H13041

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

DESCRIPTIVE REPORT

Type of Survey: Navigable Area

Registry Number: H13041

LOCALITY

State(s): Louisiana

General Locality: Gulf of Mexico

Sub-locality: East Tiger Shoal

2017

CHIEF OF PARTY
George G. Reynolds

U.S. DEPARTMENT OF COMMERCE
NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION

REGISTRY NUMBER:

HYDROGRAPHIC TITLE SHEET

H13041

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:	**Gulf of Mexico**
Sub-Locality:	**East Tiger Shoal**
Scale:	**40000**
Dates of Survey:	**08/03/2017 to 10/12/2017**
Instructions Dated:	**06/21/2017**
Project Number:	**OPR-K354-KR-17**
Field Unit:	**Oceans Surveys, Inc.**
Chief of Party:	**George G. Reynolds**
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:

The purpose of this project is to provide contemporary surveys to update National Ocean Service (NOS) nautical charting products. All times are recorded in UTC. Data recorded and presented relative to UTM Zone 15 North. THE INFORMATION PRESENTED IN THIS REPORT AND THE ACCOMPANYING BASE SURFACES REPRESENTS THE RESULTS OF SURVEYS PERFORMED BY OCEAN SURVEYS, INC. DURING THE PERIOD OF 3 AUGUST 2017 TO 12 OCTOBER 2017 AND CAN ONLY BE CONSIDERED AS INDICATING THE CONDITIONS EXISTING AT THAT TIME. REUSE OF THIS INFORMATION BY CLIENT OR OTHERS BEYOND THE SPECIFIC SCOPE OF WORK FOR WHICH IT WAS ACQUIRED SHALL BE AT THE SOLE RISK OF THE USER AND WITHOUT LIABILITY TO OSI.

The purpose of this survey is to provide contemporary surveys to update National Ocean Service (NOS) nautical charts. All separates are filed with the hydrographic data. Any revisions to the Descriptive Report (DR) generated during office processing are shown in bold red italic text. The processing branch maintains the DR as a field unit product, therefore, all information and recommendations within the body of the DR are considered preliminary unless otherwise noted. The final disposition of surveyed features is represented in the OCS nautical chart update products. All pertinent records for this survey, including the DR, are archived at the National Centers for Environmental Information (NCEI) and can be retrieved via https://www.ncei.noaa.gov/.

Table of Contents

A. Area Surveyed 1
A.1 Survey Limits 1
A.2 Survey Purpose 1
A.3 Survey Quality 2
A.4 Survey Coverage 2
A.5 Survey Statistics 3
B. Data Acquisition and Processing 6
B.1 Equipment and Vessels 6
B.1.1 Vessels 6
B.1.2 Equipment 7
B.2 Quality Control 7
B.2.1 Crosslines 7
B.2.2 Uncertainty 13
B.2.3 Junctions 15
B.2.4 Sonar QC Checks 22
B.2.5 Equipment Effectiveness 22
B.2.6 Factors Affecting Soundings 24
B.2.7 Sound Speed Methods 30
B.2.8 Coverage Equipment and Methods 31
B.2.9 Density 31
B.3 Echo Sounding Corrections 32
B.3.1 Corrections to Echo Soundings 32
B.3.2 Calibrations 32
B.4 Backscatter 32
B.5 Data Processing 32
B.5.1 Primary Data Processing Software 32
B.5.2 Surfaces 33
C. Vertical and Horizontal Control 33
C.1 Vertical Control 34
C.2 Horizontal Control 35
D. Results and Recommendations 36
D.1 Chart Comparison 36
D.1.1 Electronic Navigational Charts 38
D.1.2 Maritime Boundary Points 40
D.1.3 Charted Features 40
D.1.4 Uncharted Features 43
D.1.5 Shoal and Hazardous Features 45
D.1.6 Channels 45
D.1.7 Bottom Samples 45
D.2 Additional Results 46
D.2.1 Shoreline 46
D.2.2 Prior Surveys 46
D.2.3 Aids to Navigation 46

D.2.4 Overhead Features..... 46
D.2.5 Submarine Features..... 47
D.2.6 Platforms..... 49
D.2.7 Ferry Routes and Terminals..... 50
D.2.8 Abnormal Seafloor and/or Environmental Conditions..... 50
D.2.9 Construction and Dredging..... 50
D.2.10 New Survey Recommendation..... 50
D.2.11 Marine Mammal Observations..... 50
D.2.12 Coast Pilot Review..... 51
D.2.13 Inset Recommendation..... 51
E. Approval Sheet..... 52
F. Table of Acronyms..... 53

List of Tables

Table 1: Survey Limits..... 1
Table 2: Hydrographic Survey Statistics..... 4
Table 3: Dates of Hydrography..... 5
Table 4: Vessels Used..... 6
Table 5: Major Systems Used..... 7
Table 6: Survey Specific Tide TPU Values. 13
Table 7: Survey Specific Sound Speed TPU Values. 14
Table 8: Junctioning Surveys..... 15
Table 9: Primary bathymetric data processing software..... 32
Table 10: Primary imagery data processing software..... 32
Table 11: Submitted Surfaces..... 33
Table 12: NWLON Tide Stations..... 34
Table 13: Water Level Files (.tid)..... 34
Table 14: Tide Correctors (.zdf or .tc)..... 34
Table 15: USCG DGPS Stations..... 35
Table 16: Largest Scale ENCs..... 38

List of Figures

Figure 1: Survey H13041 MBES coverage overlaid on RNC 11340..... 3
Figure 2: An overview of the crossline layout on a 1-meter surface. In this figure the combined Complete Coverage/Set Line Spacing mainscheme MBES surface is colored by depth. The Complete Coverage crosslines are colored black and the Set Line Spacing crosslines are colored blue. RNC 11349 is visible in the background..... 10
Figure 3: The graph shows a frequency distribution of the depth differences between the H13041 Complete Coverage crossline data and the H13041 Complete Coverage mainscheme MBES data. Statistics from the depth difference sample set are displayed above the graph..... 11

Figure 4: The graph shows a frequency distribution of the depth differences between the H13041 Set Line Spacing crossline data and the H13041 Set Line Spacing mainscheme MBES data. Statistics from the depth difference sample set are displayed above the graph. 12
Figure 5: The graph shows a frequency distribution of the depth differences between H13041 MBES data collected by R/V Ocean Explorer vs. MBES data collected by R/V Osprey. Statistics from the depth difference sample set are displayed above the graph. 13
Figure 6: Survey junctions for Project OPR-K354-KR-17. RNC 11340 is displayed in the background. 15
Figure 7: Surface-to-surface difference histogram comparing Survey H13041 to H11670. 17
Figure 8: Junction area depth disparity area where contemporary soundings compare favorably with the junction survey crossline soundings but compare poorly with the junction survey mainscheme soundings. Soundings from each survey are presented using a similar color palette which allows visualization of the sounding disparity discussed above. 18
Figure 9: Surface-to-surface difference histogram comparing Survey H13041 to H11990. 20
Figure 10: Surface-to-surface difference histogram comparing Survey H13041 to H13040. 21
Figure 11: Surface-to-surface difference histogram comparing Survey H13041 to H13042. 22
Figure 12: Refraction in the SSS imagery is visible in both channels at the 30-meter range of a survey line acquired with the fixed-mount 4125 SSS. 25
Figure 13: This figure shows how cavitation noise at the SSS and MBES transducer heads presented in the converted data. Noise at the 4125 TX head is visible as a dark return at the top of the water column with white streaking across the raw SSS imagery (bottom). In this instance, the SSS white streak coincided with an MBES blowout (top right and top left images). 26
Figure 14: The left image shows a subset window displayed over the Standard Deviation layer from the H13041 1-meter CUBE surface. The yellow colors indicate areas of higher standard deviation in the surface due to a tide offset. The right image displays MBES data loaded into CARIS Subset Editor with a tide offset noted between DN 217 (bright green) and some of the survey lines from DN 233(purple), DN 234 (olive green), and DN 275 (mustard yellow) . Depths and distances are in meters. 27
Figure 15: A school of individual large fish as it appears in the MBES data and in the water column of the raw, un-slant range corrected SSS imagery. The image on the top was taken from the CARIS Subset Editor 3D window with rejected soundings, in this case returns off of the individual fish, colored yellow. 28
Figure 16: SSS image showing a large "fish cloud" on the starboard channel. 29
Figure 17: An example of dolphins as they appear in the water column of the MBES and un-slant range corrected SSS and the acoustic shadow cast in each dataset. In the top panel the rejected MBES soundings are colored yellow. 30
Figure 18: A depth difference surface overlaid on RNC 11349 provides an overview of the areas of change between charted depths and H13041 surveyed soundings. 37
Figure 19: An overview of ENC US3GC03M (shaded orange) superimposed on RNC 11340. 40
Figure 20: An obstruction was surveyed near the location of a disproved platform with CSF-defined position 29-20-08.33N, 92-00-35.24W. 44
Figure 21: A "satellite" platform is surrounded by numerous pilings. The pilings are new features and are included in the FFF. 45
Figure 22: BOEM-defined pipelines that are not charted are highlighted in yellow in reference to RNC 11349. Survey H13041 sheet limits are shown in black. 48

Descriptive Report to Accompany Survey H13041

Project: OPR-K354-KR-17

Locality: Gulf of Mexico

Sublocality: East Tiger Shoal

Scale: 1:40000

August 2017 - October 2017

Oceans Surveys, Inc.

Chief of Party: George G. Reynolds

A. Area Surveyed

This survey provides hydrographic data for the Gulf of Mexico waters approaching the Louisiana Coast south of Marsh Island. The general locations of the survey limits are presented in Table 1.

A.1 Survey Limits

Data were acquired within the following survey limits:

Northwest Limit	Southeast Limit
29° 27' 44.25" N 92° 0' 49.08" W	29° 17' 41.76" N 91° 52' 50.36" W

Table 1: Survey Limits

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

A.2 Survey Purpose

Per the Hydrographic Survey Project Instructions: The Louisiana Coast project will provide contemporary surveys to update National Ocean Service (NOS) nautical charting products. It is in the vicinity of the Atchafalaya River Delta and Port of Morgan City, LA. The survey will address concerns of migrating shoals and exposed hazards by updating bathymetry and positions of hazards, reducing the risk to navigation.

The Port of Morgan City is growing significantly and is working on programs to deepen and maintain the ship channel through the Gulf, bay, and up the Atchafalaya River to the Port of Morgan City where it will intersect with the Gulf of Mexico Intracoastal Waterway. The Port serves the offshore oil, shrimping, seafood, chemicals, and machinery industries. In addition to the port commerce, the Atchafalaya River Delta

has a rich ecosystem that supports both commercial fishing and recreational fishing communities. Updated charts from this project will support commerce and protect the environment by improving the safety of navigation for area traffic.

The project will cover approximately 185 square nautical miles of high priority survey area identified in the 2017 Hydrographic Health model. Adjacent modern surveys show shoaling, with contours that have migrated up to 9 miles since the 1935 vintage source surveys. The adjacent 2016 Atchafalaya survey uncovered numerous exposed pipelines and hazards. This project will significantly update the chart. Data from this project will supersede all prior survey data in the common area.

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	LNM not to exceed 6300 LNM. Acquire backscatter data during all multibeam data acquisition (HSSD Section 6.2). Report significant shoaling via weekly progress report. COR may adjust survey prioritization based on observed shoaling.
Inshore limit to 4 meters water depth for H13041 - H13043	200 meter set line spacing HSSD Section 5.2.2.4 Option A.
Greater than 4 meters water depth for H13041 - H13043	Complete Coverage (refer to HSSD Section 5.2.2.3)
All waters in survey area of H13040	Complete Coverage (refer to HSSD Section 5.2.2.3)
Disproval radius of features in all waters	Complete Coverage (refer to HSSD Section 5.2.2.3)

Survey Coverage is in accordance with the requirements in the Hydrographic Survey Project Instructions (June 21, 2017), the Statement of Work, [May 18, 2017 (SOW)], and the Hydrographic Surveys Specifications and Deliverables, [April 2017 (HSSD)]. Where required, Complete Coverage was accomplished by acquiring one hundred percent (100%) side scan sonar (SSS) coverage with concurrent multibeam echosounder (MBES) with backscatter or Complete Coverage MBES with backscatter. Inside the 4-meter contour, except in investigation or disproval areas, Set Line Spacing MBES was acquired on a 200 meter offset lineplan.

Additional SSS and MBES coverage was obtained as necessary to fill gaps in coverage, to provide a least depth for all significant SSS contacts and for charted feature disprovals. Gaps in the 100% SSS coverage were addressed with SSS fill-in lines or covered with complete MBES data. Bathymetric splits were also acquired to verify or disprove charted depths that fell between two MBES survey lines when the charted depth was shallower than the adjacent survey soundings. The final survey area covers 44.75 square nautical miles (Figure 1).

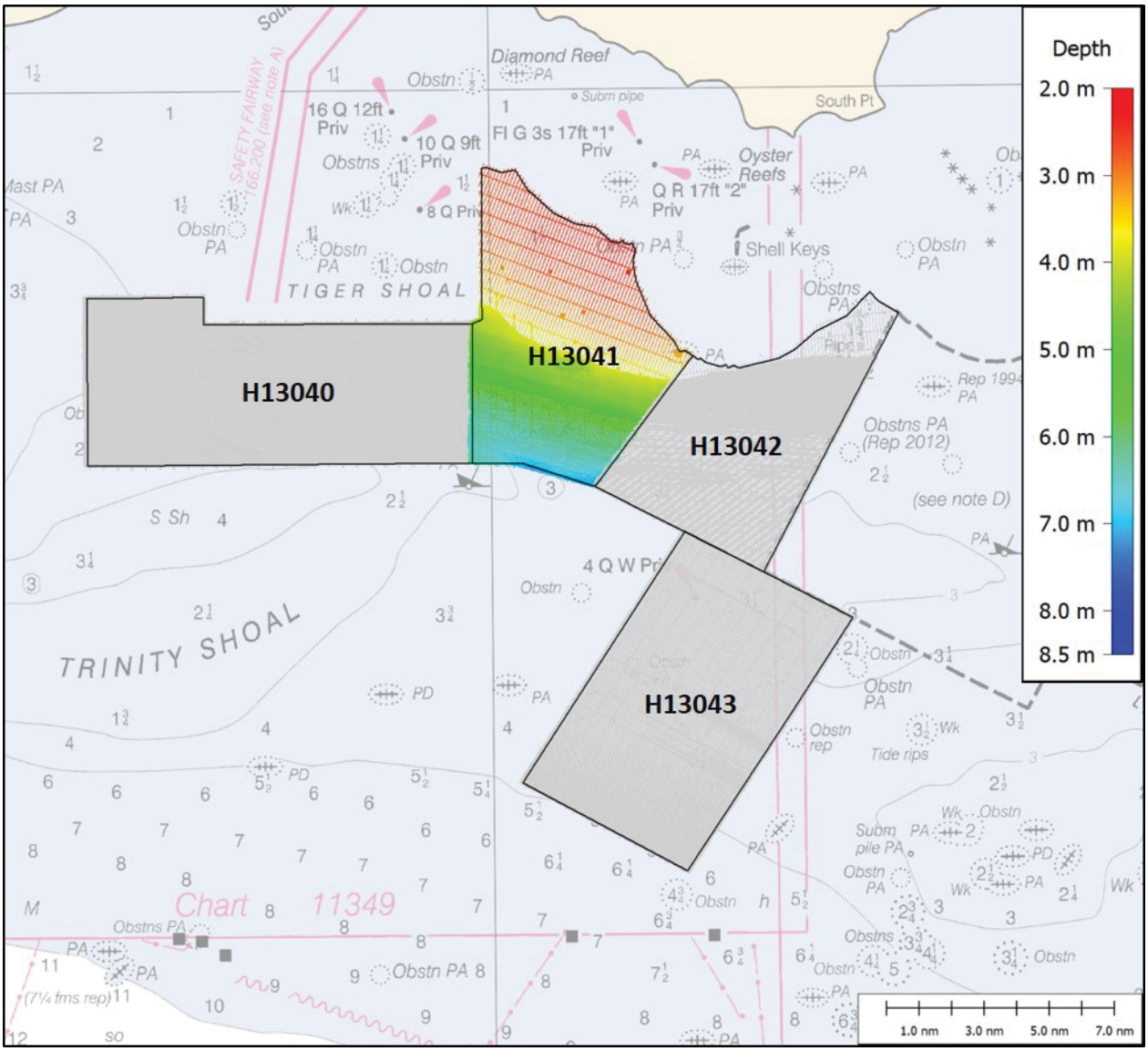

Figure 1: Survey H13041 MBES coverage overlaid on RNC 11340.

A.5 Survey Statistics

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

	HULL ID	*R/V Ocean Explorer "OE"*	*R/V Osprey "SB"*	*Total*
LNM	**SBES Mainscheme**	0	0	0
	MBES Mainscheme	0	238.55	238.55
	Lidar Mainscheme	0	0	0
	SSS Mainscheme	0	0.70	0.7
	SBES/SSS Mainscheme	0	0	0
	MBES/SSS Mainscheme	681.10	121.05	802.15
	SBES/MBES Crosslines	40.65	43.77	84.42
	Lidar Crosslines	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				44.75

Table 2: Hydrographic Survey Statistics

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

Survey Dates	Day of the Year
08/05/2017	217
08/06/2017	218
08/21/2017	233
08/22/2017	234
08/23/2017	235
08/24/2017	236
09/01/2017	244
09/02/2017	245
09/03/2018	246
09/04/2017	247
09/08/2017	251
09/09/2017	252
09/11/2017	254
09/12/2017	255
09/13/2017	256
09/14/2017	257
09/16/2017	259
09/17/2017	260
09/18/2017	261
09/22/2017	265
09/23/2017	266
09/26/2017	269
09/27/2017	270
10/12/2017	285

Table 3: Dates of Hydrography

The lineal nautical miles (LNM) for MBES-only development and fill in lines were included under the heading "Mainscheme MBES" and the LNM for SSS-only fill in lines were included under the heading "Mainscheme SSS" in Table 2, Hydrographic Survey Statistics. The overall crossline/mainscheme MBES line percentage (8.1%) is based on combined coverage types, e.g. Complete Coverage and Set Line Spacing. If considered independently the Complete Coverage crossline percentage is 5.0% and the Set Line Spacing crossline percentage is 19.2%.

B. Data Acquisition and Processing

B.1 Equipment and Vessels

Refer to the OPR-K354-KR-17 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	***R/V Ocean Explorer "OE"***	***R/V Osprey "SB"***
LOA	18 meters	7.9 meters
Draft	2 meters	0.6 meters

Table 4: Vessels Used

The survey was conducted employing two vessels. Much of the relatively deep reaches of the study area were surveyed using the R/V Ocean Explorer. A smaller vessel, the R/V Osprey, surveyed relatively shallow reaches of the study area as well as certain “deep” water areas. For the sake of clarity, especially as concerns the field data file naming convention, two distinct abbreviations are employed. Specifically, files generated on the R/V Ocean Explorer include “OE” in the name and files generated on the R/V Osprey include “SB” which is meant to indicate “small boat” files.

B.1.2 Equipment

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

Manufacturer	Model	Type
Onboard the R/V Ocean Explorer	-	-
EdgeTech	4125	SSS
Teledyne RESON	SeaBat 8125	MBES
ODIM Brooke Ocean	MVP30	Sound Speed System
AML Oceanographic	Micro X	Sound Speed System
AML Oceanographic	Base X	Sound Speed System
Applanix	POS MV 320 v4	Positioning and Attitude System
Trimble	ProBeacon	Positioning System
Trimble	MS750	Positioning System
Onboard the R/V Osprey	-	-
EdgeTech	4125	SSS
Teledyne RESON	SeaBat 8125	MBES
Sea-Bird Scientific	SBE-37	Sound Speed System
AML Oceanographic	Base X	Sound Speed System
Applanix	POS MV 320 v5	Positioning and Attitude System
Leica	MX52R	Positioning System
Trimble	DSM232	Positioning System

Table 5: Major Systems Used

Table 5 summarizes the primary equipment used on the respective vessels to acquire MBES and SSS data. All equipment was installed, calibrated and operated in accordance with the DAPR.

B.2 Quality Control

B.2.1 Crosslines

Multibeam/single beam echo sounder/side scan sonar crosslines acquired for this survey totaled 8.11% of mainscheme acquisition.

A total of 84.42 nm of crossline data were acquired August 5 (DN217), August 6, 2017 (DN 218), August 24, 2017 (DN 236) and September 4, 2017 (DN247). Of these data, 40.65 nm from DN 217 and DN 218 apply to the deeper water, Complete Coverage dataset (acquired by the R/V Ocean Explorer). The 43.77 nm of crossline data acquired on DN 236 and DN 247 apply to the shallow water Set Line Spacing dataset (acquired by the R/V Osprey).

Complete Coverage crossline mileage equaled 5.0%. Set Line Spacing crossline mileage equaled 19.2%. Crosslines were run nominally perpendicular to their coverage type-specific mainscheme lines (Figure 2).

Soundings from mainscheme lines and crosslines were compared periodically throughout survey operations reviewing preliminary MBES surfaces and using CARIS HIPS Subset Editor. Crossline comparisons provided confirmation that the system offsets and biases were entered correctly and verified the accuracy of sounding correctors (i.e. tide, sound speed, TrueHeave).

Statistical quality control information was compiled from various difference surfaces, generated in CARIS HIPS. In all cases the depth layer of a 1-meter CUBE surface was used. The following crossline comparisons were undertaken:
1) Complete Coverage MBES mainscheme vs. Complete Coverage MBES crosslines. These data were generally acquired by the R/V Ocean Explorer.

2) Set Line Spacing MBES mainscheme vs. Set Line Spacing MBES crosslines. These data generally acquired by the R/V Osprey.

3) R/V Ocean Explorer MBES mainscheme & crosslines vs. R/V Osprey MBES mainscheme and crosslines. This test compares data acquired by the R/V Ocean Explorer to data acquired by the R/V Osprey. There is not a regular pattern of overlap between the two vessels. Rather, the overlaps primarily occur throughout the southern 2/3 of the survey where R/V Ocean Explorer data were later supplemented with additional MBES data acquired by the R/V Osprey. Despite the fact that there was not a deliberate attempt to create overlap for the purposes of this analysis, over 350,000 individual 1-meter comparison cells exist. The relatively large amount of overlap cells is due to the fact that much of the comparison data is derived from overlapping parallel lines.

In each case the crossline analysis results demonstrate good to excellent agreement between crossline soundings and mainscheme soundings. The following numbered list (keyed to the comparison surface description numbered list above) summarize the maximum depth differences and average depth differences of the respective comparisons:
1) Maximum depth difference 0.51 meters, average depth difference 0.12 meters. Depth differences, including the maximum difference of 0.51 meters, are mostly attributable to tide offsets. However, over 40 days elapsed between acquisition of the crosslines and some of the worst mainscheme line agreement nodes. During this period Hurricane Harvey passed relatively close to the survey area. As such some discrepancy between the early-survey crosslines and late-survey mainscheme lines is expected.

2) Maximum depth difference 0.26 meters, average depth difference 0.02 meters. In contrast to the Complete Coverage analysis above, the majority of crosslines considered in this case (along with all set line spacing mainscheme lines) were acquired after Hurricane Harvey passed.

3) Maximum depth difference 0.72 meters, average depth difference 0.05 meters. The maximum difference of 0.72 meters occurs at approximate position 29-20-55.63N, 91-59-19.27W at the location of a platform with nearby jackup barge footprints. In this case, DGPS positioning accuracy (+/- 1-meter) is responsible for enough of a shift in vessel/day-specific sounding points to cause a relatively large difference in the 1-meter comparison grid cells, i.e. the crossline statistics consider depths from the bottom of a jackup barge footprint (from one dataset) and the top of the berm from the same footprint (from another dataset) within the same 1-meter comparison cell. Discounting this anomalous region (and a few other comparable feature-specific instances) the vessels compare quite well.

The allowable TVU for the range of water depths within Survey H13041 is 0.50 to 0.51 meters.

Figure 3 is a histogram showing the distribution of depth differences for all comparison grid cells considered in comparison case #1 noted above. The total number of 1-meter comparison cells equaled 409,916. Of 409,916 possible comparison cells, 377,577 or 92.11% of the cells include crossline and mainscheme soundings that match within +/- 25 centimeters.

Figure 4 is a histogram showing the distribution of depth differences for all comparison grid cells considered in comparison case #2 noted above. The total number of 1-meter comparison cells equaled 44,118. Of 44,118 possible comparison cells, 44,115 or 99.99% of the cells include crossline and mainscheme soundings that match within +/- 25 centimeters.

Figure 5 is a histogram showing the distribution of depth differences for all comparison grid cells considered in comparison case #3 noted above. The total number of 1-meter comparison cells equaled 359,668. Of 359,668 possible comparison cells, 350,337 or 97.41% of the cells include crossline and mainscheme soundings that match within +/- 25 centimeters.

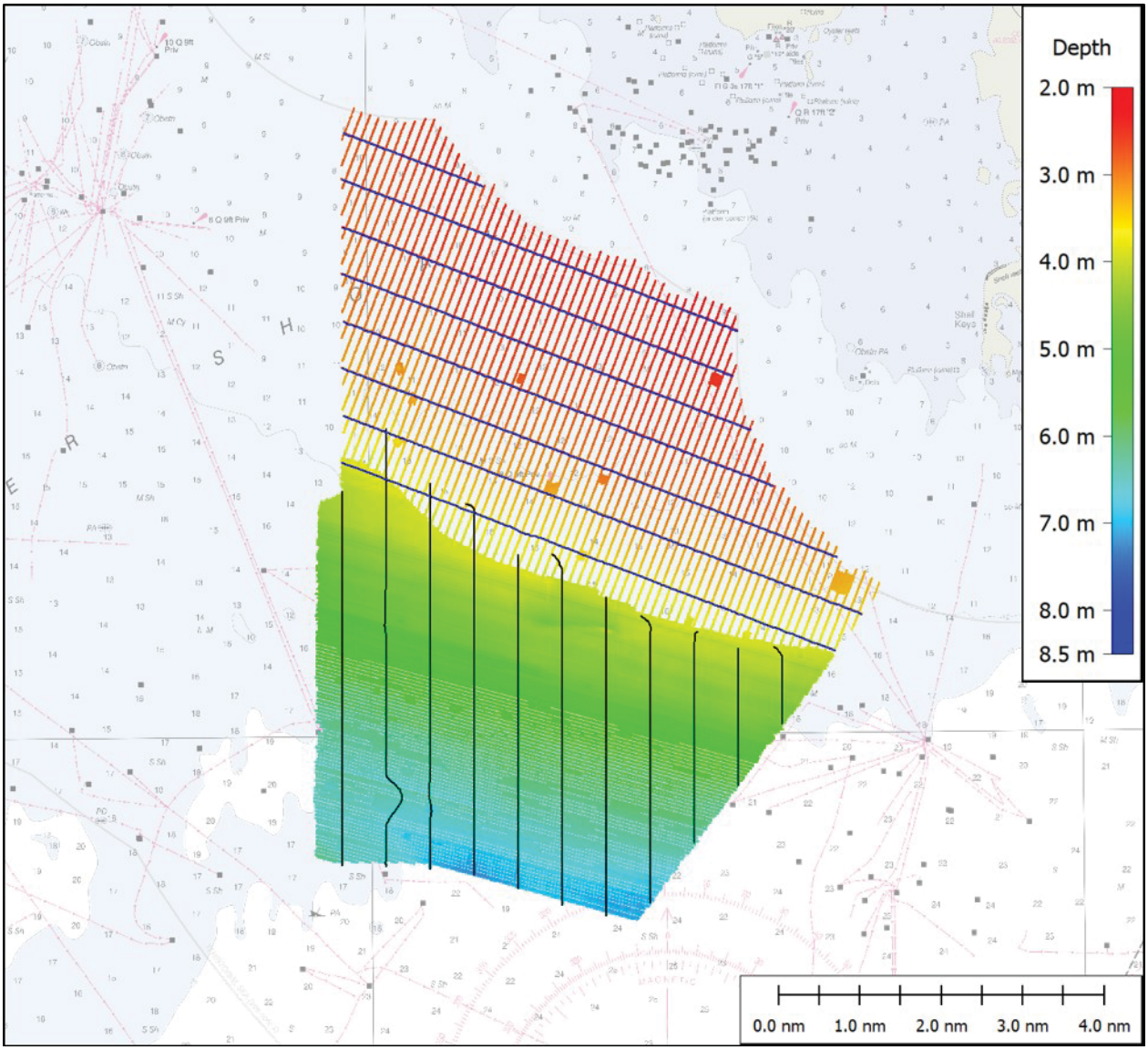

Figure 2: An overview of the crossline layout on a 1-meter surface. In this figure the combined Complete Coverage/Set Line Spacing mainscheme MBES surface is colored by depth. The Complete Coverage crosslines are colored black and the Set Line Spacing crosslines are colored blue. RNC 11349 is visible in the background.

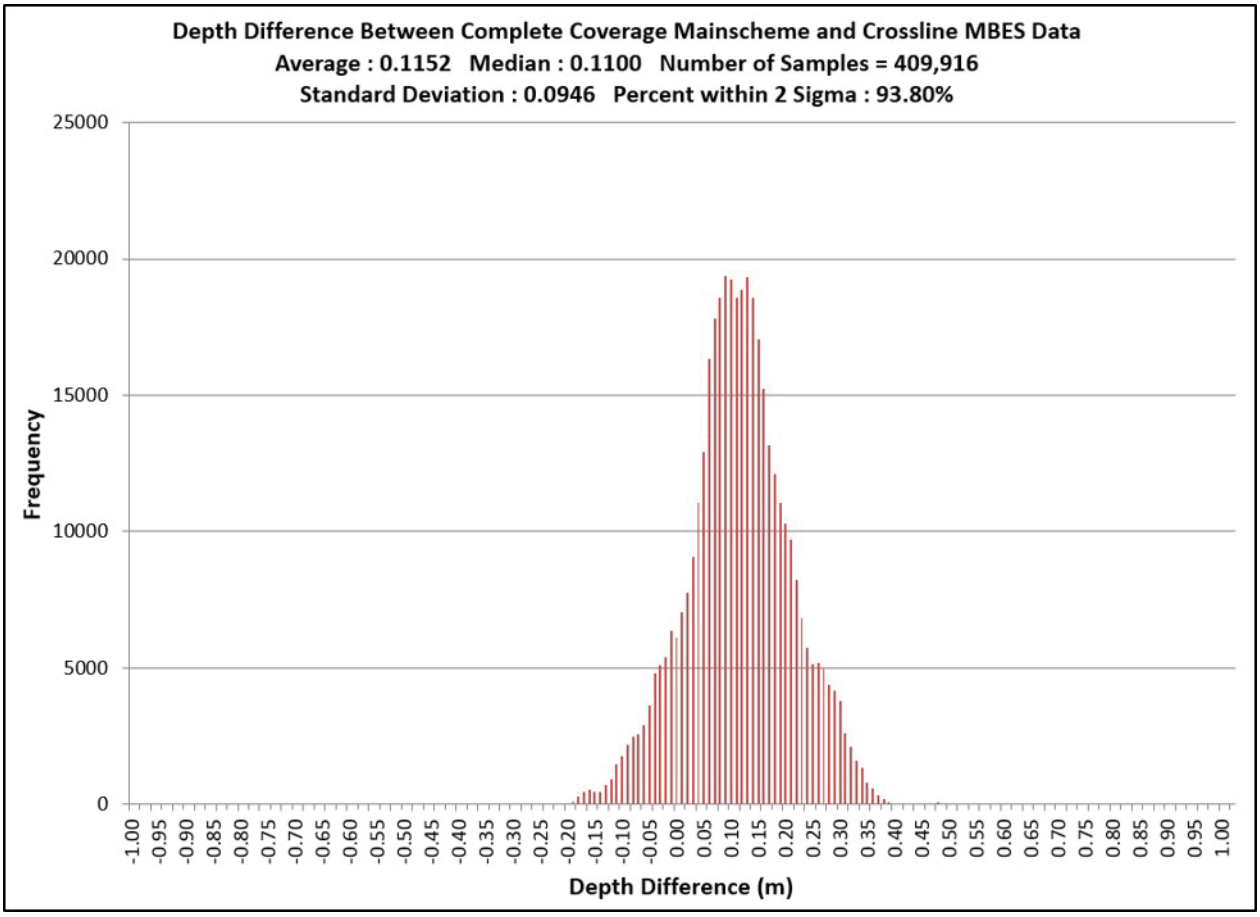

Figure 3: The graph shows a frequency distribution of the depth differences between the H13041 Complete Coverage crossline data and the H13041 Complete Coverage mainscheme MBES data. Statistics from the depth difference sample set are displayed above the graph.

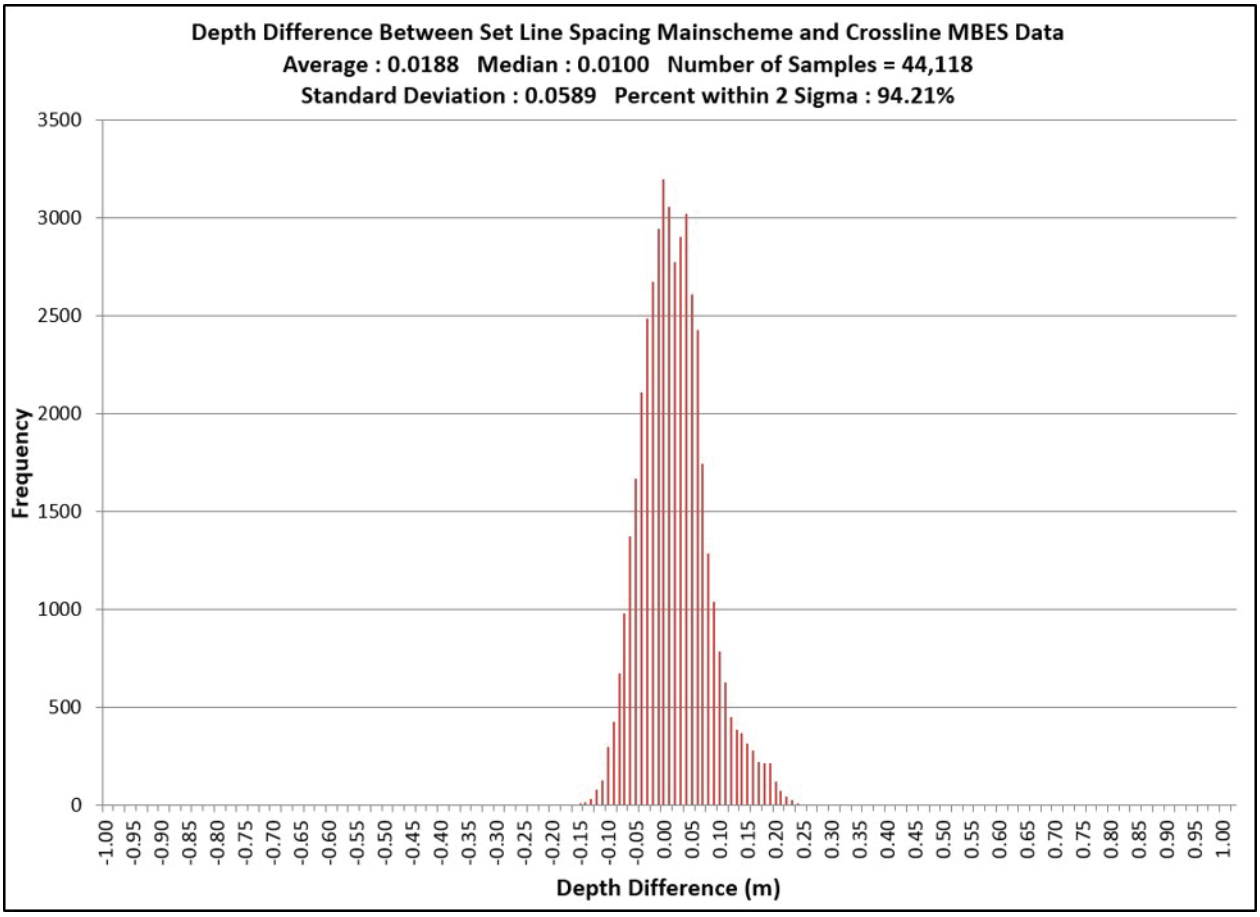

Figure 4: The graph shows a frequency distribution of the depth differences between the H13041 Set Line Spacing crossline data and the H13041 Set Line Spacing mainscheme MBES data. Statistics from the depth difference sample set are displayed above the graph.

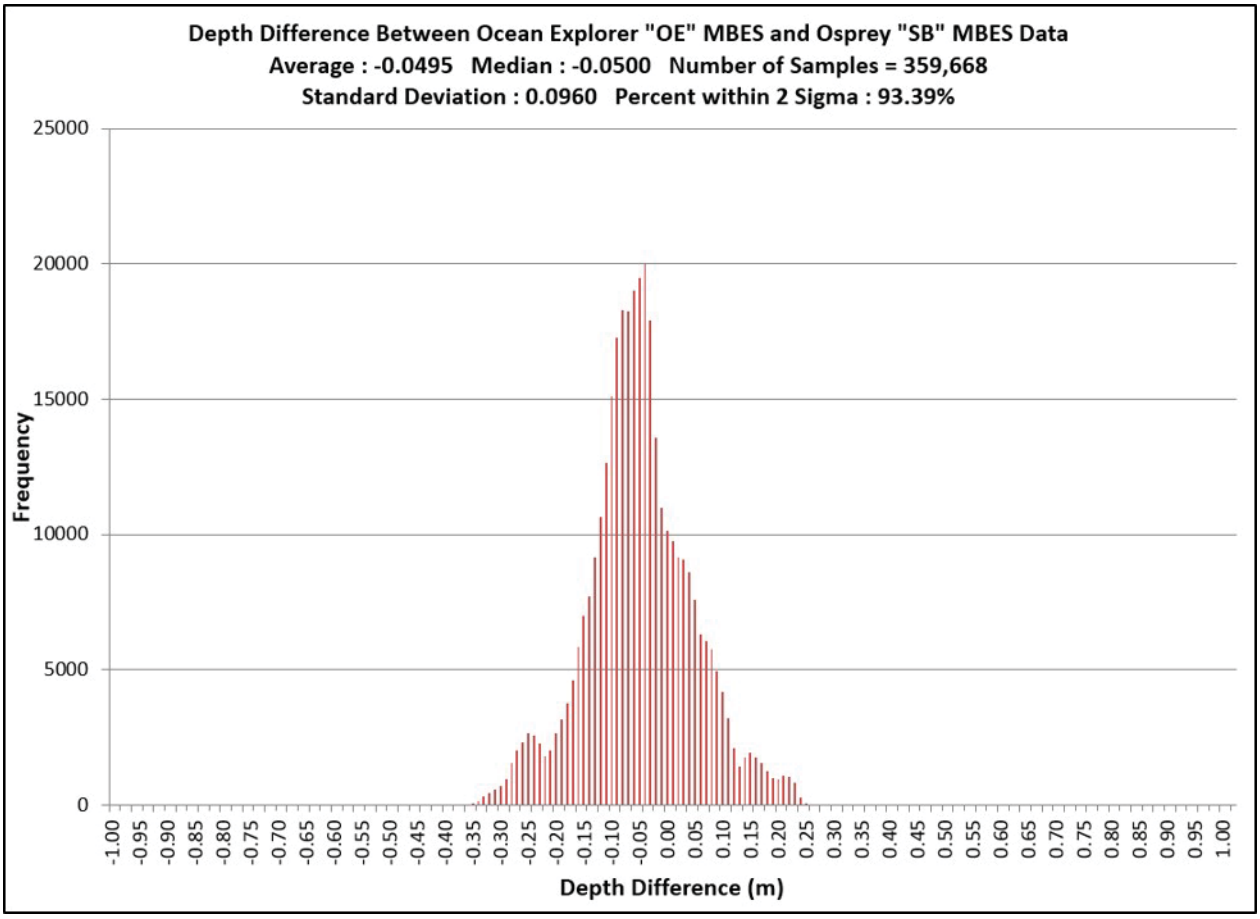

Figure 5: The graph shows a frequency distribution of the depth differences between H13041 MBES data collected by R/V Ocean Explorer vs. MBES data collected by R/V Osprey. Statistics from the depth difference sample set are displayed above the graph.

B.2.2 Uncertainty

The following survey specific parameters were used for this survey:

Method	Measured	Zoning
Discrete Zoning	0.01 meters	0.19 meters

Table 6: Survey Specific Tide TPU Values.

Hull ID	Measured - CTD	Measured - MVP	Surface
R/V Ocean Explorer		1 meters/second	2 meters/second
R/V Osprey	4 meters/second		2 meters/second

Table 7: Survey Specific Sound Speed TPU Values.

The methods used to minimize the uncertainty in the corrections to echo soundings are described in detail in Section B. Processing and Quality Control of the project DAPR. Survey H13041 did not deviate from the methods documented in the DAPR.

The Total Vertical Uncertainty Quality Check (TVU QC) "Ratio Method" was used to evaluate IHO uncertainty for the finalized surface. The TVU QC "Ratio Method" is described in the Chapter 4 Appendices of the NOAA OCS Field Procedures Manual (FPM) dated April 2014. Per the FPM TVU QC section, "The hydrographer should use the finalized surface because this surface will identify areas where either the uncertainty or the standard deviation exceeded the maximum allowable error and the greater of these two values is used in addition to having the uncertainty scaled to a 95% CI, whereas unfinalized surface uncertainties are reported at the 68% CI." The FPM TVU QC section also states that, "[ratio] values which do not require further examination are from -1 to 0 and the values which do require further examination are from -100 to -1".

A finalized surface was used in this analysis. The surface was finalized using the “greater of the two” option as the basis for calculating “Final Uncertainty” in the CARIS “Finalize Base Surface” utility.

In anticipation of shallow conditions in the north end of the survey area the Project Instructions requested Complete Coverage in regions deeper than 4-meters and Set Line Spacing coverage in regions shoaler than 4-meters. This assignment would normally result in production of two delivered surfaces: a 1-meter Complete Coverage surface and a 4-meter Set Line Spacing surface. After consultation with the COR and AHB personnel it was agreed that the entire survey area would be presented as a single, 1-meter surface. As such one (1) MBES CUBE (Combined Uncertainty and Bathymetric Estimator) surface was delivered along with Survey H13041: "H13041_MB_1m_MLLW_Final." The 1-meter surface is intended to satisfy coverage and sounding density requirements for both of the assigned coverage type-specific regions within the survey. The TVU QC values discussed below are calculated using the comprehensive 1-meter surface.

Results from the TVU QC indicate that 99.99% of the nodes from the submitted surface meet IHO Order 1 uncertainty specifications, i.e. the ratio values of nearly all the nodes are less than -1. Of the 30,068,726 nodes considered, 15 had a ratio value below -1. Upon examination it was found that the nodes with ratio values below -1 were located over known seafloor disturbances and/or known discrete features resulting in higher standard deviation values and finalized uncertainty values, which is to be expected.

B.2.3 Junctions

Two (2) prior surveys and two (2) contemporary surveys junction with Survey H13041. Figure 6 displays the location of the prior and contemporary junction surveys for Project OPR-K354-KR-17. The allowable TVU for the range of water depths within Survey H13041 is 0.50 to 0.51 meters. Therefore, according to the XMLDR Junction Area "maximum difference" threshold guidance equation (SQRT2 * TVU) the junction discrepancy action threshold = 0.71 meters.

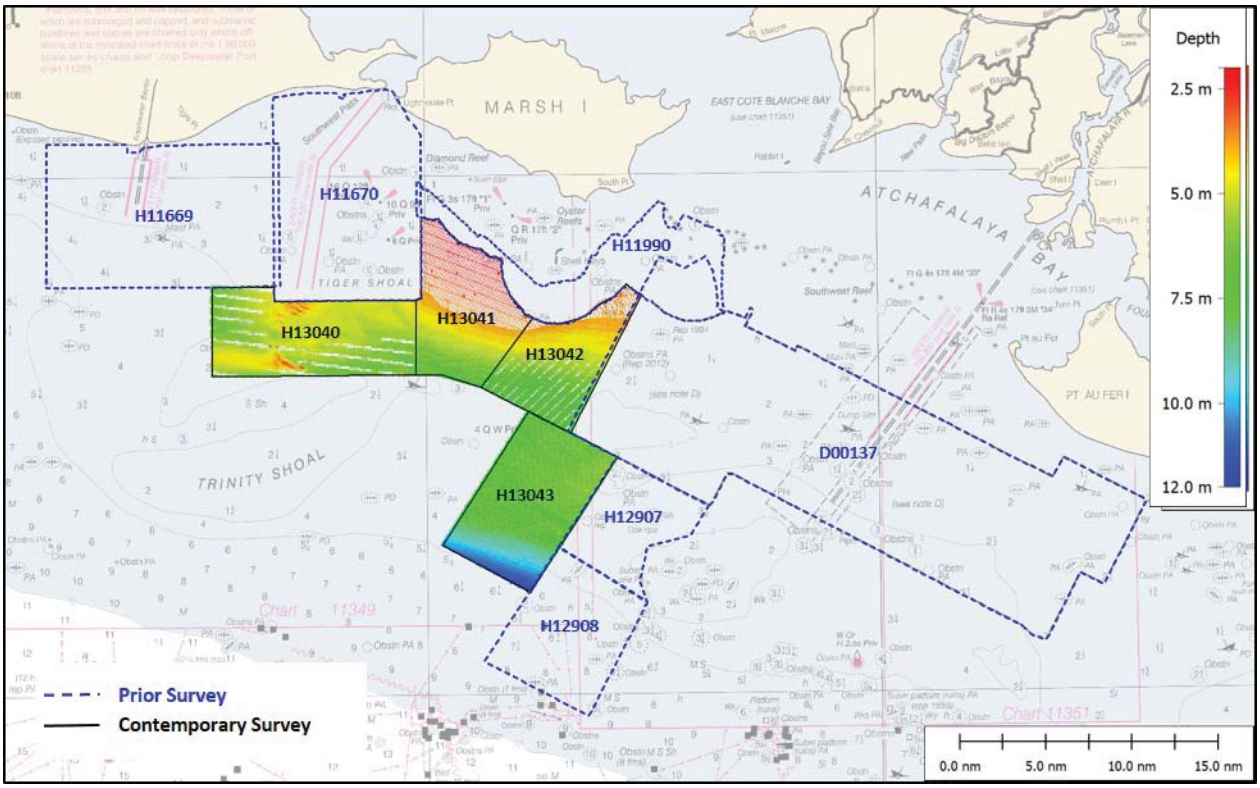

Figure 6: Survey junctions for Project OPR-K354-KR-17. RNC 11340 is displayed in the background.

The following junctions were made with this survey:

Registry Number	Scale	Year	Field Unit	Relative Location
H11670	1:20000	2007	C&C	NW
H11990	1:20000	2008	C&C	N
H13040	1:40000	2017	Oceans Surveys, Inc.	W
H13042	1:40000	2017	Oceans Surveys, Inc.	SE

Table 8: Junctioning Surveys

H11670

Survey H11670, a MBES/SSS survey conducted by C&C in 2007-2008, overlaps the northern half of the western border of H13041. Survey H11670 was run with the intention of achieving 200% SSS coverage. In the overlap area of Survey H13041 both 100% SSS (with concurrent MBES) and Set Line Spacing MBES-only were acquired. The majority of the overlap area is in the H13041 Set Line Spacing region. As such, each survey's MBES coverage is essentially "skunk stripe coverage."

The mainscheme line plan orientation for each survey type is variable. The common border length is approximately 9,000 meters. The junction area between the surveys is relatively sparse. The overlap between surveys is on the order of 100-150 meters.

Depth data for Survey H11670 were downloaded from the National Geophysical Data Center (NGDC) website (http://www.ngdc.noaa.gov) in the form of 2-meter resolution Bathymetric Attributed Grids (BAG), "H11670_2m_MLLW_1of6.bag" and "H11670_2m_MLLW_5of6.bag."

To conduct the junction comparison a 2-meter CUBE surface was generated from the entire MBES data set for Survey H13041, "H13041_MB_2m_MLLW." In CARIS HIPS, depths from the "H11670_2m_MLLW_1of6" and "H11670_2m_MLLW_5of6" BAGs were subtracted from the depths in the "H13041_MB_2m_MLLW" CUBE surface using the CARIS HIPS Difference Surface function. A histogram of the differences is shown in Figure 7. The total number of 2-meter comparison cells equaled 5,924. Of 5,924 possible comparison cells, 5,647 or 95.32% of the cells include survey-specific soundings that match within +/- 25 centimeters. 99.26% of junction comparison cells have a difference < 0.71 meters.

With a few noteworthy exceptions, depths from the H13041 survey show good agreement with depths from the H11670 survey. Depth discrepancies equaled 0.76 centimeters or less. However the mean difference is only 4 centimeters. On average, Survey H11670 depths were deeper than H13041 depths. The largest depth discrepancies occur in the vicinity of position 29-25-41.68N, 92-00-21.46W. In this region of overlap the contemporary soundings and the junction soundings disagree by as much as 0.76 meters. In this same general area mainscheme and crossline soundings from the junction survey disagree by as much as 0.6 meters whereas soundings from the contemporary survey show fairly good agreement (<20 cm) with the nearest junction survey's crossline. In summary, it is surmised that the junction survey used a flawed tide source to correct mainscheme soundings in the area of overlap discussed herein (see Figure 8).

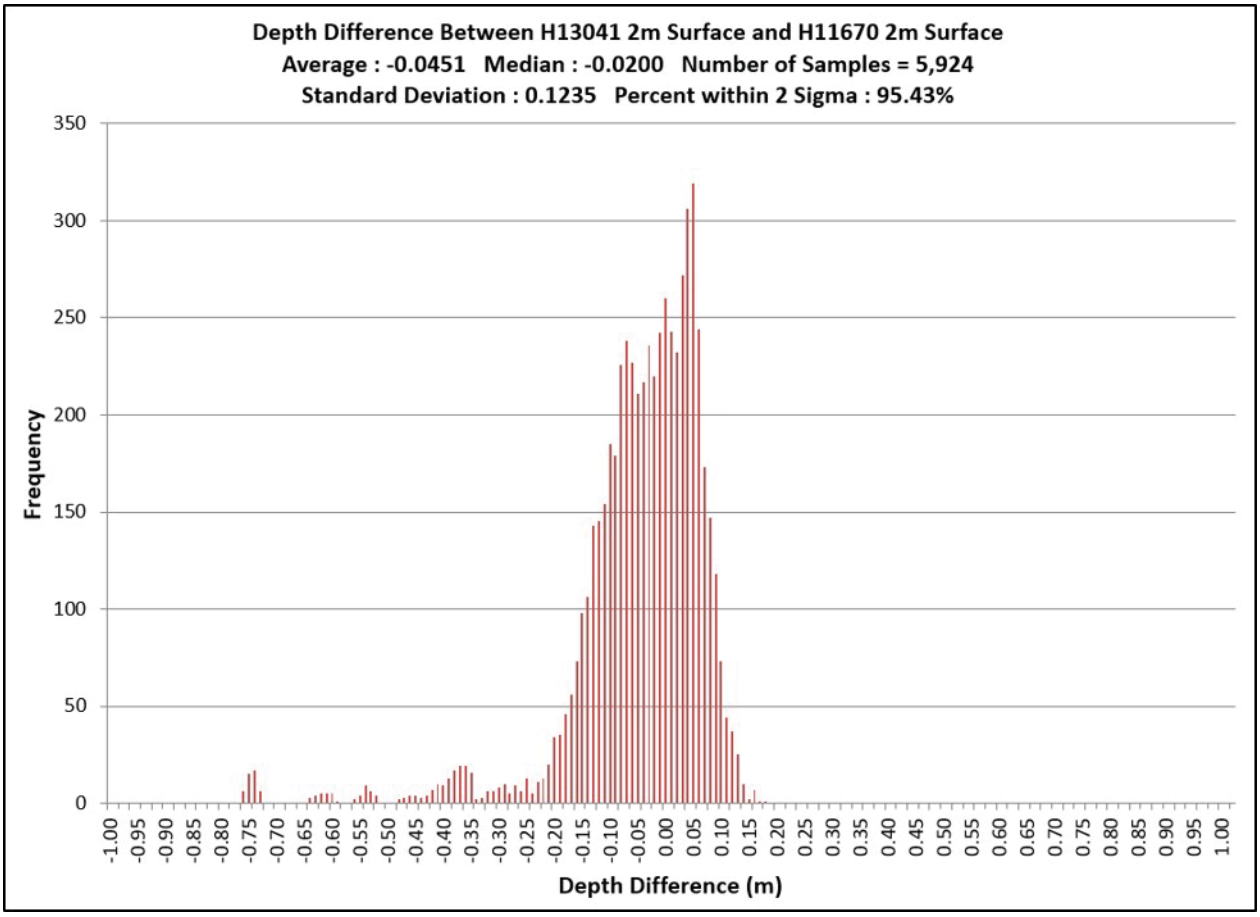

Figure 7: Surface-to-surface difference histogram comparing Survey H13041 to H11670.

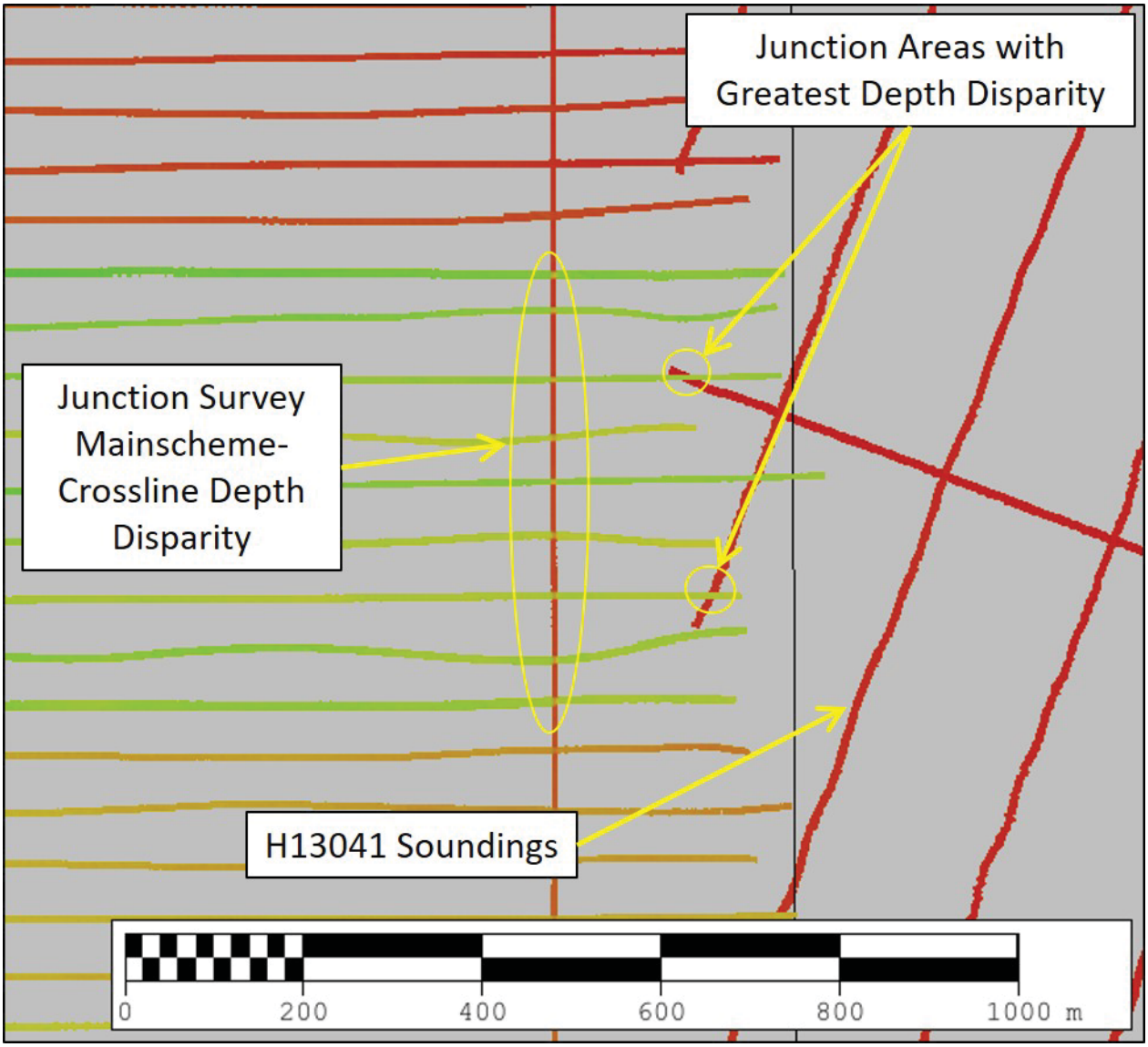

Figure 8: Junction area depth disparity area where contemporary soundings compare favorably with the junction survey crossline soundings but compare poorly with the junction survey mainscheme soundings. Soundings from each survey are presented using a similar color palette which allows visualization of the sounding disparity discussed above.

H11990

Survey H11990, a MBES/SSS survey conducted by C&C in 2008-2011, overlaps the northern border of H13041. Survey H11990 was run with the intention of achieving 200% SSS with concurrent MBES and, in the overlap area, Survey H13041 was run on a MBES-only 200-meter Set Line Spacing plan. As such, each survey's MBES coverage is essentially "skunk stripe coverage." In the overlap area the mainscheme line plan for Survey H11990 has various orientations. As a result the Survey H13041 Set Line Spacing line plan, oriented nominally south-north, meets the junction survey at various intersection angles. The common

border length is approximately 18,000 meters. The junction area between the surveys is relatively sparse. The combined overlap of the adjacent survey areas is around 100-250 meters.

Depth data for Survey H11990 were downloaded from the National Geophysical Data Center (NGDC) website (http://www.ngdc.noaa.gov) in the form of 1-meter resolution Bathymetric Attributed Grid (BAG)s, "H11990_MB_1m_MLLW_2of7.bag," "H11990_MB_1m_MLLW_3of7.bag," and "H11990_MB_1m_MLLW_4of7.bag."

To conduct the junction comparison a 1-meter CUBE surface was generated for the overlapping MBES data set for Survey H13041, "H13041_North_MB_1m_MLLW." In CARIS HIPS, depths from the three H11990_1m_MLLW BAGs were subtracted from the depths in the "H13041_North_MB_1m_MLLW" CUBE surface using the CARIS HIPS Difference Surface function. A histogram of the differences is shown in Figure 9.

Depths from the H13041 survey show relatively poor agreement with depths from the H11990 survey. Depth discrepancies equaled 1.15 meters or less with a mean difference of 0.48 meters. Unlike other junction analyses presented along with Project OPR-KR354-KR-17, the maximum difference in this junction analysis does not occur at a discrete feature or seafloor anomaly. Rather, the maximum junction depth disparity is one of many differences in the area with nearly the same magnitude. Survey H11990 depths were overwhelmingly deeper than H13041 depths. Given that the contemporary survey's mainscheme/ crossline agreement is consistently tight in the region of the junction and that the junction analysis shows a consistent offset it follows that the consistent offset could be due to application of tide correctors, and/or sediment transport in the H13041 survey area since the 2008-2011 survey. It is noted that in the northwest corner of Survey H13041 there is a consistent offset on the order of 0.3 meters in the area of overlap between junction Surveys H11990 and H11670 (discussed above). Based on this observation it appears that there may have been some trouble with internal consistency of the junction surveys which would likely point to a tide application issue.

Most (90.59%) junction comparison cells have a difference < 0.71 meters.

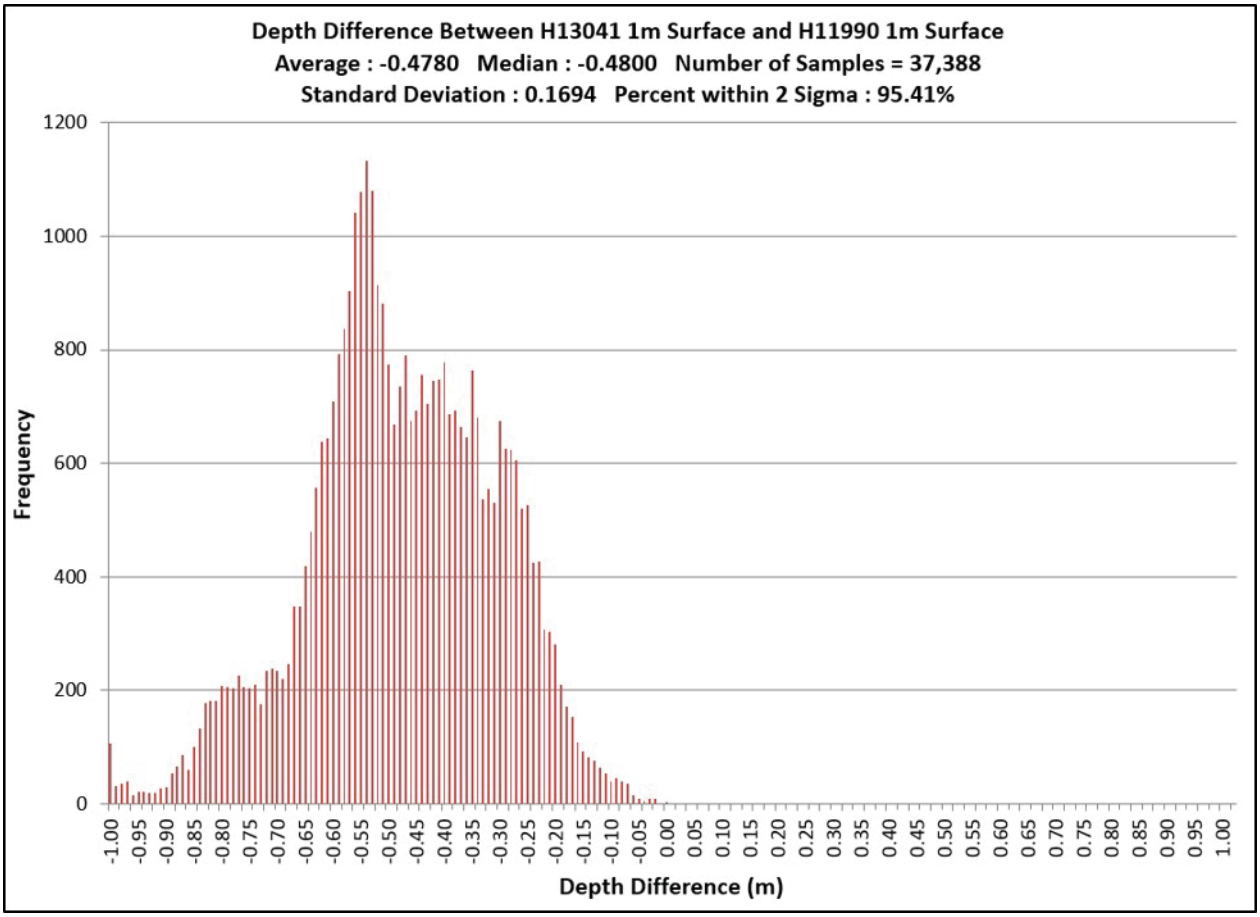

Figure 9: Surface-to-surface difference histogram comparing Survey H13041 to H11990.

H13040

The approximate overlap between the bathymetric data from contemporary Surveys H13041 and H13040 was approximately 300 meters (within Complete Coverage areas) along a common border of approximately 8,000 meters. Both surveys were acquired to meet 100% SSS Coverage over the length of the common border. Given that the respective line plans meet at an obtuse angle there is a fair amount of overlapping data despite the skunk stripe nature of Complete Coverage MBES coverage.

Depths from 1-meter BASE surfaces compiled from the MBES data from each survey, "H13041_MB_1m_MLLW" and "H13040_MB_1m_MLLW," were compared using the CARIS HIPS Difference Surface function. A histogram of the differences is shown in Figure 10. Depths from the H13041 survey show good agreement with the depths from the H13040 survey. Depth discrepancies generally equaled 25 centimeters or less with a mean difference of 2 centimeters.

All (100%) junction comparison cells have a difference < 0.71 meters.

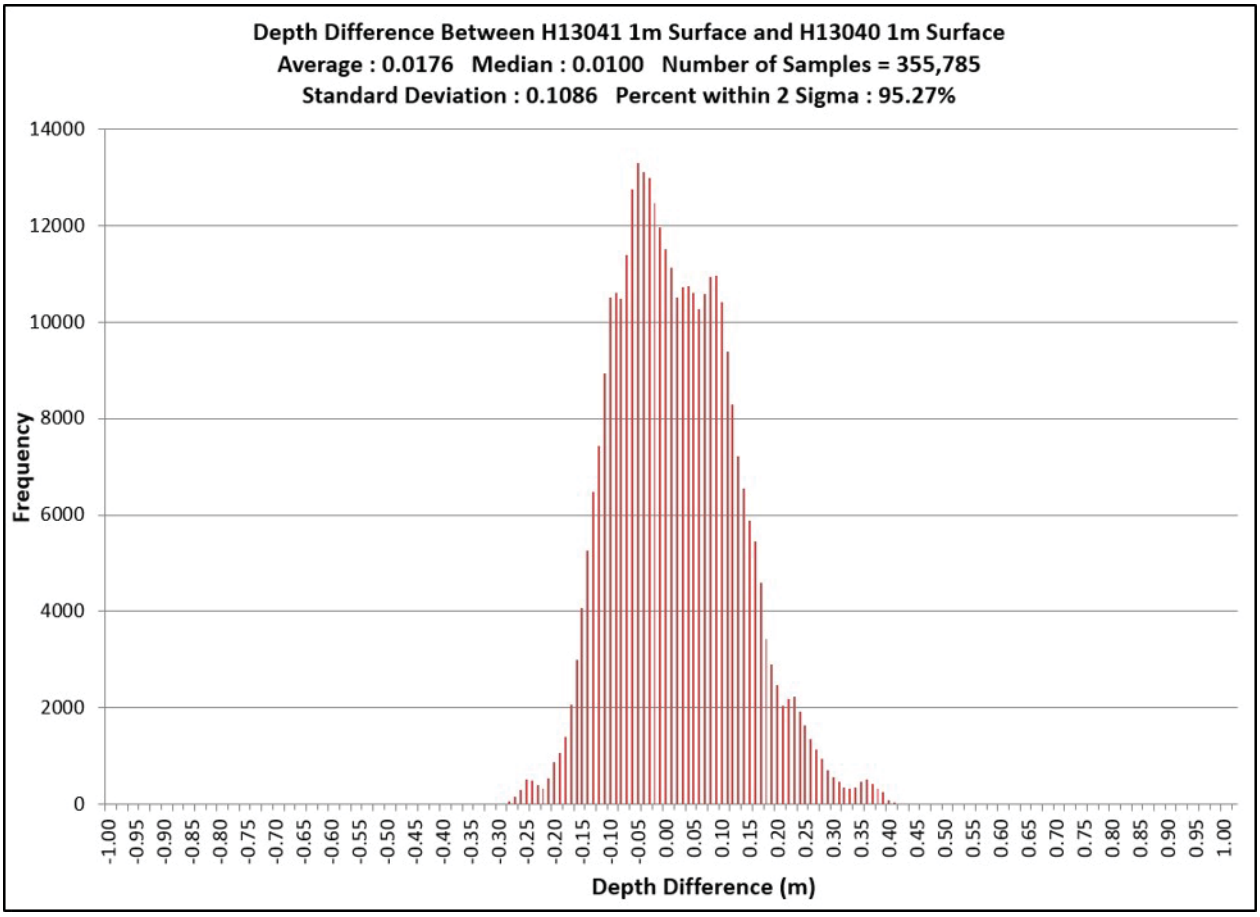

Figure 10: Surface-to-surface difference histogram comparing Survey H13041 to H13040.

H13042

The approximate overlap between the bathymetric data from contemporary Surveys H13041 and H13042 was approximately 300 meters along a common border of approximately 9,400 meters. Both surveys were acquired to meet 100% SSS Coverage over much of the length of the common border and Set Line Spacing coverage just at the northern end of the common border. Given that the respective line plans meet at an obtuse angle there is a fair amount of overlapping data despite the skunk stripe nature of Complete Coverage MBES coverage.

Depths from 1-meter BASE surfaces compiled from the MBES data from each survey, "H13041_MB_1m_MLLW" and "H13042_MB_1m_MLLW," were compared using the CARIS HIPS Difference Surface function. A histogram of the differences is shown in Figure 11. Depths from the H13041 survey show good agreement with the depths from the H13042 survey. Depth discrepancies generally equaled 20 centimeters or less with a mean difference of 4 centimeters.

All (100%) of junction comparison cells have a difference < 0.71 meters.

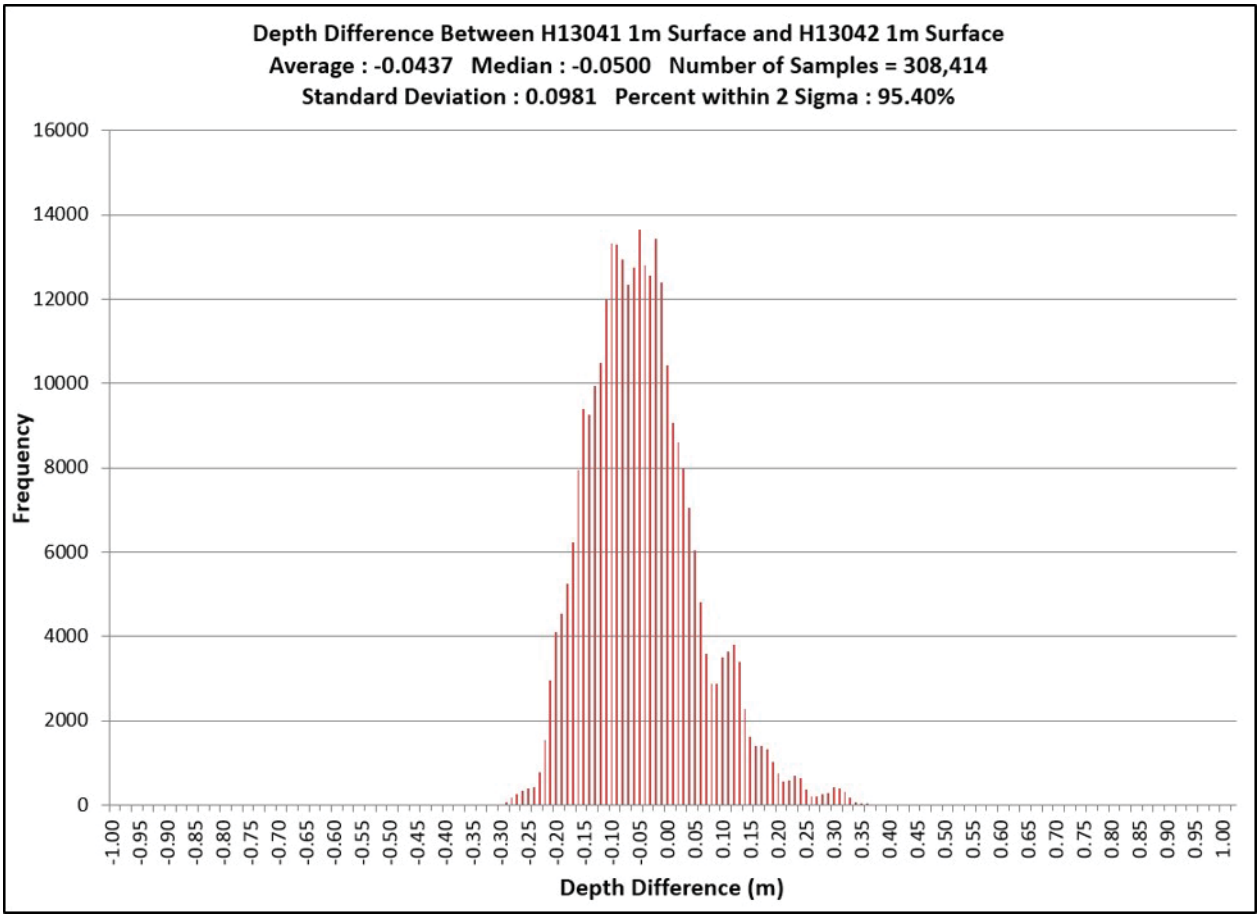

Figure 11: Surface-to-surface difference histogram comparing Survey H13041 to H13042.

B.2.4 Sonar QC Checks

Sonar system quality control checks were conducted as detailed in the Quality Control section of the DAPR. Results from the MBES bar checks are included in Appendix II of the DAPR.

B.2.5 Equipment Effectiveness

R/V Ocean Explorer MBES Time Sync Errors

Onboard the R/V Ocean Explorer occasional time sync alarms were observed on the Reson 7125 Seabat display during data acquisition. This phenomenon did not occur on the R/V Osprey (using a Reson 8125). The field personnel noted that along with the time sync alarm a brief gap may be observed in the real time display of the Seabat waterfall window. In some cases these events resulted in what appeared to be a gap in the recorded HYPACK .HSX file. Using an EXCEL utility developed by OSI, each and every HYPACK .HSX file was analyzed for these types of gaps upon check-in to the data processing flow. Upon

review of the HYPACK .HSX files affected by the time sync gaps, it was noted that the sounding pings were in fact present but, a number of sounding pings would be time tagged with identical times. It is surmised that the gaps are not due to the Reson multibeam hardware, rather that the gaps are associated with acquisition computer buffering. The majority of gaps were less than 1 second. Throughout Project OPR-K354-KR-17, 69 time sync gaps were detected.

When possible (and practical) the HYPACK .HSX time-stacked sounding pings were manually edited and the time stamps rewritten (interpolated/advanced at a 1/15 second interval until proper timing was reacquired). The 1/15 second interval was chosen because the sonar ping rate was limited, via user control, to a rate of 15 pings/second and the sonar range was maintained at a setting that did not limit the pings below 15/second. The affected lines were not converted to CARIS HDCS data until the time stacking editing had been completed. There were certain cases when a given gap was deemed unrepairable based on its duration or its relative location within a file.

By manually editing certain HYPACK .HSX files many lines were "saved." In some cases a gap occurred outside the bounds of the survey area or in an area with adjacent line overlap. In these cases the affected data were rejected. Between "saving" lines and rejecting certain affected data none of the delivered data contain gaps that exceeded 3x3 surface nodes in the 1-meter Complete Coverage surface.

POSPac TrueHeave gaps

Especially during the first few days of data acquisition (DN 218, DN 219, DN 220) and periodically thereafter the recorded, stand-alone Applanix POSPac files were affected by occasional brief network interruptions with durations on the order of around 5 to 22 seconds. It was believed initially that the cause of the outages was a faulty network cable on the R/V Ocean Explorer (which was replaced on DN 221). However, additional outages on the R/V Ocean Explorer after DN 221 and the fact that both vessels ultimately experienced outages suggest that network collisions may have been the culprit. The result of the network interruptions is an associated gap in the TrueHeave or delayed heave record for each file affected. It turns out that a number of the gaps described herein occur between times of data acquisition, e.g. before the start of acquisition for the day or between lines. For those files affected a custom "repair" was undertaken.

CARIS HIPS does not allow for application of TrueHeave files with data gaps. Rather than forgo using the discontinuous TrueHeave files, OSI developed a utility to “fill” TrueHeave gaps with the real-time heave data recorded by HYPACK. In practice the utility loops through a given POSPac file and searches for gaps in the TrueHeave record of > 0.1 second. If a gap is detected the utility then polls the appropriate HYPACK .HSX file and extracts the non-delayed, real-time heave values for the period of the data gap. Finally, a TrueHeave file (supplemented with real-time heave as appropriate) is written as a TrueHeave group 111-only file (.000 format). During data check-in each and every POSPac file was analyzed for TrueHeave gaps. For the few days affected by the network interruptions, the OSI utility-generated .000 files were used in lieu of the POSPac .000 file for application of TrueHeave. The analysis and generation of “repaired” files described above were undertaken prior to ingestion into the CARIS HIPS data processing work flow. The "repaired" files include a "TH" for TrueHeave in the file name instead of the OSI default notation of "POS." For example, a file named "17ES024_OE_2017_TH_219_0807.000" was generated after repairing the POSPac file named "17ES024_OE_2017_POS_219_0807.000."

It is important to note that at no time did the network outages described above result in an interruption to the real time network stream as recorded by HYPACK.

B.2.6 Factors Affecting Soundings

SSS Refraction

Dynamic sound speed changes affected the SSS imagery at times, causing refraction in the outer ranges of the SSS swath (Figure 12). To ensure that 100% coverage of high quality SSS data was acquired, when necessary, SSS lines with excessive refraction were rejected or the portion of the line with severe refraction was re-run. Due to the relatively shallow water depths and the relatively close line spacing employed in some locations, there were many instances of outer range refraction that did not trigger a re-run or rejection. In these cases high quality, 100% SSS coverage was achieved using only a portion of the imagery from a given line. For example, if refraction affected only the outer 20 meters of the 50 meter image range but the vessel was running on a 40 meter offset line plan, ample overlap was still achieved between adjacent tracklines resulting in greater than 100% SSS coverage of the area. In this scenario SSS imagery was not rejected.

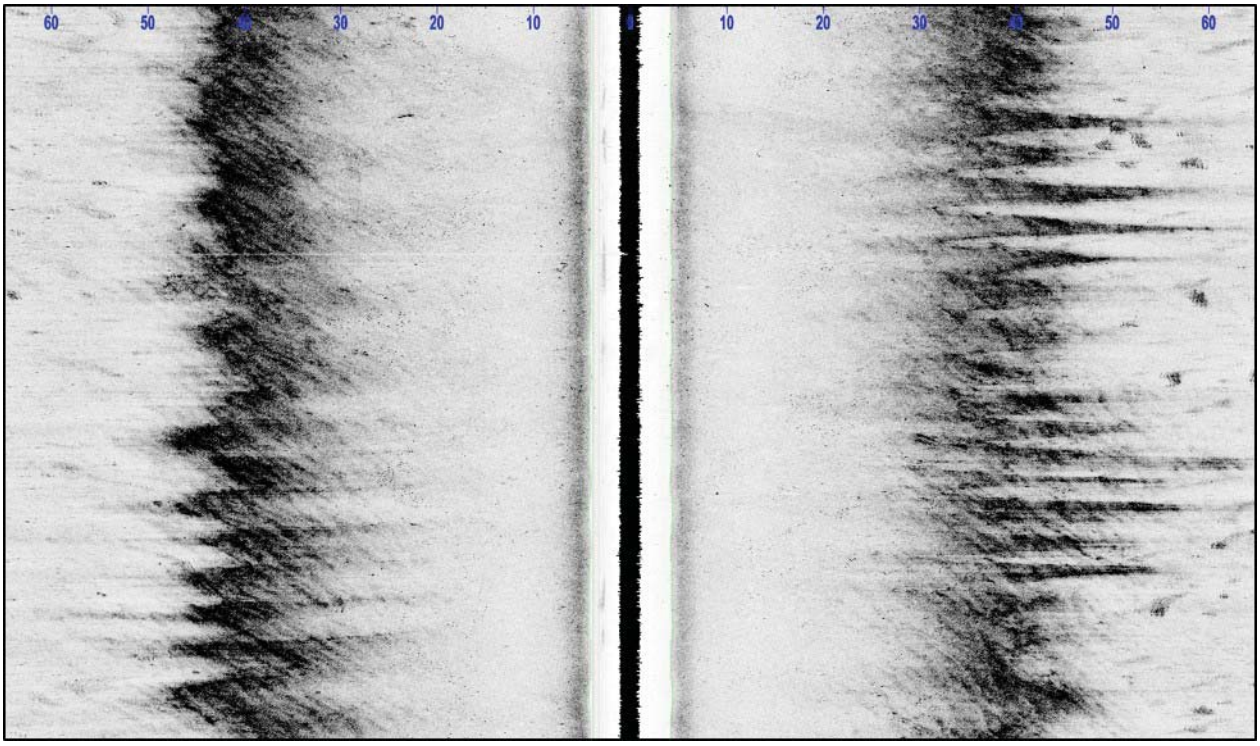

Figure 12: Refraction in the SSS imagery is visible in both channels at the 30-meter range of a survey line acquired with the fixed-mount 4125 SSS.

Sea State Induced White Streaks in SSS Imagery and MBES "Blowouts"

Both the Reson 7125 and Reson 8125 systems experienced periodic bursts of motion-induced noise or “blowouts,” typically affecting between 1 and 4 sequential profiles. Efforts were made to reduce this noise during acquisition, including adjustments to system gain and power, in addition to the multibeam pole fairing that was installed (on the R/V Ocean Explorer only) to reduce cavitation effects. The noise bursts were infrequent and were encountered when sea state worsened. Accepted data affected by blowouts did not show any coverage gaps in excess of 3 x 3 nodes in the 1-meter MBES coverage surface.

The fixed mount SSS data were also impacted by sea state conditions, such that when the wave frequency and height increased more cavitation effects were observed near the transducer head with a dark return noted at the top of the water column in the raw SSS record. The cavitation noise at the transducer head resulted in intermittent black lines across the SSS record, which occasionally coincided with blowouts in the MBES data (Figure 13). The term "black line" is seen in the acquisition log to denote these types of events. The acquisition SSS waterfall was the opposite palette as the CARIS SSS palette. Therefore, a "black line" noted in the log coincides with a white line in CARIS. To ensure that 100% coverage was attained where the white streaks occurred, holiday fill-in lines were acquired over the location of the streaks with either MBES or SSS coverage as necessary.

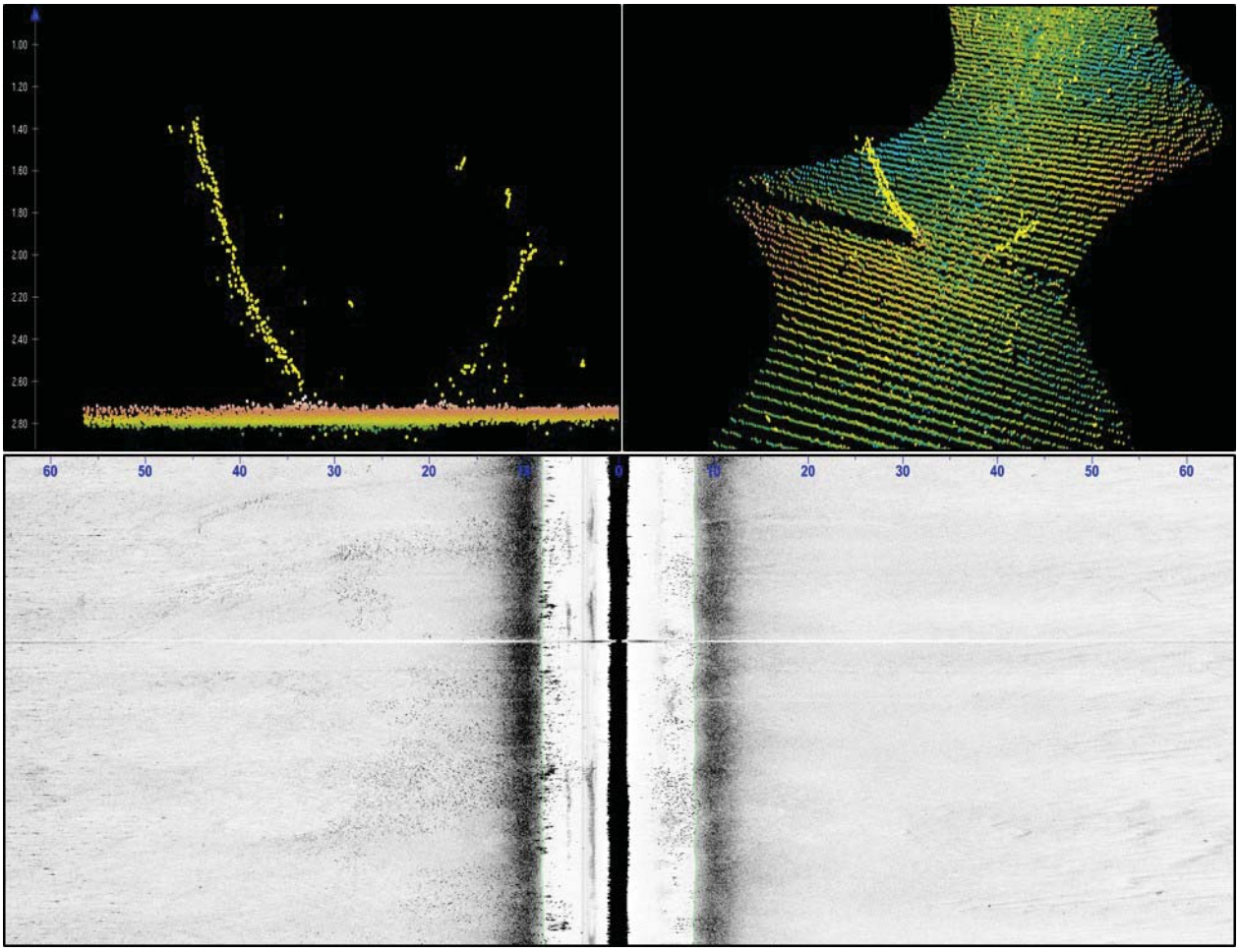

Figure 13: This figure shows how cavitation noise at the SSS and MBES transducer heads presented in the converted data. Noise at the 4125 TX head is visible as a dark return at the top of the water column with white streaking across the raw SSS imagery (bottom). In this instance, the SSS white streak coincided with an MBES blowout (top right and top left images).

Tide Offset

Review of surface data indicated that there were a number of minor tide-related offsets between MBES data collected on different days scattered throughout Survey H13041. There were no noteworthy tide events that affected this survey. However, there was a consistent offset on the scale of 10 to 30 centimeters between the predicted and verified tides at the LAWMA, Amerada Pass LA tide station during the period of the survey. Overall, the tide correctors were modeled well for Survey H13041, showing good agreement between survey days. Tide offsets generally equaled 20 cm or less and are likely associated with local environmental effects, i.e. wind setup. Figure 14 highlights a portion of the survey area where a tide offset was noted between a crossline from DN 217 and mainscheme data from DN 233, DN 234, and DN 265 .

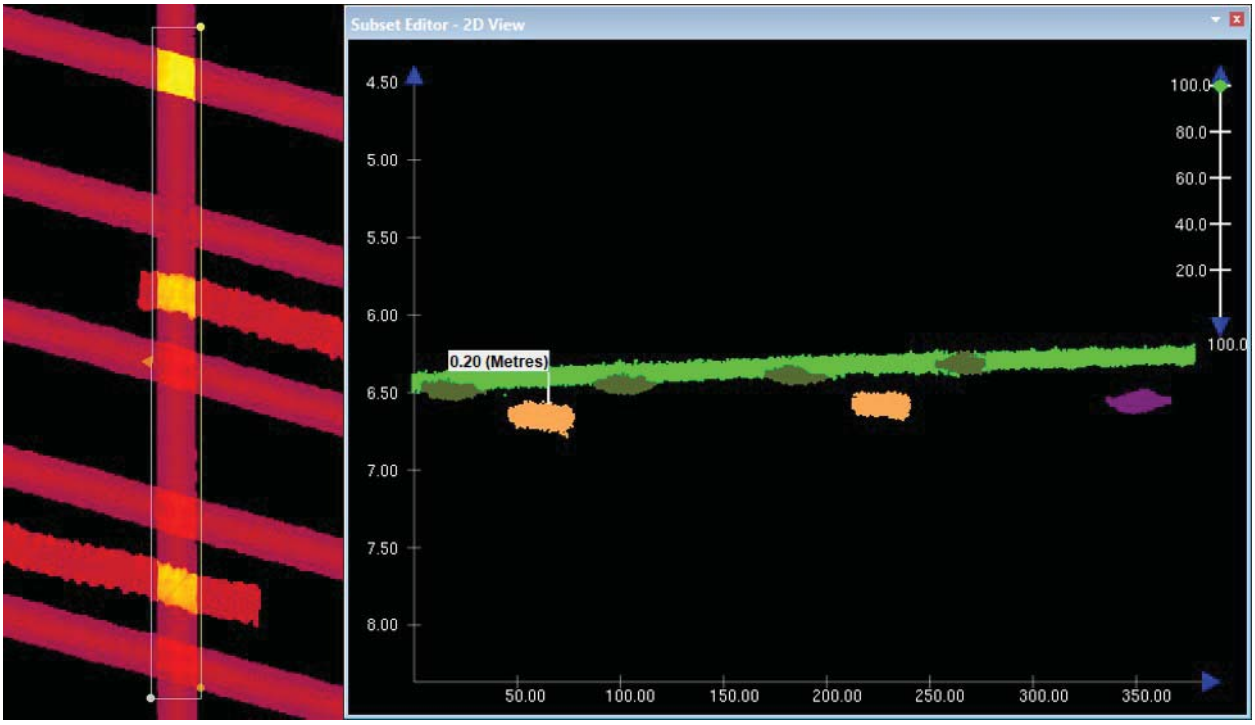

Figure 14: The left image shows a subset window displayed over the Standard Deviation layer from the H13041 1-meter CUBE surface. The yellow colors indicate areas of higher standard deviation in the surface due to a tide offset. The right image displays MBES data loaded into CARIS Subset Editor with a tide offset noted between DN 217 (bright green) and some of the survey lines from DN 233(purple), DN 234 (olive green), and DN 275 (mustard yellow) . Depths and distances are in meters.

Fish in SSS Imagery and MBES Data

An abundance of fish and marine sea life were seen in the SSS and MBES data, either as lone swimmers or in schools (Figures 15-17). Fish and dolphins were noted in the acquisition log by the field team, and these areas were carefully reviewed during data processing. Shadows in the SSS, usually detached from a dark return, were typically associated with fish either in the water column or at a position closer to nadir. In the cases where a visible shadow was recorded in the SSS, the contact was designated as a fish, for two reasons: 1) the possibility that the assumed fish was actually a feature and 2) to assist processors in rejecting fish-related noise from the MBES data.

Dolphin pods were present within the survey area, as well as large schools of fish, which at times created large shadows in the SSS imagery and gaps in the MBES data where soundings on fish and dolphins were rejected. To ensure that possible significant features were not located in these fish and dolphin shadows, these fish/dolphin related coverage gaps were developed with 200% SSS coverage or complete MBES coverage.

Within the Complete Coverage portion of the survey area alone over 17,000 fish contacts were chosen in Survey H13042.

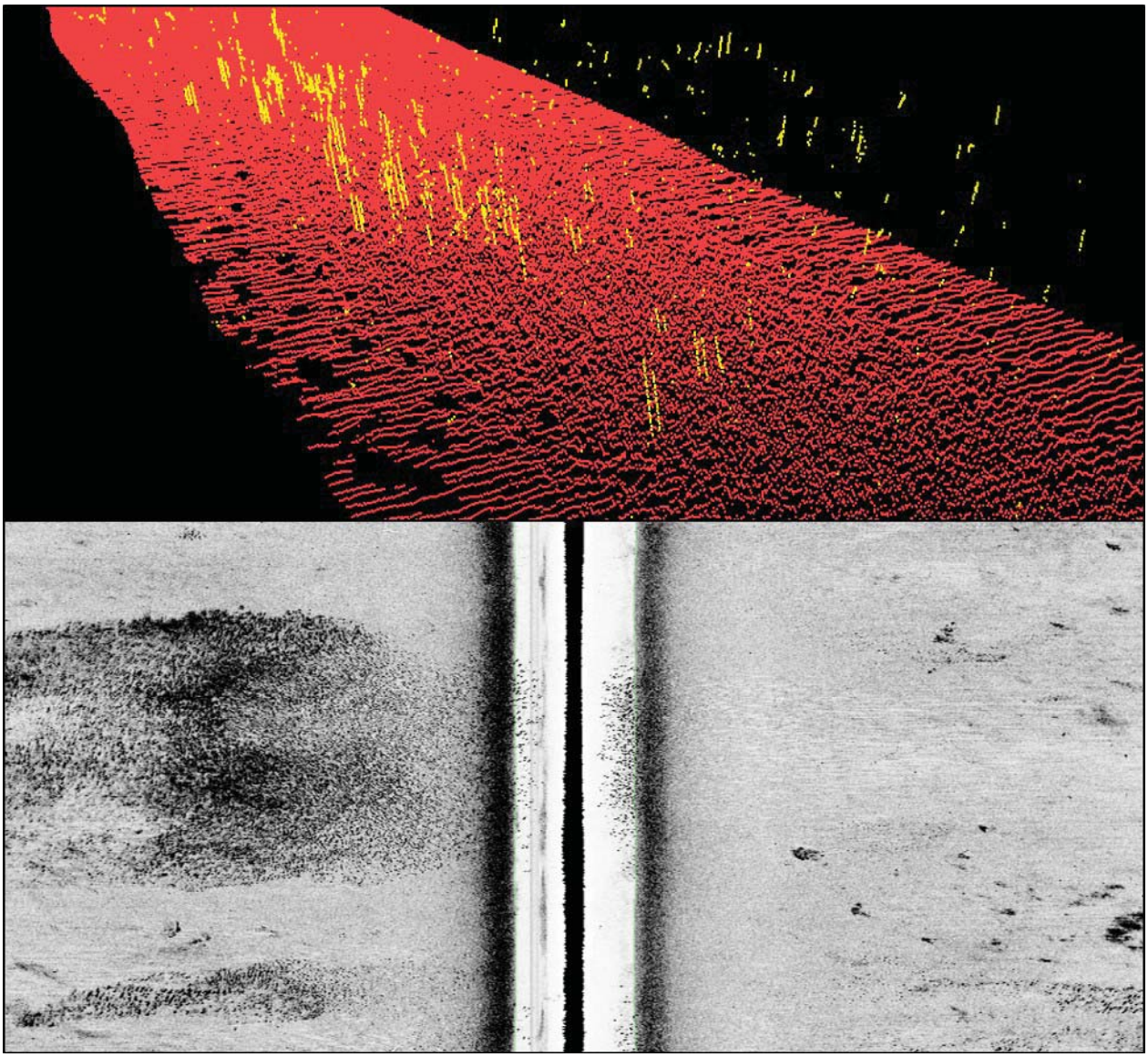

Figure 15: A school of individual large fish as it appears in the MBES data and in the water column of the raw, un-slant range corrected SSS imagery. The image on the top was taken from the CARIS Subset Editor 3D window with rejected soundings, in this case returns off of the individual fish, colored yellow.

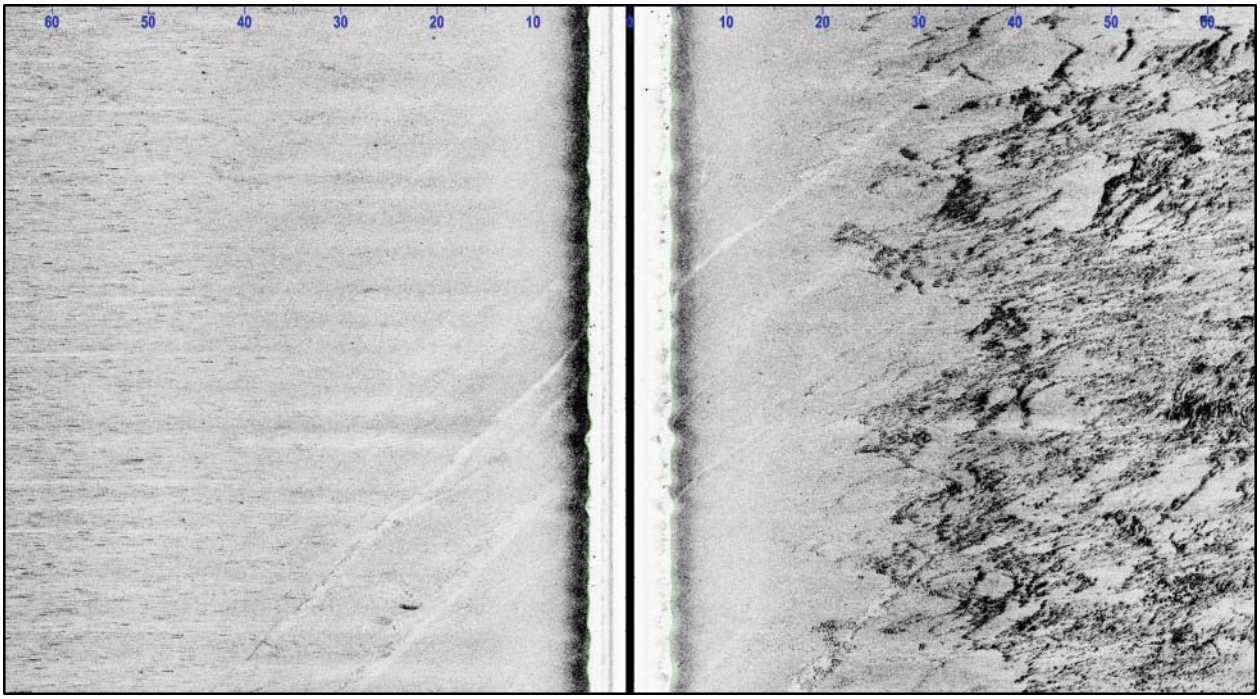

Figure 16: SSS image showing a large "fish cloud" on the starboard channel.

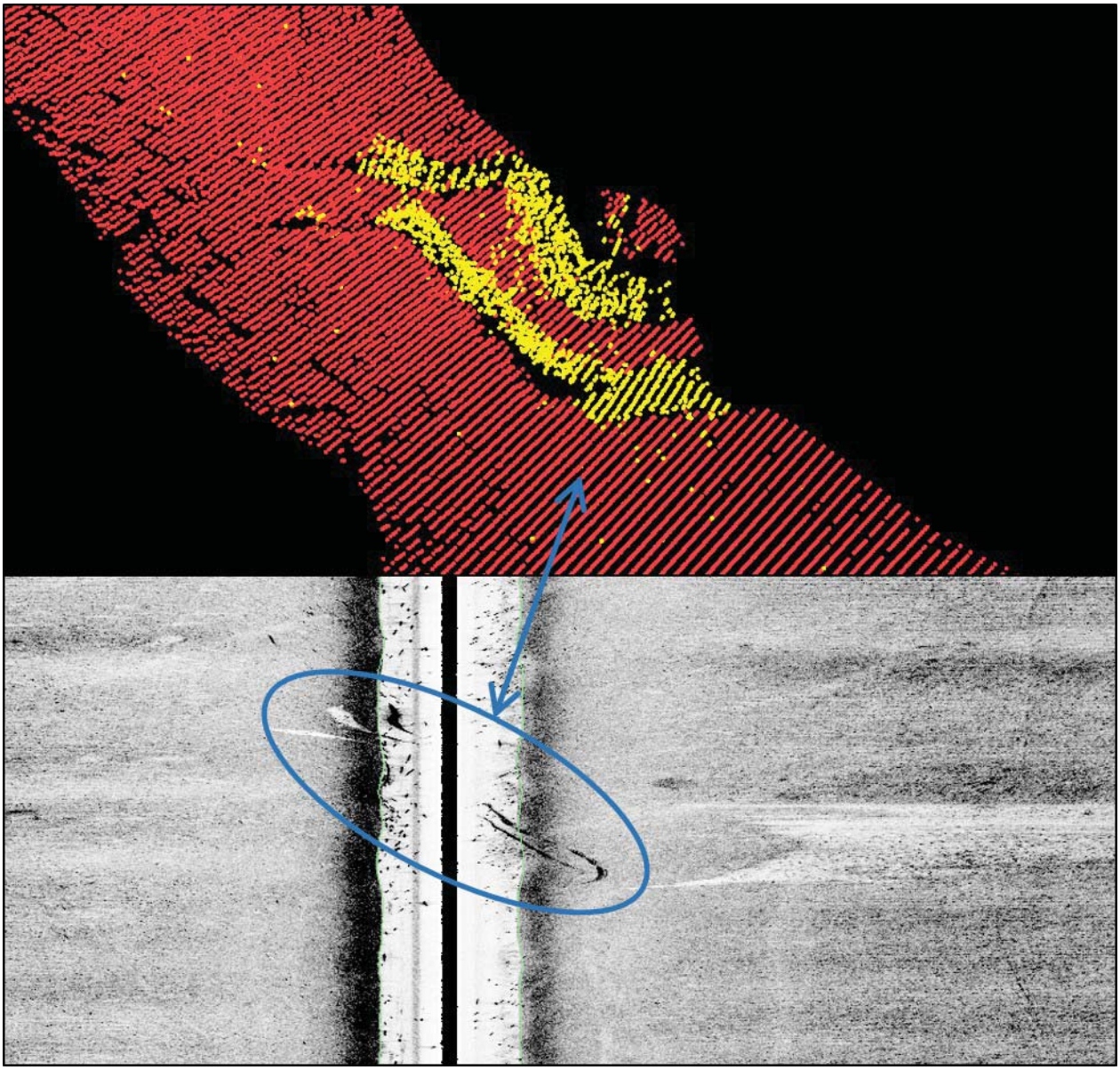

Figure 17: An example of dolphins as they appear in the water column of the MBES and un-slant range corrected SSS and the acoustic shadow cast in each dataset. In the top panel the rejected MBES soundings are colored yellow.

B.2.7 Sound Speed Methods

Sound Speed Cast Frequency: Onboard the R/V Ocean Explorer sound speed profile data were acquired with the ODIM MVP30 approximately every 15 minutes as documented in the DAPR. On the R/V Osprey sound speed profiles were acquired at an interval of approximately 1-2 hours or better.

All MBES lines were sound speed corrected using CARIS HIPS' "Nearest in Distance Within Time" method. For MBES data acquired by the R/V Ocean Explorer the interval used was one (1) hour. For MBES data acquired by the R/V Osprey the interval used was two (2) hours. For the duration of data acquisition for Project OPR-K354-KR-17, the water column was relatively well-mixed.

OSI submitted H13041 sound speed data in NetCDF format to the National Centers for Environmental Information (NCEI) on December 7, 2017 via the S2N tool. NCEI assigned the sound speed submission Accession Numbers 0169266 and 0169267. Correspondence regarding the NCEI data submission is included in Appendix II.

B.2.8 Coverage Equipment and Methods

This survey was conducted to develop 100% SSS coverage along with concurrent MBES with backscatter for depths 4-meters and greater, i.e. Complete Coverage, Option B as defined in Section 5.2.2.3 of the HSSD 2017. Inside the 4-meter contour Set Line Spacing MBES coverage without SSS was acquired. For all disprovals either 200% SSS or Complete Coverage MBES was achieved. All depths within Survey H13041 were shallower than 20 meters. Per the HSSD which states "Gaps in SSS coverage should be treated as gaps in MBES coverage and addressed accordingly," gaps in SSS coverage and holidays caused by fish, dolphins, or white line noise were developed with Complete Multibeam or a second side scan coverage. All potentially significant features located with mainscheme SSS or MBES were developed with high density multibeam sonar data to meet the Project Instructions/HSSD requirement of Complete Coverage Multibeam.

The survey methods used to meet coverage requirements did not deviate from those described in the DAPR.

B.2.9 Density

As mentioned above a single 1-meter surface was delivered for this survey. To confirm the HSSD Density coverage requirements, the Compute Statistics tool was utilized within CARIS HIPS and SIPS to generate statistics for the Density layer of the submitted CUBE surface. The HSSD states that at least 95% of the surface nodes shall be populated with at least 5 soundings (for either a Complete Coverage (Option B) 1-meter surface or a Set Line Spacing 4-meter surface). In this case the survey resulted in more than enough along-track density to compute favorable 1-meter surface density statistics even within the Set Line Spacing region which requires a relatively coarse cell size/density in comparison.

The Compute Statistics tool generates an ASCII export containing two columns: 1) sounding density value and 2) the number of nodes that returned that value. This export was used to determine the percentage of nodes with a sounding density greater than or equal to 5 for the submitted CUBE surface.

The percentage of nodes with density greater than or equal to 5 soundings for the 1-meter Complete Coverage surface is as follows: H13041_MB_1m_MLLW = 98.79%.

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

Backscatter data were acquired concurrent with bathymetry data for Survey H3041. Backscatter data were recorded with HYSWEEP SURVEY in .7K format or 81X format by the R/V Ocean Explorer and R/V Osprey respectively. These data were periodically reviewed to ensure function of the backscatter acquisition process. No specific instructions were made in the Project Instructions regarding coverage, ground truthing or processing for the Backscatter data, as such, these data are delivered in raw format in the "Preprocess \Backscatter" directory per the HSSD, Section 8.3.4 Backscatter Deliverables.

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	10.4

Table 9: Primary bathymetric data processing software

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

Manufacturer	Name	Version
CARIS	SIPS	10.4

Table 10: Primary imagery data processing software

The following Feature Object Catalog was used: NOAA Profile V_5_5.

Software versions described in Section A of the DAPR were used throughout acquisition and processing of data for Project OPR-K354-KR-17.

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
H13041_MB_1m_MLLW_Final	CARIS Raster Surface (CUBE)	1 meters	2.24 meters - 7.70 meters	NOAA_1m	Complete Coverage (Option B) and super-density Set Line Spacing Coverage
H13041_SSS_1m_100	SSS Mosaic	1 meters	-	N/A	100% SSS
H13041_SSS_1m_200	SSS Mosaic	1 meters	-	N/A	200% SSS

Table 11: Submitted Surfaces

As mentioned above, what was assigned as a survey comprising both Complete Coverage and Set Line Spacing coverage types (and surface delivery resolutions) is being delivered as a 1-meter, single resolution surface that covers the entire survey area. As such, one (1) MBES CUBE (Combined Uncertainty and Bathymetric Estimator) surface was delivered along with Survey H13041; "H13041_MB_1m_MLLW_Final."

Two 1-meter SSS mosaics were submitted as GeoTIFFs to satisfy the SSS coverage requirements of 100% coverage and 200% coverage over charted feature disprovals and SSS fill-ins. In addition, a higher resolution, 25-centimeter SSS mosaic image composed of all SSS lines was submitted in the ECW (Enhanced Compressed Wavelet) format to assist with the survey review.

C. Vertical and Horizontal Control

Additional information regarding the vertical or horizontal control for this survey can be found in the accompanying Horizontal and Vertical Control Report (HVCR) for Project OPR-K354-KR-17.

C.1 Vertical Control

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

Traditional Methods Used:

Discrete Zoning

The following National Water Level Observation Network (NWLON) stations served as datum control for this survey:

Station Name	Station ID
LAWMA, Amerada Pass, LA	876-4227

Table 12: NWLON Tide Stations

File Name	Status
8764227.tid	Verified Observed

Table 13: Water Level Files (.tid)

File Name	Status
K354KR2017rev.zdf	Final

Table 14: Tide Correctors (.zdf or .tc)

A final verified tide file was created from verified water level data from the primary tide station LAWMA, Amerada Pass, LA (876-4227) obtained from the CO-OPS website upon completion of survey operations. Discrete zoning methods were utilized to apply tide correctors in CARIS HIPS. The survey area is located within Zones 115, 154, 189, 191, and 193 as provided in the preliminary tidal zoning scheme included with the project SOW.

Final project data are delivered with verified tides applied using a slightly altered version of the preliminary zoning file provided by CO-OPS, “K354KR2017rev.zdf.” Neither time nor magnitude multiplier changes were made to the preliminary zoning file provided by CO-OPS. However, the CO-OPS provided zoning file was found to have a minor flaw in the 6th vertex of Zone #82. It was discovered during data processing that this vertex did not fall exactly on a nearby vertex of the adjacent zone (the presumed intention of CO-OPS). The result was a long, narrow, triangular area with no zoning coverage. The non-coverage triangle had two legs roughly 11.6 kilometers long with the third leg being only about 4 meters long. OSI adjusted the Zone

#82 vertex which resulted in elimination of the non-coverage area. The OSI-edited zoning file included with the project deliverables uses the same name as noted above, i.e. the file name, as delivered by CO-OPS, was retained.

C.2 Horizontal Control

The horizontal datum for this project is North American Datum of 1983 (NAD83).

The projection used for this project is UTM Zone 15 North.

All data products, except the S-57 Final Feature File (FFF) are referenced to Latitude/Longitude, UTM Zone 15 North. The S-57 Final Feature File, H13041_FFF.000, is referenced to the World Geodetic System Datum of 1984 (WGS 84).

All MBES and SSS line and item investigation position data were acquired using an Applanix POS-MV operating in Differential GPS (DGPS) mode. The POS MV on both vessels was configured to receive USCG Differential beacon correctors from the English Turn, LA station.

On both vessels a secondary GPS, used to facilitate real-time horizontal control confidence checks, was supplied with correctors from the Angleton, TX beacon.

Prior to and during the course of the survey the accuracy of the primary positioning system on each vessel was verified by means of a physical measurement to a horizontal control point established at the respective vessel's base of operation. In the case of the R/V Ocean Explorer the checkpoint was established at Shell Morgan Landing on the Intracoastal Waterway. Position confidence checks for this vessel were accomplished, when practical, during fuel or weather stops. In the case of the R/V Osprey the checkpoint was established at a dock in the Quintana Canal at Cypremort Point, LA. Position confidence checks for this vessel were accomplished daily. Refer to the DAPR and HVCR for additional details.

The following DGPS Stations were used for horizontal control:

DGPS Stations
English Turn, LA (primary), 293 kHz
Angleton, TX (secondary), 301 kHz

Table 15: USCG DGPS Stations

D. Results and Recommendations

D.1 Chart Comparison

Chart comparisons were performed in CARIS HIPS/SIPS using finalized BASE surfaces, contours and selected soundings. The latest editions of the NOAA NOS Electronic Nautical Charts (ENC) were downloaded from the NOAA Office of Coast Survey website (http://www.nauticalcharts.noaa.gov/) regularly during survey operations, and after the survey was completed for final comparisons. The ENCs used for final comparisons were downloaded on November 15, 2017 and are submitted with the survey deliverables.

Local Notice to Mariners (LNM) and Notice to Mariners (NM) spanning the period beginning subsequent to the date of issuance of the final Hydrographic Project Instructions (June 21, 2017) and ending on November 15, 2017 were consulted in conjunction with the chart comparison.

The following sections adhere to the Descriptive Report sounding rounding system as described in Section 5.1.2 of the HSSD. Specifically, features described below having “precision” depths are presented along with the sounding's TPU. Depth and TPU are rounded to the nearest centimeter by standard arithmetic rounding ("round half up").

During the chart comparison it was found that the shoalest seafloor soundings for charted regions was at the northern end of H13041 (as presently charted). The chart comparisons documented below will discuss general seafloor changes, shoaling and deepening trends. All new or charted features identified, updated or disproved within Survey H13041 were addressed and attributed in the S-57 Final Feature File. For more information on the methodology that was used to build the FFF see Section B.2.5 Feature Verification in the DAPR.

An overview of the areas of change between charted depths and H13041 surveyed soundings is shown in Figure 18. The figure displays a difference surface made by subtracting a 10-meter resolution depth surface generated from the H13041 MBES data from a 250-meter resolution depth surface interpolated from the charted ENC soundings within the project area. Regions of shoaling are represented by positive depth differences (hot colors) and regions of deepening are represented by negative depth differences (cool colors). In general the survey area has seen a general shoaling in the northern and eastern regions and a general deepening in the middle and southwestern regions. Areas of nominal change are also widespread. A detailed description of each chart comparison follows.

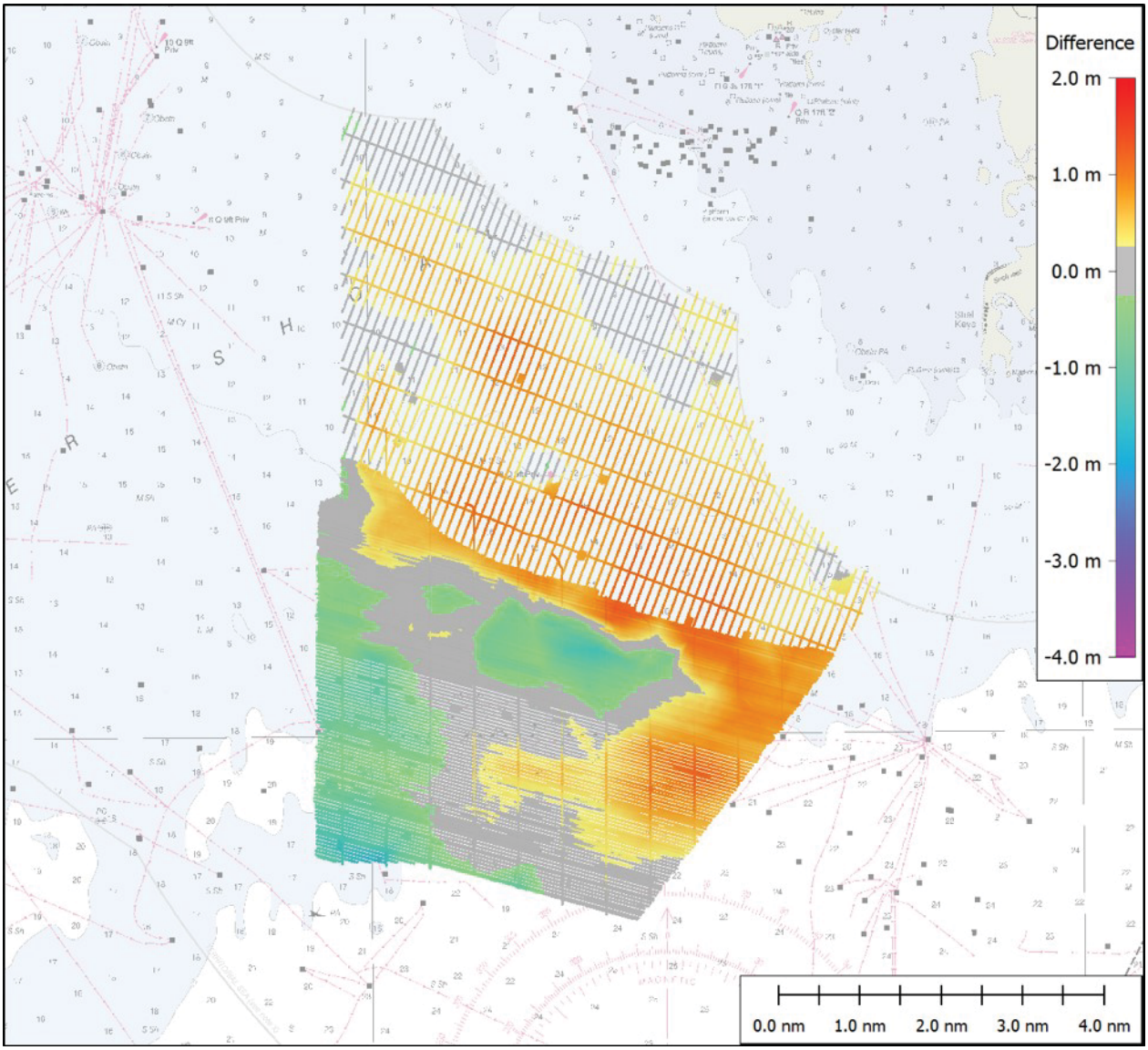

Figure 18: A depth difference surface overlaid on RNC 11349 provides an overview of the areas of change between charted depths and H13041 surveyed soundings.

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	Preliminary?
US4LA15M	1:80000	27	09/29/2017	10/27/2017	NO
US3GC03M	1:458596	54	07/27/2017	10/13/2017	NO
US4LA21M	1:80000	30	08/25/2017	10/18/2017	NO

Table 16: Largest Scale ENCs

US4LA15M

ENC US4LA15M is analogous to RNC 11349. In fact, these two chart products essentially share the same geographic footprint. Therefore, chart comparison notes entered under ENC US4LA15M apply to RNC 11349. Within the survey area ENC US4LA15M overlaps ENC US3GC03M (discussed below).

As noted above a general shoaling trend (on the order of 1-meter) occurs in the northern and eastern regions of the survey. Deepening on the order 1-meter is observed in the middle and southwestern regions of the survey.

As anticipated, the surveyed 12-foot contour will shift south substantially from its presently charted position. This move was anticipated in light of the relatively recent soundings and contour placement associated with Survey H11670 (2007-2008). Presently, the west end of the charted 12-foot contour (within H13041) is offset a distance of approximately 2,400 meters between its representation within Survey H13041 and its representation within Survey H11670. This move affects both ENC US4LA15M and RNC 11349.

The 18-foot contour enters H13041 in two locations. The first representation is a sinuous contour running essentially east-west at approximate latitude 29-20-00N. The second representation (contiguous with the first) enters the survey area's southwest corner. The 18-foot contour that enters the southwestern corner of the survey area is no longer valid based on recently surveyed deeper soundings and should be redrawn outside the bounds of the survey. The sinuous east-west contour moves south on its east end and movers slightly north on its west end.

A 12-foot depth area located at approximate position 29-21-08.00N, 91-57-02.00W was disproved. The depths in this area are now deeper than 13 feet.

A 12-foot depth area located at approximate position 29-21-31.00N, 91-57-57.00W was disproved. The depths in this area are now deeper than 12 feet.

A 12-foot depth area located at approximate position 29-20-56.00N, 91-55-47.00W was disproved. The depths in this area are now deeper than 13 feet.

US3GC03M

ENC US3GC03M falls entirely within the bounds of RNC 11340. However, as seen in the figure below, despite the fact that the ENC and RNC charts are published at the same scale they do not share the same geographic boundary. Chart comparison notes entered under ENC US3GC03M apply to RNC 11340 where the two charts have overlapping coverage.

The 18-foot (3-fathom) contour enters H13041 in two locations. The first representation is a nearly straight contour running essentially east-west at approximate latitude 29-20-00N. The second representation (contiguous with the first) enters the survey area's southwest corner. The 18-foot contour that enters the southwestern corner of the survey area is no longer valid based on recently surveyed deeper soundings and should be redrawn outside the bounds of the survey. The east-west contour moves south on its east end and moves slightly north on its west end.

The northern edge of an 18-foot (3-fathom) depth area located at approximate position 29-17-46.00N, 91-57-56.00W was disproved. The depths in the area surveyed are now deeper than 18 feet.

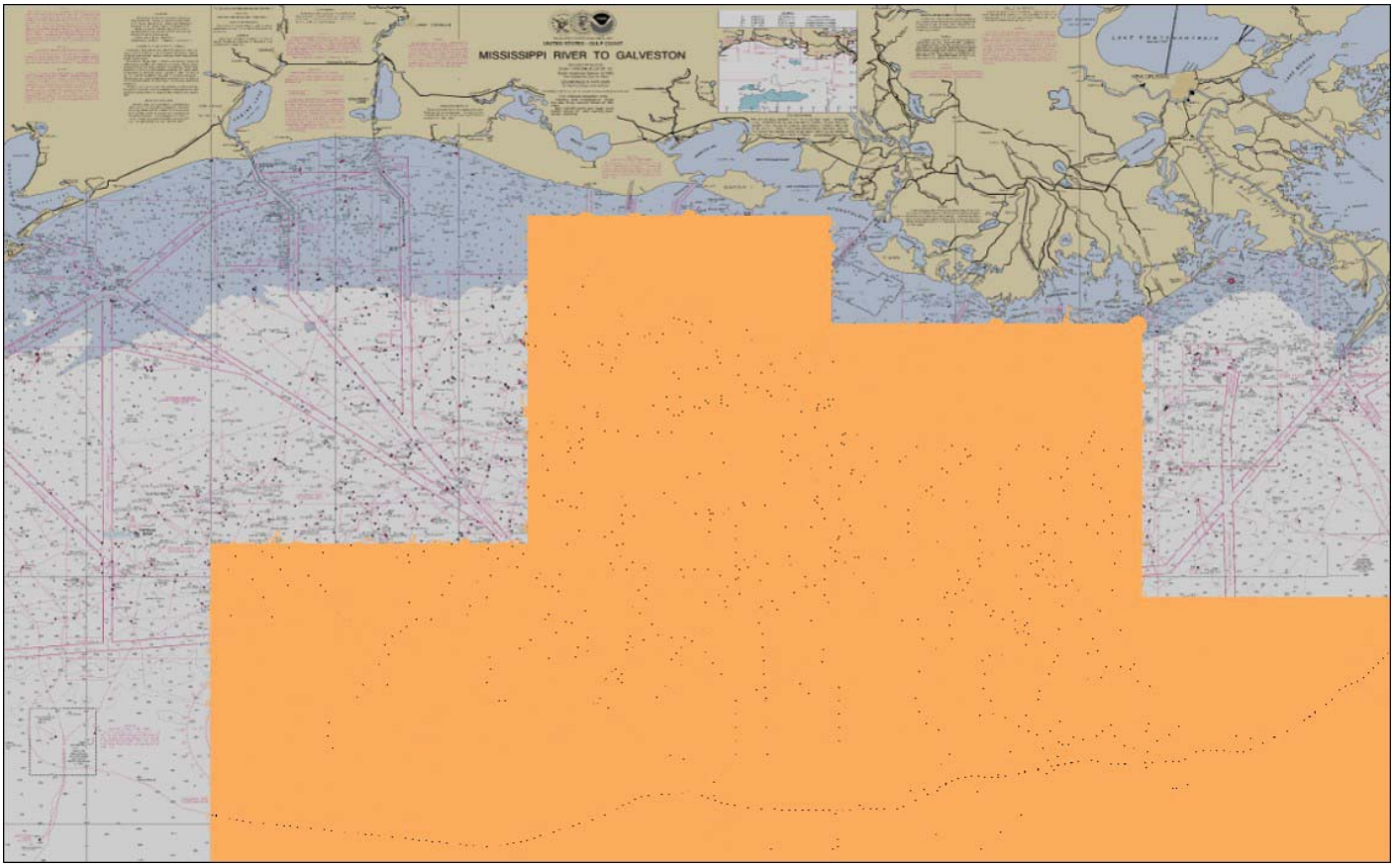

Figure 19: An overview of ENC US3GC03M (shaded orange) superimposed on RNC 11340.

US4LA21M

Data from Survey H13041 do not intersect ENC US4LA21M.

D.1.2 Maritime Boundary Points

No Maritime Boundary Points were assigned for this survey.

D.1.3 Charted Features

The Project Instructions' guidance on Shoreline and Nearshore Features states, "Submit a Final Feature File in accordance with HSSD Section 7. Contact the COR if there are any questions regarding feature assignments and feature management. All features with attribute ‘asgnmnt’ populated with ‘Assigned’ shall be addressed in accordance with Chapter 7 of the HSSD. Investigation requirements for all assigned features will be provided in the investigation requirement attribute ‘invreq.’ For the purposes of disproval, charted features labeled with a "PA" will have a search radius of 160 meters, charted features labeled with a "PD"

will have a search radius of 240 meters, and other features without a position qualifier will have a search radius of 80 meters. With respect to wellheads, reference HSSD Chapter 7.5.1. If a wellhead is not found, for the purposes of disproval, a 50 m search radius shall be used following the feature disproval techniques for a complete coverage survey outlined in HSSD Section 7.3.4. Include feature in the FFF with descrp = delete."

Guidance on attribution of charted and CSF-assigned features varies between NOS-NOAA documents pertaining to this survey. For example, guidance on New/Delete vs. Update attribution is quite detailed in the HSSD Section 7.5.2 which lists numerous attribution change thresholds. In contrast, the CSF investigation requirements for platforms states, "If visually confirmed, include in FFF with descrp=retain. If not visible, conduct a feature disproval (Section 7.3.4) and if disproved, include in FFF with descrp = delete." The addition of uncharted BSSE Wellheads in the CSF (which were, as assigned, often closer to a surveyed platform than the CSF-defined position of the platform, creates further uncertainty on how to attribute certain features. Given the ambiguity in directives, OSI consulted with the COR for clarification via e-mail on December 6, 2017. The COR's December 11, 2017 response follows: "Include both the significant wellheads and platform features in the FFF, and reposition any platform that deviates greater than 10 meters from the center point of the corresponding charted feature, based on the Page 97 of the HSSD. These are all delete/add for the charted platforms." A record of this correspondence is included in DR Appendix II.

Within the bounds of Survey H13041, eighty five (85) features were assigned for investigation within the Composite Source File (CSF): one (1) Wreck (WRECKS), eighteen (18) Platforms (OSFPLF), twenty seven (27) pipeline sections (PIPSOL), one (1) Pile (PILPNT), one (1) Light (LIGHTS), one (1) Mooring/Warping Facility (MORFAC) and thirty six (36) obstructions (OBSTRN). Of the assigned obstructions, all but two are "BSSE Wellheads." The Pile and one of the non-BSSE Wellhead obstructions (having area, not point, geometry) are co-located. The Light and Mooring/Warping facility are co-located.

The assigned "Wreck PA," was disproved with 200% SSS and partial MBES coverage within a 160 meters search radius. The ENC US4LA15M wreck symbol correlates well with its RNC counterpart (about 10 meters apart). The ENC US3GC03M wreck symbol is approximately 76 meters from its ENC US4LA21M counterpart.

The co-located Pile and Obstruction (area) are represented as a "Pipe PA" on RNC 11349. Both of these chart elements, located at position 29-21-41.96N, 91-56-55.85W were disproved with 200% SSS and partial MBES coverage within a 160 meters search radius. The ENC US4LA15M obstruction symbols correlate well their RNC counterparts (less than 10 meters apart). The "Pile PA" is not represented on ENC US3GC03M.

The co-located Light and Mooring/Warping Facility located at position 29-23-02.36N, 91-57-27.29W are represented only by a light symbol (adjoining a platform symbol) on RNC 11349. The RNC (and ENC) show the light character as "8 Q 9ft Priv". Neither the light nor the mooring/warping facility (nor the adjacent platform) were found to exist and all were disproved with 200% SSS and partial MBES coverage within an 80 meter search radius. The ENC US4LA15M Light symbol and MORFAC dot-symbol correlate well with their RNC counterparts (about 10 meters apart). Neither the Light nor the MORFAC are represented on ENC US3GC03M. The missing light is the subject of H13041 DTON #1.

The remaining non-BSSE Wellhead obstruction, a nonspecific "Obstruction PA," located at position 29-19-11.70N, 91-59-49.90W, was disproved with 200% SSS and partial MBES coverage within a 160 meters search radius. The ENC US4LA15M and ENC US3LA03M obstruction symbol, correlate well with the RNC counterpart.

See DR Section D.2.6 Platforms for information regarding the verification or disproval of the charted platforms.

Of the thirty four (34) assigned BSSE Wellhead obstructions, all are recommended for deletion. In many cases assigned BSSE wellheads were coincident with verified charted platforms; however, in each case, no evidence of a wellhead aside from the verified platform was found within the disproval area centered on the CSF provided positions defined by a 50-meter search radius. All other CSF-assigned BSSE Wellhead obstructions were either stand-alone features or were coincident with disproved CSF-assigned platforms. All disproved BSSE Wellhead obstructions were disproved with 200% SSS and partial MBES or Complete Coverage MBES in a 50-meter search radius (unless a larger radius was compulsory due to the missing platform). For a more complete description of the well head investigations, refer to the H13041 FFF. The source indication (SORIND) attribute field was blank for the BSSE well head features submitted in the CSF; therefore, the SORIND fields are blank for the disproved well heads attributed with a description (descrp) of "Delete" in the FFF.

Twenty seven (27) pipeline features were assigned for investigation in the CSF. A number of the pipelines, as packaged and assigned in the CSF, extend outside the bounds of the H13041 survey area. As such, a number of the assigned pipelines are coincident with pipelines in adjacent sheets. During preliminary data processing there were forty one (41) pipeline or potential pipeline detections identified in Survey H13041. The majority of these detections are duplicate detections, i.e. a single feature imaged on one or more adjacent tracklines. Discounting the duplicated detections, the total number of pipeline or potential pipeline detections is eleven (11).

All pipeline detections are less 1.0 meter above the seafloor. As such, no exposed pipelines were cause for DTON notification. Valid pipeline detections, as interpreted during late stage processing, were forwarded to the COR via e-mail on December 21, 2017 according to guidance in Section 1.7 of the HSSD regarding Non-DTON Seeps and Pipelines. No "seeps" were detected in Survey H13041.

Regarding the OCS-provided CSF, it should be noted that not all “assigned” features included in the CSF were addressed during the survey. This note is made in light of the Project Instructions’ directive that, “all features with attribute ‘asgnmnt’ populated with ‘Assigned’ shall be addressed in accordance with Chapter 7 of the HSSD.” The following time line and narrative are offered as an explanation thereof. The Draft Project Instructions are dated May 2, 2017 and the Draft Composite Source File (CSF) and Project Reference File (PRF) were issued on May 19, 2017. The Final Project Instructions are dated June 21, 2017, and the Final Data Package (including "final" CSF and PRF) was issued to OSI on July 5, 2017. The draft Project Instructions included seven (7) potential sheets, i.e. HXXXXX Registry Numbers. The negotiated survey effort, reflected in the Final Project Instructions and PRF include four (4) of the seven (7) original sheets. The remaining three (3) sheets are depicted as “unassigned” in the figure included with the Final Project Instructions. However, the Final CSF (file date 5-19-2017) does not reflect the reduction in sheets mentioned above. As such, there are a number of Final CSF “assigned” features that fall well outside of the four surveyed sheets. OSI’s assumption that the CSF “assigned” features falling within the three

“unassigned” sheets need not be addressed was confirmed in correspondence with the COR (see Descriptive Reports Appendix II, Correspondence). For clarity the CSF “assigned” features that fall within the three “unassigned” sheets mentioned above are not included in the FFFs.

Prior to this year, exposed pipes and seeps were handled as DTONs and therefore were appended to the FFF. The 2017 HSSD includes a new category of feature, "non-DTON seeps and pipes." However, the 2017 HSSD does not mention whether or not to include these non-DTON features in the FFF. The HSSD only addresses undetected charted pipelines and recommends that a non-detected pipeline should be attributed "Retain." In a December 11, 2017 e-mail to the COR, OSI inquired about how to treat exposed, non-DTON pipes and seeps in the FFF. The COR's December 12, 2017 response follows, "The current requirement of the "Non-DTON Seep and Pipeline Report" is a separate deliverable from the FFF. Your historic method of including the pipeline segments in the FFF is good. How you manage the other features is up to your discretion. The features that are not cartographically significant they will be ignored in the FFF." Given this latitude in how to treat the non-DTON seeps and pipes, OSI chose to include them in the FFF as discrete features.

D.1.4 Uncharted Features

In general there were very few new features surveyed in H13041 and only one (1) is a navigationally significant submerged feature worthy of description herein. Of the relatively few SSS contacts chosen most were either fish (chosen independent of the mass fish targeting scheme described in the DAPR) or features of insignificant height. All noteworthy new obstructions were surveyed with Complete Coverage MBES.

In close proximity to one of the "missing" CSF platforms with position 29-20-08.33N, 92-00-35.24W an obstruction was surveyed at position 29-20-07.89N, 92-00-34.90W (Figure 20). This nominally 1.5-meter tall feature may otherwise have been cause for DTON notification except for the following: the relative depth of the obstruction as compared to nearby soundings, the obstruction's position coincides with a presently charted RNC platform symbol and, the obstruction is within 260 meters of a large, sprawling platform. It is recommended that the charted/CSF platform is removed from the chart and that an obstruction symbol is added at the aforementioned location.

One of the surveyed platforms at CSF position 29-23-37.98N, 91-59-34.43W is surrounded by numerous pilings essentially making the footprint of the platform much larger than the actual platform itself. The pilings surrounding the platform, which can be described as a "satellite" platform or drying wellhead, are uncharted features and thus included in the FFF as piling features (PILPNT). Figure 21 depicts the "platform" and surrounding pilings.

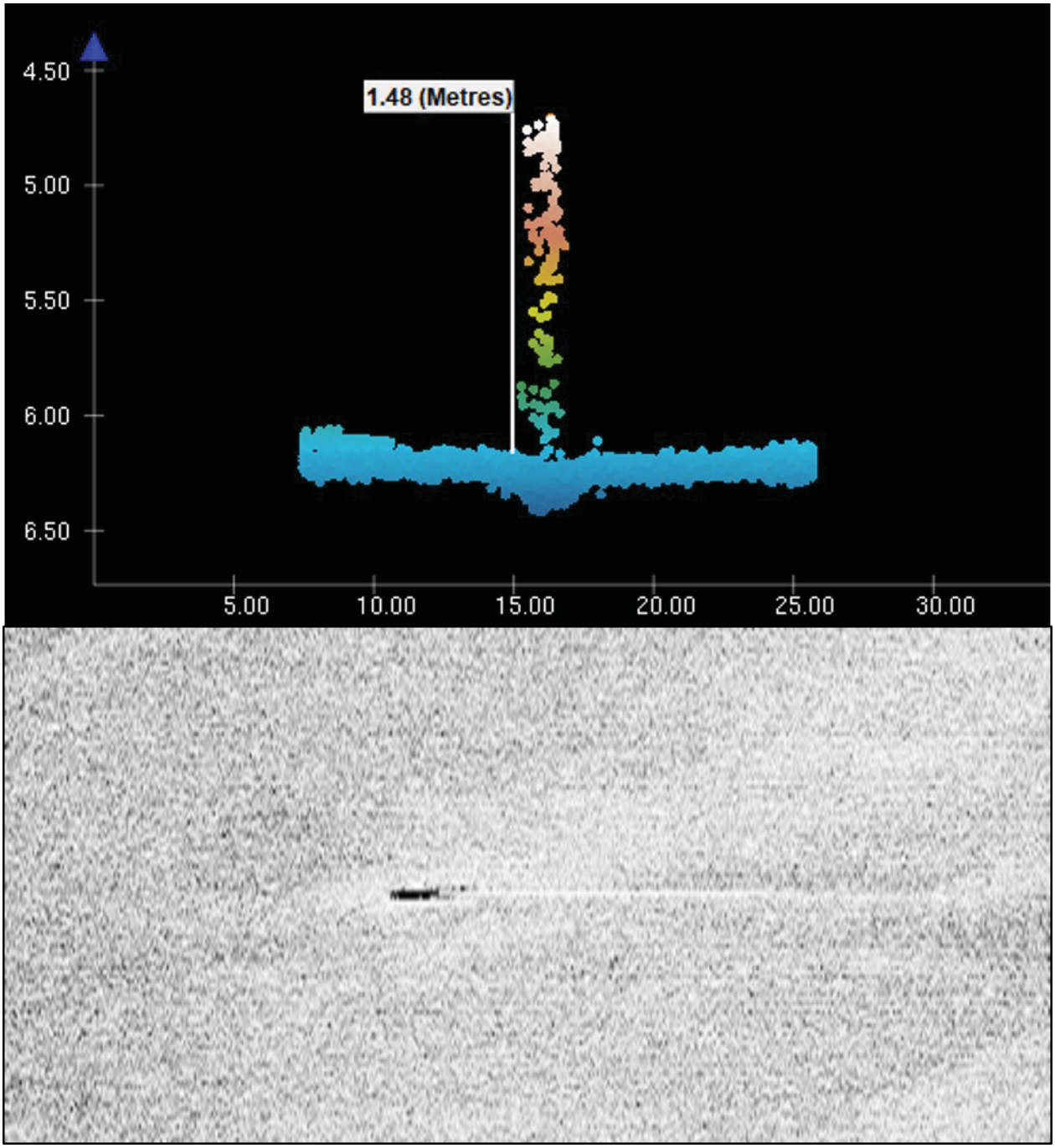

Figure 20: An obstruction was surveyed near the location of a disproved platform with CSF-defined position 29-20-08.33N, 92-00-35.24W.

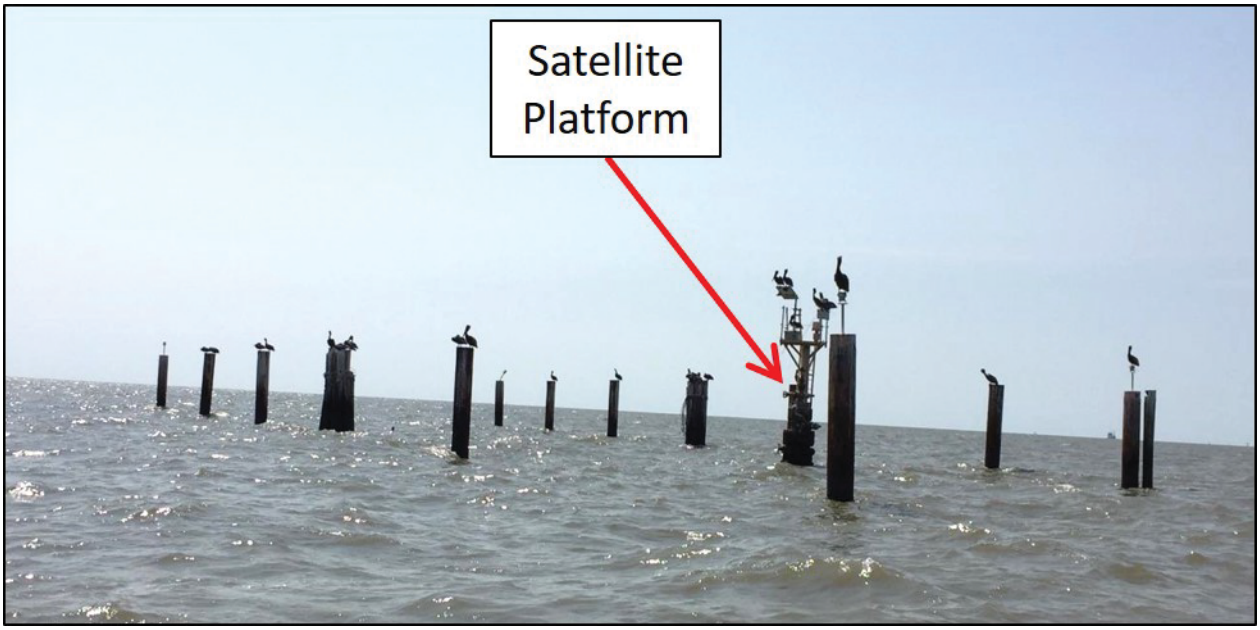

Figure 21: A "satellite" platform is surrounded by numerous pilings. The pilings are new features and are included in the FFF.

D.1.5 Shoal and Hazardous Features

The methods employed in conducting the Shoal and Hazard Features analysis are the same as described above for the Chart Comparison discussion.

As mentioned above, there is a general shoaling trend across the extents of Survey H13041. However, there are numerous isolated deepening trends as well. There are a few locations that have seen up to 4.5 feet (1.4 meters) of shoaling and there are areas that have seen deepening on the order of 5.5 feet (1.7 meters). In light of the nearby charted soundings and the observed (and anticipated) vessel traffic the shoaling trend is not cause for undue concern nor is the 1.3 meter shoaling example cause for DTON notification. In general it can be stated that no new dangerous shoals were surveyed. Rather, a complete rework of the charted soundings and contours on the affected ENC/RNC products is required.

Two DTONs were generated as a result of this survey.

D.1.6 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.1.7 Bottom Samples

Ten (10) bottom samples were acquired in close proximity to the recommended positions included in the PRF provided with the OPR-K354-KR-17 Project Instructions. Both vessels shared responsibility for

sediment sample acquisition. On each vessel a sediment sampler was deployed from a davit to acquire the requisite sample. Bottom sample locations were logged in a target file in HYPACK SURVEY. Once the sample was on deck it was photographed and classified based on the criteria outlined in Appendix H, Bottom Classification, in the HSSD. In general, sediment was found to be in keeping with anticipated nearshore, coastal Louisiana sediments and as-charted conditions. Specifically, sediment within Survey H13041 is generally soft mud.

D.2 Additional Results

D.2.1 Shoreline

Shoreline was not assigned in the Hydrographic Survey Project Instructions or Statement of Work.

D.2.2 Prior Surveys

Prior survey data exist for this survey area. However, with the exception of the assigned junction surveys, prior data were not investigated.

D.2.3 Aids to Navigation

One (1) ATON was assigned with Survey H13041. The CSF-"assigned" and ENC-charted Light (LIGHTS) are attributed with the same position: 29-23-02.361N, 91-57-27.285W. The Light List-published position of this light is 29-23-01.80N, 91-57-26.90W. This light is depicted on ENC US4LA15M and RNC 11349. The CSF and the ENC also list a Mooring/warping facility (MORFAC) at the exact aforementioned position. The structure on which the light was presumably installed and the nearby adjacent platform were disproved visually at the surface and with 200% SSS coverage and partial MBES coverage within the disproval area defined by an 80-meter radius centered on the CSF provided ATON position. According to the Light List the light was on a pile. No evidence of a seafloor obstruction was detected within or in the vicinity of the 80-meter search radius.

The missing ATON is the subject of H13041 DTON #1.

As indicated above the light is listed in the Light List. No indication of the removal of the platform or the removal of the light are found in the LNM or NM consulted in reviewing this survey. According to information at the web address https://ocsdata.ncd.noaa.gov/ntm/resultList.aspx?Chart=11349&Edition=43&DateSince=20070516, the light was added to RNC 11349 with LNM 06/08 and has never been removed.

D.2.4 Overhead Features

No overhead features exist for this survey.

D.2.5 Submarine Features

As discussed above, twenty seven (27) assigned charted pipelines (PIPSOL) are located within Survey H13041. On RNC 11349 only magenta pipeline symbols are shown. This symbol represents supply pipelines for oil, gas, chemicals, or water, according to U.S. Chart No. 1: Symbols, Abbreviations and Terms used on Paper and Electronic Navigational Charts. None of the Information contained within ENC US4LA15M or the CSF refute the RNC symbolism. None of the charted pipelines have a buried depth value (BURDEP). The majority of the charted pipelines were not visible in the SSS or MBES data.

All ENC pipelines within the survey area have a RNC counterpart. With one exception all CSF assigned pipelines are represented (within the survey area) on ENC US4LA15M as well as the the large scale RNC of the area, RNC 11349. The pipelines are not represented on ENC US3GC03M or RNC 11340. CSF vs. ENC vs. RNC pipeline inconsistencies are summarized below.

At the following general location, a pipeline shown on ENC US4LA15M and RNC 11349 is not included in the CSF: 29-23-18.35N, 91-54-43.89W.

To further the submarine features discussion an alternate pipeline information source was consulted. The consult includes review of information contained in a pipeline shape file (.SHP) downloaded from the Bureau of Ocean Energy Management (BOEM) on November 30, 2017. Prior to including the BOEM shape file in this analysis, the portion of the shape file that intersects with the OPR-K354-KR-17 project area was reprojected to UTM, Zone 15N, NAD83 and saved as a .DXF file. In CARIS HIPS/SIPS the BOEM pipeline .DXF file was then visually compared to the charted pipelines within the project area to identify any potentially uncharted BOEM pipelines.

All charted pipelines have a BOEM pipeline counterpart. However, the results of the analysis suggests that there are a few uncharted BOEM-listed pipe segments within Survey H13041. Figure 22 depicts uncharted BOEM pipelines.

The shape file, “ppl_arcs.shp” (contained within ppl_arcs.zip) and re-projected .DXF file, “BOEM_Pipelines_UTM_15N_NAD83_Meters.dxf” are included with the digital deliverables along with the RNC/ENC charts considered in the chart comparison. BOEM pipeline data were obtained at the following web address: https://www.data.boem.gov/Main/Mapping.aspx

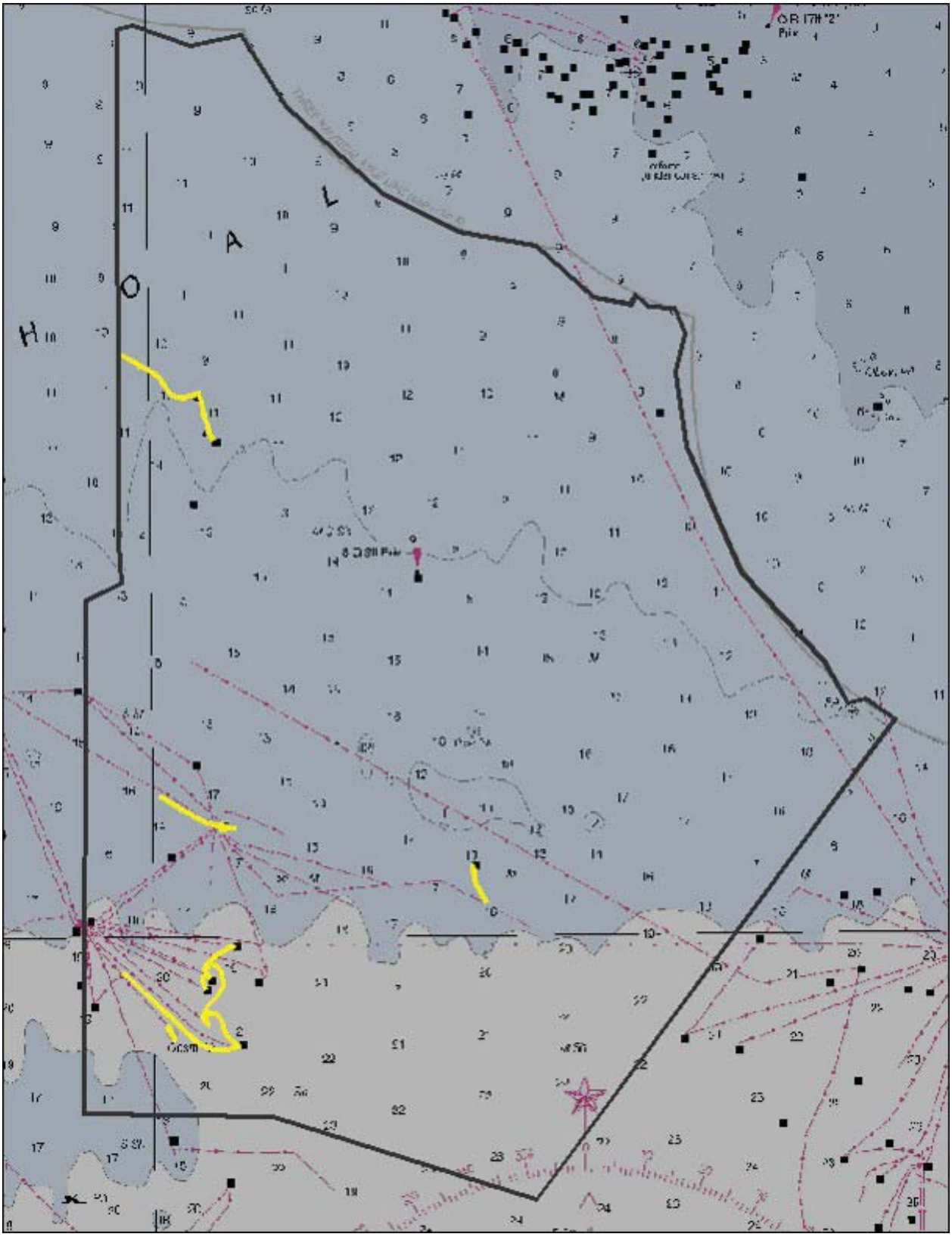

Figure 22: BOEM-defined pipelines that are not charted are highlighted in yellow in reference to RNC 11349. Survey H13041 sheet limits are shown in black.

D.2.6 Platforms

Eighteen (18) platforms (OSFPLF) were assigned for investigation in the CSF for Survey H13041. Of the CSF platforms, fourteen (14) platforms were surveyed close to the CSF-defined position. All but one of the surveyed CSF platforms was greater than 10 meters from the CSF position. As such, all but one of the surveyed CSF platforms were marked for deletion and a new platform was added to the FFF in their place. It follows then the one of the surveyed CSF platforms is attributed "Retain" in the FFF. Four (4) CSF platforms were not found and are recommended for deletion as they were disproved visually at the surface and with 200% SSS coverage and partial MBES coverage within the disproval area.

One of the "missing" platforms was recommended for deletion in the various Local Notice to Mariners and Notice to Mariners cited above. The NM recommendations follow:
NM 41-17
11349 46Ed. 3/14 LAST NM 40/17 41/17
Delete Platform 29-20-49N 91-58-42W

One platform which was recommended for deletion in both the LNM and NM (and was in fact non charted on the contemporary ENC/RNC) was found to exist at position 29-20-23.91N, 91-57-43.68W and was thus cause for DTON notification (H13041 DTON #2) . The LNM and NM notifications follow.
NM 40-17
11349 46Ed. 3/14 LAST NM 37/17 40/17
Delete Platform 29-20-23N, 91-57-43W

LNM 20/17 (May 17, 2017)
Delete Platform 29-20-23.19N, 91-57-43.25W.

Images are included in the FFF for all verified platforms. The existing platforms are as follows (positions per CSF):
29-19-05.95N 91-59-09.28W
29-19-24.66N 92-00-33.67W
29-19-33.08N 91-59-30.12W
29-19-37.78N 91-58-59.40W
29-19-38.70N 91-59-26.77W
29-19-55.39N 91-59-12.07W
29-20-23.05N 91-57-43.03W
29-20-34.58N 91-56-55.09W
29-20-39.92N 91-59-49.48W
29-20-55.19N 91-59-19.20W
29-21-25.90N 91-59-34.68W
29-23-37.98N 91-59-34.43W
29-24-07.98N 91-59-22.14W
29-24-30.46N 91-59-32.32W

To further the offshore platform discussion an alternate platform information source was consulted. The consult includes review of information contained in a platform shape file (.SHP) downloaded from the

Bureau of Ocean Energy Management (BOEM) on November 30, 2017. Prior to including the BOEM shape file in this analysis, the portion of the shape file that intersects with the OPR-K354-KR-17 project area was reprojected to UTM, Zone 15N, NAD83 and saved as a .DXF file. In CARIS HIPS/SIPS the BOEM platform .DXF file was then visually compared to the charted platforms within the project area to identify any potentially uncharted BOEM platforms. The shape file, “platforms.shp” (contained within platforms.zip) and re-projected .DXF file, “BOEM_Platforms_UTM_15N_NAD83_Meters.dxf” are included with the digital deliverables along with the RNC/ENC charts considered in the chart comparison. BOEM platform data were obtained at the following web address: https://www.data.boem.gov/Main/Mapping.aspx

D.2.7 Ferry Routes and Terminals

No ferry routes or terminals exist for this survey.

D.2.8 Abnormal Seafloor and/or Environmental Conditions

Abnormal seafloor and/or environmental conditions were not observed for this survey.

D.2.9 Construction and Dredging

Except for the presence of temporary jackup barges attending to platform maintenance, no other construction or dredging was observed within the survey limits at the time of data acquisition.

D.2.10 New Survey Recommendation

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

D.2.11 Marine Mammal Observations

Per direction in Section 1.5 of the HSSD all personnel aboard the survey vessel used during Project OPR-K354-KR-17 were "trained" as Marine Mammal Observers prior to commencement of the survey. Training consisted of each surveyor and vessel crew member watching the US Navy video referenced in the HSSD.

As noted multiple times in the survey acquisition log, large, mobile water column sonar targets (assumed to be dolphins) were ensonified by either the MBES or the SSS. The dolphin-assumption is based on both the size and behavior of the sonar targets. Often times these observations did not coincide with a visual (above water) sighting. Visual observations, when noted, were recorded on NOAA/NMFS,AFSC/NMML Form 11US (POP) which is included as Appendix L of the HSSD.

Completed digital 11US (POP) forms were compiled and transmitted along with the Project's digital marine mammal training record to pop.information@noaa.gov and ocs.ecc@noaa.gov with a CC to the Project's COR, Starla Robinson. These records are also included in Descriptive Report Appendix II.

D.2.12 Coast Pilot Review

In reference to the OPR-K354-KR-17 survey area the Coast Pilot Report, included with the July 6, 2017 Final Data Package, states that, "there are no paragraphs included in the U.S. Coast Pilot 5 that describe this area and thus, there are no investigation items to be listed." The survey area considered in the Coast Pilot Report does not exactly match the area ultimately surveyed. However, the Report's "no-investigations" statement still applies to the area actually surveyed. Furthermore, the Hydrographic Survey Project Instructions contained only general guidance regarding the Coast Pilot. As such OSI was not able to "respond to each question posed in the Coast Pilot Field Report" as mentioned in Section 8.1.3 of the HSSD. In lieu of targeted responses to an assigned Coast Pilot Field Report, OSI conducted a general review of relevant Coast Pilot excerpts. Specifically, pertinent paragraphs from the following Coast Pilot section were considered: Coast Pilot 5 - 45th Edition, 2017 updated through 12-October-2017, Mississippi River to Sabine Pass.

Within the Coast Pilot Edition mentioned above there are no specific, detailed, relevant entries concerning the assigned H13041 survey area. Rather, only entries of a general nature are mentioned and are not refutable based on the observations of the OSI field team. Regarding "areas frequently transited and facilities utilized during in-ports" (as mentioned in the HSSD Section 8.1.3), Coast Pilot entries are somewhat more relevant. However, there are only a few Coast Pilot entries that OSI's general review attempts to address as most entries were not relevant to the "areas frequently transited by the survey vessel and facilities utilized during in-ports."

OSI's Coast Pilot Review Report and the original Coast Pilot Report, mentioned above, were transmitted to ocs.nbd@noaa.gov and coast.pilot@noaa.gov with a CC to the Project's COR, Starla Robinson. These records are also included in Descriptive Report Appendix II.

D.2.13 Inset Recommendation

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 meet or exceed 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 with the exception of deficiencies noted in the Descriptive Report.

Report Name	Report Date Sent
Data Acquisition and Processing Report	2018-01-19
Horizontal and Vertical Control Report	2018-01-19

Approver Name	Approver Title	Approval Date	Signature
George G. Reynolds	Chief of Party	01/31/2018	

Digitally signed by George G. Reynolds
Date: 2018.01.31 16:52:59 -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	Continually Operating Reference Staiton
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
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
HSSD	Hydrographic Survey Specifications and Deliverables

Acronym	Definition
HSTP	Hydrographic Systems Technology Programs
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
MCD	Marine Chart Division
MHW	Mean High Water
MLLW	Mean Lower Low Water
NAD 83	North American Datum of 1983
NAIP	National Agriculture and Imagery Program
NALL	Navigable Area Limit Line
NM	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
PRF	Project Reference File

Acronym	Definition
PS	Physical Scientist
PST	Physical Science Technician
RNC	Raster Navigational Chart
RTK	Real Time Kinematic
SBES	Singlebeam Echosounder
SBET	Smooth Best Estimate and Trajectory
SNM	Square Nautical Miles
SSS	Side Scan Sonar
ST	Survey Technician
SVP	Sound Velocity Profiler
TCARI	Tidal Constituent And Residual Interpolation
TPE	Total Propagated Error
TPU	Topside Processing Unit
USACE	United States Army Corps of Engineers
USCG	United Stated Coast Guard
UTM	Universal Transverse Mercator
XO	Executive Officer
ZDA	Global Positiong System timing message
ZDF	Zone Definition File

Appendix I

Tides and Water Levels

The following table summarizes the days in which data were collected that contribute to the final accepted data set.

Table 1
Abstract of Times of Hydrography

Date	Day Number	Min. Time UTC	Max. Time UTC
8/5/2017	217	18:03:58	23:20:51
8/6/2017	218	00:26:15	01:19:51
8/21/2017	233	00:25:06	18:13:57
8/22/2017	234	19:36:30	23:43:29
8/23/2017	235	00:18:00	23:51:22
8/24/2017	236	00:32:49	19:42:14
9/1/2017	244	16:15:57	23:45:23
9/2/2017	245	00:25:19	22:34:54
9/3/2017	246	13:25:33	20:14:11
9/4/2017	247	13:47:12	20:09:57
9/8/2017	251	13:30:37	21:02:07
9/9/2017	252	13:39:27	22:05:54
9/11/2017	254	18:27:03	22:12:41
9/12/2017	255	14:15:07	22:16:30
9/13/2017	256	14:28:45	22:26:26
9/14/2017	257	13:58:24	20:12:19
9/16/2017	259	13:41:34	23:51:28
9/17/2017	260	00:17:02	22:15:57
9/18/2017	261	13:52:11	17:18:04
9/22/2017	265	14:34:22	22:34:35
9/23/2017	266	14:56:32	17:25:01
9/26/2017	269	13:37:44	22:22:20
9/27/2017	270	14:18:06	20:56:43
10/12/2017	285	14:47:10	14:51:25

Tide/water levels for this project were provided exclusively by NOAA as verified data from NOAA Tide Station 876-4227, LAWMA, LA. The project is located within zones indicated by preliminary tidal zoning included in the project Statement of Work. Time and range corrections were applied to LAWMA, LA (876-4227) verified tide data according to Table 2.

Based on the results of crossline analysis, it appears that the time and range factors as provided in the preliminary zoning scheme are adequate.

Coordinated Universal Time (UTC) was used to annotate the tide records and all other data obtained for this project.

Preliminary tide correctors were retrieved daily from the CO-OPS website. Verified tides were retrieved as they were made available by CO-OPS. Tide data were applied to processed soundings employing the CARIS "Import Tide to HIPS" function.

A slightly altered version of the CARIS-format zoning file, "K354KR2017rev.zdf" (provided by CO-OPS), was employed to facilitate the application of final tide zoning scheme factors. During data processing OSI discovered a minor flaw in the 6th vertex of CO-OPS-provided Zone #82; the vertex did not fall exactly on a nearby vertex of the adjacent zone which is the presumed intention of CO-OPS. The result was a long, narrow, triangular area with no zoning coverage. The non-coverage triangle had two legs roughly 11.6 kilometers long with the third leg being only about 4 meters long. OSI adjusted the Zone #82 vertex which resulted in elimination of the non-coverage area. The 6th vertex as delivered by CO-OPS was 29.448176, -92.096407. OSI changed this vertex to 29.448128, -92.096409. In making the edit neither time nor magnitude multiplier changes were made to the preliminary zoning file. The OSI-edited zoning file, included with the project deliverables, uses the same name as noted above, i.e. the file name, as delivered by CO-OPS, was retained.

Table 2
Tide Zones Associated with Project OPR-K354-KR-17

Zone	Time Correction	Range Correction
65	-60	0.94
66	-60	1.03
82	-72	1.31
115	-78	1.28
154	-72	1.22
182	-60	1.12
189	-84	1.31
191	-66	1.12
193	-72	1.25
263	-66	1.03

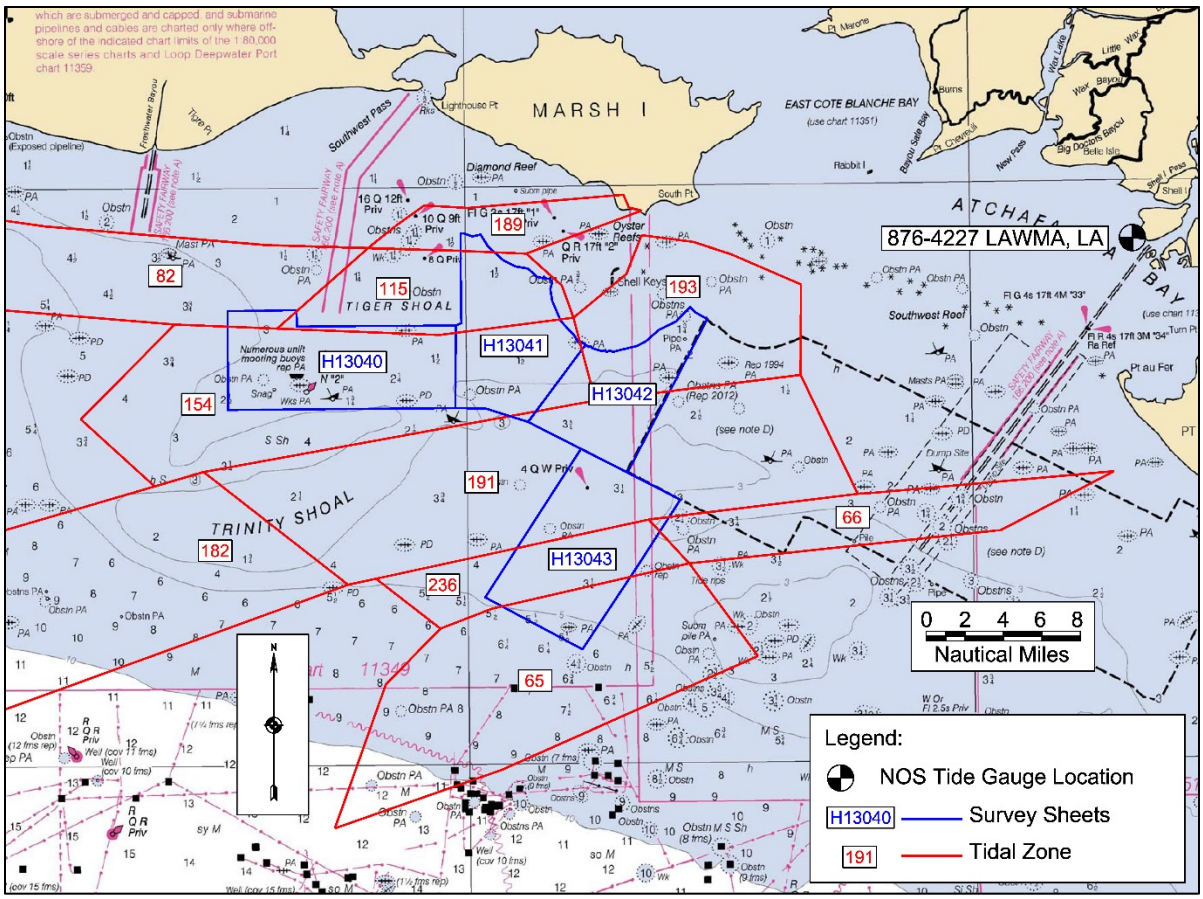

Figure 1. Project survey boundaries (blue lines), tidal zone boundaries (red lines), and the LAWMA, LA tide station location. In this figure the western end of Tide Zones 182 and 82 have been cropped for the sake of clarity of the 2017 project area.

APPENDIX II

SUPPLEMENTAL SURVEY RECORDS AND CORRESPONDENCE

From: OCS NDB - NOAA Service Account [mailto:ocs.ndb@noaa.gov]
Sent: Friday, December 15, 2017 9:38 AM
To: Bob Wallace <rmw@oceansurveys.com>
Cc: NSD Coast Pilot <coast.pilot@noaa.gov>; Starla Robinson - NOAA Federal <starla.robinson@noaa.gov>; George G Reynolds <ggr@oceansurveys.com>
Subject: Re: NOAA Contract Hydrographic Survey Coast Pilot Review Report (Project OPR-K354-KR-17)

Good morning, Mr. Wallace,

Thanks for submitting this report. We here at NOAA's National Ocean Service, Marine Chart Division did indeed receive this info and it's been entered in the system for application to the Coast Pilot. Sorry for not responding, that was my oversight. I certainly appreciate you checking back.

Thanks again,

John Whiddon, Cartographer
Nautical Data Branch/Marine Chart Division/
Office of Coast Survey/National Ocean Service/
Contact: ocs.ndb@noaa.gov
NOAA NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION

On Fri, Dec 15, 2017 at 9:31 AM, Bob Wallace <rmw@oceansurveys.com> wrote:

All,

I sent this e-mail back on November 29, 2017. I never received a response from any of the NOAA addressees so I am sending again to be sure that it was received.

Would one of the NOAA folks please let me know if you received this e-mail and two attached .PDF documents.

Thanks, Bob Wallace

From: Bob Wallace [mailto:rmw@oceansurveys.com]
Sent: Wednesday, November 29, 2017 3:59 PM
To: 'ocs.ndb@noaa.gov' <ocs.ndb@noaa.gov>; 'coast.pilot@noaa.gov' <coast.pilot@noaa.gov>
Cc: 'starla.robinson@noaa.gov' <starla.robinson@noaa.gov>; 'George G Reynolds' <ggr@oceansurveys.com>; 'Bob Wallace' <rmw@oceansurveys.com>; 'David Somers' <dts@oceansurveys.com>
Subject: NOAA Contract Hydrographic Survey Coast Pilot Review Report (Project OPR-K354-KR-17)

All,

Attached are two Coast Pilot-related .PDFs. The first documents is the original Coast Pilot Report furnished with the July 6, 2017 "Final Data Package" for NOS-NOAA contract survey OPR-K354-KR-17. The second document is OSI's Coast Pilot Review Report. Given that there were no specific Coast Pilot Report investigations assigned, OSI conducted a general review of pertinent Coast Pilot sections as applies to the general locality of the survey area and the areas frequently transited and facilities utilized during in-ports.

Please don't hesitate to contact me if you have any questions or concerns.

Regards, Bob Wallace

Robert M. Wallace Jr.

Project Manager

OCEAN SURVEYS, INC.

129 Mill Rock Road East, Old Saybrook, CT 06475

T 860-388-4631 x129 **M** 860-227-3099 **F** 860-388-5879

rmw@oceansurveys.com | www.oceansurveys.com

From: Starla Robinson - NOAA Federal [mailto:starla.robinson@noaa.gov]
Sent: Friday, November 17, 2017 5:56 PM
To: George Reynolds <ggr@oceansurveys.com>
Cc: Douglas Wood - NOAA Federal <douglas.wood@noaa.gov>; Corey Allen - NOAA Federal <corey.allen@noaa.gov>
Subject: Re: CSF "assigned" features in "unassigned" sheets

Hello George,

To confirm, OSI is not responsible for the CSF assigned features that are outside the surveyed area beyond the surveyed extent defined by what OSI was able to complete of the main scheme before squaring off (H13040 through H13043).

I absolutely agree with the assumption and thanks for asking.

Happy Holidays,
Starla

H13043	4	17 Miles South of South Point	Louisiana	40000	53	Additional sheet not yet assigned. As the LNM are completed, the KR will square off the acquired area and ensure the full investigation of any features within the surveyed extent.

--
Starla D. Robinson, Physical Scientist
NOS - OCS - Hydrographic Survey Division - Operations Branch
National Oceanic Atmospheric Administration
Office: ***240-533-0034*** ***(Updated 6/13/17)***
Cell: 360-689-1431
Website: HSD Planned Hydrographic Surveys

On Fri, Nov 17, 2017 at 4:41 PM, George Reynolds <ggr@oceansurveys.com> wrote:

Hi Starla,

We have begun writing the project reports and, in re-reading the various project documentation and reviewing files, we noticed the following potential bookkeeping/reporting issue. You may recall that the Draft Project Instructions, Composite Source File (CSF) and Project Reference File (PRF) considered a seven-sheet survey program The Final Project Instructions and PRF consider the survey that was ultimately conducted, a four-sheet survey. However, the Final CSF does not reflect the change from seven sheets to four sheets. As such the Final CSF includes many "assigned" features that fall well outside of the four-sheet survey. We don't believe that NOAA intended for us to cover the 100+ CSF "assigned" features that fall outside of the assigned survey area, i.e. within the three sheets that were dropped from the original "draft" survey program. However, we have no documentation attesting to such. Assuming you agree with this assumption, would you please document that OSI is not responsible for investigating any features beyond those located within the four (4) assigned sheets. We will include your correspondence in with the Project Deliverables, i.e. a page in DR Appendix II, Correspondence.

Thanks, George

From: Starla Robinson - NOAA Federal <starla.robinson@noaa.gov>
Date: 12/11/17 5:46 PM (GMT-05:00)
To: GGR Backup <ggr@oceansurveys.com>
Cc: Douglas Wood - NOAA Affiliate <douglas.wood@noaa.gov>, Corey Allen - NOAA Federal <corey.allen@noaa.gov>, Briana Welton - NOAA Federal <Briana.Hillstrom@noaa.gov>, Castle Parker - NOAA Federal <castle.e.parker@noaa.gov>, Martha Herzog - NOAA Federal <martha.herzog@noaa.gov>
Subject: Re: Platform vs. Update Clarification

Hello George,

Include both the significant wellheads and platform features in the FFF, and reposition any platform that deviates greater than 10 meter from the center point of the corresponding charted feature, based on the page 97 of the HSSD. These are all delete/add for the charted platforms.

Thank you,
Starla

--
Starla D. Robinson, Physical Scientist
NOS - OCS - Hydrographic Survey Division - Operations Branch
National Oceanic Atmospheric Administration
Office: ***240-533-0034*** ***(Updated 6/13/17)***
Cell: 360-689-1431
Website: HSD Planned Hydrographic Surveys

On Wed, Dec 6, 2017 at 10:19 AM, GGR Backup <ggr@oceansurveys.com> wrote:

Good morning Starla,

We would like some S-57 clarification/guidance regarding offshore platforms and BSSE wellheads in close proximity to each other. Please see the attached PDF.

In the 2 examples provided and many other cases the wellhead position is much closer to the surveyed positioned of the platform and the surveyed platform position is greater than 20 meters from the CSF platform position. Given our survey scale of 1:40,000, what are the distance thresholds for updating vs new/delete for a feature position?

Should we mark both the CSF wellhead and CSF platform as "delete" and create a new platform feature at the surveyed position? Or, mark the welhead as "delete" and the platform as "retain" at the CSF position?

Thanks,

George

Reference HSSD 7.5.2

New/Delete vs. Update:

1.Charted feature is found in new position via multibeam, lidar, vessel-mounted laser scanning, or any remote sensing system capable of generating a georeferenced point cloud sufficient to differentiate features at survey scale, regardless of proximity to charted feature:

- descrp = Delete for charted feature (delivered from CSF)

- descrp = New for surveyed feature (derived from grid sounding for multibeam and lidar, derived frompoint cloud for laser scanning)

2.Charted feature is found via visual observation or handheld laser range finder, within 10 m of the charted feature:

- descrp = Update (populate surveyed height/depth of feature, not position)

3.Charted feature is found via visual observation or handheld laser range finder, greater than 10 m from the charted feature:

- descrp = Delete for charted feature (delivered from CSF)

- descrp = New for surveyed feature (derived from visual observation or handheld laser range finder)

4.Charted line or area feature geometry has changed.

- descrp = Update; then manually edit the geometry

Note: if the new area extents border the edge of bathymetry, instead of manually editing the geometry, the hydrographer may use ‘recomd’ = edit the geometry to extents of bathymetry

OR when extensive geometry changes are needed:

- descrp = Delete for incorrectly charted feature

CSF Investigation Requirements:

Platform. If visually confirmed, include in FFF with descrp=retain. If not visible, conduct a feature disproval (Section 7.3.4) and if disproved, include in FFF with descrp = delete.

BSSE wellhead. See Project Instructions for further information. Contact HSD Project Manager/COR for clarification, if needed.

Project Instructions:

With respect to wellheads, reference HSSD Chapter 7.5.1. If a wellhead is not found, for the purposes of disproval, a 50 m search radius shall be used following the feature disproval techniques for a complete coverage survey outlined in HSSD Section 7.3.4. Include feature in the FFF with descrp = delete.

From: Starla Robinson - NOAA Federal [mailto:starla.robinson@noaa.gov]
Sent: Tuesday, December 12, 2017 5:19 PM
To: George Reynolds <ggr@oceansurveys.com>
Cc: David T. Somers <dts@oceansurveys.com>; Bob Wallace <rmw@oceansurveys.com>; Douglas Wood - NOAA Affiliate <douglas.wood@noaa.gov>; Corey Allen - NOAA Federal <corey.allen@noaa.gov>; Martha Herzog - NOAA Federal <martha.herzog@noaa.gov>
Subject: Re: non-DTON pipelines and seeps in the FFF

Hello George,

Excellent question.

The current requirement of the "Non-DTON Seep and Pipeline Report" is a separate deliverable from the FFF. Your historic method of including the pipeline segments in the FFF is good. How you manage the other features is up to your discretion. The features that are not cartographically significant they will be ignored in the FFF.

Thank you,
Starla
--
Starla D. Robinson, Physical Scientist
NOS - OCS - Hydrographic Survey Division - Operations Branch
National Oceanic Atmospheric Administration
Office: ***240-533-0034*** ***(Updated 6/13/17)***
Cell: 360-689-1431
Website: HSD Planned Hydrographic Surveys

On Mon, Dec 11, 2017 at 2:06 PM, George Reynolds <ggr@oceansurveys.com> wrote:

Hi Starla,

We are compiling the "Non-DTON Seep and Pipeline Report" and FFF files for our sheets and have a question about pipeline FFF attribution.

The pipeline investigation requirements are "See HSSD Section 1.6.2 for Elevated Pipeline guidance or Section 1.7 for Non-DTON Exposed Pipeline guidance. If pipeline is not elevated or exposed, include in FFF with descrp = retain."

HSSD Sections 1.7 and 1.6.2 are straight forward but we are not as clear on the FFF requirements.

How should pipelines that have exposed sections or seeps be attributed in the FFF? Also, should the exposed pipelines and seeps be included in the FFF separately from the full-length pipeline object?

In prior years we have included exposed pipelines in the FFF because they were full DtoNs per the older HSSDs, but have not included the seeps as they were not physical features.

Thanks, George

From: Alexandra.Grodsky@noaa.gov [mailto:Alexandra.Grodsky@noaa.gov]
Sent: Thursday, December 14, 2017 11:30 AM
To: jjd@oceansurveys.com
Subject: NCEI acceptance confirmation for Reference ID: GUTAE6

Dear Joseph DiPalma:

Thank you for sending your data and metadata files to the NOAA National Centers for Environmental Information (NCEI). NCEI received these data, SOUND VELOCITY collected from R/V Ocean Explorer in Gulf of Mexico from
2017-08-04 to 2017-10-12, on 2017-12-07 21:47:46 via S2N.

After reviewing your submission package (metadata and data), I assigned your submission an NCEI Accession Number 0169266. This number is a tracking identifier for the NCEI Ocean Archive. Please reference this number when corresponding with NCEI about these data.

You can find information about these archived data at http://accession.nodc.noaa.gov/0169266.

After further reviewing your data, creating any additional representations of these data in a format that is more preservable in the NCEI Ocean Archive, and developing necessary tracking metadata, NCEI will publish these archived data online. You may access the archival copy of your original data via the link listed above.

In addition to creating an archival copy of these data, NCEI may include all or part of your data into one or more product databases, such as the World Ocean Database.

Please let me know if you have any questions or if you have additional data and documentation that you would like to archive with these data.

Thank you again for choosing to archive your data with the National Centers for Environmental Information (NCEI).

Regards,
Alexandra Grodsky
Alexandra.Grodsky@noaa.gov

Subject: [Send2NCEI] data submission confirmation for Reference ID: GUTAE6
To: jjd@oceansurveys.com
From: NODC.DataOfficer@noaa.gov

Dear Joseph DiPalma,

Thank you for submitting your data collection, titled "SOUND VELOCITY collected from R/V Ocean Explorer in Gulf of Mexico from 2017-08-04 to 2017-10-12", to the NOAA National Centers for Environmental Information (NCEI). Your submission package has been assigned Reference ID: GUTAE6. After reviewing your data and metadata, NCEI will update you about the archival status of your submission package.

You will be notified if NCEI creates an archival information package (accession) of your data, including the unique identifier for that archival information package (the NCEI Accession number). When your data are archived, NCEI keeps an exact copy of the data and metadata you sent and will develop necessary tracking and discovery metadata. In addition, NCEI may create additional versions to ensure your data are preserved for long-term access.

Upon completion of these archival ingest actions, NCEI will publish your data online (including a copy of your original files). You will receive another email once your submission package (Reference ID: GUTAE6) is published for global access. In addition, NCEI may include all or part of your data into one or more product databases, such as the World Ocean Database.

If you have any questions about NCEI archival processes, please contact NODC.DataOfficer@noaa.gov. Also, if at any time you wish to update your submission package, please send an e-mail to NODC.DataOfficer@noaa.gov with your request. Please remember to include your submission package Reference ID.

Thank you again for choosing to archive your data with the National Centers for Environmental Information (NCEI).

NCEI Data Officer Team
NOAA National Centers for Environmental Information NOAA/NESDIS
1315 East-West Highway
Silver Spring, MD 20910
USA

From: Alexandra.Grodsky@noaa.gov [mailto:Alexandra.Grodsky@noaa.gov]
Sent: Thursday, December 14, 2017 11:30 AM
To: jjd@oceansurveys.com
Subject: NCEI acceptance confirmation for Reference ID: JG5TKB

Dear Joseph DiPalma:

Thank you for sending your data and metadata files to the NOAA National Centers for Environmental Information (NCEI). NCEI received these data, SOUND VELOCITY collected from R/V Osprey in Gulf of Mexico from 2017-09-01 to 2017-10-12, on 2017-12-07 21:55:48 via S2N.

After reviewing your submission package (metadata and data), I assigned your submission an NCEI Accession Number 0169267. This number is a tracking identifier for the NCEI Ocean Archive. Please reference this number when corresponding with NCEI about these data.

You can find information about these archived data at http://accession.nodc.noaa.gov/0169267.

After further reviewing your data, creating any additional representations of these data in a format that is more preservable in the NCEI Ocean Archive, and developing necessary tracking metadata, NCEI will publish these archived data online. You may access the archival copy of your original data via the link listed above.

In addition to creating an archival copy of these data, NCEI may include all or part of your data into one or more product databases, such as the World Ocean Database.

Please let me know if you have any questions or if you have additional data and documentation that you would like to archive with these data.

Thank you again for choosing to archive your data with the National Centers for Environmental Information (NCEI).

Regards,
Alexandra Grodsky
Alexandra.Grodsky@noaa.gov

Subject: [Send2NCEI] data submission confirmation for Reference ID: JG5TKB
To: jjd@oceansurveys.com
From: NODC.DataOfficer@noaa.gov

Dear Joseph DiPalma,

Thank you for submitting your data collection, titled "SOUND VELOCITY collected from R/V Osprey in Gulf of Mexico from 2017-09-01 to 2017-10-12", to the NOAA National Centers for Environmental Information (NCEI). Your submission package has been assigned Reference ID: JG5TKB. After reviewing your data and metadata, NCEI will update you about the archival status of your submission package.

You will be notified if NCEI creates an archival information package (accession) of your data, including the unique identifier for that archival information package (the NCEI Accession number). When your data are archived, NCEI keeps an exact copy of the data and metadata you sent and will develop necessary tracking and discovery metadata. In addition, NCEI may create additional versions to ensure your data are preserved for long-term access.

Upon completion of these archival ingest actions, NCEI will publish your data online (including a copy of your original files). You will receive another email once your submission package (Reference ID: JG5TKB) is published for global access. In addition, NCEI may include all or part of your data into one or more product databases, such as the World Ocean Database.

If you have any questions about NCEI archival processes, please contact NODC.DataOfficer@noaa.gov. Also, if at any time you wish to update your submission package, please send an e-mail to NODC.DataOfficer@noaa.gov with your request. Please remember to include your submission package Reference ID.

Thank you again for choosing to archive your data with the National Centers for Environmental Information (NCEI).

NCEI Data Officer Team
NOAA National Centers for Environmental Information NOAA/NESDIS
1315 East-West Highway
Silver Spring, MD 20910
USA

From: Starla Robinson - NOAA Federal [mailto:starla.robinson@noaa.gov]
Sent: Monday, June 26, 2017 1:47 PM
To: George Reynolds <ggr@oceansurveys.com>; Emily Clark - NOAA Federal <emily.clark@noaa.gov>
Cc: Douglas Wood - NOAA Affiliate <douglas.wood@noaa.gov>; russell.quintero <russell.quintero@noaa.gov>; Corey Allen - NOAA Federal <corey.allen@noaa.gov>
Subject: Re: Final Project Instructions OPR-K354-KR-17, Louisiana Coast, LA

Hello Emily and George,

I want to follow up on a conversation George and I had this morning.

1) CO-OPS will have new tide zones for the area in August. We would like to supersede the existing tide zones via a change memo when they become available.

2) I stated that there is no expectation that OSI collects sidescan on the crosslines.

3) George would like to be CCed on any emails going to OSI.

Thank you,
Starla

--
Starla D. Robinson, Physical Scientist
NOS - OCS - Hydrographic Survey Division - Operations Branch
National Oceanic Atmospheric Administration
Office: ***240-533-0034*** ***(Updated 6/13/17)***
Cell: 360-689-1431
Website: HSD Planned Hydrographic Surveys

On Mon, Jun 26, 2017 at 11:34 AM, Starla Robinson - NOAA Federal <starla.robinson@noaa.gov> wrote:
Hello George,

Would OSI be willing to use a modified version of the existing zoning for now, and we will issue a memo with updated zoning in August?

Thanks,
Starla

On Fri, Jun 23, 2017 at 10:06 PM, George Reynolds <ggr@oceansurveys.com> wrote:

Hi Starla.

In reviewing the project instructions, it appears that the preliminary tide zoning does not cover H13040 (survey priority 1).

Thanks, George

From: Corey Allen - NOAA Federal [mailto:corey.allen@noaa.gov]
Sent: Friday, January 12, 2018 1:38 PM
To: Starla Robinson - NOAA Federal <starla.robinson@noaa.gov>
Cc: George Reynolds <ggr@oceansurveys.com>; Martha Herzog - NOAA Federal <martha.herzog@noaa.gov>; Bob Wallace <rmw@oceansurveys.com>; David T. Somers <dts@oceansurveys.com>
Subject: Re: OPR-K354-KR-17, Task T-0003 1-meter surface delivery request

George,
If the set line spacing data can support the density requirements (for the swath of obtained coverage) of the more resolute grid, then you may submit the entire survey as a single 1m grid.

Corey

--
J. Corey Allen
Chief (acting), Operations Branch
Office of Coast Survey, NOAA
Corey.Allen@noaa.gov
240.533.0037 (Office)
301.717.7271 (Cell)
Click here for information on our planned survey activities
Find us on Facebook, Twitter and the NOAA Coast Survey blog

On Fri, Jan 12, 2018 at 12:10 PM, Starla Robinson - NOAA Federal <starla.robinson@noaa.gov> wrote:
Hello George,

I am out of the office till next week and will not be able to answer your email in a timely manner. I am going to forward it to Chief of OPS Corey Allen and our team lead Martha Herzog.

Thanks,
Starla

--
Starla D. Robinson, Physical Scientist
NOS - OCS - Hydrographic Survey Division - Operations Branch
National Oceanic Atmospheric Administration
Office: ***240-533-0034*** ***(Updated 6/13/17)***
Cell: 360-689-1431
Website: HSD Planned Hydrographic Surveys

From: **George Reynolds** <ggr@oceansurveys.com>
Date: Wed, Jan 10, 2018 at 4:30 PM
Subject: OPR-K354-KR-17, Task T-0003 1-meter surface delivery request
To: Starla Robinson - NOAA Federal <starla.robinson@noaa.gov>
Cc: Bob Wallace <rmw@oceansurveys.com>, "David T. Somers" <dts@oceansurveys.com>

Hi Starla,

We are to the point of finalizing the MBES surfaces for Project OPR-K354-KR-17. As you are aware we acquired both Complete Coverage and Set Line Spacing datasets in Surveys H13041 and H13042; the demarcation line between methods being the 4-meter contour. The seafloor around the 4-meter contour is flat over a large geographic range. It follows then that flat bottom contours are quite variable over a relatively large geographic range (especially when using zoned tides). Simply put the surveyed contours in the flats are jagged, i.e. visually unappealing. The result is that the junction area of each of the respective surfaces is also jagged (visually unappealing). We would prefer to not submit visually unappealing surfaces if it can be avoided. As such we are requesting that we submit a single 1-meter surface for each sheet. This accomplishes a couple of things: 1) the surfaces look better and 2) both OSI and NOAA have less surfaces to manage. The MBES data density in all areas is more than sufficient to support this approach.

Please let us know if it would be acceptable to submit a single 1-meter surface for each of the affected sheets in lieu of the 1-meter/4-meter surfaces as described above.

Thanks, George

From: Starla Robinson - NOAA Federal [mailto:starla.robinson@noaa.gov]
Sent: Friday, September 15, 2017 11:08 AM
To: George Reynolds <ggr@oceansurveys.com>
Cc: Corey Allen - NOAA Federal <corey.allen@noaa.gov>; Douglas Wood - NOAA Affiliate <douglas.wood@noaa.gov>
Subject: Re: Louisiana Coast Sounding Verification

Good morning George,

Thank you for asking for clarification. The official guidance is:

All charted depths falling between sounding lines and shallower by two feet or greater than adjacent water-level corrected surveyed soundings shall be verified or disproved. Verification and disproval of shoal charted depths that fall between set line spacing shall be accomplished by acquiring a star-like pattern using three lines centered on the charted depth and each extending 1 mm at chart scale. All significant shoals or features found in waters less than 20 m deep shall be developed to complete coverage standards.

A 40-meter will radius star-like pattern at the centroid of the sounding will cover a 1mm footprint at chart scale. This will be sufficient to disprove the sounding.

Please copy this guidance to your consults folder.

Thank you,
Starla

--
Starla D. Robinson, Physical Scientist
NOS - OCS - Hydrographic Survey Division - Operations Branch
National Oceanic Atmospheric Administration
Office: ***240-533-0034*** ***(Updated 6/13/17)***
Cell: 360-689-1431
Website: HSD Planned Hydrographic Surveys

From: Starla Robinson - NOAA Federal [mailto:starla.robinson@noaa.gov]
Sent: Monday, September 11, 2017 3:33 PM
To: George Reynolds <ggr@oceansurveys.com>
Cc: Corey Allen - NOAA Federal <corey.allen@noaa.gov>; Martha Herzog - NOAA Federal <martha.herzog@noaa.gov>; Douglas Wood - NOAA Affiliate <douglas.wood@noaa.gov>
Subject: Re: FW: H13040 sounding verification

Hello George,

Following up on our conversation regarding sounding disapprovals:

- If the multibeam lines, on either side of a sounding are shoaler than the sounding, the data will be superseded. No additional disproval of a *deep sounding* is required.

- If the multibeam lines are deeper then the sounding, the *shoal sounding* must be disproved using the star-like pattern discussed. This follows HSSD section 5.2.2.1 Bathymetric Splits.

Thanks,
Starla

--
Starla D. Robinson, Physical Scientist
NOS - OCS - Hydrographic Survey Division - Operations Branch
National Oceanic Atmospheric Administration
Office: ***240-533-0034*** ***(Updated 6/13/17)***
Cell: 360-689-1431
Website: HSD Planned Hydrographic Surveys

Hello George,

Attached are the updated tide zones for OPR-K354-KR-17, Louisiana Coast. These tide zones completely cover the project area.

Please copy this email into your correspondence folder.

Thank you,
Starla Robinson

PS: A change memo is pending. I wanted to make sure we sent the data to you sooner than waiting to finalize that process.

--

Starla D. Robinson, Physical Scientist
NOS - OCS - Hydrographic Survey Division - Operations Branch
National Oceanic Atmospheric Administration
Office: ***240-533-0034*** ***(Updated 6/13/17)***
Cell: 360-689-1431
Website: HSD Planned Hydrographic Surveys

---------- Forwarded message ----------
From: **David Wolcott - NOAA Federal** <david.wolcott@noaa.gov>
Date: Fri, Jul 28, 2017 at 6:11 PM
Subject: Project Instructions for OPR-K354-KR-2017 Louisiana Coast (Revised)
To: Russell Quintero - NOAA Federal <russell.quintero@noaa.gov>, Gerald Hovis <gerald.hovis@noaa.gov>, "_NOS.CO-OPS.HTP" <nos.coops.hpt@noaa.gov>, "J. Corey Allen" <corey.allen@noaa.gov>, Starla Robinson - NOAA Federal <Starla.Robinson@noaa.gov>

UNITED STATES DEPARMENT OF COMMERCE
National Oceanic and Atmospheric Administration
National Ocean Service
Silver Spring, Maryland 20910

DATE: 07/28/2017

MEMORANDUM FOR: LT Russell Quintero
Chief, Operations Branch N/CS31

FROM: Gerald Hovis
Chief, Products and Services Branch, N/OPS3

SUBJECT: Delivery of Tide Requirements for Hydrographic Surveys

Tide requirements for hydrographic survey project OPR-K354-KR-2017 (Revised) Louisiana Coast are being provided in Microsoft Word format. A .ZIP file containing all pertinent ESRI ArcGIS files, as well as a tidal zoning graphic in PDF, is attached to this email and posted to the Sharepoint website under the project name "OPR-K354-KR-17". Six minute preliminary data for LAWMA, LA (8764227) may be retrieved in one month increments over the internet from the CO-OPS SOAP web services at http://opendap.co-ops.nos.noaa.gov/axis/text.html by clicking on "Six Minute Data".

--
David Wolcott
Oceanographic Division
Center for Operational Oceanographic Products and Services
National Ocean Service
National Oceanic and Atmospheric Administration

1305 East-West Highway, 7133
Silver Spring, MD 20910
Office: 240-533-0614
Fax: 301-713-4437

From: George Reynolds [mailto:ggr@oceansurveys.com]
Sent: Friday, June 23, 2017 10:06 PM
To: 'Starla Robinson - NOAA Federal' <starla.robinson@noaa.gov>
Cc: 'Douglas Wood - NOAA Affiliate' <douglas.wood@noaa.gov>; 'Emily Clark - NOAA Federal' <emily.clark@noaa.gov>; 'russell.quintero' <russell.quintero@noaa.gov>; 'Corey Allen - NOAA Federal' <corey.allen@noaa.gov>
Subject: RE: Final Project Instructions OPR-K354-KR-17, Louisiana Coast, LA

Hi Starla.

In reviewing the project instructions, it appears that the preliminary tide zoning does not cover H13040 (survey priority 1).

Thanks,
George

From: OCS NDB - NOAA Service Account [mailto:ocs.ndb@noaa.gov]
Sent: Friday, December 22, 2017 9:24 AM
To: Bryan Chauveau <Bryan.Chauveau@noaa.gov>
Cc: Briana Welton <Briana.Hillstrom@noaa.gov>; Castle E Parker <Castle.E.Parker@noaa.gov>; Starla Robinson - NOAA Federal <Starla.Robinson@noaa.gov>; Douglas Wood - NOAA Federal <douglas.wood@noaa.gov>; Tim Osborn <Tim.Osborn@noaa.gov>; David Somers <dts@oceansurveys.com>; Tiffany Squyres - NOAA Federal <tiffany.squyres@noaa.gov>; _NOS OCS PBA Branch <ocs.pba@noaa.gov>; _NOS OCS PBB Branch <ocs.pbb@noaa.gov>; _NOS OCS PBC Branch <ocs.pbc@noaa.gov>; _NOS OCS PBD Branch <ocs.pbd@noaa.gov>; _NOS OCS PBE Branch <ocs.pbe@noaa.gov>; _NOS OCS PBG Branch <ocs.pbg@noaa.gov>; Charles Porter - NOAA Federal <charles.porter@noaa.gov>; James M Crocker <James.M.Crocker@noaa.gov>; Ken Forster <Ken.Forster@noaa.gov>; Kevin Jett - NOAA Federal <kevin.jett@noaa.gov>; Matt Kroll <Matt.Kroll@noaa.gov>; Michael Gaeta <Michael.Gaeta@noaa.gov>; Nautical Data Branch <OCS.NDB@noaa.gov>; NSD Coast Pilot <coast.pilot@noaa.gov>; PHB Chief <PHB.Chief@noaa.gov>; Tara Wallace <Tara.Wallace@noaa.gov>
Subject: Fwd: H13041 DtoN #2

DD-29118 has been registered by the Nautical Data Branch and directed to Products Branch G for processing.

The DtoN reported is an uncharted platform in the Gulf of Mexico, LA.

The following chart is affected:
11349 kapp 64

The following ENC is affected:
US4LA15M

References:
H13041
OPR-K354-KR-17

This information was discovered by a NOAA contractor and was submitted by AHB.

Nautical Data Branch/Marine Chart Division/
Office of Coast Survey/National Ocean Service/
Contact: ocs.ndb@noaa.gov
NOAA NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION

From: Bryan Chauveau - NOAA Federal [mailto:bryan.chauveau@noaa.gov]
Sent: Thursday, December 21, 2017 4:04 PM
To: OCS NDB - NOAA Service Account <ocs.ndb@noaa.gov>
Cc: Briana Welton - NOAA Federal <Briana.Hillstrom@noaa.gov>; Castle Parker <castle.e.parker@noaa.gov>; Starla Robinson - NOAA Federal <Starla.Robinson@noaa.gov>; Douglas Wood - NOAA Federal <douglas.wood@noaa.gov>; Tim Osborn - NOAA Federal <tim.osborn@noaa.gov>; dts@oceansurveys.com; tiffany.squyres@noaa.gov
Subject: H13041 DtoN #2

Good Day,

Please find attached a zip file for survey H13041 DtoN report # 2 for submission to Nautical Data Branch (NDB) of the Marine Chart Division (MCD). This Danger submission contains one Uncharted Platform.

The information originates from a NOAA contractor and was submitted to the Atlantic Hydrographic Branch (AHB) for review and processing. The contents of the attached WinZip file were generated at AHB. The attached zip file contains a DtoN Letter (PDF), associated image files, and a Pydro XML file.

If you have any questions, please direct them back to me via email or phone (757-364-7457).

Thank you for your assistance with this matter.

Regards,

Bryan Chauveau

From: David Somers [mailto:dts@oceansurveys.com]
Sent: Thursday, December 21, 2017 11:40 AM
To: ahb.dton@noaa.gov; Starla Robinson - NOAA Federal <starla.robinson@noaa.gov>
Cc: George Reynolds <ggr@oceansurveys.com>; Bob Wallace <rmw@oceansurveys.com>
Subject: H13041 DtoN #2

Good Afternoon,

OSI has compiled and attached 1 DtoN feature file along with supporting imagery for survey H13041.

An assigned platform from our CSF has been removed from chart but was found to still exist near it's previously charted position.

Please let me know if OSI can provide any additional information regarding the platform.

Regards,
Dave

David Somers
Data Processing Manager

OCEAN SURVEYS, INC.
129 Mill Rock Road East, Old Saybrook, CT 06475
T 860-388-4631 x135 **M** 860-575-3361 **F** 860-388-5879
dts@oceansurveys.com | www.oceansurveys.com
Follow us: LinkedIn | Twitter | Facebook

From: Castle Parker - NOAA Federal [mailto:castle.e.parker@noaa.gov]
Sent: Friday, January 26, 2018 9:17 AM
To: Starla Robinson - NOAA Federal <Starla.Robinson@noaa.gov>; George Reynolds <ggr@oceansurveys.com>; Bob Wallace <rmw@oceansurveys.com>; David Somers <dts@oceansurveys.com>
Subject: RE: FW: DTON correspondence record request

FYI,

Reference attached spreadsheet regarding K354 OSI DtoN and feature submissions. I have annotated with dates where AHB either submitted emails to NDB and received registration emails.

AHB is somewhat perplexed with NDB and MCD policy with regards to exposed or unburied pipelines. NDB is hesitant to chart single point obstruction on a charted linear obstruction (pipeline). The subject matter remains a topic of conversation with no clear resolution as of today. OSI has done due diligence with the submissions and hope that I have provided the proper emails for DR inclusion.

Some conflict at AHB was during a time period of which I was out of the office and the Acting Team Lead did not understand the protocol of submitting uncharted platforms. Therefore, when re-addressing all of the elevated pipelines, the uncharted platforms were submitted to NDB.

All of the submitted DtoNs that were forwarded to the GOM Navigation Manager needed a time period for actions in contacting the source authorities. After 30 days with no response, AHB has submitted or intends to submit the features to NDB. If the reports are not generated or submitted by the time the survey is ready to submit, do not hold up the submission. AHB will add any reports or emails to the survey submission after it arrives.

Regarding uncharted or missing AtoNs, NDB and MCD determine that USCG is source authority, at least for the items documented in the USCG Light List. AHB forwards survey information to USCG with request to update the Light List (LL); after the LL is updated MCD will apply the AtoN to the chart, or delete the missing AtoN. Bearing in mind the flow of information, there will be delays with chart corrections for AtoNs.

Please respond with any questions or outstanding issues related to this discussion thread.
Regards,
Gene

Castle Eugene Parker
NOAA Office of Coast Survey
Atlantic Hydrographic Branch
Hydrographic Team Lead / Physical Scientist
castle.e.parker@noaa.gov
office (757) 364-7472

From: AHB Chief - NOAA Service Account [mailto:ahb.chief@noaa.gov]
Sent: Monday, December 18, 2017 12:52 PM
To: d8OANpaton@uscg.mil
Cc: Castle Parker - NOAA Federal <castle.e.parker@noaa.gov>; Edward Owens - NOAA Federal <edward.owens@noaa.gov>; Corey Allen - NOAA Federal <corey.allen@noaa.gov>; Tim Osborn - NOAA Federal <tim.osborn@noaa.gov>; James Miller - NOAA Federal <james.j.miller@noaa.gov>; Clinton Marcus - NOAA Federal <clinton.r.marcus@noaa.gov>; Briana Welton - NOAA Federal <Briana.Hillstrom@noaa.gov>; Starla Robinson - NOAA Federal <Starla.Robinson@noaa.gov>
Subject: USCG PATON Discrepancy for Coast Guard District 8 from NOAA Survey H13041

Good day,

NOAA's Office of Coast Survey received a report from the field surveyor conducting NOAA hydrographic survey H13041 in the vicinity of East Tiger Shoal, Louisiana, regarding one disproved private Aid to Navigation (PATON):

1.) Private Aid to Navigation "MCMORAN-SMI-224 Mooring Facility Lights" (USCG District 8 Light List #815) was disproved (not found) in position 29-23-01.800N, 091-57-26.900W as is currently reported in the Light List and depicted on NOAA chart products. See attached report for additional information.

For nautical charting purposes NOAA sources the position and characteristics of all ATONs from IATONIS. Any discrepancies noted by the field surveyor are routed directly to the appropriate USCG district. As a result, I wanted to pass along this information and recommend updating the Light List with the relevant information.

Many thanks,

Bri

CDR Briana Welton Hillstrom, NOAA
Chief, Atlantic Hydrographic Branch
439 W. York St.
Norfolk, VA 23510
office: NEW OFFICE PHONE #: 757-364-7460 (old: 757-441-6746, ext 200)

From: David Somers [mailto:dts@oceansurveys.com]
Sent: Friday, December 15, 2017 4:19 PM
To: James J. Miller <james.j.miller@noaa.gov>
Cc: Corey Allen <corey.allen@noaa.gov>; Janice Eisenberg - NOAA Federal <janice.eisenberg@noaa.gov>; ahb.dton@noaa.gov; Starla Robinson - NOAA Federal <starla.robinson@noaa.gov>; George Reynolds <ggr@oceansurveys.com>; Bob Wallace <rmw@oceansurveys.com>
Subject: Re: H13040, H13041, H13042, and H13043 DtoNs

Hi James,

Please see detailed answers embedded below. Attached are 2 images referenced below and a pdf containing an excerpt of draft text from our DR with a more extensive discussion of H13043 DtoN #1.

Regards,
Dave

From: James J. Miller <james.j.miller@noaa.gov>
To: David Somers <dts@oceansurveys.com>
Cc: Corey Allen <corey.allen@noaa.gov>; Janice Eisenberg - NOAA Federal <janice.eisenberg@noaa.gov>; "ahb.dton@noaa.gov" <ahb.dton@noaa.gov>; Starla Robinson - NOAA Federal <starla.robinson@noaa.gov>; George Reynolds <ggr@oceansurveys.com>; Bob Wallace <rmw@oceansurveys.com>
Sent: Friday, December 15, 2017 1:59 PM
Subject: Re: H13040, H13041, H13042, and H13043 DtoNs

David Somers,

AHB has several questions regarding the disproved AtoNs. We greatly appreciate your assistance.

H13041 DtoN #1
The submitted DtoN feature attributes state that the charted aid to navigation light was found not to exist at or near the charted location. The light is currently charted in association with an offshore platform (OFSPLF). Were both of the features disproved, or just the light itself?

The provided side scan imagery possibly indicates something in the vicinity of the charted features (circled below). Do submerged remnants of the platform and light exist?

The side scan imagery shows an area of darker return, which is common around platforms, but there is no seafloor relief or platform remnants observed. The attached image (H13041_DtoN_1_MBES-SSS.jpg) depicts: 25m spaced shoal bias soundings on a 1m CUBE surface overlain on MBES and SSS data.

H13043 DtoN #1
The submitted DtoN feature attributes state that the charted aid to navigation light was found not to exist at or near the charted location The provided multibeam image possibly indicates

something in the vicinity of the charted feature (circled below). Do submerged remnants of the light exist?

Yes, submerged remnants of the platform exist, but they are insignificant, 2 features less than 70cm tall and a 25cm tall mound. The shoaler of the 2 features, if designated, would chart as a 21ft depth which matches the closest charted depth on chart 11349. See attached image H13043_DtoN_1_MBES.jpg.

Respectfully,
James Miller

James J. Miller
Physical Scientist
NOAA Office of Coast Survey
Atlantic Hydrographic Branch
439 W York St | Norfolk, VA | 23510
757-364-7465

On Thu, Dec 14, 2017 at 5:22 PM, David Somers <dts@oceansurveys.com> wrote:

Good Afternoon,

OSI has compiled and attached 7 DtoN feature files along with supporting imagery for surveys H13040, H13041, H13042, and H13043.

H13040 DtoN 2 - Large platform

H13041 DtoN 1 - AtoN not present

H13042 DtoN 5 - Large platform, recently uncharted platform
H13042 DtoN 6 - Obstructions near platform
H13042 DtoN 7 - Obstruction near pipe arch

H13043 DtoN 1 - AtoN not present
H13043 DtoN 2 - Obstruction

Please let me know if OSI can provide any additional information regarding these DtoNs.

Regards,
Dave

David Somers
Data Processing Manager

OCEAN SURVEYS, INC.
129 Mill Rock Road East, Old Saybrook, CT 06475
T 860-388-4631 x135 **M** 860-575-3361 **F** 860-388- 5879
dts@oceansurveys.com | Ocean Surveys Incorporated

From: Starla Robinson - NOAA Federal [mailto:starla.robinson@noaa.gov]
Sent: Friday, December 22, 2017 12:09 PM
To: Bob Wallace <rmw@oceansurveys.com>
Subject: Re: Non-DTON Seep and Pipeline Reports for H13042 and H13043

Thank you Bob. Reports received. Happy Holidays! – Starla

--
Starla D. Robinson, Physical Scientist
NOS - OCS - Hydrographic Survey Division - Operations Branch
National Oceanic Atmospheric Administration
Office: ***240-533-0034*** ***(Updated 6/13/17)***
Cell: 360-689-1431
Website: HSD Planned Hydrographic Surveys

On Thu, Dec 21, 2017 at 4:03 PM, Bob Wallace <rmw@oceansurveys.com> wrote:

Starla,

Attached are Non-DTON Seep and Pipeline reports for OPR-K354-KR-17, Surveys H13042 and H13043. We are presenting the information as stand-alone compilation reports (rather than in the body of an e-mail) since there are multiple reportable items per sheet.

The Non-DTON reports for Surveys H13040 and H13041 preceded this e-mail.

Please let me know that you received both e-mails once you have.

Thanks, Bob Wallace

Robert M. Wallace Jr.

Project Manager

OCEAN SURVEYS, INC.

129 Mill Rock Road East, Old Saybrook, CT 06475

T 860-388-4631 x129 **M** 860-227-3099 **F** 860-388-5879

rmw@oceansurveys.com | www.oceansurveys.com

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Non-DTON Report Image Key	Interpreted Exposed Pipeline or Seep (Latitude)	Interpreted Exposed Pipeline or Seep (Longitude)	Distance to Nearest Charted Pipeline or Platform (m)	Approx. Length of Interpreted Exposed Pipeline (m)	Date/Time of Observation (UTC)	Approx. Water Depth Near Feature (m)	Interpreted Height Above Bottom (m)	Comment
1	29-24-08.86N	91-59-21.63W	17/33	8	2017/09/09 15:50	3.3	0.1	17m to uncharted BOEM pipeline and 18m to surveyed platform. No charted pipelines within 3,400 meters.
2	29-19-58.42N	92-00-25.88W	4	9	2017/08/21 16:03	6.2	0.1	4m to nearest charted pipeline.
3	29-19-43.41N	92-00-17.98W	40	5	2017/09/23 15:47	6.4	0.2	40m to nearest charted pipeline.
4 South Pipe	29-19-26.61N	92-00-34.10W	0	15	2017/09/23 15:13	6.4	0.0	Falls on charted pipeline. Bottom is disturbed and of variable depth.
4 North Pipe	29-19-27.22N	92-00-33.38W	13	15	2017/09/22 22:01	6.4	0.7	13m to nearest charted pipeline. Bottom is disturbed and of variable depth.
5	29-19-33.30N	92-00-06.31W	75	10	2017/09/23 15:38	6.5	0.1	75m to nearest charted pipeline. Between two pipelines. Falls on uncharted BOEM pipeline.
6	29-19-50.08N	91-59-55.19W	0	8	2017/09/23 16:27	6.2	0.0	Falls on charted pipeline.
7	29-21-03.82N	91-59-29.71W	27	5	2017/09/26 21:29	5.0	0.4	27m to nearest charted pipeline.
8	29-21-25.52N	91-59-36.00W	29/57	6	2017/09/26 21:01	5.1	0.6	29m to nearest charted pipeline. 57m to surveyed platform.
9	29-19-53.57N	91-59-39.05W	10	4	2017/09/23 16:36	6.2	0.2	10m to nearest charted pipeline.
10	29-19-07.47N	91-59-34.92W	127	8	2017/09/22 15:15	6.7	0.3	127m to nearest charted pipeline but falls on uncharted BOEM pipeline.
11	29-19-04.88N	91-59-11.21W	22/15	10	2017/08/22 21:59	6.8	0.3	22m to nearest charted pipeline. 15m to surveyed platform.

From: Jay Nunenkamp - NOAA Federal [mailto:jay.nunenkamp@noaa.gov]
Sent: Wednesday, November 29, 2017 2:03 PM
To: Bob Wallace <rmw@oceansurveys.com>
Subject: Re: NOAA Contract Hydrographic Survey MMO Records (Project OPR-K354-KR-17)

Bob:

Received, thank you.

Sincerely,

Jay Nunenkamp
Environmental Compliance Coordinator
Office of Coast Survey
National Oceanic and Atmospheric Administration (NOAA)
240-533-0118
SSMC3 Room 6513

On Wed, Nov 29, 2017 at 1:59 PM, Bob Wallace <rmw@oceansurveys.com> wrote:

All,

Attached is a .7z format zip file containing a tabulation of OSI's "trained observers" as well as 32 individual Marine Mammal Observation Logs. Observations were made during OSI's contract hydrographic survey entitled "Louisiana Coast", NOAA Project Number OPR-K354-KR-17. The period of the survey was August 3, 2017 through October 12, 2017.

Please don't hesitate to contact me if you have any questions or concerns.

Regards, Bob Wallace

Robert M. Wallace Jr.

Project Manager

OCEAN SURVEYS, INC.

129 Mill Rock Road East, Old Saybrook, CT 06475

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rmw@oceansurveys.com | www.oceansurveys.com

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The following table summarizes Ocean Surveys, Inc. staff who were onboard the *R/V Ocean Explorer* "OE" or the *R/V Osprey* "SB" during NOAA Contract Survey entitled "Louisiana Coast" (Project OPR-K354-KR-17). The period of the survey was August 3, 2017 to October 12, 2017.

Personnel	**Position**	**Marine Species Awareness Video View Date**
Robert Wallace	Lead Hydrographer	May 2, 2016
John Bean	Senior Hydrographer	May 2, 2016
Curt Ramsey	Hydrographic Survey Technician	July 22, 2016
George Main Sr.	Captain	July 22, 2016
Logan Crouse	Hydrographic Survey Technician	July 21, 2017
Rick Waters	Captain	July 21, 2017
Dalton Leonhardt	Hydrographic Survey Technician	August 18, 2017

APPROVAL PAGE

H13041

Data meet or exceed current specifications as certified by the OCS survey acceptance review process. Descriptive Report and survey data except where noted are adequate to supersede prior surveys and nautical charts in the common area.

The following products will be sent to NCEI for archive

- Descriptive Report
- Collection of Bathymetric Attributed Grids (BAGs)
- Collection of backscatter mosaics
- Processed survey data and records
- Bottom samples
- GeoPDF of survey products

The survey evaluation and verification has been conducted according current OCS Specifications, and the survey has been approved for dissemination and usage of updating NOAA's suite of nautical charts.

Briana Welton Hillstrom

Digitally signed by HILLSTROM.BRIANA.WELTON.1267667531
Date: 2018.10.25 09:49:39 -04'00'

Approved:_____

Commander Briana W. Hillstrom, NOAA
Chief, Atlantic Hydrographic Branch