H13357

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

DESCRIPTIVE REPORT

Type of Survey:	Navigable Area
Registry Number:	H13357

LOCALITY

State(s):	Florida
General Locality:	Northwest Gulf of Mexico
Sub-locality:	5 Miles South of East Pass

2020

CHIEF OF PARTY
Allison C Stone

LIBRARY & ARCHIVES

Date:

U.S. DEPARTMENT OF COMMERCE NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION	REGISTRY NUMBER:
HYDROGRAPHIC TITLE SHEET	**H13357**

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):	**Florida**
General Locality:	**Northwest Gulf of Mexico**
Sub-Locality:	**5 Miles South of East Pass**
Scale:	**5000**
Dates of Survey:	**05/18/2020 to 10/08/2020**
Instructions Dated:	**03/25/2020**
Project Number:	**OPR-J359-KR-20**
Field Unit:	**Fugro USA Marine, Inc.**
Chief of Party:	**Allison C Stone**
Soundings by:	**Multibeam Echo Sounder (MBES)**
Imagery by:	**Multibeam Acoustic Backscatter (MBAB)**
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.

Table of Contents

List of Tables

List of Figures

Descriptive Report to Accompany Survey H13357

Project: OPR-J359-KR-20

Locality: Northwest Gulf of Mexico

Sublocality: 5 Miles South of East Pass

Scale: 1:5000

May 2020 - October 2020

Fugro USA Marine, Inc.

Chief of Party: Allison C Stone

A. Area Surveyed

Survey H13357 (Table 1) is the southern approach to East Pass (Figure 1). The M/V GO Freedom acquired complete coverage multibeam echosounder (MBES) and multibeam echosounder acoustic backscatter (MBAB) within the assigned survey limits from 4 June 2020 to 9 July 2020. The M/V Pelagos acquired complete coverage MBES and MBAB within the assigned survey limits 18 May 2020 to 8 October 2020.

A.1 Survey Limits

Data were acquired within the following survey limits:

Northwest Limit	Southeast Limit
29° 36' 48.57" N 84° 48' 23.86" W	29° 35' 7.76" N 84° 37' 53.23" W

Table 1: Survey Limits

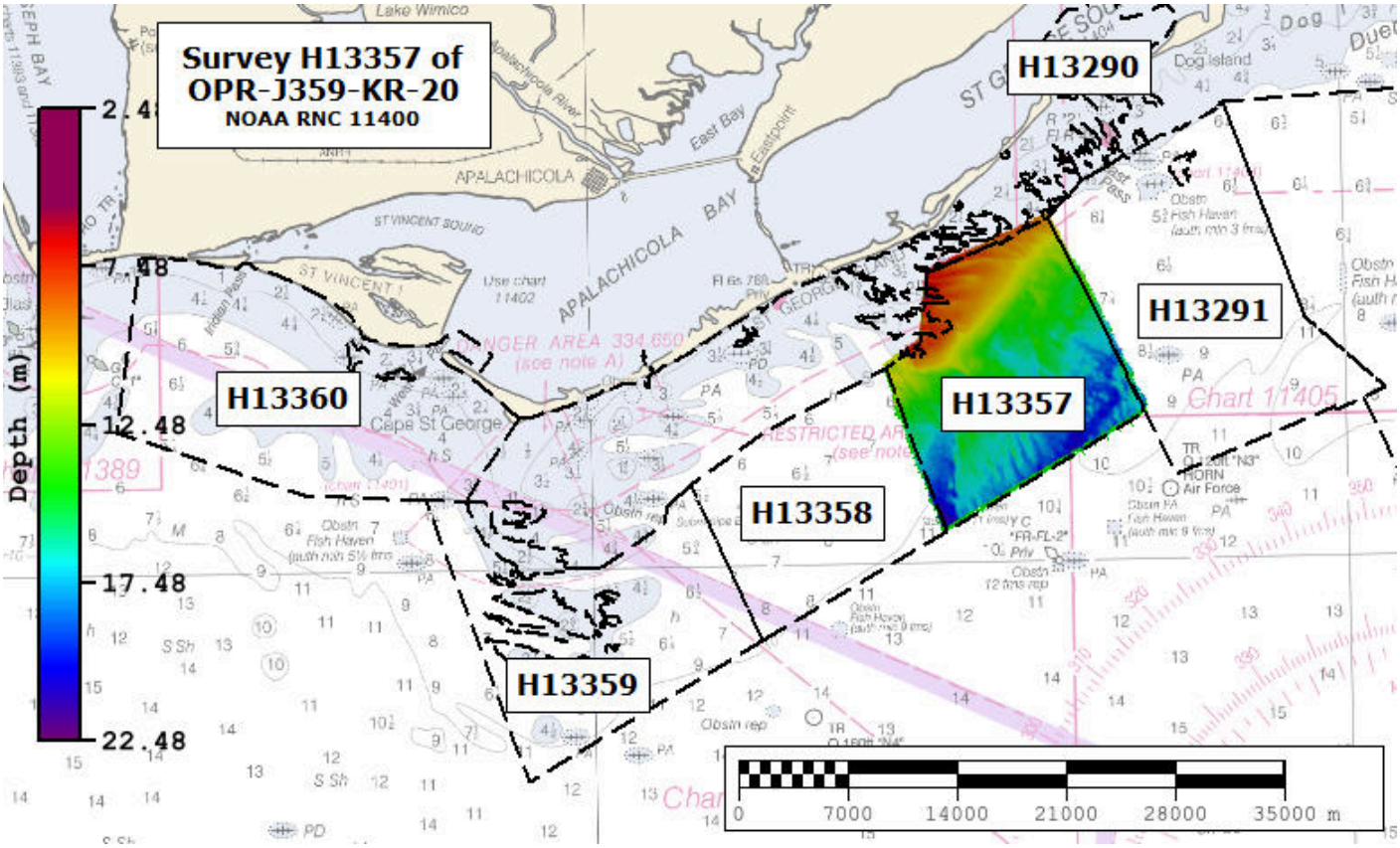

Figure 1: Survey H13357 relative to overall sheet limits of OPR-J359-KR-20

Survey limits were acquired in accordance with the requirements in the Project Instructions and the HSSD.

A.2 Survey Purpose

The Offshore Apalachicola project will provide contemporary surveys to update National Ocean Service (NOS) nautical charting products and services. It is offshore of Apalachicola Bay and Joseph Bay, FL. The survey will provide updated bathymetry and feature data to address concerns of migrating shoals, thus reducing the risk to navigation within the project area.

The Apalachicola Surveys delineate the western extent of the Big Bend Mapping project, a Florida Coastal Mapping Program (FCMaP) priority. This multi-year, multi-agency mapping project will fill in an area in which only 2% of the seafloor is mapped to modern standards. Improving the understanding of the bathymetry, geomorphology, bio-diversity and distribution of habitats in this region will support Floridian fisheries, coastal modeling, and resource management.

The project will cover approximately 430 square nautical miles of high priority survey area identified in the latest iteration of NOAA HSD's risk-based prioritization model. Data from this project will supersede all

prior survey data by providing modern hydrographic survey data for this area and updating the local charting products.

A.3 Survey Quality

The entire survey is adequate to supersede previous data.

Full coverage MBES and MBAB (Table 2 and Figures 2-4) were achieved within the survey limits of H13357. ***Concur with clarification: MBAB backscatter mosaics are only partially processed. When processing backscatter, not all lines were able to be processed.***

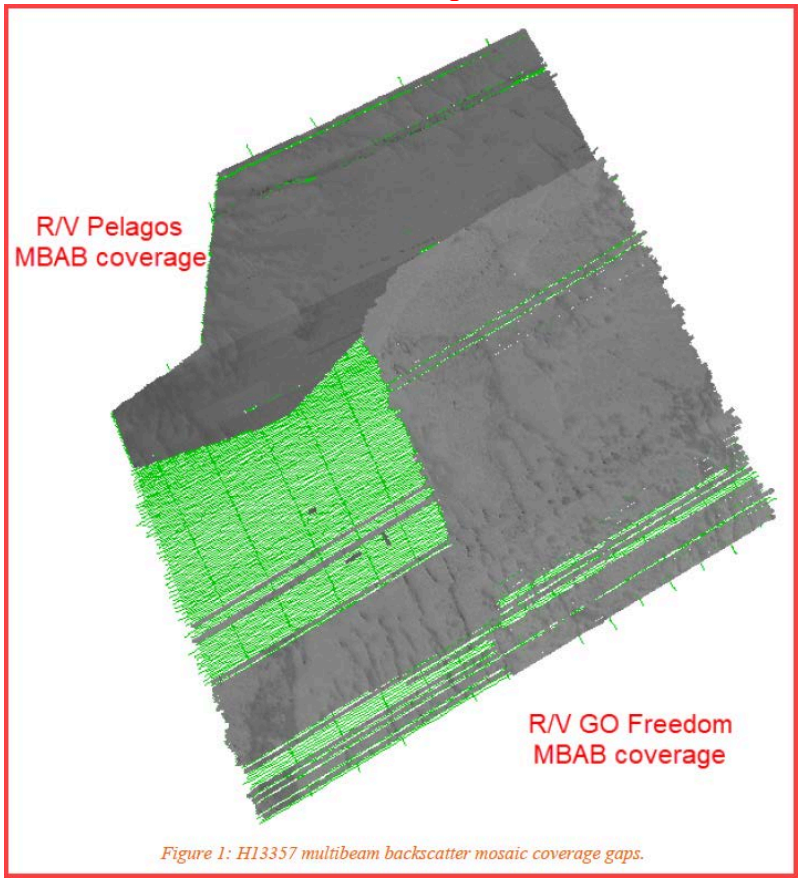

Figure 1: H13357 multibeam backscatter mosaic coverage gaps.

A.4 Survey Coverage

The following table lists the coverage requirements for this survey as assigned in the project instructions:

Water Depth	Coverage Required
All waters in survey area	Complete coverage (HSSD 2019 5.2.2.3)

Table 2: Survey Coverage

Survey coverage was in accordance with the requirements listed above and in the HSSD.

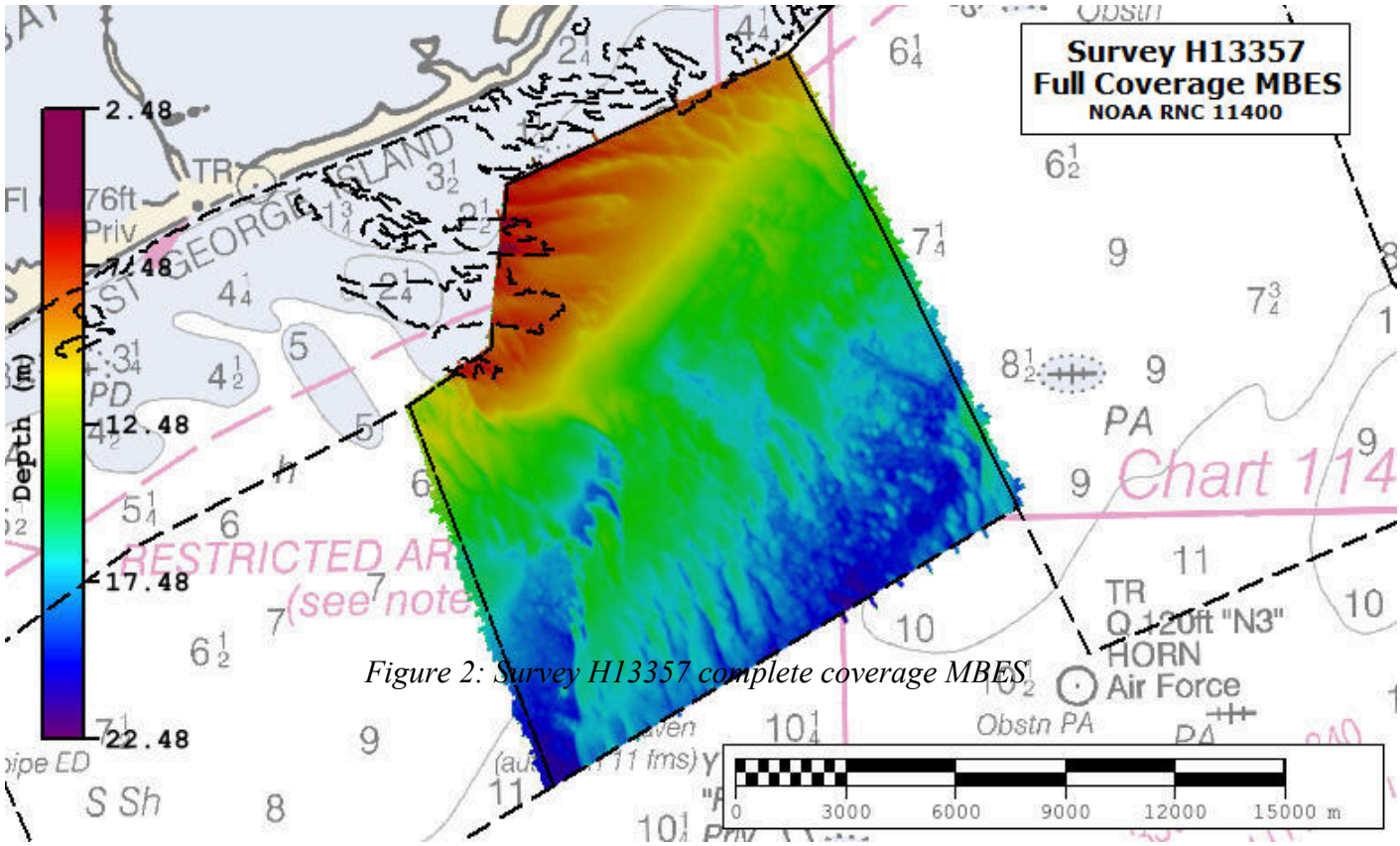

Figure 2: Survey H13357 complete coverage MBES

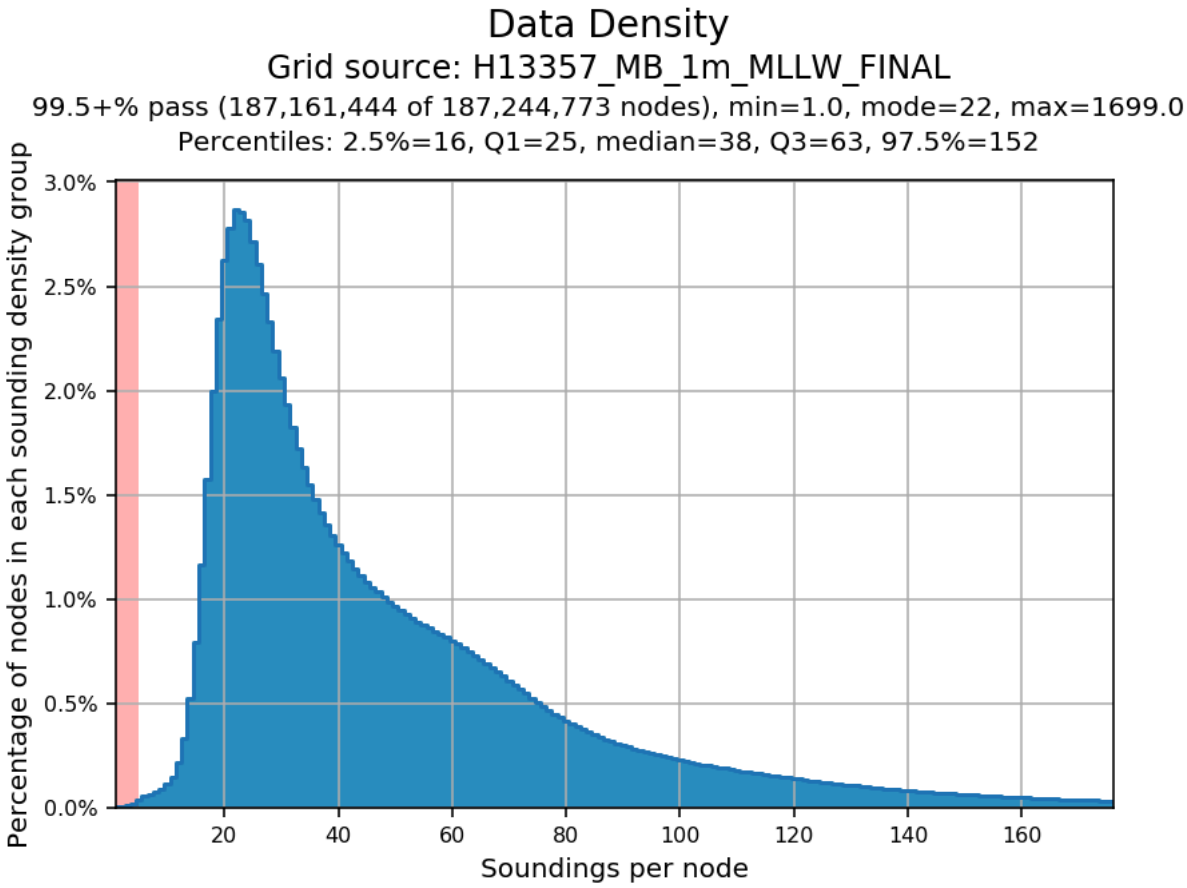

Figure 3: Survey H13357 1m complete coverage MBES density QC

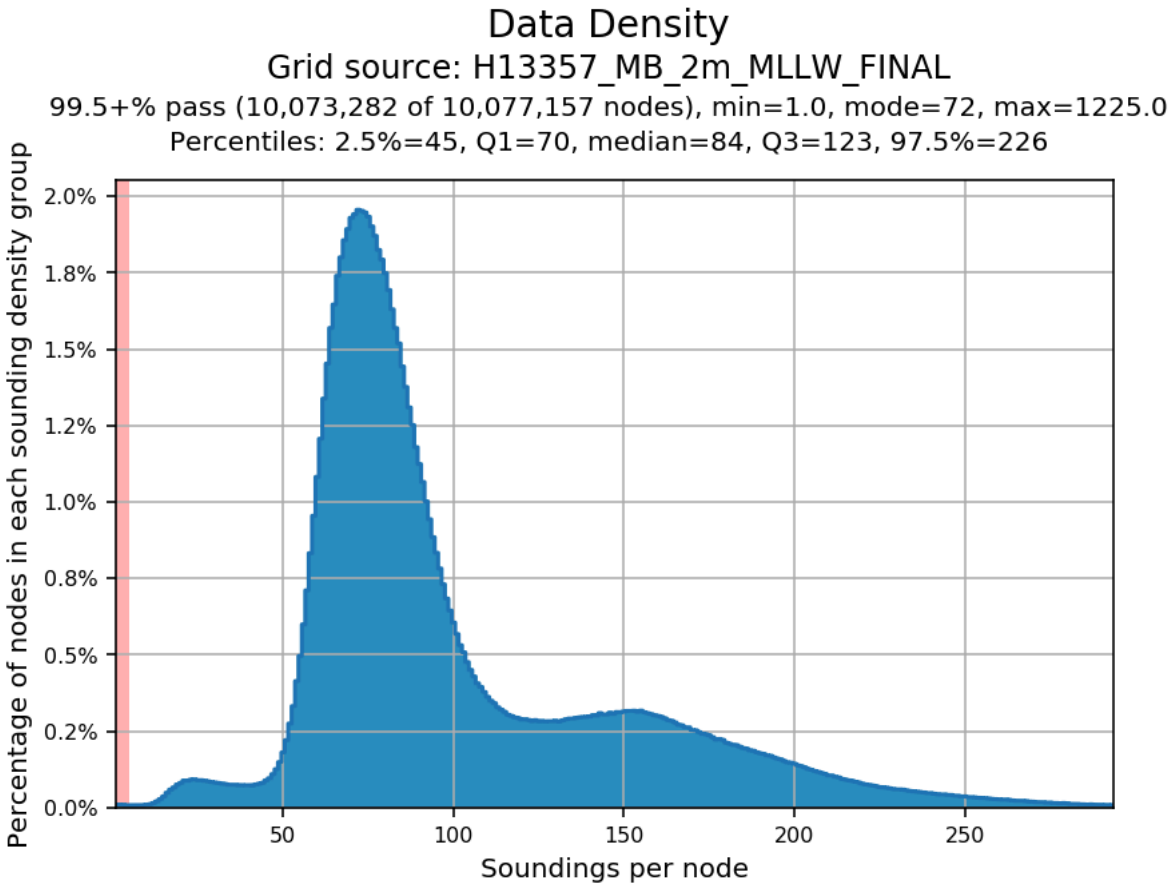

Figure 4: Survey H13357 2m complete coverage MBES density QC

A.6 Survey Statistics

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

	HULL ID	*M/V GO Freedom*	*M/V Pelagos*	*Total*
LNM	**SBES Mainscheme**	0.0	0.0	0.0
	MBES Mainscheme	1512.1	1071.59	2583.69
	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	0.0	0.0	0.0
	SBES/MBES Crosslines	71.35	15.45	86.8
	Lidar Crosslines	0.0	0.0	0.0
Number of Bottom Samples				10
Number Maritime Boundary Points Investigated				0
Number of DPs				0
Number of Items Investigated by Dive Ops				0
Total SNM				57.77

Table 3: Hydrographic Survey Statistics

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

Survey Dates	Day of the Year
05/18/2020	139

Survey Dates	Day of the Year
05/19/2020	140
05/21/2020	142
05/22/2020	143
05/24/2020	145
05/27/2020	148
05/28/2020	149
06/04/2020	156
06/05/2020	157
06/06/2020	158
06/10/2020	162
06/11/2020	163
06/12/2020	164
06/13/2020	165
06/14/2020	166
06/15/2020	167
06/16/2020	168
06/17/2020	169
06/18/2020	170
06/19/2020	171
06/20/2020	172
06/21/2020	173
06/22/2020	174
06/25/2020	177
06/26/2020	178
06/27/2020	179
06/29/2020	181
06/30/2020	182
07/01/2020	183
07/02/2020	184
07/09/2020	191
07/25/2020	207
07/26/2020	208

Survey Dates	Day of the Year
07/28/2020	210
07/29/2020	211
07/30/2020	212
07/31/2020	213
08/21/2020	234
08/28/2020	241
09/25/2020	269
10/08/2020	282

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	***M/V GO Freedom***	***M/V Pelagos***
LOA	150.0 feet	34.0 feet
Draft	12.0 feet	2.0 feet

Table 5: Vessels Used

Figure 5: M/V GO Freedom

Figure 6: M/V Pelagos

M/V GO Freedom (Table 5 and Figure 5) and M/V Pelagos (Table 5 and Figure 6) acquired MBES, MBAB, surface sound velocity, sound velocity profiles, and attitude and positioning data within the survey limits of H13357 (Table 6). For a detailed listing of equipment used to acquire survey data, refer to the DAPR submitted with this report under Project Reports.

B.1.2 Equipment

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

Manufacturer	Model	Type
Teledyne RESON	SeaBat 7125 SV2	MBES
Teledyne RESON	SVP 70	Sound Speed System
AML Oceanographic	Smart SVP	Conductivity, Temperature, and Depth Sensor
Applanix	POS MV 320 v5	Positioning and Attitude System
Applanix	POS MV 320 v4	Positioning and Attitude System

Table 6: Major Systems Used

For a detailed listing of equipment, refer to the DAPR submitted with this report.

B.2 Quality Control

B.2.1 Crosslines

Crosslines for survey H13357 were not acquired in accordance with section 5.2.4.2 of the HSSD 2019 (Figure 7). Mainscheme to crossline mileage percentage across H13357 is 3.36%, not the 4-5% as dictated in the HSSD 2019. Of the 12,734,494 grid nodes compared between H13357 mainscheme MBES and MBES crosslines, 99.99% were within 50cm difference. The mean difference is 1cm, with a standard deviation of 6cm (Figure 8).

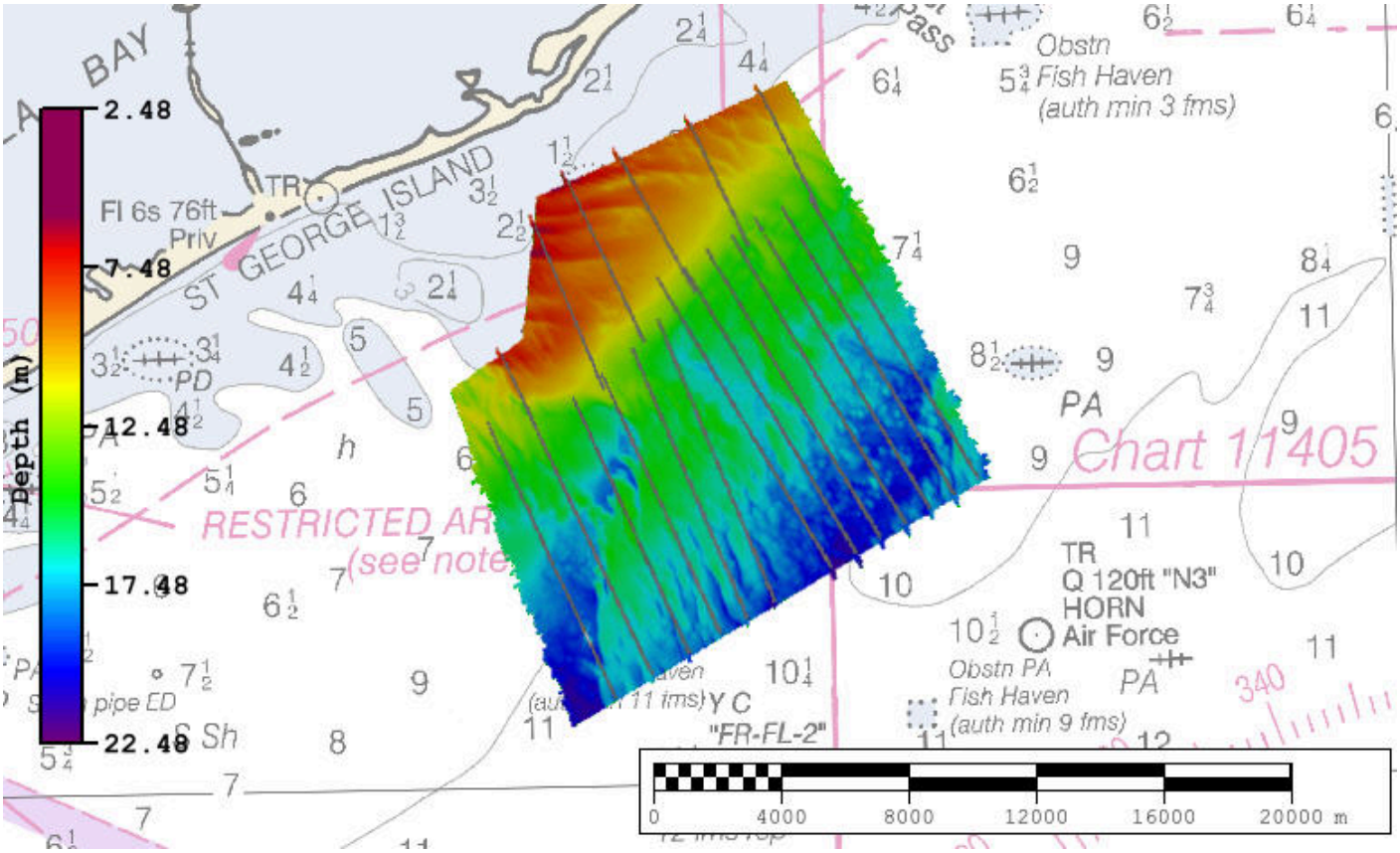

Figure 7: H13357 MBES mainscheme and MBES crossline distribution

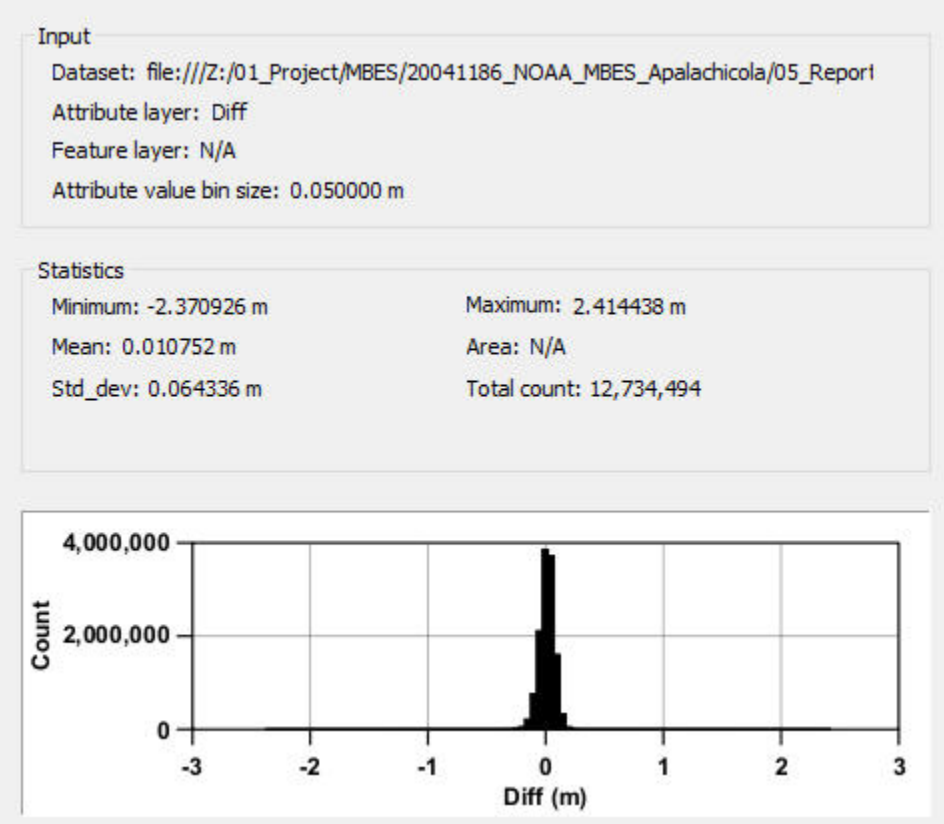

Figure 8: H13357 MBES mainscheme differenced from MBES crosslines statistical output

B.2.2 Uncertainty

The following survey specific parameters were used for this survey:

Method	Measured	Zoning
ERS via VDATUM	0.1 meters	0.101 meters

Table 7: Survey Specific Tide TPU Values.

Hull ID	Measured - CTD	Measured - MVP	Measured - XBT	Surface
M/V GO Freedom	1.075 meters/second	N/A meters/second	N/A meters/second	0.25 meters/second
M/V Pelagos	3.346 meters/second	N/A meters/second	N/A meters/second	0.25 meters/second

Table 8: Survey Specific Sound Speed TPU Values.

Survey H13357 uncertainty values (Tables 7 and 8) were evaluated in both CARIS HIPS 11.3 and via Pydro QC Tools v3.2.10. The finalized 1m (Figure 9) and 2m (Figure 10) bathymetric grids meet uncertainty standards with a minimum of 99.5% of nodes passing.

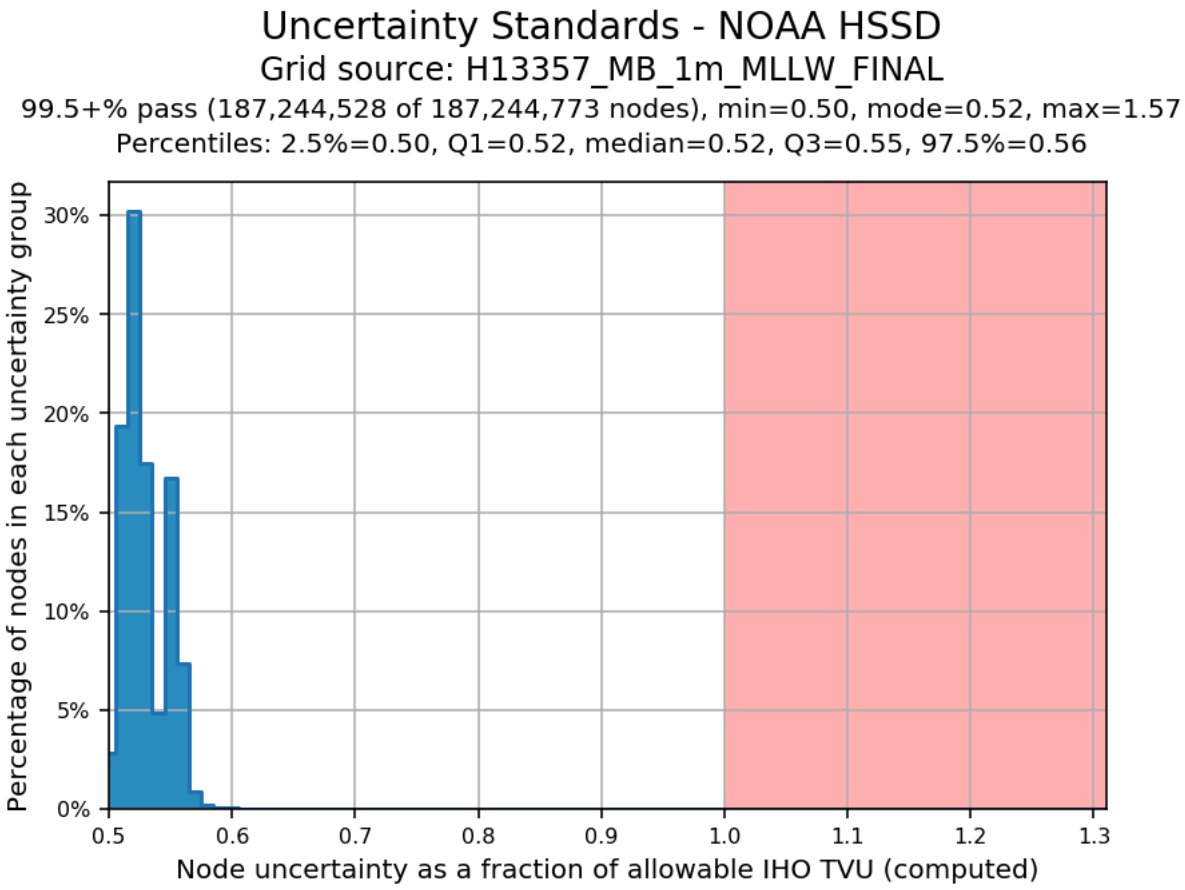

Figure 9: H13357 1m finalized grid TPU QC

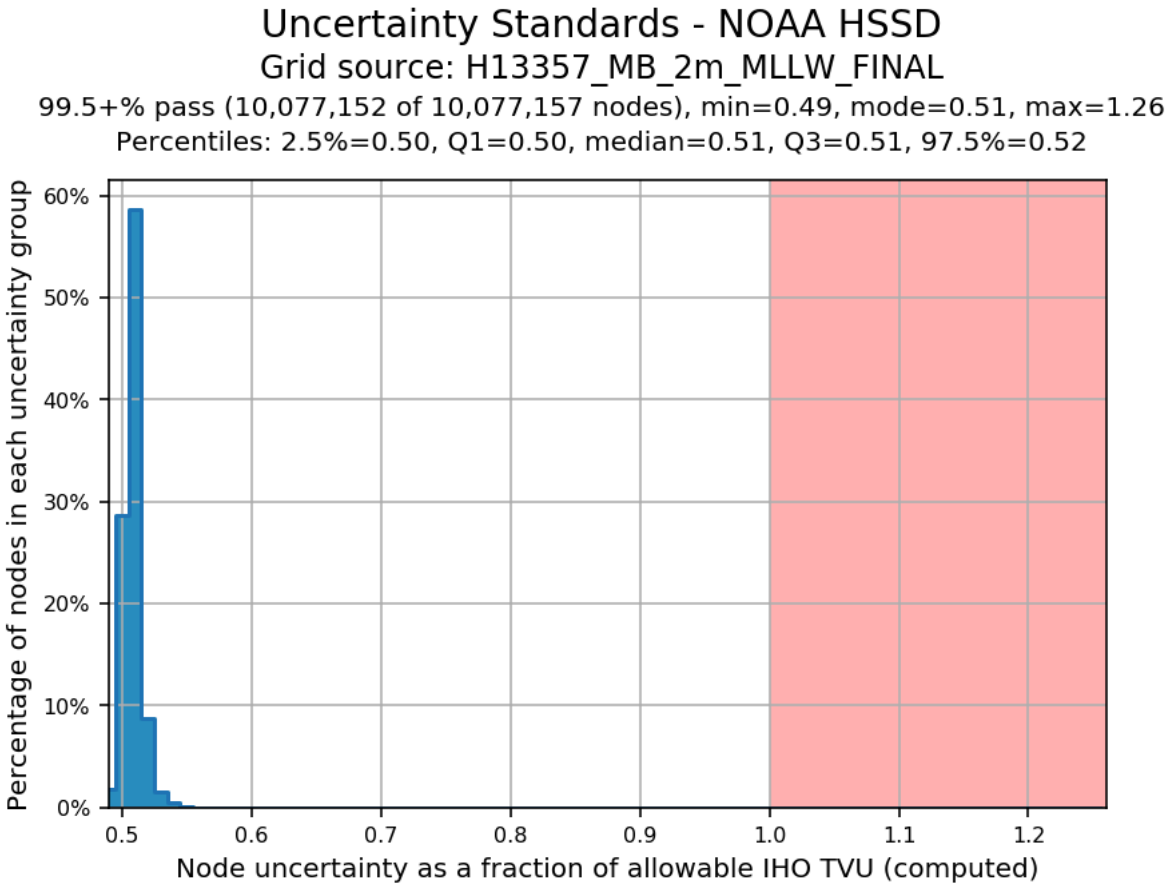

Figure 10: H13357 2m finalized grid TPU QC

B.2.3 Junctions

Four contemporary surveys are available for comparison to H13357: H13358, H13291, H13361, and H13288 (2019) (Table 9 and Figure 11).

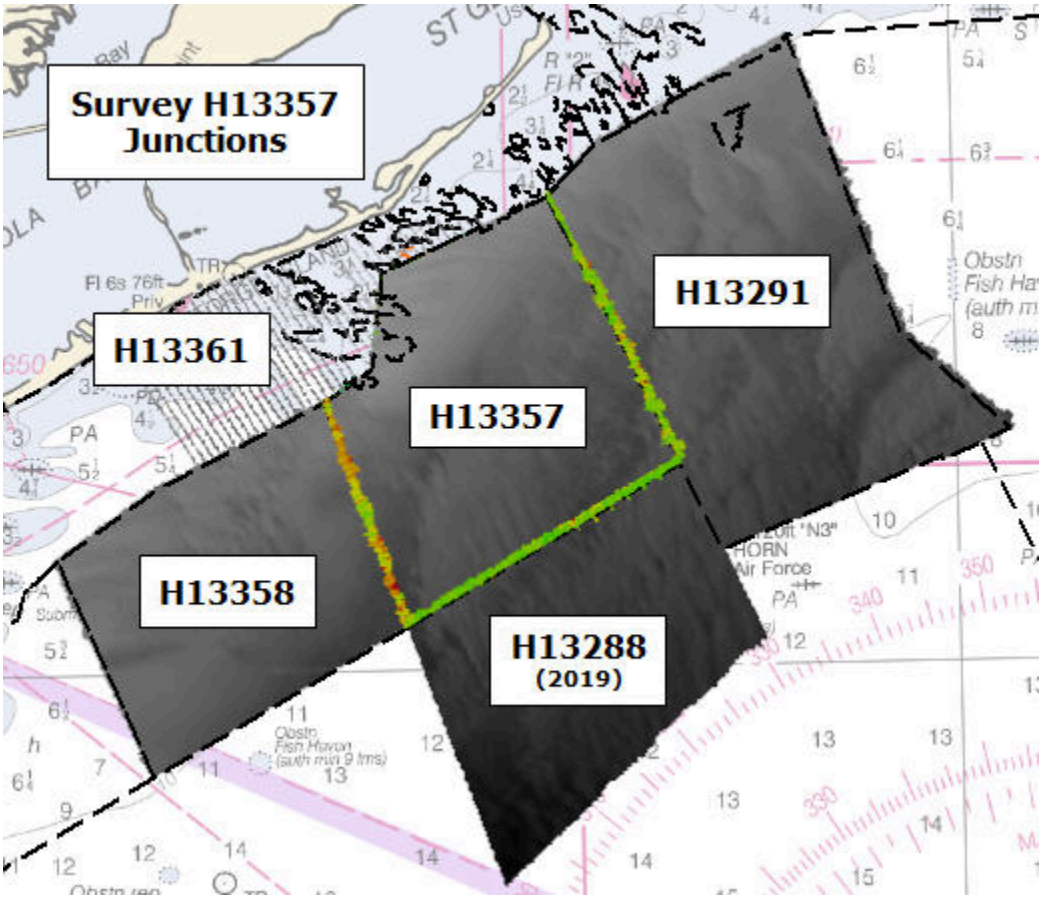

Figure 11: Junction surveys to H13357

The following junctions were made with this survey:

Registry Number	Scale	Year	Field Unit	Relative Location
H13358	1:20000	2020	Fugro USA Marine, Inc.	W
H13288	1:40000	2019	Fugro USA Marine, Inc.	S
H13361	1:5000	2020	Fugro USA Marine, Inc.	N
H13291	1:5000	2020	Fugro USA Marine, Inc.	E

Table 9: Junctioning Surveys

H13358

Survey H13358 was acquired by Fugro USA Marine, Inc. in 2020 as a part of OPR-J359-KR-20. Of the 4,875,638 grid nodes compared between H13357 and H13358, 99.9% agree within 50cm (Figure 12).

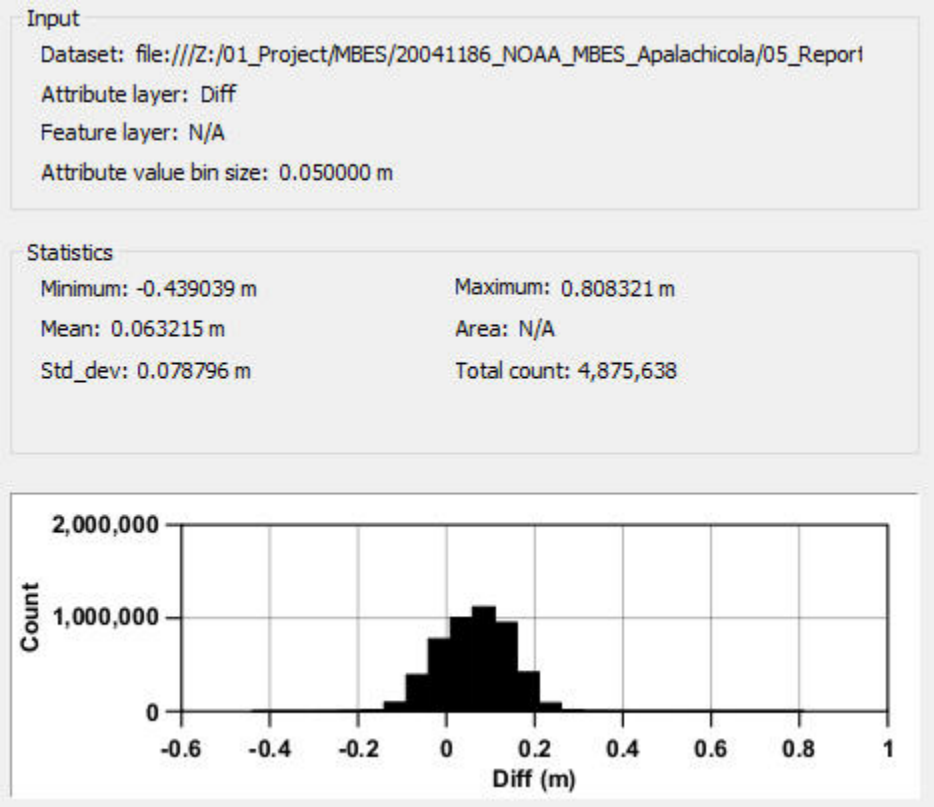

Figure 12: Survey H13357 junction with Survey H13358

H13288

Survey H13288 was acquired by Fugro USA Marine, Inc. in 2019 as a part of OPR-J359-KR-19. Of the 5,631,377 grid nodes compared between H13357 and H13288, 99.9% agree within 50cm (Figure 13).

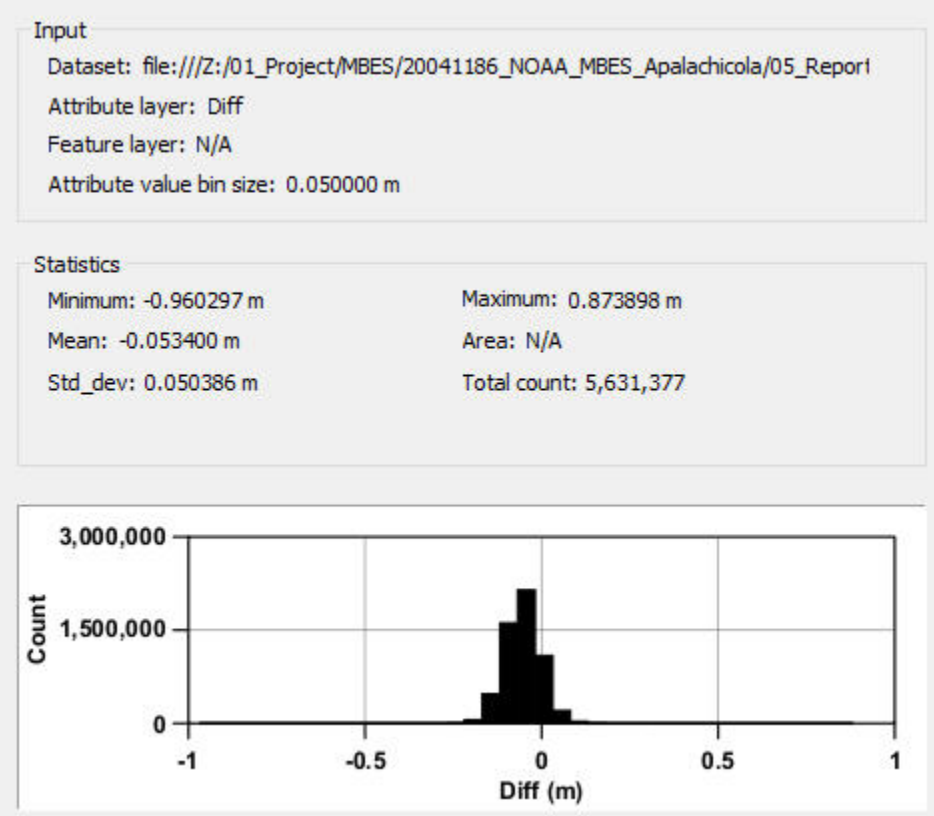

Figure 13: Survey H13357 junction with Survey H13288

H13361

Survey H13361 was acquired by Fugro USA Marine, Inc. in 2020 as a part of OPR-J359-KR-20. Of the 132,846 grid nodes compared between H13357 and H13361, 100% agree within 50cm (Figure 14).

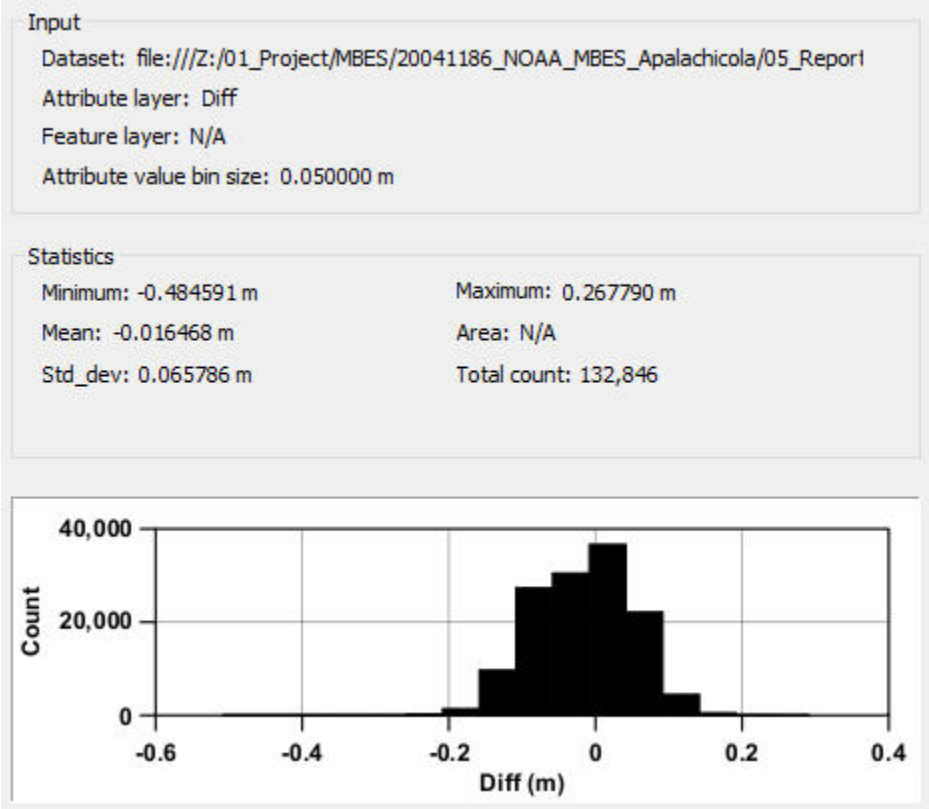

Figure 14: Survey H13357 junction with Survey H13361

H13291

Survey H13291 was acquired by Fugro USA Marine, Inc. in 2020 as a part of OPR-J359-KR-20. Of the 5,430,690 grid nodes compared between H13357 and H13291, 99.9% agree within 50cm (Figure 15).

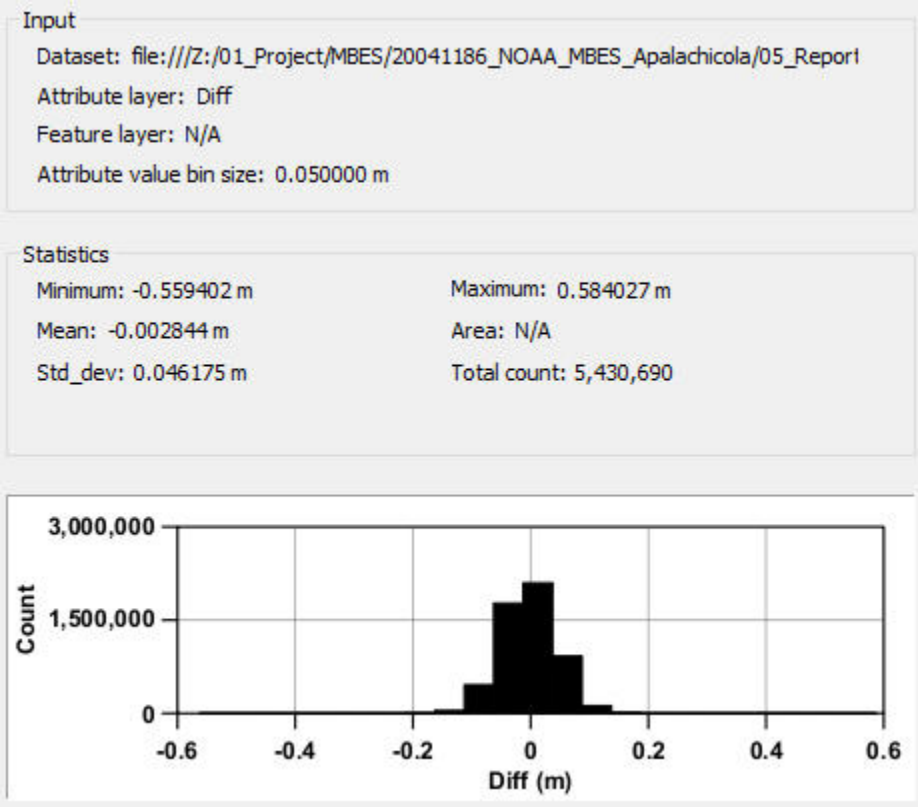

Figure 15: Survey H13357 junction with Survey H13291

B.2.4 Sonar QC Checks

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

B.2.5 Equipment Effectiveness

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

B.2.6 Factors Affecting Soundings

There were no other factors that affected corrections to soundings.

B.2.7 Sound Speed Methods

Sound Speed Cast Frequency: Sound velocity profiles were acquired approximately every two hours from the M/V GO Freedom and M/V Pelagos using an AML SV&P probe.

Refer to the DAPR for additional information.

B.2.8 Coverage Equipment and Methods

All equipment and survey methods were used as detailed in the DAPR.

B.3 Echo Sounding Corrections

B.3.1 Corrections to Echo Soundings

All data reduction procedures conform to those detailed in the DAPR.

B.3.2 Calibrations

All sounding systems were calibrated as detailed in the DAPR.

B.4 Backscatter

No backscatter deliverables are submitted with survey H13357. One line of data per vessel, per day was processed to ensure quality control. All equipment and survey methods utilized in the acquisition and processing of backscatter are detailed in the DAPR.

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

Table 10: Primary bathymetric data processing software

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

Manufacturer	Name	Version
QPS	Fledermaus	7.9.3

Table 11: Primary imagery data processing software

The following Feature Object Catalog was used: NOAA Profile Version 2020.

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
H13357_MB_1m_MLLW	CARIS Raster Surface (CUBE)	1 meters	5.49 meters - 22.47 meters	NOAA_1m	Complete MBES
H13357_MB_1m_MLLW_FINAL	CARIS Raster Surface (CUBE)	1 meters	5.49 meters - 20.0 meters	NOAA_1m	Complete MBES
H13357_MB_2m_MLLW	CARIS Raster Surface (CUBE)	2 meters	5.5 meters - 22.45 meters	NOAA_2m	Complete MBES
H13357_MB_2m_MLLW_FINAL	CARIS Raster Surface (CUBE)	2 meters	18.0 meters - 22.45 meters	NOAA_2m	Complete MBES

Table 12: Submitted Surfaces

The final grid deliverable is now H13357_MB_1m_MLLW_1of1.bag. Resolution is 1m and depth ranges from 5.49 to 22.47 m. The grid was generated using the NOAA 1m surface parameters following complete MBES requirements.

C. Vertical and Horizontal Control

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

C.1 Vertical Control

The vertical datum for this project is Mean Lower Low Water.

ERS Datum Transformation

The following ellipsoid-to-chart vertical datum transformation was used:

Method	Ellipsoid to Chart Datum Separation File
ERS via VDATUM	GeneralArea_Apalachicola_100m_NAD83-MLLW_geoid12b

Table 13: ERS method and SEP file

C.2 Horizontal Control

The horizontal datum for this project is North American Datum of 1983 (NAD 83).

The projection used for this project is Universal Transverse Mercator (UTM) Zone 16.

PPP

All positioning and attitude data associated with OPR-J359-KR-20 was post-processed in POSPac MMS using PP-RTX methods. For further discussion, reference the DAPR submitted with this report.

D. Results and Recommendations

D.1 Chart Comparison

A chart comparison was conducted using the Triangle Rule script within the Chart Review Tool of Pydro QC Tools. A combined s57 file of charted soundings extracted from ENCs listed in the project instructions and an s57 file of surveyed soundings were compared with the following results (Figure 16).

Survey H13357 surveyed soundings exhibit 2816 instances where surveyed soundings are shoal to charted soundings by more than 1ft: 2,751 surveyed soundings are 1-3ft shoal to charted (Figure 17); 56 surveyed soundings are 4-6ft shoal to charted (Figure 18); 9 surveyed soundings are 7-11ft shoal to charted (Figure 19).

The majority of all instances where surveyed soundings are 1-3ft shoal to charted soundings occurs where sand wave crests have shifted, likely due storm activity. The maximum difference of surveyed soundings shoal to charted soundings is approximately 11ft. This difference occurs within the charted boundaries of a fish haven. Least depths of surveyed soundings from survey H13357 exceed the minimum authorized least depth and the reported depth of the previously charted obstruction (Figure 20). Reference the Final Feature File associated with this survey for further detail.

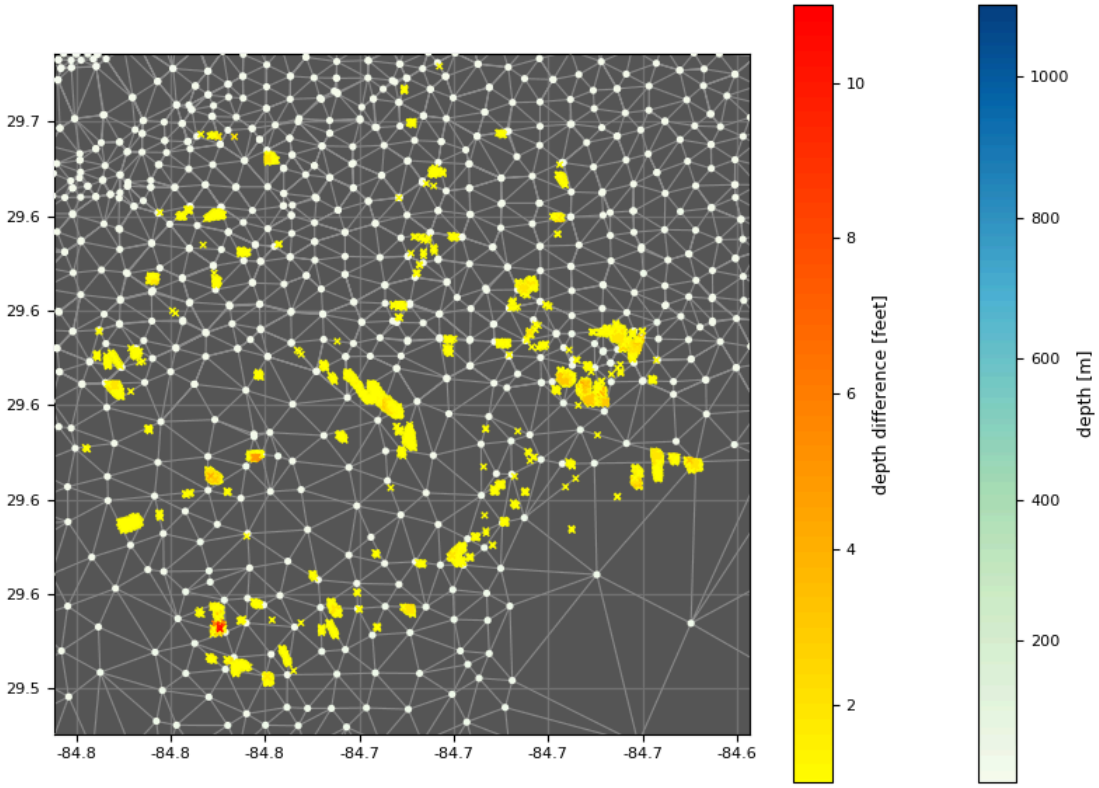

Figure 16: Pydro QC Tools chart review output of surveyed soundings shoal to charted soundings

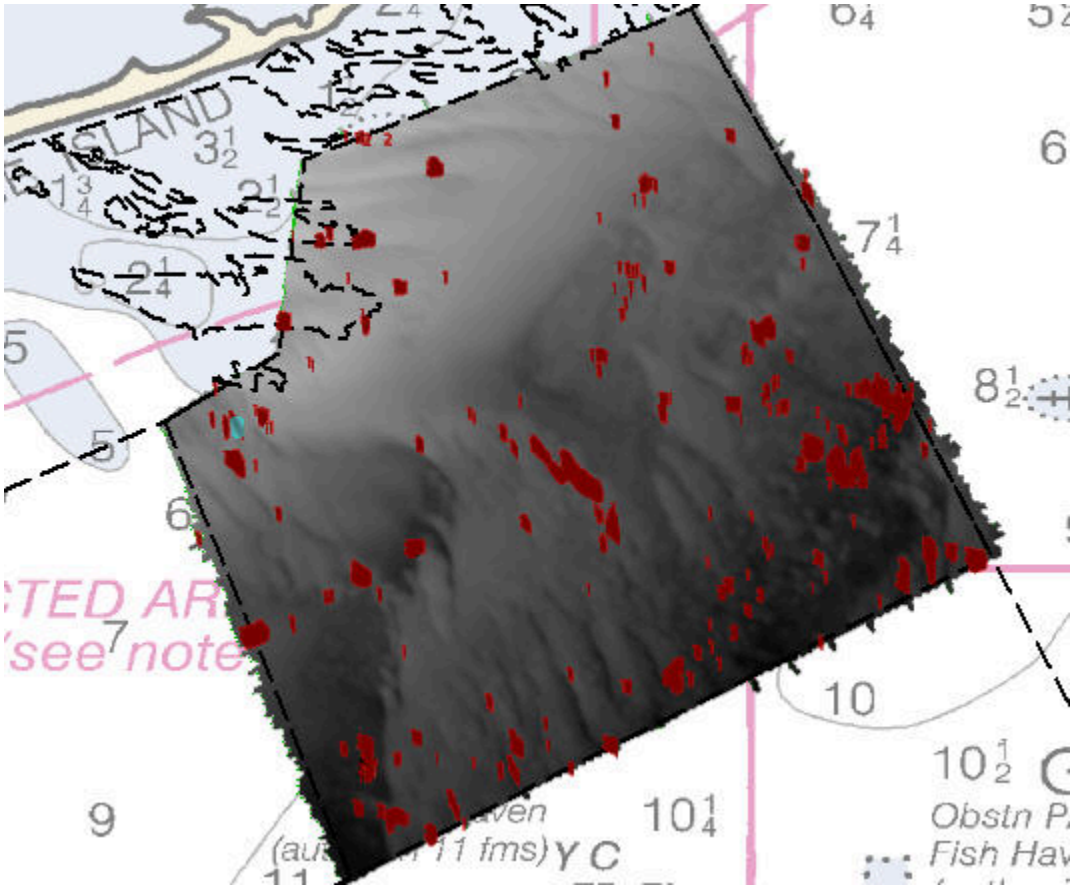

Figure 17: Pydro QC Tools output of survey H13357 areas of shoaling of up to 3ft

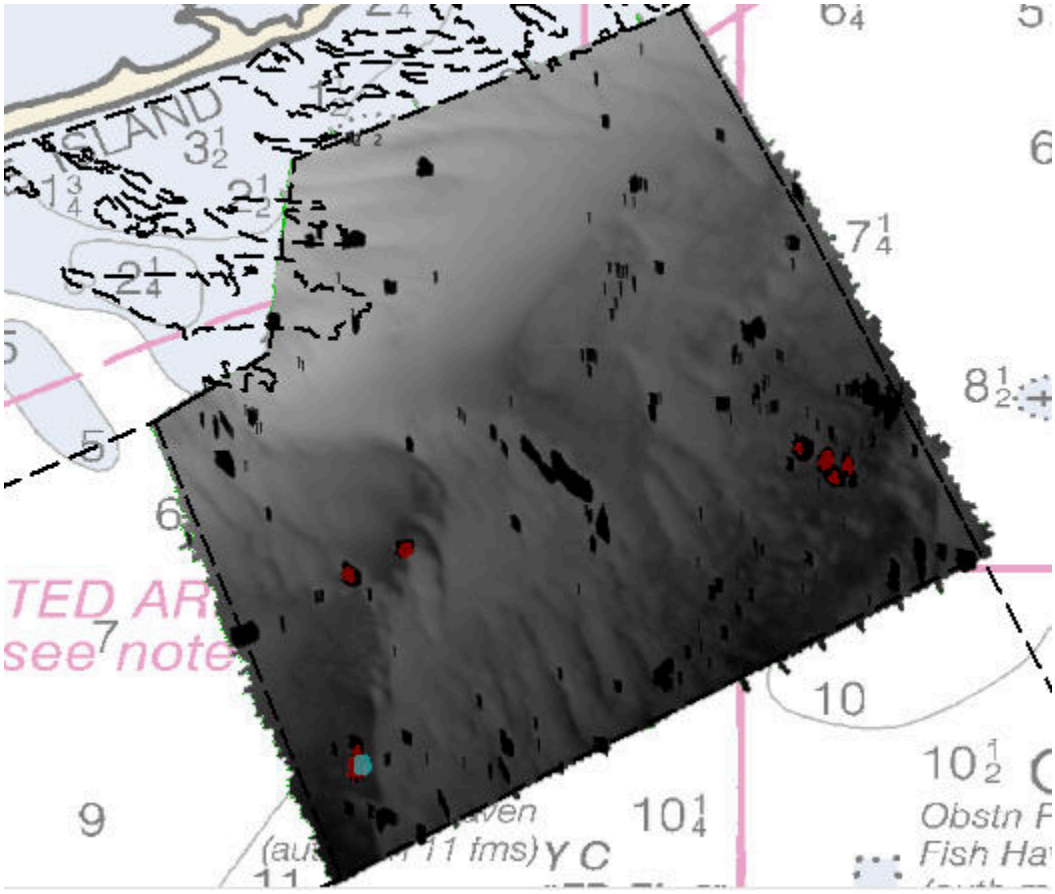

Figure 18: Pydro QC Tools output of survey H13357 areas of shoaling of up to 6ft

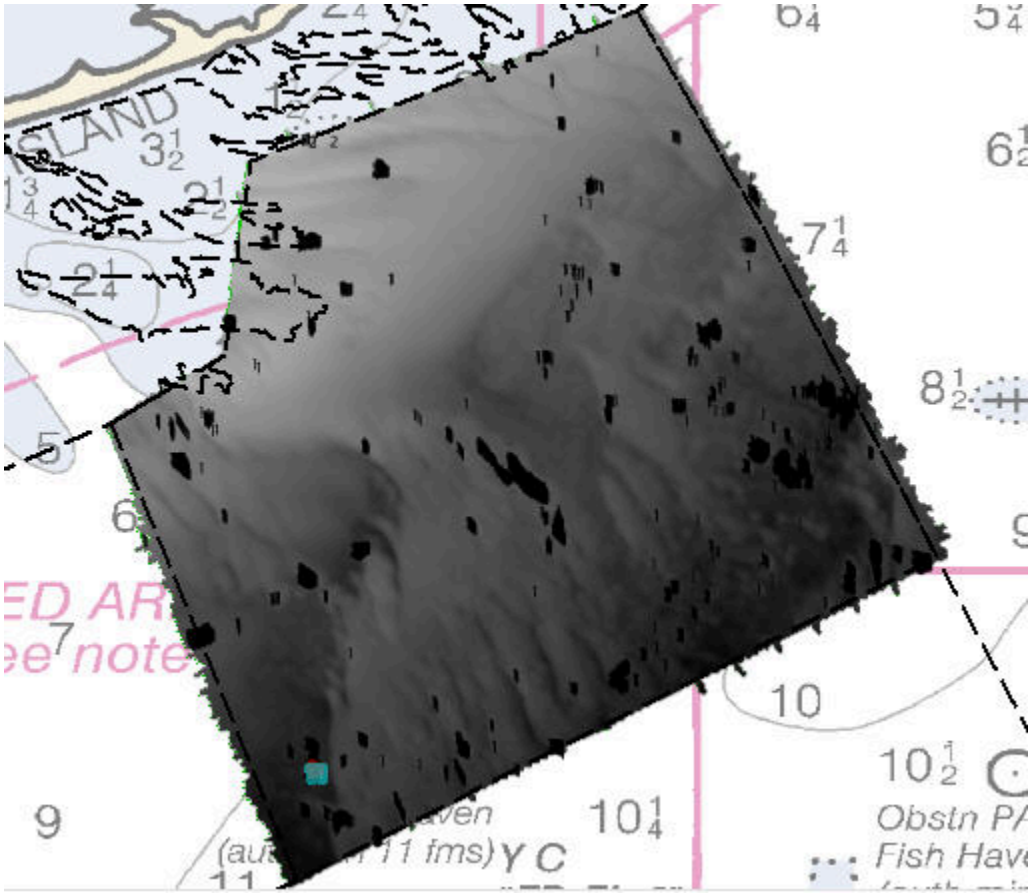

Figure 19: Pydro QC Tools output of survey H13357 areas of shoaling of 7ft to 11ft

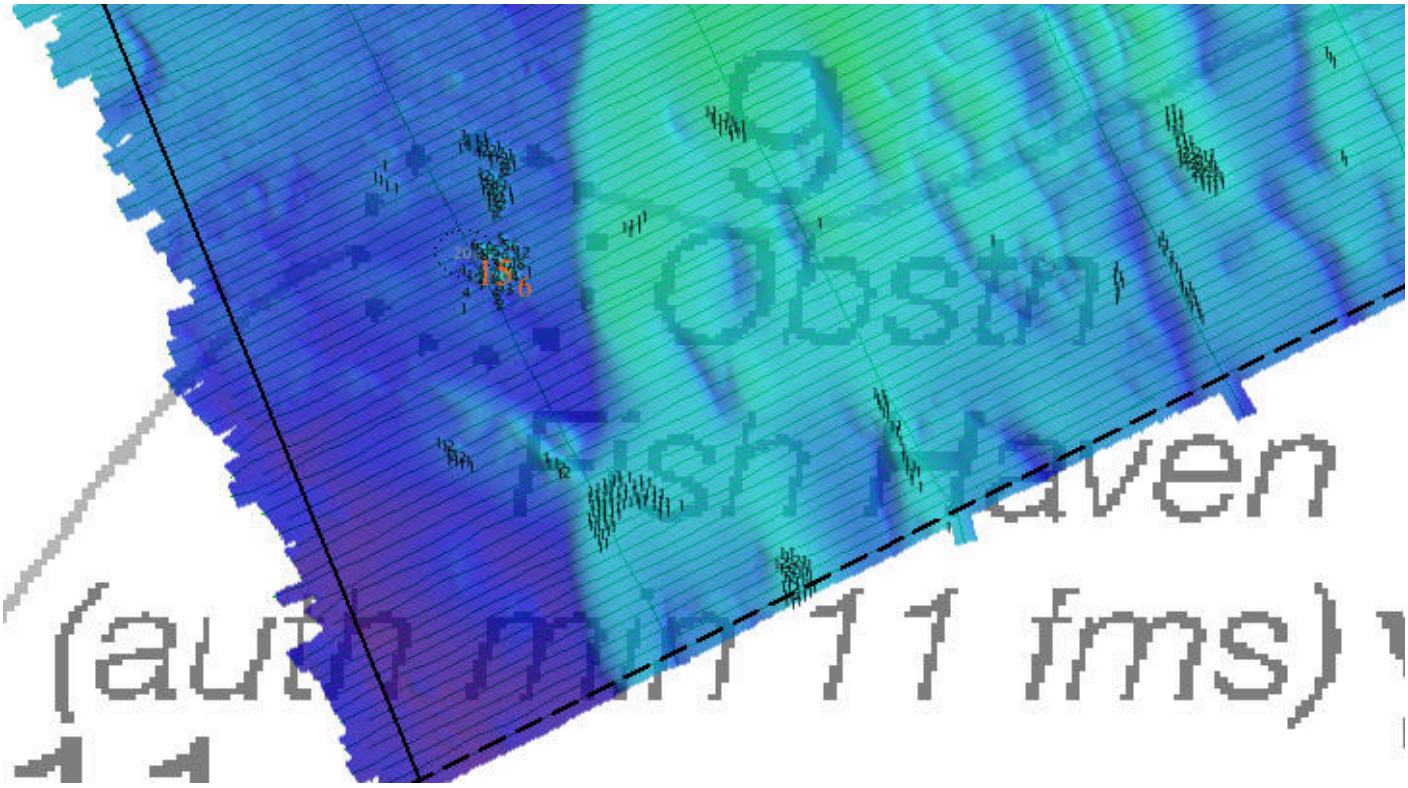

Figure 20: Fish Haven located 29-32-30.2568N 084-45-49.3308W minimum authorized depth violation

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
US5FL65M	1:40000	34	10/01/2019	09/06/2019
US4FL68M	1:80000	17	09/06/2019	10/01/2019
US4FL69M	1:80000	17	06/28/2019	09/27/2019
US3GC06M	1:350000	26	10/01/2019	10/01/2019

Table 14: Largest Scale ENCs

D.1.2 Shoal and Hazardous Features

One potentially hazardous feature area exists within the boundary of survey H13357. Within the charted boundaries of a fish haven, located in the vicinity of 29-32-26.8881N 084-45-42.8527W, the least depth of surveyed soundings from survey H13357 exceeds the minimum authorized least depth and charted

obstruction depth. Reference the Final Feature File associated with this survey for further detail. Due to the general draft of vessel and traffic patterns in the area, no Danger to Navigation Report was submitted.

D.1.3 Charted Features

Three assigned features were investigated within the survey limits of H13357. Reference the Final Feature File associated with this survey for further detail.

D.1.4 Uncharted Features

One uncharted obstruction of note exists within the extents of survey H13357. Reference the Final Feature File associated with this survey for further detail.

D.1.5 Channels

No channels exist for this survey. There are no designated anchorages, precautionary areas, safety fairways, traffic separation schemes, pilot boarding areas, or channel and range lines within the survey limits.

D.2 Additional Results

D.2.1 Aids to Navigation

No Aids to Navigation (ATONs) exist for this survey.

D.2.2 Maritime Boundary Points

No Maritime Boundary Points were assigned for this survey.

D.2.3 Bottom Samples

A total of 10 bottom samples were assigned and investigated within the survey limits of survey H13357. Reference the Final Feature File associated with this survey for further detail.

D.2.4 Overhead Features

No overhead features exist for this survey.

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 and/or environmental conditions exist for this survey.

D.2.9 Construction and Dredging

No present or planned construction or dredging exist within the survey limits.

D.2.10 New Survey Recommendations

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

D.2.11 ENC Scale Recommendations

No new insets are recommended for this area.

E. Approval Sheet

As Chief of Party, field operations for this hydrographic survey were conducted under my direct supervision, with frequent personal checks of progress and adequacy. I have reviewed the attached survey data and reports.

All field sheets, this Descriptive Report, and all accompanying records and data are approved. All records are forwarded for final review and processing to the Processing Branch.

The survey data meets or exceeds requirements as set forth in the NOS Hydrographic Surveys Specifications and Deliverables, Field Procedures Manual, Letter Instructions, and all HSD Technical Directives. These data are adequate to supersede charted data in their common areas. This survey is complete and no additional work is required with the exception of deficiencies noted in the Descriptive Report.

Approver Name	Approver Title	Approval Date	Signature
Allison C Stone	Chief of Party	12/10/2020	Allison C Stone Digitally signed by Allison C Stone Date: 2020.12.14 10:05:25 -05'00'

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