' 21.9" N	075° 42' 16.7" W	---
1.5	Charted 47ft Obstrn	Obstruction	14.14 m	36° 59' 24.4" N	075° 43' 19.9" W	---
1.6	Charted 37ft Obstn	Obstruction	11.96 m	37° 02' 04.0" N	075° 47' 32.2" W	---
1.7	Charted 36ft Obstn	Obstruction	11.19 m	37° 02' 45.3" N	075° 47' 25.3" W	---
1.8	Charted 33ft Obstrn	Obstruction	10.19 m	37° 03' 08.0" N	075° 47' 11.8" W	---

1 - DR_Charted

1.1) Charted 37ft Obstrn

Survey Summary

Survey Position: 37° 02' 33.4" N, 075° 46' 11.3" W

Least Depth: [None]

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

Timestamp: 2009-243.09:17:17 (08/31/2009)

GP Dataset: ChartGPs - Digitized

GP No.: 8

Charts Affected: 12208_1, 12221_1, 12280_2, 12200_1, 13003_1

Remarks:

Feature not found in 100% or 200% Side Scan Sonar.

Feature Correlation

Address	Feature	Range	Azimuth	Status
ChartGPs - Digitized	8	0.00	000.0	Primary

Hydrographer Recommendations

Remove charted dangerous obstruction, chart current survey sounding.

S-57 Data

[None]

Office Notes

Concur.

1.2) Charted Dangerous Wreck

Survey Summary

Survey Position: 37° 03' 04.2" N, 075° 45' 50.7" W

Least Depth: [None]

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

Timestamp: 2009-243.09:21:39 (08/31/2009)

GP Dataset: ChartGPs - Digitized

GP No.: 9

Charts Affected: 12208_1, 12221_1, 12280_2, 12200_1, 13003_1

Remarks:

Feature not found in 100% or 200% Side Scan Sonar.

Feature Correlation

Address	Feature	Range	Azimuth	Status
ChartGPs - Digitized	9	0.00	000.0	Primary

Hydrographer Recommendations

Remove charted dangerous wreck, chart current survey sounding.

S-57 Data

[None]

Office Notes

Concur.

1.3) Charted 44ft Wk

Survey Summary

Survey Position: 36° 59' 46.1" N, 075° 45' 21.9" W

Least Depth: 13.85 m (= 45.43 ft = 7.572 fm = 7 fm 3.43 ft)

TPU (±1.96σ): **THU (TPEh)** ±1.007 m ; **TVU (TPEv)** ±0.427 m

Timestamp: 2009-151.08:39:13.758 (05/31/2009)

Survey Line: h12100 / tj_s222_reson7125_stbd / 2009-151 / 135_0830

Profile/Beam: 5147/1

Charts Affected: 12208_1, 12221_1, 12280_2, 12200_1, 13003_1

Remarks:

Charted wreck found with MB and SS.

Feature Correlation

Address	Feature	Range	Azimuth	Status
h12100/tj_s222_reson7125_stbd/2009-151/135_0830	5147/1	0.00	000.0	Primary
h12100/tj_s222_klein5000_sss100/2009-151/135_090531083800	0001	6.19	263.5	Secondary
ChartGPs - Digitized	2	6.59	316.6	Secondary (grouped)
ChartGPs - Digitized	3	7.33	316.5	Secondary (grouped)
h12100/tj_s222_klein5000_sss200/2009-190/235_090709024900	0001	8.25	227.6	Secondary

Hydrographer Recommendations

Update chart - Dangerous wreck least depth 45 ft

Cartographically-Rounded Depth (Affected Charts):

45ft (12208_1, 12221_1, 12280_2)

7 ½fm (12200_1, 13003_1)

S-57 Data

Geo object 1: Wreck (WRECKS)

Attributes: CATWRK - 2:dangerous wreck

OBJNAM - Charted 44ft Wk

QUASOU - 6:least depth known

SORDAT - 20090714

SORIND - US,US,graph,H12100

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

VALSOU - 13.848 m

WATLEV - 3:always under water/submerged

Office Notes

Concur. Delete charted wreck and add new wreck at survey depth and location.

Feature Images

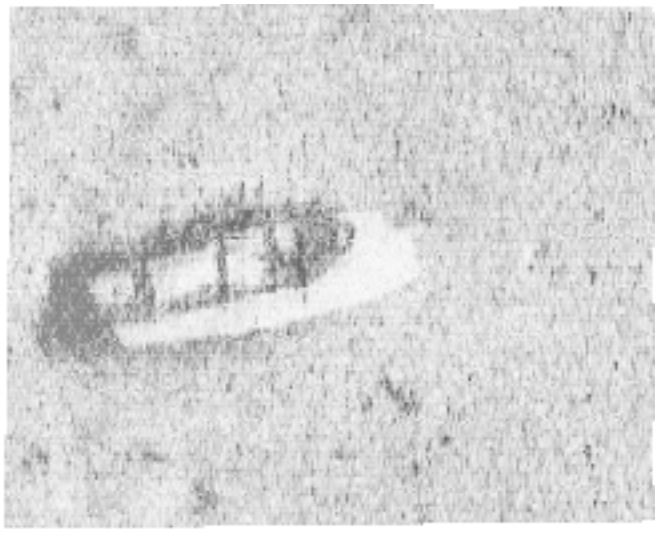


Figure 1.3.1

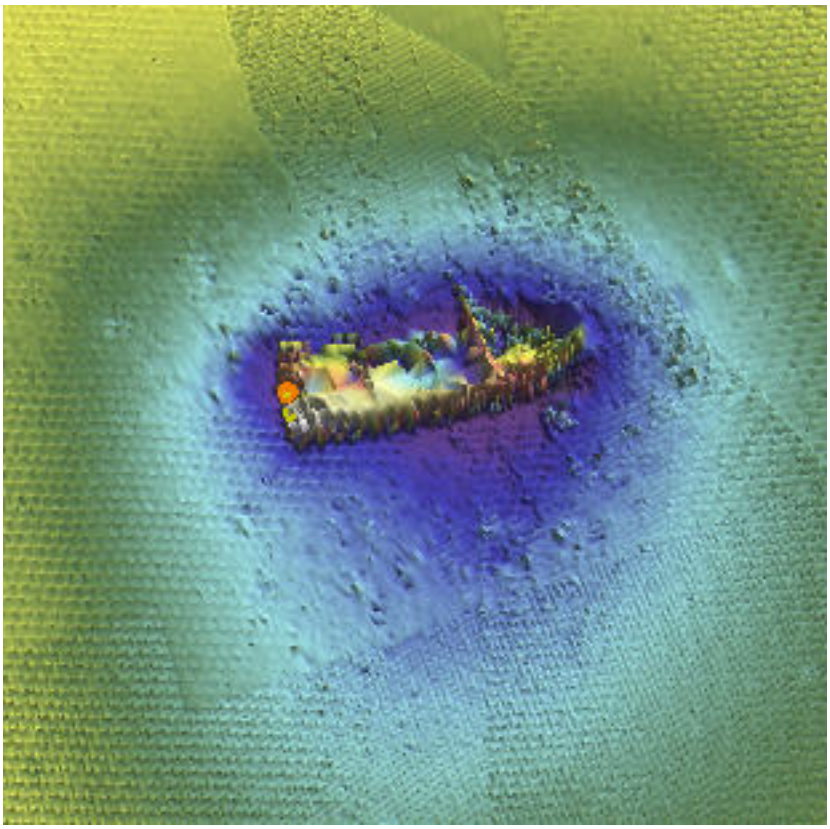


Figure 1.3.2

1.4) Charted 49ft Obstrn

Survey Summary

Survey Position: 36° 59' 21.9" N, 075° 42' 16.7" W

Least Depth: 16.75 m (= 54.96 ft = 9.160 fm = 9 fm 0.96 ft)

TPU (±1.96σ): **THU (TPEh)** ±1.001 m ; **TVU (TPEv)** ±0.410 m

Timestamp: 2009-192.23:40:40.548 (07/11/2009)

Survey Line: h12100 / tj_s222_reson7125_stbd / 2009-192 / 510_2340

Profile/Beam: 92/184

Charts Affected: 12208_1, 12221_1, 12280_2, 12200_1, 13003_1

Remarks:

Obstruction is insignificant

Feature Correlation

Address	Feature	Range	Azimuth	Status
h12100/tj_s222_reson7125_stbd/2009-192/510_2340	92/184	0.00	000.0	Primary
h12100/tj_s222_klein5000_sss200/2009-160/273_090609165000	0001	1.42	019.1	Secondary (grouped)
ChartGPs - Digitized	1	1.60	005.2	Secondary (grouped)
h12100/tj_s222_klein5000_sss100/2009-147/173_090527103300	0001	3.54	228.2	Secondary

Hydrographer Recommendations

Recommend removal from chart and chart current surveyed soundings.

Cartographically-Rounded Depth (Affected Charts):

55ft (12208_1, 12221_1, 12280_2)

9fm (12200_1, 13003_1)

S-57 Data

Geo object 1: Obstruction (OBSTRN)

Attributes: OBJNAM - Charted 49ft Obstrn

QUASOU - 6:least depth known

SORDAT - 20090714

SORIND - US,US,graph,H12100

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

VALSOU - 16.752 m

WATLEV - 3:always under water/submerged

Office Notes

Concur

Feature Images

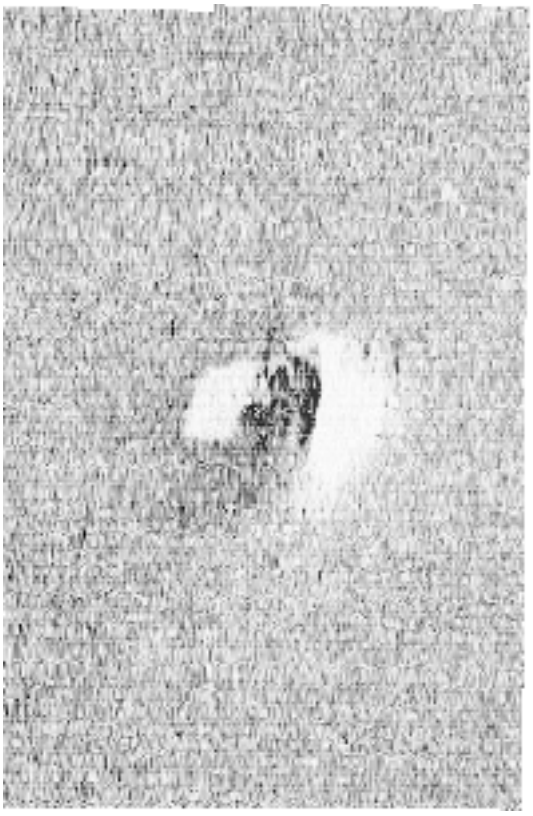


Figure 1.4.1

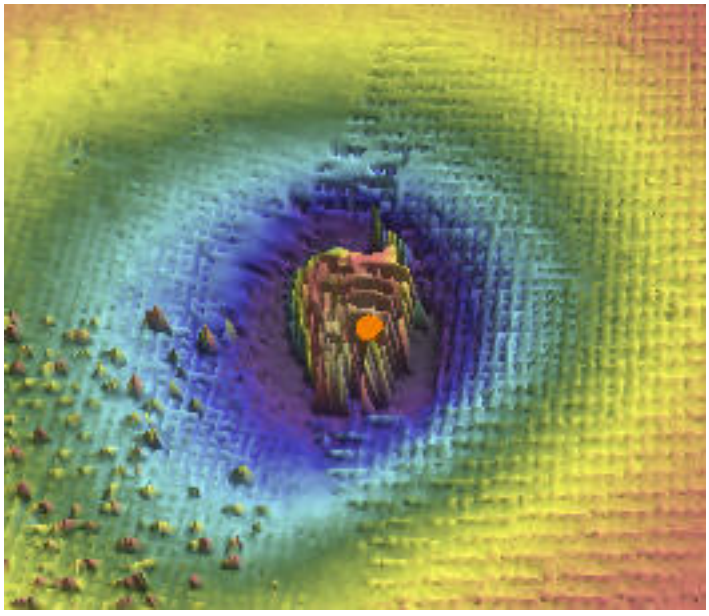


Figure 1.4.2

1.5) Charted 47ft Obstrn

Survey Summary

Survey Position: 36° 59' 24.4" N, 075° 43' 19.9" W

Least Depth: 14.14 m (= 46.37 ft = 7.729 fm = 7 fm 4.37 ft)

TPU (±1.96σ): **THU (TPEh)** ±1.000 m ; **TVU (TPEv)** ±0.408 m

Timestamp: 2009-192.23:08:56.280 (07/11/2009)

Survey Line: h12100 / tj_s222_reson7125_stbd / 2009-192 / 512_2306

Profile/Beam: 2094/333

Charts Affected: 12208_1, 12221_1, 12280_2, 12200_1, 13003_1

Remarks:

Charted obstruction found with MB and SS.

Feature Correlation

Address	Feature	Range	Azimuth	Status
h12100/tj_s222_reson7125_stbd/2009-192/512_2306	2094/333	0.00	000.0	Primary
h12100/tj_s222_klein5000_sss200/2009-188/260_090707235100	0001	0.96	210.4	Secondary
h12100/tj_s222_klein5000_sss200/2009-169/260_090618035500	0001	1.94	051.4	Secondary
ChartGPs - Digitized	4	2.42	298.9	Secondary (grouped)

Hydrographer Recommendations

Update charted obstruction with designated depth at surveyed position.

Cartographically-Rounded Depth (Affected Charts):

46ft (12208_1, 12221_1, 12280_2)

7 ¾fm (12200_1, 13003_1)

S-57 Data

Geo object 1: Obstruction (OBSTRN)

Attributes: OBJNAM - Charted 47ft Obstrn

QUASOU - 6:least depth known

SORDAT - 20090714

SORIND - US,US,graph,H12100

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

VALSOU - 14.135 m

WATLEV - 3:always under water/submerged

Office Notes

Concur with clarification. Delete charted 47ft obstruction, add 46ft obstruction at surveyed position.

Feature Images

Figure 1.5.1

Figure 1.5.2

1.6) Charted 37ft Obstn

Survey Summary

Survey Position: 37° 02' 04.0" N, 075° 47' 32.2" W

Least Depth: 11.96 m (= 39.25 ft = 6.542 fm = 6 fm 3.25 ft)

TPU (±1.96σ): **THU (TPEh)** ±1.001 m ; **TVU (TPEv)** ±0.409 m

Timestamp: 2009-191.01:37:12.076 (07/10/2009)

Survey Line: h12100 / tj_s222_reson7125_stbd / 2009-191 / 208_0121

Profile/Beam: 11148/112

Charts Affected: 12208_1, 12221_1, 12280_2, 12200_1, 13003_1

Remarks:

Charted obstruction found with MB and SS.

Feature Correlation

Address	Feature	Range	Azimuth	Status
h12100/tj_s222_reson7125_stbd/2009-191/208_0121	11148/112	0.00	000.0	Primary
h12100/tj_s222_klein5000_sss100/2009-154/109_090603101400	0001	2.21	251.0	Secondary
ChartGPs - Digitized	5	72.57	222.8	Secondary (grouped)

Hydrographer Recommendations

Revise charted location and depth with current survey.

S-57 Data

Geo object 1: Obstruction (OBSTRN)

Attributes: OBJNAM - Charted 37ft Obstrn

QUASOU - 6:least depth known

SORDAT - 20090714

SORIND - US,US,graph,H12100

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

VALSOU - 11.964 m

WATLEV - 3:always under water/submerged

Office Notes

Do not concur. Do not chart obstruction. Shoaler surrounding soundings exist. Chart survey soundings in surveyed location.

Feature Images

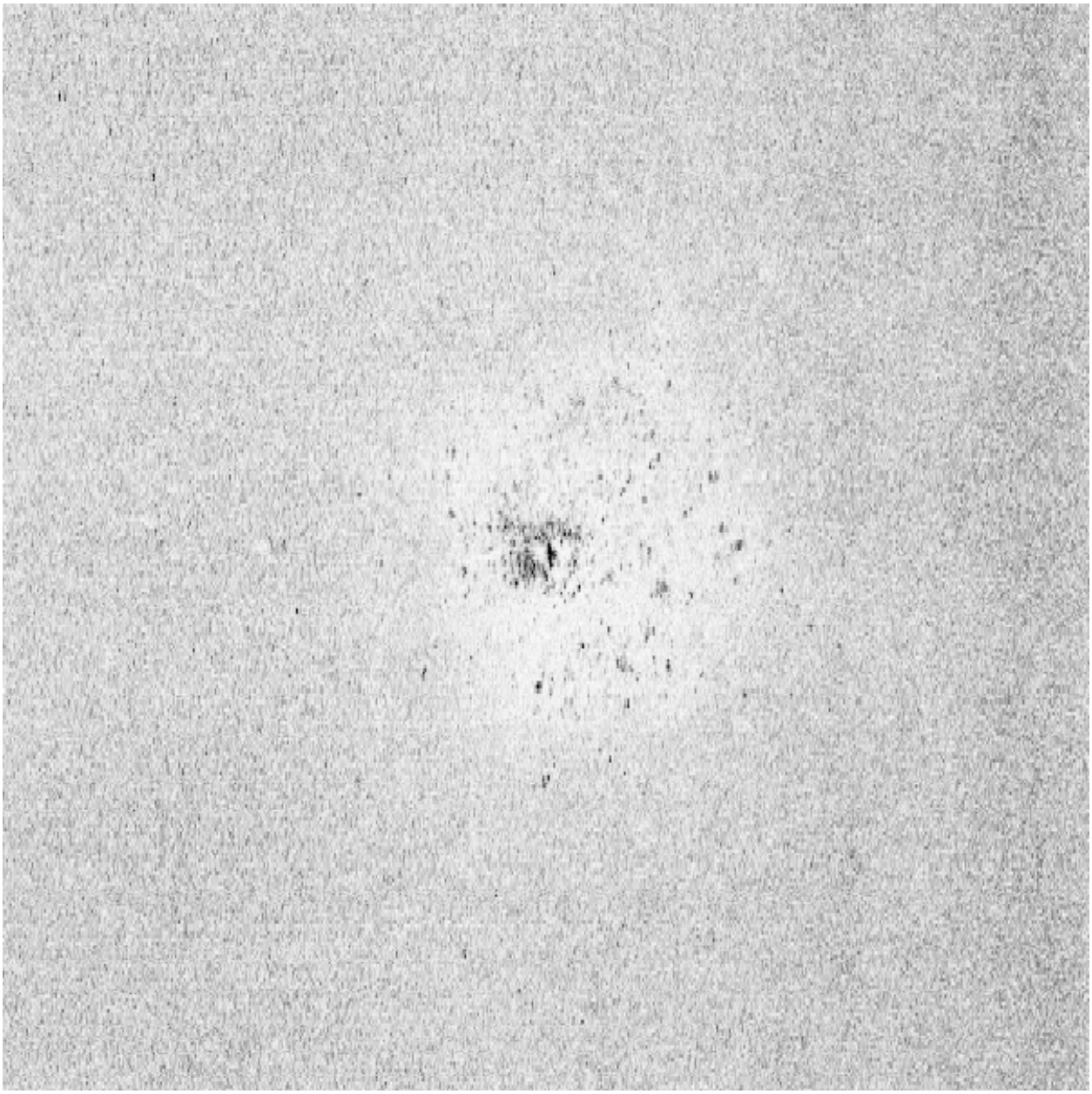


Figure 1.6.1

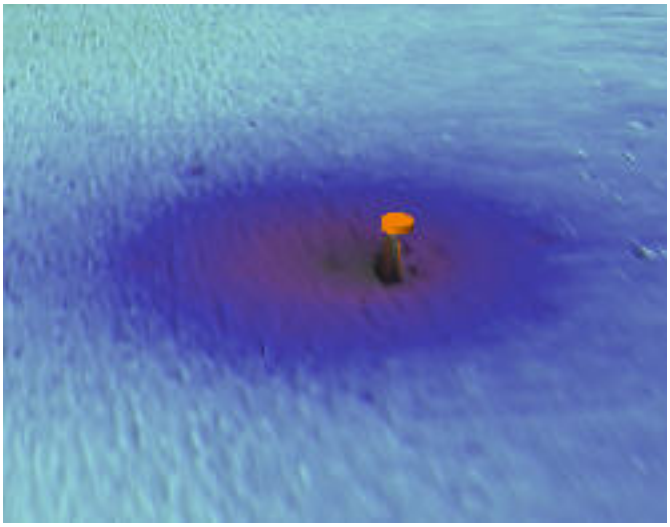


Figure 1.6.2

1.7) Charted 36ft Obstn

Survey Summary

Survey Position: 37° 02' 45.3" N, 075° 47' 25.3" W

Least Depth: 11.19 m (= 36.71 ft = 6.119 fm = 6 fm 0.71 ft)

TPU (±1.96σ): **THU (TPEh)** ±1.003 m ; **TVU (TPEv)** ±0.412 m

Timestamp: 2009-154.09:06:19.492 (06/03/2009)

Survey Line: h12100 / tj_s222_reson7125_stbd / 2009-154 / 110_0844

Profile/Beam: 15577/466

Charts Affected: 12208_1, 12221_1, 12280_2, 12200_1, 13003_1

Remarks:

Charted 36 Dangerous Obstruction found with MB and SSS.

Feature Correlation

Address	Feature	Range	Azimuth	Status
h12100/tj_s222_reson7125_stbd/2009-154/110_0844	15577/466	0.00	000.0	Primary
h12100/tj_s222_klein5000_sss100/2009-154/110_090603085900	0001	1.58	247.6	Secondary
ChartGPs - Digitized	6	39.44	258.0	Secondary (grouped)

Hydrographer Recommendations

Feature height is insignificant. Remomve charted dangerous obstruction and chart designated sounding in survey location.

S-57 Data

Geo object 1: Obstruction (OBSTRN)

Attributes:

OBJNAM - Charted 36ft Obstrn

QUASOU - 6:least depth known

SORDAT - 20090714

SORIND - US,US,graph,H12100

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

VALSOU - 11.190 m

WATLEV - 3:always under water/submerged

Office Notes

Concur with clarification. Remove 36ft Obstruction from chart. Chart survey soundings as appropriate.

Feature Images

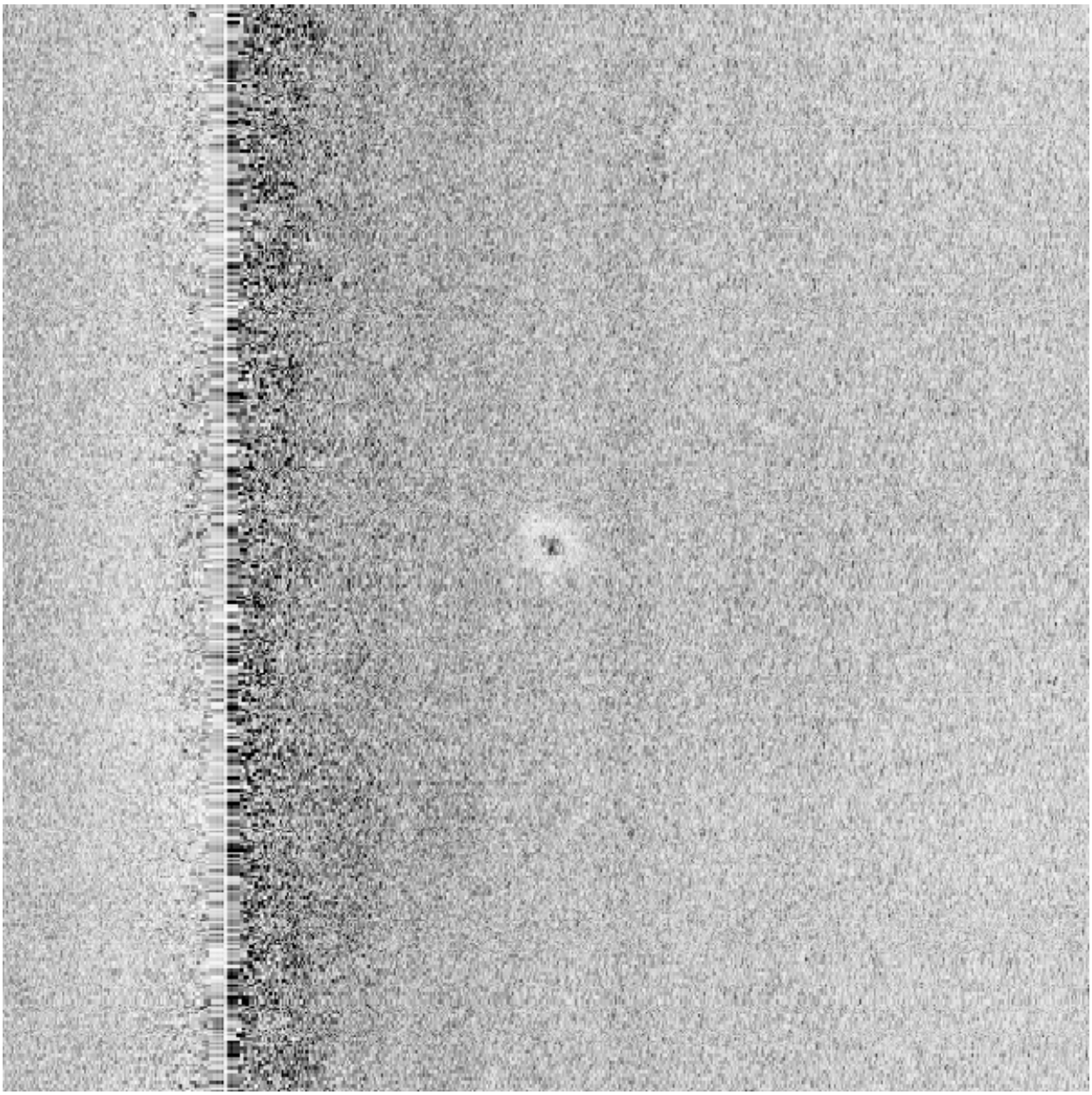


Figure 1.7.1

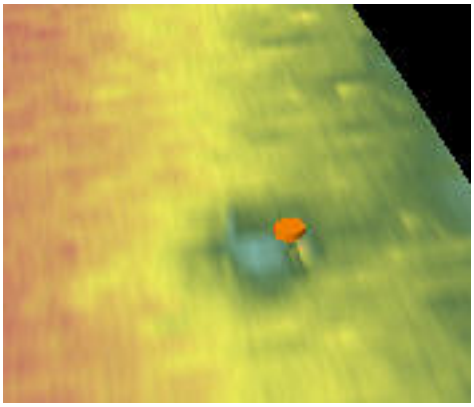


Figure 1.7.2

1.8) Charted 33ft Obstrn

Survey Summary

Survey Position: 37° 03' 08.0" N, 075° 47' 11.8" W

Least Depth: 10.19 m (= 33.43 ft = 5.571 fm = 5 fm 3.43 ft)

TPU (±1.96σ): **THU (TPEh)** ±1.000 m ; **TVU (TPEv)** ±0.406 m

Timestamp: 2009-154.07:04:42.028 (06/03/2009)

Survey Line: h12100 / tj_s222_reson7125_stbd / 2009-154 / 113_0657

Profile/Beam: 5381/348

Charts Affected: 12208_1, 12221_1, 12280_2, 12200_1, 13003_1

Remarks:

Obstruction found with MB, not found in 100% or 200% side scan.

Feature Correlation

Address	Feature	Range	Azimuth	Status
h12100/tj_s222_reson7125_stbd/2009-154/113_0657	5381/348	0.00	000.0	Primary
ChartGPs - Digitized	7	41.01	302.3	Secondary (grouped)

Hydrographer Recommendations

Revise charted dangerous obstruction to designated location.

Cartographically-Rounded Depth (Affected Charts):

33ft (12208_1, 12221_1, 12280_2)

5 ½fm (12200_1, 13003_1)

S-57 Data

Geo object 1: Obstruction (OBSTRN)

Attributes: OBJNAM - Charted 33ft Obstrn

QUASOU - 6:least depth known

SORDAT - 20090714

SORIND - US,US,graph,H12100

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

VALSOU - 10.189 m

WATLEV - 3:always under water/submerged

Office Notes

Do not concur. Scour exists but no feature height evident. Remove 33ft obstruction from chart.

Uncharted Features

Registry Number: H12100

State: Virginia

Locality: Approaches to Chesapeake Bay, VA

Sub-locality: 16 NM NE of Cape Henry

Project Number: OPR-D304-TJ-09

Survey Dates: 05/27/2009 - 07/11/2009

Charts Affected

Number	Edition	Date	Scale (RNC)	RNC Correction(s)*
12208	13th	08/01/2008	1:50,000 (12208_1)	USCG LNM: 02/24/2009 (03/17/2009) NGA NTM: 06/09/2007 (03/21/2009)
12221	80th	01/01/2009	1:80,000 (12221_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	52ft Sndg	Sounding	15.90 m	37° 05' 14.1" N	075° 42' 30.6" N	---
1.2	42ft Wreck	Wreck	13.03 m	37° 00' 30.3" N	075° 45' 46.3" W	---

1 - DR_UnCharted

1.1) 52ft Sounding

Survey Summary

Survey Position: 37° 05' 14.1" N, 075° 42' 30.6" W

Least Depth: 15.90 m (= 52.16 ft = 8.693 fm = 8 fm 4.16 ft)

TPU (±1.96σ): **THU (TPEh)** ±1.010m ; **TVU (TPEv)** ±0.434 m

Timestamp: 2009-193.01:54:54.555 (07/12/2009)

Survey Line: h12100 / tj_s222_reson7125_stbd / 2009-193 / 501_0152

Profile/Beam: 1951/498

Charts Affected: 12208_1, 12221_1, 12280_2, 12200_1, 13003_1

Remarks:

Wreck, partially covered with sand.

Feature Correlation

Address	Feature	Range	Azimuth	Status
h12100/tj_s222_reson7125_stbd/2009-147/171_1454	34817/391	0.00	000.0	Primary
h12100/tj_s222_klein5000_sss200/2009-160/271_090609184800	0001	4.87	177.1	Secondary

Hydrographer Recommendations

Chart non-dangerous wreck at designated location.

Cartographically-Rounded Depth (Affected Charts):

52ft (12208_1, 12221_1, 12280_2)

8 ¾fm (12200_1, 13003_1)

S-57 Data

Geo object 1: Sounding (SOUNDG)

Attributes: OBJNAM - 52ft Sounding

SORDAT - 20090714

SORIND - US,US,graph,H12100

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

VALSOU - 15.897 m

Office Notes

Do not concur. Not positively identified as a wreck. Further office review determined feature to be a seafloor object, seen thorughout the survey area. Chart sounding at surveyd location.

Feature Images

Figure 1.1.1

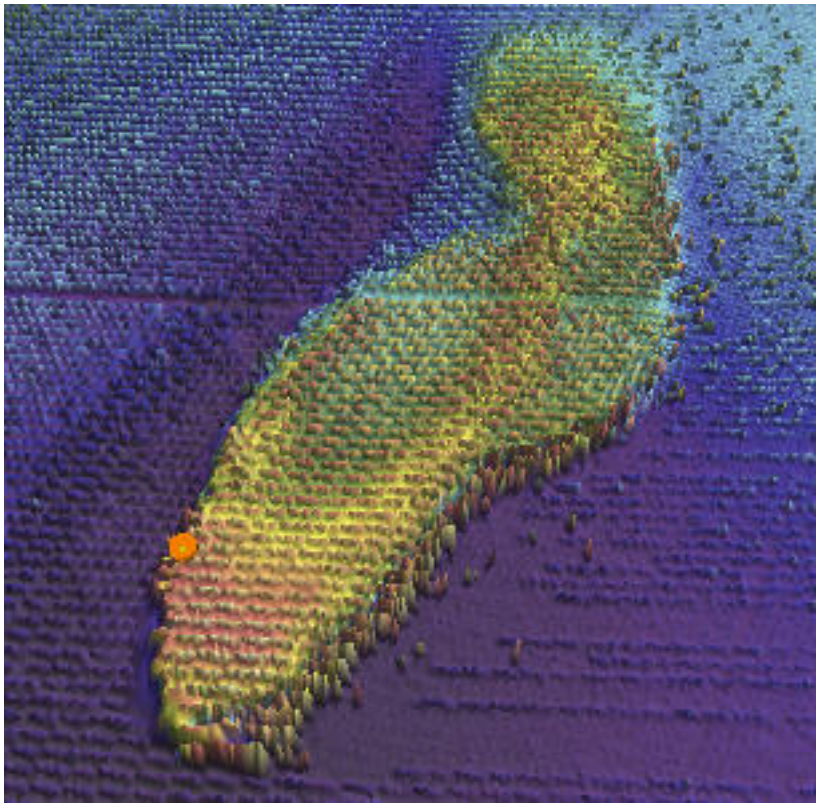


Figure 1.1.2

1.2) 42ft Wreck

Survey Summary

Survey Position: 37° 00' 30.3" N, 075° 45' 46.3" W

Least Depth: 13.03 m (= 42.74 ft = 7.124 fm = 7 fm 0.74 ft)

TPU (±1.96σ): **THU (TPEh)** ±1.000 m ; **TVU (TPEv)** ±0.407 m

Timestamp: 2009-192.19:30:44.089 (07/11/2009)

Survey Line: h12100 / tj_s222_reson7125_stbd / 2009-192 / 508_1929

Profile/Beam: 877/287

Charts Affected: 12208_1, 12221_1, 12280_2, 12200_1, 13003_1

Remarks:

Uncharted wreck found with MB and SS.

Feature Correlation

Address	Feature	Range	Azimuth	Status
h12100/tj_s222_reson7125_stbd/2009-192/508_1929	877/287	0.00	000.0	Primary
h12100/tj_s222_klein5000_sss200/2009-190/230_090709065400	0001	9.20	069.6	Secondary
h12100/tj_s222_klein5000_sss100/2009-151/130_090531101100	0001	9.92	130.9	Secondary
h12100/tj_s222_klein5000_sss200/2009-190/229_090709072300	0001	16.10	125.1	Secondary
h12100/tj_s222_reson7125_stbd/2009-151/130_1011	4715/480	16.60	135.0	Secondary

Hydrographer Recommendations

Chart Dangerous wreck in designated location.

Cartographically-Rounded Depth (Affected Charts):

42ft (12208_1, 12221_1, 12280_2)

7fm (12200_1, 13003_1)

S-57 Data

Geo object 1: Wreck (WRECKS)

Attributes: CATWRK - 2:dangerous wreck

OBJNAM - 42ft Wreck

QUASOU - 6:least depth known

SORDAT - 20090714

SORIND - US,US,graph,H12100

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

VALSOU - 13.028 m

WATLEV - 3:always under water/submerged

Office Notes

Concur.

Feature Images

Figure 1.2.1

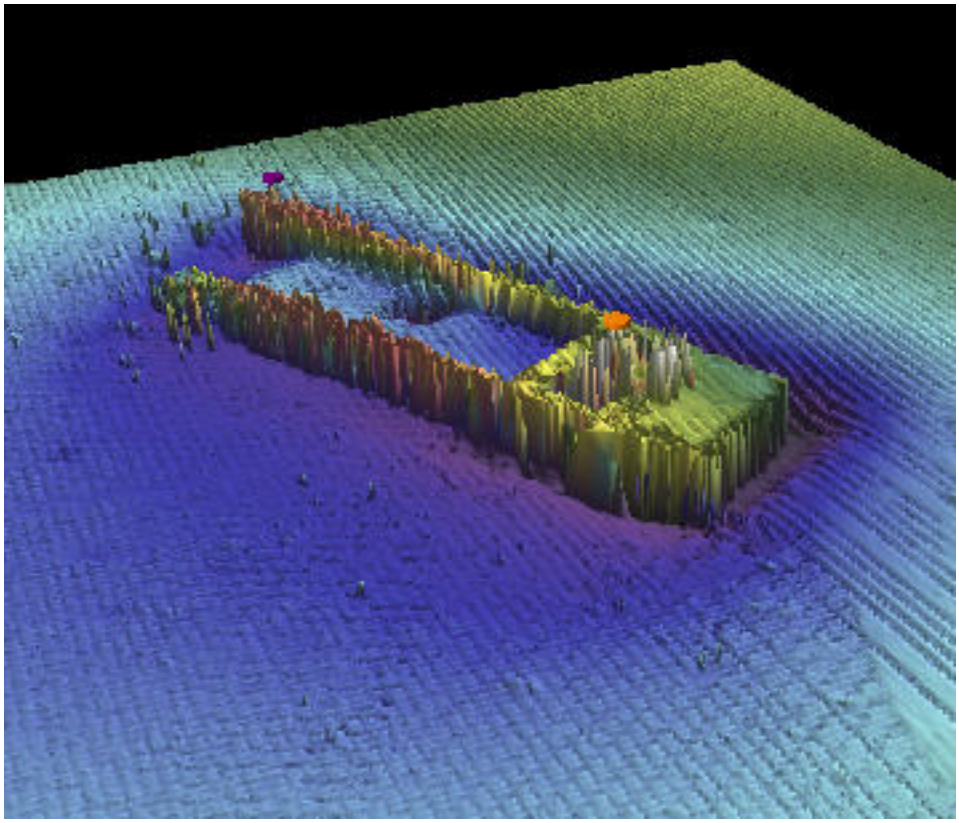
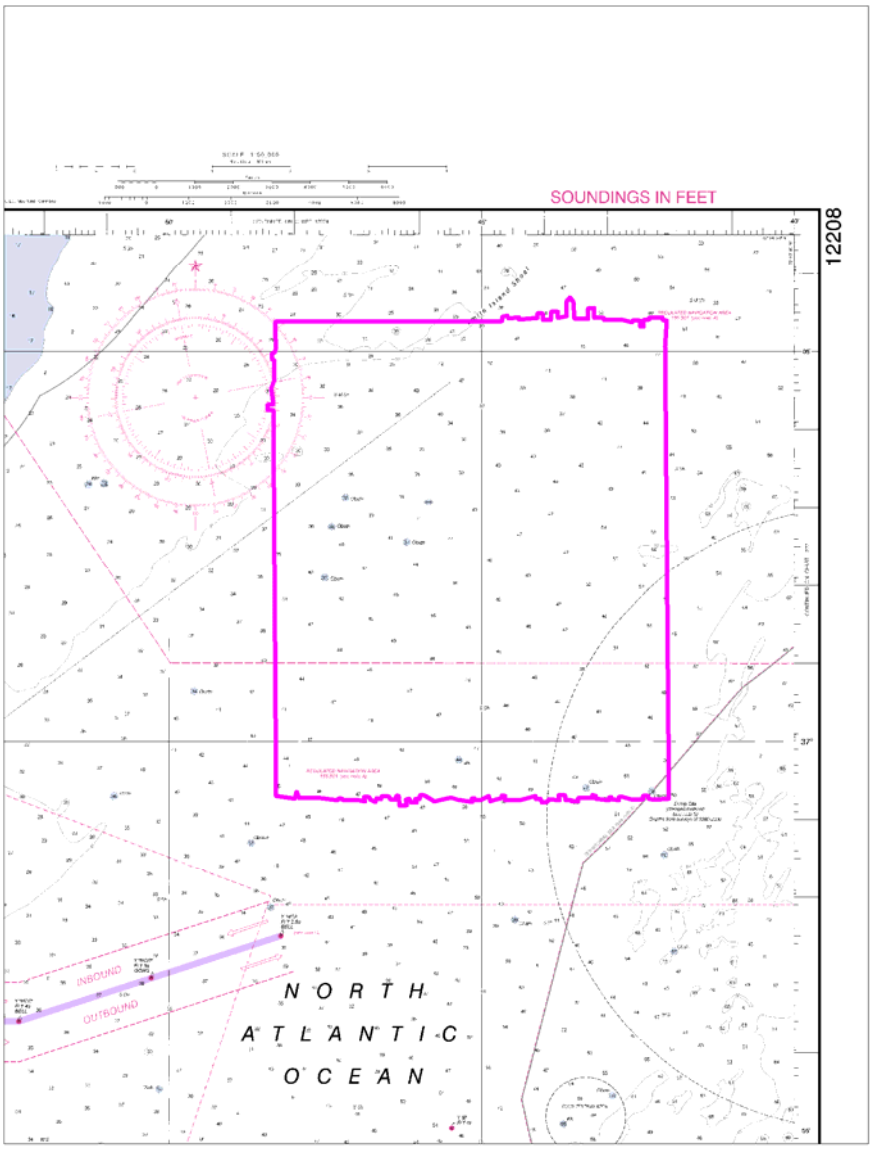


Figure 1.2.2

Appendix III

Progress Sketch



Project Number and Name	Sheet Identifier	Registry Number	HQ Estimated SNM	Sheet Start Date	Sheet End Date	Smooth Tides Request	Smooth Tides Received	Cumulative % Complete at the end of March	Cumulative % Complete at the end of April	Cumulative % Complete at the end of May	Cumulative % Complete at the end of June	Cumulative % Complete at the end of July	C
OPR-D304, Appr. to Chesapeake Bay, VA	1	H12037	39	4/6/09	4/17/09	4/21/09	5/18/09		100%				
	2	H12038	19	5/27/09	7/21/09	7/23/09	8/14/09			30%	95%	100%	
	3	H12039	13	6/12/09	7/21/09	7/22/09	8/14/09				30%	100%	
	4	H12100	30	5/27/09	7/15/09	7/17/09	8/14/09			30%	65%	100%	

APPENDIX IV

Tides and Water Levels

UNITED STATES DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration
NOAA Ship THOMAS JEFFERSON (MOA-TJ)
439 West York St
Norfolk, VA 23510-1145

July 17, 2009

MEMORANDUM FOR: Chief, Requirements and Development Division, N/OPS1

FROM: CDR Shepard M. Smith, NOAA Ship THOMAS JEFFERSON (MOA-TJ)

SUBJECT: Request for Approved Tides/Water Levels

Please provide the following data:

1. Tide Note
2. Final TCARI grid
3. Final zoning in MapInfo and .MIX format
4. Six Minute Water Level data (Co-ops web site)

Transmit data to the following:

NOAA/NOS/Atlantic Hydrographic Branch
N/CS33, Building #2
439 West York Street
Norfolk, VA 23510
ATTN: Chief AHB

NOAA Thomas Jefferson
439 West York Street
Norfolk, VA 23510
ATTN: Commanding Officer

These data are required for the processing of the following hydrographic survey:

Project No.:	OPR-D304-TJ-09
Registry No.:	H12100
State:	Virginia
Locality:	Approaches to Chesapeake Bay, VA
Sublocality:	16 NM NE of Cape Henry

Attachments containing:

1) an Abstract of Times of Hydrography,
2) digital MID MIF files of the track lines from Pydro

cc: N/CS33
MOC/TJ

Generated by Pydro v9.6 (r2698) on Fri Jul 17 16:57:56 2009 [UTC]

Year_DOY	Min Time	Max Time
2009_146	23:49:39	23:59:58
2009_147	00:00:04	19:19:11
2009_148	15:20:42	20:33:07
2009_149	17:17:59	23:32:00
2009_150	15:26:03	21:32:18
2009_151	01:25:09	21:19:16
2009_154	03:02:48	11:56:01
2009_160	06:15:18	18:50:52
2009_167	23:38:20	23:54:07
2009_168	00:20:40	23:55:56
2009_169	00:00:00	05:35:09
2009_188	23:27:50	23:56:49
2009_189	00:00:08	23:58:54
2009_190	00:00:11	23:59:16
2009_191	00:04:46	09:08:05
2009_192	14:01:17	23:57:11
2009_193	00:10:31	02:33:57
2009_195	14:00:47	21:23:11

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

TIDE NOTE FOR HYDROGRAPHIC SURVEY

DATE : August 13, 2009

HYDROGRAPHIC BRANCH: Atlantic
HYDROGRAPHIC PROJECT: OPR-D304-TJ-2009
HYDROGRAPHIC SHEET: H12100

LOCALITY: 16 NM NE OF Cape Henry, Approaches to Chesapeake Bay, VA
TIME PERIOD: May 26 - July 14, 2009

TIDE STATION USED: CBBT, VA 863-8863
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

TIDE STATION USED: Kiptopeke, VA 863-2200
Lat. 37° 10.0' N Long. 75° 59.3' W
PLANE OF REFERENCE (MEAN LOWER LOW WATER): 0.000 meters
HEIGHT OF HIGH WATER ABOVE PLANE OF REFERENCE: 0.827 meters

REMARKS: RECOMMENDED GRID

Please use the TCARI grid "D304TJ2009-TCARI" as the final grid for project OPR-D304-TJ-2009, H12100 during the time period between May 26 - July 14, 2009.

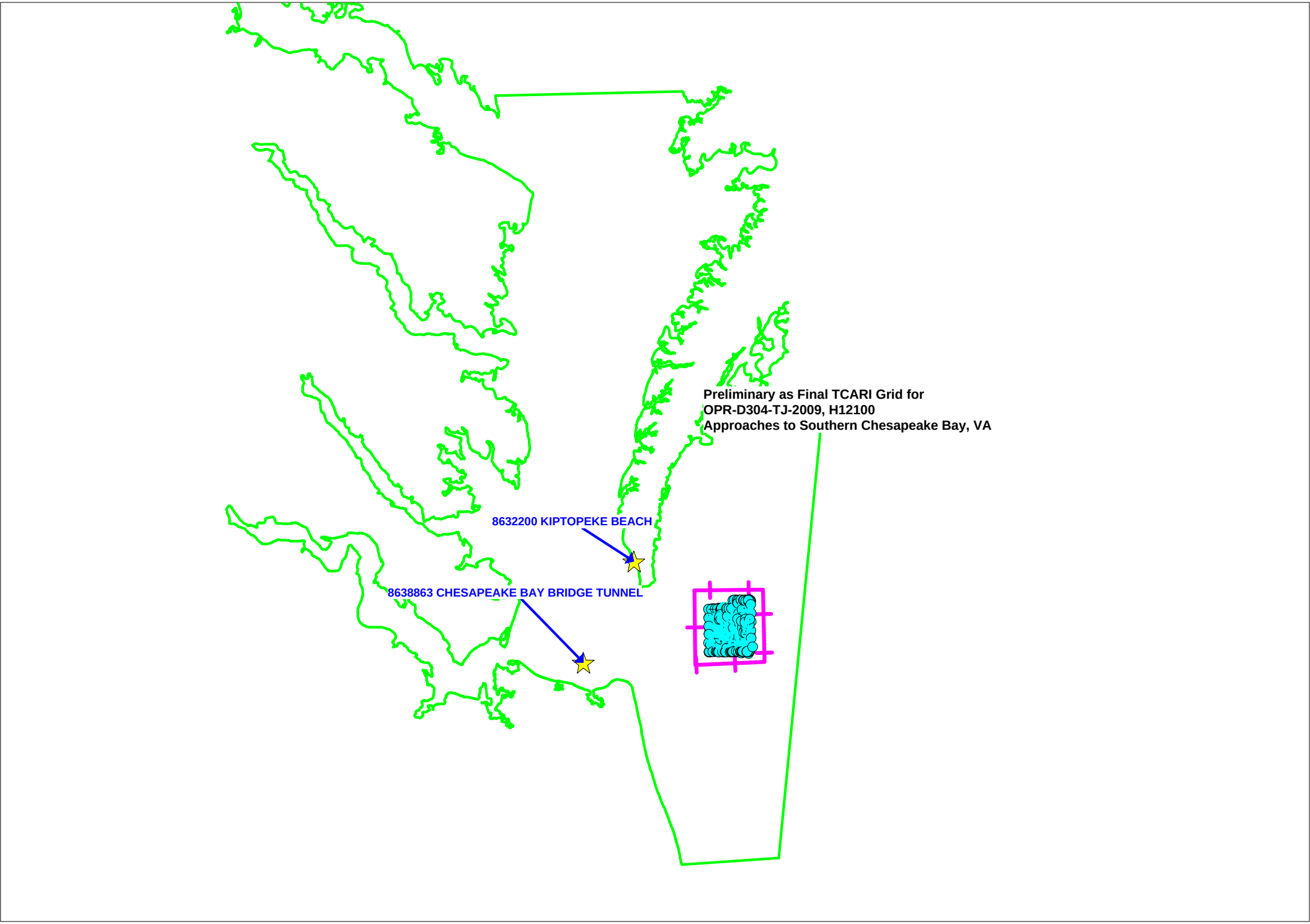
Refer to attachments for grid information.

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=CO-OPS, ou=NOAA/NOS, email=peter.stone@noaa.gov, c=US
Date: 2009.08.13 17:26:30 -04'00'

CHIEF, OCEANOGRAPHIC DIVISION


Preliminary as Final TCARI Grid for
OPR-D304-TJ-2009, H12100
Approaches to Southern Chesapeake Bay, VA
8632200 KIPTOPEKE BEACH
8638863 CHESAPEAKE BAY BRIDGE TUNNEL

Appendix V

Supplemental Survey Records and Correspondance

Company
Att.: Name
Street Adress
Street Adress line 2
City
Zip code – State
Country

LOAN AGREEMENT

Date : 05-JUN-09
Pages : 2
Your ref :
Our ref……:

Loan agreement between:

RESON A/S
Fabriksvangen 13
3550 Slangerup
Denmark

and the customer:

NOAA Ship THOMAS JEFFERSON
439 W York St
Norfolk, VA 23510
USA

The following agreement has been made regarding loan of a 7125 system from RESON for the purpose of usage by the customer to their clients.

Description of the equipment:
New replacement value: **50,000**

S/N 2208050

1. Period of loan and hire fee/day rate:

   Shipment date: 05-Jun-2009 **Return date:** upon return of RMA #501727

   The above mentioned return date shall not exceed without prior special arrangement otherwise a day rate of **Euro €xxxx** shall apply.

2. Insurance – equipment must be fully insured by the customer during the period of the loan and shall provide proof of insurance on request.
3. RESON emphasise that the customer has full responsibility for the safe return of the equipment and any equipment loss or damage must be paid for in full by the customer.
4. RESON emphasise that the customer has full responsibility for shipment to their premises and any place of use and for safe return of above equipment to RESON on above adress. RESON can not be held liable for any cost or losses due to this shipment.
5. All transportation costs will be met by the customer.
6. The equipment specified above is and remains the property of RESON. The recipient shall not sell, mortgage, assign, pledge, let or hire, part with possession, or otherwise deal with the equipment.
7. RESON may at any time cancel this agreement with immediate effect and take repossession of the equipment.

8. All manuals, system specifications, drawings etc delivered with the equipment must be returned to RESON together with any copies there of at the termination of this agreement
9. RESON shall, at all reasonable times be granted permission to inspect the equipment.
10. The customer acknowledges that according to EU and Danish law the system/equipment is subject to export control as per pos. 6A001a1.a in the control list, and may require an export license for shipment out of Europe.
11. **Please print and sign this form and fax it to RESON A/S.** Fax number is +45 4738 0066.

For RESON A/S	**For customer**
Date:	Date: 5 June 2009
Name:	Name: LT Jasper D. Schaer, NOAA
Title:	Title: Operations Officer
Signature: _____	Signature: _____

This Document is for Office Process use only and is intended to supplement, not supersede or replace, information/recommendations in the Descriptive or Evaluation Reports

AHB COMPILATION LOG

General Survey Information	
REGISTRY No.	***H12100***
PROJECT No.	***OPR-D304-TJ-09***
FIELD UNIT	***THOMAS JEFFERSON***
DATE OF SURVEY	***20090527-20090714***
LARGEST SCALE CHART	***12208, edition 14, August 2009, 1:50,000***
SOUNDING UNITS	***Feet***
COMPILER	***Wyllie***

Source Grids	**File Name** H:\Compilation\H12100_D304_TJ\AHB_H12100\SAR Final Products\GRIDS\
	H12100_NE_cube_NOAA_2m_Final.csar
	H12100_NW_cube_NOAA_2m_Final.csar
	H12100_SE_cube_NOAA_2m_Final.csar
	H12100_SW_cube_NOAA_2m_Final.csar
Surfaces	**File Name** H:\Compilation\H12100_D304_TJ\AHB_H12100\COMPILE\Working
Combined	***H12100_4m_Combined.hns***
Interpolated TIN	***\Interpolated TIN\H12100_12m_InterpTIN.hns***
Shifted Interpolated TIN	***\Shifted Surface\H12100_12m_InterpTIN_Shifted.hns***
Final HOBs	**File Name** H:\Compilation\H12100_D304_TJ\AHB_H12100\COMPILE\Final_Hobs
Survey Scale Soundings	***H12100_SS_Soundings.hob***
Chart Scale Soundings	***H12100_CS_Soundings.hob***
Contour Layer	***H12100_Contours.hob***
Feature Layer	***H12100_Features.hob***
Meta-Objects Layer	***H12100_MetaObjects.hob***
Blue Notes	***H12100_BlueNotes.hob***

Meta-Objects Attribution	
Acronym	**Value**
M_COVR	
CATCOV	***Coverage available***
SORDAT	***20090714***
SORIND	***US,US,graph,H12100***
M_QUAL	
CATZOC	***zone of confidence U (data not assessed)***
INFORM	***NOAA Ship Thomas Jefferson***
POSACC	***10***
SORDAT	***20090714***
SORIND	***US,US,graph,H12100***
SUREND	***20090714***
SURSTA	***20090527***
DEPARE	
DRVALV 1	***24.6227ft***
DRVALV2	***63.9698ft***
SORDAT	***20090714***
SORIND	***US,US,graph,H12100***

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SPECIFICATIONS:

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

II. SURVEY SCALE SOUNDINGS (SS):
   a. Radius
   b. Shoal biased
   c. Use Single-Defined Radius (mm at Map Scale): Radius Value = 1.1
   d. Queried Depth of All Soundings
      i. Minimum: 24.6627ft
      ii. Maximum: 63.9698ft

III. INTERPOLATED TIN SURFACE:
   a. Resolution (m): 12
   b. Natural Neighbor
   c. Shifted value: -0.75ft

IV. CONTOURS:
   a. Use a Depth List: H12100_NOAA_depth_curves.txt
   b. Line Object: DEPCNT
   c. Value Attribute: VALDCO

V. CHART SURVEY SOUNDINGS (CS):
   a. Number of ENC CS Soundings:125
   b. Radius
   c. Shoal biased
   d. Use Single-Defined Radius: m on the ground: H12100_CS_SSR.txt
   e. Filter: Interpolated != 1
   f. Number Survey CS Soundings:159

ATLANTIC HYDROGRAPHIC BRANCH
H-CELL REPORT to ACCOMPANY
SURVEY H12100 (2009)

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

B. DATA ACQUISITION AND PROCESSING

B.2. QUALITY CONTROL

B.2.1. H-Cell

The AHB source depth grid for the survey's nautical chart update product entailed the field's 2m grids, combined at a 4m resolution. The survey scale soundings were created from the combined grid at 1.1mm radius at 1:50,000. The chart scale selected soundings are a subset of the survey scale selected soundings. The surface model was referenced when selecting the chart scale soundings, to ensure that the selected soundings portrayed the bathymetry within the common area.

A TIN (Triangulated Irregular Network) surface was created from the survey scale soundings from which an interpolated surface was generated for the purpose of automatically generating depth contours. These contours were minimally edited and forwarded to MCD for reference only. The contours were utilized during chart scale sounding selection and quality assurance efforts at AHB. The depth contours are incorporated into the SS H-Cell product as per 2009 H-Cell Specifications.

The pre-compilation products or components (Stand Alone HOB files (SAHOB)) are detailed in the Compile Log attached directly before this H-Cell Report. The SAHOB files included depth areas (DEPARE), depth contours (DEPCNT), sounding selections (SOUNDG), features (OBSTRN, SBDARE, WRECKS), Meta objects (M_COVR, M_QUAL), and cartographic Blue Notes ($CSYMB).

All of the components with the exception of the sounding selection and depth contours were inserted into one feature layer (including the Blue notes, as dictated by Hydrographic Technical Directive 2008-8 and HSD's H-Cell Specifications 2009). The SAHOB H-Cell layers were exported to S-57 format for the H-Cell deliverable. H12100 H-Cell chart scale soundings were selected based upon the scale of the applicable chart. The H-Cell's SS deliverable includes survey scale selected soundings and depth contours.

The SAHOB's were exported from CARIS Bathy DataBASE to a metric S-57 file (H12100_SS_metric.000 and H12100_CS_metric.000). These files were then opened in CARIS HOM and were converted from metric to chart units (feet) and exported for delivery to MCD. The final deliverables are two S-57 files; one that contains the chart scale soundings, all the features, meta objects, and blue notes (H12100_CS.000), and one that contains the survey scale sounding selections and depth contours (H12100_SS.000).

Quality assurance checks were made utilizing CARIS S-57 Composer 2.0 validation checks and dKart Inspector 5.0 tests.

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

H12100 CARIS H-Cell final deliverables include the following products:

H12100_CS.000	1:50,000 Scale	H12100 H-Cell with Chart Scale Selected Soundings
H12100_SS.000	1:25,000 Scale	H12100 Selected Soundings (Survey Scale)

B.4 DATA PROCESSING

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

CARIS Bathy DataBASE version 2.3 SP1 HF 1-16
CARIS Bathy DataBASE version 2.1 SP1 HF 1-10
CARIS S-57 Composer version 2.1 HF 1-4
DKART INSPECTOR, version 5.0 Build 732 SP1
CARIS HOM version 3.3 SP3 HF 8
HSTP PYDRO version 9.10 (r2824)

C. VERTICAL AND HORIZONTAL CONTROL

Final vertical correction processing was completed by the field unit with no additional correction required by Atlantic Hydrographic Branch. The field unit applied verified water levels in conjunction with a TCARI file. Sounding datum is Mean Lower Low Water (MLLW). 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 18N.

D. RESULTS AND RECOMMENDATIONS

D.1 CHART COMPARISON

12208_1 (14th Edition, Aug. /09)
Corrected through NM 07/31/2010
Corrected through LNM 07/20/2010
Scale 1:50,000

ENC Comparison

US5VA11M
Approaches to Chesapeake Bay
Edition 14
Application Date 2010-03-01
Issue Date 2010-03-01
Chart 12208

D.1.1 Hydrography

The charted hydrography originates with prior surveys and requires no further consideration. The hydrographer makes adequate chart comparisons in section "D" and Appendix I and II of the Descriptive Report.

D.6. MISCELLANEOUS

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

D.7. ADEQUACY OF SURVEY

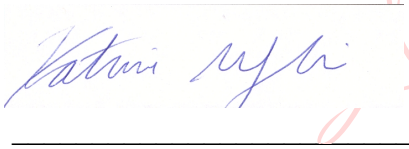
The present survey is adequate to supersede the charted bathymetry within the common area. Any features not specifically addressed either in the H-Cell BASE Cell File or the Blue Notes should be retained as charted. Refer to the Descriptive Report for further recommendations by the hydrographer.

APPROVAL SHEET
H12100

Initial Approvals:

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

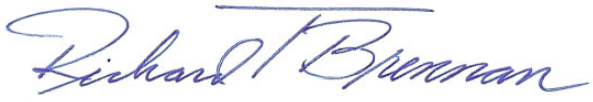
All final products have undergone a comprehensive reviews per the Hydrographic surveys Division Office Processing Manual and are verified to be accurate and complete except where noted.



Digitally signed by Katrina Wyllie
DN: cn=Katrina Wyllie, o=NOAA, ou=AHB, email=katrina.wyllie@noaa.gov, c=US
Date: 2010.07.30 10:26:36 -04'00'

Katrina Wyllie
Hydrographic Intern
Atlantic Hydrographic Branch

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



Richard T. Brennan
I am approving this document
2010.07.31 19:10:41 -04'00'

Approved: _____

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

J. Corey Allen
AWOIS and SURF Review Complete
2010.08.11 10:27:17 -04'00'