H13474

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

DESCRIPTIVE REPORT

Type of Survey:	Navigable Area Maritime EEZ Mapping
Registry Number:	H13474

LOCALITY

State(s):	New Jersey
General Locality:	Northern New Jersey
Sub-locality:	10NM East of Shark River

2021

CHIEF OF PARTY
Michael Gonsalves, CDR/NOAA

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Date:

U.S. DEPARTMENT OF COMMERCE NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION	REGISTRY NUMBER:
HYDROGRAPHIC TITLE SHEET	**H13474**

INSTRUCTIONS: The Hydrographic Sheet should be accompanied by this form, filled in as completely as possible, when the sheet is forwarded to the Office.

State(s):	**New Jersey**
General Locality:	**Northern New Jersey**
Sub-Locality:	**10NM East of Shark River**
Scale:	**20000**
Dates of Survey:	**07/24/2021 to 10/07/2021**
Instructions Dated:	**04/23/2021**
Project Number:	**OPR-C319-FH-21**
Field Unit:	**NOAA Ship *Ferdinand R. Hassler***
Chief of Party:	**Michael Gonsalves, CDR/NOAA**
Soundings by:	**Multibeam Echo Sounder**
Imagery by:	**Multibeam Echo Sounder Backscatter Side Scan Sonar**
Verification by:	**Pacific 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.

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Descriptive Report to Accompany Survey H13474

Project: OPR-C319-FH-21

Locality: Northern New Jersey

Sublocality: 10NM East of Shark River

Scale: 1:20000

July 2021 - October 2021

NOAA Ship *Ferdinand R. Hassler*

Chief of Party: Michael Gonsalves, CDR/NOAA

A. Area Surveyed

The survey is referred to as H13474, "10 NM East of Shark River" (Sheet 1), within the Project Instructions. The surveyed area encompasses approximately 64.3 square nautical miles and is located approximately 10 nautical miles off the coast New Jersey.

A.1 Survey Limits

Data were acquired within the following survey limits:

Northwest Limit	Southeast Limit
40° 15' 36.94" N 73° 52' 56.65" W	40° 4' 30.01" N 73° 41' 54.53" W

Table 1: Survey Limits

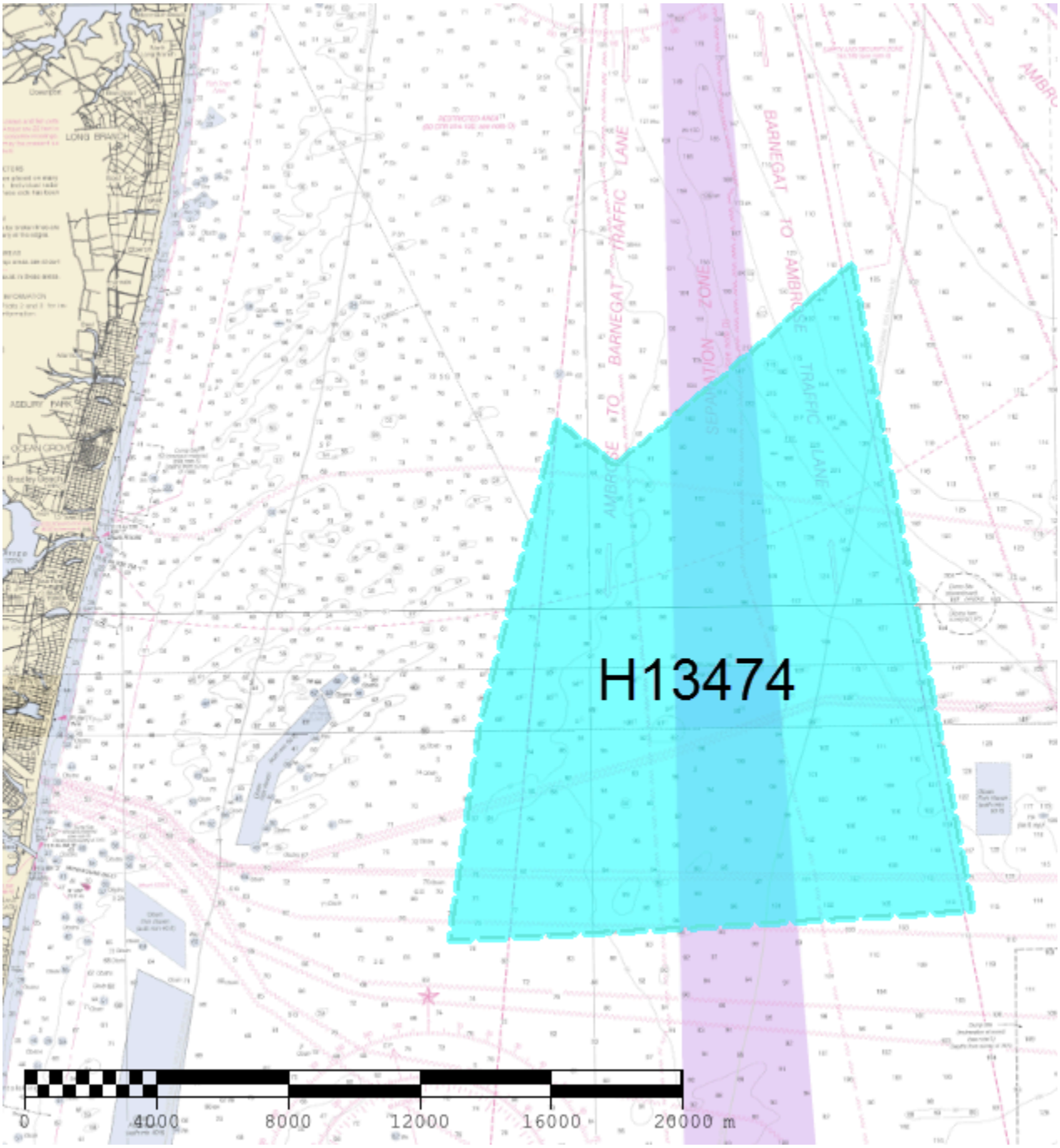


Figure 1: H13474 assigned survey area (Chart 12323 & 12326).

Data were acquired with in the assigned survey limits as required in the Project Instructions (PI) and Hydrographic Surveys Specifications and Deliverables (HSSD) unless otherwise denoted.

A.2 Survey Purpose

The Port of New York and New Jersey, is the largest importer of goods in the United States by volume, handling over 74,000,000 short tons in 2018. With larger Post-Panamax ships with deeper drafts often calling upon the Port of New York and New Jersey, accurate navigational charts are essential for the continued safe transit of vessels in and out of the Port.

This 64 square nautical mile survey area offshore of the coast of New Jersey focuses on a section of the traffic separation scheme for large vessels calling upon the Port of New York and New Jersey, and will supersede 1970 vintage chart data for the area.

This project will provide modern bathymetric data to update National Ocean Service (NOS) nautical charting products as well as support the Seabed 2030 global mapping initiative in this heavily trafficked area, which supports commerce along the eastern seaboard.

A.3 Survey Quality

The entire survey is adequate to supersede previous data.

Data acquired in H13474 meet multibeam echo sounder (MBES) coverage requirements for complete coverage, as specified by the 2021 HSSD. This includes crosslines (see Section B.2.1), NOAA allowable uncertainty (see Section B.2.2), and density requirements (see Section B.5.2).

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 2021 HSSD. Coverage requirements were met with a combination of 100% complete coverage multibeam echosounder (MBES) coverage and 100% side scan sonar (SSS) with concurrent MBES coverage. Complete coverage MBES was used to reacquire areas of poor-quality SSS data created by refraction. See Figure 2 for coverage details.

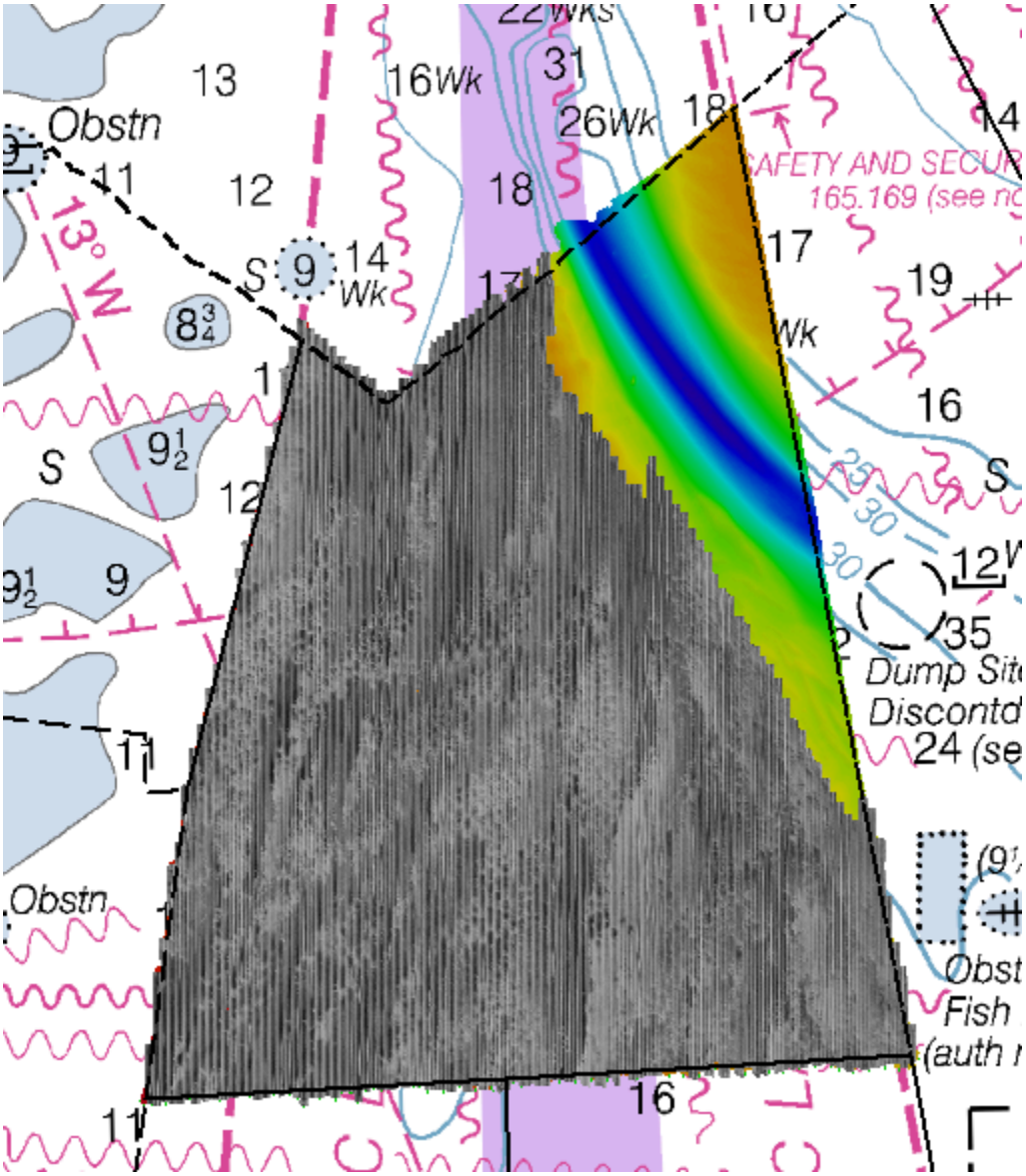


Figure 2: Complete coverage SSS (gray scale) plotted over MBES coverage acquired on H13474. Black outline represents sheet limits.

A.6 Survey Statistics

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

	HULL ID	*S250*	*Total*
LNM	**SBES Mainscheme**	0.0	0.0
	MBES Mainscheme	832.44	832.44
	Lidar Mainscheme	0.0	0.0
	SSS Mainscheme	0.0	0.0
	SBES/SSS Mainscheme	0.0	0.0
	MBES/SSS Mainscheme	602.13	602.13
	SBES/MBES Crosslines	37.47	37.47
	Lidar Crosslines	0.0	0.0
Number of Bottom Samples			2
Number Maritime Boundary Points Investigated			0
Number of DPs			16
Number of Items Investigated by Dive Ops			0
Total SNM			64.3

Table 3: Hydrographic Survey Statistics

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

Survey Dates	Day of the Year
07/24/2021	205
07/25/2021	206

Survey Dates	Day of the Year
07/26/2021	207
07/27/2021	208
07/28/2021	209
07/29/2021	210
08/11/2021	223
10/07/2021	280

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	***S250***
LOA	37.7 meters
Draft	3.85 meters

Table 5: Vessels Used

Figure 3: NOAA Ship Ferdinand Hassler (S250).

B.1.2 Equipment

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

Manufacturer	Model	Type
Kongsberg Maritime	EM 2040	MBES
Kongsberg Maritime	EM 2040	MBES Backscatter
Klein Marine Systems	System 5000	SSS
AML Oceanographic	MVP200	Conductivity, Temperature, and Depth Sensor
AML Oceanographic	MVP-X	Conductivity, Temperature, and Depth Sensor
Teledyne RESON	SVP 70	Sound Speed System
Applanix	POS MV 320 v5	Positioning and Attitude System
Sea-Bird Scientific	SBE 19plus	Conductivity, Temperature, and Depth Sensor

Table 6: Major Systems Used

B.2 Quality Control

B.2.1 Crosslines

S250 collected 37.5 linear nautical miles of MBES crosslines, approximately 4.3 percent, across a range of depths in the mainscheme data. The Compare Grids function in Pydro Explorer was used to analyze the finalized variable resolution (VR) surfaces of H13474 mainscheme only and crossline only data. Pydro determined that the resulting mean difference was 0.04m with a standard deviation of 0.11m and over 99.5 percent of nodes met allowable uncertainties. Mainscheme and crossline data were compared, and an offset of approximately 0.5 meters was apparent across the survey area in various locations. This is potentially a result of changes in environmental conditions between the collection of crosslines and mainscheme, resulting in variable sound velocity. After completing QC Tools analysis, it was determined that the offset does not impede the reliability of the data. For additional results, see plots below.

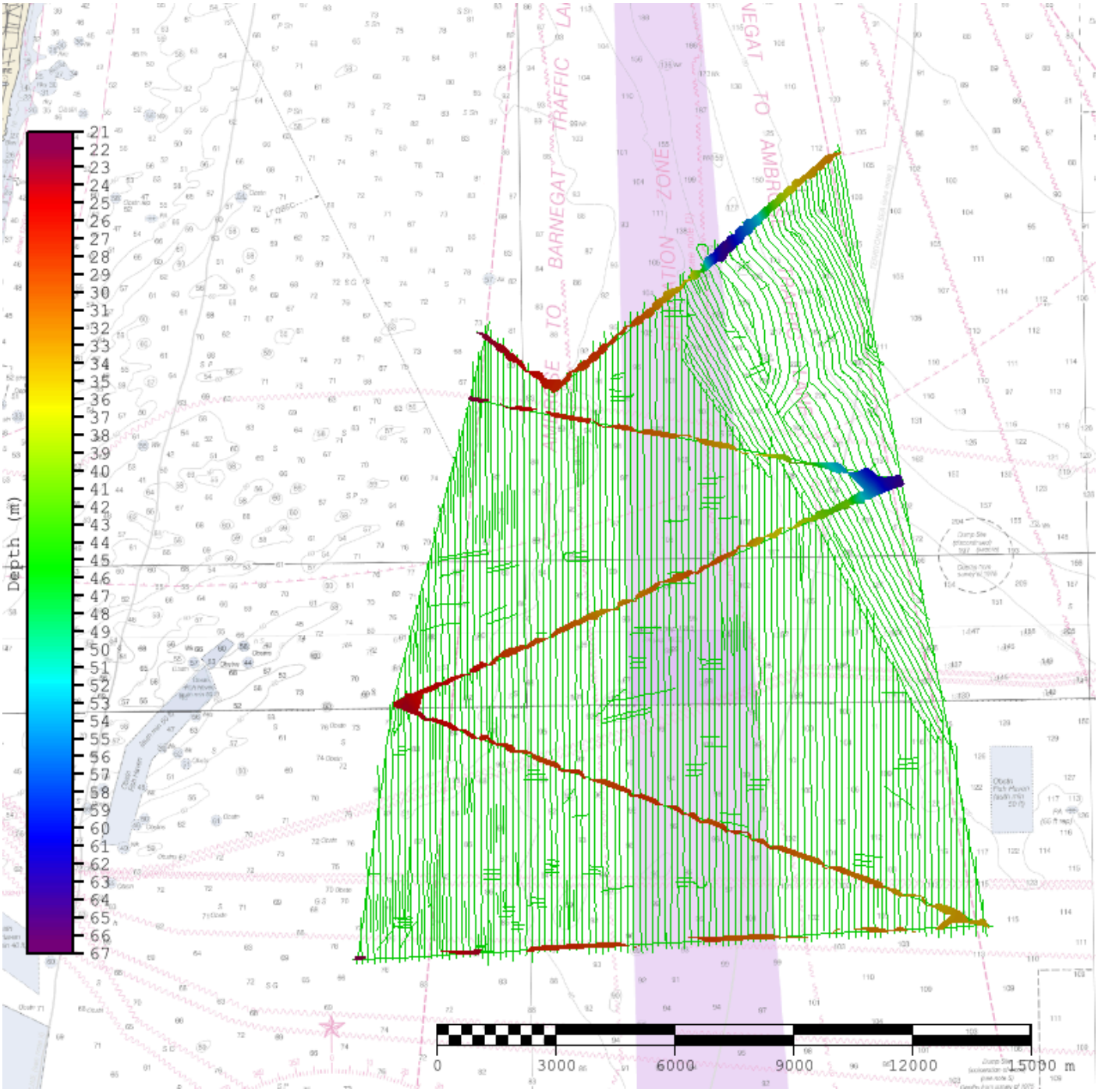
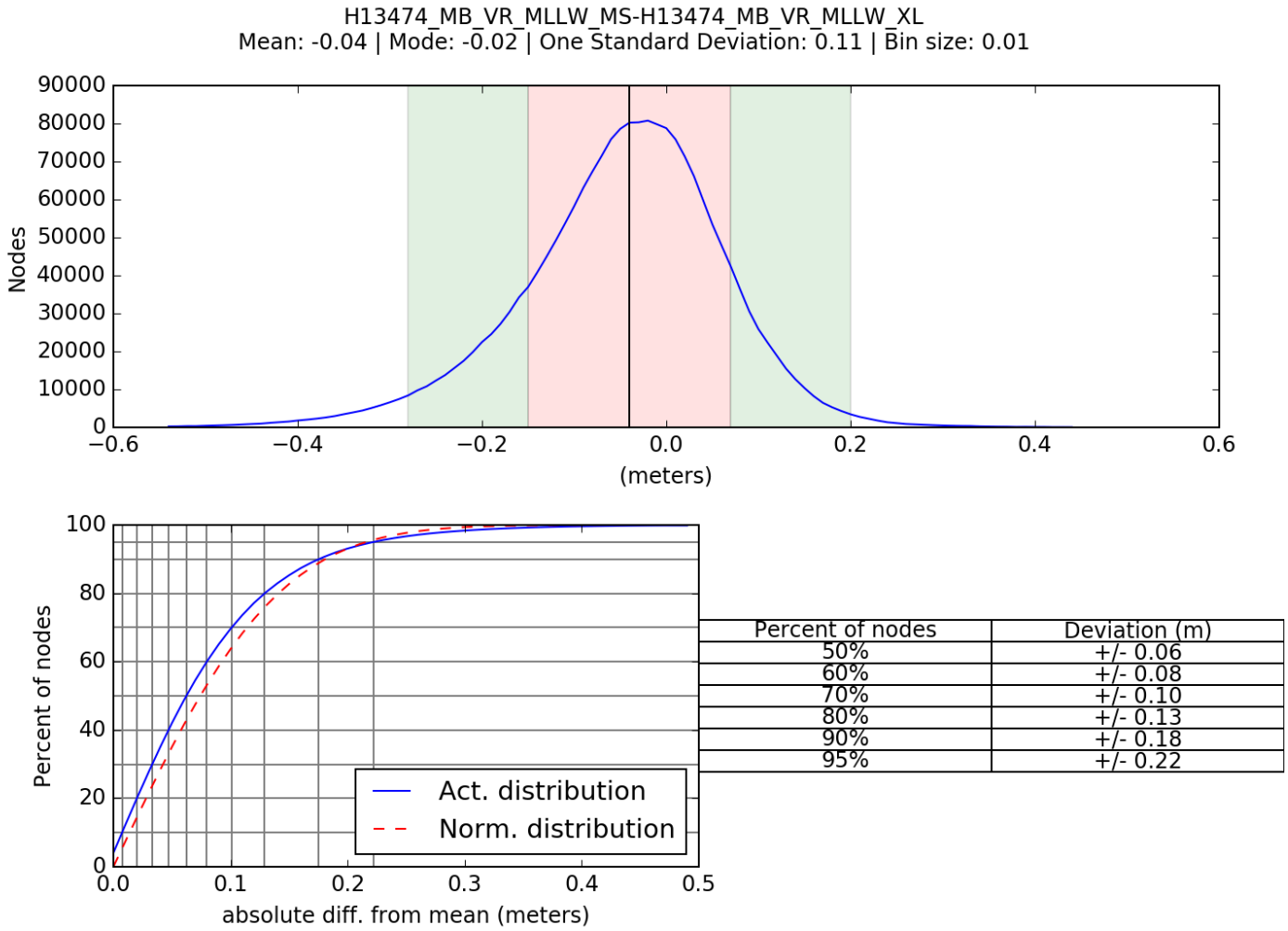


Figure 4: H13474 crossline surface overlaid on mainscheme tracklines.



Percent of nodes	Deviation (m)
50%	+/- 0.06
60%	+/- 0.08
70%	+/- 0.10
80%	+/- 0.13
90%	+/- 0.18
95%	+/- 0.22

Figure 5: Pydro derived plot showing absolute difference statistics of H13474 mainscheme to crossline data.

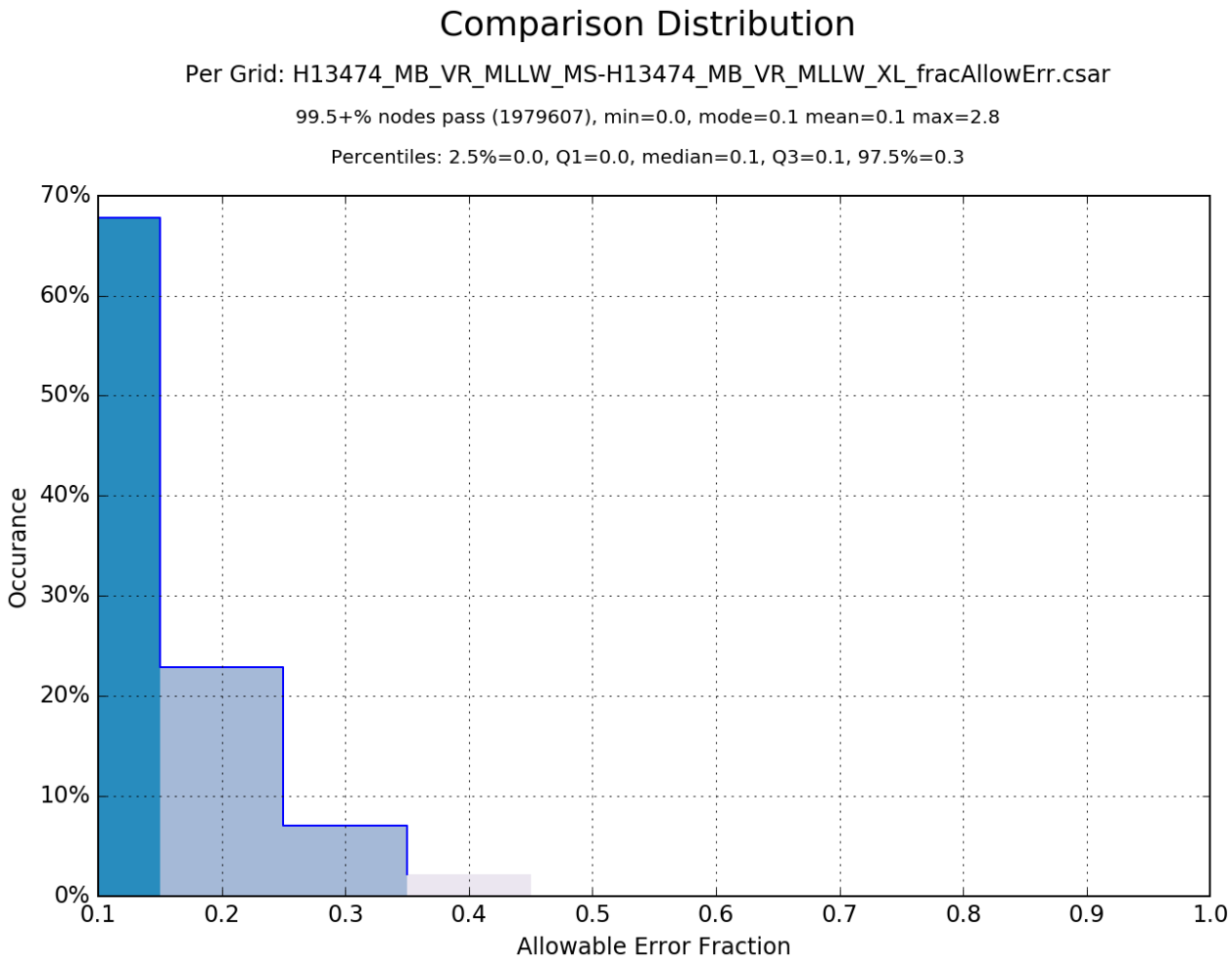


Figure 6: Pydro derived plot showing percentage-pass value of H13474 mainscheme to crossline data.

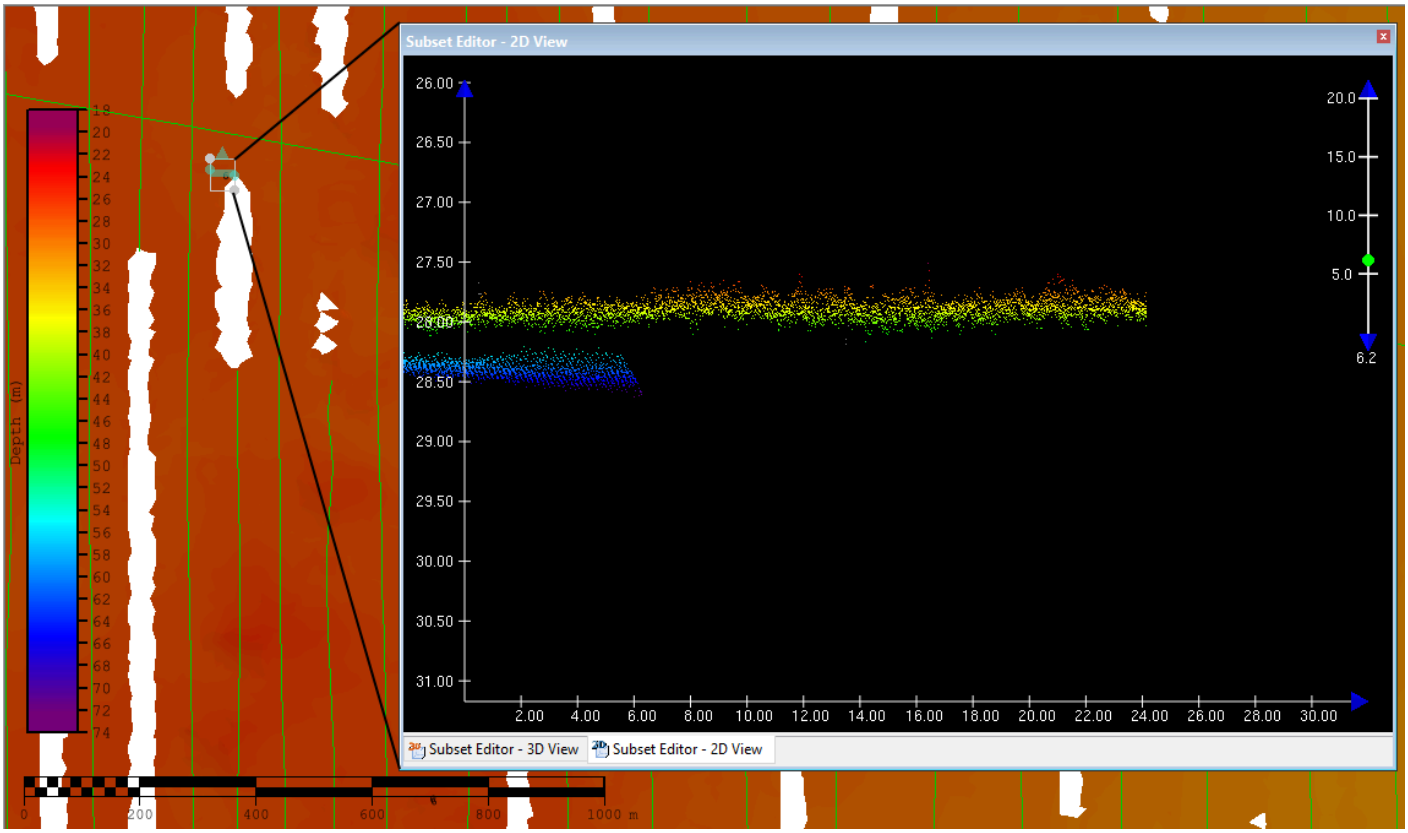


Figure 7: Example of offset between mainscheme and crossline data.

B.2.2 Uncertainty

The following survey specific parameters were used for this survey:

Method	Measured	Zoning
ERS via VDATUM	0.0 meters	0.092 meters

Table 7: Survey Specific Tide TPU Values.

Hull ID	Measured - CTD	Measured - MVP	Measured - XBT	Surface
S250	4 meters/second	4 meters/second	N/A	0.5 meters/second

Table 8: Survey Specific Sound Speed TPU Values.

Total Propagated Uncertainty (TPU) values for survey H13474 were derived from a combination of fixed values for equipment and vessel characteristics, as well as from field assigned values for sound speed

uncertainties. Tidal uncertainty was provided in the project instructions for the NOAA vertical datum transformation model used for this survey.

In addition to the usual a priori estimates of uncertainty, real-time and post-processed uncertainty sources were also incorporated into the depth estimates of this survey. Real-time uncertainties for position, navigation, attitude, and vessel motion data from Applanix POS MV were applied during acquisition and initially in post-processing. POSPac SBET and RMS files were later applied in CARIS HIPS to supersede POS MV uncertainties associated with GPS height and position.

Uncertainty values of the submitted finalized grids were calculated in Caris using "Greater of the Two" of uncertainty and standard deviation (scaled to 95%). Grid QA v5 within Pydro QC Tools was used to analyze H13474 TVU compliance. H13474 met HSSD requirements in over 99.5 percent of grid nodes, which is shown in the histogram plot below.

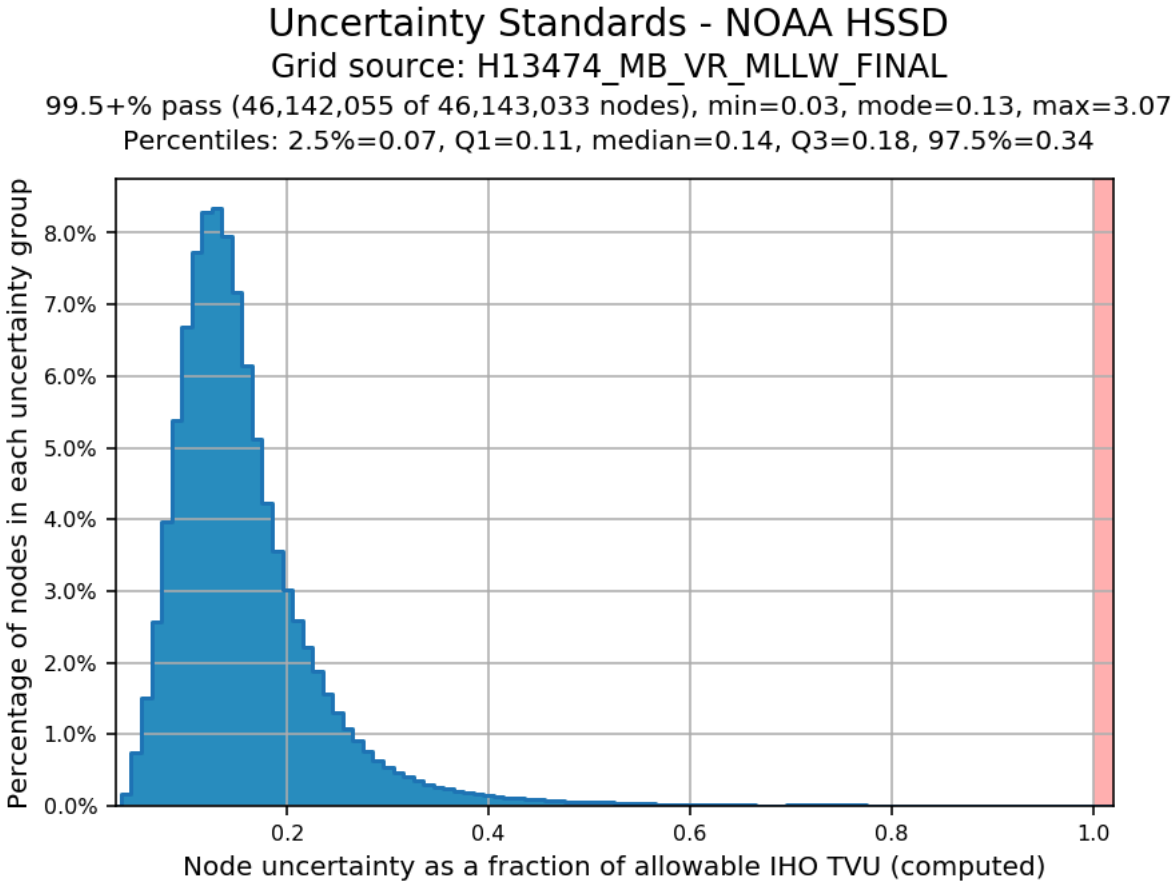


Figure 8: Pydro derived plot showing TVU compliance of H13474 finalized variable-resolution MBES data.

B.2.3 Junctions

There are six surveys that junction with H13474. H12628 and H11536 are historical surveys. H12628 was conducted by Ferdinand R. Hassler in 2013 and H11536 was conducted in 2006 by SAIC. The remaining four surveys were conducted with H13474 while on OPR-C319-FH-21: H13475, H13476, H13477, and H13480. See figure below that depicts the locations of junction surveys relative to H13474. Information from junction analysis with H11536, H12628, and H13477 can be found below. Reference the respective Descriptive Reports (DRs) for the junction analyses of the remaining three contemporary surveys from OPR-C319-FH-21.

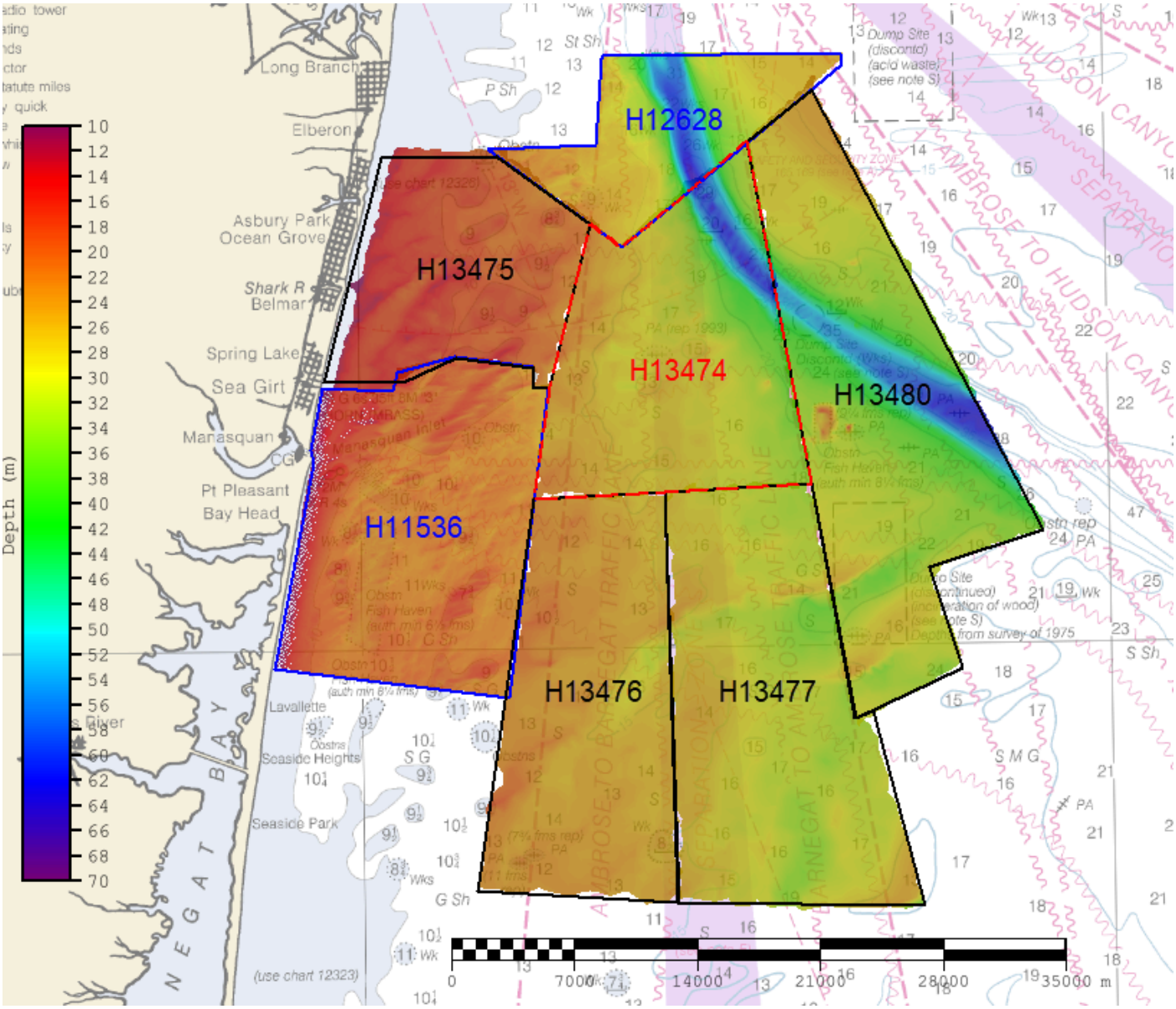


Figure 9: Overview of surveys that junction with H13474.

The following junctions were made with this survey:

Registry Number	Scale	Year	Field Unit	Relative Location
H11536	1:20000	2006	SAIC	W
H12628	1:40000	2013	Ferdinand R. Hassler	N
H13477	1:20000	2021	Ferdinand R. Hassler	S

Table 9: Junctioning Surveys

H11536

The junction with survey H11536 encompasses approximately 0.21 square nautical miles along the western border of coverage. The Compare Grids function of Pydro Explorer derived a difference surface from H13474 2-meter resolution surface and H11536 2-meter resolution surface. Pydro Compare Grids showed that 100 percent of nodes in the overlapping area met NOAA allowable error standards. Analysis of the difference surface indicated that there is a 0.05-meter average difference between the two surveys. For additional results, see figures below.

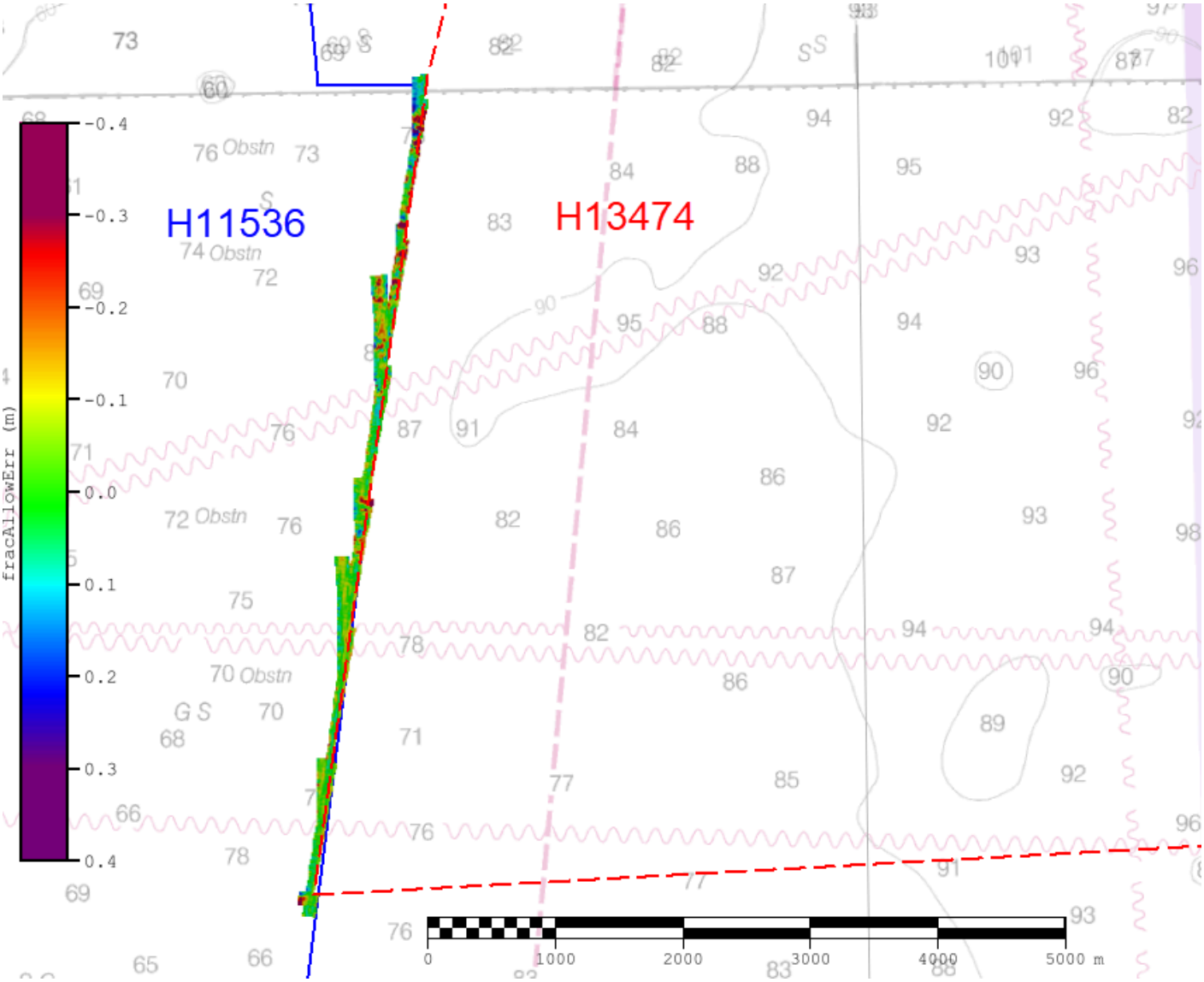
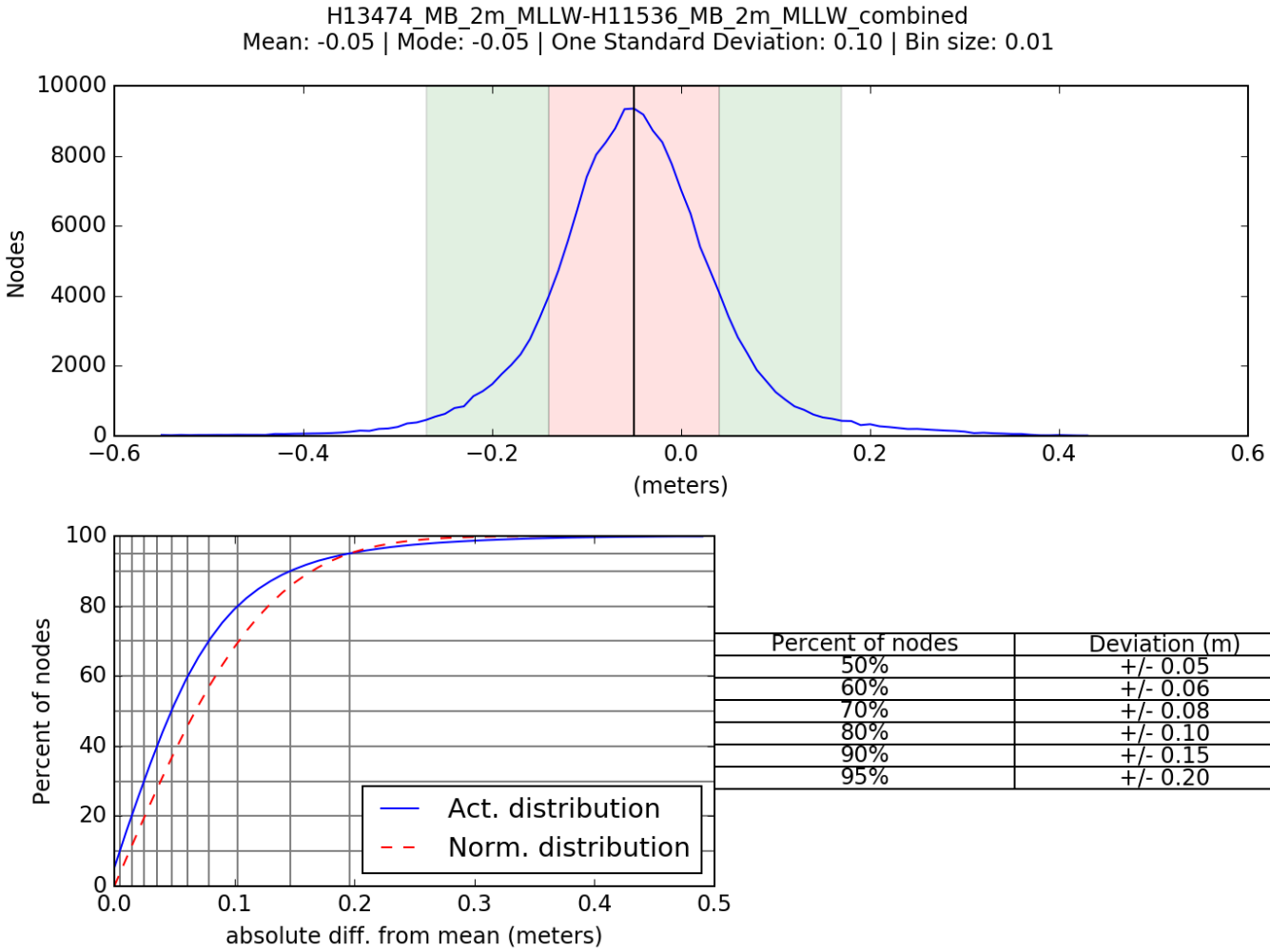


Figure 10: H13474 and H11536 fraction of allowable error junction surface.



Percent of nodes	Deviation (m)
50%	+/- 0.05
60%	+/- 0.06
70%	+/- 0.08
80%	+/- 0.10
90%	+/- 0.15
95%	+/- 0.20

Figure 11: Pydro derived plot showing absolute difference statistics of the junction between H13474 and H11536 2-meter resolution surface.

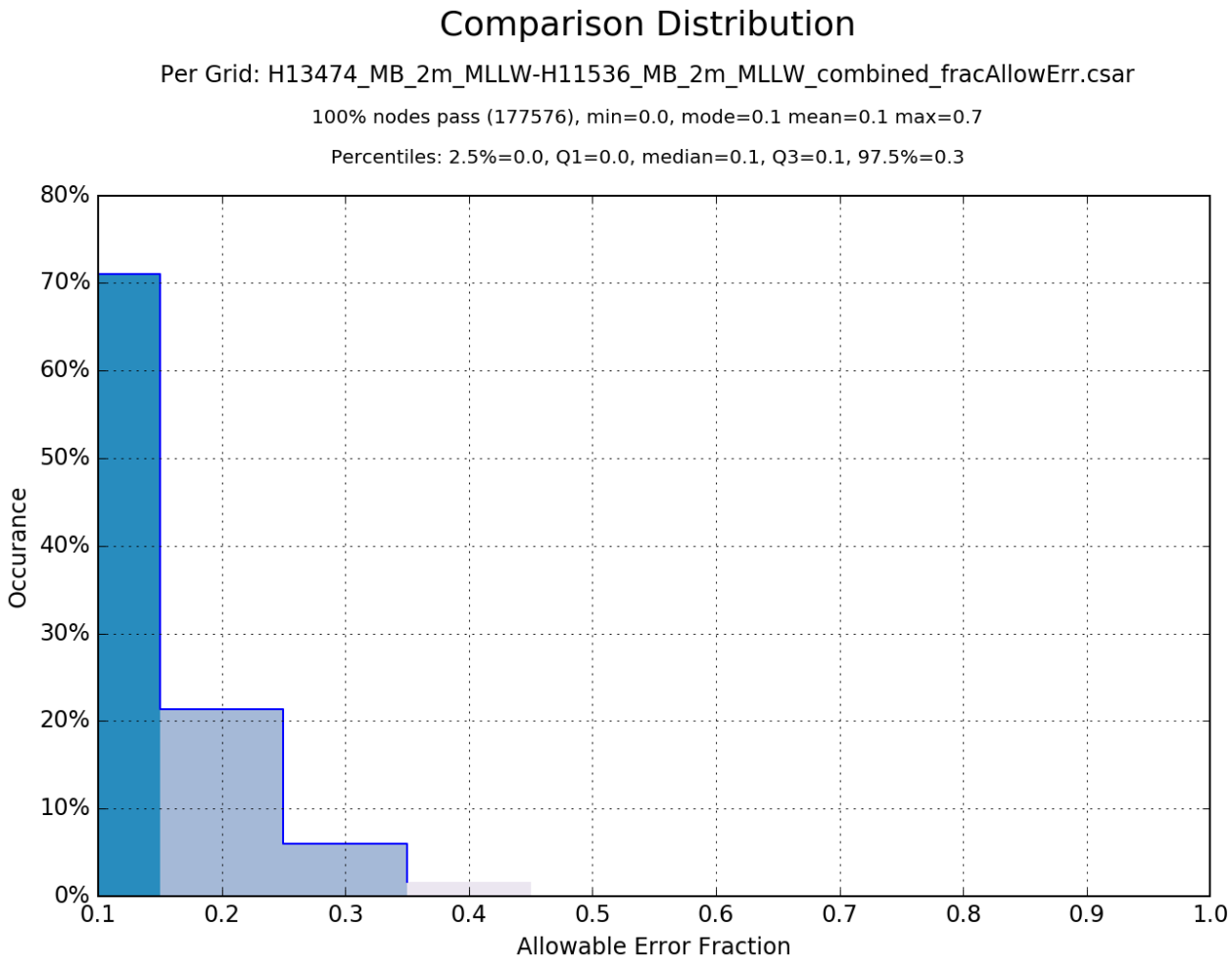


Figure 12: Pydro derived plot showing percentage-pass volume of the junction between H13474 and H11536 2-meter resolution surface.

H12628

The junction with survey H12628 encompasses approximately 0.78 square nautical miles along the western border of coverage. The Compare Grids function of Pydro Explorer derived a difference surface from H13474 4-meter resolution surface and H12628 4-meter resolution surface. Pydro Compare Grids showed that 100 percent of nodes in the overlapping area met NOAA allowable error standards. Analysis of the difference surface indicated that there is a 0.08-meter average difference between the two surveys. For additional results, see figures below.

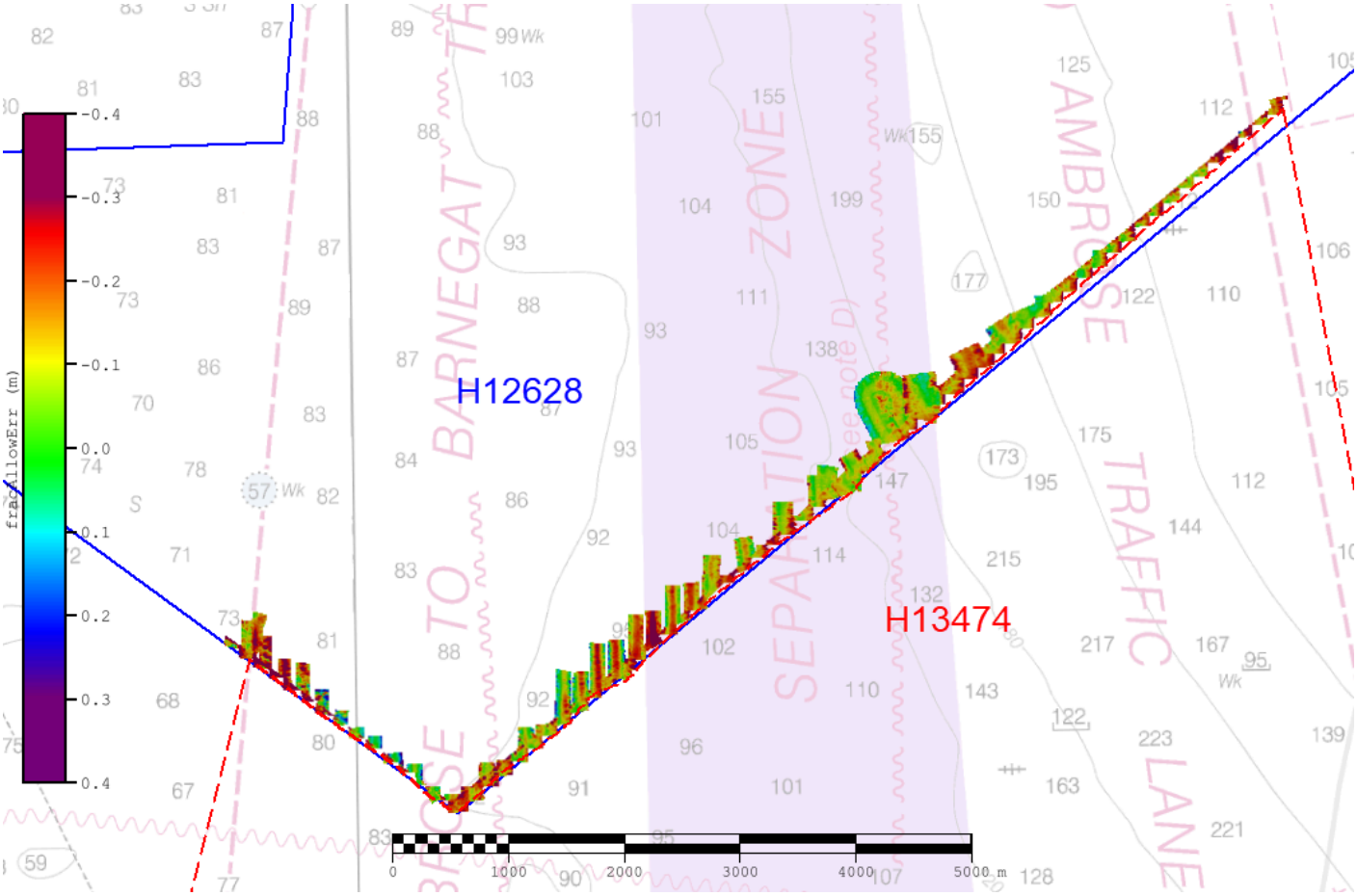
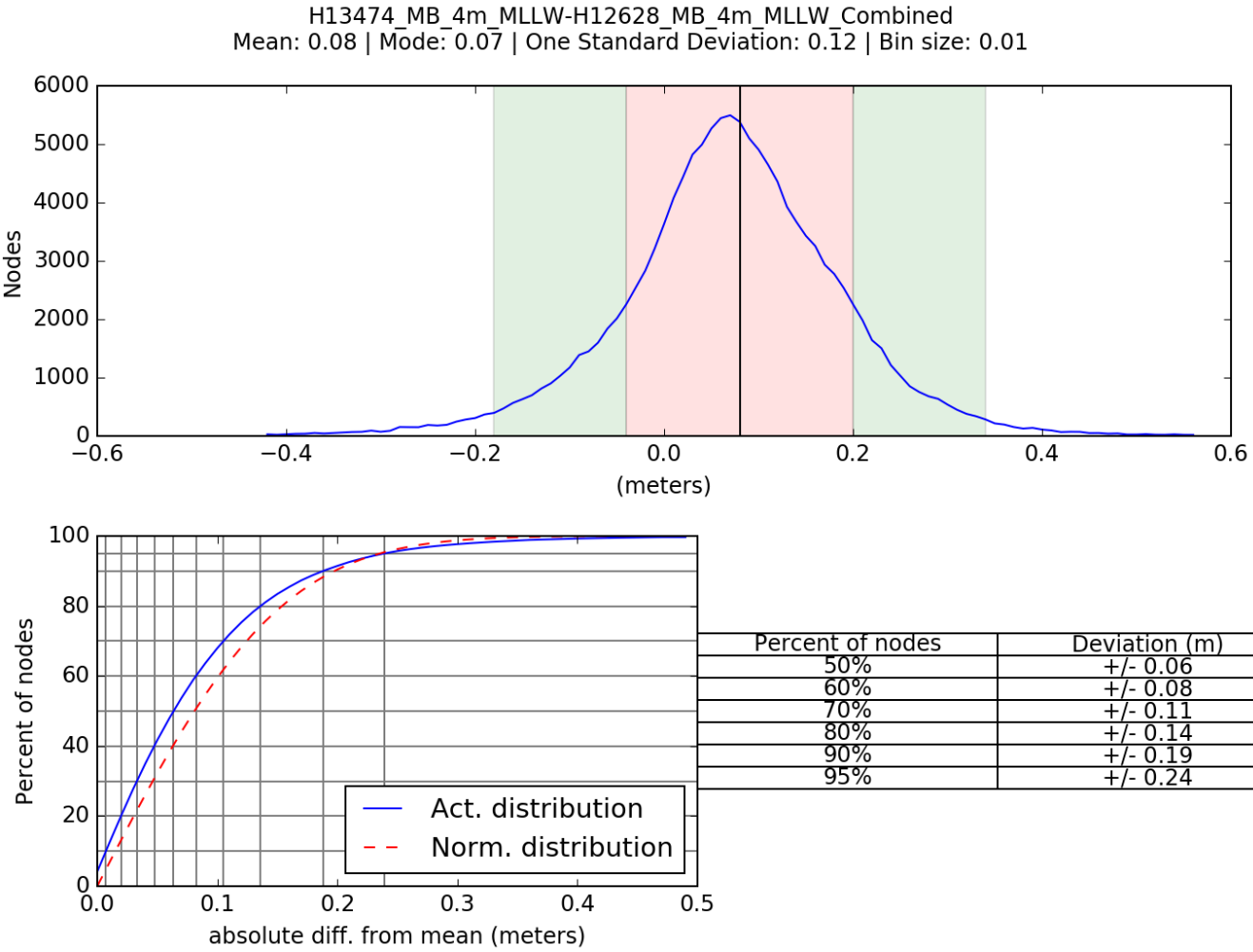


Figure 13: H13474 and H12628 fraction of allowable error junction surface.



Percent of nodes	Deviation (m)
50%	+/- 0.06
60%	+/- 0.08
70%	+/- 0.11
80%	+/- 0.14
90%	+/- 0.19
95%	+/- 0.24

Figure 14: Pydro derived plot showing absolute difference statistics of the junction between H13474 and H12628 4-meter resolution surface.

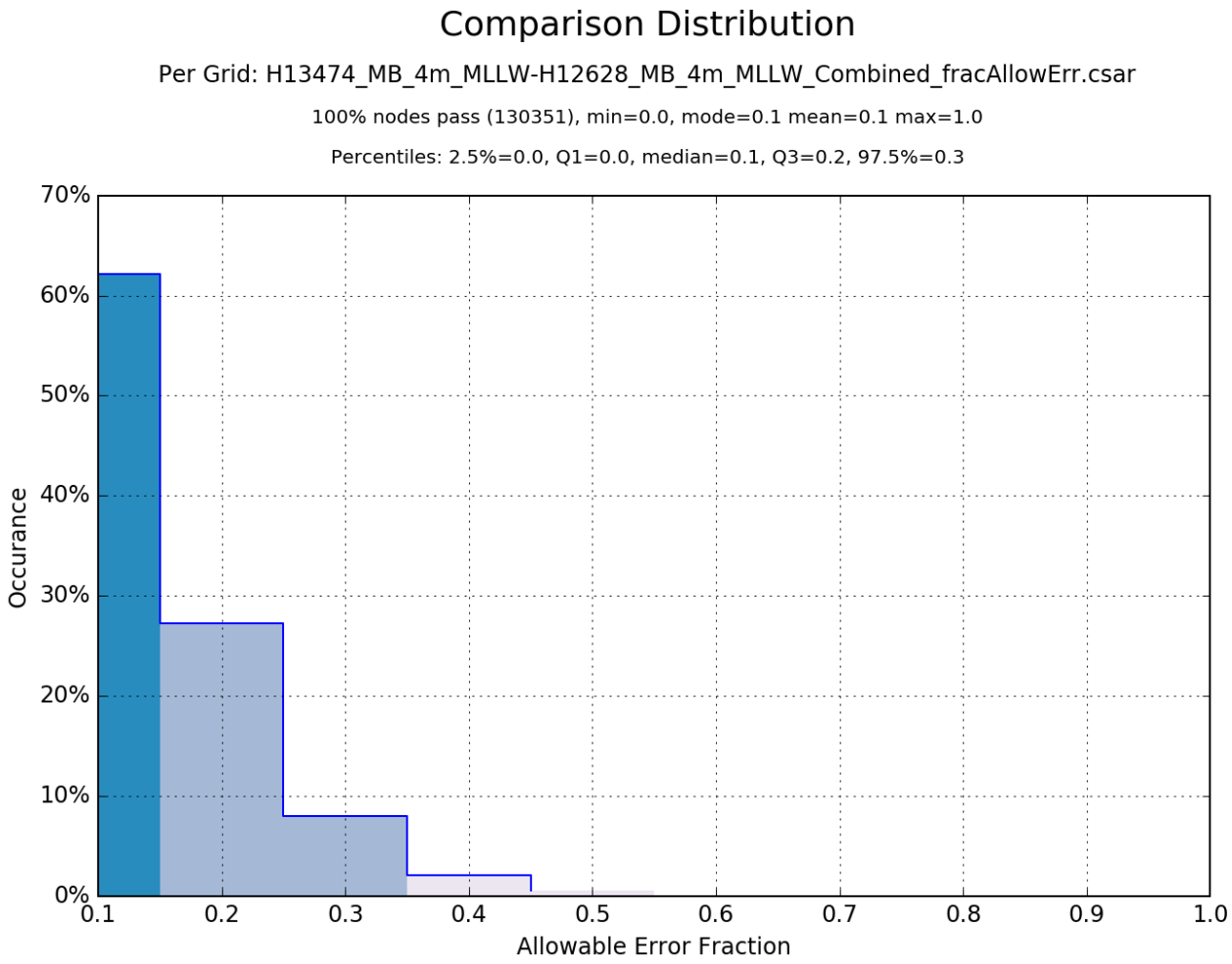


Figure 15: Pydro derived plot showing percentage-pass volume of the junction between H13474 and H12628 4-meter resolution surface.

H13477

The junction with survey H13477 encompasses approximately 0.75 square nautical miles along the western border of coverage. The Compare Grids function of Pydro Explorer derived a difference surface from H13474 variable resolution surface and H13477 variable resolution surface. Pydro Compare Grids showed that 99.5 percent of nodes in the overlapping area met NOAA allowable error standards. Analysis of the difference surface indicated that there is a 0.03-meter average difference between the two surveys. For additional results, see figures below.

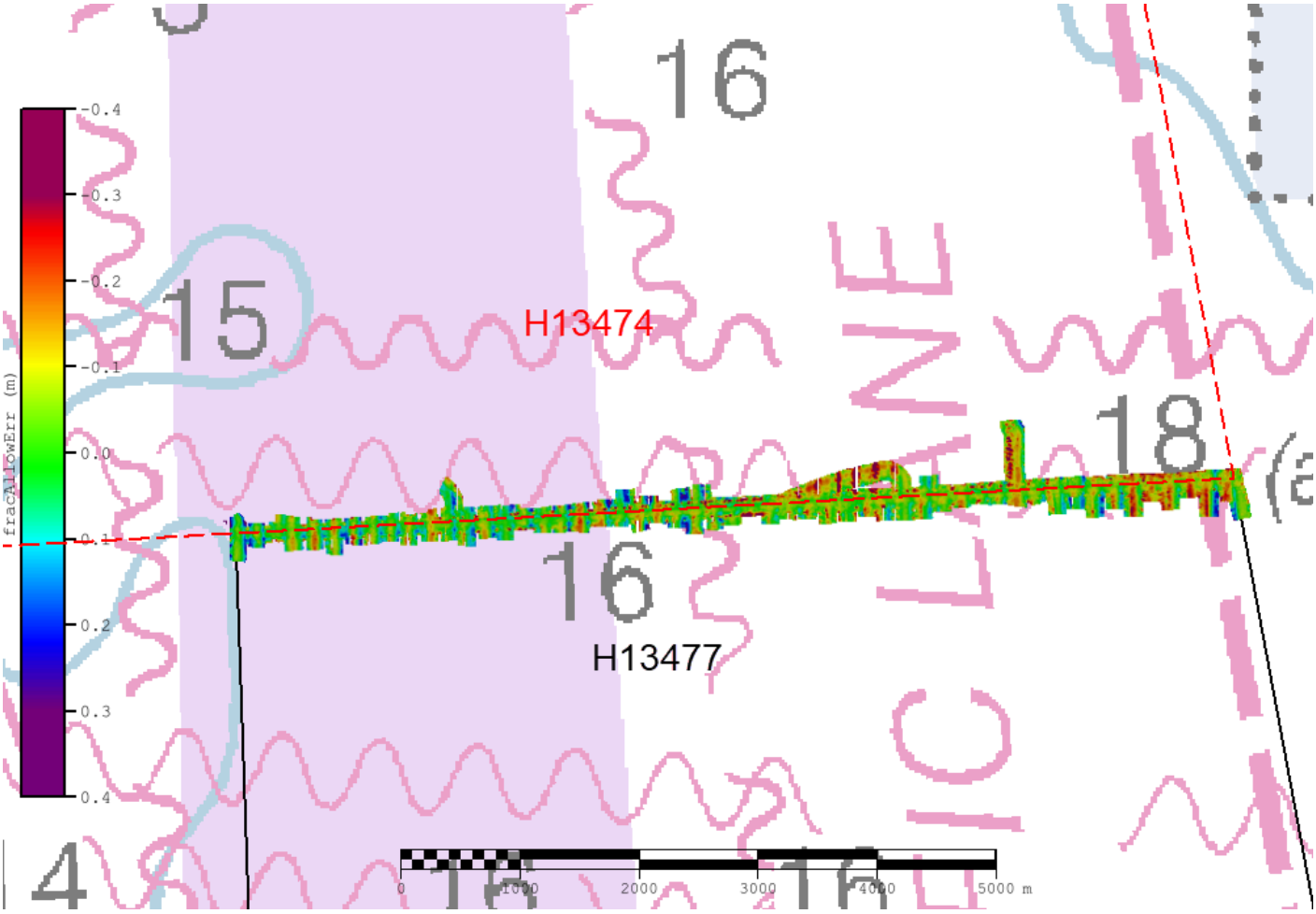
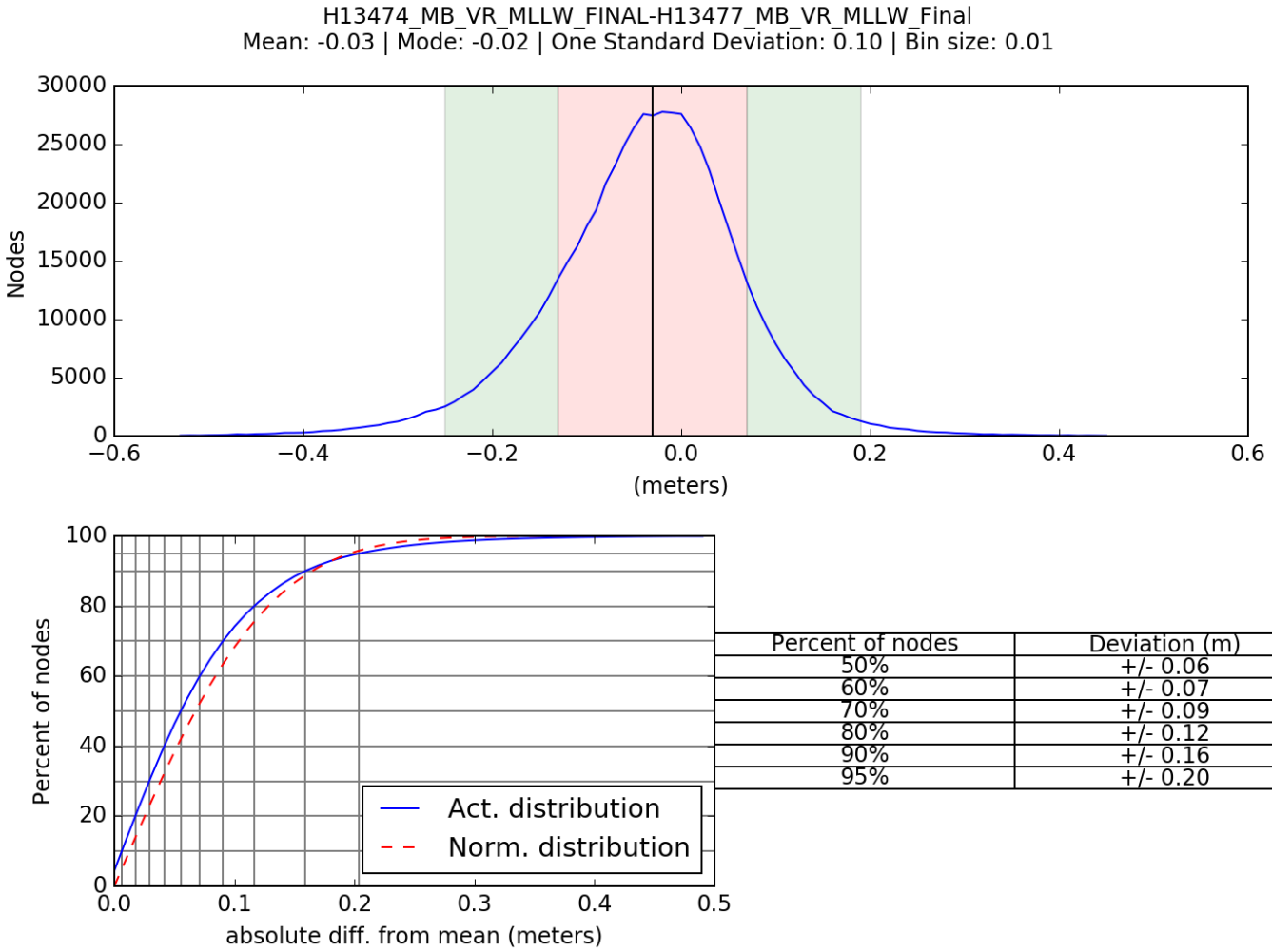


Figure 16: H13474 and H13477 fraction of allowable error junction surface.



Percent of nodes	Deviation (m)
50%	+/- 0.06
60%	+/- 0.07
70%	+/- 0.09
80%	+/- 0.12
90%	+/- 0.16
95%	+/- 0.20

Figure 17: Pydro derived plot showing absolute difference statistics of the junction between H13474 and H13477 variable resolution surface.

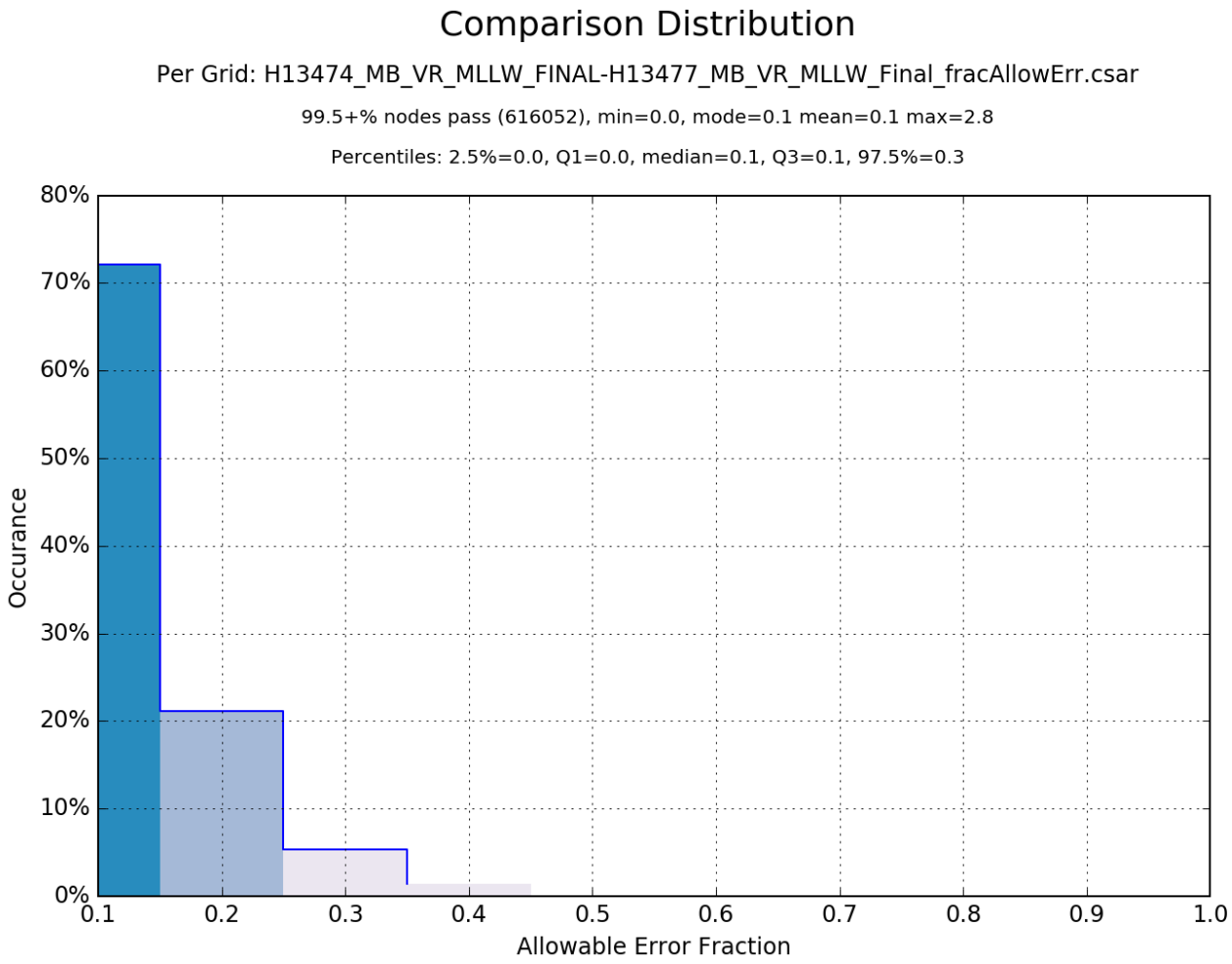


Figure 18: Pydro derived plot showing percentage-pass volume of the junction between H13474 and H13477 variable resolution surface.

B.2.4 Sonar QC Checks

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

B.2.5 Equipment Effectiveness

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

B.2.6 Factors Affecting Soundings

There were no other factors that affected corrections to soundings.

B.2.7 Sound Speed Methods

Sound Speed Cast Frequency: Casts were conducted at the start of each acquisition day and within four hours of each previous cast per the 2021 HSSD Specifications. S250 conducted casts using a Rolls Royce Brooke Ocean Mapping Vessel Profiler (MVP) 200 and a Seabird SBE 19+ CTD. Variations in surface sound speed were monitored by the survey watch to assess appropriate cast frequency.

A total of 66 sound speed profiles were acquired within the survey limits of H13474 and display good spatial diversity (see figure below). All sound speed profile data were concatenated into a master file for the sheet. MBES data were corrected by applying profiles nearest in distance in time (4 hours) using this master file.

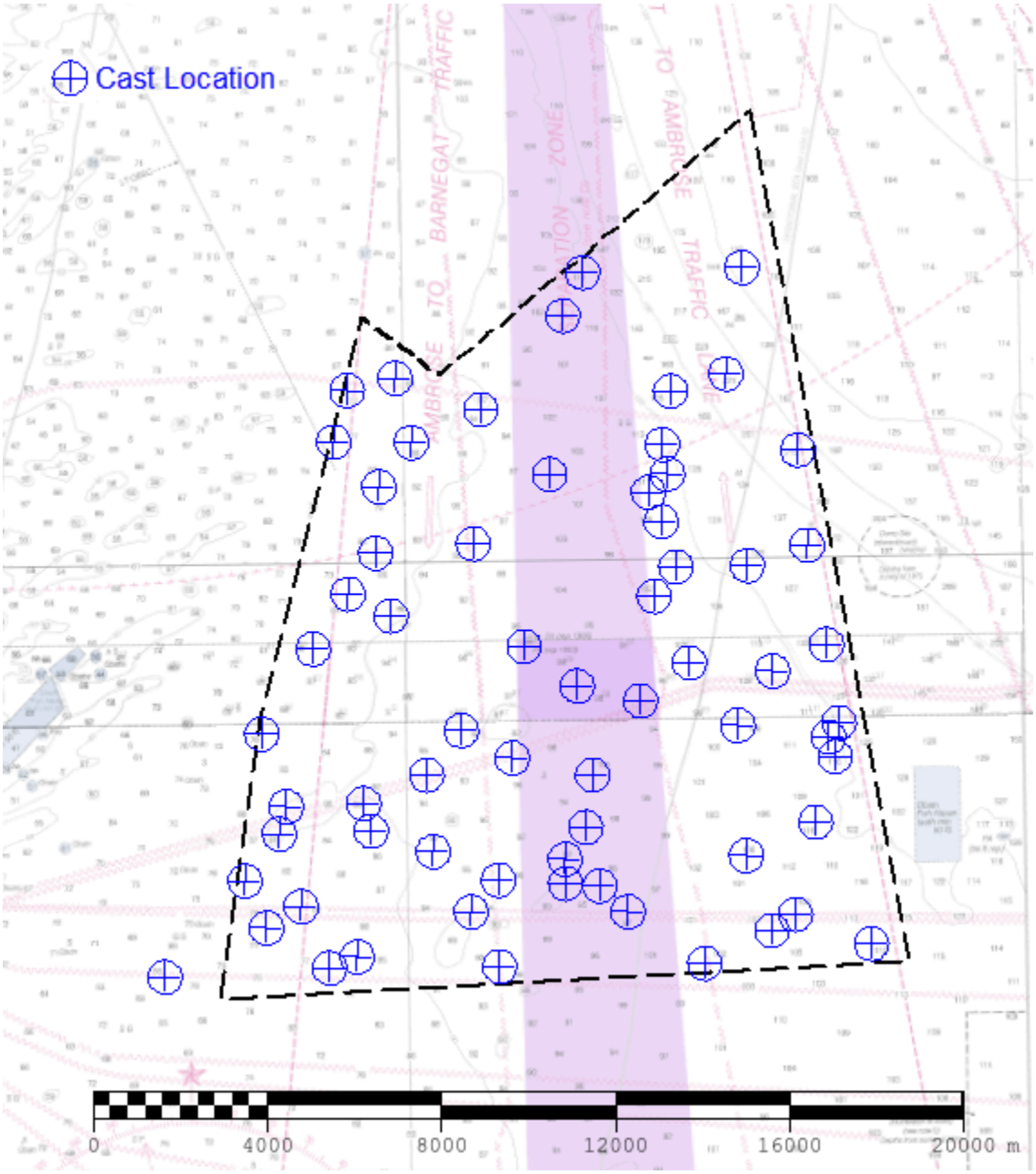


Figure 19: H13474 sound speed cast locations.

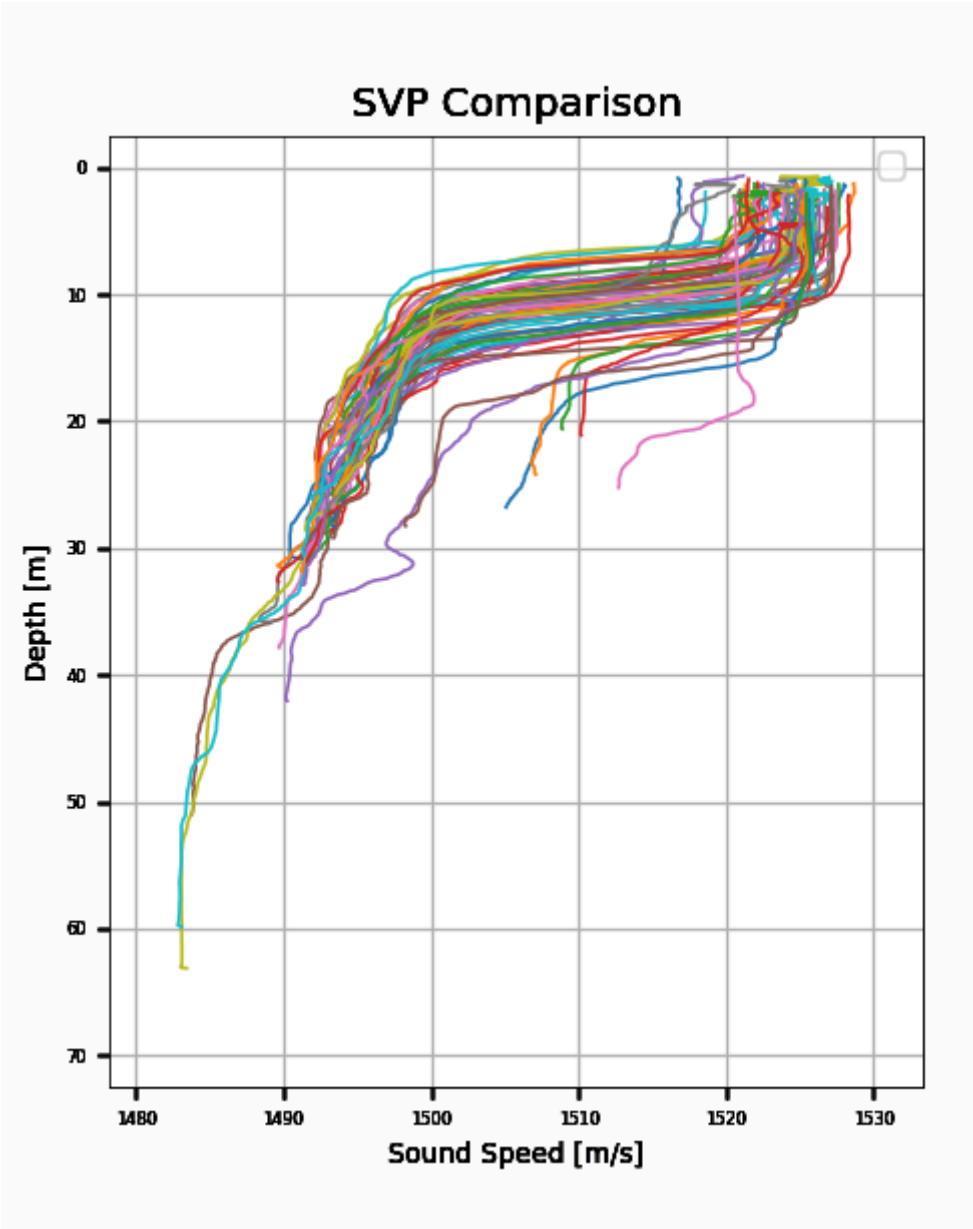


Figure 20: Comparison plot of CTD casts taken during survey acquisition of H13474.

B.2.8 Coverage Equipment and Methods

S250 acquired 100% side scan sonar coverage with concurrent multibeam and 100% complete coverage MBES to meet coverage requirements on survey H13474, as specified in the project instructions, using a Klein 5000V2 towfish and dual Kongsberg EM2040 multibeam systems.

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 flagged as part of the .all file from the Kongsberg EM2040 systems. Backscatter was processed in QPS Fledermaus GeoCoder Toolbox (FMGT) software, and the exported geotiffs are included in the final processed data submission package. See image below for an overview mosaic of H13474 backscatter data.

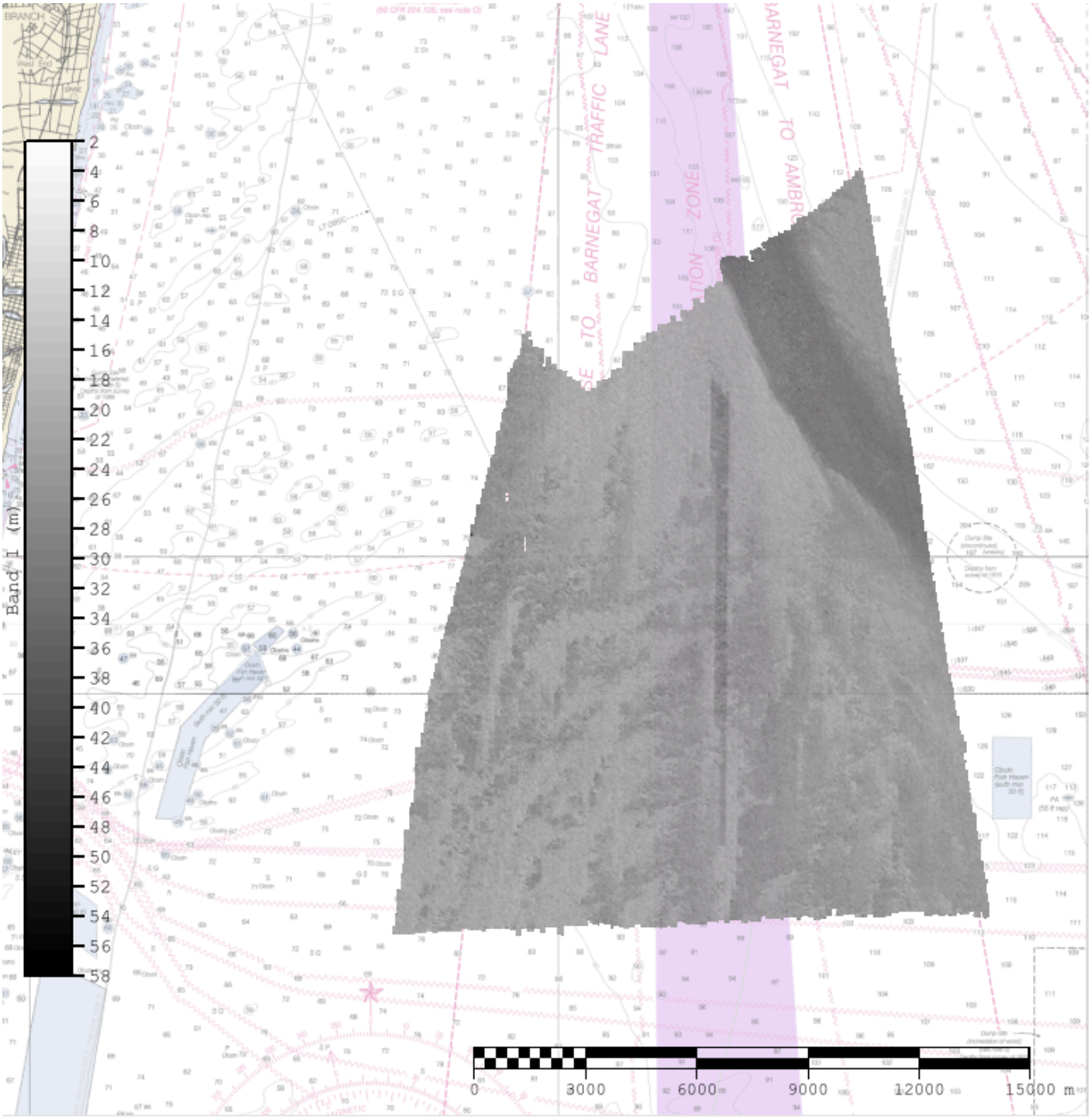


Figure 21: H13474 backscatter mosaic.

B.5 Data Processing

B.5.1 Primary Data Processing Software

The following software program was the primary program used for bathymetric data processing:

Manufacturer	Name	Version
CARIS	HIPS and SIPS	11.3.16

Table 10: Primary bathymetric data processing software

The following software program was the primary program used for imagery data processing:

Manufacturer	Name	Version
QPS	Fledermaus Geocoder Tool Box (FMGT)	7.10.0

Table 11: Primary imagery data processing software

The following Feature Object Catalog was used: NOAA ProfileVersion 2021.

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
H13474_MB_VR_MLLW	CARIS VR Surface (CUBE)	Variable Resolution	19.4 meters - 72.4 meters	NOAA_VR	Complete MBES
H13474_MB_VR_MLLW_FINAL	CARIS VR Surface (CUBE)	Variable Resolution	19.4 meters - 72.4 meters	NOAA_VR	Complete MBES
H13474_SSSAB_1m_500kHz_1of1	SSS Mosaic	1 meters	-	N/A	100% SSS
H13474_MBAB_2m_300kHz_1of5	MB Backscatter Mosaic	2 meters	-	NOAA_2m	Complete MBES
H13474_MBAB_2m_300kHz_2of5	MB Backscatter Mosaic	2 meters	-	NOAA_2m	Complete MBES

Surface Name	Surface Type	Resolution	Depth Range	Surface Parameter	Purpose
H13474_MBAB_2m_300kHz_3of5	MB Backscatter Mosaic	2 meters	-	NOAA_2m	Complete MBES
H13474_MBAB_2m_300kHz_4of5	MB Backscatter Mosaic	2 meters	-	NOAA_2m	Complete MBES
H13474_MBAB_2m_300kHz_5of5	MB Backscatter Mosaic	2 meters	-	NOAA_2m	Complete MBES

Table 12: Submitted Surfaces

Complete coverage requirements were met by 100% side scan sonar coverage with concurrent multibeam and complete coverage multibeam as specified under section 5.2.2.3 of the 2021 HSSD. All bathymetric grids for H13474 meet density requirements specified in the 2021 HSSD (see Figure below). Pydro QC Tools 2 Grid QA was used to analyze H13474 multibeam echosounder (MBES) data density. The submitted H13474 variable-resolution (VR) surface met HSSD density requirements shown in the histograms below.

After multiple rounds of surface cleaning, 7 fliers remain as detected by NOAA's QC Tools Flier Finder available in the Pydro XL-19 suite. Upon further inspection, these flagged grid nodes are considered to be accurate representations of the sea floor and have been retained in the submitted surfaces.

While there are data gaps present in both the MBES surface and the SSS mosaic, the combined coverage resulted in no holidays present within the assigned survey limits.

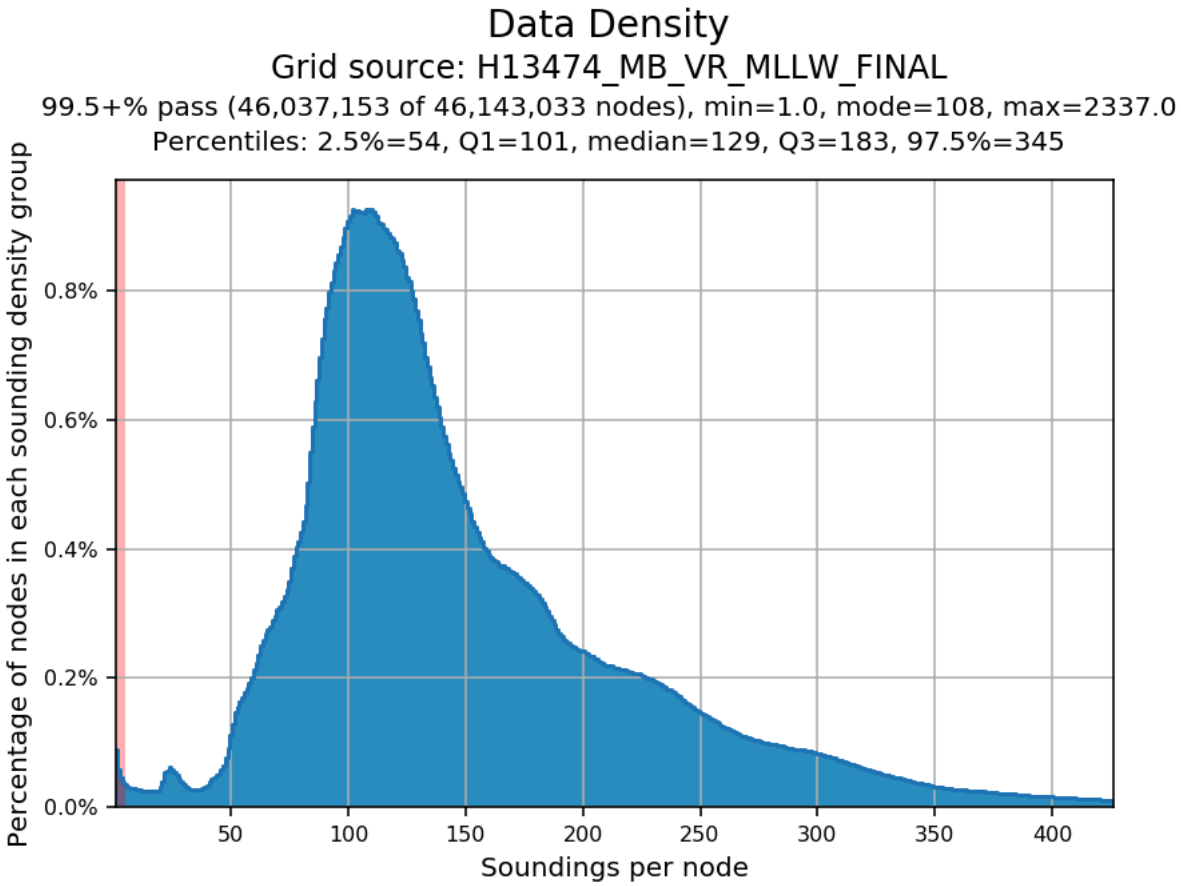


Figure 22: Pydro derived histogram plot showing HSSD density compliance of H13474 finalized variable-resolution MBES data.

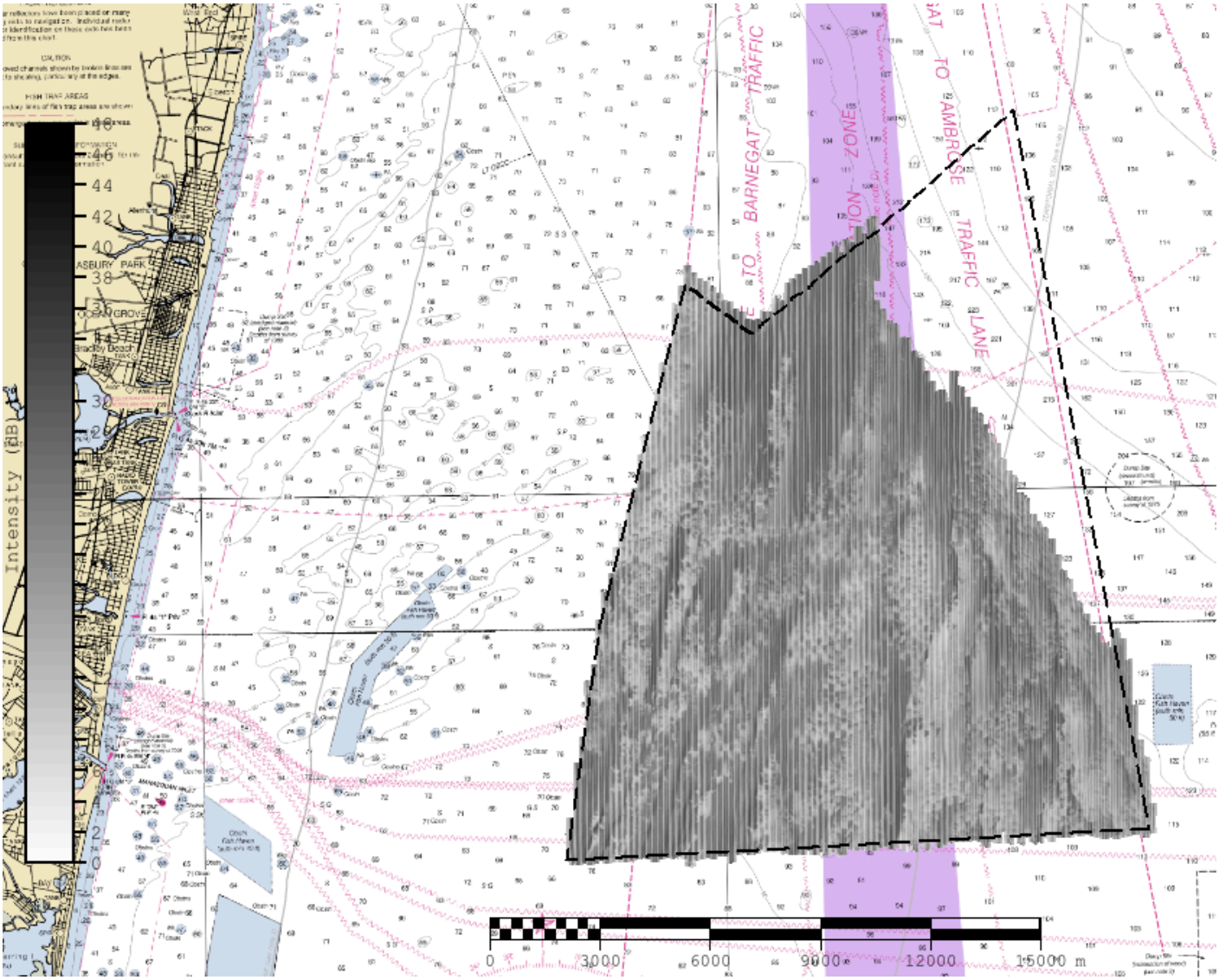


Figure 23: H13474 SSS mosaic with a 1m resolution. Gaps in coverage were addressed with complete MBES coverage.

C. Vertical and Horizontal Control

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

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	OPR-C319-FH-21_NAD83_VDatum_MLLW.csar

Table 13: ERS method and SEP file

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.

The following PPK methods were used for horizontal control:

- RTX

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 H13474 MBES data from vessel S250.

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

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
US3NY01M	1:400000	49	08/03/2020	02/18/2021
US4NJ23M	1:80000	13	05/10/2018	09/16/2020
US4NY1AM	1:80000	38	02/18/2020	08/17/2020

Table 14: Largest Scale ENCs

D.1.2 Shoal and Hazardous Features

No shoals or potentially hazardous features exist for this survey.

D.1.3 Charted Features

All assigned features were investigated and have been updated with correct depths and locations based on MBES data collected. This includes two wrecks that were disproved and two wrecks that were updated to a more accurate position using MBES and SSS data. See the Final Feature File submitted with this report for more information.

D.1.4 Uncharted Features

Several uncharted features were identified in the MBES and SSS data for survey H13474. Refer to the H13474 Final Feature File for additional information.

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

Two bottom samples were acquired during survey acquisition of H13474. The results of the acquired bottom samples are included in the H13474 Final Feature File submitted with this report.

D.2.4 Overhead Features

No overhead features exist for this survey.

D.2.5 Submarine Features

Thirteen charted submarine cables were assigned for investigation. No evidence of these cables were identified in either the MBES or SSS coverage.

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
Michael O. Gonsalves, CDR/NOAA	Chief of Party	07/25/2022	Digitally signed by GONSALVES.MICHAEL.OLIVER.1275635126 Date: 2022.07.27 09:43:28 -04'00'
Jeffrey J. Douglas, LT/NOAA	Field Operations Officer	07/25/2022	Digitally signed by GONSALVES.MICHAEL.OLIVER.1275635126 Date: 2022.07.27 09:43:02 -04'00'
Melissa A. Weber	Hydrographic Survey Technician	07/25/2022	Digitally signed by WEBER.MELISSA.ANNE.1554978483 Date: 2022.07.27 09:08:10 +10'00'

F. Table of Acronyms

Acronym	Definition
AHB	Atlantic Hydrographic Branch
AST	Assistant Survey Technician
ATON	Aid to Navigation
AWOIS	Automated Wreck and Obstruction Information System
BAG	Bathymetric Attributed Grid
BASE	Bathymetry Associated with Statistical Error
CO	Commanding Officer
CO-OPS	Center for Operational Products and Services
CORS	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