H12139

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: H12139

LOCALITY

State: Rhode Island

General Locality: Block Island Sound

Sub-locality: 5 NM West of Block Island

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

H12139

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, RI**
Sub-Locality:	**5 NM West of Block Island**
Scale:	**1:20,000** Date of Survey: **08/20/09 to 08/31/09**
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 7125 multibeam echo sounder.**
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 19.
Bold, italic, red notes in the Descriptive Report were made during office processing.

Table of Contents

List of Tables

List of Figures

Descriptive Report to Accompany Hydrographic Survey H12139

Project OPR-B363-TJ-09
Block Island Sound, RI
5 NM West of Block Island
Scale 1:20,000
August 20th – August 31th 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. ***Filed with original field records***

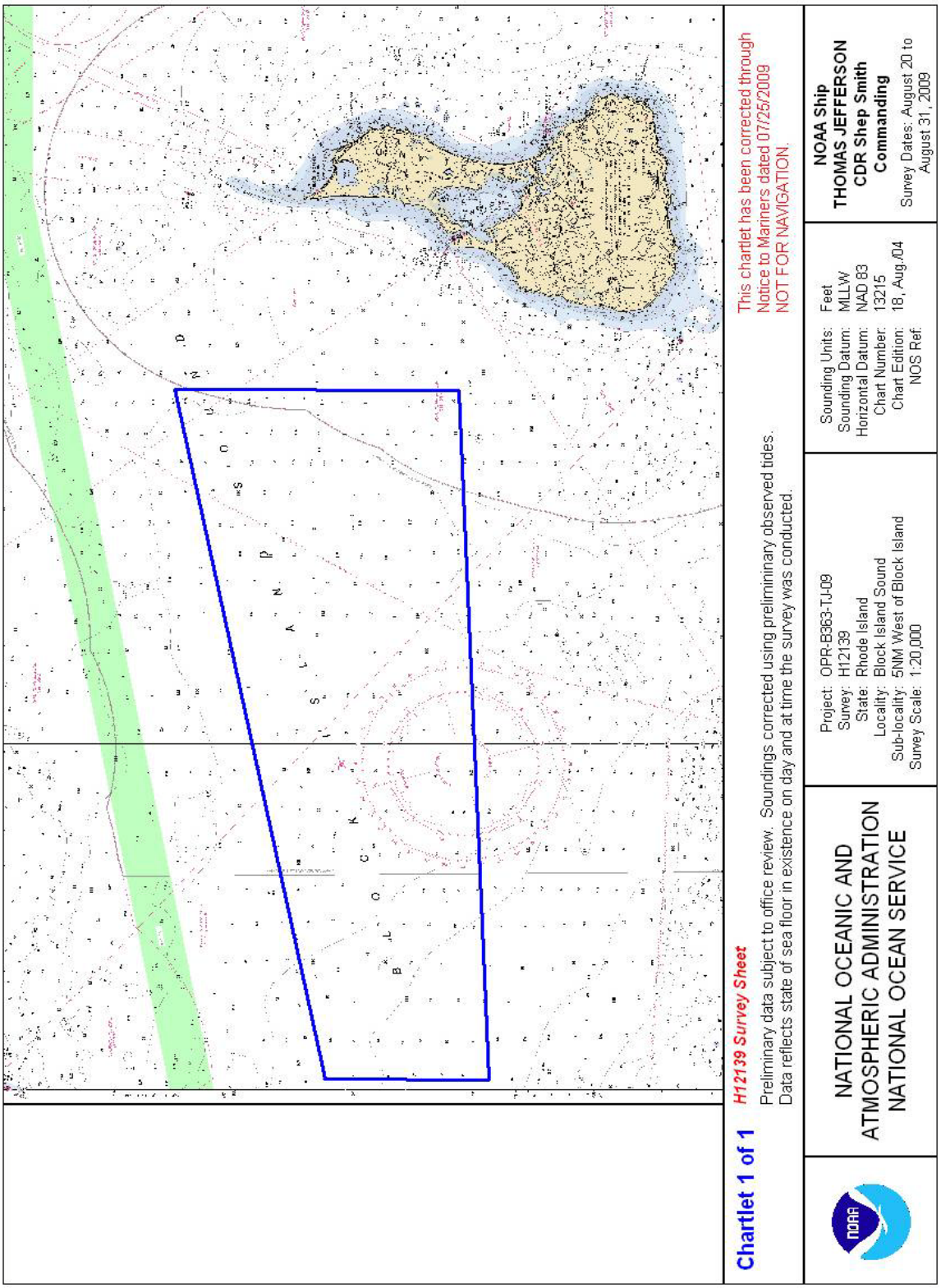
North Western Limit	South Western Limit	South Eastern Limit	North Eastern Limit
41° 14’ 54.07” N 071° 38’ 11.43” W	41°13'38.41" N 071°51'25.08" W	41°11'22.91" N 071°51'32.37" W	41°12'17.83" N 071°36'25.87" W

Data acquisition was conducted from August 20th – August 31th, 2009.

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 survey 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
LNM Single beam mainscheme only	N/A
LNM Multibeam mainscheme only	593.28
LNM Lidar mainscheme only	N/A
LNM Side Scan Sonar mainscheme only	N/A
Lineal nautical miles of any combination of the above techniques (specify methods)	593.28
LNM Crosslines singlebeam and multibeam combined	29.86
LNM Lidar Crosslines	N/A
LNM development lines non mainscheme	N/A
LNM shoreline/nearshore investigations	0
Number of Bottom Samples	6
Number of items investigated that required additional time/effort in the field beyond the above survey operations	0
Total number of square nautical miles	29.12

Table 1: Hydrographic Survey Statistics



Calendar Date	Julian Day
20-August-09	232
21-August-09	233
22-August-09	234

24-August-09	236
25-August-09	237
26-August-09	238
27-August-09	239
28-August-09	240
31-August-09	243

Table 2: MB Acquisition Dates

B. DATA ACQUISTION AND PROCESSING *See Also H-Cell Report*

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.
Submitted with H-Cell Deliverable

B 1. EQUIPMENT AND VESSELS

Data were acquired by NOAA Ship *Thomas Jefferson* . NOAA Ship *Thomas Jefferson* acquired Reson 7125 multibeam echo sounder soundings and sound velocity profiles. Bottom samples were collected by NOAA Ship *Thomas Jefferson* . Vessel configurations, equipment operation and data acquisition and processing were consistent with specifications described in the DAPR*. ***Submitted with H-Cell Deliverable***

B 2. QUALITY CONTROL

B 2.1 System Certification and Calibration

Refer to NOAA Ship *Thomas Jefferson's* 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 H-Cell Deliverable***
****HSRR memo filed at 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 two meter resolution, as per HTD 2009-2 for Complete Multibeam Coverage in depths greater than 20 meters. ****Filed with original field records***

B 2.3 Crosslines

Multibeam echosounder cross-lines totaling 29.86 lineal nautical miles, comprising 5.03% of multibeam hydrography, were acquired during the course of the survey. As per email dated 9/10/2009 from AHB*, the quality control check was done using the standard deviation layer of the survey's CUBE surface. Standard deviation values higher than 0.4m 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. ***Concur with clarification. The standard of deviation method as described by the field unit was authorized during the survey and not prior to the survey as stated in HSSD 5.1.4.3. *Email included in Appendix V***

B 2.4 Junctions and Prior Surveys

The following contemporary surveys junction with H12139:

Registry #	Scale	Date	Field Party	Junction side
H12137*	1:20,000	2009	Thomas Jefferson	south
H12033	1:7,500	2009	Thomas Jefferson	east
H12015*	1:7,500	2009	Thomas Jefferson	north

Survey H12139 junctions with survey H12137 to the south. Soundings between H12139 and H12137 agreed within 1 foot. ***Concur with clarification. An office QC determined soundings between H12139 and H12033 agree within 1 to 2 feet.***

Survey H12139 junctions with survey H12033 to the east. Soundings between H12139 and H12033 agreed within 1 foot. ***Concur with clarification. An office QC determined soundings between H12139 and H12033 agree within 1 to 3 feet.***

Survey H12139 junctions with survey H12015 to the north. Soundings between H12139 and H12015 agreed within 1 foot. ***Concur with clarification. An office QC determined soundings between H12139 and H12033 agree within 1 to 2 feet.***

*surveys currently still being processed on ship.

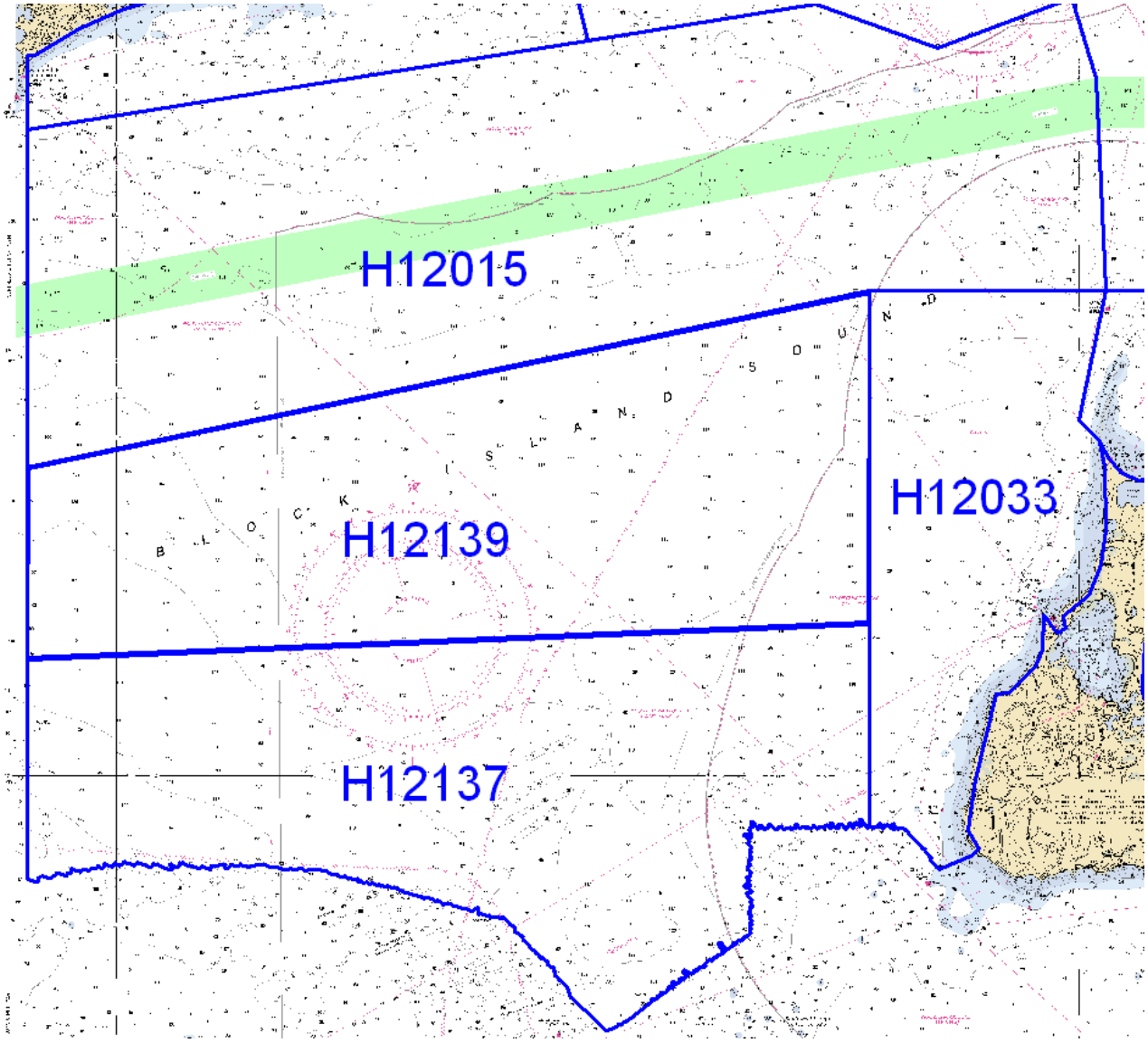


Fig 2. H12139 Junction Surveys.

B 2.5 Systematic Errors

The southern section of the survey showed high standard deviations (0.4m), see Figure 3. The verified tide correctors were double checked and remerged. The cause for this error is unknown, but may be attributed to unresolved tide correctors.

Concur with clarification. The high standard of deviation is the result of a tide error and an error of the roll bias of the MBES sonar.

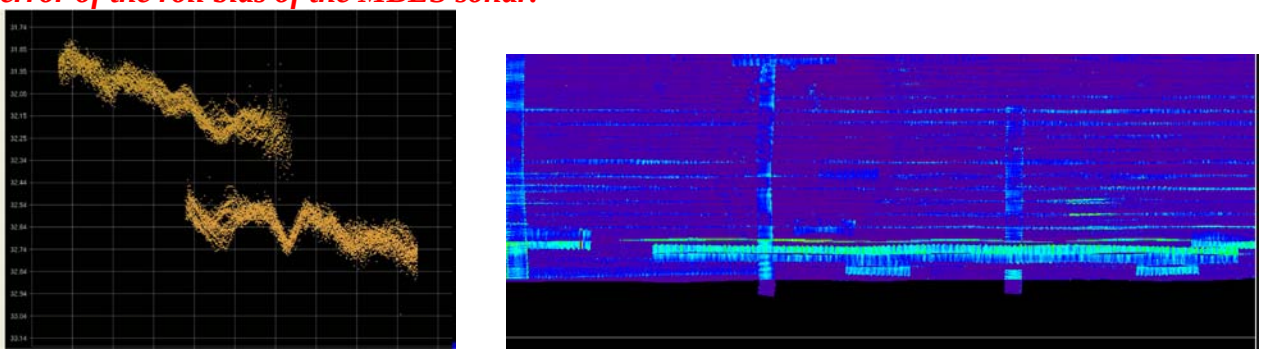


Fig 3. H12139 Difference in Tides and location in SW portion of the survey.

B 3. CORRECTIONS TO ECHO SOUNDING

HDCS sounding data were reduced to mean lower-low water (MLLW) using verified water levels from New London, CT (8461490), Newport, RI (8452660), and Montauk, NY (8510560) adjusted for tidal constituents and residuals provided by CO-OPS and illustrated in Fig. 11.

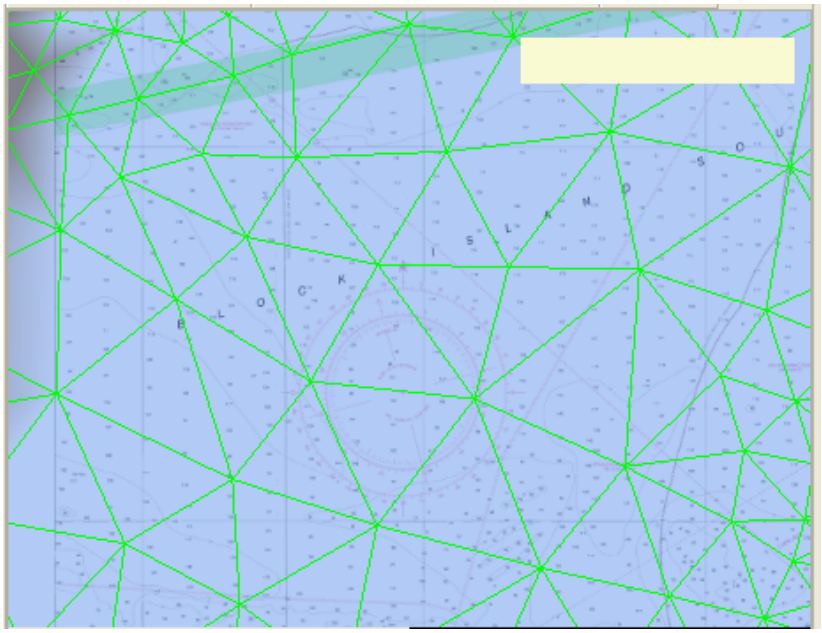


Fig 3. Final Tide Zoning

All other datum reduction procedures conform to those outlined in the DAPR*. ***Submitted with H-Cell Deliverable***

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. ***Submitted with H-Cell Deliverable **Filed with original field records***

Sound velocity corrections for this survey were applied using only the ship's Moving Vessel Profiler (MVP).

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 H12139 are as follows:

Project	Vessel	Tide Values		Sound Velocity Values		
		Measured	Zoning	CTD	MVP	Surface
H12139	S222	TCARI	TCARI	4	1	0.2

Table 3: TPE Parameters

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

B 4.2 BASE Surfaces and Mosaics

The following table describes all BASE Surfaces submitted as part of Survey H12139:

Name of Surface	***Resolution***	***Type***	***Purpose***
H12139_East_CUBE_NOAA_2m_Final	2.0 meter	CUBE	Sounding Coverage
H12139_West_CUBE_NOAA_2m_Final	2.0 meter	CUBE	Sounding Coverage

Table 4: BASE Surfaces

This survey was processed using the Combined Uncertainty and Bathymetry Estimator (CUBE) algorithm. The CUBE configuration was set to NOAA_2m for the two meter coverage surface. Refer to the 2009 Data Acquisition and Processing Report*, 2009 Field Procedures Manual, and CARIS HIPS and SIPS User Guide for further discussion. ***Submitted with H-Cell Deliverable***

B 4.3 Data Cleaning

The survey data was cleaned using a 65x65m filter and 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.***

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). Differential GPS (DGPS) was the sole method of positioning. Differential corrections from U.S. Coast Guard beacons at Moriches, NY (293 kHz), and Acushnet, MA (kHz 306), 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). The operating National Water Level Observation Network (NWLON) station at New London, CT (8461490), Newport, RI (8452660), and Montauk, NY (8510560) will serve as datum control for H12139. 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 13 September 2009 in accordance with the FPM and project letter instructions.

D. RESULTS AND RECOMMENDATIONS

D.1 Chart Comparison

Chart/ENC	Edition/Date	Scale
13214	28th Ed., Apr/06	1:20,000
13215	18th Ed., Aug/04	1:40,000
13217	15th Ed., Nov/06	1:15,000
13218	40th Ed., Feb/08	1:80,000
13219	12th Ed., Oct/01	1:15,000
US5RI11E	N/A	
US4CN21M	9th	
US4MA23M	12th	

Table 5. Chart Editions

D 1.1 Chart 13214 Comparison

No depths or features are charted within the limits of H12139. ***Concur.***

D.1.2 Chart 13215 Comparison

Depths from charts 13215 generally agree with the current survey, with differences generally 1 feet or less. ***Concur with clarification. Difference surface produced at the Atlantic Hydrographic Branch concluded that the depths form chart 13215 agrees with survey H12139, with differences generally within 1-2 feet.***

D.1.3 Chart 13217 Comparison

No depths or features are charted within the limits of H12139. ***Concur.***

D.1.4 Chart 13218 Comparison

No depths or features are charted within the limits of H12139. ***Concur.***

D 1.5 Chart 13219 Comparison

No depths or features are charted within the limits of H12139. ***Concur.***

D.1.6 ENC US5RI11E

This preliminary ENC has not been reviewed by the Marine Chart Division. ***Difference surface produced at the Atlantic Hydrographic Branch concluded that the depths form chart 13215 agrees with survey H12139, with differences generally within 1-2 feet.***

D 1.7 ENC US4CN21M Comparisons

Soundings are generally comparable with charted depths, with differences in charted and survey soundings 1 meter or less. ***Concur***

D.1.8 ENC US4MA23M

No depths or features are charted within the limits of H12139. ***Concur.***

D.2 Additional Results

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

No AWOIS items were located within the limits of H12139. ***Concur.***

D.2.4 Shoreline

There is no shoreline within the sheet limits of survey H12139. ***Concur.***

D.2.5 Charted Features

There are no charted features within the limits of survey H12139. ***Concur.***

D.2.6 Charted Pipelines and Cables

One charted cable transects the survey area. This cable is not visible in multibeam data. The Hydrographer has no recommendation on these cables. ***Concur.***

D.2.7 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

No dangers to navigation were found or reported to the NOAA's Office of Coast Survey. ***Concur.***

D 3.2 Shoals

There is a shoal that has spread from east to southwest in the western portion of the survey near 41°12'44"N, 071°49'14"W. ***Concur.***

D.4 Aids to Navigation

There are no charted Aids to Navigation (ATON) within the limits of H12139. ***Concur.***

D.5 Coast Pilot Information

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

D.6 Miscellaneous

Bottom Samples

Bottom samples were collected in accordance with NOAA Hydrographic Survey Specifications and Deliverables. A complete description of all bottom samples acquired during Survey H12139 is contained in the Pydro PSS. A total of six bottom samples were acquired. A list of all bottom samples acquired during Survey H12139 is contained in Appendix V***. ***Concur. *Appended to this report***

Environmental Conditions and Notes

No environmental conditions occurred. ***Concur.***

D.8 Adequacy of Survey

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

Summary and Recommendations for Additional Work

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

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:

Jasper Schaer
2009.10.02 10:44:53
-04'00'

LT Jasper D. Schaer, NOAA
Field Operations Officer

Digitally signed by Shepard Smith
Date: 2009.10.02 11:00:02 -04'00'

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:

Frank Daniel
2009.10.02 10:42:54
-04'00'

Frankie A. Daniel, NOAA
Assistant Survey Tech

Appendix I

Dangers to Navigation

No Dangers to navigation were reported for survey H12139.

Appendix II

Survey Features Report

1. AWOIS Items

-none

2. Charted Features

-none

3. Uncharted Features

-2

H12139 DR Appendix 2

Registry Number: H12139

State: Rhode Island

Locality: Block Island Sound

Sub-locality: 5 NM West of Block Island

Project Number: OPR-B363-TJ-09

Survey Dates: 8/19/2009 - 8/31/2009

Charts Affected

Number	Edition	Date	Scale (RNC)	RNC Correction(s)*
13215	19th	12/01/2009	1:40,000 (13215_1)	USCG LNM: 12/08/2009 (01/12/2010) CHS NTM: None (11/27/2009) NGA NTM: None (01/23/2010)
13205	38th	02/01/2007	1:80,000 (13205_1)	[L]NTM: ?
12300	47th	05/01/2008	1:400,000 (12300_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

No.	Name	Feature Type	Survey Depth	Survey Latitude	Survey Longitude	AWOIS Item
1.1	Obstruction	Obstruction	31.81 m	41° 14' 16.8" N	071° 41' 40.9" W	---
1.2	Rock 84ft	Shoal	25.60 m	41° 12' 14.6" N	071° 38' 48.7" W	---

1 - DR_UnCharted

1.1) Obstruction

Survey Summary

Survey Position: 41° 14' 16.8" N, 071° 41' 40.9" W

Least Depth: 31.81 m (= 104.37 ft = 17.395 fm = 17 fm 2.37 ft)

TPU (±1.96σ): **THU (TPEh)** ±1.004 m ; **TVU (TPEv)** ±0.487 m

Timestamp: 2009-240.07:09:00.925 (08/28/2009)

Survey Line: h12139 / tj_s222_reson7125_stbd / 2009-240 / 449_0653

Profile/Beam: 4688/290

Charts Affected: 13215_1, 13205_1, 12300_1, 13006_1, 5161_1, 13003_1

Remarks:

Possible obstruction found with Reson 7125 MB.

Feature Correlation

Address	Feature	Range	Azimuth	Status
h12139/tj_s222_reson7125_stbd/2009-240/449_0653	4688/290	0.00	000.0	Primary
hdcs_data/tj_s222_reson7125_stbd/2009-240/449_0653	4688/290	0.00	000.0	Secondary

Hydrographer Recommendations

Chart non-dangerous obstruction in designated location.

Cartographically-Rounded Depth (Affected Charts):

104ft (13215_1, 13205_1)

17fm (12300_1, 13006_1, 13003_1)

32m (5161_1)

S-57 Data

Geo object 1: Obstruction (OBSTRN)

Attributes: OBJNAM - Obsrtuction

QUASOU - 6:least depth known

SORDAT - 20090831

SORIND - US,US,graph,H12139

TECSOU - 3:found by multi-beam

	VALSOU - 31.812 m
	WATLEV - 3:always under water/submerged
Geo object 2:	Sounding (SOUNDG)
Attributes:	QUASOU - 6:least depth known
	SORDAT - 20090831
	SORIND - US,US,graph,H12139
	TECSOU - 3:found by multi-beam
	VERDAT - 12:Mean lower low water

Office Notes

Do not concur. Chart feature as sounding.

Feature Images

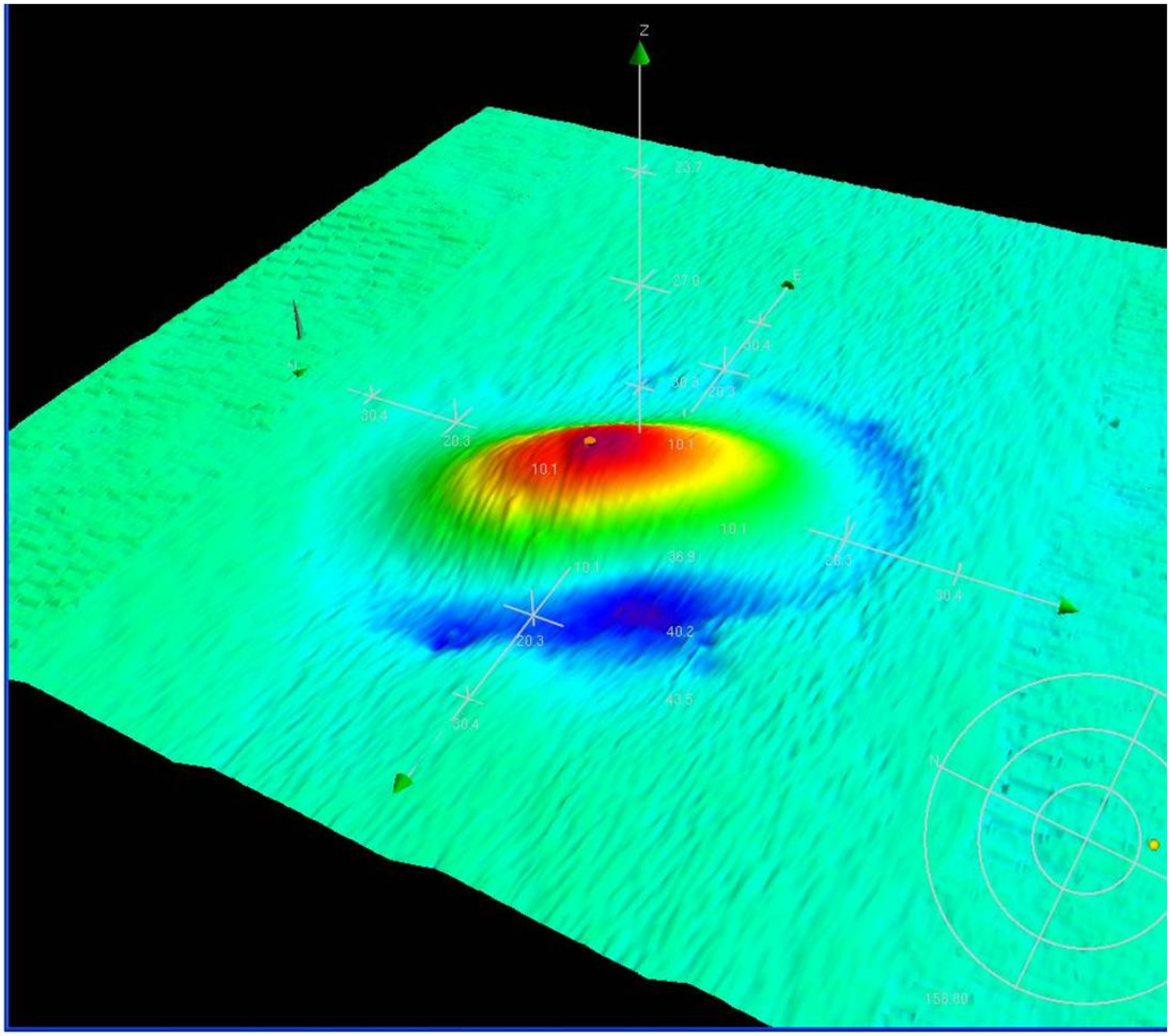


Figure 1.1.1

1.2) Rock 84ft

Survey Summary

Survey Position: 41° 12' 14.6" N, 071° 38' 48.7" W

Least Depth: 25.60 m (= 84.00 ft = 14.000 fm = 13 fm 6.00 ft)

TPU (±1.96σ): **THU (TPEh)** ±1.001 m ; **TVU (TPEv)** ±0.478 m

Timestamp: 2009-238.02:34:38.358 (08/26/2009)

Survey Line: h12139 / tj_s222_reson7125_stbd / 2009-238 / 411_0218

Profile/Beam: 4824/279

Charts Affected: 13215_1, 13205_1, 12300_1, 13006_1, 5161_1, 13003_1

Remarks:

Rock significantly shoaler than surrounding soundings.

Feature Correlation

Address	Feature	Range	Azimuth	Status
h12139/tj_s222_reson7125_stbd/2009-238/411_0218	4824/279	0.00	000.0	Primary
hdcs_data/tj_s222_reson7125_stbd/2009-238/411_0218	4824/279	0.00	000.0	Secondary

Hydrographer Recommendations

Chart rock at designated location.

Cartographically-Rounded Depth (Affected Charts):

84ft (13215_1, 13205_1)

14fm (12300_1, 13006_1, 13003_1)

26m (5161_1)

S-57 Data

Geo object 1: Sounding (SOUNDG)

Attributes: SORDAT - 20090831

SORIND - US,US,graph,H12139

Office Notes

Do not concur. Chart rock as a sounding, within rocky seabed area.

Feature Images

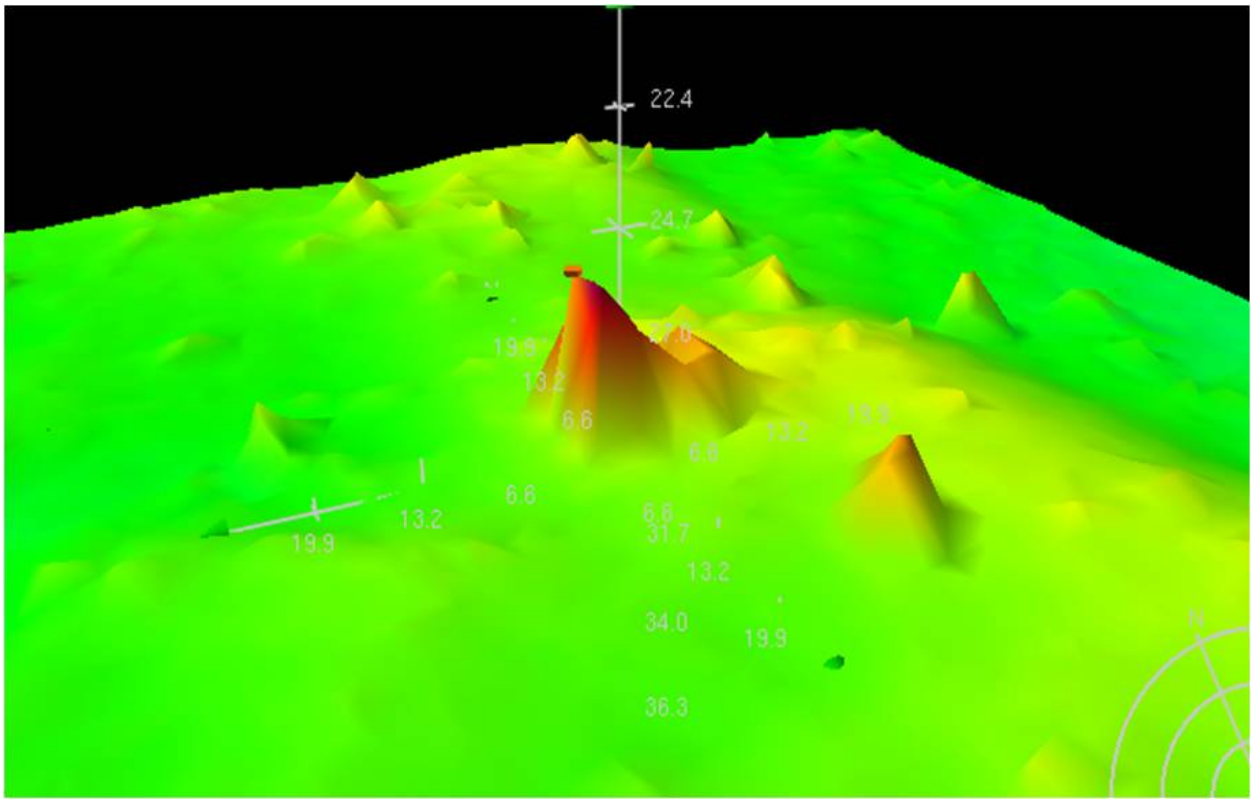
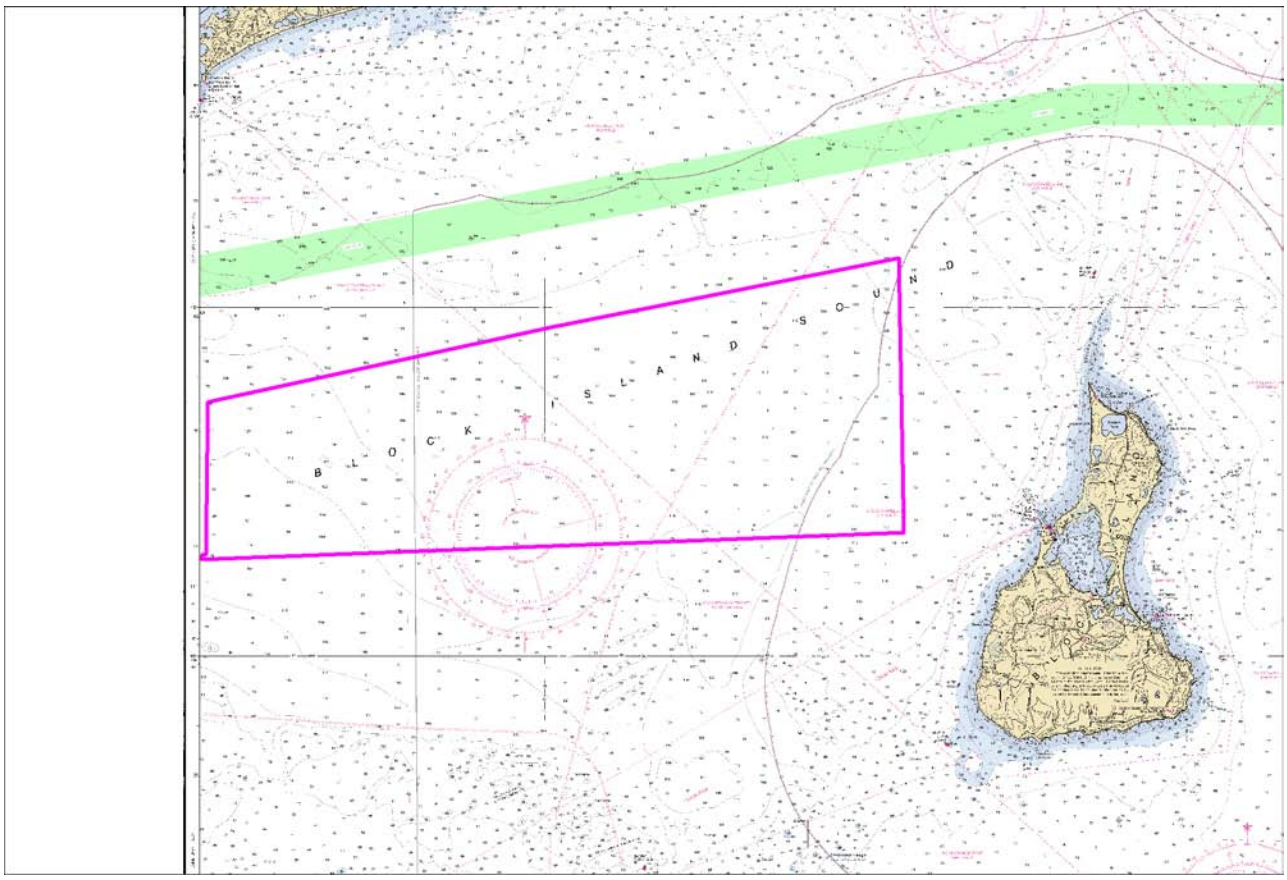


Figure 1.2.1

Appendix III

Progress Sketch



Sheet Identifier	Registry Number	HQ Estimated SNM	Sheet Start Date	Sheet End Date	Smooth Tides Request Date	Smooth Tides Received Date	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	Cumulative % Complete at the end of August
1	H12009	25	4/7/09	5/19/09	5/27/09	6/23/09			100%			
2	H12010	13	7/23/09	8/19/09	8/27/09	9/11/09					75%	100%
3	H12033	14	8/7/09	8/21/09	8/23/09	9/11/09						100%
4	H12011	24	7/24/09	8/26/09	8/26/09	9/11/09					75%	100%
5	H12023	16	8/20/09									75%
10	H12137		8/8/09	8/22/09	8/24/09	9/11/09						100%
9	H12139		8/24/09	8/31/09	9/14/09							100%

Appendix IV

Tides and Water Levels

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

WATER LEVEL INSTRUCTIONS
OPR-B363-TJ-2009 Block Island Sound, RI
(01/15/2009 LH)

1.0. TIDES AND WATER LEVELS

1.1. Specifications

Tidal data acquisition, data processing, tidal datum computation and final tidal zoning shall be performed utilizing sound engineering and oceanographic practices as specified in National Ocean Service (NOS) Hydrographic Surveys Specifications and Deliverables (HSSD), dated April 2008, and OCS Field Procedures Manual (FPM), dated May 2008. Specifically reference Chapter 4 of the HSSD and Sections 1.5.8, 1.5.9, 2.4.3, and 3.4.2 of the FPM.

1.2. Vertical Datums

The tidal datums for this project are referenced to Chart Datum, Mean Lower Low Water (MLLW) and Mean High Water (MHW). Soundings are referenced to MLLW and heights of overhead obstructions (bridges and cables) are referenced to MHW.

The operating National Water Level Observation Network (NWLON) stations at New London, CT (8461490), Newport, RI (8452660) and Montauk, NY (8510560) will serve as datum control for the survey area including determination at each subordinate station. Therefore, it is critical that these stations remain in operation during all periods of hydrography.

1.2.1. Water Level Data Acquisition Monitoring

The Commanding Officer (or Team Leader) and the Center for Operational Oceanographic Products and Services (CO-OPS) are jointly responsible for ensuring that valid water level data are collected during periods of hydrography. The Commanding Officer (or Team Leader) is required to monitor the pertinent water level data via the CO-OPS Web site at http://tidesandcurrents.noaa.gov/hydro.shtml, email data transmissions through TIDEBOT, or through regular communications with CO-OPS/Requirements and Development Division (RDD) personnel before and during operations. During traditional non duty hours, the Commanding Officer/Team Leader may contact the Continuous Operational Real-Time Monitoring System (CORMS) watch stander who is available 24 hours/day - 7 days/week for assistance in assessing the status of applicable water level station operation. The CORMS watch stander may be contacted either by phone at 301-713-2540 or by Email: CORMS@noaa.gov. Problems or concerns regarding the acquisition of valid water level data identified by the Commanding Officer/Team Leader shall be communicated with CO-OPS/RDD (Tom Landon, 301-713-2897 ext. 191, Email: Thomas.Landon@noaa.gov on the East Coast) to coordinate the appropriate course of action to be taken such as gauge repair and/or developing contingency plans for hydrographic survey operations. In addition, CO-OPS is required to coordinate with the Commanding Officer/Team Leader before interrupting the acquisition of water level data for any reason during periods of hydrography.

1.2.2. NWLON Water Level Station Operation and Maintenance

The operating water level stations at New London, CT (8461490), Newport, RI (8452660) and Montauk, NY (8510560) will also provide water level reducers for this project, reiterating the importance of their operation during all periods of hydrography. See Sections 1.1. and 1.2. concerning responsibilities.

No leveling is required at New London, CT (8461490), Newport, RI (8452660) or Montauk, NY (8510560) by NOAA Ship THOMAS JEFFERSON personnel.

CO-OPS/FOD is responsible for the operation and maintenance of all NWLON primary control stations. If a problem is identified at an NWLON primary control station, FOD shall make all reasonable efforts to repair the malfunctioning station. However, CO-OPS may request assistance from the NOAA ship personnel in the actual repair of the water level station to facilitate a rapid repair. CO-OPS/FOD and the Commanding Officer (or Team Leader) shall maintain the required communications until the repairs to the water level station have been completed.

1.3. Tide Reducer Stations

1.3.1. No subordinate water level stations are required for this project, however, supplemental and/or back-up water level stations may be necessary depending on the complexity of the hydrodynamics and/or the severity of the environmental conditions of the project area. The installation and continuous operation of water level measurement systems (tide gauges) at subordinate station locations is left to the discretion of the Commanding Officer (or Team Leader), subject to the approval of CO-OPS. If the Commanding Officer (or Team Leader) decides to install additional water level stations, then a 30-day minimum of continuous data acquisition is required. For all subordinate stations, data must be collected throughout the entire survey period for which they are applicable, and not less than 30 continuous days. This is necessary to facilitate the computation of an accurate datum reference as per NOS standards.

1.3.1.1 Tide Component Error Estimation

This section is not applicable for this project. Tidal Constituent And Residual Interpolator (TCARI) automatically calculates the error associated with water level interpolation. This error is incorporated into the residual/harmonic solutions and included in the Total Propagated Error (TPE) for the survey.

1.3.2. GOES Satellite Enabled Subordinate Stations

This section is not applicable for this project.

1.3.3. Benchmark Recovery and GPS Requirements

This section is not applicable for this project.

1.3.4. Residual Water Level Station(s) Data

Tidal Constituent And Residual Interpolation (TCARI) method uses harmonic constituents and residuals from historical and operating water level stations to provide precise water level correction for bathymetric surveys. Download the following water level station(s) data for all periods of survey. Preliminary water level data may be retrieved in one month increments over the Internet from the CO-OPS Home Page at http://tidesandcurrents.noaa.gov/olddata and then clicking on "Preliminary Water Level". Preliminary data are six-minute time series data relative to **Mean Sea Level (MSL)** in metric units on Greenwich Mean Time. The Commanding Officer (or Team Leader) must notify CO-OPS/RDD personnel immediately of any problems concerning the preliminary tides.

The operating stations at New London, CT (8461490), Newport, RI (8452660) and Montauk, NY (8510560) will provide residuals for this project and must remain in operation during all periods of hydrography.

Station Number	Station Name	Latitude(N)	Longitude(W)
845-2660	**Newport, RI**	**41 º 30.3'**	**71 º 19.6'**
846-1490	**New London,CT**	**41 º 21.7'**	**72 º 05.4'**
851-0560	**Montauk, NY**	**41 º 02.9'**	**71 º 57.6'**

1.4. Tidal Constituent and Residual Interpolation (TCARI)

1.4.1. For hydrography in the area of Block Island Sound, apply the TCARI grid "B363TJ2009-TCARI" supplied in conjunction with the water level data from Section 1.3.4 to produce a seamless tide correction. Refer to the TCARI Field SOP for detailed TCARI instructions.

1.4.2. This section is not applicable for this project.

1.4.3 TCARI Diagram(s)

A diagram created in Pydro, is provided in digital copy format to assist with the information provided in section 1.4.1.

1.4.4 TCARI Final Solutions

Upon completion of project OPR-B363-TJ-2009, submit a Pydro generated request for smooth tides, with times of hydrography abstract and mid/mif tracklines attached. Forward this request to smooth.tides@noaa.gov . Provide the project number, as well as sheet number, in the subject line of the email.
CO-OPS will review the times of hydrography, final tracklines, and six-minute water level data from all applicable water level gauges. If there are any discrepancies, CO-OPS will make the appropriate adjustments and forward a revised TCARI grid and solutions to the field group and processing branch for final processing.

1.5 TideBot

Preliminary and verified six minute water level time series data may be retrieved from the CO-OPS database via TideBot application. TideBot delivers timely preliminary/verified tidal and Great Lakes six minute water level observations via email to users on a scheduled, recurring

basis. To access TideBot through an email account, send an email to TideBot@noaa.gov with the word "help" as the subject. An email reply will be sent with instructions on how to subscribe to TideBot for time series data retrieval.

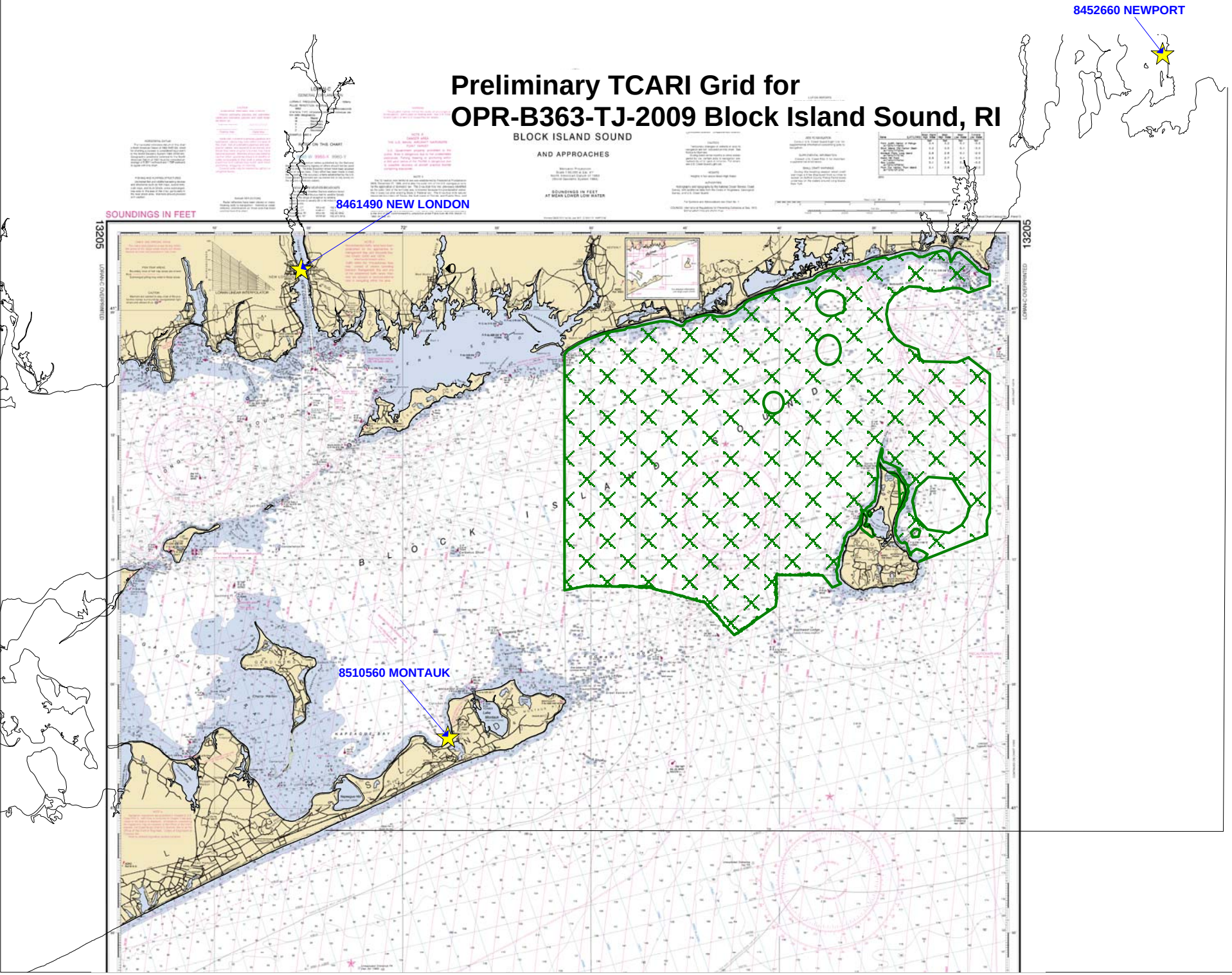
1.6 Water Level Records

Submit water level data, such as leveling records, field reports, and any other relevant data/reports, including the data downloaded onto diskette/CD within 1 week after the end of each month or the end of hydrography to CO-OPS/RDD. Refer to Section 1.1.

1.6.1 Water level records should be forwarded to the following address:

NOAA/National Ocean Service/CO-OPS
Chief, Requirements and Development Division
N/OPS1 - SSMC4, Station 6531
1305 East-West Highway
Silver Spring, MD 20910

Preliminary TCARI Grid for OPR-B363-TJ-2009 Block Island Sound, RI



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

September 14, 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 Ship 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-B363-TJ-09
Registry No.:	H12139
State:	Rhode Island
Locality:	Block Island Sound
Sublocality:	5 NM West of Block Island

Attachments containing:

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

cc: N/CS33
MOCA/TJ

Generated by Pydro v9.6 (r2698) on Mon Sep 14 10:58:18 2009 [UTC]

Year_DOY	Min Time	Max Time
2009_232	23:09:02	23:55:32
2009_233	00:14:16	00:59:25
2009_234	08:14:45	10:37:40
2009_236	23:26:55	23:52:55
2009_237	00:04:08	10:57:58
2009_238	00:23:56	23:58:19
2009_239	00:00:01	23:59:44
2009_240	00:00:04	18:01:01
2009_243	00:46:06	17:43:27

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

TIDE NOTE FOR HYDROGRAPHIC SURVEY

DATE : September 23, 2009

HYDROGRAPHIC BRANCH: Atlantic
HYDROGRAPHIC PROJECT: OPR-B363-TJ-2009
HYDROGRAPHIC SHEET: H12139

LOCALITY: 5 NM West of Block Island, Rhode Island Sound, RI
TIME PERIOD: August 20 - 31, 2009

TIDE STATION USED: Newport, RI 845-2660
Lat.41° 30.3' N Long. 71° 19.6' W
PLANE OF REFERENCE (MEAN LOWER LOW WATER): 0.000 meters
HEIGHT OF HIGH WATER ABOVE PLANE OF REFERENCE: 1.099 meters

TIDE STATION USED: New London, CT 846-1490
Lat. 41° 21.7' N Long. 72° 05.4' W
PLANE OF REFERENCE (MEAN LOWER LOW WATER): 0.000 meters
HEIGHT OF HIGH WATER ABOVE PLANE OF REFERENCE: 0.839 meters

Tide STATION USED: Montauk, NY 851-0560
Lat. 41° 02.9' Long. 71° 57.6' W
PLANE OF REFERENCE (MEAN LOWER LOW WATER): 0.000 meters
HEIGHT OF HIGH WATER ABOVE PLANE OF REFERENCE: 0.683 meters

REMARKS: RECOMMENDED GRID

Please use the TCARI grid "B363TJ2009-TCARI-Revised" as the final grid for project OPR-B363-TJ-2009, H12139, during the time period between August 20 and August 31, 2009.

Refer to attachments for grid information.

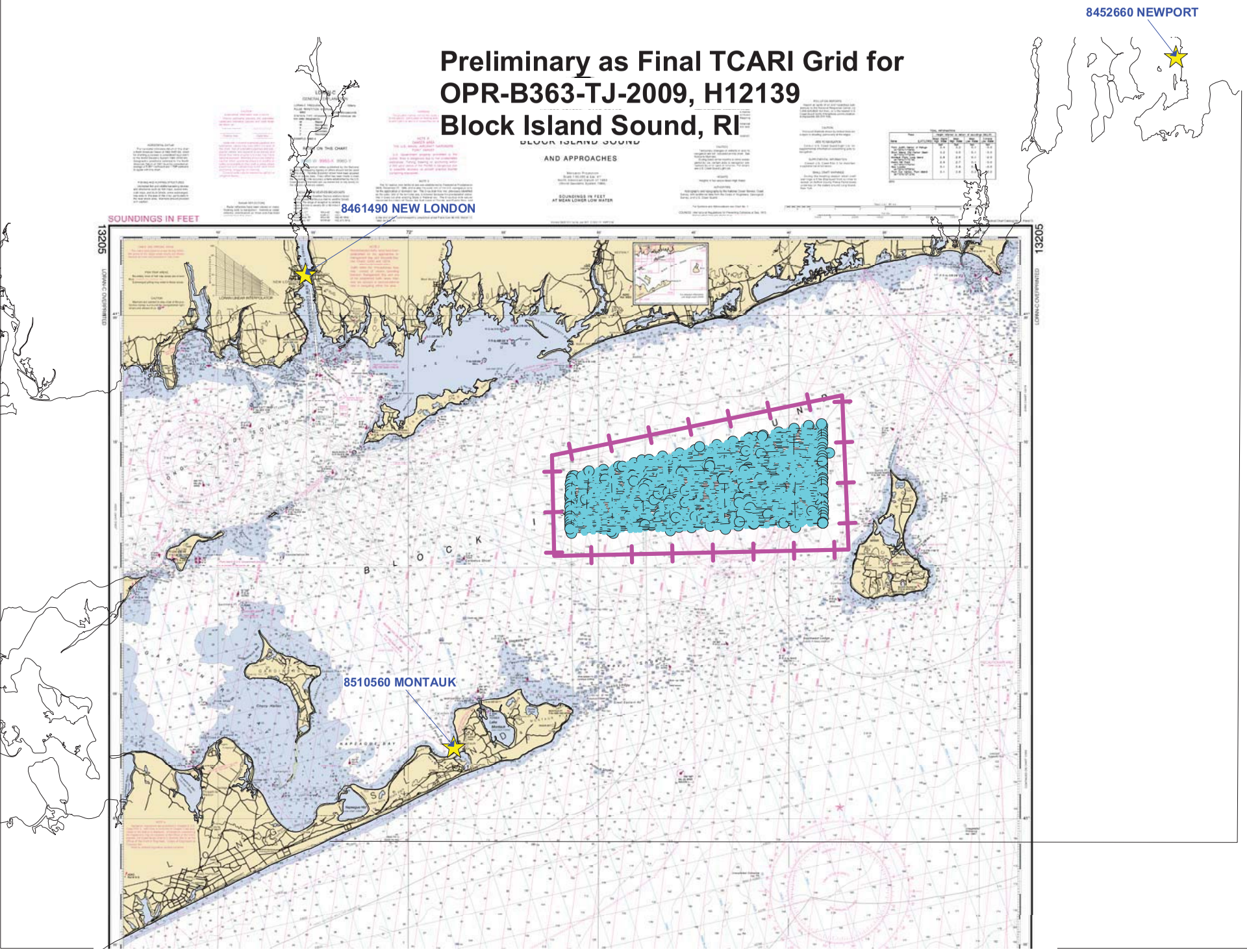
Note 1: Provided time series data are tabulated in metric units (meters), relative to MLLW and on Greenwich Mean Time on the 1983-2001 National Tidal Datum Epoch (NTDE).

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: 2009.09.25 14:57:35 -04'00'

CHIEF, OCEANOGRAPHIC DIVISION

Preliminary as Final TCARI Grid for OPR-B363-TJ-2009, H12139 Block Island Sound, RI



Appendix V

Supplemental Survey Records & Correspondence

Subject: Re: Crossline comparison
From: Chris van Westendorp <Christiaan.VanWestendorp@noaa.gov>
Date: Thu, 10 Sep 2009 13:00:35 -0400
To: "mark.blankenship" <Mark.Blankenship@noaa.gov>
CC: LCDR Rick Brennan <Richard.T.Brennan@noaa.gov>, Castle Parker <Castle.E.Parker@noaa.gov>, Edward Owens <Edward.Owens@noaa.gov>, LT Jasper Schaer <jasper.schaer@noaa.gov>, CDR Shep Smith <Shep.Smith@noaa.gov>, Daniel Wright <Daniel.Wright@noaa.gov>

Mark,

Per 5.1.4.3 of the HSSD, AHB authorizes TJ to use the Standard Deviation layer to conduct surface difference comparison and analysis on future survey submissions of multibeam data. This meets the crossline comparison requirement laid out in HSSD.

Please let me know if you have any questions or need for further clarification.

R/
LCDR Chris van Westendorp, NOAA

mark.blankenship wrote:

> Chris,
> You mentioned in the meeting today that AHB was not going to require the multiple CUBE surface comparison, instead allowing us to use a single surface standard deviation layer to do our checks with. Is there any memo coming out for that?
> Mark

LCDR Chris van Westendorp <christiaan.vanwestendorp@noaa.gov>
Atlantic Hydrographic Branch
NOAA OCS

Subject: Re: B363, priority 10. H12137
From: Jeremy McHugh <Jeremy.McHugh@noaa.gov>
Date: Wed, 30 Sep 2009 15:43:43 -0400
To: jasper schaer <jasper.schaer@noaa.gov>, _NMAO MOA FOO Thomas Jefferson <FOO.Thomas.Jefferson@noaa.gov>, _NMAO MOA OPS Thomas Jefferson <OPS.Thomas.Jefferson@noaa.gov>

H12137, 6 NM West of Block Island, 31 SNM, 20k

H12139, 8 NM West of Block Island's Sandy Pt., 28 SNM, 20k

jasper schaer wrote, On 9/30/2009 3:18 PM:

> Would you resend the official verbage for sub locality, SNM, and scale for H12137 and H12139?
>
> thanks-js

--
Jeremy McHugh, Physical Scientist
NOAA's Office of Coast Survey
301-713-2702 x117

Subject: [Fwd: Revised Coverage Requirements]
From: "co.thomas.jefferson" <co.thomas.jefferson@noaa.gov>
Date: Mon, 14 Sep 2009 17:17:28 -0400
To: foo.thomas.jefferson@noaa.gov, daniel wright <daniel.wright@noaa.gov>

Please include in DR correspondence as appropriate.

CO

-------- Original Message --------
Subject: Revised Coverage Requirements
Date: Mon, 14 Sep 2009 17:05:00 -0400
From: james.m.crocker <James.M.Crocker@noaa.gov>
To: _NMAO MOA CO Thomas Jefferson <CO.Thomas.Jefferson@noaa.gov>, _NMAO MOA FOO Thomas Jefferson <FOO.Thomas.Jefferson@noaa.gov>
CC: Jeffrey Ferguson <Jeffrey.Ferguson@noaa.gov>, Jeremy McHugh <Jeremy.McHugh@noaa.gov>, Richard T Brennan <Richard.T.Brennan@noaa.gov>, Kyle Ward <Kyle.Ward@noaa.gov>, Benjamin K Evans <Benjamin.K.Evans@noaa.gov>

CDR Smith,

This email is to detail the agreement to relax the multibeam resolution requirements for a survey when collecting multibeam bathymetry concurrent with side scan sonar data, where complete coverage for object detection for the survey is being met by 200% side scan sonar coverage. This agreement supersedes, where applicable, the requirements outlined in the 2009 HSSD and HTD 2009-2 for grid resolution and density.

For all projects assigned in 2009, where the complete coverage requirement for assigned surveys is being met by 200% side scan sonar data acquisition, the following requirements shall be meet at a minimum:

1 - Grid resolutions shall be 2m for water depths less than 20m, and 4 m for water depths of 20m to 40m.
2 - Sounding density requirements are set at a minimum of 2 sounding per node.
3 - Grid resolution and density for feature developments used to determine least depth shall meet object detection requirements as defined in 2009 HSSD and HTD 2009-2 and soundings shall be designated where appropriate.

Regards,
Jim

--
CDR Shepard Smith, NOAA
Commanding Officer
NOAA Ship Thomas Jefferson
439 West York St
Norfolk, VA 23510
757-647-0187

U.S. DEPARTMENT OF COMMERCE

(10-95) NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION

OCEANOGRAPHIC LOG SHEET - M

BOTTOM SEDIMENT DATA

VESSEL No. S222	PROJECT NO. OPR-B363-TJ-09 FIELD NO. N/A SHEET LETTER: "N/A"			YEAR 2008	SURVEY TITLE: OPR-B3636-TJ-09			SURVEY NO: H12139	CHECKED BY:	DATE CHECKED:
POSITION NUMBERS	DAY OF THE YEAR	SAMPLE POSITION LATITUDE (o ' ") North	 LONGITUDE (o ' ") West	DEPTHS (METERS)	TYPE OF SAMPLE	APPROXIMATE PENETRATION (CENTIMETERS)	LENGTH OF CORE	FIELD DESCRIPTION SIZE OR CONSISTENCY COLOR-NOUN (USE STANDARD ABBREVIATIONS)	REMARKS (Unusual conditions ,cohesiveness,dented cutter, stat.no.,type of bottom, relief .i.e slope plain disposition etc.)	
1	243	41°14'53"N	71°40'43"W					M		
2	243	41°12'32"N	71°39'18"W					M		
3	243	41°11'52"N	71°40'59"W					M		
4	243	41°11'57"N	71°44'01"W					M Sh		
5	243	41°12'35"N	71°47'35"W					M		
6	243	41°13'49"N	71°49'11"W					M		

AHB COMPILATION LOG

General Survey Information	
REGISTRY No.	H12139
PROJECT No.	OPR-B363-TJ-09
FIELD UNIT	NOAA SHIP THOMAS JEFFERSON
DATE OF SURVEY	20090820 - 20090831
LARGEST SCALE CHART	***13215, edition 19, 20091201, 1:40000***
ADDITIONAL CHARTS	***N/A***
SOUNDING UNITS	**feet**
COMPILER	ENS Anthony Klemm, Katrina Wyllie

Source Grids	**File Name** H:\ H:\Compilation\H12139_B363 _TJ\AHB_H12139\\SAR Final Products\GRIDS
	E-SAR Final Products\GRIDS\H12139_East_CUBE_NOAA_2m_Final.csar **E-SAR Final Products\GRIDS\H12139_West_CUBE_NOAA_2m_Final.csar**
Surfaces	**File Name** H:\Compilation\ H12139_B363 _TJ\AHB_H12139\COMPILE\Working
Combined	**H12139_4m_Combined.csar**
Interpolated TIN	\Interpolated TIN**H12139_12m_InterpTIN.csar**
Shifted Interpolated TIN	\Shifted Surface**H12139_12m_InterpTIN_Shifted.csar**
Final HOBs	**File Name** H:\Compilation\ H12139_B363 _TJ\AHB_H12139\COMPILE\Working \HOB's
Survey Scale Soundings	**H12139_SS_Soundings.hob**
Chart Scale Soundings	**H12139_CS_Soundings.hob**
Contour Layer	**H12139_Contours.hob**
Feature Layer	**H12139_Features.hob**
Meta-Objects Layer	**H12139_MetaObjects.hob**
Blue Notes	**H12139_BlueNotes.hob**

Meta-Objects Attribution	
Acronym	**Value**
M_COVR	
CATCOV	1 – coverage available
SORDAT	20090831
SORIND	US,US,graph,H12139
M_QUAL	
CATZOC	6 – zone of confidence U (data not assessed)
INFORM	NOAA Ship Thomas Jefferson
POSACC	10.0 m
SORDAT	20090831
SORIND	US,US,graph,H12139
SUREND	20090831
SURSTA	20090820
DEPARE	
DRVALV 1	25.603 m
DRVALV2	55.336 m
SORDAT	20090831
SORIND	US,US,graph,H12139

M_CSCL	
CSCALE	N/A
SORDAT	N/A
SORIND	N/A

SPECIFICATIONS:

I. COMBINED SURFACE:
- a. Number of ESAR Final Grids: 2
- b. Resolution of Combined (m): 4 m

II. SURVEY SCALE SOUNDINGS (SS):
- a. Attribute Name: Depth
- b. Selection criteria: Radius, Shoal bias
- c. Radius value is: mm at map scale
  - i. Use single-defined radius: N/A
  - ii. Or use radius table file: H12139_SS_SSR.txt [*XXk = chart scale*]
- d. Queried Depth of All Soundings
  - i. Minimum: 25.603 m
  - ii. Maximum: 55.336 m

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

IV. CONTOURS:
- a. Attribute Name: Depth
- b. Use a Depth List: H12139_depth_contours.txt
- c. Output Options: Create contour lines
  - i. Line Object: DEPCNT
  - ii. Value Attribute: VALDCO

V. FEATURES:
- a. Total Number of Features: 7
- b. Number of Insignificant Features: N/A

VI. CHART SURVEY SOUNDINGS (CS):
- a. Number of ENC CS Soundings: 212
- b. Attribute Name: Depth
- c. Selection criteria: Radius, Shoal bias
- d. Radius value is: Distance on the ground (m)
  - i. Use single-defined radius: N/A
  - ii. Or use radius table file: H12139_CS_SSR.txt [*XXk = chart scale*]
- e. Enable Filter: Interpolated != 1
- f. Number Survey CS Soundings: 290

VII. NOTES:

[*Type text*]

ATLANTIC HYDROGRAPHIC BRANCH
H-CELL REPORT to ACCOMPANY
SURVEY H12139 (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 two 2m grids, combined at a 4m resolution. The survey scale soundings were created from the combined grid using a sounding space range file at 1:40,000. 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 (SBDARE), 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. H12139 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 (H12139_SS_metric.000 and H12139_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 (H12139_CS.000), and one that contains the survey scale sounding selections and depth contours (H12139_SS.000).

Quality assurance checks were made utilizing CARIS S-57 Composer 2.1 validation checks and dKart Inspector 5.1 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.

H12139 CARIS H-Cell final deliverables include the following products:

H12139_CS.000	1:40,000 Scale	H12139 H-Cell with Chart Scale Selected Soundings
H12139_SS.000	1:20,000 Scale	H12139 Selected Soundings (Survey Scale)

B.2.4 Junctions

Survey H12139 junctions to the North, South and East are described adequately in the Descriptive Report. Present survey soundings compare within 1-2 feet with charted soundings to the west.

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 3.0 HF 1-3
CARIS S-57 Composer version 2.1 HF 1-4
DKART INSPECTOR, version 5.1 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 19N.

D. RESULTS AND RECOMMENDATIONS

D.1 CHART COMPARISON **13215 (19th Edition, Dec. /09)**
Corrected through NM 09/04/2010
Corrected through LNM 08/24/2010
Scale 1:40,000

ENC Comparison **US5RI10M**

Approaches to Chesapeake Bay
Edition 3
Application Date 2010-03-02
Issue Date 2010-07-06
Chart 13215

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. Exception:

Five rocky seabed areas were digitized within the survey limits to represent the bathymetry of the seafloor. These seabed areas are included in the H-Cell Deliverable, H12139_CS.000 file.

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
H12139

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: 2010.09.02 08:00:31 -04'00'

Katrina Wyllie
Physical Scientist
Atlantic Hydrographic Branch

Anthony Klemm
ENS/NOAA 2010.09.02
12:09:47 -04'00'

Anthony Klemm
ENS/NOAA

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
2010.09.30 16:38:53 -04'00'

Approved: _____

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

Megan Greenaway
AWOIS and SURDEX Check Complete
2010.10.29 08:36:37 -04'00'