H12613

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

DESCRIPTIVE REPORT

Type of Survey:	Navigable Area
Registry Number:	H12613

LOCALITY

State(s):	Maine
General Locality:	Gulf of Maine
Sub-locality:	Vicinity of Isles of Shoals

2013

CHIEF OF PARTY
LCDR Benjamin K. Evans, NOAA

LIBRARY & ARCHIVES

Date:

U.S. DEPARTMENT OF COMMERCE NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION	REGISTRY NUMBER:
HYDROGRAPHIC TITLE SHEET	**H12613**

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):	**Maine**
General Locality:	**Gulf of Maine**
Sub-Locality:	**Vicinity of Isles of Shoals**
Scale:	**40000**
Dates of Survey:	**08/12/2013 to 09/08/2013**
Instructions Dated:	**07/25/2013**
Project Number:	**OPR-A321-FH-13**
Field Unit:	**NOAA Ship *Ferdinand R. Hassler***
Chief of Party:	**LCDR Benjamin K. Evans, NOAA**
Soundings by:	**Multibeam Echo Sounder**
Imagery by:	**Multibeam Echo Sounder Backscatter**
Verification by:	**Atlantic 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 considered 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 Geophysical Data Center (NGDC) and can be retrieved via http:// www.ngdc.noaa.gov/.***

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Descriptive Report to Accompany Survey H12613

Project: OPR-A321-FH-13

Locality: Gulf of Maine

Sublocality: Vicinity of Isles of Shoals

Scale: 1:40000

August 2013 - September 2013

NOAA Ship *Ferdinand R. Hassler*

Chief of Party: LCDR Benjamin K. Evans, NOAA

A. Area Surveyed

The survey area is located in the Gulf of Maine, within the sub-locality of the Vicinity of Isles of Shoals as shown in Figure 1.

A.1 Survey Limits

Data were acquired within the following survey limits:

Northwest Limit	Southeast Limit
43° 6" 17" N 70° 36" 11" W	42° 56" 37" N 70° 24" 4" W

Table 1: Survey Limits

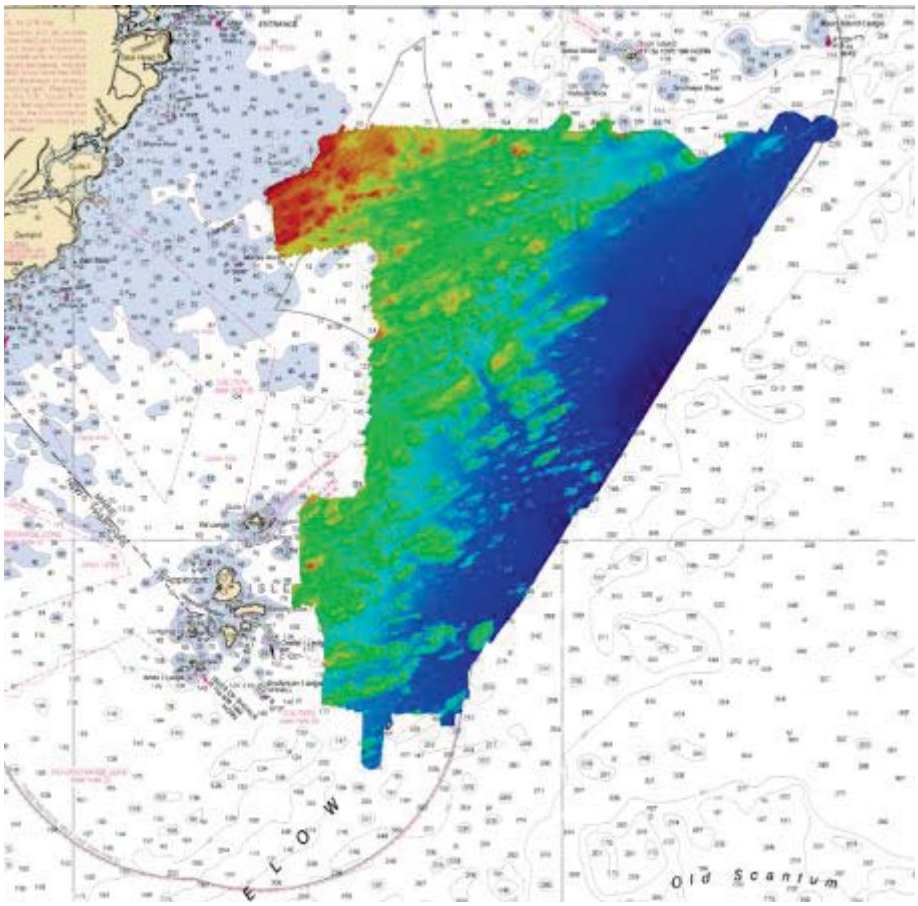


Figure 1: General locality of survey H12613

The surveyed area for H12613 was modified from the assigned survey limits to exclude the search radius for AWOIS item 2190. The AWOIS item and search radius are predominantly within the assigned limits of survey H12612. The item and search radius will be fully addressed with that survey.

The survey does not reach the assigned inshore limit in the vicinity of York Ledge. HASSLER defined an inshore limit line for ship hydrography at the beginning of acquisition. Work inshore of this limit will require a survey launch due to strong current, high density of lobster fishing gear, and proximity of grounding hazards. As no survey launch was available at the time of the survey, this area went unaddressed.

The region of York Ledge showed significant differences from charted depths, resulting in 15 DTON accompanied by a sounding plot submitted by the field party to MCD. The Hydrographer recommends the area be addressed in a later survey by a platform suited for nearshore work.

A.2 Survey Purpose

The primary purpose of this project is to support safe navigation through the acquisition and processing of hydrographic data for updating the National Ocean Service's (NOS) nautical charting products.

A.3 Survey Quality

The entire survey is adequate to supersede previous data.

A.4 Survey Coverage

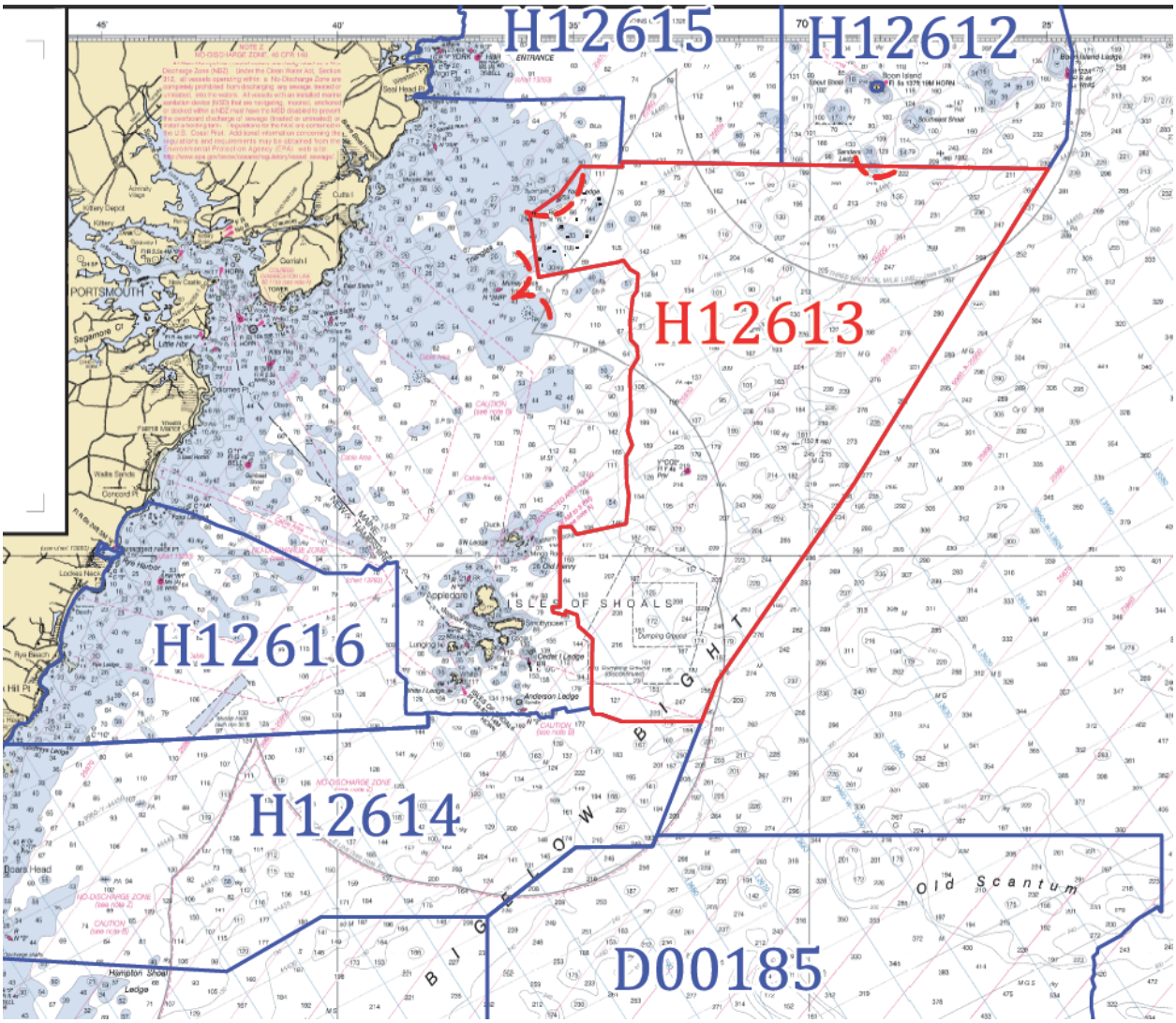


Figure 2: Project OPR-A321-FH-13 Sheet Layout

There are numerous small holidays located within the coverage of H12613. These holidays are all sonic shadows caused by the areas of high relief located within the survey. Since the top of features are accurately represented in cases of downslope shadows, the hydrographer is confident the least depths over features have been achieved.

A.5 Survey Statistics

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

	Vessel	***Total***
LNM	**SBES Mainscheme**	0
	MBES Mainscheme	483
	Lidar Mainscheme	0
	SSS Mainscheme	0.5
	SBES/MBES Combo Mainscheme	0
	SBES/SSS Combo Mainscheme	0
	MBES/SSS Combo Mainscheme	26.9
	SBES/MBES Combo Crosslines	0
	Lidar Crosslines	0
Number of Bottom Samples		13
Number AWOIS Items Investigated		2
Number Maritime Boundary Points Investigated		0
Number of DPs		0
Number of Items Items Investigated by Dive Ops		0
Total Number of SNM		41.04

Table 2: Hydrographic Survey Statistics

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

Survey Dates	Julian Day Number
08/12/2013	224
08/13/2013	225
08/14/2013	226
08/15/2013	227
08/16/2013	228
08/17/2013	229
08/18/2013	230
08/19/2013	231
09/07/2013	250

Table 3: Dates of Hydrography

Survey lines were run with a dual-head multibeam echosounder. Linear nautical miles for the dual-head system were calculated using statistics from the starboard head.

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	*S-250*
LOA	37.7 meters
Draft	3.85 meters

Table 4: Vessels Used

NOAA Ship FERDINAND R. HASSLER (S-250) acquired all data within the limits of H12613.

B.1.2 Equipment

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

Manufacturer	Model	Type
Reson	7125	MBES
Applanix	POS M/V Version 5	Positioning and Attitude System
Hemisphere	MBX-4	Positioning System
Seabird	SBE 19Plus	Conductivity, Temperature, and Depth Sensor
Reson	SVP 70	Sound Speed System
Brooke Ocean	MVP-30	Sound Speed System
AML	Micro CTD	Conductivity, Temperature, and Depth Sensor
AML	Smart SV & P	Sound Speed System

Table 5: Major Systems Used

The AML Micro CTD was lost with the ship's MVP towfish during acquisition on Dn224 at 2030 UTC. All subsequent sound speed profiles on H12613 were acquired with SBE 19Plus CTDs (manual casts) and AML Smart SV & P (fit to a replacement MVP towfish).

B.2 Quality Control

B.2.1 Crosslines

Crosslines, acquired for this survey, totalled 5.5% of mainscheme acquisition.

Twenty six linear nautical miles of crosslines were acquired, shown in Figure 3. This percentage satisfies NOS Specifications and Deliverables (2013). Crosslines were filtered to remove soundings greater than 45 degrees from nadir. To evaluate crossline agreement, two 4-meter surfaces were created; one from crossline soundings only and the other from mainscheme soundings only. The crossline surface was differenced from the mainscheme surfaces using CARIS BASE Editor. The statistical analysis of the differences between mainscheme and crossline surfaces are shown in Figure 4. The average difference between the surfaces is 0.0 meters; 95% of all differences were less than 0.31 meters. High standard deviation is attributed to the large areas with high relief within the survey.

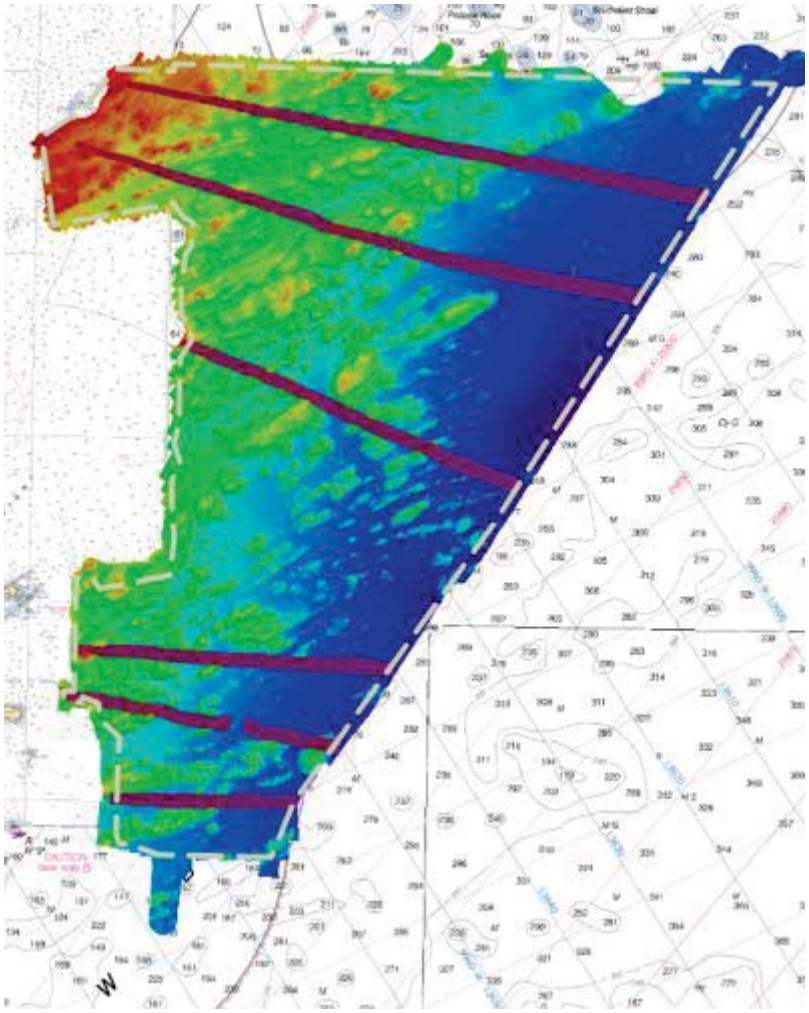
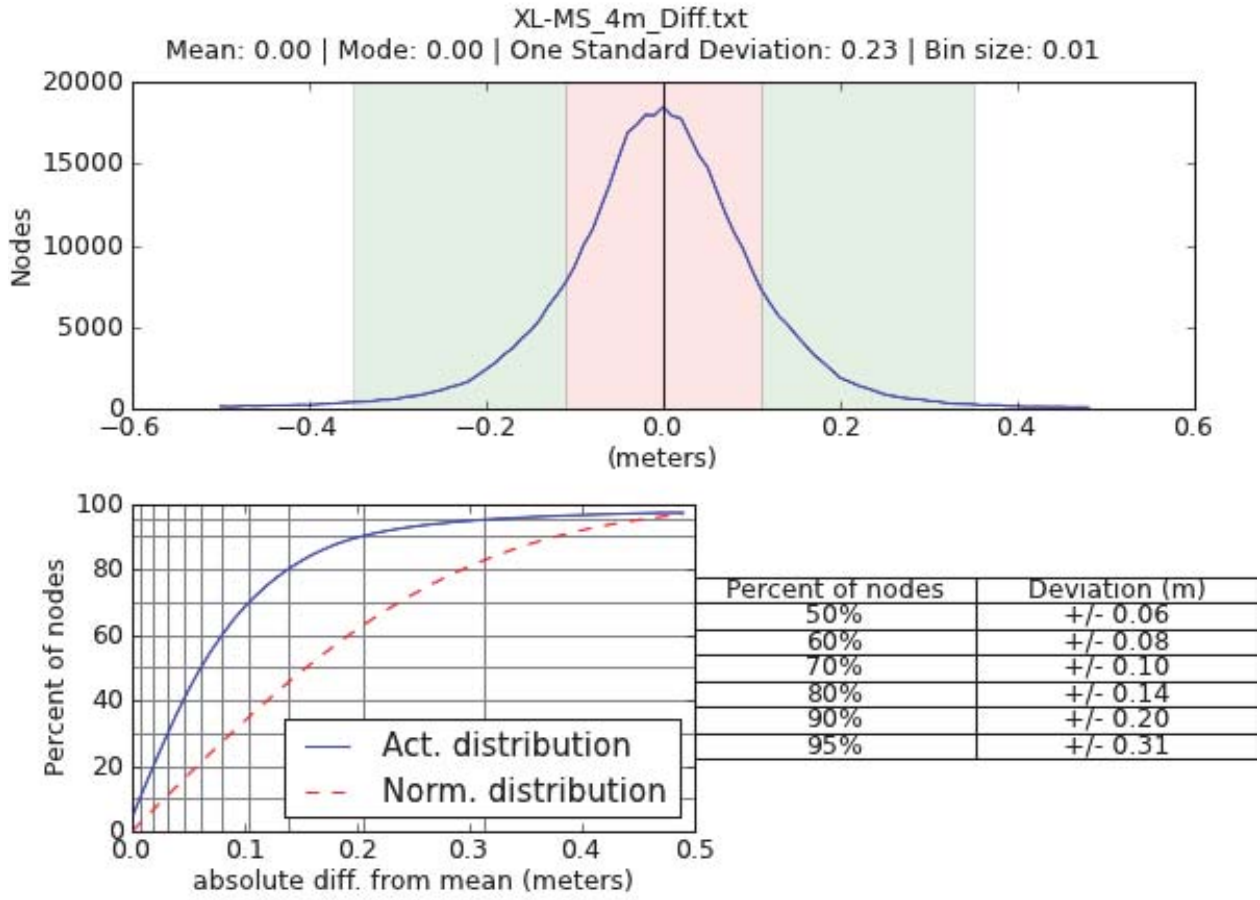


Figure 3: Crosslines (shown in red) and mainscheme data for H12613



Percent of nodes	Deviation (m)
50%	+/- 0.06
60%	+/- 0.08
70%	+/- 0.10
80%	+/- 0.14
90%	+/- 0.20
95%	+/- 0.31

Figure 4: Statistical analysis of the mainscheme and crossline difference surface.

B.2.2 Uncertainty

The following survey specific parameters were used for this survey:

Measured	Zoning
0.01 meters	0.2 meters

Table 6: Survey Specific Tide TPU Values

Hull ID	Measured - CTD	Measured - MVP	Surface
S250	1.0 meters/second	1.0 meters/second	0.5 meters/second

Table 7: Survey Specific Sound Speed TPU Values

All data within H12613 were reduced to MLLW via discrete zoned tides and were attributed with 0.2 meter zoning uncertainty (Table 6), provided by CO-OPS in the project instructions.

B.2.3 Junctions

The areas of overlap between sheet H12613 and its junction sheets, shown in Figure 5, were reviewed in CARIS Subset Editor for sounding consistency. Each junctioning surface was subtracted from the corresponding resolution surface of H12613 to assess sounding consistency.

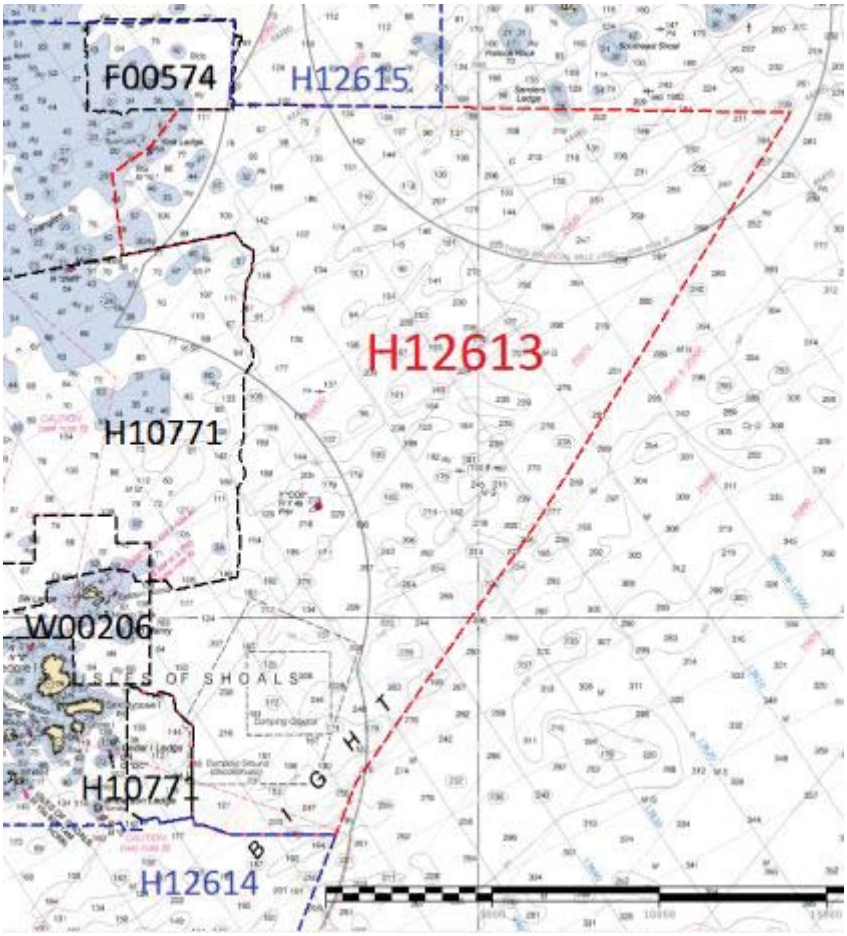


Figure 5: Surveys junctioning H12613. Surveys in blue are a part of OPR-A321-FH-13. Surveys in black were provided with project instructions.

The following junctions were made with this survey:

Registry Number	Scale	Year	Field Unit	Relative Location
H12615	1:40000	2013	NOAA Ship FERDINAND R. HASSLER	N
H12614	1:40000	2013	NOAA Ship FERDINAND R. HASSLER	S
H10771	1:10000	1997	NOAA Ship RUDE	E
W00206	1:10000	2009	UNH - R/V Coastal Surveyor	SW
F00574	1:10000	2011	NOAA Ship THOMAS JEFFERSON	NW

Table 8: Junctioning Surveys

H12615

Survey H12615 was assigned as a part of OPR-A321-FH-13. The extent of overlap with H12613 is shown in Figure 6. The average difference of surfaces H12613 and H12615 is 0.09 meters with a standard deviation of 0.26 meters. 95% of all differences were less than +/- 0.48m, as shown in Figure 7. High standard deviation is attributed to the large areas with high relief within the survey. Areas with flat sea floor show agreement less than 0.2 meters, where areas of high relief are greater than 0.3 meters.

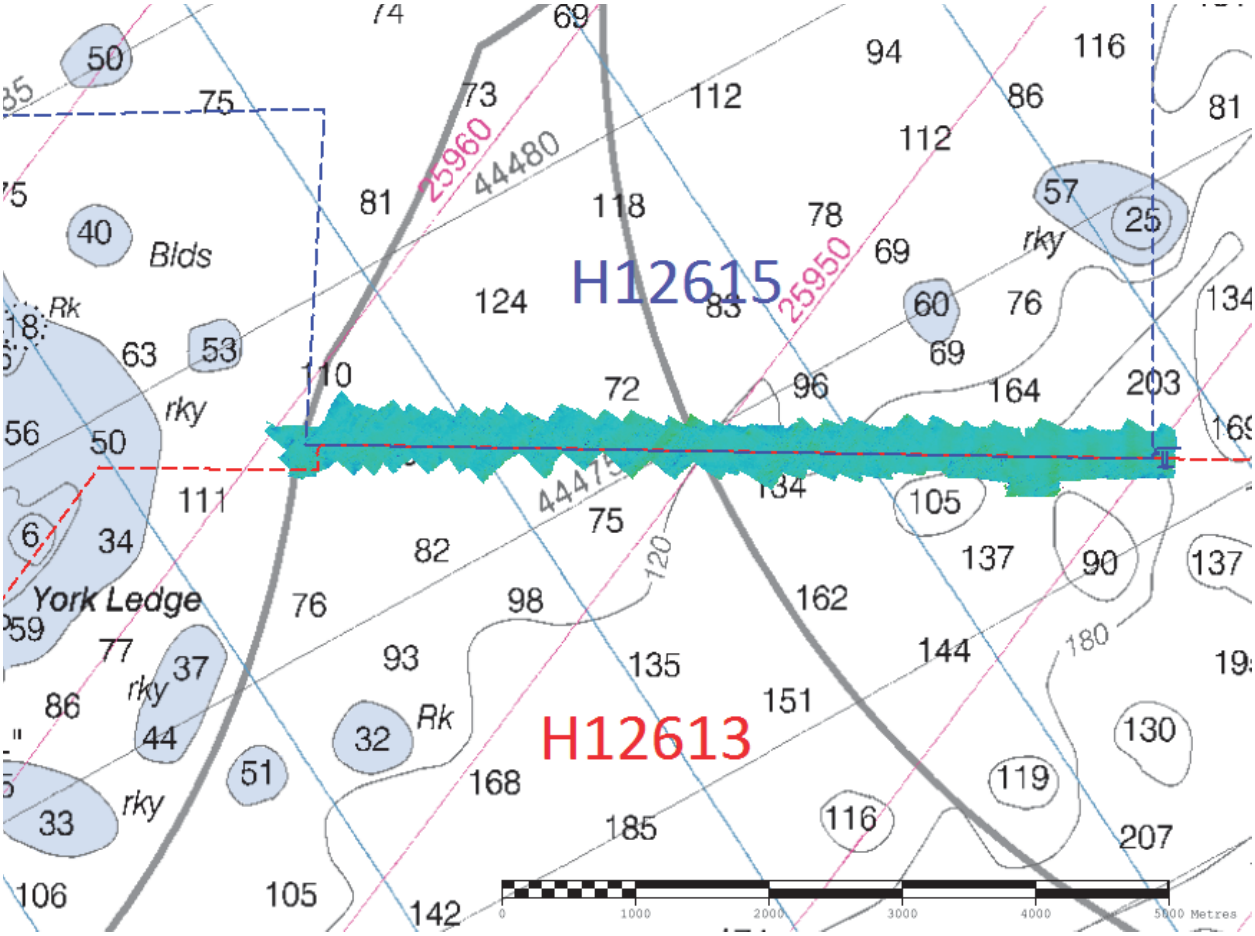
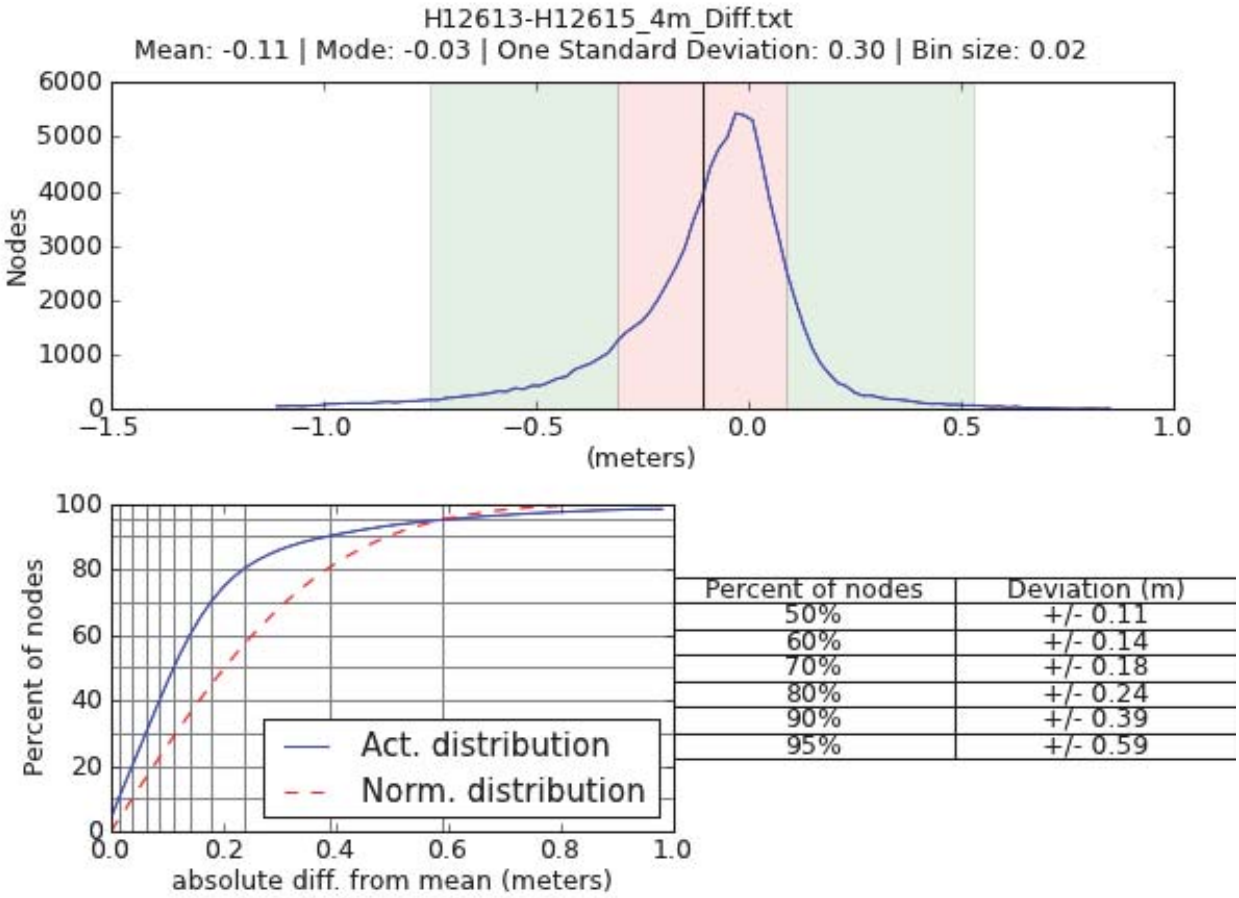


Figure 6: Junction surface (4-meter) H12613 minus H12615.



Percent of nodes	Deviation (m)
50%	+/- 0.11
60%	+/- 0.14
70%	+/- 0.18
80%	+/- 0.24
90%	+/- 0.39
95%	+/- 0.59

Figure 7: Difference Surface Statistics - H12613 minus H12615

H12614

Survey H12614 was assigned as a part of OPR-A321-FH-13. The extent of overlap with H12613 is shown in Figure 8. The average difference of surfaces H12613 and H12614 is 0.03 meters with a standard deviation of 0.38 meters. 95% of all differences were less than +/- 0.62m, as shown in Figure 9. High standard deviation is attributed to the large areas with high relief within the survey. Areas with flat sea floor show agreement less than 0.2 meters, where areas of high relief are greater than 0.3 meters.

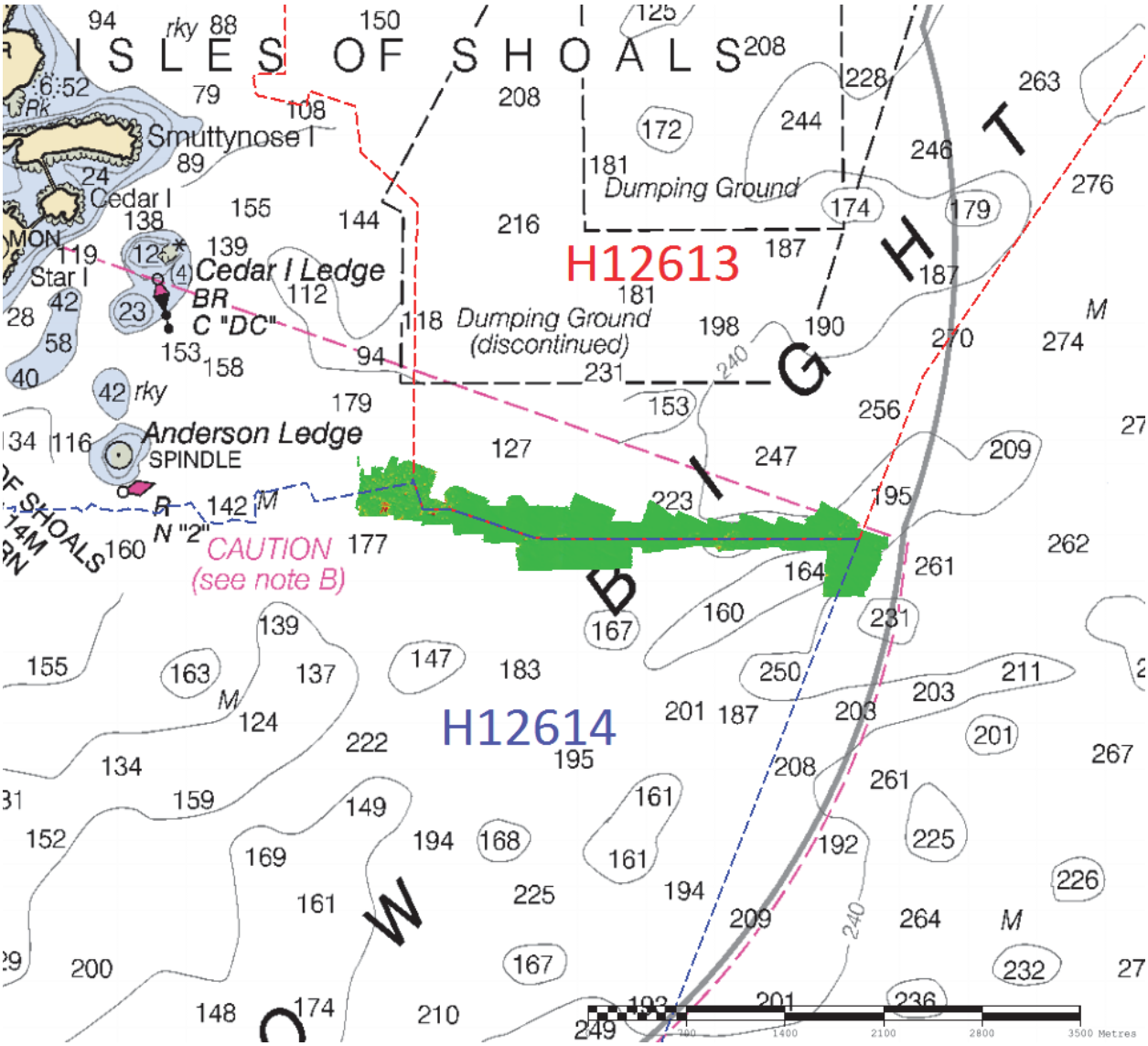
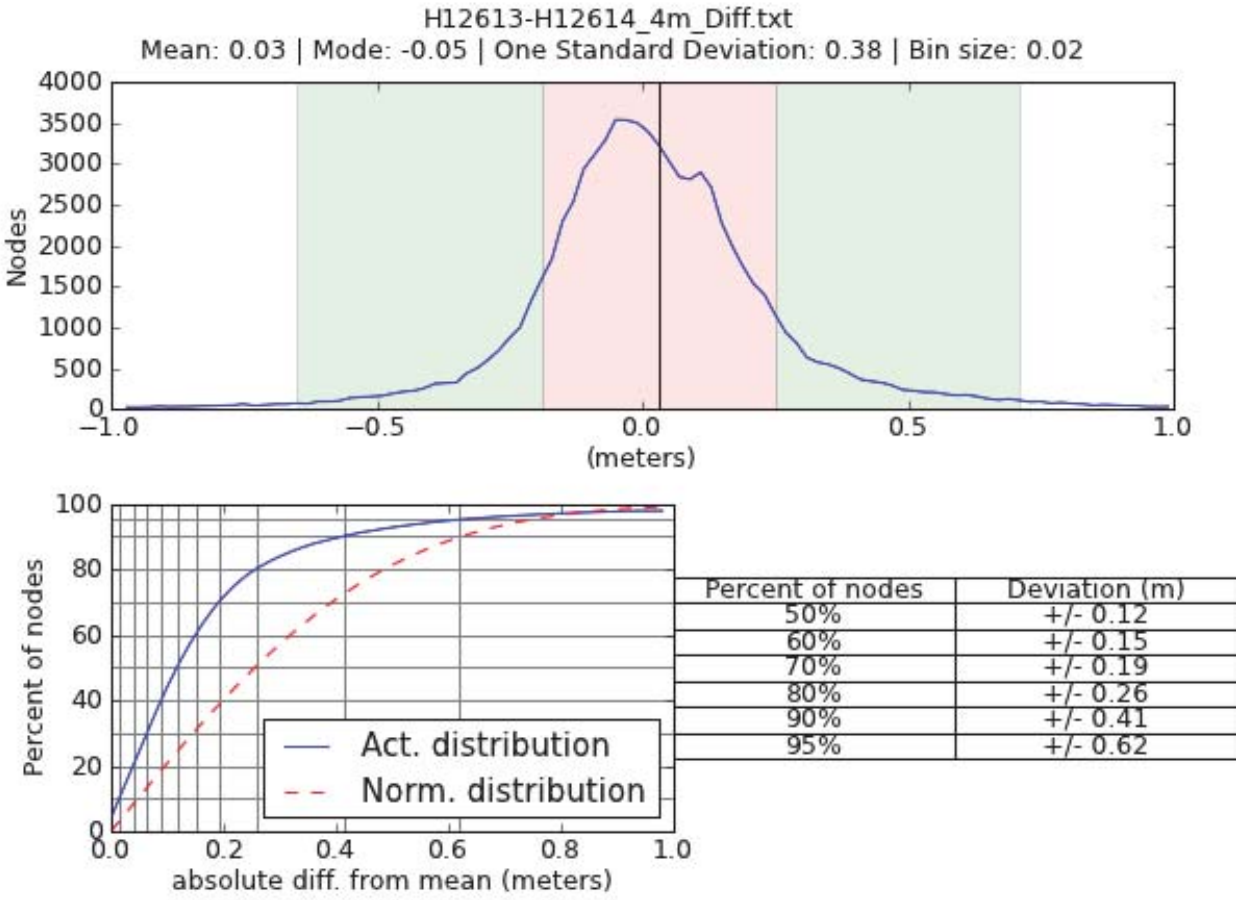


Figure 8: Junction surface (4-meter) H12613 minus H12614.



Percent of nodes	Deviation (m)
50%	+/- 0.12
60%	+/- 0.15
70%	+/- 0.19
80%	+/- 0.26
90%	+/- 0.41
95%	+/- 0.62

Figure 9: Difference Surface Statistics - H12613 minus H12614

H10771

Survey H10771 was completed in 1997 by NOAA Ship RUDE. The extent of overlap with H12613 is shown in Figure 10. This junction survey is composed of two regions which are separated by the Isles of Shoals; the larger portion to the north of Duck Island and a small area to the East of Cedar Island Ledge. Data for H10771 was provided with the project instructions as a 15-meter irregular grid of shoal-biased soundings (see H10771 DR for submitted sounding selection). For comparison with H12613, the hydrographer created a TIN of the point cloud and interpolated across the TIN to make a 4-meter surface.

The average difference of surfaces H12613 and H10771 is 0.65 meters with a standard deviation of 1.6 meters. 95% of all differences were less than +/- 3.2m. As shown in Figure 11, the mode of the differenced surface is zero while the average trends significantly to H10771 soundings being shoaler. A visual examination of the differenced surface shows that in areas of flat sea floor, the surfaces agree within 0.2 meters. In areas of rock ledges, which cover the majority of the junction area, the surfaces agree on the shoalest points of the ledges. In the valleys between the rocky ledges, the surface created from H10771 favors higher depths, likely caused by the TINing method used to create the surface. In addition, the lower resolution in which H10771 was surveyed was shoal-biased and does not honor the valleys seen in the surface generated from H12613. To verify that agreement was best on the top of rock ledges, the differenced

surface was overlayed in Base Editor's 3D editor on top of bathymetry from H12613 and colored to display areas where H12613 was shoaler or deeper than H10771, shown in Figure 12.

The hydrographer recommends that H12613 supersede H10771 in the common area.

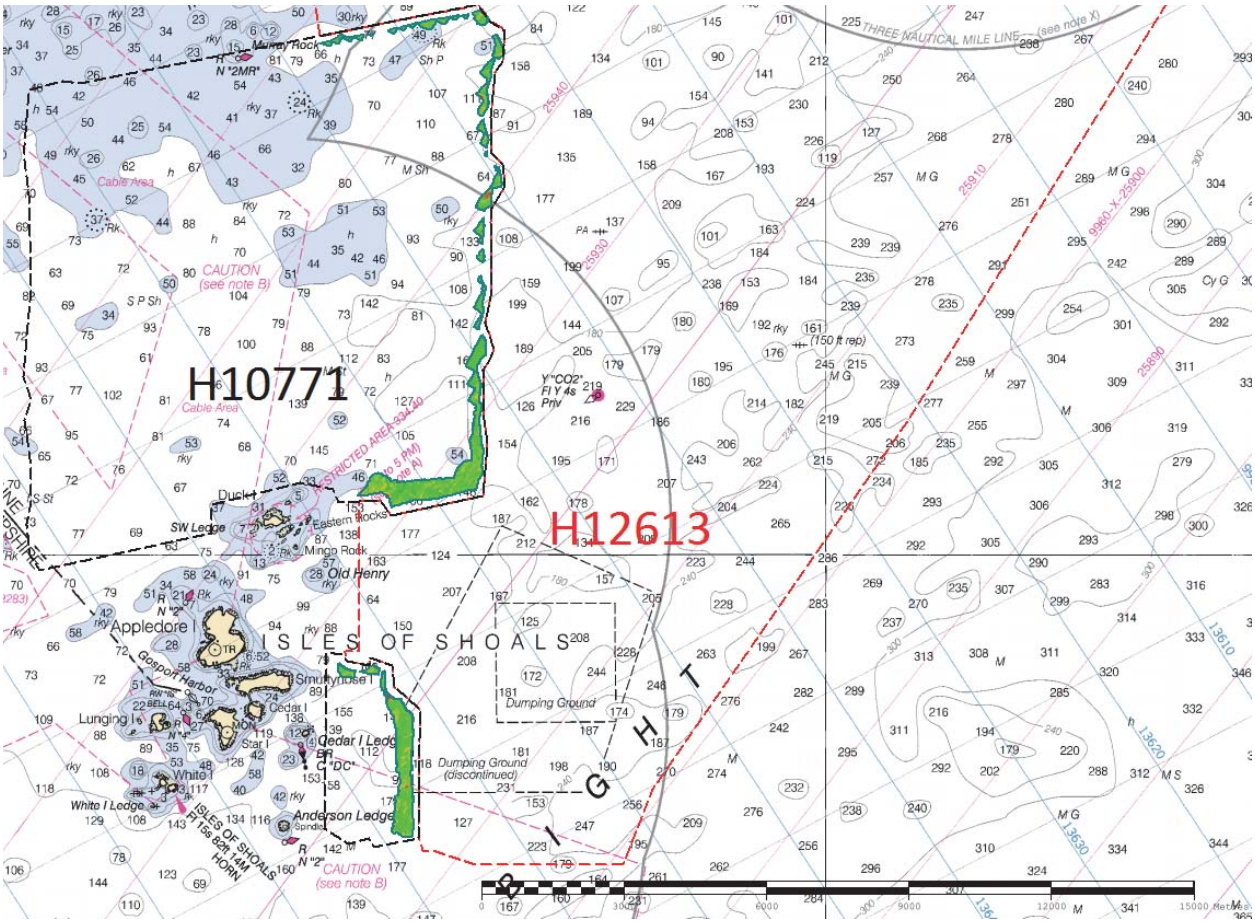
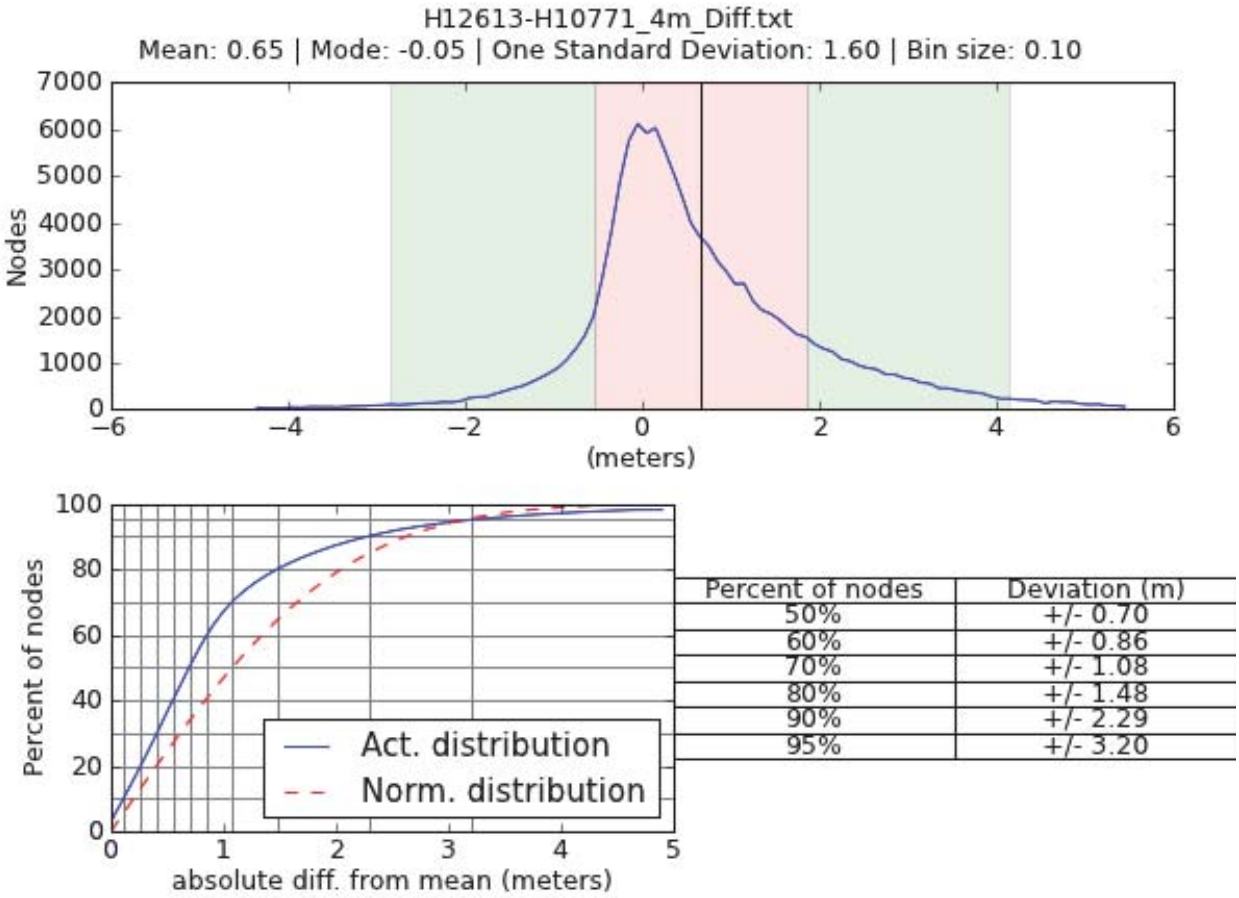


Figure 10: Junction surface (4-meter) H12613 minus H12615.



Percent of nodes	Deviation (m)
50%	+/- 0.70
60%	+/- 0.86
70%	+/- 1.08
80%	+/- 1.48
90%	+/- 2.29
95%	+/- 3.20

Figure 11: Difference Surface Statistics - H12613 minus H10771

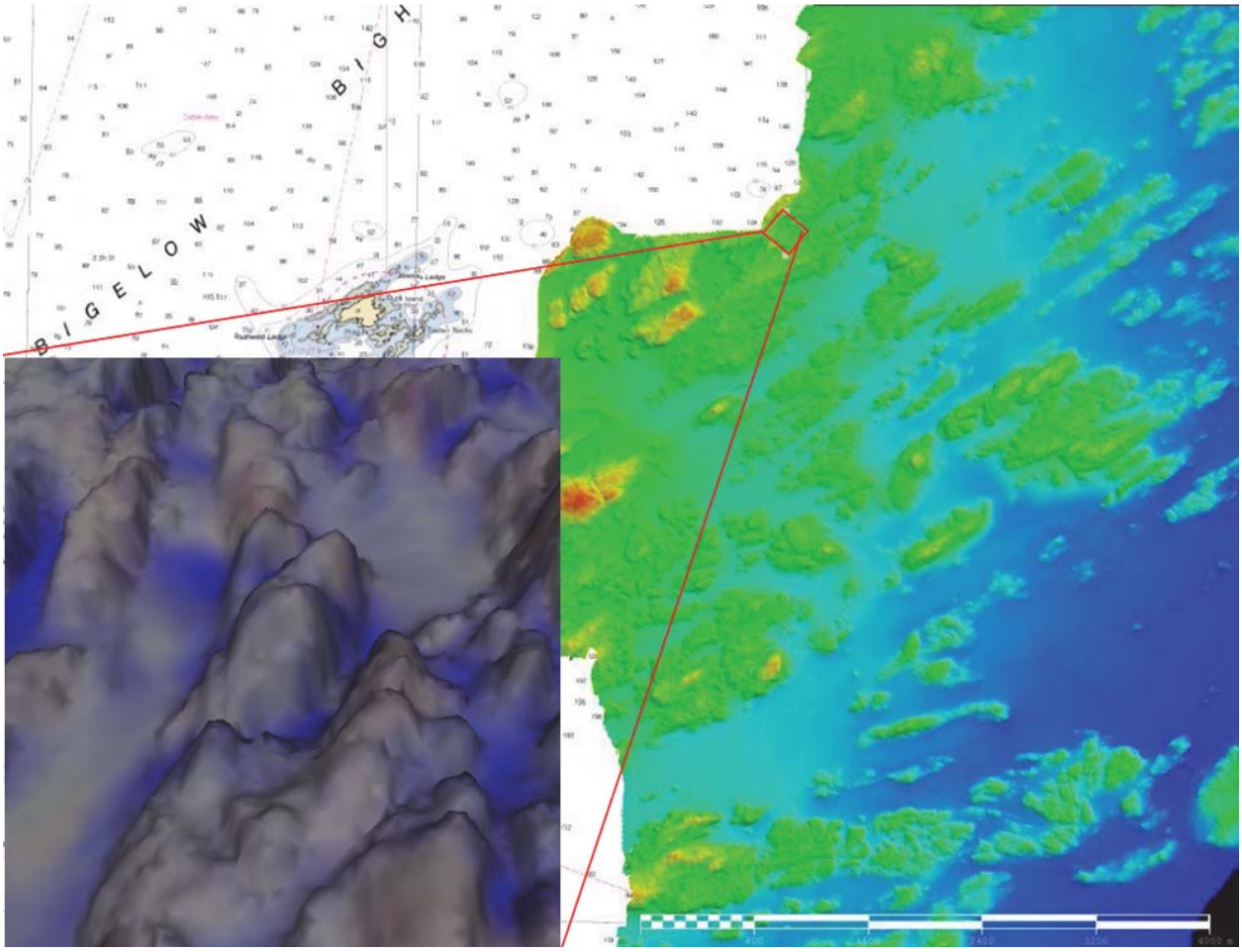


Figure 12: H12613 minus H10771 differenced surface overlayed on bathymetry from H12613, inset displayed at 1:100 meter scale. Blue colors indicate locations where soundings from H10771 are shoaler, grey indicates agreement, and red indicates soundings from H10771 deeper than H12613.

W00206

Survey W00206 was completed in 2009 by R/V COASTAL SURVEYOR as part of the UNH/CCOM Summer Hydrography Course. The extent of overlap with H12613 is shown in Figure 13. The average difference of surfaces H12613 and W00206 is 0.11 meters with a standard deviation of 0.15 meters. 95% of all differences were less than +/- 0.30m, as shown in Figure 14.

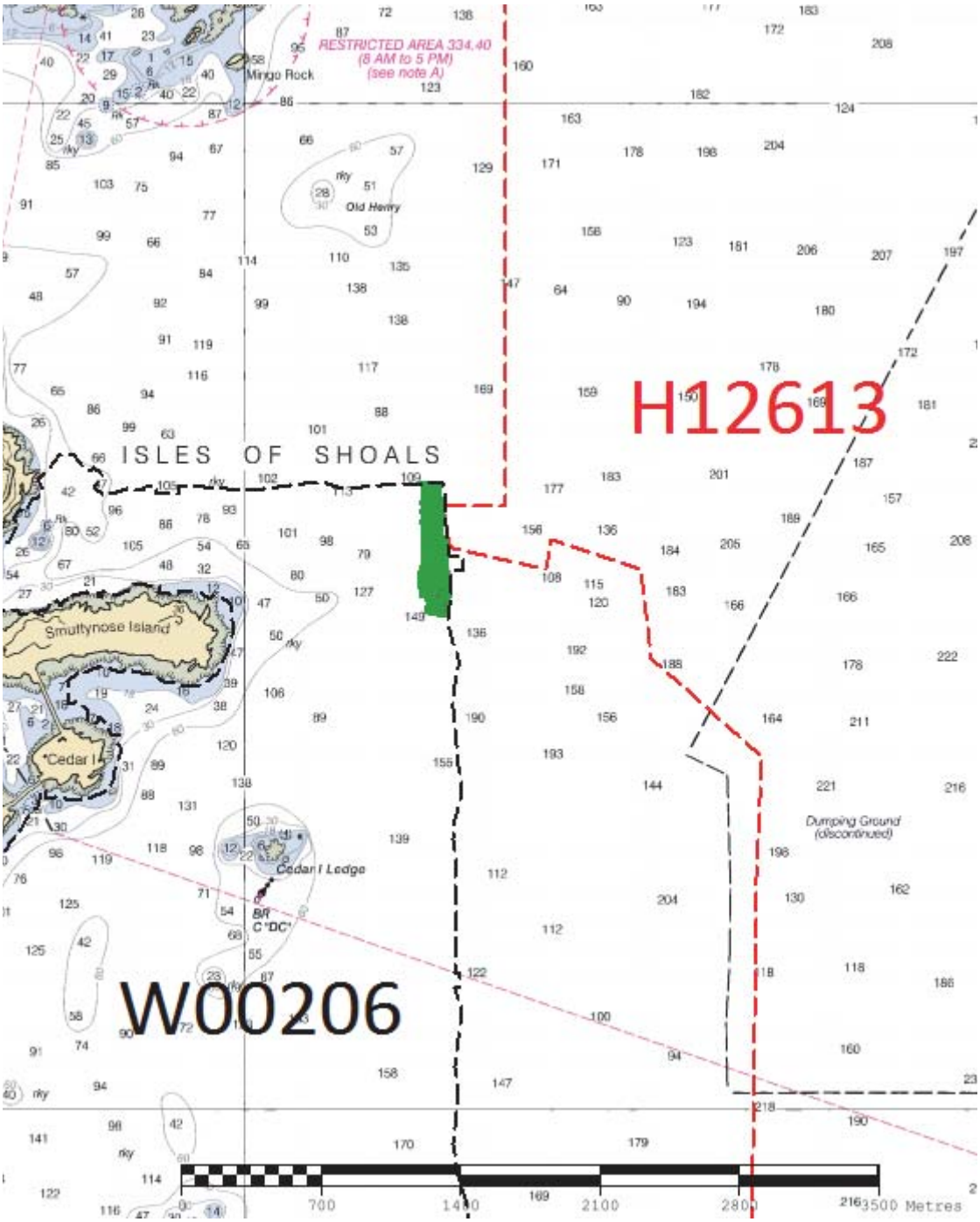
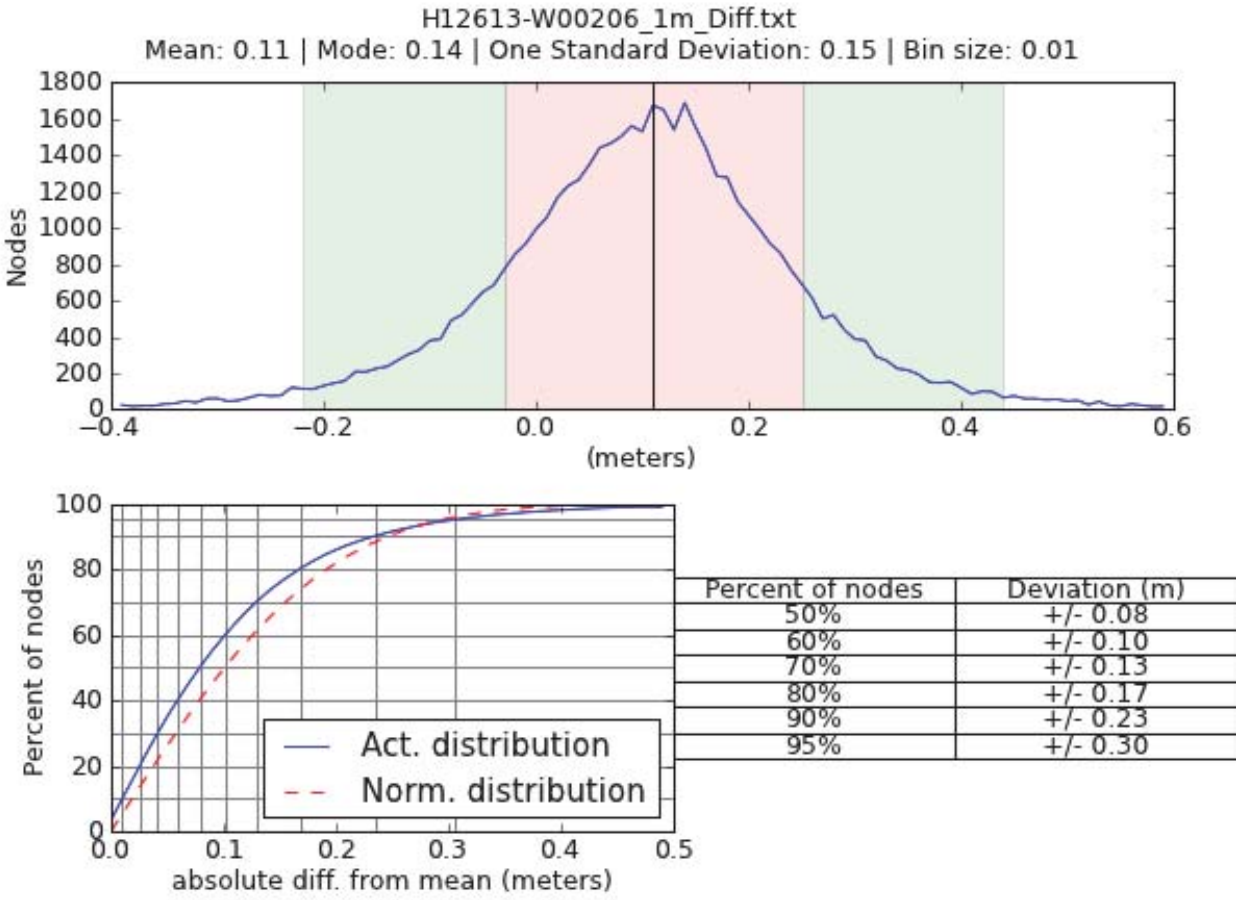


Figure 13: Junction surface (1-meter) H12613 minus W00206.



Percent of nodes	Deviation (m)
50%	+/- 0.08
60%	+/- 0.10
70%	+/- 0.13
80%	+/- 0.17
90%	+/- 0.23
95%	+/- 0.30

Figure 14: Difference Surface Statistics - H12613 minus W00206

F00574

Survey F00574 was completed in 2009 by NOAA Ship THOMAS JEFFERSON. The extent of overlap with H12613 is shown in Figure 15. The average difference of surfaces H12613 and F00574 is 0.09 meters with a standard deviation of 0.24 meters. 95% of all differences were less than +/- 0.44m, as shown in Figure 16.

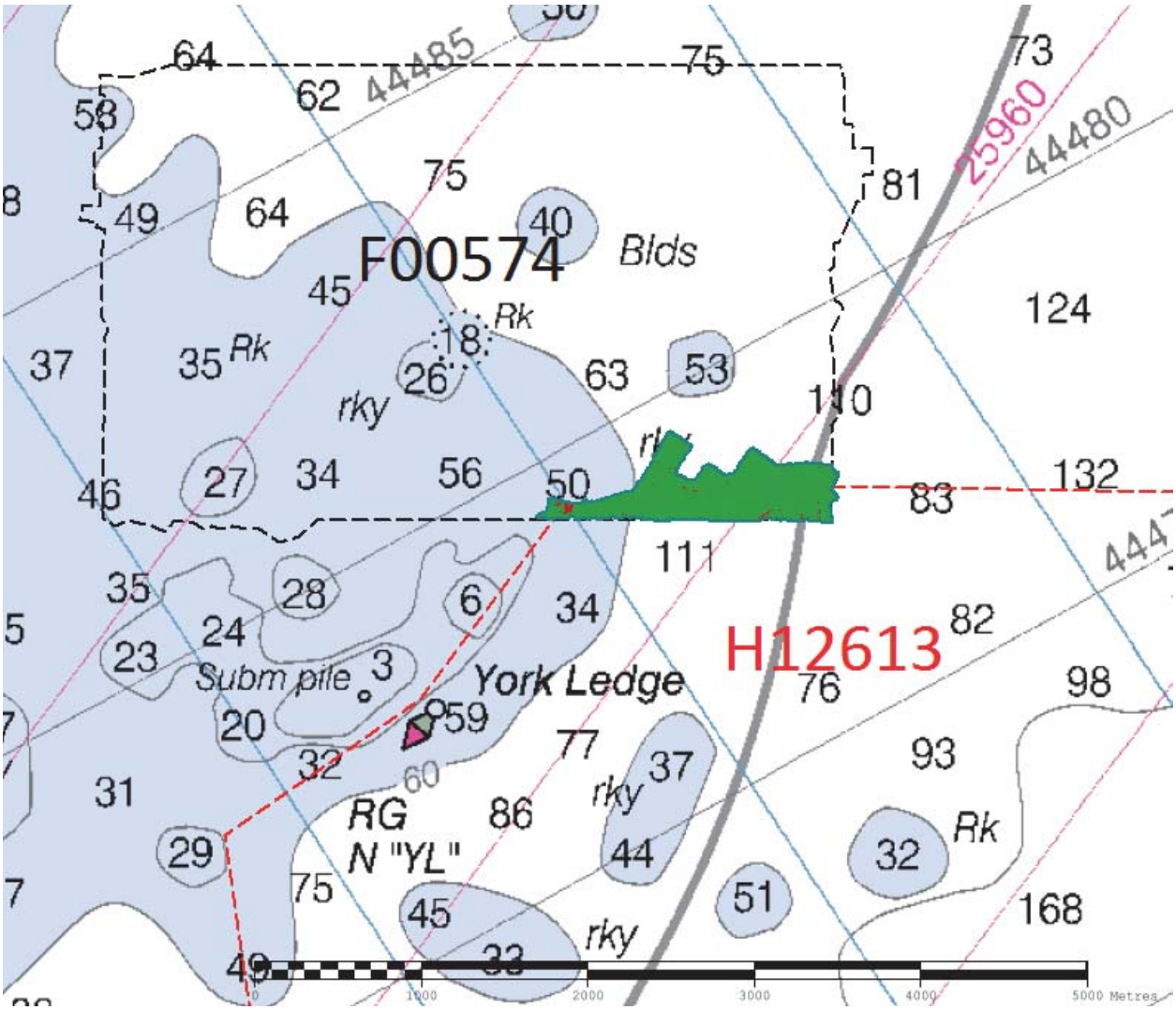


Figure 15: Junction surface (2-meter) H12613 minus F00574.

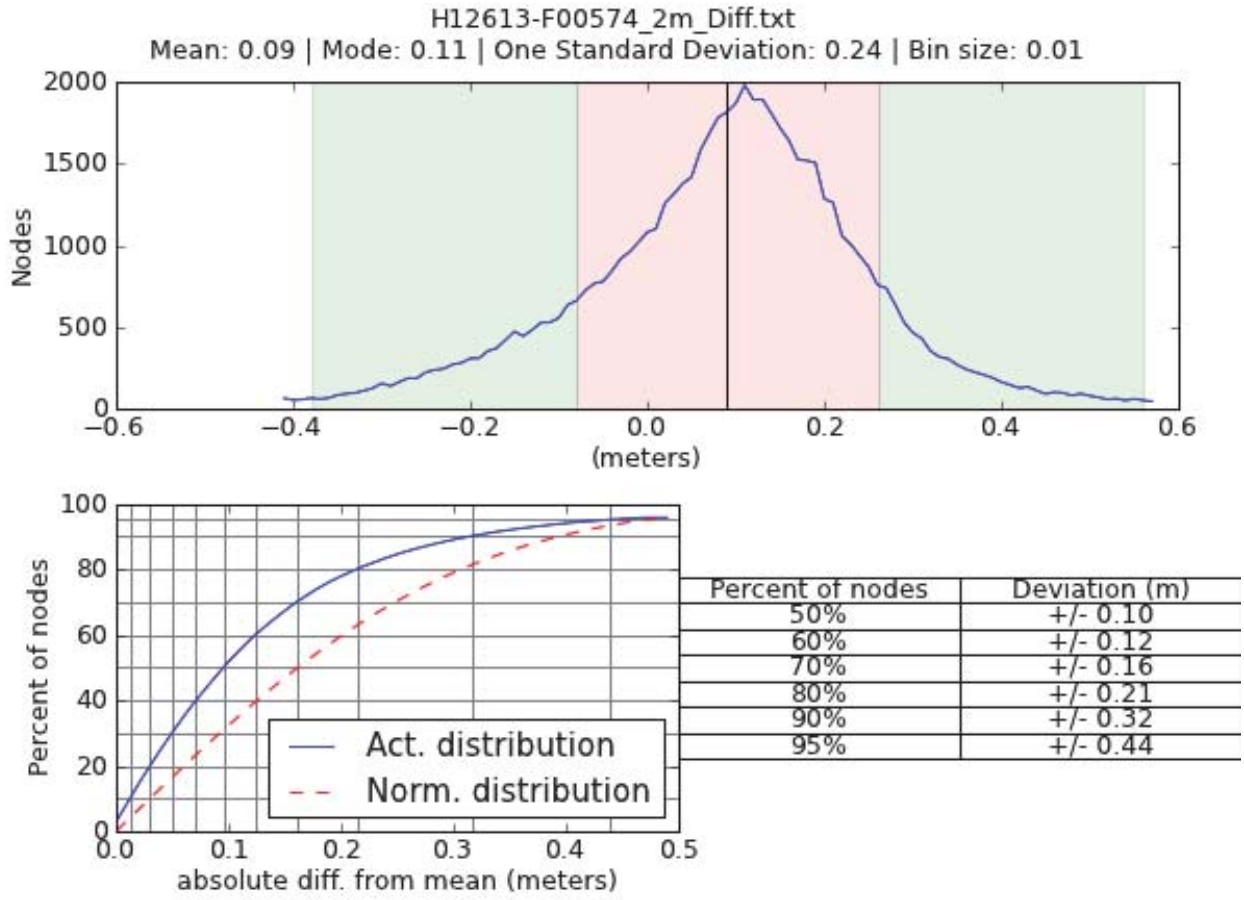


Figure 16: Difference Surface Statistics - H12613 minus F00574

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

Sonar Range

All sonar data in H12613 was acquired with Reson 7125 400kHz systems, set to equidistant beam forming with 512 beams per head for 1024 beams per ping. The depths along the eastern edge of H12613 push the depth limits of 400kHz capability for full swath width. Lines run in this depth contain outer beam noise, illustrated in Figure 17, that was rejected by the hydrographer.

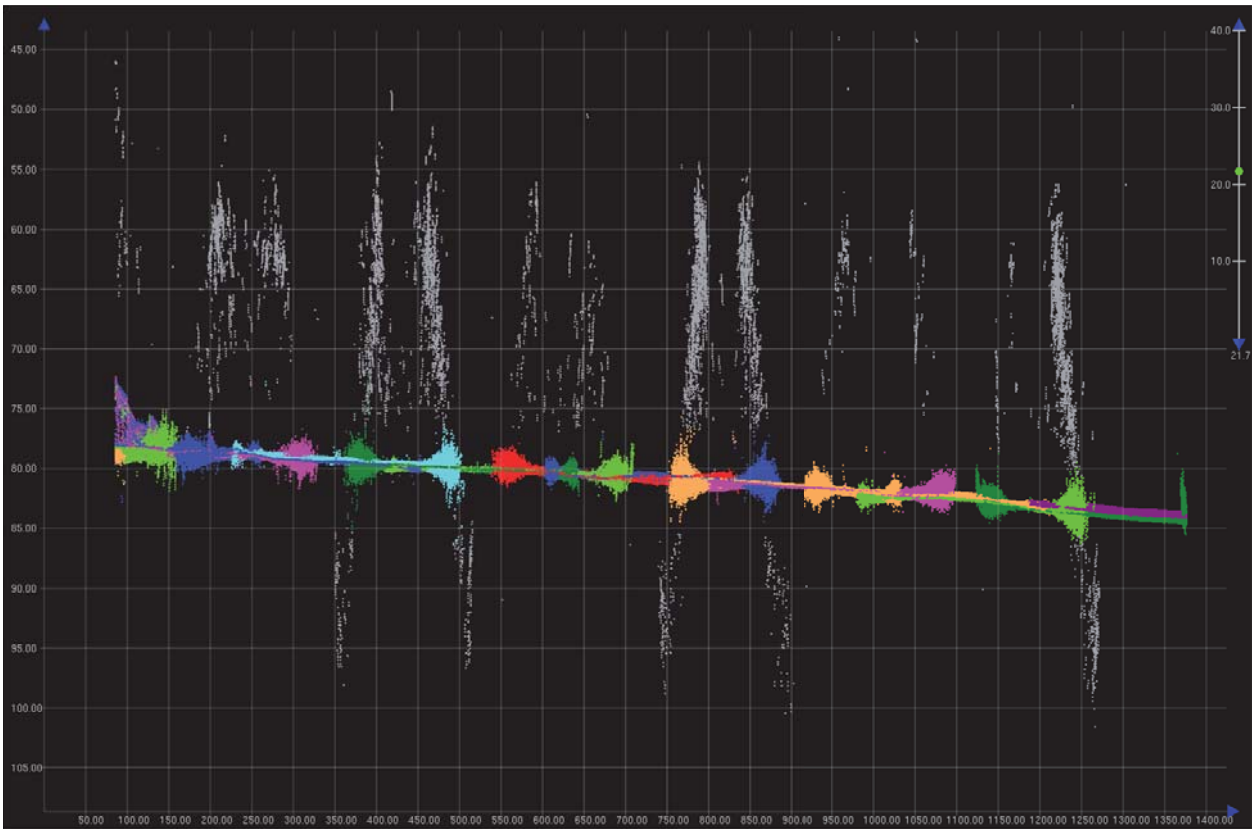


Figure 17: Outer beam noise resulting from reaching the depth limits of the Reson 400kHz system.

Data Acquired During Turns

Several lines run by HASSLER on H12613 include turns between planned lines or data logged while the ship was hove to. This was caused by the acquisition configuration between Hypack and Reson, where logging is triggered by Hypack but data is logged locally on the Reson topside unit. Hysweep occasionally froze its display and failed to continue logging during acquisition. As this did not effect the 7k data logged by Reson, the hydrographer would reset Hysweep and Hypack, but would not always stop logging on the Reson TPU. Due to hydrographer failure to manually stop the Reson topside unit logging upon completion of a line, logging would continue across planned lines or during CTD casts, as shown in Figure 18 & 19. These data were examined and fall within survey standards.

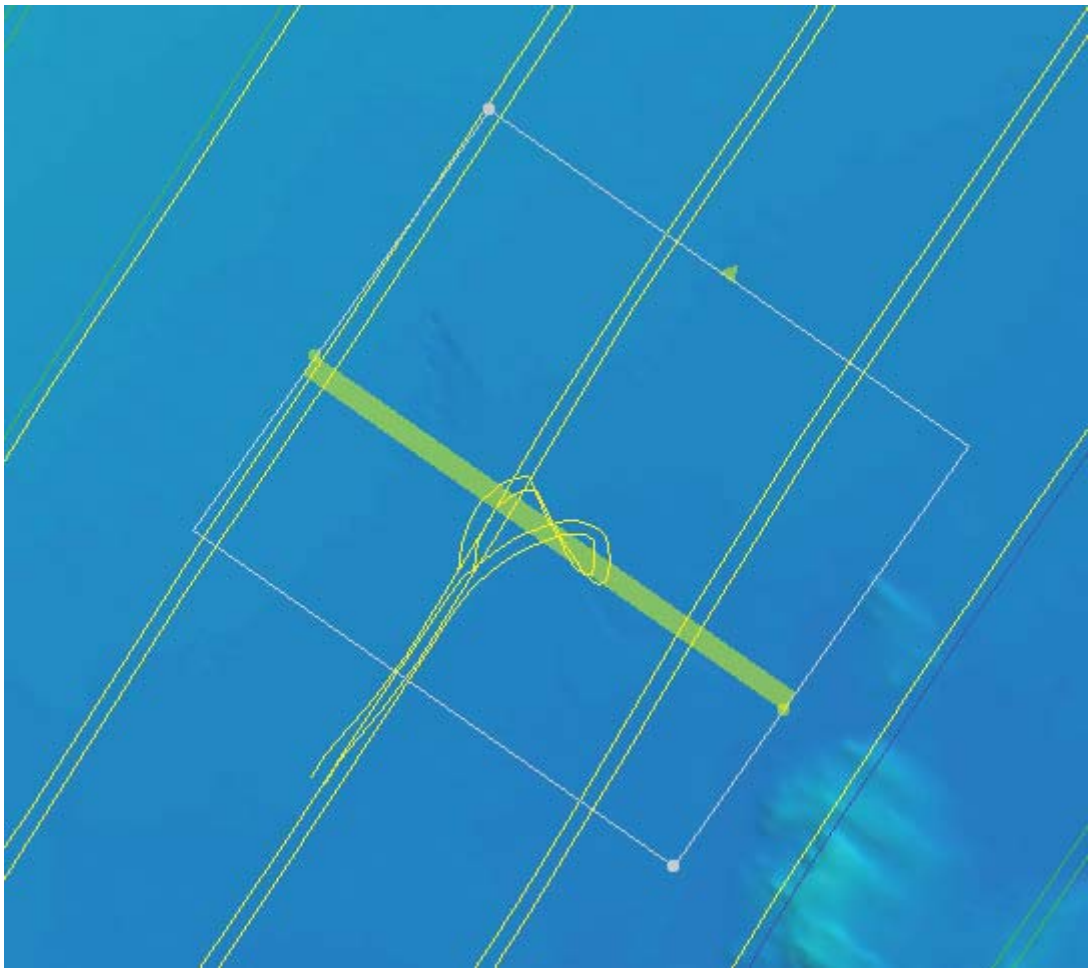


Figure 18: Data acquired during a CTD cast

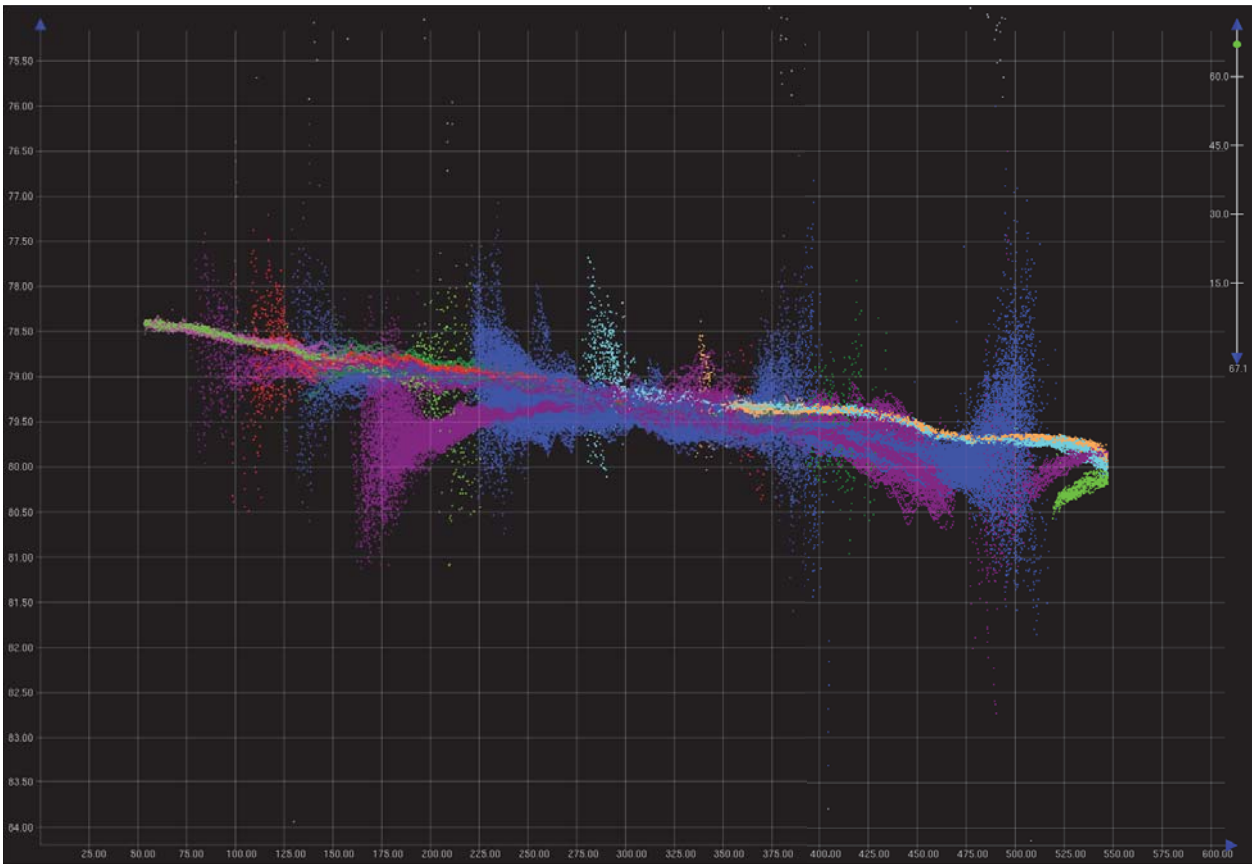


Figure 19: Subset view of data depicted in Figure 17

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: Moving Vessel Profiler casts were taken in 30 minute increments for 3 casts until the instrument was lost during acquisition, as discussed in B.1.2. CTD casts were taken every 2.5 hours or when geographically needed for all follow-on acquisition for H12613. Sound speed corrections were applied with Nearest in Distance Within Time (NIDWT) of 3 hours for the entire survey, with the exception of the lines listed below where NIDWT of 4 hours was used.

Starboard
20130816_111800
20130816_111312

Port
20130816_111800
20130816_111310

B.2.8 Coverage Equipment and Methods

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

B.2.9 Sound Speed Instrument DQA

Quality comparisons described in the DAPR were not performed between the AML MicroCTD and CTD for H12613. The MVP towfish was lost during acquisition of a buffer line establishing the Northeast boundary of the sheet. A successful QA comparison was made between the CTD and AML SV & P sensor on DN248.

B.2.10 Density Analysis

A density analysis was run to calculate the number of soundings per surface node. Five or more soundings per node were present in over 97% of all surfaces. For additional details refer to H12613_Standards_Compliance report submitted in Appendix II of this report.

B.2.11 Outer Beam Vertical offset

Data throughout H12613 exhibits an oscillating vertical offset with a spatial wavelength of about 25 meters, and a maximum amplitude of approximately +/-15cm in ~80 meters of water. This offset is most noticeable when comparing the outermost beams with near nadir beams of adjacent lines, using an along track view in subset (Figure 20). The error is persistent regardless of SBET application, reduction to MLLW, or sound speed cast applied. It also has a period that does not match up with pitch, roll, or heave, and persists even when rotational attitude has minimal change. No other anomalies were matched with periods of time where the oscillation occurs. Upon visual inspection, the oscillation is evident in areas of deep, flat sea floor and undetectable over rocky ledges. The hydrographer was unable to isolate the source of the offset. The oscillating vertical offset does not affect the CUBE surface where present. The hydrographer recommends retaining these data.

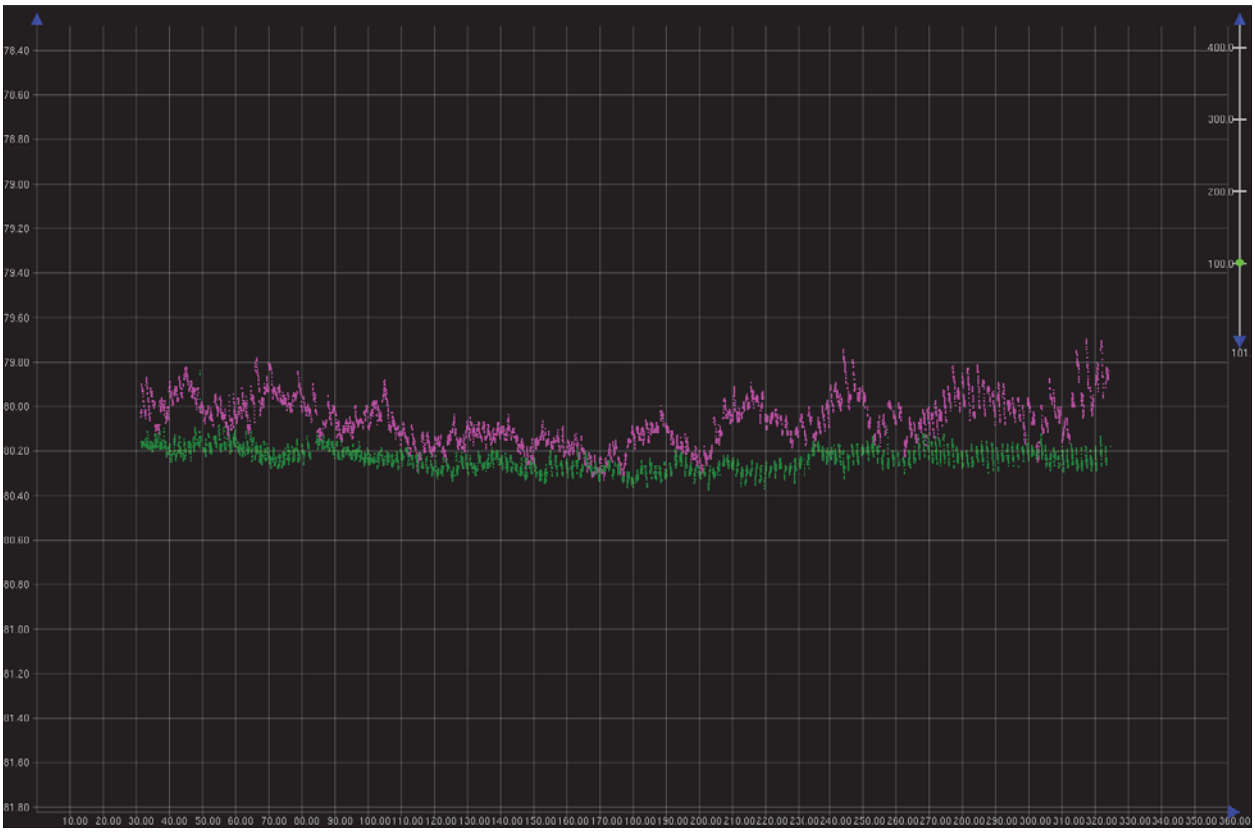


Figure 20: Subset view of most egregious instance of outer beam vertical offset.

B.2.12 Sound Speed Error

The north edge of H12613 contains an area with a large sound speed artifact, shown in Figures 21 and 22. This artifact is most pronounced in starboard lines 20130815_043832 and 20130815_041422 and port lines 20130815_043833 and 20130815_041422. The hydrographer inspected the lines for surface sound speed inconsistencies, differences in CTD cast application, and inconsistencies associated with the cast, and found no conclusive reason for the issue. As this issue affects two lines at the same location run 30 minutes apart, it is likely caused by a localized factor that affected the two lines. This sound speed artifact does not affect the CUBE surface. The hydrographer recommends retaining these data.

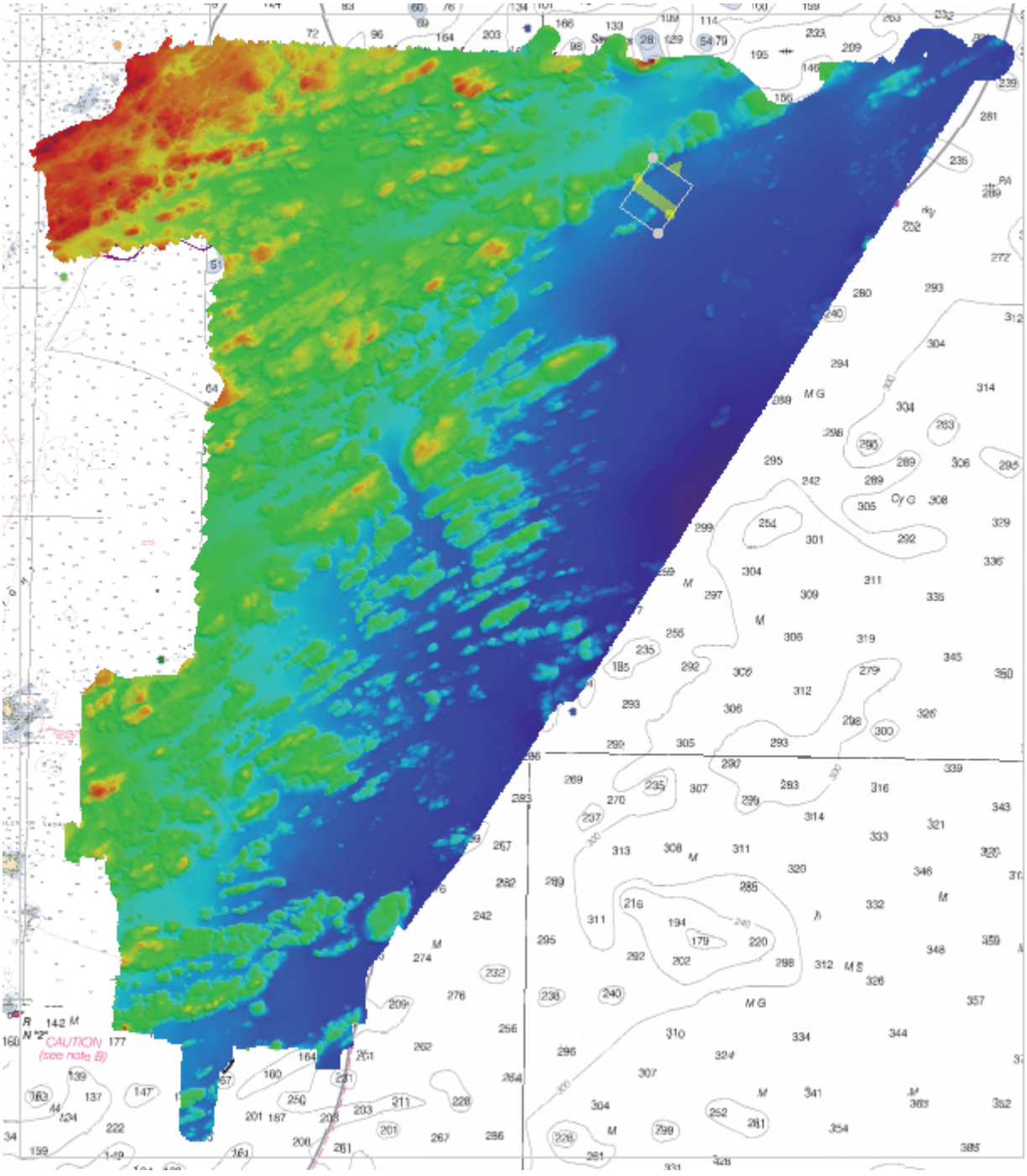


Figure 21: Data effected by sound speed issue

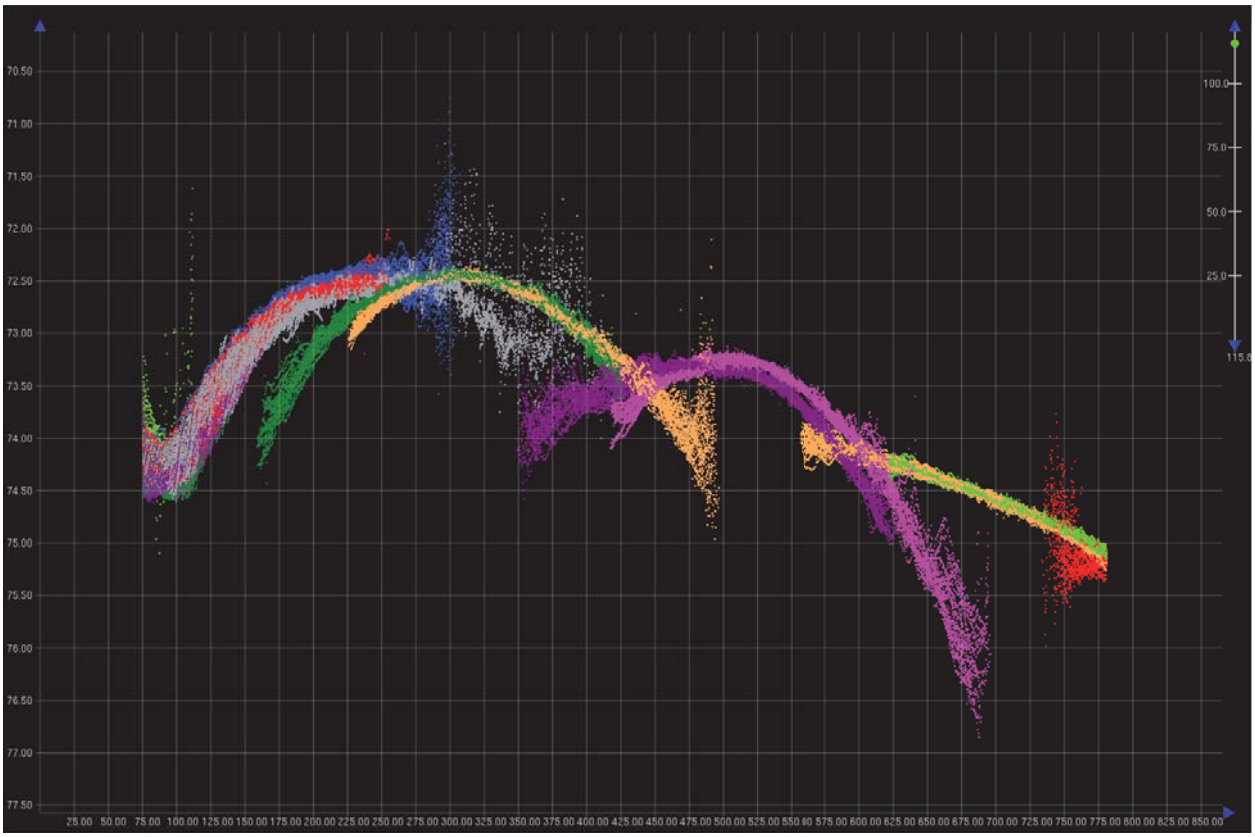


Figure 22: Subset view of data depicted in Figure 21, displaying artifacts in outer beams indicative of sound speed errors.

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.3.3 Designated Soundings

Seventeen soundings were designated for H12613: 15 were submitted as DTONs on September 16th as discussed in Appendix II. The other two sounding were designated to ensure the surface reflected the shoalest sounding on two features. One is cartographically insignificant and the other, an anthropogenic feature, is discussed in section D.2.8.

B.4 Backscatter

Backscatter was logged in Reson datagram 7008 snippets record in the raw .s7k files. The .s7k file also holds the navigation record and bottom detections for all lines of survey H12613. The files were paired with the CARIS HDCS data, imported and processed using Fledermaus Geocoder Toolbox, version 7.3 4a, Build 371, 64-bit version.

The GSF files containing the extracted backscatter are submitted with the data in this survey. The processed mosaic is saved as a geoTiff and also submitted.

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 Extended Attribute Files V5_3_2

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
H12613_MB_50cm_MLLW	CUBE	0.5 meters	7 meters - 172 meters	NOAA_0.5m	Object Detection
H12613_MB_50cm_MLLW_Final_0to20	CUBE	0.5 meters	0 meters - 20 meters	NOAA_0.5m	Object Detection
H12613_MB_2m_MLLW	CUBE	2 meters	8 meters - 96 meters	NOAA_2m	Complete MBES
H12613_MB_2m_MLLW_Final_18to40	CUBE	2 meters	18 meters - 40 meters	NOAA_2m	Complete MBES
H12613_MB_4m_MLLW	CUBE	4 meters	8 meters - 94 meters	NOAA_4m	Complete MBES
H12613_MB_4m_MLLW_Final_36plus	CUBE	4 meters	36 meters - 100 meters	NOAA_4m	Complete MBES

Table 9: Submitted Surfaces

B.5.3 Total Vertical Uncertainty Analysis

A custom layer was created on finalized surfaces showing the uncertainty of individual nodes in relation to the allowable uncertainty for their depths. A statistical analysis of the data showed 99.71% of nodes within the 2-meter and 4-meter surfaces met the vertical uncertainty standards of section 5.1.3 of the Hydrographic Surveys Specifications and Deliverables 2013 (HSSD). Only 92.88% of nodes within the 50-cm surface met the vertical uncertainty standards, which fails to meet the requirements in section 5.1.3 of the HSSD. An analysis of the 50cm surface indicates that failure to meet HSSD uncertainty standards may be attributable to the high relief exhibited by the seabed in this depth range.

For more detail, see the H12613_Standards_Compliance report submitted in Appendix II of this report.

C. Vertical and Horizontal Control

All vertical and horizontal control activities conducted during the course of this survey are fully addressed in the following sections. Therefore, no separate HVCR is submitted.

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
Fort Point, NH	8423898

Table 10: NWLON Tide Stations

File Name	Status
8423898.tid	Final Approved

Table 11: Water Level Files (.tid)

File Name	Status
A321FH2013CORP.zdf	Final

Table 12: Tide Correctors (.zdf or .tc)

A request for final approved tides was sent to N/OPS1 on 09/08/2013. The final tide note was received on 09/23/2013.

Preliminary zoning is accepted as the final zoning for project OPR-A321-FH-13, H12613, during the entire time period of survey operations.

Non-Standard Vertical Control Methods Used:

VDatum

Ellipsoid to Chart Datum Separation File:

2013_A321_VDatum_NAD83Ellip_MLLW.xyz

As required by the Project Instructions, the hydrographer evaluated VDatum for the survey area prior to H12613 final processing. Due to vertical anomalies in the post processed trajectory, VDatum was not the chosen vertical transformation tool for H12613. The Chief, Hydrographic Surveys Division, concurred with this recommendation. See Appendix II for correspondence associated with this decision.

GPS Tides were computed using the aforementioned separation file, but all bathymetric data submitted is vertically corrected using discrete zoned tides. All SBETs remain loaded with the submitted data, and are used for horizontal positioning only. All SMRMSG files remain loaded with the submitted data, but were not used in uncertainty calculations and should be ignored.

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 19N.

The following PPK methods were used for horizontal control:

Smart Base

All data submitted as H12613 have SBETs applied for post processed horizontal position. DGPS positioning, shown in Table 14, was used only for real-time horizontal control during data acquisition.

While planning for project A321-FH-13, a proposed smartbase network was analyzed. According to active CORS stations, a reference station (NHUN) is located on the University of New Hampshire Campus in Durham, New Hampshire. This station is within the 50km radius specified in the HSSD 2013. Data acquisition during the first leg of the project (8/12/13-8/21/13) revealed that this reference station rarely had continuous coverage throughout a 24-hour period. As a result of these gaps, data from station NHUN could not be utilized in post-processing and the Smartbase project does not meet the specifications of the 2013 HSSD.

The hydrographer contacted the NHUN operators and learned that the station was not expected to be repaired in the near future. However, the University operates an alternate reference station on Odiornes Point, which is ideally situated for use on OPR-A321-FH-13. This station was found to be more reliable, and the hydrographer arranged to utilize the data. This station is referred to by either the name “Odiornes” or “8276” in the submitted data. Base station coordinates were computed by averaging three days of 24-hour OPUS solutions. With the use of this reference station, all data collected after September 4th meets specifications of the HSSD 2013.

The following CORS Stations were used for horizontal control:

HVCR Site ID	Base Station ID
Bar Harbor NGS	BARH
Concord NHDOT	NHCO
Gilford UNAVCO	P776
Foxborough COOP	XMTS
Yarmouth COOP	YMTS
Nashua WAAS 1	ZBW1
Westford 2	WES2
Acushnet 5	ACU5
Durham UNH	NHUN
Penobscot 6	PNB6
Halifax	HLFX

Table 13: CORS Base Stations

The following user installed stations were used for horizontal control:

HVCR Site ID	Base Station ID
Odiornes Point	8276

Table 14: User Installed Base Stations

The following DGPS Stations were used for horizontal control:

DGPS Stations
Brunswick, ME (316kHz)

Table 15: USCG DGPS Stations

D. Results and Recommendations

D.1 Chart Comparison

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
13283	1:20000	22	04/2013	09/17/2013	10/05/2013
13278	1:80000	28	08/2013	09/17/2013	09/28/2013
13286	1:80000	31	06/2013	10/05/2013	09/17/2013

Table 16: Largest Scale Raster Charts

13283

Two small areas of H12613, approximately 2 snm each, overlap 13283 in the vicinity of York Ledge and east of Isles of Shoals. Discrepancies between H12613 soundings and charted depths were the greatest in magnitude and number within the northern area, the vicinity of York Ledge. Approximately 50% of charted depths were more than 6 feet deeper than surveyed soundings. In the area east of Isles of Shoals, approximately 40% of charted depths were more than 6 feet deeper than surveyed soundings. In addition, where shoals are charted, significant horizontal displacement was found between charted and surveyed least depths. Charted depths in this area are primarily sourced from early 20th century surveys performed with lead line and visual positioning methods. The hydrographer considers seabed changes of this magnitude since the prior survey highly unlikely, and suggests that these discrepancies are the result of the increased coverage, resolution, and accuracy of the current survey. The hydrographer recommends that the current survey data supersede charted depths in the common area.

13278

Seventy percent of survey soundings agree to within three feet of charted depths. In areas of high relief, survey soundings were shoaler than nearby charted depths, likely as a result of the increased coverage, resolution, and accuracy of the current survey. While most charted depth curves agreed with contours generated from survey data, dramatic differences are apparent in the vicinity of isolated shoals. This is likely due to the lower resolution and incomplete coverage of the sounding set from which the charted curves are drawn. The hydrographer recommends that the current survey data supersede charted depths in the common area.

13286

Charts 13286 and 13278 overlap for 6 NM within H12613. Both charts are at a 1:80,000 scale, and contain identical depths. Comparison of H12613 with chart 13286 revealed the same discrepancies as comparison with raster chart 13278. See section D.1.1 for details.

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?
US4MA04M	1:80000	21	10/02/2013	10/02/2013	NO

Table 17: Largest Scale ENCs

US4MA04M

Comparison of H12613 with ENC US4MA04M revealed the same discrepancies as comparison with raster chart 13278. See section D.1.1 for details.

D.1.3 AWOIS Items

Number of AWOIS Items Addressed: 2
Number of AWOIS Items Not Addressed: 1

100% multibeam was accomplished for the full search radius of AWOIS item #2181. Item #2181 has a detailed description of a wreck dating to 1944 measuring 150 ft and covered in 210 ft of water, listing an accuracy of 1 mile. The hydrographer created field sheets covering twice the distance of the AWOIS search radius of the item, and utilized surfaces at twice the resolution of the appropriate depth to search of the AWOIS item. This item was not found within H12613. The hydrographer recommends removing the charted wreck.

100% multibeam was accomplished for the full search radius of AWOIS item #15149. Item #15149 is a wreck of undetermined size reported by the USCG in 1993 with an approximate position. The hydrographer created field sheets covering twice the distance of the AWOIS search radius of the item, and utilized surfaces at twice the resolution of the appropriate depth to search of the AWOIS item. This item was not found within H12613. The hydrographer recommends removing the charted wreck.

The search radius for AWOIS Item #2190 was partially inside of the assigned survey limits for H12613. The survey extents were modified to excise the AWOIS item search radius as mentioned in section A.3. This item will be fully investigated as part of H12612.

D.1.4 Maritime Boundary Points

No Maritime Boundary Points were assigned for this survey.

D.1.5 Charted Features

The 'Rk' charted in the vicinity of York Ledge at position 43° 05.26' N 070° 33.77' W was examined and does not appear to be an isolated rock. It was found to be part one of numerous rocky ledges found in the area. The hydrographer recommends removal of the charted rock, replacing it with surveyed soundings in the area, and retaining the 'Rky' seabed type annotation charted nearby.

D.1.6 Uncharted Features

An object which appears to be anthropogenic with dimensions of 6 by 5 meters and a height of 3 meters was discovered by 100% multibeam coverage at position 43° 06.05' N 070° 30.55' W in 47 meters of water, shown in Figure 23. HASSLER ran 3 SSS development lines over the target, see Figure 24. The shoalest sounding on the object was designated in CARIS HIPS to force CUBE to honor the object in the surface.

The hydrographer is confident the least depth is reflected in the submitted data. Due to the depth of water and uncertain nature of this feature, the hydrographer recommends charting survey soundings only. For this reason, the object is not included in the Final Feature File.

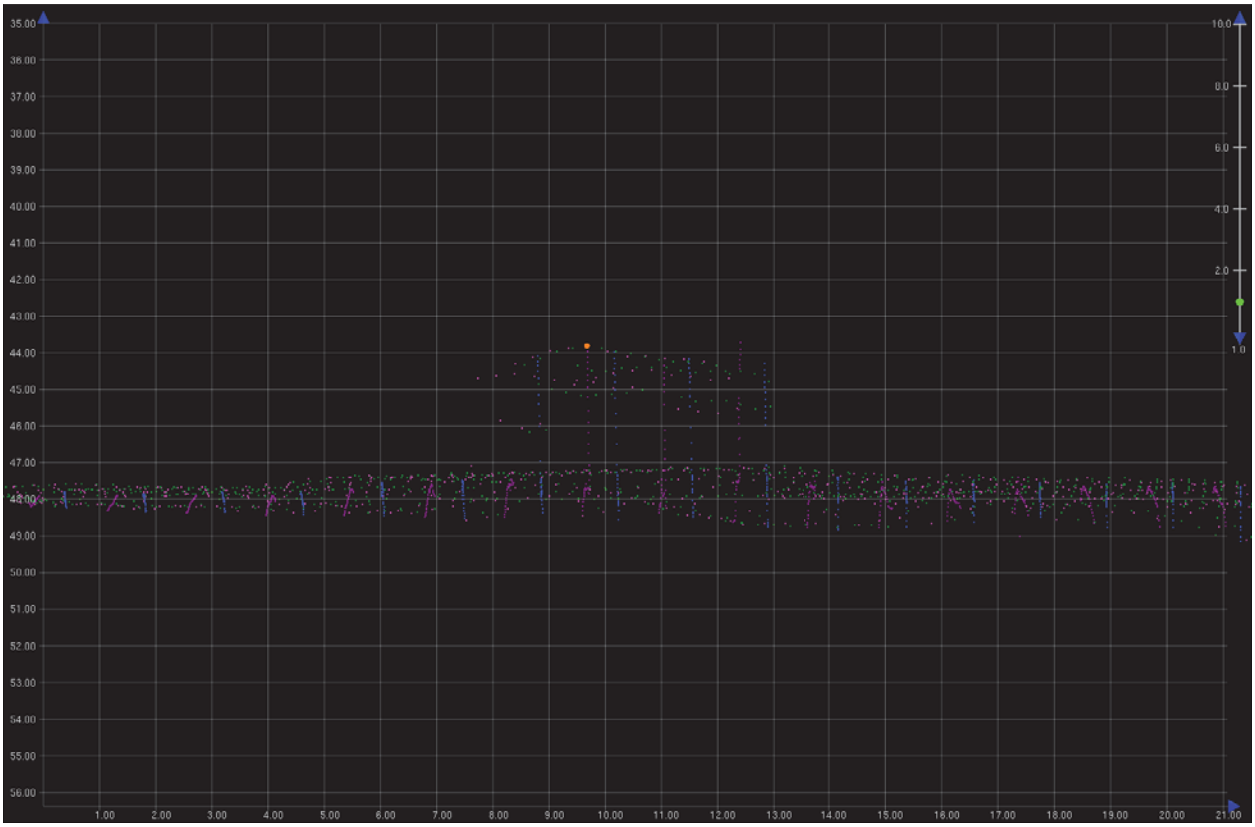


Figure 23: Object discovered in 47m depth.

Figure 24: SSS data over discovered object.

D.1.7 Dangers to Navigation

Danger to Navigation Reports were submitted on September 16th, and are included in Appendix II of this report.

D.1.8 Shoal and Hazardous Features

Numerous shoals exist within the extents of H12613. However, none outside the vicinity o York Ledge pose a hazard to surface navigation. As discussed in Section D.1.1, the York Ledge area was assessed for discrepancies with navigation significance and DTONs were submitted as appropriate.

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

Bottom samples were taken to adequately sample the different bottom types apparent in the backscatter mosaic. Twelve bottom samples were taken within the limits of H12613 to ground truth areas of different backscatter return. All bottom samples received S-57 attribution and are included in the submitted final feature file (FFF).

In addition, where areas of similar bottom type could be identified in the backscatter data, the hydrographer has digitized seabed areas attributed with the characteristics of the appropriate bottom sample. These area objects are also included in the FFF.

D.2 Additional Results

D.2.1 Shoreline

No shoreline exists within the limits assigned for H12613.

D.2.2 Prior Surveys

Prior surveys were available, but not compared with current data.

D.2.3 Aids to Navigation

The "CO2" lighted private buoy was not found at its charted location at the beginning of survey operations for H12613. During the last day of acquisition, the buoy was sighted and found to be in its charted location. The hydrographer determined through discussion with University of New Hampshire personnel that the buoy had been redeployed by R/V GULF CHALLENGER during survey operations. This buoy is for research purposes and does not serve as a navigational aid. The hydrographer recommends retaining as charted.

All other ATONs within the extents of H12613 were found to be on station and serving their intended purpose.

D.2.4 Overhead Features

No overhead features exist for this survey.

D.2.5 Submarine Features

Submarine features were investigated and attributed in the sheet's final feature file if deemed significant.

D.2.6 Ferry Routes and Terminals

No ferry routes or terminals exist for this survey.

D.2.7 Platforms

No platforms exist for this survey.

D.2.8 Significant Features

No significant features exist for this survey.

D.2.9 Construction and Dredging

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

D.2.10 New Survey Recommendations

The area surrounding York Ledge was surveyed to the safe navigable limit achievable by HASSLER without the use of a survey launch. As discussed in Section D.1.1, the region of York Ledge showed significant differences from charted depths. The hydrographer recommends the area be addressed in a later survey by a platform suited for nearshore work.

D.2.11 New Inset Recommendations

No new insets are recommended for this area.

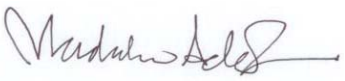
E. Approval Sheet

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 with the exception of discrepancies noted in this report. These data are adequate to supersede charted data in their common areas. This survey is complete and no additional work is required except as noted in Section D.2.10 of this report.

Report Name	Report Date Sent
OPR-A321-FH-13 Data Acquisition and Processing Report	2013-12-09
Hydrographic Survey Readiness Review Memo	2013-08-15

Approver Name	Approver Title	Approval Date	Signature
LT Adam Reed, NOAA	Sheet Manager	12/02/2013	
LT Madeleine Adler, NOAA	Field Operations Officer	12/02/2013	
LCDR Benjamin K. Evans, NOAA	Commanding Officer	12/02/2013	

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
TPU	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

APPENDIX I

TIDES AND WATER LEVELS

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

PROVISIONAL TIDE NOTE FOR HYDROGRAPHIC SURVEY

DATE: September 19, 2013

HYDROGRAPHIC BRANCH: Atlantic
HYDROGRAPHIC PROJECT: OPR-A321-FH-2013
HYDROGRAPHIC SHEET: H12613

LOCALITY: Vicinity of Isle of Shoals
TIME PERIOD: August 12 – September 7, 2013

TIDE STATION USED: 842-3898 Fort Point, NH
Lat: 43° 4.3'N Lon: 70° 42.7'W
PLANE OF REFERENCE (MEAN LOWER LOW WATER): 0.000 meters
HEIGHT OF HIGH WATER ABOVE PLANE OF REFERENCE: 2.735 meters

REMARKS: RECOMMENDED ZONING
Preliminary zoning is provisionally accepted as the final zoning for project OPR-A321-FH-2013, H12613, during the time period between August 12 - September 7, 2013.

Please use the zoning file A321NF2013CORP submitted with the project instructions for OPR-A321-FH-2013. Zones NA157, NA168, and NA169 are the applicable zones for H12613.

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).

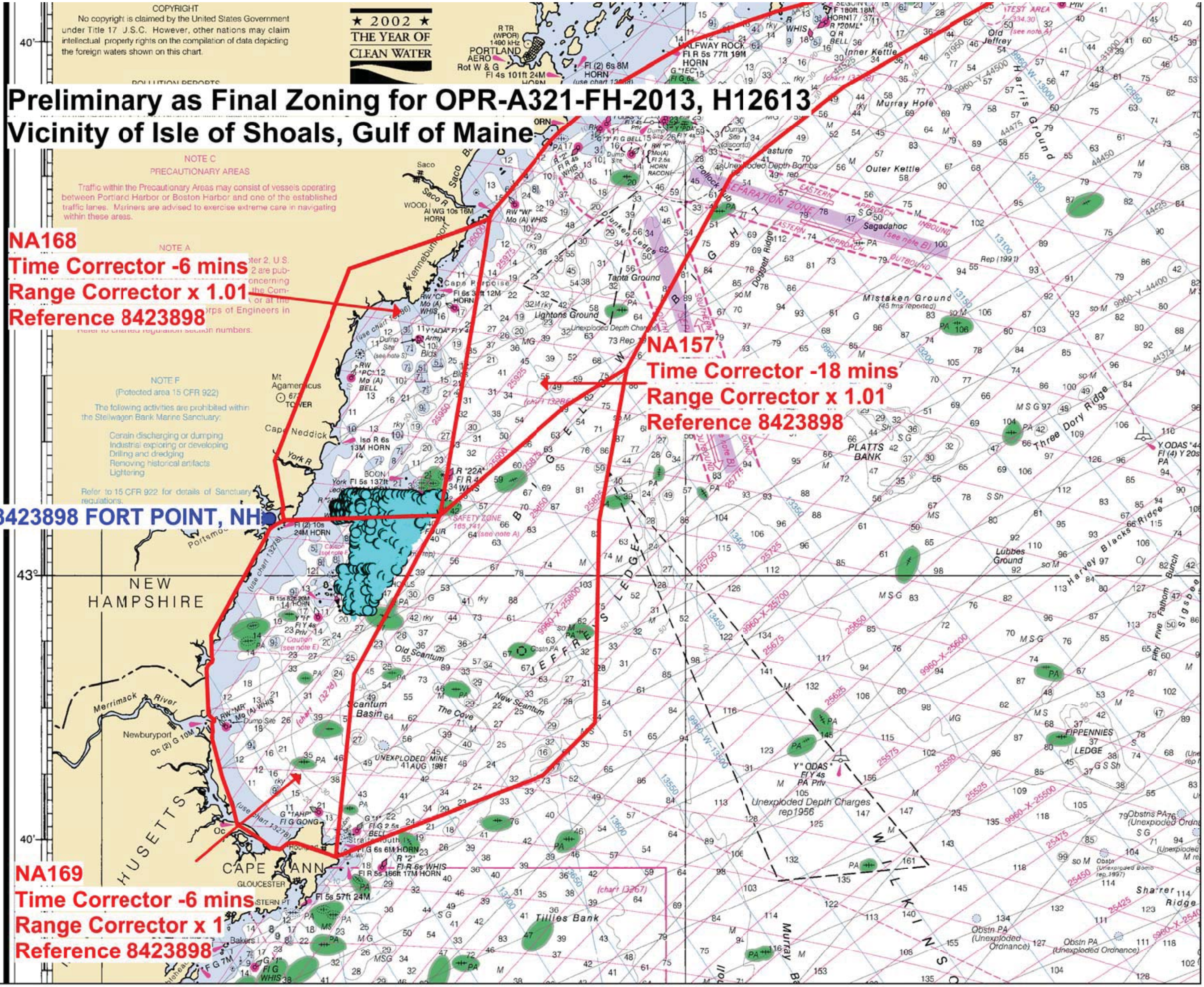
Note 2: Annual Leveling for the tide station at Fort Point, NH (8423898) was not completed in FY13. A review of the verified leveling records from October 2002 - 2012 show the tide station benchmark network to be stable within an allowable 0.009 m tolerance. This Tide Note may be used as final stability verification for the purposes of survey OPR-A321-FH-2013, H12613. CO-OPS will immediately provide a revised Tide Note should subsequent leveling records indicate any benchmark network stability movement beyond the allowable 0.009 m tolerance.

HOVIS.GERALD.THOMAS.1365860250

Digitally signed by HOVIS.GERALD.THOMAS.1365860250
DN: c=US, o=U.S. Government, ou=DoD, ou=PKI, ou=OTHER, cn=HOVIS.GERALD.THOMAS.1365860250
Date: 2013.09.20 12:43:34 -04'00'

Chief, Products and Services Branch

Preliminary as Final Zoning for OPR-A321-FH-2013, H12613 Vicinity of Isle of Shoals, Gulf of Maine



APPENDIX II

SUPPLEMENTAL SURVEY RECORDS AND CORRESPONDENCE

UNITED STATES DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration
Office of Marine and Aviation Operations
NOAA Ship *Ferdinand R. Hassler* (S-250)
Box 638, New Castle, NH 03854

November 29, 2013

MEMORANDUM FOR: Jeffrey Ferguson
Chief, Hydrographic Survey Branch

FROM: LCDR Benjamin K. Evans, NOAA
Commanding Officer

TITLE: OPR-A321-FH-13 VDatum Evaluation and Deliverable Recommendation

Ferdinand R. Hassler personnel conducted a comparison of VDatum based Ellipsoid Referenced Survey (ERS) versus discrete tidal zoning vertical transformation techniques using crossline data per the Hydrographic Survey Project Instructions (PI). In addition we conducted comparisons using the difference between crosslines and mainscheme to give a better recommendation on internal consistency. While there are differences between the two data reduction methods, there is no justification to disprove or suspect the VDatum separation model. Results and analysis of the comparison are in the attached report.

When successful, ERS methods generally result in a more internally consistent sounding set. However, we experienced some problems in reliably processing the vessel trajectory relative to the ellipsoid. We recommend that the entirety of H12613 be submitted with zoned water level correctors and that surveys H12614 and H12615 be submitted as hybrids, with the majority of data reduced by VDatum.

It is understood that upon review of this report, a determination will be made for the final vertical transformation technique to be used to create the final deliverables.

Attachment

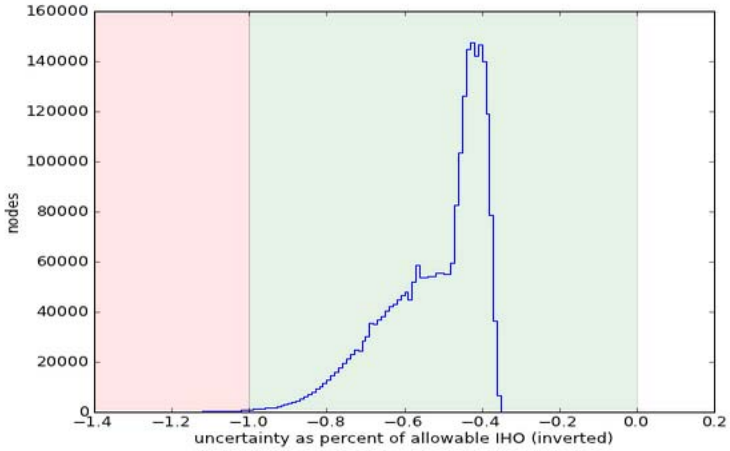
H12613_2m_Final_18to40_Density_IHO

The finalized surface has 2667669 nodes with 357234275 soundings.

Uncertainty Standards

99.71% | PASS

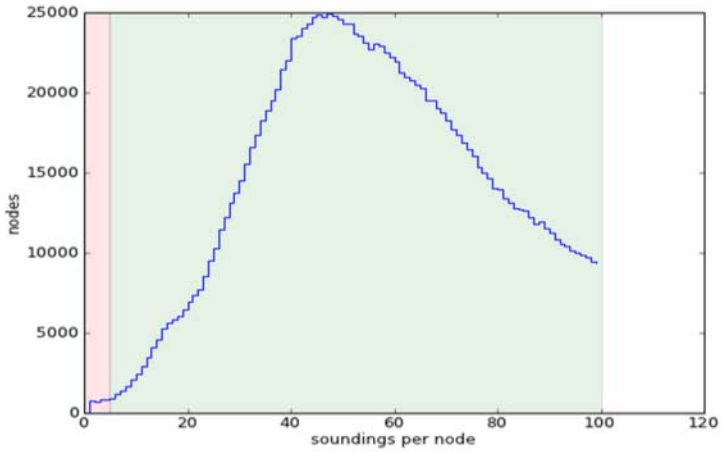
Nodes with Uncertainty less then or equal allowable IHO error **99.71%** (2660011/2667669).



Object Detection Coverage

99.88% | PASS

Nodes with 5 or more soundings **99.88%** (2664554/2667669).
Sounding count average is **133.91** soundings per node.
Sounding count mode is **48** soundings per node.



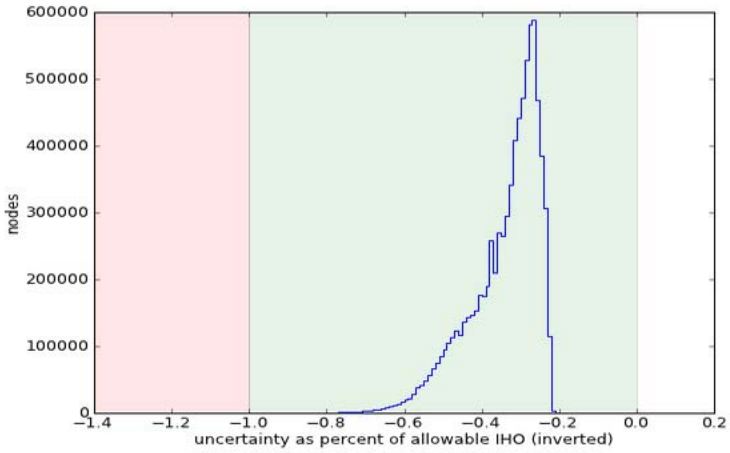
H12613_4m_Final_36plus_Density_IHO

The finalized surface has 8195115 nodes with 847428515 soundings.

Uncertainty Standards

100.00% | PASS

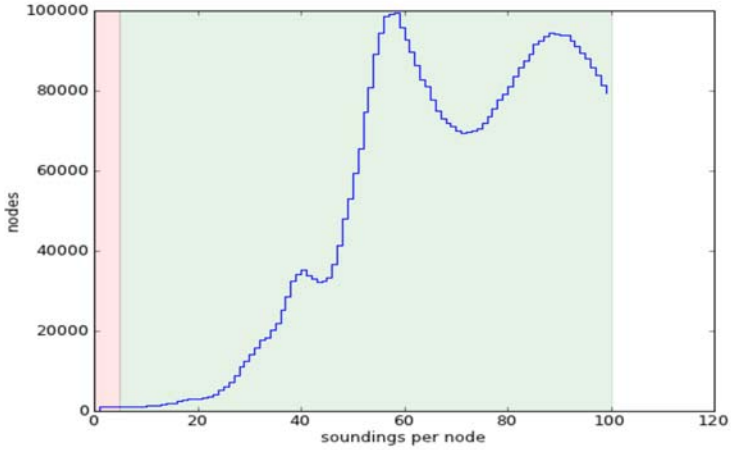
Nodes with Uncertainty less then or equal allowable IHO error **100.00%** (8194963/8195115).



Object Detection Coverage

99.95% | PASS

Nodes with 5 or more soundings **99.95%** (8190753/8195115).
Sounding count average is **103.41** soundings per node.
Sounding count mode is **59** soundings per node.



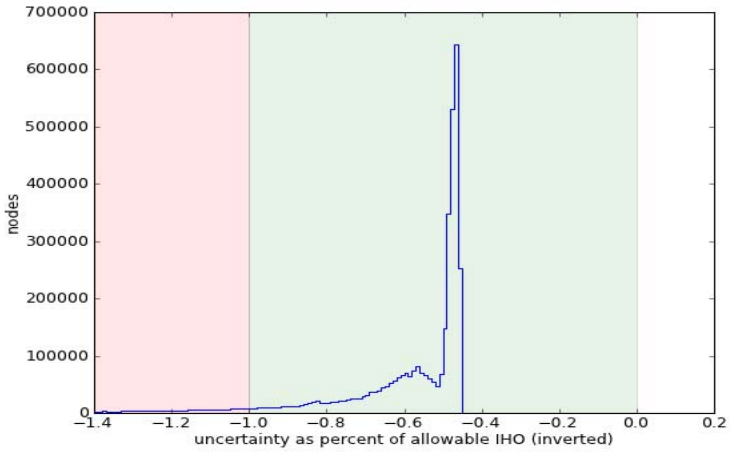
H12613_50cm_Final_0to20_Density_IHO

The finalized surface has 3808182 nodes with 97425772 soundings.

Uncertainty Standards

92.88% | FAIL

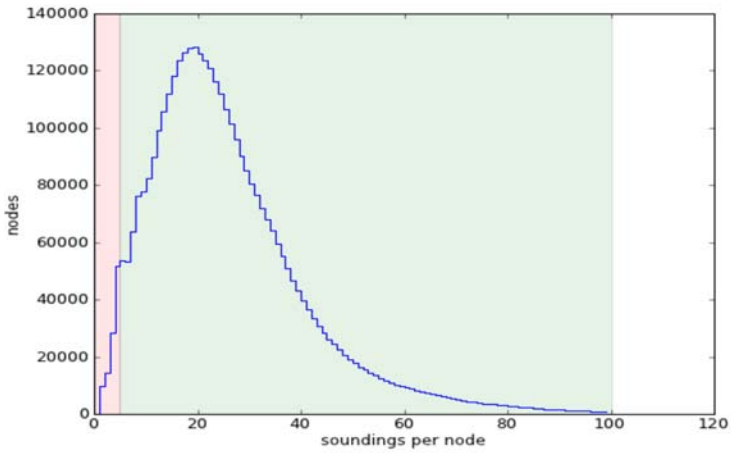
Nodes with Uncertainty less then or equal allowable IHO error **92.88%** (3537149/3808182).



Object Detection Coverage

97.26% | PASS

Nodes with 5 or more soundings **97.26%** (3703748/3808182).
Sounding count average is **25.58** soundings per node.
Sounding count mode is **20** soundings per node.



APPENDIX III

SURVEY FEATURES REPORT

AWOIS - two
Dangers to Navigation - fourteen
Maritime Boundary - none
Wrecks - two

H12613 Features Report

Registry Number: H12613
State: Maine
Locality: Gulf of Maine
Sub-locality: Vicinity of Isles of Shoals
Project Number: OPR-A321-FH-13
Survey Dates: 01/01/1981 - 10/17/2012

Charts Affected

Number	Edition	Date	Scale (RNC)	RNC Correction(s)*
13283	22nd	04/01/2013	1:20,000 (13283_1)	USCG LNM: 5/13/2014 (5/20/2014) CHS NTM: None (4/25/2014) NGA NTM: None (5/31/2014)
13274	27th	06/01/2007	1:40,000 (13274_2)	[L]NTM: ?
13286	32nd	12/01/2013	1:80,000 (13286_1)	USCG LNM: 5/13/2014 (5/20/2014) CHS NTM: None (4/25/2014) NGA NTM: 1/22/2011 (5/31/2014)
13278	28th	08/01/2013	1:80,000 (13278_1)	USCG LNM: 5/13/2014 (5/20/2014) CHS NTM: None (4/25/2014) NGA NTM: 11/1/2008 (5/31/2014)
13260	40th	05/01/2007	1:378,838 (13260_1)	[L]NTM: ?
13009	33rd	05/01/2007	1:500,000 (13009_1)	[L]NTM: ?
13006	34th	05/01/2007	1:675,000 (13006_1)	[L]NTM: ?
13003	49th	04/01/2007	1:1,200,000 (13003_1)	[L]NTM: ?

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

Features

No.	Name	Feature Type	Survey Depth	Survey Latitude	Survey Longitude	AWOIS Item
1.1	DtoN #1 - 25 ft. shoal sounding	Shoal	7.58 m	43° 05' 13.4" N	070° 35' 58.0" W	---
1.2	DtoN #2 - 37 ft. shoal sounding	Shoal	11.38 m	43° 05' 10.4" N	070° 35' 49.1" W	---
1.3	DtoN #3 - 29 ft. shoal sounding	Shoal	8.80 m	43° 05' 19.5" N	070° 35' 48.6" W	---
1.4	DtoN #4 - 30 ft. shoal sounding	Shoal	9.07 m	43° 04' 36.1" N	070° 35' 43.0" W	---
1.5	DtoN #5 - 33 ft. shoal sounding	Shoal	10.18 m	43° 04' 30.4" N	070° 35' 40.4" W	---

1.6	DtoN #6 - 32 ft. shoal sounding	Shoal	9.73 m	43° 04' 36.1" N	070° 35' 24.8" W	---
1.7	DtoN #7 - 31 ft. shoal sounding	Shoal	9.58 m	43° 05' 06.7" N	070° 35' 15.6" W	---
1.8	DtoN #8 - 54 ft. shoal sounding	Shoal	16.52 m	43° 04' 40.0" N	070° 35' 11.1" W	---
1.9	DtoN #9 - 26 ft. shoal sounding	Shoal	7.95 m	43° 04' 56.2" N	070° 35' 08.2" W	---
1.10	DtoN #10 - 28 ft. shoal sounding	Shoal	8.60 m	43° 05' 54.1" N	070° 34' 56.8" W	---
1.11	DtoN #11 - 40 ft. shoal sounding	Shoal	12.46 m	43° 04' 46.6" N	070° 34' 56.7" W	---
1.12	DtoN #12 - 40 ft. shoal sounding	Shoal	12.38 m	43° 05' 37.8" N	070° 34' 47.1" W	---
1.13	DtoN #13 - 31 ft. shoal sounding	Shoal	9.56 m	43° 05' 51.5" N	070° 34' 46.9" W	---
1.14	DtoN #14 - 47 ft. shoal sounding	Shoal	14.55 m	43° 04' 57.5" N	070° 34' 43.3" W	---
1.15	AWOIS #15149 - delete Wreck	GP	[None]	43° 02' 41.3" N	070° 32' 33.9" W	---
1.16	AWOIS #2181 - delete Wreck	GP	[None]	43° 01' 45.0" N	070° 30' 18.0" W	---

1.1) DtoN #1 - 25 ft. shoal sounding

DANGER TO NAVIGATION

Survey Summary

Survey Position:	43° 05' 13.4" N, 070° 35' 58.0" W
Least Depth:	7.58 m (= 24.85 ft = 4.142 fm = 4 fm 0.85 ft)
TPU (±1.96σ):	**THU (TPEh)** [None] ; **TVU (TPEv)** [None]
Timestamp:	2012-291.00:00:00.000 (10/17/2012)
Dataset:	H12613_DtoNs.000
FOID:	0_ 0001214828 00001(FFFE0012896C0001/1)
Charts Affected:	13283_1, 13274_2, 13278_1, 13286_1, 13260_1, 13009_1, 13006_1, 13003_1

Remarks:

DTON feature from sounding

Feature is the top of a rocky ledge, and has 100% Reson 7125 MBES coverage and preliminary tides applied.

Feature Correlation

Source	Feature	Range	Azimuth	Status
H12613_DtoNs.000	0_ 0001214828 00001	0.00	000.0	Primary
20130907_172140	470/106	0.25	000.0	Secondary (grouped)

Hydrographer Recommendations

Chart as surveyed

Cartographically-Rounded Depth (Affected Charts):

25ft (13283_1, 13274_2, 13278_1, 13286_1)

4fm (13260_1, 13009_1, 13006_1, 13003_1)

S-57 Data

Geo object 1:	Sounding (SOUNDG)
Attributes:	QUASOU - 6:least depth known
	SORDAT - 20130908

SORIND - US,US,graph,H12613

TECSOU - 2:found by side scan sonar

Office Notes

Compile: Chart a shoal 25 ft. sounding

1.2) DtoN #2 - 37 ft. shoal sounding

DANGER TO NAVIGATION

Survey Summary

Survey Position:	43° 05' 10.4" N, 070° 35' 49.1" W
Least Depth:	11.38 m (= 37.33 ft = 6.222 fm = 6 fm 1.33 ft)
TPU (±1.96σ):	**THU (TPEh)** [None] ; **TVU (TPEv)** [None]
Timestamp:	2012-291.00:00:00.000 (10/17/2012)
Dataset:	H12613_DtoNs.000
FOID:	0_ 0001214831 00001(FFFE0012896F0001/1)
Charts Affected:	13283_1, 13274_2, 13278_1, 13286_1, 13260_1, 13009_1, 13006_1, 13003_1

Remarks:

DTON feature from sounding

Feature is the top of a rocky ledge, and has 100% Reson 7125 MBES coverage and preliminary tides applied.

Feature Correlation

Source	Feature	Range	Azimuth	Status
H12613_DtoNs.000	0_ 0001214831 00001	0.00	000.0	Primary
20130818_141448	822/411	0.00	000.0	Secondary (grouped)

Hydrographer Recommendations

Chart as surveyed

Cartographically-Rounded Depth (Affected Charts):

37ft (13283_1, 13274_2, 13278_1, 13286_1)

6 ¼fm (13260_1, 13009_1, 13006_1, 13003_1)

S-57 Data

Geo object 1:	Sounding (SOUNDG)
Attributes:	QUASOU - 6:least depth known
	SORDAT - 20130908

SORIND - US,US,graph,H12613

TECSOU - 3:found by multi-beam

Office Notes

Compile: Chart a shoal 37 ft. sounding

1.3) DtoN #3 - 29 ft. shoal sounding

DANGER TO NAVIGATION

Survey Summary

Survey Position:	43° 05' 19.5" N, 070° 35' 48.6" W
Least Depth:	8.80 m (= 28.89 ft = 4.815 fm = 4 fm 4.89 ft)
TPU (±1.96σ):	**THU (TPEh)** [None] ; **TVU (TPEv)** [None]
Timestamp:	2012-291.00:00:00.000 (10/17/2012)
Dataset:	H12613_DtoNs.000
FOID:	0_ 0001214834 00001(FFFE001289720001/1)
Charts Affected:	13283_1, 13274_2, 13278_1, 13286_1, 13260_1, 13009_1, 13006_1, 13003_1

Remarks:

DTON feature from sounding

Feature is the top of a rocky ledge, and has 100% Reson 7125 MBES coverage and preliminary tides applied.

Feature Correlation

Source	Feature	Range	Azimuth	Status
H12613_DtoNs.000	0_ 0001214834 00001	0.00	000.0	Primary
20130907_170710	297/81	0.95	322.0	Secondary (grouped)

Hydrographer Recommendations

Chart as surveyed

Cartographically-Rounded Depth (Affected Charts):

29ft (13283_1, 13274_2, 13278_1, 13286_1)

4 ¾fm (13260_1, 13009_1, 13006_1, 13003_1)

S-57 Data

Geo object 1:	Sounding (SOUNDG)
Attributes:	QUASOU - 6:least depth known
	SORDAT - 20130908

SORIND - US,US,graph,H12613

TECSOU - 3:found by multi-beam

Office Notes

Compile: Chart a shoal 29 ft. sounding

1.4) DtoN #4 - 30 ft. shoal sounding

DANGER TO NAVIGATION

Survey Summary

Survey Position:	43° 04' 36.1" N, 070° 35' 43.0" W
Least Depth:	9.07 m (= 29.76 ft = 4.961 fm = 4 fm 5.76 ft)
TPU (±1.96σ):	**THU (TPEh)** [None] ; **TVU (TPEv)** [None]
Timestamp:	2012-291.00:00:00.000 (10/17/2012)
Dataset:	H12613_DtoNs.000
FOID:	0_ 0001214833 00001(FFFE001289710001/1)
Charts Affected:	13283_1, 13274_2, 13278_1, 13286_1, 13260_1, 13009_1, 13006_1, 13003_1

Remarks:

DTON feature from sounding

Feature is the top of a rocky ledge, and has 100% Reson 7125 MBES coverage and preliminary tides applied.

Feature Correlation

Source	Feature	Range	Azimuth	Status
H12613_DtoNs.000	0_ 0001214833 00001	0.00	000.0	Primary
20130818_132301	87/272	0.00	000.0	Secondary (grouped)

Hydrographer Recommendations

Chart as surveyed

Cartographically-Rounded Depth (Affected Charts):

30ft (13283_1, 13274_2, 13278_1, 13286_1)

5fm (13260_1, 13009_1, 13006_1, 13003_1)

S-57 Data

Geo object 1:	Sounding (SOUNDG)
Attributes:	QUASOU - 6:least depth known
	SORDAT - 20130908

SORIND - US,US,graph,H12613

TECSOU - 3:found by multi-beam

Office Notes

Compile: Chart a shoal30 ft. sounding

1.5) DtoN #5 - 33 ft. shoal sounding

DANGER TO NAVIGATION

Survey Summary

Survey Position:	43° 04' 30.4" N, 070° 35' 40.4" W
Least Depth:	10.18 m (= 33.39 ft = 5.565 fm = 5 fm 3.39 ft)
TPU (±1.96σ):	**THU (TPEh)** [None] ; **TVU (TPEv)** [None]
Timestamp:	2012-291.00:00:00.000 (10/17/2012)
Dataset:	H12613_DtoNs.000
FOID:	0_ 0001214835 00001(FFFE001289730001/1)
Charts Affected:	13283_1, 13274_2, 13278_1, 13286_1, 13260_1, 13009_1, 13006_1, 13003_1

Remarks:

DTON feature from sounding

Feature is the top of a rocky ledge, and has 100% Reson 7125 MBES coverage and preliminary tides applied.

Feature Correlation

Source	Feature	Range	Azimuth	Status
H12613_DtoNs.000	0_ 0001214835 00001	0.00	000.0	Primary
20130814_112419	855/307	0.00	000.0	Secondary (grouped)

Hydrographer Recommendations

Chart as surveyed

Cartographically-Rounded Depth (Affected Charts):

33ft (13283_1, 13274_2, 13278_1, 13286_1)

5 ½fm (13260_1, 13009_1, 13006_1, 13003_1)

S-57 Data

Geo object 1:	Sounding (SOUNDG)
Attributes:	QUASOU - 6:least depth known
	SORDAT - 20130908

SORIND - US,US,graph,H12613

TECSOU - 3:found by multi-beam

Office Notes

Compile: Chart a shoal 33 ft. sounding

1.6) DtoN #6 - 32 ft. shoal sounding

DANGER TO NAVIGATION

Survey Summary

Survey Position:	43° 04' 36.1" N, 070° 35' 24.8" W
Least Depth:	9.73 m (= 31.93 ft = 5.322 fm = 5 fm 1.93 ft)
TPU (±1.96σ):	**THU (TPEh)** [None] ; **TVU (TPEv)** [None]
Timestamp:	2012-291.00:00:00.000 (10/17/2012)
Dataset:	H12613_DtoNs.000
FOID:	0_ 0001214836 00001(FFFE001289740001/1)
Charts Affected:	13283_1, 13274_2, 13278_1, 13286_1, 13260_1, 13009_1, 13006_1, 13003_1

Remarks:

DTON feature from sounding

Feature is the top of a rocky ledge, and has 100% Reson 7125 MBES coverage and preliminary tides applied.

Feature Correlation

Source	Feature	Range	Azimuth	Status
H12613_DtoNs.000	0_ 0001214836 00001	0.00	000.0	Primary
20130814_114615	5569/189	0.33	032.6	Secondary (grouped)

Hydrographer Recommendations

Chart as surveyed

Cartographically-Rounded Depth (Affected Charts):

32ft (13283_1, 13274_2, 13278_1, 13286_1)

5 ¼fm (13260_1, 13009_1, 13006_1, 13003_1)

S-57 Data

Geo object 1:	Sounding (SOUNDG)
Attributes:	QUASOU - 6:least depth known
	SORDAT - 20130908

SORIND - US,US,graph,H12613

TECSOU - 3:found by multi-beam

Office Notes

Compile: Chart a shoal 32 ft. sounding

1.7) DtoN #7 - 31 ft. shoal sounding

DANGER TO NAVIGATION

Survey Summary

Survey Position:	43° 05' 06.7" N, 070° 35' 15.6" W
Least Depth:	9.58 m (= 31.44 ft = 5.240 fm = 5 fm 1.44 ft)
TPU (±1.96σ):	**THU (TPEh)** [None] ; **TVU (TPEv)** [None]
Timestamp:	2012-291.00:00:00.000 (10/17/2012)
Dataset:	H12613_DtoNs.000
FOID:	0_ 0001214829 00001(FFFE0012896D0001/1)
Charts Affected:	13283_1, 13278_1, 13286_1, 13260_1, 13009_1, 13006_1, 13003_1

Remarks:

DTON feature from sounding

Feature is the top of a rocky ledge, and has 100% Reson 7125 MBES coverage and preliminary tides applied.

Feature Correlation

Source	Feature	Range	Azimuth	Status
H12613_DtoNs.000	0_ 0001214829 00001	0.00	000.0	Primary
20130813_203853	868/356	0.00	000.0	Secondary (grouped)

Hydrographer Recommendations

Chart as surveyed

Cartographically-Rounded Depth (Affected Charts):

31ft (13283_1, 13278_1, 13286_1)

5 ¼fm (13260_1, 13009_1, 13006_1, 13003_1)

S-57 Data

Geo object 1:	Sounding (SOUNDG)
Attributes:	QUASOU - 6:least depth known
	SORDAT - 20130908

SORIND - US,US,graph,H12613

TECSOU - 3:found by multi-beam

Office Notes

Compile: Chart a shoal 31 ft. sounding

1.8) DtoN #8 - 54 ft. shoal sounding

DANGER TO NAVIGATION

Survey Summary

Survey Position:	43° 04' 40.0" N, 070° 35' 11.1" W
Least Depth:	16.52 m (= 54.19 ft = 9.031 fm = 9 fm 0.19 ft)
TPU (±1.96σ):	**THU (TPEh)** [None] ; **TVU (TPEv)** [None]
Timestamp:	2012-291.00:00:00.000 (10/17/2012)
Dataset:	H12613_DtoNs.000
FOID:	0_ 0001214825 00001(FFFE001289690001/1)
Charts Affected:	13283_1, 13274_2, 13278_1, 13286_1, 13260_1, 13009_1, 13006_1, 13003_1

Remarks:

DTON feature from sounding

Feature is the top of a rocky ledge, and has 100% Reson 7125 MBES coverage and preliminary tides applied.

Feature Correlation

Source	Feature	Range	Azimuth	Status
H12613_DtoNs.000	0_ 0001214825 00001	0.00	000.0	Primary
20130817_133918	202/279	0.00	000.0	Secondary (grouped)

Hydrographer Recommendations

Chart as surveyed

Cartographically-Rounded Depth (Affected Charts):

54ft (13283_1, 13274_2, 13278_1, 13286_1)

9fm (13260_1, 13009_1, 13006_1, 13003_1)

S-57 Data

Geo object 1:	Sounding (SOUNDG)
Attributes:	QUASOU - 6:least depth known
	SORDAT - 20130908

SORIND - US,US,graph,H12613

TECSOU - 3:found by multi-beam

Office Notes

Compile: Chart a shoal 54 ft. sounding

1.9) DtoN #9 - 26 ft. shoal sounding

DANGER TO NAVIGATION

Survey Summary

Survey Position:	43° 04' 56.2" N, 070° 35' 08.2" W
Least Depth:	7.95 m (= 26.08 ft = 4.347 fm = 4 fm 2.08 ft)
TPU (±1.96σ):	**THU (TPEh)** [None] ; **TVU (TPEv)** [None]
Timestamp:	2012-291.00:00:00.000 (10/17/2012)
Dataset:	H12613_DtoNs.000
FOID:	0_ 0001214824 00001(FFFE001289680001/1)
Charts Affected:	13283_1, 13274_2, 13278_1, 13286_1, 13260_1, 13009_1, 13006_1, 13003_1

Remarks:

DTON feature from sounding

Feature is the top of a rocky ledge, and has 100% Reson 7125 MBES coverage and preliminary tides applied.

Feature Correlation

Source	Feature	Range	Azimuth	Status
H12613_DtoNs.000	0_ 0001214824 00001	0.00	000.0	Primary
20130814_135306	2568/374	0.00	000.0	Secondary (grouped)

Hydrographer Recommendations

Chart as surveyed

Cartographically-Rounded Depth (Affected Charts):

26ft (13283_1, 13274_2, 13278_1, 13286_1)

4 ¼fm (13260_1, 13009_1, 13006_1, 13003_1)

S-57 Data

Geo object 1:	Sounding (SOUNDG)
Attributes:	QUASOU - 6:least depth known
	SORDAT - 20130908

SORIND - US,US,graph,H12613

TECSOU - 3:found by multi-beam

Office Notes

Compile: Chart a shoal 26 ft. sounding

1.10) DtoN #10 - 28 ft. shoal sounding

DANGER TO NAVIGATION

Survey Summary

Survey Position:	43° 05' 54.1" N, 070° 34' 56.8" W
Least Depth:	8.60 m (= 28.22 ft = 4.703 fm = 4 fm 4.22 ft)
TPU (±1.96σ):	**THU (TPEh)** [None] ; **TVU (TPEv)** [None]
Timestamp:	2012-291.00:00:00.000 (10/17/2012)
Dataset:	H12613_DtoNs.000
FOID:	0_ 0001214827 00001(FFFE0012896B0001/1)
Charts Affected:	13283_1, 13278_1, 13286_1, 13260_1, 13009_1, 13006_1, 13003_1

Remarks:

DTON feature from sounding

Feature is the top of a rocky ledge, and has 100% Reson 7125 MBES coverage and preliminary tides applied.

Feature Correlation

Source	Feature	Range	Azimuth	Status
H12613_DtoNs.000	0_ 0001214827 00001	0.00	000.0	Primary
20130907_163319	506/147	0.64	300.1	Secondary (grouped)

Hydrographer Recommendations

Chart as surveyed

Cartographically-Rounded Depth (Affected Charts):

28ft (13283_1, 13278_1, 13286_1)

4 ¾fm (13260_1, 13009_1, 13006_1, 13003_1)

S-57 Data

Geo object 1:	Sounding (SOUNDG)
Attributes:	QUASOU - 6:least depth known
	SORDAT - 20130908

SORIND - US,US,graph,H12613

TECSOU - 3:found by multi-beam

Office Notes

Compile: Chart a shoal 28 ft. sounding

1.11) DtoN #11 - 40 ft. shoal sounding

DANGER TO NAVIGATION

Survey Summary

Survey Position:	43° 04' 46.6" N, 070° 34' 56.7" W
Least Depth:	12.46 m (= 40.89 ft = 6.815 fm = 6 fm 4.89 ft)
TPU (±1.96σ):	**THU (TPEh)** [None] ; **TVU (TPEv)** [None]
Timestamp:	2012-291.00:00:00.000 (10/17/2012)
Dataset:	H12613_DtoNs.000
FOID:	0_ 0001214823 00001(FFFE001289670001/1)
Charts Affected:	13283_1, 13274_2, 13278_1, 13286_1, 13260_1, 13009_1, 13006_1, 13003_1

Remarks:

DTON feature from sounding

Feature is the top of a rocky ledge, and has 100% Reson 7125 MBES coverage and preliminary tides applied.

Feature Correlation

Source	Feature	Range	Azimuth	Status
H12613_DtoNs.000	0_ 0001214823 00001	0.00	000.0	Primary
20130813_204928	297/219	0.00	000.0	Secondary (grouped)

Hydrographer Recommendations

Chart as surveyed

Cartographically-Rounded Depth (Affected Charts):

41ft (13283_1, 13274_2, 13278_1, 13286_1)

6 ¾fm (13260_1, 13009_1, 13006_1, 13003_1)

S-57 Data

Geo object 1:	Sounding (SOUNDG)
Attributes:	QUASOU - 6:least depth known
	SORDAT - 20130908

SORIND - US,US,graph,H12613

TECSOU - 3:found by multi-beam

Office Notes

Compile: Chart a shoal 40 ft. sounding

1.12) DtoN #12 - 40 ft. shoal sounding

DANGER TO NAVIGATION

Survey Summary

Survey Position:	43° 05' 37.8" N, 070° 34' 47.1" W
Least Depth:	12.38 m (= 40.63 ft = 6.772 fm = 6 fm 4.63 ft)
TPU (±1.96σ):	**THU (TPEh)** [None] ; **TVU (TPEv)** [None]
Timestamp:	2012-291.00:00:00.000 (10/17/2012)
Dataset:	H12613_DtoNs.000
FOID:	0_ 0001214832 00001(FFFE001289700001/1)
Charts Affected:	13283_1, 13278_1, 13286_1, 13260_1, 13009_1, 13006_1, 13003_1

Remarks:

DTON feature from sounding

Feature is the top of a rocky ledge, and has 100% Reson 7125 MBES coverage and preliminary tides applied.

Feature Correlation

Source	Feature	Range	Azimuth	Status
H12613_DtoNs.000	0_ 0001214832 00001	0.00	000.0	Primary
20130814_112419	5084/369	0.00	000.0	Secondary (grouped)

Hydrographer Recommendations

Chart as surveyed

Cartographically-Rounded Depth (Affected Charts):

40ft (13283_1, 13278_1, 13286_1)

6 ¾fm (13260_1, 13009_1, 13006_1, 13003_1)

S-57 Data

Geo object 1:	Sounding (SOUNDG)
Attributes:	QUASOU - 6:least depth known
	SORDAT - 20130908

SORIND - US,US,graph,H12613

TECSOU - 3:found by multi-beam

Office Notes

Compile: Chart a shoal 40 ft. sounding

1.13) DtoN #13 - 31 ft. shoal sounding

DANGER TO NAVIGATION

Survey Summary

Survey Position:	43° 05' 51.5" N, 070° 34' 46.9" W
Least Depth:	9.56 m (= 31.38 ft = 5.230 fm = 5 fm 1.38 ft)
TPU (±1.96σ):	**THU (TPEh)** [None] ; **TVU (TPEv)** [None]
Timestamp:	2012-291.00:00:00.000 (10/17/2012)
Dataset:	H12613_DtoNs.000
FOID:	0_ 0001214830 00001(FFFE0012896E0001/1)
Charts Affected:	13283_1, 13278_1, 13286_1, 13260_1, 13009_1, 13006_1, 13003_1

Remarks:

DTON feature from sounding

Feature is the top of a rocky ledge, and has 100% Reson 7125 MBES coverage and preliminary tides applied.

Feature Correlation

Source	Feature	Range	Azimuth	Status
H12613_DtoNs.000	0_ 0001214830 00001	0.00	000.0	Primary
20130814_110202	1540/313	0.00	000.0	Secondary (grouped)

Hydrographer Recommendations

Chart as surveyed

Cartographically-Rounded Depth (Affected Charts):

31ft (13283_1, 13278_1, 13286_1)

5 ¼fm (13260_1, 13009_1, 13006_1, 13003_1)

S-57 Data

Geo object 1:	Sounding (SOUNDG)
Attributes:	QUASOU - 6:least depth known
	SORDAT - 20130908

SORIND - US,US,graph,H12613

TECSOU - 3:found by multi-beam

Office Notes

Compile: Chart a shoal 31 ft. sounding

1.14) DtoN #14 - 47 ft. shoal sounding

DANGER TO NAVIGATION

Survey Summary

Survey Position:	43° 04' 57.5" N, 070° 34' 43.3" W
Least Depth:	14.55 m (= 47.75 ft = 7.959 fm = 7 fm 5.75 ft)
TPU (±1.96σ):	**THU (TPEh)** [None] ; **TVU (TPEv)** [None]
Timestamp:	2012-291.00:00:00.000 (10/17/2012)
Dataset:	H12613_DtoNs.000
FOID:	0_ 0001214826 00001(FFFE0012896A0001/1)
Charts Affected:	13283_1, 13278_1, 13286_1, 13260_1, 13009_1, 13006_1, 13003_1

Remarks:

DTON feature from sounding

Feature is the top of a rocky ledge, and has 100% Reson 7125 MBES coverage and preliminary tides applied.

Feature Correlation

Source	Feature	Range	Azimuth	Status
H12613_DtoNs.000	0_ 0001214826 00001	0.00	000.0	Primary
20130818_160449	648/385	0.00	000.0	Secondary (grouped)

Hydrographer Recommendations

Chart as surveyed

Cartographically-Rounded Depth (Affected Charts):

48ft (13283_1, 13278_1, 13286_1)

8fm (13260_1, 13009_1, 13006_1, 13003_1)

S-57 Data

Geo object 1:	Sounding (SOUNDG)
Attributes:	QUASOU - 6:least depth known
	SORDAT - 20130908

SORIND - US,US,graph,H12613

TECSOU - 3:found by multi-beam

Office Notes

Compile: Chart a shoal 47 ft. sounding

1.15) AWOIS #15149 - delete Wreck

Survey Summary

Survey Position:	43° 02' 41.3" N, 070° 32' 33.9" W
Least Depth:	[None]
TPU (±1.96σ):	**THU (TPEh)** [None] ; **TVU (TPEv)** [None]
Timestamp:	1981-001.00:00:00.000 (01/01/1981)
Dataset:	H12613_AWOIS__Wreck.000
FOID:	0_ 0001214840 00001(FFFE001289780001)
Charts Affected:	13274_2, 13278_1, 13286_1, 13260_1, 13009_1, 13006_1, 13003_1

Remarks:

History

LNM 04/93 -- USCG Dist 1 reported a wreck PA 43 02 40.9N / 70 32 33.6W (7/012/13 PTT)

Feature Correlation

Source	Feature	Range	Azimuth	Status
H12613_AWOIS_&_Wreck.000	0_ 0001214840 00001	0.00	000.0	Primary

Hydrographer Recommendations

$CSYMB/remrks: AWOIS #15149 - 100% Multibeam coverage, wreck not found within search radius (H12613/ 20130907)

S-57 Data

Geo object 1:	Cartographic symbol ($CSYMB)
Attributes:	NINFOM - delete Wreck
	NTXTDS - ENC US4MA04M, Ed. 22, Update 12/3/2013

Office Notes

Compile: Delete Wreck

1.16) AWOIS #2181 - delete Wreck

Survey Summary

Survey Position: 43° 01' 45.0" N, 070° 30' 18.0" W

Least Depth: [None]

TPU (±1.96σ): **THU (TPEh)** [None] ; **TVU (TPEv)** [None]

Timestamp: 1981-001.00:00:00.000 (01/01/1981)

Dataset: H12613_AWOIS__Wreck.000

FOID: 0_ 0001214841 00001(FFFE001289790001)

Charts Affected: 13278_1, 13260_1, 13009_1, 13006_1, 13003_1

Remarks:

History

HISTORY NM 40/44 DESCRIPTION 24 NO.204; CARGO 7244 GT SUNK 2/11/44 BY MARINE CASUALTY; POS. ACCURACY WITHIN 1 MILE; COVERED 150 FT IN 210 FT; REPORTED THROUGH EASTERN SEA FRONTIER 5/19/44; POS. LAT. 43-01-43N LONG. 70-30-18W. 27 NO.804; FTR. 7244 GT; SUNK 2/11/44 IN 210 FT.; PART OF HULL ONLY COVERED APPROX. 150 FT.

Feature Correlation

Source	Feature	Range	Azimuth	Status
H12613_AWOIS_&_Wreck.000	0_ 0001214841 00001	0.00	000.0	Primary
H12613_AWOIS_&_Wreck.000	0_ 0001214842 00001	65.85	321.8	Secondary (grouped)
H12613_AWOIS_&_Wreck.000	0_ 0001214844 00001	434.61	139.8	Secondary (grouped)

Hydrographer Recommendations

$CSYMB/remrks: AWOIS #2181 - 100% Multibeam coverage, wreck not found (H12613/ 20130907)

S-57 Data

Geo object 1: Cartographic symbol ($CSYMB)

Attributes: NINFOM - delete Wreck

NTXTDS - ENC US4MA04M, Ed. 22, Update 12/3/2013

Office Notes

Compile: Delete Wreck

APPROVAL PAGE

H12613

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

- H12613_DR.pdf
- Collection of depth varied resolution BAGS
- Processed survey data and records
- H12613_GeoImage.pdf

The survey evaluation and verification has been conducted according current OCS Specifications, and the survey has been approved for dissemination and usage of updating NOAA's suite of nautical charts.

Approved:_____

Lieutenant Matthew Jaskoski, NOAA
Chief, Atlantic Hydrographic Branch