

**F00837**

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

**DESCRIPTIVE REPORT**

Type of Survey: Natural Disaster Response

Registry Number: F00837

**LOCALITY**

State(s): Louisiana

General Locality: Louisiana

Sub-locality: Approaches to Port Fourchon and Houma

**2021**

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

**LIBRARY & ARCHIVES**

Date:

**HYDROGRAPHIC TITLE SHEET**

**F00837**

**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: **Louisiana**

Sub-Locality: **Approaches to Port Fourchon and Houma**

Scale: **10000**

Dates of Survey: **09/03/2021 to 09/05/2021**

Instructions Dated: **09/01/2021**

Project Number: **S-J322-KR-21**

Field Unit: **David Evans and Associates, Inc.**

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

Soundings by: **Teledyne RESON SeaBat T50-R (MBES)**

Imagery by: **EdgeTech 4200 (SSS)**

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, Port Fourchon MLLW and Houma Mean Low Gulf (MLG). All references to other horizontal or vertical datums in this report are applicable to the processed hydrographic data provided by the field unit.*

## DESCRIPTIVE REPORT SUMMARY

### A. Area Surveyed

David Evans and Associates, Inc. (DEA) conducted a hydrographic survey of the assigned area in the Approaches to Port Fourchon and Houma, LA. Survey F00837 was conducted in accordance with the Statement of Work and Hydrographic Survey Project Instructions (September 1, 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.

Survey Limits were surveyed in accordance with the requirements in the Project Instructions and the HSSD.

Data were acquired within the following survey limits:

Northwest Limit	Southeast Limit
29° 13' 42.23" N 90° 39' 56.12" W	29° 0' 5.08" N 90° 13' 28.45" W

### B. Survey Purpose

The survey project's purpose, which was defined in the Project Instructions, is written as follows: "Emergency survey in response to a request from the United States Army Corps of Engineers (USACE) via the United States Coast Guard (USCG) to survey the Approaches to Port Fourchon and Houma, LA, following Hurricane Ida. Hydrography shall consist of Navigable Area Surveys in accordance with the following support documents."

The survey data acquired were used in coordination between the National Oceanic and Atmospheric Administration (NOAA) and the USACE with the primary objective to conduct a clearance survey suitable to open the navigation channel to Port Fourchon and Houma.

In addition, DEA is responsible for secondary special requirements for this project for specified Dangers to Navigation (DTONs) and Aids to Navigation (ATONs), including but not limited to the following instructions:

"As soon as possible after discovery, provide the location, least depth (feet at MLLW), brief description and image of the DTON via email to Andrew Oakmann (Andrew.T.Oakman@usace.army.mil) and the Navigation Manager (Tim.Osborn@noaa.gov) with a CC to the COR and PM) using the provided DTON template. An additional XYZ dataset over the feature may be required, as directed by the COR. In addition, submit DTON reports in accordance with Section 1.6 of the HSSD to ahb.dton@noaa.gov with a CC to the COR and PM. It is of paramount importance that DTONs be reported as soon as possible."

"Any observed off-station or damaged ATONs shall be reported via email to Andrew Oakmann (Andrew.T.Oakman@usace.army.mil) and the Navigation Manager (Tim.Osborn@noaa.gov) with a CC to the COR and PM) using the provided ATON template. The requirement to include ATONS that are off-station or not serving their intended purposes in the FFF is waived."

### **C. Intended Use of Survey**

The entire survey is adequate to supersede previous data.

Multibeam echosounder (MBES) data with time series backscatter was collected concurrently with side scan sonar (SSS) data to obtain Set Line Spacing coverage in all waters in the survey area. This coverage type follows Option A of the Set Line Space requirement specified in section 5.2.2.4 of the 2021 HSSD. Line spacing was also dictated by the need to provide nadir depths from MBES to USACE at a minimum of three lines down the channel.

Survey coverage for the Fourchon survey area was obtained using the polygon depicted in the Project Reference File (PRF) S-J322-KR-21\_PRF\_FINAL\_08302021.000, which was provided by NOAA to DEA on August 31, 2021, along with verbal authorization to proceed with survey operations under the emergency action. On September 4, 2021, NOAA revised the survey area to remove the northern extents of the Houma area. Survey coverage was obtained using the polygon included in the Houma\_Modified\_Northern\_Extent.shp shapefile issued by NOAA with the modification. Later in the day on September 4, 2021, the project requirements were modified again to remove the requirement to survey the planned area at Morgan City, which was included in the PRF. The PRF, S-J322-KR-21\_PRF\_FINAL\_DESCOPE\_09082021.000, issued on September 9, 2021, with revised Project Instructions defining these changes depicts the final survey area for the project including all modifications. Correspondence related to these project modifications are included in Appendix II. Figure 1 depicts the survey outlines that were obtained for survey F00837.

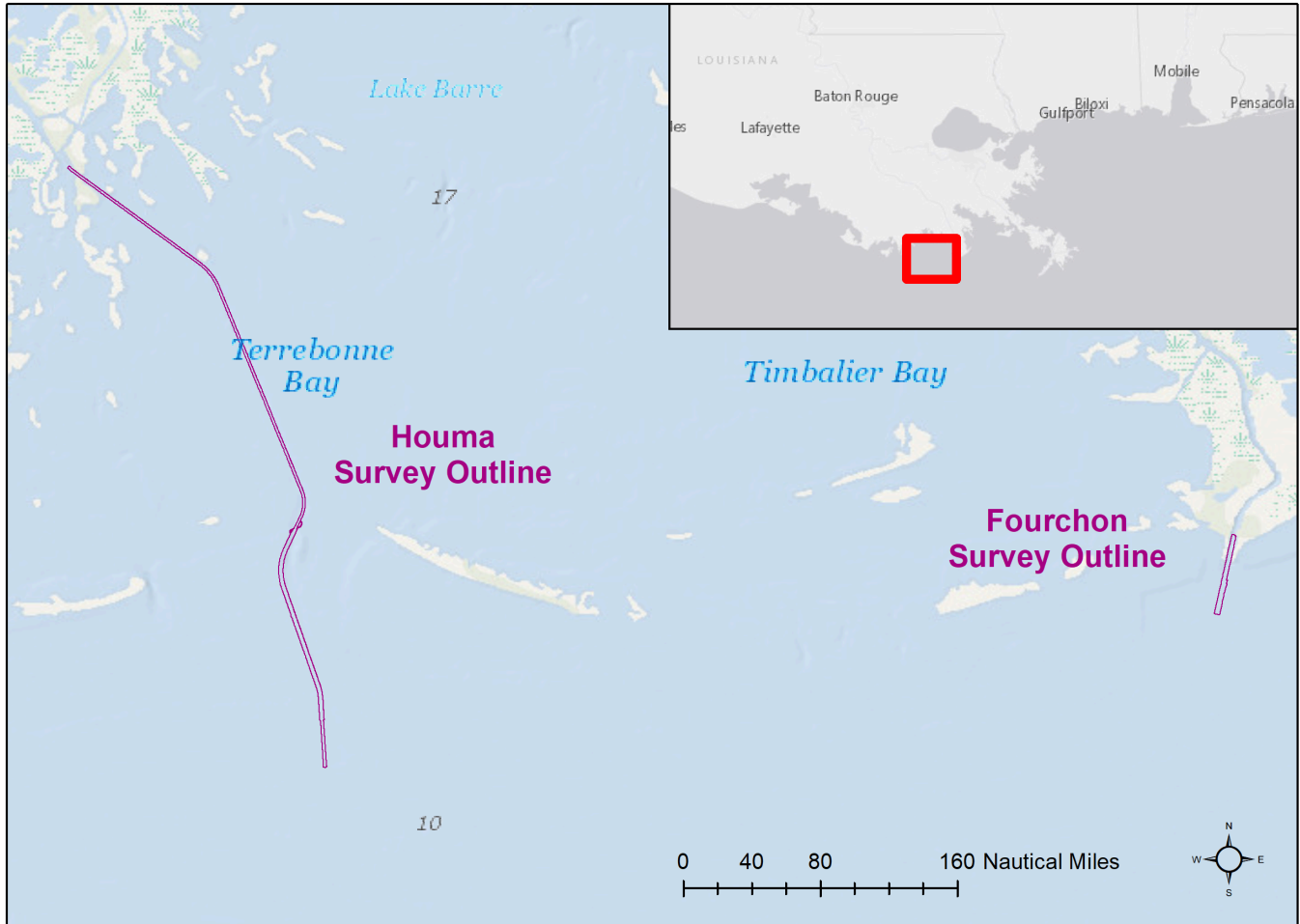


Figure 1: F00837 Survey Outline

#### D. Data Acquisition and Processing

Data acquisition and processing procedures for this survey are the same as those detailed for the S/V Blake in the OPR-J315-KR-21 Data Acquisition and Processing Report (DAPR). S/V Blake was engaged on Project OPR-J315-KR-21, Pascagoula, MS – AL – LA, when the emergency action was issued to support Hurricane Ida response efforts.

The SSS processing workflow for survey F00837 deviated from the workflow discussed in the OPR-J315-KR-21 DAPR. Raw SSS data in HSX format were converted to XTF format before importing into Chesapeake SonarWiz. In addition, real-time SSS navigation data were overwritten with post-processed SBET solutions using Chesapeake NavInjectorPro. The DAPR describes the import of HSX files into SonarWiz and the use of real-time navigation data during SSS processing.

The requirement for crosslines was waived for this survey.

Quality control is discussed in detail in Section B of the DAPR. Results from a position check, multibeam bar check, and a sound speed check are included in the DAPR Appendices.

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

Casts were collected as frequently as safe navigation operations allowed. For F00837 survey operations, casts were distributed both temporally and spatially based on observed changes in sound speed profiles. Sound speed readings were applied in CARIS using the nearest in distance within a two-hour interval. All sound speed measurements were made within 500 meters of the survey limits.

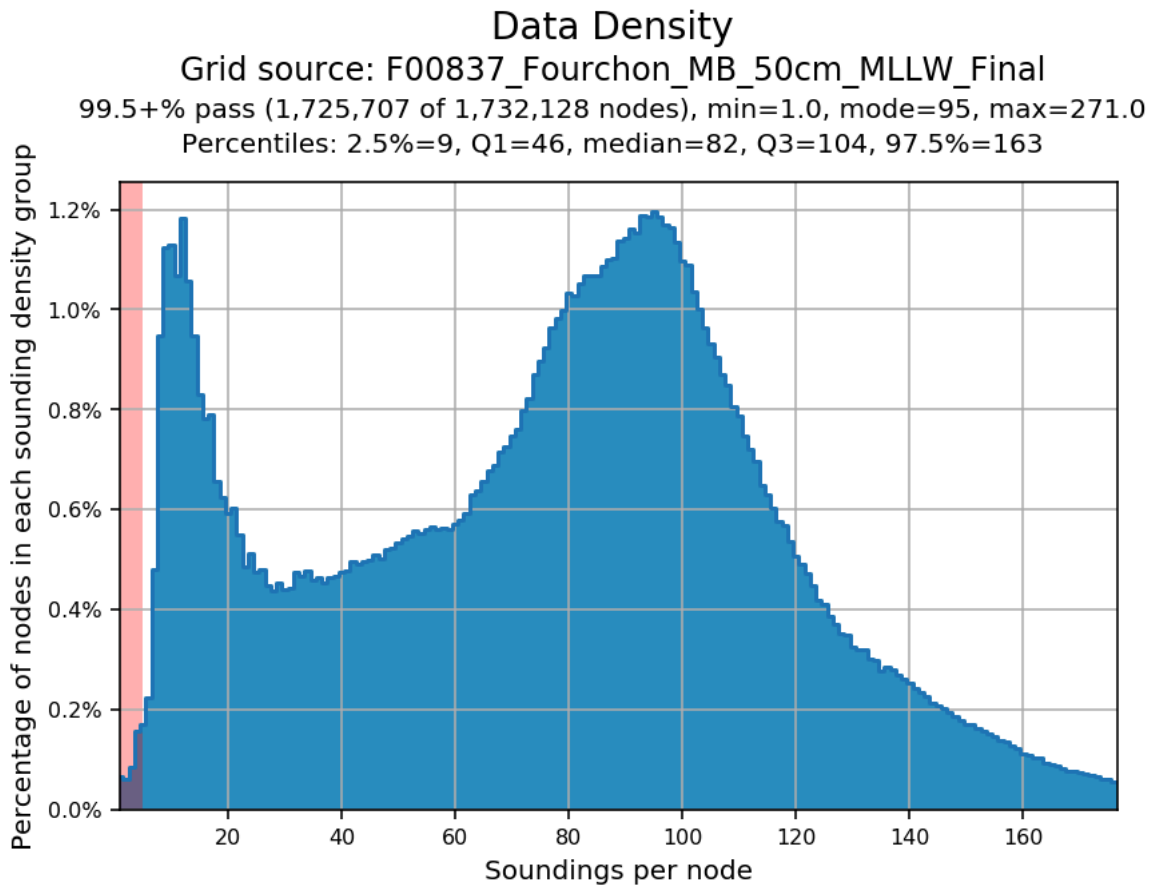
Survey speeds were maintained to meet or exceed along-track sounding density requirements and side scan sonar ensonification requirements.

During survey operations, daily emails were sent to NOAA and USACE to report missing or damaged ATONs, daily survey coverage, and preliminary depth information. Preliminary depths consisted of extracted nadir depths, shoal bias thinning to 25 feet along line, and were exported as NAD83(2011) positions projected to Louisiana South Zone in U.S. Survey Feet, with Mean Lower Low Water (MLLW) for Port Fourchon and Mean Low Gulf (MLG) for Houma. Copies of these daily reports are included in Appendix II.

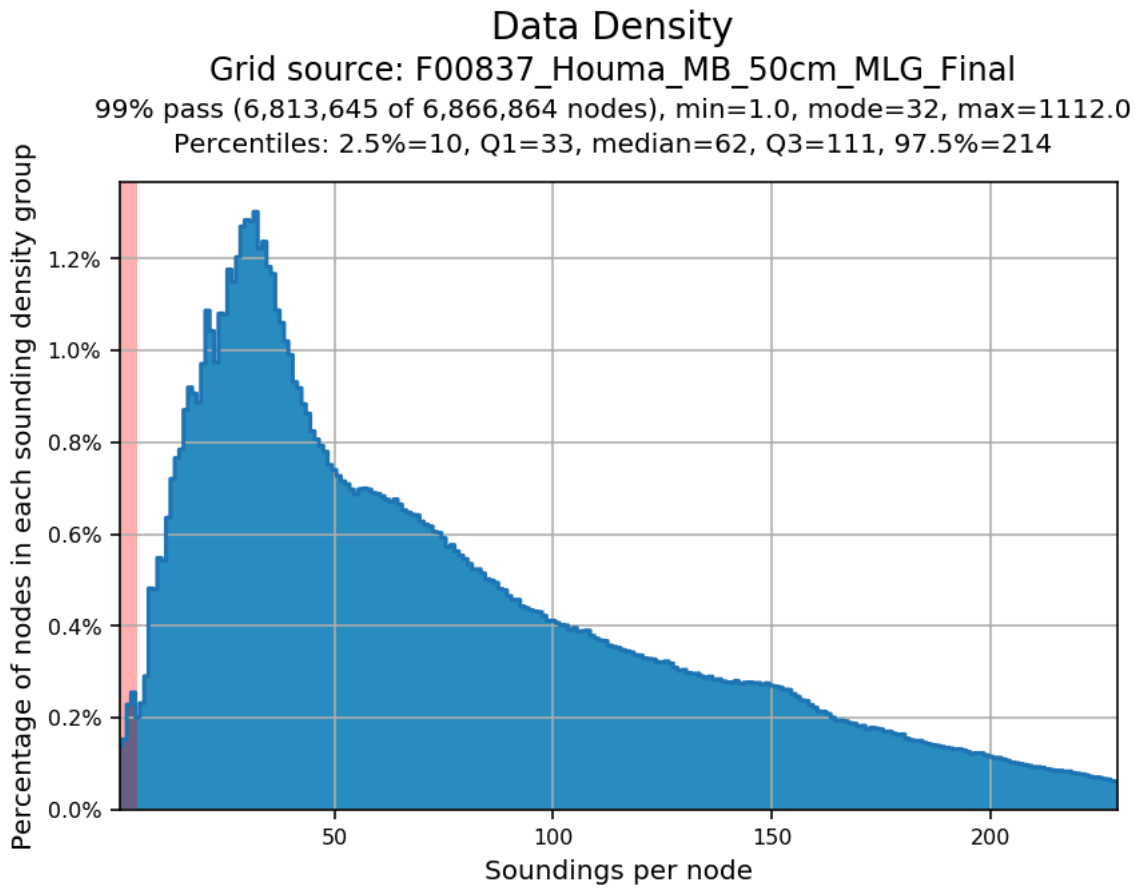
Multibeam data and side scan mosaics were thoroughly reviewed for holidays and areas of poor-quality coverage due to biomass, vessel wakes, or other factors. Side scan sonar contacts were developed with multibeam sonar to obtain a least depth of the contact using Object Detection requirements. The seafloor at the southern end of the Houma survey area was too undulating to safely fly the SSS towfish low enough to meet HSSD altitude requirements. Bottom coverage in this area was met with Object Detection MBES. Object Detection grids are included with the survey deliverables.

The planned survey lines for the Fourchon area resulted in 100% MBES bottom coverage capable of meeting Object Detection coverage requirements. After consultation with the NOAA Operations Branch, Object Detection grids have been submitted for the Fourchon area instead of lower resolution Set Line Spacing grids. Copies of emails related to this change are included in Appendix II.

The sounding density requirement of 95% of all nodes, populated with at least five soundings per node, was reviewed by analyzing the density layer of each finalized surface. Individual surface results are presented in Figures 2 through 4.

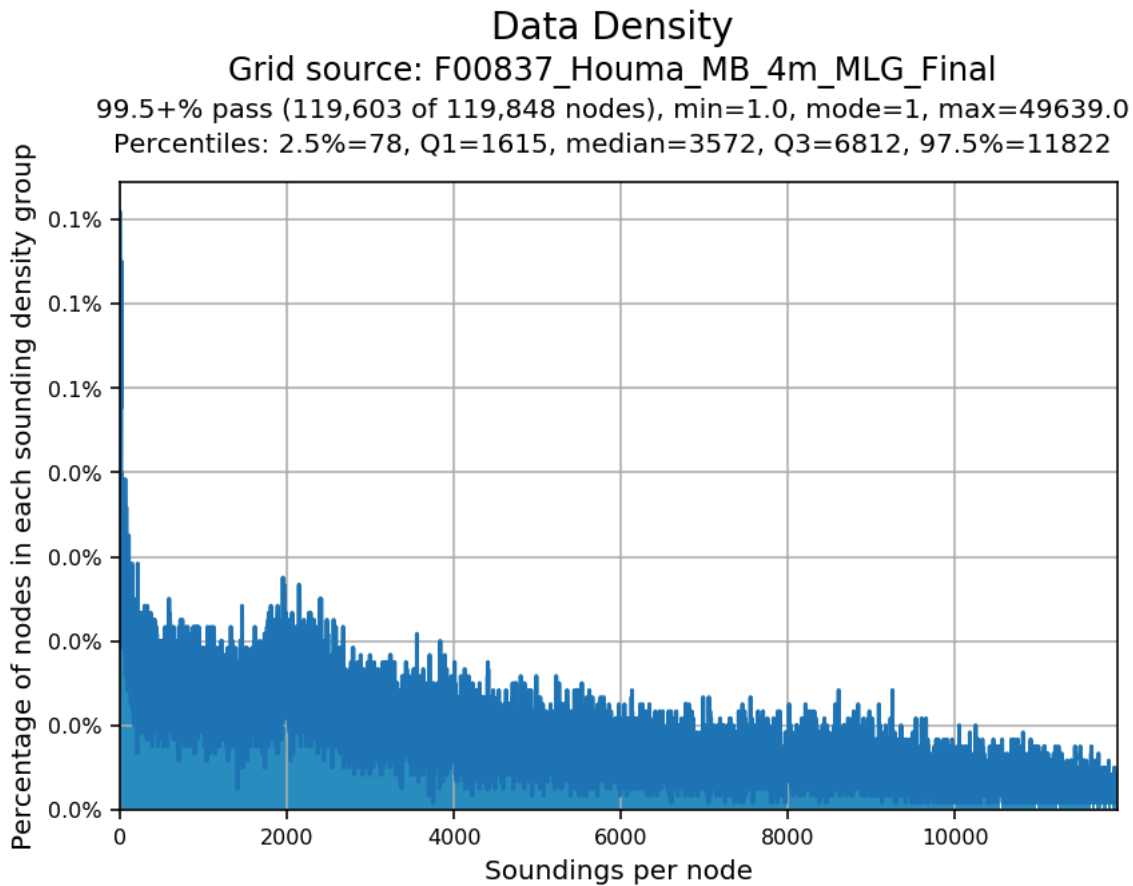


*Figure 2: Port Fourchon Node Density Statistics - 50 centimeter Finalized*



*Figure 3: Houma Node Density Statistics - 50 centimeter Finalized*





*Figure 4: Houma Node Density Statistics - 4 meter Finalized*

Multibeam backscatter was logged in HYPACK 7k format and is included with the F00837 digital deliverables.

### **E. Uncertainty**

Uncertainty values relevant for the submission of this survey include separation model uncertainties of 16.9 centimeters for Port Fourchon and 15 centimeters for Houma, as provided by the Project Instructions. Sound speed uncertainty values were 1.0 m/s for the Moving Vessel Profiler (MVP) system measuring the sound speed for the full depth of the water column. Surface sound speed uncertainty was 0.5 m/s for all data.

Additional discussion of these parameters are included in the DAPR.

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, where the standard deviation of the node was

greater than the TPU. To determine if the surface grid nodes met IHO Special Order 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 5 through 7.

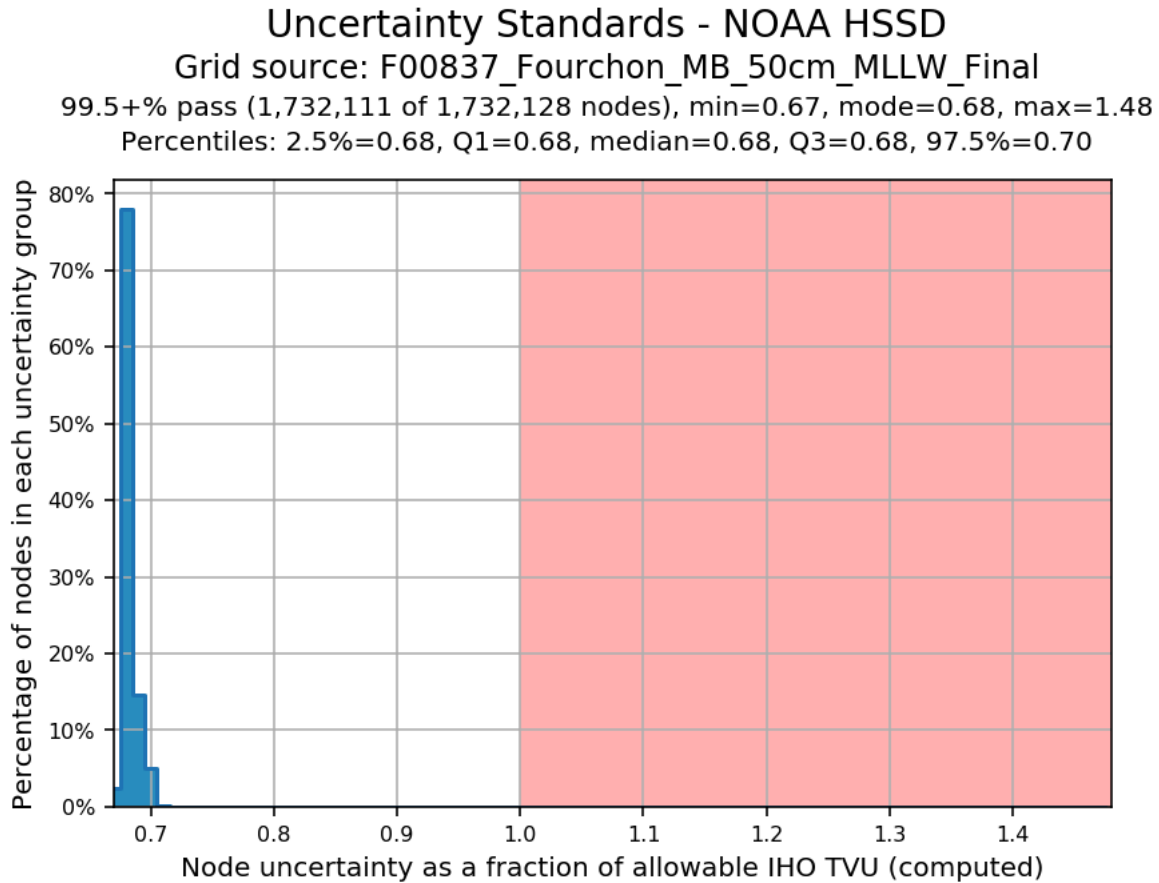
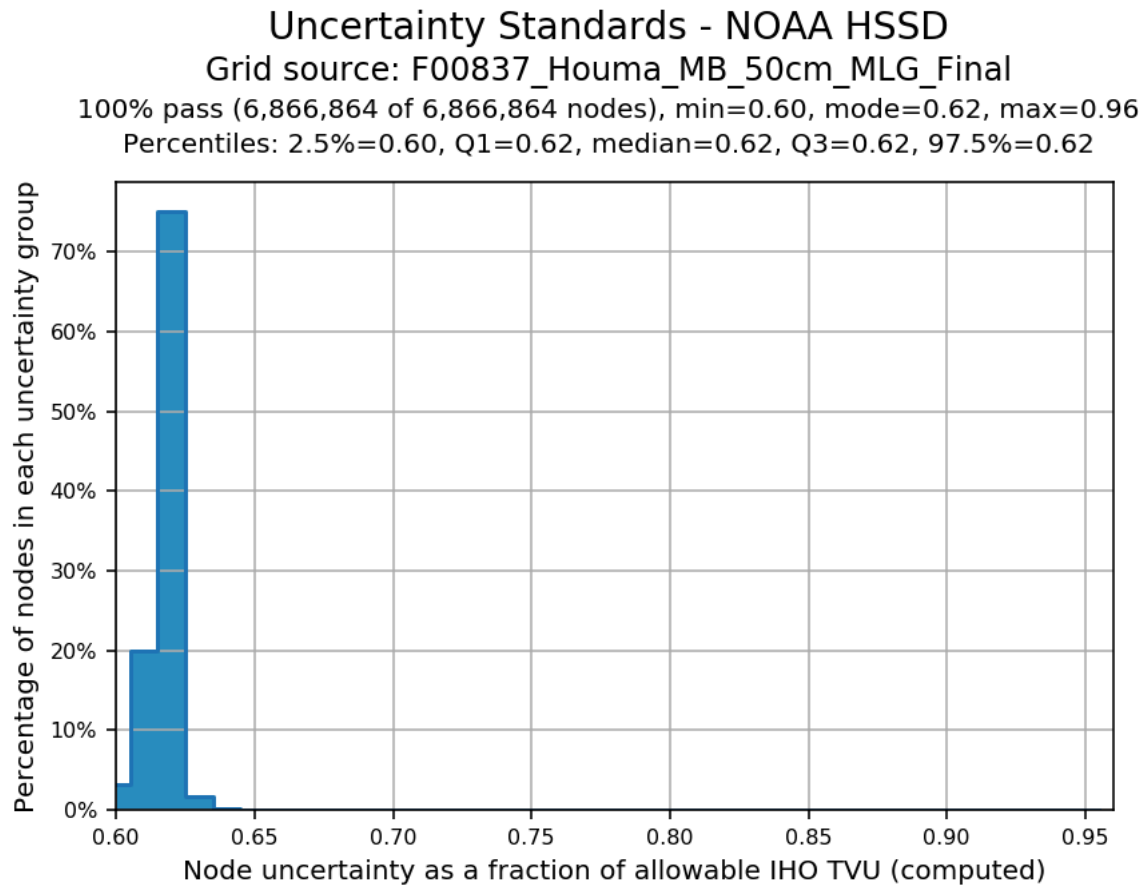
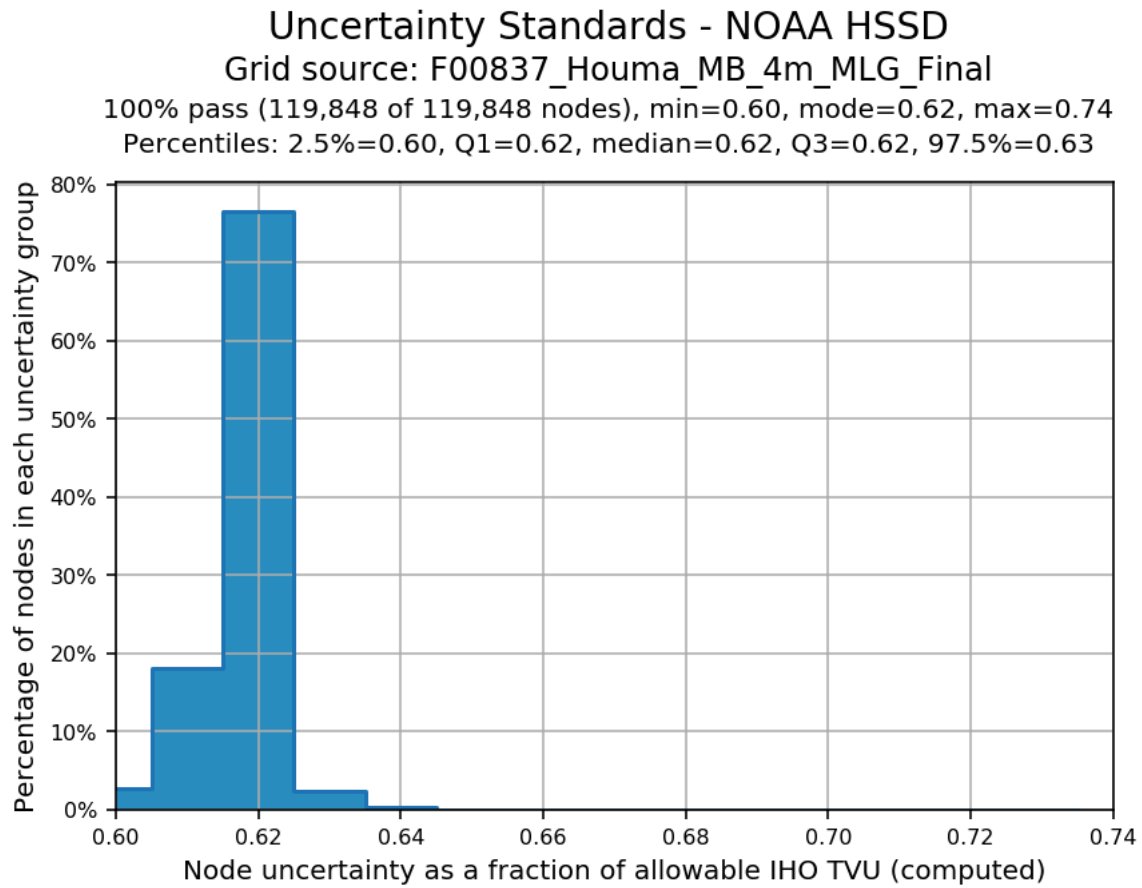


Figure 5: Port Fourchon Node TVU Statistics - 50 centimeter Finalized



*Figure 6: Houma Node TVU Statistics - 50 centimeter Finalized*



*Figure 7: Houma Node TVU Statistics - 4 meter Finalized*

## F. Results and Recommendations

The following are the largest scale ENC's, which cover the survey area:

ENC	Scale	Edition	Update Application Date	Issue Date
US4LA20M	1:80000	15	08/30/2021	08/30/2021
US4LA21M	1:80000	40	07/28/2021	07/28/2021
US4LA31M	1:80000	36	07/23/2021	07/23/2021
US5LA26M	1:40000	38	08/05/2021	08/05/2021
US5LA27M	1:40000	17	04/20/2021	04/20/2021

The following surfaces and/or BAGs were submitted to the Processing Branch:

Surface Name	Surface Type	Resolution	Depth Range	Surface Parameter	Purpose
F00837_Fourchon_MB_50cm_MLLW	CARIS Raster Surface (CUBE)	0.5 m	6.112 m - 10.545 m	NOAA_0.5m	Object Detection
F00837_Fourchon_MB_50cm_MLLW_Final	Finalized CARIS Raster Surface (CUBE)	0.5 m	6.112 m - 10.545 m	NOAA_0.5m	Object Detection
F00837_Houma_MB_50cm_MLG	CARIS Raster Surface (CUBE)	0.5 m	6.617 m - 10.322 m	NOAA_0.5m	Object Detection
F00837_Houma_MB_50cm_MLG_Final	Finalized CARIS Raster Surface (CUBE)	0.5 m	6.268 m - 10.322 m	NOAA_0.5m	Object Detection
F00837_Houma_MB_4m_MLG	CARIS Raster Surface (CUBE)	4 m	2.418 m - 10.287 m	NOAA_4m	MBES Set Line Spacing
F00837_Houma_MB_4m_MLG_Final	Finalized CARIS Raster Surface (CUBE)	4 m	2.418 m - 10.287 m	NOAA_4m	MBES Set Line Spacing
F00837_Fourchon_SSSAB_1m_600khz	SSS Mosaic	4 m	N/A	N/A	100% SSS
F00837_Houma_SSSAB_1m_600khz	SSS Mosaic	4 m	N/A	N/A	100% SSS

Bathymetric grids were created relative to MLLW in the Fourchon survey area and MLG in the Houma survey area in CUBE format using Object Detection and Set Line Spacing resolution requirements as specified in the HSSD.

A chart comparison was not required for this survey.

## G. Vertical and Horizontal Control

The vertical datum for this project is Mean Lower Low Water. The vertical control method used was VDatum.

The vertical datum for the Fourchon survey area is MLLW while the vertical datum for the Houma area is MLG. Both areas were reduced to chart datum using ERS methods and the NOAA-supplied separation models. Real-time navigation for all MBES survey lines were overwritten with post-processed navigation solutions in 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.

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 15.

The POS MV was configured to receive real time corrections from the Federal Aviation Administration Wide Area Augmentation System (FAA WAAS) during data acquisition. All real-time navigation data were overwritten with the application of post-processed SBET files when processing multibeam data in CARIS Hydrographic Information Processing System (HIPS).

## **H. Additional Results**

### Submerged Dredge Pipe




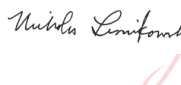
A segment of submerged dredge pipe, which was observed in the Fourchon area during survey operations and reported to NOAA and USACE during the daily reporting process, was removed after it was reported. Following guidance provided by the Atlantic Hydrographic Branch and the NOAA project manager for this survey, multibeam data on this submerged pipeline was rejected during data processing. Correspondence related to the salvage of the pipeline and guidance on data processing is included in Appendix II of this report.

## I. Approval

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 Survey Summary 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, Standing and 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 Survey Summary Report.

Approver Name	Title	Date	Signature
Jonathan L. Dasler, PE, PLS, CH	NSPS-THSOA Certified Hydrographer, Chief of Party	12/09/2021	 Digitally signed by Jonathan L. Dasler, PE, PLS, CH Date: 2021.12.09 12:45:52 -08'00'
Jason Creech, CH	NSPS-THSOA Certified Hydrographer, Charting Manager/ Project Manager	12/09/2021	 Digitally signed by Jason Creech Date: 2021.12.09 12:47:28 -08'00'
James Guilford	IHO Cat-A Hydrographer, Lead Hydrographer	12/09/2021	 Digitally signed by James Guilford Date: 2021.12.09 12:49:20 -08'00'
Nick Lesnikowski	NSPS-THSOA Certified Hydrographer, Charting Manager/ Project Manager	12/09/2021	 Digitally signed by Nicholas S. Lesnikowski Date: 2021.12.09 14:08:34 -08'00'