

H12007

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: H12007

LOCALITY

State: Massachusetts

General Locality: Nantucket Sound

Sub-locality: Cross Rip Channel

2009

CHIEF OF PARTY
CDR P. Tod Schattgen
NOAA

LIBRARY & ARCHIVES

DATE

HYDROGRAPHIC TITLE SHEET

H12007

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: **Massachusetts**

General Locality: **Nantucket Sound**

Sub-Locality: **Cross Rip Channel**

Scale: **1:10,000** Date of Survey: **23 April 2009 to 4 May 2009**

Instructions Dated: **17 February 2009** Project Number: **OPR-B356-TJ-09**

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

Chief of Party: **CDR P. Tod Schattgen**

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

Soundings by: **Reson 7125 and 8125 multibeam echosounder**

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

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

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

Verification by:

Soundings in: ***Feet* ~~Meters~~ at MLLW**

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

Remarks:
1) All Times are in UTC.
2) This is a Navigable Area Hydrographic Survey.
3) Projection is NAD83, UTM Zone 19.

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Descriptive Report to Accompany Hydrographic Survey H12007

Project OPR-B356-TJ-09
 Nantucket Sound
 Cross Rip Channel
 Scale 1:10,000
 23 April 2009 – 04 May, 2009
NOAA Ship *Thomas Jefferson*

A. AREA SURVEYED

This hydrographic survey was completed as specified by Hydrographic Survey Letter Instructions OPR-356-TJ-09, dated 17 February, 2009.

Northern Limit	Southern Limit	Western Limit	Eastern Limit
41°27'43.71" N 070°18'00.15" W	41°27'02.85" N 070°15'51.45" W	41°27'12.88" N 070°18'16.69" W	41°27'13.01" N 070°13'26.63" W

Data acquisition was conducted from 23 April to 04 May 2009.

The purpose of the survey is to evaluate if there has been any shoaling in the channel as requested by the U.S. Army Corps of Engineers. This project will cover approximately 3nm² of priority 4 survey area as designated in the NOAA Hydrographic Survey Priorities, 2008 edition.

	Linear Nautical Miles
Single beam mainscheme only	N/A
Multibeam mainscheme only	203
Side Scan Sonar mainscheme only	N/A
Crosslines	5
Developments	N/A
Shoreline/nearshore investigations	N/A
Number of Bottom Samples	0
Number of AWOIS items investigated	1

Table 1: Hydrographic Survey Statistics

The survey limits of H12007 (Figure 1) are shown on the following page.

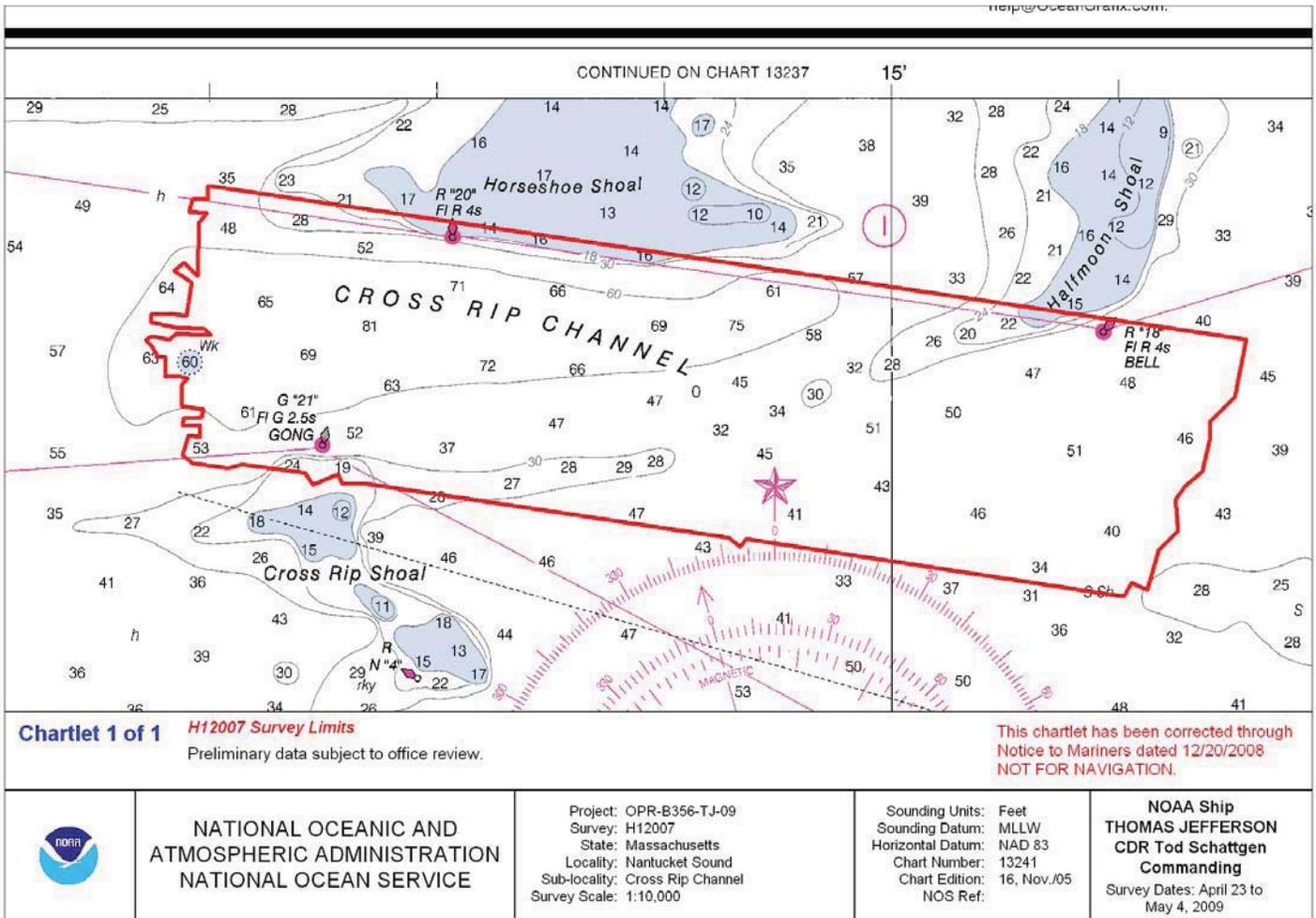


Figure 1: Survey Limits

Calendar Date	Julian Day
23 April 2009	113
03 May 2009	123
04 May 2009	124

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

B DATA ACQUISITION AND PROCESSING

Refer to *OPR-B356-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.

** Data filed at the Atlantic Hydrographic Branch.*

B 1 EQUIPMENT AND VESSELS

Data were acquired by NOAA Ship *Thomas Jefferson* and Hydrographic Survey Launches (HSL) 3101 and 3102. NOAA Ship *Thomas Jefferson* acquired Reson 7125 multibeam echosounder soundings and sound velocity profiles. HSL 3101 acquired Reson 8125 multibeam echosounder soundings. HSL 3102 acquired Reson 7125 multibeam echosounder soundings. No bottom samples were collected by any platform. HSL 3101 acquired Detached Positions for Maritime Boundary investigation items as specified in the Project Instructions. All vessel configurations, equipment operation and data acquisition and processing were consistent with specifications described in the DAPR*. ** Data filed at the Atlantic Hydrographic Branch.*

B 2 QUALITY CONTROL

B 2.1 System Certification and Calibration

Refer to OPR-B356-TJ-09 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. ** Data filed at the Atlantic Hydrographic Branch.*

B 2.2 Sounding Coverage

As per the Letter Instructions, this survey was conducted using complete coverage multibeam. Bathymetry coverage was monitored by creating a BASE surface with one meter resolution, as per HTD 2009-2 for Complete Multibeam Coverage in depth ranges 0-23 meters. Coverage over the AWOIS item was monitored by creating BASE surfaces with a 50cm resolution over the radius. *Concur*

A swath of no coverage approximately 180 meters in length and 5 meters in width exists between 41-27-03.45N, 070-14-49.5W and 41-27-02.67N, 070-14-41.7W. Other gaps in coverage exist in the final base surface, but these do not usually exceed the allowable limit of 3 consecutive nodes in 95% of the area. *Concur*

Data from Launch 3101 collected on DN113 was excluded from the final BASE surface due to an unknown problem with navigation data for that day. All lines were subsequently rerun by S222.

The survey limits do not include the Maritime Boundary data points as these locations are up to 15 NM away from the primary acquisition area. See Feature report for further information.

Concur with clarification. Several AWOIS items were investigated by the field unit. See section D 2.1

B 2.3 Crosslines

Multibeam echosounder cross-lines totaling 5.4 lineal nautical miles (LNM), comprising 2.7 percent of total main scheme hydrography, were acquired during the course of the survey. HSL data were acquired by filling polygons in HYPACK, and since no mainscheme line plan was used, it was considered unnecessary to collect crossline data for these areas. Upon further analysis it was determined that additional crosslines would have been useful for resolving systematic artifacts. The crosslines collected were examined using the standard deviation layer of the BASE surface and the results indicate some systematic errors between platforms.

Concur with clarification. The acquisition of additional crosslines would have provided additional coverage to achieve compliance.

Sources of error could include positioning inputs, tidal zoning, dynamic draft and/or static draft measurement error. See section 2.5, Systematic errors below. A crossline to mainscheme difference surface, H12007_Crossline_Difference.csar, is included in the Descriptive Report/Separates/IVCrossline_Comparison folder submitted with this survey. *Concur.*

B 2.4 Junctions and Prior Surveys

The following prior survey junctions with H12007:

<u>Registry #</u>	<u>Scale</u>	<u>Date</u>	<u>Field Party</u>	<u>Junction side</u>
H10817	1:10,000	1998	Rude	East

Survey H12007 overlaps survey H10817 which represents most recent charted hydrography. Soundings agree to within 3 feet in most areas.

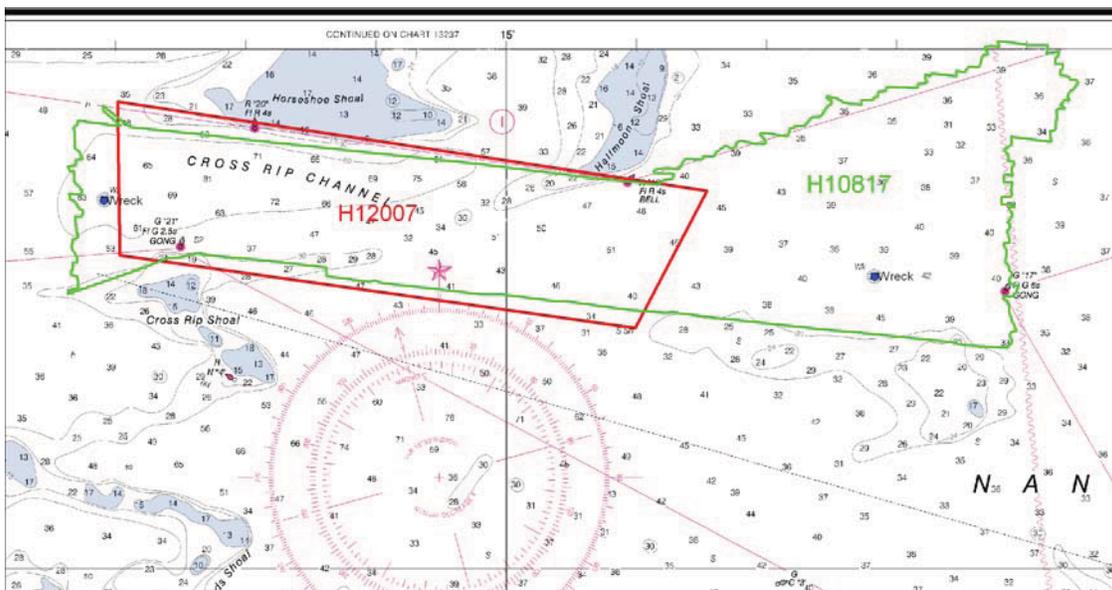


Figure 2: H12007 Junction Surveys

B 2.5 Systematic Errors

Multibeam data collected on HSL 3102 on JD 123 at the Southern tip of Horseshoe Shoal shows a vertical offset between adjacent lines of up to 30 cm (Figure 3). A probable cause is the change and acceleration of current flow in the narrow and shallow confines of the channel, causing an unaccounted for change in the draft of the vessel. The high vertical slope in this area makes the error less significant for charting purposes. It is not recommended to acquire additional data as this would be of minimal additional value to the survey.

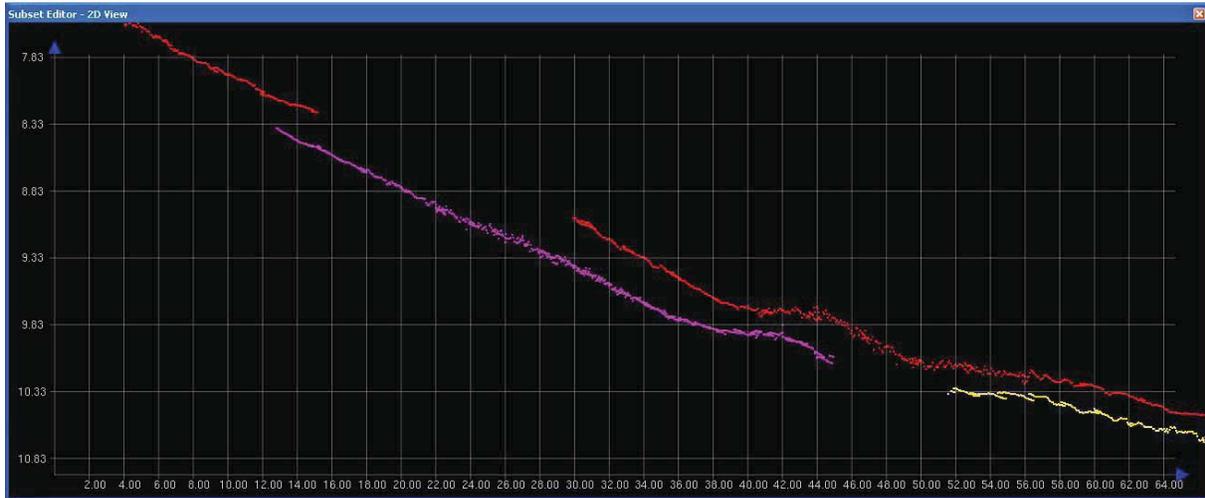


Figure 3: 3102 vertical offset

Multibeam data collected on HSL 3101 on Julian day number 123 shows a horizontal offset between overlapping data of up to 1.5 meters (Figure 4). The cause is likely shifting of the sand waves due to strong currents in the area. This error is within horizontal limits and does not affect the usefulness of the survey.

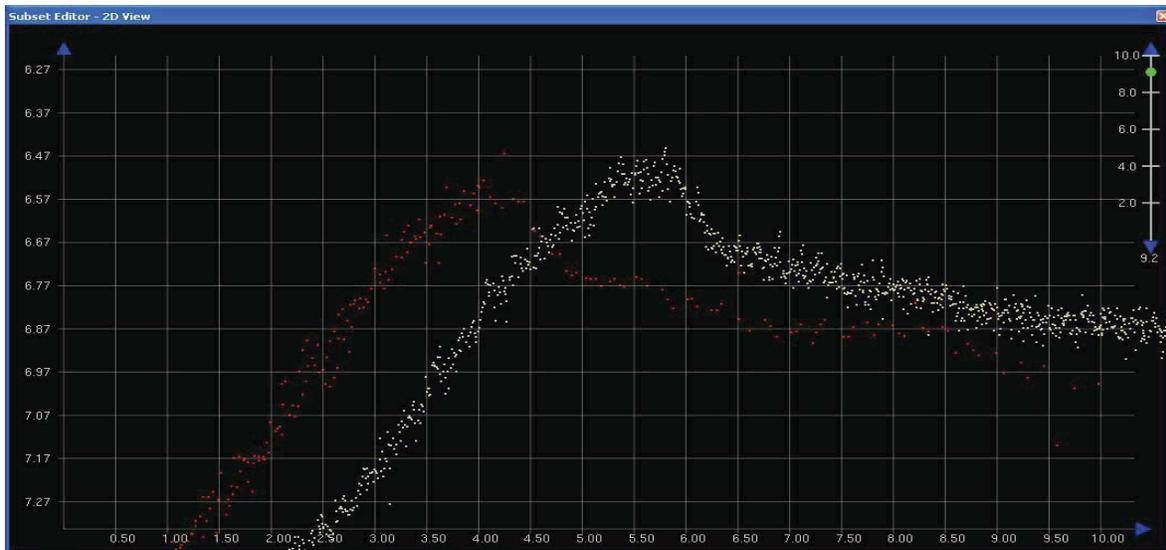


Figure 4: 3101 horizontal offset

Data from Launch ~~3101~~ 3102 shows a consistent 15 cm - 20 cm positive bias throughout the survey, as compared to S222 and Launch 3101 (Figure 5). This is apparent in the standard deviation layer of the BASE surface. This bias is within the IHO Order 1 error limits and does not warrant resurvey of the area. *Concur with clarification. The surface generated by the combined dataset (launches 3101 and 3102 and S222) identifies the bias to fall within the IHO Order 1 error limits.*

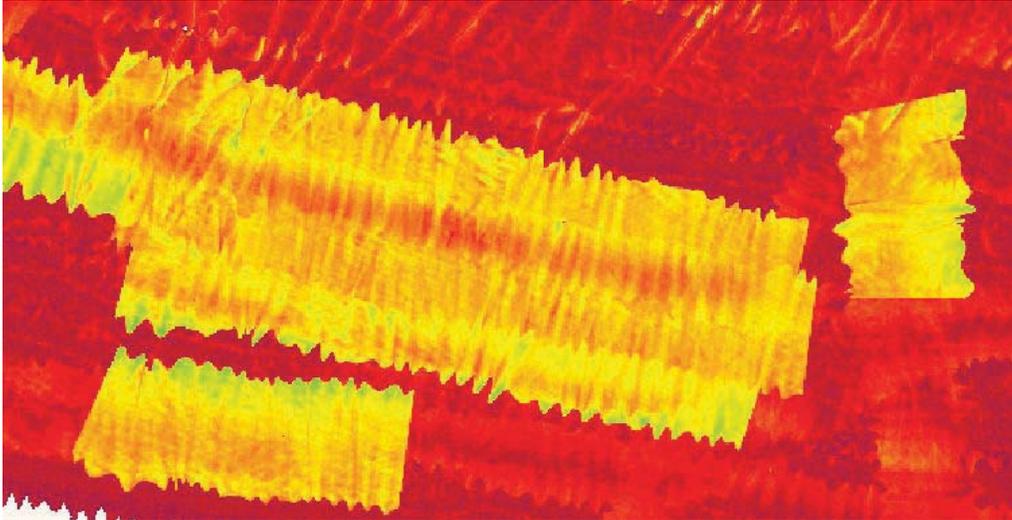


Figure 5: 3102 Positive bias

Due to a faulty RESON 7125 multibeam receiver on S-222, a systematic artifact appears throughout the data as dual along track striping near nadir, ranging in height from 10cm to 20cm (Figure 6). This error was accounted for in the CARIS vessel configuration (TJ_S222_RESON7125.hvf) by adding a 0.20 meter value for the Total Propagated Error for the delta draft. This device was replaced subsequent to data acquisition. *Concur with clarification. Although the field unit did add a 20 cm value for the Total Propagated Error for the delta draft this is not an standard acceptable practice because the value induces propagated error across the swath. The final hns and CSAR grid files do not indicate that this additional value exceeds the IHO Order 1 error budget. Therefore, the hydrographer recommends to retain the value as is.*

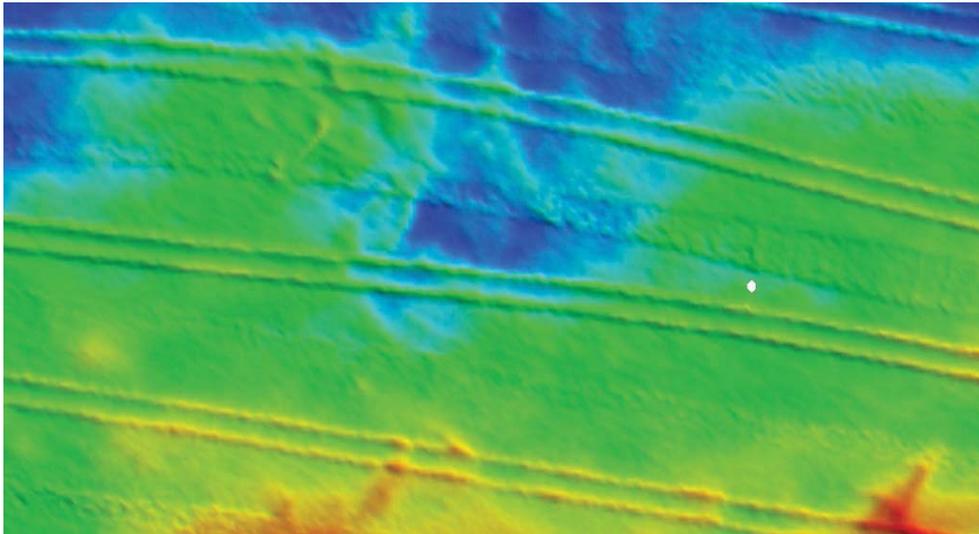


Figure 6: S22 Tracks

B 3 CORRECTIONS TO ECHO SOUNDING

HDCS sounding data were reduced to mean lower-low water (MLLW) using verified water levels from the tide station at Nantucket Island, MA (8449130), and applied using final zoning provided by CO-OPS as per the final tide note dated August 25, 2009 and illustrated in Figure 6.

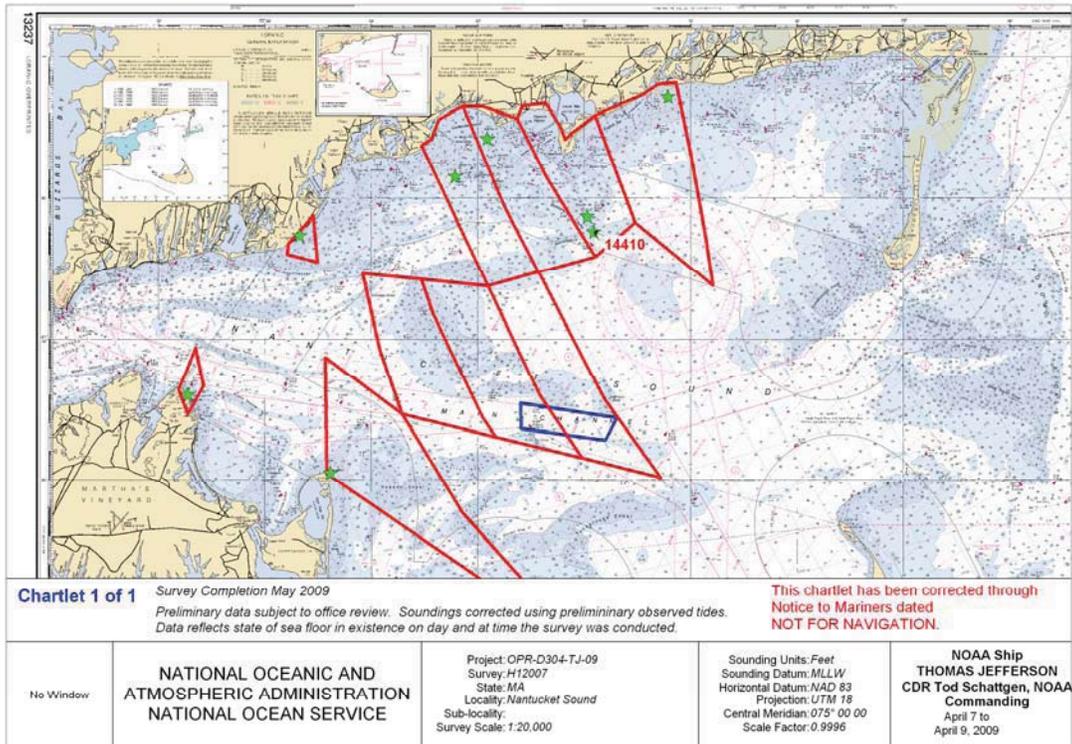


Figure 7: Final Tide Zoning

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.

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-B356-TJ-09, Survey H12007 are as follows:

Table 3: TPE Parameters

Project	Vessel	Tide Values		Sound Speed Values		
		Measured	Zoning	CTD	MVP	Surface
H12007	3101	0.09	0	4	NA	0.2
	3102	0.09	0	4	NA	0.2
	S222	0.09	0	4	1	0.2

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

B 4.2 BASE Surfaces

The following table describes all BASE Surfaces submitted as part of Survey H12007:

<i>Name of Surface</i>	<i>Resolution</i>	<i>Type</i>	<i>Purpose</i>
H12007_1_CUBE_NOAA_1m_Final	1.0 meter	CUBE	Sounding Coverage
H12007_AWOIS_6858_Cube_NOAA_1m_Final	0.5 meter	CUBE	AWOIS Coverage
H12007_Obstn66_Cube_NOAA_50cm_Final	0.5 meter	CUBE	Feature Coverage
H12007_Obstn51_Cube_NOAA_50cm_Final	0.5 meter	CUBE	Feature Coverage
H12007_Wreck71_Cube_NOAA_50cm_Final	0.5 meter	CUBE	Feature Coverage
H12007_Wreck21_Cube_NOAA_50cm_Final	0.5 meter	CUBE	Feature Coverage

Table 4: Fieldsheets

This survey was processed using the Combined Uncertainty and Bathymetry Estimator (CUBE) algorithm. The CUBE configuration was set to NOAA_1m for the one meter coverage surface and NOAA_.5m for the 50 cm surfaces. Refer to the 2009 Data Acquisition and Processing Report, 2009 Field Procedures Manual, and CARIS HIPS and SIPS 6.1 User Guide for further discussion.

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.

B 4.4 Special Data Handling

As specified in the Project Instructions, Maritime Boundary features were assigned as additional AWOIS items for investigation. Eight (8) items were assigned and seven (7) were investigated, using a combination of Lead Line, Sounding Pole, visual height estimation and Detached Position triangulation for horizontal positioning. One (1) additional item was investigated and assigned the AWOIS number 14410 by the field party for tracking purposes. A DP specific Hips Vessel File (HVF) was created to account for the measurements from waterline versus measurements from transducer depth. Figure 8 shows the relative locations of each point in relation to the primary survey area. A description of each AWOIS and its acquisition method is contained in Appendix II of this report.

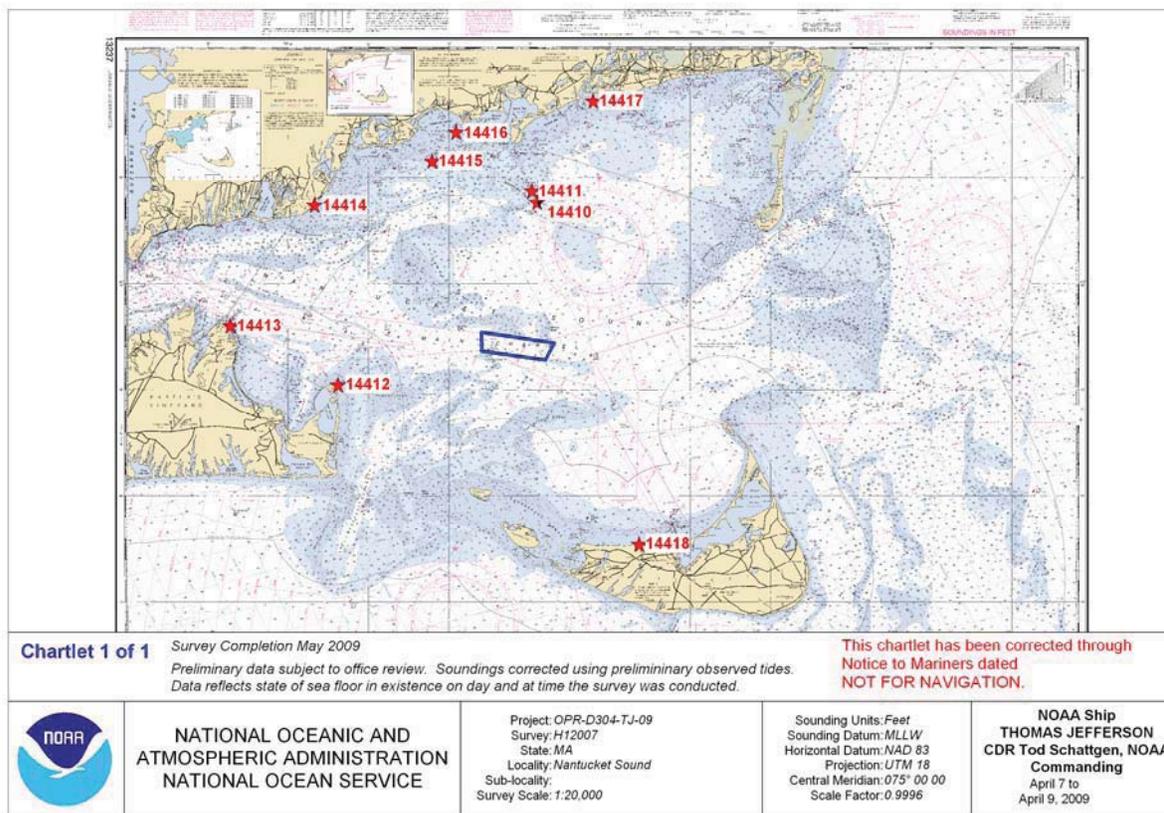


Figure 8: Maritime Boundary Points

C HORIZONTAL AND VERTICAL CONTROL

As per FPM section 5.2.3.2.3 a 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), zone 19. Differential GPS (DGPS) was the sole method of positioning. Differential corrections from the U.S. Coast Guard beacon at Acushnet, MA (306 kHz) were as used during this survey.

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 operating National Water Level Observation Network (NWLON) stations at Nantucket Island, MA (8449130) served as datum control for H12007. Verified tides with Final Tidal Zoning were applied to all sounding data on 5/28/2009.

A request for delivery of final approved (verified) tides for this survey was forwarded to N/OPS1 5 May 2009 in accordance with the FPM and project letter instructions.

D RESULTS AND RECOMMENDATIONS

D 1 Chart Comparison

Survey H12007 was compared with the charts listed in table 5 and ENC US4MA43M. Chart comparisons were performed in CARIS HIPS and CARIS BASE Editor.

Chart	Edition/Date	Corr. For NM	Corr. For LNM	Scale
12341 13241	16 th Ed., Nov./05	Nov. 5/05	Nov. 1/05	1:40,000
13237	40 th Ed., Mar./07	Mar. 10/07	Feb. 27/07	1:80,000
12300	47 th Ed., May/08	May 31/08	May 20/08	1:400,000
13009	34 th Ed., Apr./09	Apr. 18/09	Apr. 7/09	1:500,000
13006	35 th Ed., Apr./09	Apr. 18/09	Apr. 7/09	1:675,000
13003	49 th Ed., Apr/07	Apr. 7/07	Apr. 3/07	1:1,200,000

Table 5: Chart Editions

D 1.1 Chart 13241 Comparison

In general, the soundings agree within 3 feet with the exception of the following: A charted 30ft sounding and contour at 41-27-02, 70-15-20 has a nearest least depth of 34 ft. Where there are differences charted soundings tend to be deeper. *Concur.*

D 1.2 Chart 12337 Comparison

In general, the soundings agree within 2 feet. Where there are differences, charted soundings tend to be deeper.

D 1.2 Chart 12300 Comparison

No depths or features are charted within the limits of H12007.

D 1.3 Chart 13009 Comparison

No depths or features are charted within the limits of H12007.

D 1.4 Chart 13006 Comparison

No depths or features are charted within the limits of H12007.

D 1.9 Chart 13003 Comparison

No depths or features are charted within the limits of H12007.

D 1.10 ENC US4MA43M Comparison

In general, the soundings agree to within 1 meter. Where there are differences they tend to be deeper.

D 2 Additional Results

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

One AWOIS item, #6858 was assigned for full investigation, and is located just outside the limits of H12007. A non assigned item, #8300 was included in the project instruction but was not investigated during this survey. AWOIS #6858 was found with object detection multibeam coverage. An additional eight AWOIS items were assigned for the purpose of updating the Maritime boundary. All items are described in detail in Appendix II of this report. *Concur.*

D 2.4 Shoreline

There is no shoreline within the sheet limits of survey H12007

D 2.5 Charted Features

No charted features exist within the limits of survey H12007.

D 2.6 Charted Pipelines and Cables

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

D 2.7 Bridges, Ferry Routes, and Overhead Cables

Numerous ferries transit the survey area daily, although this is not indicated on the chart. There are no bridges or overhead cable crossings within the limits of the survey.

D 3 Dangers to Navigation and Shoals

D 3.1 Dangers to Navigation

There are no dangers to navigation within the survey limits of H12007. *A DTON was observed during Maritime Boundary reconnaissance and is described in in Appendix I of this report. Do not concur. Appendix I is incorrectly named DtoN report and does not contain any DtoNs. Furthermore, AHB has no documentation of a DtoN submitted in correlation with survey H12007.*

D 3.2 Shoals

There is a dangerous shoal which crosses the survey area, running from southwest to northeast, which is represented on chart 13241 by the 30ft contour between Cross Rip shoal and Halfmoon Shoal. The least depth on this shoal has moved southwest and is detailed in Appendix II.

D 4 Aids to Navigation

There are three charted Aids to Navigation (ATON) within the survey limits of H12007, all of which were noted to be on station.

D 5 Coast Pilot Information

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

D 6 Miscellaneous**Bottom Samples**

Bottom samples were not collected.

D 7 Adequacy of Survey

This survey is considered complete and adequate to supersede charted depths within the common area as per requirements specified in the Project Letter Instructions.

For AWOIS items assigned to update the National Baseline, provide copies of this report and all feature data in S-57(.000) format and any field notes to Erin Nagel (Erin.Nagel@noaa.gov) and Meredith Westington (Meredith.Westington@noaa.gov).

Provide Ed O'Donnell of the USACE (contact information below) with preliminary data products.

U.S. Army Corps of Engineers, New England District
Mr. Ed O'Donnell
Chief, Navigation Section
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Concord, MA 01741-2751
Office- (978) 318-8375
Edward.G.O'Donnell@usace.army.mil

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.

Survey H12007 is adequate to supersede charted soundings in their common areas.

The Data Acquisition and Processing Report for OPR-B356-TJ-09 is submitted separately and contains additional information relevant to this survey.

Approved and Forwarded:

LT Jasper D. Schaer, NOAA
Field Operations Officer



Digitally signed by Shepard Smith
Date: 2009.09.02 20:29:11 -04'00'

CDR P. Tod Schattgen, NOAA
Commanding Officer

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

Survey Manager:



Daniel Wright
2009.09.03
07:26:25 -04'00'

Daniel B. Wright
Chief Hydro Survey Technician, NOAA

Appendix I

Dangers to Navigation

No Dangers to navigation were reported for survey H12007.

Appendix II

Survey Features Report

1. Charted Features

-9

2. New Features

-1

3. AWOIS

-6

H12007

Registry Number: H12007
State: Massachusetts
Locality: Nantucket Sound
Sub-locality: Cross Rip Channel
Project Number: OPR-B356-TJ-09
Survey Dates: 23 April 2009 - 4 May 2009

Charts Affected

Number	Edition	Date	Scale (RNC)	RNC Correction(s)*
13238	16th	08/01/2007	1:20,000 (13238_1)	[L]NTM: ?
13241	16th	11/01/2005	1:40,000 (13241_1)	USCG LNM: 05/05/2009 (05/12/2009) NGA NTM: None (05/23/2009)
13229	30th	04/01/2008	1:40,000 (13229_4)	USCG LNM: 11/17/2009 (03/23/2010) CHS NTM: None (02/26/2010) NGA NTM: 03/07/1998 (04/10/2010)
13229	30th	04/01/2008	1:40,000 (13229_1)	USCG LNM: 05/05/2009 (05/12/2009) NGA NTM: None (05/23/2009)
13233	18th	10/01/2008	1:40,000 (13233_1)	USCG LNM: 03/10/2009 (03/10/2009) CHS NTM: None (02/27/2009) NGA NTM: 03/07/1998 (03/21/2009)
13246	38th	12/01/2006	1:80,000 (13246_1)	[L]NTM: ?
13237	40th	03/01/2007	1:80,000 (13237_1)	USCG LNM: 05/05/2009 (05/12/2009) NGA NTM: 08/12/2000 (05/23/2009)
13200	36th	11/01/2008	1:400,000 (13200_1)	[L]NTM: ?
12300	47th	05/01/2008	1:400,000 (12300_1)	[L]NTM: ?
13009	33rd	05/01/2007	1:500,000 (13009_1)	[L]NTM: ?
13006	34th	05/01/2007	1:675,000 (13006_1)	[L]NTM: ?
5161	13th	10/01/2003	1:1,058,400 (5161_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

Name	Feature Type	Survey Depth	Survey Latitude	Survey Longitude	AWOIS Item
------	--------------	--------------	-----------------	------------------	------------

Wreck 21ft	Wreck	6.45 m	41° 27' 13.9" N	070° 14' 40.3" W	---
AWOIS_14410	Rock	-0.41 m	41° 34' 05.9" N	070° 14' 51.9" W	---
Rock	Rock	1.95 m	41° 34' 25.7" N	070° 14' 50.2" W	---
Wreck 71ft	Wreck	21.62 m	41° 27' 15.6" N	070° 16' 01.8" W	---
AWOIS #6858	Wreck	18.58 m	41° 27' 08.2" N	070° 18' 05.6" W	6858
AWOIS_14412	Rock	0.94 m	41° 25' 15.3" N	070° 26' 56.5" W	14412
AWOIS_14413	Rock	1.02 m	41° 28' 01.1" N	070° 33' 38.5" W	14413
AWOIS_14414	Rock	0.24 m	41° 33' 42.9" N	070° 28' 12.8" W	14414
AWOIS_14415	Rock	-0.77 m	41° 35' 47.6" N	070° 21' 05.2" W	14415
AWOIS_14416	Rock	0.37 m	41° 37' 08.0" N	070° 19' 35.2" W	14416
AWOIS_14411	Rock	-1.36 m	41° 34' 22.9" N	070° 14' 57.3" W	14411
AWOIS_14417	Rock	0.29 m	41° 38' 35.6" N	070° 11' 04.3" W	14417
MARITIME BOUNDARY CLAIM	AWOIS	[no data]	[no data]	[no data]	---

1 - Charted Features

1.1) Wreck 21ft

Survey Summary

Survey Position: 41° 27' 13.9" N, 070° 14' 40.3" W
Least Depth: 6.45 m (= 21.16 ft = 3.527 fm = 3 fm 3.16 ft)
TPU ($\pm 1.96\sigma$): THU (TPEh) ± 0.999 m ; TVU (TPEv) ± 0.334 m
Timestamp: 2009-123.17:08:06.256 (05/03/2009)
Survey Line: h12007 / tj_3102_reson7125_mb / 2009-123 / 307_1659
Profile/Beam: 5479/301
Charts Affected: 13241_1, 13237_1, 12300_1, 13200_1, 13009_1, 13006_1, 5161_1, 13003_1

Remarks:

Wreck, approximately 1.75m in height.

Feature Correlation

Address	Feature	Range	Azimuth	Status
h12007/tj_3102_reson7125_mb/2009-123/307_1659	5479/301	0.00	000.0	Primary

Hydrographer Recommendations

Chart dangerous wreck with least depth on feature as designated.

S-57 Data

Geo object 1: Wreck (WRECKS)
Attributes: CATWRK - 2:dangerous wreck
 QUASOU - 6:least depth known
 SORDAT - 20090504
 SORIND - US,US,graph,H12007
 VALSOU - 6.450 m
 WATLEV - 3:always under water/submerged

Office Notes

Concur. Chart dangerous wreck with least depth on feature as designated.

Feature Images

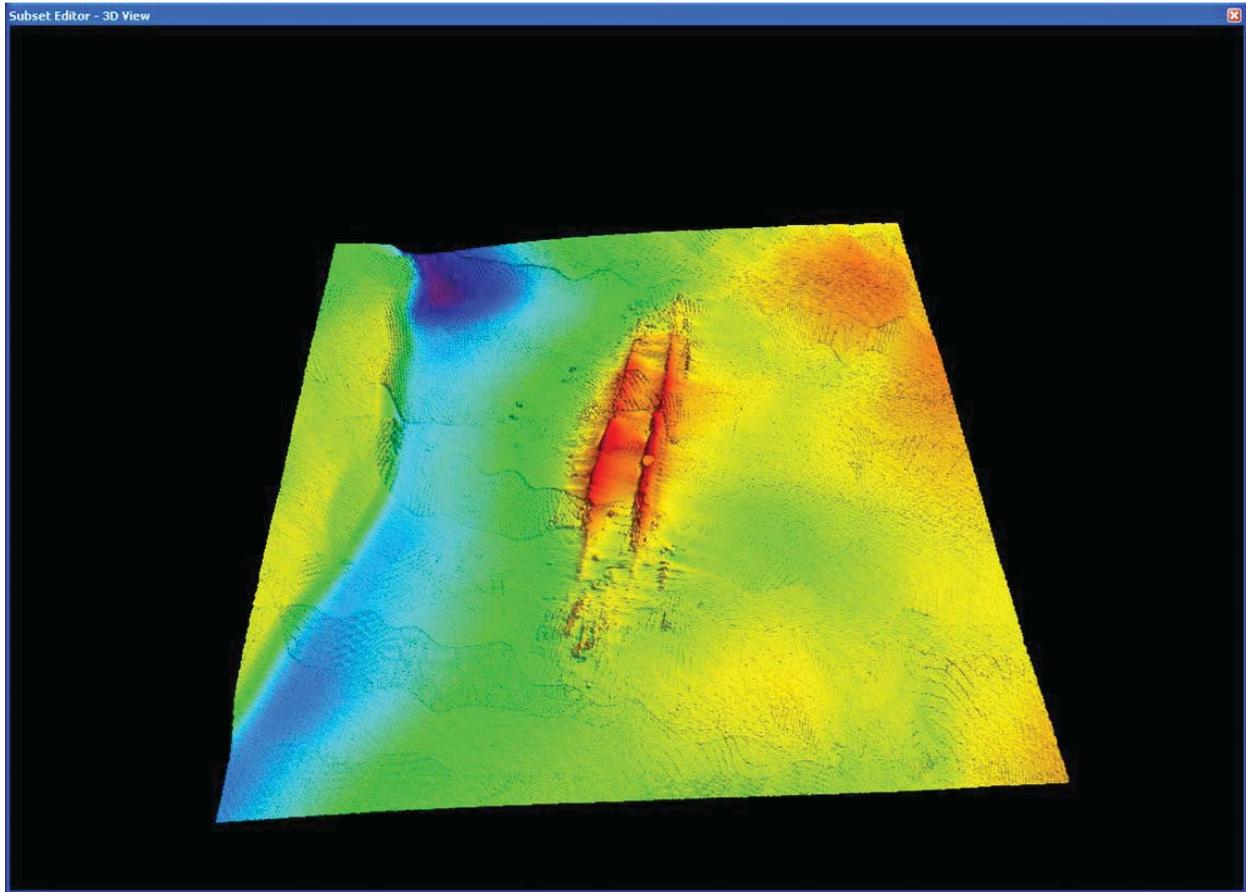


Figure 1.1.1

1.2) AWOIS_14410

Survey Summary

Survey Position: 41° 34' 05.9" N, 070° 14' 51.9" W
Least Depth: -0.41 m (= -1.33 ft = -0.222 fm = 0 fm 4.67 ft)
TPU ($\pm 1.96\sigma$): THU (TPEh) ± 0.980 m ; TVU (TPEv) ± 0.103 m
Timestamp: 2009-124.17:37:34.000 (05/04/2009)
DP Dataset: h12007 / tj_3101_dp_vessel / 2009-124 / awois_import
Profile/Beam: 6/1
Charts Affected: 13229_1, 13237_1, 12300_1, 13200_1, 13009_1, 13006_1, 5161_1, 13003_1

Remarks:

Maritime boundary investigation as per project instructions, special data handling requirements. AWOIS_14410 added to investigation items as it represents the southernmost rock in the vicinity of Bishop and Clerks reef. Feature positioned with DP triangulation, least depth by visual observation.

Feature Correlation

Address	Feature	Range	Azimuth	Status
h12007/tj_3101_dp_vessel/2009-124/awois_import	6/1	0.00	000.0	Primary

Hydrographer Recommendations

Revise charted rock.

Cartographically-Rounded Depth (Affected Charts):

-2ft (13229_1, 13237_1)

0 ¼fm (12300_1, 13200_1, 13009_1, 13006_1, 13003_1)

-.4m (5161_1)

S-57 Data

Geo object 1: Underwater rock / awash rock (UWTROC)

Attributes: SORDAT - 20090504

SORIND - US,US,graph,H12007

VALSOU - -0.406 m

WATLEV - 4:covers and uncovers

Office Notes

Concur. Chart rock at survey position.

Feature Images

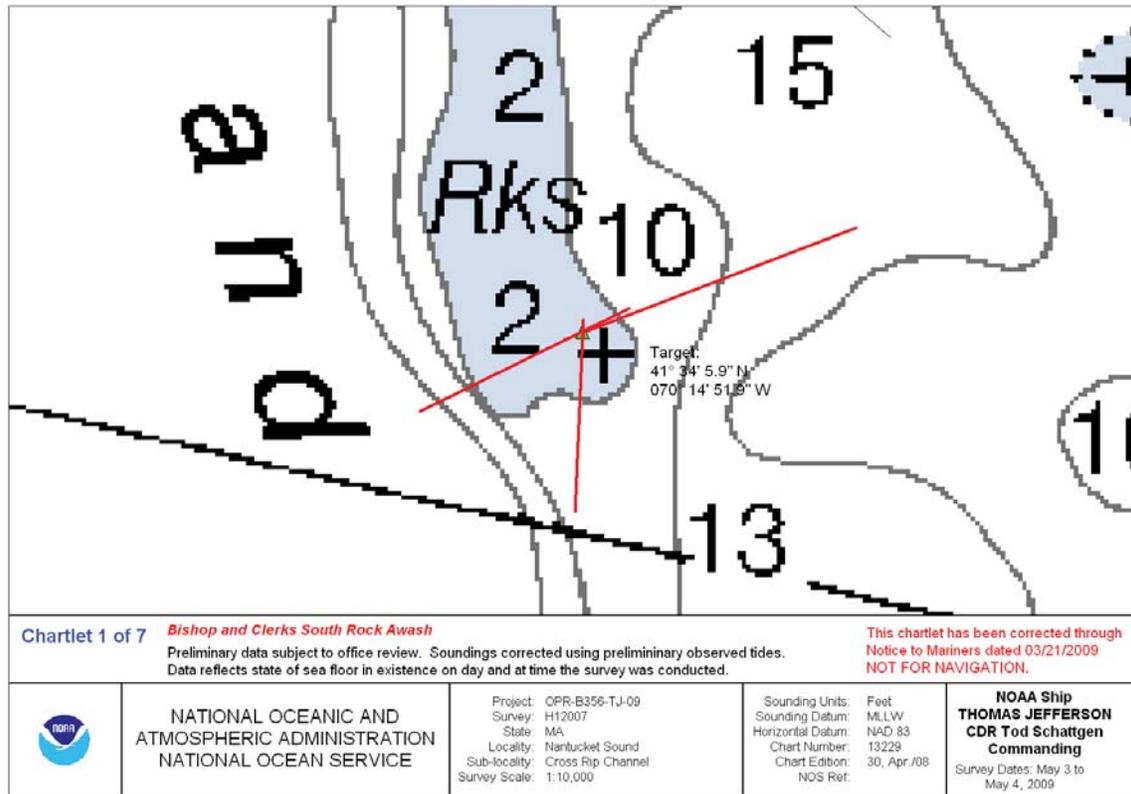


Figure 1.2.1



Figure 1.2.2

2 - New Features

2.1) Rock

Survey Summary

Survey Position: 41° 34' 25.7" N, 070° 14' 50.2" W
Least Depth: 1.95 m (= 6.38 ft = 1.064 fm = 1 fm 0.38 ft)
TPU ($\pm 1.96\sigma$): **THU (TPEh)** ± 0.980 m ; **TVU (TPEv)** ± 0.103 m
Timestamp: 2009-124.17:56:12.000 (05/04/2009)
DP Dataset: h12007 / tj_3101_dp_vessel / 2009-124 / awois_import
Profile/Beam: 8/1
Charts Affected: 13229_1, 13237_1, 12300_1, 13200_1, 13009_1, 13006_1, 5161_1, 13003_1

Remarks:

Rock, least depth from leadline, found during maritime boundary reconnaissance.

Feature Correlation

Address	Feature	Range	Azimuth	Status
h12007/tj_3101_dp_vessel/2009-124/awois_import	8/1	0.00	000.0	Primary

Hydrographer Recommendations

Chart rock at designated location, extend 6 ft contour and rky area.

Cartographically-Rounded Depth (Affected Charts):

6ft (13229_1, 13237_1)

1fm (12300_1, 13200_1, 13009_1, 13006_1, 13003_1)

1.9m (5161_1)

S-57 Data

Geo object 1: Underwater rock / awash rock (UWTROC)
Attributes: QUASOU - 6:least depth known
 SORDAT - 20090504
 SORIND - US,US,graph,H12007
 TECSOU - 5:found by lead-line
 VALSOU - 1.945 m
 WATLEV - 3:always under water/submerged

Office Notes

Concur. Chart rock at survey position.

Feature Images

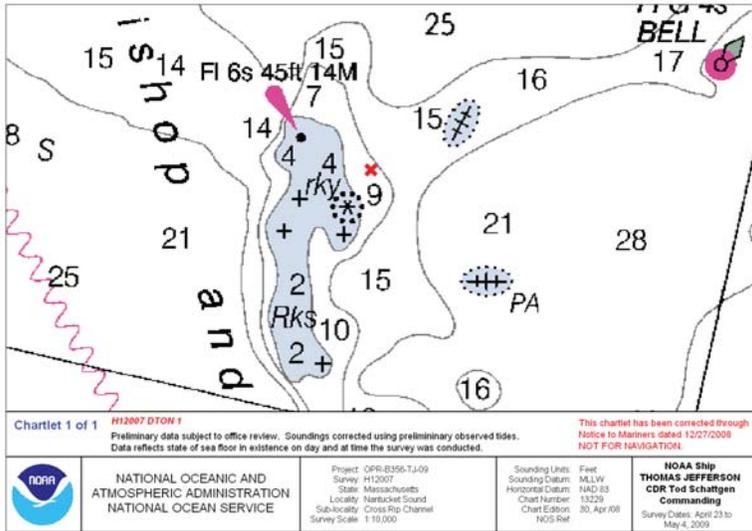


Figure 2.1.1

2.2) Wreck 71ft

Survey Summary

Survey Position: 41° 27' 15.6" N, 070° 16' 01.8" W
Least Depth: 21.62 m (= 70.93 ft = 11.822 fm = 11 fm 4.93 ft)
TPU ($\pm 1.96\sigma$): THU (TPEh) ± 1.001 m ; TVU (TPEv) ± 0.335 m
Timestamp: 2009-123.12:43:33.152 (05/03/2009)
Survey Line: h12007 / tj_3102_reson7125_mb / 2009-123 / 301_1229
Profile/Beam: 5567/282
Charts Affected: 13241_1, 13237_1, 12300_1, 13200_1, 13009_1, 13006_1, 5161_1, 13003_1

Remarks:

Wreck, approximately 2.5 meters in height.

Feature Correlation

Address	Feature	Range	Azimuth	Status
h12007/tj_3102_reson7125_mb/2009-123/301_1229	5567/282	0.00	000.0	Primary

Hydrographer Recommendations

Chart wreck with least depth.

S-57 Data

Geo object 1: Wreck (WRECKS)
Attributes: CATWRK - 1:non-dangerous wreck
 QUASOU - 6:least depth known
 SORDAT - 20090504
 SORIND - US,US,graph, H12007
 VALSOU - 21.620 m
 WATLEV - 3:always under water/submerged

Office Notes

Concur. Chart wreck with least depth.

Feature Images

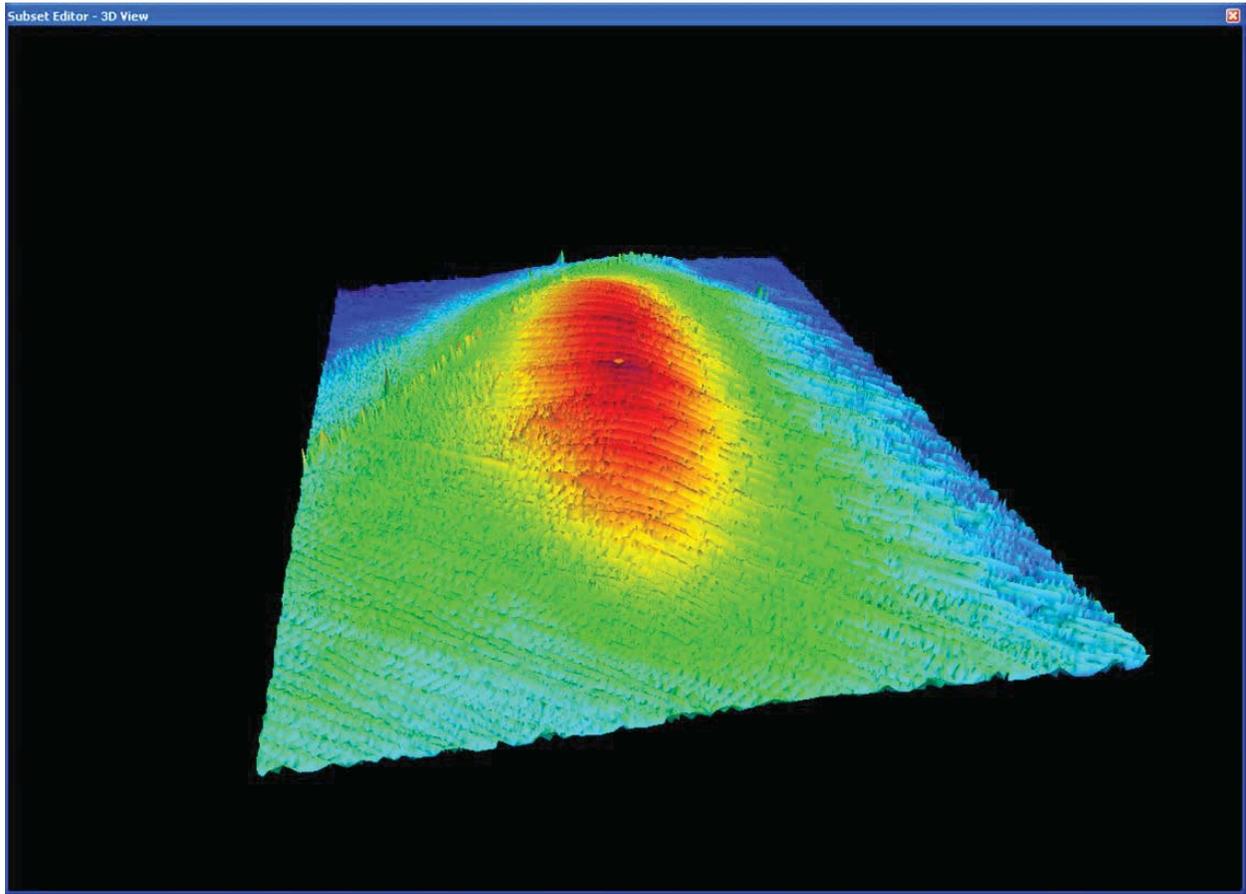


Figure 2.2.1

3 - AWOIS Features

3.1) AWOIS #6858

Primary Feature for AWOIS Item #6858

Search Position: 41° 27' 08.2" N, 070° 18' 05.6" W
Historical Depth: 18.29 m
Search Radius: 50
Search Technique: MB,ES
Technique Notes: [None]

History Notes:

SURVEY REQUIREMENT COMMENTS ■ POSITION GIVEN IN HEADER IS A MEAN BETWEEN THE POSITION GIVEN IN NM26/65 (CHARTED GP) AND A ESTIMATED POSITION DERIVED FROM LORAN RATES LISTED BELOW IN PUB. 210 (FISHABLE WRECKS AND ROCK PILES). ■ ■ HISTORY ■ H8824/63-64--UNVERIFIED; 67-72FT DEPTHS EXIST IN VICINITY. (UPDATED 7/92 RWD). ■ NM26/65(3648)--A BARGE 100 FT L, 32 FT W, LOADED WITH STONE REPORTED SUNK APPROX. 666 YDS NW OF CROSS RIP LIGHTED HORN BUOY 21 (LAT 41-26-54N, LONG 70-17-30W). WK POSITION SCALED FROM NOS CHART 13241, 14TH ED, 6/6/92 IN APPROXIMATE POSITION LAT.41-27-06N, LONG.70-17-47.8W (NAD83). (ENTERED 8/88 MCR, UPDATED 5/98 MCR). ■ H-10817/98--OPR-B318-RU; WRECK WAS LOCATED IN POS.41/27/08.18N, 070/18/05.56W WITH A LEAST DEPTH OF 60 FT. UPDATED 11/99 MCR ■ ■ DESCRIPTION ■ 196 SANK 5/24/65; STEEL BARGE; FOUNDERED; 126 FT LONG; OBSERVED LORAN C: 9960-W 14019.4, 9960-Y 43892.0.

Survey Summary

Survey Position: 41° 27' 08.2" N, 070° 18' 05.6" W
Least Depth: 18.58 m (= 60.95 ft = 10.158 fm = 10 fm 0.95 ft)
TPU ($\pm 1.96\sigma$): THU (TPEh) ± 1.001 m ; TVU (TPEv) ± 0.216 m
Timestamp: 2009-123.12:02:32.785 (05/03/2009)
Survey Line: h12007 / tj_s222_reson7125_stbd / 2009-123 / 312_1201
Profile/Beam: 554/255
Charts Affected: 13241_1, 13237_1, 12300_1, 13200_1, 13009_1, 13006_1, 5161_1, 13003_1

Remarks:

AWOIS #6858 found.

Feature Correlation

Address	Feature	Range	Azimuth	Status
h12007/tj_s222_reson7125_stbd/2009-123/312_1201	554/255	0.00	000.0	Primary
OPR-B356-TJ-09-AWOIS	AWOIS # 6858	0.43	257.4	Secondary

Hydrographer Recommendations

Chart least depth on dangerous wreck as designated.

S-57 Data

Geo object 1: Wreck (WRECKS)
Attributes: CATWRK - 2:dangerous wreck
QUASOU - 6:least depth known
SORDAT - 20090504
SORIND - US,US,graph,H12007
VALSOU - 18.577 m
WATLEV - 3:always under water/submerged

Office Notes

Concur. Chart least depth on dangerous wreck as designated.

Feature Images

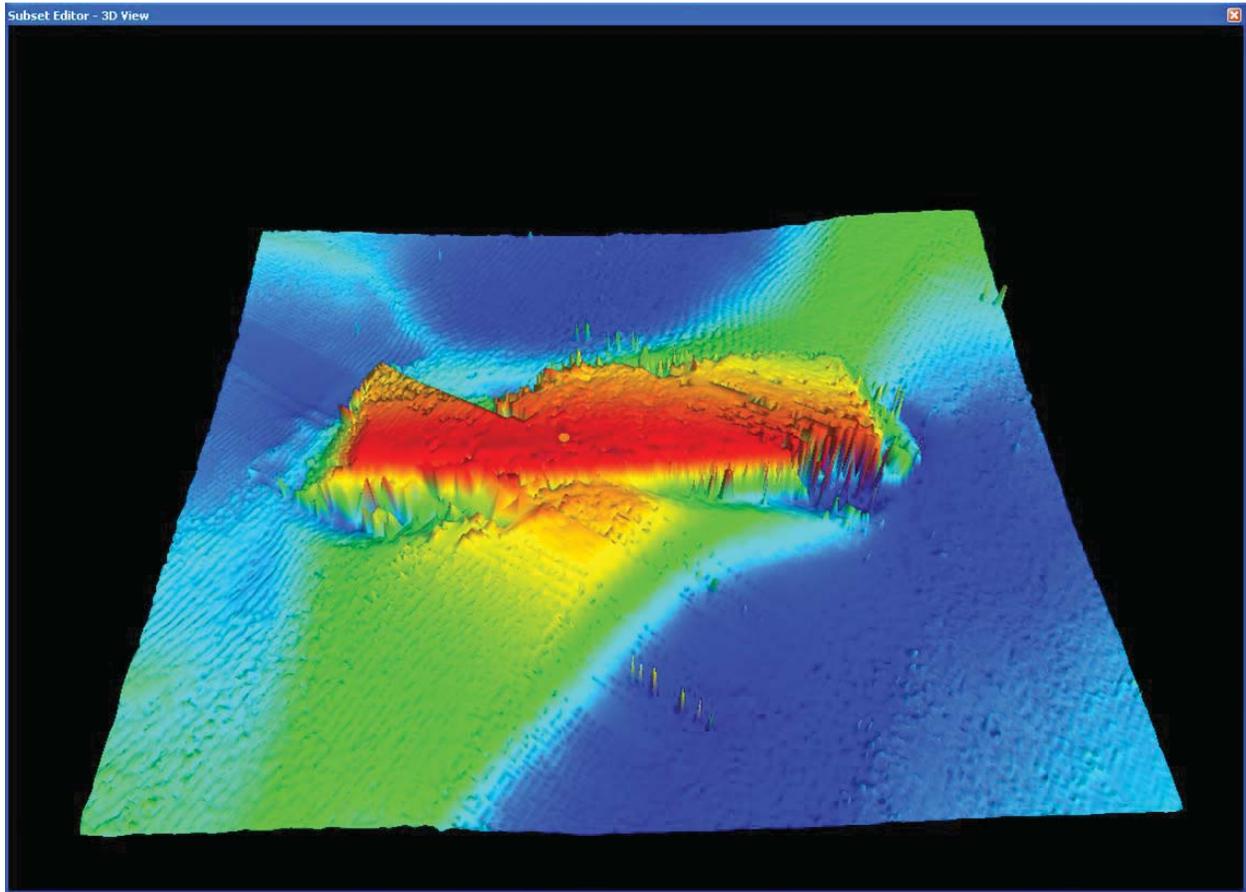


Figure 3.1.1

3.2) AWOIS_14412

Primary Feature for AWOIS Item #14412

Search Position: 41° 25' 15.1" N, 070° 26' 56.1" W
Historical Depth: [None]
Search Radius: 100
Search Technique: [None]
Technique Notes: UPDATE POSITION AND HEIGHT IN SUPPORT OF MARITIME BOUNDARY CLAIM.

History Notes:

H00821/65-- THIS ROCK IS IN THE VICINITY OF CAPE PODE IN SCALED (CHART 13238) POSITION LAT. 41/25/15.11N LONG. 70/26/56.1W (NAD83) BASELINE POINT NEEDS TO BE REPOSITIONED FOR A MARITIME BOUNDARY CLAIM. (Entered 1/22/09, EAN)

Survey Summary

Survey Position: 41° 25' 15.3" N, 070° 26' 56.5" W
Least Depth: 0.94 m (= 3.08 ft = 0.513 fm = 0 fm 3.08 ft)
TPU ($\pm 1.96\sigma$): THU (TPEh) ± 0.980 m ; TVU (TPEv) ± 0.103 m
Timestamp: 2009-124.12:51:41.000 (05/04/2009)
DP Dataset: h12007 / tj_3101_dp_vessel / 2009-124 / awois_import
Profile/Beam: 1/1
Charts Affected: 13238_1, 13233_1, 13237_1, 12300_1, 13200_1, 13009_1, 13006_1, 5161_1, 13003_1

Remarks:

Maritime boundary investigation as per project instructions, special data handling requirements. Feature positioned with Hypack DP, least depth by sounding pole.

QUA: GPSmode=4, SVs=9, HDOP=1.96

Feature Correlation

Address	Feature	Range	Azimuth	Status
h12007/tj_3101_dp_vessel/2009-124/awois_import	1/1	0.00	000.0	Primary
OPR-B356-TJ-09-AWOIS	AWOIS # 14412	12.55	298.5	Secondary

Hydrographer Recommendations

Revise charted rock.

Cartographically-Rounded Depth (Affected Charts):

3ft (13238_1, 13233_1, 13237_1)

0 ½fm (12300_1, 13200_1, 13009_1, 13006_1, 13003_1)

.9m (5161_1)

S-57 Data

Geo object 1: Underwater rock / awash rock (UWTROC)
Attributes: QUASOU - 6:least depth known
SORDAT - 20090504
SORIND - US,US,graph,H12007
TECSOU - 5:found by lead-line
VALSOU - 0.939 m
WATLEV - 3:always under water/submerged

Office Notes

Concur. Chart rock at survey position.

Feature Images

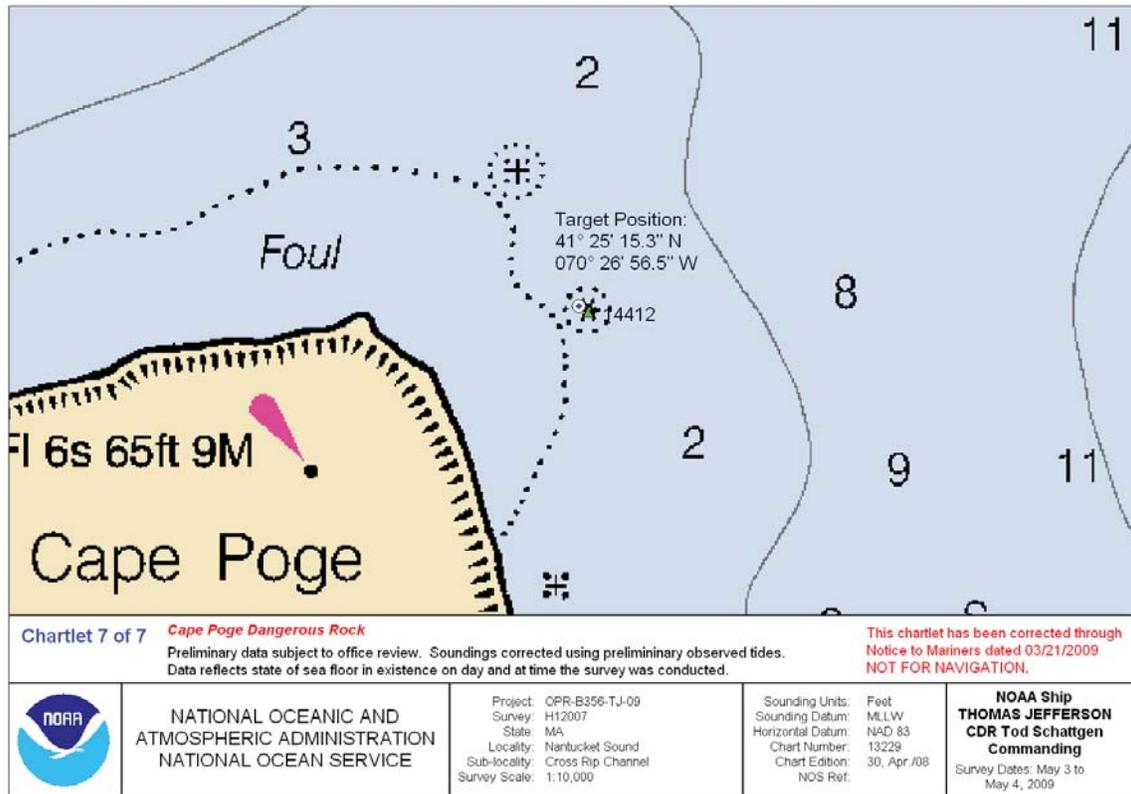


Figure 3.2.1



Figure 3.2.2

3.3) AWOIS_14413

Primary Feature for AWOIS Item #14413

Search Position: 41° 28' 01.0" N, 070° 33' 37.6" W
Historical Depth: [None]
Search Radius: 100
Search Technique: [None]
Technique Notes: UPDATE POSITION AND HEIGHT IN SUPPORT OF MARITIME BOUNDARY CLAIM.

History Notes:

H10556/94 -- THIS ROCK IS IN THE VICINITY OF EAST CHOP IN SCALED (CHART 13238) POSITION LAT. 41/28/0.9N LONG. 70/33/37.6W (NAD83) BASELINE POINT NEEDS TO BE REPOSITIONED FOR A MARITIME BOUNDARY CLAIM. (ENTERED 1/22/09, EAN)

Survey Summary

Survey Position: 41° 28' 01.1" N, 070° 33' 38.5" W
Least Depth: 1.02 m (= 3.35 ft = 0.558 fm = 0 fm 3.35 ft)
TPU ($\pm 1.96\sigma$): THU (TPEh) ± 0.980 m ; TVU (TPEv) ± 0.103 m
Timestamp: 2009-124.14:03:33.000 (05/04/2009)
DP Dataset: h12007 / tj_3101_dp_vessel / 2009-124 / awois_import
Profile/Beam: 2/1
Charts Affected: 13238_1, 13229_4, 13233_1, 13237_1, 12300_1, 13200_1, 13009_1, 13006_1, 5161_1, 13003_1

Remarks:

Maritime boundary investigation as per project instructions, special data handling requirements. Feature positioned with Hypack DP, least depth by lead line.

QUA: GPSmode=4, SVs=9, HDOP=1.96

Feature Correlation

Address	Feature	Range	Azimuth	Status
h12007/tj_3101_dp_vessel/2009-124/awois_import	2/1	0.00	000.0	Primary
OPR-B356-TJ-09-AWOIS	AWOIS # 14413	22.40	281.8	Secondary

Hydrographer Recommendations

Chart dangerous underwater rock of known depth at designated location.

Cartographically-Rounded Depth (Affected Charts):

3ft (13238_1, 13229_4, 13233_1, 13237_1)

0 ½fm (12300_1, 13200_1, 13009_1, 13006_1, 13003_1)

1.0m (5161_1)

S-57 Data

Geo object 1: Underwater rock / awash rock (UWTROC)
Attributes: QUASOU - 6:least depth known
SORDAT - 20090504
SORIND - US,US,graph,H12007
TECSOU - 5:found by lead-line
VALSOU - 1.021 m
WATLEV - 3:always under water/submerged

Office Notes

Concur. Chart rock at survey position.

Feature Images

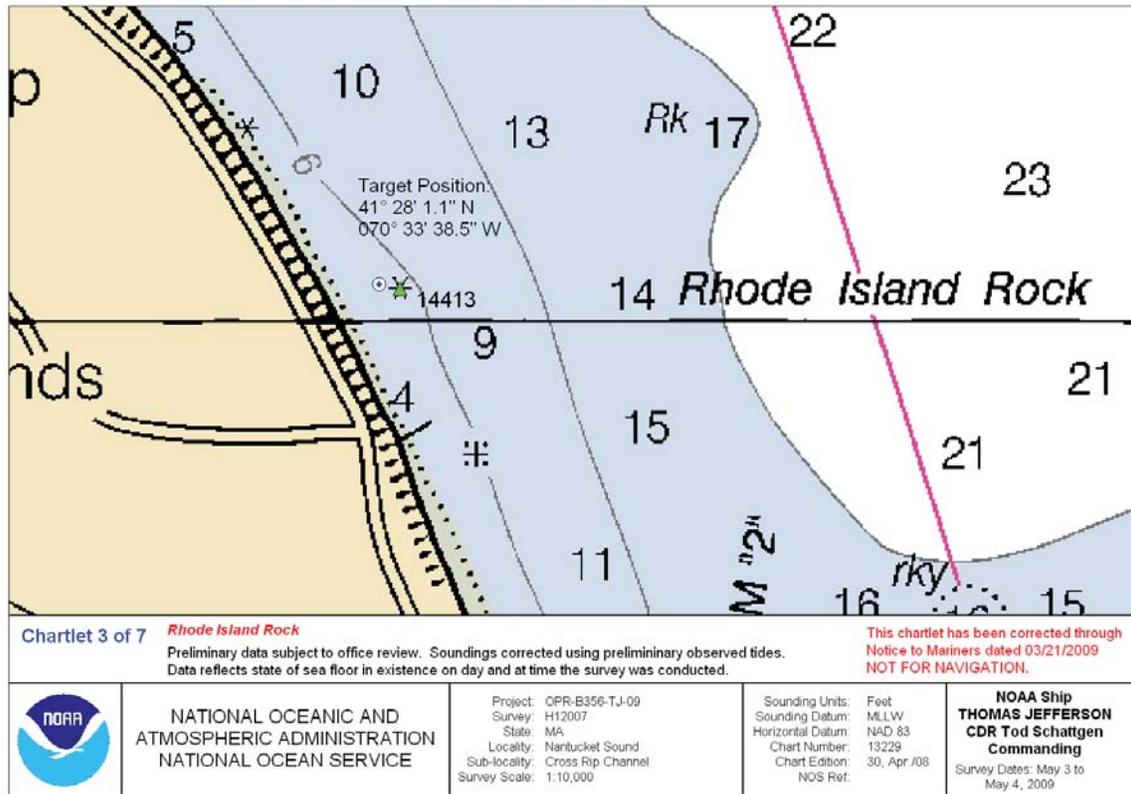


Figure 3.3.1



Figure 3.3.2

3.4) AWOIS_14414

Primary Feature for AWOIS Item #14414

Search Position: 41° 33' 42.0" N, 070° 28' 23.4" W
Historical Depth: [None]
Search Radius: 100
Search Technique: [None]
Technique Notes: UPDATE POSITION AND HEIGHT IN SUPPORT OF MARITIME BOUNDARY CLAIM.

History Notes:

NF-H01880/1889-- THIS ROCK IS IN THE VICINITY OF SUCCONNESSED POINT IN SCALED (CHART 13329) POSITION LAT. 41/33/41.9N LONG. 70/28/23.4W (NAD83) BASELINE POINT NEEDS TO BE REPOSITIONED FOR A MARITIME BOUNDARY CLAIM. (ENTERED 1/22/09, EAN)

Survey Summary

Survey Position: 41° 33' 42.9" N, 070° 28' 12.8" W
Least Depth: 0.24 m (= 0.80 ft = 0.133 fm = 0 fm 0.80 ft)
TPU ($\pm 1.96\sigma$): THU (TPEh) ± 0.980 m ; TVU (TPEv) ± 0.103 m
Timestamp: 2009-124.15:18:34.000 (05/04/2009)
DP Dataset: h12007 / tj_3101_dp_vessel / 2009-124 / awois_import
Profile/Beam: 3/1
Charts Affected: 13229_4, 13237_1, 12300_1, 13200_1, 13009_1, 13006_1, 5161_1, 13003_1

Remarks:

Maritime boundary investigation as per project instructions, special data handling requirements. Feature positioned with DP triangulation, least depth by visual observation.

Feature Correlation

Address	Feature	Range	Azimuth	Status
h12007/tj_3101_dp_vessel/2009-124/awois_import	3/1	0.00	000.0	Primary
OPR-B356-TJ-09-AWOIS	AWOIS # 14414	245.49	083.5	Secondary (grouped)

Hydrographer Recommendations

Retain as charted.

Cartographically-Rounded Depth (Affected Charts):

1ft (13229_4, 13237_1)

0fm (12300_1, 13200_1, 13009_1, 13006_1, 13003_1)

.2m (5161_1)

S-57 Data

Geo object 1: Underwater rock / awash rock (UWTROC)
Attributes: QUASOU - 9:value reported (not confirmed)
SORDAT - 20090504
SORIND - US,US,graph,H12007
TECSOU - 14:computer generated
VALSOU - 0.243 m
WATLEV - 1:partly submerged at high water

Office Notes

Concur. Chart rock at survey position.

Feature Images

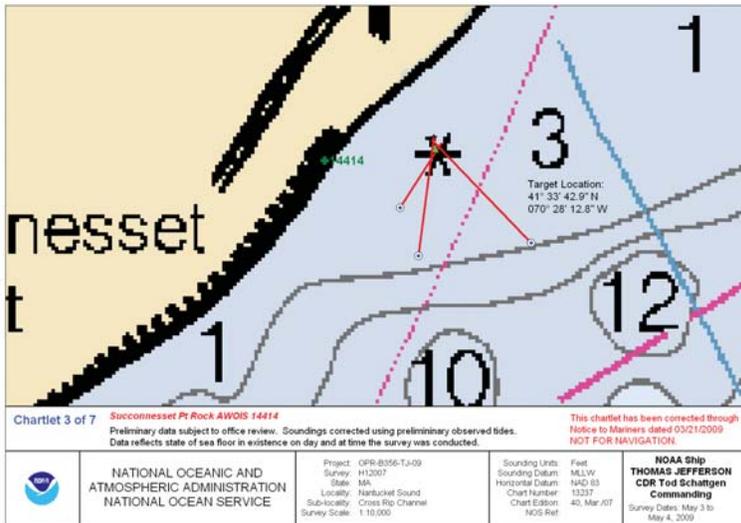


Figure 3.4.1



Figure 3.4.2

3.5) AWOIS_14415

Primary Feature for AWOIS Item #14415

Search Position: 41° 35' 46.8" N, 070° 21' 04.2" W
Historical Depth: [None]
Search Radius: 100
Search Technique: [None]
Technique Notes: UPDATE POSITION AND HEIGHT IN SUPPORT OF MARITIME BOUNDARY CLAIM.

History Notes:

H10498/93-- THIS ROCK IS IN THE VICINITY OF COLLIER LEDGE IN SCALED (CHART 13229) POSITION LAT. 41/35/46.8N LONG. 70/21/4.2W (NAD83) BASELINE POINT NEEDS TO BE REPOSITIONED FOR A MARITIME BOUNDARY CLAIM. (ENTERED 1/22/09, EAN)

Survey Summary

Survey Position: 41° 35' 47.6" N, 070° 21' 05.2" W
Least Depth: -0.77 m (= -2.51 ft = -0.418 fm = 0 fm 3.49 ft)
TPU (±1.96σ): THU (TPEh) ±0.980 m ; TVU (TPEv) ±0.103 m
Timestamp: 2009-124.16:07:41.000 (05/04/2009)
DP Dataset: h12007 / tj_3101_dp_vessel / 2009-124 / awois_import
Profile/Beam: 4/1
Charts Affected: 13229_1, 13229_4, 13237_1, 13200_1, 13009_1, 13006_1, 5161_1, 13003_1

Remarks:

Maritime boundary investigation as per project instructions, special data handling requirements. Feature positioned with DP triangulation, height by visual observation.

Feature Correlation

Address	Feature	Range	Azimuth	Status
h12007/tj_3101_dp_vessel/2009-124/awois_import	4/1	0.00	000.0	Primary
OPR-B356-TJ-09-AWOIS	AWOIS # 14415	32.60	315.4	Secondary

Hydrographer Recommendations

Revise charted rock.

Cartographically-Rounded Depth (Affected Charts):

-3ft (13229_1, 13229_4, 13237_1)

0 ¼fm (13200_1, 13009_1, 13006_1, 13003_1)

-.8m (5161_1)

S-57 Data

Geo object 1: Underwater rock / awash rock (UWTROC)
Attributes: QUASOU - 9:value reported (not confirmed)
SORDAT - 20090504
SORIND - US,US,graph,H12007
TECSOU - 14:computer generated
VALSOU - -0.765 m
WATLEV - 4:covers and uncovers

Office Notes

Concur. Chart rock at survey position.

Feature Images

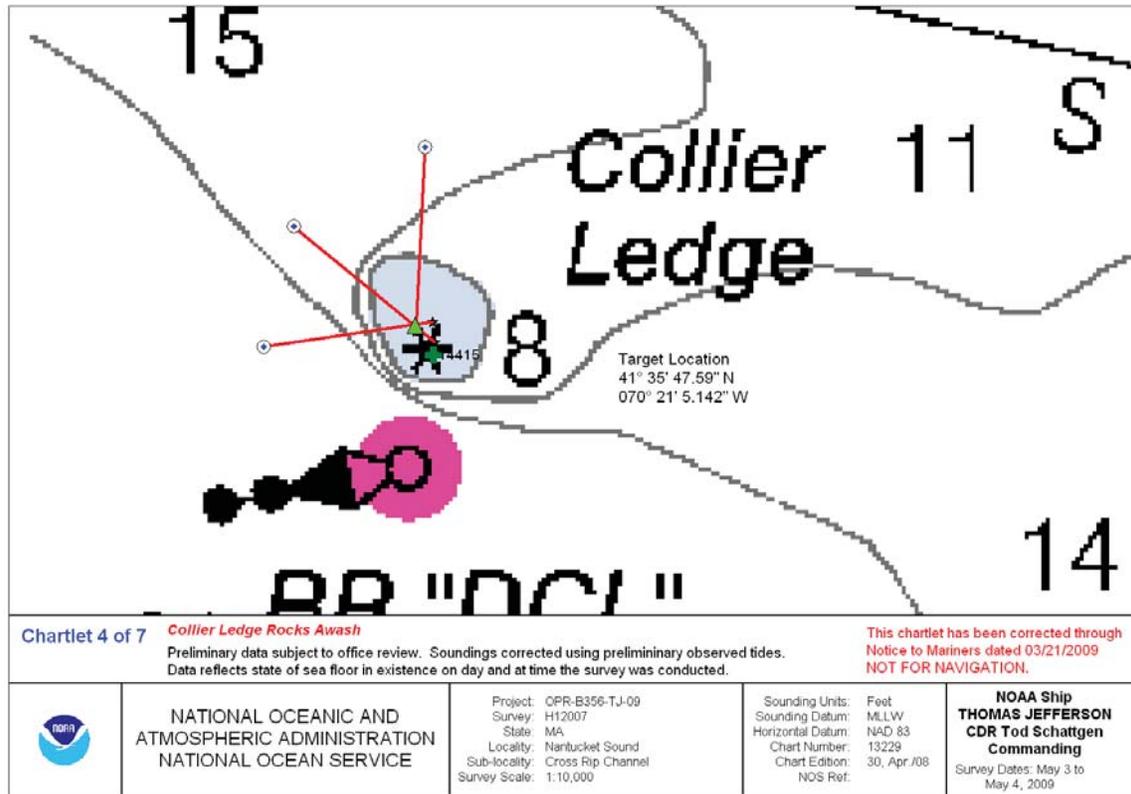


Figure 3.5.1



Figure 3.5.2



Figure 3.5.3

3.6) AWOIS_14416

Primary Feature for AWOIS Item #14416

Search Position: 41° 37' 07.6" N, 070° 19' 34.7" W
Historical Depth: [None]
Search Radius: 100
Search Technique: [None]
Technique Notes: UPDATE POSITION AND HEIGHT IN SUPPORT OF MARITIME BOUNDARY CLAIM.

History Notes:

OPR-B356-TJ-08-- NO PRIOR SURVEY HISTORY AVAILABLE BEYOND CHART--THIS OBSTRUCTION IS IN THE VICINITY OF HYANNIS POINT IN SCALED (CHART 13229) POSITION LAT. 41/37/07.6N LONG. 70/19/34.7W (NAD83) BASELINE POINT NEEDS TO BE REPOSITIONED FOR A MARITIME BOUNDARY CLAIM. (ENTERED 1/22/09, EAN)

Survey Summary

Survey Position: 41° 37' 08.0" N, 070° 19' 35.2" W
Least Depth: 0.37 m (= 1.20 ft = 0.200 fm = 0 fm 1.20 ft)
TPU ($\pm 1.96\sigma$): THU (TPEh) ± 0.980 m ; TVU (TPEv) ± 0.103 m
Timestamp: 2009-124.16:41:55.000 (05/04/2009)
DP Dataset: h12007 / tj_3101_dp_vessel / 2009-124 / awois_import
Profile/Beam: 5/1
Charts Affected: 13229_1, 13237_1, 13246_1, 13200_1, 13009_1, 13006_1, 5161_1, 13003_1

Remarks:

Maritime boundary investigation as per project instructions, special data handling requirements. Feature positioned with Hypack DP, least depth by sounding pole.

Feature Correlation

Address	Feature	Range	Azimuth	Status
h12007/tj_3101_dp_vessel/2009-124/awois_import	5/1	0.00	000.0	Primary
OPR-B356-TJ-09-AWOIS	AWOIS # 14416	17.17	320.3	Secondary

Hydrographer Recommendations

Revise charted rock.

Cartographically-Rounded Depth (Affected Charts):

1ft (13229_1, 13237_1, 13246_1)

0 ¼fm (13200_1, 13009_1, 13006_1, 13003_1)

.4m (5161_1)

S-57 Data

Geo object 1: Underwater rock / awash rock (UWTROC)
Attributes: QUASOU - 6:least depth known
SORDAT - 20090504
SORIND - US,US,graph,H12007
TECSOU - 5:found by lead-line
VALSOU - 0.366 m
WATLEV - 3:always under water/submerged

Office Notes

Concur. Chart rock at survey position.

Feature Images

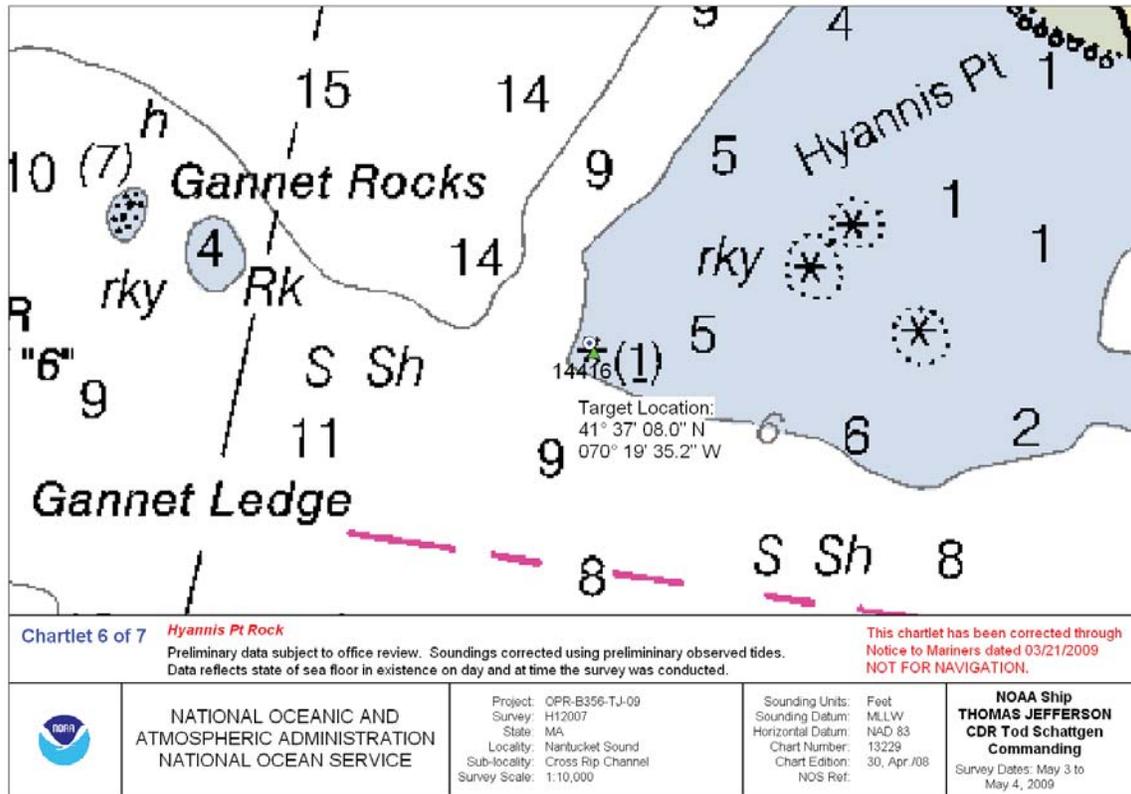


Figure 3.6.1

3.7) AWOIS_14411

Primary Feature for AWOIS Item #14411

Search Position: 41° 34' 21.6" N, 070° 14' 52.0" W
Historical Depth: [None]
Search Radius: 100
Search Technique: [None]
Technique Notes: UPDATE POSITION AND HEIGHT IN SUPPORT OF MARITIME BOUNDARY CLAIM.

History Notes:

H00184/1847 -- THIS ROCK IS IN THE VICINITY OF BISHOP AND CLERKS IN SCALED (CHART 13229) POSITION LAT. 41/34/21.6N LONG. 70/14/52W (NAD83) BASELINE POINT NEEDS TO BE REPOSITIONED FOR A MARITIME BOUNDARY CLAIM. (ENTERED 1/22/09, EAN)

Survey Summary

Survey Position: 41° 34' 22.9" N, 070° 14' 57.3" W
Least Depth: -1.36 m (= -4.45 ft = -0.741 fm = 0 fm 1.55 ft)
TPU ($\pm 1.96\sigma$): THU (TPEh) ± 0.980 m ; TVU (TPEv) ± 0.103 m
Timestamp: 2009-124.17:49:17.000 (05/04/2009)
DP Dataset: h12007 / tj_3101_dp_vessel / 2009-124 / awois_import
Profile/Beam: 7/1
Charts Affected: 13229_1, 13237_1, 12300_1, 13200_1, 13009_1, 13006_1, 5161_1, 13003_1

Remarks:

Maritime boundry investigation as per project instructions, special data handling requirements. Feature positioned with DP triangulation, least depth by visual observation.

Feature Correlation

Address	Feature	Range	Azimuth	Status
h12007/tj_3101_dp_vessel/2009-124/awois_import	7/1	0.00	000.0	Primary
OPR-B356-TJ-09-AWOIS	AWOIS # 14411	128.26	287.8	Secondary (grouped)

Hydrographer Recommendations

Chart Rock.

S-57 Data

Geo object 1: Underwater rock / awash rock (UWTROC)
Attributes: QUASOU - 9:value reported (not confirmed)
SORDAT - 20090504
SORIND - US,US,graph,H12007
TECSOU - 14:computer generated
VALSOU - -1.356 m
WATLEV - 4:covers and uncovers

Office Notes

Chart rock at survey position.

Feature Images

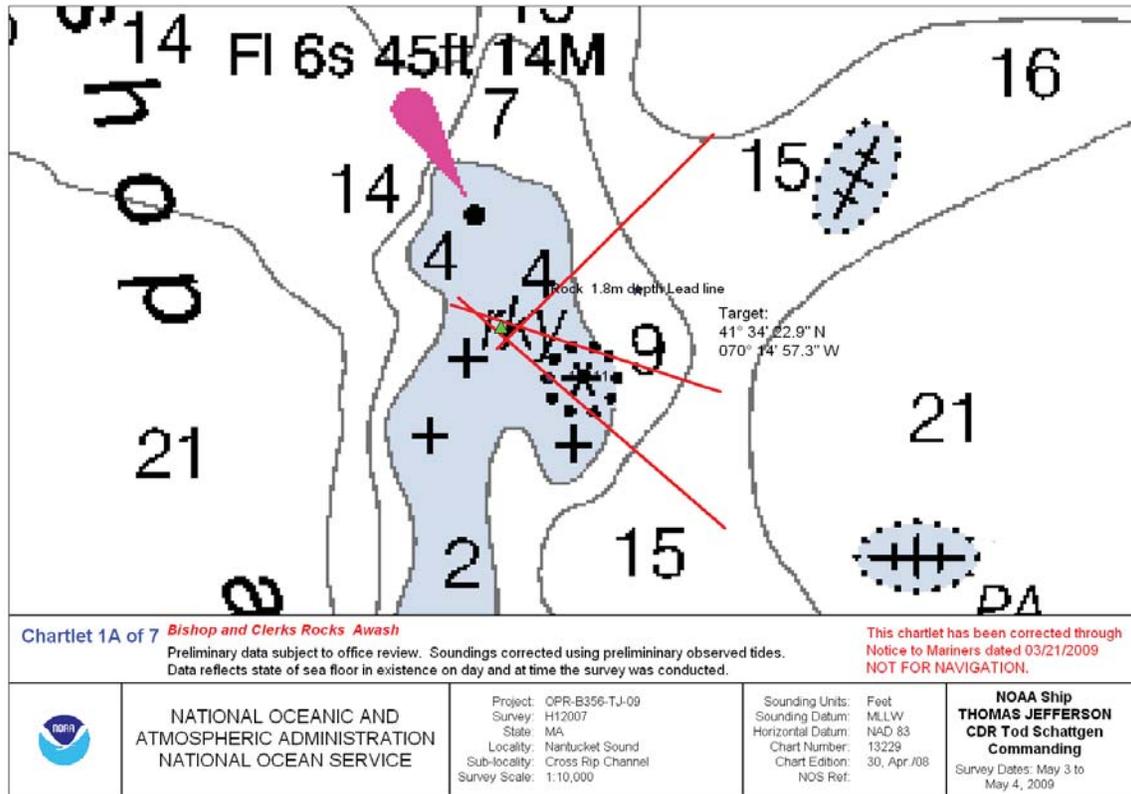


Figure 3.7.1



Figure 3.7.2



Figure 3.7.3

3.8) AWOIS_14417

Primary Feature for AWOIS Item #14417

Search Position: 41° 38' 35.6" N, 070° 11' 04.3" W
Historical Depth: [None]
Search Radius: 100
Search Technique: [None]
Technique Notes: UPDATE POSITION AND HEIGHT IN SUPPORT OF MARITIME BOUNDARY CLAIM.

History Notes:

H06471/40 -- THIS ROCK IS IN THE VICINITY OF PARKERS NECK IN SCALED (CHART 13229) POSITION LAT. 41/38/35.7N LONG. 70/11/4.3W (NAD83) BASELINE POINT NEEDS TO BE REPOSITIONED FOR A MARITIME BOUNDARY CLAIM. (ENTERED 1/22/09, EAN)

Survey Summary

Survey Position: 41° 38' 35.6" N, 070° 11' 04.3" W
Least Depth: 0.29 m (= 0.94 ft = 0.156 fm = 0 fm 0.94 ft)
TPU (±1.96σ): THU (TPEh) ±0.980 m ; TVU (TPEv) ±0.103 m
Timestamp: 2009-124.18:49:08.000 (05/04/2009)
DP Dataset: h12007 / tj_3101_dp_vessel / 2009-124 / awois_import
Profile/Beam: 9/1
Charts Affected: 13229_1, 13237_1, 13246_1, 13200_1, 13009_1, 13006_1, 5161_1, 13003_1

Remarks:

Maritime boundary investigation as per project instructions, special data handling requirements. Feature positioned with single LOP due to shallow depth, least depth by visual observation.

Feature Correlation

Address	Feature	Range	Azimuth	Status
h12007/tj_3101_dp_vessel/2009-124/awois_import	9/1	0.00	000.0	Primary
OPR-B356-TJ-09-AWOIS	AWOIS # 14417	0.78	254.6	Secondary

Hydrographer Recommendations

Investigation inadequate. Retain as charted.

S-57 Data

Geo object 1: Underwater rock / awash rock (UWTROC)
Attributes: QUASOU - 9:value reported (not confirmed)
SORDAT - 20090504
SORIND - US,US,graph,H12007
TECSOU - 9:found by electromagnetic sensor
VALSOU - 0.286 m
WATLEV - 3:always under water/submerged

Office Notes

Concur, retain rock as charted.

Feature Images

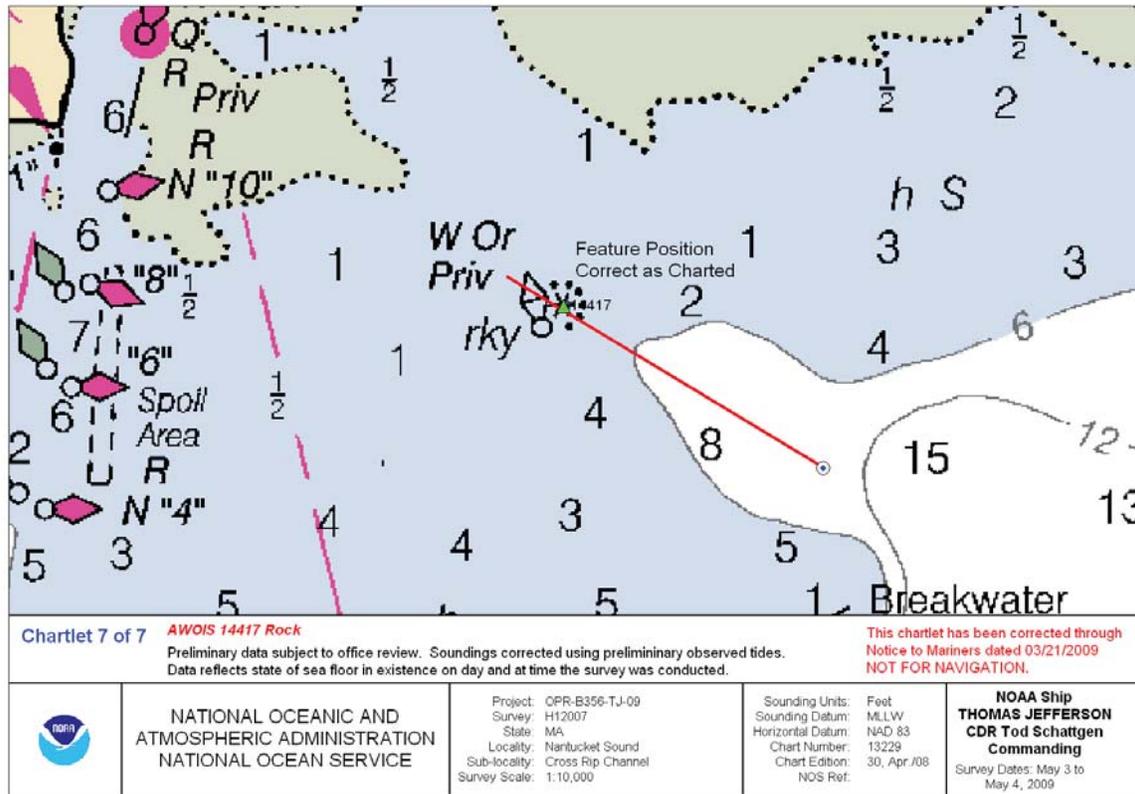


Figure 3.8.1

3.9) AWOIS #14418 - MARITIME BOUNDARY CLAIM

No Primary Survey Feature for this AWOIS Item

Search Position: 41° 17' 43.2" N, 070° 08' 11.4" W
Historical Depth: [None]
Search Radius: 100
Search Technique: [None]
Technique Notes: UPDATE POSITION AND HEIGHT IN SUPPORT OF MARITIME BOUNDARY CLAIM.

History Notes:

H08497/58 -- THIS ROCK IS IN THE VICINITY OF DIONIS BEACH IN SCALED (CHART 16540) POSITION LAT. 41/17/43.2N LONG. 70/8/11.4W (NAD83) BASELINE POINT NEEDS TO BE REPOSITIONED FOR A MARITIME BOUNDARY CLAIM. (ENTERED 1/22/09, EAN)

Survey Summary

Charts Affected: 13241_1, 13237_1, 12300_1, 13200_1, 13009_1, 13006_1, 5161_1, 13003_1

Remarks:

Item not investigated.

Feature Correlation

Address	Feature	Range	Azimuth	Status
OPR-B356-TJ-09-AWOIS	AWOIS # 14418	0.00	000.0	Primary

Hydrographer Recommendations

Retain as charted.

S-57 Data

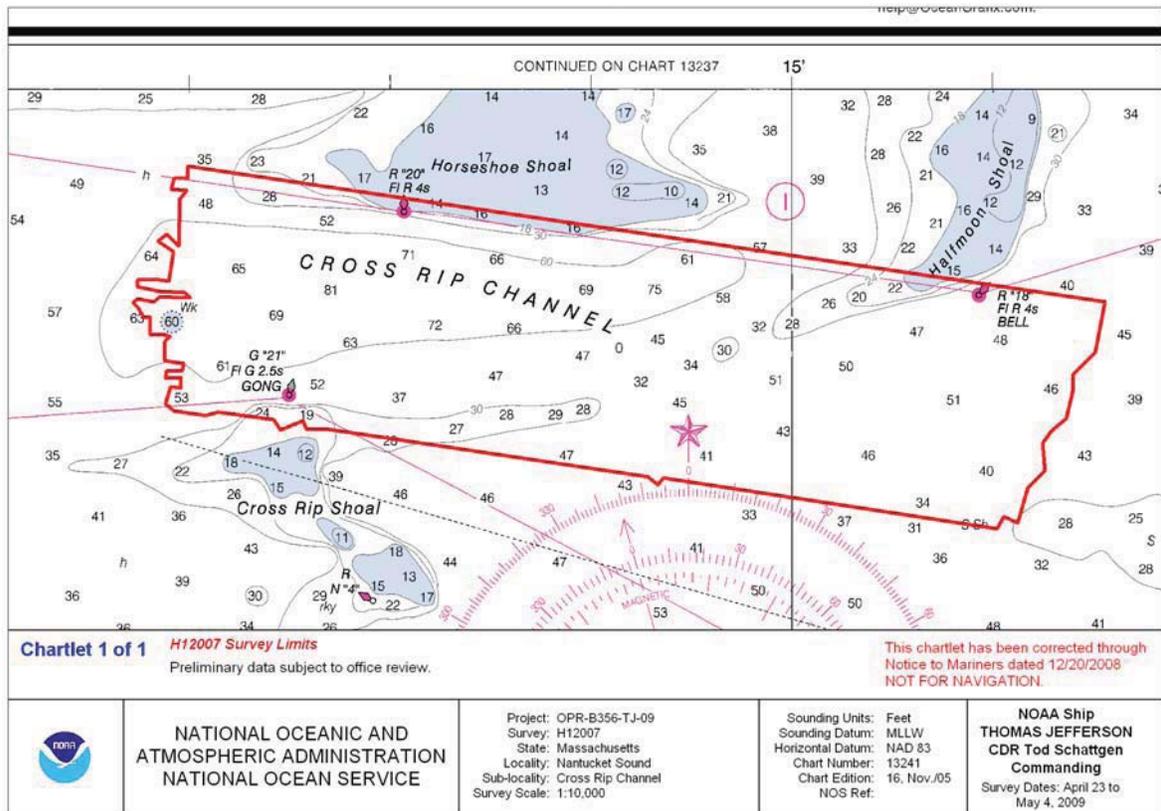
[None]

Office Notes

Concur.

Appendix III

Progress Sketch



Appendix IV

Tides and Water Levels

- 1. Tide Notes**
- 2. Request for Approved Tides**
- 3. Final Tide Notes**



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

TIDE NOTE FOR HYDROGRAPHIC SURVEY

DATE : August 25, 2009

HYDROGRAPHIC BRANCH: Atlantic
HYDROGRAPHIC PROJECT: OPR-B356-TJ-2009
HYDROGRAPHIC SHEET: H12007 Rev

LOCALITY: Cross Rip Channel, Nantucket Sound, MA
TIME PERIOD: April 23 - May 4, 2009

TIDE STATION USED: 844-9130 Nantucket, MA
Lat. 41° 17.1'N Long. 70° 5.8' W

PLANE OF REFERENCE (MEAN LOWER LOW WATER): 0.000 meters
HEIGHT OF HIGH WATER ABOVE PLANE OF REFERENCE: 0.985 meters

REMARKS: RECOMMENDED ZONING

Use zone(s) identified as: SCM115, SCM127, SCM130, SCM132, SCM137,
SCM143, SCM144, SCM145, SCM152 and SCM154

Refer to attachments for zoning 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: 2009.08.26 07:28:45 -04'00'

CHIEF, OCEANOGRAPHIC DIVISION



Appendix V

Supplemental Survey Records & Correspondence

N/A

AHB COMPILATION LOG

General Survey Information	
REGISTRY No.	H12007
PROJECT No.	OPR-B356-TJ-09
FIELD UNIT	NOAA SHIP THOMAS JEFFERSON
DATE OF SURVEY	23 APR 2009 – 4 MAY 2009
LARGEST SCALE CHART	<i>13241_1, edition 16, 20100424, 1:40000</i>
ADDITIONAL CHARTS	<i>13237_1, edition 40, 20100424, 1:80000</i>
SOUNDING UNITS	feet
COMPILER	Kolleen McKenzie

Source Grids	File Name
	H:\Compilation\H12007_B356_TJ\AHB_H12007\
	E-SAR Final Products\GRIDS\H12007_Cube_NOAA_1m_Final
	E-SAR Final Products\GRIDS\H12007_AWOIS_6858_50cm_Final
	E-SAR Final Products\GRIDS\H12007_Obstn51_Cube_NOAA_50cm_Final
	E-SAR Final Products\GRIDS\H12007_Obstn66_Cube_NOAA_50cm_Final
	E-SAR Final Products\GRIDS\H12007_Wreck21_Cube_NOAA_50cm_Final
	E-SAR Final Products\GRIDS\H12007_Wreck71_Cube_NOAA_50cm_Final
Surfaces	File Name
	H:\Compilation\H12007_B356_TJ\AHB_H12007\COMPILE\Working
<i>Combined</i>	H12007_4m_Combined.hns
<i>Interpolated TIN</i>	\Interpolated TIN\H12007_4m_InterpTIN.hns
<i>Shifted Interpolated TIN</i>	\Shifted Surface\H12007_4m_InterpTIN_Shifted.hns
<i>Product Surface</i>	N/A
Final HOBs	File Name
	H:\Compilation\H12007_B356_TJ\AHB_H12007\COMPILE\Final_Hobs\
<i>Survey Scale Soundings</i>	H12007_SS_Soundings.hob
<i>Chart Scale Soundings</i>	H12007_CS_Soundings.hob
<i>Contour Layer</i>	H12007_Contours.hob
<i>Feature Layer</i>	H12007_Features.hob
<i>Meta-Objects Layer</i>	H12007_MetaObjects.hob
<i>Blue Notes</i>	H12007_BlueNotes.hob
<i>ENC Retain Soundings</i>	H12007_ENC_Retain_Soundings.hob

Meta-Objects Attribution	
Acronym	Value
M_COVR	
CATCOV	Coverage available
SORDAT	20090504
SORIND	US,US_graph,H12007
M_QUAL	
CATZOC	Zone of confidence U (data not assessed)
INFORM	NOAA SHIP THOMAS JEFFERSON
POSACC	10 m
SORDAT	20090504
SORIND	US,US_graph,H12007

[Type text]

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

SUREND	20090504
SURSTA	20090423
DEPARE	
DRVALV 1	13.99278 ft
DRVALV2	85.37720 ft
SORDAT	20090504
SORIND	US,US,graph,H12007
M_CSCL	
CSCALE	N/A
SORDAT	N/A
SORIND	N/A

SPECIFICATIONS:

- I. COMBINED SURFACE:
 - a. Number of ESAR Final Grids: 6
 - b. Resolution of Combined (m): 4

- II. SURVEY SCALE SOUNDINGS (SS):
 - a. Radius
 - b. Shoal biased
 - c. Use Single-Defined Radius (mm at Map Scale): ; Radius Value = 1
 - d. Queried Depth of All Soundings
 - i. Minimum: 13.99278 ft
 - ii. Maximum: 85.37730 ft

- III. INTERPOLATED TIN SURFACE:
 - a. Resolution (m):
 - b. Linear
 - c. Shifted value: *-0.229m (feet), (≤ 10 fathoms)*

- IV. CONTOURS:
 - a. Use a Depth List: H12007_NOAA_depth_curves_list.txt
 - b. Line Object: DEPCNT
 - c. Value Attribute: VALDCO

- V. FEATURES:
 - a. Total Number of Features:
 - b. Number of Insignificant Features:

- VI. CHART SURVEY SOUNDINGS (CS):
 - a. Number of ENC CS Soundings:
 - b. Radius
 - c. Shoal biased
 - d. Use Single-Defined Radius: m on the ground
 - i. Radius Value (m):
 - ii. Or use a Sounding Space Range Table (if applicable): HXXXXX_SSR.txt
 - e. Filter: Interpolated != 1
 - f. Number Survey CS Soundings: 65

VII. Notes:

[Type text]

**ATLANTIC HYDROGRAPHIC BRANCH
EVALUATION REPORT to ACCOMPANY
SURVEY H12007 (2009)**

This Evaluation 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.1 DATA PROCESSING

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

CARIS HIPS/SIPS version 6.1 SP2 HF 7
CARIS Bathy DataBASE version 2.3 HF 1-16
CARIS S-57 Composer version 2.1 HF 4
DKART INSPECTOR, version 5.0 Build 732 SP1
CARIS HOM version 3.3 SP3 HF 8

B.2. QUALITY CONTROL

B.2.1. H-Cell

AHB personnel utilized the source depth grids for the survey's nautical chart update product by combining the final grids of four individual wrecks and obstructions at 50 cm grid resolution with the 1 meter grid resolution at a combined resolution of 4 meters. Survey scale soundings were created from the combined surface using a depth radius table with minimum value of one millimeter at chart scale for the affected chart scale of 1:40,000. A TIN was created from the survey scale soundings from which an interpolated surface was generated. The chart scale selected soundings (CS Soundings) are a subset of the survey scale selected soundings and were generated using a single defined radius of 750 meters.

Depth contours were created from a shifted interpolated TIN surface of 4m resolution. The depth contours are forwarded to MCD for reference only. The contours were utilized during chart scale sounding selection and quality assurance efforts at AHB. The depth contours are incorporated into the SS H-Cell product as per 2009 H-Cell Specifications.

The pre-compilation products or components (Stand Alone HOB files (SAHOB)) are detailed in the Compile Log attached at the end of this document. The SAHOB files included depth area (DEPARE), depth contours (DEPCNT), sounding selections (SOUNDG), features (SNDWAV, WRECKS, UWTRC), Meta objects (M_COVR, M_QUAL), and cartographic Blue Notes (\$CSYMB).

All of the components with the exception of the survey scale sounding selection and depth contours were inserted into one feature layer (including the Bluenotes, as dictated by Hydrographic Technical Directive 2008-8), and this layer was exported into S-57 format in order

to create the H-Cell deliverable. Similarly, the survey scale sounding selection and depth contours were exported into S-57 format separately, and then both S-57 files were processed in CARIS HOM to convert the metric units to feet. The final products are two S-57 files, in Lat/Lon NAD-83, one that contains the chart scale soundings, Meta objects, features, and Bluenotes (H12007_CS.000), and one that contains the survey scale sounding selection and depth contours (H12007_SS.000). Finally, quality assurance checks were made utilizing CARIS S-57 Composer version 2.0 validation checks.

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

H12007 CARIS H-Cell final deliverables include the following products:

H12007_CS.000	1:40,000 Scale	H12007 H-Cell with Chart Scale Selected Soundings
H12007_SS.000	1:10,000 Scale	H12007 Selected Soundings (Survey Scale)

B.2.2. Junctions

No contemporary surveys junction with survey H12007. Survey scale soundings are in good agreement with the charted depths to the north, south, east and west of the survey area.

C. VERTICAL AND HORIZONTAL CONTROL

A Horizontal and Vertical Control Report (HVCR) was not filed with H12007 survey. The horizontal datum used for survey H12007 is the North American Datum of 1983 (NAD83), zone 19N. The vertical datum was Mean Lower-Low Water (MLLW) and the operating National Water Level Observation Network (NWLON) station at Nantucket Island, MA (84499130) was used for this survey. Verified tides with Final Tidal Zoning was then applied to all sounding data.

D. RESULTS AND RECOMMENDATIONS

D.1 CHART COMPARISON

13241 (16th Edition, Apr./10)

Corrected through NM 04/24/2010
 Corrected through LNM 04/13/2010
 Scale 1:40,000

13232 (40th Edition, Apr./10)

Corrected through NM 04/24/2010
 Corrected through LNM 04/13/2010
 Scale 1:80,000

13238 (16th Edition, Aug./07)

Corrected through NM 05/15/2010
 Corrected through LNM 05/04/2010

Scale 1:20,000

13229 (30th Edition, Apr./08)

Corrected through NM 05/10/2010

Corrected through LNM 05/04/2010

Scale 1:40,000

ENC Comparison

US4MA43M

Nantucket Sound and Approaches

Edition 5

Application Date 2010-04-15

Issue Date 2010-04-15

Chart 13237

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 1&2 of the Descriptive Report. The following exceptions are noted:

- a. There is a sandwave area which crosses the survey area; running from southwest to northeast across the survey area and is represented by the 30 foot contour.
- b. As specified in the Project Instructions, Maritime Boundary features were assigned as additional AWOIS items for investigation. Eight items were assigned and seven were investigated, using a combination of Lead Line, Sounding Pole, visual height estimation and Detached Position triangulation for horizontal positioning.

D.2. ADDITIONAL RESULTS

D.3. 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.

D.4. 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
H12007**

Initial Approvals:

The completed survey has been inspected with regard to survey coverage, delineation of depth contours, disposition of critical depths, cartographic symbolization, and verification or disproof 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.



**Kolleen
McKenzie**

Kolleen McKenzie
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.

A handwritten signature in blue ink that reads 'Richard T. Brennan'. The signature is written in a cursive style.

Richard T. Brennan

I am approving this document
2010.05.28 12:37:15 -04'00'

Approved: _____

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