H12023

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: **H12023**

LOCALITY

State: Rhode Island

General Locality: Block Island Sound

Sub-locality: Point Judith to Green Hill Point

2009

CHIEF OF PARTY

CDR Shepard M. Smith

NOAA

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DATE

NOAA FORM 77-28 (11-72) U.S. DEPARTMENT OF COMMERCE NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION	REGISTRY NUMBER:
HYDROGRAPHIC TITLE SHEET	**H12023**

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:	Rhode Island		
General Locality:	Block Island Sound		
Sub-Locality:	Point Judith to Green Hill Point		
Scale:	1:7,500	Date of Survey:	08/24/09 to 10/14//09
Instructions Dated:	26 February 2009	Project Number:	OPR-B363-TJ-09
Vessel:	NOAA Ship THOMAS JEFFERSON		
Chief of Party:	CDR Shepard M. Smith, NOAA		
Surveyed by:	THOMAS JEFFERSON Personnel		
Soundings by:	Reson 8125 &7125 Multibeam and Odom MKII single beam echosounders.		
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		

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

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

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Descriptive Report to Accompany Hydrographic Survey H12023

Project OPR-B363-TJ-09
H12023
Point Judith to Green Hill Point
Block Island Sound, RI
Scale 1:7500
24 Aug 2009- 14 Oct 2009
NOAA Ship THOMAS JEFFERSON

A. AREA SURVEYED

This hydrographic survey was completed as specified by Hydrographic Survey Letter Instructions OPR-B363-TJ-09, dated 26 February 2009. The survey limits are contained within the coordinates below.

Northern Limit	Southern Limit	Western Limit	Eastern Limit
41° 22’ 39.4” N	41° 18’ 54.17” N	71° 36’ 18.9” W	71° 28’ 40.2” W

Data acquisition was conducted from 24 August 2009 to 14 October 2009. Two additional lines of data were acquired on 22 October 2011 by *Thomas Jefferson* while working on OPR-B363-TJ-11. *Thomas Jefferson* took the opportunity to obtain a least depth over a rock that was not developed during the original survey dates. 2011 DAPR and HVF are submitted along with this survey.

The purpose of this project is to update the nautical charts in the area. Most of the bathymetry is from surveys completed before 1940. This project responds, in part, to a request from the President of the Northeast Marine Pilots for new hydrographic surveys to support deep draft (60') vessels carrying oil along the route that proceeds northwest from the precautionary area south of the Narragansett Bay and Buzzards Bay traffic lanes.

	Linear Nautical Miles
Single beam mainscheme	125.0
Multibeam mainscheme	806.6
Side Scan Sonar mainscheme	380.1
Developments	28.5
Crosslines	33.0
Shoreline/nearshore investigations	0
Number of Bottom Samples	6
Number of AWOIS items investigated	16
Total number of square nautical miles	14.84

Table 1: Hydrographic Survey Statistics

Calendar Date	Julian Day	Calendar Date	Julian Day
24-Aug-2009	236	25-Sep-2009	268
25-Aug-2009	237	26-Sep-2009	269
26-Aug-2009	238	10-Oct-2009	283
27-Aug-2009	239	11-Oct-2009	284
28-Aug-2009	240	12-Oct-2009	285
31-Aug-2009	243	13-Oct-2009	286
01-Sep-2009	244	14 Oct 2009	287
24-Sep-2009	267	22 Oct 2011*	295

Table 2: Dates of Survey - *Additional work performed during OPR-B363-TJ-11

Survey limits of H12023 are shown below.

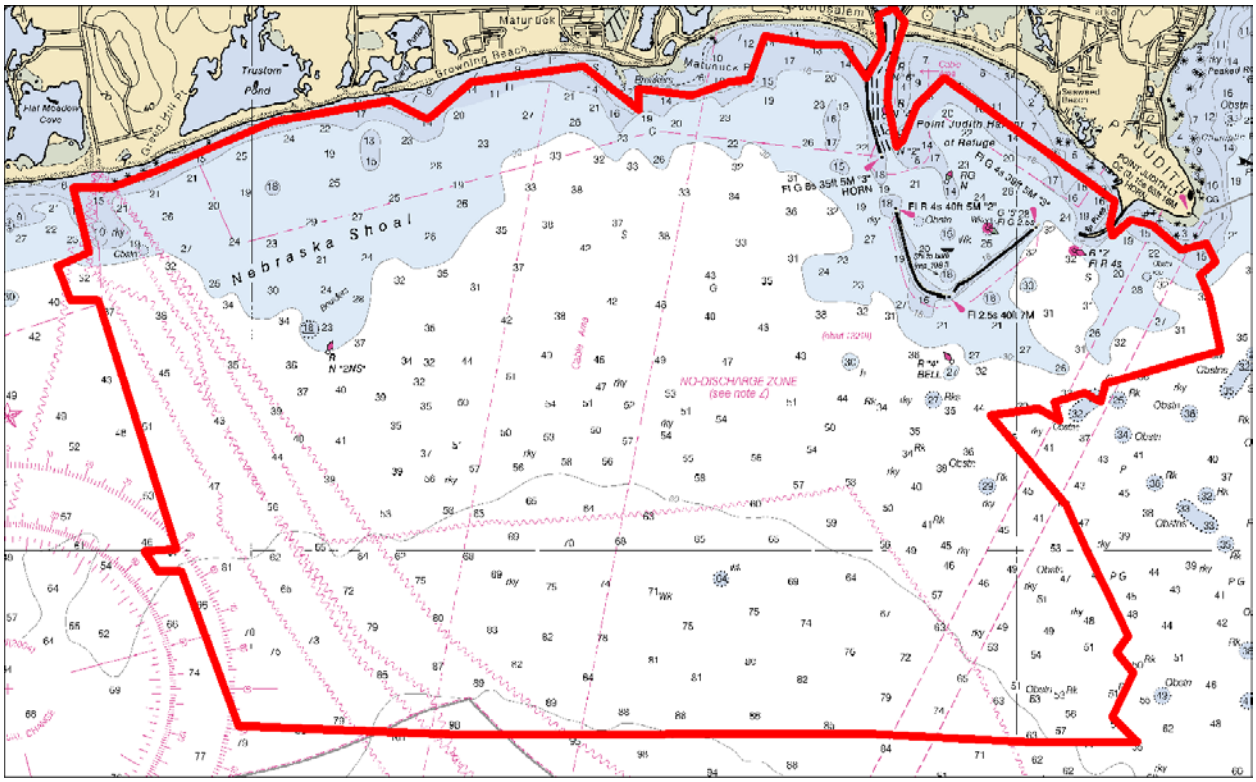

Figure 1: H12023 Survey Limits.

B. DATA ACQUISITION AND PROCESSING

Refer to ***OPR-B363-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.

B 1. EQUIPMENT AND VESSELS

Ship S222 acquired multibeam echosounder soundings, sound velocity profiles, and bottom samples. Launch 3101 acquired hull mounted side-scan imagery, multibeam echosounder soundings, vertical beam echosounder soundings, bottom samples, and sound velocity profiles. Launch 3102 acquired hull mounted and towed side-scan imagery, high-resolution multibeam echosounder soundings, and sound velocity profiles. On August 30th (DN242), a new POS/MV topside unit was installed on 3101. All other vessel configurations, equipment operation and data acquisition and processing were consistent with specifications described in the DAPR.

While conducting operations for a junction survey on October 22, 2011 (DN295) two MB development lines were acquired by *Thomas Jefferson* over a significant sidescan contact in the H12023 survey area that had been left undeveloped in 2009. These two lines were converted in Caris using the 2011 HVF for the ship's Reson 7125 (which also contains all the relevant 2009 dated entries for this survey), from which a 50cm CUBE surface was generated in a separate field sheet.

B 2. QUALITY CONTROL

B 2.1 System Certification and Calibration

Refer to NOAA Ship *Thomas Jefferson* DAPR and Hydrographic Systems Readiness Report (HSRR) memo for a complete description of system integration and initial calibration results for equipment and sensors used for this survey.

B.2.2 Sounding Coverage

As per the Letter Instructions, this survey was conducted using "Object Detection Multibeam" (OD MB) in depths less than 20 meters and "Complete Multibeam" in depths greater than 20 meters. As per guidance from HSD OPS, 100% SSS was initially acquired throughout the entire project area, to determine the extent of significant features. Subsequently, the survey area was divided into either 200% SSS or OD MB coverage, based on the available OD MB coverage density (Figure 2).

Figure 2: Coverage Type. Object detection MB coverage in blue. 200% SSS coverage in green.

In areas designated as side scan sonar coverage, this was monitored by creation of 100% and 200% coverage mosaics, each with 1m resolution. Bathymetry coverage was monitored by creating 0.5 meter resolution BASE surfaces in the object detection areas and 1 meter BASE surfaces over the complete multibeam areas as specified in HSSD 2009, Section 5.1.2. These outlines are provided as .hob file in the PSS\HOB_Files folder of this report.

An area west of the primary Point Judith breakwater received only 100% SS coverage and partial bathymetry coverage. All significant features have adequate bathymetry.

In general, buffer lines acquired along near shore areas did not receive 200% SS coverage.

A coverage gap exists between H12023 and the adjoining survey H12011. Neither survey has soundings in this section. The width of the area is 16m in the east to 4m in the west starting at 41-19-04 N 071-30-07.1W and ending at 41-19-04 N 71-30-29.0 W approximately 500m long.

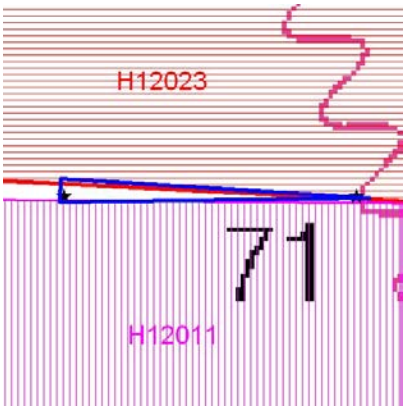

Figure 3: Coverage gap between H12023 and H12011

B 2.3 Crosslines

Multibeam echosounder crosslines totaling 33.0 lineal nautical miles, comprising 4.1% of mainscheme multibeam hydrography, were acquired during the course of the survey. As per email dated 10 September 2009 from AHB, the quality control check was done using the standard deviation layer of the survey's CUBE surface. Unusually high standard deviation values were investigated and resolved in processing, except where caused by areas of high bathymetric relief or features or as described in Section 2.5 Systematic Errors.

B 2.4 Junctions and Prior Surveys

The following contemporary surveys junction with H12023 (Figure 4). Comparisons were made in CARIS BASE Editor using a difference surface.

Registry #	Scale	Year	Field Party	Junction side
H10659	1:10,000	1995	*Rude*	East
H12011	1:7,500	2009	*Thomas Jefferson*	South

Survey H12023 junctions with survey H10659 to the east. Survey was older than five years and no comparison was made.

Survey H12023 junctions with survey H12011 to the south. Soundings between H12023 and H12011 agreed within 1 foot.

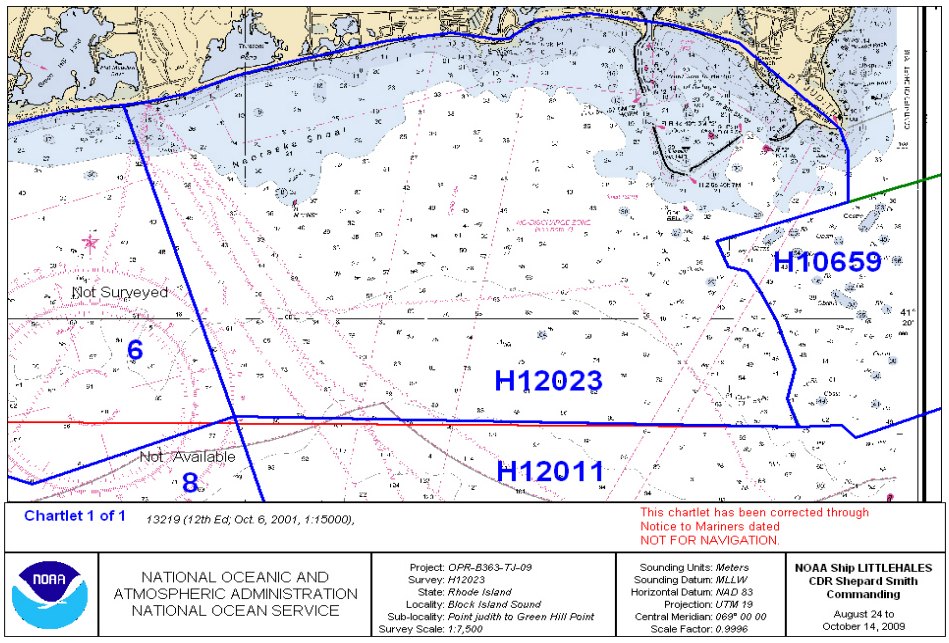

Figure 4: Survey Junctions

B 2.5 Systematic Errors

On DNs 243, 267 and 268, the Reson 7125 computer on Launch 3102 had an intermittent timing error. The error can be observed throughout the data as a wave in the surface. This generally does not exceed 40 cm in the grid. Where it exceeded this, the swaths were rejected, leaving gaps in the data (Figure 5). See correspondence in Appendix V.

Figure 5: Data gaps from rejected data where heave artifacts exceeded 40cm.

Areas of sounding rarefaction (reduction in density) occur with the Reson 8125 system in depths approaching 20m. As the sonar system reaches the deeper limit of its range scale, the survey vessel must slow down significantly to maintain adequate coverage. Partly as a result of this issue, only 91% of nodes met the minimum density requirement of 5 soundings per node (Figure 6).

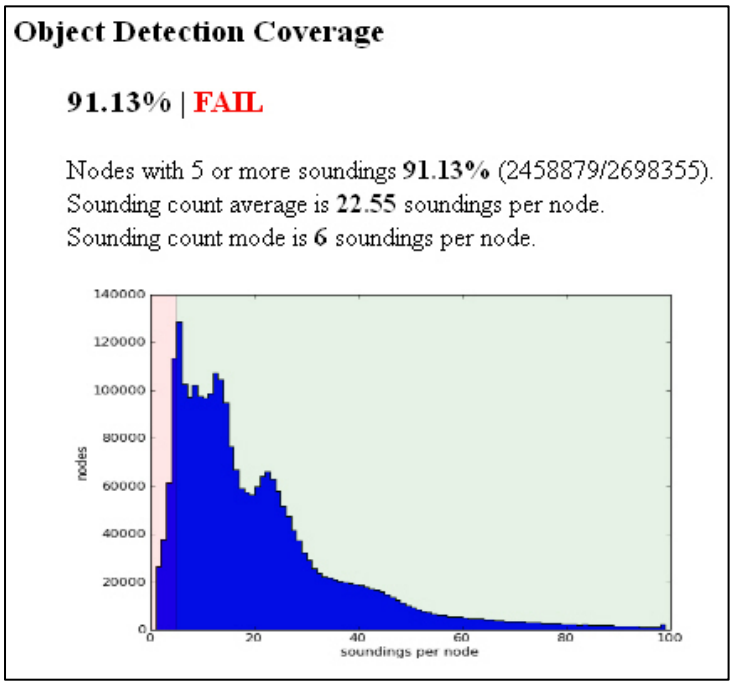

Figure 6: Sounding density plot produced with Python script

The sounding density is higher in the Object Detection MB areas of the survey (Figure 7). A more lenient requirement of 2 soundings per node was granted for areas covered by 200% SSS, as dictated in an email from James Crocker (Appendix V). Once this exception is taken into consideration, the survey does meet sounding density requirements (Figure 7).

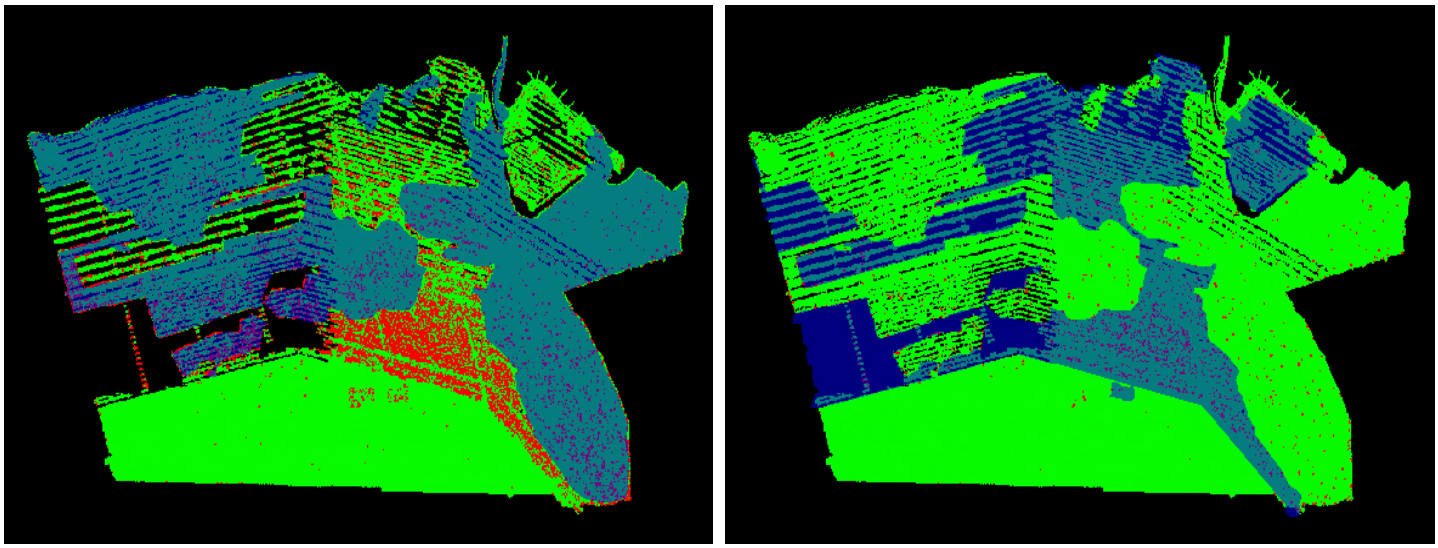

Figure 7: Density Comparison - On left, Object Detection MB areas are highlighted in transparent blue, green nodes have 5 or more soundings per node, and red nodes have fewer. On right, 200% SS coverage is highlighted in blue, green nodes have 2 or more soundings per node, and red nodes have fewer.

In areas where Odom MKII vertical beam data overlaps with multibeam coverage, vertical offsets are present. Most of the vertical beam data is 20-40cm shoaler than multibeam data, but still meets IHO Order 1 requirements. This offset can be identified in the combined surface (Figure 8).

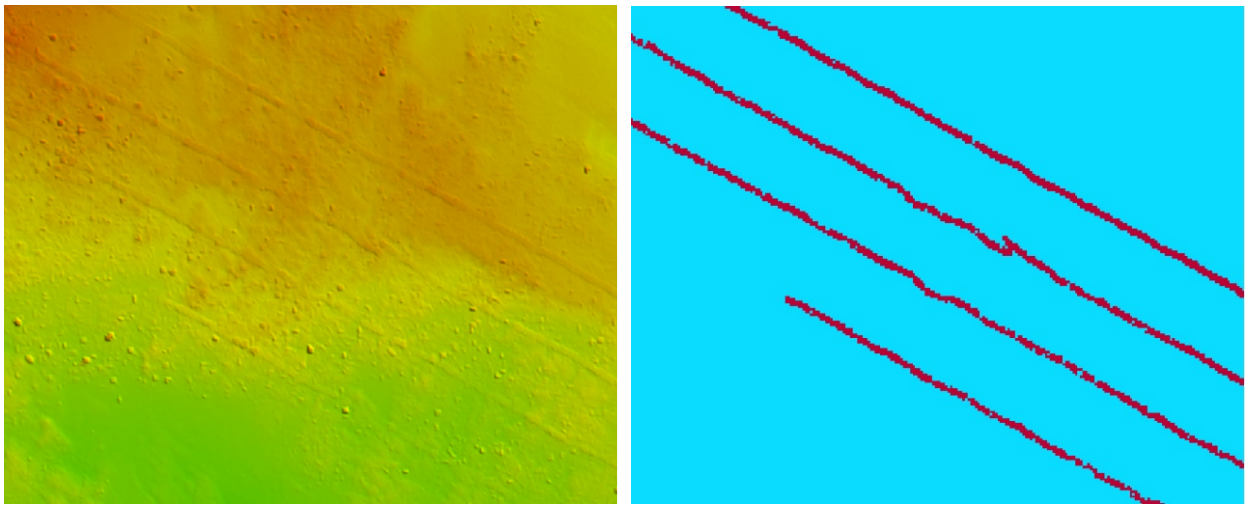

Figure 8: Vertical offset between VB and MB data as exhibited in the Depth (left) and Contributer (right) layers of the combined grid

B 3. CORRECTIONS TO ECHO SOUNDING

HDCS sounding data were reduced to mean lower-low water (MLLW) using approved tides from the primary stations at New London CT, 8461490; Newport RI,8452660; and Montauk NY8510560. TCARI was used for tidal constituents and residuals provided by CO-OPS as specified in the Letter Instructions and illustrated in Figure 9.

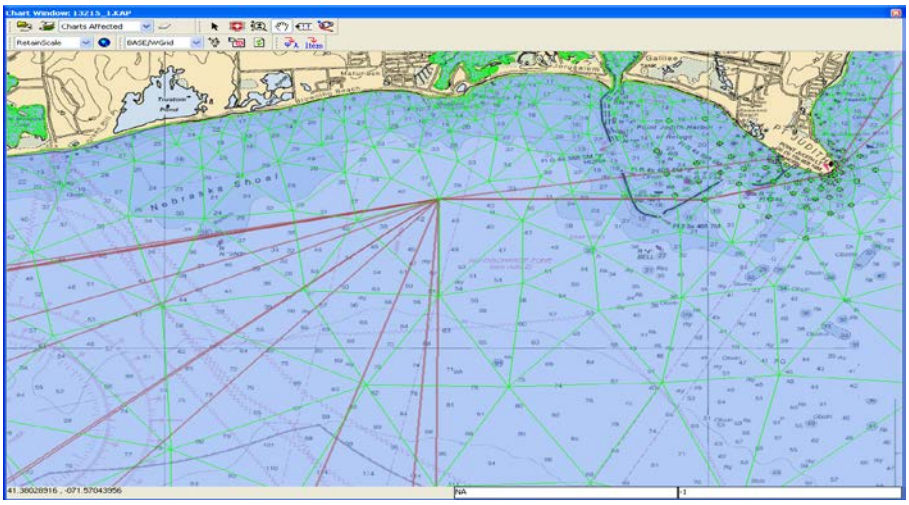

Figure 9: TCARI Zones.

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***.

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-B363-TJ-09, survey H12023 are as follows:

Vessel	Tide Values		Sound Speed Values		
	Measured	Zoning	CTD	MVP	Surface
3101	TCARI	TCARI	4	N/A	.2
3102	TCARI	TCARI	4	N/A	.2
S222	TCARI	TCARI	4	1	.2

Table 3. TPE parameters.

B 4.2 BASE Surfaces and Mosaics

The following table describes all BASE Surfaces and Mosaics submitted as part of Survey H12023:

Name of Surfaces and/or Mosaics	Resolution	Type	Purpose
H12023_MB_CUBE_MLLW_50cm_1_Final	0.5 meter	CUBE	Object Detection
H12023_MB_CUBE_MLLW_50cm_2_Final	0.5 meter	CUBE	Object Detection
H12023_MB_CUBE_MLLW_50cm_3_Final	0.5 meter	CUBE	Object Detection
H12023_MB_CUBE_MLLW_50cm_4_Final	0.5 meter	CUBE	Object Detection
H12023_MB_CUBE_MLLW_50cm_5_Final	0.5 meter	CUBE	Object Detection
H12023_MB_CUBE_MLLW_50cm_6_Final	0.5 meter	CUBE	Object Detection
H12023_MB_CUBE_MLLW_50cm_7_Final	0.5 meter	CUBE	Object Detection
H12023_MB_CUBE_MLLW_50cm_8_Final	0.5 meter	CUBE	Object Detection
H12023_MB_CUBE_MLLW_50cm_9_Final	0.5 meter	CUBE	Object Detection
H12023_MB_CUBE_MLLW_50cm_10_Final	0.5 meter	CUBE	Object Detection
H12023_MB_CUBE_MLLW_50cm_11_Final	0.5 meter	CUBE	Object Detection
H12023_MB_CUBE_MLLW_50cm_12_Final	0.5 meter	CUBE	Object Detection
H12023_MB_CUBE_MLLW_50cm_13_Final	0.5 meter	CUBE	Object Detection
H12023_MB_CUBE_MLLW_50cm_14_Final	0.5 meter	CUBE	Object Detection
H12023_MB_CUBE_MLLW_50cm_15_Final	0.5 meter	CUBE	Object Detection
H12023_MB_CUBE_MLLW_50cm_16_Final	0.5 meter	CUBE	Object Detection
H12023_MB_CUBE_MLLW_50cm_17_Final	0.5 meter	CUBE	Object Detection
H12023_MB_CUBE_MLLW_1m_17_Final	1.0 meter	CUBE	Complete MB
H12023_MB_CUBE_MLLW_50cm_18_Final	0.5 meter	CUBE	Object Detection
H12023_MB_CUBE_MLLW_1m_18_Final	1.0 meter	CUBE	Complete MB
H12023_MB_CUBE_MLLW_50cm_19_Final	0.5 meter	CUBE	Object Detection
H12023_MB_CUBE_MLLW_1m_19_Final	1.0 meter	CUBE	Complete MB
H12023_MB_CUBE_MLLW_50cm_20_Final	0.5 meter	CUBE	Object Detection
H12023_MB_CUBE_MLLW_1m_21_Final	1.0 meter	CUBE	Complete MB
H12023_MB_CUBE_MLLW_1m_22_Final	1.0 meter	CUBE	Complete MB
H12023_MB_CUBE_MLLW_1m_23_Final	1.0 meter	CUBE	Complete MB
H12023_MB_CUBE_MLLW_1m_24_Final	1.0 meter	CUBE	Complete MB
H12023_MB_CUBE_MLLW_50cm_25_Final	0.5 meter	CUBE	Object Detection
H12023_MB_CUBE_MLLW_1m_25_Final	1.0 meter	CUBE	Complete MB
H12023_MB_CUBE_MLLW_50cm_26_Final	0.5 meter	CUBE	Object Detection
H12023_MB_CUBE_MLLW_1m_26_Final	1.0 meter	CUBE	Complete MB
H12023_AWOIS_1873_MB_CUBE_MLLW_50cm_Final	0.5 meter	CUBE	Development
H12023_AWOIS_7480_MB_CUBE_MLLW_50cm_Final	0.5 meter	CUBE	Development
H12023_Development_MB_CUBE_MLLW_50cm_Final	0.5 meter	CUBE	Development
H12023_VB_Uncert_MLLW_4m	4.0 meter	Uncertainty	VB Bathymetry
H12023_VB_Uncert_MLLW_4m_ShoalExtracted.bag	4.0 meter	Uncertainty	VB Bathymetery
H12023_SSS_100_1m	1.0 meter	Mosaic	Coverage
H12023_SSS_200_1m	1.0 meter	Mosaic	Coverage

Table 4. Base Surfaces and mosaics

This survey was processed using the Combined Uncertainty and Bathymetry Estimator (CUBE) algorithm. The CUBE configuration was set to the appropriate NOAA-specific grid parameters in accordance with the FPM and the appropriate resolution and grid purpose. Where applicable, grids were thresholded at 0.5m resolution for depths 0-20m, and at 1m resolution for depths 19-40m. Refer to the 2009 Data Acquisition and Processing Report*, 2009 Field Procedures Manual, and CARIS HIPS/SIPS 7.0 manual for further discussion of CUBE.

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 at least 95% of all nodes meet the IHO Order 1 depth accuracy requirements.

C. VERTICAL AND HORIZONTAL CONTROL

As per FPM section 5.2.3.2.3 a HVCR report was not filed because horizontal and vertical control stations were not established by the field party for this survey. A summary of horizontal and vertical control for this survey follows.

C 1.1 Horizontal Control

The horizontal datum for this project is the North American Datum of 1983 (NAD83). Differential GPS (DGPS) was the sole method of positioning. Differential corrections from U.S. Coast Guard beacons at Acushnet MA (306 kHz), and Moriches NY (293 kHz), were 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). All HDCS sounding data were reduced to mean lower-low water (MLLW) using approved tides from the primary station at New London CT, (8461490), Newport RI (8452660), and Montauk NY (8510560). TCARI was used for tidal constituents and residuals provided by CO-OPS as specified in the Letter Instructions. A request for delivery of final approved (verified) tides for this survey was forwarded to N/OPS1on 15 October 2009 in accordance with the FPM and project letter instructions. The final smooth tide letter was received 29 October 2009, and states TCARI grid B363TJ2009-TCARI-Revised should be used as final (Appendix VI).

D. RESULTS AND RECOMMENDATIONS

D.1 Chart Comparison

Survey H12023 was compared with chart 13215 (18th Ed.; Aug. 1, 2004, 1:40,000) and chart 13219 (12th Ed; Oct. 6, 2001, 1:15000). Charts 13205, 13218, 12300, 13006, 5161, 13003 are at a scale of 80,000 or smaller and there are no observable discrepancies.

Chart comparisons were performed in CARIS, in Pydro using survey-scale excessed soundings, and in MapInfo using survey-scale and chart-scale excessed soundings exported from Pydro.

D.1.1 Chart 13219

Point Judith to Seaweed Beach

Shore to18ft curve: Soundings were shoal of chart by 3-6 feet. Most were uncharted rocks.

18 to 30ft curve: Soundings were within range of chart with isolated rocks shoal by 3-6 ft.

30ft curve seaward: Shoaling near 41°21'14.829"N, -071°28'58.642"W and Danger to Navigation (Appendix I). Soundings are within range of chart, isolated rocks shoal by 3-6ft.

Seaweed Beach to The Breachway

Shore to18ft curve: Soundings were within range of charted depths. Surveyed depths in the Point Judith Harbor Entrance Channel were within tabulated limits.

18 to 30ft curve: Soundings were within range of charted depths, isolated rocks shoal by 3-6ft.

30ft curve seaward: Soundings were within range of charted depths.

The Breachway to Matunuck Pt.

Shore to18ft curve: Soundings were within range of charted depths with isolated rocks 3-6 ft.

18 to 30ft curve: Soundings were within range of chart.

30ft curve seaward: Soundings were within range of charted depths.

Other Notes

There are 3 fish traps found by ortho-imagery. The fish traps at West Wall and East Wall were verified visually and positioned by launch 3102. The Brickwater Village Trap was not in place at the time, but its intended position was verified by CaptainTom Hoxsie of the *North Star*. The three traps are intermittent as they get serviced and replaced at the same location. Below is the *North Star* servicing the trap and a view of a typical layout of a fish trap (Figure 10). There are barrels anchored to the bottom supporting the trap gear. See Appendix II and V.

Figure 10: Fish traps photos.

There is a feature “Shoal to bare” located in the south west Harbor Refuge (Figure 11). The area was found and observed to bare towards the jetty. The perimeter of the shoal was covered and identified with Side Scan Sonar and Reson 7125 MB. See Appendix II.

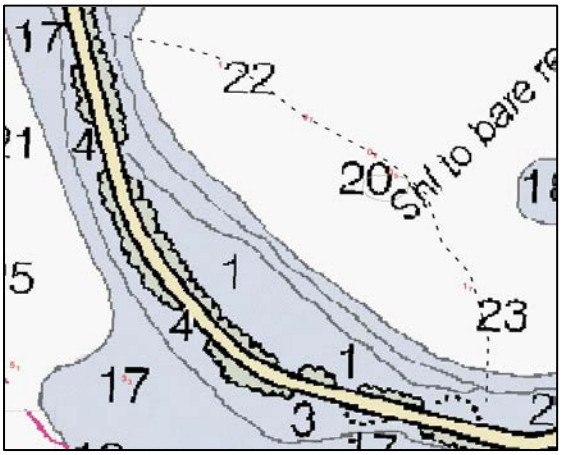

Fig 11: Shoal to bare

D.1.2 Chart 13215

Point Judith to Seaward Beach

Same as 13219.

Seaward Beach to The Breachway

Same as 13219.

The Breachway to Matunuck Pt.

Same as 13219.

Matunuck Pt to Nebraska Shoal

Shore to 18ft curve: Soundings were within range of charted depths.

18 to 30ft curve: 12% of soundings were shoal of chart by 3-6 ft the rest within range of chart.

30ft curve seaward: Soundings were within range of charted depths

D.1.3 ENCs US4CN21M and US4MA23M were not compared.

D.2 Additional Results

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

A total of 16 assigned AWOIS items were located within the modified limits of H12023 and investigated during this survey. AWOIS items were investigated with OD MB, and/or 200% SSS or onsite visual inspection. All AWOIS items are described in detail in Appendix II of this report. The maritime boundary AWOIS items were not investigated because Thomas Jefferson does not have a maneuverable, shallow draft survey boat for inshore survey operations.

D.2.4 Shoreline

There is shoreline within the sheet limits of survey H12023. In particular the Harbor of Refuge jetty is not depicted with symbology that depicts the jetty extending out under the water. The hydrographer recommends delineating this from the SSS and updating the chart.

D.2.5 Charted Features

There are numerous charted features within the limits of survey H12023, see Appendix II for a listing of all charted items addressed by this survey.

D.2.6 Charted Pipelines and Cables

There are two charted cable areas that transect the survey area; one from Galilee heading south and one from Point Judith heading southwest. All of these pipelines and cables are buried and are not visible in either side-scan imagery or multibeam digital terrain models. The Hydrographer has no particular recommendations for these and cables.

D.2.7 Bridges, Ferry Routes, and Overhead Cables

There are no bridges or overhead cable crossings within the limits of the survey. There is a ferry route from Point Judith to Block Island, but the Hydrographer has no recommendations regarding this ferry route.

D.3 Dangers to Navigation and Shoals

D 3.1 Dangers to Navigation

Nine Dangers to Navigation were found and reported to the NOAA's Office of Coast Survey, Marine Chart Division (MCD), and are include in Appendix I. All Dangers to Navigation identified in this survey are listed in Table 5, with their submission date to MCD.

DtoN Number	Description	Latitude	Longitude	Date Submitted
1.1	Rock	41° 21' 53.4" N	071° 29' 42.4" W	12/18/09
1.2	Rock	41° 21' 53.7" N	071° 29' 44.5" W	12/18/09
1.3	Rock	41° 21' 16.2" N	071° 30' 39.8" W	12/18/09
1.4	Rock	41° 21' 14.9" N	071° 28' 58.5" W	12/18/09
1.5	Rock	41° 21' 48.7" N	071° 31' 07.4" W	12/18/09
1.6	Rock	41° 21' 22.0" N	071° 28' 49.7" W	12/18/09
1.7	Rock	41° 21' 54.1" N	071° 30' 57.9" W	12/18/09
1.8	Rock	41° 21' 10.0" N	071° 29' 22.8" W	12/18/09
1.9	Rock	41° 21' 10.0" N	071° 28' 44.8" W	12/18/09

Table 5: DTONs

D 3.2 Shoals

The 1 ft shoal reported located near R N"2" at the channel entrance was disproved (see Appendix II).

D.4 Aids to Navigation

There are 14 charted Aids to Navigation (ATON) within the revised limits of H12023.

All Aids to Navigation were found to be on station and serving their intended purpose. The Hydrographer has no recommendations regarding these ATONs.

D.5 Coast Pilot Information

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

D.6 Bottom Samples

Bottom samples were collected throughout the survey area. A total of 6 bottom samples were acquired. A complete description of all bottom samples acquired during Survey H12023 is contained in Appendix V.

D.8 Adequacy of Survey

This survey is considered complete and adequate to supersede charted depths within the common area except as noted elsewhere in this report.

Summary and Recommendations for Additional Work

No additional work is needed to complete this survey. There are significant changes to navigation and this has been noted. It is recommended that this survey receive higher processing priority.

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-B363-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 Manager:

_____

Peter Lewit, NOAA
Senior Survey Tech

Appendix I

Tides and Water Levels

Appendix II

Supplemental Survey Records & Correspondence

Appendix III

Survey Features Report