

H13226

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

DESCRIPTIVE REPORT

Type of Survey: Navigable Area

Registry Number: H13226

LOCALITY

State(s): Texas

General Locality: Corpus Christi, TX & Approaches

Sub-locality: 17 NM SE of Port Aransas

2019

CHIEF OF PARTY
John R. Bean

LIBRARY & ARCHIVES

Date:

HYDROGRAPHIC TITLE SHEET

H13226

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): **Texas**

General Locality: **Corpus Christi, TX & Approaches**

Sub-Locality: **17 NM SE of Port Aransas**

Scale: **20000**

Dates of Survey: **06/09/2019 to 08/29/2019**

Instructions Dated: **03/06/2019**

Project Number: **OPR-K379-KR-19**

Field Unit: **Ocean Surveys, Inc.**

Chief of Party: **John R. Bean**

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 information presented in this report and the accompanying digital data represents the results of surveys performed by Ocean Surveys, Inc. during the period of June 9, 2019 to August 29, 2019 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.

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

Products created during office processing were generated in NAD83 UTM 14N, MLLW. All references to other horizontal or vertical datums in this report are applicable to the processed hydrographic data provided by the field unit.

Table of Contents

<u>A. Area Surveyed</u>	<u>1</u>
<u>A.1 Survey Limits</u>	<u>1</u>
<u>A.2 Survey Purpose</u>	<u>1</u>
<u>A.3 Survey Quality</u>	<u>2</u>
<u>A.4 Survey Coverage</u>	<u>2</u>
<u>A.6 Survey Statistics</u>	<u>3</u>
<u>B. Data Acquisition and Processing</u>	<u>5</u>
<u>B.1 Equipment and Vessels</u>	<u>5</u>
<u>B.1.1 Vessels</u>	<u>5</u>
<u>B.1.2 Equipment</u>	<u>6</u>
<u>B.2 Quality Control</u>	<u>6</u>
<u>B.2.1 Crosslines</u>	<u>6</u>
<u>B.2.2 Uncertainty</u>	<u>8</u>
<u>B.2.3 Junctions</u>	<u>9</u>
<u>B.2.4 Sonar QC Checks</u>	<u>10</u>
<u>B.2.5 Equipment Effectiveness</u>	<u>11</u>
<u>B.2.6 Factors Affecting Soundings</u>	<u>11</u>
<u>B.2.7 Sound Speed Methods</u>	<u>15</u>
<u>B.2.8 Coverage Equipment and Methods</u>	<u>15</u>
<u>B.3 Echo Sounding Corrections</u>	<u>16</u>
<u>B.3.1 Corrections to Echo Soundings</u>	<u>16</u>
<u>B.3.2 Calibrations</u>	<u>16</u>
<u>B.4 Backscatter</u>	<u>16</u>
<u>B.5 Data Processing</u>	<u>16</u>
<u>B.5.1 Primary Data Processing Software</u>	<u>16</u>
<u>B.5.2 Surfaces</u>	<u>17</u>
<u>C. Vertical and Horizontal Control</u>	<u>17</u>
<u>C.1 Vertical Control</u>	<u>18</u>
<u>C.2 Horizontal Control</u>	<u>18</u>
<u>D. Results and Recommendations</u>	<u>19</u>
<u>D.1 Chart Comparison</u>	<u>19</u>
<u>D.1.1 Electronic Navigational Charts</u>	<u>21</u>
<u>D.1.2 Maritime Boundary Points</u>	<u>22</u>
<u>D.1.3 Charted Features</u>	<u>22</u>
<u>D.1.4 Uncharted Features</u>	<u>22</u>
<u>D.1.5 Shoal and Hazardous Features</u>	<u>22</u>
<u>D.1.6 Channels</u>	<u>22</u>
<u>D.1.7 Bottom Samples</u>	<u>23</u>
<u>D.2 Additional Results</u>	<u>23</u>
<u>D.2.1 Shoreline</u>	<u>23</u>
<u>D.2.2 Aids to Navigation</u>	<u>23</u>
<u>D.2.3 Overhead Features</u>	<u>23</u>
<u>D.2.4 Submarine Features</u>	<u>23</u>

D.2.5 Platforms.....	23
D.2.6 Ferry Routes and Terminals.....	24
D.2.7 Abnormal Seafloor and/or Environmental Conditions.....	24
D.2.8 Construction and Dredging.....	24
D.2.9 New Survey Recommendation.....	24
D.2.10 Inset Recommendation.....	24
E. Approval Sheet.....	25
F. Table of Acronyms.....	26

List of Tables

Table 1: Survey Limits.....	1
Table 2: Survey Coverage.....	2
Table 3: Hydrographic Survey Statistics.....	4
Table 4: Dates of Hydrography.....	5
Table 5: Vessels Used.....	5
Table 6: Major Systems Used.....	6
Table 7: Survey Specific Tide TPU Values.....	8
Table 8: Survey Specific Sound Speed TPU Values.....	9
Table 9: Junctioning Surveys.....	10
Table 10: Submitted Surfaces.....	17
Table 11: ERS method and SEP file.....	18
Table 12: CORS Base Stations.....	19
Table 13: User Installed Base Stations.....	19
Table 14: Largest Scale ENCs.....	21

List of Figures

Figure 1: Survey H13226 MBES coverage overlaid on a composite of RNCs.....	3
Figure 2: An overview of the crossline layout on a 1m surface created from mainscheme MBES data and colored by depth. A composite image of RNCs is in the background.....	7
Figure 3: The graph shows a frequency distribution of the depth differences between the H13226 crossline vs mainscheme MBES data. Statistics from the depth difference sample set are displayed above the graph.....	8
Figure 4: Survey junctions for Project OPR-K379-KR-19.....	10
Figure 5: SSS imagery showing refraction in both port and starboard channels.....	12
Figure 6: SSS and MBES images showing a school of fish in the starboard channel and the acoustic shadow it casts in each dataset. Rejected soundings are colored yellow.....	13
Figure 7: An example of dolphins appearing in the water column of the MBES and the SSS, and the acoustic shadows cast in each dataset. Rejected soundings are colored yellow.....	14
Figure 8: This figure shows how cavitation noise at the MBES transducer head is presented in the converted data. Rejected soundings are colored yellow.....	15
Figure 9: A depth difference surface overlaid on a composite of RNCs provides an overview of the areas of change between charted depths and H13226 surveyed soundings.....	20

Figure 10: A depth surface with contours shows the change from the charted 60-foot contour to the surveyed contour..... 21

Descriptive Report to Accompany Survey H13226

Project: OPR-K379-KR-19

Locality: Corpus Christi, TX & Approaches

Sublocality: 17 NM SE of Port Aransas

Scale: 1:20000

June 2019 - August 2019

Ocean Surveys, Inc.

Chief of Party: John R. Bean

A. Area Surveyed

This survey provides hydrographic data for the Gulf of Mexico waters approaching the Texas coast southeast of Port Aransas. 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
27° 39' 41.21" N 97° 13' 13.17" W	27° 28' 1.23" N 97° 2' 12.21" 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

The following text is copied verbatim from the Project Instructions' Purpose and Location Section:

"This project is located in Corpus Christi Bay, including the Corpus Christi Shipping Channel and offshore approaches. The U.S. Army Corps of Engineers maintains the channel which is dredged through the bay to the jetties of Port Aransas. The Corpus Christi Port primarily supports deepdraft vessels for export of petroleum and energy related products. In addition, the port supports seafood, industrial and agricultural industries in the state of Texas. Metals, stone products, glass, chemicals, and gypsum products are produced near Corpus Christi Bay. Six oil refineries and 1,500 wells are located near the bay as well as a large supply

of natural gas. The Channel also serves as a conduit for commercial ship traffic between Houston terminuses and the Gulf. This survey will identify hazards and changes in bathymetry, providing contemporary data to update National Ocean Service (NOS) nautical charting products."

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.	Complete Coverage (Refer to HSSD Section 5.2.2.3)

Table 2: Survey Coverage

Per the Project Instructions, towfish height requirements from HSSD Section 6.1.2.3 were modified for this task order to allow a towfish altitude of 6-20% of range scale.

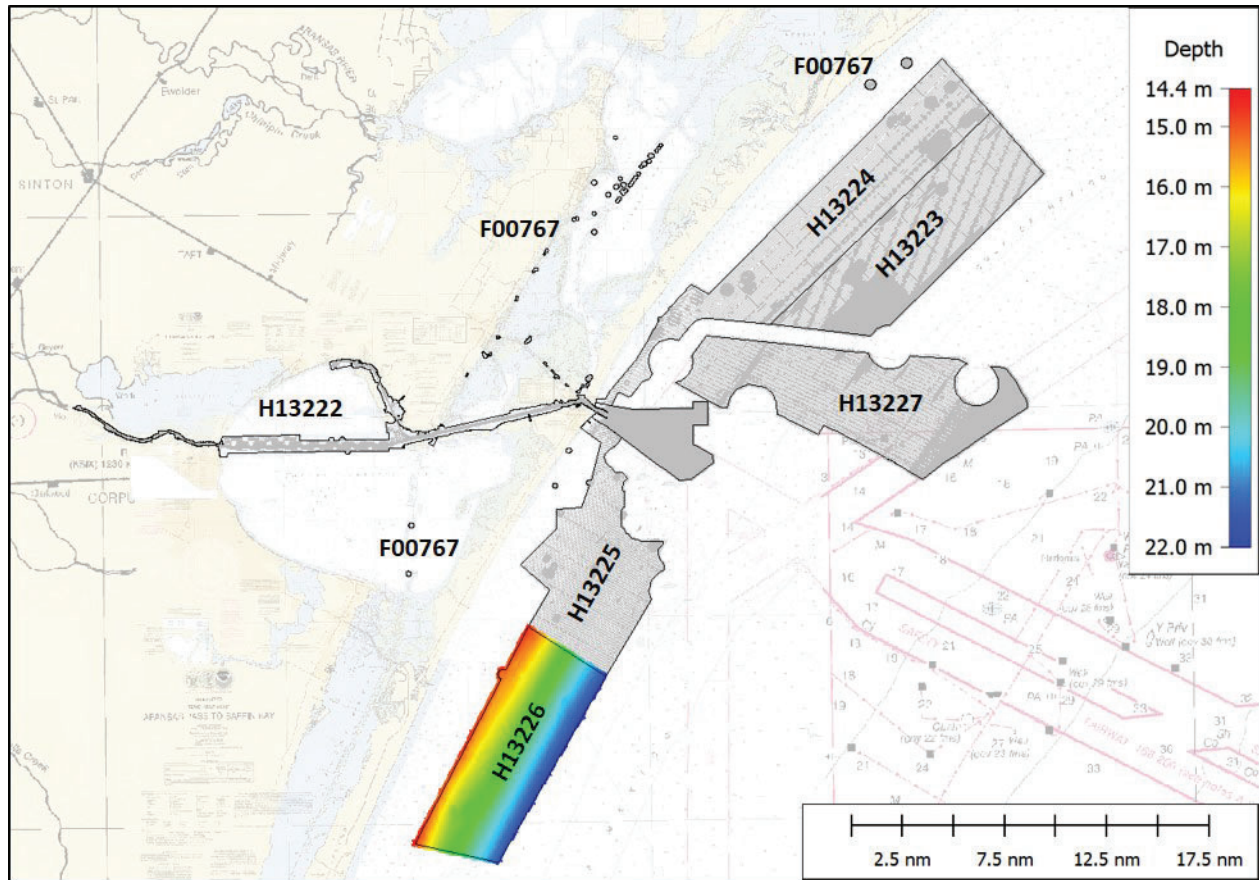


Figure 1: Survey H13226 MBES coverage overlaid on a composite of RNCs.

A.6 Survey Statistics

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

	HULL ID	<i>R/V Ocean Explorer</i>	<i>R/V H.F. Stout</i>	<i>Total</i>
LNM	SBES Mainscheme	0	0	0
	MBES Mainscheme	42.6	1.36	43.96
	Lidar Mainscheme	0	0	0
	SSS Mainscheme	0	0	0
	SBES/SSS Mainscheme	0	0	0
	MBES/SSS Mainscheme	815.99	0	815.99
	SBES/MBES Crosslines	33.22	0	33.22
	Lidar Crosslines	0	0	0
Number of Bottom Samples			9	
Number Maritime Boundary Points Investigated			0	
Number of DPs			0	
Number of Items Investigated by Dive Ops			0	
Total SNM			51.09	

Table 3: Hydrographic Survey Statistics

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

Survey Dates	Day of the Year
06/09/2019	160

Survey Dates	Day of the Year
08/03/2019	215
08/04/2019	216
08/05/2019	217
08/11/2019	223
08/12/2019	224
08/14/2019	226
08/15/2019	227
08/16/2019	228
08/17/2019	229
08/24/2019	236
08/28/2019	240
08/29/2019	241

Table 4: Dates of Hydrography

The LNM for MBES-only development and fill-in lines were included under the heading "MBES Mainscheme" in Table 3. There was no SSS-only mileage for this survey.

B. Data Acquisition and Processing

B.1 Equipment and Vessels

Refer to the project DAPR for a complete description of data acquisition and processing systems, survey vessels, quality control procedures, and data processing methods.

B.1.1 Vessels

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

Hull ID	<i>R/V Ocean Explorer</i>	<i>R/V H.F. Stout</i>
LOA	18 meters	9 meters
Draft	2 meters	0.76 meters

Table 5: Vessels Used

B.1.2 Equipment

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

Manufacturer	Model	Type
Teledyne RESON	SeaBat 7125 SV2	MBES
EdgeTech	4200	SSS
EdgeTech	4125	SSS
Applanix	POS MV 320 v5	Positioning and Attitude System
AML Oceanographic	Base X	Sound Speed System
AML Oceanographic	MicroX	Sound Speed System
AML Oceanographic	MVP30	Sound Speed System
Trimble	NetR9	Positioning System

Table 6: Major Systems Used

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 3.86% of mainscheme acquisition.

If the investigation and fill-in lines are not included in the mainscheme mileage, then the crosslines acquired for this survey totaled 4.27% of mainscheme acquisition.

All crosslines for Survey H13226 were acquired on June 9, 2019 (DN 160), the first day of surveying in this area. The crosslines were run approximately northwest-southeast, with mainscheme lines run perpendicular to the crosslines (Figure 2).

Agreement between crossline and mainscheme data was very good, with no geographic pattern to the magnitude of discrepancy. A difference surface was generated in CARIS HIPS to compare a surface of only crosslines to a surface of only mainscheme data, and the average difference was found to be less than 0.04m. Figure 3 is a histogram showing the distribution of depth differences for all comparison grid cells considered.

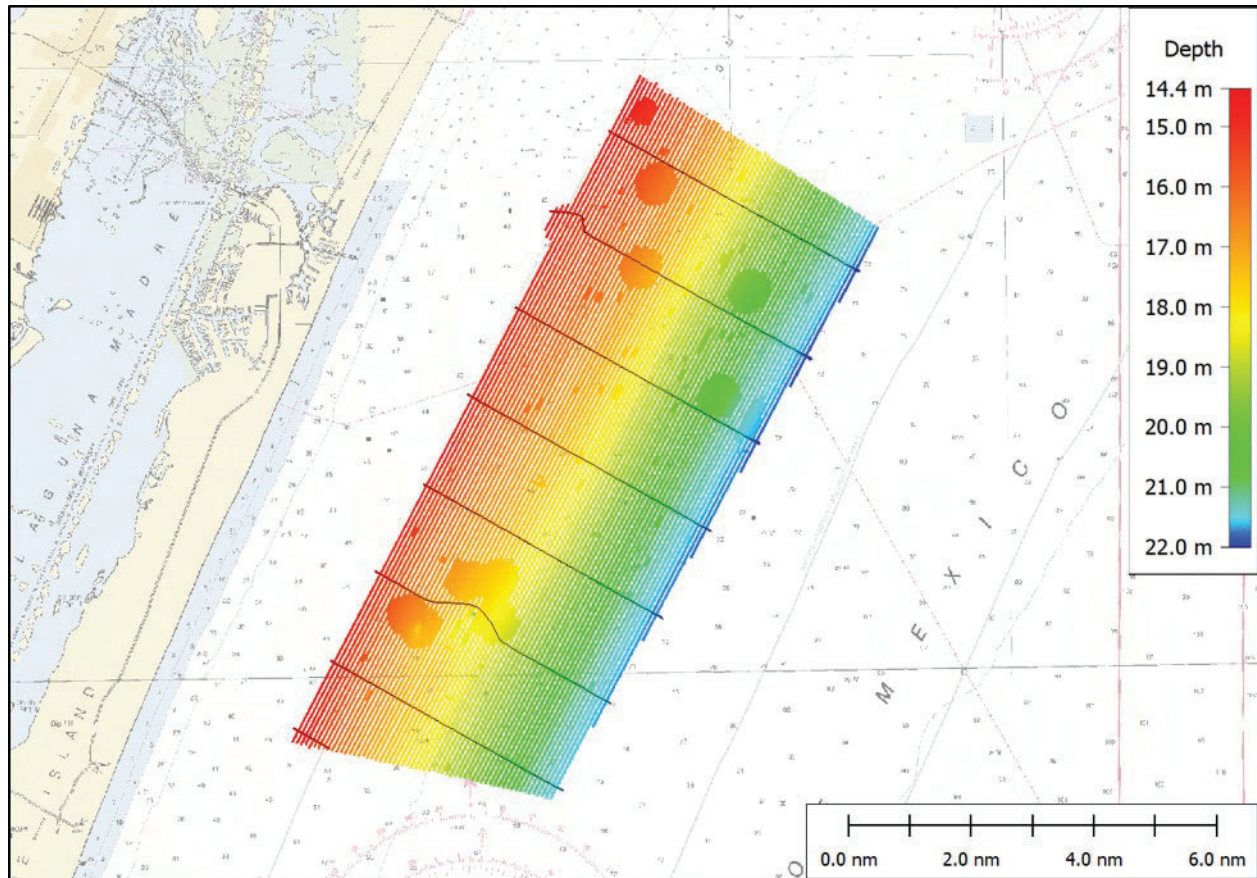


Figure 2: An overview of the crossline layout on a 1m surface created from mainscheme MBES data and colored by depth. A composite image of RNCs is in the background.

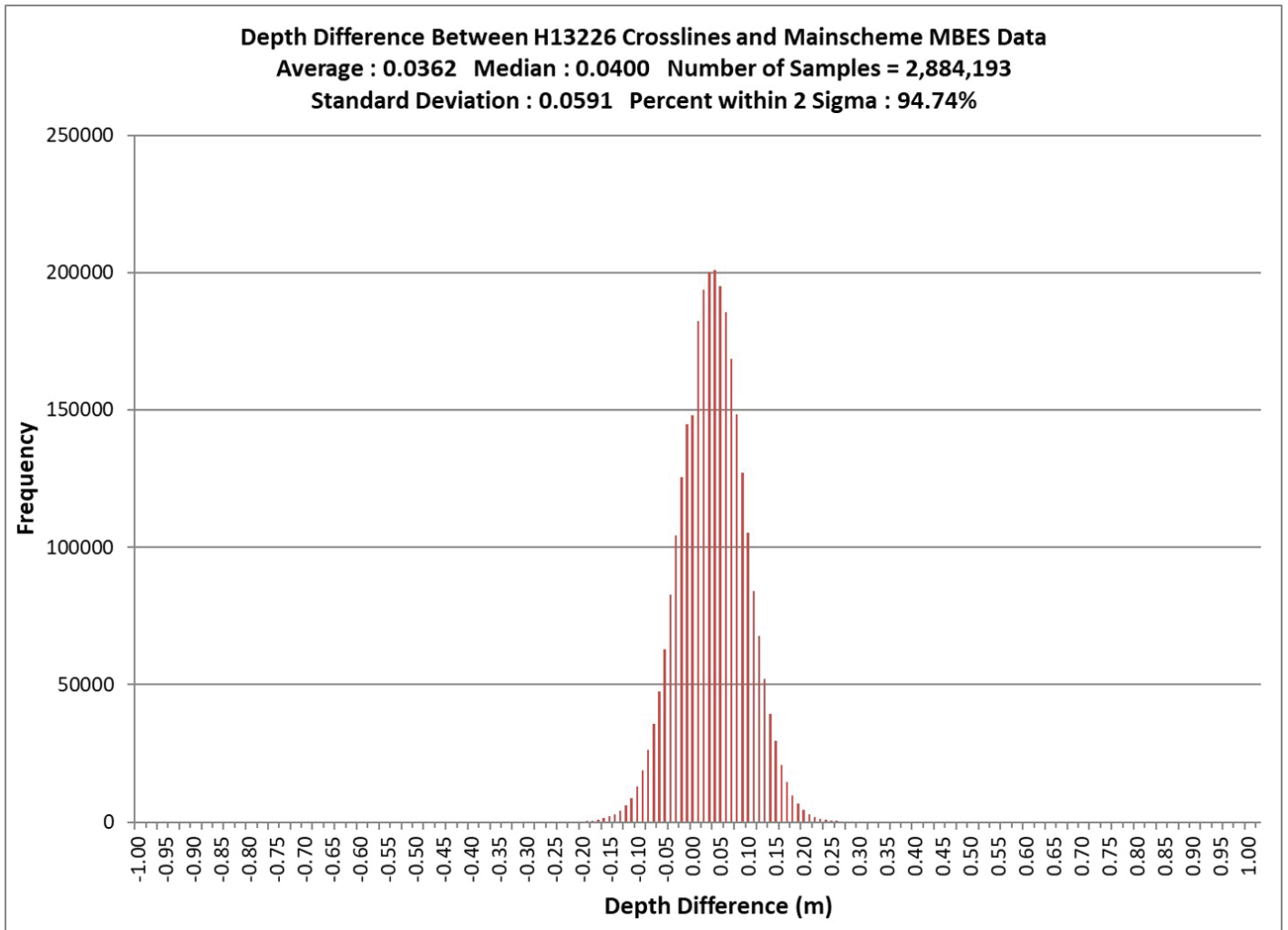


Figure 3: The graph shows a frequency distribution of the depth differences between the H13226 crossline vs mainscheme MBES data. Statistics from the depth difference sample set are displayed above the graph.

B.2.2 Uncertainty

The following survey specific parameters were used for this survey:

Method	Measured	Zoning
ERS via VDATUM	0 meters	0.098 meters

Table 7: Survey Specific Tide TPU Values.

Hull ID	Measured - CTD	Measured - MVP	Surface
R/V Ocean Explorer	N/A	1 meters/second	2 meters/second
R/V H.F. Stout	N/A	1 meters/second	2 meters/second

Table 8: Survey Specific Sound Speed TPU Values.

The methods used to minimize the uncertainty in the corrections to echo soundings are described in detail in the project DAPR.

The Total Vertical Uncertainty Quality Check (TVU QC) "Ratio Method" was used to evaluate IHO uncertainty for the finalized surfaces of Survey H13226. The finalized surfaces were generated using the CARIS "Finalize Base Surface" utility, with the uncertainty source selected as the greater of the two values between the predicted uncertainty and the standard deviation (scaled to 95% CI). The FPM 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."

Results from the TVU QC indicate that 99.99% of the nodes in the 1m resolution surface and 100% of nodes in the 2m resolution surface meet IHO Order 1 uncertainty specifications. In the 1m resolution surface, over 15 million nodes were considered and only 7 had a ratio of less than -1. Upon examination, 3 of these 7 nodes were found on surveyed platform positions. The remaining 4 nodes were on the edge of an investigation line collected by the smaller of the survey vessels, the R/V H.F. Stout, and are associated with boat motion.

B.2.3 Junctions

One current survey junctions with Survey H13226. Figure 4 displays the location of the junction surveys for Project OPR-K379-KR-19, and the junction specific to this survey is listed in Table 9.

Junction analyses were conducted by generating a difference surface in CARIS HIPS for the pair of surveys to compare the MBES surfaces where they overlap. A histogram of the depth differences was plotted to show the relative agreement of the surveyed depths, and to indicate shoaling or deepening trends by positive or negative differences. The magnitude of differences were compared to the maximum allowable TVU for the water depths in Survey H13226. The HSSD defines junction discrepancies requiring further examination as those greater than the $TVU * \sqrt{2}$, which for the water depths in Survey H13226 was 0.75m to 0.82m.

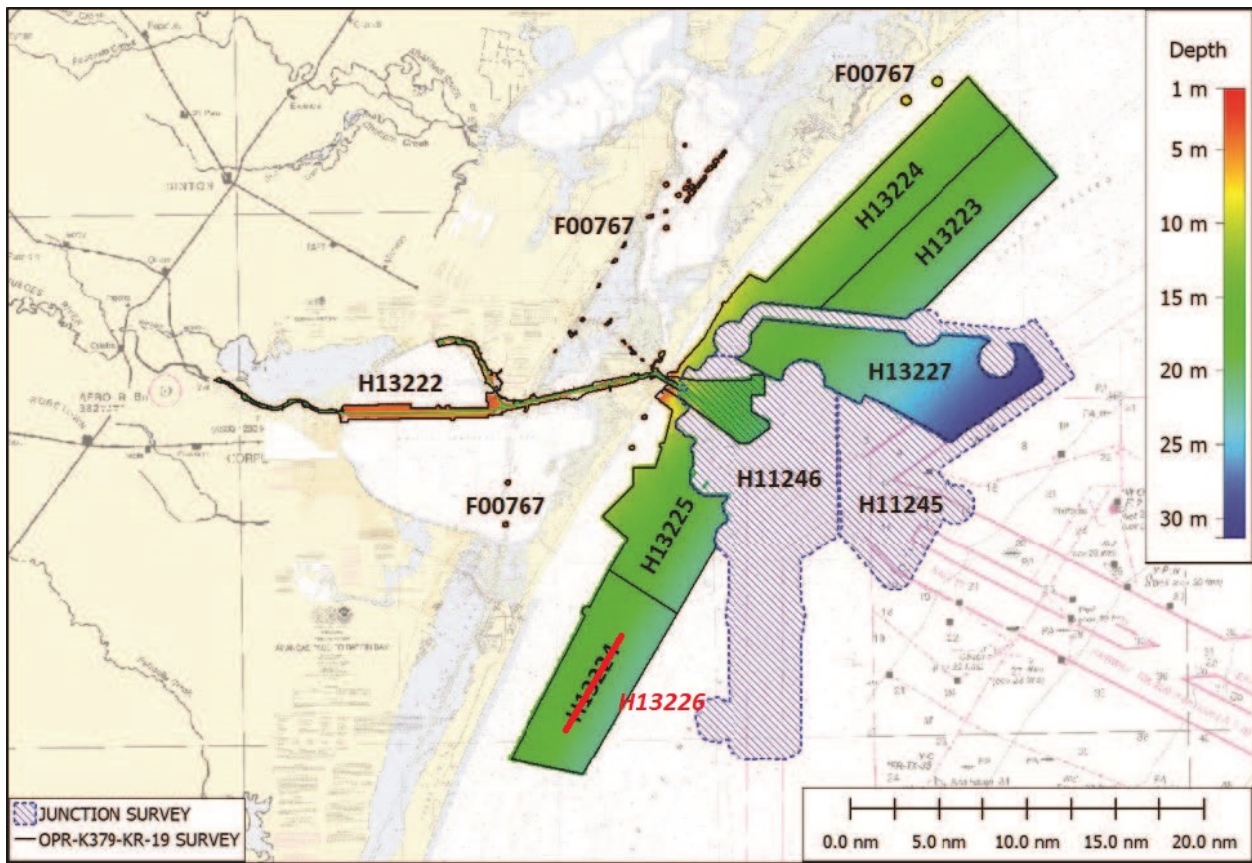


Figure 4: Survey junctions for Project OPR-K379-KR-19.

The following junctions were made with this survey:

Registry Number	Scale	Year	Field Unit	Relative Location
H13225	1:10000	2019	Ocean Surveys, Inc.	N

Table 9: Junctioning Surveys

H13225

The junction analysis is described in the DR for Survey H13225.

B.2.4 Sonar QC Checks

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

B.2.5 Equipment Effectiveness

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

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 5). To ensure coverage with high quality SSS data, lines with excessive refraction were rejected. If clear SSS imagery from adjacent lines was insufficient to cover the area of refraction, portions of the line were re-run.

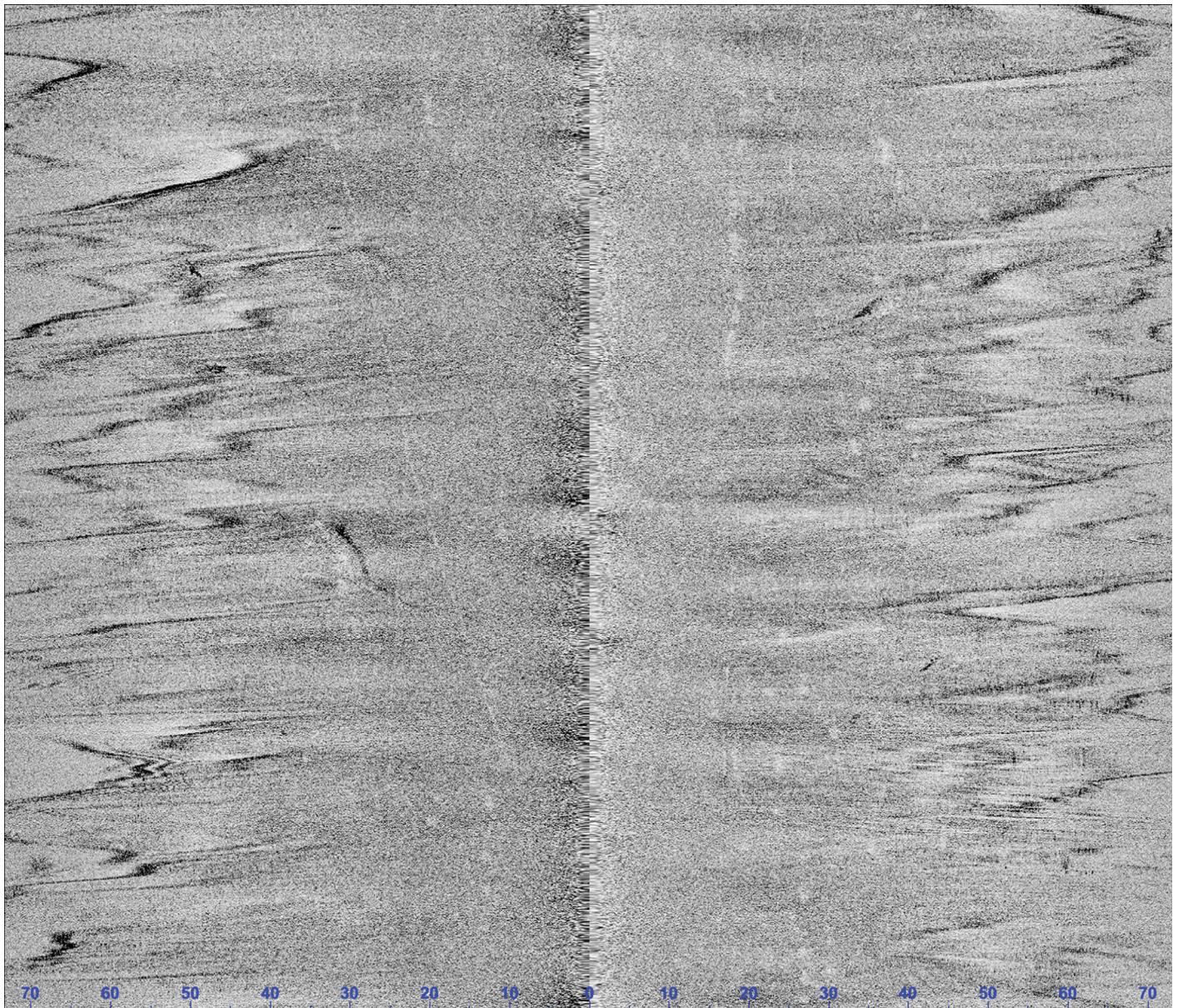


Figure 5: SSS imagery showing refraction in both port and starboard channels.

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 6 and 7). In cases where large shadows in the SSS imagery or gaps in the MBES data were created by schools of fish or dolphins, additional coverage was obtained to ensure no significant features were located in these fish and dolphin shadows.

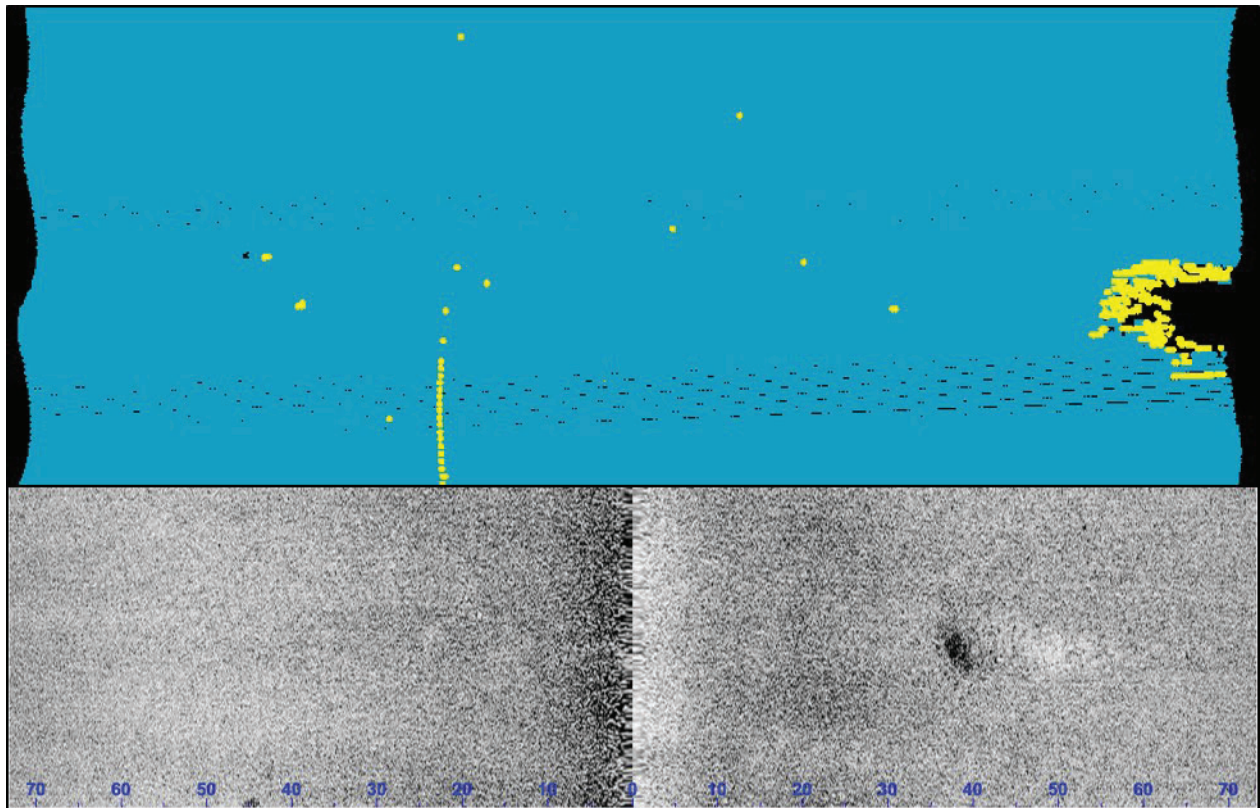


Figure 6: SSS and MBES images showing a school of fish in the starboard channel and the acoustic shadow it casts in each dataset. Rejected soundings are colored yellow.

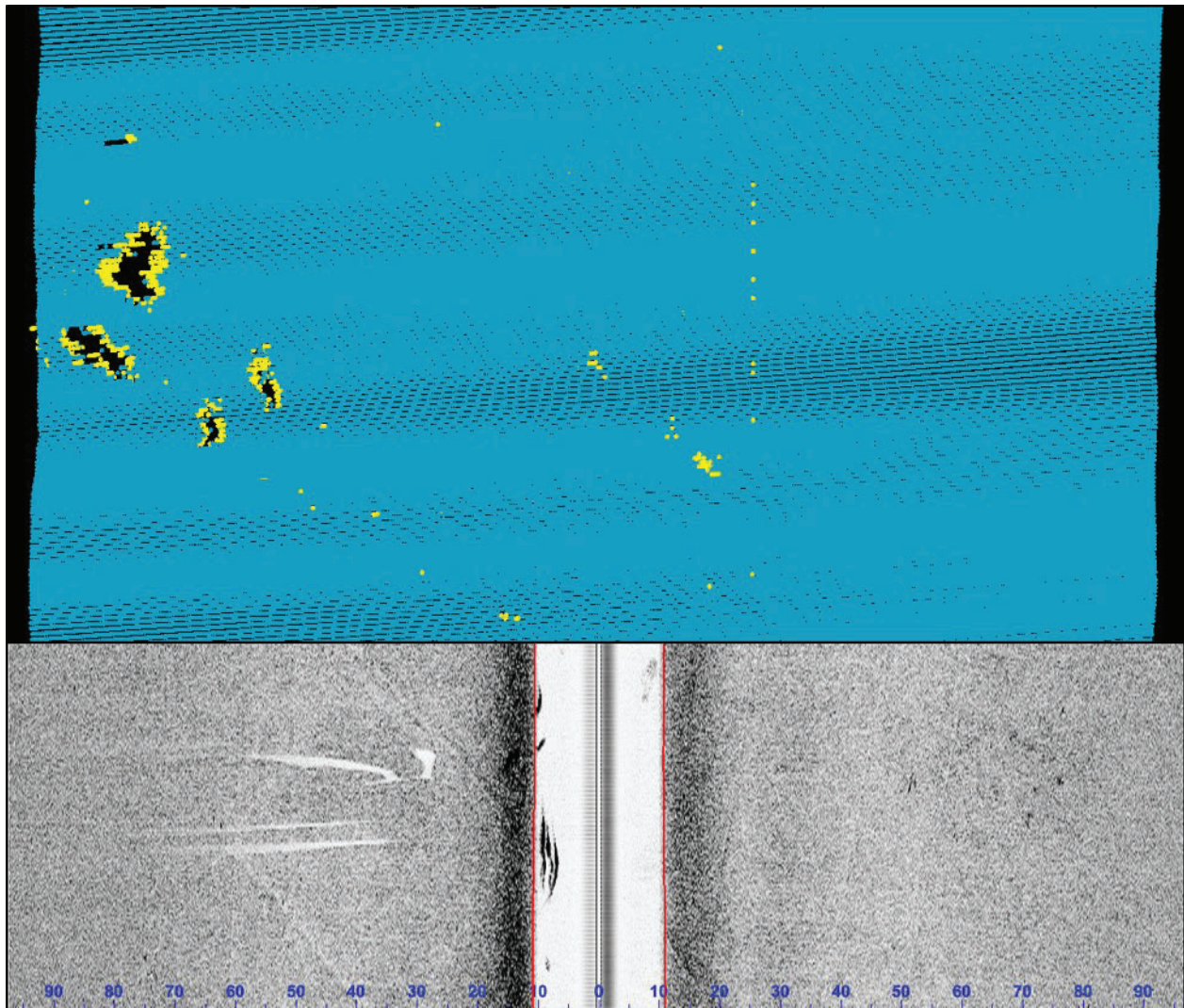


Figure 7: An example of dolphins appearing in the water column of the MBES and the SSS, and the acoustic shadows cast in each dataset. Rejected soundings are colored yellow.

MBES "Blowouts"

The Reson 7125 systems experienced occasional bursts of motion-induced noise or “blowouts,” typically affecting between one and four sequential profiles. The noise bursts were infrequent and were encountered when sea state worsened. Accepted data affected by blowouts did not show any coverage holidays in the final MBES surface.

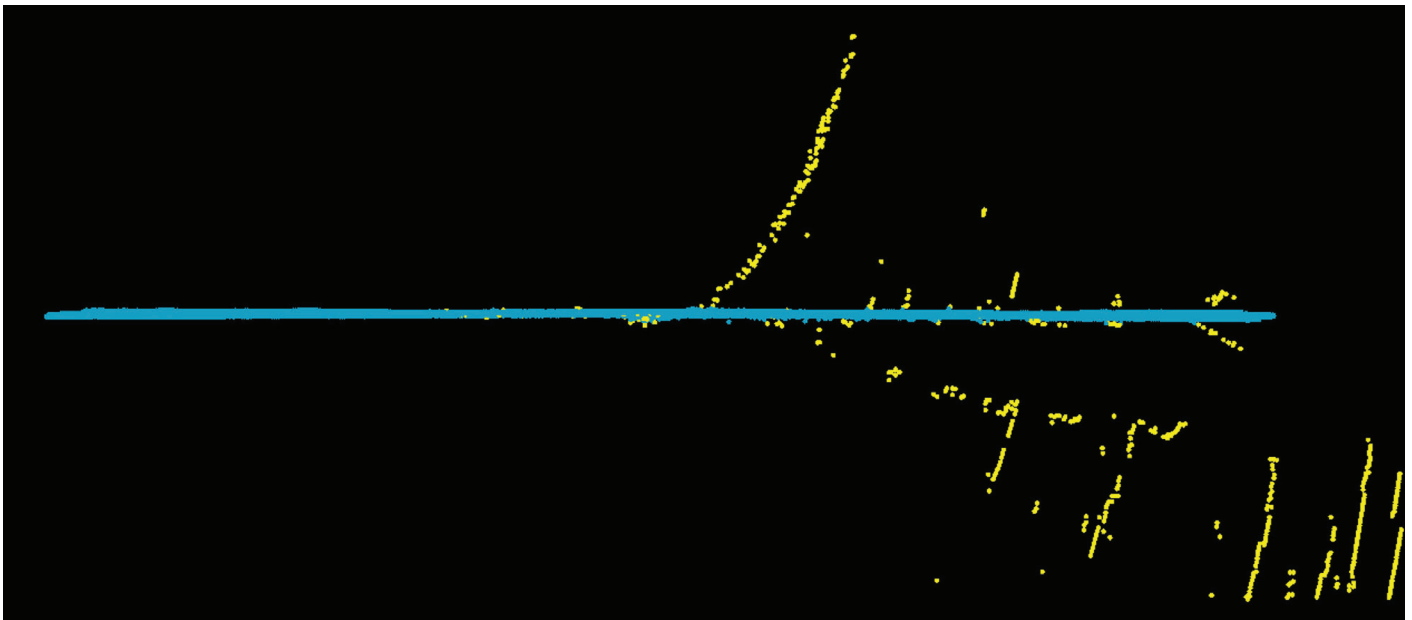


Figure 8: This figure shows how cavitation noise at the MBES transducer head is presented in the converted data. Rejected soundings are colored yellow.

B.2.7 Sound Speed Methods

Sound Speed Cast Frequency: On board the R/V Ocean Explorer, sound speed profile data were acquired with the AML MVP30 approximately every 15 minutes as documented in the DAPR. On board the R/V H.F. Stout sound speed profiles were acquired with the AML Base X at intervals of approximately 1-2 hours.

All MBES lines were sound speed corrected using CARIS HIPS' "Nearest in Distance Within Time" method. The time interval used was 2 hours for the R/V H.F. Stout and 1 hour for the R/V Ocean Explorer.

OSI submitted H13226 sound speed data in NetCDF format to the National Centers for Environmental Information (NCEI) on Jan 6, 2020 via the S2N tool. NCEI assigned Accession Number 0208349 to the R/V Ocean Explorer data and Accession Number 0208350 to the R/V H.F. Stout data. Correspondence regarding the NCEI data submission is included in Appendix II.

B.2.8 Coverage Equipment and Methods

Survey H13225 was conducted to achieve Complete Coverage, using 100% SSS coverage with concurrent MBES (Option B; HSSD Section 5.2.2.3). All potentially significant features located by mainscheme SSS or MBES were also developed with MBES data to meet the Complete Coverage Multibeam requirements.

For single-resolution surfaces, HSSD Section 5.2.2.3 specifies a grid resolution of 1m for depths less than 20m and a grid resolution of 2m for depths between 18 and 40m. Water depths in Survey H13226 ranged

from 13.38m to 22.09m, therefore two separate single-resolution grids were submitted to meet the resolution requirements: a 1m grid for depth shoaler than 20m and a 2m grid for depths greater than 18m. The survey area covering depths between 18m and 20m is represented in both grids.

The CARIS HIPS and SIPS "Compute Statistics" tool was used to verify the grid nodes met the density coverage requirements, defined in the HSSD as having at least 95% of the nodes populated with at least 5 soundings. Both surfaces meet this requirement, with 99.54% of nodes in the 1m resolution surface and 99.64% of nodes in the 2m resolution surface having 5 or more soundings.

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

B.3 Echo Sounding Corrections

B.3.1 Corrections to Echo Soundings

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

B.3.2 Calibrations

All sounding systems were calibrated as detailed in the DAPR.

B.4 Backscatter

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

B.5 Data Processing

B.5.1 Primary Data Processing Software

The following Feature Object Catalog was used: NOAA Profile Version 2019.

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
H13226_MB_1m_MLLW_Final.csar	CARIS Raster Surface (CUBE)	1 meters	13.379 meters - 20 meters	NOAA_1m	Complete MBES
H13226_MB_1m_MLLW.csar	CARIS Raster Surface (CUBE)	1 meters	14.339 meters - 22.373 meters	NOAA_1m	Complete MBES
H13226_MB_2m_MLLW_Final.csar	CARIS Raster Surface (CUBE)	2 meters	18 meters - 22.091 meters	NOAA_2m	Complete MBES
H13226_MB_2m_MLLW.csar	CARIS Raster Surface (CUBE)	2 meters	14.343 meters - 22.091 meters	NOAA_2m	Complete MBES
H13226_SSSAB_1m_600kHz_1of2.tif	SSS Mosaic	1 meters	-	N/A	100% SSS
H13226_SSSAB_1m_600kHz_2of2.tif	SSS Mosaic	1 meters	-	N/A	200% SSS

Table 10: Submitted Surfaces

In addition to the surfaces in Table 10, a set of 0.25m SSS mosaic images were submitted in Enhanced Compressed Wavelet (ECW) format to assist with the survey review.

C. Vertical and Horizontal Control

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

C.1 Vertical Control

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

ERS Datum Transformation

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

Method	Ellipsoid to Chart Datum Separation File
ERS via VDATUM	buff_xyNAD83-MLLW_geoid12b.csar

Table 11: ERS method and SEP file

C.2 Horizontal Control

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

The projection used for this project is Universal Transverse Mercator (UTM) Zone 14.

The following PPK methods were used for horizontal control:

- Smart Base

The primary CORS stations used for Project OPR-379-KR-19 are listed in Table 12. Additional stations used on 8 or fewer survey days include TXFE, DEV1, TXBC, TXED, LCSM, TXKC, ANG5, COH2, TXAG, and TXBV. See the HVCR for details.

The following CORS Stations were used for horizontal control:

HVCR Site ID	Base Station ID
Corpus Christi R2	TXCC
Port Lavaca	TXPV
Beeville	TXBE
KingsvilleTX2006	KVTV
Laguna Vista	TXLN
Clute Coop	DWI1
Alice	TXAI
Victoria	TXVA
Raymondville	TXRV

Table 12: CORS Base Stations

The following user installed stations were used for horizontal control:

HVCR Site ID	Base Station ID
OSI Port Aransas	OSPA

Table 13: User Installed Base Stations

D. Results and Recommendations

D.1 Chart Comparison

Chart comparisons were conducted visually using a difference surface generated by subtracting ENC soundings from a finalized CUBE depth surface of survey MBES data. The difference surface, shown in Figure 9, represents regions of deepening with negative depth differences (cool colors), shoaling with positive depth differences (warm colors), and grey indicating areas of no significant change.

The CUBE depth surface of survey data used for this difference surface had a resolution of 10m. ENC soundings were taken from the latest editions of the charts available on the NOAA OCS website. Soundings from the two assigned ENCs that cover Survey H13226 were combined into a single sounding set using data from only the largest-scale chart that provided coverage at any given point. The ENCs used for final comparisons were submitted with the survey deliverables.

Local NTMs and NTMs from March 6, 2019 to August 30, 2019 were reviewed in conjunction with the chart comparison, but no notices were made during this time that concerned Survey H13226. The last NTM

reviewed was No. 35, dated August 31, 2019, and the last Local NTM reviewed was notice 35/19, dated August 28, 2019.

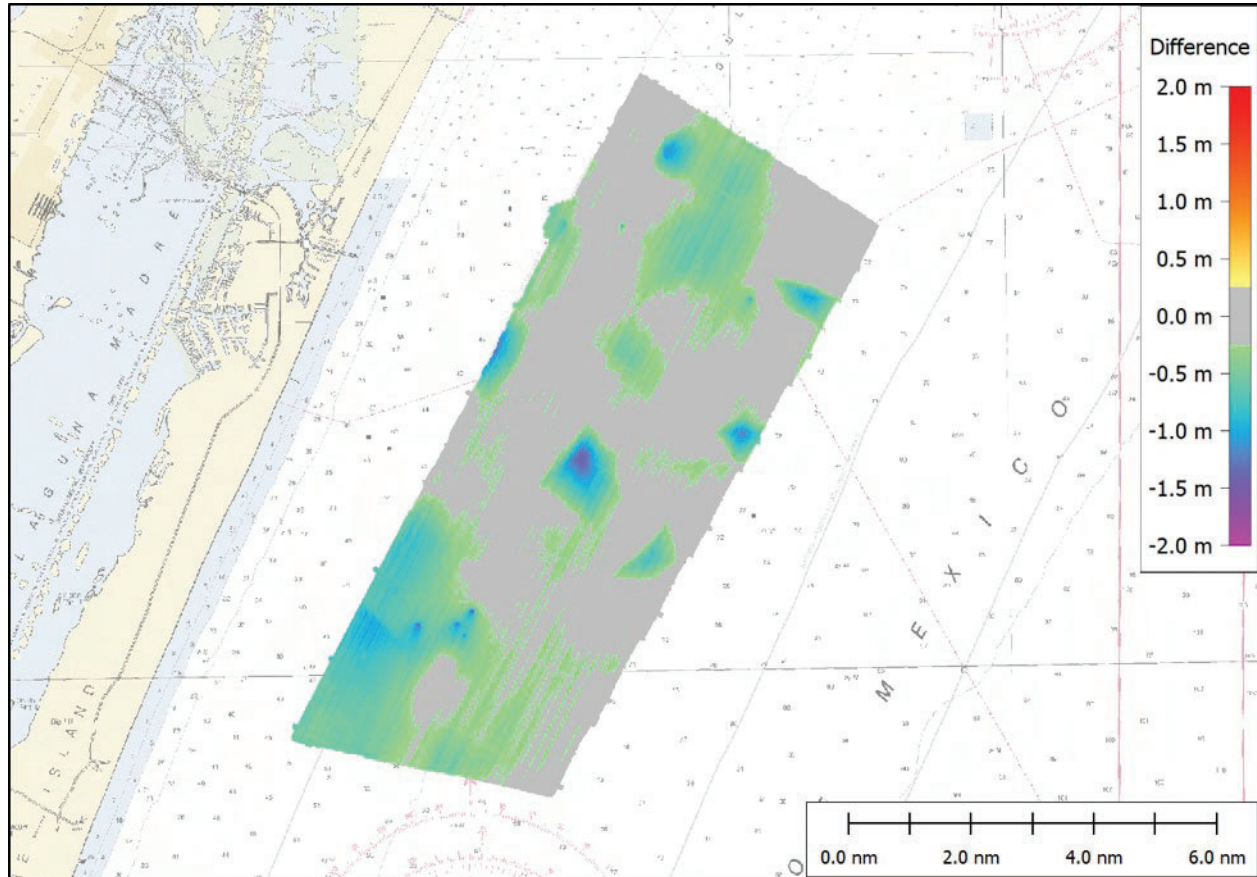


Figure 9: A depth difference surface overlaid on a composite of RNCs provides an overview of the areas of change between charted depths and H13226 surveyed soundings.

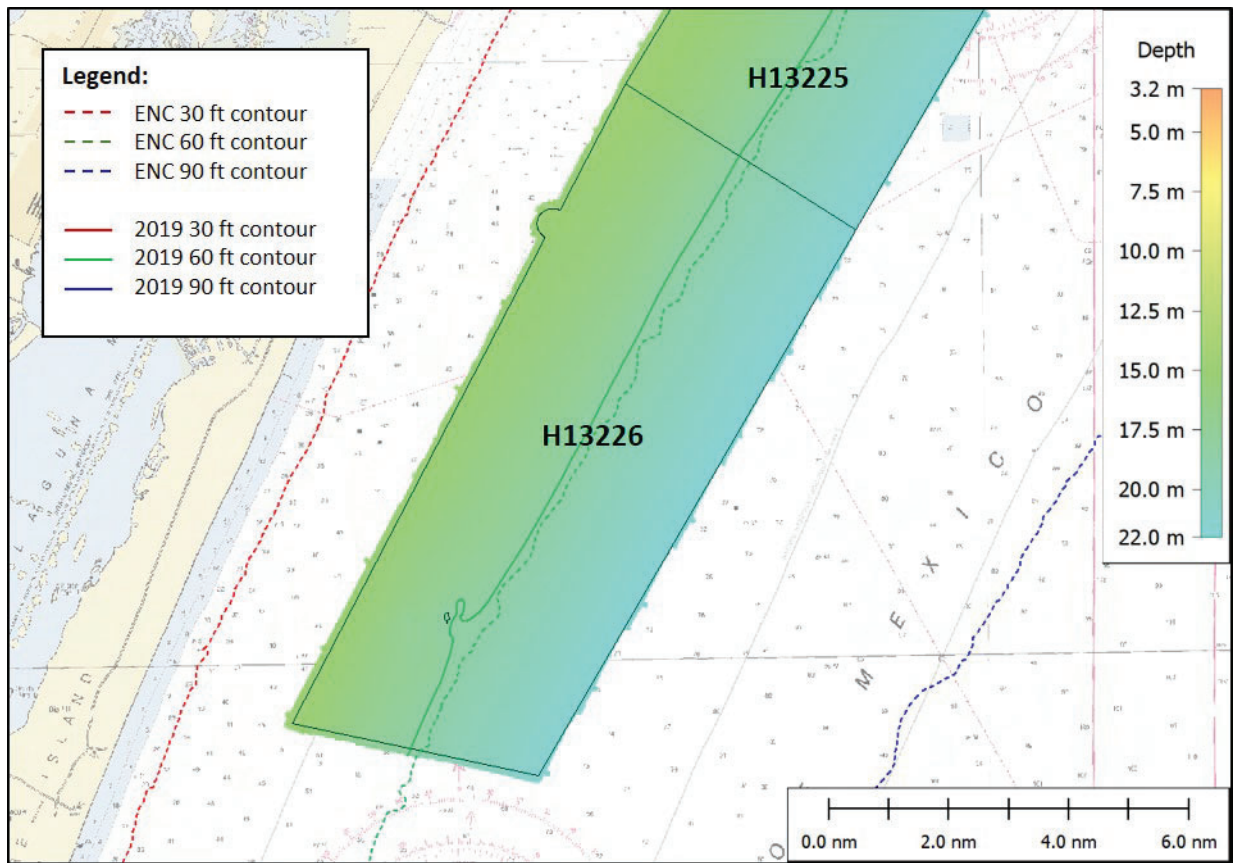


Figure 10: A depth surface with contours shows the change from the charted 60-foot contour to the surveyed contour.

D.1.1 Electronic Navigational Charts

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

ENC	Scale	Edition	Update Application Date	Issue Date	Preliminary?
US4TX21M	1:80000	20	11/06/2018	08/19/2019	NO
US5TX22M	1:40000	38	08/12/2019	08/12/2019	NO

Table 14: Largest Scale ENCs

US4TX21M

ENC US4TX21M covers the entirety of Survey H13226, and is the largest-scale ENC covering 94% of the survey, all but the northern corner. The majority of the survey area shows no significant change from charted depths, with some patches of deepening. There was almost no shoaling evident in Survey H13226. Figure 10 shows the charted 60-foot contour, which runs lengthwise through the survey area, and the surveyed contour slightly shoreward from it.

US5TX22M

US5TX22M covers only the northern corner of Survey H13226, approximately 6% of the total survey area. As with the entirety of the survey, the northern corner shows mostly no significant change from depths charted in ENC US5TX22M. A small portion of the survey was slightly deeper than charted, and there was no shoaling observed compared to depths on this chart.

D.1.2 Maritime Boundary Points

No Maritime Boundary Points were assigned for this survey.

D.1.3 Charted Features

There were 2 charted wrecks in Survey H13226, both of which were disproved.

D.1.4 Uncharted Features

No uncharted features exist for this survey other than those that were addressed as DTONS.

D.1.5 Shoal and Hazardous Features

There were 3 DTON reports for obstructions surveyed in H13226. No charted shoals were present, and no other potentially hazardous features were observed.

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

There were 9 bottom samples collected in Survey H13226. The sediment in this area was primarily found to be mud, with some fine sand. See the FFF for details and images of each bottom sample.

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 Aids to Navigation

No ATONs exist for this survey.

D.2.3 Overhead Features

No overhead features exist for this survey.

D.2.4 Submarine Features

There were 7 submarine pipelines assigned in the CSF for Survey H13226. None of these pipelines were observed to be elevated or exposed.

In addition to the ENC and the CSF, pipeline data from the Bureau of Ocean Energy Management (BOEM) were reviewed prior to field operations and during data processing to identify any potential uncharted BOEM pipelines in the survey area. There was 1 BOEM pipeline within Survey H13226, which aligned with a pipeline represented in the ENC and the CSF.

The BOEM pipeline data (last updated on Oct 1, 2019) were obtained as a shape file "ppl_arcs.shp" from the BOEM website (<https://www.data.boem.gov/Main/Mapping.aspx>) and re-projected as a .DXF file "BOEM_Pipelines_UTM_14N_NAD83_Meters.dxf." These files are included with the digital deliverables for Survey H13226.

D.2.5 Platforms

There were 13 charted platforms assigned in the CSF for Survey H13226, 7 of which were disproved and 6 were verified. The 6 platforms were found to be at slightly different positions from charted, and are recommended for charting at their surveyed positions. See the FFF for further details.

In addition to the ENC and the CSF, BOEM platform data were reviewed prior to field operations and during data processing to identify any potential uncharted BOEM platforms in the survey area. There were no BOEM platforms within Survey H13226.

The BOEM platform data (last updated on Oct 1, 2019) were obtained as a shape file "platform.shp" from the BOEM website (<https://www.data.boem.gov/Main/Mapping.aspx>) and re-projected as a .DXF file "BOEM_Platforms_UTM_14N_NAD83_Meters.dxf." These files are included with the digital deliverables for Survey H13226.

D.2.6 Ferry Routes and Terminals

No ferry routes or terminals exist for this survey.

D.2.7 Abnormal Seafloor and/or Environmental Conditions

No abnormal seafloor and/or environmental conditions exist for this survey.

D.2.8 Construction and Dredging

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

D.2.9 New Survey Recommendation

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

D.2.10 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 meets or exceeds requirements as set forth in the NOS Hydrographic Surveys Specifications and Deliverables (2018), Field Procedures Manual (2014), Project Instructions, and all HSD Technical Directives. These data are adequate to supersede charted data in their common areas. This survey is complete and no additional work is required with the exception of deficiencies noted in the Descriptive Report.

Approver Name	Approver Title	Approval Date	Signature
John R. Bean	Chief of Party	01/23/2020	John R. Bean 2020.01.23 13:37:40 -05'00'
David T. Somers	Data Processing Manager	01/23/2020	David T. Somers 2020.01.23 13:38:01 -05'00'

F. Table of Acronyms

Acronym	Definition
AHB	Atlantic Hydrographic Branch
AST	Assistant Survey Technician
ATON	Aid to Navigation
AWOIS	Automated Wreck and Obstruction Information System
BAG	Bathymetric Attributed Grid
BASE	Bathymetry Associated with Statistical Error
CO	Commanding Officer
CO-OPS	Center for Operational Products and Services
CORS	Continuously Operating Reference Station
CTD	Conductivity Temperature Depth
CEF	Chart Evaluation File
CSF	Composite Source File
CST	Chief Survey Technician
CUBE	Combined Uncertainty and Bathymetry Estimator
DAPR	Data Acquisition and Processing Report
DGPS	Differential Global Positioning System
DP	Detached Position
DR	Descriptive Report
DTON	Danger to Navigation
ENC	Electronic Navigational Chart
ERS	Ellipsoidal Referenced Survey
ERTDM	Ellipsoidally Referenced Tidal Datum Model
ERZT	Ellipsoidally Referenced Zoned Tides
FFF	Final Feature File
FOO	Field Operations Officer
FPM	Field Procedures Manual
GAMS	GPS Azimuth Measurement Subsystem
GC	Geographic Cell
GPS	Global Positioning System
HIPS	Hydrographic Information Processing System
HSD	Hydrographic Surveys Division

Acronym	Definition
HSSD	Hydrographic Survey Specifications and Deliverables
HSTB	Hydrographic Systems Technology Branch
HSX	Hypack Hysweep File Format
HTD	Hydrographic Surveys Technical Directive
HVCR	Horizontal and Vertical Control Report
HVF	HIPS Vessel File
IHO	International Hydrographic Organization
IMU	Inertial Motion Unit
ITRF	International Terrestrial Reference Frame
LNM	Linear Nautical Miles
MBAB	Multibeam Echosounder Acoustic Backscatter
MCD	Marine Chart Division
MHW	Mean High Water
MLLW	Mean Lower Low Water
NAD 83	North American Datum of 1983
NALL	Navigable Area Limit Line
NTM	Notice to Mariners
NMEA	National Marine Electronics Association
NOAA	National Oceanic and Atmospheric Administration
NOS	National Ocean Service
NRT	Navigation Response Team
NSD	Navigation Services Division
OCS	Office of Coast Survey
OMAO	Office of Marine and Aviation Operations (NOAA)
OPS	Operations Branch
MBES	Multibeam Echosounder
NWLON	National Water Level Observation Network
PDBS	Phase Differencing Bathymetric Sonar
PHB	Pacific Hydrographic Branch
POS/MV	Position and Orientation System for Marine Vessels
PPK	Post Processed Kinematic
PPP	Precise Point Positioning
PPS	Pulse per second

Acronym	Definition
PRF	Project Reference File
PS	Physical Scientist
RNC	Raster Navigational Chart
RTK	Real Time Kinematic
RTX	Real Time Extended
SBES	Singlebeam Echosounder
SBET	Smooth Best Estimate and Trajectory
SNM	Square Nautical Miles
SSS	Side Scan Sonar
SSSAB	Side Scan Sonar Acoustic Backscatter
ST	Survey Technician
SVP	Sound Velocity Profiler
TCARI	Tidal Constituent And Residual Interpolation
TPU	Total Propagated Uncertainty
USACE	United States Army Corps of Engineers
USCG	United States Coast Guard
UTM	Universal Transverse Mercator
XO	Executive Officer
ZDF	Zone Definition File

From: [Richard Powell - NOAA Federal](#)
To: [John R. Bean](#)
Subject: Re: OPR-K379-KR-2019 Coast Pilot Review Report
Date: Friday, November 22, 2019 1:52:15 PM

Good afternoon John,

I just finished reviewing your report for survey OPR-K379-KR-19 and have made all the corrections you and your team suggested. You have provided the branch with an exceptionally detailed report and I thank you for that. It is rare that field party digs into that much information in the Coast Pilot and it's good to see from time to time.

Thanks again and have a good day!

Sincerely,

Richard Hodge Powell
Cartographer / Marine Information
Nautical Publications Branch
240-533-0060

National Oceanic and Atmospheric Administration
National Ocean Service
Office of Coast Survey

On Fri, Nov 1, 2019 at 3:10 PM John R. Bean <jrb@oceansurveys.com> wrote:

Good Afternoon,

Please see the attached Coast Pilot Review Report for a contract hydrographic survey of Corpus Christi, TX and Approaches—NOAA Project Number OPR-K379-KR-19. The period of the survey was April 29 – August 30, 2019.

Please don't hesitate to contact me if you have any questions regarding this submission.

Best regards,

John R. Bean, MS, CH

Manager-Hydrographic Surveys

OCEAN SURVEYS, INC.

129 Mill Rock Road East, Old Saybrook, CT 06475

T 860-388-4631 x148 **M** 860-710-8653 **F** 860-388-5879

jrb@oceansurveys.com | www.oceansurveys.com

From: [David Somers](#)
To: ahb.dton@noaa.gov; [Christina Belton - NOAA Federal](#); [Castle Parker - NOAA Federal](#)
Cc: [George Reynolds](#); [John R. Bean](#)
Subject: H13226 DtoNs 1, 2 & 3
Date: Thursday, October 24, 2019 11:19:13 AM
Attachments: [H13226 DtoN 1 Obstruction.zip](#)
[H13226 DtoN 2 Obstruction.zip](#)
[H13226 DtoN 3 Obstruction.zip](#)

Good Morning,

OSI has compiled and attached DtoN feature files along with supporting imagery for survey H13226.

H13226 DtoN 1 - Obstruction
H13226 DtoN 2 - Obstruction
H13226 DtoN 3 - 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 | www.oceansurveys.com

From: [OCS NDB - NOAA Service Account](#)
To: [Rita Bowker - NOAA Federal](#)
Cc: [AHB Chief - NOAA Service Account](#); [Castle Parker - NOAA Federal](#); [Christina Belton - NOAA Federal](#); [Tim Osborn - NOAA Federal](#); [George Reynolds](#); [David Somers](#); [John R. Bean](#); [NSD Coast Pilot](#); [PHB Chief](#); [James M Crocker](#); [Matt Kroll](#); [Nautical Data Branch](#); [Tara Wallace](#); [Chris Libeau](#); [Ken Forster](#); [Michael Gaeta](#); [Charles Porter - NOAA Federal](#); [Kevin Jett - NOAA Federal](#); [William Winner](#); [_NOS OCS PBA Branch](#); [_NOS OCS PBB Branch](#); [_NOS OCS PBC Branch](#); [_NOS OCS PBD Branch](#); [_NOS OCS PBE Branch](#); [_NOS OCS PBG Branch](#)
Subject: Re: H13226 DtoN #1- #3 Submission to NDB
Date: Monday, October 28, 2019 10:55:22 AM
Attachments: [H13226 DtoN 1-3 rev.zip](#)

DD-31538 has been registered by the Nautical Data Branch and directed to Products Branch G for processing.

The DtoNs reported are three submerged obstructions located east of Padre Island in the Gulf of Mexico.

The following charts have been assigned to the record:
11307 KAPP 130
11300 KAPP 178

The following ENC's have been assigned to the record:
US4TX21M
US3GC01M

References:
H13226
OPR-K379-KR-19

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](#)/
[National Oceanic and Atmospheric Administration](#)
[United States Department of Commerce](#)
Contact: ocs.ndb@noaa.gov



On Fri, Oct 25, 2019 at 10:53 AM Rita Bowker - NOAA Federal <rita.s.bowker@noaa.gov> wrote:

Good day,

Please find attached a compressed file for H13226 DtoN Report #1 through #3. The DtoN submission includes three uncharted obstructions. The features are located south southwest of Port Aransas, Texas. The submission to Nautical Data Branch (NDB) and Marine Chart Division (MCD) is intended for chart application.

It should be noted that this DtoN submission follows Office of Coast Survey's Sensitive

Data Policy for features that have not been evaluated by the Texas Historic Commission (State Historic Preservation Office) with regards to charting certain feature types.

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

If you have any questions, please contact me via email or phone 757-364-7469. Thank you for your assistance with this matter.

Regards,

Rita

Rita Bowker
NOAA Office of Coast Survey
Atlantic Hydrographic Branch
Physical Scientist
rita.s.bowker@noaa.gov
office (757) 364-7469

From: [Nancy Young - NOAA Federal](#)
To: [John R. Bean](#)
Subject: Re: NOAA Contract Hydrographic Survey-MMO Observation Records-Project OPR-K379-KR-19
Date: Tuesday, October 29, 2019 12:47:53 PM

Thank you, John!

On Fri, Oct 11, 2019 at 7:24 AM John R. Bean <jrb@oceansurveys.com> wrote:

Good morning,

Please see the attached *.7z format zip file containing a tabulation of OSI's trained observers and a collection of individual Marine Mammal Observation Logs. Observations were made during OSI's contract hydrographic survey of Corpus Christi, TX and Approaches—NOAA Project Number OPR-K379-KR-19. The period of the survey was April 29 – August 30, 2019.

Please don't hesitate to contact me if you have any questions regarding this submission.

Best regards,

John R. Bean, MS, CH

Manager-Hydrographic Surveys

OCEAN SURVEYS, INC.

129 Mill Rock Road East, Old Saybrook, CT 06475

T 860-388-4631 x148 **M** 860-710-8653 **F** 860-388-5879

jrb@oceansurveys.com | www.oceansurveys.com

--

Nancy Young
NOAA Fisheries
Alaska Fisheries Science Center
Marine Mammal Laboratory
(206) 526-4297

The following table lists Ocean Surveys, Inc. staff who were trained Marine Mammal Observers aboard the *R/V Ocean Explorer* and the *R/V H.F. Stout* during the NOAA Contract Survey Project OPR-K379-KR-19—Corpus Christi, TX & Approaches. The period of the survey was April 29, 2019 to August 30, 2019.

Personnel	Position	Marine Species Awareness Video Viewing Date
Yulio Araya	Hydrographic Survey Technician	April 3, 2019
Morgan D. Barrett	Hydrographic Survey Technician	April 3, 2019
John Bean	Lead Hydrographer	May 2, 2016
Jack Brigg	Captain	April 26, 2019
Logan Crouse	Senior Hydrographer	July 21, 2017
Corey Leamy	Hydrographer	May 15, 2018
Hugh Lincoln	Hydrographer	April 3, 2019
Dalton Leonhardt	Hydrographer	August 18, 2017
George Main Sr.	Captain	July 22, 2016
George Main III	Captain	July 22, 2016
Curt Ramsay	Hydrographic Survey Technician	July 22, 2016
James M. Roth	Hydrographic Survey Technician	April 24, 2019
Evan Shalagan	Hydrographic Survey Technician	April 3, 2019
Joseph Tyler	Lead Hydrographer	June 5, 2017
Alexander Unrein	Lead Hydrographer	May 25, 2017
Robert Wallace	Lead Hydrographer	May 2, 2016

John R. Bean

From: Larisa Avens - NOAA Federal <larisa.avens@noaa.gov>
Sent: Tuesday, October 15, 2019 8:02 AM
To: John R. Bean
Cc: _NOS OCS ECC; Christina Belton - NOAA Federal; David Somers
Subject: Re: NOAA Contract Hydrographic Survey-Turtle Observation Records-Project OPR-K379-KR-19

Good morning, John - thank you for passing along these sightings data!

Best,
Larisa

On Fri, Oct 11, 2019 at 10:23 AM John R. Bean <jrb@oceansurveys.com> wrote:

Good morning Larisa,

Please see the attached *.7z format zip file containing a tabulation of OSI's trained observers and a collection of individual Turtle Observation Logs. Observations were made during OSI's contract hydrographic survey of Corpus Christi, TX and Approaches—NOAA Project Number OPR-K379-KR-19. The period of the survey was April 29 – August 30, 2019.

Please don't hesitate to contact me if you have any questions regarding this submission.

John R. Bean, MS, CH

Manager-Hydrographic Surveys

OCEAN SURVEYS, INC.

129 Mill Rock Road East, Old Saybrook, CT 06475

T 860-388-4631 x148 **M** 860-710-8653 **F** 860-388-5879

jrb@oceansurveys.com | www.oceansurveys.com

--

~~~~~

Larisa Avens, Ph.D., Research Fishery Biologist  
National Marine Fisheries Service, NOAA Beaufort Laboratory  
101 Pivers Island Rd. Beaufort, NC 28516  
Ph: 252-728-8747  
<http://www.sefsc.noaa.gov/labs/beaufort/>

The contents of this e-mail do not represent official opinion or policy. No official endorsement of any product is made or implied.



**From:** [Joseph DiPalma](#)  
**To:** [Kelley Winocur](#); [John R. Bean](#); [David Somers](#)  
**Subject:** Fw: [Send2NCEI] data submission confirmation for Reference ID: 1PHU9G  
**Date:** Monday, January 6, 2020 2:49:02 PM

---

Submission of HF Stout SVP files to NCEI

----- Forwarded Message -----

**From:** "nodc.dataofficer@noaa.gov" <nodc.dataofficer@noaa.gov>  
**To:** "jjd@oceansurveys.com" <jjd@oceansurveys.com>  
**Sent:** Monday, January 6, 2020, 02:45:12 PM EST  
**Subject:** [Send2NCEI] data submission confirmation for Reference ID: 1PHU9G

Dear Joseph DiPalma,

Thank you for submitting your data collection, titled "SOUND VELOCITY collected from RV H.F. Stout in Coastal Waters of Gulf of Mexico from 2019-04-29 to 2019-08-25", to the NOAA National Centers for Environmental Information (NCEI). Your submission package has been assigned Reference ID: 1PHU9G. 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: 1PHU9G) 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](mailto: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](mailto: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:** [John R. Bean](#)  
**To:** ["pipelines@bsee.gov"](mailto:pipelines@bsee.gov)  
**Cc:** ["Christina Belton - NOAA Federal"](#); ["Tim Osborn - NOAA Federal"](#); ["David Somers"](#)  
**Subject:** H13226 Non-DTON Seep and Pipeline Report  
**Date:** Thursday, January 16, 2020 7:51:00 AM  
**Attachments:** [H13226 Non-DTON Seep and Pipeline Report.pdf](#)

---

Good morning:

Attached is a Non-DTON Seeps and Pipelines Report for NOAA Contract Hydrographic Survey **H13226**. The file includes a tabular description of each feature and imagery. Please acknowledge receipt and should you have any questions, please don't hesitate to contact me.

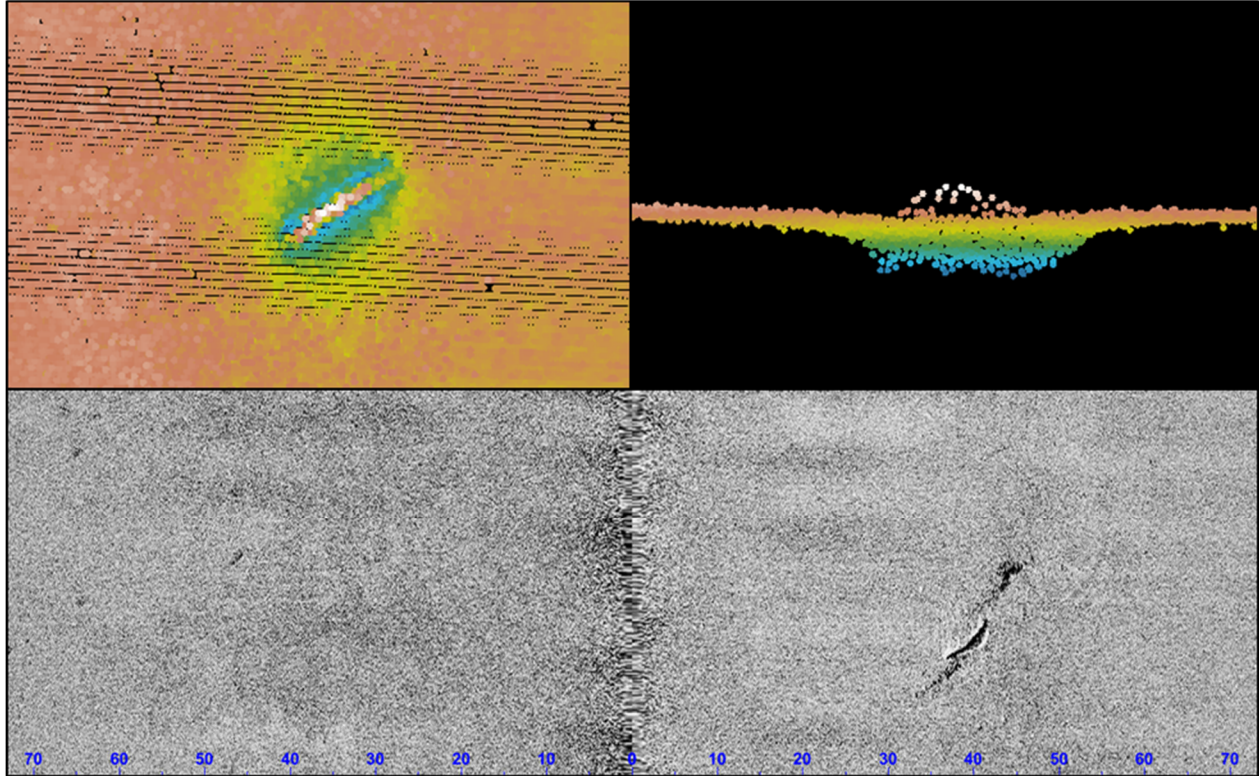
Sincerely,

**John R. Bean, MS, CH**  
Manager-Hydrographic Surveys

**OCEAN SURVEYS, INC.**  
129 Mill Rock Road East, Old Saybrook, CT 06475  
**T** 860-388-4631 x148 **M** 860-710-8653 **F** 860-388-5879  
jrb@oceansurveys.com | [www.oceansurveys.com](http://www.oceansurveys.com)

| 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                         | 27.513125N                                      | 97.158635W                                       | 253 m to charted platform (platform not present)     | 5 m                                                | 2019/08/05 03:10               | 18 m                                 | 0.15 m                              | A low pipe arch was developed with MBES in a region with several charted platforms, some of which were present and some not. There are no charted pipelines in the area. |

H13226 Non-DTON Seeps and Pipelines Report Image 1



**From:** [David Somers](#)  
**To:** [survey.outlines@noaa.gov](mailto:survey.outlines@noaa.gov); [Christina Belton - NOAA Federal](#)  
**Cc:** [John R. Bean](#); [George Reynolds](#)  
**Subject:** Survey Outlines for OPR-K379-KR-19  
**Date:** Monday, September 30, 2019 4:59:01 PM  
**Attachments:** [F00767\\_Survey\\_Outline.000](#)  
[H13222\\_Survey\\_Outline.000](#)  
[H13223\\_Survey\\_Outline.000](#)  
[H13224\\_Survey\\_Outline.000](#)  
[H13225\\_Survey\\_Outline.000](#)  
[H13226\\_Survey\\_Outline.000](#)  
[H13227\\_Survey\\_Outline.000](#)

---

Good Afternoon,

Attached are the survey outlines for Surveys F00767, H13222, H13223, H13224, H13225, H13226, and H13223 under project number OPR-K379-KR-19.

Please let me know if there is any additional information required.

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](mailto:dts@oceansurveys.com) | [www.oceansurveys.com](http://www.oceansurveys.com)

APPROVAL PAGE

H13226

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
- Data Acquisition and Processing Report
- Collection of Bathymetric Attributed Grids (BAGs)
- Processed survey data and records
- Geospatial PDF of survey products
- Collection of backscatter mosaics

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

Approved: \_\_\_\_\_

**Commander Meghan McGovern, NOAA**  
Chief, Atlantic Hydrographic Branch