H13393

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

DESCRIPTIVE REPORT

Type of Survey:	Navigable Area
Registry Number:	H13393

LOCALITY

State(s):	North Carolina Virginia
General Locality:	Offshore Chesapeake Bay
Sub-locality:	34 NM NE of Currituck Beach

2020

CHIEF OF PARTY
CDR Briana Hillstrom, NOAA

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Date:

U.S. DEPARTMENT OF COMMERCE NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION	REGISTRY NUMBER:
HYDROGRAPHIC TITLE SHEET	**H13393**

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):	**North Carolina Virginia**
General Locality:	**Offshore Chesapeake Bay**
Sub-Locality:	**34 NM NE of Currituck Beach**
Scale:	**40000**
Dates of Survey:	**08/22/2020 to 08/31/2020**
Instructions Dated:	**08/05/2020**
Project Number:	**OPR-D304-TJ-20**
Field Unit:	**NOAA Ship *Thomas Jefferson***
Chief of Party:	**CDR Briana Hillstrom, NOAA**
Soundings by:	**Multibeam Echo Sounder**
Imagery by:	**Side Scan Sonar Multibeam Echo Sounder Backscatter**
Verification by:	**Atlantic Hydrographic Branch**
Soundings Acquired in:	**meters at Mean Lower Low Water**

Remarks: ***Any revisions to the Descriptive Report (DR) applied during office processing are shown in red italic text. The DR is maintained as a field unit product, therefore all information and recommendations within this report are considered preliminary unless otherwise noted. The final disposition of survey data is represented in the NOAA nautical chart products. All pertinent records for this survey are archived at the National Centers for Environmental Information (NCEI) and can be retrieved via https://www.ncei.noaa.gov/.***

Products created during office processing were generated in NAD83 UTM 18N, MLLW. All references to other horizontal or vertical datums in this report are applicable to the processed hydrographic data provided by the field unit.

Table of Contents

List of Tables

List of Figures

Descriptive Report to Accompany Survey H13393

Project: OPR-D304-TJ-20

Locality: Offshore Chesapeake Bay

Sublocality: 34 NM NE of Currituck Beach

Scale: 1:40000

August 2020 - August 2020

NOAA Ship *Thomas Jefferson*

Chief of Party: CDR Briana Hillstrom, NOAA

A. Area Surveyed

Survey H13393, located in the Approaches to Chesapeake Bay, North Carolina and Virginia within the sub locality of Offshore Chesapeake Bay, was conducted in accordance with coverage requirements set forth in the Project Instructions OPR-D304-TJ-20.

A.1 Survey Limits

Data were acquired within the following survey limits:

Northwest Limit	Southeast Limit
36° 42' 16.52" N 75° 13' 23.37" W	36° 24' 22.6" N 75° 7' 30.85" W

Table 1: Survey Limits

Survey data were acquired in accordance with the requirements set forth by the Project Instructions (PI) and the Hydrographic Surveys Specifications and Deliverables (HSSD) dated May 2020.

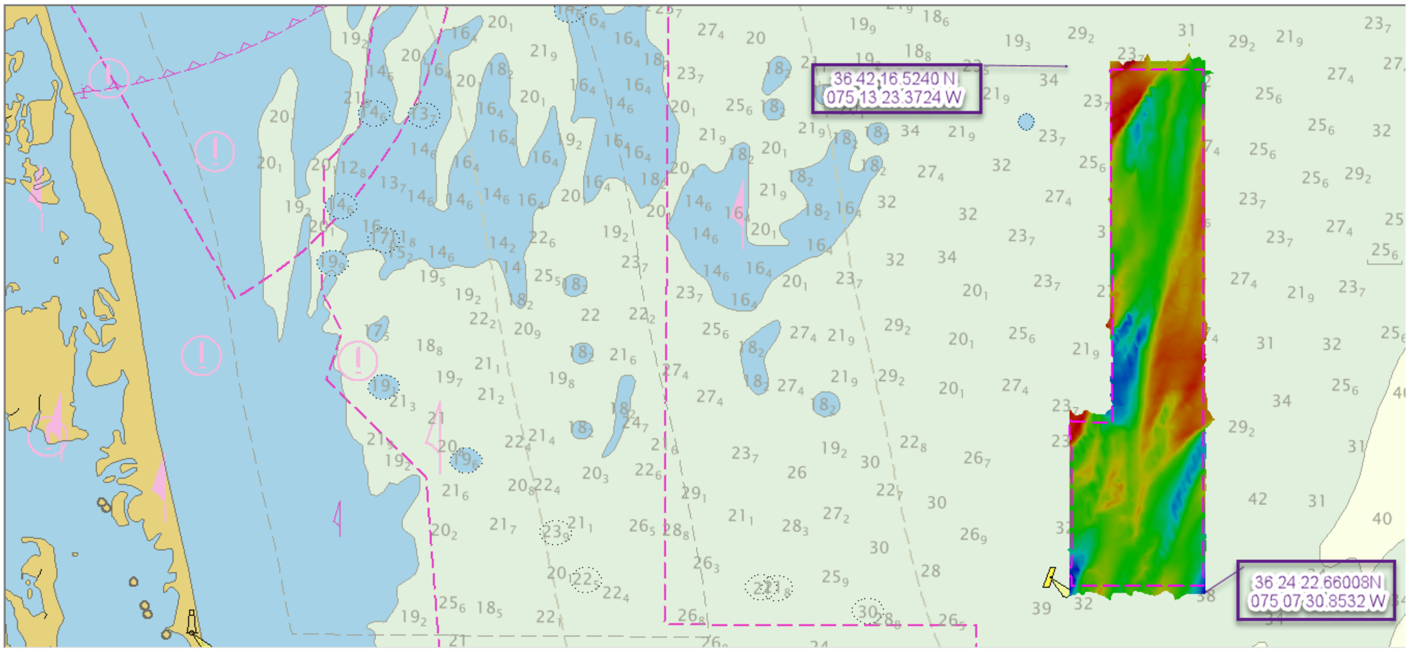


Figure 1: Survey layout for H13393, plotted over ENC US3DE01M. Pink dotted outline represents the survey limits set forth by the Project Instructions.

A.2 Survey Purpose

This sheet covers 62 SNM approaching Chesapeake Bay, home for two top 20 container ports in the USA: Baltimore, MD and Port of Virginia. Together they net over 116 million tons of imports and exports per year. 1

The Port of Virginia, with four 50 foot deep water marine terminals located in Norfolk Harbor, 18 nautical miles from the Atlantic Ocean, regularly hosts the larger New Panamax vessels over 1,000 feet in length and the Ultra Large Container Vessels (ULCVs) over 1,200 feet. In 2018, the Port of Virginia received Congressional authorization to dredge 55 feet (16.75 meters) deep and 1,400 feet (426.72 meters) wide channels in Norfolk Harbor and plan to start in 2020. 2

Norfolk is the home a Naval Station in the Sewell’s Point area and is a major base for the US Atlantic Command, US Atlantic Fleet and other fleet forces operating internationally.

The Port of Baltimore, 145 nautical miles from the Atlantic Ocean, also receives New Panamax and ULCV vessels and is competitively located close to USA Midwestern metropolitan areas with only a day truck drive. 3

The most recent surveys in this approaches project are partial bottom coverage from the 1880s to 1940s. Chart depths currently indicate 66 to 110 feet. Historic storms and hurricanes have likely made substantial changes to the seabed and therefore deprecated the nautical charts over the last century raising a concern for shoaling.

This important survey is a critical part of an ongoing, multi-year hydrographic survey covering the Approaches to Chesapeake Bay to support the safety of waterborne commerce to these vital ports and monitor the habitat and the environmental health of the region. Survey data from this project is intended to supersede all prior survey data in the common area.

References

1.U.S. Army Corps of Engineers, ”Waterborne Commerce Statistics Center: Tonnage for selected U.S. ports in 2018.” Institute for Water Resources. Submitted to USACE Digital Library 2019-12-12. https://usace.contentdm.oclc.org/. Accessed May 21, 2020.

2. The Port of Virginia, “Virginia Directories: Virginia Advantages.” 600 World Trade Center, Norfolk, VA 23510. PORTOFVIRGINIA.COM. http://aapa.files.cms-plus.com/AwardsCompetitionMaterials/2019CommunicationsAward/DirectoriesHandbooks/Virginia_Directories_Virginia-Advantages.pdf. Accessed May 21, 2020.

3. Ronan, Dan, “Port of Baltimore Welcomes Its Largest Cargo Ship” Transport Topics, May 29, 2019. https://www.ttnews.com/articles/port-baltimore-welcomes-its-largest-cargo-ship. Accessed May 21, 2020.

A.3 Survey Quality

The entire survey is adequate to supersede previous data.

Data acquired in H13393 meet multibeam echo sounder (MBES) coverage requirements for complete coverage, as required by the HSSD dated May 2020. This includes crosslines (see Section B.2.1), NOAA allowable uncertainty (see Section B.2.10), and density requirements (see Section B.2.11).

A.4 Survey Coverage

The following table lists the coverage requirements for this survey as assigned in the project instructions:

Water Depth	Coverage Required
All waters in survey area	Complete Coverage (Refer to HSSD Section 5.2.2.3)

Table 2: Survey Coverage

Survey coverage is in accordance with requirements listed in Table 2 and in the 2020 Hydrographic Survey Specifications and Deliverables (HSSD). Coverage requirements were met with 100% side scan sonar (SSS) with concurrent multibeam echosounder (MBES) coverage. Complete coverage MBES was used to fill areas of SSS holidays created by refraction. See Figures 2 and 3.

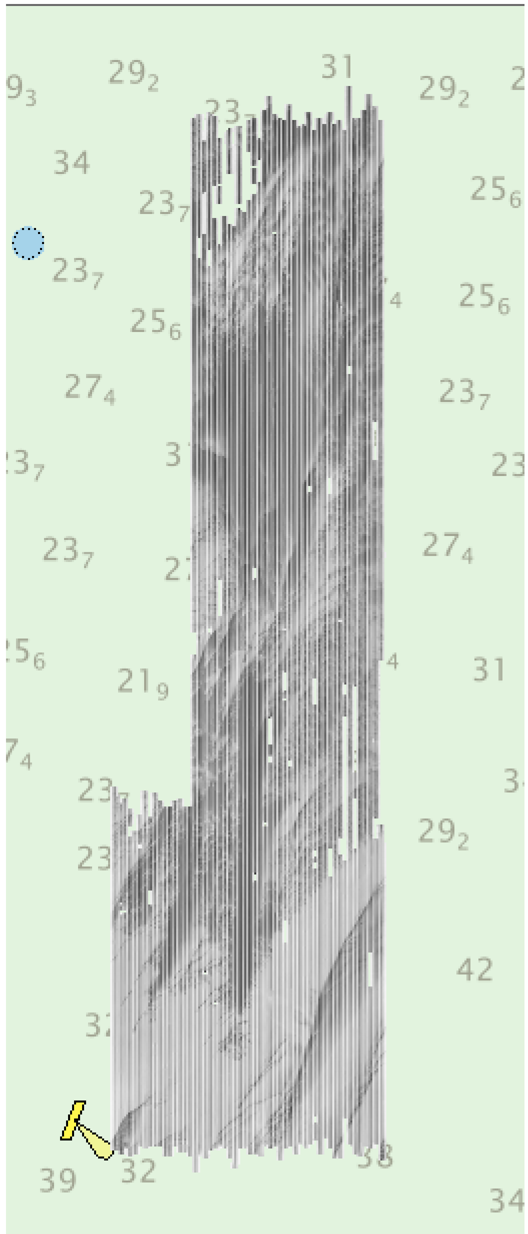


Figure 2: H13393 Side Scan Sonar coverage.

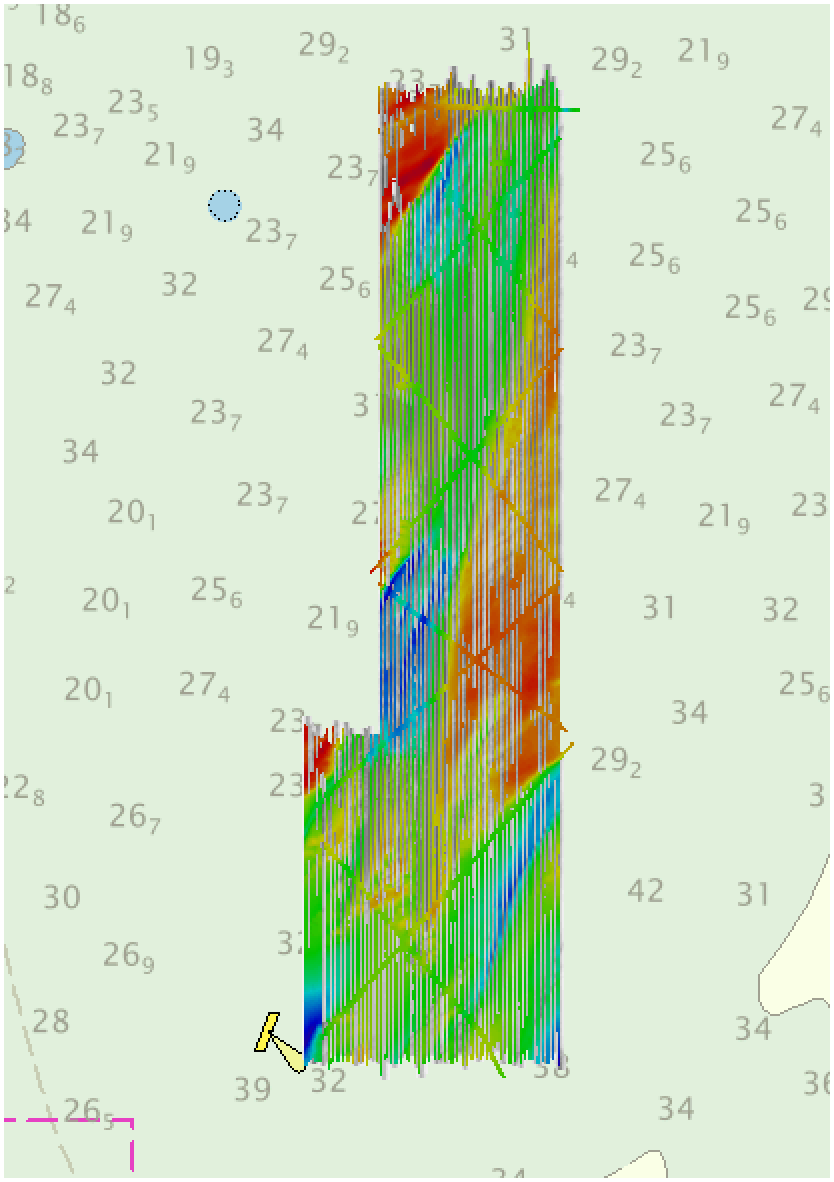


Figure 3: H13393 Side Scan Sonar with concurrent Multibeam overlaid.

A.6 Survey Statistics

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

	HULL ID	*S222*	*Total*
LNM	SBES Mainscheme	0	0
	MBES Mainscheme	111.2	111.2
	Lidar Mainscheme	0	0
	SSS Mainscheme	0	0
	SBES/SSS Mainscheme	0	0
	MBES/SSS Mainscheme	790.2	790.2
	SBES/MBES Crosslines	48.1	48.1
	Lidar Crosslines	0	0
Number of Bottom Samples			5
Number Maritime Boundary Points Investigated			0
Number of DPs			0
Number of Items Investigated by Dive Ops			0
Total SNM			68

Table 3: Hydrographic Survey Statistics

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

Survey Dates	Day of the Year
08/22/2020	235
08/23/2020	236

Survey Dates	Day of the Year
08/24/2020	237
08/25/2020	238
08/26/2020	239
08/27/2020	240
08/28/2020	241
08/29/2020	242
08/31/2020	244

Table 4: Dates of Hydrography

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	***S222***
LOA	63.4 meters
Draft	4.6 meters

Table 5: Vessels Used

B.1.2 Equipment

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

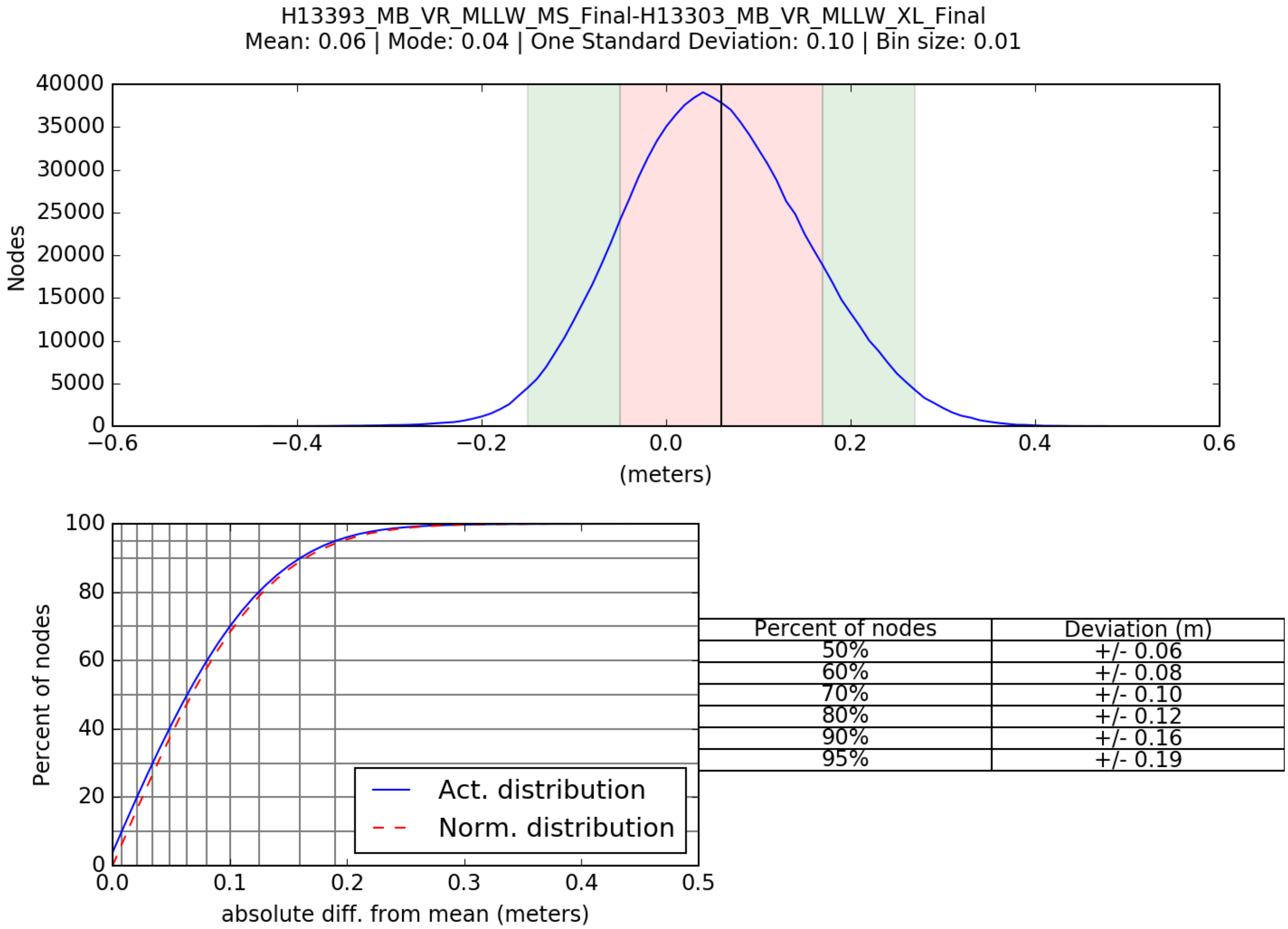
Manufacturer	Model	Type
Klein Marine Systems	System 5000	SSS
Kongsberg Maritime	EM 710	MBES
Valeport	Thru-Hull SVS	Sound Speed System
AML Oceanographic	MVP100	Conductivity, Temperature, and Depth Sensor
Applanix	POS MV 320 v5	Positioning and Attitude System
AML Oceanographic	MVP-X	Conductivity, Temperature, and Depth Sensor

Table 6: Major Systems Used

B.2 Quality Control

B.2.1 Crosslines

S222 collected 48.124 linear nautical miles of MBES crosslines, or 5.33% of mainscheme MBES data. A variable resolution (VR) Combined Uncertainty and Bathymetry Estimator (CUBE) surface of mainscheme data and a VR CUBE surface of crossline data were differenced - the resulting mean was 0.06m with a standard deviation of 0.10m (see Figures 4 and 5).



Percent of nodes	Deviation (m)
50%	+/- 0.06
60%	+/- 0.08
70%	+/- 0.10
80%	+/- 0.12
90%	+/- 0.16
95%	+/- 0.19

Figure 4: H13393 crossline/mainscheme comparison.

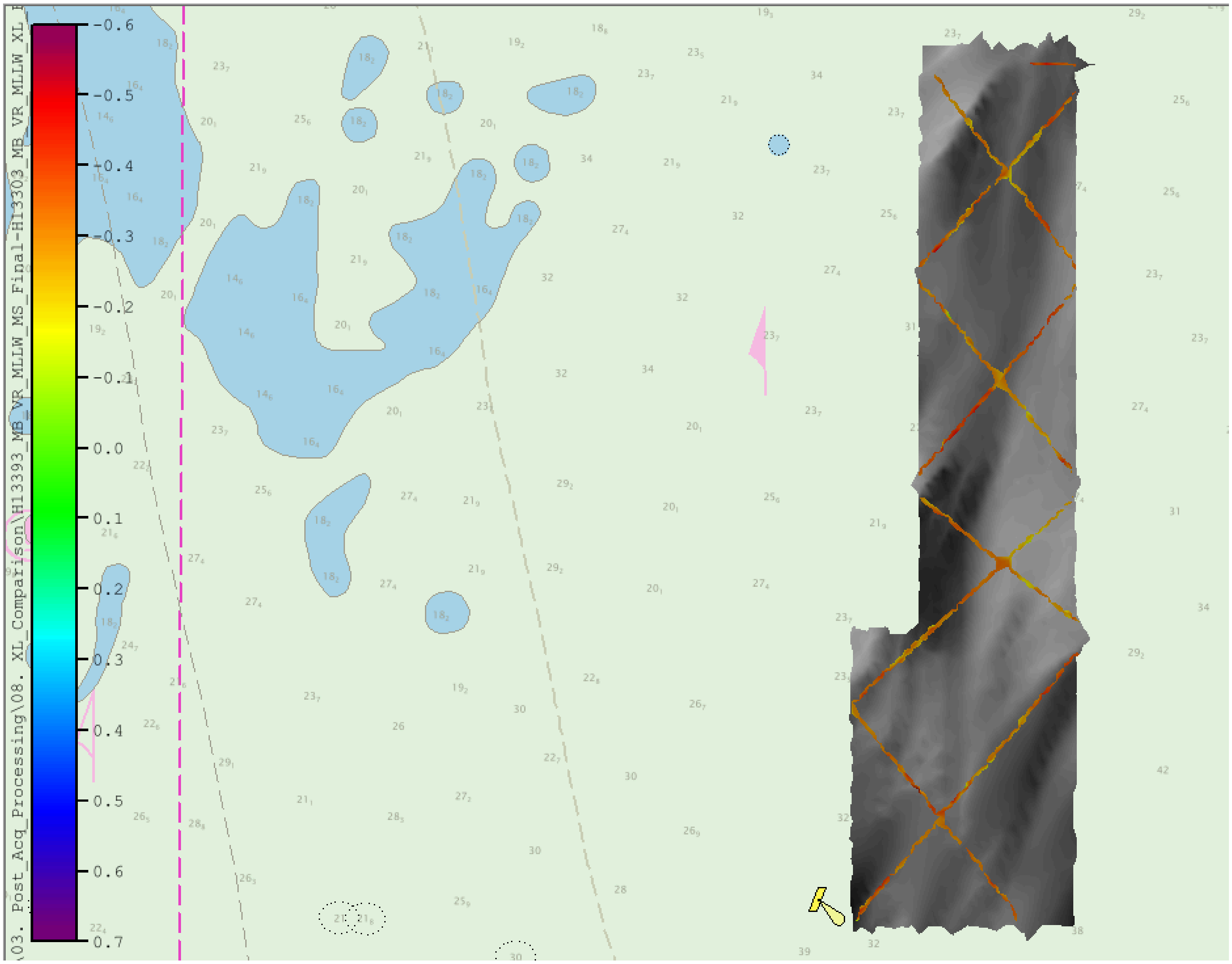


Figure 5: H13393 MBES crossline difference surface, shown in color, overlaid on mainscheme data, shown in greyscale.

B.2.2 Uncertainty

The following survey specific parameters were used for this survey:

Method	Measured	Zoning
ERS via VDATUM	0 meters	0.095 meters

Table 7: Survey Specific Tide TPU Values.

Hull ID	Measured - CTD	Measured - MVP	Measured - XBT	Surface
S222	0 meters/second	4.0 meters/second	0 meters/second	0.2 meters/second

Table 8: Survey Specific Sound Speed TPU Values.

The bathymetric surface's uncertainty layer is compliant with HSSD 2020 uncertainty standards. Over 99.5% of all nodes pass uncertainty standards (Figure 6).

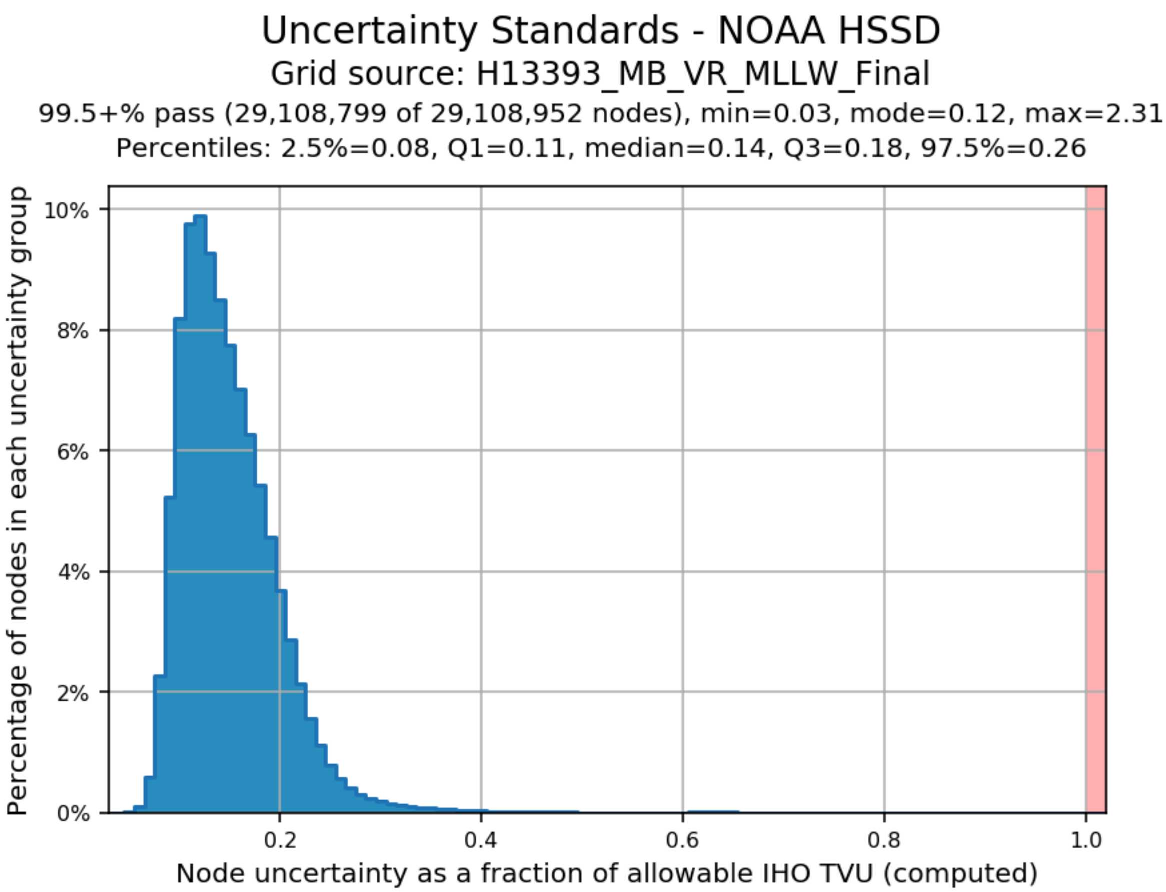


Figure 6: H13393 uncertainty standards

B.2.3 Junctions

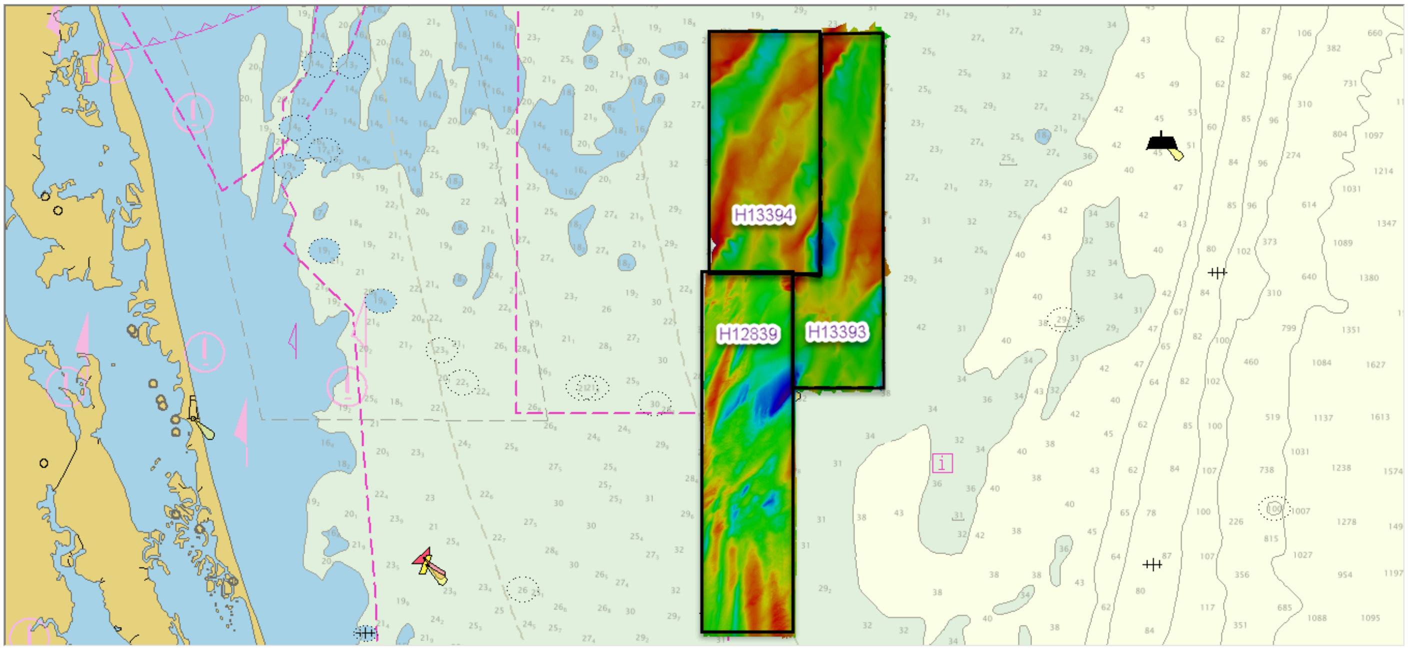


Figure 7: H13393 and junctioning sheets H12839 and H13394

The following junctions were made with this survey:

Registry Number	Scale	Year	Field Unit	Relative Location
H12839	1:40000	2015	NOAA Ship Ferdinand R. Hassler	SW
H13394	1:40000	2020	NOAA Ship Thomas Jefferson	NW

Table 9: Junctioning Surveys

<u>H12839</u>

The north east side of Survey H12839 junctioned with Survey H13393. A single resolution Combined Uncertainty and Bathymetry Estimator (CUBE) surface of H13393 at the 4m resolution and a single resolution BAG (Bathymetric Attribute Grid) surface at the 4m resolution of H12839 data were differenced. The mean difference between bathymetric surface nodes was 0.11m with a standard deviation of 0.16m. Statistics and visual inspection indicate that surveys H13393 and H12389 are in general agreement, with the greatest differences observed over a dynamic shoal in the north junction area (Figures 8 and 9).

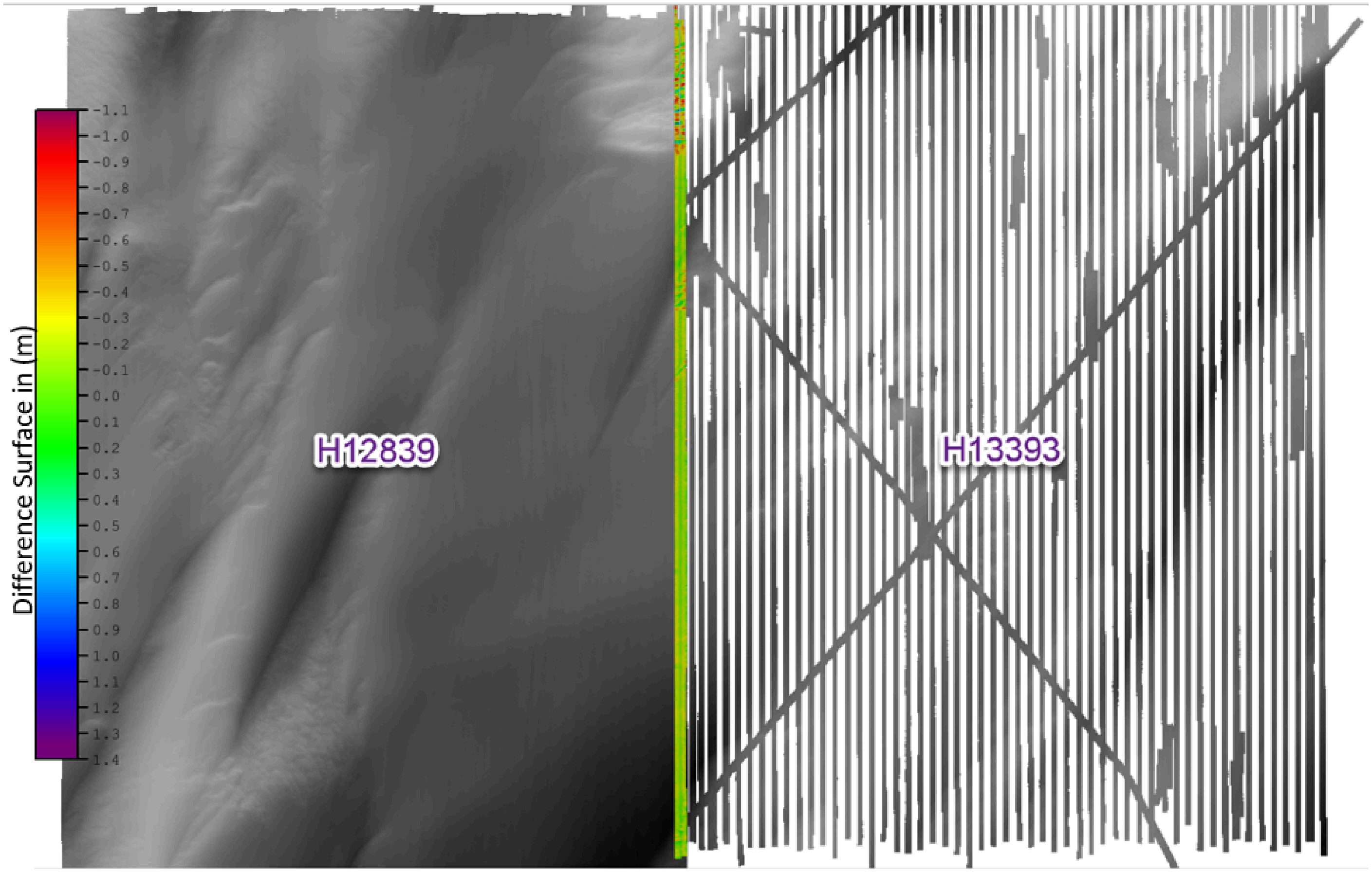
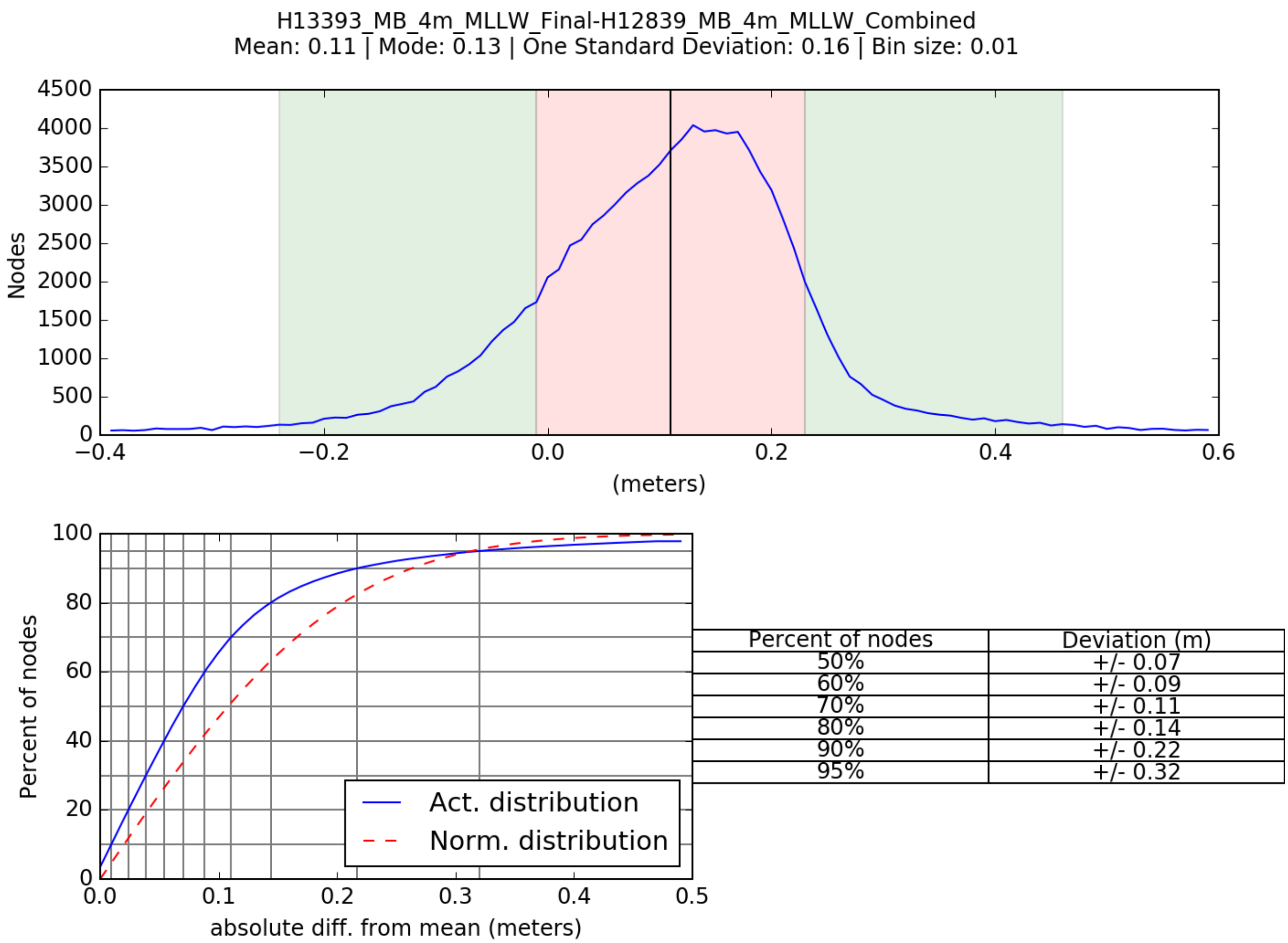


Figure 8: Junction difference surface between Survey H13393 and H12839 in color. Visual inspection indicate that the surveys are in general agreement.



Percent of nodes	Deviation (m)
50%	+/- 0.07
60%	+/- 0.09
70%	+/- 0.11
80%	+/- 0.14
90%	+/- 0.22
95%	+/- 0.32

Figure 9: H13393 and H12839 surface difference comparison statistics.

<u>H13394</u>

The eastern side of Survey H13394 junctioned with Survey H13393. A variable resolution (VR) Combined Uncertainty and Bathymetry Estimator (CUBE) surface of H13393 data and a VR CUBE surface of H13394 data were differenced. The mean difference between bathymetric surface nodes was 0.01m with a standard deviation of 0.08m. Statistics and visual inspection indicate that surveys H13393 and H13394 are in general agreement (Figures 10 and 11).

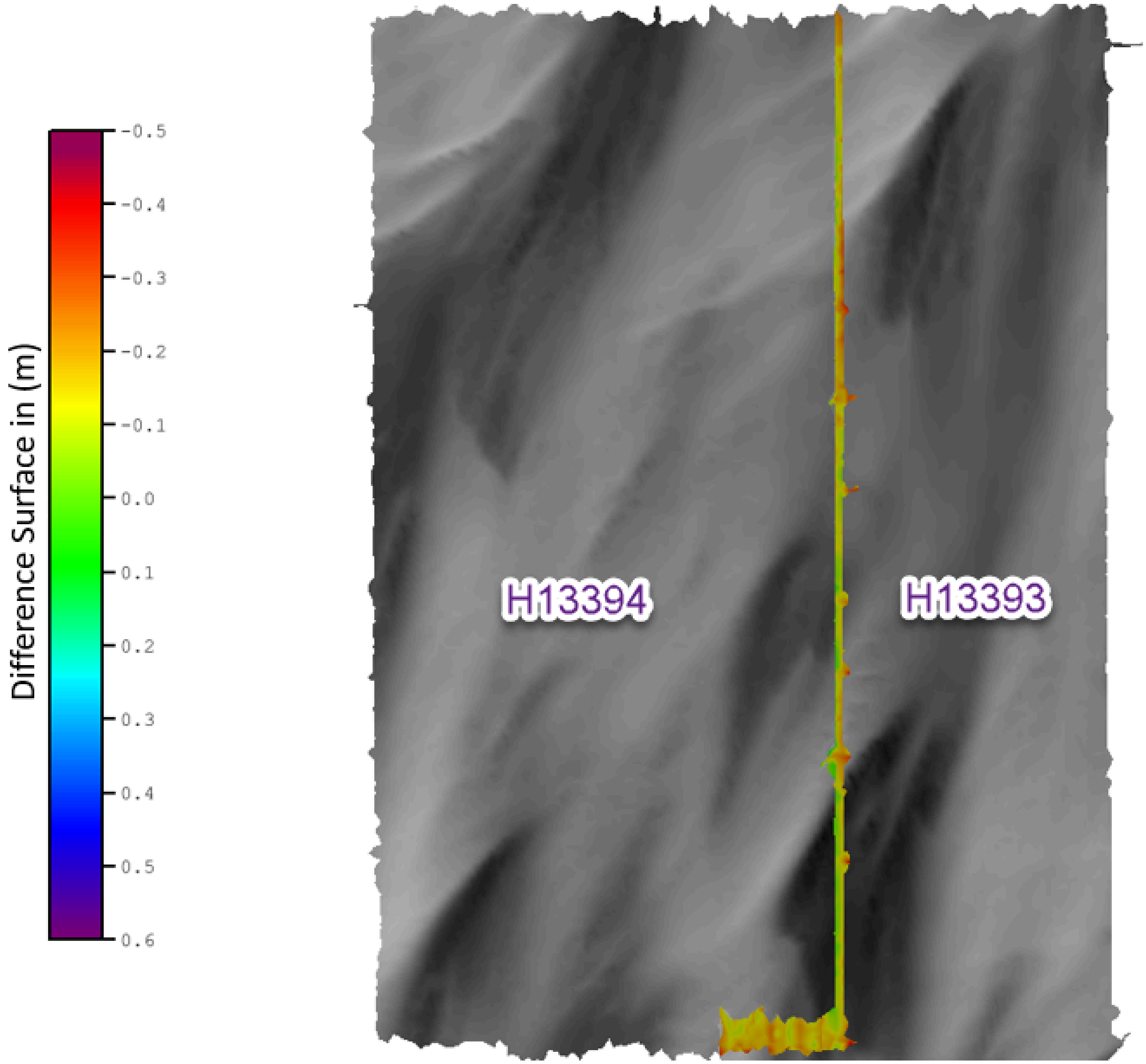
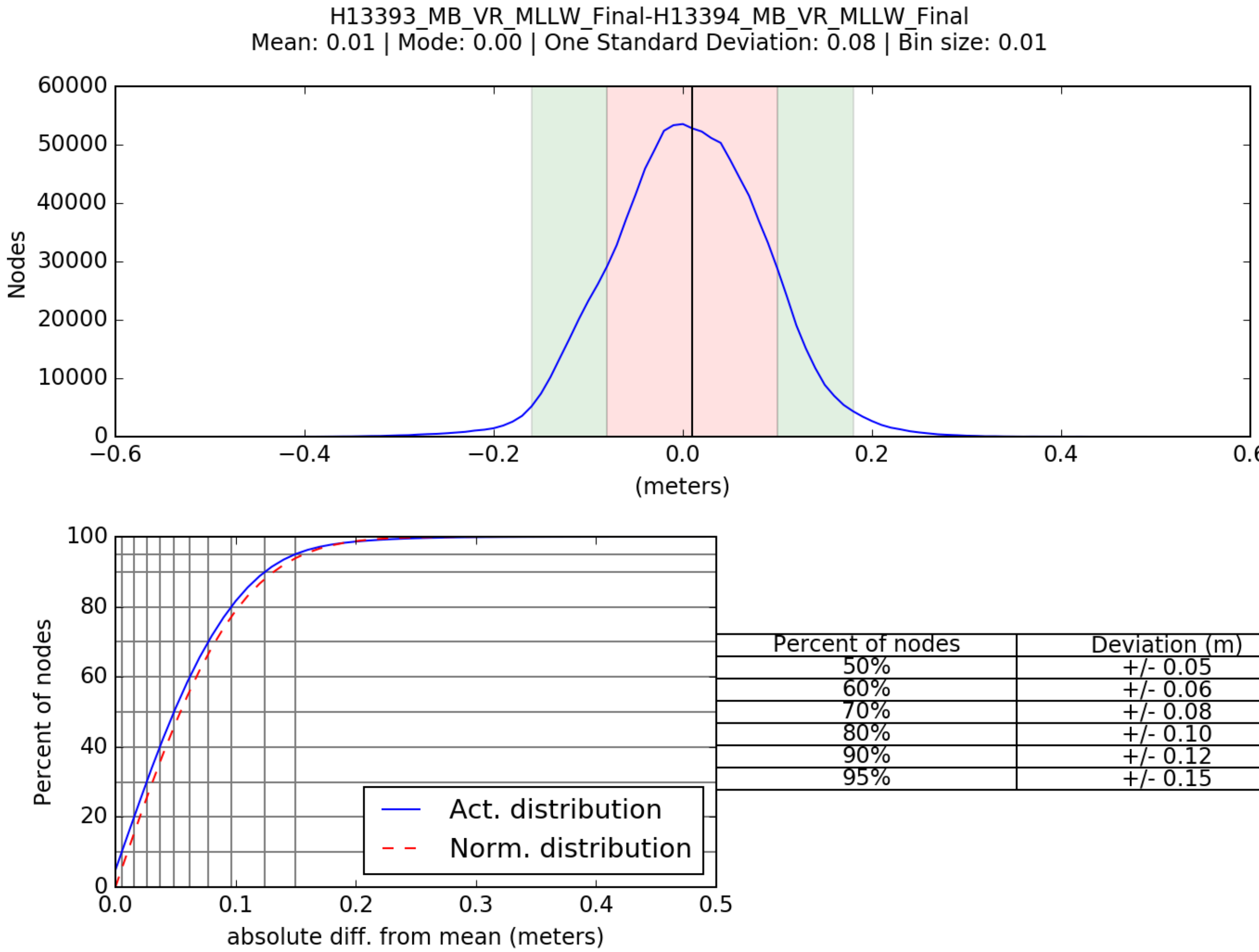


Figure 10: Junction difference surface between Survey H13393 and H13394 shown in color. Visual inspection indicate that the surveys are in general agreement.



Percent of nodes	Deviation (m)
50%	+/- 0.05
60%	+/- 0.06
70%	+/- 0.08
80%	+/- 0.10
90%	+/- 0.12
95%	+/- 0.15

Figure 11: H13393 and H13394 surface difference comparison statistics.

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

Side Scan Ping Skips

During the 2019 field season, while working on sheet H13327, the survey team on Thomas Jefferson discovered significant data gaps (up to 150m in length) present in the side scan record from the Klein 5000

V1 SSS system. After extensive troubleshooting and collaboration with Klein technicians, the problem was traced to engineering deficiencies within the TPU. Over the winter repair period, the Klein TPU with serial number 007 (“black” TPU) was sent to Klein for servicing and was returned to TJ for use during the 2020 field season. This black TPU was used for acquisition on H13393 for Julian days 236-240. Detailed analysis of the raw .sdf files revealed that the problem of missing pings was still present, but on a much smaller scale than what was observed in 2019. Where present, small data gaps were caused by groups of five consecutive missed pings. Some lines contained no missed pings while others contained up to five of these groups spread over the length of the data record (approximately 2 hours, or 18 nautical miles). It was determined that these small groupings of missed pings would not impede the detection of significant objects present on the seafloor. SSS data from Julian days 241 and 242 was collected using a “gold” TPU (serial number 118) on loan from Klein and no data gaps or missed pings were detected in the records.

B.2.6 Factors Affecting Soundings

SSS Refraction

This survey had issues with refraction as a result of the variable thermocline in the survey area. SSS data was acquired at the 75m range scale and the fish was flown at the lowest possible altitude in an attempt to record data below the thermocline. In areas of unacceptable levels of refraction, the area was filled in with complete coverage MBES to cover the holidays created (see Figure 12).

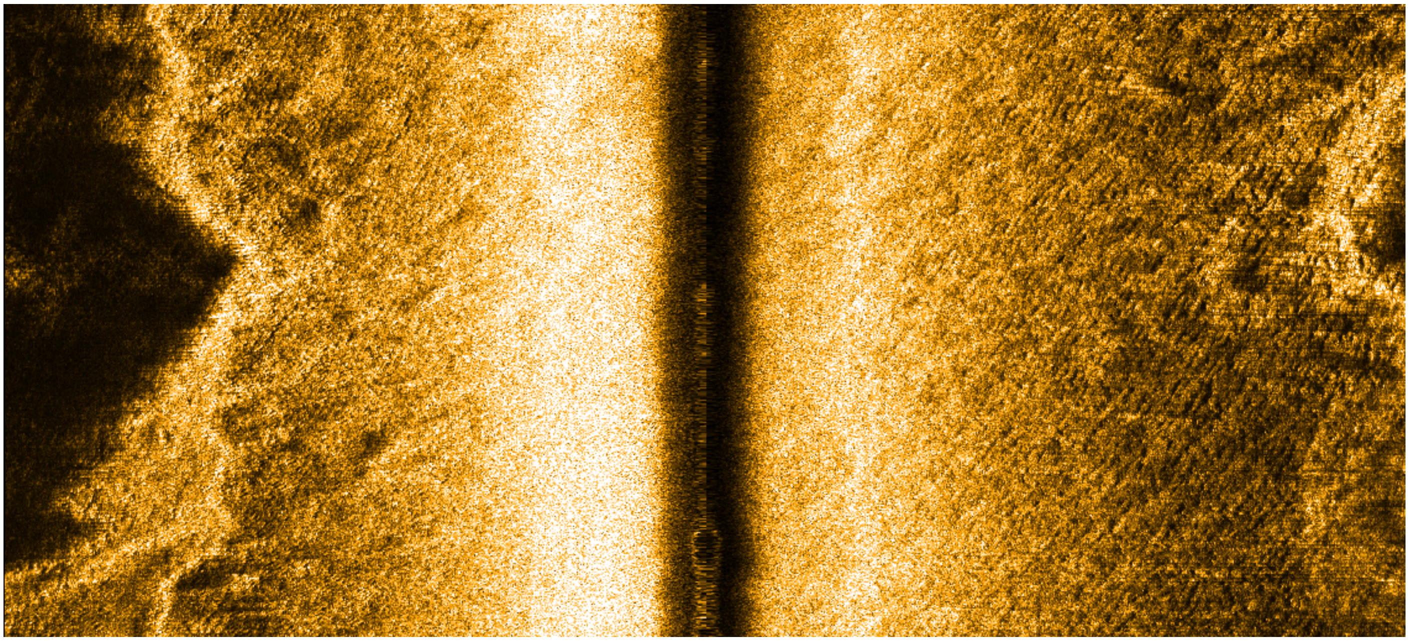


Figure 12: Example of refraction seen in Side Scan Sonar data.

B.2.7 Sound Speed Methods

Sound Speed Cast Frequency: Casts were conducted at the start of acquisition each day and at a minimum of one every four hours during acquisition.

MVP casts on S222 were conducted at an average interval of 10 to 15 minutes as recommended by CastTime analysis in Sound Speed Manager, which determines optimum cast frequency based on the observed sound speed variations from previous casts (see Figure 13). As seen from the below figure, the thermocline changed over short temporal and spatial distances, meriting the frequent casts to compensate.

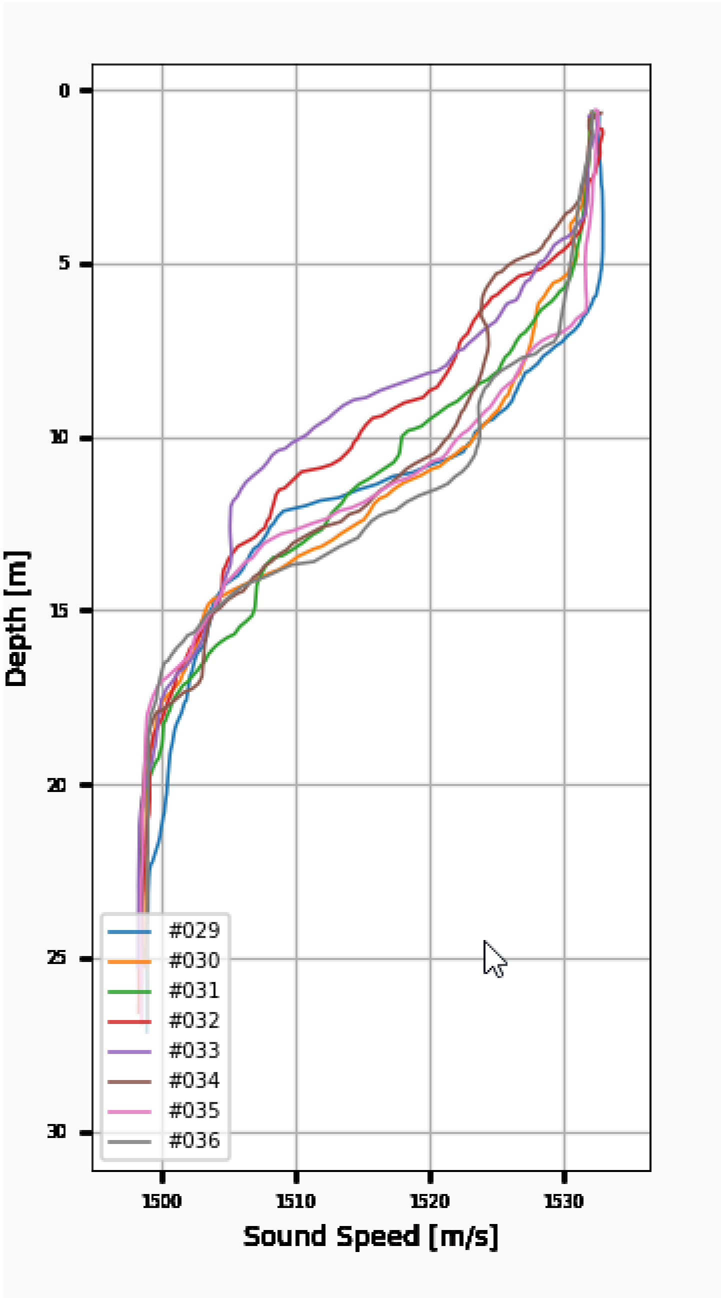


Figure 13: Sound speed profiles from MVP casts on Julian Day 234, taken over a 3 hour period.

B.2.8 Coverage Equipment and Methods

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

B.3 Echo Sounding Corrections

B.3.1 Corrections to Echo Soundings

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

B.3.2 Calibrations

All sounding systems were calibrated as detailed in the DAPR.

B.4 Backscatter

All equipment and survey methods were used as detailed in the DAPR. Raw MBES backscatter was logged as part of the .all file of the Kongsberg EM710 systems. Backscatter was processed in QPS Fledermaus GeoCoder Toolbox (FMGT) software, and the exported geotiffs are included in the final processed data package (see Figure 14).

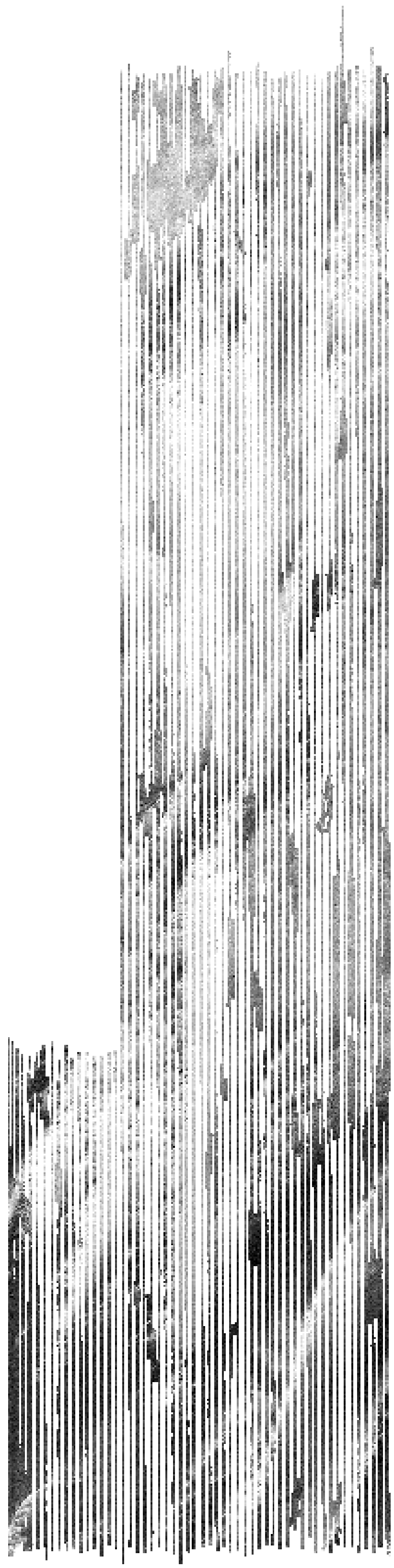


Figure 14: S222's 100 Khz multibeam backscatter

B.5 Data Processing

B.5.1 Primary Data Processing Software

The following Feature Object Catalog was used: NOAA Profile Version 2020.

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
H13393_MB_VR_MLLW	CARIS VR Surface (CUBE)	Variable Resolution	23.41 meters - 42.52 meters	NOAA_VR	Complete MBES
H13393_MB_VR_MLLW_Final	CARIS VR Surface (CUBE)	Variable Resolution	23.41 meters - 42.52 meters	NOAA_VR	Complete MBES
H13393_SSSAB_1m_455kHz_1of1	SSS Mosaic	1 meters	-	N/A	100% SSS
H13393_MBAB_6m_S222_100Khz_1of1	MB Backscatter Mosaic	6 meters	-	N/A	MBES Backscatter

Table 10: Submitted Surfaces

Complete coverage requirements were met by 100% Side Scan Sonar coverage with concurrent Multibeam, with areas of complete coverage MBES as specified under section 5.2.2.4 of the HSSD 2020. All bathymetric grids for H13393 meet density requirements per the HSSD 2020 (Figure 15). See section A.4 Survey Coverage for a complete discussion on side scan coverage.

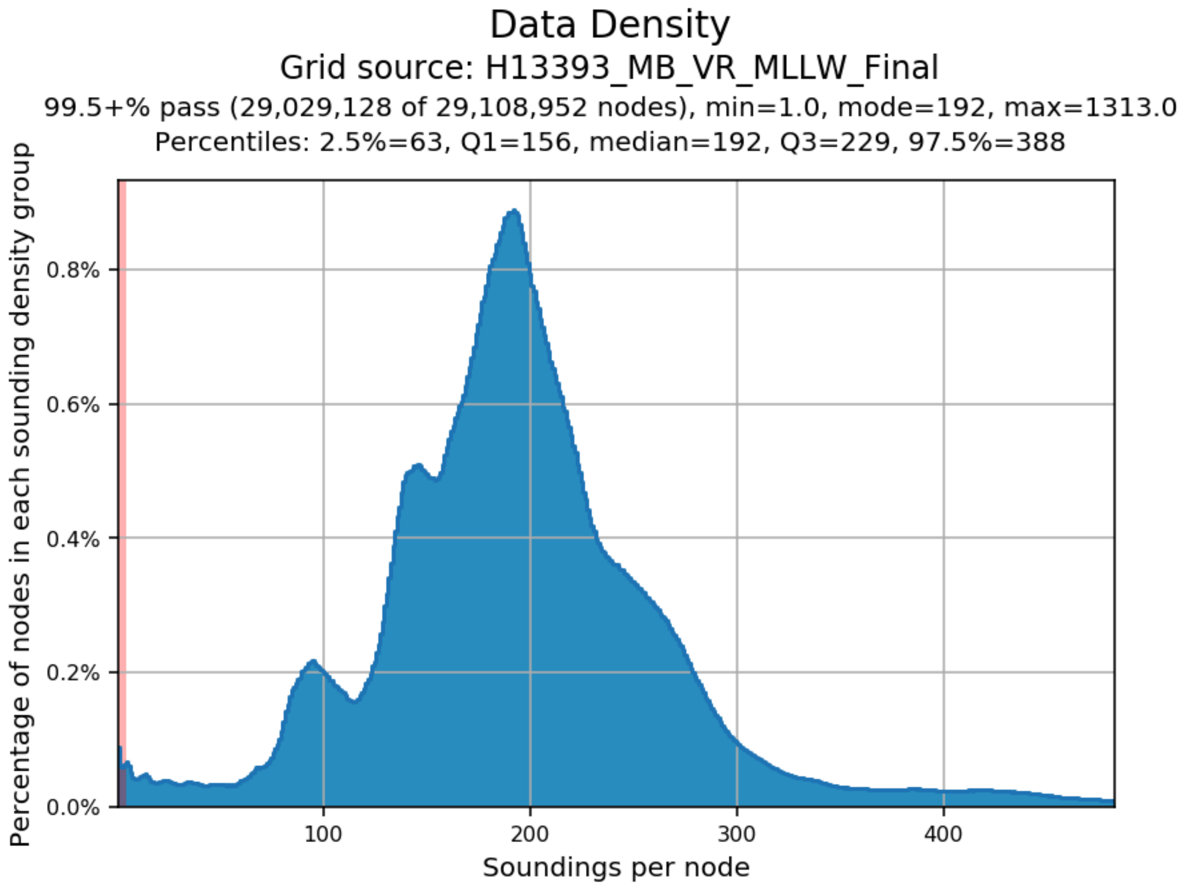


Figure 15: H13393 density statistics.

C. Vertical and Horizontal Control

No Horizontal and Vertical Control Report (HVCR) is required for this survey.

C.1 Vertical Control

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

ERS Datum Transformation

The following ellipsoid-to-chart vertical datum transformation was used:

Method	Ellipsoid to Chart Datum Separation File
ERS via VDATUM	vdatum_July_cb_100m_NAD83-MLLW_geoid12b.csar

Table 11: ERS method and SEP file

All soundings submitted for H13393 are reduced to MLLW using VDatum techniques as outlined in the DAPR.

C.2 Horizontal Control

The horizontal datum for this project is North American Datum of 1983 (NAD 83).

The projection used for this project is Universal Transverse Mercator (UTM) Zone 18.

PPP

Trimble-RTX service was used with an Applanix POS MVv5 GNSS_INS system to obtain highly accurate ellipsoidally referenced position data to meet ERS specifications for H13393 MBES data acquisition.

WAAS

The Wide Area Augmentation System (WAAS) was used for real-time horizontal control during data acquisition.

D. Results and Recommendations

D.1 Chart Comparison

A chart comparison was conducted between survey H13393 soundings and previously charted ENC soundings using procedures outlined in the DAPR.

D.1.1 Electronic Navigational Charts

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

ENC	Scale	Edition	Update Application Date	Issue Date
US3DE01M	1:419706	22	06/20/2018	08/12/2020

Table 12: Largest Scale ENCs

D.1.2 Shoal and Hazardous Features

In general the bathymetry matched the charted depth, or was deeper. Only one area in particular was found to be shoal of the charted depth. This area does not present a hazard to navigation as the surveyed area of H13393 is 23.4m and deeper (all deeper than the minimum depth of 66ft to be noted as a potential hazard). See Figure 16 below.

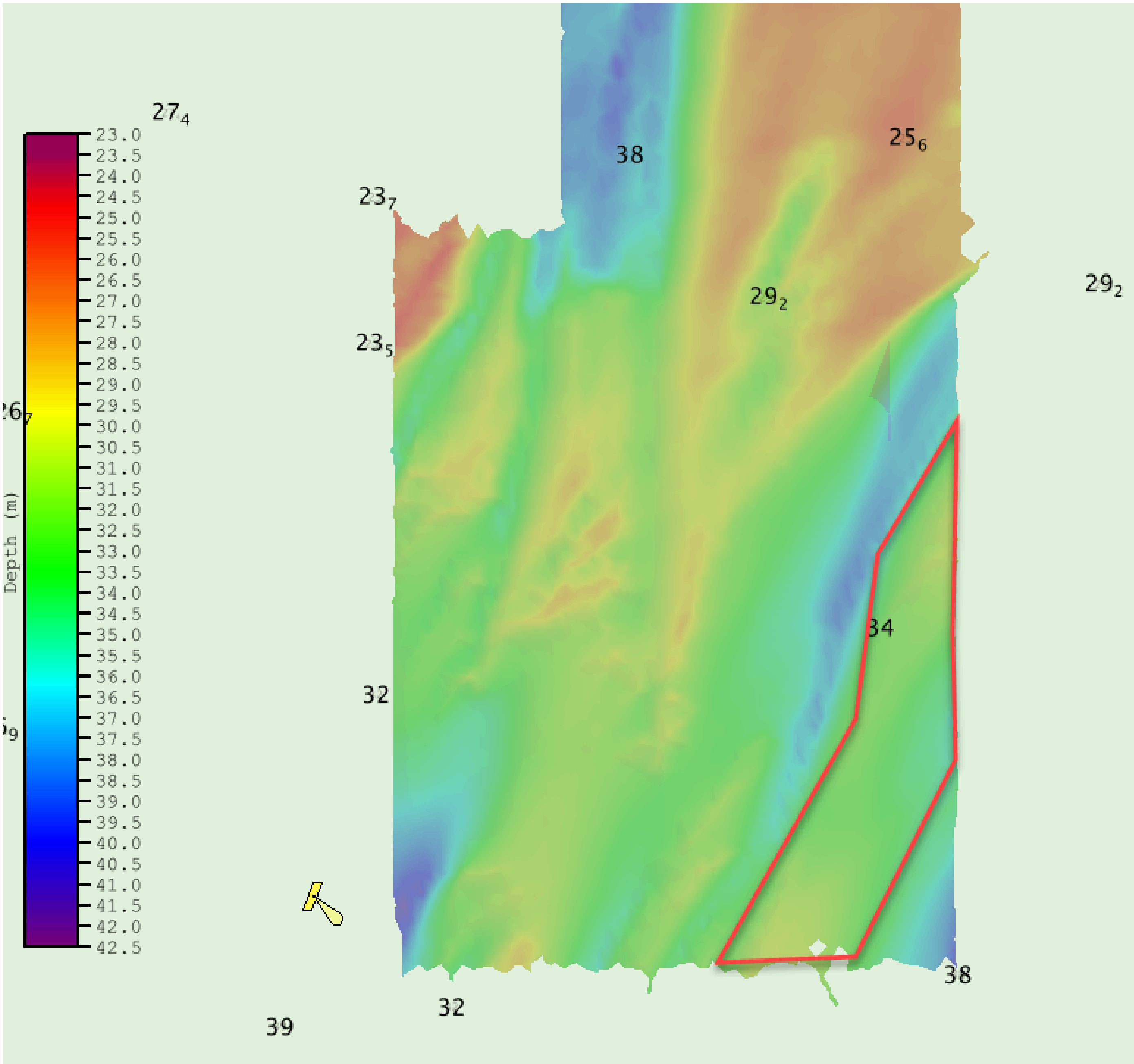


Figure 16: Area within red found to be more shoal than the charted depth (numbers in grey).

D.1.3 Charted Features

No charted features exist for this survey.

D.1.4 Uncharted Features

No uncharted features exist for this survey.

D.1.5 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.2 Additional Results

D.2.1 Aids to Navigation

No Aids to navigation (ATONs) exist for this survey.

D.2.2 Maritime Boundary Points

No Maritime Boundary Points were assigned for this survey.

D.2.3 Bottom Samples

Bottom samples were assigned, investigated, and are included in the Final Feature File. See Figure 17 for a generalized view of H13393's bottom sample locations.

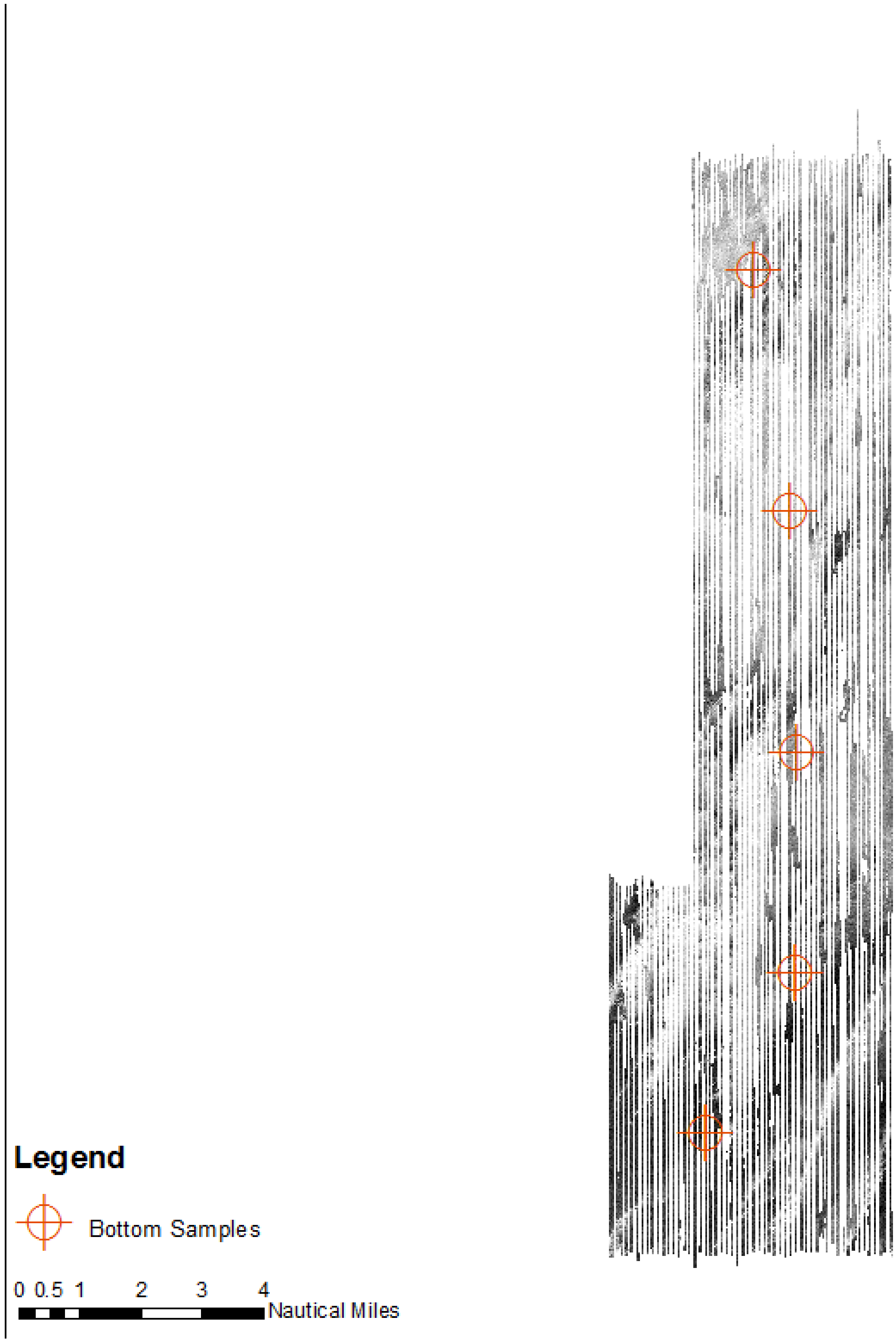


Figure 17: Bottom Samples, shown as orange targets overlaid on S222 backscatter imagery.

D.2.4 Overhead Features

No overhead features exist for this survey.

D.2.5 Submarine Features

No submarine features exist for this survey.

D.2.6 Platforms

No platforms exist for this survey.

D.2.7 Ferry Routes and Terminals

No ferry routes or terminals exist for this survey.

D.2.8 Abnormal Seafloor or Environmental Conditions

No abnormal seafloor or environmental conditions 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

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

D.2.11 ENC Scale Recommendations

No new ENC scales 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 Specifications and Deliverables, Field Procedures Manual, Letter Instructions, and all HSD Technical Directives. These data are adequate to supersede charted data in their common areas. This survey is complete and no additional work is required with the exception of deficiencies noted in the Descriptive Report.

Approver Name	Approver Title	Approval Date	Signature
CDR Briana Hillstrom, NOAA	Commanding Officer	10/28/2020	
LT Calandria DeCastro, NOAA	Field Operations Officer	10/28/2020	
Josh Hiteshew	Chief Survey Technician	10/28/2020	
Adam Martinez	Sheet Manager	10/28/2020	

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	Continuously Operating Reference Station
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
ERTDM	Ellipsoidally Referenced Tidal Datum Model
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

Acronym	Definition
HSSD	Hydrographic Survey Specifications and Deliverables
HSTB	Hydrographic Systems Technology Branch
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	Linear Nautical Miles
MBAB	Multibeam Echosounder Acoustic Backscatter
MCD	Marine Chart Division
MHW	Mean High Water
MLLW	Mean Lower Low Water
NAD 83	North American Datum of 1983
NALL	Navigable Area Limit Line
NTM	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
RNC	Raster Navigational Chart
RTK	Real Time Kinematic
RTX	Real Time Extended
SBES	Singlebeam Echosounder
SBET	Smooth Best Estimate and Trajectory
SNM	Square Nautical Miles
SSS	Side Scan Sonar
SSSAB	Side Scan Sonar Acoustic Backscatter
ST	Survey Technician
SVP	Sound Velocity Profiler
TCARI	Tidal Constituent And Residual Interpolation
TPU	Total Propagated Uncertainty
USACE	United States Army Corps of Engineers
USCG	United States Coast Guard
UTM	Universal Transverse Mercator
XO	Executive Officer
ZDF	Zone Definition File