H13490

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

DESCRIPTIVE REPORT

Type of Survey:	Navigable Area
Registry Number:	H13490

LOCALITY

State(s):	Louisiana Mississippi
General Locality:	Approaches to Pascagoula, Louisiana, Mississippi, and Alabama
Sub-locality:	Ship Island Pass and Approach

2021

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	**H13490**

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 Mississippi**
General Locality:	**Approaches to Pascagoula, Louisiana, Mississippi, and Alabama**
Sub-Locality:	**Ship Island Pass and Approach**
Scale:	**20000**
Dates of Survey:	**06/17/2021 to 10/14/2021**
Instructions Dated:	**04/27/2021**
Project Number:	**OPR-J315-KR-21**
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**
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 16N, 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 H13490

Project: OPR-J315-KR-21

Locality: Approaches to Pascagoula, Louisiana, Mississippi, and Alabama

Sublocality: Ship Island Pass and Approach

Scale: 1:20000

June 2021 - October 2021

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 vicinity of Pascagoula and Gulfport, Mississippi. Survey H13490 was conducted in accordance with the Statement of Work and Hydrographic Survey Project Instructions dated April 27, 2021.

The Hydrographic Survey Project Instructions reference the National Ocean Service (NOS) Hydrographic Surveys Specifications and Deliverables Manual (HSSD) (April 2021) as the technical requirements for this project.

A.1 Survey Limits

Data were acquired within the following survey limits:

Northwest Limit	Southeast Limit
30° 13' 19.76" N 89° 0' 31.38" W	30° 5' 31.35" N 88° 36' 8.47" 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.

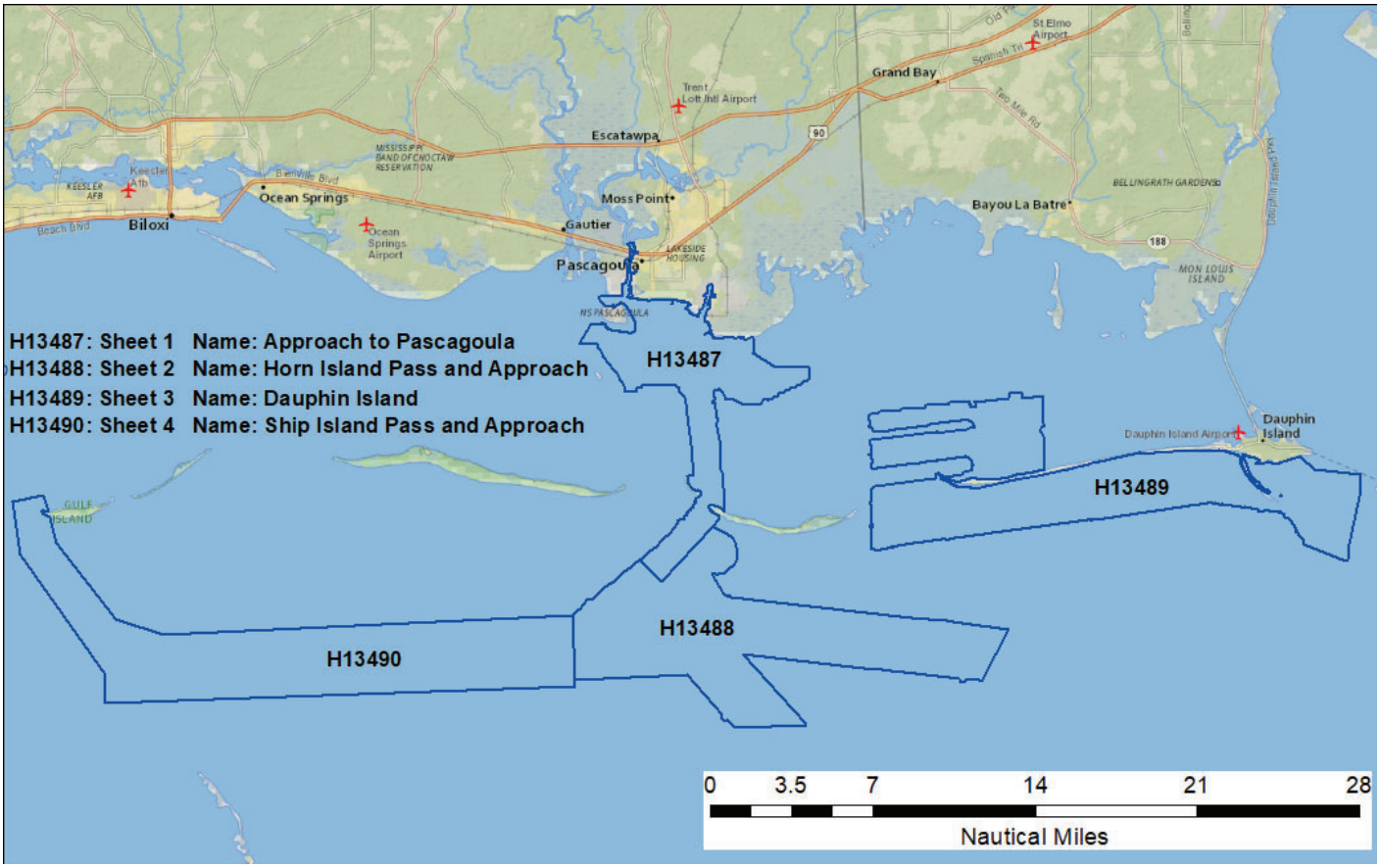


Figure 1: OPR-J315-KR-21 Assigned Survey Areas

A.2 Survey Purpose

The purpose of this survey, defined in the Project Instructions, is as follows: "The Port of Pascagoula, Mississippi is ranked as the 25th busiest by total tons of commerce in the US (1). This proposed survey area covers approximately 189 square nautical miles of the approaches to Pascagoula and Gulfport as well as sections of the Intercoastal Waterway (ICW) between Louisiana and Alabama. The region has been affected by several recent hurricanes so it is expected that modern hydrographic techniques will find significant changes to the seabed since the most recent surveys. Survey data from this project are intended to supersede all prior survey data in the common area."

(1) The U.S. Coastal and Inland Navigation System 2019 Transportation Facts & Information, Navigation and Civil Works Decision Support Center, USACE

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	Acquire backscatter data during all multibeam data acquisition (Refer to HSSD Section 6.2).
All waters in survey area	Object Detection Coverage for channel areas represented as ACHARE (refer to HSSD Section 5.2.2.2), and Complete Coverage for non-ACHARE areas (refer to HSSD Section 5.2.2.3).

Table 2: Survey Coverage

Object Detection was obtained over channel areas represented as ACHARE polygons in the OPR-J315-KR-21 Project Reference File (PRF). Complete Coverage was obtained over non-ACHARE areas. For the entire survey area, data were collected in depths greater than 3.5 meters relative to chart datum using 100% multibeam echosounder (MBES) and backscatter. These coverage types follow the Object Detection Coverage requirement specified in Section 5.2.2.2 of the 2021 HSSD, and Option A of the Complete Coverage requirement specified in Section 5.2.2.3 of the 2021 HSSD.

Figure 2 depicts the H13490 survey outline.

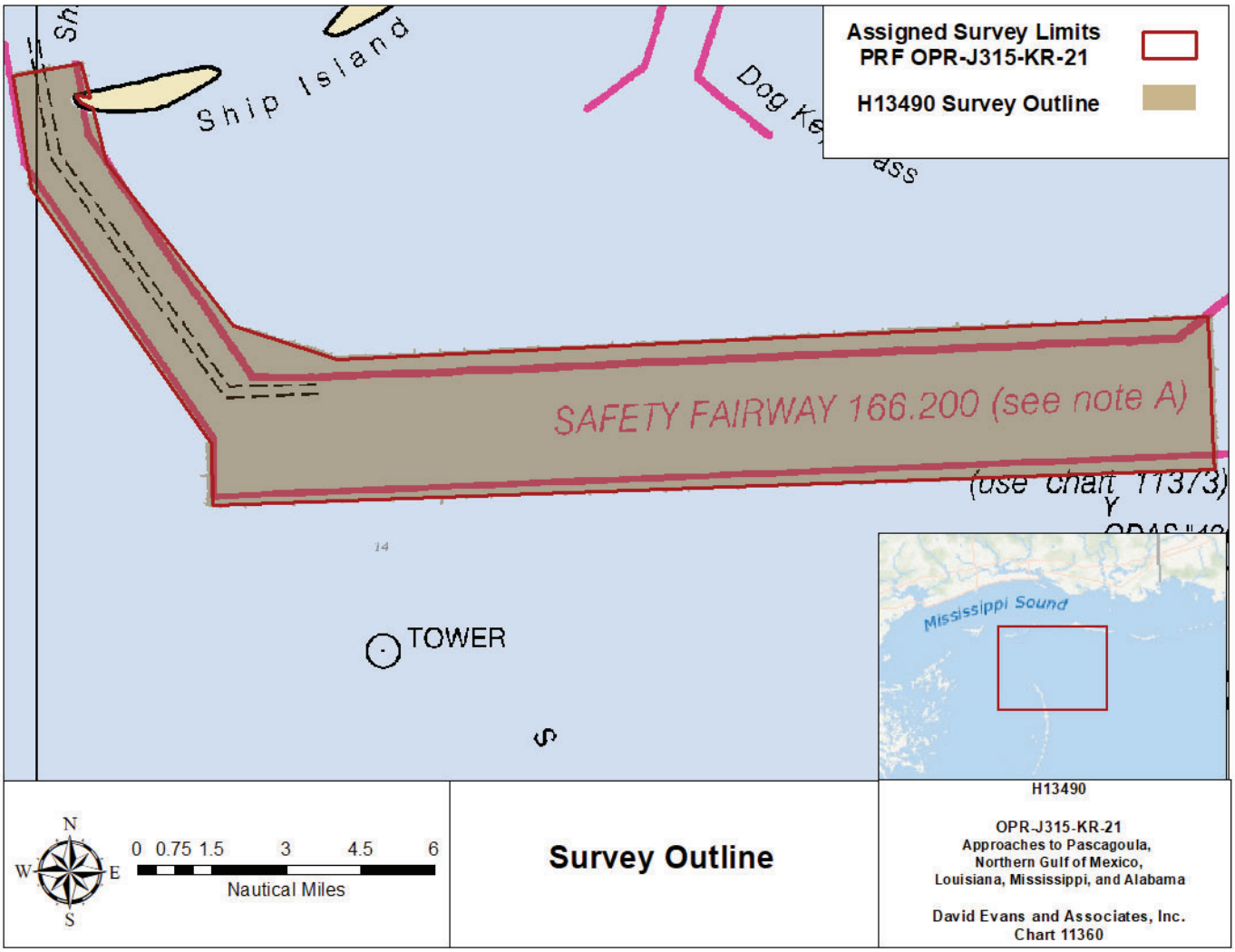


Figure 2: H13490 Survey Outline

A.6 Survey Statistics

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

	HULL ID	*S/V Blake*	*R/V Broughton*	*Total*
LNM	**SBES Mainscheme**	0	0	0
	MBES Mainscheme	2686.39	15.96	2702.35
	Lidar Mainscheme	0	0	0
	SSS Mainscheme	0	0	0
	SBES/SSS Mainscheme	0	0	0
	MBES/SSS Mainscheme	0	0	0
	SBES/MBES Crosslines	127.46	1.29	128.75
	Lidar Crosslines	0	0	0
Number of Bottom Samples				13
Number Maritime Boundary Points Investigated				0
Number of DPs				0
Number of Items Investigated by Dive Ops				0
Total SNM				55.96

Table 3: Hydrographic Survey Statistics

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

Survey Dates	Day of the Year
06/17/2021	168

Survey Dates	Day of the Year
06/18/2021	169
06/22/2021	173
06/23/2021	174
06/24/2021	175
06/25/2021	176
06/30/2021	181
07/01/2021	182
07/02/2021	183
07/03/2021	184
07/04/2021	185
07/05/2021	186
07/06/2021	187
07/07/2021	188
07/08/2021	189
07/09/2021	190
07/10/2021	191
07/11/2021	192
07/12/2021	193
07/13/2021	194
07/14/2021	195
07/15/2021	196
07/16/2021	197
07/17/2021	198
07/18/2021	199
07/19/2021	200
07/21/2021	202
07/27/2021	208
07/29/2021	210
10/07/2021	280
10/12/2021	285
10/13/2021	286
10/14/2021	287

Table 4: Dates of Hydrography

B. Data Acquisition and Processing

B.1 Equipment and Vessels

The OPR-J315-KR-21 Data Acquisition and Processing Report (DAPR), submitted with prior survey H13488, 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 S/V Blake is an 82-foot aluminum catamaran with a 27-foot beam and a draft of 4.5 feet (Figure 3). The R/V Broughton is a 24-foot custom Duckworth offshore with an 8.5-foot beam and a draft of 2.75 feet (Figure 4).

B.1.1 Vessels

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

Hull ID	*S/V Blake*	*R/V Broughton*
LOA	82 feet	24 feet
Draft	4.5 feet	2.75 feet

Table 5: Vessels Used

Figure 3: S/V Blake

Figure 4: R/V Broughton

B.1.2 Equipment

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

Manufacturer	Model	Type
Teledyne RESON	SeaBat T50-R	MBES
Applanix	POS MV 320 v5	Positioning and Attitude System
AML Oceanographic	MicroX SV	Sound Speed System
AML Oceanographic	MVP30-350	Sound Speed System
AML Oceanographic	SmartX	Sound Speed System

Table 6: Major Systems Used

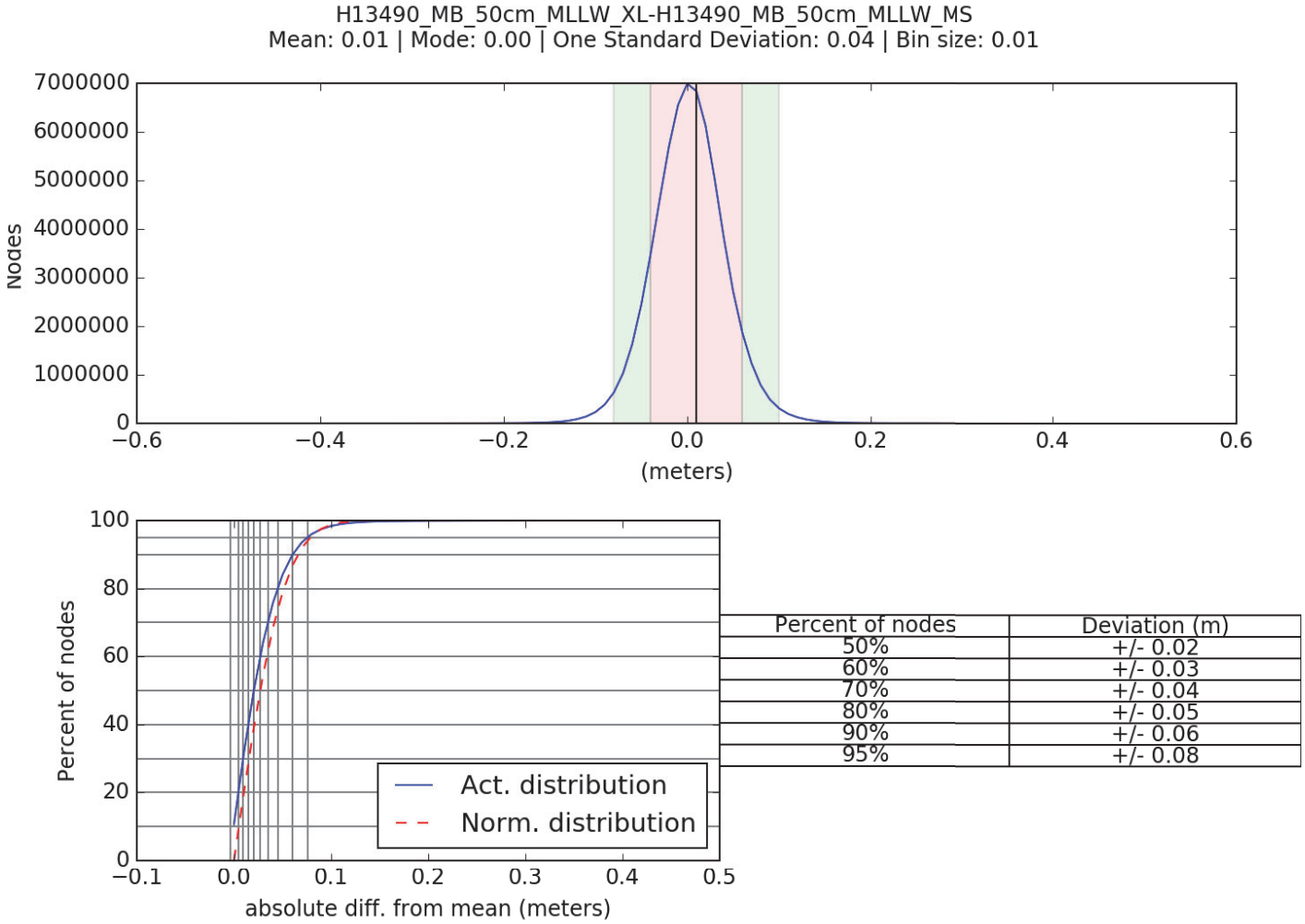
B.2 Quality Control

B.2.1 Crosslines

Multibeam crosslines were run across 4.76% 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 1-meter 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 Combined Uncertainty and Bathymetry Estimator (CUBE) surfaces of mainscheme and crossline depths. Results from the crossline to mainscheme difference analysis are depicted in Figure 5, with units represented in meters.



Percent of nodes	Deviation (m)
50%	+/- 0.02
60%	+/- 0.03
70%	+/- 0.04
80%	+/- 0.05
90%	+/- 0.06
95%	+/- 0.08

Figure 5: H13490 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	0.152 meters

Table 7: Survey Specific Tide TPU Values.

Hull ID	Measured - CTD	Measured - MVP	Measured - XBT	Surface
S/V Blake	n/a meters/second	1.0 meters/second	n/a meters/second	0.5 meters/second
R/V Broughton	1.0 meters/second	n/a meters/second	n/a meters/second	0.5 meters/second

Table 8: Survey Specific Sound Speed TPU Values.

Additional discussion of these parameters is included in the DAPR. The S/V Blake used an AML MVP30-350 with integrated Micro SVP&T to acquire sound speed measurements. The R/V Broughton used an AML Smart X to acquire sound speed measurements. The measurement uncertainty for these sensors is listed in the Moving Vessel Profiler (MVP) and CTD columns in Table 8.

During surface finalization in HIPS, the "Greater of the two values" option was selected, where the calculated uncertainty from Total Propagated Uncertainty (TPU) is compared to the standard deviation of the soundings influencing the node, and where the greater value is assigned as the final uncertainty of the node. The uncertainty of the finalized surfaces increased for nodes that had a standard deviation greater than TPU.

To determine if the surface grid nodes met 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 TVU values of all nodes in the submitted finalized surfaces are shown in Figures 6 and 7.

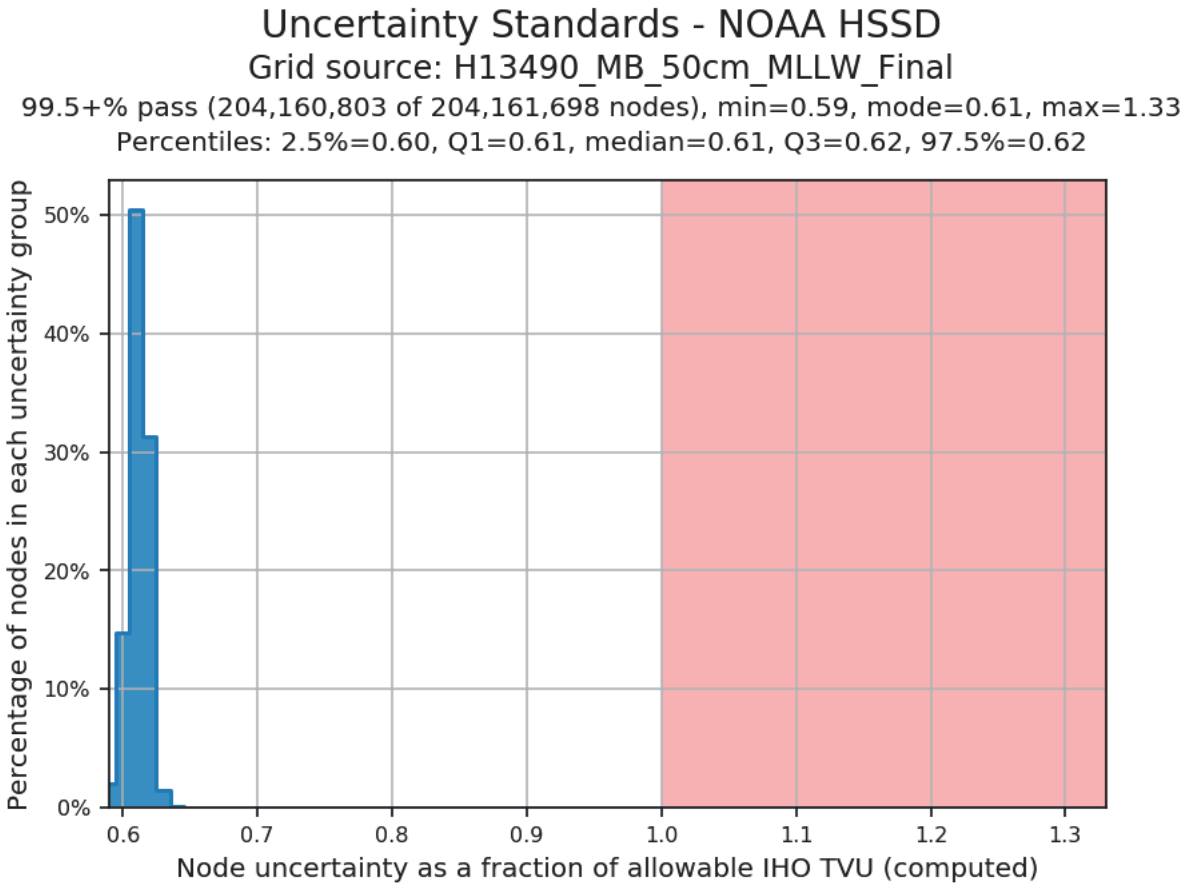


Figure 6: Node TVU Statistics - 50 centimeters, Finalized

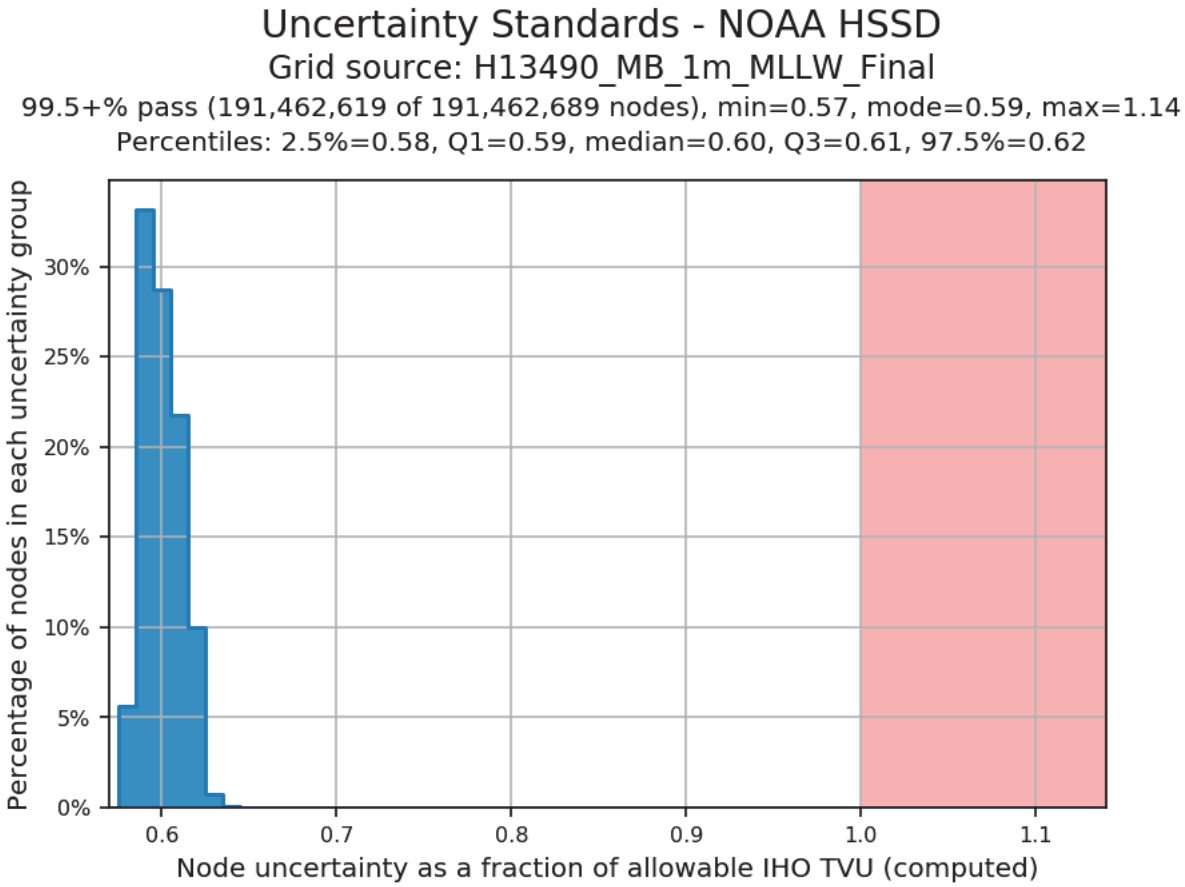


Figure 7: Node TVU Statistics - 1 meter, Finalized

B.2.3 Junctions

Survey H13490 junctions with current survey H13488, and prior contemporary surveys H12353, H12355, H12356, and H12710. Figure 8 depicts H13490 and the junctioning surveys.

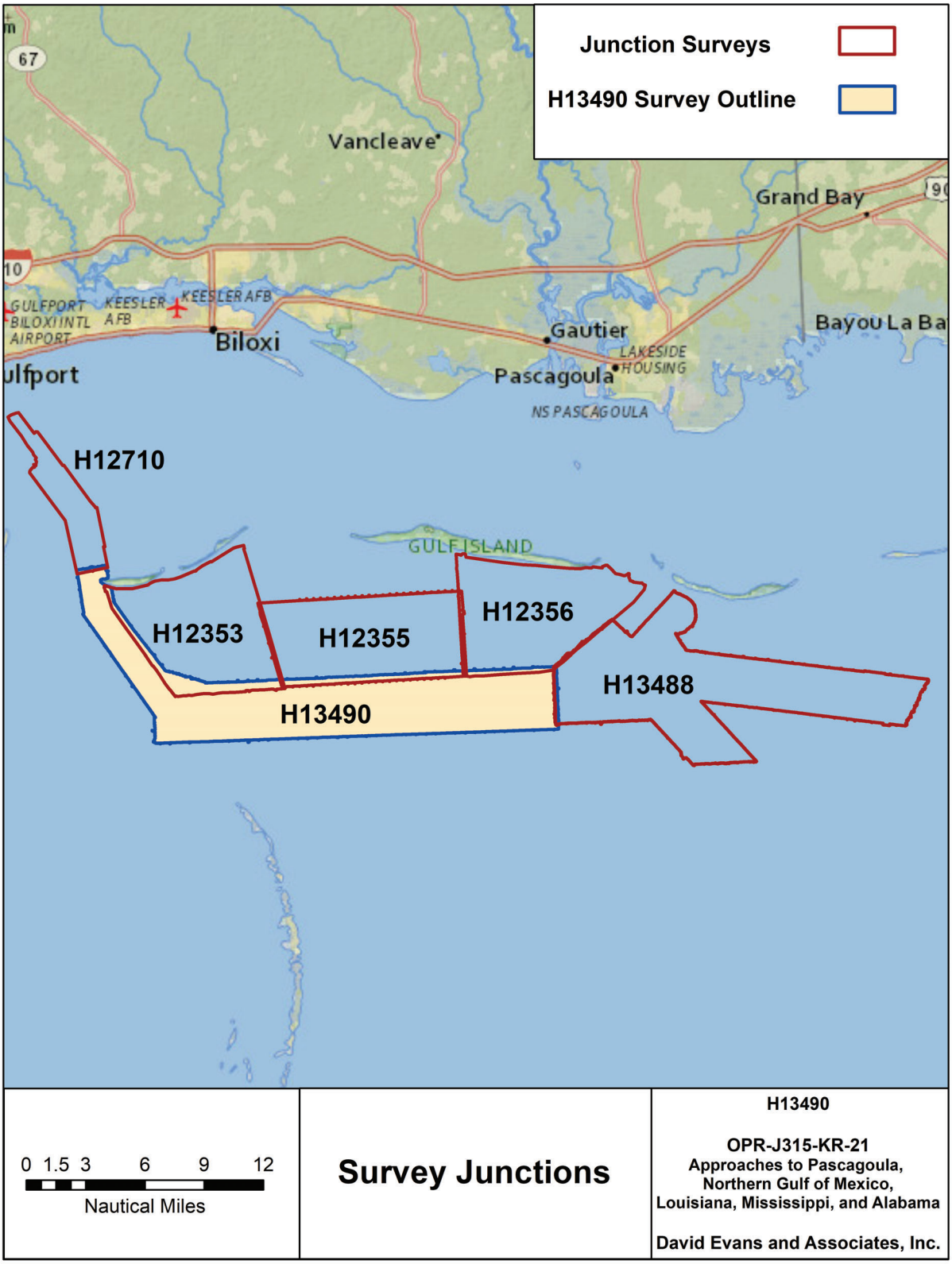


Figure 8: Survey Junctions with Registry Number H13490

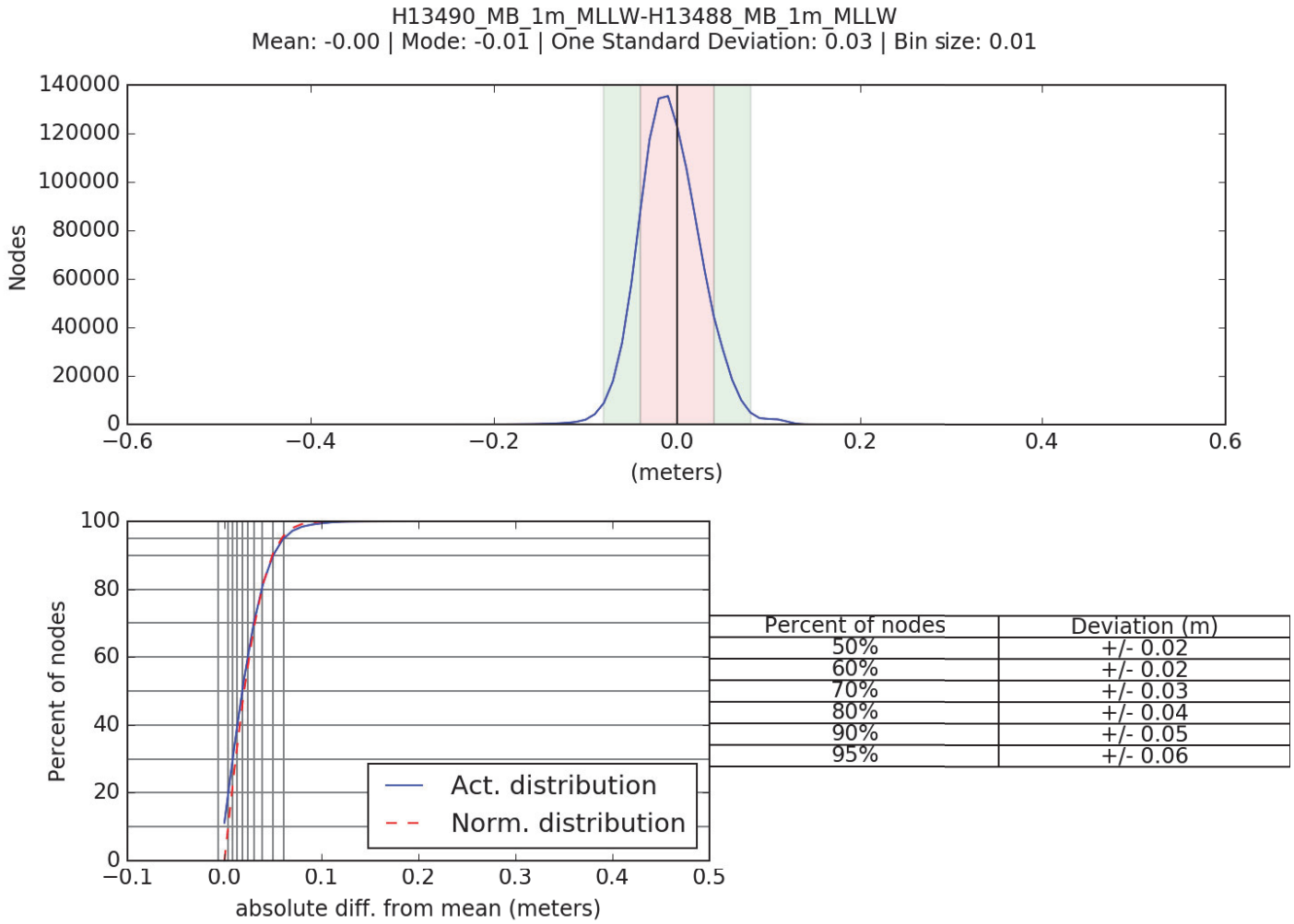
The following junctions were made with this survey:

Registry Number	Scale	Year	Field Unit	Relative Location
H13488	1:10000	2021	David Evans and Associates, Inc.	E
H12353	1:20000	2021	David Evans and Associates, Inc.	N
H12355	1:20000	2011	David Evans and Associates, Inc.	N
H12356	1:20000	2017	David Evans and Associates, Inc.	N
H12710	1:240000	2014	David Evans and Associates, Inc.	N

Table 9: Junctioning Surveys

H13488

The mean difference between H13490 and H13488 survey depths is 0 centimeters, shown in Figure 9.

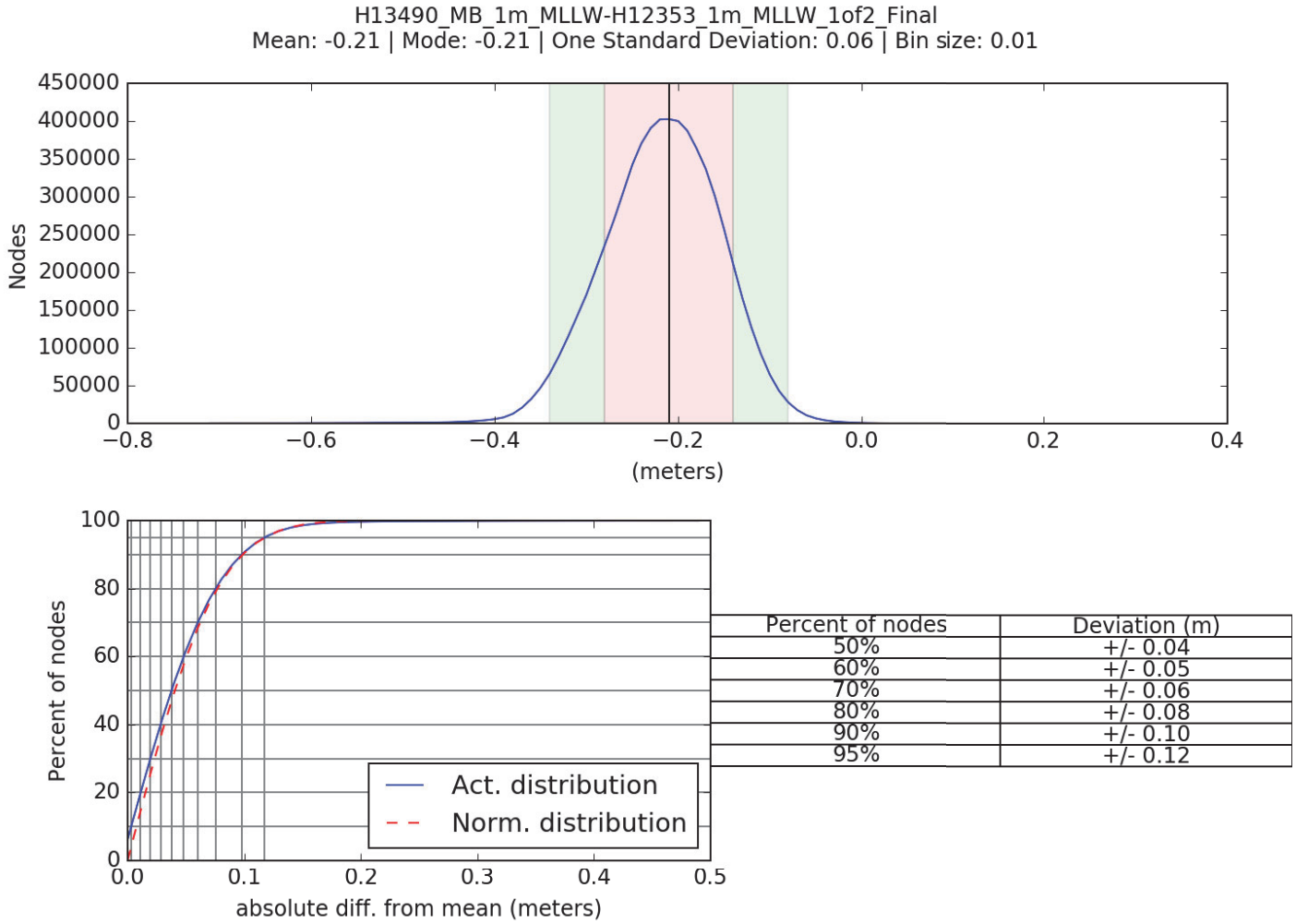


Percent of nodes	Deviation (m)
50%	+/- 0.02
60%	+/- 0.02
70%	+/- 0.03
80%	+/- 0.04
90%	+/- 0.05
95%	+/- 0.06

Figure 9: Distribution Summary Plot of Survey H13490 1-meter vs H13488 1-meter

H12353

The mean difference between H13490 and H12353 survey depths is 21 centimeters (H13490 deeper than H12353), shown in Figure 10. GPS Tides computed for prior survey H12353 used a VDatum-based Mean Lower Low Water (MLLW) separation model that has a mean separation difference of 10 centimeters over the area of junction overlap. Removing the model differences from the analysis would improve the junction comparison between surveys H12353 and H13490 to 11 centimeters. In addition, GPS Tides for survey H12353 were computed from a post-processed single base navigation solution where survey H13490 was post-processed using Real Time Extended (RTX) methods. Single base processing relied on Global Navigation Satellite System (GNSS) data from a temporary base station (HORN) installed on Horn Island in support of the prior survey. Further, this area has been significantly impacted by recent hurricanes, as noted in the project instructions.

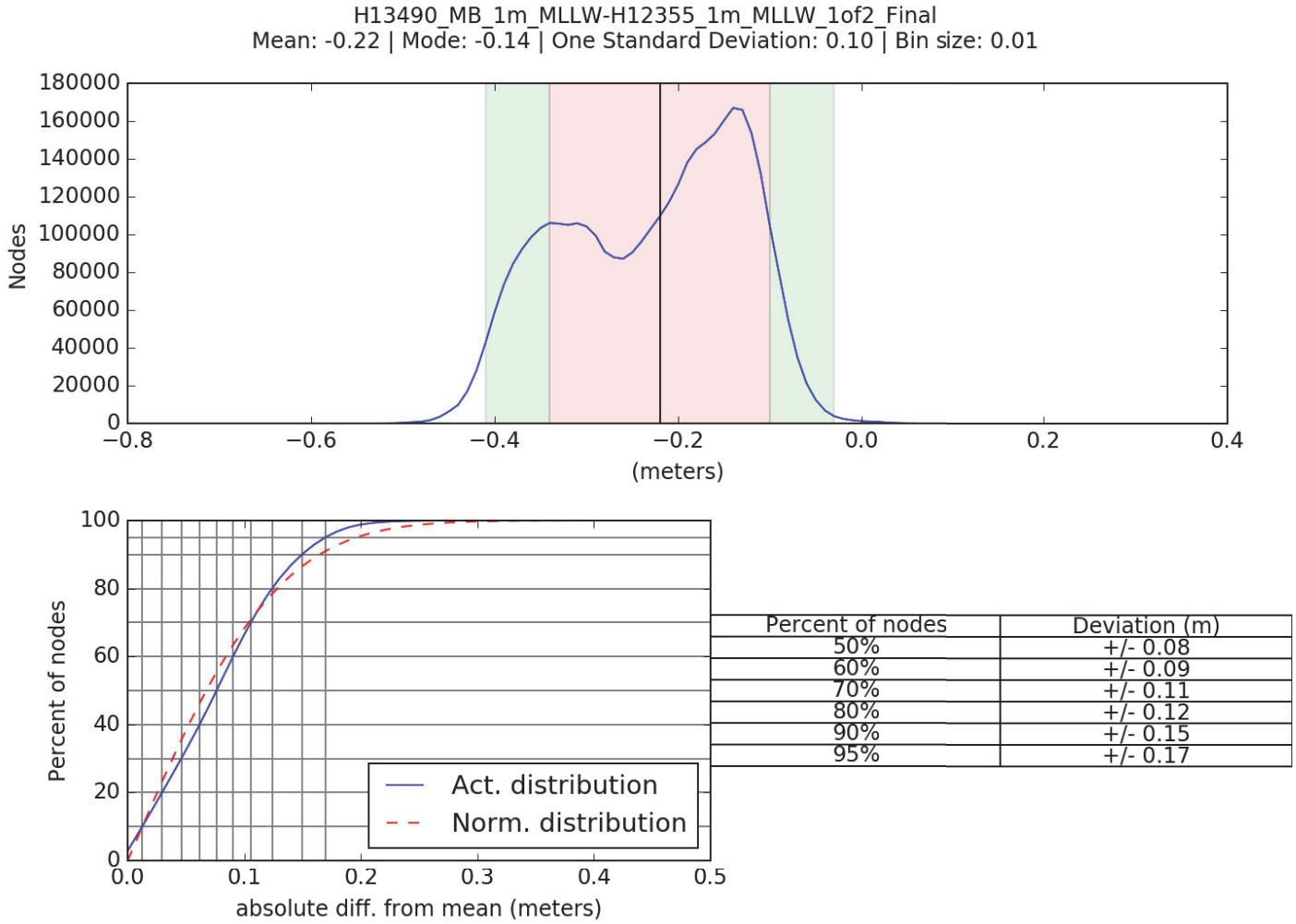


Percent of nodes	Deviation (m)
50%	+/- 0.04
60%	+/- 0.05
70%	+/- 0.06
80%	+/- 0.08
90%	+/- 0.10
95%	+/- 0.12

Figure 10: Distribution Summary Plot of Survey H13490 1-meter vs H12353 1-meter

H12355

The mean difference between H13490 and H12355 survey depths is 22 centimeters (H13490 deeper than H12355), shown in Figure 11. Removing the model differences discussed in the H12353 junction analysis section would improve the junction comparison between surveys H12355 and H13490 to 12 centimeters. The deviations in post-processing methodology discussed in the H12353 junction analysis section also exist between surveys H12355 (single base) and H13490 (RTX). The project area has also been impacted by recent hurricanes, which can result in changes to the seabed.

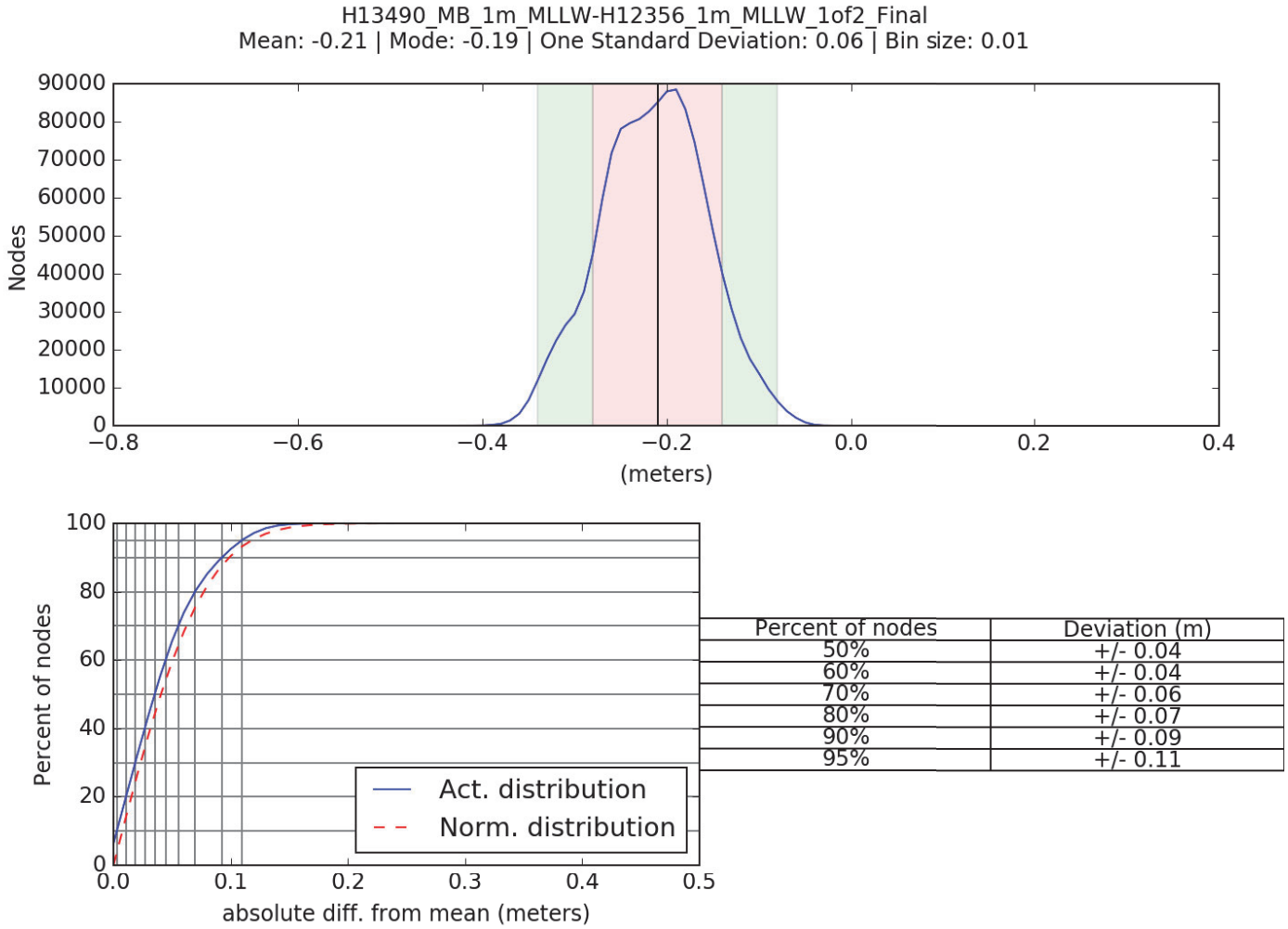


Percent of nodes	Deviation (m)
50%	+/- 0.08
60%	+/- 0.09
70%	+/- 0.11
80%	+/- 0.12
90%	+/- 0.15
95%	+/- 0.17

Figure 11: Distribution Summary Plot of Survey H13490 1-meter vs H12355 1-meter

H12356

The mean difference between H13490 and H12356 survey depths is 21 centimeters (H13490 deeper than H12356), shown in Figure 12. Removing the model differences discussed in the H12353 junction analysis section would improve the junction comparison between surveys H12356 and H13490 to 11 centimeters. The deviations in post-processing methodology discussed in the H12353 junction analysis section also exist between surveys H12356 (single base) and H13490 (RTX). The project area has also been impacted by recent hurricanes, which can result in changes to the seabed.

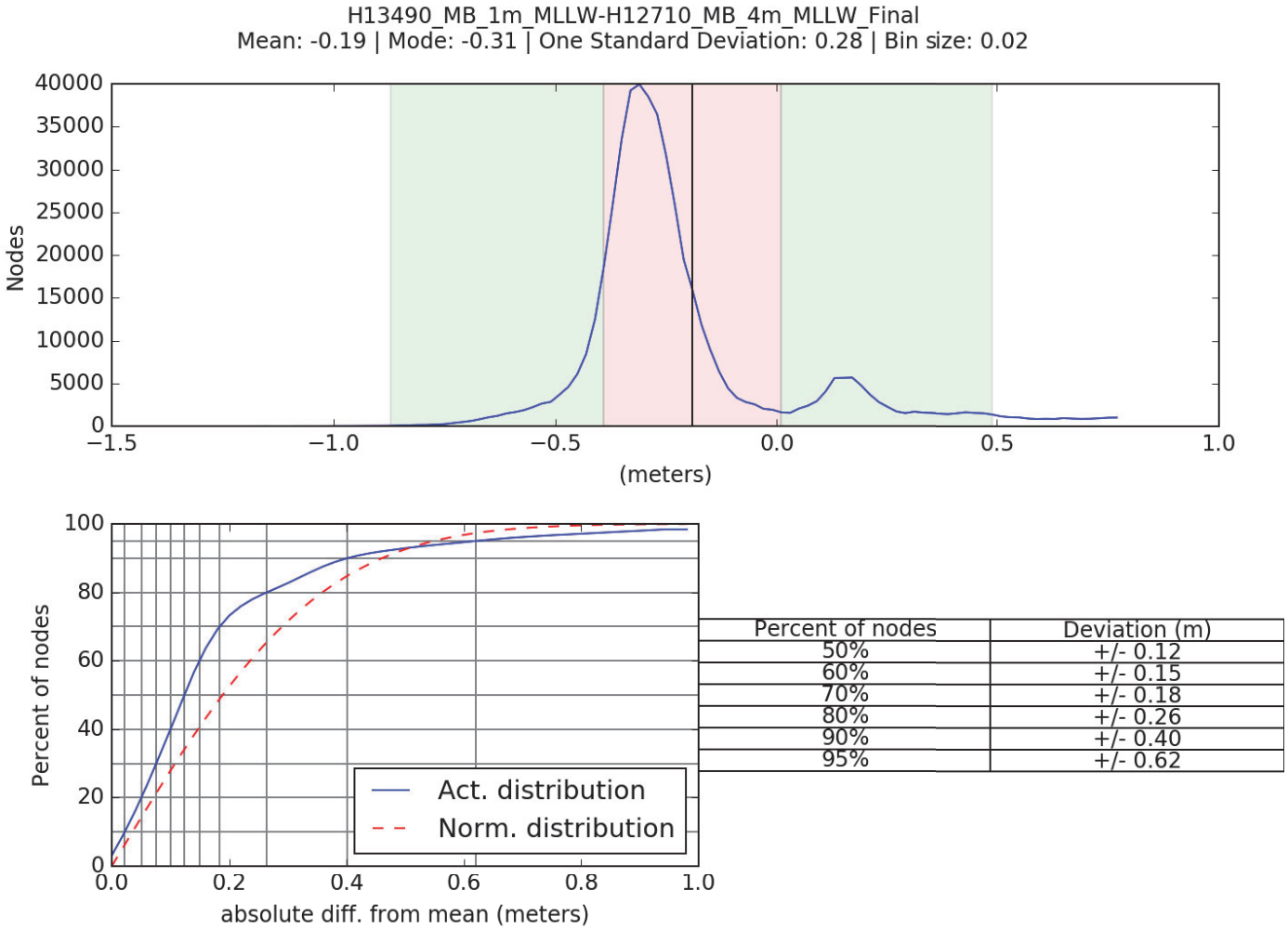


Percent of nodes	Deviation (m)
50%	+/- 0.04
60%	+/- 0.04
70%	+/- 0.06
80%	+/- 0.07
90%	+/- 0.09
95%	+/- 0.11

Figure 12: Distribution Summary Plot of Survey H13490 1-meter vs H12356 1-meter

H12710

The mean difference between H13490 and H12710 survey depths is 19 centimeters (H13490 deeper than H12710), shown in Figure 13. Bottom change in the area of overlap is likely a common occurrence considering it includes portions of the Gulfport Bar Channel and an area of sand waves. Tide reduction methods also differed between the surveys. Survey H12710 was reduced to MLLW using a tide zoning scheme relying on water levels from the NOAA National Water Level Observation Network (NWLON) station at Bay Waveland Yacht Club, Mississippi (8747437). Survey H13490 was corrected using post-processed GPS tides using RTX methods. The project area has also been impacted by recent hurricanes, which can result in changes to the seabed.



Percent of nodes	Deviation (m)
50%	+/- 0.12
60%	+/- 0.15
70%	+/- 0.18
80%	+/- 0.26
90%	+/- 0.40
95%	+/- 0.62

Figure 13: Distribution Summary Plot of Survey H13490 1-meter vs H12710 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.

B.2.5 Equipment Effectiveness

Real-Time Heave

The following lines were processed with real-time heave due to logging errors during acquisition that resulted in no delayed heave file being recorded:

2021BL1850009
2021BL1920011
2021BL1920033
2021BL1990009_XL
2021BL1990034_XL

B.2.6 Factors Affecting Soundings

Bottom Changes During Survey Operations

Changes in the bottom during survey operations caused misalignment between some sounding data in the vicinity of the Gulfport Bar Channel near the western end of West Ship Island. These differences appear to be caused by natural sediment migration, which occurred over the course of the survey, and dredging activity, which was observed in the area during survey operations. In these areas, the hydrographer allowed the CUBE algorithm to estimate a gridded depth without attempting to manually clean the sounding data to portray a uniform bottom. These areas of disagreement have been noted in the H13490_Notes_for_Reviewer.hob file with the SNDWAV area feature class, submitted in Appendix II of this report.

Sound Speed

During survey operations, a strong sound speed inversion was often seen in the water column around the vicinity of the shoals west of West Ship Island. As a result, occasional sound speed artifacts, which at times approach 20 centimeters vertically, are visible in the processed data. These are likely due to ray tracing uncertainty in post-processing. It is believed that increasing the frequency of casts would not have aided in this process. The artifacts are less pronounced in the CUBE surfaces submitted with the survey. In all cases all data meet requirements outlined in the HSSD.

B.2.7 Sound Speed Methods

Sound Speed Cast Frequency: Approximately 20-minute intervals

For H13490 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 a two-hour interval.

All sound speed profiles were acquired within 500 meters of the survey limits.

During H13490 survey operations, the S/V Blake occasionally acquired the first cast of the day after starting multibeam data acquisition. In all cases, the first cast of the day was acquired within five minutes of the first sonar ping of the day. This issue occurred on the following days:

June 24, 2021 (DN175)
July 10, 2021 (DN191)

B.2.8 Coverage Equipment and Methods

Survey speeds were maintained to meet or exceed along-track sounding density requirements.

Multibeam data were thoroughly reviewed for holidays and areas of poor-quality coverage due to biomass, vessel wakes, or other factors.

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 surface. Individual surface results are stated in Figures 14 and 15.

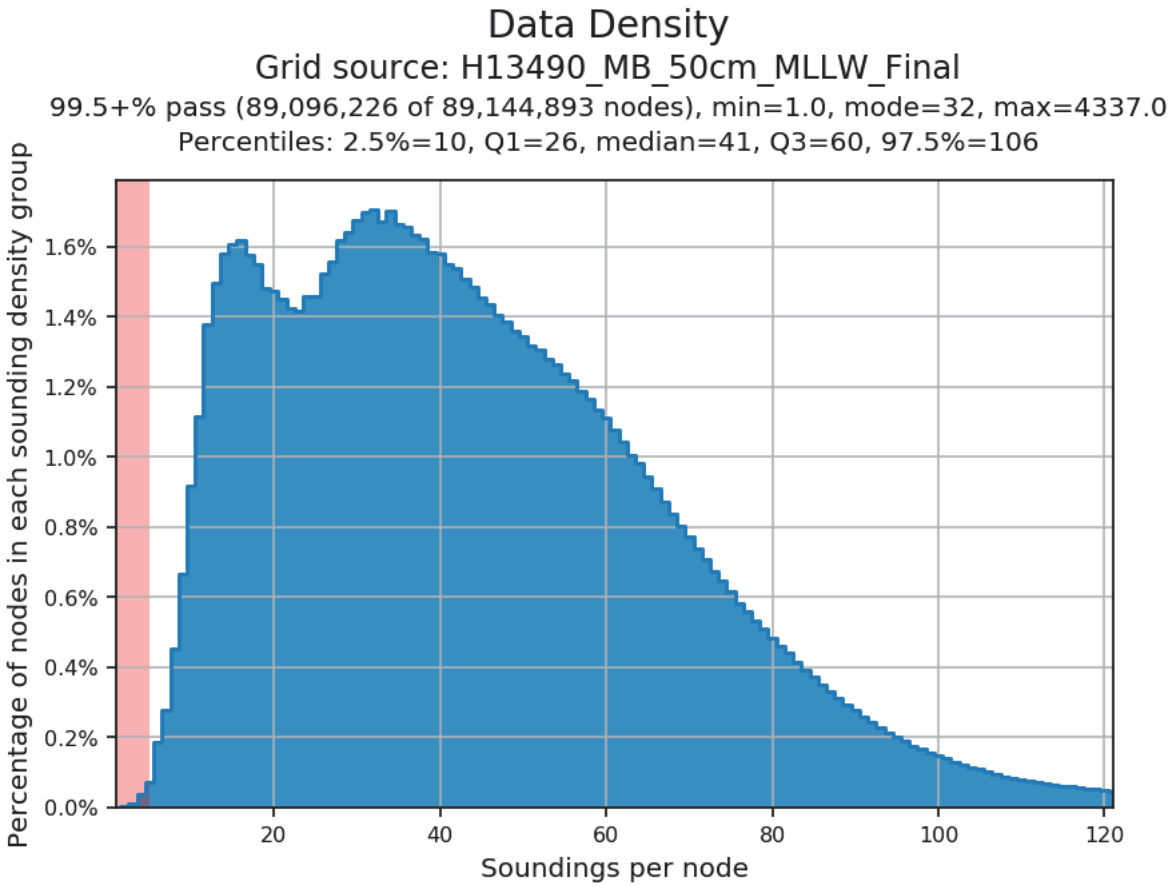


Figure 14: Node Density Statistics - 50 centimeters, Finalized

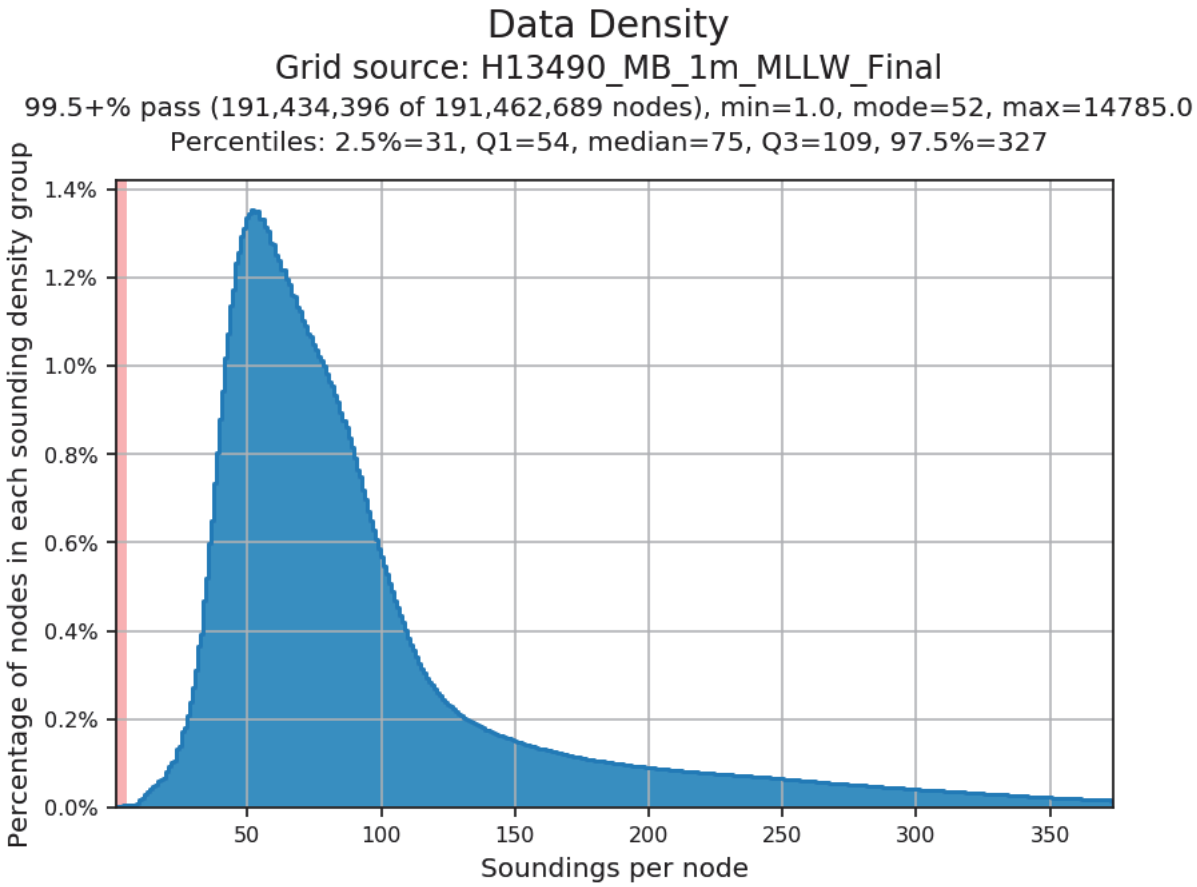


Figure 15: Node Density Statistics - 1 meter, Finalized

B.3 Echo Sounding Corrections

B.3.1 Corrections to Echo Soundings

Data reduction procedures for survey H13490 are detailed in the DAPR.

B.3.2 Calibrations

All sounding systems were calibrated as detailed in the DAPR.

B.4 Backscatter

Multibeam backscatter was logged in HYPACK 7K format and included with the H13490 digital deliverables. Data were processed periodically in CARIS HIPS to evaluate backscatter quality, but the processed data is not included with the deliverables. For data management purposes, the names of multibeam crosslines have been appended with the suffix _XL. This change was made to HIPS files only. The original file names of raw data files (HYPACK HSX and 7K) have been retained.

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	11.3.8

Table 10: Primary bathymetric data processing software

The following Feature Object Catalog was used: NOAA Profile Version 2021.

A detailed listing of all data processing software is included in the OPR-J315-KR-21 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
H13490_MB_50cm_MLLW.csar	CARIS Raster Surface (CUBE)	0.5 meters	1.614 meters - 14.750 meters	NOAA_0.5m	Object Detection
H13490_MB_50cm_MLLW_Final.csar	Finalized CARIS Raster Surface (CUBE)	0.5 meters	1.614 meters - 14.750 meters	NOAA_0.5m	Object Detection
H13490_MB_1m_MLLW.csar	CARIS Raster Surface (CUBE)	1 meters	1.582 meters - 18.526 meters	NOAA_1m	Complete MBES

Surface Name	Surface Type	Resolution	Depth Range	Surface Parameter	Purpose
H13490_MB_1m_MLLW_Final.csar	Finalized CARIS Raster Surface (CUBE)	1 meters	1.582 meters - 18.526 meters	NOAA_1m	Complete MBES

Table 11: Submitted Surfaces

Bathymetric grids were created relative to MLLW in CUBE format using Object Detection and Complete Coverage resolution requirements as specified in the HSSD. Grids covering areas surrounding the Gulfport Ship Channel, which were assigned for Object Detection Coverage, have been extracted from a 50-centimeter grid covering the entire survey area to limit coverage to the ACHARE polygons depicted in the PRF. This practice, which was approved by HSD Operations Branch and Atlantic Hydrographic Branch (AHB), excluded areas surveyed to the Complete Coverage requirements from the Object Detection grids and the grid analysis reported in Sections B.2.2 and B.2.9. Correspondence related to this technique is included in Appendix II.

B.5.3 Holiday

A small four-node holiday exists in the Object Detection grids along the western end of Ship Island. The holiday, which was not present in the grids during initial processing of the data using Real Time Kinematic (RTK) corrections, was introduced after applying post-processed navigation with RTX corrections after the survey was complete. The holiday (30 12 33.3854N, 88 59 17.4164W) was reviewed by Operations Branch staff and deemed to be insignificant, requiring no additional data acquisition to fill. Correspondence related to this holiday is included in Appendix II.

C. Vertical and Horizontal Control

A summary of the horizontal and vertical control for survey H13490 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-J315-KR-21_100m_NAD83_2011-MLLW.csar

Table 12: 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 16.

The following PPK methods were used for horizontal control:

- RTX

The separation model listed in Table 12 was provided with the Project Instructions and used for sounding correction within the assigned survey area. Real-time navigation for all MBES survey lines were overwritten with post-processed navigation solutions in Smooth Best Estimate of Trajectory (SBET) format. Post-processed solutions were generated using Applanix POSPac MMS using the Trimble CenterPoint RTX option, which relies on precise satellite orbit and timing information to create centimeter-level positioning and elevation without the use of traditional local base stations. Information on survey control is detailed in the DAPR.

D. Results and Recommendations

D.1 Chart Comparison

The chart comparison was performed by comparing H13490 survey depths to a digital surface generated from the Band 4 and Band 5 electronic navigational charts (ENCs) covering the survey area. A 5-meter product surface was generated from a triangular irregular network (TIN) created from the ENC's soundings, depth contours, and depth features. An additional 5-meter HIPS product surface of the entire survey area was generated from the 1-meter CUBE surface. The chart comparison was conducted by creating and reviewing a difference surface using the ENC surface 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 relevant charts used during the comparison were reviewed to check that all United States Coast Guard (USCG) Local Notice to Mariners (LNMs) 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 13. Figures 16 through 19 show the magnitude of differences along the comparison area.

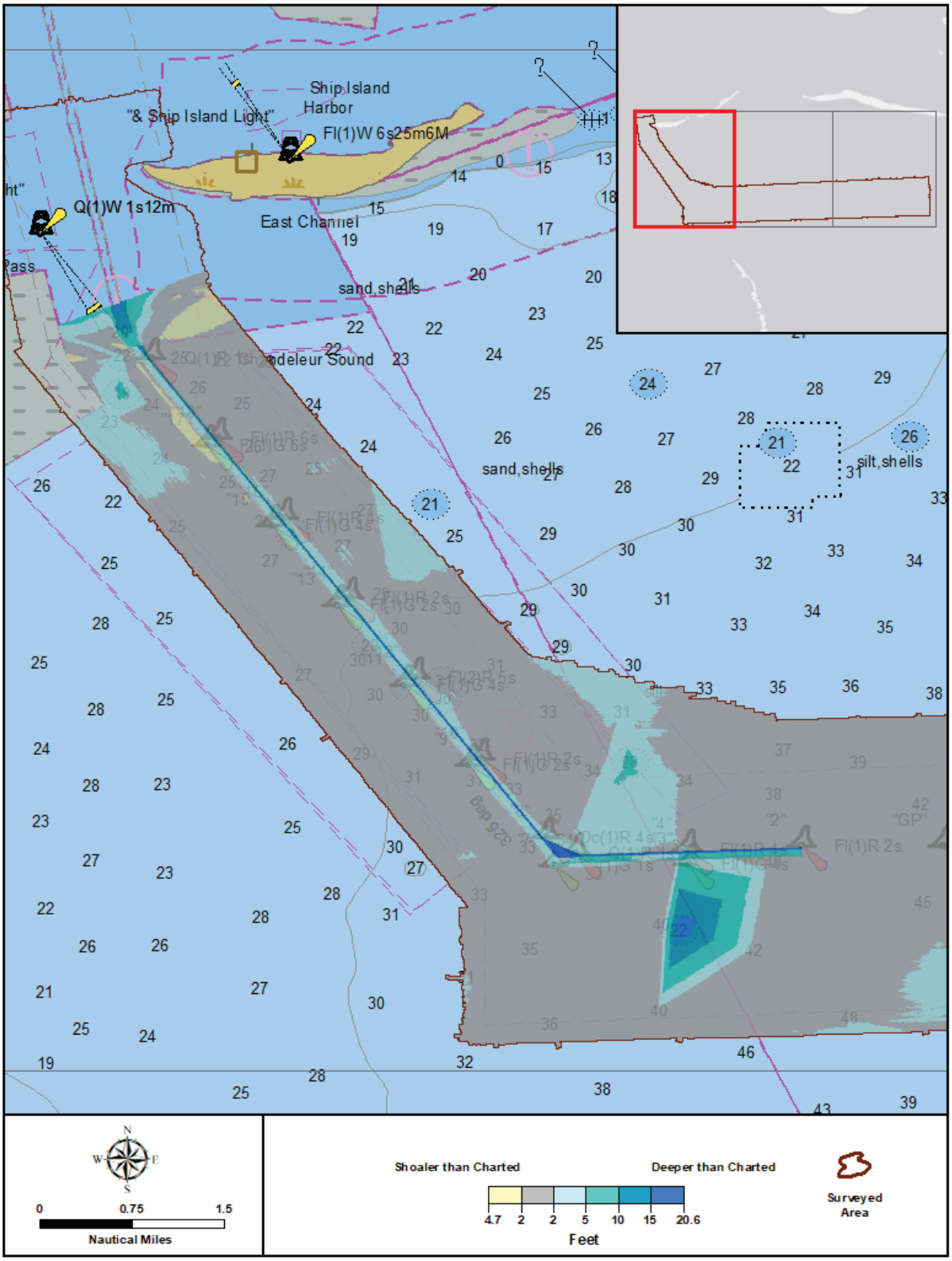


Figure 16: Depth Difference Between H13490 and US4MS12M Area 1 of 3.

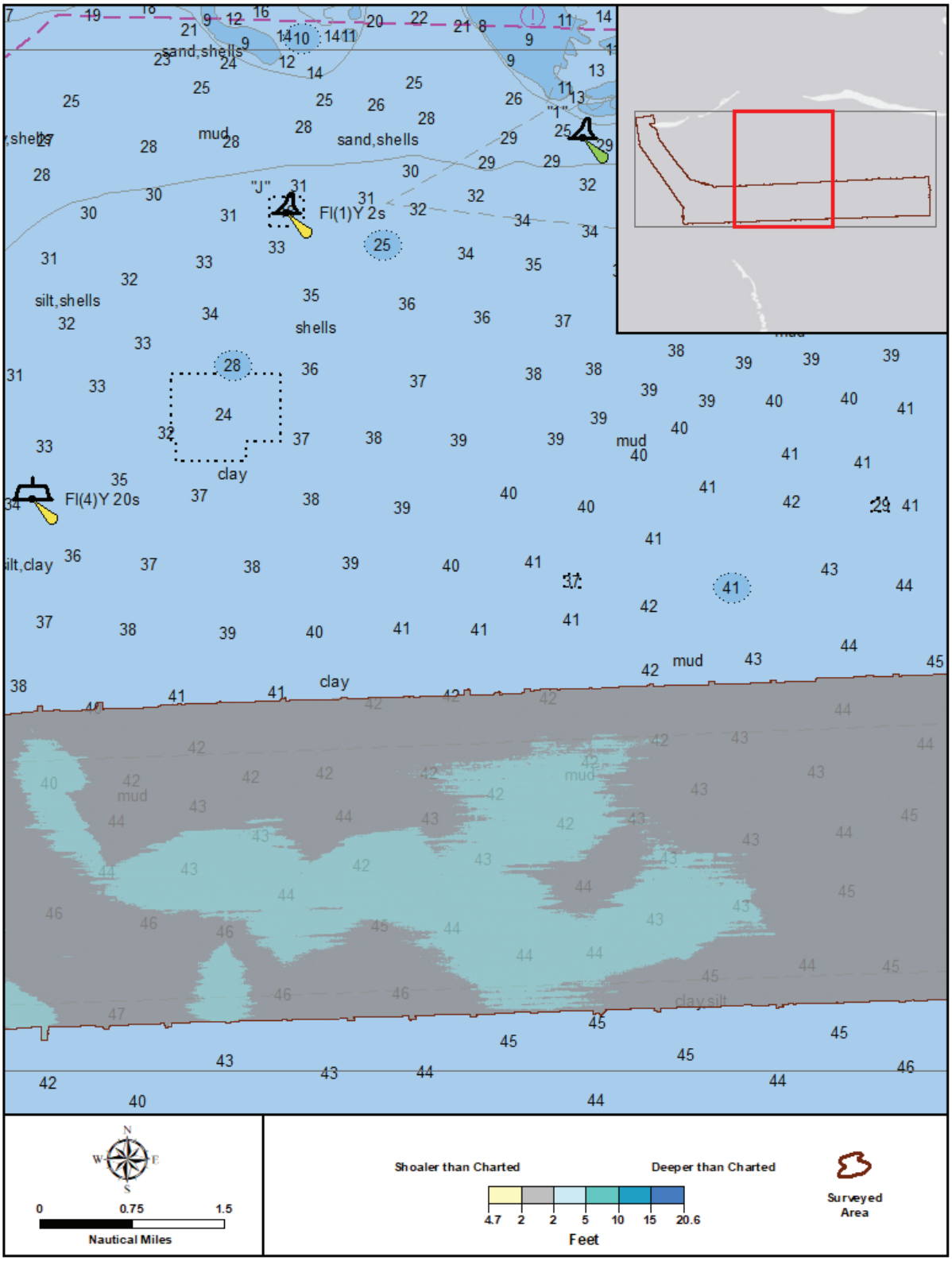


Figure 17: Depth Difference Between H13490 and US4MS12M Area 2 of 3.

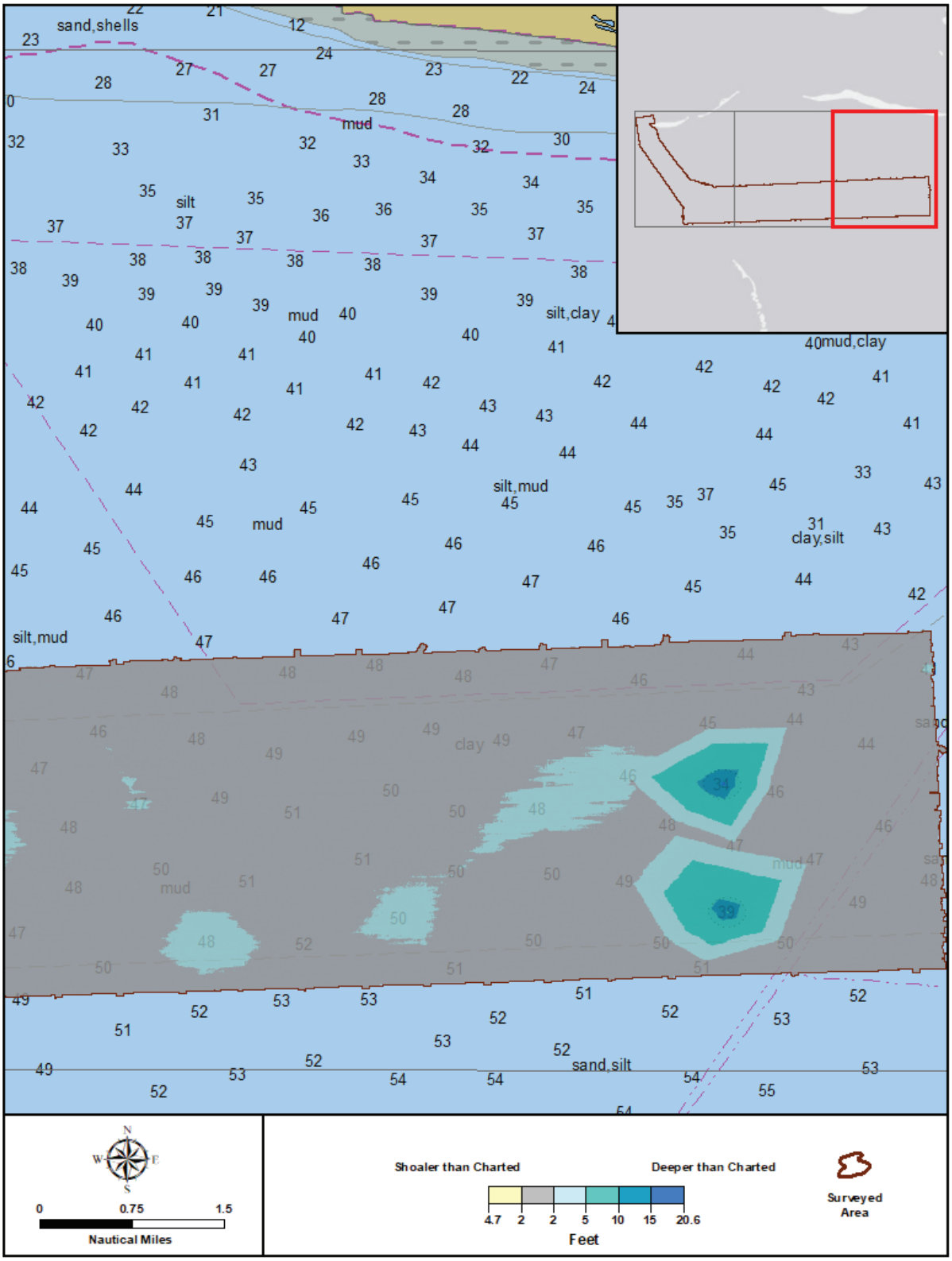


Figure 18: Depth Difference Between H13490 and US4MS12M Area 3 of 3.

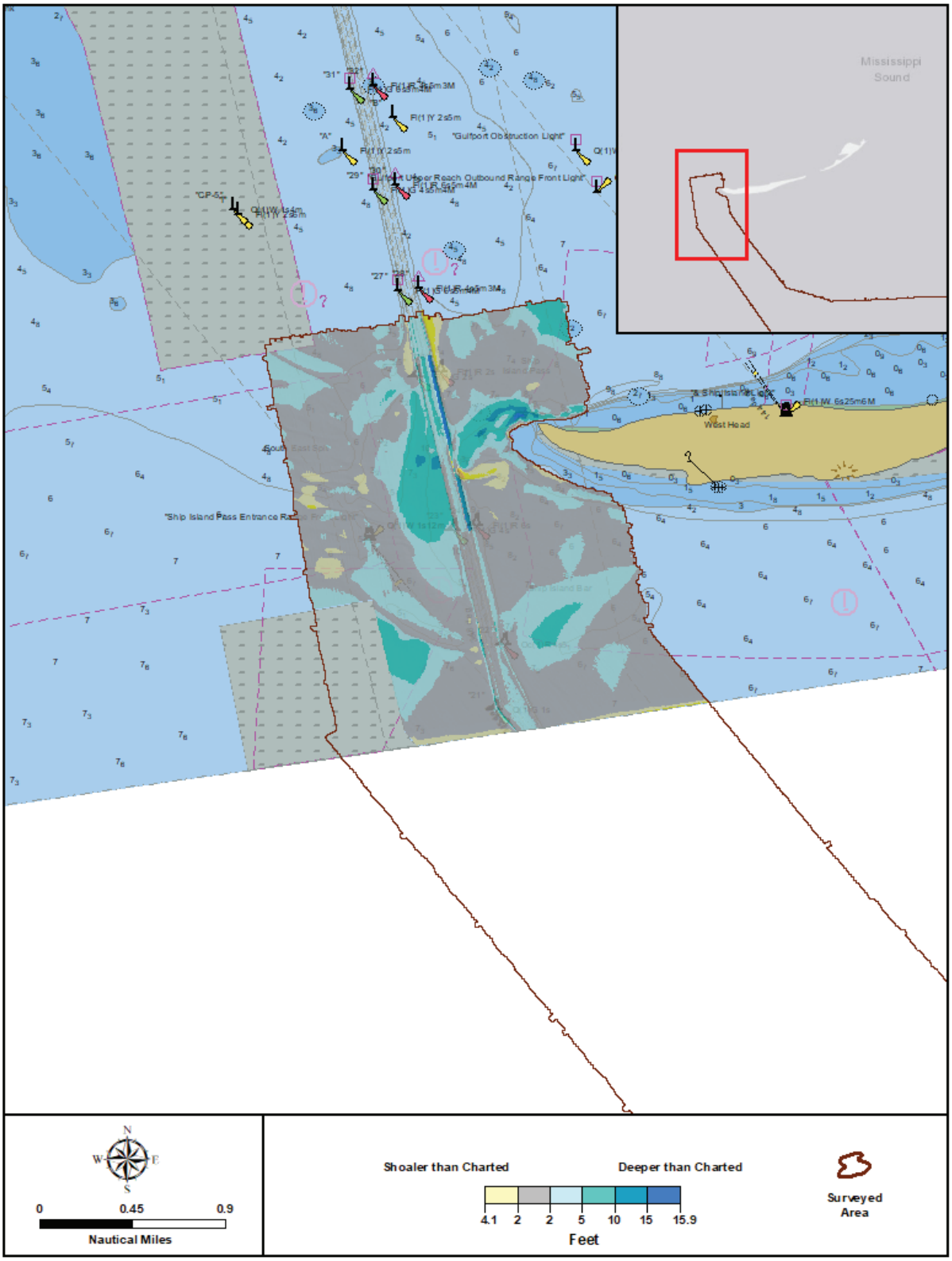


Figure 19: Depth Difference Between H13490 and US5MS11M.

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
US5MS11M	1:40000	61	09/07/2021	11/24/2021
US4MS12M	1:80000	45	10/14/2020	10/14/2020

Table 13: Largest Scale ENCs

D.1.2 Shoal and Hazardous Features

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

-Survey H13490 DtoN 2, submitted July 5, 2021, reported an uncharted submerged obstruction located south of the Gulfport Bar Channel.

The DtoN has been added to the ENCs using preliminary survey data. The hydrographer recommends updating the charts to depict the DtoNs as portrayed in the Final Feature File (FFF).

D.1.3 Charted Features

Numerous charted features exist within the limits of Sheet H13490. 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."

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

The southern end of the Gulfport Bar Channel is charted within the survey area. Two areas where surveyed depths were shallower than charted channel depths (DRVAL1) were observed within the channel during survey operations and reported to the United States Army Corps of Engineers (USACE) and NOAA Operations Branch. USACE was aware of the shoaling and had already deployed the Dredge COLUMBIA

to address this area. Additional discussion on dredging operations is included in Section D.2.9. Email correspondence discussing the shoaling is included in Appendix II.

There are no charted precautionary areas, traffic separation schemes, or pilot boarding areas within the survey limits.

The survey area encompasses the Gulfport Safety Fairway, Ship Island Pass to Horn Island Pass Safety Fairway, and the Pascagoula Safety Fairway (33 CFR 166.200). The hydrographer recommends encoding the name of safety fairways in the ENCs. Safety fairway names are included in the Code of Federal Regulations (CFR).

Portions of a charted Restricted Area surrounding the Gulf Islands National Seashore (GUIS) extends into the survey area at the western end of West Ship Island.

During survey operations, it was found that a recent DRVAL1 change on ENC US4MS12M appeared to have been applied as feet instead of meters. This impacted the Gulfport Bar Channel Left Outside Quarter (LOQ) and Right Outside Quarter (ROQ). The issue was reported to the Marine Chart Division (MCD) through the MCD Assist website (NOAA Coast Survey Customer Response for Ticket #386010) on November 30, 2021. Email correspondence related to this issue is included in Appendix II. MCD has since addressed the error. The corrected chart was used in the chart comparison discussed in Section D.1.

D.2 Additional Results

D.2.1 Aids to Navigation

Aids to Navigation (AtoNs) were investigated using bathymetric data and visual observations. Three AtoN discrepancies were reported to USCG using the Navigation Center’s Online ATON Discrepancy Report Form on August 3, 2021. Copies of the online submittals are included in Appendix II. AtoNs have been included in the FFF with appropriate comments and recommendations.

D.2.2 Maritime Boundary Points

No Maritime Boundary Points were assigned for this survey.

D.2.3 Bottom Samples

Thirteen bottom samples were acquired on October 12, 2021, (DN285) and October 13, 2021 (DN286). The bottom sampling plan followed suggested sample locations included in the provided PRF. Minor adjustments were made to the recommended sampling locations with approval from the Contracting Officer's Representative (COR). Correspondence is included in Appendix II.

D.2.4 Overhead Features

No overhead features exist for this survey.

D.2.5 Submarine Features

There are three submerged pipelines charted in the survey area. There was no evidence of unburied pipelines within the survey data.

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

Dredging was observed in the vicinity of the Gulfport Bar Channel from July 11, 2021, through July 13, 2021 (DN192-194). Impacts to data quality are discussed in Section B.2.6

D.2.10 New Survey Recommendations

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

D.2.11 ENC Scale Recommendations

According to the National Charting Plan, the ENCs covering the survey area are slated to be reschemed to include new Band 2 through Band 5 cells based on a gridded production scheme. The hydrographer has no ENC scale recommendations for the 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	2021-12-09

Approver Name	Approver Title	Approval Date	Signature
Jonathan L. Dasler, PE, PLS, CH	NSPS-THSOA Certified Hydrographer, Chief of Party	01/18/2022	Digitally signed by Jonathan L. Dasler, PE, PLS, CH Date: 2022.01.18 09:00:35 -08'00'
Jason Creech, CH	NSPS-THSOA Certified Hydrographer, Charting Manager / Project Manager	01/18/2022	Digitally signed by Jason Creech Date: 2022.01.18 09:06:39 -08'00'
James Guilford	IHO Cat-A Hydrographer, Lead Hydrographer	01/18/2022	Digitally signed by James Guilford Date: 2022.01.18 09:13:04 -08'00'
Michael Redmayne	IHO Cat-A Hydrographer, Lead Hydrographer	01/18/2022	Digitally signed by Michael Redmayne Date: 2022.01.18 09:18:45 -08'00'

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