H13836

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

DESCRIPTIVE REPORT

Type of Survey:	Navigable Area
Registry Number:	H13836

LOCALITY

State(s):	Alabama
General Locality:	Mobile Bay, AL
Sub-locality:	North Portion of Mobile Bay

2023

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	**H13836**

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):	**Alabama**
General Locality:	**Mobile Bay**
Sub-Locality:	**North Portion of Mobile Bay**
Scale:	**5000**
Dates of Survey:	**09/02/2023 to 02/06/2024**
Instructions Dated:	**07/26/2023**
Project Number:	**OPR-J325-KR-23**
Field Unit:	**David Evans and Associates, Inc.**
Chief of Party:	**Jonathan L. Dasler, PE, PLS, CH**
Soundings by:	**Multibeam Echo Sounder**
Imagery by:	**Side Scan Sonar Multibeam Echo Sounder Backscatter**
Verification by:	**Atlantic Hydrographic Branch**
Soundings Acquired in:	**meters at Mean Lower Low Water**

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

Products created during office processing were generated in NAD83 UTM 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 H13836

Project: OPR-J325-KR-23

Locality: Mobile Bay, AL

Sublocality: North Portion of Mobile Bay

Scale: 1:5000

September 2023 - February 2024

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 Mobile Bay, AL. Survey H13836 was conducted in accordance with the Statement of Work and Hydrographic Survey Project Instructions dated July 26, 2023.

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
30° 41' 4.77" N 88° 1' 23.71" W	30° 35' 17.14" N 87° 55' 1.6" 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.

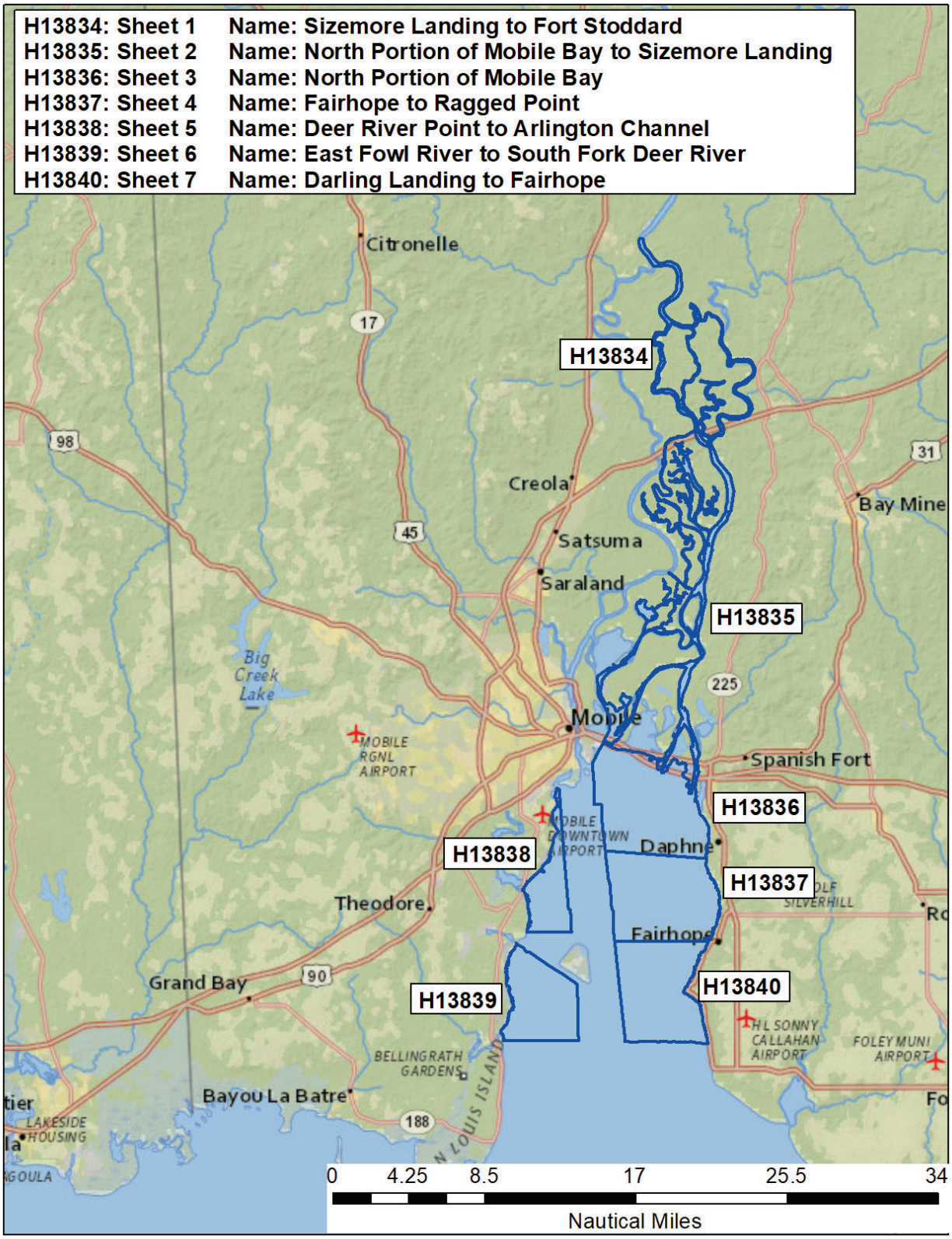


Figure 1: OPR-J325-KR-23 Assigned Survey Areas

A.2 Survey Purpose

The purpose of this survey, defined in the Project Instructions, is as follows: "This project will provide modern bathymetric data for Mobile Bay and the Tensaw River. The project area was identified as a high priority area for NOAA's National Water Center, and is a statistically significant hot spot within the 2018 hydrographic health model, a risk model that Coast Survey uses for evaluating priorities based upon navigational risks and the necessary quality of data to support modern traffic. Prior surveys in the area are from 2007, and there have been significant changes to the bay and its water circulation with the last several years of storm events. In addition, the Port of Mobile handles in excess of 55 million tons of international and domestic cargo delivering $85 billion in economic value to the state of Alabama each year (1).

Conducting a modern bathymetric survey in this area will identify hazards and changes to the seafloor, update NOAA National Ocean Survey (NOS) charts and products, and provide forecasters at NOAA's National Water Center with bathymetric data for critical hydrodynamic modeling necessary to understand the timing and impact of rapid river stage increases and decreases, the duration of high water, inundation or drought. Survey data from this project is intended to supersede all prior survey data in the common area."

(1) https://www.alports.com/economic-impact/

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 less than 8 meters water depth	Side Scan Sonar Data may be acquired at an altitude of 4-20% of the range scale.
Sheets 3 - 7	Complete Coverage (Refer to HSSD Section 5.2.2.3 Option B).

Table 2: Survey Coverage

Complete Coverage using 100% side scan sonar (SSS) coverage was collected concurrently with multibeam echosounder (MBES) data with the Richard T Brennan, and 100% MBES was collected with the William R Broughton in the north end of the survey sheet in areas that the Brennan could not access. Backscatter was logged during all multibeam acquisition. Option A and Option B of the Complete Coverage requirement were followed as specified in Section 5.2.2.3 of the 2022 HSSD. The inshore limit of hydrography was the Navigable Area Limit Line (NALL) as defined in Section 1.3.2 of the HSSD with the exception that the

Project Instructions defined the use of the surveyed 2-meter depth contour instead of the surveyed 3.5-meter contour as listed in the HSSD.

Survey coverage for feature disprovals followed disproval radii size determination based on the largest scale charts published at the time of the disproval evaluation. Several new gridded ENCs were issued during the survey to replace older legacy ENCs as part of the NOAA rescheming process. According to Office of Coast Survey (OCS) guidance, features outside the 2-meter NALL were investigated and ensonified as much as was safe to do so. For features in which the disproval radius was seaward of the sheet limits and shoreward of the NALL, the radius became the sheet boundary and limit of safe navigation. Additional details can be found in Appendix II - Supplemental Survey Records & Correspondence.

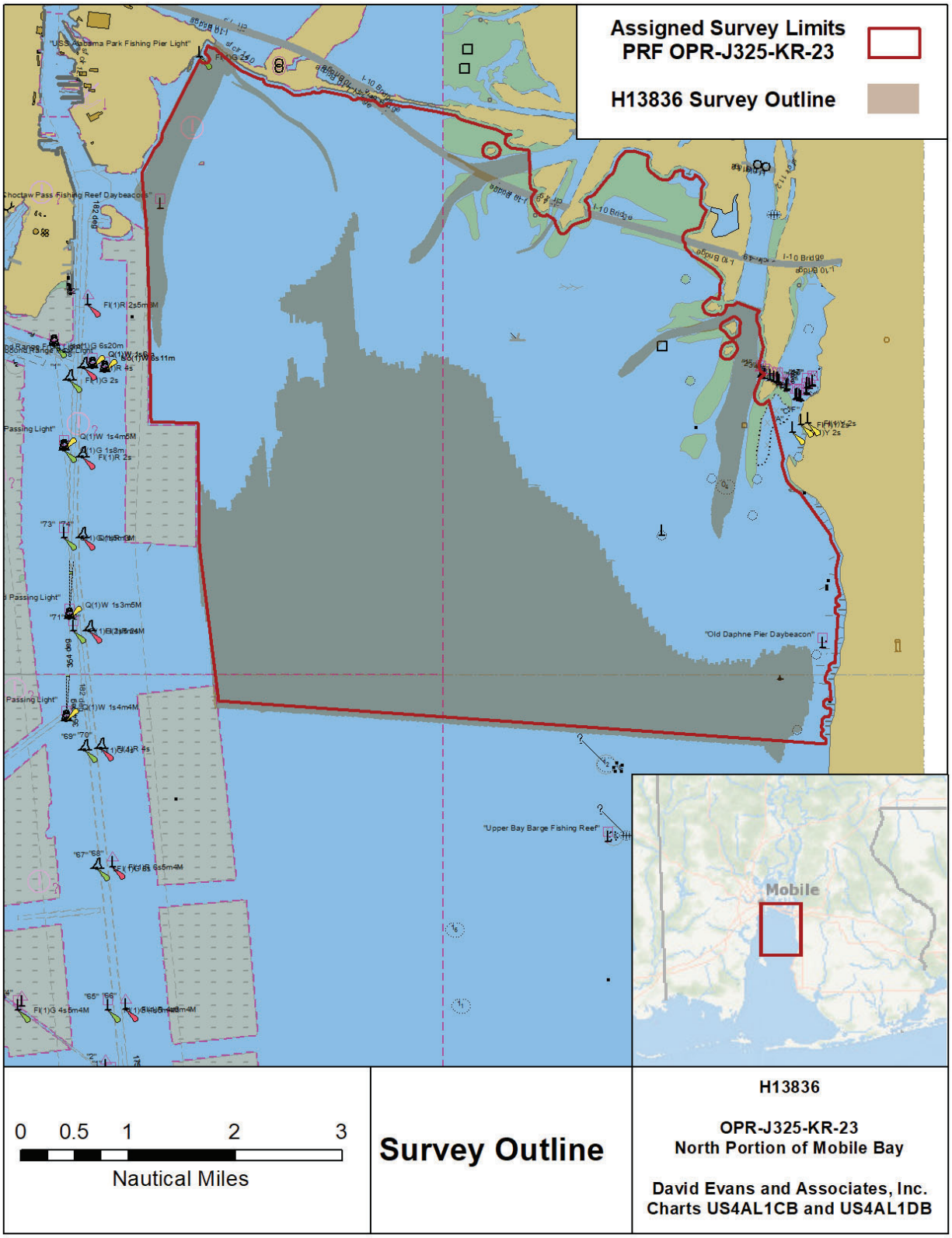


Figure 2: H13836 Survey Outline

A.6 Survey Statistics

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

	HULL ID	*Richard T Brennan*	*William R Broughton*	*Total*
LNM	**SBES Mainscheme**	0.0	0.0	0.0
	MBES Mainscheme	6.83	153.21	160.04
	Lidar Mainscheme	0.0	0.0	0.0
	SSS Mainscheme	0.0	0.0	0.0
	SBES/SSS Mainscheme	0.0	0.0	0.0
	MBES/SSS Mainscheme	475.81	0.0	475.81
	SBES/MBES Crosslines	21.52	4.78	26.3
	Lidar Crosslines	0.0	0.0	0.0
Number of Bottom Samples				0
Number Maritime Boundary Points Investigated				0
Number of DPs				0
Number of Items Investigated by Dive Ops				0
Total SNM				10.62

Table 3: Hydrographic Survey Statistics

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

Survey Dates	Day of the Year
09/02/2023	245
09/03/2023	246
09/04/2023	247
09/05/2023	248
09/06/2023	249
09/07/2023	250
09/08/2023	251
09/09/2023	252
09/10/2023	253
09/11/2023	254
09/12/2023	255
09/13/2023	256
10/15/2023	288
10/16/2023	289
10/19/2023	292
10/20/2023	293
10/24/2023	297
10/25/2023	298
10/26/2023	299
10/27/2023	300
10/28/2023	301
01/11/2024	11
01/14/2024	14
02/03/2024	34
02/04/2024	35
02/06/2024	37

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	*Richard T Brennan*	*William R Broughton*
LOA	34.0 feet	24.0 feet
Draft	2.0 feet	2.0 feet

Table 5: Vessels Used

Figure 3: Richard T Brennan

Figure 4: William R 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
EdgeTech	4200	SSS
EdgeTech	4205	SSS
Applanix	POS MV 320 v5	Positioning and Attitude System
AML Oceanographic	Micro SV-Xchange	Sound Speed System
AML Oceanographic	SmartX	Conductivity, Temperature, and Depth Sensor

Table 6: Major Systems Used

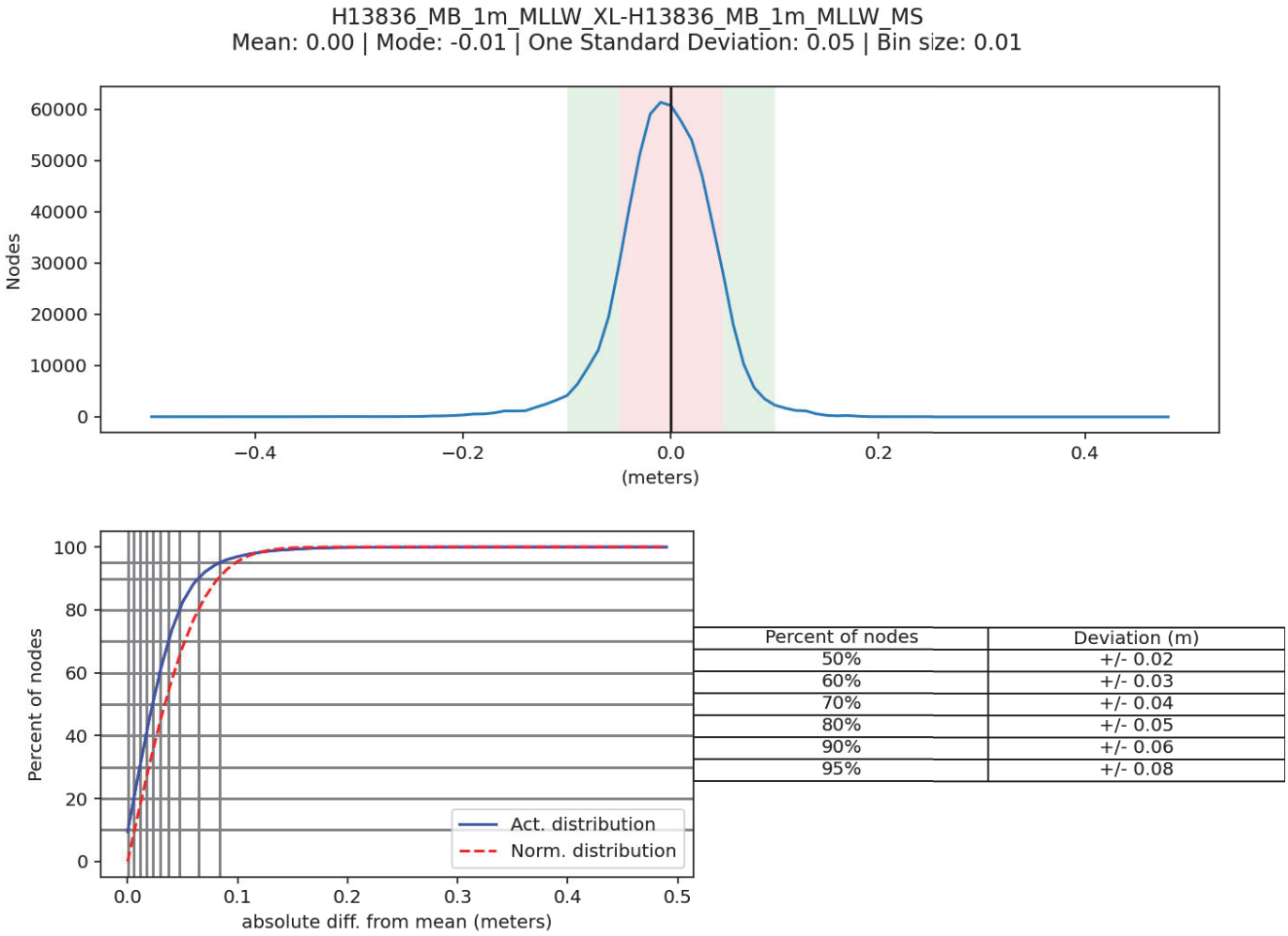
B.2 Quality Control

B.2.1 Crosslines

Multibeam crosslines were run across 4.14% 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 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 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: H13836 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	0.1 meters

Table 7: Survey Specific Tide TPU Values.

Hull ID	Measured - CTD	Measured - MVP	Measured - XBT	Surface
Brennan	1.0 meters/second	n/a meters/second	n/a meters/second	0.5 meters/second
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.

During surface finalization in HIPS, the "Uncertainty" option was selected, where uncertainty values from the source surface are applied to the finalized surface uncertainty. This method, which incorporates grid uncertainties computed during the TPU process, was deemed to better reflect actual grid uncertainty when compared to the option to use standard deviation values scaled to 95% confidence interval.

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 established. 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 surface are shown in Figure 6.

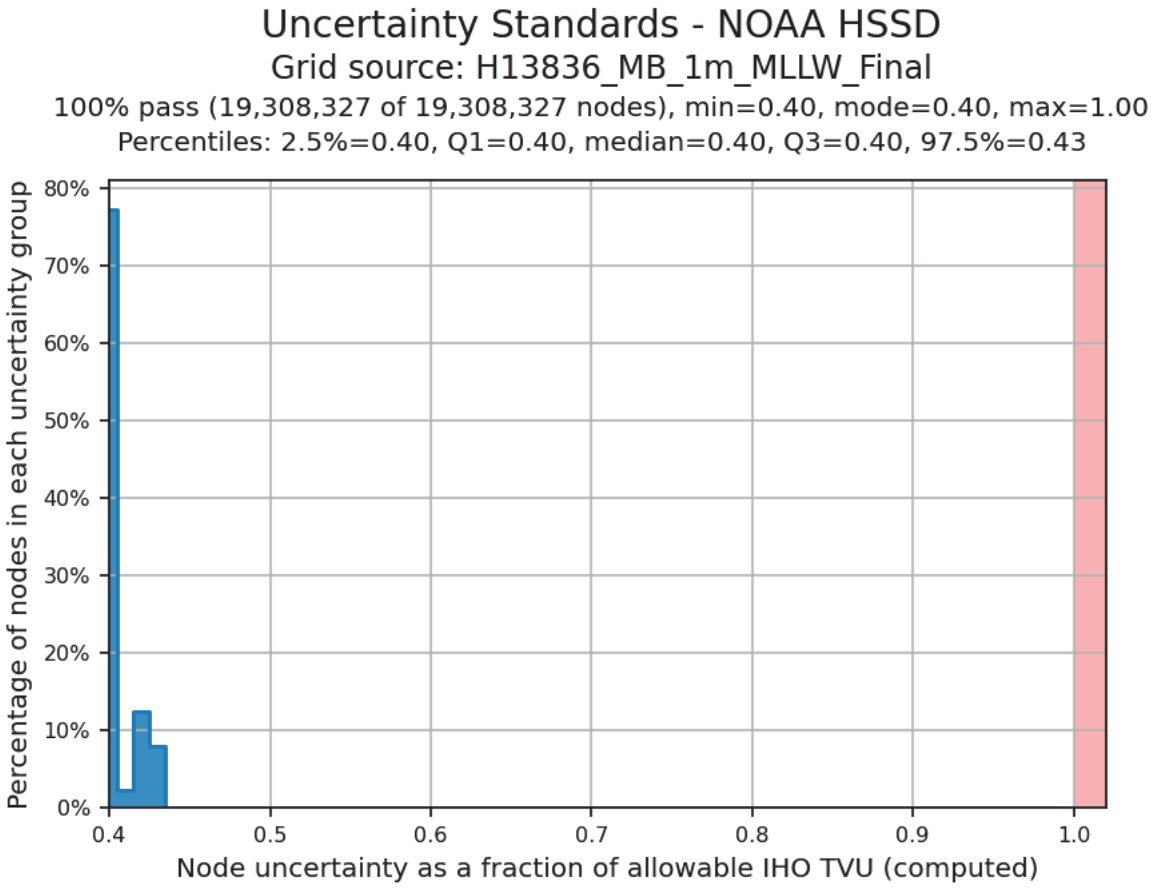


Figure 6: Node TVU Statistics - 1 meter, Finalized

B.2.3 Junctions

Survey H13836 has junctions with current surveys H13835 and H13837. Figure 7 depicts H13836 and the junctioning surveys.

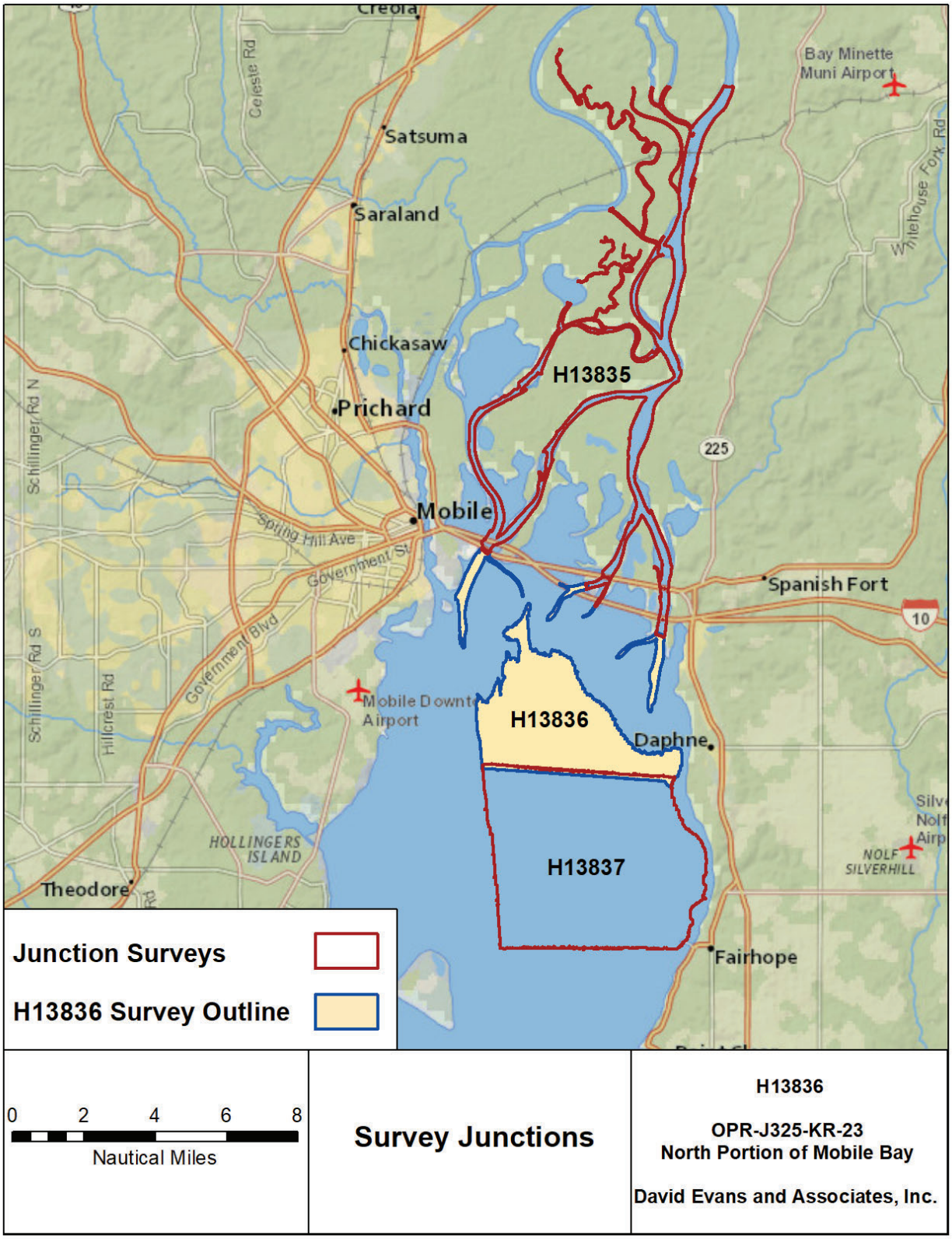


Figure 7: Survey Junctions with Registry Number H13836

The following junctions were made with this survey:

Registry Number	Scale	Year	Field Unit	Relative Location
H13835	1:20000	2023	David Evans and Associates, Inc.	N
H13837	1:5000	2023	David Evans and Associates, Inc.	S

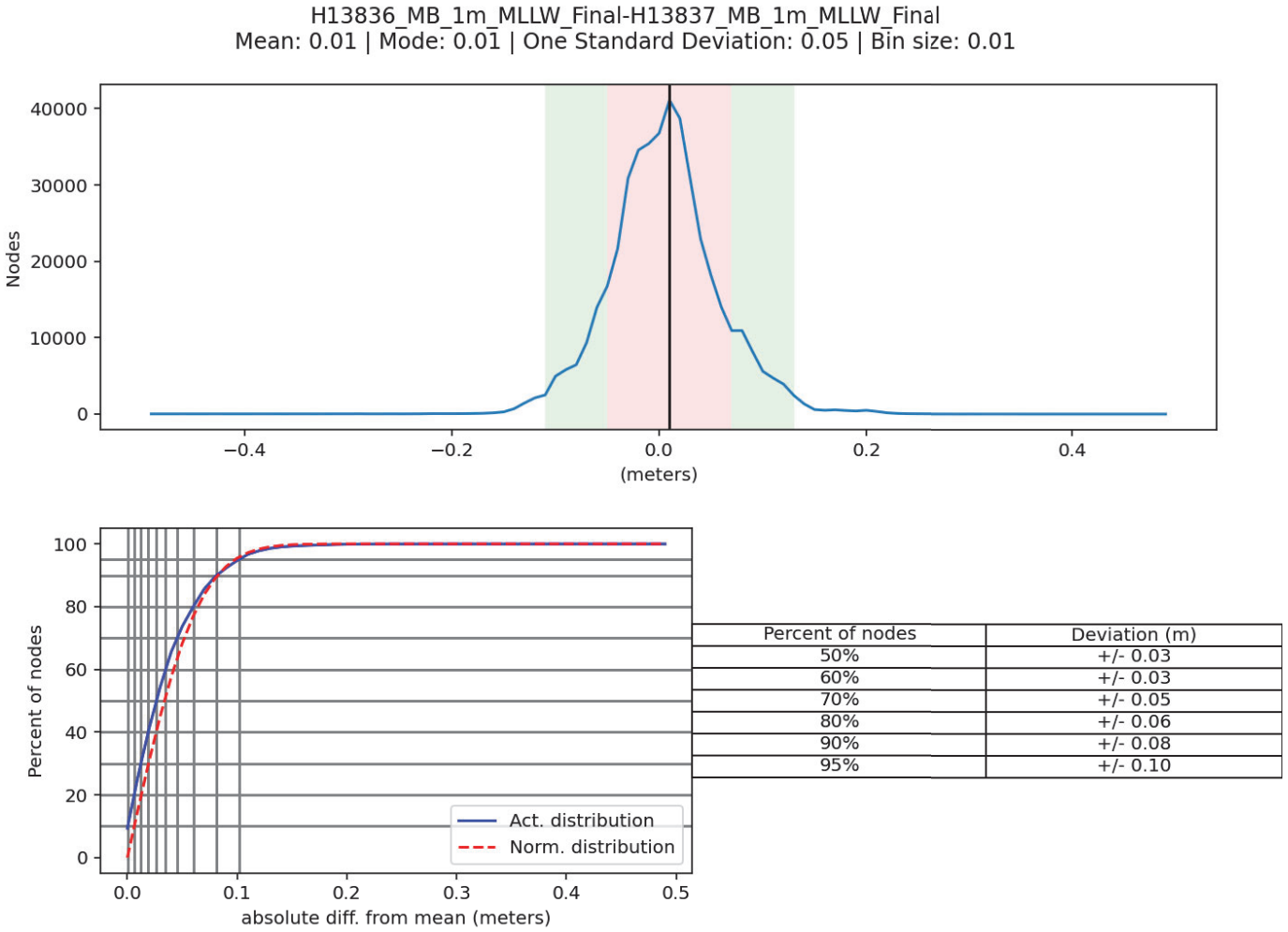
Table 9: Junctioning Surveys

H13835

At the time of writing, data from survey H13835 was still being processed. The Descriptive Report (DR) for H13835 will include the junction analysis with H13836.

H13837

The mean difference between H13836 and H13837 is 1 centimeters (H13836 shoaler than H13837), shown in Figure 8.



Percent of nodes	Deviation (m)
50%	+/- 0.03
60%	+/- 0.03
70%	+/- 0.05
80%	+/- 0.06
90%	+/- 0.08
95%	+/- 0.10

Figure 8: Distribution summary plot of survey H13836 1-meter vs H13837 1-meter

B.2.4 Sonar QC Checks

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

Side scan data were reviewed at multiple levels of data processing, including during the initial SonarWiz import 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

Split Line

The Hypack MBES data file 2023RI2501240A.HSX does not have a corresponding 2023RI2501240A.RAW file because the file 2023RI2501240.RAW contains data for both lines 2023RI2501240 and 2023RI2501240A.

B.2.6 Factors Affecting Soundings

Bottom Change During Survey Operations

In several areas of H13836, a vertical offset between multibeam soundings acquired on or before October 28, 2023 (DN301) and after February 2, 2024 (DN033), was observed. In all cases, the more recent data are shoaler than prior collected data, with disagreements of up to 1.3 meters. This shoaling could be due to Apalachee River runoff after several winter storms. In most areas of misalignment, the hydrographer allowed the CUBE algorithm to estimate a gridded depth without manually cleaning the data.

All cases of noticeable sediment deposition between multibeam data are called out in the H13836_"Notes_for_Reviewer.hob as SNDWAV features with remarks of "Shoaling."

B.2.7 Sound Speed Methods

Sound Speed Cast Frequency: 30-minute intervals

For H13836 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" option with a two-hour interval.

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

During survey operations on September 2, 2023 (DN245), October 15, 2023 (DN288), and October 16, 2023 (DN289), the first cast of the day was acquired after starting multibeam data acquisition.

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. Significant side scan sonar contacts were developed with multibeam sonar to obtain a least depth, meeting the survey's coverage requirements, where it was safe for the vessel to operate. Survey coverage for feature disprovals was acquired inside disproval radii to meet the coverage requirement for the area. Disproval radii were covered with either 200% SSS or 100% MBES. Additional discussion of coverage methods can be found in the DAPR.

One area in the northeast portion of the sheet, slightly west of the Apalachee River by the I-10 bridge, was not surveyed to the 2-meter NALL due to hazardous shallow water and poor maneuverability behind the bridge structure. This area is called out in the H13836_Notes_for_Reviewer.hob as a Breakline feature.

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. Surface results are stated in Figure 9.

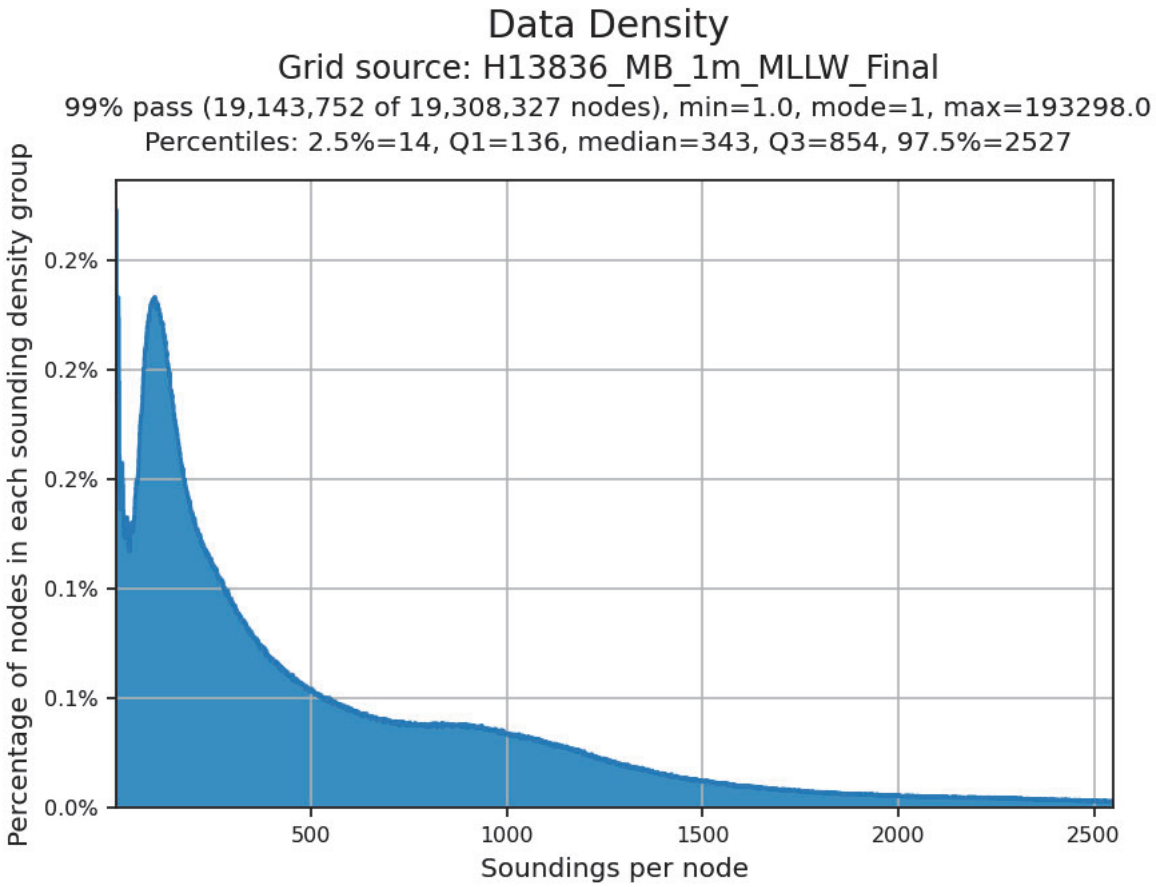


Figure 9: Node Density Statistics - 1 meter, Finalized

B.3 Echo Sounding Corrections

B.3.1 Corrections to Echo Soundings

Data reduction procedures for survey H13836 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 (RESON 7058 normalized backscatter datagram) were logged in HYPACK 7K format and are included with the H13836 raw digital deliverables. Backscatter data were referenced to processed multibeam bathymetric data and processed in QPS FMGT. Two 2-meter backscatter mosaics are included with the H13836 processed deliverables, one mosaic for each vessel that operated within the sheet. 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."

Although multiple RESON T50 receivers were used on the Brennan and Broughton during acquisition of H13836, only one mosaic per vessel was generated due to normalized backscatter 7058 datagrams being logged throughout the entirety of the sheet. See the OPR-J325-KR-23 DAPR for more details.

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	11.4.14
CARIS	HIPS and SIPS	11.4.29 (Only for surface finalization)

Table 10: Primary bathymetric data processing software

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

Manufacturer	Name	Version
QPS	FMGT	7.11.1
Chesapeake Technology, Inc.	SonarWiz	7.11.02 (64-bit)

Table 11: Primary imagery data processing software

The following Feature Object Catalog was used: NOAA Profile Version 2023.

A detailed listing of all data processing software is included in the OPR-J325-KR-23 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
H13836_MB_1m_MLLW.csar	CARIS Raster Surface (CUBE)	1 meters	0.016 meters - 13.329 meters	NOAA_1m	Complete MBES
H13836_MB_1m_MLLW_Final.csar	Finalized CARIS Raster Surface (CUBE)	1 meters	0.016 meters - 13.329 meters	NOAA_1m	Complete MBES
H13836_MB_2m_NAVD88.tiff	CARIS Raster Surface (CUBE)	2 meters	0.213 meters - 13.425 meters	NOAA_2m	Complete MBES
H13836_MB_2m_NAVD88_Interpolated.tiff	CARIS Raster Surface (CUBE)	2 meters	0.213 meters - 13.425 meters	NOAA_2m	Complete MBES
H13836_MBAB_2m_RI_400kHz_1of2.tiff	MB Backscatter Mosaic	2 meters	0.0 meters - 0.0 meters	N/A	Complete MBES
H13836_MBAB_2m_BR_400kHz_2of2.tiff	MB Backscatter Mosaic	2 meters	0.0 meters - 0.0 meters	N/A	Complete MBES
H13836_SSSAB_1m_540kHz_1of2.tif	SSS Mosaic	1 meters	0.0 meters - 0.0 meters	N/A	100% SSS
H13836_SSSAB_1m_540kHz_2of2.tif	SSS Mosaic	1 meters	0.0 meters - 0.0 meters	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 addition to the standard gridded data products prescribed in the HSSD, the survey deliverables also include grids and interpolated grids in geotiff format relative to NAVD88 for NOAA's National Water Center as required by the OPR-J325-KR-23 Project Instructions.

To create the 2-meter NAVD88 grid, CARIS HIPS was used to initially create a 2-meter CUBE surface relative to MLLW (using the NOAA_2m CUBE grid parameters file). After creation, the grid was then transformed from MLLW to NAVD88 using CARIS Base Editor. The transformation utilized a shift file

containing elevations corresponding to the difference between MLLW to NAVD88 as determined from the MLLW and NAVD88 separation models provided with the OPR-J325-KR-23 project files. After the NAVD88 transformation, an interpolated version of the grid was created where gaps in the data coverage were filled to create a seamless digital elevation model (DEM) of the survey area. The interpolated 2-meter grid was generated from a triangulated irregular network (TIN) using the natural neighbor method in CARIS BASE Editor. The TIN was constrained to prevent interpolation shoreward of survey coverage using long edge controls and by applying a polygon mask.

C. Vertical and Horizontal Control

A summary of the horizontal and vertical control for this survey 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-J325-KR-23_MobileBay-TensawRiver_2023-06-26_NAD83-MLLW_PtCloud_1sigma10cm.csar OPR-J325-KR-23_NAD83(2011)-NAVD88(GEOID18)_1sigma7cm.csar OPR-J325-KR-23_MobileBay-TensawRiver_2023-06-26_NAD83-MHW_PtCloud_1sigma10cm.csar

Table 13: ERS method and SEP file

In addition to the standard gridded data products relative to MLLW prescribed in the HSSD, the survey deliverables also include grids and interpolated grids in geotiff format relative to NAVD88 for NOAA's National Water Center as required by the OPR-J325-KR-23 Project Instructions. The NAVD83(2011) to NAVD88(GEOID18) separation file listed in Table 13 was used to generate the Water Center grids. The mean high water (MHW) separation model listed in Table 13 was used to determine the appropriate water level effect (WATLEV) attribution for features included in the FFF and when applicable was used to determine height attribution for any features that are always dry.

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 16.

RTK

The NAD83 to MLLW separation model listed in Table 13 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 SBET format. Additional 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 H13836 survey depths to a digital surface generated from 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 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 chart used during the comparison was reviewed to check that all United States Coast Guard (USCG) Local Notice to Mariners issued during survey acquisition, and impacting survey area, were applied and addressed by this survey.

The ENCs used in the chart comparison are listed in Table 14. Figures 10 and 11 show the magnitude of differences along the comparison area.

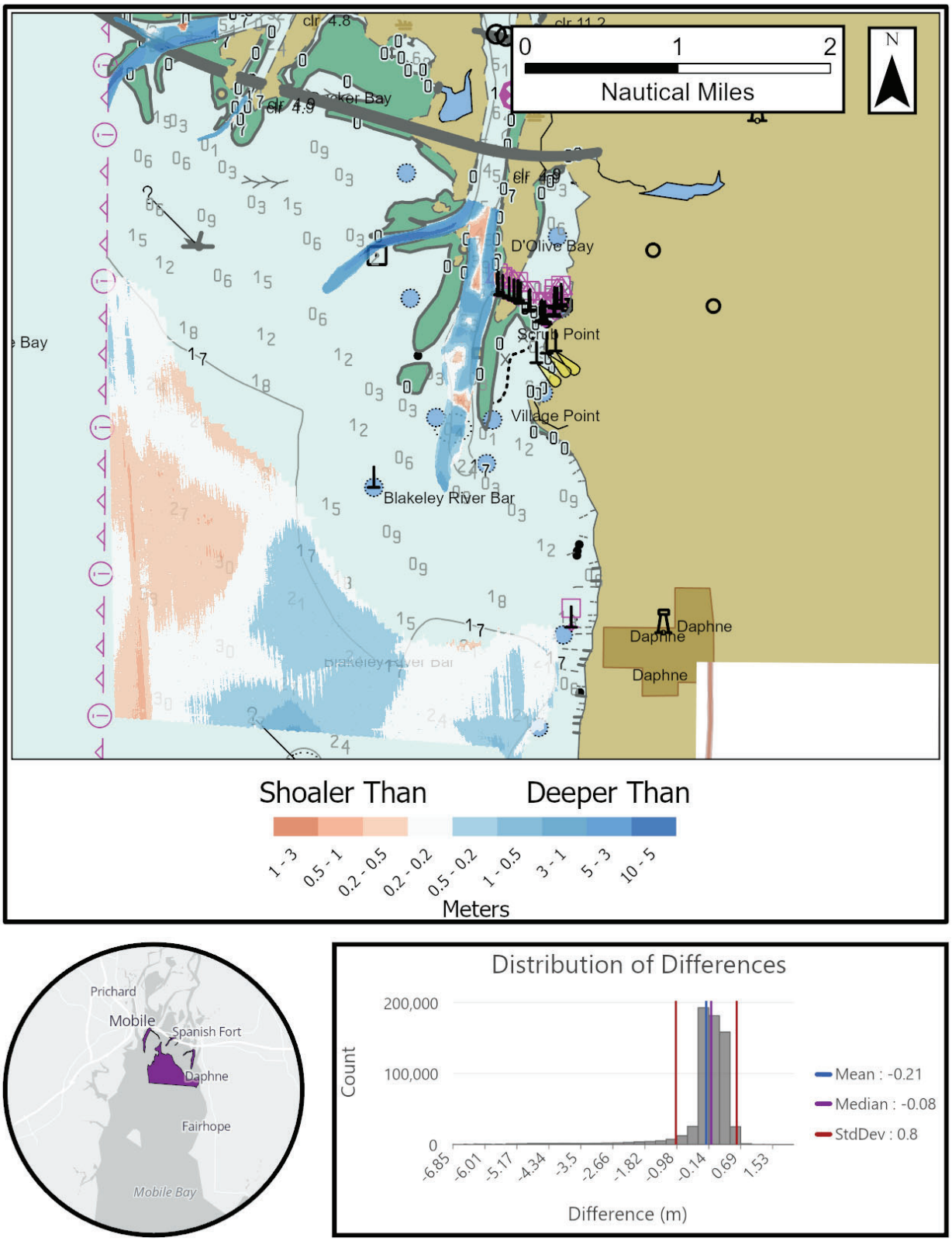


Figure 10: Depth Difference Between H13836 and Band 4 ENCs

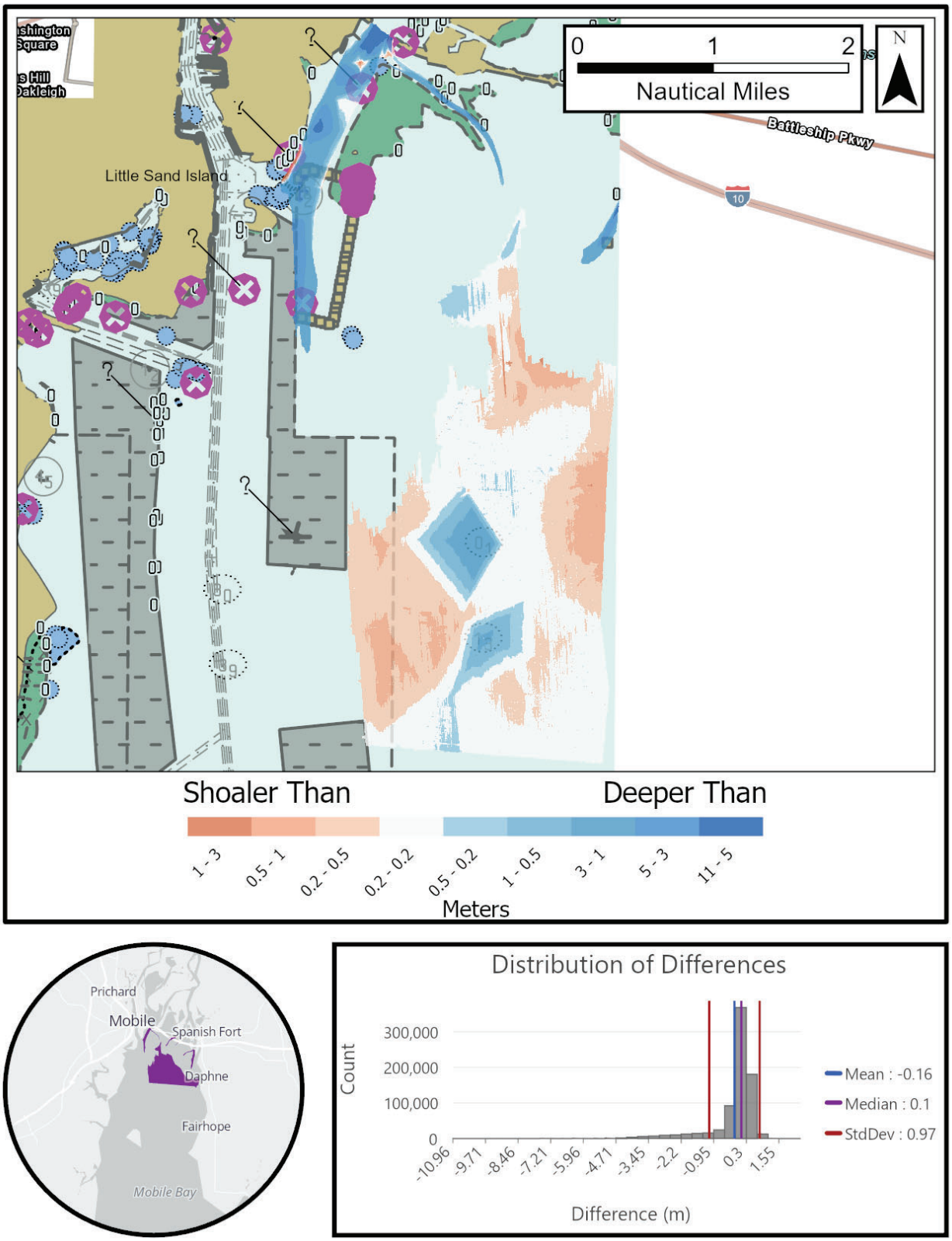


Figure 11: Depth Difference Between H13836 and Band 5 ENCs

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
US4AL1DB	1:40000	1	11/08/2023	11/28/2023
US4AL1CB	1:40000	2	03/05/2024	05/31/2024
US5MOBGF	1:40000	3	05/08/2024	05/14/2024
US5MOBIF	1:40000	2	05/08/2024	05/08/2024
US5MOBHF	1:10000	2	05/08/2024	05/08/2024

Table 14: Largest Scale ENCs

D.1.2 Shoal and Hazardous Features

Four Danger to Navigation (DtoN) reports were submitted for this survey.

-H13836 DtoN 01, submitted September 8, 2023, reported two uncharted obstructions in the survey area.
-H13836 DtoN 02, submitted October 26, 2023, reported one uncharted obstruction in the survey area.
-H13836 DtoN 03, submitted November 3, 2023, reported three uncharted obstructions in the survey area.
-H13836 DtoN 04, submitted June 4, 2024, reported one uncharted obstruction in the survey area.

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

Shoaling was observed east of Choctaw Pass along the western extent of the survey coverage. Surveyed depths were found to be approximately 1.5 meters shoaler than charted. Surveyed shoal soundings (red) are shown with charted depths in Figure 12.

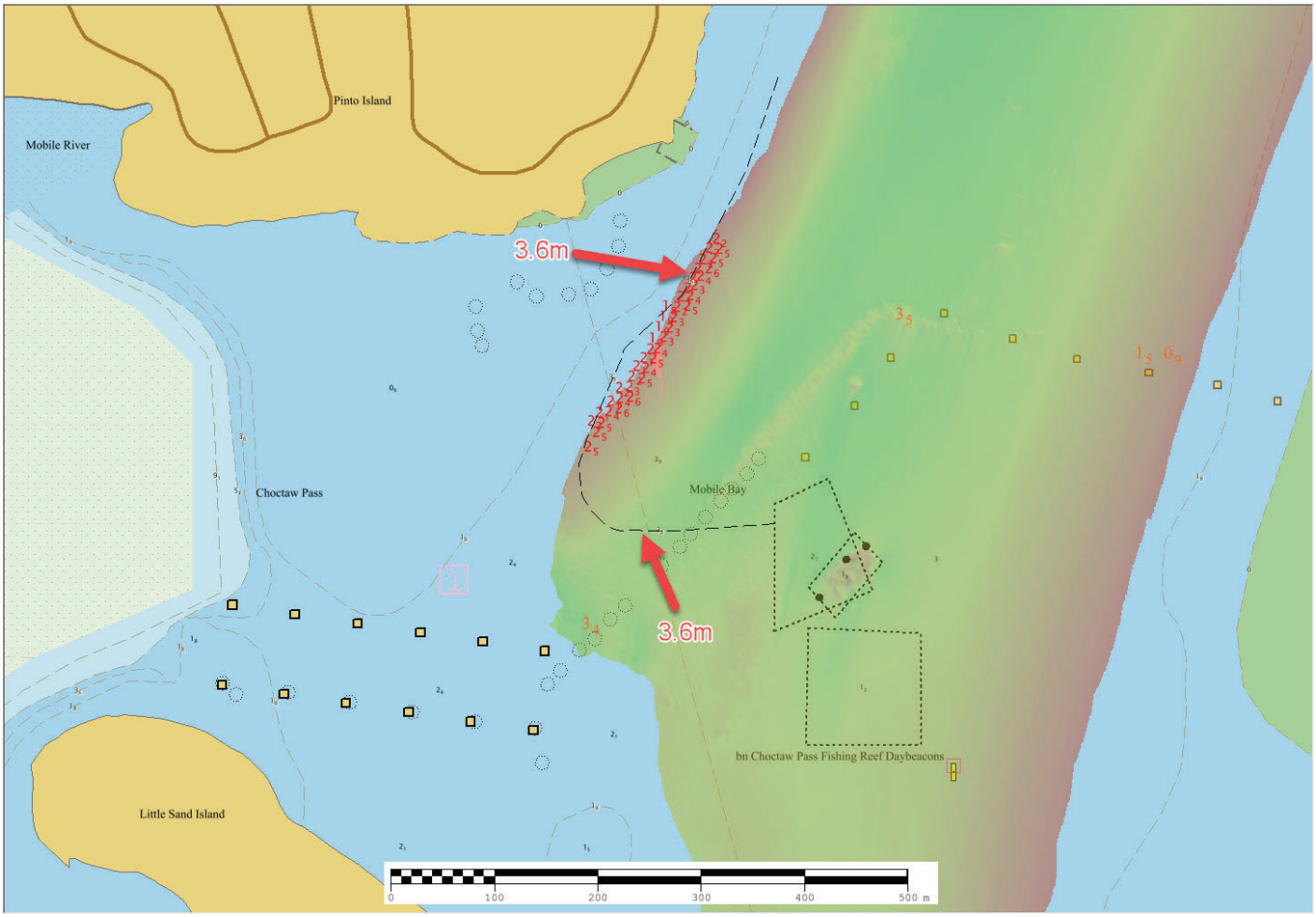


Figure 12: Shoaling in the Vicinity of Choctaw Pass

D.1.3 Charted Features

All assigned features included in the project Composite Source File (CSF) are included in the FFF with remarks and recommendations. Some assigned features located inshore of the NALL, or that could not be fully disproved because of their proximity to the NALL, were not addressed by the survey.

Two obstructions located in the junction overlap with survey H13835 were investigated as part of the H13835 survey. These features will be included in the H13835 FFF and thus are not part of the H13836 deliverables. The features are included in the H13836_Notes_for_Reviewer.hob to assist with review.

The FFF includes a cluster of three charted fish haven obstruction features. One of these features correctly depicts the Choctaw Pass Reef which is managed by the Alabama Department of Conservation and Natural Resources (ADCNR). The other two features are recommended for removal by ADCNR. Associated correspondence and ADCNR contact information is included in Appendix II.

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. The height field for contacts created on baring features observed in side scan data have been intentionally left blank.

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

A charted PILPNT and co-located BCNSPP were not observed during survey operations and were disproved using 200% SSS. This discrepancy was reported to the Marine Chart Division (MCD) via the ASSIST customer service chart reporting system. Correspondence related to this issue is included in Appendix II. The four Choctaw Pass Fishing Reef Daybeacons published in the USCG Light List were reported to the USCG as missing using the Navigation Center Online Discrepancy Report Form. A copy of the discrepancy report and associated correspondence are included in Appendix II.

All other AtoNs charted within the survey area were found to be on-station and serving their intended purpose.

D.2.2 Maritime Boundary Points

No maritime boundary points were assigned for this survey.

D.2.3 Bottom Samples

No bottom samples were required for this survey.

D.2.4 Overhead Features

The ENCs covering the survey area include the Interstate 10 bridge over the Apalachee River and the Highway 90/98 bridge (Admiral Raphael Semmes Bridge) over the Tensaw River and Polecat Bay. Charted vertical and horizontal clearances for the Highway 90/98 bridge were not obtained or verified as part of the survey. There are no charted clearances for the I-10 Bridge. The bridges were both visually confirmed as required by the investigation requirements in the OPR-J325-KR-23 CSF.

D.2.5 Submarine Features

No submarine features exist for this survey.

D.2.6 Platforms

No platforms exist for this survey.

D.2.7 Ferry Routes and Terminals

No ferry routes or terminals exist for this survey.

D.2.8 Abnormal Seafloor or Environmental Conditions

No abnormal seafloor or environmental conditions exist for this survey.

D.2.9 Construction and Dredging

A dredge was observed during field operations outside the area of survey coverage. An approximately 800 meter section of submerged dredge pipe was identified in the MBES and SSS data during processing. After consulting with the Hydrographic Surveys Division (HSD), multibeam data on the dredge pipe were rejected. Correspondence related to this issue is included in Appendix II. A graphic depicting the location of the dredge and dredge pipe is included in Figure 13.

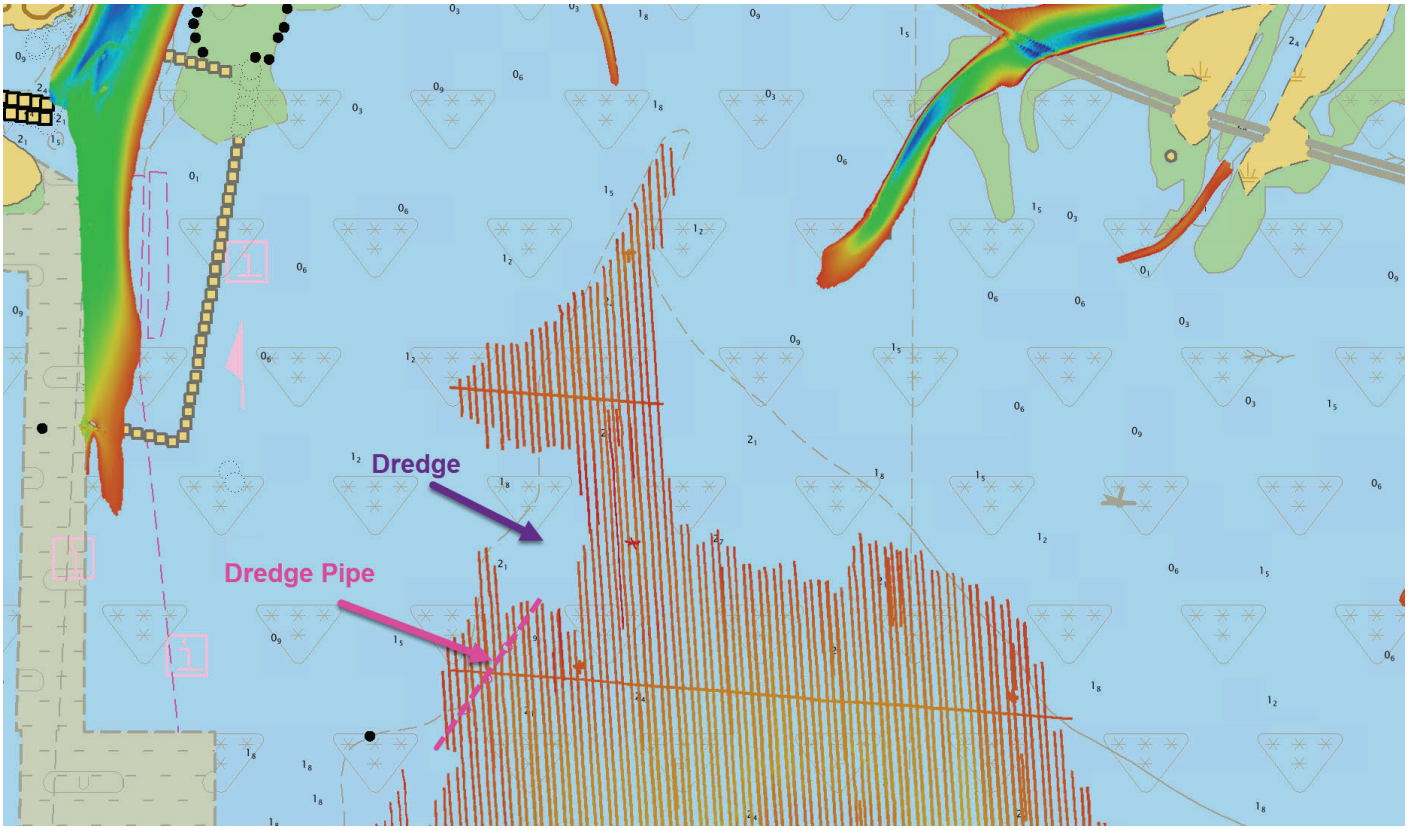


Figure 13: Dredge and Dredge Pipe Locations

D.2.10 New Survey Recommendations

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

D.2.11 ENC Scale Recommendations

New gridded ENC cells were released for Mobile Bay over the course of hydrographic project OPR-J325-KR-23. The cells included both Band 4 and Band 5 ENCs, however, Band 5 cells were not published for the eastern side of Mobile Bay which excluded large scale chart coverage for much of the shoreline including the City of Fair Hope, the City of Daphne, Point Clear, and several marinas frequented by recreational boaters. The hydrographer is not certain if this was intentional or an oversight and recommends considering publishing Band 5 ENCs in these areas.

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.

Report Name	Report Date Sent
Data Acquisition and Processing Report	2024-05-01

Approver Name	Approver Title	Approval Date	Signature
Jonathan L. Dasler, PE, PLS, CH	NSPS-THSOA Certified Hydrographer, Chief of Party	07/09/2024	Digitally signed by Jonathan L. Dasler, PE, PLS, CH Date: 2024.07.09 09:06:09 -07'00'
Jason Creech, CH	NSPS-THSOA Certified Hydrographer, Charting Manager / Project Manager	07/09/2024	Digitally signed by Jason Creech, CH Date: 2024.07.09 09:08:40 -07'00'
James Guilford, CH(A)	NSPS-THSOA Certified Hydrographer, Lead Hydrographer	07/09/2024	Digitally signed by James Guilford Date: 2024.07.09 09:11:22 -07'00'
Jason Dorfman, CH	NSPS-THSOA Certified Hydrographer, Lead Hydrographer	07/09/2024	Digitally signed by Jason Dorfman Date: 2024.07.09 09:12:37 -07'00'
Sam Werner	Data Processing Manager	07/09/2024	Digitally signed by Sam Werner Date: 2024.07.09 09:15:06 -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