H13971

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

DESCRIPTIVE REPORT

Type of Survey:	Navigable Area
Registry Number:	H13971

LOCALITY

State(s):	Louisiana
General Locality:	Approaches to Calcasieu
Sub-locality:	26 NM South of Joseph Harbor Bayou

2024

CHIEF OF PARTY
Jonathan L. Dasler, PE, PLS, CH

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Date:

U.S. DEPARTMENT OF COMMERCE NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION	REGISTRY NUMBER:
HYDROGRAPHIC TITLE SHEET	**H13971**

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):	**Louisiana**
General Locality:	**Approaches to Calcasieu**
Sub-Locality:	**26 NM South of Joseph Harbor Bayou**
Scale:	**20000**
Dates of Survey:	**09/18/2024 to 01/25/2025**
Instructions Dated:	**07/11/2024**
Project Number:	**OPR-K356-KR-24**
Field Unit:	**David Evans and Associates, Inc.**
Chief of Party:	**Jonathan L. Dasler, PE, PLS, CH**
Soundings by:	**Multibeam Echo Sounder**
Imagery by:	**Multibeam Echo Sounder Backscatter Synthetic Aperture Sonar**
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 15N, Mean Lower Low Water. 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 H13971

Project: OPR-K356-KR-24

Locality: Approaches to Calcasieu

Sublocality: 26 NM South of Joseph Harbor Bayou

Scale: 1:20000

September 2024 - January 2025

David Evans and Associates, Inc.

Chief of Party: Jonathan L. Dasler, PE, PLS, CH

A. Area Surveyed

David Evans and Associates, Inc. (DEA) conducted a hydrographic survey of the assigned area in the waters offshore of Calcasieu Channel, LA. Survey H13971 was conducted in accordance with the Statement of Work and Hydrographic Survey Project Instructions dated July 11, 2024.

The Hydrographic Survey Project Instructions reference the National Ocean Service (NOS) Hydrographic Survey Specifications and Deliverables Manual (HSSD) (March 2022) as the technical requirements for this project.

A.1 Survey Limits

Data were acquired within the following survey limits:

Northwest Limit	Southeast Limit
29° 20' 5.71" N 93° 1' 32.7" W	29° 10' 12.47" N 92° 49' 8.25" W

Table 1: Survey Limits

Survey limits were surveyed in accordance with the requirements in the Project Instructions and the HSSD. The assigned survey areas are outlined in Figure 1.

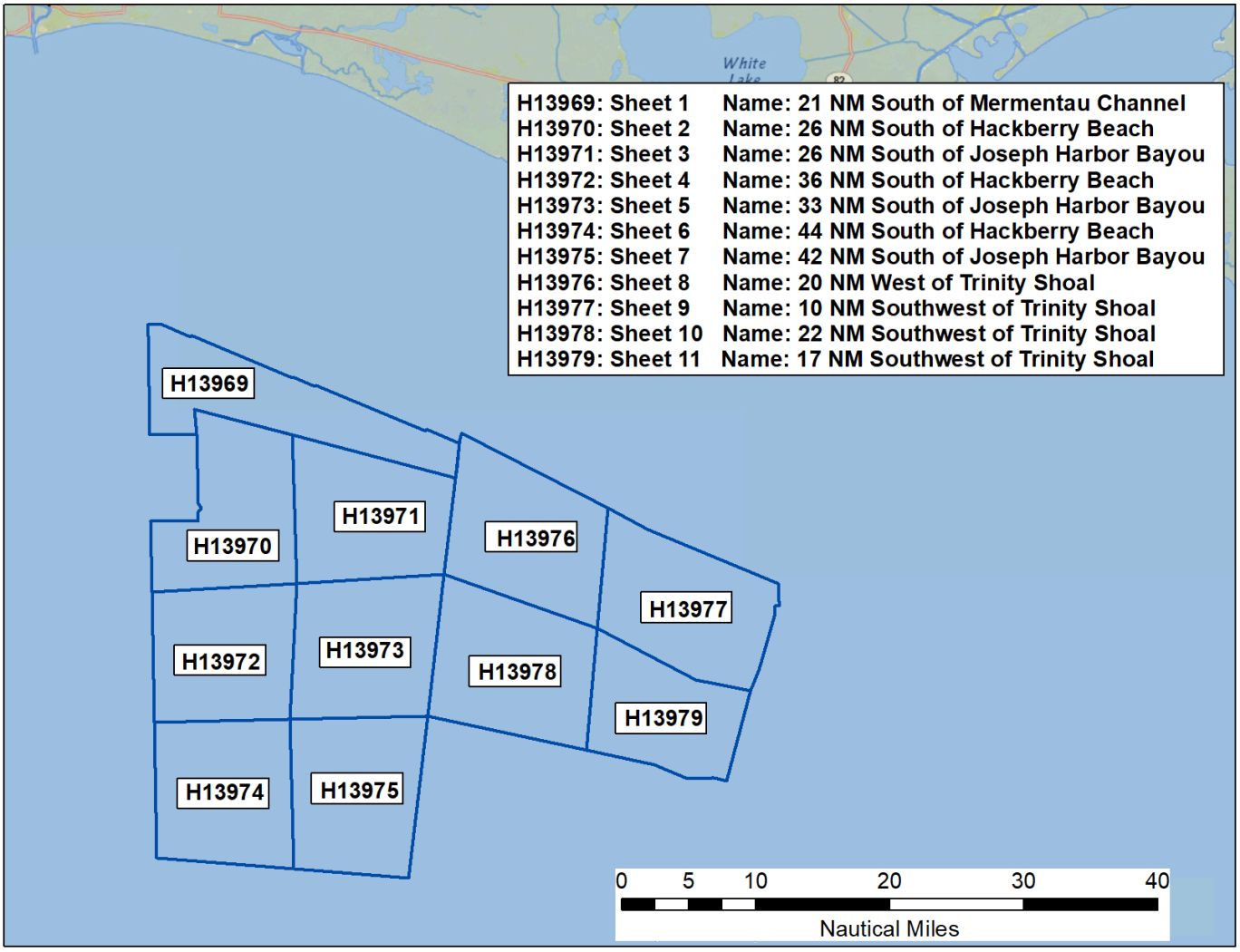


Figure 1: OPR-K356-KR-24 Assigned Survey Areas

A.2 Survey Purpose

The purpose of this survey, defined in the Project Instructions, is as follows: "The waters offshore of Calcasieu Channel, Louisiana have been identified as an area in critical need of updated hydrographic data by NOAA's Hydrographic Health models and the Lake Charles Pilot's Association. The Port of Lake Charles is ranked fourteenth by tonnage for U.S. Ports(1), and the region is expected to see an expansion in marine commerce due in part to an increase in LNG distribution, as well as offshore wind-energy development. Since 2020, the Louisiana Coast has been hit by six hurricanes and two named tropical storms, several of which caused serious damage to the Ports of Lake Charles and Calcasieu. Many parts of the coverage area have not been charted since the 1930s.

This survey will provide contemporary data to update National Ocean Service (NOS) nautical charting products and services, improving the safety of maritime traffic and services available to the Port of Lake

Charles by reducing the current risk that is present due to outdated bathymetry. Survey data from this project is intended to supersede all prior survey data in the common area."

(1) Bureau of Transportation Statistics, 2023 https://www.bts.gov/content/tonnage-top-50-us-water-ports-ranked-total-tons

A.3 Survey Quality

The entire survey is adequate to supersede previous data.

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

Complete coverage using 100% side scan sonar (SSS) coverage, collected using seafloor imagery from a synthetic aperture sonar (SAS), with concurrent multibeam echosounder (MBES) was obtained over the entire survey area. Backscatter was logged during all multibeam acquisition. This coverage type follows Option B of the Complete Coverage requirement specified in Section 5.2.2.3 of the 2022 HSSD. In all cases, the inshore limit of hydrography was the Navigable Area Limit Line (NALL) as defined in Section 1.3.2 of the HSSD; however, for this survey, the inshore limit was not encountered and the full extent of the assigned boundary was met.

Survey coverage for feature disprovals followed the criteria set in the HSSD for determining radii size. The field unit manually generated disproval radii as the PRF lacked preassigned radii for all features.

Figure 2 shows the H13971 survey outline in relation to the assigned survey area.

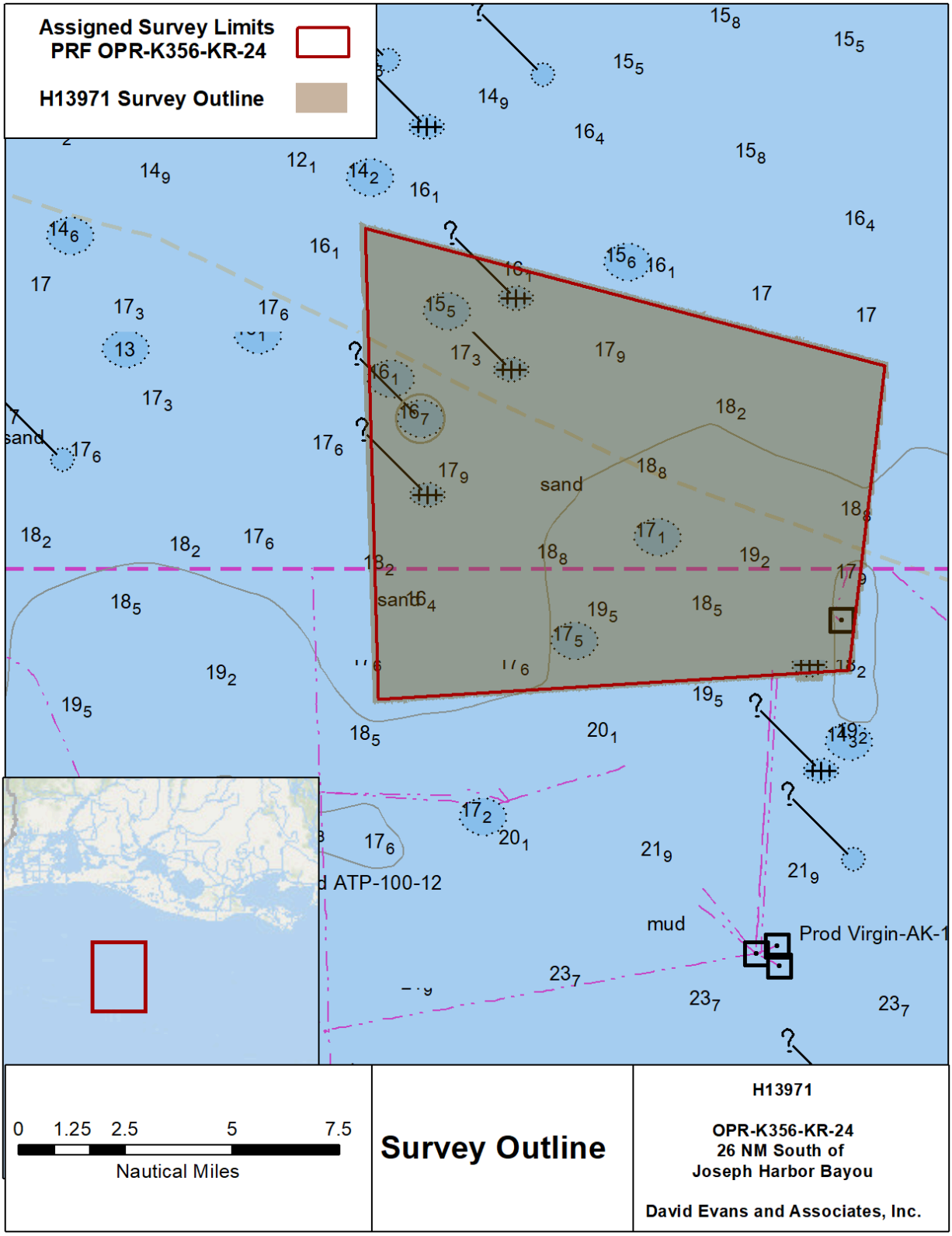


Figure 2: H13971 Survey Outline

A.6 Survey Statistics

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

	HULL ID	*DriX 5*	*Total*
LNM	**SBES Mainscheme**	0.0	0.0
	MBES Mainscheme	46.81	46.81
	Lidar Mainscheme	0.0	0.0
	SSS Mainscheme	0.26	0.26
	SBES/SSS Mainscheme	0.0	0.0
	MBES/SSS Mainscheme	1260.19	1260.19
	SBES/MBES Crosslines	60.94	60.94
	Lidar Crosslines	0.0	0.0
Number of Bottom Samples			2
Number Maritime Boundary Points Investigated			0
Number of DPs			0
Number of Items Investigated by Dive Ops			0
Total SNM			83.86

Table 3: Hydrographic Survey Statistics

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

Survey Dates	Day of the Year
09/18/2024	262
09/19/2024	263
09/20/2024	264
09/21/2024	265
09/22/2024	266
09/23/2024	267
09/24/2024	268
09/25/2024	269
09/26/2024	270
09/27/2024	271
09/28/2024	272
10/02/2024	276
10/03/2024	277
11/14/2024	319
12/16/2024	351
01/25/2025	25

Table 4: Dates of Hydrography

B. Data Acquisition and Processing

B.1 Equipment and Vessels

A revised Data Acquisition and Processing Report (DAPR), which was submitted with this survey H13971, details equipment and vessel information as well as data acquisition and processing procedures. There were no vessel or equipment configurations used during data acquisition that deviated from those described in the DAPR.

The DriX 5 is a 25-foot uncrewed surface vessel (USV) with a 2.62-foot beam and a draft of 6 feet (Figure 3).

B.1.1 Vessels

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

Hull ID	*DriX 5*
LOA	25.0 feet
Draft	6.0 feet

Table 5: Vessels Used

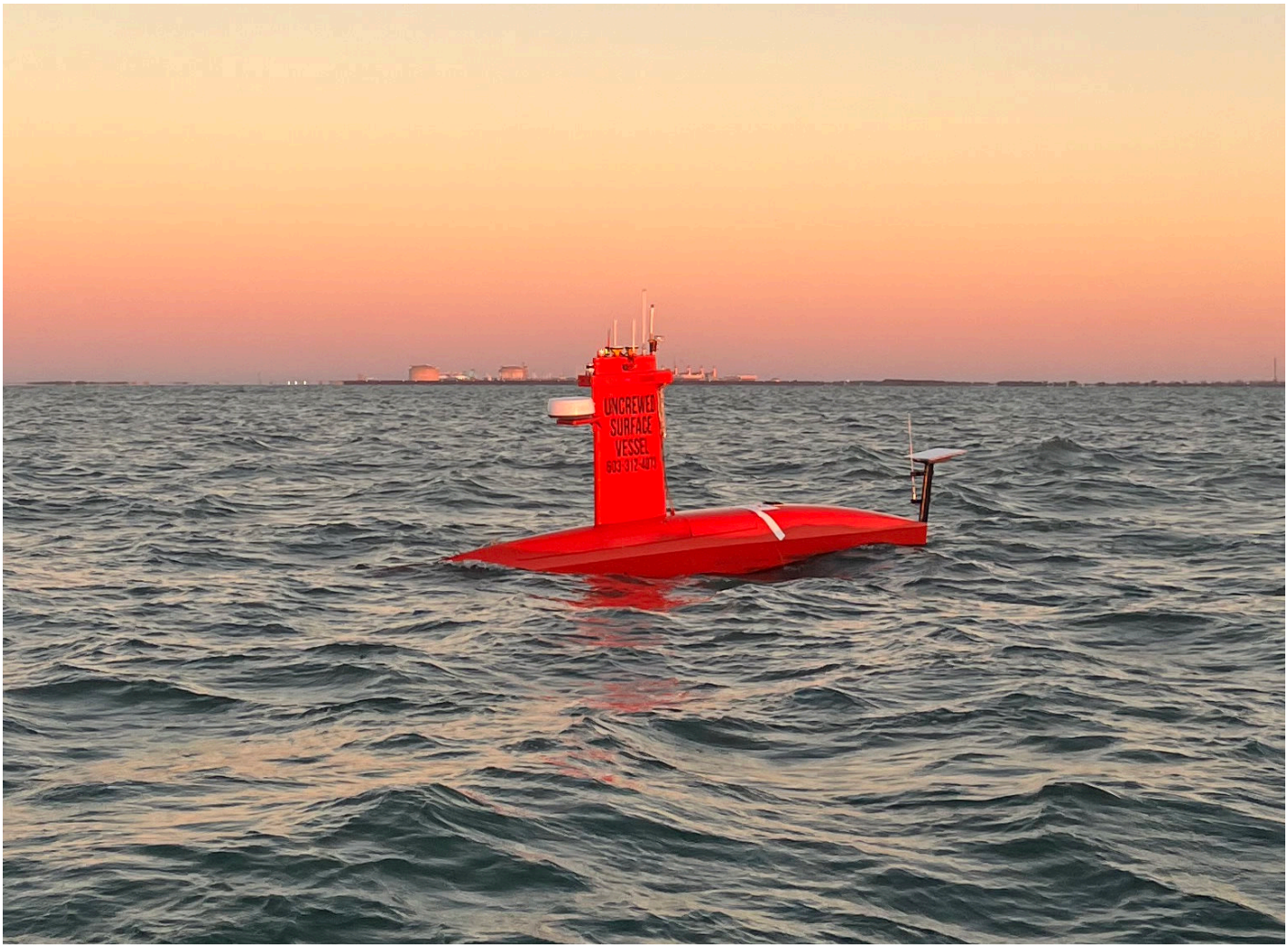


Figure 3: DriX 5

B.1.2 Equipment

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

Manufacturer	Model	Type
Kongsberg Maritime	EM 2040-MK2	MBES
Valeport	MiniSVS	Sound Speed System
Valeport	SWiFT SVP	Sound Speed System

Table 6: Major Systems Used

Side scan sonar (SSS), seafloor imagery, data were collected with an Exail Sams 150 synthetic aperture mapping sonar and processed in inertial side scan mode. An Exail Phins INS with integrated Septentrio AsteRx-U-Fg GNSS receiver was used as the positioning and attitude system. These systems are not part of the NOAA XML DR schema, and therefore not included in Table 6.

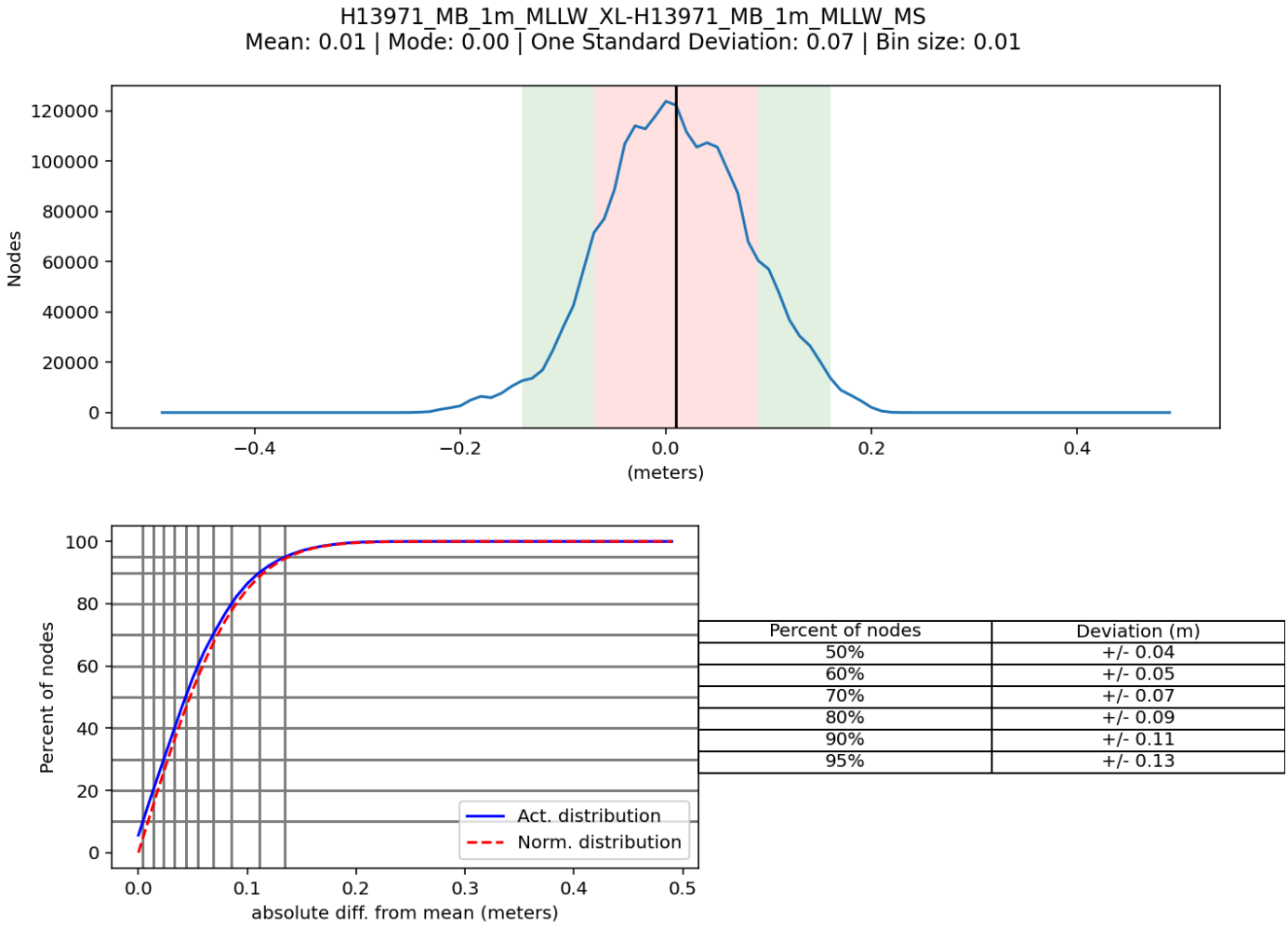
B.2 Quality Control

B.2.1 Crosslines

Multibeam crosslines were run across 4.66% of the entire survey area to provide a varied spatial and temporal distribution for analysis of internal consistency within the survey data.

Crossline analysis was performed using the CARIS Hydrographic Information Processing System (HIPS) Quality Control (QC) Report tool, which compares crossline data to a gridded surface and reports results by beam number. Crosslines were compared to a 2-meter Combined Uncertainty and Bathymetry Estimator (CUBE) surface encompassing mainscheme, fill, and investigation data for the entire survey area.

DEA performed an additional crossline analysis using the NOAA Pydro Compare Grids tool to analyze the differences between gridded mainscheme depths and gridded crossline depths. Input grids were 1-meter resolution CUBE surfaces of mainscheme and crossline depths. Results from the crossline-to-mainscheme difference analysis are depicted in Figure 4, with units represented in meters.



Percent of nodes	Deviation (m)
50%	+/- 0.04
60%	+/- 0.05
70%	+/- 0.07
80%	+/- 0.09
90%	+/- 0.11
95%	+/- 0.13

Figure 4: H13971 Crossline Difference

B.2.2 Uncertainty

The following survey specific parameters were used for this survey:

Method	Measured	Zoning
ERS via VDATUM	0.05 meters	0.097 meters

Table 7: Survey Specific Tide TPU Values.

Hull ID	Measured - CTD	Measured - MVP	Measured - XBT	Surface
DriX 5	0.5 meters/second	n/a meters/second	n/a meters/second	0.5 meters/second

Table 8: Survey Specific Sound Speed TPU Values.

The datum separation (Zoning) uncertainty value of 0.097 meters, used to compute Total Propagated Uncertainty (TPU) listed in Table 7, corresponds to the uncertainty of a revised NAD83 to MLLW SEP file issued by NOAA on July 30, 2024 and does not match the model uncertainty listed in the Project Instructions. Related correspondence is included in Appendix II.

The revised model resolved errors in the original model that were discovered by DEA and reported to NOAA. The OPR-K356-KR-24 DAPR includes more information on the model update.

The DriX 5 used a SWiFT SVP Conductivity, Temperature, and Depth probe (CTD) to acquire sound speed measurements. The measurement uncertainty for these sensors is listed in the CTD column in Table 8.

During surface finalization in HIPS, the "Uncertainty" option was selected, which uses the calculated uncertainty value at the node. Additional discussion of the parameters used to compute TPU is included in the DAPR.

To determine if the surface grid nodes met the International Hydrographic Organization (IHO) Order 1a specification, a ratio of the final node uncertainty to the allowable uncertainty at that depth was determined. As a percentage, this value represents the amount of error budget utilized by the Total Vertical Uncertainty (TVU) at each node. Values greater than 100% indicate nodes exceeding the allowable IHO uncertainty. The resulting calculated node uncertainty as a fraction of allowable IHO Order 1a TVU is shown in Figures 5 and 6.

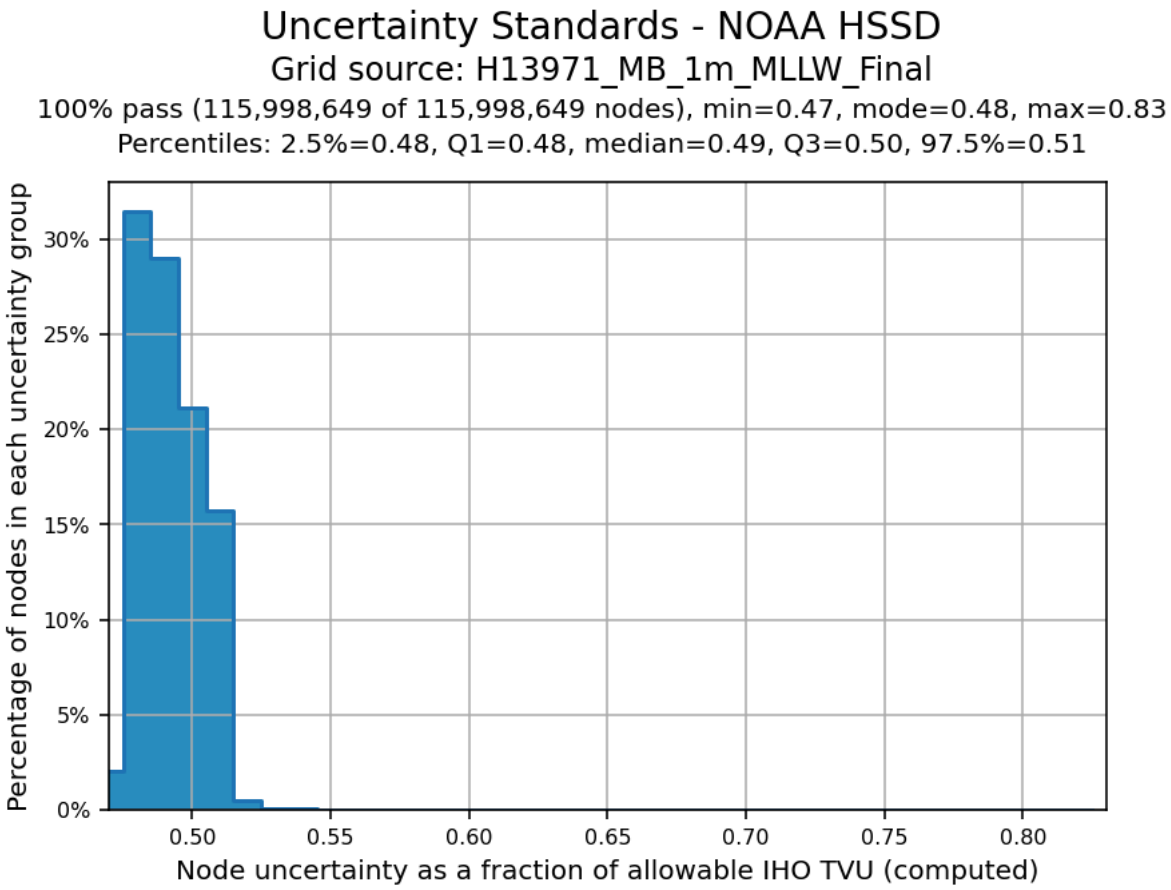


Figure 5: Node TVU Statistics - 1 meter, Finalized

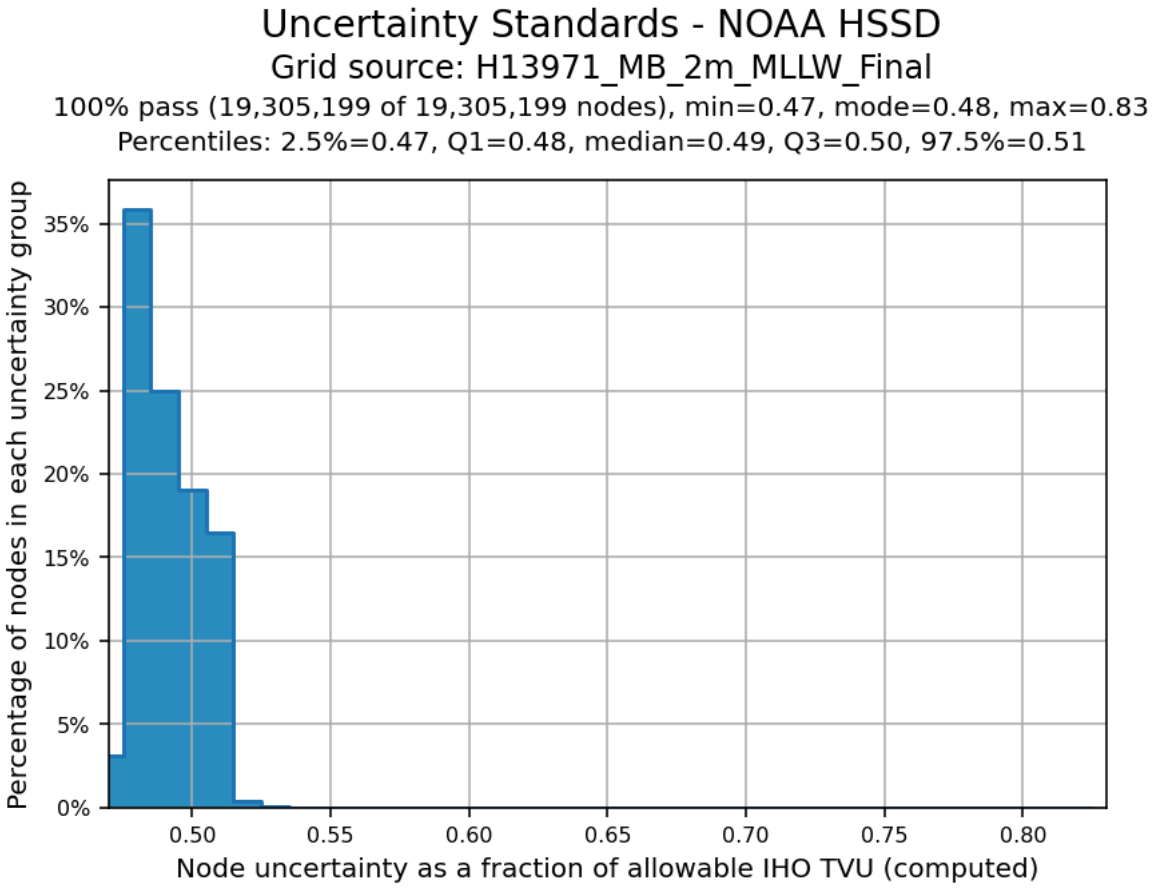


Figure 6: Node TVU Statistics - 2 meter, Finalized

B.2.3 Junctions

Survey H13971 junctions with current surveys H13969, H13970, H13972, H13973, H13976, and H13978. Figure 7 depicts H13971 and the junctioning surveys.

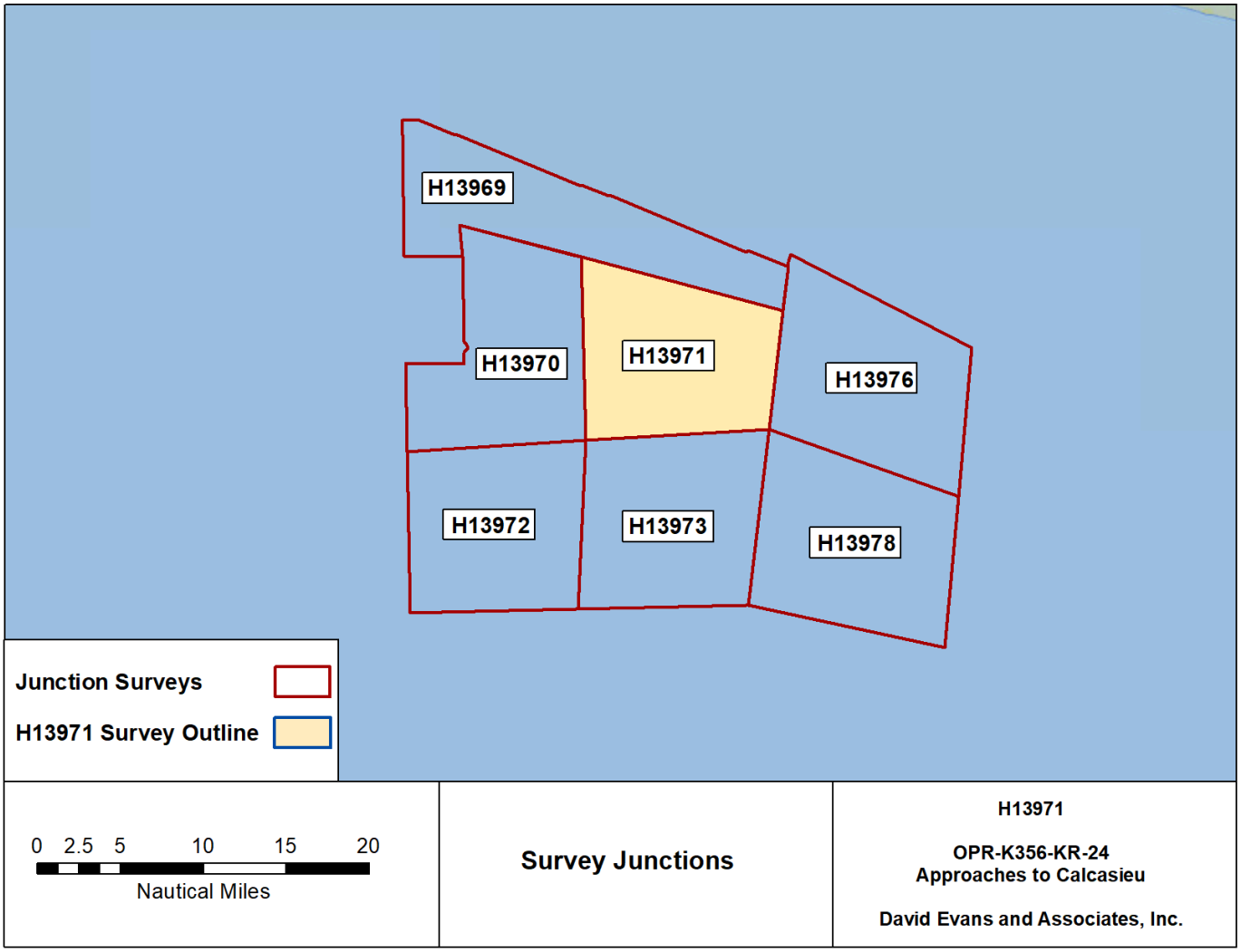


Figure 7: Survey Junctions with Registry Number H13971

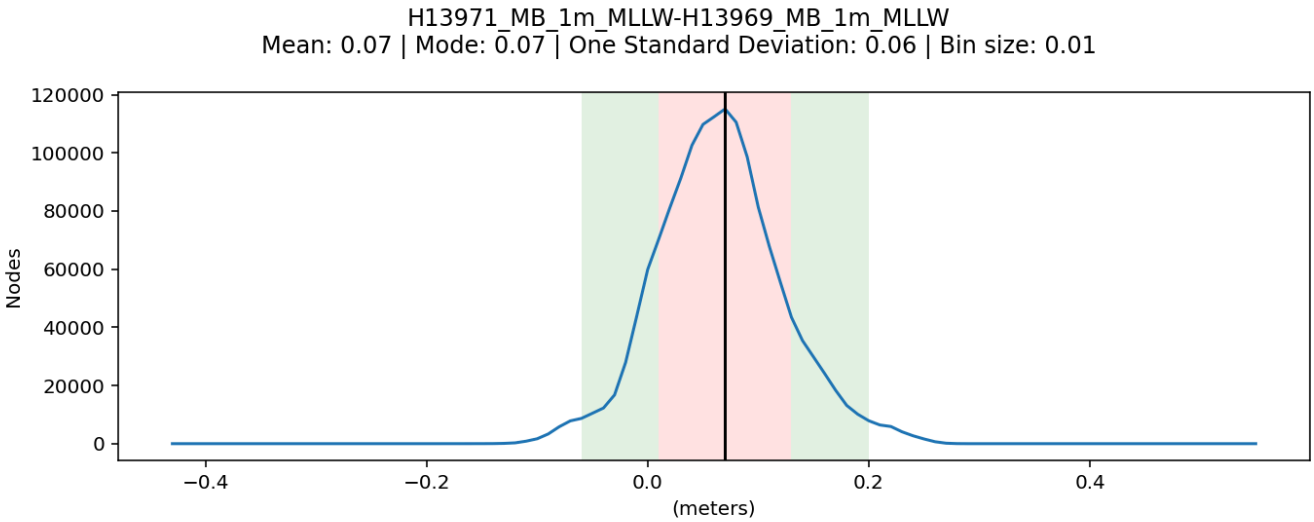
The following junctions were made with this survey:

Registry Number	Scale	Year	Field Unit	Relative Location
H13969	1:10000	2024	David Evans and Associates, Inc.	N
H13970	1:20000	2024	David Evans and Associates, Inc.	W
H13972	1:20000	2024	David Evans and Associates, Inc.	SW
H13973	1:20000	2024	David Evans and Associates, Inc.	S
H13976	1:40000	2024	David Evans and Associates, Inc.	E
H13978	1:40000	2024	David Evans and Associates, Inc.	SE

Table 9: Junctioning Surveys

H13969

The mean difference between H13971 and H13969 is 7 centimeters (H13971 shoaler than H13969), shown in Figure 8.

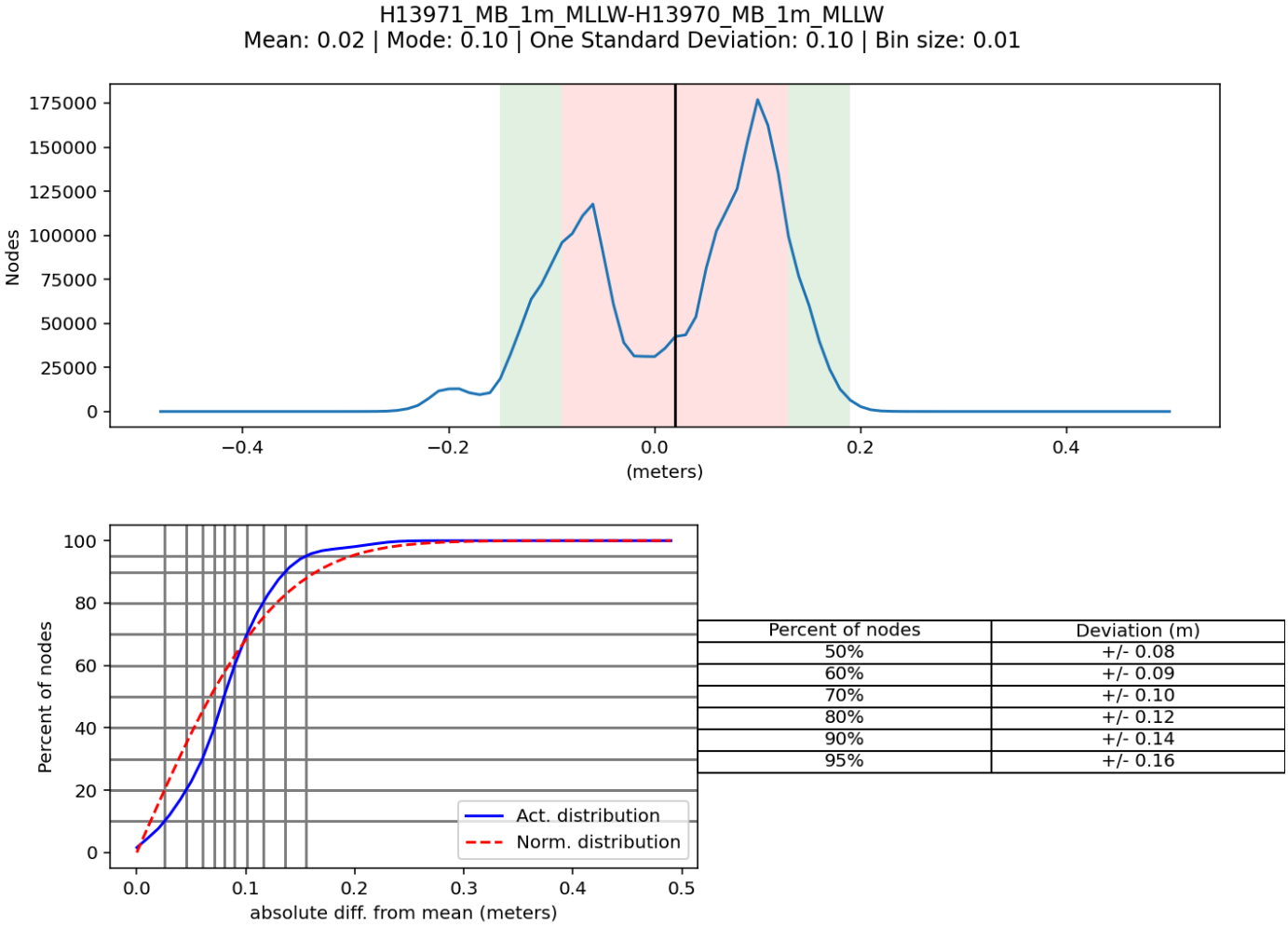


Percent of nodes	Deviation (m)
50%	+/- 0.03
60%	+/- 0.04
70%	+/- 0.05
80%	+/- 0.07
90%	+/- 0.09
95%	+/- 0.11

Figure 8: Distribution Summary Plot of Survey H13971 1-meter vs. H13969 1-meter

H13970

The mean difference between H13971 and H13970 is 2 centimeters (H13971 shoaler than H13970), shown in Figure 9.

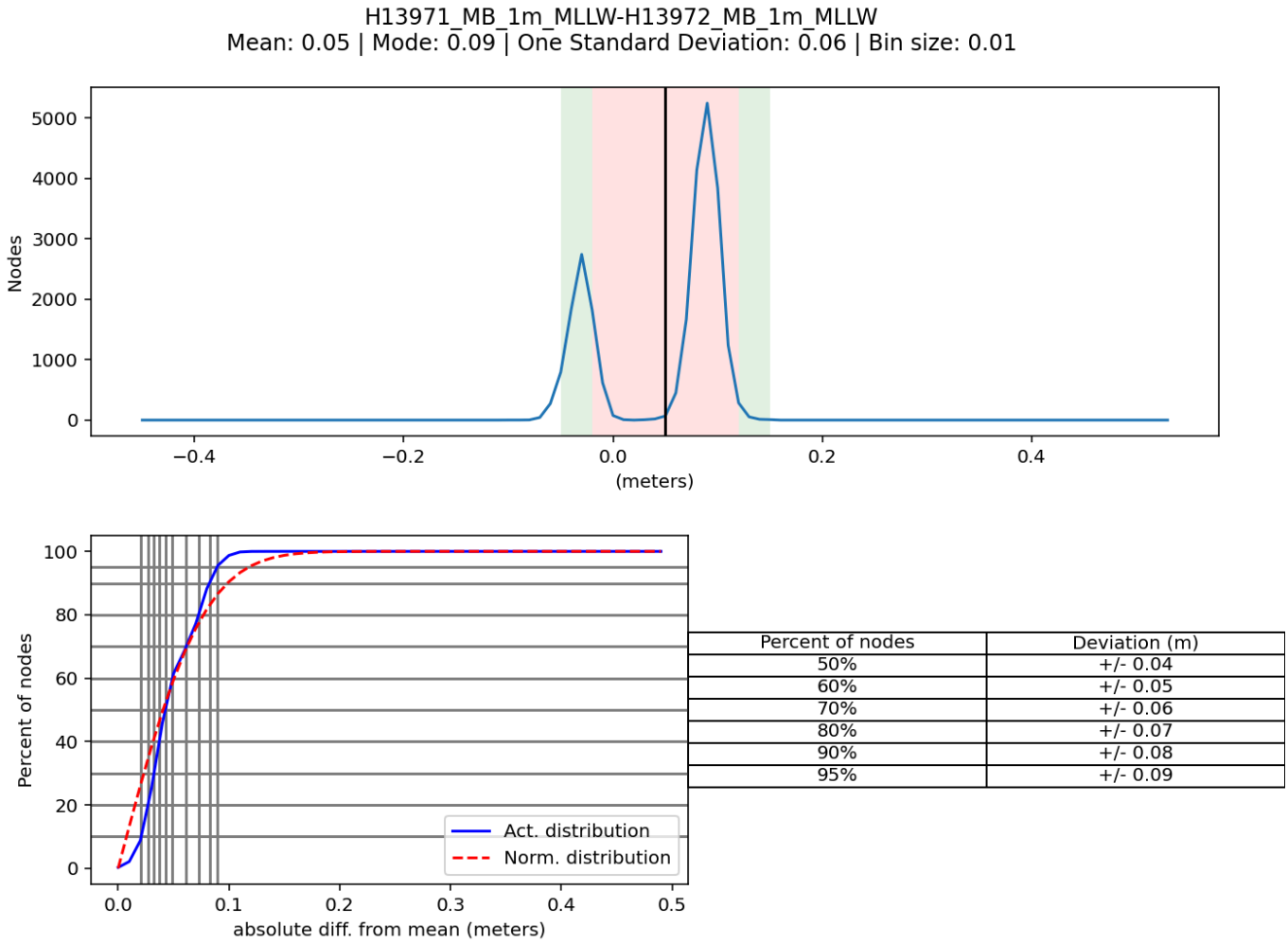


Percent of nodes	Deviation (m)
50%	+/- 0.08
60%	+/- 0.09
70%	+/- 0.10
80%	+/- 0.12
90%	+/- 0.14
95%	+/- 0.16

Figure 9: Distribution Summary Plot of Survey H13971 1-meter vs. H13970 1-meter

H13972

The mean difference between H13971 and H13972 is 5 centimeters (H13971 shoaler than H13972), shown in Figure 10. The bimodal nature of the distribution is explained in Section B.2.6 of the DR.



Percent of nodes	Deviation (m)
50%	+/- 0.04
60%	+/- 0.05
70%	+/- 0.06
80%	+/- 0.07
90%	+/- 0.08
95%	+/- 0.09

Figure 10: Distribution Summary Plot of Survey H13971 1-meter vs. H13972 1-meter

H13973

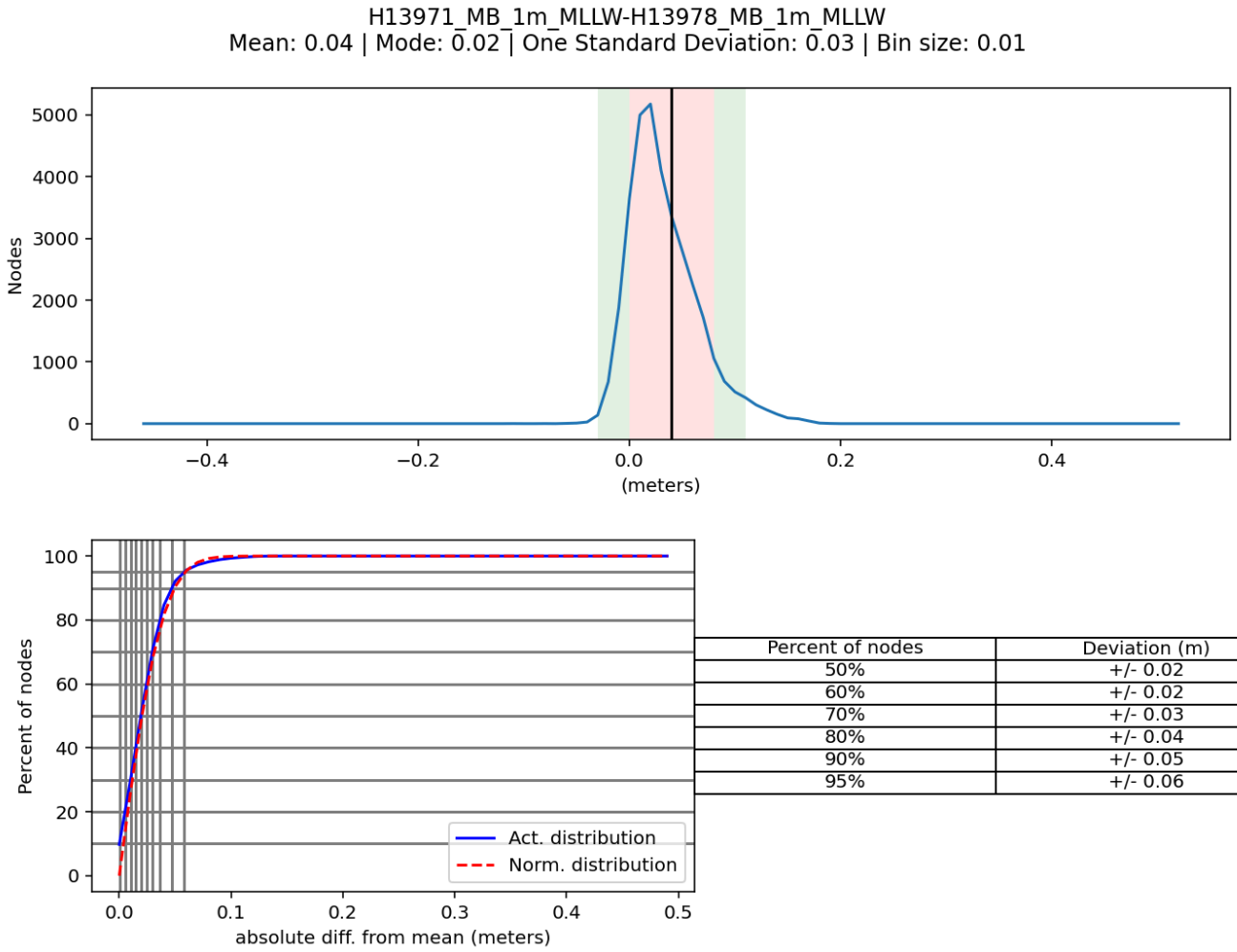
At the time of writing, data from survey H13973 was still being processed. The Descriptive Report (DR) for H13973 will include the junction analysis with H13971.

H13976

At the time of writing, data from survey H13976 was still being processed. The DR for H13976 will include the junction analysis with H13971.

H13978

The mean difference between H13971 and H13978 is 4 centimeters (H13971 shoaler than H13978), shown in Figure 11.



Percent of nodes	Deviation (m)
50%	+/- 0.02
60%	+/- 0.02
70%	+/- 0.03
80%	+/- 0.04
90%	+/- 0.05
95%	+/- 0.06

Figure 11: Distribution Summary Plot of Survey H13971 1-meter vs. H13978 1-meter

B.2.4 Sonar QC Checks

Quality control is discussed in detail in Section B of the DAPR.

Multibeam data were reviewed at multiple levels of data processing, including CARIS HIPS conversion, subset editing, and analysis of anomalies revealed in CUBE surfaces.

Sams 150 data were reviewed at multiple levels of data processing, including during the initial SonarWiz and Delph Geo imports, and preliminary stages of bottom-tracking, navigation review, and contact identification. Data were also reviewed during the final stages of mosaic generation, data coverage and quality assessment, and contact correlation and attribution.

B.2.5 Equipment Effectiveness

Ping Anomalies

On occasion, anomalous and high intensity returns were observed in the Sams 150 seafloor imagery dataset. While recognizable in the raw data and processed imagery, these anomalies were generally isolated to a single ping, and therefore did not significantly affect the ability to discern contacts and meet feature detection requirements.

Port and Starboard Signal Imbalance

The seafloor imagery data acquired with the Sams 150 displayed a signal amplitude imbalance between the port and starboard channels. The signal response from the port channel was of greater amplitude than that of the starboard channel. This was corrected in processing during the creation of the calibrated gain curve in Delph Geo software by mirroring the port-side gain calibration to the starboard channel, resulting in a more even-toned mosaic across both channels of the inertial side scan imagery. No correction was necessary for the single-ping XTF dataset processed in SonarWiz software when applying Emprical Gain Normalization (EGN).

Delph Geo Mosaic Processing Errors

During the generation of inertial side scan sonar mosaics in Delph Geo, processing errors were encountered when building mosaics for the following tracklines:

75m_FM_2500uS_80pc_20240923_225512_*
75m_FM_2500uS_80pc_20240926_003036_*
75m_FM_2500uS_80pc_20240927_232850_*

At times these errors prevented the completion of a full mosaic for the trackline, however any resulting coverage gaps were small and generally limited to the ends of the lines beyond the sheet limits. This issue was only observed in the 10-centimeter inertial side scan mosaic products from Delph Geo. No errors were encountered during the creation of the 1-meter single-ping side scan mosaics in SonarWiz, and these mosaics are complete without coverage gaps.

B.2.6 Factors Affecting Soundings

Vertical MBES Offset

During processing, an occasional vertical offset was observed in the MBES data on the order of 10 to 20-centimeters. The duration of these offsets lasted sometimes for most of a survey line and occasionally over multiple survey lines. The offset is believed to be related to drift in the inertial navigation system. Data during these events still met specifications but do present as a bimodal distribution in the Junction Analysis.

B.2.7 Sound Speed Methods

Sound Speed Cast Frequency: Approximately four-hour intervals

For H13971 survey operations, casts were distributed both temporally and spatially based on observed changes in sound speed profiles. Sound speed readings were applied in CARIS HIPS using the "nearest in distance within time" with a four-hour interval.

B.2.8 Coverage Equipment and Methods

Survey speeds were maintained to meet or exceed along-track sounding density requirements and side scan sonar ensonification requirements.

Multibeam data and side scan mosaics were thoroughly reviewed for holidays and areas of poor-quality coverage due to biomass, vessel wakes, or other factors. Feature investigations were performed with multibeam sonar to obtain a least depth, meeting the survey’s coverage requirements. Survey coverage for feature disprovals was acquired inside disproval radii to meet the coverage requirement for the area. Additional discussion of coverage methods can be found in the DAPR.

B.2.9 Density

The sounding density requirement of 95% of all nodes, populated with at least five soundings per node, was verified by analyzing the density layer of the finalized surfaces. Surface results are stated in Figures 12 and 13.

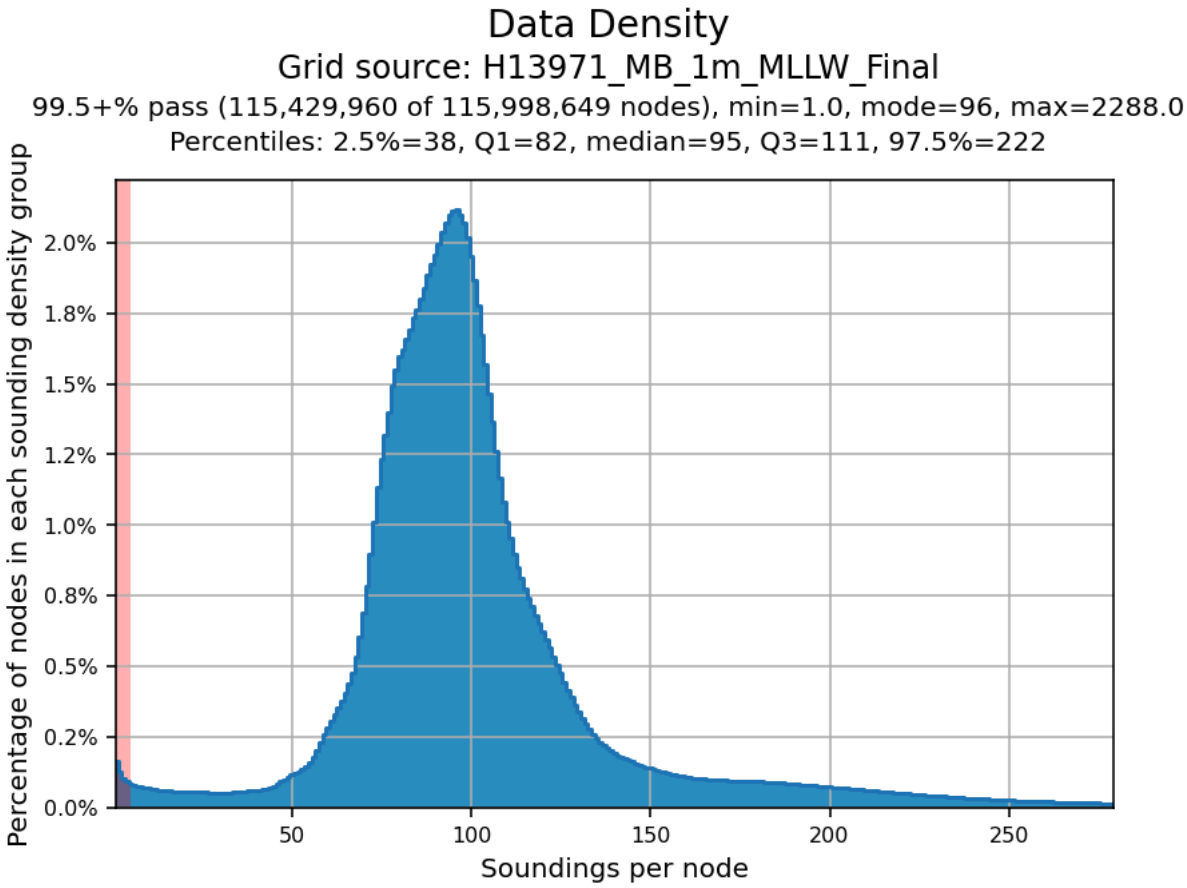


Figure 12: Node Density Statistics - 1 meter, Finalized

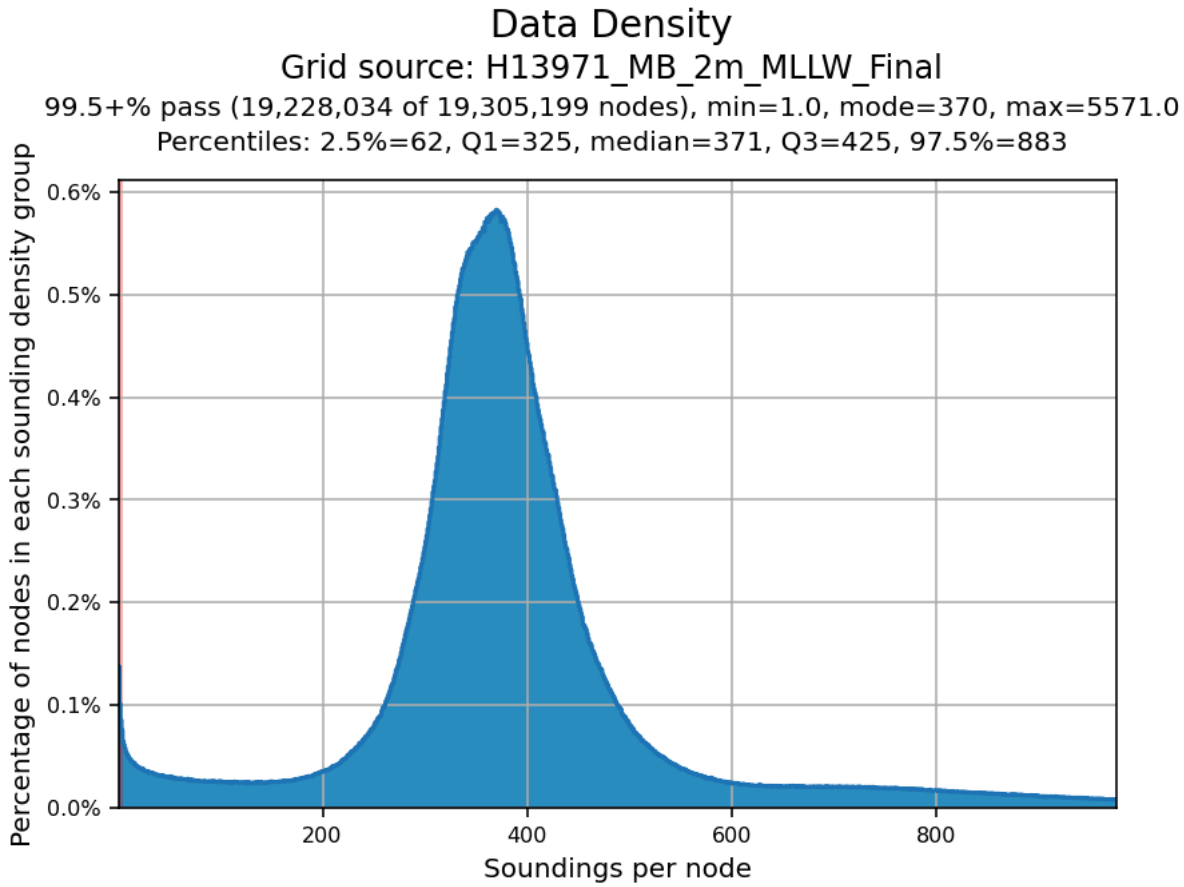


Figure 13: Node Density Statistics - 2 meter, Finalized

B.3 Echo Sounding Corrections

B.3.1 Corrections to Echo Soundings

Data reduction procedures for survey H13971 are detailed in the DAPR.

B.3.2 Calibrations

All sounding systems were calibrated as detailed in the DAPR.

B.4 Backscatter

Multibeam time series backscatter data were logged in Kongsberg KMALL format and are included with the H13971 raw digital deliverables. Backscatter data were referenced to processed multibeam bathymetric data and processed in QPS FMGT. A 2-meter backscatter mosaic is included with the H13971 processed deliverables. A GSF export containing the final bathymetry and backscatter with edits retains the original file names of the raw data files but with the postfix "_merged."

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/SIPS	11.4.29

Table 10: Primary bathymetric data processing software

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

Manufacturer	Name	Version
Chesapeake Technology	SonarWiz	8.00.01 (64-bit)
Exail	Delph Geo	5.0.506
QPS	FMGT	7.11.1

Table 11: Primary imagery data processing software

The following Feature Object Catalog was used: NOAA Profile Version 2024.

A detailed listing of all data processing software is included in the OPR-K356-KR-24 DAPR.

The 90-degree, single-ping XTF data collected with the Sams 150 were processed in Chesapeake SonarWiz software to obtain the primary side scan coverage mosaics for this project. The full SAS XTF data collected with the Sams 150 were processed in Delph Geo software using “inertial side scan sonar” mode to produce high-resolution inertially-corrected seafloor imagery mosaics to aid contact identification in SonarWiz. Further information is available in the DAPR.

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
H13971_MB_1m_MLLW.csar	CARIS Raster Surface (CUBE)	1 meters	15.294 meters - 20.275 meters	NOAA_1m	Complete MBES
H13971_MB_1m_MLLW_Final.csar	Finalized CARIS Raster Surface (CUBE)	1 meters	15.294 meters - 20.0 meters	NOAA_1m	Complete MBES
H13971_MB_2m_MLLW.csar	CARIS Raster Surface (CUBE)	2 meters	15.306 meters - 20.207 meters	NOAA_2m	Complete MBES
H13971_MB_2m_MLLW_Final.csar	Finalized CARIS Raster Surface (CUBE)	2 meters	18.0 meters - 20.207 meters	NOAA_2m	Complete MBES
H13971_MBAB_2m_DX_400kHz_1of1.tiff	MB Backscatter Mosaic	2 meters	-	N/A	Complete MBES
H13971_SSSAB_1m_540kHz_1of2.tif	SSS Mosaic	1 meters	-	N/A	100% SSS
H13971_SSSAB_1m_540kHz_2of2.tif	SSS Mosaic	1 meters	-	N/A	200% SSS
H13971_100P_Inertial_SSS_10cm_Merged.tif	Inertial SSS Mosaic	10 centimeters	-	N/A	100% SSS
H13971_200P_Inertial_SSS_10cm_Merged.tif	Inertial SSS Mosaic	10 centimeters	-	N/A	200% SSS

Table 12: Submitted Surfaces

Bathymetric grids were created relative to Mean Lower Low Water (MLLW) in CUBE format using Complete Coverage resolution requirements as specified in the HSSD. Grid resolution for the backscatter mosaic was determined by the HSSD frequency-dependent resolution requirement.

In the 2-meter MBES surface, the hydrographer notes that QC Tools 3 Holiday Finder flags five false single-pixel holidays. These holidays do not follow the definition outlined in section 5.2.2.3 of the HSSD and, after consultation with the QC Tools support team, it was determined that these holidays are flagged as part of a

conservative measure built into the Holiday Finder formula. Since these same data gaps are not flagged on the 1-meter MBES surface, the hydrographer has justification to conclude they are not true holidays.

Seafloor imagery was produced using two processing pipelines. Due to the different processing routines of each software, different data inputs, resolutions, and attention to elective processing options such as draw order, gain settings, and vessel-turn clipping, seafloor imagery mosaics produced in Delph Geo may appear slightly different. These differences may be seen in terms of coverage or quality when compared to their counterparts using conventional single-ping imagery in SonarWiz, and do not meet the standard requirements specified in the HSSD for naming convention, floating point format, or noData value. The 10-centimeter seafloor imagery mosaics provided in this table were created by merging the Delph Geo mosaic tiles into a single TIF image using QGIS software, and may be viewed in their native format only within Delph Geo software.

C. Vertical and Horizontal Control

A summary of the horizontal and vertical control for survey H13971 follows.

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-K356-KR-24_NAD83(2011)-MLLW.csar

Table 13: ERS method and SEP file

C.2 Horizontal Control

The horizontal datum for this project is North American Datum 1983 (2011).

The projection used for this project is Universal Transverse Mercator (UTM) Zone 15.

PPP

Different PPP corrections were used during this survey. Fugro Marinestar corrections were used for real-time navigation during acquisition and then later replaced during processing in HIPS with an inertially coupled PPP post processed solution using Novatel Terrastar (NRT) corrections. Real-time navigation for all MBES and single-ping SSS survey lines were overwritten with post-processed navigation solutions in SBET format. Further discussion on post-processing methods and survey control is included in the DAPR.

D. Results and Recommendations

D.1 Chart Comparison

The chart comparison was performed by comparing H13971 survey depths to a digital surface generated from the Band 3 and Band 4 electronic navigational charts (ENCs) covering the survey area. A 80-meter product surface was generated from a triangular irregular network (TIN) created from the ENC's soundings, depth contours, and depth features. An additional 80-meter HIPS product surface was generated from the survey's 1-meter CUBE surface. The chart comparison was conducted by creating and reviewing a difference surface using the ENC surfaces and survey surface as inputs. The chart comparison also included a review of all assigned charted features within the survey area. The results of the comparison are detailed below.

The charts used during the comparison were reviewed to check that all United States Coast Guard (USCG) Local Notice to Mariners issued during survey acquisition, and impacting the survey area, were applied and addressed by this survey.

The ENCs used in the chart comparison are listed in Table 14. Figures 14 and 15 show the magnitude of differences along the comparison area.

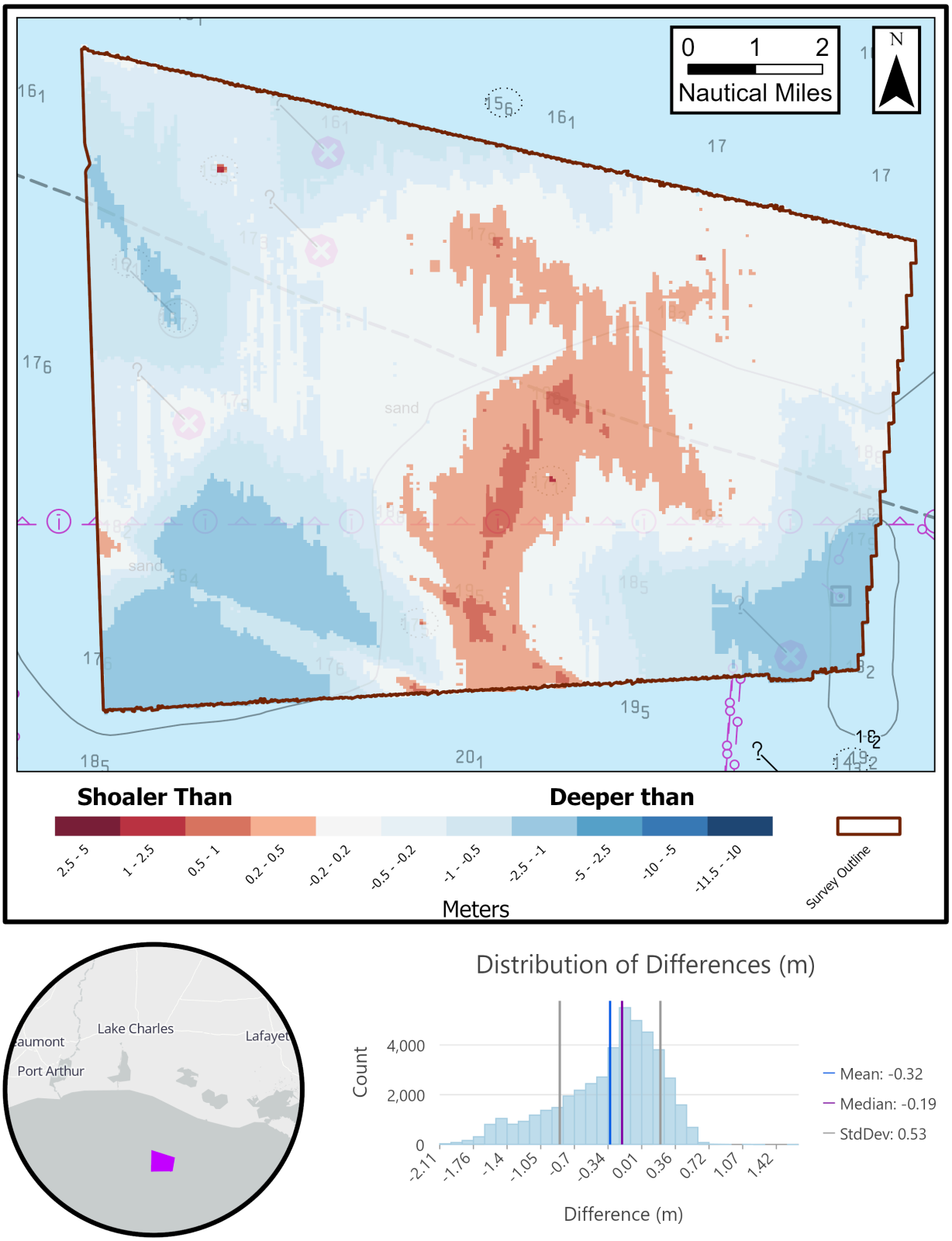


Figure 14: Depth Difference between H13971 and Band 3 ENCs

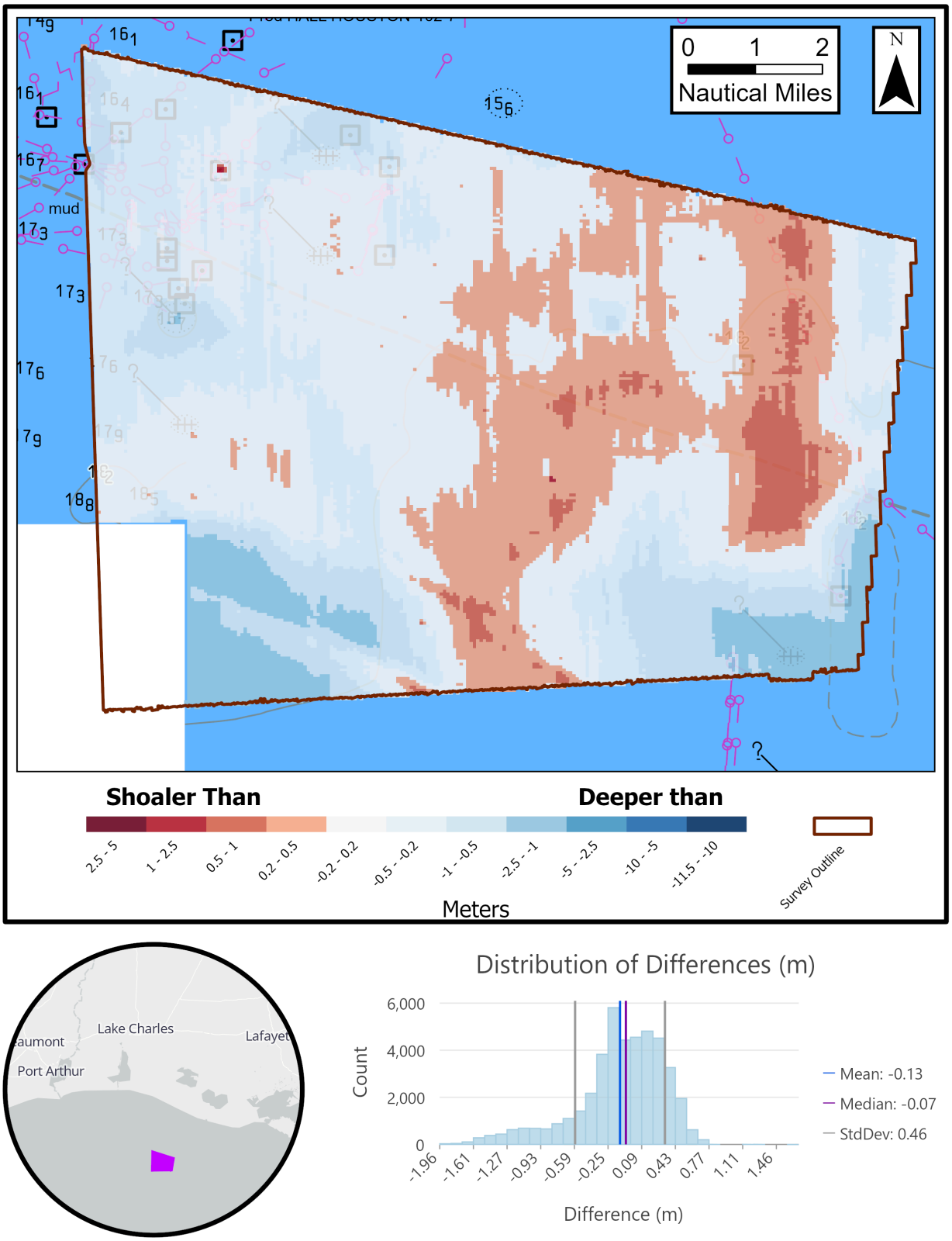


Figure 15: Depth Difference between H13971 and Band 4 ENCs

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
US3GC02M	1:250000	52	02/06/2025	02/06/2025
US4LA1ED	1:90000	1	09/03/2024	03/26/2025
US4LA14M	1:90000	36	01/02/2025	01/02/2025

Table 14: Largest Scale ENCs

D.1.2 Shoal and Hazardous Features

One Danger to Navigation (DtoN) report was submitted for this survey.

-H13971 DtoN 01, submitted December 13, 2024, reported five uncharted obstructions within the survey area.

The hydrographer recommends updating the charts to depict the DtoN as portrayed in the Final Feature Files (FFF).

D.1.3 Charted Features

All assigned features included in the project Composite Source File (CSF) have been addressed by the survey and are included in the FFF.

All disproved features have been included in the FFF with a description of "Delete." All new features have been included in the FFF with the surveyed feature depicted and a description of "New."

Contact heights included in the side scan contact .000 file have been sourced from the shadow height measurement obtained from SonarWiz. Due to the limitations in computing accurate heights from side scan shadow lengths, contact heights may not match heights from correlating contacts or feature heights measured from multibeam data included in the FFF. In cases where the shadow height measurement could not be adequately determined, either due to the broad nature of the feature, its proximity to nadir, or simply, the lack of a measurable shadow in the Sams 150 imagery, the contact height is listed as "unknown" and the height of the feature as measured in multibeam from the surrounding natural bottom is provided in the remarks.

D.1.4 Uncharted Features

All uncharted features are portrayed in the FFF as surveyed and attributed with the description of "New." Refer to the FFF for additional information.

D.1.5 Channels

No channels exist 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 on January 25, 2025. The bottom sampling plan was developed to include different bottom types based on imagery observed in the side scan sonar and backscatter mosaics.

D.2.4 Overhead Features

No overhead features exist for this survey.

D.2.5 Submarine Features

Assigned submerged pipelines that are within the survey area are included in the FFF. Nine sections of exposed pipeline were reported to the Bureau of Safety and Environmental Enforcement (BSEE) on March 17, 2025. Correspondence related to this reporting is included in Appendix II.

D.2.6 Platforms

Surveyed and disproved platforms are addressed in the FFF. Remnants of a charted platform that had been decommissioned and removed were detected in both MBES and SSS data during the survey. These remnants were reported as an obstruction area feature in H13971 DtoN 01 (submitted on December 13, 2024) and included in the FFF. The least depth from within the obstruction area was marked as a designated sounding.

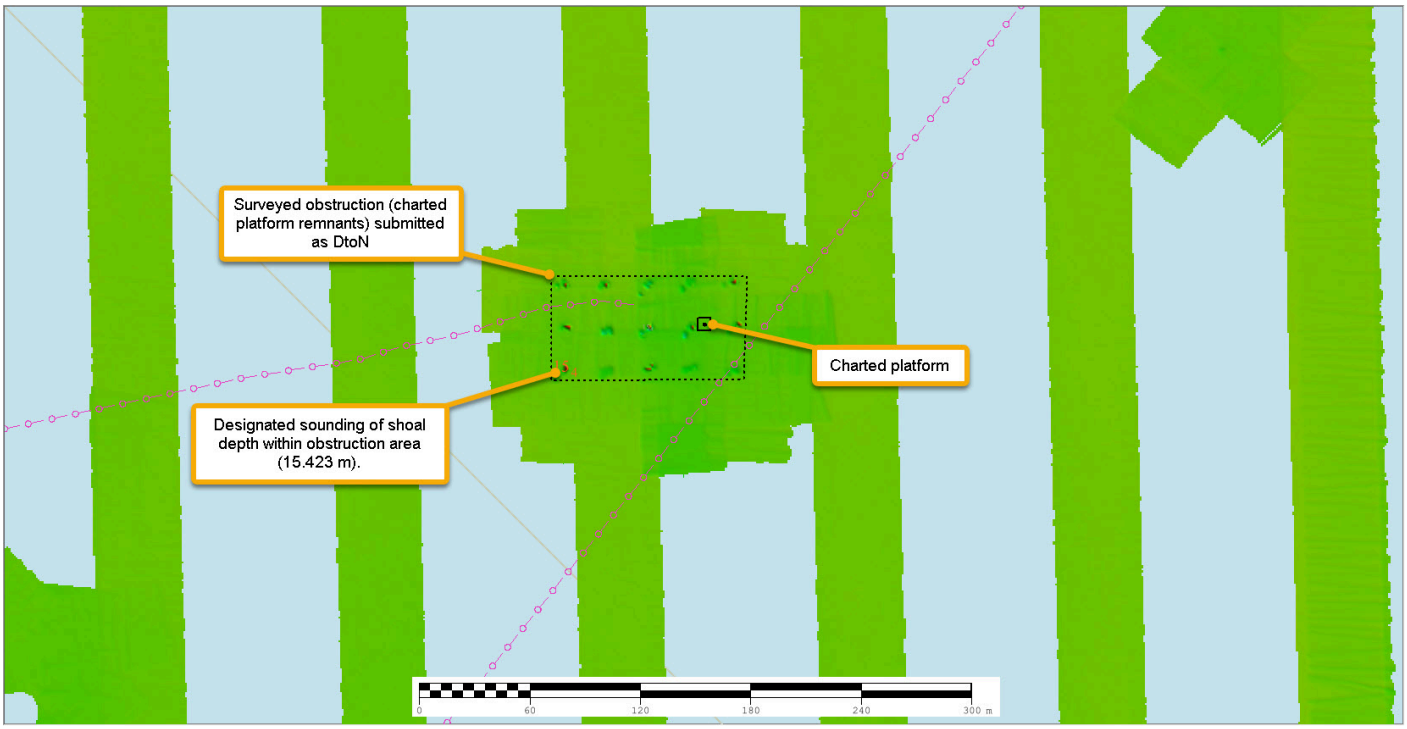


Figure 16: H13971 DtoN 01 Platform Remnants

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 construction or dredging activities were observed during survey operations.

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 and Specifications 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.

Report Name	Report Date Sent
Data Acquisition and Processing Report Revision	2025-04-16
Coast Pilot Report	2025-02-25
Survey Outline	2024-11-08
Marine Mammal Observers	2025-02-13
NCEI Sound Speed Data	2025-02-13

Approver Name	Approver Title	Approval Date	Signature
Jonathan L. Dasler, PE, PLS, CH	NSPS-THSOA Certified Hydrographer, Chief of Party	04/16/2025	Digitally signed by Jonathan L. Dasler, PE, PLS, CH Date: 2025.04.16 10:15:57 -07'00'
Jason Creech, CH	NSPS-THSOA Certified Hydrographer, Charting Manager / Project Manager	04/16/2025	Digitally signed by Jason Creech, CH Date: 2025.04.16 10:16:23 -07'00'
James Guilford, CH(A)	NSPS-THSOA Certified Hydrographer, Lead Hydrographer	04/16/2025	Digitally signed by James Guilford Date: 2025.04.16 10:16:53 -07'00'
Jason Dorfman, CH	NSPS-THSOA Certified Hydrographer, Lead Hydrographer	04/16/2025	Digitally signed by Jason Dorfman Date: 2025.04.16 10:17:27 -07'00'
Sam Werner	Data Processing Manager	04/16/2025	Digitally signed by Sam Werner Date: 2025.04.16 10:17:59 -07'00'

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