F00598

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

DESCRIPTIVE REPORT

Type of Survey:	Navigable Area
Registry Number:	F00598

LOCALITY

State(s):	New Jersey New York
General Locality:	New York Harbor
Sub-locality:	Yonkers to George Washington Bridge

2012

CHIEF OF PARTY
LTJG Steven Loy

LIBRARY & ARCHIVES

Date:

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

REGISTRY NUMBER:

HYDROGRAPHIC TITLE SHEET

F00598

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):	**New Jersey New York**
General Locality:	**New York Harbor**
Sub-Locality:	**Yonkers to George Washington Bridge**
Scale:	**5000**
Dates of Survey:	**03/09/2011 to 04/30/2013**
Instructions Dated:	**08/28/2013**
Project Number:	**S-B925-NRT5-12**
Field Unit:	**Navigation Response Team 5**
Chief of Party:	**LTJG Steven Loy**
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. Revisions and notes in red 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/.

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Descriptive Report to Accompany Survey F00598

Project: S-B925-NRT5-12

Locality: New York Harbor

Sublocality: Yonkers to George Washington Bridge

Scale: 1:5000

March 2011 - April 2013

Navigation Response Team 5

Chief of Party: LTJG Steven Loy

A. Area Surveyed

The area surveyed includes the Hudson River from Glenwood, NY down to the George Washington Bridge, the mooring field around the 79th St. Pier (Hudson River), Piers 94 through 83 (Hudson River), Pier 61 through 64 (Hudson River), Pier 40 (Hudson River), Pier 25 and 26 (Hudson River), Pier 14 through 17 (East River), Pier 35 through 42 (East River), Pier 5 through 9A (Brooklyn), Pier 11 and 12 (Brooklyn), a pier on the south side of Governors Island, the entrance to Erie Basin (Brooklyn), a fireboat station pier (Staten Island), Pier 7 at Liberty State Park (NJ), and the Morris Canal Basin (NJ).

A.1 Survey Limits

Data were acquired within the following survey limits:

Northwest Limit	Southeast Limit
40° 57' 8.86" N 74° 4' 29.47" W	40° 37' 28.73" N 73° 53' 54.65" W

Table 1: Survey Limits

Survey Limits were acquired in accordance with the requirements in the Project Instructions and the HSSD.

A.2 Survey Purpose

The purpose of the operations in this area was to provide contemporary surveys to support Navy's Fleet Week and Opsail in 2012 and update National Oceanic and Atmospheric Administration (NOAA) nautical charts.

A.3 Survey Quality

The entire survey is adequate to supersede previous data.

The entire survey is adequate to supersede previous data except as noted in section B.2.11.

A.4 Survey Coverage

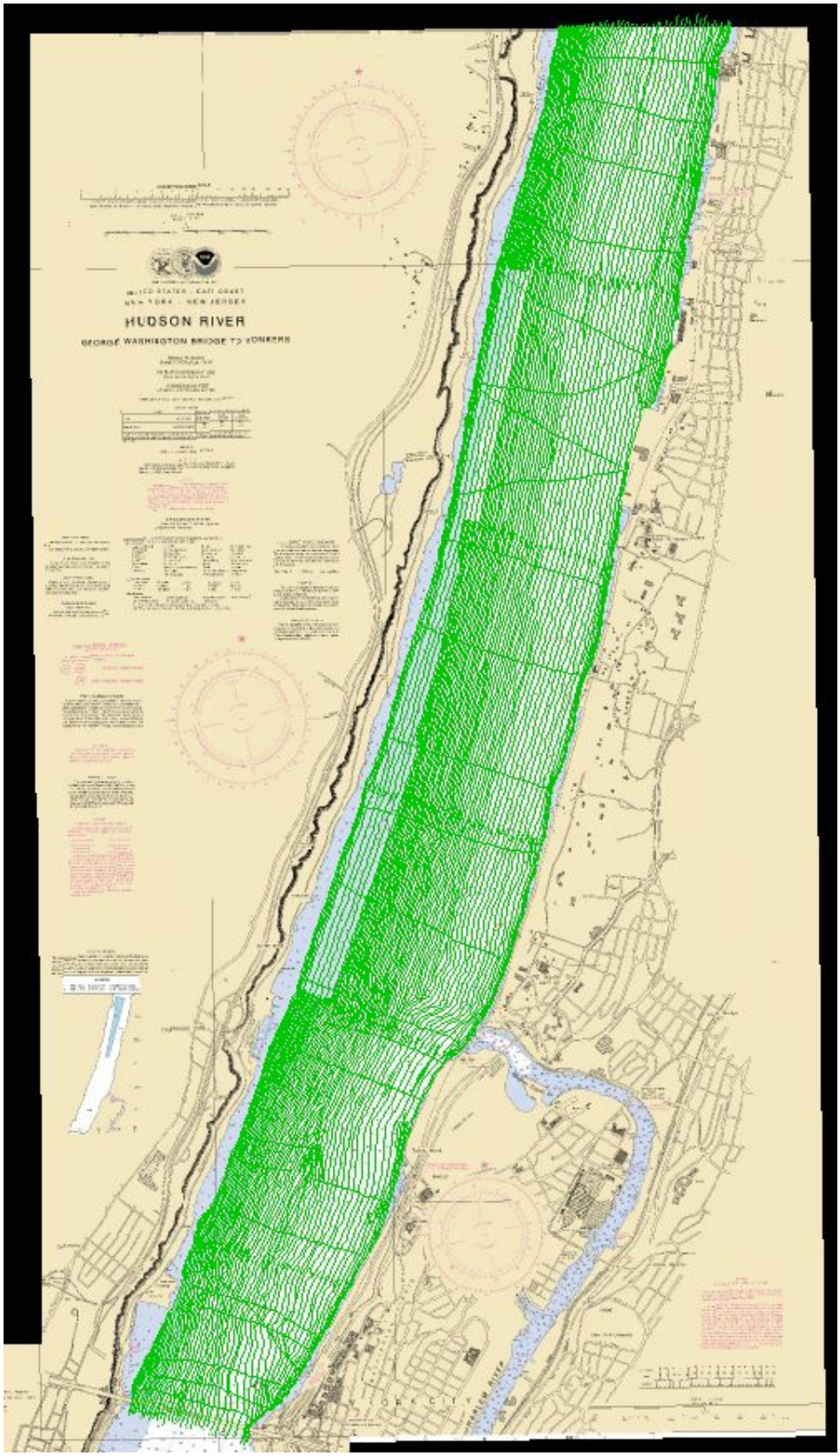


Figure 1: Northern section of the survey area. The area extends along the Hudson River from George Washington Bridge in the south to Yonkers in the north.

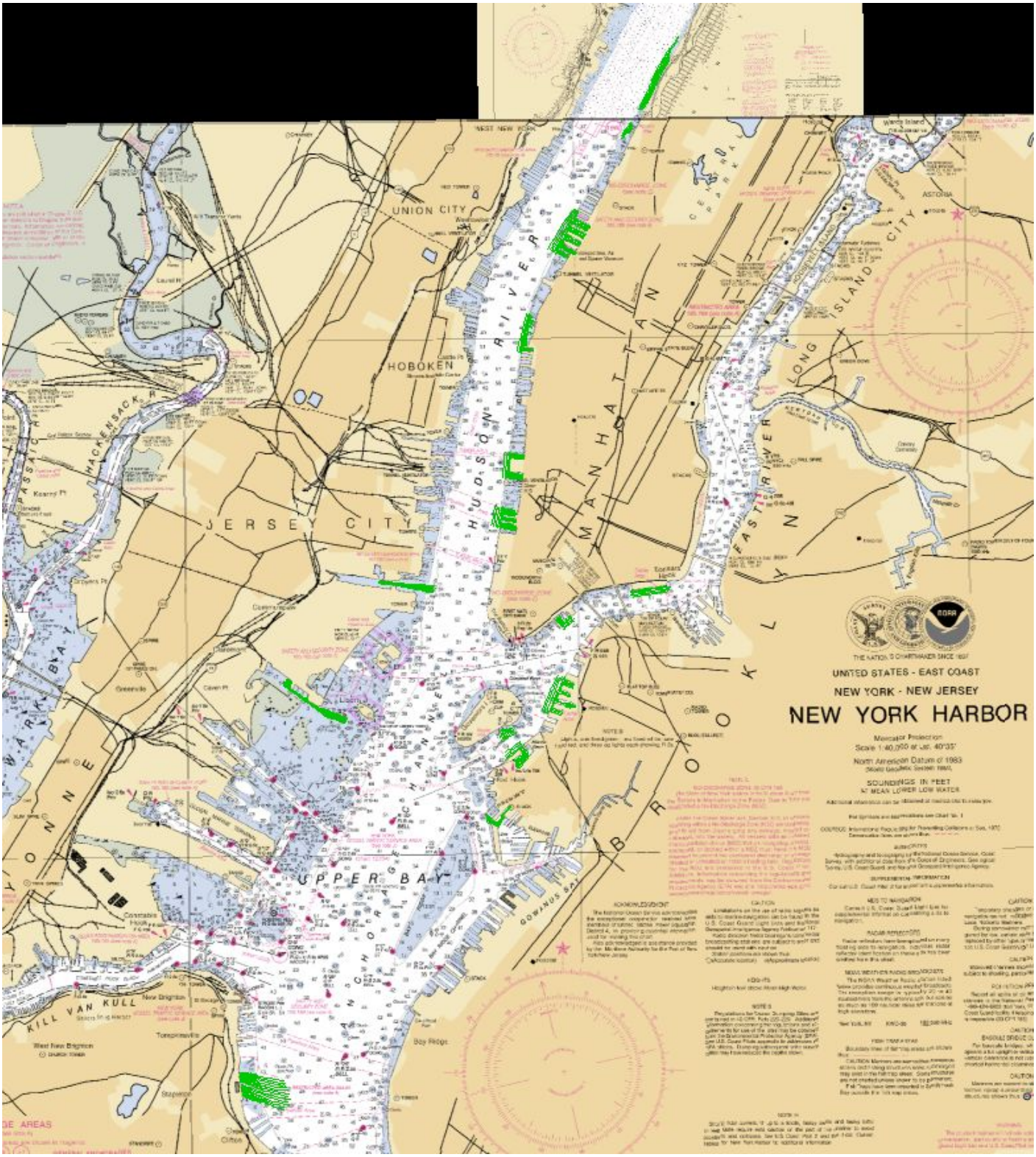


Figure 2: Southern section of the survey area. These survey areas were part of the request for support of Navy's Fleet Week and OpSail 2012.

Minimum survey coverage requirements were met in all areas of the surveys. Additional SSS data was acquired over some 100% multibeam areas due to new personnel training requirements.

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	444.43	444.43
	Lidar Mainscheme	0	0
	SSS Mainscheme	60.58	60.58
	SBES/SSS Mainscheme	0	0
	MBES/SSS Mainscheme	60.58	60.58
	SBES/MBES Crosslines	26.34	26.34
	Lidar Crosslines	0	0
Number of Bottom Samples			6
Number of AWOIS Items Investigated			18
Number Maritime Boundary Points Investigated			0
Number of DPs			0
Number of Items Investigated by Dive Ops			0
Total SNM			5.16

Table 2: Hydrographic Survey Statistics

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

Survey Dates	Day of the Year
03/09/2011	68
03/14/2011	73
03/15/2011	74
03/16/2011	75
03/17/2011	76
11/08/2011	312
11/09/2011	313
11/10/2011	314
11/14/2011	318
11/16/2011	320
11/21/2011	325
11/29/2011	333
11/30/2011	334
12/01/2011	335
12/05/2011	339
12/07/2011	341
12/12/2011	346
12/13/2011	347
04/30/2013	120

Table 3: Dates of Hydrography

Due to survey time constraints and safety concerns, crosslines were not run in the southern section of the survey in and around the piers.

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.

B.1.1 Vessels

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

Hull ID	***S3002***
LOA	30 feet
Draft	3.5 feet

Table 4: Vessels Used

B.1.2 Equipment

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

Manufacturer	**Model**	**Type**
Kongsberg	EM3002	MBES
Klein	3000	SSS
Applanix	POS/MV	Positioning and Attitude System
Odom	Digibar Pro	Sound Speed System
Seabird	SBE 19+	Conductivity, Temperature and Depth Sensor
Trimble	DSM212L	Positioning System

Table 5: Major Systems Used

B.2 Quality Control

B.2.1 Crosslines

Crosslines acquired for this survey totaled 5% of mainscheme acquisition.

A total of 16 lnm of crosslines comprising 3.64% of the mainscheme coverage were run for this survey. Data was acquired at the beginning 2011 using the HSX format and a different vessel configuration than the data collected near the end of 2011 using the *.ALL format. The following crossline figures show that the crossline data generally agrees with the mainscheme data. A second crossline comparison was completed in April 2013 to determine the effects of Hurricane Sandy on the bottom. The second crossline comparison shows very little change in depth post-Sandy with a mean difference = 0.03 m and a standard deviation of 0.26 m. Data used to create the graphs can be found in the Crossline Comparison folder of the survey.

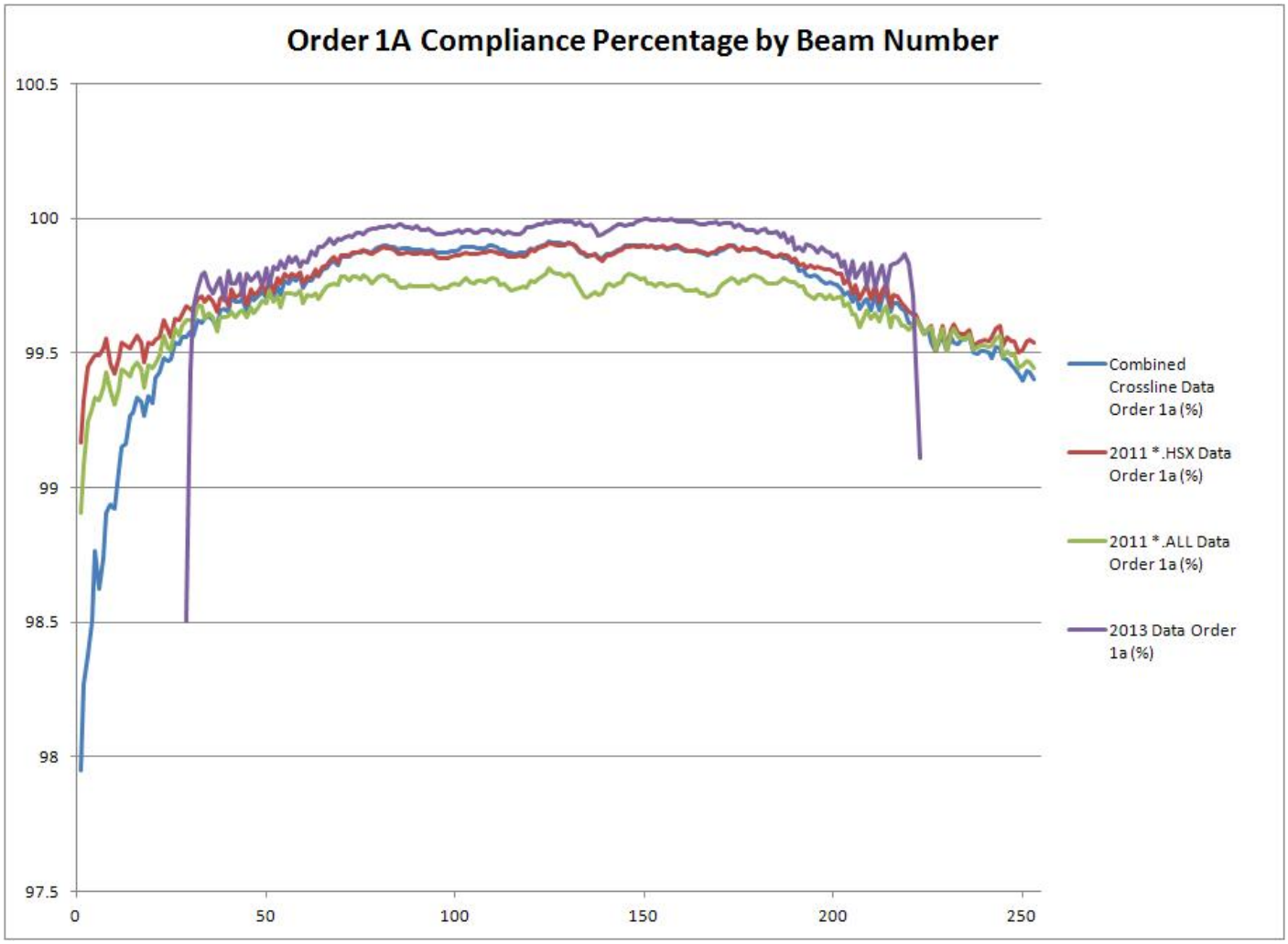


Figure 3: This shows the order 1a compliance of the crossline soundings with the 1m mainscheme surface.

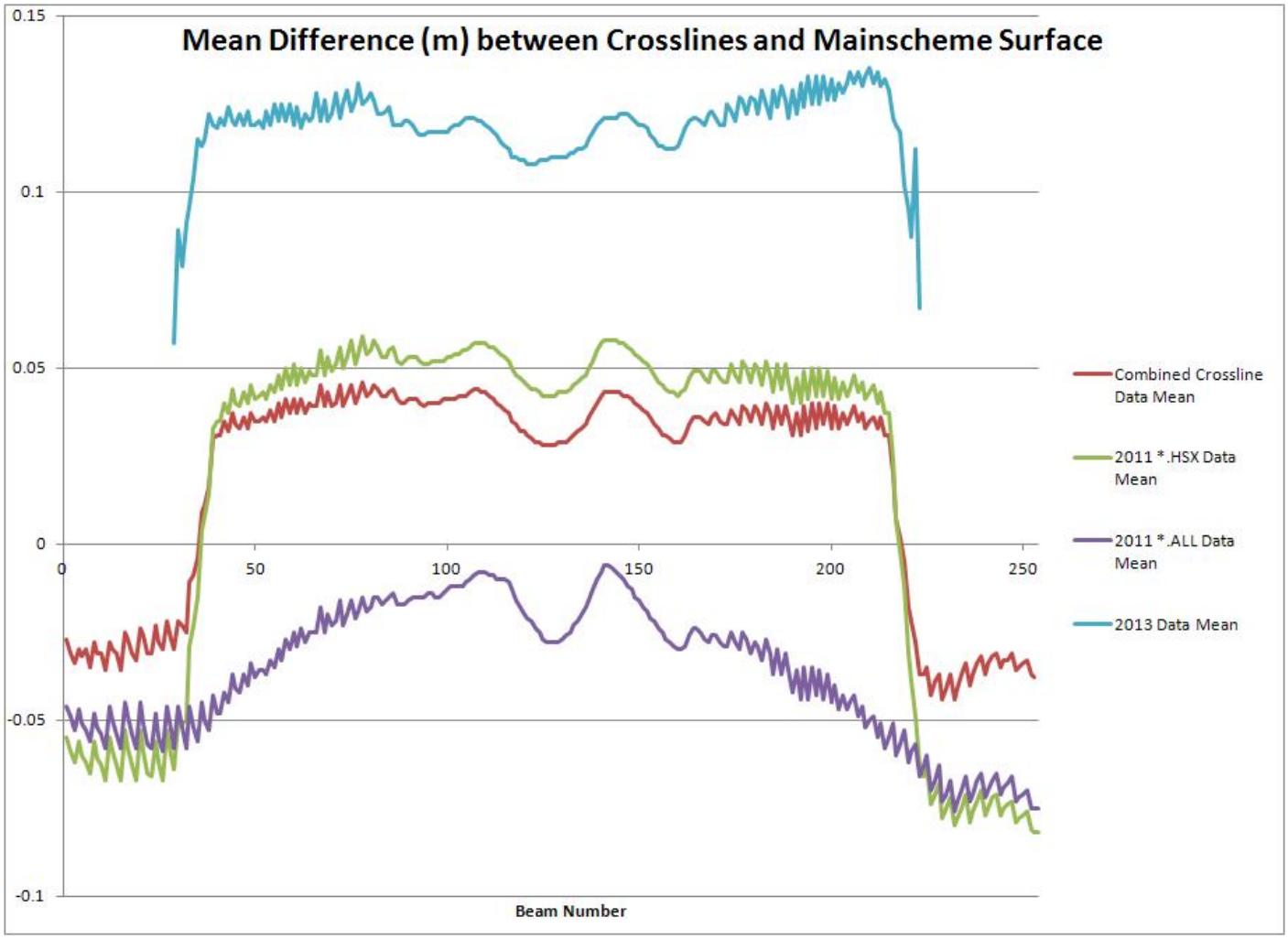


Figure 4: This shows the mean difference of the crossline soundings with the 1m mainscheme surface.

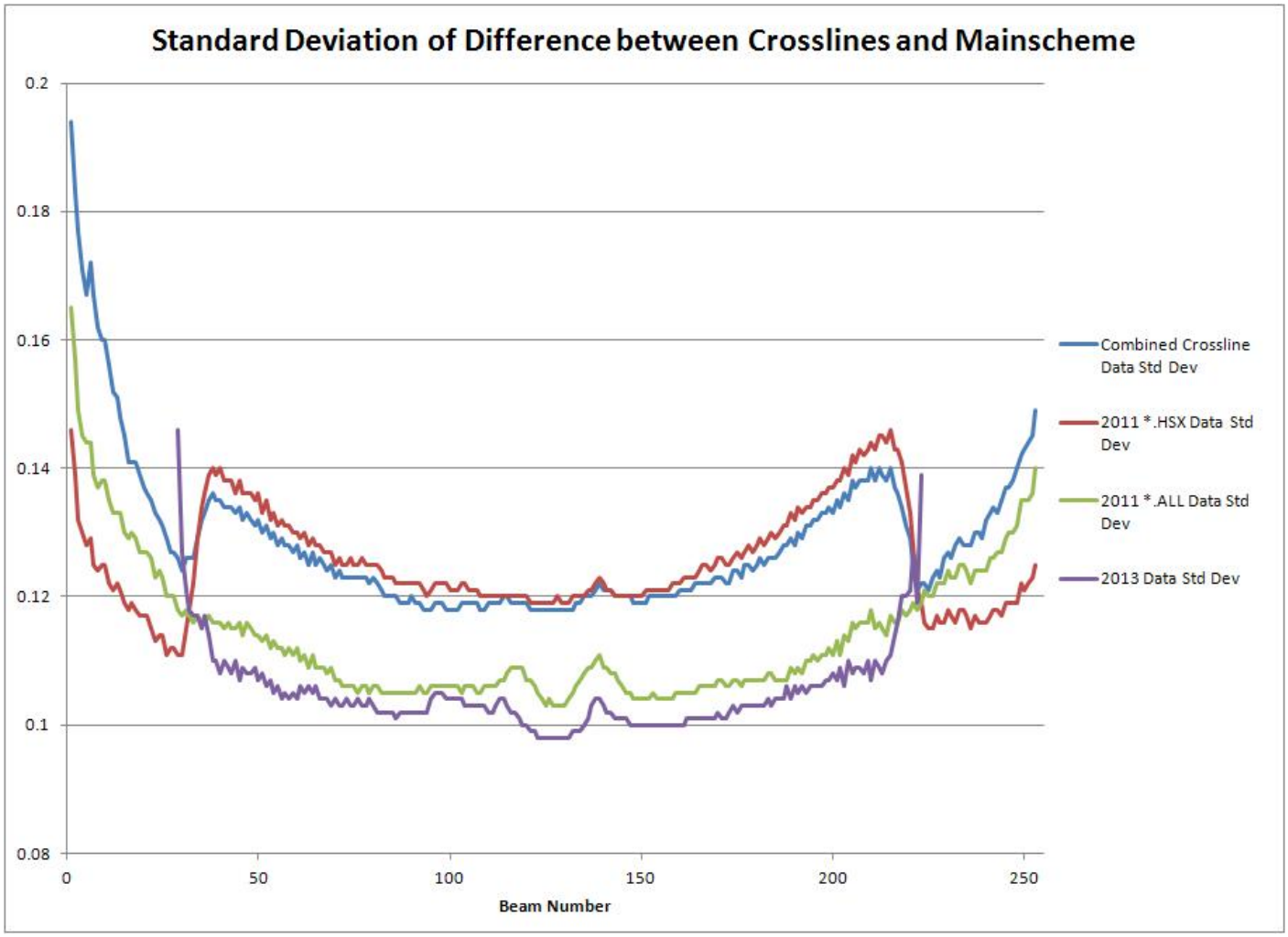


Figure 5: This shows the standard deviation of the difference between crosslines and the mainscheme surface.

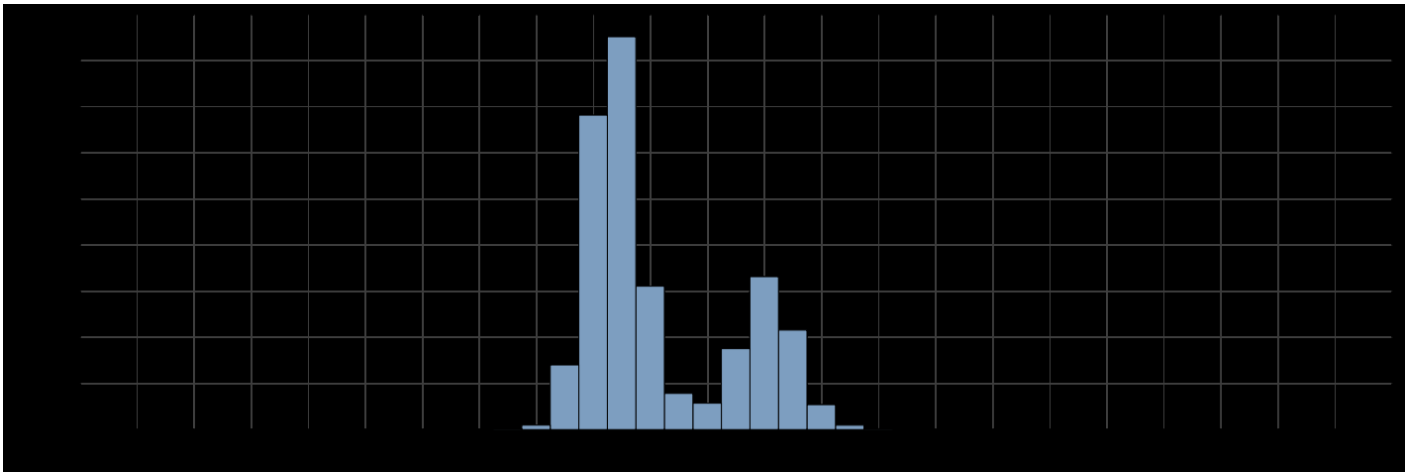


Figure 6: This is a histogram of nodes in the difference surface between the 2013 crosslines surface and the mainscheme surface binned in 0.1 m increments. A text file with additional statistical info can be found at: ...\F00598\Descriptive_Report \Separates\IV Crossline_Comparisons\2013 Post-Sandy Comparison_Diff.txt

Visual inspection of the surfaces shows a few areas where there are large enough differences in cross line and main scheme depths to cause the surface algorithm to jump from one line to another. The large differences on the order of 0.20m to 0.30m occur using cross lines that were acquired in 2013 combined with main scheme data from 2011. The loose sediment and currents of the Hudson River produce a dynamic sea floor that may change year to year as seen in this survey.

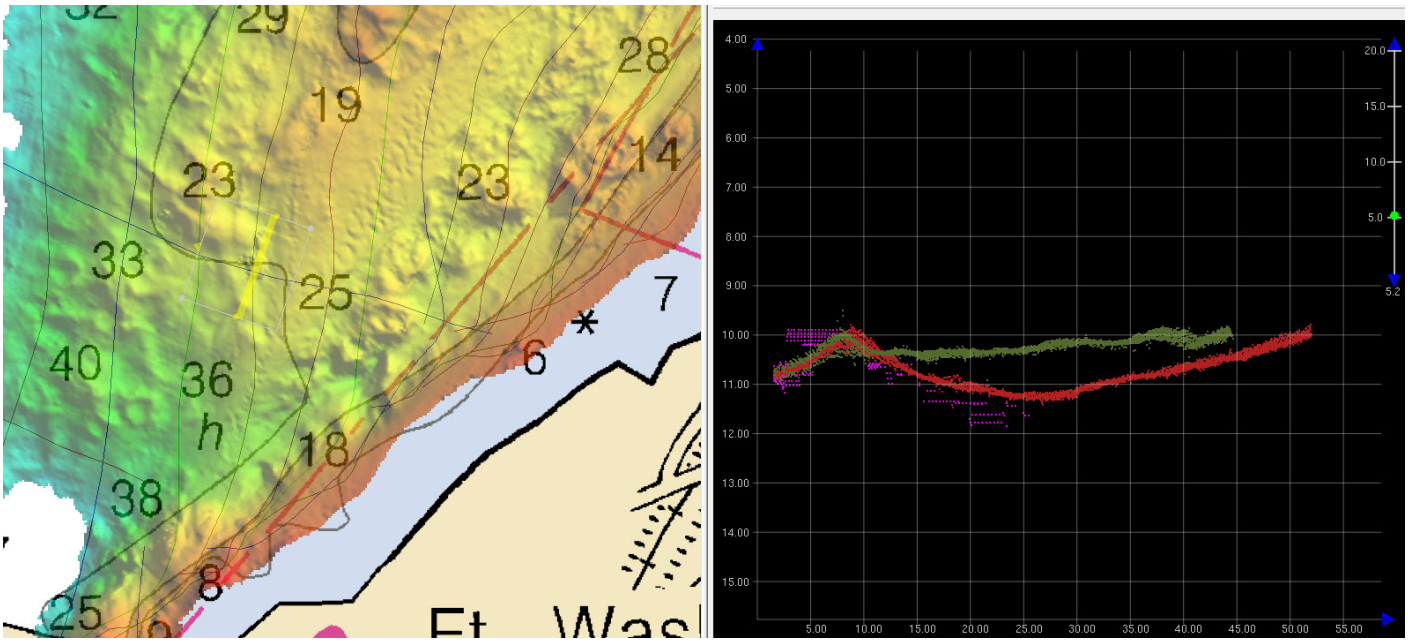


Image showing the 1m finalized surface jump between the 2011 main scheme and 2013 cross line

Crosslines consisting of 5.9% of main scheme acquisition include both crosslines acquired in 2011 as well as post Hurricane Sandy cross lines of 2013. The 3.64% indicates using only crosslines from 2011.

B.2.2 Uncertainty

The following survey specific parameters were used for this survey:

Measured	Zoning
0.01 meters	0.1 meters

Table 6: Survey Specific Tide TPU Values

Hull ID	Measured - CTD	Measured - MVP	Surface
S3002	2 meters/second		0.5 meters/second

Table 7: Survey Specific Sound Speed TPU Values

All nodes in the submitted surfaces meet order 1a specifications.

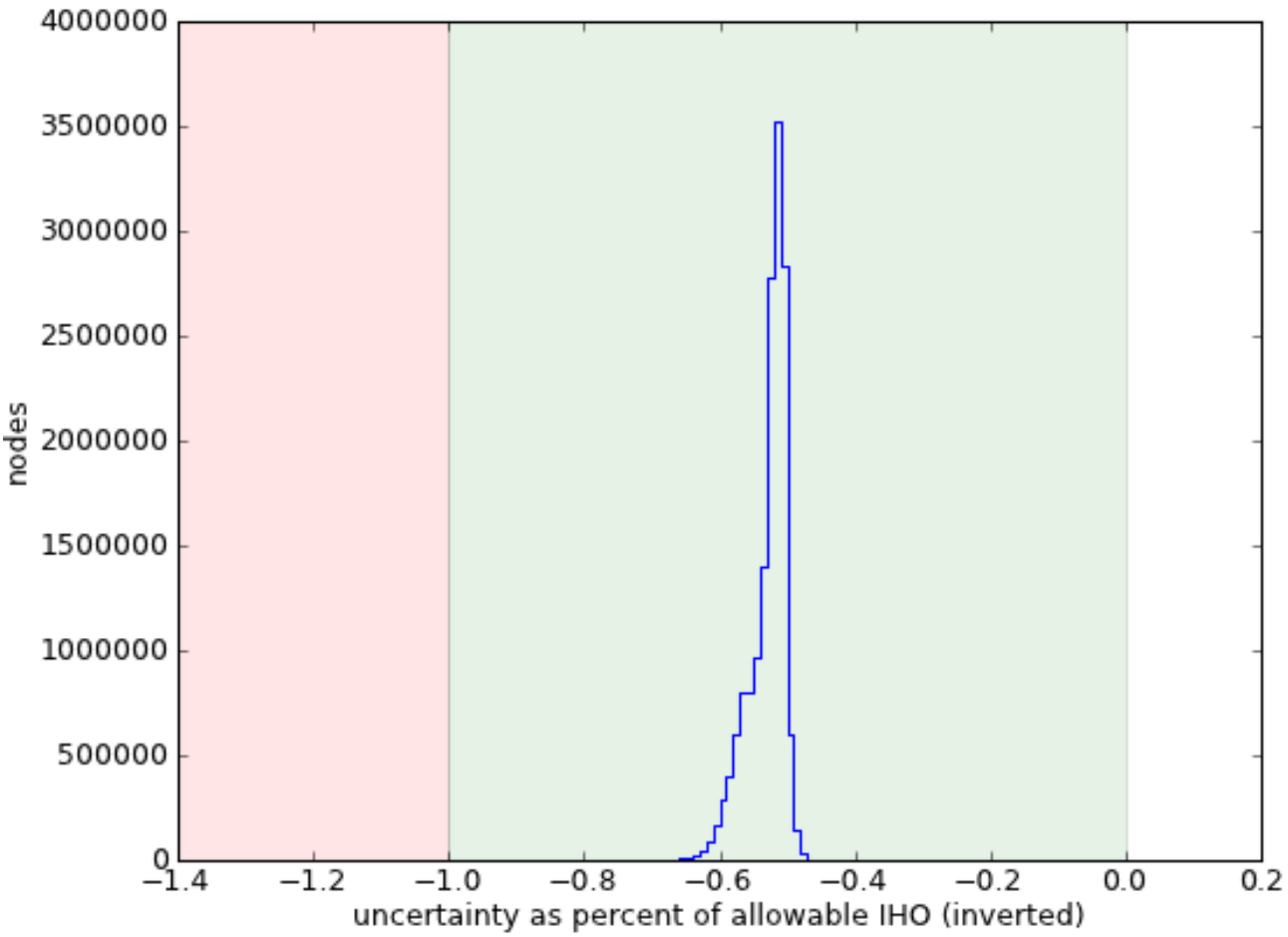


Figure 7: A graph showing the IHO compliance of nodes in the 1m resolution surface.

B.2.3 Junctions

No junctions with contemporary surveys were available.

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: SVP casts were taken, at a minimum, every four hours, or when there was an indication that the sound velocity had changed, e.g. a change in the surface sound speed or smiling/frowning of the data was observed.

B.2.8 Coverage Equipment and Methods

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

Incomplete feature development. A significant feature (also an AWOIS item) seen in SSS imagery just south of Huyler Landing was not further developed with multibeam. Therefore, an updated least depth on the object was not obtained.

B.2.9 Unidentified Features

In the deep portion of the east side of the river are a series of slightly protruding features that NRT5 was unable to identify. They are generally 10 to 20 meters across and less than 0.5 meters protruding from the seafloor. In the cases where the features were deemed navigationally significant, they were designated as obstructions. The features all appear to be roughly circular with some looking like a series of circles joined at the edges.

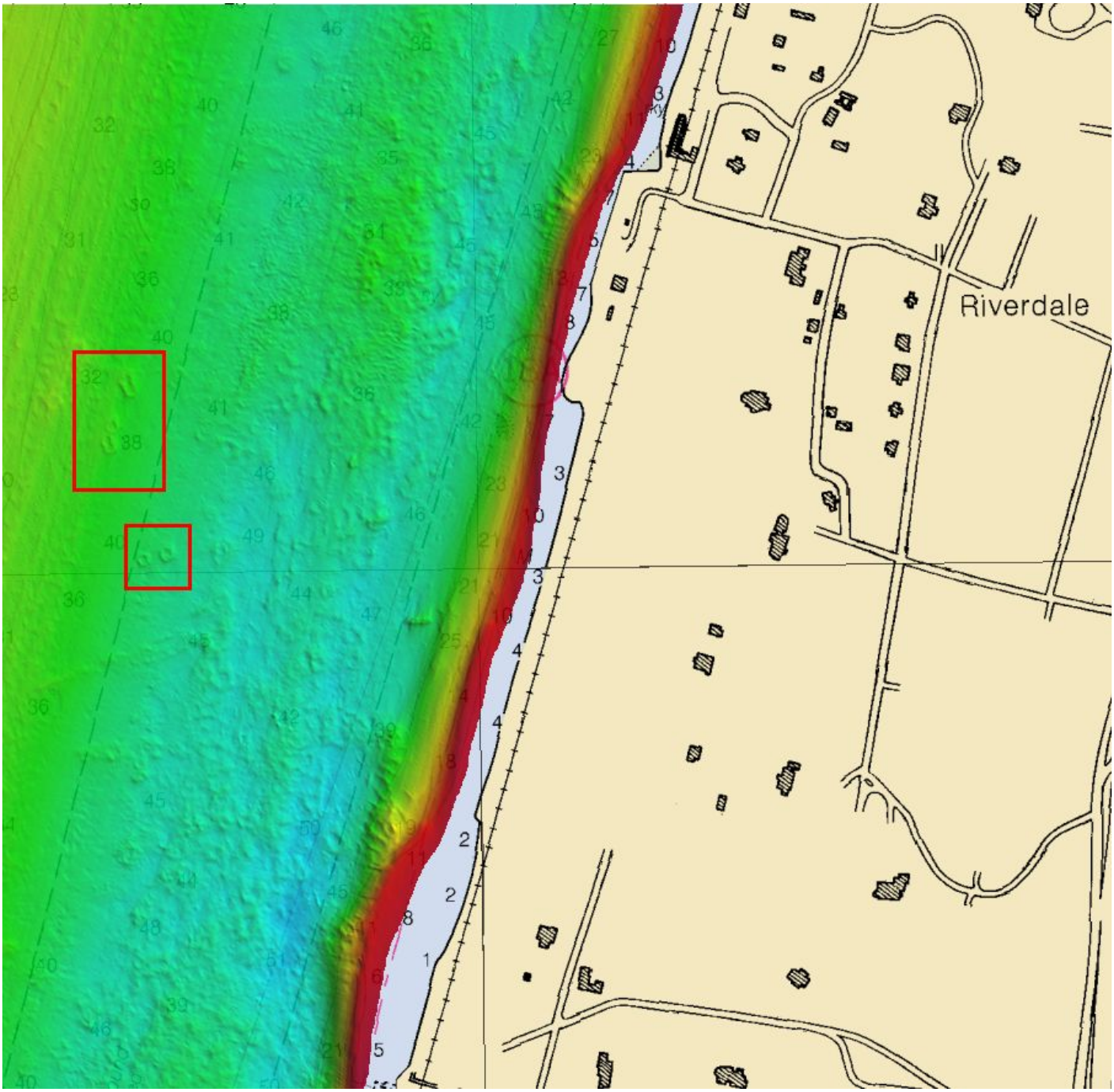


Figure 8: Unidentified circular features west of Riverdale.

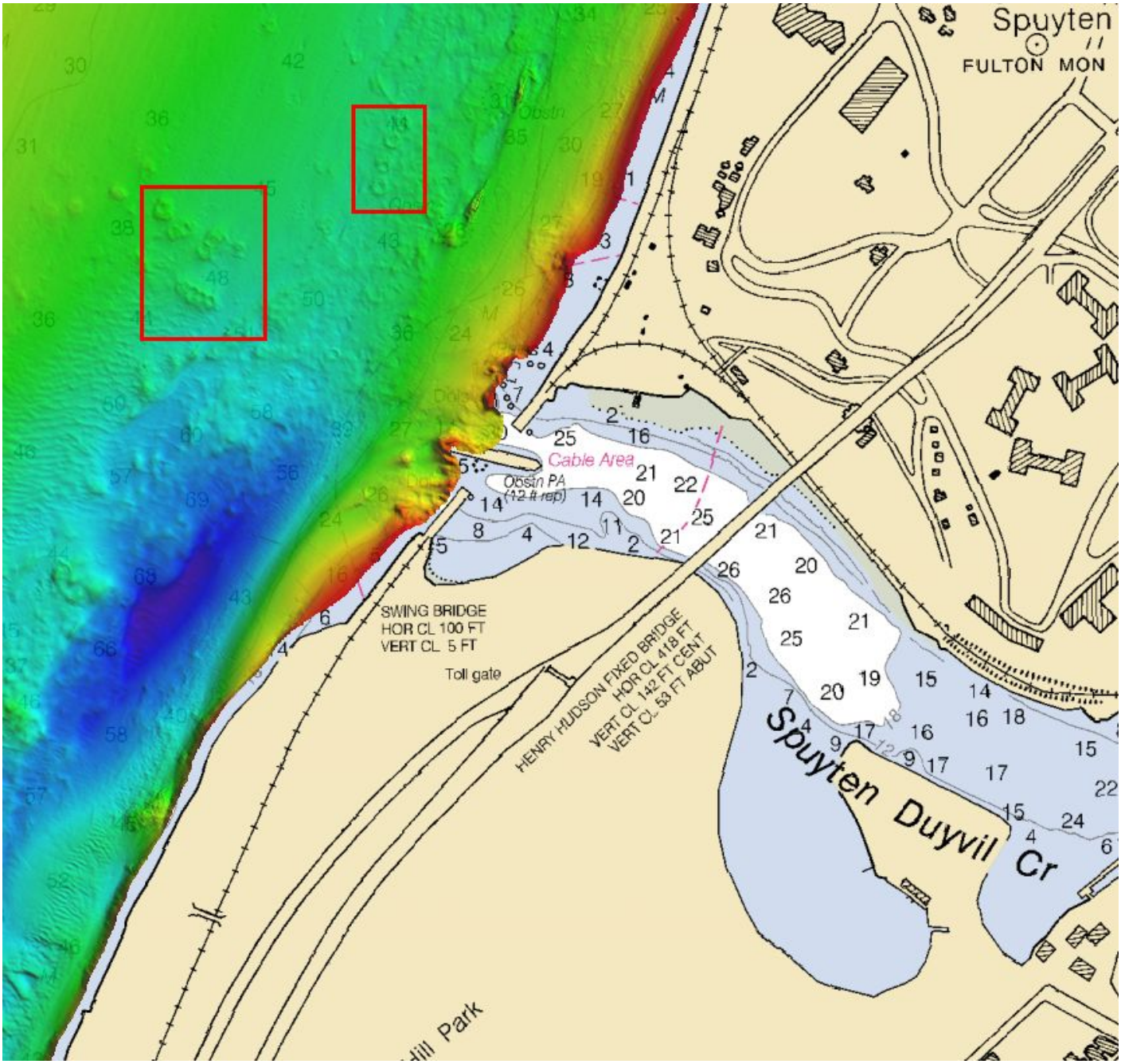


Figure 9: Unidentified circular features west of Spuyten Duyvil.

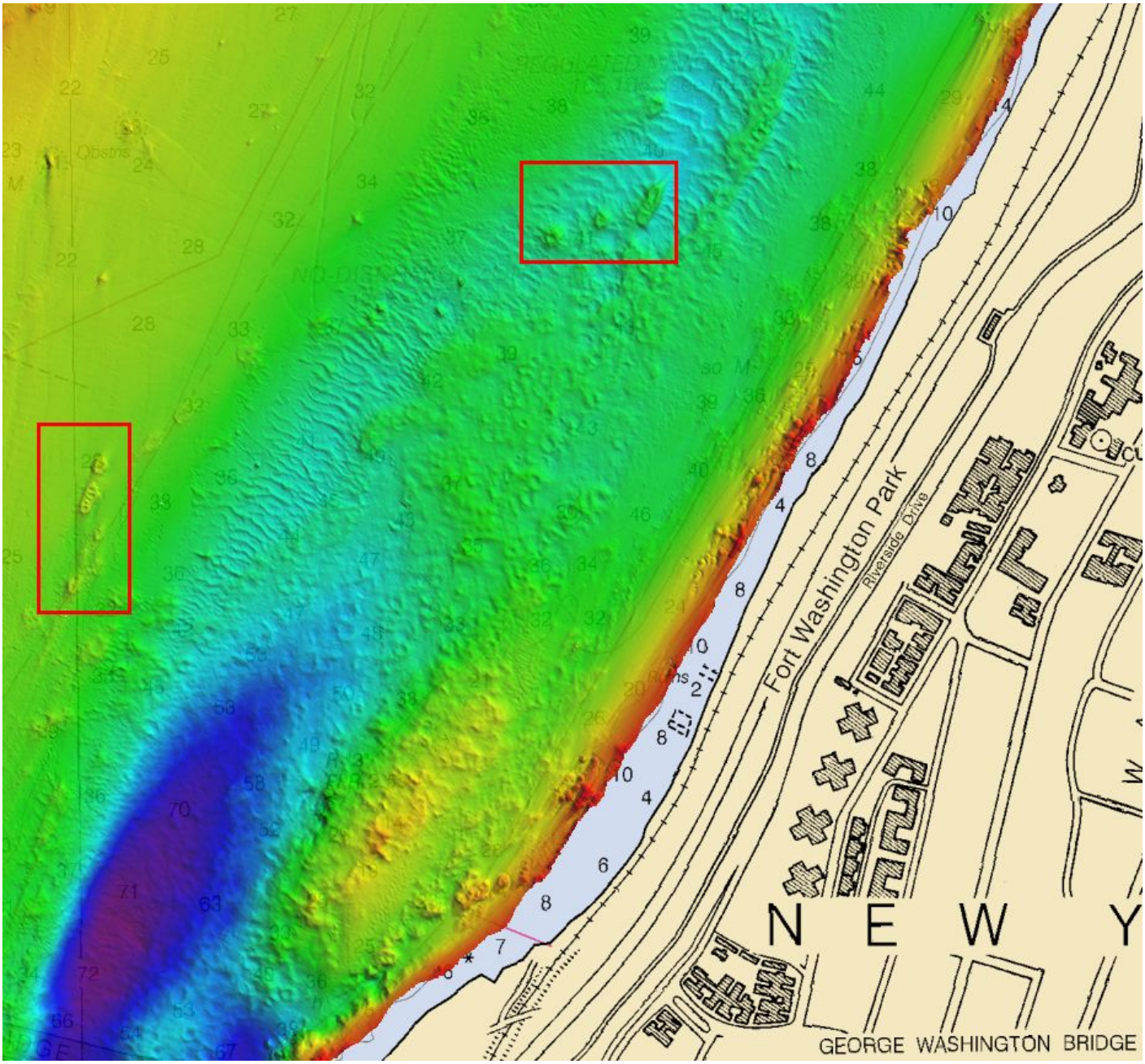


Figure 10: Unidentified circular features west of Fort Washington Park.

B.2.10 Outer Beam Noise in Data

An unusually high amount of outer beam noise is present in the data compared to other projects completed with the same vessel configurations. The noise occurs in areas acquired with both vessel configurations, therefore it is believed that the noise is related to unique conditions found in the area surveyed at the time of survey rather than a systematic error in our vessel configuration. In order to provide surfaces free of fliers NRT5 aggressively cleaned all of the data with a particular focus on the outer beams. Filters were not used as the noise was not found in all areas of the survey.

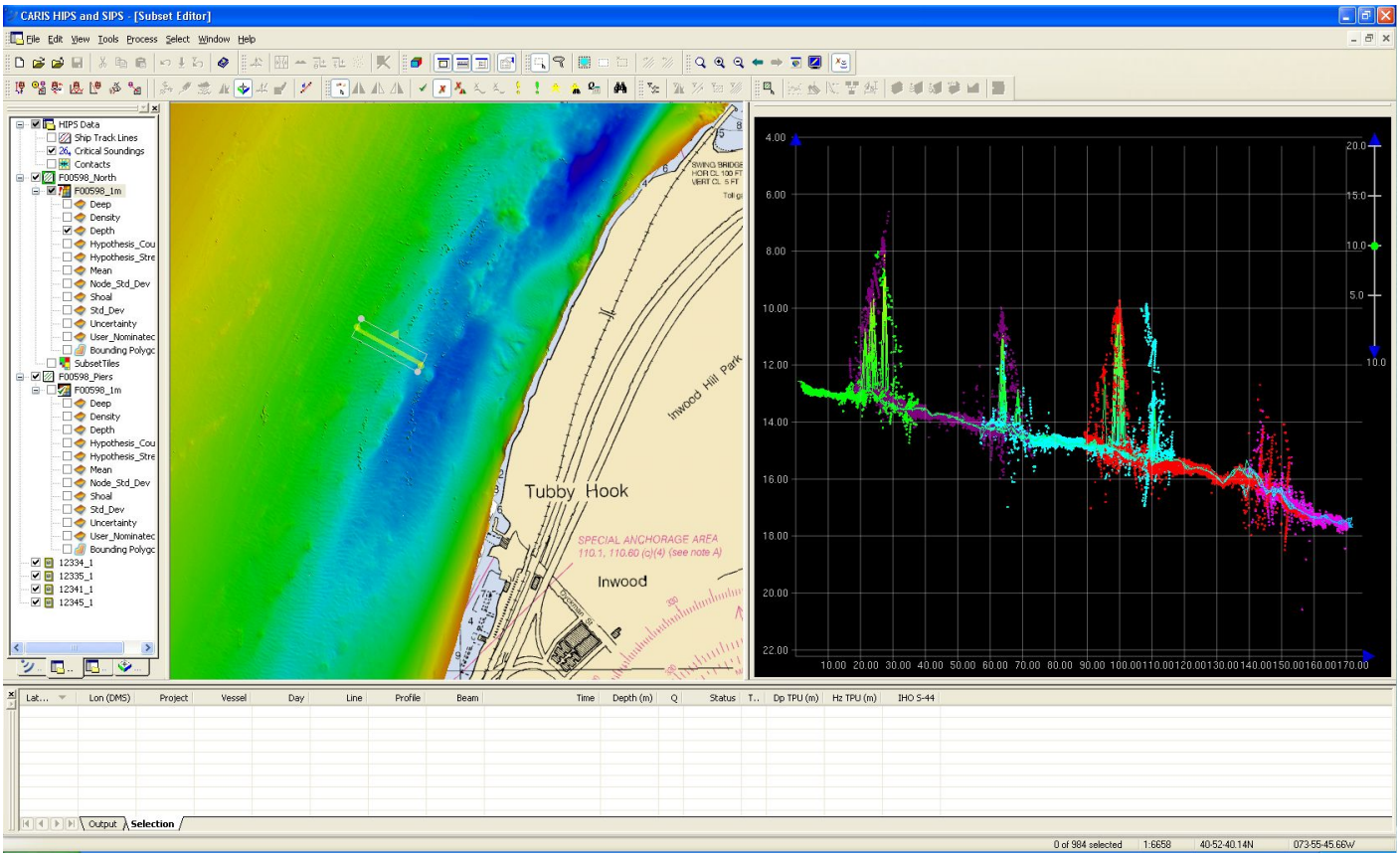


Figure 11: A typical example of high levels of noise in the survey. Most of the noise is concentrated in the outer beams.

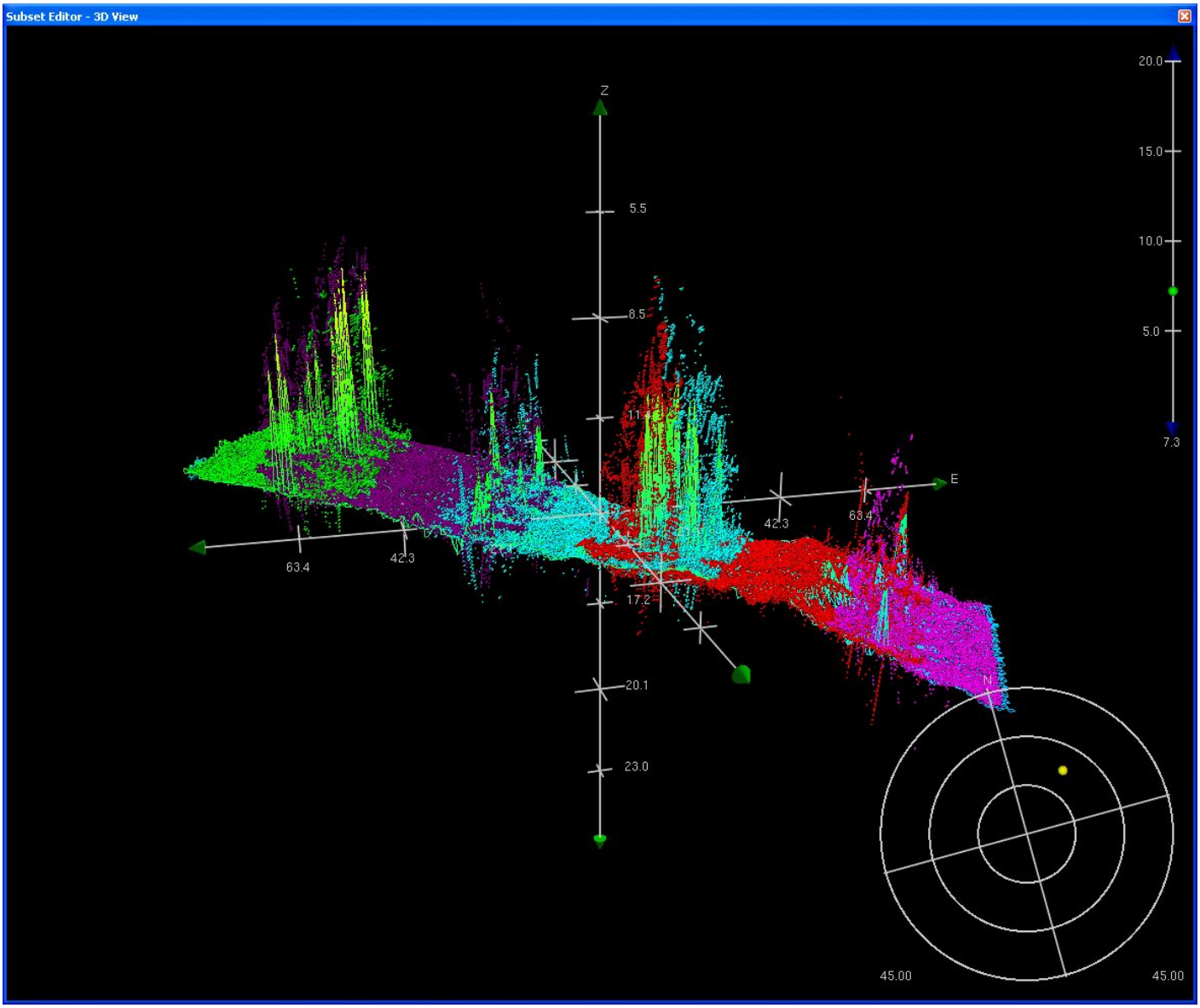


Figure 12: A 3-D view of the same area showing the along track fliers in the outer beams.

B.2.11 Density Holidays

A small number of density holidays occur in the surface. The holidays were created due to the aggressive cleaning needed to address the outer beam noise discussed in the previous section. The hydrographer has inspected the areas and believes that no significant features were missed due to the holidays.

B.2.12 Hurricane Sandy

All of the data acquisition for this survey occurred in 2011. Before submission, a major storm, Hurricane Sandy, passed through the region. As discussed in the crosslines section, NRT5 ran a set of crosslines to assess the effects of Hurricane Sandy north of the George Washington Bridge. While no significant

differences were found in the northern region it is possible that the more southern and exposed areas were affected. Some areas have since been resurveyed as part of project S-B906-NRT5-13.

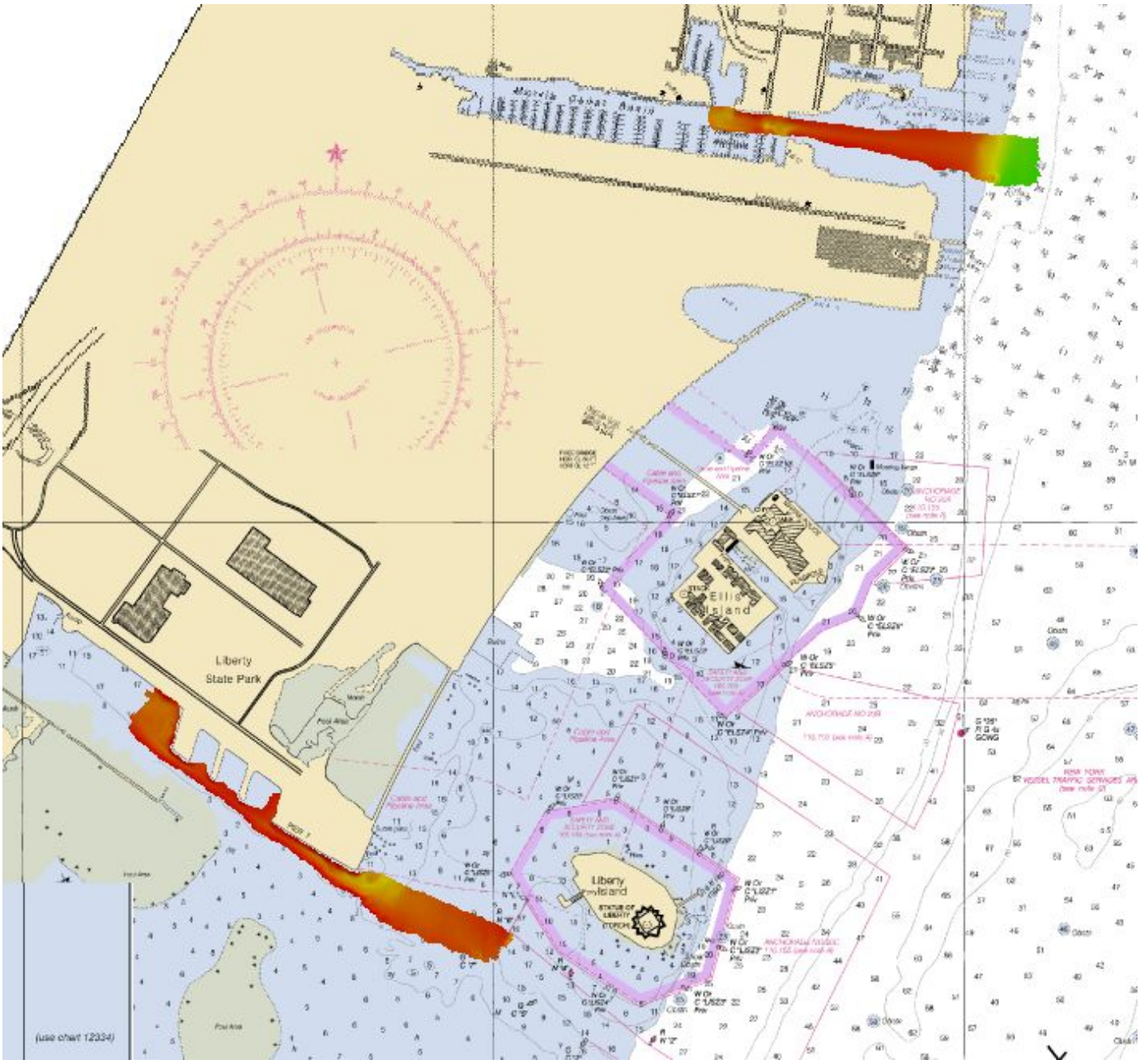


Figure 13: These areas have been resurveyed post-hurricane as part of project S-B906-NRT5-13.

B.2.13 GeoBaR and Mosaic Creation Issues

Seven lines from days 233 and 234 failed to create visually accurate GeoBaRs for use in the mosaic. 6 of the lines are concurrent with 100% multibeam coverage. The 7th line is part of an area covered by multibeam

skunk striping and 100% sidescan. All the lines were examined in side scan editor and found sufficient to identify contacts. A CARIS help desk ticket was not submitted due to the use of version 7.1 of CARIS for processing.

GeoBaRs with visual issues:

DN333:
100_SSS111129135600
100_SSS111129140800
100_SSS111129141900
100_SSS111129143200

DN334:
100_SSS111129143200
100_SSS111130121800
100_SSS111130133500

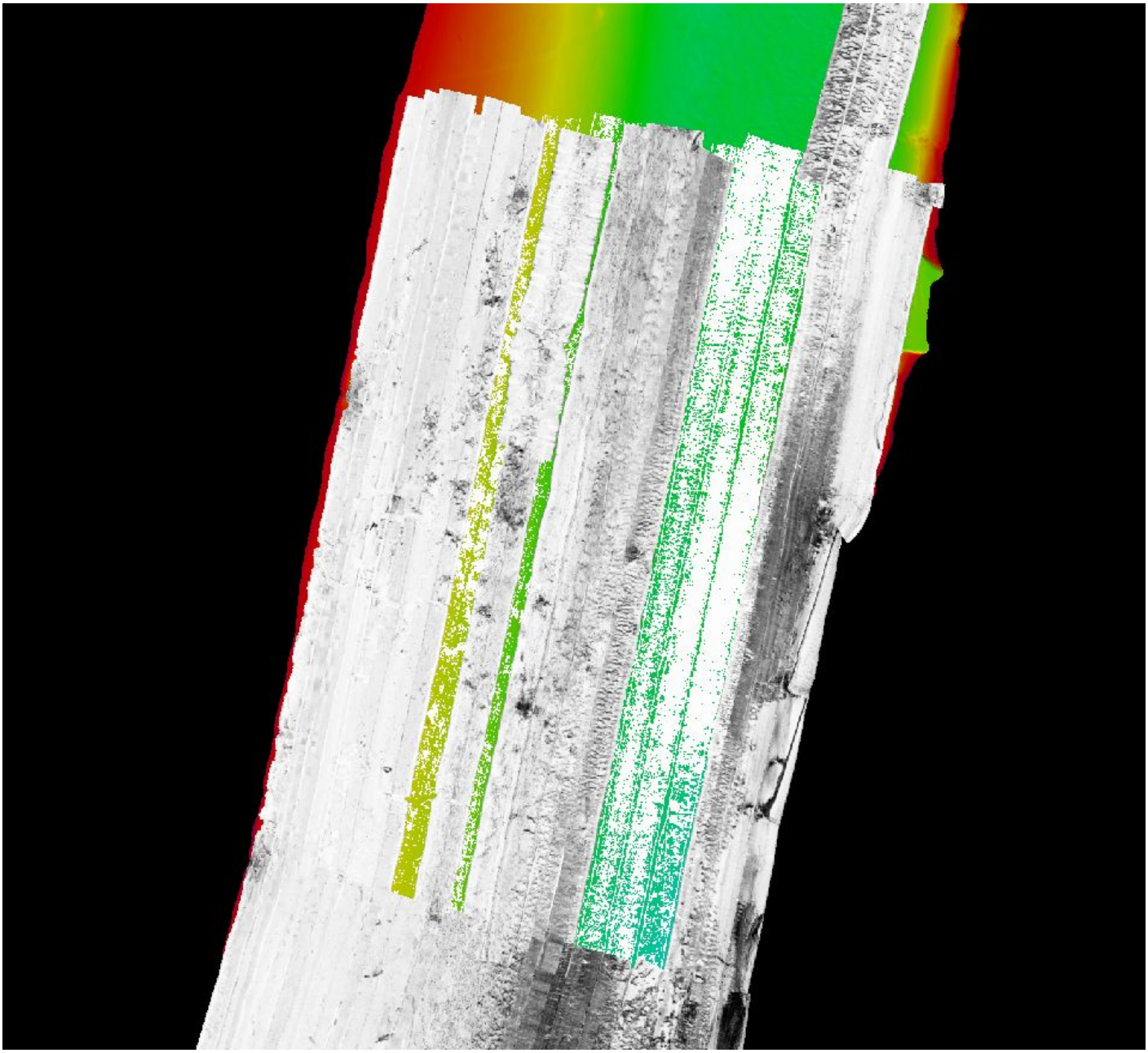


Figure 14: Side scan sonar mosaic showing GeoBaR issues with multibeam surface in the background.

B.3 Echo Sounding Corrections

B.3.1 Corrections to Echo Soundings

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

Only two patch tests are listed in the DAPR. There are entries for roll, pitch and yaw that aren't referenced in the DAPR or DR and it is unknown how these values were obtained. The patch test values that are listed in the DAPR are from DN 242 2010 and DN 172 2012. _NRT5_S3002_EM3002_MBES.hvf

has two entries used in processing the line data (2011-049 and 2011-152) neither of which have pitch, roll, and yaw values listed in the DAPR or DR. NRT5_S3002_EM3002_2013 was only applied to the post Hurricane Sandy Crosslines and contains the pitch, roll, and yaw values described in the DAPR (2012-172 patch test). Roll, pitch, and yaw values of the NRT5_2011_forALLFiles.hvf do not have any reference in the DAPR or DR. In summary, the main scheme acquisition share both the _NRT5_S3002_EM3002_MBES.hvf and NRT5_2011_forALLFiles.hvf. The entries within these two HVFs for roll, pitch, and yaw are not found in the DAPR or DR. The data does not appear to be adversely affected by these findings.

B.3.2 Calibrations

All sounding systems were calibrated as detailed in the DAPR.

B.4 Backscatter

Backscatter was not collected for this survey.

B.5 Data Processing

B.5.1 Software Updates

There were no software configuration changes after the DAPR was submitted.

The following Feature Object Catalog was used: NOAA Profile Version 5.3

There were no software configuration changes after the DAPR was submitted.

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
F00598_North_1m	CUBE	1 meters	-	NOAA_1m	Complete MBES
F00598_North_1m_Final	CUBE	1 meters	0 meters - 20 meters	NOAA_1m	Complete MBES
F00598_North_2m	CUBE	2 meters	-	NOAA_2m	Complete MBES
F00598_North_2m_Final	CUBE	2 meters	18 meters - 40 meters	NOAA_2m	Complete MBES

Surface Name	Surface Type	Resolution	Depth Range	Surface Parameter	Purpose
F00598_Piers_1m	CUBE	1 meters	-	NOAA_1m	Complete MBES
F00598_Piers_1m_Final	CUBE	1 meters	0 meters - 20 meters	NOAA_1m	Complete MBES
F00598_North_2m_Combined	CUBE	2 meters	-	NOAA_2m	Complete MBES
F00598_Mosaic_1m	SSS Mosaic	1 meters	-	N/A	200% SSS

Table 8: Submitted Surfaces

F00598_Mosaic_1m was created by the field with the intent to show the 200% SSS coverage. The HSSD (2011) Section 8.4.3 requires that two 1m mosaics are submitted, each showing 100% coverage. The surface that was submitted by the field did not satisfy this requirement, however, two 100% coverage 1m mosaics were created at the processing branch. These mosaics are named F00598_1m_Mosaic_Office_1of2 and F00598_1m_Mosaic_Office_2of2.The naming convention of surfaces do not match that of the HSSD (2011) Section 8.4.2. The resolution is correct and surfaces are finalized.No 0.5m grid was submitted for object detection as required by the Project Instructions. A 0.5m surface was created and finalized from -3m to 14m at the branch. The data did not have the density required to support a 0.5m surface deeper than 14m.

C. Vertical and Horizontal Control

Additional information discussing the vertical or horizontal control for this survey can be found in the accompanying HVCR.

C.1 Vertical Control

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

Standard Vertical Control Methods Used:

Discrete Zoning

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

Station Name	Station ID
The Battery, NY	851-8750

Table 9: NWLON Tide Stations

File Name	Status
8518750.tid	Final Approved

Table 10: Water Level Files (.tid)

File Name	Status
F00598CORF.zdf	Final

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

A request for final approved tides was sent to N/OPS1 on 04/27/2012. The final tide note was received on 05/18/2012.

Preliminary zoning was accepted as final zoning for this survey.

2011 and 2012 Tide Notes are appended to this document.

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 Zone 18N.

The following DGPS Stations were used for horizontal control:

DGPS Stations
Sandy Hook, NJ, Station ID: 8, Frequency 286 kHz

Table 12: USCG DGPS Stations

D. Results and Recommendations

D.1 Chart Comparison

The chart comparison was completed by comparing the largest scale raster charts to the digital surfaces and survey scale soundings generated by the survey data.

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
12333	1:15000	37	12/2012	NaN/NaN/NaN	02/23/2013
12334	1:10000	71	06/2011	NaN/NaN/NaN	05/19/2012
12335	1:10000	45	03/2012	NaN/NaN/NaN	05/19/2012
12341	1:10000	28	05/2011	NaN/NaN/NaN	04/28/2012
12342	1:10000	24	05/2013	NaN/NaN/NaN	06/29/2013
12345	1:10000	11	12/2010	NaN/NaN/NaN	12/29/2012
12346	1:10000	11	09/2004	NaN/NaN/NaN	02/23/2013

Table 13: Largest Scale Raster Charts

12333

Generally, F00598 found the area to be deeper than charted.

12334

Generally, F00598 found the area to be deeper than charted.

12335

F00598 deviates by 2-3 feet in some areas. The differences are well represented by the base surfaces. Some charted features are not charted on the concurrent ENC.

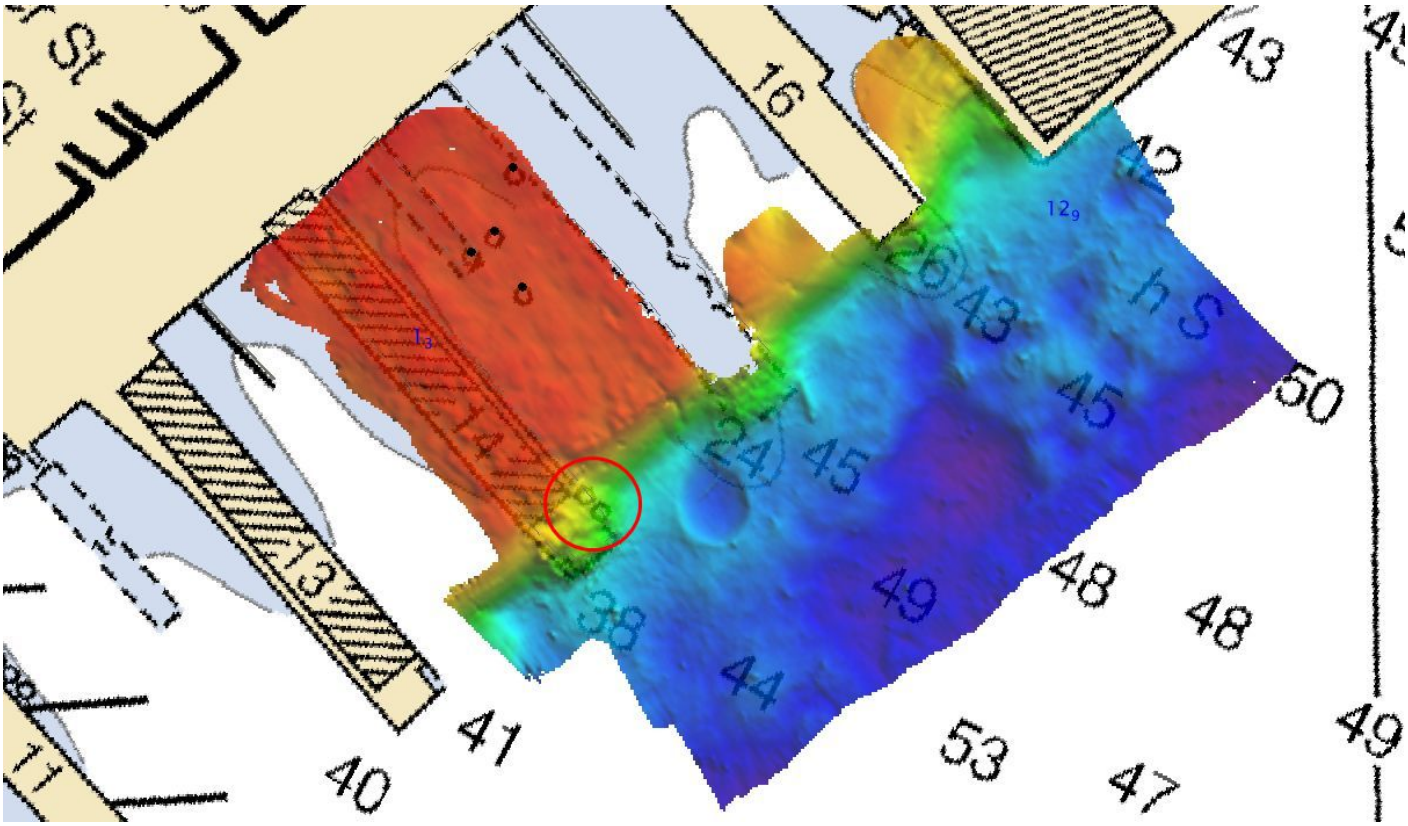


Figure 15: There are two piles charted at the end of pier 14 that should be removed from the chart. They do not exist in the multibeam or on the ENC.

12341

Generally, F00598 found the area to be deeper than charted with a few exceptions not significant to navigation.

12342

Generally, F00598 found the area to be deeper than charted. For additional chart comparison information see notes on chart 12345.

Chart 12342 survey coverage is duplicated on chart 12345.

12345

Generally, F00598 found the area to be deeper than charted in the southern portions with the discrepancies decreasing farther to the north. The area around Spuyten Duyvil contained many discrepancies between existing chart 12345 and 12342 and between F00598 and existing charts. The area of greatest navigational concern is around the swing bridge where there is 100 ft of horizontal clearance and horizontal discrepancies of up to 50 ft. In the northern channel chart 12342 shows the 18 ft contour extending much farther into the channel than chart 12345. Additionally, there is a charted ruin outside of the main channel that was partially disproved by F00598. In the southern channel, chart 12342 shows a pile in the navigable channel, but chart 12345 shows the pile just outside of the channel. The ENC, US5NY1FM, shows better agreement with chart 12342 than chart 12345. The field unit recommends additional survey and shoreline work in and around the Spuyten Duyvil where the discrepancies exist.

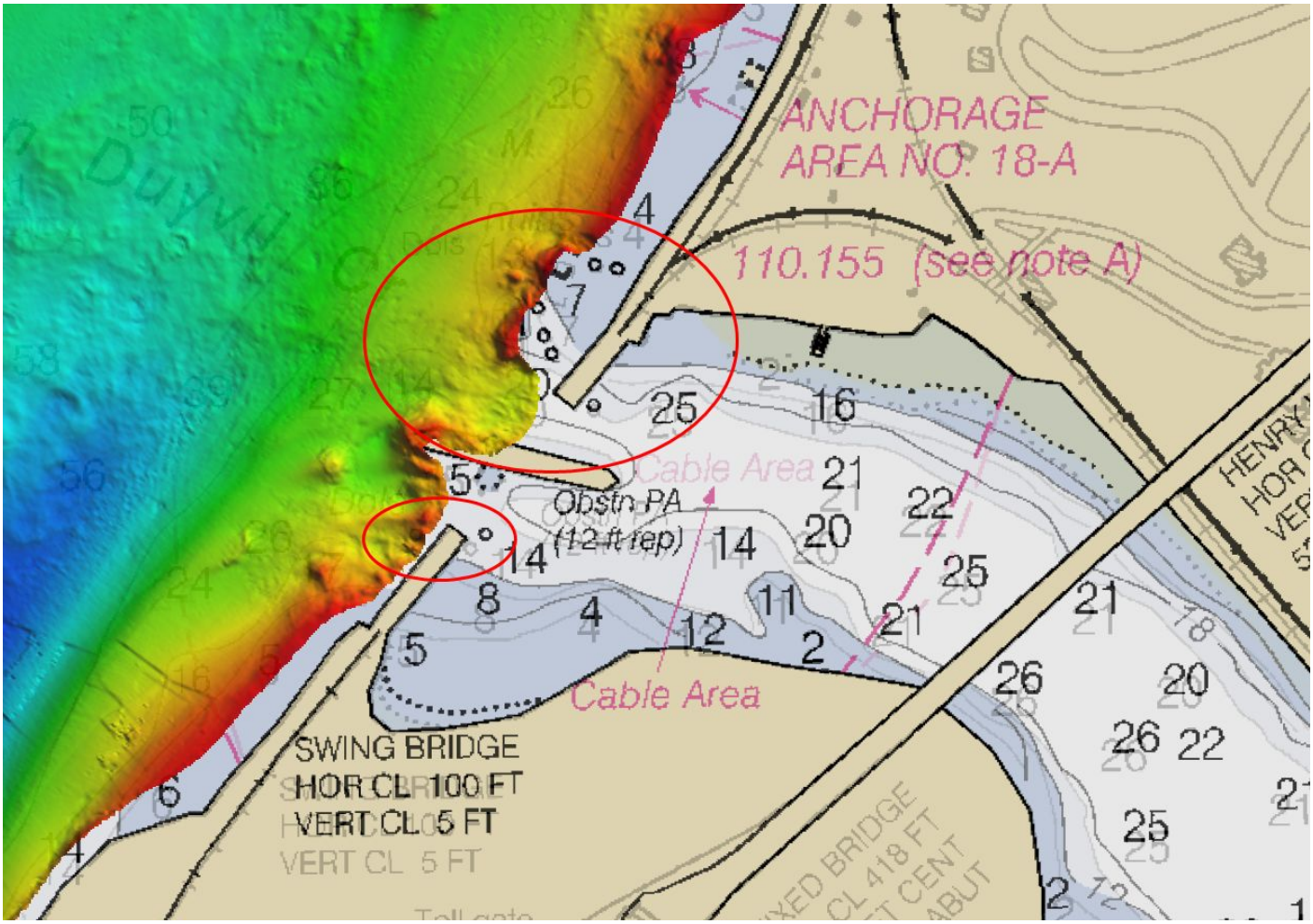


Figure 16: Layers included (top down): F00598 1m surface, Chart 12342, Chart12345. Areas of greatest concern are circled in red.

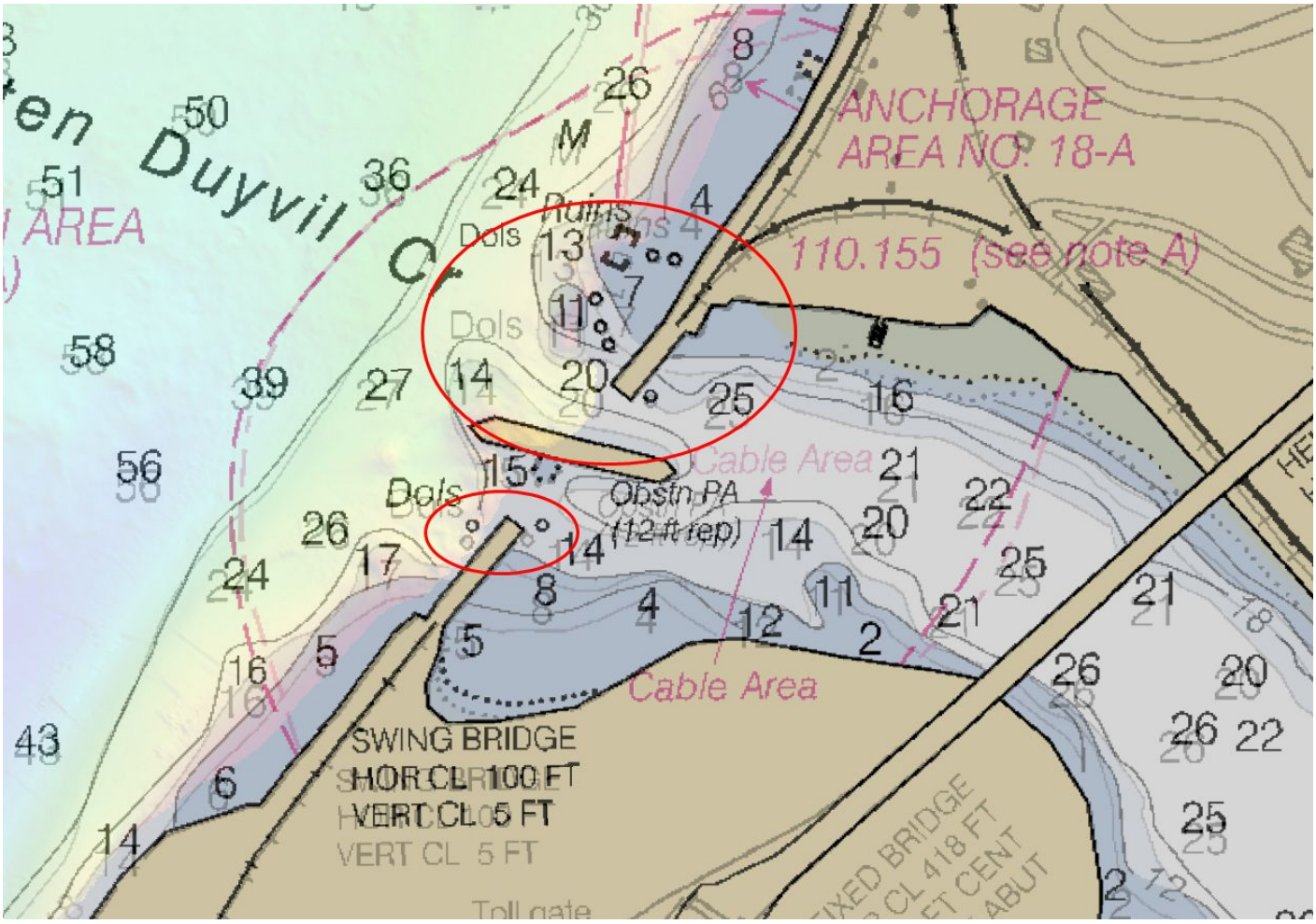


Figure 17: Layers included (top down): Chart 12342, Chart12345, F00598 1m surface. The image more clearly shows the discrepancies. Only the land features show strong agreement.

12346

Generally, F00598 found the area to be deeper than charted.

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?
US5NY1CM	1:10000	34	01/08/2013	01/08/2013	NO
US5NY1DM	1:10000	24	12/20/2012	12/20/2012	NO
US5NY1EM	1:10000	13	08/10/2012	08/10/2012	NO
US5NY1FM	1:10000	13	05/23/2012	05/23/2012	NO
US5NY1HM	1:10000	12	05/10/2012	05/10/2012	NO
US5NY42M	1:10000	8	05/15/2012	05/15/2012	NO

Table 14: Largest Scale ENCs

US5NY1CM

Generally, F00598 found the area to be slightly shoaler than charted, particularly next to the pier.

US5NY1DM

Generally, F00598 found the area to be as charted with minor variations well represented by the surfaces.

US5NY1EM

Generally, F00598 found the area to be deeper than charted by up to 4 meters.

US5NY1FM

Generally, F00598 found the area to be deeper than charted. For additional chart comparison information see notes on chart 12345.

US5NY1HM

Generally, F00598 found the area to be deeper than charted.

US5NY42M

Generally, F00598 found the area to be deeper than charted.

No survey coverage falls on this ENC, but survey coverage does fall on the equivalent RNC, chart 12346.

D.1.3 AWOIS Items

All 18 assigned AWOIS items were addressed by survey F00598. 5 AWOIS items were found to be significantly mischarted necessitating the features being marked as new, 9 were well charted but received updates to their attribution, 3 were disproved by 100% multibeam coverage, and 1 is recommended to remain as charted. Additional details can be found in the Final Feature File.

AWOIS item 14856 was verified with 200% SSS, however, the feature was not fully developed with MBES. A least depth was not obtained by the field for this feature and will be retained as charted. This feature was also not included in the SSS contact list.

D.1.4 Maritime Boundary Points

No Maritime Boundary Points were assigned for this survey.

D.1.5 Charted Features

Charted features are addressed in the Final Feature File.

D.1.6 Uncharted Features

58 uncharted features were found and recommended for charting. Details can be found in the Final Feature File.

After further analysis by the branch, a total of 63 new features were found and recommended for charting. The new features can be found in the Final Feature File created by the branch.

D.1.7 Dangers to Navigation

The following DTON reports were submitted to the processing branch:

DTON Report Name	Date Submitted
F00598_DTON_Report	2011-03-30

Table 15: DTON Reports

Danger to Navigation Reports are included in Appendix I of this report.

D.1.8 Shoal and Hazardous Features

No shoals or potentially hazardous features exist for this survey.

D.1.9 Channels

No channels exist for this survey. There are no designated anchorages, precautionary areas, safety fairways, traffic separation schemes, pilot boarding areas, or channel and range lines within the survey limits.

D.1.10 Bottom Samples

6 bottom samples were acquired in accordance with the project instructions or HSSD. Details can be found in the Final Feature File.

D.2 Additional Results

D.2.1 Shoreline

Shoreline was assigned in the Hydrographic Survey Project Instructions or Statement of Work, but not all areas were investigated. Only areas concurrent with multibeam data acquisition were investigated, and all results and recommendations can be found in the Final Feature File.

D.2.2 Prior Surveys

No prior survey comparisons exist for this survey.

D.2.3 Aids to Navigation

All ATONS in the survey area were found to be serving their intended purpose.

D.2.4 Overhead Features

Overhead features exist for this survey, but were not investigated.

D.2.5 Submarine Features

Several pipes were noted in the MBES data and addressed in the Final Feature File.

D.2.6 Ferry Routes and Terminals

Ferry routes and/or terminals exist for this survey, but were not investigated.

D.2.7 Platforms

No platforms exist for this survey.

D.2.8 Significant Features

No significant features exist for this survey.

A significant feature (also an AWOIS item) seen in SSS imagery just south of Huyler Landing was not further developed with multibeam. Therefore, a least depth on the object is unknown. The object has partial multibeam and is about 1m in height in water with a depth of 6m.
Cross lines collected in 2013 superimposed over the 2011 main scheme data show that the sea floor of the Hudson River is dynamic and prone to sediment shifts and deposits. There are also artifacts in the shape of circles and other elliptical shapes scattered through out the survey from what appears to be dredging operations. These features along with the dynamic sediment shifting (where coincidently 2013 cross lines can be found) have been examined and do not pose a threat to navigation.

D.2.9 Construction and Dredging

No present or planned construction or dredging exist within the survey limits.

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, Standing and 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
Matthew Andring	Hydrographic Survey Technician	01/02/2014	ANDRING.MATTHEW.ALAN.1381350858 2014.01.09 15:11:42 -05'00'
Steven Loy, LTJG	Chief of Party	01/02/2014	Digitally signed by STEVEN TENHET LOY DN: c=US, o=TSA, ou=TWIC, cn=STEVEN TENHET LOY Date: 2014.01.09 14:43:34 -05'00'

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 : April 13, 2011

HYDROGRAPHIC BRANCH: Atlantic
HYDROGRAPHIC PROJECT: S-B925-NRT5-11
HYDROGRAPHIC SHEET: F00598

LOCALITY: Yonkers to GW Bridge, New York Harbor
TIME PERIOD: March 09 - March 17, 2011

TIDE STATION USED: 851-8750 The Battery, NY
Lat. 40° 42.0'N Long. 74° 00.9' W
PLANE OF REFERENCE (MEAN LOWER LOW WATER): 0.000 meters
HEIGHT OF HIGH WATER ABOVE PLANE OF REFERENCE: 1.443 meters

REMARKS: RECOMMENDED ZONING

Preliminary zoning is accepted as the final zoning for project S-B925-NRT5-11, F00598, during the time period between March 09 to March 17, 2011.

Please use the zoning file "B925NRT52011CORP" submitted with the project instructions for S-B925-NRT5-11. Zones HR3 and HR4 are the applicable zones for F00598.

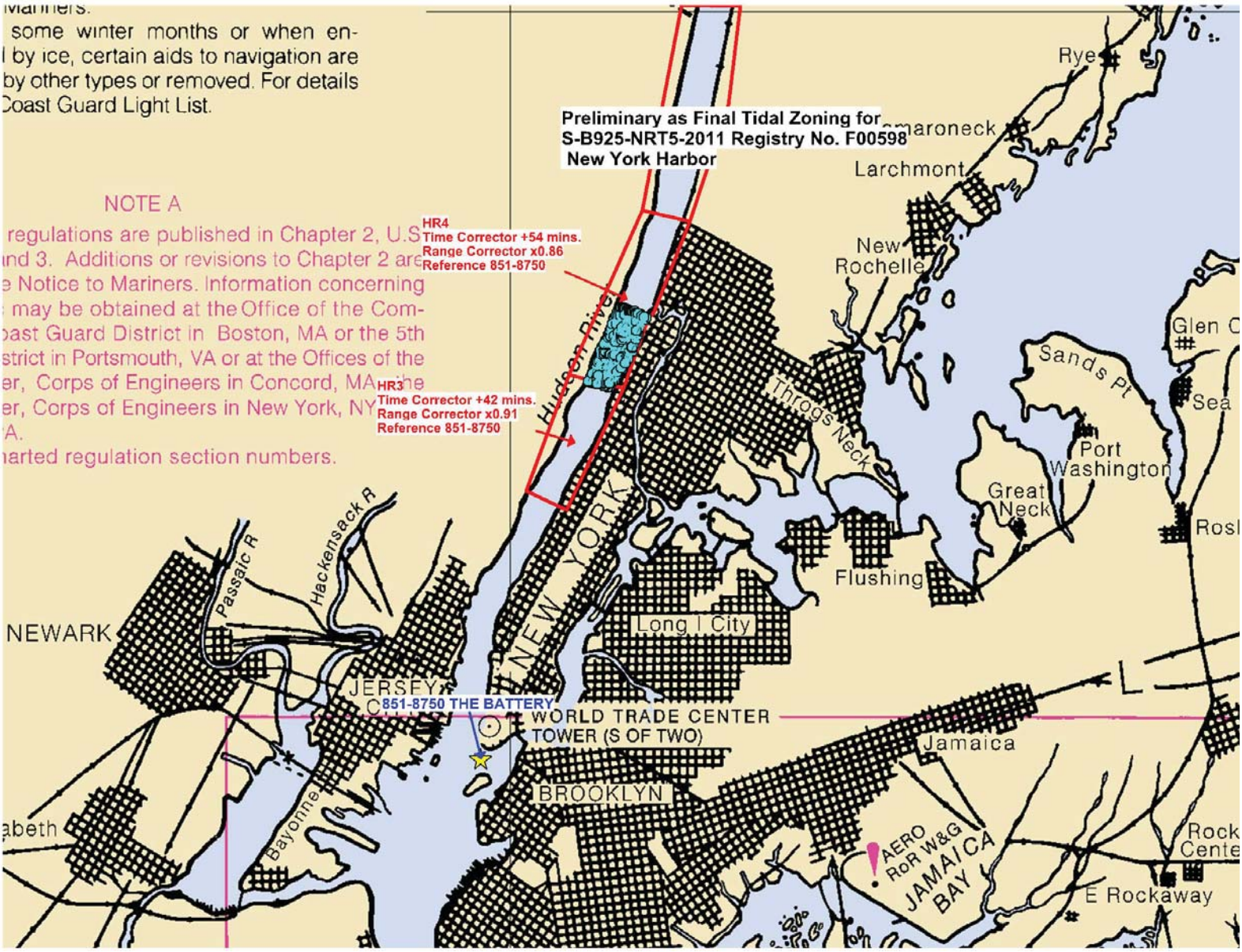
Refer to attachments for zoning information.

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

Peter J. Stone

Digitally signed by Peter J. Stone
DN: cn=Peter J. Stone, o=NOAA/NOS/CO-OPS, ou=Oceanographic Division, email=peter.stone@noaa.gov, c=US
Date: 2011.04.15 06:50:02 -04'00'

CHIEF, OCEANOGRAPHIC DIVISION


Mariners.
some winter months or when en-
by ice, certain aids to navigation are
by other types or removed. For details
Coast Guard Light List.
NOTE A
regulations are published in Chapter 2, U.S
and 3. Additions or revisions to Chapter 2 are
e Notice to Mariners. Information concerning
may be obtained at the Office of the Com-
oast Guard District in Boston, MA or the 5th
strict in Portsmouth, VA or at the Offices of the
er, Corps of Engineers in Concord, MA the
er, Corps of Engineers in New York, NY
A.
harted regulation section numbers.
Preliminary as Final Tidal Zoning for
S-B925-NRT5-2011 Registry No. F00598
New York Harbor
HR4
Time Corrector +54 mins.
Range Corrector x0.86
Reference 851-8750
HR3
Time Corrector +42 mins.
Range Corrector x0.91
Reference 851-8750
Rye
Mamaroneck
Larchmont
New Rochelle
Glen C
Sands Pt
Sea
Port Washington
Great Neck
Rosl
Throgs Neck
Hudson Riv
NEW YORK
Flushing
Long I City
Passaic R
Hackensack R
NEWARK
JERSEY C
851-8750 THE BATTERY
WORLD TRADE CENTER
TOWER (S OF TWO)
BROOKLYN
Jamaica
Bayonne
abeth
AERO
RoR W&G
JAMAICA
BAY
Rock
Cente
E Rockaway

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

TIDE NOTE FOR HYDROGRAPHIC SURVEY

DATE : May 18, 2012

HYDROGRAPHIC BRANCH: Pacific
HYDROGRAPHIC PROJECT: S-B925-NRT5-2012
HYDROGRAPHIC SHEET: F00598

LOCALITY: Yonkers to George Washington Bridge, New York Harbor, NY
TIME PERIOD: March 9 - December 13, 2011

TIDE STATION USED: 851-8750 The Battery, NY
Lat. 40° 42.0'N Long. 74° 0.9' W

PLANE OF REFERENCE (MEAN LOWER LOW WATER): 0.000 meters
HEIGHT OF HIGH WATER ABOVE PLANE OF REFERENCE: 1.443 meters

REMARKS: RECOMMENDED ZONING
Use zone(s) identified as: HR1, HR2, HR3, HR4, HR5, NY18, NY19, NY21, NY21A, NY22 & NY23

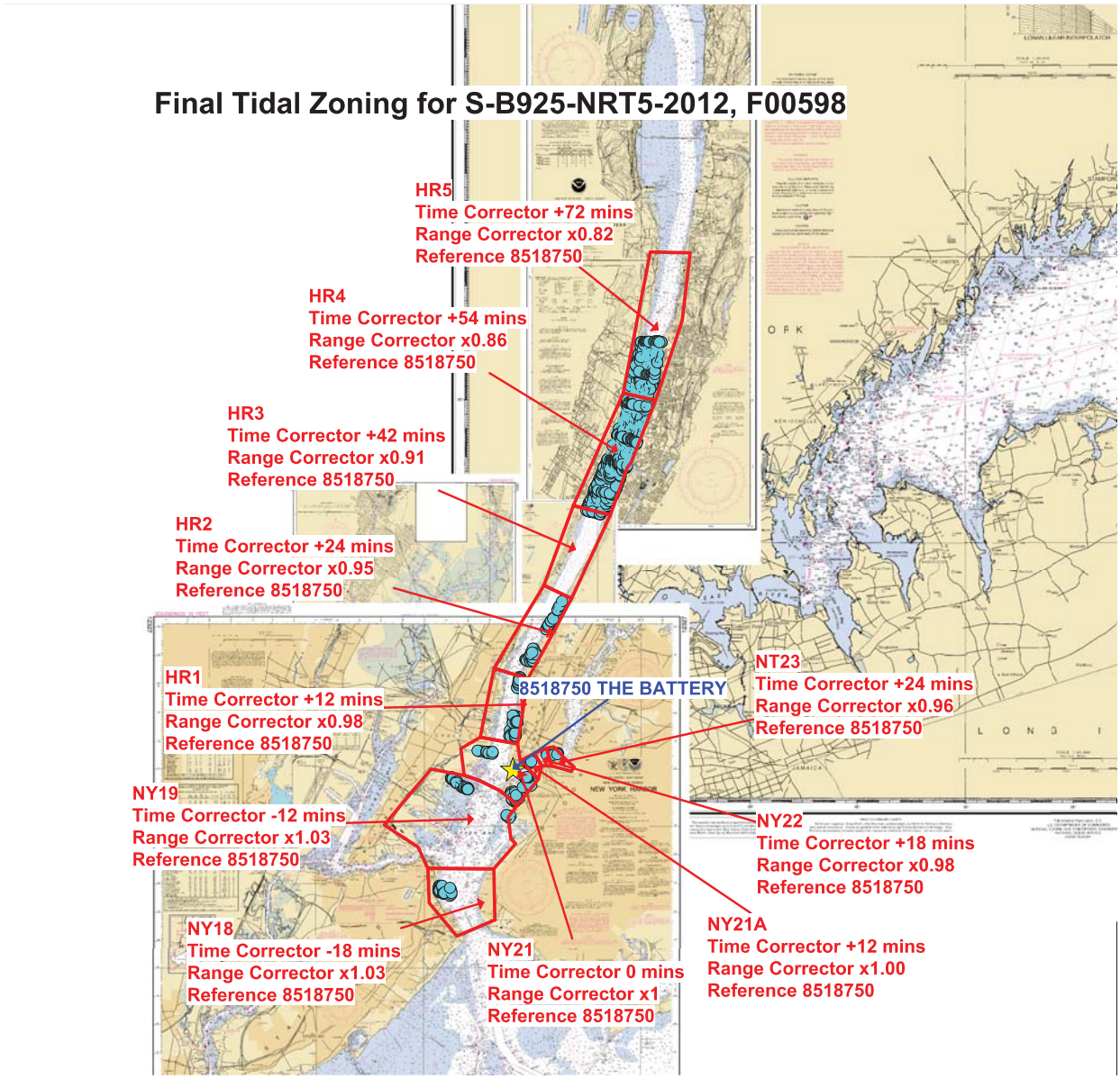
Refer to attachments for zoning information.

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

Note 2: The Battery, NY (851-8750) is slowly sinking relative to bench marks on the land; however, the datum offset, C2, has been adjusted every one or two years to correctly account for the movement.

CHIEF, PRODUCTS AND SERVICES BRANCH

Final Tidal Zoning for S-B925-NRT5-2012, F00598



F00598 DTON Report

Registry Number: F00598

State: New York

Locality: New York Harbor

Sub-locality: Yonkers to the George Washington Bridge

Project Number: S-B925-NRT5-11

Survey Date: 03/14/2011

Charts Affected

Number	Edition	Date	Scale (RNC)	RNC Correction(s)*
12342	23rd	01/01/2005	1:10,000 (12342_1)	[L]NTM: ?
12345	10th	09/01/2002	1:10,000 (12345_1)	[L]NTM: ?
12343	19th	10/01/2005	1:40,000 (12343_1)	[L]NTM: ?
12363	40th	06/01/2005	1:80,000 (12363_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: ?
14500	27th	10/01/2002	1:1,500,000 (14500_1)	[L]NTM: ?

* Correction(s) - *source: last correction applied (last correction reviewed--"cleared date")*

Features

Feature Type	Survey Depth	Survey Latitude	Survey Longitude
Wreck	7.16 m	40° 51' 59.0" N	073° 56' 04.4" W

1 - Danger To Navigation

1.1) Profile/Beam - 1123/122 from f00597 / _nrt5_s3002_em3002_mbes / 2011-073 / 000_1648

DANGER TO NAVIGATION

Survey Summary

Survey Position:	40° 51' 59.0" N, 073° 56' 04.4" W
Least Depth:	7.16 m (= 23.49 ft = 3.915 fm = 3 fm 5.49 ft)
TPU (±1.96σ):	**THU (TPEh)** ±1.963 m ; **TVU (TPEv)** ±0.258 m
Timestamp:	2011-073.16:49:22.908 (03/14/2011)
Survey Line:	f00597 / _nrt5_s3002_em3002_mbes / 2011-073 / 000_1648
Profile/Beam:	1123/122
Charts Affected:	12342_1, 12345_1, 12343_1, 12363_1, 12300_1, 13006_1, 5161_1, 13003_1, 14500_1

Remarks:

Shoal wreck 23 feet surveyed offshore of 29 sounding on Chart 12345.

Hydrographer Recommendations

[None]

Cartographically-Rounded Depth (Affected Charts):

23ft (12342_1, 12345_1, 12343_1, 12363_1)

3 ¾fm (12300_1, 13006_1, 13003_1, 14500_1)

7.2m (5161_1)

S-57 Data

Geo object 1:	Wreck (WRECKS)
Attributes:	VALSOU - 7.159 m

Concur. Charted wreck.

Feature Images

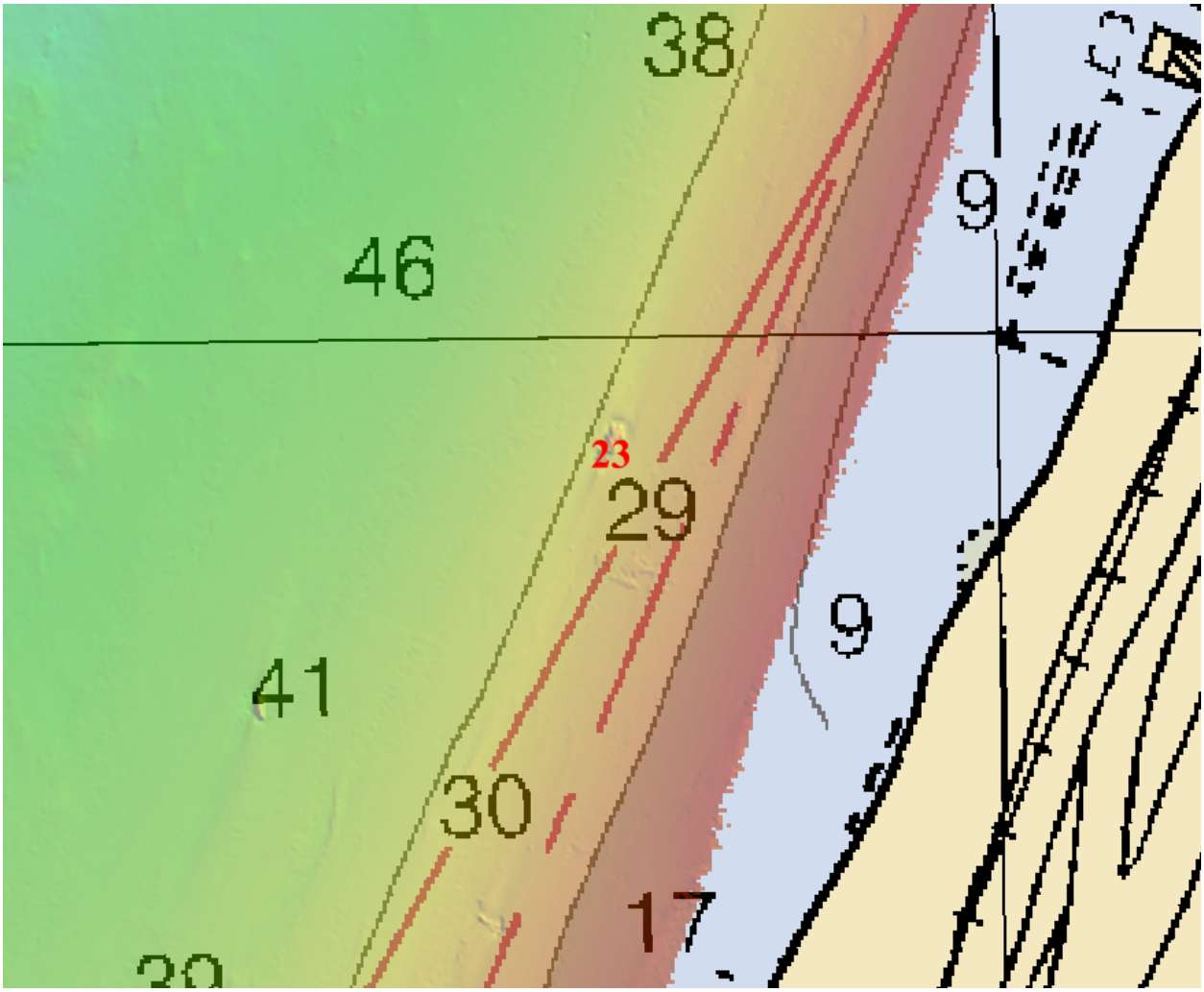


Figure 1.1.1

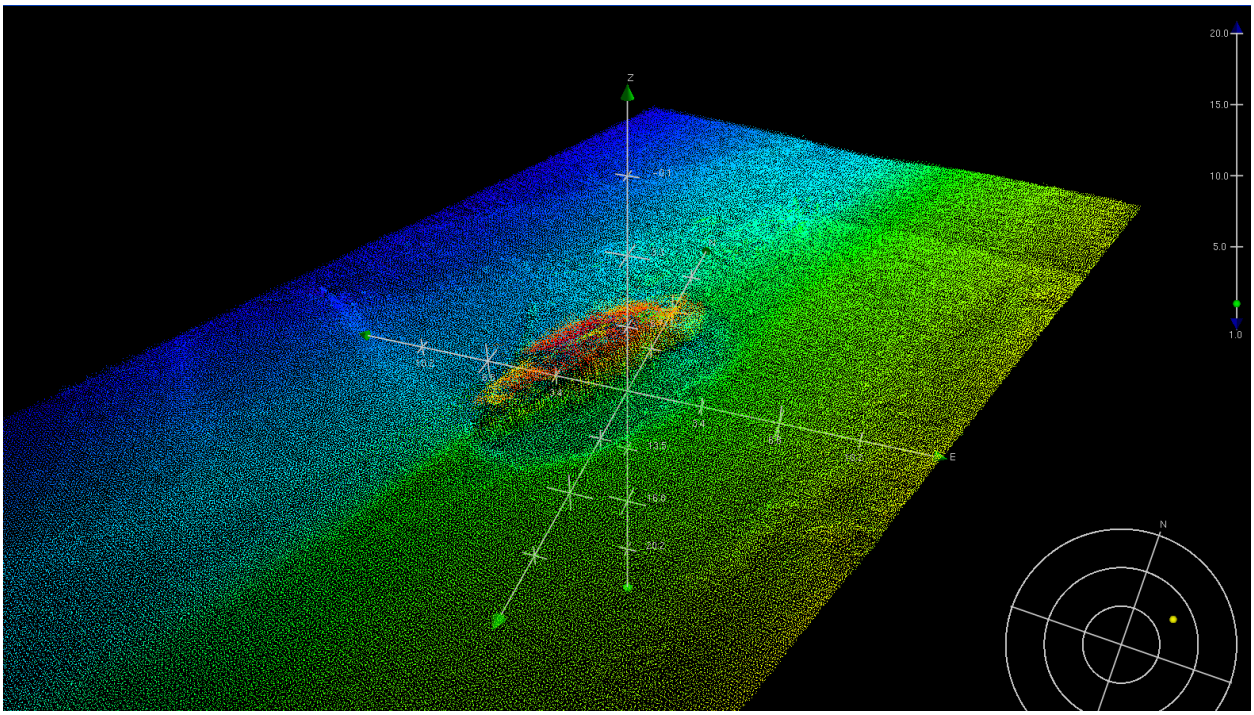


Figure 1.1.2

F00598 Feature Report

Registry Number: F00598
State: New York
Locality: New York Harbor
Sub-locality: Yonkers to George Washington Bridge
Project Number: S-B925-NRT5-12
Survey Dates: 03/09/2011 - 04/30/2013

Charts Affected

Number	Edition	Date	Scale (RNC)	RNC Correction(s)*
12341	26th	06/01/2003	1:10,000 (12341_1)	[L]NTM: ?
12335	42nd	03/01/2008	1:10,000 (12335_1)	[L]NTM: ?
12342	23rd	01/01/2005	1:10,000 (12342_1)	[L]NTM: ?
12345	11th	12/01/2010	1:10,000 (12345_1)	USCG LNM: 12/10/2013 (7/29/2014) CHS NTM: None (7/25/2014) NGA NTM: 6/6/1998 (8/23/2014)
12346	11th	09/01/2004	1:10,000 (12346_1)	[L]NTM: ?
12337	23rd	10/01/2005	1:20,000 (12337_1)	[L]NTM: ?
12327	101st	04/01/2008	1:40,000 (12327_1)	[L]NTM: ?
12343	19th	10/01/2005	1:40,000 (12343_1)	[L]NTM: ?
12363	40th	06/01/2005	1:80,000 (12363_1)	[L]NTM: ?
12326	50th	05/01/2006	1:80,000 (12326_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: ?
14500	27th	10/01/2002	1:1,500,000 (14500_1)	[L]NTM: ?

* Correction(s) - *source: last correction applied (last correction reviewed--"cleared date")*

Features

Feature Type	Survey Depth	Survey Latitude	Survey Longitude
Wreck	[None]	40° 42' 38.4" N	074° 02' 04.2" W

Generated by Pydro v14.6(r4896) on Tue Dec 09 22:29:27 2014 [UTC]

Wreck	[None]	40° 47' 32.4" N	073° 58' 50.2" W
Obstruction	6.00 m	40° 51' 27.7" N	073° 57' 09.4" W
Obstruction	6.40 m	40° 51' 37.6" N	073° 57' 00.9" W
Obstruction	7.30 m	40° 51' 38.9" N	073° 56' 57.0" W
Obstruction	4.00 m	40° 52' 32.2" N	073° 56' 39.8" W
Wreck	3.10 m	40° 53' 45.5" N	073° 56' 06.0" W
Wreck	[None]	40° 52' 17.6" N	073° 55' 56.7" W
Wreck	11.40 m	40° 52' 19.9" N	073° 55' 55.6" W
Obstruction	7.90 m	40° 53' 59.3" N	073° 55' 27.3" W
Obstruction	4.50 m	40° 55' 24.0" N	073° 55' 24.8" W
Obstruction	11.80 m	40° 54' 58.6" N	073° 55' 01.1" W
Wreck	[None]	40° 54' 05.3" N	073° 54' 58.6" W
Obstruction	12.50 m	40° 56' 48.5" N	073° 54' 36.5" W
Rock	12.00 m	40° 56' 57.0" N	073° 54' 31.1" W
Wreck	[None]	40° 56' 09.7" N	073° 54' 15.0" W
Wreck	[None]	40° 56' 26.5" N	073° 54' 11.6" W
Wreck	4.90 m	40° 47' 13.6" N	073° 59' 08.8" W
Wreck	4.00 m	40° 51' 26.4" N	073° 57' 18.0" W
Obstruction	8.70 m	40° 52' 50.8" N	073° 55' 32.4" W
Obstruction	9.60 m	40° 52' 55.0" N	073° 55' 30.2" W
Obstruction	6.50 m	40° 54' 34.6" N	073° 55' 29.9" W
Wreck	11.00 m	40° 53' 31.3" N	073° 55' 22.1" W
Obstruction	11.40 m	40° 55' 22.4" N	073° 54' 55.7" W
Wreck	6.60 m	40° 51' 59.0" N	073° 56' 04.4" W

1 - Charted Features

1.1) US 0000020067 00001

Charting Action is Not Addressed

Survey Summary

Survey Position:	40° 42' 38.4" N, 074° 02' 04.2" W
Least Depth:	[None]
TPU (±1.96σ):	**THU (TPEh)** [None] ; **TVU (TPEv)** [None]
Timestamp:	1996-342.00:00:00.000 (12/07/1996)
Dataset:	Feature_Report_Office.000
FOID:	US 0000020067 00001(022600004E630001)
Charts Affected:	12335_1, 12337_1, 12327_1, 12326_1, 12363_1, 12300_1, 13006_1, 5161_1, 13003_1, 14500_1

Remarks:

WRECKS/remrks: Retain as charted, not investigated.

Hydrographer Recommendations

Retain as charted.

S-57 Data

Geo object 1:	Wreck (WRECKS)
Attributes:	CATWRK - 2:dangerous wreck
	QUASOU - 2:depth unknown
	SORDAT - 19961207
	SORIND - US,US,graph,Chart 12335
	WATLEV - 3:always under water/submerged

Concur. This features was addressed as part of Hurricane Sandy survey F00630.

1.2) US 0000020197 00001

Charting Action is Not Addressed

Survey Summary

Survey Position:	40° 47' 32.4" N, 073° 58' 50.2" W
Least Depth:	[None]
TPU (±1.96σ):	**THU (TPEh)** [None] ; **TVU (TPEv)** [None]
Timestamp:	1998-003.00:00:00.000 (01/03/1998)
Dataset:	Feature_Report_Office.000
FOID:	US 0000020197 00001(022600004EE50001)
Charts Affected:	12341_1, 12363_1, 12300_1, 13006_1, 5161_1, 13003_1, 14500_1

Remarks:

WRECKS/remrks: Retain as charted, not investigated.

Hydrographer Recommendations

Retain as charted.

S-57 Data

Geo object 1:	Wreck (WRECKS)
Attributes:	CATWRK - 5:wreck showing any portion of hull or superstructure
	SORDAT - 19980103
	SORIND - US,US,graph,Chart 12341
	WATLEV - 2:always dry

Concur. Retained as charted.

1.3) US 0000019948 00001

Survey Summary

Survey Position:	40° 51' 27.7" N, 073° 57' 09.4" W
Least Depth:	6.00 m (= 19.69 ft = 3.281 fm = 3 fm 1.69 ft)
TPU (±1.96σ):	**THU (TPEh)** [None] ; **TVU (TPEv)** [None]
Timestamp:	2013-120.00:00:00.000 (04/30/2013)
Dataset:	Feature_Report_Office.000
FOID:	US 0000019948 00001(022600004DEC0001)
Charts Affected:	12345_1, 12343_1, 12363_1, 12300_1, 13006_1, 5161_1, 13003_1, 14500_1

Remarks:

OBSTRN/remrks: AWOIS_14843 - Obstruction found by 100% multibeam. New least depth obtained.

Hydrographer Recommendations

Update charted obstruction with new least depth.

Cartographically-Rounded Depth (Affected Charts):

19ft (12345_1, 12343_1, 12363_1)

3 ¼fm (12300_1, 13006_1, 13003_1, 14500_1)

6.0m (5161_1)

S-57 Data

Geo object 1:	Obstruction (OBSTRN)
Attributes:	QUASOU - 6:least depth known
	SORDAT - 20130430
	SORIND - US,US,graph,F00598
	TECSOU - 3:found by multi-beam
	VALSOU - 6.000 m
	WATLEV - 3:always under water/submerged

Concur. Updated charted Obstruction with new least depth.

1.4) US 0000019947 00001

Survey Summary

Survey Position:	40° 51' 37.6" N, 073° 57' 00.9" W
Least Depth:	6.40 m (= 21.00 ft = 3.500 fm = 3 fm 3.00 ft)
TPU (±1.96σ):	**THU (TPEh)** [None] ; **TVU (TPEv)** [None]
Timestamp:	2013-120.00:00:00.000 (04/30/2013)
Dataset:	Feature_Report_Office.000
FOID:	US 0000019947 00001(022600004DEB0001)
Charts Affected:	12345_1, 12343_1, 12363_1, 12300_1, 13006_1, 5161_1, 13003_1, 14500_1

Remarks:

OBSTRN/remrks: AWOIS_14844 - Obstruction found with 100% multibeam. New least depth obtained.

Hydrographer Recommendations

Update chart with new least depth.

Cartographically-Rounded Depth (Affected Charts):

21ft (12345_1, 12343_1, 12363_1)

3 ½fm (12300_1, 13006_1, 13003_1, 14500_1)

6.4m (5161_1)

S-57 Data

Geo object 1:	Obstruction (OBSTRN)
Attributes:	QUASOU - 6:least depth known
	SORDAT - 20130430
	SORIND - US,US,graph,F00598
	TECSOU - 3:found by multi-beam
	VALSOU - 6.400 m
	WATLEV - 3:always under water/submerged

Concur. Updated charted Obstruction with new least depth.

1.5) US 0000019949 00001

Survey Summary

Survey Position:	40° 51' 38.9" N, 073° 56' 57.0" W
Least Depth:	7.30 m (= 23.95 ft = 3.992 fm = 3 fm 5.95 ft)
TPU (±1.96σ):	**THU (TPEh)** [None] ; **TVU (TPEv)** [None]
Timestamp:	2013-120.00:00:00.000 (04/30/2013)
Dataset:	Feature_Report_Office.000
FOID:	US 0000019949 00001(022600004DED0001)
Charts Affected:	12345_1, 12343_1, 12363_1, 12300_1, 13006_1, 5161_1, 13003_1, 14500_1

Remarks:

OBSTRN/remrks: AWOIS_14845 - Obstruction found by 100% multibeam. New least depth obtained.

Hydrographer Recommendations

Update obstruction with new least depth.

Cartographically-Rounded Depth (Affected Charts):

24ft (12345_1, 12343_1, 12363_1)

4fm (12300_1, 13006_1, 13003_1, 14500_1)

7.3m (5161_1)

S-57 Data

Geo object 1:	Obstruction (OBSTRN)
Attributes:	QUASOU - 6:least depth known
	SORDAT - 20130430
	SORIND - US,US,graph,F00598
	TECSOU - 3:found by multi-beam
	VALSOU - 7.300 m
	WATLEV - 3:always under water/submerged

Concur. Updated charted Obstruction with new least depth.

1.6) US 0000019975 00001

Survey Summary

Survey Position:	40° 52' 32.2" N, 073° 56' 39.8" W
Least Depth:	4.00 m (= 13.12 ft = 2.187 fm = 2 fm 1.12 ft)
TPU (±1.96σ):	**THU (TPEh)** [None] ; **TVU (TPEv)** [None]
Timestamp:	2013-120.00:00:00.000 (04/30/2013)
Dataset:	Feature_Report_Office.000
FOID:	US 0000019975 00001(022600004E070001)
Charts Affected:	12345_1, 12343_1, 12363_1, 12300_1, 13006_1, 5161_1, 13003_1, 14500_1

Remarks:

OBSTRN/remrks: AWOIS_14848 - Update charted obstruction with new least depth. Obstruction covered with 100% multibeam.

Hydrographer Recommendations

Update obstruction with new least depth.

Cartographically-Rounded Depth (Affected Charts):

13ft (12345_1, 12343_1, 12363_1)

2fm (12300_1, 13006_1, 13003_1, 14500_1)

4.0m (5161_1)

S-57 Data

Geo object 1:	Obstruction (OBSTRN)
Attributes:	QUASOU - 6:least depth known
	SORDAT - 20130430
	SORIND - US,US,graph,F00598
	TECSOU - 3:found by multi-beam
	VALSOU - 4.000 m
	WATLEV - 3:always under water/submerged

Concur with clarification. Updated charted Obstruction with new position and least depth.

1.7) US 0000020018 00001

Survey Summary

Survey Position:	40° 53' 45.5" N, 073° 56' 06.0" W
Least Depth:	3.10 m (= 10.17 ft = 1.695 fm = 1 fm 4.17 ft)
TPU (±1.96σ):	**THU (TPEh)** [None] ; **TVU (TPEv)** [None]
Timestamp:	2013-120.00:00:00.000 (04/30/2013)
Dataset:	Feature_Report_Office.000
FOID:	US 0000020018 00001(022600004E320001)
Charts Affected:	12345_1, 12343_1, 12363_1, 12300_1, 13006_1, 5161_1, 13003_1, 14500_1

Remarks:

WRECKS/remrks: Update charted wreck with new least depth information. Wreck covered with 100% multibeam.

Hydrographer Recommendations

Update charted wreck with new depth information.

Cartographically-Rounded Depth (Affected Charts):

10ft (12345_1, 12343_1, 12363_1)

1 ¾fm (12300_1, 13006_1, 13003_1, 14500_1)

3.1m (5161_1)

S-57 Data

Geo object 1:	Wreck (WRECKS)
Attributes:	CATWRK - 2:dangerous wreck
	EXPSOU - 2:shoaler than range of depth of the surrounding depth area
	QUASOU - 6:least depth known
	SORDAT - 20130430
	SORIND - US,US,graph,F00598
	TECSOU - 3:found by multi-beam
	VALSOU - 3.100 m
	WATLEV - 3:always under water/submerged

Concur with clarification. Updated charted wreck with new position and new least depth.

1.8) US 0000020266 00001

Survey Summary

Survey Position:	40° 52' 17.6" N, 073° 55' 56.7" W
Least Depth:	[None]
TPU (±1.96σ):	**THU (TPEh)** [None] ; **TVU (TPEv)** [None]
Timestamp:	2001-058.00:00:00.000 (02/27/2001)
Dataset:	Feature_Report_Office.000
FOID:	US 0000020266 00001(022600004F2A0001)
Charts Affected:	12342_1, 12345_1, 12343_1, 12363_1, 12300_1, 13006_1, 5161_1, 13003_1, 14500_1

Remarks:

WRECKS/remrks: AWOIS_14846 - Wreck disproved by 100% multibeam. Wreck not present in navigable area.

Hydrographer Recommendations

Remove wreck from chart.

S-57 Data

Geo object 1:	Wreck (WRECKS)
Attributes:	CATWRK - 2:dangerous wreck
	QUASOU - 2:depth unknown
	SORDAT - 20010227
	SORIND - US,US,graph,chart 12342
	TECSOU - 3:found by multi-beam
	WATLEV - 3:always under water/submerged

Concur. Wreck removed from chart.

1.9) US 0000020267 00001

Survey Summary

Survey Position:	40° 52' 19.9" N, 073° 55' 55.6" W
Least Depth:	11.40 m (= 37.40 ft = 6.234 fm = 6 fm 1.40 ft)
TPU (±1.96σ):	**THU (TPEh)** [None] ; **TVU (TPEv)** [None]
Timestamp:	2013-120.00:00:00.000 (04/30/2013)
Dataset:	Feature_Report_Office.000
FOID:	US 0000020267 00001(022600004F2B0001)
Charts Affected:	12342_1, 12345_1, 12343_1, 12363_1, 12300_1, 13006_1, 5161_1, 13003_1, 14500_1

Remarks:

WRECKS/remrks: AWOIS_14847 - Wreck covered with 100% multibeam. New least depth obtained.

Hydrographer Recommendations

Update charted wreck with new least depth.

Cartographically-Rounded Depth (Affected Charts):

37ft (12342_1, 12345_1, 12343_1, 12363_1)

6 ¼fm (12300_1, 13006_1, 13003_1, 14500_1)

11.4m (5161_1)

S-57 Data

Geo object 1:	Wreck (WRECKS)
Attributes:	CATWRK - 2:dangerous wreck
	QUASOU - 6:least depth known
	SORDAT - 20130430
	SORIND - US,US,graph,F00598
	TECSOU - 3:found by multi-beam
	VALSOU - 11.400 m
	WATLEV - 3:always under water/submerged

Concur with clarification. Updated charted wreck with new position and new least depth.

1.10) US 0000019976 00001

Survey Summary

Survey Position:	40° 53' 59.3" N, 073° 55' 27.3" W
Least Depth:	7.90 m (= 25.92 ft = 4.320 fm = 4 fm 1.92 ft)
TPU (±1.96σ):	**THU (TPEh)** [None] ; **TVU (TPEv)** [None]
Timestamp:	2013-120.00:00:00.000 (04/30/2013)
Dataset:	Feature_Report_Office.000
FOID:	US 0000019976 00001(022600004E080001)
Charts Affected:	12345_1, 12343_1, 12363_1, 12300_1, 13006_1, 5161_1, 13003_1, 14500_1

Remarks:

OBSTRN/remrks: AWOIS_14852 - Obstruction found and least depth updated with 100% multibeam.

Hydrographer Recommendations

Update charted wreck with new depth information.

Cartographically-Rounded Depth (Affected Charts):

26ft (12345_1, 12343_1, 12363_1)

4 ¼fm (12300_1, 13006_1, 13003_1, 14500_1)

7.9m (5161_1)

S-57 Data

Geo object 1:	Obstruction (OBSTRN)
Attributes:	QUASOU - 6:least depth known
	SORDAT - 20130430
	SORIND - US,US,graph,F00598
	TECSOU - 3:found by multi-beam
	VALSOU - 7.900 m
	WATLEV - 3:always under water/submerged

Concur with clarification. Updated charted Obstruction with new position and new least depth.

1.11) US 0000019974 00001

Survey Summary

Survey Position:	40° 55' 24.0" N, 073° 55' 24.8" W
Least Depth:	4.50 m (= 14.76 ft = 2.461 fm = 2 fm 2.76 ft)
TPU (±1.96σ):	**THU (TPEh)** [None] ; **TVU (TPEv)** [None]
Timestamp:	2007-262.00:00:00.000 (09/19/2007)
Dataset:	Feature_Report_Office.000
FOID:	US 0000019974 00001(022600004E060001)
Charts Affected:	12345_1, 12343_1, 12363_1, 12300_1, 13006_1, 5161_1, 13003_1, 14500_1

Remarks:

OBSTRN/remrks: AWOIS_14856 - Retain feature as charted. Feature was covered with partial multibeam and 200% sidescan coverage. A new least depth was not obtained.

Hydrographer Recommendations

Retain feature as charted.

Cartographically-Rounded Depth (Affected Charts):

15ft (12345_1, 12343_1, 12363_1)

2 ½fm (12300_1, 13006_1, 13003_1, 14500_1)

4.5m (5161_1)

S-57 Data

Geo object 1:	Obstruction (OBSTRN)
Attributes:	QUASOU - 6:least depth known
	SORDAT - 20070919
	SORIND - US,US,reprt,DD-9992
	TECSOU - 3,2:found by multi-beam,found by side scan sonar
	VALSOU - 4.500 m
	WATLEV - 3:always under water/submerged

Concur. Least depth not achieved. Retained charted Obstruction.

1.12) US 0000019973 00001

Survey Summary

Survey Position:	40° 54' 58.6" N, 073° 55' 01.1" W
Least Depth:	11.80 m (= 38.71 ft = 6.452 fm = 6 fm 2.71 ft)
TPU (±1.96σ):	**THU (TPEh)** [None] ; **TVU (TPEv)** [None]
Timestamp:	2013-120.00:00:00.000 (04/30/2013)
Dataset:	Feature_Report_Office.000
FOID:	US 0000019973 00001(022600004E050001)
Charts Affected:	12345_1, 12343_1, 12363_1, 12300_1, 13006_1, 5161_1, 13003_1, 14500_1

Remarks:

OBSTRN/remrks: AWOIS_14855 - Obstruction covered with 100% multibeam. New least depth obtained.

Hydrographer Recommendations

Update charted obstruction with new least depth.

Cartographically-Rounded Depth (Affected Charts):

38ft (12345_1, 12343_1, 12363_1)

6 ½fm (12300_1, 13006_1, 13003_1, 14500_1)

11.8m (5161_1)

S-57 Data

Geo object 1:	Obstruction (OBSTRN)
Attributes:	QUASOU - 6:least depth known
	SORDAT - 20130430
	SORIND - US,US,graph,F00598
	TECSOU - 3:found by multi-beam
	VALSOU - 11.800 m
	WATLEV - 3:always under water/submerged

Concur with clarification. Deleted the charted Obstruction and added a new rock in the same position, with a new least depth.

1.13) US 0000020014 00001

Survey Summary

Survey Position:	40° 54' 05.3" N, 073° 54' 58.6" W
Least Depth:	[None]
TPU (±1.96σ):	**THU (TPEh)** [None] ; **TVU (TPEv)** [None]
Timestamp:	2002-204.00:00:00.000 (07/23/2002)
Dataset:	Feature_Report_Office.000
FOID:	US 0000020014 00001(022600004E2E0001)
Charts Affected:	12345_1, 12343_1, 12363_1, 12300_1, 13006_1, 5161_1, 13003_1, 14500_1

Remarks:

WRECKS/remrks: AWOIS_14853 - Remove charted wreck from chart. Wreck disproved by 100% multibeam in navigable waters.

Hydrographer Recommendations

Remove wreck from chart.

S-57 Data

Geo object 1:	Wreck (WRECKS)
Attributes:	CATWRK - 2:dangerous wreck
	QUASOU - 2:depth unknown
	SORDAT - 20020723
	SORIND - US,US,graph,chart 12345
	TECSOU - 3:found by multi-beam
	WATLEV - 3:always under water/submerged

Concur. Wreck removed from chart.

1.14) US 0000019978 00001

Survey Summary

Survey Position:	40° 56' 48.5" N, 073° 54' 36.5" W
Least Depth:	12.50 m (= 41.01 ft = 6.835 fm = 6 fm 5.01 ft)
TPU (±1.96σ):	**THU (TPEh)** [None] ; **TVU (TPEv)** [None]
Timestamp:	2013-120.00:00:00.000 (04/30/2013)
Dataset:	Feature_Report_Office.000
FOID:	US 0000019978 00001(022600004E0A0001)
Charts Affected:	12345_1, 12346_1, 12343_1, 12363_1, 12300_1, 13006_1, 5161_1, 13003_1, 14500_1

Remarks:

OBSTRN/remrks: AWOIS_14145 - Obstruction covered with 100% multibeam. New least depth obtained.

Hydrographer Recommendations

Update the least depth.

Cartographically-Rounded Depth (Affected Charts):

41ft (12345_1, 12346_1, 12343_1, 12363_1)

6 ¾fm (12300_1, 13006_1, 13003_1, 14500_1)

12.5m (5161_1)

S-57 Data

Geo object 1:	Obstruction (OBSTRN)
Attributes:	QUASOU - 6:least depth known
	SORDAT - 20130430
	SORIND - US,US,graph,F00598
	TECSOU - 3:found by multi-beam
	VALSOU - 12.500 m
	WATLEV - 3:always under water/submerged

Do not concur. Deleted charted Obstruction; charted sounding instead.

1.15) US 0000020008 00001

Survey Summary

Survey Position:	40° 56' 57.0" N, 073° 54' 31.1" W
Least Depth:	12.00 m (= 39.37 ft = 6.562 fm = 6 fm 3.37 ft)
TPU (±1.96σ):	**THU (TPEh)** [None] ; **TVU (TPEv)** [None]
Timestamp:	2013-120.00:00:00.000 (04/30/2013)
Dataset:	Feature_Report_Office.000
FOID:	US 0000020008 00001(022600004E280001)
Charts Affected:	12345_1, 12346_1, 12343_1, 12363_1, 12300_1, 13006_1, 5161_1, 13003_1, 14500_1

Remarks:

UWTROC/remrks: AWOIS_12379 - Rock was covered with 100% multibeam.

Hydrographer Recommendations

Update least depth.

Cartographically-Rounded Depth (Affected Charts):

39ft (12345_1, 12346_1, 12343_1, 12363_1)

6 ½fm (12300_1, 13006_1, 13003_1, 14500_1)

12.0m (5161_1)

S-57 Data

Geo object 1:	Underwater rock / awash rock (UWTROC)
Attributes:	QUASOU - 6:least depth known
	SORDAT - 20130430
	SORIND - US,US,graph,F00598
	TECSOU - 3:found by multi-beam
	VALSOU - 12.000 m
	WATLEV - 3:always under water/submerged

Do not concur. Deleted charted rock; charted sounding instead.

1.16) US 0000020015 00001

Charting Action is Not Addressed

Survey Summary

Survey Position:	40° 56' 09.7" N, 073° 54' 15.0" W
Least Depth:	[None]
TPU (±1.96σ):	**THU (TPEh)** [None] ; **TVU (TPEv)** [None]
Timestamp:	2002-204.00:00:00.000 (07/23/2002)
Dataset:	Feature_Report_Office.000
FOID:	US 0000020015 00001(022600004E2F0001)
Charts Affected:	12345_1, 12343_1, 12363_1, 12300_1, 13006_1, 5161_1, 13003_1, 14500_1

Remarks:

WRECKS/remrks: Retain as charted, Not investigated

Hydrographer Recommendations

Retain as charted.

S-57 Data

Geo object 1:	Wreck (WRECKS)
Attributes:	CATWRK - 2:dangerous wreck
	QUASOU - 2:depth unknown
	SORDAT - 20020723
	SORIND - US,US,graph,chart 12345
	WATLEV - 3:always under water/submerged

Concur. Retained wreck as charted.

1.17) US 0000020016 00001

Survey Summary

Survey Position:	40° 56' 26.5" N, 073° 54' 11.6" W
Least Depth:	[None]
TPU (±1.96σ):	**THU (TPEh)** [None] ; **TVU (TPEv)** [None]
Timestamp:	2002-204.00:00:00.000 (07/23/2002)
Dataset:	Feature_Report_Office.000
FOID:	US 0000020016 00001(022600004E300001)
Charts Affected:	12345_1, 12343_1, 12363_1, 12300_1, 13006_1, 5161_1, 13003_1, 14500_1

Remarks:

WRECKS/remrks: AWOIS_14857 - Reported wreck disproved by 100% multibeam. Wreck not found within navigable area.

Hydrographer Recommendations

Remove wreck from chart.

S-57 Data

Geo object 1:	Wreck (WRECKS)
Attributes:	CATWRK - 2:dangerous wreck
	QUASOU - 2:depth unknown
	SORDAT - 20020723
	SORIND - US,US,graph,chart 12345
	TECSOU - 3:found by multi-beam
	WATLEV - 3:always under water/submerged

Concur. Wreck removed from chart.

2 - New Features

2.1) US 0000041262 00001

Survey Summary

Survey Position:	40° 47' 13.6" N, 073° 59' 08.8" W
Least Depth:	4.90 m (= 16.08 ft = 2.679 fm = 2 fm 4.08 ft)
TPU (±1.96σ):	**THU (TPEh)** [None] ; **TVU (TPEv)** [None]
Timestamp:	2013-120.00:00:00.000 (04/30/2013)
Dataset:	Feature_Report_Office.000
FOID:	US 0000041262 00001(02260000A12E0001)
Charts Affected:	12341_1, 12363_1, 12300_1, 13006_1, 5161_1, 13003_1, 14500_1

Remarks:

WRECKS/remrks: New wreck found with 100% multibeam.

Hydrographer Recommendations

Chart new wreck.

Cartographically-Rounded Depth (Affected Charts):

16ft (12341_1, 12363_1)

2 ½fm (12300_1, 13006_1, 13003_1, 14500_1)

4.9m (5161_1)

S-57 Data

Geo object 1:	Wreck (WRECKS)
Attributes:	CATWRK - 2:dangerous wreck
	QUASOU - 6:least depth known
	SORDAT - 20130430
	SORIND - US,US,graph,F00598
	TECSOU - 3:found by multi-beam
	VALSOU - 4.900 m
	WATLEV - 3:always under water/submerged

Concur. Added new wreck.

2.2) 0_ 0000000460 00001

Survey Summary

Survey Position:	40° 51' 26.4" N, 073° 57' 18.0" W
Least Depth:	4.00 m (= 13.12 ft = 2.187 fm = 2 fm 1.12 ft)
TPU (±1.96σ):	**THU (TPEh)** [None] ; **TVU (TPEv)** [None]
Timestamp:	2013-120.00:00:00.000 (04/30/2013)
Dataset:	Feature_Report_Office.000
FOID:	0_ 0000000460 00001(FFFE000001CC0001)
Charts Affected:	12345_1, 12343_1, 12363_1, 12300_1, 13006_1, 5161_1, 13003_1, 14500_1

Remarks:

WRECKS/remrks: New wreck found with 100% multibeam.

Hydrographer Recommendations

Chart new wreck.

Cartographically-Rounded Depth (Affected Charts):

13ft (12345_1, 12343_1, 12363_1)

2fm (12300_1, 13006_1, 13003_1, 14500_1)

4.0m (5161_1)

S-57 Data

Geo object 1:	Wreck (WRECKS)
Attributes:	CATWRK - 2:dangerous wreck
	QUASOU - 6:least depth known
	SORDAT - 20130430
	SORIND - US,US,graph,F00598
	TECSOU - 3:found by multi-beam
	VALSOU - 4.000 m
	WATLEV - 3:always under water/submerged

Concur. Added new wreck.

2.3) US 0000040970 00001

Survey Summary

Survey Position:	40° 52' 50.8" N, 073° 55' 32.4" W
Least Depth:	8.70 m (= 28.54 ft = 4.757 fm = 4 fm 4.54 ft)
TPU (±1.96σ):	**THU (TPEh)** [None] ; **TVU (TPEv)** [None]
Timestamp:	2013-120.00:00:00.000 (04/30/2013)
Dataset:	Feature_Report_Office.000
FOID:	US 0000040970 00001(02260000A00A0001)
Charts Affected:	12342_1, 12345_1, 12343_1, 12363_1, 12300_1, 13006_1, 5161_1, 13003_1, 14500_1

Remarks:

OBSTRN/remrks: AWOIS_14849 - New obstruction found with 100% multibeam. Obstruction represents updated position and least depth for previously charted obstruction.

Hydrographer Recommendations

Chart new obstruction.

Cartographically-Rounded Depth (Affected Charts):

28ft (12342_1, 12345_1, 12343_1, 12363_1)

4 ¾fm (12300_1, 13006_1, 13003_1, 14500_1)

8.7m (5161_1)

S-57 Data

Geo object 1:	Obstruction (OBSTRN)
Attributes:	QUASOU - 6:least depth known
	SORDAT - 20130430
	SORIND - US,US,graph,F00598
	TECSOU - 3:found by multi-beam
	VALSOU - 8.700 m
	WATLEV - 3:always under water/submerged

Concur. Added new Obstruction.

2.4) US 0000040969 00001

Survey Summary

Survey Position:	40° 52' 55.0" N, 073° 55' 30.2" W
Least Depth:	9.60 m (= 31.50 ft = 5.249 fm = 5 fm 1.50 ft)
TPU (±1.96σ):	**THU (TPEh)** [None] ; **TVU (TPEv)** [None]
Timestamp:	2013-120.00:00:00.000 (04/30/2013)
Dataset:	Feature_Report_Office.000
FOID:	US 0000040969 00001(02260000A0090001)
Charts Affected:	12345_1, 12343_1, 12363_1, 12300_1, 13006_1, 5161_1, 13003_1, 14500_1

Remarks:

OBSTRN/remrks: AWOIS_14850 - New obstruction found with 100% multibeam. Obstruction represents updated position and least depth for previously charted obstruction.

Hydrographer Recommendations

Chart new obstruction.

Cartographically-Rounded Depth (Affected Charts):

31ft (12345_1, 12343_1, 12363_1)

5 ¼fm (12300_1, 13006_1, 13003_1, 14500_1)

9.6m (5161_1)

S-57 Data

Geo object 1:	Obstruction (OBSTRN)
Attributes:	QUASOU - 6:least depth known
	SORDAT - 20130430
	SORIND - US,US,graph,F00598
	TECSOU - 3:found by multi-beam
	VALSOU - 9.600 m
	WATLEV - 3:always under water/submerged

Concur. Added new Obstruction.

2.5) US 0000040959 00001

Survey Summary

Survey Position:	40° 54' 34.6" N, 073° 55' 29.9" W
Least Depth:	6.50 m (= 21.33 ft = 3.554 fm = 3 fm 3.33 ft)
TPU (±1.96σ):	**THU (TPEh)** [None] ; **TVU (TPEv)** [None]
Timestamp:	2013-120.00:00:00.000 (04/30/2013)
Dataset:	Feature_Report_Office.000
FOID:	US 0000040959 00001(022600009FFF0001)
Charts Affected:	12345_1, 12343_1, 12363_1, 12300_1, 13006_1, 5161_1, 13003_1, 14500_1

Remarks:

OBSTRN/remrks: AWOIS_14854 - Obstruction found by 100% multibeam. Obstruction stands 0.5 meters tall from the seafloor.

Hydrographer Recommendations

Chart new obstruction.

Cartographically-Rounded Depth (Affected Charts):

21ft (12345_1, 12343_1, 12363_1)

3 ½fm (12300_1, 13006_1, 13003_1, 14500_1)

6.5m (5161_1)

S-57 Data

Geo object 1:	Obstruction (OBSTRN)
Attributes:	QUASOU - 6:least depth known
	SORDAT - 20130430
	SORIND - US,US,graph,F00598
	TECSOU - 3:found by multi-beam
	VALSOU - 6.500 m
	WATLEV - 3:always under water/submerged

Concur. Added new Obstruction.

2.6) US 0000040967 00001

Survey Summary

Survey Position:	40° 53' 31.3" N, 073° 55' 22.1" W
Least Depth:	11.00 m (= 36.09 ft = 6.015 fm = 6 fm 0.09 ft)
TPU (±1.96σ):	**THU (TPEh)** [None] ; **TVU (TPEv)** [None]
Timestamp:	2013-120.00:00:00.000 (04/30/2013)
Dataset:	Feature_Report_Office.000
FOID:	US 0000040967 00001(02260000A0070001)
Charts Affected:	12345_1, 12343_1, 12363_1, 12300_1, 13006_1, 5161_1, 13003_1, 14500_1

Remarks:

WRECKS/remrks: AWOIS_14851 - New wreck found by 100% multibeam.

Hydrographer Recommendations

Chart new wreck.

Cartographically-Rounded Depth (Affected Charts):

36ft (12345_1, 12343_1, 12363_1)

6fm (12300_1, 13006_1, 13003_1, 14500_1)

11.0m (5161_1)

S-57 Data

Geo object 1:	Wreck (WRECKS)
Attributes:	CATWRK - 2:dangerous wreck
	QUASOU - 6:least depth known
	SORDAT - 20130430
	SORIND - US,US,graph,F00598
	TECSOU - 3:found by multi-beam
	VALSOU - 11.000 m
	WATLEV - 3:always under water/submerged

Concur. Added new wreck.

2.7) US 0000040920 00001

Survey Summary

Survey Position:	40° 55' 22.4" N, 073° 54' 55.7" W
Least Depth:	11.40 m (= 37.40 ft = 6.234 fm = 6 fm 1.40 ft)
TPU (±1.96σ):	**THU (TPEh)** [None] ; **TVU (TPEv)** [None]
Timestamp:	2013-120.00:00:00.000 (04/30/2013)
Dataset:	Feature_Report_Office.000
FOID:	US 0000040920 00001(022600009FD80001)
Charts Affected:	12345_1, 12343_1, 12363_1, 12300_1, 13006_1, 5161_1, 13003_1, 14500_1

Remarks:

OBSTRN/remrks: AWOIS_14144 - Obstruction is the new position and depth for the AWOIS item.

Hydrographer Recommendations

Chart new obstruction.

Cartographically-Rounded Depth (Affected Charts):

37ft (12345_1, 12343_1, 12363_1)

6 ¼fm (12300_1, 13006_1, 13003_1, 14500_1)

11.4m (5161_1)

S-57 Data

Geo object 1:	Obstruction (OBSTRN)
Attributes:	QUASOU - 6:least depth known
	SORDAT - 20130430
	SORIND - US,US,graph,F00598
	TECSOU - 3:found by multi-beam
	VALSOU - 11.400 m
	WATLEV - 3:always under water/submerged

Concur. Added new Obstruction.

APPROVAL PAGE

F00598

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

- F00598_DR.pdf
- Collection of depth varied resolution BAGS
- Processed survey data and records
- F00598_GeoImage.pdf

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

Approved: Digitally signed by HOLMBERG.PETER.SCOTT.1365886101 DN: c=US, o=U.S. Government, ou=DoD, ou=PKI, ou=OTHER, cn=HOLMBERG.PETER.SCOTT.1365886101 Date: 2015.12.18 07:58:46 -08'00'

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.

Approved: Digitally signed by EVANS.BENJAMIN.K.1237217094 Reason: I am approving this document Date: 2015.12.17 17:12:30 -08'00'

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