F00642

U.S. Department of Commerce
National Oceanic and Atmospheric Administration
National Ocean Survey

DESCRIPTIVE REPORT

Type of Survey:	Navigable Area
Registry Number:	F00642

LOCALITY

State(s):	Rhode Island
General Locality:	Narragansett Bay, RI
Sub-locality:	Approaches to Davisville

2015

CHIEF OF PARTY
LTjg Andrew R. Clos

LIBRARY & ARCHIVES

Date:

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

REGISTRY NUMBER:

HYDROGRAPHIC TITLE SHEET

F00642

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(s):	**Rhode Island**
General Locality:	**Narragansett Bay, RI**
Sub-Locality:	**Approaches to Davisville**
Scale:	**10000**
Dates of Survey:	**07/14/2014 to 05/15/2015**
Instructions Dated:	**06/27/2014**
Project Number:	**S-B904-NRT5-14**
Field Unit:	**Navigation Response Team 5**
Chief of Party:	**LTjg Andrew R. Clos**
Soundings by:	**Multibeam Echo Sounder**
Imagery by:	**Side Scan Sonar**
Verification by:	**Pacific Hydrographic Branch**
Soundings Acquired in:	**meters at Mean Lower Low Water**

Remarks:

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. Any revisions to the Descriptive Report (DR) generated during office processing are shown in bold, red italic text. The processing branch maintains the DR as a field unit product, therefore, all information and recommendations within the body of the DR are considere preliminary unless otherwise noted. The final disposition of surveyed features is represented in the OCS nautical chart update products. All pertinent records for this survey, including the DR, are archived at the National Centers for Environmental Information (NCEI) and can be retrieved via http://www.ncei.noaa.gov/.

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Descriptive Report to Accompany Survey F00642

Project: S-B904-NRT5-14

Locality: Narragansett Bay, RI

Sublocality: Approaches to Davisville

Scale: 1:10000

July 2014 - May 2015

Navigation Response Team 5

Chief of Party: LTjg Andrew R. Clos

A. Area Surveyed

This survey was conducted in Narragansett Bay, in the vicinity north of Conanicut Island and towards Davisville Depot.

A.1 Survey Limits

Data were acquired within the following survey limits:

Northwest Limit	Southeast Limit
41° 37' 8.96" N 71° 25' 10.7" W	41° 33' 36.15" N 71° 20' 48.15" W

Table 1: Survey Limits

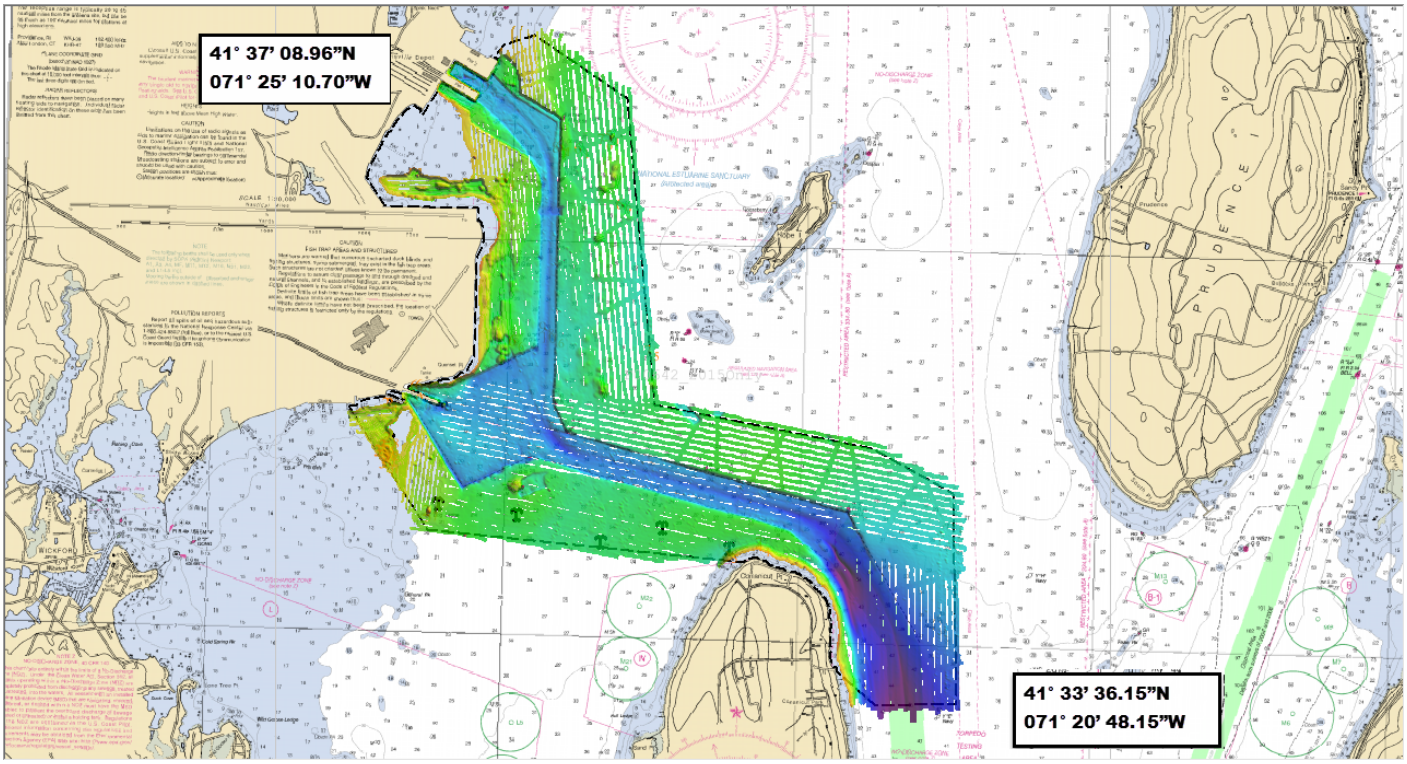

Figure 1: F00642 Survey Area.

Due to safety concerns, there were a few small areas where the nearshore limit was not reached. See figure 2 below.

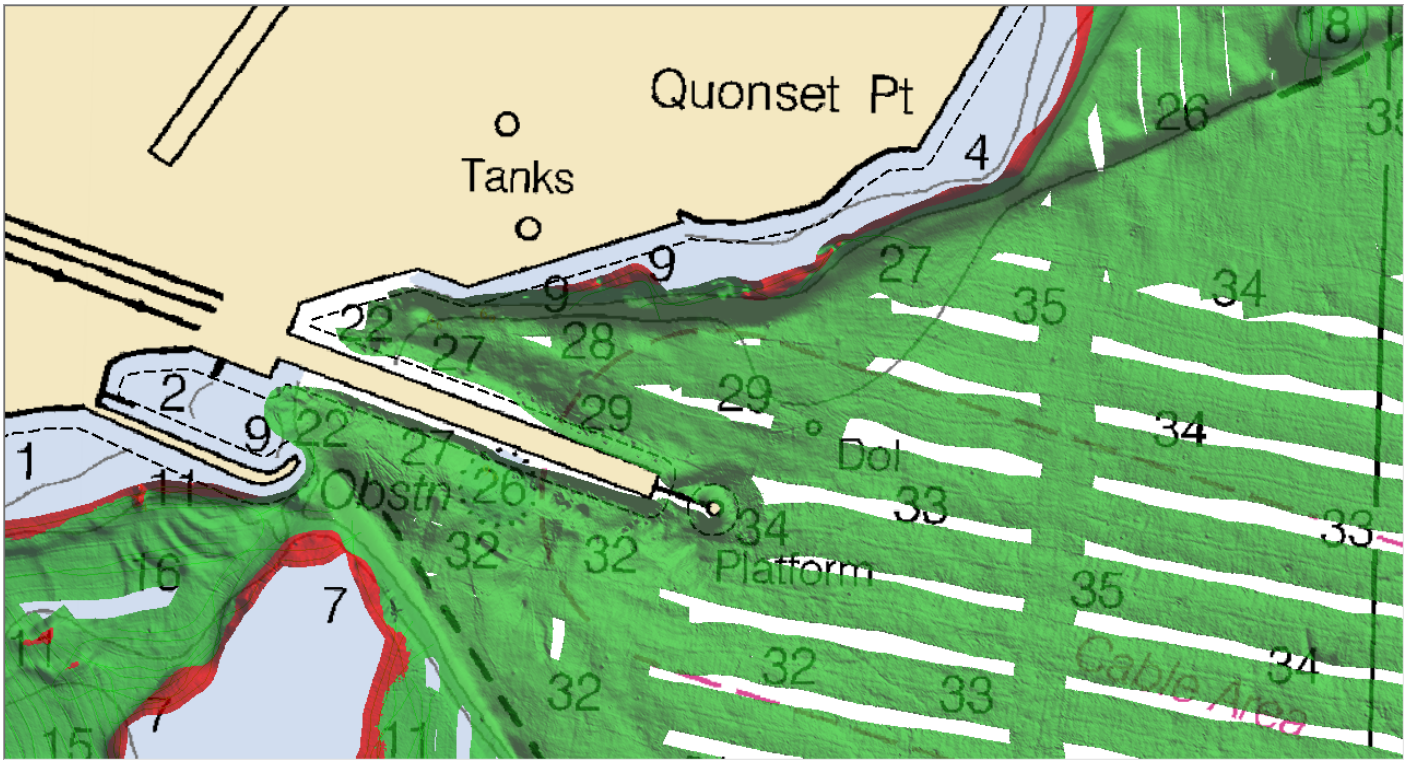

Figure 2: Southwest portion of the sheet. Red areas indicate where the four meter contour was reached.

A.2 Survey Purpose

This survey was conducted at the request of the Northeast Marine Pilots Association to update survey data for the approaches to the piers at Davisville and Quonset, RI. Ship traffic to the facilities at Davisville is steadily increasing and the draft of the vessels calling on the port is getting deeper.

A.3 Survey Quality

The entire survey is adequate to supersede previous data.

MBES coverage was acquired to pier faces at the Davisville Depot aside from a small section where construction was occurring. See figures 3 and 4 below.

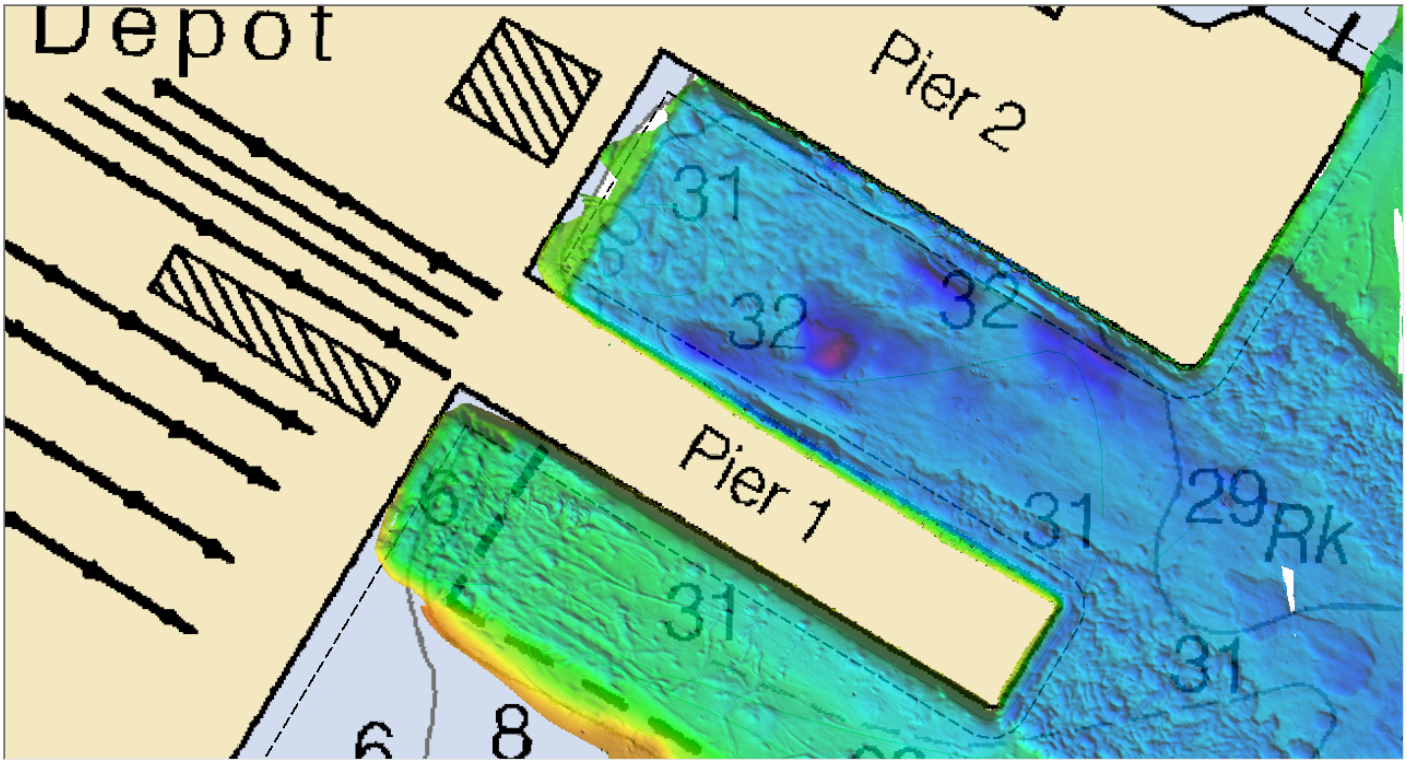

Figure 3: Depicting the extent of MBES coverage acquired near the piers at Davisville Depot, RI.

Figure 4: Showing the NW portion of the wharf between pier 1 and pier 2 and floats marking an area where work was occurring.

A.4 Survey Coverage

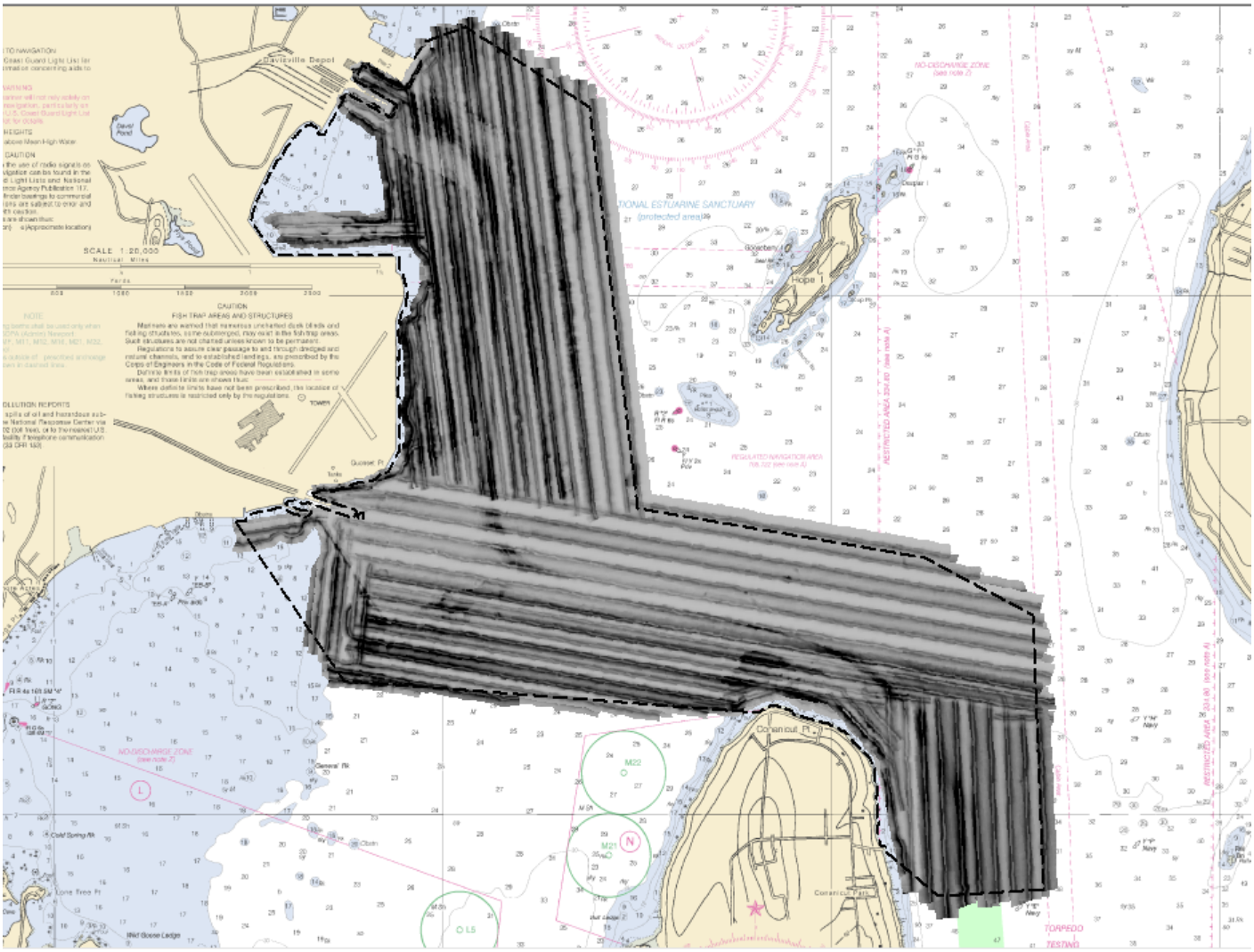

Figure 5: Side scan coverage area for F00642.

Survey coverage was in accordance with the requirements in the Project Instructions and the HSSD.

A.5 Survey Statistics

The following table lists the mainscheme and crossline acquisition mileage for this survey:

	HULL ID	*S3002*	*Total*
LNM	**SBES Mainscheme**	0	0
	MBES Mainscheme	26.84	26.84
	Lidar Mainscheme	0	0
	SSS Mainscheme	0	0
	SBES/SSS Mainscheme	0	0
	MBES/SSS Mainscheme	185.6	185.6
	SBES/MBES Crosslines	17.14	17.14
	Lidar Crosslines	0	0
Number of Bottom Samples			6
Number of AWOIS Items Investigated			0
Number Maritime Boundary Points Investigated			0
Number of DPs			0
Number of Items Investigated by Dive Ops			0
Total SNM			0

Table 2: Hydrographic Survey Statistics

The following table lists the specific dates of data acquisition for this survey:

Survey Dates	Day of the Year
07/14/2014	195
07/15/2014	196
07/16/2014	197
07/17/2014	198
07/18/2014	199
07/21/2014	202
07/22/2014	203
05/13/2015	133
05/14/2015	134
05/15/2015	135

Table 3: Dates of Hydrography

During the processing and data review, it was decided that more inshore coverage and additional development of areas of shoaling should be acquired. The team returned to the area for three days in May, 2015 to acquire this additional data.

B. Data Acquisition and Processing

B.1 Equipment and Vessels

Refer to the 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 discussed in the following sections.

MBES data acquired in 2015 utilized the 2014 DAPR and HVF values, therefore only the 2014 DAPR is submitted with this project. 2015 data was compared to 2014 over several features within the survey area and all data were found to be in agreement. Additionally, an abbreviated 2015 HSRR was carried out after this survey was completed and new HVF values were established. 2015 HVF values were in extremely close agreement with 2014, indicating negligible . Refer to the Project Correspondence folder for discussion regarding this matter. Refer to the "Additional Quality Control" section of this report for a discussion on the comparison of 2014 to 2015 data.

B.1.1 Vessels

The following vessels were used for data acquisition during this survey:

Hull ID	***S3002***
LOA	33 feet
Draft	0.75 meters

Table 4: Vessels Used

Figure 6: S3002.

S3002 acquired towed side scan data with concurrent multibeam, attitude data and bottom samples.

B.1.2 Equipment

The following major systems were used for data acquisition during this survey:

Manufacturer	Model	Type
Kongsberg	EM3002	MBES
Edgetech	4125	SSS
Applanix	POS M/V V5	Positioning and Attitude System
Trimble	SPS361	Positioning System
Sea-Bird Electronics	SBE 19+	Conductivity, Temperature, and Depth Sensor
AML	Micro X	Sound Speed System

Table 5: Major Systems Used

B.2 Quality Control

B.2.1 Crosslines

Crosslines acquired for this survey totaled 8% of mainscheme acquisition.

S3002 acquired 17.14 linear nautical miles of MBES cross lines, equating to 8.1% of mainscheme MBES data. Crosslines were compared to mainscheme using a difference surface, created in CARIS BathyDataBase. Using the difference surface, every instance of overlap was evaluated. The mean was 0.02 meters and the standard deviation was 0.05 meters. Survey F00642 complies with section 5.2.4.3 of the HSSD (2013 ed).

Additional comparison was made using CARIS Subset Editor and a 50 centimeter BASE surface to visually identify areas of mainscheme/crossline disagreement. The highest areas of disagreement occurred near sand waves and the steep edges of the channel.

B.2.2 Uncertainty

Hull ID	Measured - CTD	Measured - MVP	Surface
S3002	2 meters/second	N/A meters/second	.5 meters/second

Table 6: Survey Specific Sound Speed TPU Values

F00642 utilized a TCARI grid, which includes uncertainty values for each node. Therefore, TPU values in CARIS were left at zero during TPU calculation.

Total Propagated Uncertainty was then evaluated to ensure compliance with section 5.1.3 of NOAA's Hydrographic Survey Specification and Deliverables (HSSD). First, the maximum allowable uncertainty for each node was calculated. Second, the ratio between actual uncertainty and maximum allowed uncertainty was found for each node. The resulting 'Order_1a' layer was filtered using a color map to show any areas where actual uncertainty exceeded the maximum allowed uncertainty. Statistics were computed for the four meter BASE surface and of the 774,538 nodes, zero fell outside acceptable levels. Additionally, Order 1a statistics were computed for the 50cm BASE surface and of the 1,197,741 nodes, zero fell outside acceptable levels.

B.2.3 Junctions

No junctions were assigned for this survey.

There are no contemporary surveys that junction with this survey.

B.2.4 Sonar QC Checks

Sonar system quality control checks were conducted as detailed in the quality control section of the DAPR.

B.2.5 Equipment Effectiveness

There were no conditions or deficiencies that affected equipment operational effectiveness.

B.2.6 Factors Affecting Soundings

There were no other factors that affected corrections to soundings.

B.2.7 Sound Speed Methods

Sound Speed Cast Frequency: CTD casts were typically taken every two to three hours in the deepest area being surveyed at the time. The sound velocity profiles were applied to the MBES lines in Caris using the "nearest in time," method.

Sound speed profiles in the area are most greatly affected by diurnal heating and cooling, and salinity fluctuations from the ebb and flood of the tide. "Nearest in time," provided the best results in this survey area.

B.2.8 Coverage Equipment and Methods

All equipment and survey methods were used as detailed in the DAPR.

B.2.9 2014/2015 MBES Comparison

When the field unit returned to the survey are in 2015, a conspicuous feature was chosen as a reference object to compare MBES data between 2014 and 2015. The data was compared in CARIS Subset editor with point colors chosen based on day of collection. This visual comparison showed perfect agreement between the 2014 and 2015 MBES data.

Figure 7: Overview of feature used for comparison. Red tracklines are from 2015, green tracklines are from 2014.

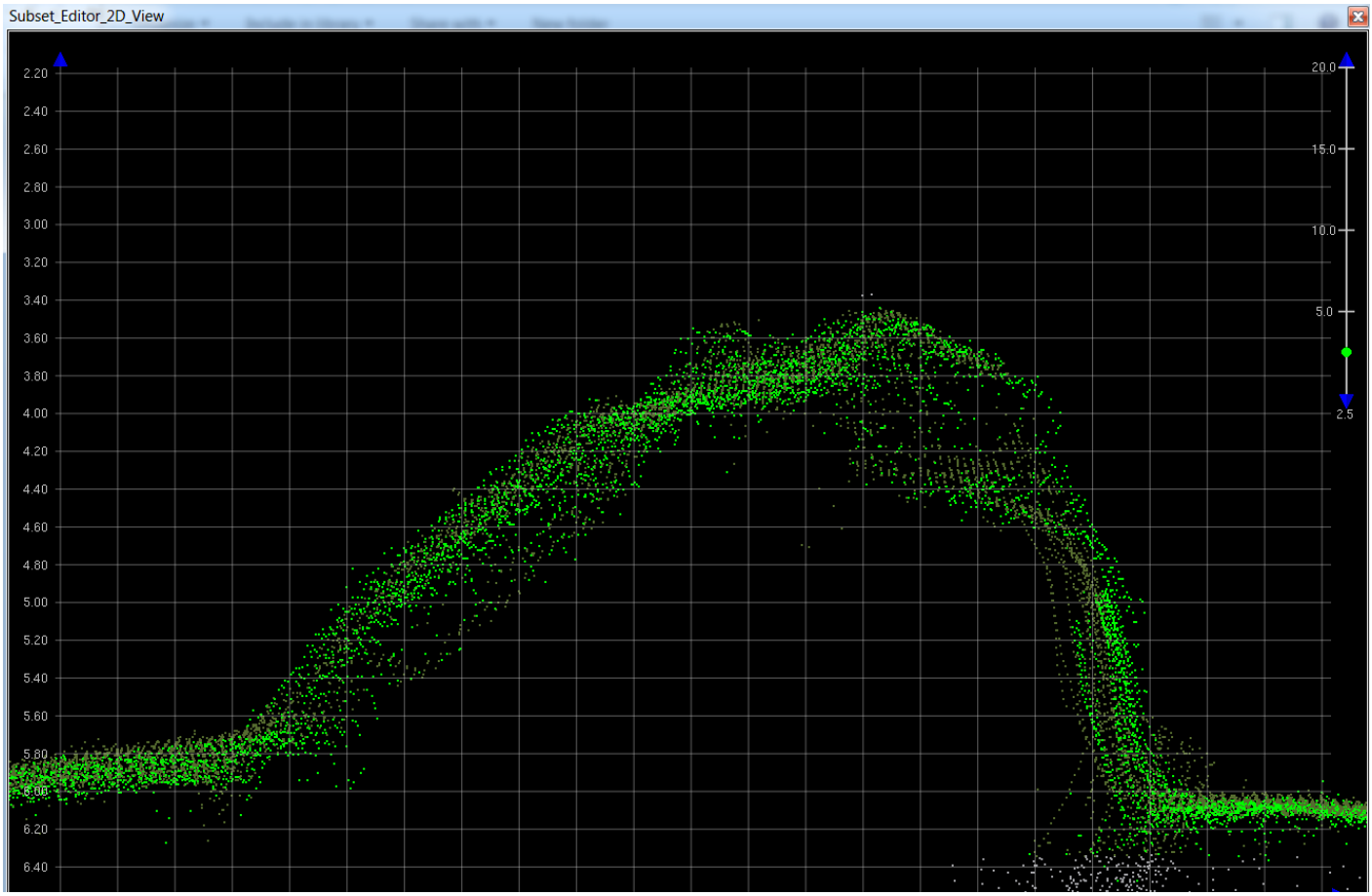

Figure 8: Dark green soundings indicate MBES data from 2015, while bright green soundings were collected in 2014.

B.3 Echo Sounding Corrections

B.3.1 Corrections to Echo Soundings

All data reduction procedures conform to those detailed in the DAPR.

B.3.2 Calibrations

All sounding systems were calibrated as detailed in the DAPR.

B.4 Backscatter

Raw Backscatter was logged in the .all file. Backscatter was not processed by the field unit.

B.5 Data Processing

B.5.1 Software Updates

The following software updates occurred after the submission of the DAPR:

Manufacturer	Name	Version	Service Pack	Hotfix	Installation Date	Use
Caris	HIPS/SIPS	8	1	10	01/16/2015	Processing

Table 7: Software Updates

The following Feature Object Catalog was used: NOAA Profile V_5_3_2

All MBES and side scan data were converted and processed using a CARIS HIPS and SIPS 8.1.7. After acquisition was completed, data cleaning and additional processing was carried out on a different computer running CARIS HIPS and SIPS 8.1.10. No errors or anomalies were noticed when making this transition. The Hydro Systems Inventory contained in Appendix I of the DAPR notes the software versions used on each computer.

B.5.2 Surfaces

The following surfaces and/or BAGs were submitted to the Processing Branch:

Surface Name	Surface Type	Resolution	Depth Range	Surface Parameter	Purpose
F00642_MB_4m_MLLW	CUBE	4 meters	1.83 meters - 15.79 meters	NOAA_4m	MBES TracklineSBES Set Line Spacing
F00642_MB_4m_MLLW_Final	CUBE	4 meters	1.83 meters - 15.79 meters	NOAA_4m	MBES TracklineSBES Set Line Spacing
F00642_MB_50cm_MLLW	CUBE	0.5 meters	2.15 meters - 10.59 meters	NOAA_0.5m	MBES TracklineSBES Set Line Spacing
F00642_MB_50cm_MLLW_Final	CUBE	0.5 meters	2.15 meters - 10.59 meters	NOAA_0.5m	MBES TracklineSBES Set Line Spacing

Surface Name	Surface Type	Resolution	Depth Range	Surface Parameter	Purpose
F00642_1m_100	SSS Mosaic	1 meters	1.83 meters - 15.79 meters	N/A	100% SSS
F00642_1m_200	SSS Mosaic	1 meters	1.83 meters - 15.79 meters	N/A	200% SSS

Table 8: Submitted Surfaces

For the majority of the survey area, object detection requirements were achieved by acquiring "200% SSS with concurrent Set Line Spacing MBES." A 4m bathymetric grid was created for these areas. The southwest corner of the sheet is shallow and rocky. In that area, object detection requirements were achieved with Object Detection MBES. Throughout the survey, data density was high enough to support a 50cm grid, so a 50cm BASE surface has been submitted for the entire area. All designated soundings were picked from point cloud data, and each meets the requirements for designated soundings as specified in the HSSD.

C. Vertical and Horizontal Control

Per section 5.1.2.3 of the FPM, no Horizontal and Vertical Control Report has been generated for Survey F00642.

C.1 Vertical Control

The vertical datum for this project is Mean Lower Low Water.

Standard Vertical Control Methods Used:

TCARI

The following National Water Level Observation Network (NWLON) stations served as datum control for this survey:

Station Name	Station ID
Conimicut Light, RI	845-2944
Quonset Point, RI	845-4049

Table 9: NWLON Tide Stations

File Name	Status
8452944	Final Approved
8454094	Final Approved

Table 10: Water Level Files (.tid)

File Name	Status
B904NRT52014_Rev.tc	Final

Table 11: Tide Correctors (.zdf or .tc)

A request for final approved tides was sent to N/OPS1 on 08/13/2014. The final tide note was received on 08/27/2014.

CO-OPS accepted the preliminary TCARI grid as the final grid for survey F00642. Verified tides were downloaded and applied to the bathymetry using the Pydro Fetch Tides tool. Due to the survey being re-opened in May 2015, the request for final water levels was resubmitted in June 2015. Final water levels were received on July 8th, 2015.

TCARI grid B904NRT52015.tc was applied to data acquired in 2015.

C.2 Horizontal Control

The horizontal datum for this project is North American Datum of 1983 (NAD83).

The projection used for this project is UTM-19N.

The following PPK methods were used for horizontal control:

Smart Base

Post Processed Kinematic GPS correctors were applied to all data except the following four lines:
0037_20140715_192653_S3002
0038_20140715_194937_S3002
0039_20140715_201306_S3002
0040_20140715_201732_S3002

These lines could not have IAPPK correctors applied, because they do not have Delayed Heave files associated with them. Using CARIS Subset Editor, these lines were compared to nearby lines that do have Delayed Heave and SBETs applied and the bathymetry was found to be in agreement.

For more information regarding SBETs for this survey, refer to the SBET processing log.

The following CORS Stations were used for horizontal control:

HVCR Site ID	Base Station ID
URIL	URIL
ACU5	ACU5
XMTS	XMTS
CTPU	CTPU
CTGR	CTGR
CTMA	CTMA
NPRI	NPRI
MOR5	MOR5

Table 12: CORS Base Stations

The following DGPS Stations were used for horizontal control:

DGPS Stations
Moriches, NY (293kHz)

Table 13: USCG DGPS Stations

D. Results and Recommendations

D.1 Chart Comparison

F00642 was compared to affected RNC and ENC products by creating a high density sounding layer in CARIS BathyDataBase and comparing charted water depths with surveyed soundings.

D.1.1 Raster Charts

The following are the largest scale raster charts, which cover the survey area:

Chart	Scale	Edition	Edition Date	LNM Date	NM Date
13223	1:20000	43	06/2013	06/28/2014	06/28/2014

Table 14: Largest Scale Raster Charts

13223

Raster chart 13223 agreed very well with F00642. Surveyed soundings generally agreed with charted depths to within 2 feet.

In the SW corner of the sheet charted 12 and 6 foot soundings were disproved by MBES. New contours should be drawn in these areas. See figure below.

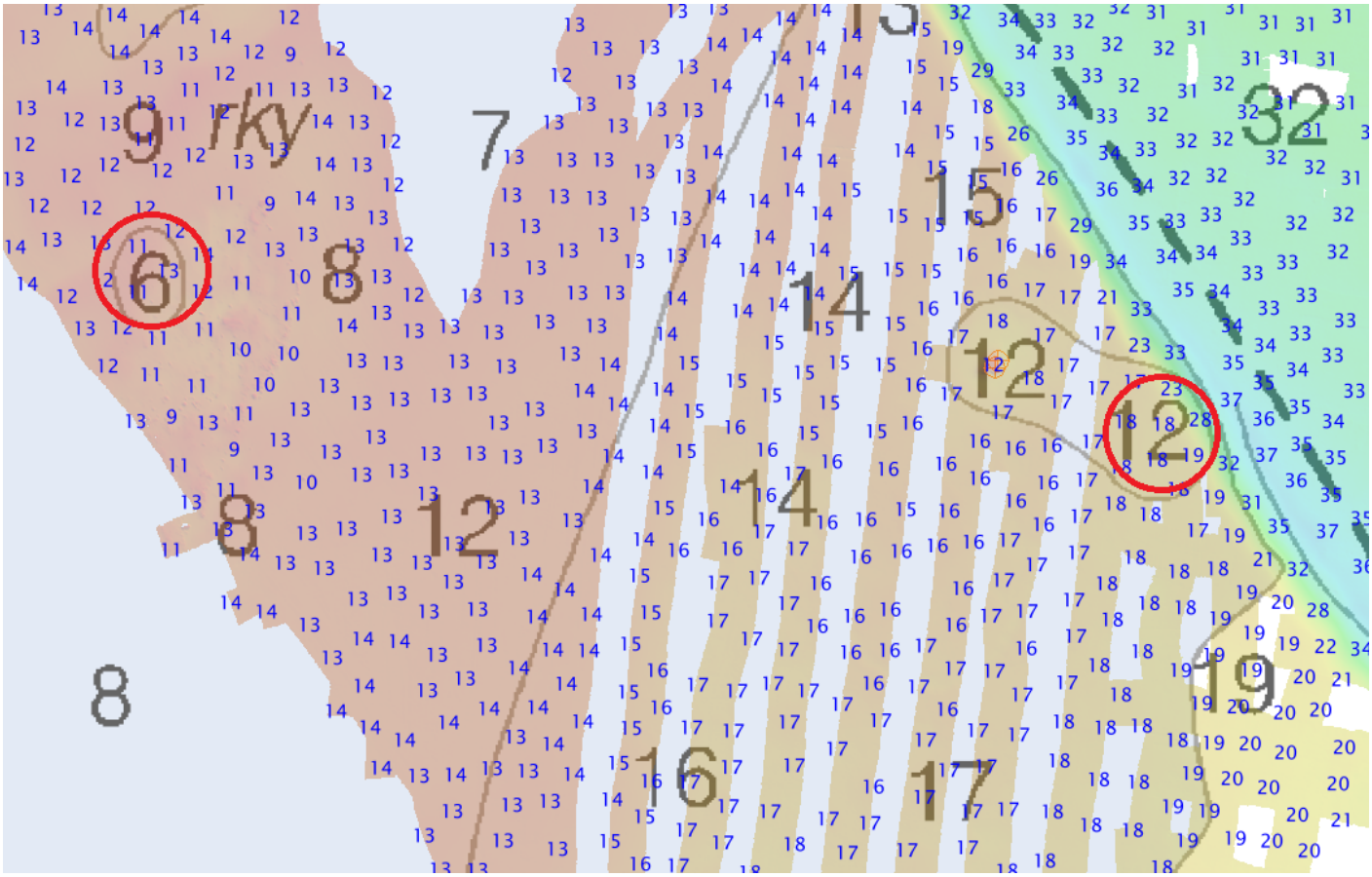

Figure 9: Southwest corner of sheet highlighting chart comparison.

D.1.2 Electronic Navigational Charts

The following are the largest scale ENCs, which cover the survey area:

ENC	Scale	Edition	Update Application Date	Issue Date	Preliminary?
US5RI22M	1:20000	23		01/27/2015	NO

Table 15: Largest Scale ENCs

US5RI22M

Electronic chart US5RI22M agreed very well with F00642. Surveyed soundings generally agreed with charted depths to within 2 feet.

D.1.3 AWOIS Items

16 assigned features were investigated by this survey. For more information, refer to the final feature file: F00642_FFF.hob.

There were no assigned AWOIS items for this survey.

D.1.4 Maritime Boundary Points

No Maritime Boundary Points were assigned for this survey.

D.1.5 Charted Features

No charted features exist for this survey.

There were 42 assigned features, 18 of which were investigated in this survey.

D.1.6 Uncharted Features

In addition to the 16 assigned features that were investigated, 2 more features were discovered and are included in the Final Feature File.

D.1.7 Dangers to Navigation

No Danger to Navigation Reports were submitted for this survey.

D.1.8 Shoal and Hazardous Features

In the southwestern portion of the sheet, a charted 12 foot sounding exists and evidence of a shoal was found with MBES and 200% SSS data. The least depth found by MBES was 12.4 feet. No charting changes are recommended.

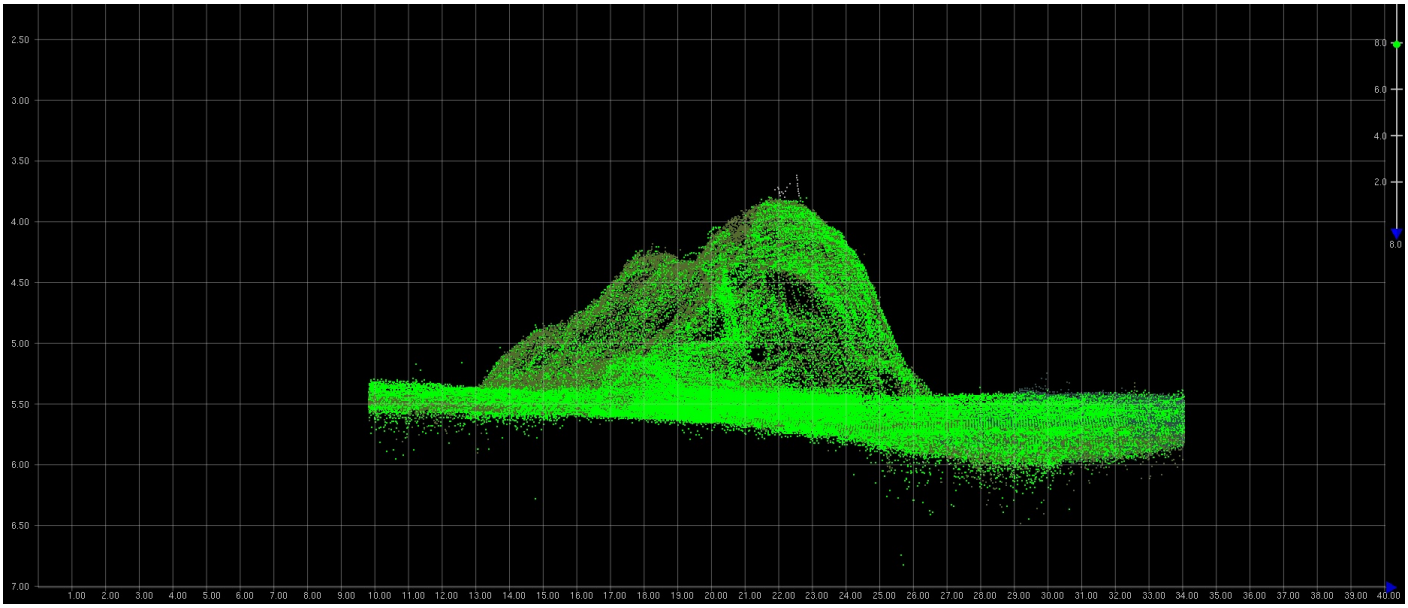

Figure 10: 12 foot shoal, MBES coverage.

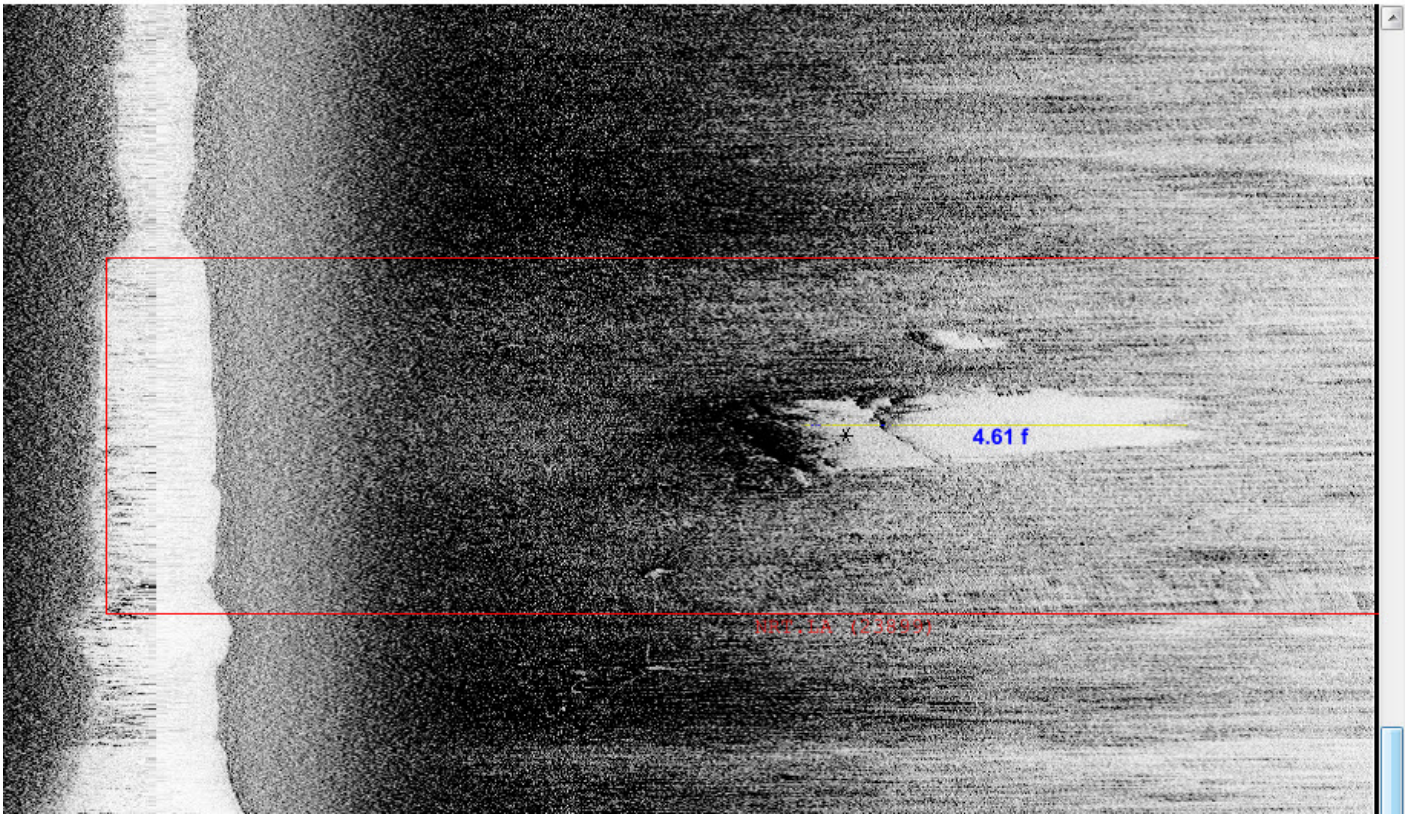

Figure 11: 12 foot shoal SSS coverage, showing shadow height of feature.

D.1.9 Channels

Survey F00642 was conducted at the request of the Northeast Marine Pilots Association to investigate the channel that runs along the north and east sides of Conanicut Island, then along Quonset Point to the Davisville Depot piers. This channel is frequently traveled by roll on, roll off car carriers with drafts up to 30 feet. Special attention was given to the chart comparison within the channel. In all areas of the channel, surveyed soundings were equal to or slightly (1 to 2 feet) deeper than charted.

D.1.10 Bottom Samples

In total, 6 bottom samples were collected and these results were compared to charted bottom types. See the final feature HOB file for more details.

D.2 Additional Results

D.2.1 Shoreline

Limited shoreline verification was performed and all features included in the CSF and falling within the survey limits were verified. Some features were inshore of the 12 foot contour (near shore limit) and could not be verified.

D.2.2 Prior Surveys

No prior survey comparisons exist for this survey.

D.2.3 Aids to Navigation

All ATONs were observed to be on station and in satisfactory condition during the acquisition phase of F00642. Observations were only made during day time, so no assessment of light functionality was made. No changes are necessary to charted ATONs.

D.2.4 Overhead Features

No overhead features exist for this survey.

D.2.5 Submarine Features

Multiple cable areas exist throughout the survey area, but very little evidence of their presence was found in the MBES data.

D.2.6 Ferry Routes and Terminals

No ferry routes or terminals exist for this survey.

An internal discrepancy report no. 28828 was submitted to NOAA's marine chart division on 10/12/16 reporting the uncharted ferry route.

D.2.7 Platforms

A platform exists in the southwestern portion of the sheet. Just south of Quonset Point, is a jetty that extends about 330 meters feet seaward. 50 meters seaward of the end of the jetty is a small platform. MBES data was acquired around this platform and it appears to be well charted.

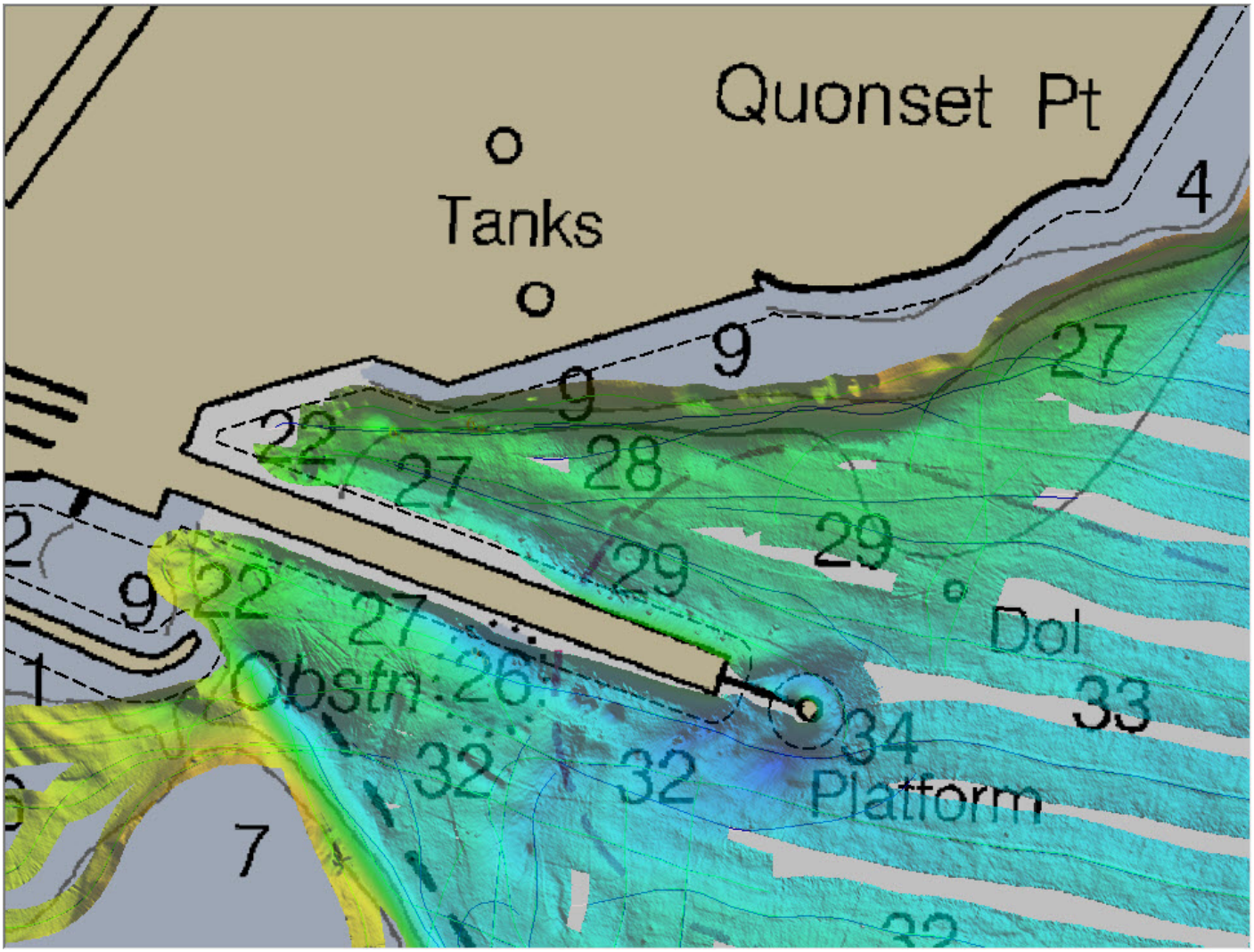

Figure 12: MBES coverage around charted platform.

Figure 13: Picture of platform extending from shore.

D.2.8 Significant Features

No significant features exist for this survey.

D.2.9 Construction and Dredging

The main channel and areas surrounding pier 1 and pier 2 at the Davisville Depot are regularly dredged. Soundings from this survey, in these controlled areas, were found to be equal to or slightly (1-2 feet) deeper than charted.

D.2.10 New Survey Recommendation

No new surveys or further investigations are recommended for this area.

D.2.11 Inset Recommendation

No new insets are recommended for this area.

E. Approval Sheet

As Chief of Party, field operations for this hydrographic survey were conducted under my direct supervision, with frequent personal checks of progress and adequacy. I have reviewed the attached survey data and reports.

All field sheets, this Descriptive Report, and all accompanying records and data are approved. All records are forwarded for final review and processing to the Processing Branch.

The survey data meets or exceeds requirements as set forth in the NOS Hydrographic Surveys and Specifications Deliverables Manual, Field Procedures Manual, Letter Instructions, and all HSD Technical Directives. These data are adequate to supersede charted data in their common areas. This survey is complete and no additional work is required with the exception of deficiencies noted in the Descriptive Report.

Approver Name	Approver Title	Approval Date	Signature
Andrew R. Clos	Sheet Manager	02/15/2016	

F. Table of Acronyms

Acronym	Definition
AHB	Atlantic Hydrographic Branch
AST	Assistant Survey Technician
ATON	Aid to Navigation
AWOIS	Automated Wreck and Obstruction Information System
BAG	Bathymetric Attributed Grid
BASE	Bathymetry Associated with Statistical Error
CO	Commanding Officer
CO-OPS	Center for Operational Products and Services
CORS	Continually Operating Reference Staiton
CTD	Conductivity Temperature Depth
CEF	Chart Evaluation File
CSF	Composite Source File
CST	Chief Survey Technician
CUBE	Combined Uncertainty and Bathymetry Estimator
DAPR	Data Acquisition and Processing Report
DGPS	Differential Global Positioning System
DP	Detached Position
DR	Descriptive Report
DTON	Danger to Navigation
ENC	Electronic Navigational Chart
ERS	Ellipsoidal Referenced Survey
ERZT	Ellipsoidally Referenced Zoned Tides
FFF	Final Feature File
FOO	Field Operations Officer
FPM	Field Procedures Manual
GAMS	GPS Azimuth Measurement Subsystem
GC	Geographic Cell
GPS	Global Positioning System
HIPS	Hydrographic Information Processing System
HSD	Hydrographic Surveys Division
HSSD	Hydrographic Survey Specifications and Deliverables

Acronym	Definition
HSTP	Hydrographic Systems Technology Programs
HSX	Hypack Hysweep File Format
HTD	Hydrographic Surveys Technical Directive
HVCR	Horizontal and Vertical Control Report
HVF	HIPS Vessel File
IHO	International Hydrographic Organization
IMU	Inertial Motion Unit
ITRF	International Terrestrial Reference Frame
LNM	Local Notice to Mariners
LNM	Linear Nautical Miles
MCD	Marine Chart Division
MHW	Mean High Water
MLLW	Mean Lower Low Water
NAD 83	North American Datum of 1983
NAIP	National Agriculture and Imagery Program
NALL	Navigable Area Limit Line
NM	Notice to Mariners
NMEA	National Marine Electronics Association
NOAA	National Oceanic and Atmospheric Administration
NOS	National Ocean Service
NRT	Navigation Response Team
NSD	Navigation Services Division
OCS	Office of Coast Survey
OMAO	Office of Marine and Aviation Operations (NOAA)
OPS	Operations Branch
MBES	Multibeam Echosounder
NWLON	National Water Level Observation Network
PDBS	Phase Differencing Bathymetric Sonar
PHB	Pacific Hydrographic Branch
POS/MV	Position and Orientation System for Marine Vessels
PPK	Post Processed Kinematic
PPP	Precise Point Positioning
PPS	Pulse per second

Acronym	Definition
PRF	Project Reference File
PS	Physical Scientist
PST	Physical Science Technician
RNC	Raster Navigational Chart
RTK	Real Time Kinematic
SBES	Singlebeam Echosounder
SBET	Smooth Best Estimate and Trajectory
SNM	Square Nautical Miles
SSS	Side Scan Sonar
ST	Survey Technician
SVP	Sound Velocity Profiler
TCARI	Tidal Constituent And Residual Interpolation
TPE	Total Porpagated Error
TPU	Topside Processing Unit
USACE	United States Army Corps of Engineers
USCG	United Stated Coast Guard
UTM	Universal Transverse Mercator
XO	Executive Officer
ZDA	Global Positiong System timing message
ZDF	Zone Definition File

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

TIDE NOTE FOR HYDROGRAPHIC SURVEY

DATE : August 14, 2014

HYDROGRAPHIC BRANCH: Pacific
HYDROGRAPHIC PROJECT: S-B904-NRT5-2014
HYDROGRAPHIC SHEET: F00642
LOCALITY: Approaches to Davisville, Narragansett Bay, RI
TIME PERIOD: July 14 to July 21, 2014

TIDE STATION USED: Conimicut Light, RI 845-2944
Lat. 41° 43.0′ N Long. 71° 20.6' W
PLANE OF REFERENCE (MEAN LOWER LOW WATER): 0.000 meters
HEIGHT OF HIGH WATER ABOVE PLANE OF REFERENCE: 1.322 meters

TIDE STATION USED: Quonset Point, RI 845-4049
Lat. 41° 35.2' N Long. 71° 24.7' W
PLANE OF REFERENCE (MEAN LOWER LOW WATER): 0.000 meters
HEIGHT OF HIGH WATER ABOVE PLANE OF REFERENCE: 1.174 meters

REMARKS: RECOMMENDED GRID

Please use the TCARI grid "B904NRT52014_Rev.tc" as the final grid for project S-B904-NRT5-2014, F00642, during the time period between July 14 and July 21, 2014.

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).

Note 2: Due to inaccurate shoreline around Narragansett Bay, RI, survey track lines fall outside of the TCARI grid boundaries in some areas. TCARI will extrapolate the tide corrector to cover these soundings

HOVIS.GERALD.THOMAS.JR.1365860250

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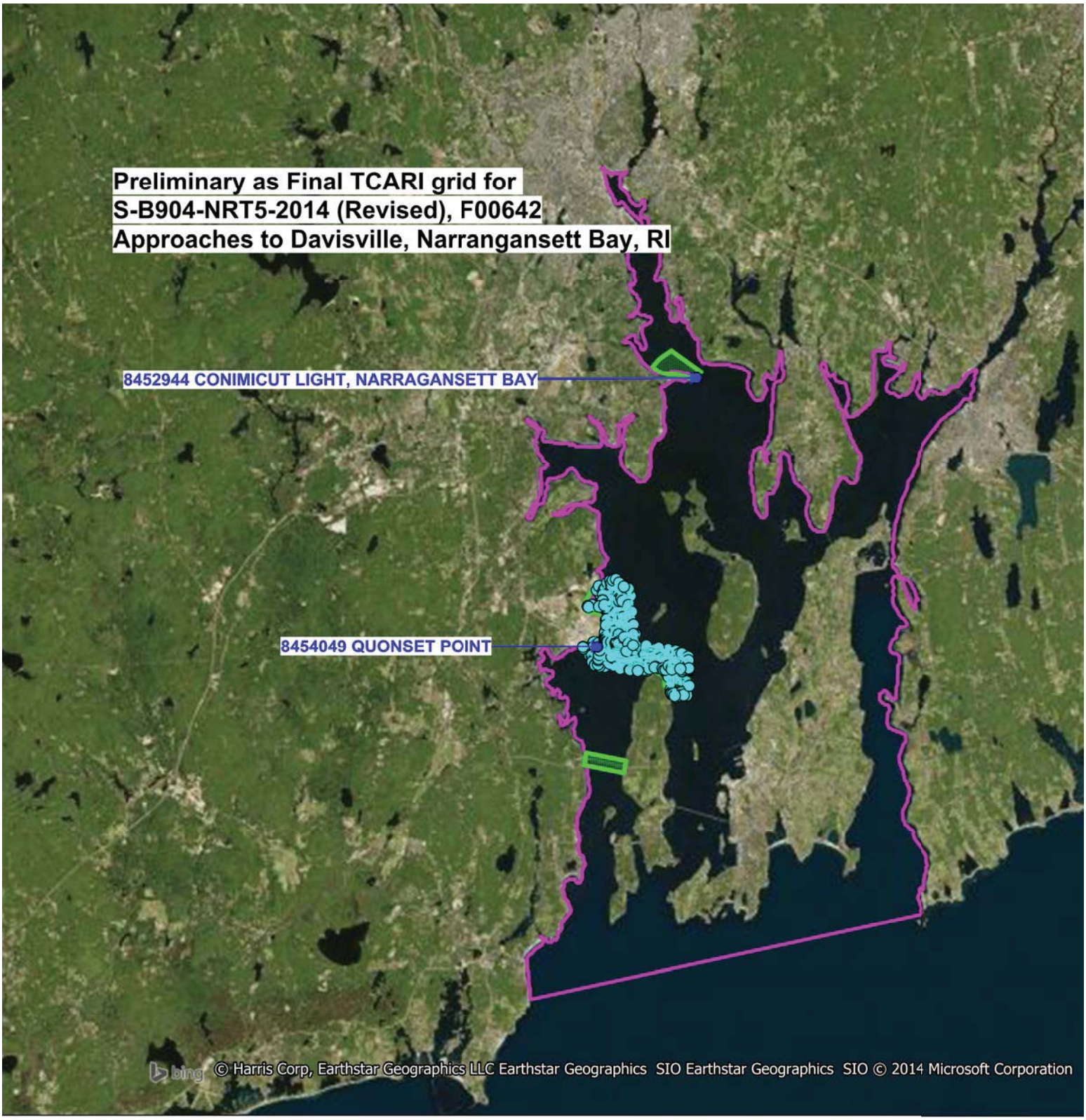
Date: 2014.08.26 10:13:37 -04'00'

CHIEF, PRODUCTS AND SERVICES BRANCH


Preliminary as Final TCARI grid for
S-B904-NRT5-2014 (Revised), F00642
Approaches to Davisville, Narrangansett Bay, RI
8452944 CONIMICUT LIGHT, NARRAGANSETT BAY
8454049 QUONSET POINT
bing
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APPROVAL PAGE

F00642

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

The following products will be sent to NGDC for archive

- F00642_DR.pdf
- Collection of depth varied resolution BAGS
- Processed survey data and records
- F00642_GeoImage.pdf

The survey evaluation and verification has been conducted according current OCS Specifications.

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Date: 2016.11.21 08:26:21 -08'00'

Approved: _____

Peter Holmberg
Cartographic Team Lead, Pacific Hydrographic Branch

The survey has been approved for dissemination and usage of updating NOAA's suite of nautical charts.

Digitally signed by Peter Holmberg
DN: cn=Peter Holmberg, o, ou=Signing for Ben Evans, email=benjamin.k.evans@noaa.gov, c=US
Date: 2016.11.21 08:26:54 -08'00'

Approved: _____

CDR, Benjamin K. Evans, NOAA
Chief, Pacific Hydrographic Branch