H13101

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

DESCRIPTIVE REPORT

Type of Survey:	Navigable Area
Registry Number:	H13101

LOCALITY

State(s):	Louisiana
General Locality:	Louisiana Coast
Sub-locality:	West Trinity Shoal

2018

CHIEF OF PARTY
George G. Reynolds

LIBRARY & ARCHIVES

Date:

U.S. DEPARTMENT OF COMMERCE NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION	REGISTRY NUMBER:
HYDROGRAPHIC TITLE SHEET	**H13101**

INSTRUCTIONS: The Hydrographic Sheet should be accompanied by this form, filled in as completely as possible, when the sheet is forwarded to the Office.

State(s):	**Louisiana**
General Locality:	**Louisiana Coast**
Sub-Locality:	**West Trinity Shoal**
Scale:	**40000**
Dates of Survey:	***~~05/28/2018~~ to 09/24/2018**
Instructions Dated:	**08/06/2018**
Project Number:	**OPR-K354-KR-18**
Field Unit:	**Ocean Surveys, Inc.**
Chief of Party:	**George G. Reynolds**
Soundings by:	**Multibeam Echosounder**
Imagery by:	**Side Scan Sonar Multibeam Echosounder 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 DIGITAL DATA REPRESENTS THE RESULTS OF SURVEYS PERFORMED BY OCEAN SURVEYS, INC. DURING THE PERIOD OF 28 MAY 2018 TO 24 SEPTEMBER 2018 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 start dates of survey listed on the Descriptive Report as 05/28/2018 deviates from the dates of survey listed on Survey Tracker (05/30/2018) and start date of survey data (DN150).

The purpose of this survey is to provide contemporary data to update National Oceanic and Atmospheric Administration (NOAA) nautical charts. 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 surveyed features is represented in the NOAA nautical chart products. All pertinent records for this survey are archived at the National Centers for Environmental Information (NCEI) and can be retrieved via https://www.ncei.noaa.gov/.

Products created during office processing were generated in NAD83 UTM 15N, MLLW vertical datum. 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

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 9
B.2.3 Junctions 10
B.2.4 Sonar QC Checks 14
B.2.5 Equipment Effectiveness 14
B.2.6 Factors Affecting Soundings 15
B.2.7 Sound Speed Methods 21
B.2.8 Coverage Equipment and Methods 21
B.2.9 Density 21
B.3 Echo Sounding Corrections 21
B.3.1 Corrections to Echo Soundings 21
B.3.2 Calibrations 21
B.4 Backscatter 22
B.5 Data Processing 22
B.5.1 Primary Data Processing Software 22
B.5.2 Surfaces 22
C. Vertical and Horizontal Control 23
C.1 Vertical Control 23
C.2 Horizontal Control 23
D. Results and Recommendations 24
D.1 Chart Comparison 24
D.1.1 Electronic Navigational Charts 25
D.1.2 Maritime Boundary Points 28
D.1.3 Charted Features 29
D.1.4 Uncharted Features 30
D.1.5 Shoal and Hazardous Features 30
D.1.6 Channels 31
D.1.7 Bottom Samples 31
D.2 Additional Results 31
D.2.1 Shoreline 31
D.2.2 Prior Surveys 31
D.2.3 Aids to Navigation 31

D.2.4 Overhead Features..... 31
D.2.5 Submarine Features..... 31
D.2.6 Platforms..... 34
D.2.7 Ferry Routes and Terminals..... 34
D.2.8 Abnormal Seafloor and/or Environmental Conditions..... 34
D.2.9 Construction and Dredging..... 36
D.2.10 New Survey Recommendation..... 36
D.2.11 Marine Mammal Observations..... 36
D.2.12 Coast Pilot Review..... 37
D.2.13 Inset Recommendation..... 37
E. Approval Sheet..... 38
F. Table of Acronyms..... 39

List of Tables

Table 1: Survey Limits..... 1
Table 2: Survey Coverage..... 2
Table 3: Hydrographic Survey Statistics..... 4
Table 4: Dates of Hydrography..... 6
Table 5: Vessels Used..... 6
Table 6: Major Systems Used..... 7
Table 7: Survey Specific Tide TPU Values..... 9
Table 8: Survey Specific Sound Speed TPU Values..... 10
Table 9: Junctioning Surveys..... 11
Table 10: Primary bathymetric data processing software..... 22
Table 11: Primary imagery data processing software..... 22
Table 12: Submitted Surfaces..... 23
Table 13: CORS Base Stations..... 24
Table 14: User Installed Base Stations..... 24
Table 15: USCG DGPS Stations..... 24
Table 16: Largest Scale ENCs..... 25

List of Figures

Figure 1: Survey H13101 MBES coverage overlaid on RNC 11340..... 3
Figure 2: An overview of the crossline layout on a 1.0m surface created from mainscheme MBES data and colored by depth. RNC 11349 is visible in the background..... 8
Figure 3: The graph shows a frequency distribution of the depth differences between the H13101 mainscheme and the H13101 crossline MBES data. Statistics from the depth difference sample set are displayed above the graph..... 9
Figure 4: Survey junctions for Project OPR-K354-KR-18. RNC 11340 is displayed in the background..... 11
Figure 5: Surface-to-surface difference histogram comparing Survey H13101 to H13100..... 13
Figure 6: Surface-to-surface difference histogram comparing Survey H13101 to H13102..... 14

Figure 7: Refraction in the SSS imagery is visible in both channels of a survey line acquired with the fixed-mount 4125 SSS..... 15
Figure 8: 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)..... 16
Figure 9: MBES and SSS images showing a school of fish visible in the water column and the acoustic shadow cast in each dataset. In the top panel the rejected MBES soundings are colored yellow..... 17
Figure 10: An example of a dolphin as it appears in the water column of the MBES and the SSS, and the acoustic shadow cast in each dataset. In the top panel the rejected MBES soundings are colored yellow..... 18
Figure 11: An example of MBES response in a seafloor depression (upper panel). In this image the accepted soundings are colored red and the rejected soundings colored yellow. The lower panel shows the associated MBES surface holiday and, underlying the multibeam surface, the white-shaded, very low intensity SSS response..... 20
Figure 12: A depth difference surface overlaid on RNC 11349 provides an overview of the areas of change between charted depths and H13101 surveyed soundings..... 27
Figure 13: A colorized depth surface provides an overview of the change in contours from ENC US4LA15M to the surveyed data. RNC 11349 is displayed as an overlay..... 28
Figure 14: BOEM-defined pipelines that are not charted are highlighted in yellow. The charted pipelines without a BOEM counterpart are highlighted in blue. Survey H13101 survey boundary limits are shown in black..... 33
Figure 15: Example of sediment transport in H13101, with the bottom character changing on a short time scale during the survey period..... 35
Figure 16: Example of sediment transport in H13101, showing depressions that formed in the seafloor on a short time scale during the survey period..... 36

Descriptive Report to Accompany Survey H13101

Project: OPR-K354-KR-18

Locality: Louisiana Coast

Sublocality: West Trinity Shoal

Scale: 1:40000

May 2018 - September 2018

Ocean 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 Vermilion Bay. 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° 24' 10.57" N 92° 26' 20.7" W	29° 9' 47.09" N 92° 14' 3.4" 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

As noted in the Hydrographic Title Sheet, the Project Instructions signature date was August 6, 2018. Before being superseded, the survey priorities from the original signed Project Instructions (March 23, 2018) were modified by a Change Request (July 9, 2018). The following text is copied verbatim from the latest Project Instructions' Purpose and Location Section.

"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, Louisiana. The survey will provide updated bathymetry and feature data to address concerns of migrating shoals and exposed hazards, thus reducing the risk to navigation within the project area.

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 intersects with the Gulf of Mexico Intracoastal Waterway.

The Port serves a number of industries, including the offshore oil, chemical and machinery industries, as well as shrimp and other seafood fisheries in the Gulf of Mexico. 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 300 square nautical miles of high priority survey area identified in the 2016 Hydrographic Health model. Modern surveys show significant shoaling and sediment transport; OPR-K354-KR-17 documented a shoal that had shifted a mile westward since the area was last surveyed in 1935. Adjacent surveys uncovered numerous exposed pipelines and hazards. Data from this project is intended to supersede all prior survey data, updating the local 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). LNM no less than 10,592 LNM. Acquire backscatter data during all multibeam data acquisition (HSSD Section 6.2). Report significant shoaling via weekly progress report. COR may adjust surveying prioritization based on observed shoaling.

Table 2: Survey Coverage

Survey Coverage is in accordance with the requirements in the Hydrographic Survey Project Instructions and the Statement of Work (August 6, 2018), 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.

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 to disprove charted features. Gaps in the 100% SSS coverage were addressed with SSS fill-in lines or covered with complete MBES data. Bathymetric "sounding stars" 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.

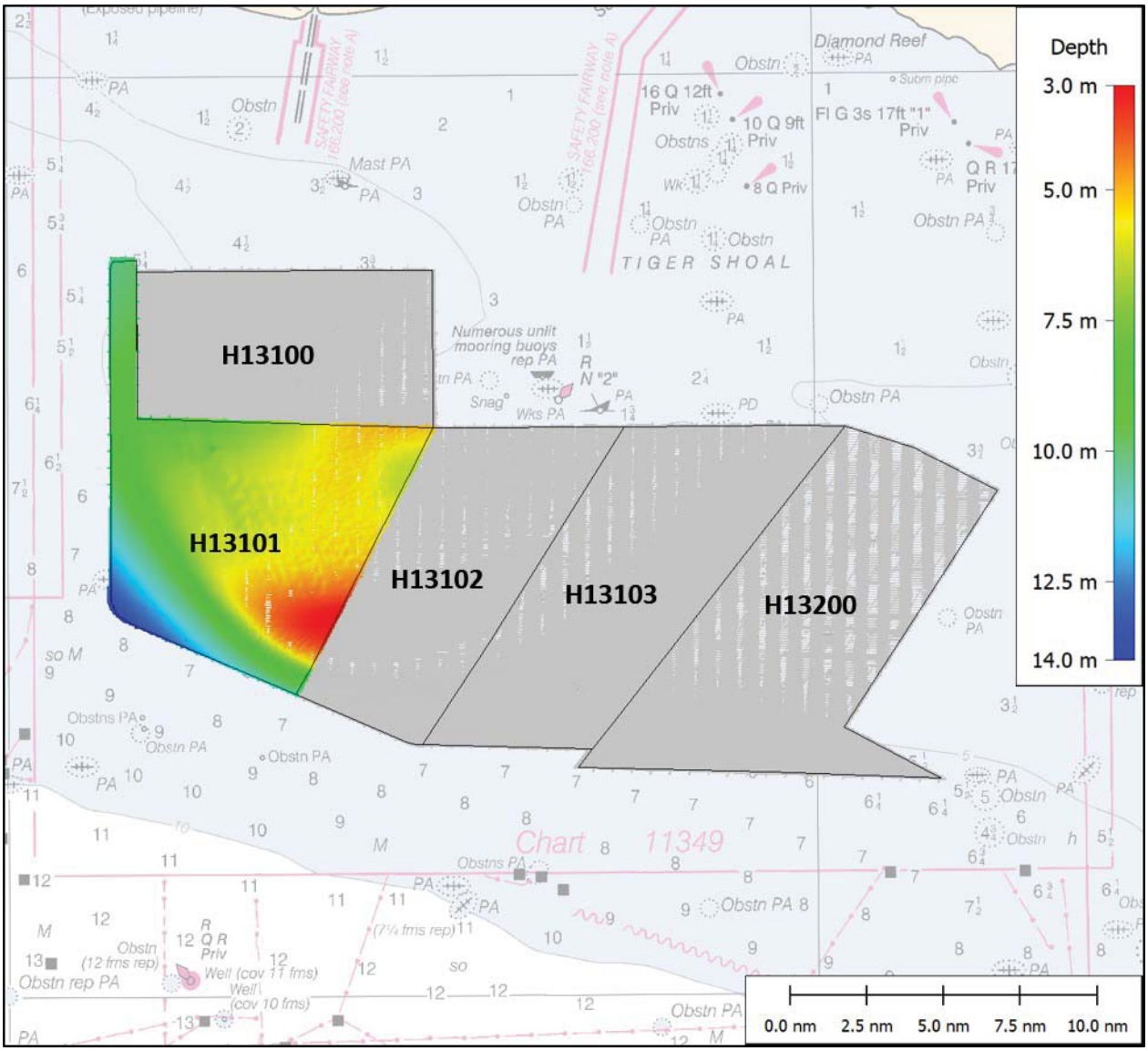


Figure 1: Survey H13101 MBES coverage overlaid on RNC 11340.

A.5 Survey Statistics

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

	HULL ID	*R/V Ocean Explorer*	*Total*
LNM	**SBES Mainscheme**	0	0
	MBES Mainscheme	183.56	183.56
	Lidar Mainscheme	0	0
	SSS Mainscheme	0	0
	SBES/SSS Mainscheme	0	0
	MBES/SSS Mainscheme	2085.08	2085.08
	SBES/MBES Crosslines	139.75	139.75
	Lidar Crosslines	0	0
Number of Bottom Samples			8
Number Maritime Boundary Points Investigated			0
Number of DPs			0
Number of Items Investigated by Dive Ops			0
Total SNM			72.35

Table 3: Hydrographic Survey Statistics

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

Survey Dates	Day of the Year
05/30/2018	150

Survey Dates	Day of the Year
05/31/2018	151
06/08/2018	159
06/09/2018	160
06/10/2018	161
06/11/2018	162
06/12/2018	163
06/13/2018	164
06/14/2018	165
06/15/2018	166
06/21/2018	172
06/22/2018	173
06/23/2018	174
06/26/2018	177
06/27/2018	178
06/28/2018	179
06/29/2018	180
06/30/2018	181
07/12/2018	193
07/14/2018	195
07/15/2018	196
07/16/2018	197
07/17/2018	198
07/18/2018	199
07/20/2018	201
07/21/2018	202
07/22/2018	203
07/24/2018	205
07/25/2018	206
07/26/2018	207
08/14/2018	226
09/05/2018	248
09/06/2018	249

Survey Dates	Day of the Year
09/07/2018	250
09/16/2018	259
09/17/2018	260
09/18/2018	261
09/21/2018	264
09/22/2018*	265*

Table 4: Dates of Hydrography

The linear nautical miles (LNM) for MBES-only development and fill-in lines were included under the heading "Mainscheme MBES" in Table 3, Hydrographic Survey Statistics. There was no SSS-only mileage for this survey.

B. Data Acquisition and Processing

B.1 Equipment and Vessels

Refer to the Data Acquisition and Processing Report (DAPR) for a complete description of data acquisition and processing systems, the survey vessel, 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*
LOA	18 meters
Draft	2 meters

Table 5: Vessels Used

***Bottom samples acquired on 09/24/2018 DN 267.**

B.1.2 Equipment

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

Manufacturer	Model	Type
EdgeTech	4125	SSS
Teledyne RESON	SeaBat 7125 SV2	MBES
Applanix	POS MV 320 v5	Positioning and Attitude System
Trimble	ProBeacon	Positioning System
Trimble	MS750	Positioning System
Trimble	NetR9	Positioning System
AML Oceanographic	Micro X	Sound Speed System
AML Oceanographic	Base X	Sound Speed System
ODIM Brooke Ocean	MVP30	Sound Speed System

Table 6: Major Systems Used

B.2 Quality Control

B.2.1 Crosslines

Multibeam/single beam echo sounder/side scan sonar crosslines acquired for this survey totaled 6.16% of mainscheme acquisition.

A total of 139.75 nm of crossline data was acquired on May 30-31, July 12, August 14, and September 5, 2018 (DNs 150, 151, 193, 226, 248). In the majority of the sheet, crosslines were run north-northeast to south-southwest, meeting the east to west mainscheme lines at an angle. After these lines were collected, the sheet was extended to the south and west. Crosslines in the southern section were run as continuations of the main section's crosslines, and the mainscheme lines were run perpendicular to them. In the western extension, crosslines were run east to west and mainscheme lines were run perpendicular to them in a north-south orientation. (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 a difference surface which was generated in CARIS HIPS between the depth layers of 1.0m resolution CUBE surfaces composed of only crossline data

and of only mainscheme data. The crossline analysis results demonstrate good agreement between crossline soundings and mainscheme soundings, with an average difference of only 0.003m and 99.94% of the 1.0m comparison cells having differences within +/- 0.25m.

Figure 3 is a histogram showing the distribution of depth differences for all comparison grid cells considered.

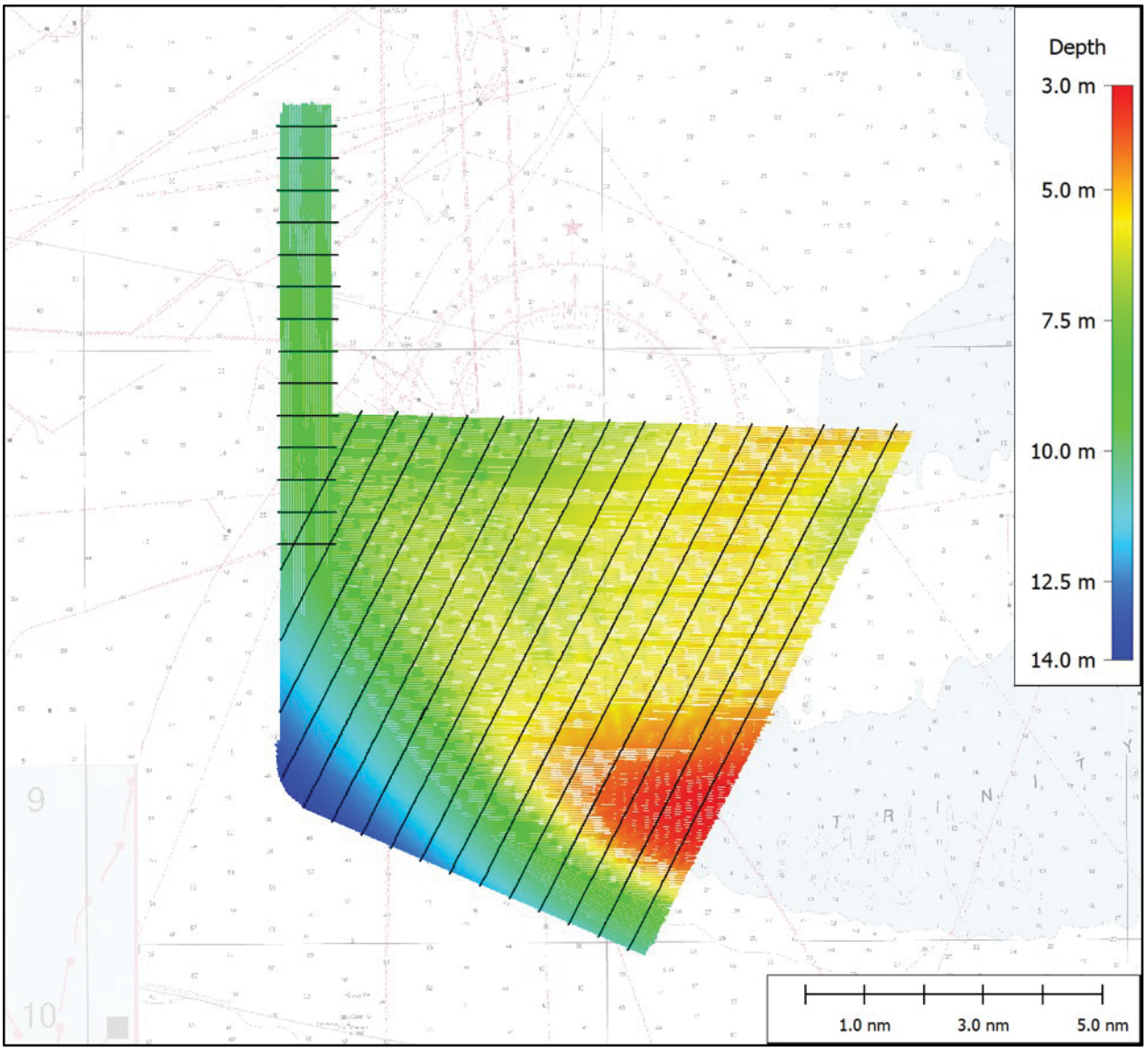


Figure 2: An overview of the crossline layout on a 1.0m surface created from mainscheme MBES data and colored by depth. RNC 11349 is visible in the background.

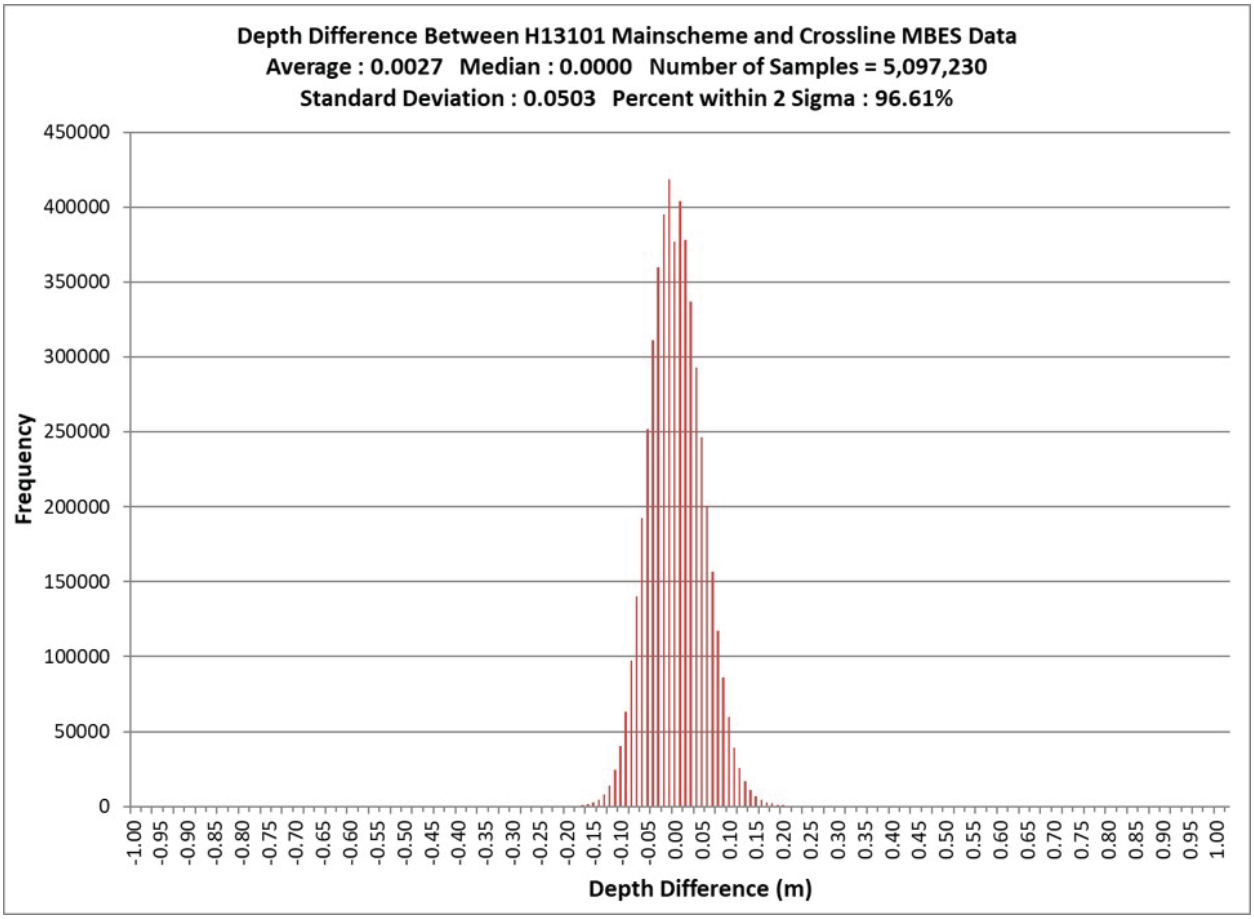


Figure 3: The graph shows a frequency distribution of the depth differences between the H13101 mainscheme and the H13101 crossline MBES data. Statistics from the depth difference sample set are displayed above the graph.

B.2.2 Uncertainty

The following survey specific parameters were used for this survey:

Method	Measured	Zoning
ERS via VDATUM	0 meters	0.17166 meters

Table 7: Survey Specific Tide TPU Values

Hull ID	Measured - CTD	Measured - MVP	Surface
R/V Ocean Explorer	N/A meters/second	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 Section B, Processing and Quality Control, of the project DAPR. Survey H13101 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, which was generated using the "greater of the two" option in the CARIS "Finalize Base Surface" utility. 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".

Results from the TVU QC indicate that 100% of the nodes in this surface meet IHO Order 1 uncertainty specifications.

B.2.3 Junctions

Two (2) contemporary surveys junction with Survey H13101. Figure 4 displays the location of the junction surveys for Project OPR-K354-KR-18. The allowable TVU for the range of water depths within Survey H13101 is 0.50m to 0.53m. Therefore, according to the XMLDR Junction Area "maximum difference" threshold guidance equation (SQRT2 * TVU), the junction discrepancy action threshold equals 0.71m.

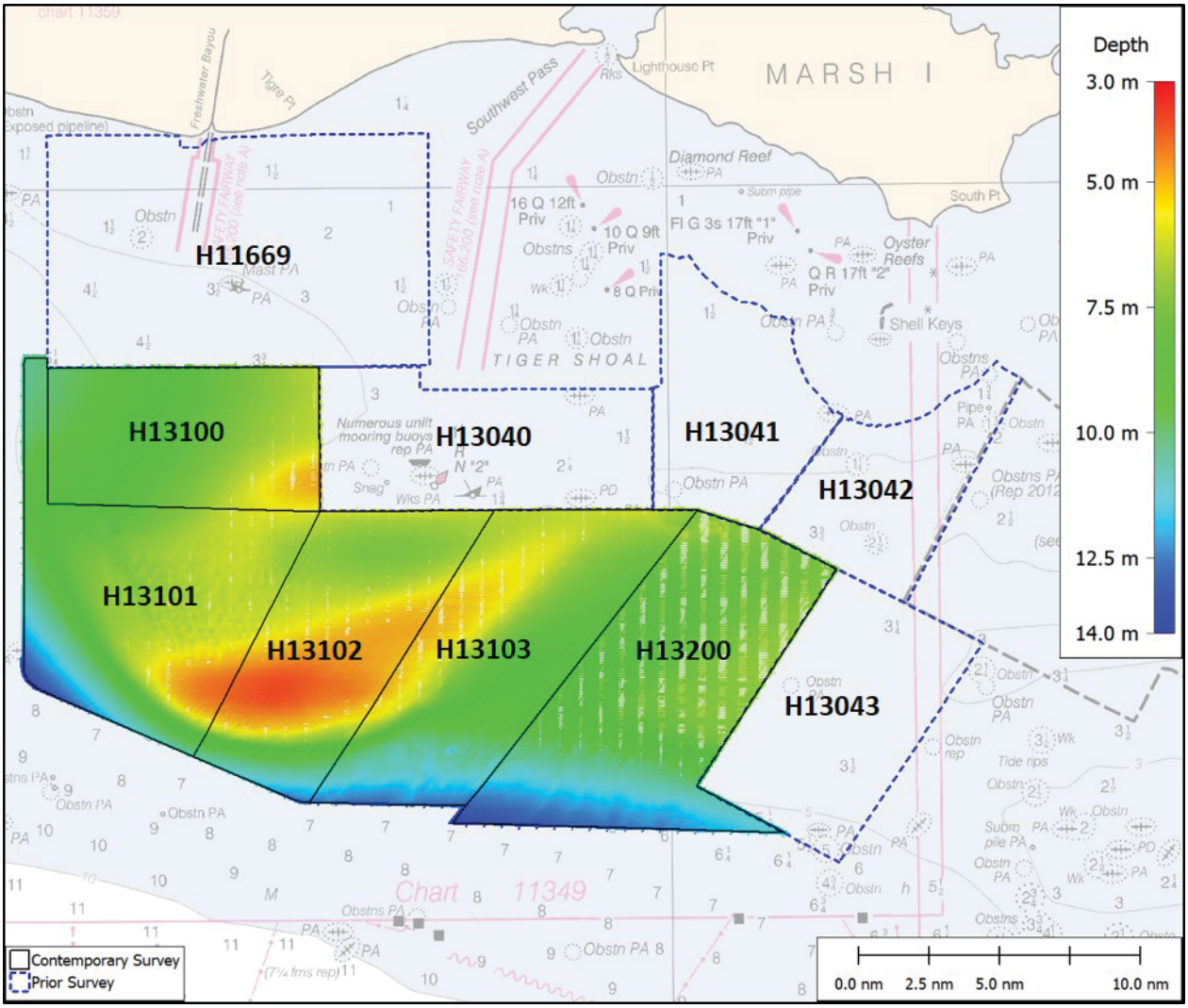


Figure 4: Survey junctions for Project OPR-K354-KR-18. RNC 11340 is displayed in the background.

The following junctions were made with this survey:

Registry Number	Scale	Year	Field Unit	Relative Location
H13100	1:40000	2018	Ocean Surveys, Inc.	NE
H13102	1:40000	2018	Ocean Surveys, Inc.	E

Table 9: Junctioning Surveys

H13100

Data from contemporary Surveys H13100 and H13101 overlapped along a common border of approximately 26,700m. Both surveys were acquired to meet 100% SSS coverage. The mainscheme line plans were

oriented east-west for Survey H13100 and for the southern section of H13101, with the parallel mainscheme lines overlapping by as much as 200m and crosslines overlapping by up to 420m. The eastern half of the common border was shoaler, leading to a sparse junction area in the east and more dense overlap in the west. Along the western border of H13100, the adjacent mainscheme lines in H13101 were oriented north-south with crosslines oriented east-west. The crosslines of H13101 aligned with the mainscheme lines of H13100, providing a relatively dense junction area with crossline overlap of approximately 350m, and mainscheme line overlap of approximately 120m.

Depths from 1.0m resolution CUBE surfaces compiled from the MBES data from each survey were compared using the CARIS HIPS Difference Surface function. A histogram of the differences is shown in Figure 5.

Depths from the H13100 survey show good agreement with depths from Survey H13101. The average difference between these surveys is 0.03m and 99.98% of the 1.0m comparison cells have differences within +/- 0.25m. The areas of greatest difference were in the mainscheme lines in the northwestern corner of the main section of Survey H13101.

All (100%) junction comparison cells have a difference below the discrepancy action threshold of 0.71m.

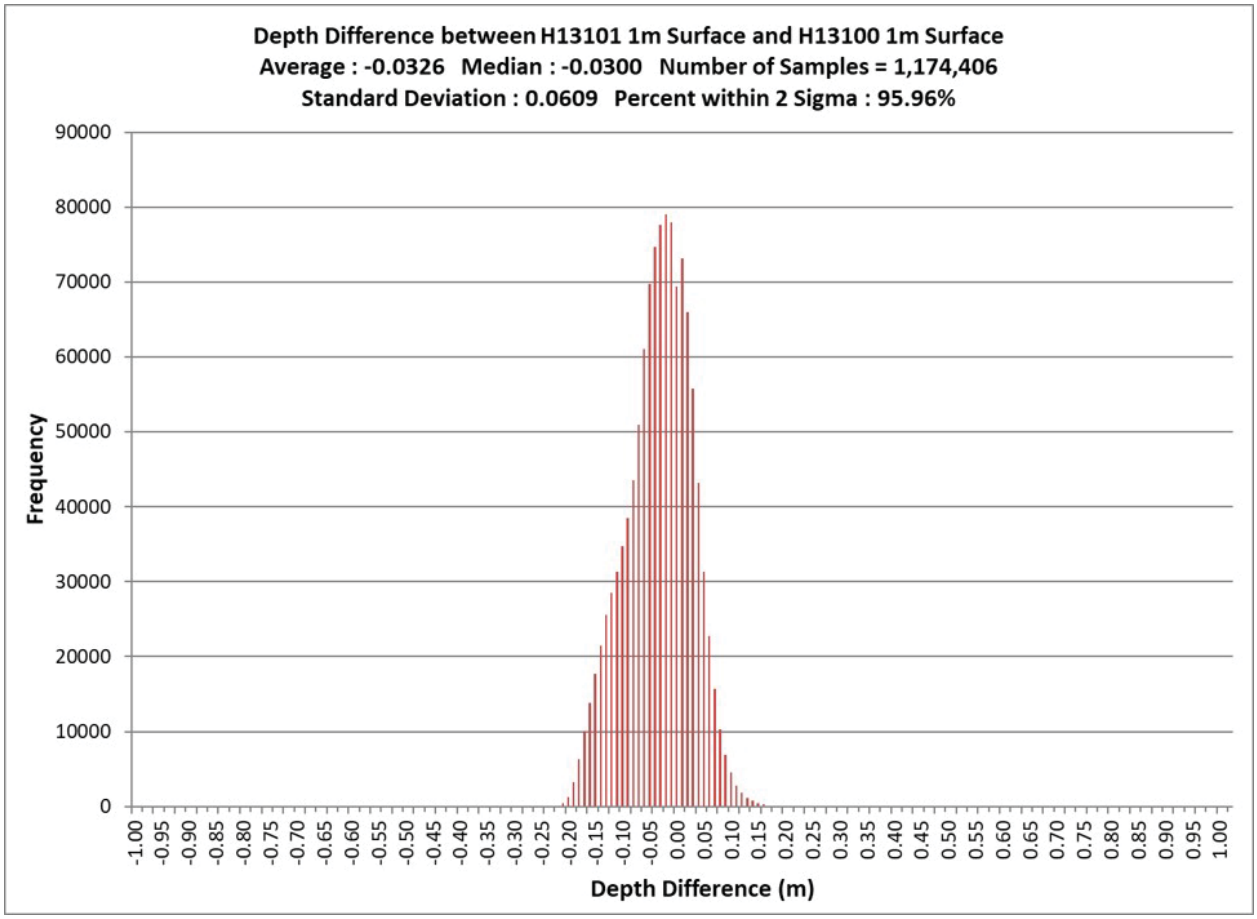


Figure 5: Surface-to-surface difference histogram comparing Survey H13101 to H13100.

H13102

Data from contemporary Surveys H13101 and H13102 overlapped along a common border of approximately 18,100m. Both surveys were acquired to meet 100% SSS coverage. The mainscheme line plans were nominally oriented east-west for most of Survey H13101 and H13102, with the southern sections of both surveys having mainscheme lines oriented southeast-northwest instead. The surveys aligned closely in both the east-west and the southeast-northwest orientations, leading to a dense junction area with parallel mainscheme lines overlapping by as much as 550m.

Depths from 1.0m resolution CUBE surfaces compiled from the MBES data from each survey were compared using the CARIS HIPS Difference Surface function. A histogram of the differences is shown in Figure 6.

Depths from the H13101 survey show good agreement with depths from Survey H13102. The average difference between these surveys is 0.01m and 99.99% of the 1.0m comparison cells have differences within +/- 0.25m. There is no discernible trend of one survey being deeper than the other, nor is there a particular region showing greater difference between the two surveys anywhere along their common border.

All (100%) junction comparison cells have a difference below the discrepancy action threshold of 0.71m.

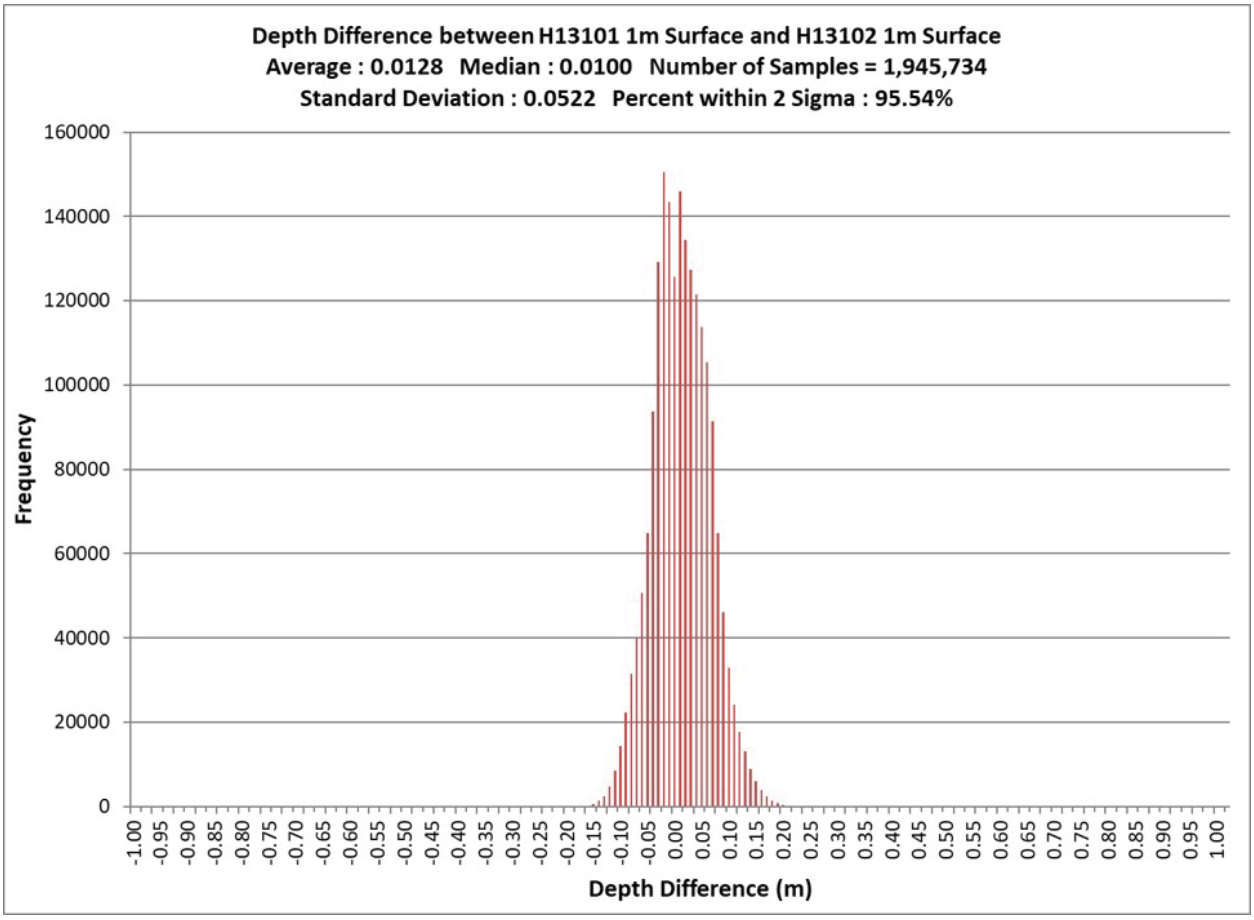


Figure 6: Surface-to-surface difference histogram comparing Survey H13101 to H13102.

B.2.4 Sonar QC Checks

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

B.2.5 Equipment Effectiveness

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

B.2.6 Factors Affecting Soundings

SSS Refraction

Dynamic sound speed changes affected the SSS imagery at times, causing refraction in the outer ranges of the SSS swath (Figure 7). 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 rerun. Due to the close line spacing employed in some locations, there were many instances of outer range refraction that did not trigger a re-run or rejection as 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 20m of the 50m image range but the vessel was running on a 40m 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.

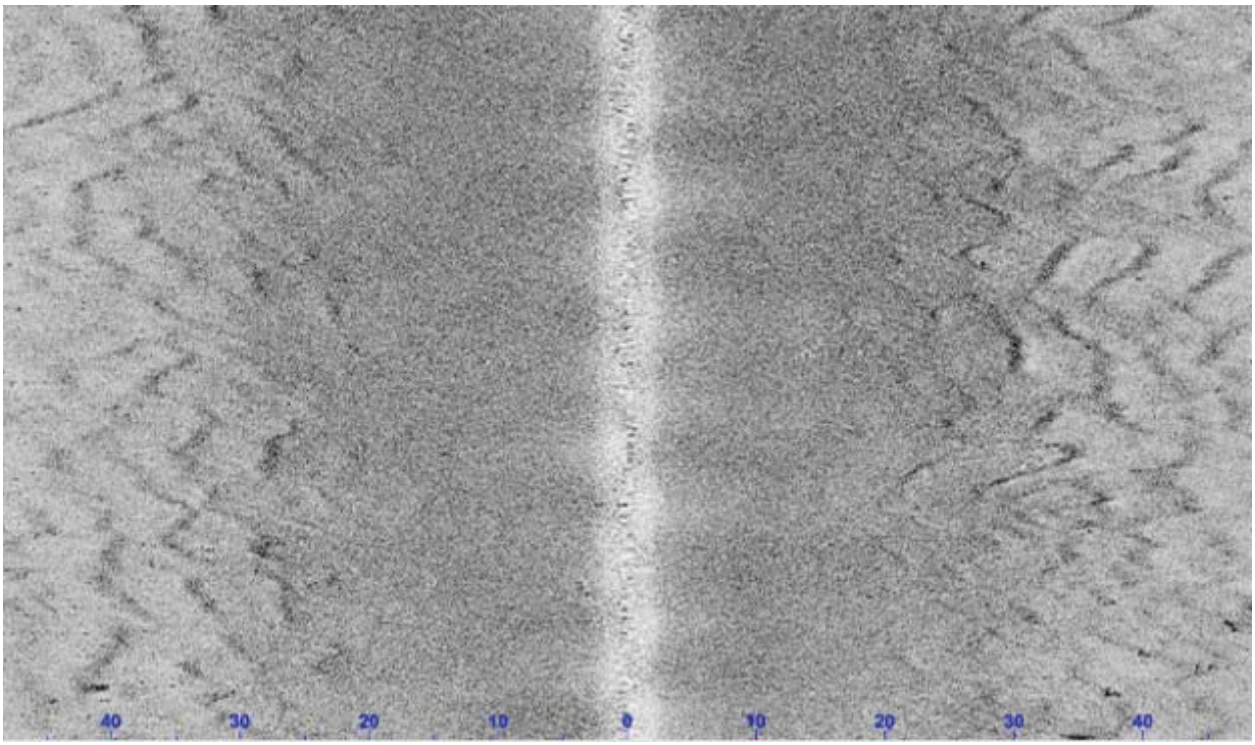


Figure 7: Refraction in the SSS imagery is visible in both channels of a survey line acquired with the fixed-mount 4125 SSS.

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

The Reson 7125 system 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 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 1.0m 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 8). 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 palate. 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.

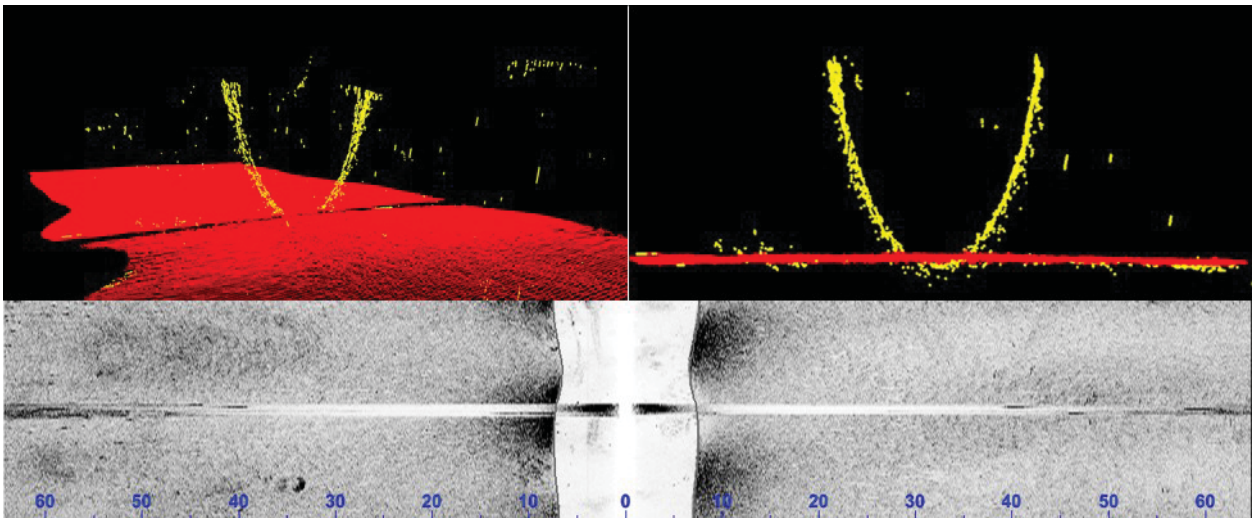


Figure 8: This figure shows how cavitation noise at the SSS and MBES transducer heads presented in the converted data. Noise at the 4125 TX head is visible as a dark return at the top of the water column with white streaking across the raw SSS imagery (bottom). In this instance, the SSS white streak coincided with an MBES blowout (top right and top left images).

Fish in SSS Imagery and MBES Data

An abundance of fish and marine life were observed in the SSS and MBES data, either as lone swimmers or in schools, which at times created large shadows in the SSS imagery and gaps in the MBES data (Figures 9 and 10). 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. Over 13,000 fish, fish school, dolphin, and other marine life contacts were identified in Survey H13101.

To ensure that possible significant features were not located in these fish and dolphin shadows, the fish/ dolphin related coverage gaps were rerun to achieve 100% SSS coverage or complete MBES coverage.

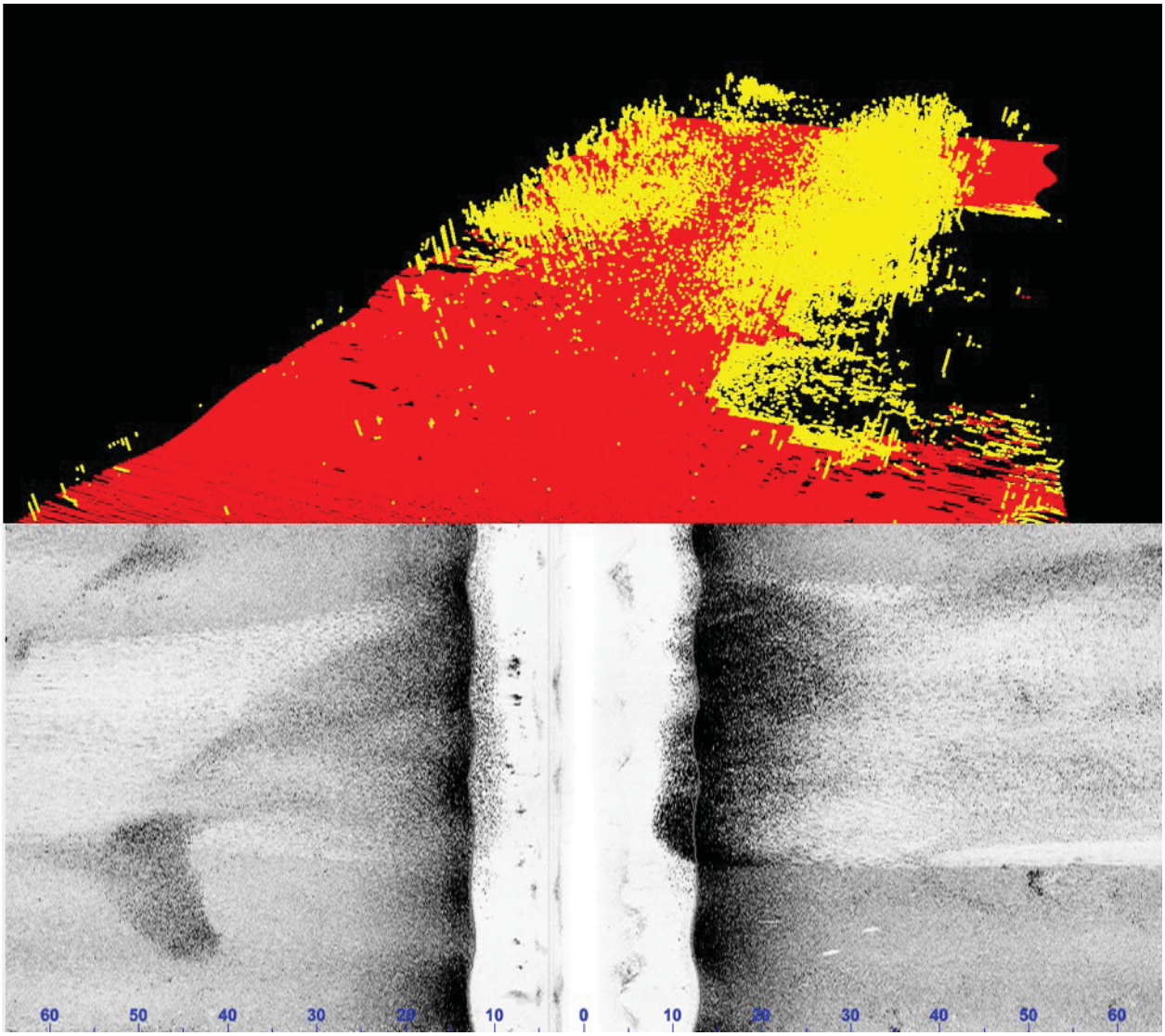


Figure 9: MBES and SSS images showing a school of fish visible in the water column and the acoustic shadow cast in each dataset. In the top panel the rejected MBES soundings are colored yellow.

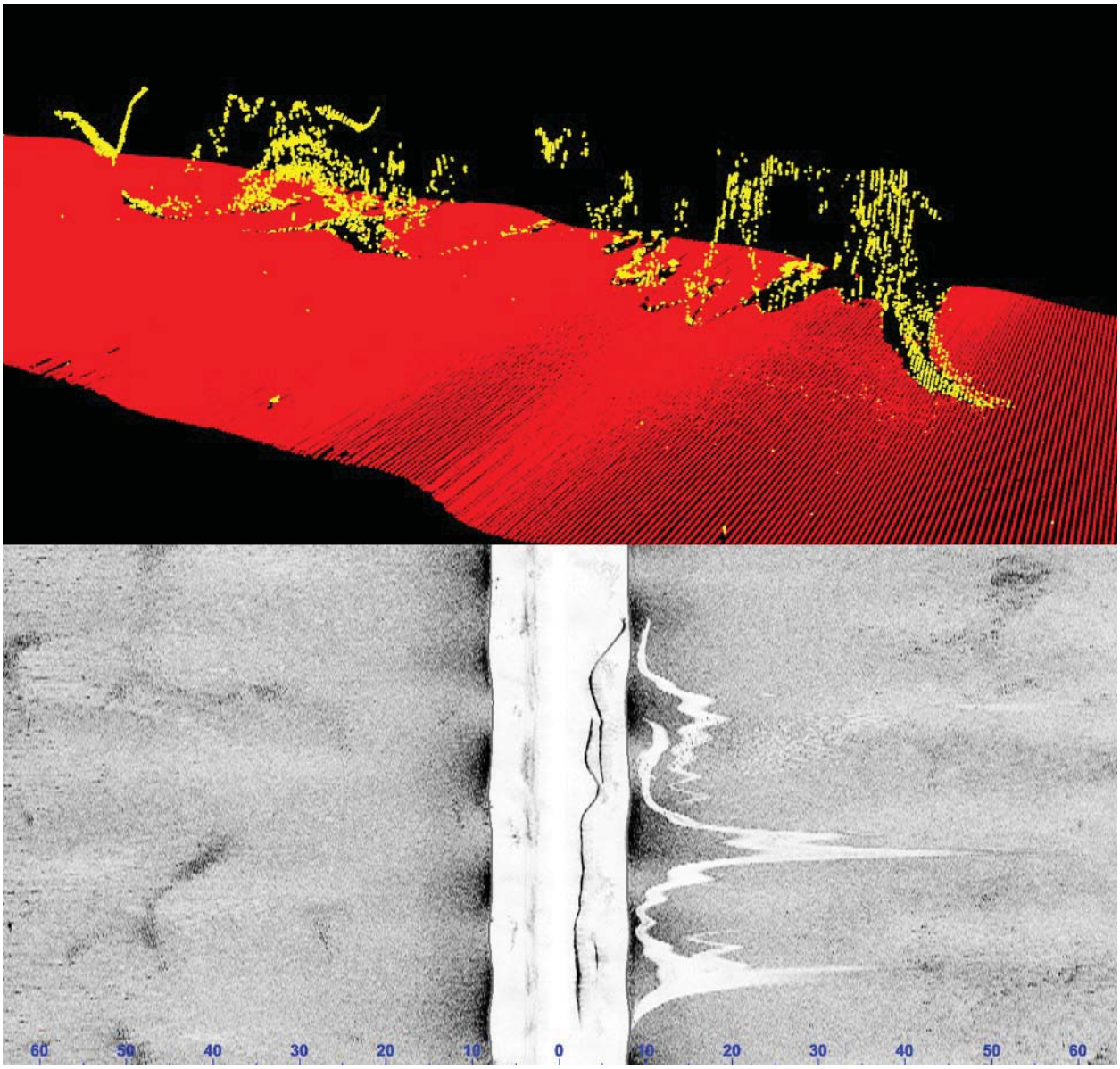


Figure 10: An example of a dolphin as it appears in the water column of the MBES and the SSS, and the acoustic shadow cast in each dataset. In the top panel the rejected MBES soundings are colored yellow.

MBES failure to return outer beam soundings in shallow depressions

There are a number of instances in the vicinity of 29-13-55N, 92-23-21W where the first pass of MBES and SSS encountered what is interpreted to be minor depressions containing minimally reflective to non-reflective sediments. The horizontal extent of the seafloor depressions is as much as 100m. The depressions are generally oriented northeast/southwest.

The MBES response to some of these patches is unique in OSI's experience. When encountering the depressions the outer beams (in particular) of the MBES appear to lose track of the bottom and, for lack of

a better term, “ramp up” in a vertical wall of false returns. The result, after editing, is Complete Coverage MBES holidays larger than permitted by Section 5.2.2.3. of the HSSD. The SSS response in these areas is, frankly, no response, i.e. the intensity of the return is so weak as to be displayed as no return. For example, when using a greyscale palate with black representing high intensity returns, these depressions are shown as a bright white patch.

These seafloor depressions were revisited about a month later and the newly acquired MBES data quality was found to be much better. The SSS signature of the fills and splits covering the depression patches, while still on the light side, were improved as compared to the first pass imagery.

Figure 11 below provides an example of the “ramped up” soundings where no minimal valid MBES returns were received (top panel) and the resultant first pass Complete Coverage MBES holiday (bottom panel). Underlying the MBES surface in the lower panel is the first pass SSS mosaic which shows the white-shaded, low intensity return discussed above. All holidays were eventually filled with second pass data.

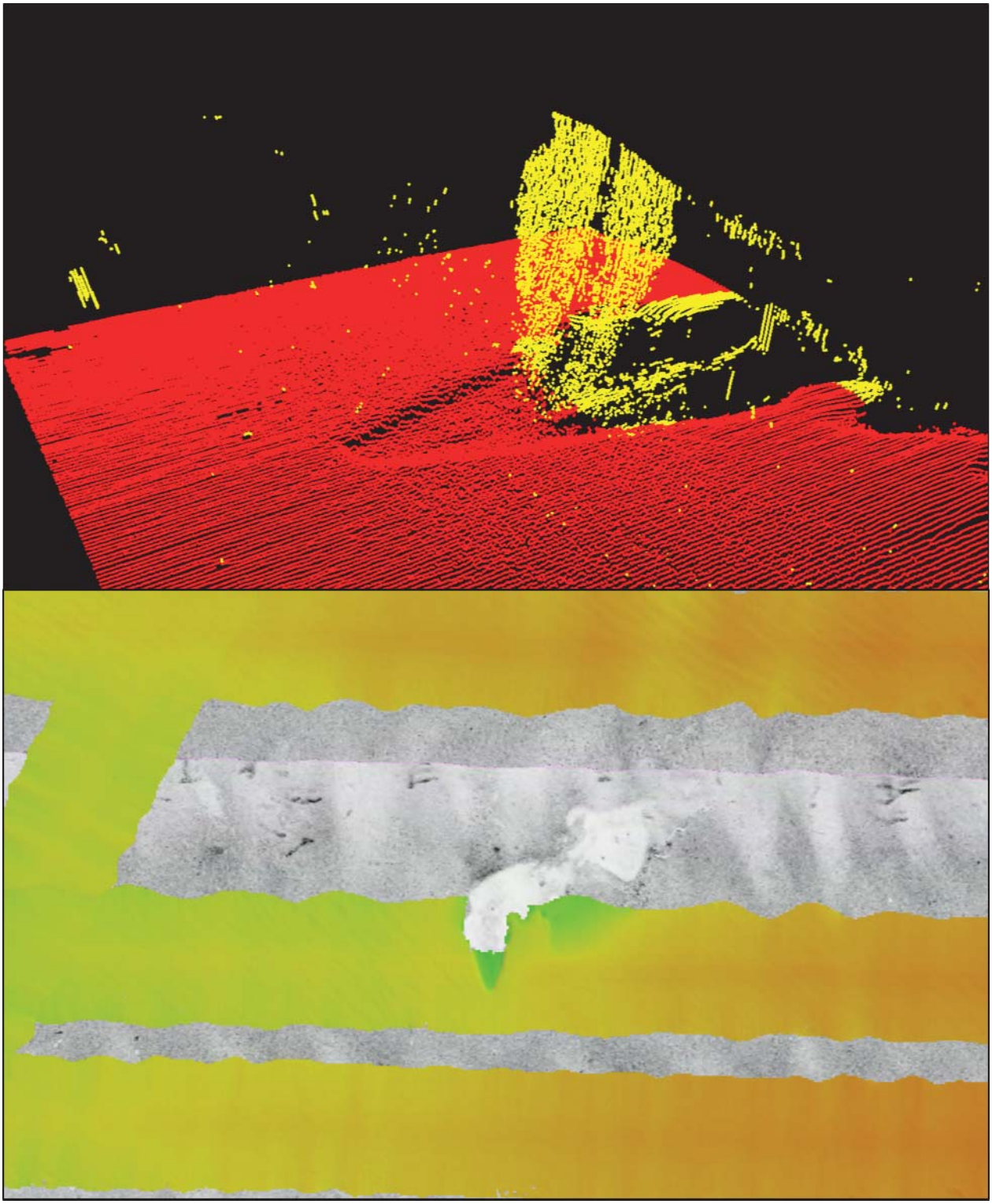


Figure 11: An example of MBES response in a seafloor depression (upper panel). In this image the accepted soundings are colored red and the rejected soundings colored yellow. The lower panel shows the associated MBES surface holiday and, underlying the multibeam surface, the white-shaded, very low intensity SSS response.

B.2.7 Sound Speed Methods

Sound Speed Cast Frequency: Sound speed profile data were acquired with the ODIM MVP30 approximately every 15 minutes as documented in the DAPR.

All MBES lines were sound speed corrected using CARIS HIPS' "Nearest in Distance Within Time" method. The time interval used was 1 hour.

OSI submitted H13101 sound speed data in NetCDF format to the National Centers for Environmental Information (NCEI) on October 15, 2018 via the S2N tool. NCEI assigned the sound speed submission Accession Number 0177405. 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 all survey depths, i.e. Complete Coverage, Option B as defined in Section 5.2.2.3 of the HSSD 2017. For all disprovals either 200% SSS or Complete Coverage MBES was achieved. Per the HSSD which states "Gaps in 100% SSS coverage should be treated as gaps in 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 multibeam sonar data to meet HSSD 5.2.2.3 Complete Coverage requirements. All depths within Survey H13101 were shallower than 20m, for which HSSD 5.2.2.3 specifies a grid resolution of 1.0m.

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

B.2.9 Density

The CARIS HIPS and SIPS Compute Statistics tool calculated that 99.61% of the 1.0m grid nodes have 5 soundings or more, which satisfies the density coverage requirements.

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 H13101. Backscatter data were recorded with HYSWEEP SURVEY in .7K format, and these data were periodically reviewed to ensure functionality of the backscatter acquisition process.

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 10: 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 11: Primary imagery data processing software

The following Feature Object Catalog was used: NOAA Extended Attribute Files V5_8.

Software versions described in Section A of the DAPR were used throughout acquisition and processing of data for Project OPR-K354-KR-18.

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
H13101_MB_1m_MLLW	CARIS Raster Surface (CUBE)	1 meters	3.98 meters - 13.76 meters	NOAA_1m	Complete Coverage (Option B)

Surface Name	Surface Type	Resolution	Depth Range	Surface Parameter	Purpose
H13101_SSS_1m_100	SSS Mosaic	1 meters	-	N/A	100% SSS
H13101_SSS_Disproval	SSS Mosaic	1 meters	-	N/A	200% SSS

Table 12: Submitted Surfaces

In addition to the above surfaces, a 0.25m SSS mosaic image composed of all SSS lines was 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 Horizontal and Vertical Control Report (HVCR) for Project OPR-K354-KR-18.

C.1 Vertical Control

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

ERS Methods Used:

ERS via VDATUM

Ellipsoid to Chart Datum Separation File:

OPR-K354-KR-2018_NAD83-MLLW_xGeoid17B.csar

C.2 Horizontal Control

The horizontal datum for this project is North American Datum 1983.

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

The following PPK methods were used for horizontal control:

Smart Base

Application of the Applanix POSPac Smart Base process is described in detail in the project HVCR.

The following CORS Stations were used for horizontal control:

HVCR Site ID	Base Station ID
Calcasieu Pass	CALC
Eugene Island 337	DEV1
Abdalla Hall ULL	TONY
Franklin High Sch	FSHS
Amerada Pass	AMER
Lumcon	LMCN
Houma	HOUM

Table 13: CORS Base Stations

The following user installed stations were used for horizontal control:

HVCR Site ID	Base Station ID
OSI Freshwater Lock	OSFL

Table 14: User Installed Base Stations

Correctors from the U.S. Coast Guard Differential GPS (DGPS) station in English Turn, LA were utilized by the secondary GPS, a Trimble MS750, used as a "position integrity" alarm.

The following DGPS Stations were used for horizontal control:

DGPS Stations
English Turn, LA

Table 15: USCG DGPS Stations

D. Results and Recommendations

D.1 Chart Comparison

Chart comparisons were performed in CARIS HIPS/SIPS using finalized CUBE surfaces, contours and selected soundings. The latest edition of the NOAA NOS Electronic Nautical Chart (ENC) was 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 ENC used for final

comparison was updated with Notice to Mariners data through December 20, 2018 and is submitted with the survey deliverables.

Local Notices to Mariners and Notices to Mariners from March 21, 2018 to December 20, 2018 were reviewed in conjunction with the chart comparison.

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 H13101 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.

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	30	12/20/2018	12/12/2018	NO

Table 16: Largest Scale ENCs

US4LA15M

An overview of the areas of change between charted depths and H13101 surveyed soundings is shown in Figure 12. The figure displays a difference surface made by subtracting a 10m resolution depth surface generated from the H13100 MBES data from a depth surface interpolated from the charted ENC soundings within the project area. Regions of shoaling are represented by positive depth differences (warm colors) and regions of deepening are represented by negative depth differences (cool colors).

The bright orange-red shading seen in the southern region of the comparison figure represents shoaling greater than 2m. This shoaling triggered issuance of Survey H13101 DTON#1. Relatively small regions of moderate shoaling also exist in the southwestern and southeastern corners of the survey. Moderate deepening is seen in the northern dogleg as well as the middle and eastern regions of the Survey. Most of the blue shading seen in Figure 12 is indicative of deepening that appears to be due to natural processes. Three discrete "blue dots" are observed within the green-shaded patch which runs along the northern border of the main body of the Survey. Based on the comparison methodology described above, these dots should represent deepening around existing platforms. However, the blue dots are an artifact of the relative sparseness of the ENC sounding surface versus the much denser 10m gridded surface.

Charted depth contours have moved significantly from their charted location and should be redrawn based on data from H13101. Figure 13 shows US4LA15M ENC contours compared to H13101 surveyed contours generated from the displayed generalized tinned surface.

The charted 18-foot contour in the southeast corner of the survey has shifted south and southwestward by as much as 1,300m. South of the 18-foot contour, an 18-foot sounding and depth area were added to the ENC based on H13101 DTON#1. This only represents a portion the data from H13101. All of the contemporary survey data should be used to more thoroughly reflect the extent of change represented in H13101 DTON#1.

The charted 18-foot depth contour that enters and exits the northeast corner of H13101 is disproved. Survey depths were found to be deeper in this region.

The charted 30-foot contour has shifted 500-700m southwest along the majority of the contour. However, a more substantial shift has occurred in the northern dogleg region, where the 30-foot contour has shifted eastward.

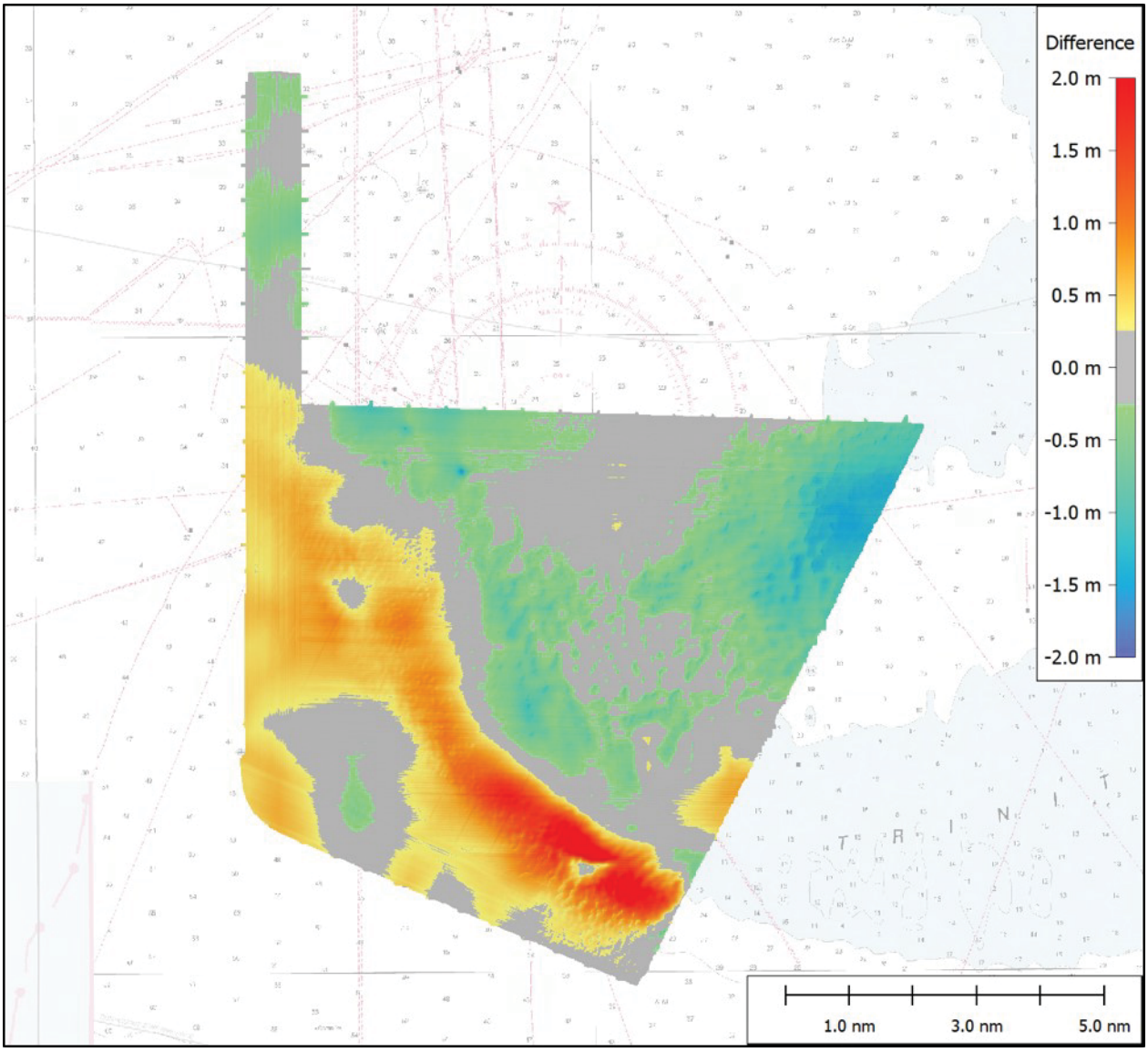


Figure 12: A depth difference surface overlaid on RNC 11349 provides an overview of the areas of change between charted depths and H13101 surveyed soundings.

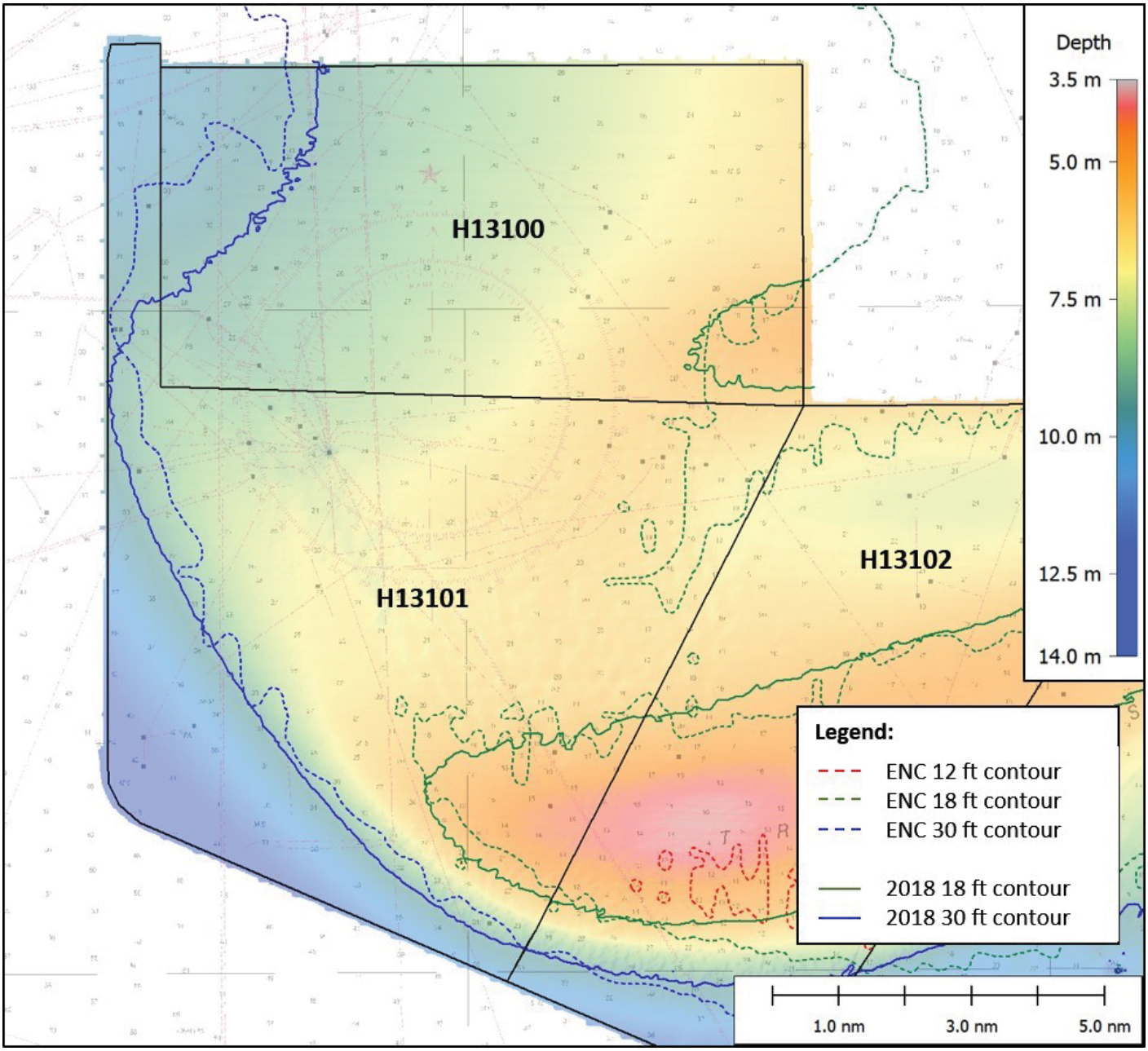


Figure 13: A colorized depth surface provides an overview of the change in contours from ENC US4LA15M to the surveyed data. RNC 11349 is displayed as an overlay.

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." The disproval area for wellheads given in the referenced HSSD chapter is a 50m search radius.

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 feature exists, include in FFF with descrp=retain. If feature is not visible, conduct a feature disproval (Section 7.3.4)." The addition of uncharted BSSE Wellheads in the CSF (which were 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 H13101, 152 charted features were investigated: 1 wreck, 24 platforms, 1 submarine cable, 54 pipeline sections, and 72 obstructions. Two (2) charted pipelines and 1 charted platform were not formally assigned in the CSF, but were treated as assigned as they fall well within the bounds of the survey area. All of the assigned obstructions were "BSSE Wellhead" obstructions.

The assigned wreck ("PA") was disproved with complete MBES coverage.

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

All BSSE Wellhead obstructions are recommended for deletion. Of the 72 BSSE Wellhead obstructions, 2 were coincident with verified and charted platforms, but no evidence of a wellhead aside from the verified platform was found within the disproval area centered on the CSF provided position defined by a 50m search radius. Each of the remaining 70 BSSE Wellhead obstructions were disproved with 200% SSS and partial MBES or with complete MBES coverage.

One (1) submarine cable feature was assigned for investigation in the CSF. The cable was not detected in the survey data and is not included in the FFF, as directed by the Investigation Requirements in the CSF.

There are 54 charted pipeline features present within the bounds of Survey H13101, 52 of which were formally assigned in the CSF. The remaining 2 pipelines are present within the bounds of the survey area

that was added to the project in the modified Project Instructions (August 6, 2018) and were treated as assigned. Many of the pipelines, as packaged and assigned in the CSF, extend outside the bounds of the H13101 survey area and were not investigated beyond the survey limits. During preliminary data processing there were numerous pipeline or potential pipeline detections identified in Survey H13101. Many of these detections are duplicate detections from a single feature imaged on one or more adjacent tracklines, leaving 30 unique potential pipeline features. A number of these potential detections were later determined to be something other than an exposed pipeline, e.g. exposed pipe armor or a low-relief escarpment. Two (2) pipeline features and 1 "seep" were confirmed. Both pipeline detections are less than 1.0m above the seafloor, and therefore, are not deemed DTONs. The valid seep and pipeline detections, as interpreted during late-stage processing, were forwarded to the COR via email on November 16, 2018 according to guidance in Section 1.7 of the HSSD regarding Non-DTON Seeps and Pipelines.

Prior to 2017, 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 H13101. Of the relatively few SSS contacts chosen, most were either fish (chosen independently of the mass fish targeting scheme described in the DAPR) or features of insignificant height. No new obstructions were surveyed in Survey H13101.

A 0.8m tall feature was surveyed approximately 29m southwest of a CSF-assigned BSSE Wellhead. While this feature is not navigationally significant, it is possible that it is the assigned wellhead. For this reason, a designated sounding was created from the least depth of this feature.

D.1.5 Shoal and Hazardous Features

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

One DTON was generated as a result of this survey and transmitted to AHB on December 7, 2018 as H13101 DTON #1.

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

Eight (8) bottom samples were acquired in close proximity to the recommended positions included in the PRF provided with the OPR-K354-KR-18 Project Instructions. 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. Sediment within Survey H13101 was primarily found to be fine sand and soft mud, with one sample also containing shells.

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 comparisons exist for this survey, but with the exception of the assigned junction surveys, prior data were not investigated.

D.2.3 Aids to Navigation

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

D.2.4 Overhead Features

No overhead features exist for this survey.

D.2.5 Submarine Features

As discussed above, 54 charted pipelines are located within Survey H13101. The majority of the charted pipelines were not visible in the SSS or MBES data, nor was the charted cable.

In addition to the ENC and the CSF, pipeline data from the Bureau of Ocean Energy Management (BOEM) were reviewed prior to field operations to identify any potential uncharted BOEM pipelines in the survey area. Eleven (11) BOEM pipelines are not represented on the chart. Seven (7) charted pipelines do not have

a BOEM pipeline counterpart. Uncharted BOEM pipelines as well as the charted pipelines without a BOEM pipeline counterpart are displayed in Figure 14.

The BOEM pipeline data (last updated on December 3, 2018) 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_15N_NAD83_Meters.dxf.” These files are included with the digital deliverables for Survey H13101.

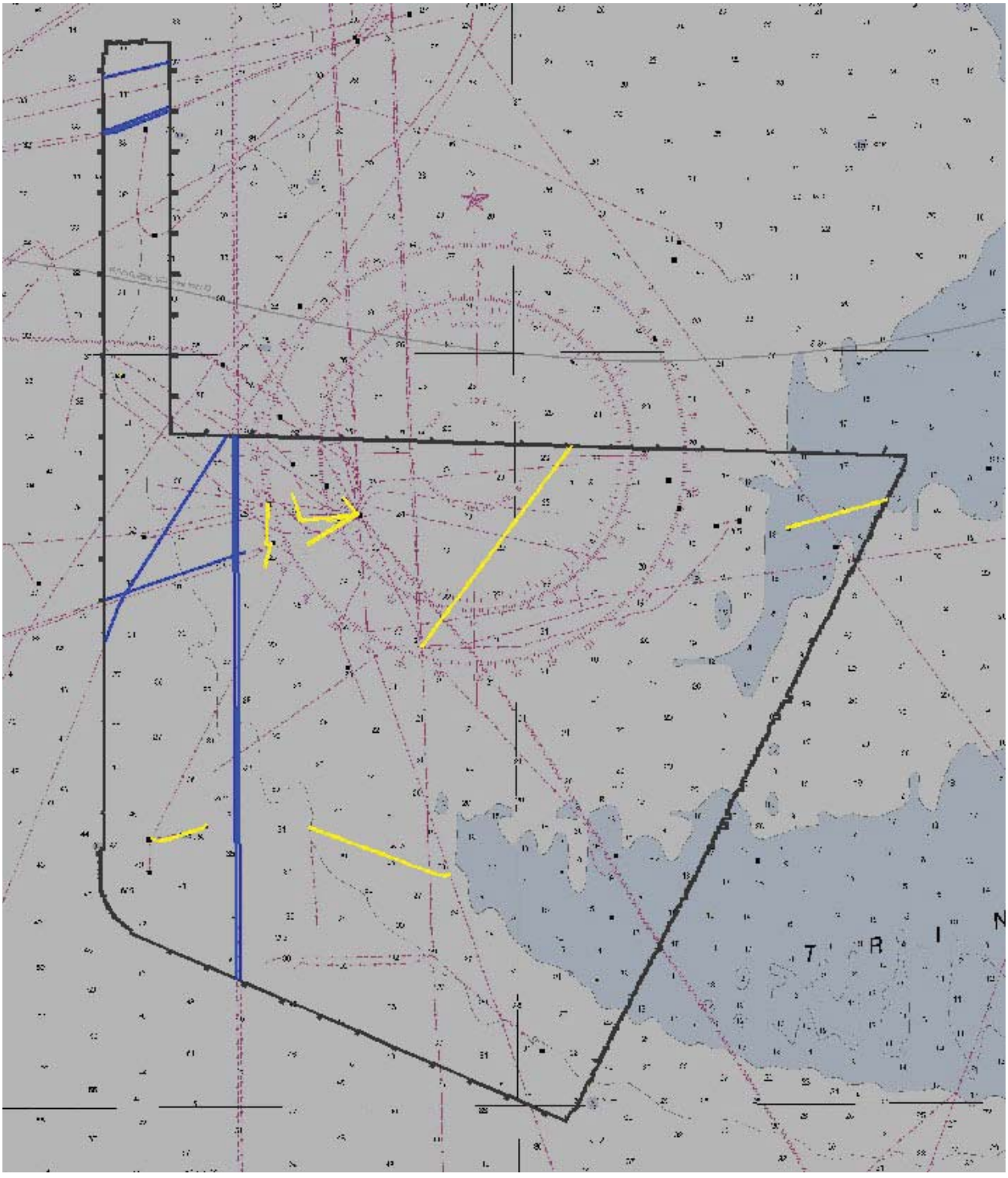


Figure 14: BOEM-defined pipelines that are not charted are highlighted in yellow. The charted pipelines without a BOEM counterpart are highlighted in blue. Survey H13101 survey boundary limits are shown in black.

D.2.6 Platforms

Of the 24 platforms assigned for investigation for Survey H13101, only 3 platforms were found to be present. These platforms are charted on the ENC and were assigned for investigation in the CSF; however, because each platform's surveyed position was greater than 10m from the CSF positions, they are recommended for deletion and new platforms are included in the FFF at the surveyed positions. The remaining 21 platforms were disproved and are recommended for deletion.

In addition to the ENC and the CSF, BOEM platform data were reviewed prior to field operations to identify any potential uncharted BOEM platforms in the survey area. There were 49 BOEM platforms in the data set. All BOEM platforms coincide with either an assigned BSSE Wellhead, a charted pipe/platform, or an uncharted BOEM-defined pipeline. Eighteen (18) assigned platforms, including the 3 platform that were found in the survey, coincide with one or more BOEM platforms.

The BOEM platform data (last updated on December 3, 2018) were obtained as a shape file "platforms.shp" from the BOEM website (https://www.data.boem.gov/Main/Mapping.aspx) and re-projected as a .DXF file “BOEM_Platforms_UTM_15N_NAD83_Meters.dxf.” These files are included with the digital deliverables for Survey H13101.

There were no platform related Local Notice to Mariners or Notice to Mariners notifications within Survey H13101 from March 21, 2018 to December 20, 2018.

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

As noted above there is evidence of long term sediment transport within the survey area, i.e. the shoal soundings of Trinity Shoal appear to be migrating westward. During the period of the survey, evidence of short term sediment movement was also observed.

Figure 15 depicts a portion of the shoal surface from the northern edge of Survey H13101. Water depth in this area is around 6.6m. Featured in the image are MBES data from a crossline acquired on DN 150, mainscheme lines acquired on DN 162, mainscheme lines acquired on DN 197, and an investigation line acquired on DN 198. Between DN 162 and DN 197 there was a weather event of several days with wind speeds of up to 35 knots. The contrast from the smooth tie line and DN 162 lines to the textured lines from DN 197 is evident in the figure.

Figure 16 depicts a portion of the shoal surface from the southern portion of Survey H13101. Water depth in this area is around 8.1m. Featured in the image are MBES data from a crossline acquired on DN 150 and mainscheme lines acquired on DN 173, showing that in between their acquisition dates, a depression formed at the location where the two lines intersect. The frequency of depressions on the mainscheme data and the

lack of depressions on the tie lines suggests that many, if not all, of these depressions were formed during that intervening time period.

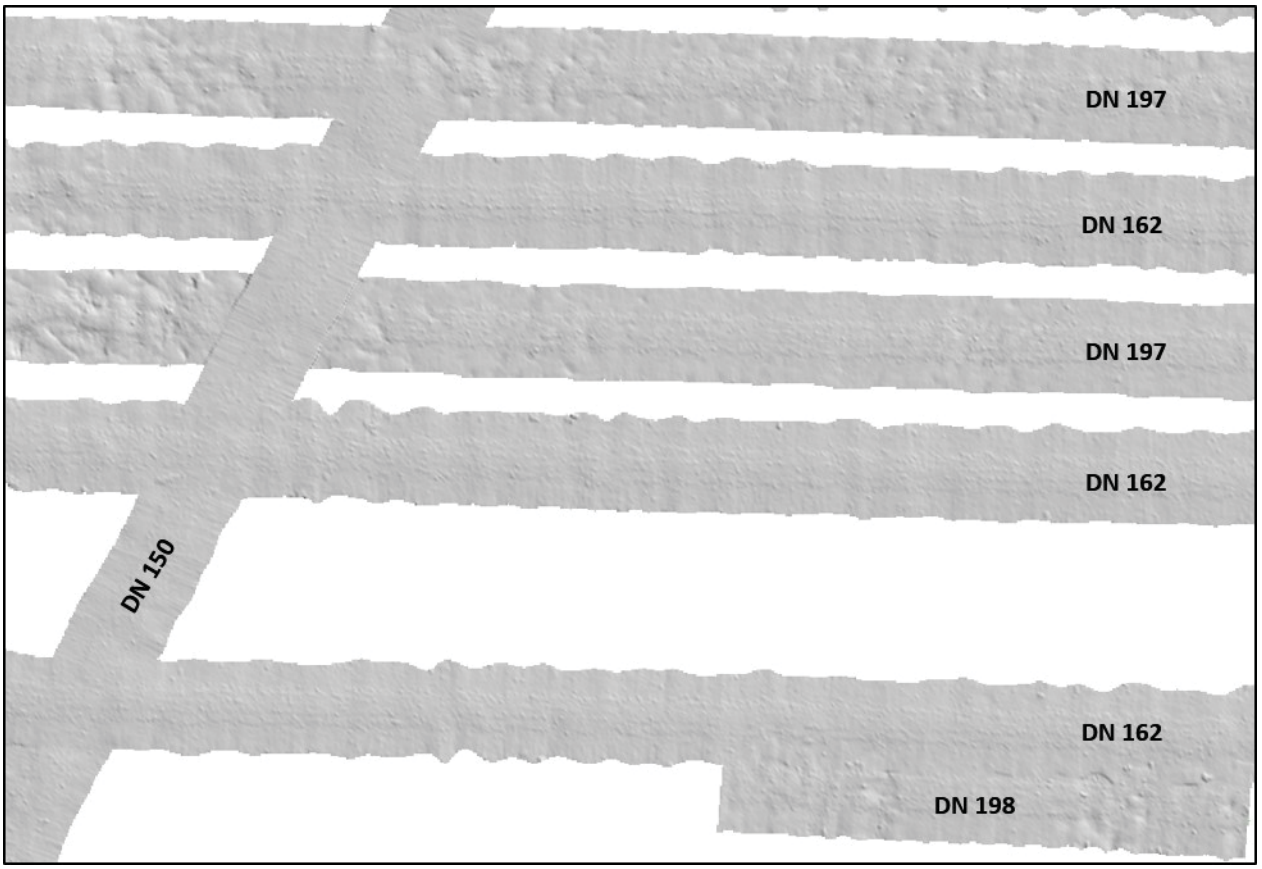


Figure 15: Example of sediment transport in H13101, with the bottom character changing on a short time scale during the survey period.

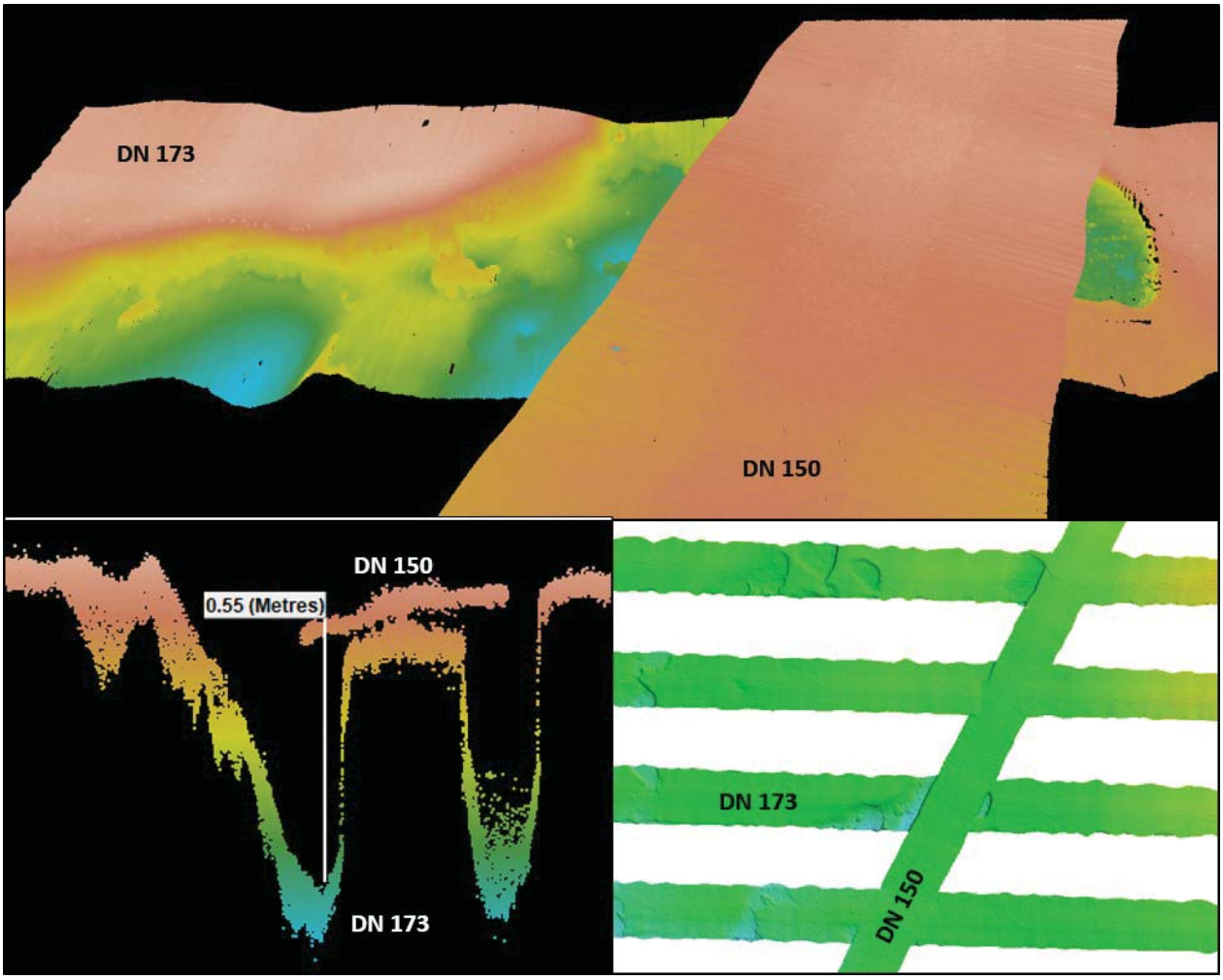


Figure 16: Example of sediment transport in H13101, showing depressions that formed in the seafloor on a short time scale during the survey period.

D.2.9 Construction and Dredging

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

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-18 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-18 survey area the Coast Pilot Report, included with the April 4, 2018 Final Data Package, states that, "there is one paragraph in Coast Pilot 5, chapter 9, that describes Trinity Shoal (paragraph 301). There are no details on the surrounding area either. The paragraph appears to be accurate to Chart 11349 and does not need an update." The survey area considered in the Coast Pilot Report does not exactly match the area ultimately surveyed (the assigned survey area expanded after issue of the April 4, 2018 Final Data Package). However, the Report's "no updates needed" statement and the lack of other investigation requirements still applies to the area actually surveyed. The Hydrographic Survey Project Instructions contained only general guidance regarding the Coast Pilot. Therefore, 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 - 46th Edition, 2018 updated through 21-October-2018, Mississippi River to Sabine Pass.

Within the Coast Pilot Edition mentioned above there is only one specific, detailed, relevant entry concerning the assigned survey area. Most entries are of a general nature 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 this document will attempt to address as most entries are 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 meets or exceeds requirements as set forth in the NOS Hydrographic Surveys Specifications and Deliverables, Field Procedures Manual, Letter Instructions, and all HSD Technical Directives. These data are adequate to supersede charted data in their common areas. This survey is complete and no additional work is required with the exception of deficiencies noted in the Descriptive Report.

Report Name	Report Date Sent
Data Acquisition and Processing Report	2019-01-25
Horizontal and Vertical Control Report	2019-01-25
Coast Pilot Report	2018-11-15

Approver Name	Approver Title	Approval Date	Signature
George G. Reynolds	Chief of Party	01/25/2019	George G. Reynolds 2019.01.25 15:59:25 -05'00'
John R. Bean	Lead Hydrographer	01/25/2019	John R. Bean 2019.01.25 15:59:46 -05'00'
David T. Somers	Data Processing Manager	01/25/2019	David T. Somers 2019.01.25 16:00:09 -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 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
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
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
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

Acronym	Definition
PRF	Project Reference File
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
SSSAB	Side Scan Sonar Acoustic Backscatter
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 Positioning System timing message
ZDF	Zone Definition File

The following table summarizes the days in which sounding 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
05/30/18	150	17:50:48	23:47:02
05/31/18	151	00:24:32	09:59:46
06/08/18	159	17:45:23	23:50:14
06/09/18	160	00:09:41	15:37:40
06/10/18	161	15:52:59	23:50:31
06/11/18	162	00:21:39	23:50:22
06/12/18	163	00:21:23	23:49:50
06/13/18	164	00:25:02	23:50:06
06/14/18	165	00:18:18	17:32:07
06/15/18	166	07:31:41	21:47:25
06/21/18	172	17:42:24	23:50:02
06/22/18	173	00:23:42	23:50:25
06/23/18	174	00:28:56	14:29:12
06/26/18	177	11:38:55	23:50:16
06/27/18	178	00:33:15	21:40:29
06/28/18	179	12:33:04	21:17:12
06/29/18	180	12:42:11	23:34:58
06/30/18	181	00:15:19	15:04:25
07/12/18	193	07:41:42	23:37:20
07/14/18	195	18:27:30	23:39:58
07/15/18	196	12:29:33	23:45:12
07/16/18	197	10:12:20	23:43:15
07/17/18	198	11:34:05	23:38:28
07/18/18	199	12:03:20	23:41:22
07/20/18	201	17:47:25	23:41:46
07/21/18	202	00:29:13	23:42:18
07/22/18	203	00:42:45	02:52:21
07/24/18	205	20:02:31	23:43:02
07/25/18	206	00:38:13	23:42:07
07/26/18	207	01:03:27	18:33:12
08/14/18	226	06:19:24	09:33:45
09/05/18	248	18:20:31	23:19:22
09/06/18	249	00:26:42	23:50:22

Date	Day Number	Min. Time UTC	Max. Time UTC
09/07/18	250	00:23:08	2:29:22
09/16/18	259	20:04:34	23:48:35
09/17/18	260	00:16:39	23:31:28
09/18/18	261	00:10:44	15:46:49
09/21/18	264	20:54:34	23:52:32
09/22/18	265	00:14:15	05:57:42

Tide/water levels for this project were derived exclusively via ERS techniques.

OSI's proposal for this survey suggested surveying to the ellipsoid using Fugro's Marinestar GNSS corrector service input to an Applanix POS MV. With the exception of certain calibrations, all field data were recorded utilizing Marinestar correctors. The manufacturer's stated horizontal and vertical accuracy using Marinestar correctors with an Applanix POS MV is 10 centimeters and 15 centimeters respectively. However, Marinestar-derived ellipsoid data (including Marinestar data processed using POSPac MMS) were found to be consistently inferior to Inertially Aided Post Processed Kinematic (IAPPK) ellipsoid data. Consequently, Applanix SmartBase (ASB)-derived ellipsoid records were used as the basis for development of MLLW tides. This change in approach, i.e. using ASB Smoothed Best Estimate of Trajectory (SBET) solutions instead of Marinestar-derived X, Y, Z data, was approved by the COR in an e-mail dated June 28, 2018. This e-mail as well as other tides-related correspondence is included in Descriptive Report Appendix II.

The QA/QC steps used in assessing ERS tide components and the processes employed in creating ERS tides are detailed in the Project Horizontal and Vertical Control Report (HVCR). In summary, once a "smoothed" IAPPK ellipsoid record was generated the CARIS "Compute GPS Tides" function was used in conjunction with the NOAA-provided SEP in creating MLLW tide correctors.

Qualitative and quantitative crossline analysis as well as junction analysis indicate that the final ERS correctors employed in reducing soundings to MLLW were adequate for their purpose. The results of crossline and junction analysis are presented in the Descriptive Report for this survey.

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

From: Starla Robinson - NOAA Federal <Starla.Robinson@noaa.gov>
Date: 11/15/18 17:30 (GMT-05:00)
To: "John R. Bean" <jrb@oceansurveys.com>
Subject: Re: NOAA Contract Hydrographic Survey Coast Pilot Review Report

Confirming receipt!

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 Acquisition: HSD Planned Hydrographic Surveys
Website Planning: OCS Survey Plans

On Thu, Nov 15, 2018 at 3:07 PM John R. Bean <jrb@oceansurveys.com> wrote:

> All,
>
> OSI's Coast Pilot Review Report for contract survey OPR-K354-KR-18 "Louisiana Coast" is attached. Also attached for your convenience is the original Coast Pilot Report provided to OSI with the final data package for OPR-K354-KR-18. Please acknowledge receipt of this deliverable and should you have any questions or concerns, 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

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: Starla Robinson - NOAA Federal [mailto:starla.robinson@noaa.gov]
Sent: Thursday, May 17, 2018 5:13 PM
To: John R. Bean <jrb@oceansurveys.com>
Cc: David Somers <dts@oceansurveys.com>; Corey Allen - NOAA Federal <corey.allen@noaa.gov>; Martha Herzog - NOAA Federal <martha.herzog@noaa.gov>; Grant Froelich - NOAA Federal <grant.froelich@noaa.gov>
Subject: Re: Single Base "certification"

Hello John,
Here is my interpretation of the spec.

The hydrographer shall certify that the station can collect data that meets specifications, which includes checking for multipath. No specific product is delivered for this step. A weekly comparison and analysis of the OPUS solution is recommended for verifying that the station has not moved and is still meeting THU.

While not discussed here it is also recommended that an TVU is also reviewed since ultimately that could bust the vertical uncertainty for the data. In the end this is all about making sure that the final product will meet TPU.

Does this help?

Thanks,

Starla

HSSD Section 3.4 Differential GNSS Reference Stations (DGPS & ERS)

The National Spatial Reference System (NSRS) is realized through the NOAA Continuously Operating Reference Station (NOAA CORS) network. The position of unknown non-CORS differential GNSS sites utilized for hydrographic control shall be established and verified through the National Geodetic Survey (NGS) Online Positioning User Service (OPUS) tie to the NSRS. Non-CORS differential sites in general include differential networks maintained by state and other municipalities, as well as commercial and private systems.

Non-CORS differential sites shall utilize existing NOAA, USACE, etc. permanent benchmarks as far as practicable, rather than opting for a temporary mark. Ideally, historic tidal benchmarks shall be used when practicable. ***The hydrographer shall conduct a certification on non-CORS to ensure that no multipath or other site specific problems exist.*** *The* ***reference position*** *of non-CORS antenna* ***installations*** *shall be* ***verified at least once per week*** *while the site is utilized for survey operations.* ***Verification may be achieved by repeated OPUS sessions to demonstrate that the difference between adopted and check positions are within the error budget*** *allotted per THU (Section 3.2).*

Many large-scale differential correction systems, such as the USCG DGPS, FAA WAAS, and certain state and commercial services, have integrated 24-hour monitoring and quality assurance, which fulfills both the certification and periodic check requirement above.

On Thu, May 17, 2018 at 10:07 AM, John R. Bean <jrb@oceansurveys.com> wrote:

> Hi Starla,
> Following up on our conversation….
> We just want to confirm that regular OPUS submissions for our temporary GPS single base installation satisfy both the certification and verification requirements outline in HSSD 3.4.
> Looking forward to your reply.
>
> Regards,
> John
> **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
> Follow us: LinkedIn | Twitter | Facebook

--

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: John R. Bean <jrb@oceansurveys.com>
Sent: Thursday, June 21, 2018 11:32 AM
To: 'Starla Robinson - NOAA Federal'
Cc: 'David Somers'; 'George Reynolds'
Subject: OPR-K354-KR-18 ERS-Tides
Attachments: OPR-K354-KR-18_ERS-Tides_DN161-166-discussion.pdf

Hi Starla,

The project is progressing well: the boat got underway again this morning after waiting out some of the same weather that the TJ had to deal with starting late last week. Looking forward to another good run. So, the reason I'm writing is that after analyzing 3 trips worth of data, we'd like to discuss our ERS tide results. In short, we have 3 items to discuss:

1) Can we use PPK instead of Marinestar for ERS tide?
2) Can we smooth the data?
3) The supplied separation model (VDATUM) is producing tides that are substantially low when compared to other tide sources.

1) In our proposal we said we would use Marinestar for ERS tide with OSI-installed singlebase PPK as a backup. We've processed the data a number of ways, and have determined that a PPK solution produces a much tighter and more reliable curve than Marinestar (see the attached plot of tide curves by method and source for DN161-DN166). Our preferred method is a POSPAC Smartbase solution using the CORS network plus our OSI-installed station (OSFL) (see the attached figure showing network geometry). We have processed the data both ways (POSPAC Smartbase and Singlebase) and the solutions are comparable. I mention this only because the geometry of the network solution is heavily dependent on station DEV1 (offshore). Should DEV1 go down during the survey, we would revert to using single base PPK. Is this approach acceptable?

2) Regarding smoothing: Although the PPK solutions are tighter than Marinestar, there is still some short-period variability (due to atmospheric effects we suspect) that is much too short to represent the tide, especially in open waters on the Louisiana Coast. We would like to smooth the data using a Butterworth signal filter in order to remove the short period variability. We have applied this smoothing method to zoned tides on a previous NOAA project (with approval) in which ship traffic affected gauge readings. Is smoothing of the PPK solution to produce a final ERS tide acceptable?

3) The tide plot shows one trip's worth of data working in Sheets 2 and 3 (H13101 and H13102) including transit from and to the tide gauge south of Freshwater Canal Lock. Based on a comparison of ERS tide solutions, local gauge data, and zoned tide using LAWMA and the 2017 zoning scheme, it appears that the supplied separation model is producing offshore tides that are 20-30cm low. You can see from the plot that when we are near the gauge, ERS and gauge tide are close, but diverge when we are out on site. I'm not sure what we do with this one except to say that it will, of course, impact the final depth values and junctions.

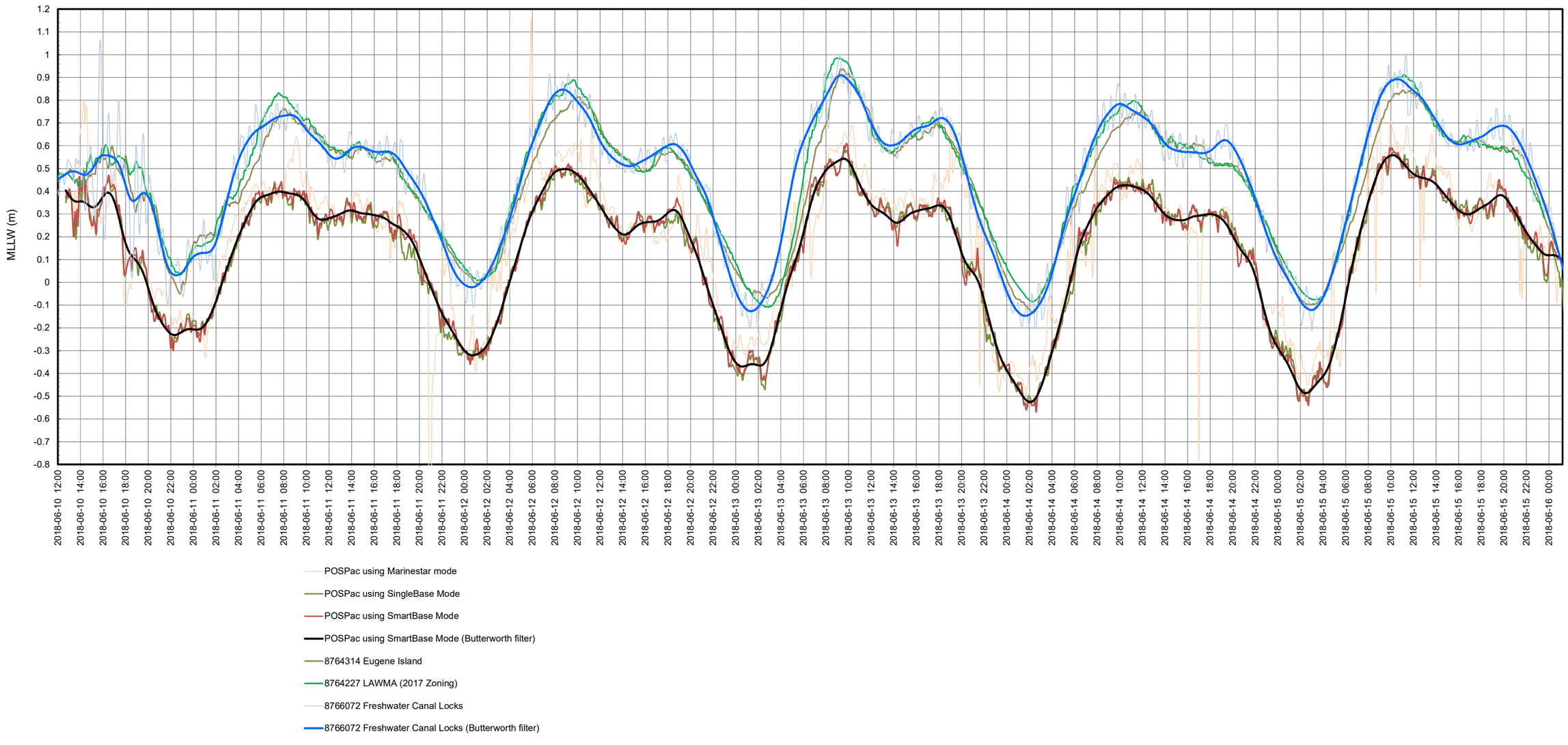
Thanks for taking a look at this. If you'd like to have an "in-person" discussion, Dave Somers and I can be available for a call any day this week or next. We look forward to your response.

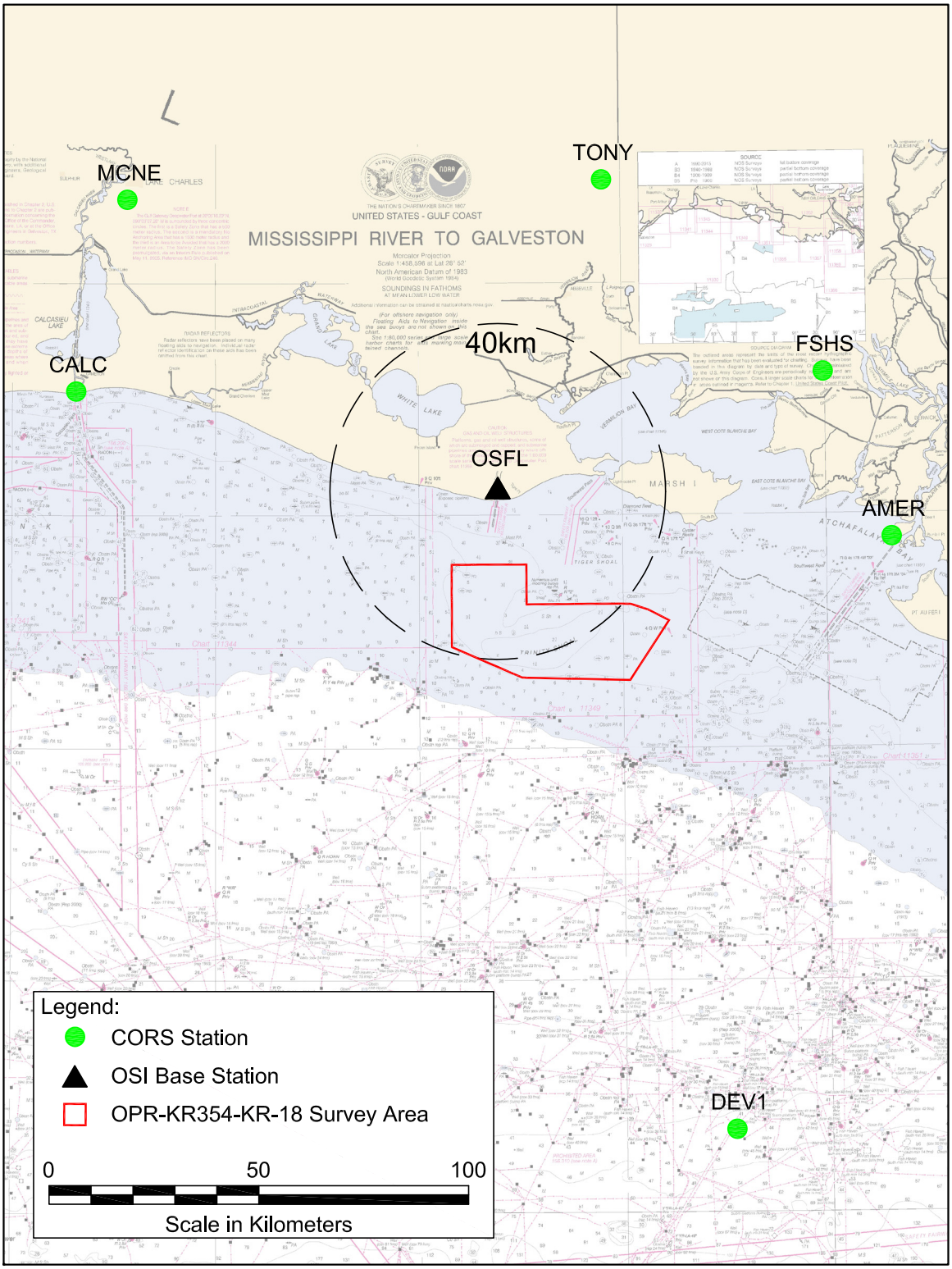
Regards,

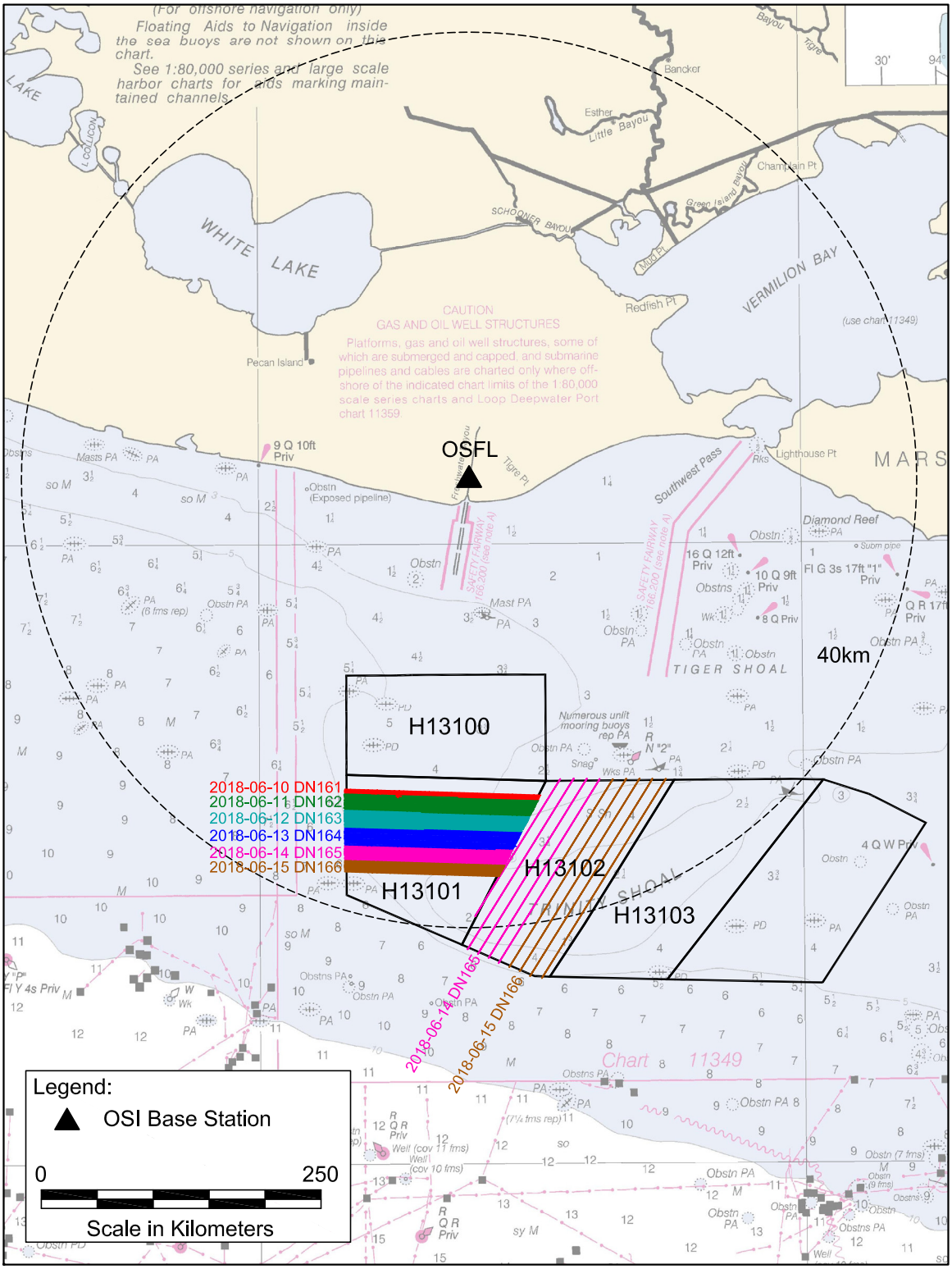
John R. Bean, MS, CH
Manager-Hydrographic Surveys

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
Follow us: LinkedIn | Twitter | Facebook

OPR-K354-KR-18 - ERS Tides - DN161 to DN166




MCNE
TONY
FSHS
CALC
OSFL
AMER
DEV1
40km
UNITED STATES - GULF COAST
MISSISSIPPI RIVER TO GALVESTON
Legend:
CORS Station
OSI Base Station
OPR-KR354-KR-18 Survey Area
0
50
100
Scale in Kilometers


OSFL
40km
H13100
H13101
H13102
H13103
2018-06-10 DN161
2018-06-11 DN162
2018-06-12 DN163
2018-06-13 DN164
2018-06-14 DN165
2018-06-15 DN166
Legend:
OSI Base Station
0
250
Scale in Kilometers
WHITE LAKE
VERMILION BAY
Pecan Island
Redfish Pt
Southwest Pass
Lighthouse Pt
Diamond Reef
TIGER SHOAL
Chart 11349

From: Starla Robinson - NOAA Federal [mailto:starla.robinson@noaa.gov]
Sent: Thursday, June 28, 2018 4:07 PM
To: John R. Bean <jrb@oceansurveys.com>; George Reynolds <ggr@oceansurveys.com>
Cc: David Somers <dts@oceansurveys.com>; Corey Allen - NOAA Federal <corey.allen@noaa.gov>; Martha Herzog - NOAA Federal <martha.herzog@noaa.gov>; Samuel Greenaway - NOAA Federal <samuel.greenaway@noaa.gov>; Jack Riley - NOAA Federal <jack.riley@noaa.gov>
Subject: Re: OPR-K354-KR-18 ERS-Tides

Hello Folk (NOAA and OSI), Following up on the ERS Challenges on the Louisiana Coast Project:

1) Can we use PPK instead of Marinestar for ERS tide?
Yes, you can use PPK instead of Marinestar. Using PPK instead of Marinestar for ERS complies with the Horizontal and Vertical control sections of the HSSD (Sections 3 and 4).

Thank you for the heads up, John.

2) Can we smooth the data?
Could we have more information on your smoothing approach? Below is Jack's response:

How do you apply "ERS tide" to the multibeam data? The ERS height vector (height) data must of course match up to the sonar vector (depth), in terms of both static offset and dynamic motion. If static draft, heave, and dynamic draft are applied to the sonar data ("corrected depths") then yes, low-pass filtering of the POSPac SBET may be a viable option to reduce noise -- as the corrected depths are per the static water line, coincident with a tide corrector to translate depths to chart datum. Ideally the same software that applies such corrections to the multibeam data will include the processing facility to apply the same applicable corrections to the ERS height data -- plus any additional compensation to bring the two vectors to a common reference for a valid summation.

3) The supplied separation model (VDATUM) is producing tides that are substantially low when compared to other tide sources.
We are looking into this. I will put a meeting on the calendar.

Is there a good time that we can call to exchange technical information?
I am proposing around July 5th 2pm (eastern)?

Thank you,
Starla

On Thu, Jun 21, 2018 at 1:52 PM, John R. Bean <jrb@oceansurveys.com> wrote:

> Thanks Starla. Talk to you then.
> John

From: Starla Robinson - NOAA Federal <starla.robinson@noaa.gov>
Sent: Thursday, June 21, 2018 1:48 PM
To: John R. Bean <jrb@oceansurveys.com>
Cc: David Somers <dts@oceansurveys.com>; George Reynolds <ggr@oceansurveys.com>; Corey Allen - NOAA Federal <corey.allen@noaa.gov>; Martha Herzog - NOAA Federal <martha.herzog@noaa.gov>
Subject: Re: OPR-K354-KR-18 ERS-Tides

Hello John,

I am going to bring some more people into the conversation. I should have an answer for you next week. Thank you for your email and thought out approach.

Sincerely,
Starla

On Thu, Jun 21, 2018 at 11:31 AM, John R. Bean <jrb@oceansurveys.com> wrote:

Hi Starla,
The project is progressing well: the boat got underway again this morning after waiting out some of the same weather that the TJ had to deal with starting late last week. Looking forward to another good run. So, the reason I'm writing is that after analyzing 3 trips worth of data, we'd like to discuss our ERS tide results. In short, we have 3 items to discuss:

1. Can we use PPK instead of Marinestar for ERS tide?
2. Can we smooth the data?
3. The supplied separation model (VDATUM) is producing tides that are substantially low when compared to other tide sources.

1. In our proposal we said we would use Marinestar for ERS tide with OSI-installed singlebase PPK as a backup. We've processed the data a number of ways, and have determined that a PPK solution produces a much tighter and more reliable curve than Marinestar (see the attached plot of tide curves by method and source for DN161-DN166). Our preferred method is a POSPAC Smartbase solution using the CORS network plus our OSI-installed station (OSFL) (see the attached figure showing network geometry). We have processed the data both ways (POSPAC Smartbase and Singlebase) and the solutions are comparable. I mention this only because the geometry of the network solution is heavily dependent on station DEV1 (offshore). Should DEV1 go down during the survey, we would revert to using single base PPK. Is this approach acceptable?
2. Regarding smoothing: Although the PPK solutions are tighter than Marinestar, there is still some short-period variability (due to atmospheric effects we suspect) that is much too short to represent the tide, especially in open waters on the Louisiana Coast. We would like to smooth the data using a Butterworth signal filter in order to remove the short period variability. We have applied this smoothing method to zoned tides on a previous NOAA project (with approval) in which ship traffic affected gauge readings. Is smoothing of the PPK solution to produce a final ERS tide acceptable?
3. The tide plot shows one trip's worth of data working in Sheets 2 and 3 (H13101 and H13102) including transit from and to the tide gauge south of Freshwater Canal Lock. Based on a comparison of ERS tide solutions, local gauge data, and zoned tide using LAWMA and the 2017 zoning scheme, it appears that the supplied separation model is producing offshore tides that are 20-30cm low. You can see from the plot that when we are near the gauge, ERS and gauge tide are close, but diverge when we are out on site. I'm not sure what we do with this one except to say that it will, of course, impact the final depth values and junctions.

Thanks for taking a look at this. If you'd like to have an "in-person" discussion, Dave Somers and I can be available for a call any day this week or next. We look forward to your response.

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
Follow us: LinkedIn | Twitter | Facebook

From: John R. Bean [mailto:jrb@oceansurveys.com]
Sent: Friday, June 29, 2018 5:13 PM
To: 'Starla Robinson - NOAA Federal' <starla.robinson@noaa.gov>; 'George Reynolds' <ggr@oceansurveys.com>
Cc: 'David Somers' <dts@oceansurveys.com>; 'Corey Allen - NOAA Federal' <corey.allen@noaa.gov>; 'Martha Herzog - NOAA Federal' <martha.herzog@noaa.gov>; 'Samuel Greenaway - NOAA Federal' <samuel.greenaway@noaa.gov>; 'Jack Riley - NOAA Federal' <jack.riley@noaa.gov>
Subject: RE: OPR-K354-KR-18 ERS-Tides

Hi Starla,

First, Dave Somers will be available for the July 5th conference call. Also, I have inserted (below) an answer to Jack's question regarding the smoothing method (in blue).

Continuing on with item 3 and in preparation for next week's call…..

3) The supplied separation model (VDATUM) is producing tides that are substantially low when compared to other tide sources.

It looks like the difference in the shapes of Geoid12B and xGeoid17B accounts for the offset we're seeing in the tide. We have attached a pdf with additional plots and figures.
Some observations:

a) The Vdatum MLLW to NAVD88 value nearest to Freshwater Canal lock is 0.28m

b) The MLLW to NAVD88 value per the Freshwater Canal Lock station web page is 0.38m

c) The MLLW to NAVD88 (POSPac Geoid12B) value during Freshwater Canal boat floats is 0.38m.

d) Shore based measure downs at the gauge confirmed the 0.38m difference.

Based on the observations above, VDATUM MLLW to Ellipsoid offset difference is -0.10m at Freshwater Canal Lock. During the 2016 survey season, OSI deployed 2 BMPGs. Using the BMPG data and OSI boat floats over the gauges, JOA calculated a VDATUM MLLW to Ellipsoid offset difference of -0.232m.

We compared xGeoid17B to Geoid12B. We computed the surface to surface difference between the geoids and subtracted a constant value of 1.234m to normalize to differences at Freshwater Canal Lock (-0.10m) and the BMPG (-0.232m). The resultant difference contours appear to model the differences between MLLW from our ERS (with current SEP model) and MLLW from gauges and 2017 zoning quite well. The differences range from 16cm at the northern extent of the survey to -0.24 over Trinity Shoal (See attached figure.).

Regards,

John

From: Starla Robinson - NOAA Federal <starla.robinson@noaa.gov>
Sent: Thursday, June 28, 2018 4:07 PM
To: John R. Bean <jrb@oceansurveys.com>; George Reynolds <ggr@oceansurveys.com>
Cc: David Somers <dts@oceansurveys.com>; Corey Allen - NOAA Federal <corey.allen@noaa.gov>; Martha Herzog - NOAA Federal <martha.herzog@noaa.gov>; Samuel Greenaway - NOAA Federal <samuel.greenaway@noaa.gov>; Jack Riley - NOAA Federal <jack.riley@noaa.gov>
Subject: Re: OPR-K354-KR-18 ERS-Tides

Hello Folk (NOAA and OSI). Following up on the ERS Challenges on the Louisiana Coast Project:

1) Can we use PPK instead of Marinestar for ERS tide?
Yes you can use PPK instead of Marinestar. Using PPK instead of Marinestar for ERS complies with the Horizontal and Vertical control sections of the HSSD (Sections 3 and 4).

Thank you for the heads up, John.

2) Can we smooth the data?
Could we have more information on your smoothing approach? Below is Jack's response:

How do you apply "ERS tide" to the multibeam data? The ERS height vector (height) data must of course match up to the sonar vector (depth), in terms of both static offset and dynamic motion. If static draft, heave, and dynamic draft are applied to the sonar data ("corrected depths") then yes, low-pass filtering of the POSPac SBET may be a viable option to reduce noise -- as the corrected depths are per the static water line, coincident with a tide corrector to translate depths to chart datum. Ideally the same software that applies such corrections to the multibeam data will include the processing facility to apply the same applicable corrections to the ERS height data -- plus any additional compensation to bring the two vectors to a common reference for a valid summation.
The method used to produce the 'ERS tide" was:

1. Create and export a POSPac Smartbase SBET referenced to the GRS80 ellipsoid.
2. Using a custom application,
   read the SBET
   read and apply delayed heave from the logged POSMV files,
   read and apply static draft & dynamic draft values from the CARIS vessel file
   calculate and export 6 minute averages
3. Convert 6min ellipsoid heights to MLLW heights using VDatum 3.6.1
4. Import the MLLW data into Excel and calculate the low pass filter "tide" values
5. Export a MLLW Caris format *.tid file

Currently, we are doing steps 1-3 one day at a time and then merging all the survey days from each trip (~6 days) together in Excel for the low pass filter. This gives the filter a few hours of transit data before and after the survey lines. We do intend to write the "smooth' tide back to the SBET, reversing the corrections, but we aren't putting time into that task until the low pass filter is approved.

If the filtering is approved, our processing steps would then be:
1. Create and export a POSPac SBET referenced to the GRS80 ellipsoid.
2. Process all the daily SBETs from a trip together and update with smoothed ellipsoid heights
3. Import the SBETs into CARIS
4. Run CARIS Compute GPS tides using the NOAA supplied SEP model.

We did confirm that our custom app (without smoothing) and the CARIS Compute GPS tides yield the same vertical results.

3) The supplied separation model (VDATUM) is producing tides that are substantially low when compared to other tide sources.
We are looking into this. I will put a meeting on the calendar.

Is there a good time that we can call to exchange technical information?
I am proposing around July 5th 2pm (eastern)?

Thank you,
Starla

On Thu, Jun 21, 2018 at 1:52 PM, John R. Bean <jrb@oceansurveys.com> wrote:

> Thanks Starla. Talk to you then.
>
> John
>
> **From:** Starla Robinson - NOAA Federal <starla.robinson@noaa.gov>
> **Sent:** Thursday, June 21, 2018 1:48 PM
> **To:** John R. Bean <jrb@oceansurveys.com>
> **Cc:** David Somers <dts@oceansurveys.com>; George Reynolds <ggr@oceansurveys.com>; Corey Allen - NOAA Federal <corey.allen@noaa.gov>; Martha Herzog - NOAA Federal <martha.herzog@noaa.gov>
> **Subject:** Re: OPR-K354-KR-18 ERS-Tides
>
> Hello John,
>
> I am going to bring some more people into the conversation. I should have an answer for you next week. Thank you for your email and thought out approach.
>
> Sincerely,
>
> Starla
>
> On Thu, Jun 21, 2018 at 11:31 AM, John R. Bean <jrb@oceansurveys.com> wrote:
>
> > Hi Starla,
> >
> > The project is progressing well: the boat got underway again this morning after waiting out some of the same weather that the TJ had to deal with starting late last week. Looking forward to another good run. So, the reason I'm writing is that after analyzing 3 trips worth of data, we'd like to discuss our ERS tide results. In short, we have 3 items to discuss:
> >
> > 1. Can we use PPK instead of Marinestar for ERS tide?
> >
> > 2. Can we smooth the data?
> >
> > 3. The supplied separation model (VDATUM) is producing tides that are substantially low when compared to other tide sources.
> >
> > 1. In our proposal we said we would use Marinestar for ERS tide with OSI-installed singlebase PPK as a backup. We've processed the data a number of ways, and have determined that a PPK solution produces a

much tighter and more reliable curve than Marinestar (see the attached plot of tide curves by method and source for DN161-DN166). Our preferred method is a POSPAC Smartbase solution using the CORS network plus our OSI-installed station (OSFL) (see the attached figure showing network geometry). We have processed the data both ways (POSPAC Smartbase and Singlebase) and the solutions are comparable. I mention this only because the geometry of the network solution is heavily dependent on station DEV1 (offshore). Should DEV1 go down during the survey, we would revert to using single base PPK. Is this approach acceptable?

2. Regarding smoothing: Although the PPK solutions are tighter than Marinestar, there is still some short-period variability (due to atmospheric effects we suspect) that is much too short to represent the tide, especially in open waters on the Louisiana Coast. We would like to smooth the data using a Butterworth signal filter in order to remove the short period variability. We have applied this smoothing method to zoned tides on a previous NOAA project (with approval) in which ship traffic affected gauge readings. Is smoothing of the PPK solution to produce a final ERS tide acceptable?

3. The tide plot shows one trip's worth of data working in Sheets 2 and 3 (H13101 and H13102) including transit from and to the tide gauge south of Freshwater Canal Lock. Based on a comparison of ERS tide solutions, local gauge data, and zoned tide using LAWMA and the 2017 zoning scheme, it appears that the supplied separation model is producing offshore tides that are 20-30cm low. You can see from the plot that when we are near the gauge, ERS and gauge tide are close, but diverge when we are out on site. I'm not sure what we do with this one except to say that it will, of course, impact the final depth values and junctions.

Thanks for taking a look at this. If you'd like to have an "in-person" discussion, Dave Somers and I can be available for a call any day this week or next. We look forward to your response.

Regards,

John R. Bean, MS, CH

Manager-Hydrographic Surveys

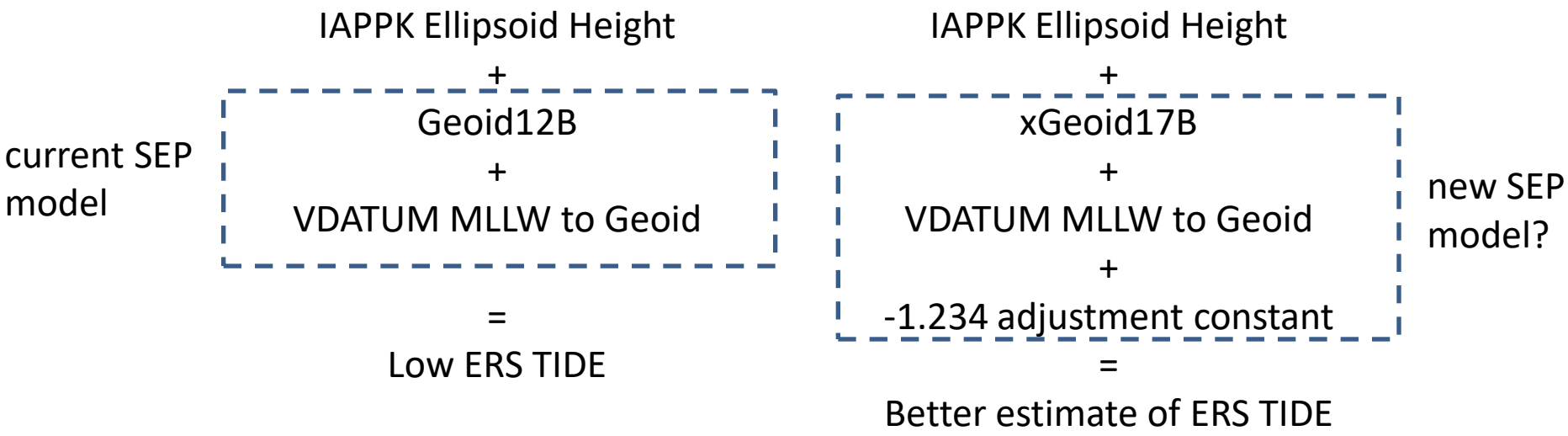
OCEAN SURVEYS, INC.

129 Mill Rock Road East, Old Saybrook, CT 06475

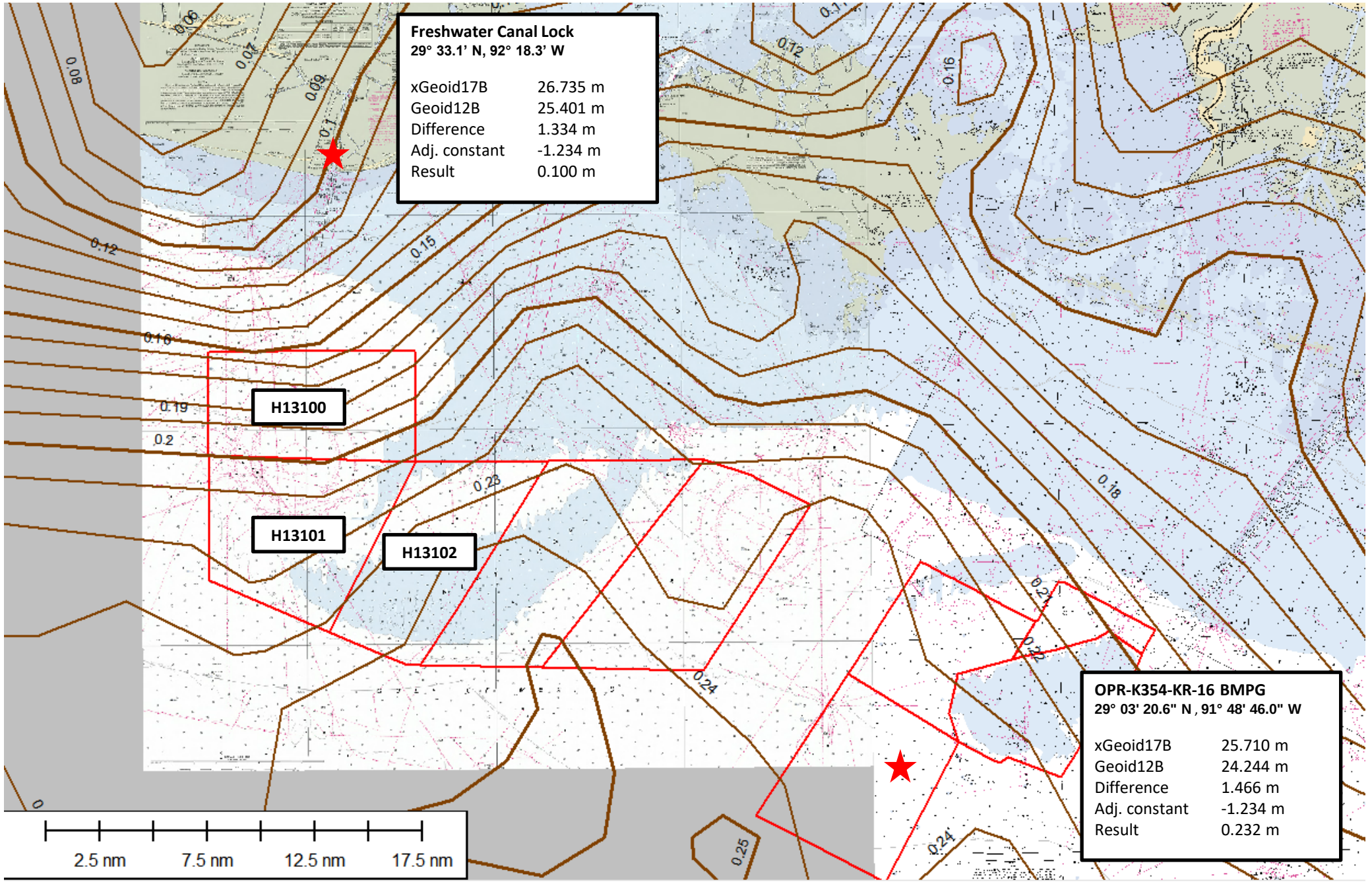
T 860-388-4631 x148 **M** 860-710-8653 **F** 860-388-5879

jrb@oceansurveys.com | www.oceansurveys.com

Follow us: LinkedIn | Twitter | Facebook

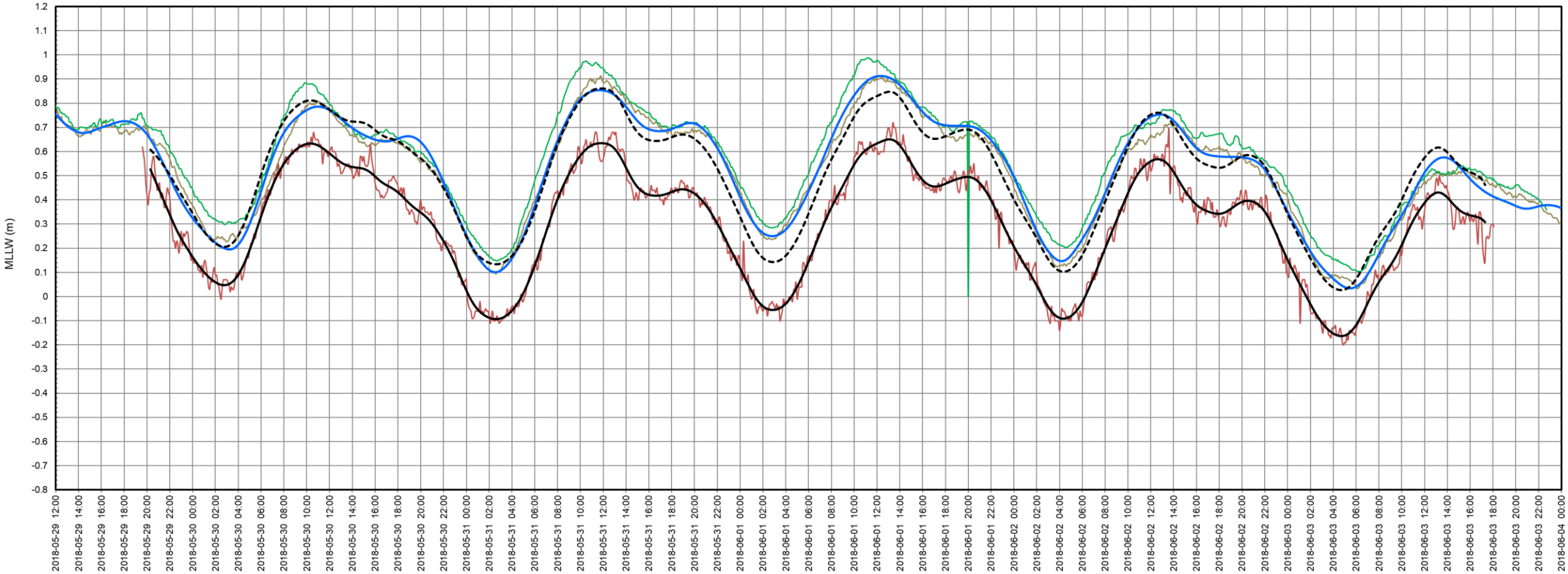

IAPPK Ellipsoid Height
+
Geoid12B
+
VDATUM MLLW to Geoid
=
Low ERS TIDE
current SEP model
IAPPK Ellipsoid Height
+
xGeoid17B
+
VDATUM MLLW to Geoid
+
-1.234 adjustment constant
=
Better estimate of ERS TIDE
new SEP model?

Geoid17B to Geoid17B SEP values with adjustment constant



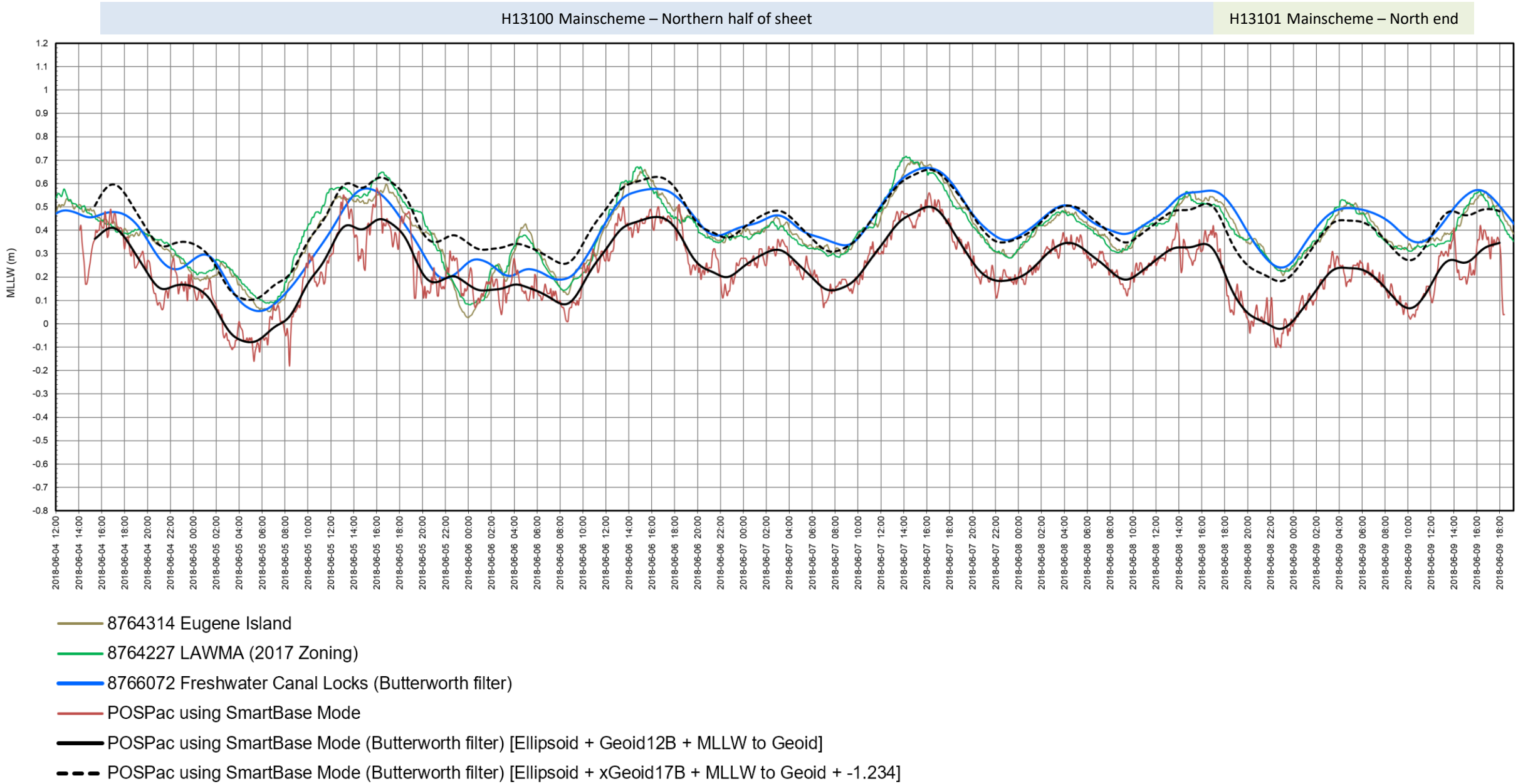
OPR K354-KR-18 ERS and Station Water Levels 29 May to 6 June 2018

H13100 Crosslines | H13101 Crosslines | H13100 Mainscheme – Southern half of sheet

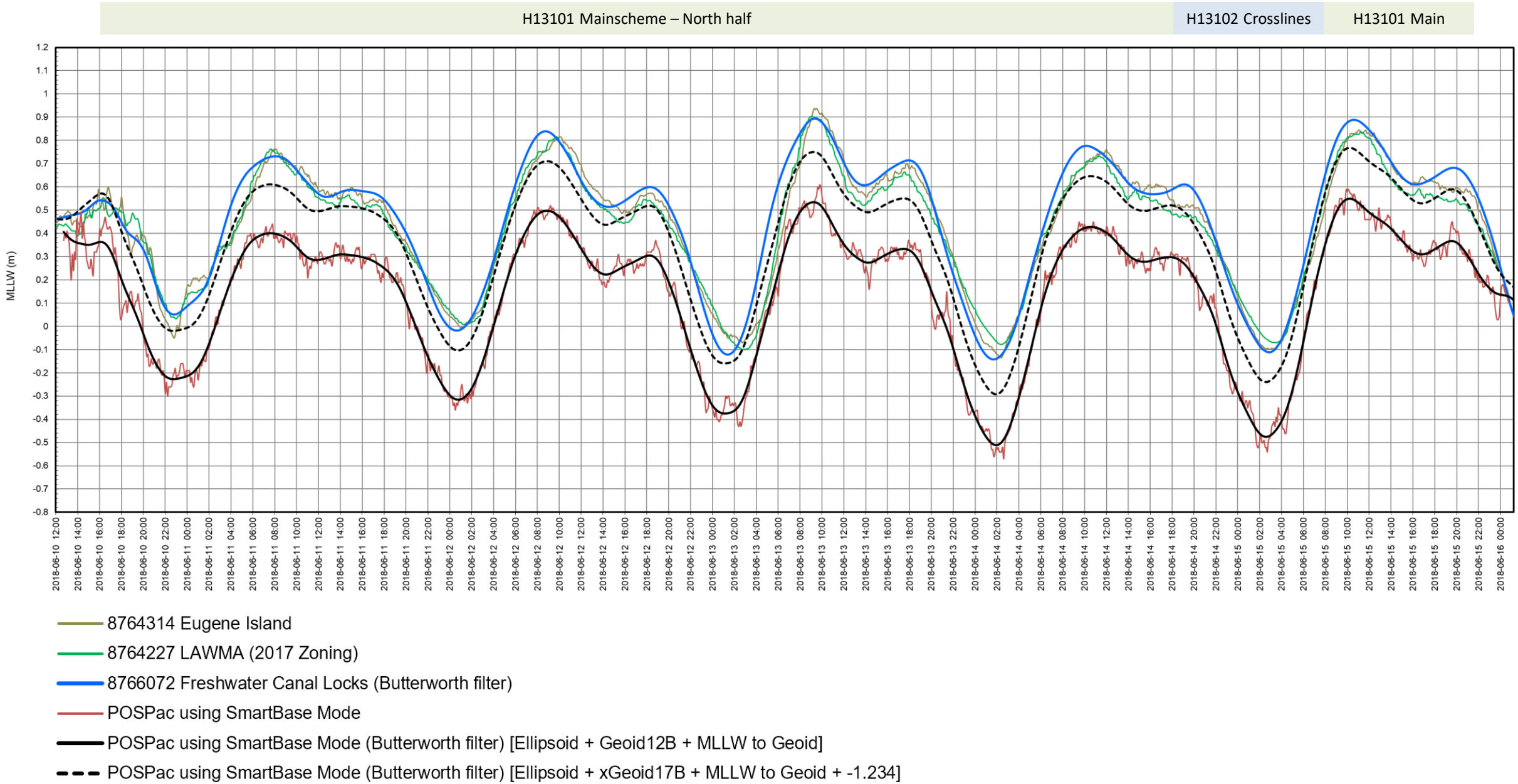


- 8764314 Eugene Island
- 8764227 LAWMA (2017 Zoning)
- 8766072 Freshwater Canal Locks (Butterworth filter)
- POSPac using SmartBase Mode
- POSPac using SmartBase Mode (Butterworth filter) [Ellipsoid + Geoid12B + MLLW to Geoid]
- POSPac using SmartBase Mode (Butterworth filter) [Ellipsoid + xGeoid17B + MLLW to Geoid + -1.234]

OPR K354-KR-18 ERS and Station Water Levels 4 June to 9 June 2018

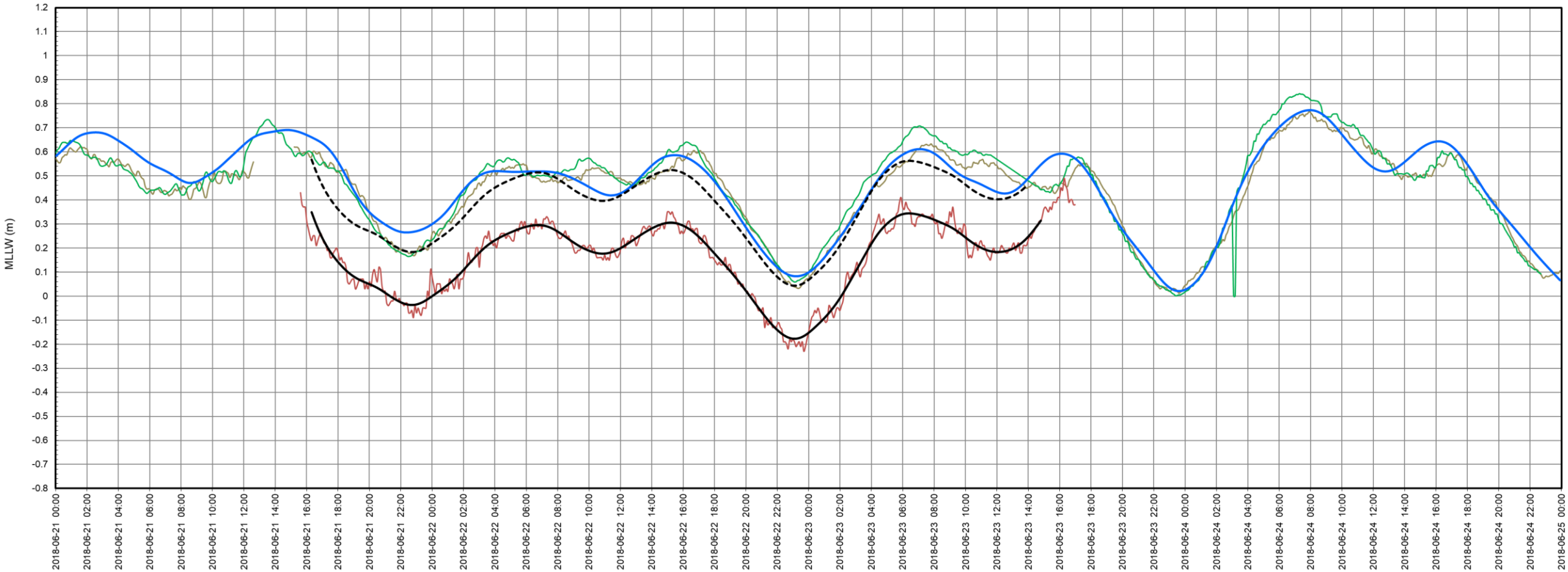


OPR K354-KR-18 ERS and Station Water Levels 10 June to 15 June 2018



OPR K354-KR-18 ERS and Station Water Levels 21 June to 23 June 2018

H13101 Main South end | Alternating between H13102 North End and H13101 South end



- 8764314 Eugene Island
- 8764227 LAWMA (2017 Zoning)
- 8766072 Freshwater Canal Locks (Butterworth filter)
- POSPac using SmartBase Mode
- POSPac using SmartBase Mode (Butterworth filter) [Ellipsoid + Geoid12B + MLLW to Geoid]
- POSPac using SmartBase Mode (Butterworth filter) [Ellipsoid + xGeoid17B + MLLW to Geoid + -1.234]

From: Starla Robinson - NOAA Federal [mailto:starla.robinson@noaa.gov]
Sent: Thursday, July 05, 2018 1:30 PM
To: David Somers <dts@oceansurveys.com>
Cc: Jack Riley - NOAA Federal <jack.riley@noaa.gov>; John R. Bean <jrb@oceansurveys.com>; George Reynolds <ggr@oceansurveys.com>; Corey Allen - NOAA Federal <corey.allen@noaa.gov>; Martha Herzog - NOAA Federal <martha.herzog@noaa.gov>; Samuel Greenaway - NOAA Federal <samuel.greenaway@noaa.gov>
Subject: Re: OPR-K354-KR-18 ERS-Tides

Hi Dave,

I am preparing for today's meeting. Could you call into our line at 2pm today? 1-866-914-4918 P:81817980

I can also do a google hangout if you have the capabilities.

Thanks,
Starla

On Mon, Jul 2, 2018 at 7:28 PM, David Somers <dts@oceansurveys.com> wrote:

> Jack,
>
> Attached is a zip file with the requested info. Let me know if you need anything else.
>
> Thanks,
> 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
>
> ---
>
> **From:** Jack Riley - NOAA Federal <jack.riley@noaa.gov>
> **To:** John R. Bean <jrb@oceansurveys.com>
> **Cc:** Starla Robinson - NOAA Federal <starla.robinson@noaa.gov>; George Reynolds <ggr@oceansurveys.com>; David Somers <dts@oceansurveys.com>; Corey Allen - NOAA Federal <corey.allen@noaa.gov>; Martha Herzog - NOAA Federal <martha.herzog@noaa.gov>; Samuel Greenaway - NOAA Federal <samuel.greenaway@noaa.gov>
> **Sent:** Monday, July 2, 2018 6:09 PM
> **Subject:** Re: OPR-K354-KR-18 ERS-Tides
>
> Starla and/or John,
>
> Can you provide the ellipsoid-MLLW SEP values and GPs of the two BMPGs from 2016?
>
> Thanks,
>
> Jack
>
> Jack L. Riley
> NOAA Coast Survey
> SSMC3 N/CS11 Rm 6601
> 240-847-8271

From: Starla Robinson - NOAA Federal [mailto:starla.robinson@noaa.gov]
Sent: Thursday, July 05, 2018 4:29 PM
To: John R. Bean <jrb@oceansurveys.com>; David Somers <dts@oceansurveys.com>; Corey Allen - NOAA Federal <corey.allen@noaa.gov>; Jack Riley - NOAA Federal <jack.riley@noaa.gov>
Cc: George Reynolds <ggr@oceansurveys.com>; Martha Herzog - NOAA Federal <martha.herzog@noaa.gov>; Samuel Greenaway - NOAA Federal <samuel.greenaway@noaa.gov>
Subject: Re: OPR-K354-KR-18 ERS-Tides

Thank you everyone who could make it to today's meeting.

The take homes were:
1) Smoothing ERS tides with a filter is fine as long as it is balanced and well documented in the DR or DAPR.
2) NOAA will provide an updated SEP. All of the factors appear to be accounted for with the last 10 cm being a discrepancy between the TSS and NAVD88.

In regards to junctions, we expect that there will be an offset from last year's surveys. I ask that you to discuss that in the DR and add this email to your consults.

Thank you everyone for troubleshooting this!

Starla

On Fri, Jun 29, 2018 at 5:13 PM, John R. Bean <jrb@oceansurveys.com> wrote:

UNITED STATES DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration
NATIONAL OCEAN SERVICE
Hydrographic Survey Division
Silver Spring, Maryland 20910-3282

Date: 7/09/2018

PROJECT: OPR-J359-KR-18 Louisiana Coast
Contract # EA-133C-14-CQ-0035, Task Order: 04

SUBJECT: Change of Priority Survey Areas

The undersigned agree to the following plan for the remaining LNM from OPR-J359-KR-18:
1) First expand southward to delineate Trinity Shoal to the 10-meter (33 feet) contour.
2) If additional LNM remain, continue expansion survey eastward.

Environmental compliance has been completed for a one-mile buffer around the original project area. It appears that the contour will be achieved before that boundary will be crossed. Should it look like the boundary may be crossed please contact the COR for discussion on how to proceed.

Expansion southward will likely include the investigation one platform and 4 wellheads. This will not be a significant change from the previous planned area. An updated CSF and PRF will be provided to address the southward expansion.

This plan is within scope of project instructions and does not constitute a change of the contract and will incur no additional cost.

Justification

Trinity Shoal is the primary hazard to navigation in the 2018 Louisiana Coast Survey, and effects traffic in the area. OSI's preliminary data shows the shoal has moved 3 nautical miles west. Local traffic includes OSV's that can have drafts as deep as 27 feet. OSI, HSD, and the Navigation Manager agree that delineating the 10-meter (33 feet) contour will address a danger to navigation, and is the priority for the traffic patterns of this area.

Decision:
Please sign to confirm agreements and approve of the plan to proceed.

Hydrographic Surveys Division

Ocean Surveys, Inc.

From: Starla Robinson - NOAA Federal <starla.robinson@noaa.gov>
Sent: Monday, July 09, 2018 6:10 PM
To: David Somers
Cc: George Reynolds; John R. Bean; Bob Wallace
Subject: Re: Change of Priority Survey Areas - OPR-J359-KR-18 Louisiana Coast
Attachments: OPR-K354-KR-18_CSF_PRF_Update07092018.zip

Attached are an updated CSF and PRF. The changes are an increased expansion area to cover the southern boundary where we have environmental compliance completed, and several BOEM sourced wellheads that were in that expanded area. Let me know if you have any questions.

Thank you,
Starla

On Mon, Jul 9, 2018 at 5:11 PM, Starla Robinson - NOAA Federal <starla.robinson@noaa.gov> wrote:

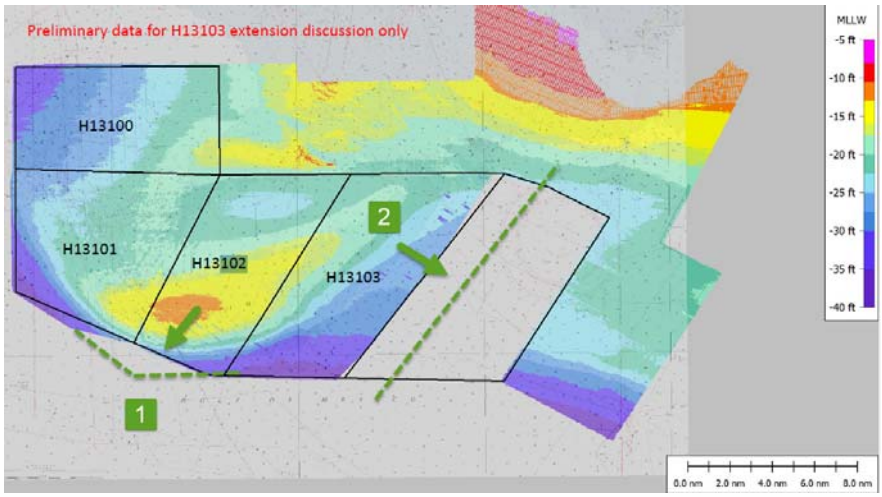
> Thanks Dave,
>
> Here is the typo corrected version. I am looking at the predicted contour and I think the important thing is that the data is contiguous with the sheet that it is attached to. Whether you add it to H13102 or H13103, as long as it is contiguous it is fine. What would be best for operations? I took the specific language out of the memo.
>
> Thank you,
> Starla
>
> On Mon, Jul 9, 2018 at 4:36 PM, David Somers <dts@oceansurveys.com> wrote:
>
> > Starla,
> >
> > A couple of clarification questions in red.
> >
> > 1) First expand H13102 southward to delineate Trinity Shoal to the 10-meter (33 feet) contour.
> > Do you want us to also expand H13101 southward or include all new area in H13102?
> >
> > 2) If additional LNM remain, continue expansion of sheet H13203 westward.
> > Shouldn't that read "eastward"?
> >
> > Thanks,
> > Dave
> >
> > ---
> >
> > **From:** Starla Robinson - NOAA Federal <starla.robinson@noaa.gov>
> > **To:** George Reynolds <ggr@oceansurveys.com>
> > **Cc:** Stacy Fullerton - NOAA Federal <stacy.fullerton@noaa.gov>; Corey Allen - NOAA Federal <corey.allen@noaa.gov>; Martha Herzog - NOAA Federal <martha.herzog@noaa.gov>; Bob Wallace <rmw@oceansurveys.com>; John R. Bean <jrb@oceansurveys.com>; David Somers <dts@oceansurveys.com>
> > **Sent:** Monday, July 9, 2018 4:26 PM
> > **Subject:** Change of Priority Survey Areas - OPR-J359-KR-18 Louisiana Coast
> >
> > Attached is a change memo for Ocean Survey, Inc's review and signature. This will cover the change of priority areas. If in agreement send a signed copy back to us and retain a copy in your consults folder.
> >
> > Thank you,
> > Starla

From: Starla Robinson - NOAA Federal <starla.robinson@noaa.gov>
Sent: Monday, July 09, 2018 9:16 AM
To: David Somers
Cc: George Reynolds; John R. Bean; Bob Wallace
Subject: Re: H13104 expansion discussion

Great! I think we can do that! I will draft a change agreement for OSI and HSD OPS to sign.

Does the image below capture what you are thinking? Would it make sense to your to append southward extension to H13102 rather than H13103 for contiguous coverage, or is that sheet already wrapped up? What is your preference?

Thanks,
Starla



On Mon, Jul 9, 2018 at 8:54 AM, David Somers <dts@oceansurveys.com> wrote:

> We recommend completing H13103 to the current sheet limits stopping at the 10m contour in the south end, cuts about 1nm off the bottom. Then continue to the H13103 expansion area.
>
> Dave

From: Starla Robinson - NOAA Federal <starla.robinson@noaa.gov>
To: David Somers <dts@oceansurveys.com>
Cc: George Reynolds <ggr@oceansurveys.com>; John R. Bean <jrb@oceansurveys.com>; Bob Wallace <rmw@oceansurveys.com>
Sent: Monday, July 9, 2018 8:29 AM

Subject: Re: H13104 expansion discussion

For my verification, what is your recommendation and preference for acquisition after completing H13103: Continue into E or do you think we should get the contour and then continue East? What is the field recommendation?

Thanks,
Starla

On Mon, Jul 9, 2018 at 8:19 AM, David Somers <dts@oceansurveys.com> wrote:

> Sounds reasonable. We do favor the plan to collect within the current sheet limits and then move on to the expansion sheet area.
>
> Thanks,
> Dave

From: Starla Robinson - NOAA Federal <starla.robinson@noaa.gov>
To: David Somers <dts@oceansurveys.com>
Cc: George Reynolds <ggr@oceansurveys.com>; John R. Bean <jrb@oceansurveys.com>; Bob Wallace <rmw@oceansurveys.com>
Sent: Monday, July 9, 2018 7:54 AM
Subject: Re: H13104 expansion discussion

Hello Dave,

What do you think of continuing to delineate Trinity Shoal to the 10-meter (33 feet) contour and then continue to the planned expansion sheet area. Does that align with your recommendation? I am discussing it with the office today and will have an answer by COB.

Thanks,
Starla

On Fri, Jul 6, 2018 at 4:53 PM, David Somers <dts@oceansurveys.com> wrote:

> Hi Starla,
>
> The field crew acquired cross lines in H13103 yesterday and were able to transmit a rough data set back to the office from the boat. Trinity Shoal has moved approximately 3 nautical miles west. The <4m area in H13103 where we had planned 40m spaced lines no longer exists. H13103 is also deeper on the southern end by 3-5+ feet. Please see attached PDF. Preliminary depths off the boat for H13100-H13103 are based on zoned predicted tides.
>
> We now anticipate we can cover at least 50% of the extension area within 7942 LNM budget.
>
> We had discussed offsetting the eastern limit of H13103, is that still the preferred plan?
>
> Thanks,
> Dave

David Somers
Data Processing Manager

From: Jack Riley - NOAA Federal [mailto:jack.riley@noaa.gov]
Sent: Sunday, July 22, 2018 8:53 PM
To: John R. Bean <jrb@oceansurveys.com>; David Somers <dts@oceansurveys.com>; George Reynolds <ggr@oceansurveys.com>
Cc: Corey Allen - NOAA Federal <corey.allen@noaa.gov>; Starla Robinson - NOAA Federal <starla.robinson@noaa.gov>; Samuel Greenaway <samuel.greenaway@noaa.gov>; Martha Herzog - NOAA Federal <martha.herzog@noaa.gov>
Subject: Re: OPR-K354-KR-18 ERS-Tides

Ocean Surveys,

Please see attached for the OPR-K354-KR-2018 amended MLLW SEP (NAD83 & WGS84), revised for an error in the VDatum TSS (topography of the sea surface) ~O(10.2 cm) and a change from Geoid12B to xGeoid17B. Bias calculations used to adjust the VDatum from LAmobile02_8301 are based on ellipsoidally-referenced tidal benchmarks at NWLON gages 8766072 and 8764227 (see OPUS Shared Solutions: DJ9334, DN4165, BBFX81 & BBBJ02, BBDX31, resp.). SEP coverage has been extended to encompass both of these gauges and offshore, to include the OPR-K354-KR-2016 BMPG site. MLLW SEP uncertainty in the OPR-K354-KR-2018 project area remains the same previously indicated: 17.2 cm.

Jack L. Riley
NOAA Coast Survey
SSMC3 N/CS11 Rm 6601
240-847-8271

-----Original Message-----
From: Alexandra.Grodsky@noaa.gov <Alexandra.Grodsky@noaa.gov>
Sent: Friday, October 19, 2018 4:45 PM
To: jjd@oceansurveys.com
Cc: Alexandra.Grodsky@noaa.gov
Subject: NCEI online publication confirmation of NCEI Accession 0177405

Dear Joseph DiPalma,

Thank you for sending your data and metadata files to be archived and published by the NOAA National Centers for Environmental Information (NCEI). NCEI received these data, SOUND VELOCITY collected from RV Ocean Explorer in Coastal Waters of Gulf of Mexico from 2018-05-29 to 2018-09-23, on 2018-10-15 19:53:12 via S2N.

Your data, identified as NCEI Accession Number 0177405, are now publicly accessible online via the NCEI Ocean Archive System at http://accession.nodc.noaa.gov/0177405. Use this link, http://accession.nodc.noaa.gov/0177405/data/0-data, to access the original data files in the NCEI archival information package.

These data will be discoverable via the NCEI Geoportal (http://data.nodc.noaa.gov/geoportal) and other online discovery tools, such as Data.gov about 24 hours after you receive this email.

If at any time you wish to update the content of NCEI Accession Number 0177405, please send an e-mail to NODC.DataOfficer@noaa.gov. Please remember to include the NCEI Accession Number.

Please let me know if you have any additional questions about NCEI archival activities or your archived data package. 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: 281HAX
From: NODC.DataOfficer@noaa.gov
To: jjd@oceansurveys.com

Dear Joseph DiPalma,

Thank you for submitting your data collection, titled "SOUND VELOCITY

collected from RV Ocean Explorer in Coastal Waters of Gulf of Mexico from 2018-05-29 to 2018-09-23", to the NOAA National Centers for Environmental Information (NCEI). Your submission package has been assigned Reference ID: 281HAX. 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: 281HAX) 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

-----Original Message-----
From: Alexandra.Grodsky@noaa.gov <Alexandra.Grodsky@noaa.gov>
Sent: Thursday, October 18, 2018 4:47 PM
To: jjd@oceansurveys.com
Cc: Alexandra.Grodsky@noaa.gov
Subject: NCEI acceptance confirmation for Reference ID: 281HAX

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 RV Ocean Explorer in Coastal Waters of Gulf of Mexico from 2018-05-29 to 2018-09-23, on 2018-10-15 19:53:12 via S2N.

After reviewing your submission package (metadata and data), I assigned your submission an NCEI Accession Number 0177405. 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/0177405.

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: 281HAX
From: NODC.DataOfficer@noaa.gov
To: jjd@oceansurveys.com

Dear Joseph DiPalma,

Thank you for submitting your data collection, titled "SOUND VELOCITY collected from RV Ocean Explorer in Coastal Waters of Gulf of Mexico from 2018-05-29 to 2018-09-23", to the NOAA National Centers for Environmental Information (NCEI). Your submission package has been assigned Reference ID: 281HAX. 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: 281HAX) 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

-----Original Message-----
From: NODC.DataOfficer@noaa.gov <NODC.DataOfficer@noaa.gov>
Sent: Monday, October 15, 2018 4:00 PM
To: jjd@oceansurveys.com
Subject: [Send2NCEI] data submission confirmation for Reference ID: 281HAX

Dear Joseph DiPalma,

Thank you for submitting your data collection, titled "SOUND VELOCITY collected from RV Ocean Explorer in Coastal Waters of Gulf of Mexico from 2018-05-29 to 2018-09-23", to the NOAA National Centers for Environmental Information (NCEI). Your submission package has been assigned Reference ID: 281HAX. 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: 281HAX) 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: OCS NDB - NOAA Service Account <ocs.ndb@noaa.gov>
Sent: Monday, December 10, 2018 3:41 PM
To: Castle E Parker
Cc: AHB Chief; Starla Robinson - NOAA Federal; Douglas Wood - NOAA Federal; George Reynolds; Bob Wallace; David Somers; jrb@oceansurveys.com; _NOS OCS PBA Branch; _NOS OCS PBB Branch; _NOS OCS PBC Branch; _NOS OCS PBD Branch; _NOS OCS PBE Branch; _NOS OCS PBG Branch; Charles Porter - NOAA Federal; Chris Libeau; James M Crocker; Ken Forster; Kevin Jett - NOAA Federal; Matt Kroll; Michael Gaeta; NSD Coast Pilot; PHB Chief; Tara Wallace
Subject: Fwd: H13101 DtoN #1 Submission to NDB
Attachments: H13101_DtoN_1.zip; H13101_ DtoN_1_Sounding-DepthCurves.000

DD-30186 has been registered by the Nautical Data Branch and directed to Products Branch G for processing.

The DtoN reported is a generally western migration of Trinity Shoal, LA

The following charts have been assigned to the record:
11349 kapp 64
11340 kapp 49

The following ENCs have been assigned to the record:
US4LA15M
US3GC03M

References:
H13101
OPR-K354-KR-18

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

From: Castle Parker - NOAA Federal <castle.e.parker@noaa.gov>
Sent: Monday, December 10, 2018 11:32 AM
To: OCS NDB - NOAA Service Account
Cc: AHB Chief - NOAA Service Account; Starla Robinson - NOAA Federal; Douglas Wood - NOAA Federal; George Reynolds; Bob Wallace; David Somers; John R. Bean
Subject: H13101 DtoN #1 Submission to NDB
Attachments: H13101_DtoN_1.zip; H13101_ DtoN_1_Sounding-DepthCurves.000

Good day,
Please reference the attached files related to a non-standard DtoN submission for survey H13101 for Nautical Data Branch and Marine Chart Division (MCD).

H13101 DtoN#1 submission is a non-standard submission that includes the submitted shoal soundings from the Field Unit, and depth curves generated at AHB based upon charted depth curve intervals. Bearing in mind the migration of depth curves and the shoal depths on the south side of Trinity Shoal, it was determined to submit a non-standard submission for MCD's cartographic selection and application. One shoal sounding was selected in order to generate the submission report and metadata for NDB registration.

Recommend sourcing this Danger submission for application of selected shoal depths and depth curves within the common area to the applicable largest scale chart products. The vertical datum is MLLW and the horizontal datum is NAD83.

The information originates from a NOAA contract field unit and was submitted to the Atlantic Hydrographic Branch (AHB) for review and submission. The contents of the attached file were generated at AHB. The attached zip file contains a DtoN Letter (PDF), associated image files, and Pydro XML file, along with an S57 file of the survey soundings.

If you have any questions, please contact me via email or phone 757-364-7472. Thank you for your assistance with this matter.

Respectfully,
Gene Parker

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: David Somers <dts@oceansurveys.com>
Sent: Friday, December 07, 2018 2:58 PM
To: ahb.dton@noaa.gov; Starla Robinson - NOAA Federal
Cc: George Reynolds; John R. Bean; Bob Wallace
Subject: H13101 DtoN 1 & H13102 DtoN 2
Attachments: H13101_DtoN_1_Shoal.zip; H13102_DtoN_2_Shoal.zip

Good Afternoon,

OSI has compiled and attached 2 DtoN feature files that cover 1 shoaling area along with supporting imagery for survey H13101 & H13102

These DtoNs cover the shoaling along the western to southwestern extend of Trinity Shoal along the 30 foot contour in H13101 and over the southwestern slope of the shoal in H13101 and H13102.

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

H13101 DtoN #1 Shoal Depths and Depth Curves

Registry Number: H13101
State: Louisiana
Locality: Louisiana Coast
Sub-locality: West Trinity Shoal
Project Number: OPR-K354-KR-18
Survey Date: 09/23/2018

Charts Affected

Number	Edition	Date	Scale (RNC)	RNC Correction(s)*
11349	47th	10/01/2017	1:80,000 (11349_1)	USCG LNM: 11/6/2018 (11/13/2018) NGA NTM: 5/4/2013 (11/24/2018)

* Correction(s) - *source: last correction applied (last correction reviewed--"cleared date")*

Features

No.	Name	Feature Type	Survey Depth	Survey Latitude	Survey Longitude	AWOIS Item
1.1	H13101_DtoN_1_Shoal	Shoal	5.70 m	29° 11' 38.7" N	092° 20' 06.9" W	---

1 - Dangers To Navigation

1.1) H13101_DtoN_1_Shoal

DANGER TO NAVIGATION

Survey Summary

Survey Position:	29° 11' 38.7" N, 092° 20' 06.9" W
Least Depth:	5.70 m (= 18.70 ft = 3.116 fm = 3 fm 0.70 ft)
TPU (±1.96σ):	**THU (TPEh)** [None] ; **TVU (TPEv)** [None]
Timestamp:	2018-266.12:00:00.000 (09/23/2018)
Dataset:	H13101_ DtoN_1_Report.000
FOID:	US 0000579037 00001(02260008D5DD0001/1)
Charts Affected:	11349_1

Remarks:

SOUNDG/remrks: The western extent of Trinty Shoal has migrigrated approximately 0.4 nautical miles to the southwest and west. Depths along the southwestern slope are as much as 10ft shoaler than charted, while depths along the 30 foot contour to the west are 2-3 feet shoaler. The eastern area of Trinty Shoal is significantely deeper than charted indicating a generally western movement of the shoal since the 1930s.

Feature Correlation

Source	Feature	Range	Azimuth	Status
H13101_ DtoN_1_Report.000	US 0000579037 00001	0.00	000.0	Primary

Hydrographer Recommendations

It is recommended that the nearby charted soundings be updated with the shoal's surveyed least depths.

Arithmetically-Rounded Depth (Unit-wise Affected Charts):

18ft (11349_1)

S-57 Data

Geo object 1:	Sounding (SOUNDG)
Attributes:	EXPSOU - 2:shoaler than range of depth of the surrounding depth area
	QUASOU - 1:depth known
	SORDAT - 20180923

SORIND - US,US,graph,H13101

TECSOU - 3:found by multi-beam

Office Notes

H13101 DtoN#1 submission is a non-standard submission that includes the submitted shoal soundings from the Field Unit, and depth curves generated at AHB based upon charted depth curve intervals. Bearing in mind the migration of depth curves and the shoal depths, it was determined to submit a non-standard submission for MCD's cartographic selection and application. One shoal sounding was selected in order to generate the submission report for NDB registration.

Some of the submitted soundings reside within the applicable depth range, while many do not. The 18ft and 30ft depth curves have migrated seaward and toward the southwest direction from the current charted depth curves.

Recommend sourcing this Danger submission for application of selected shoal depths and depth curves within the common area to the applicable largest scale chart products. The vertical datum is MLLW and the horizontal datum is NAD83.

This danger submission is preliminary. No data has been provided to AHB for verification. The submitted features and data will be reviewed and verified once the survey data has been submitted to AHB.

Feature Images

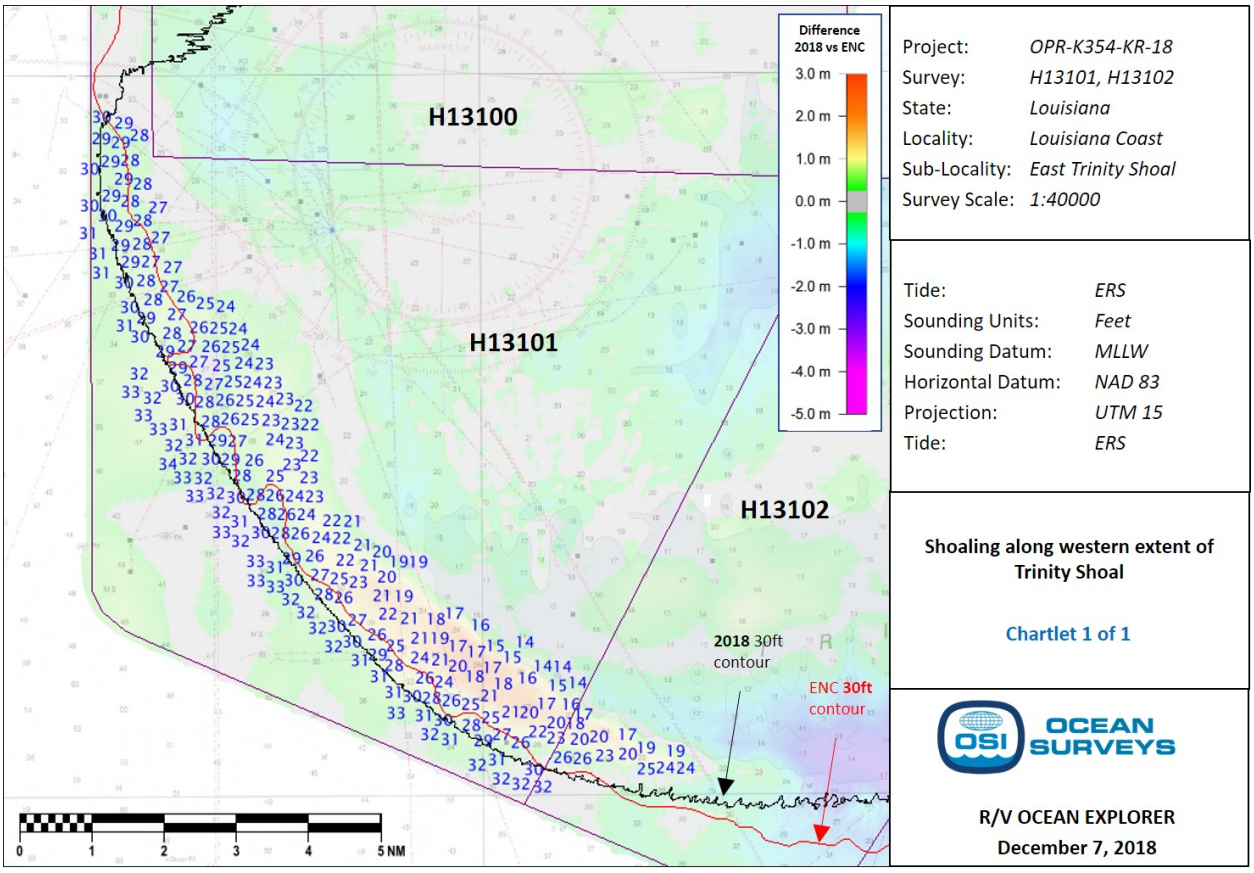


Figure 1.1.1

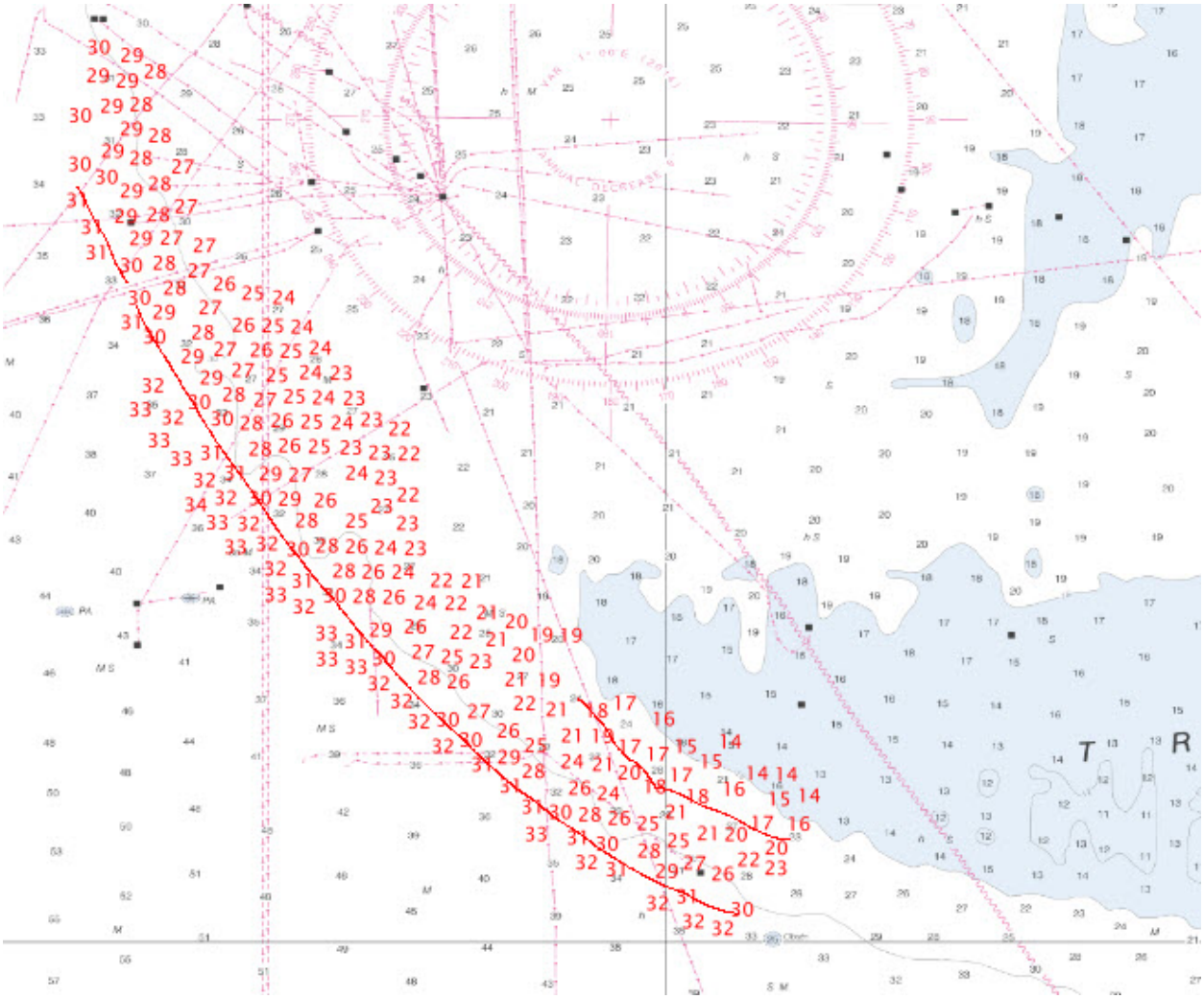


Figure 1.1.2

From: Blair Delean - NOAA Federal [mailto:blair.j.delean@noaa.gov]
Sent: Thursday, October 25, 2018 3:53 PM
To: rmw@oceansurveys.com
Cc: pop.information@noaa.gov; ocs.ecc@noaa.gov; Starla Robinson - NOAA Federal <starla.robinson@noaa.gov>; jrb@oceansurveys.com; dts@oceansurveys.com
Subject: Re: NOAA Contract Hydrographic Survey - MMO Observation Records - Project OPR-K354-KR-18

Excellent, thank you for your submission to the POP.

Very Respectfully,

LTJG Blair Delean, NOAA
Marine Mammal Laboratory
206.526.4048

From: Bob Wallace [mailto:rmw@oceansurveys.com]
Sent: Wednesday, October 24, 2018 4:27 PM
To: 'pop.information@noaa.gov' <pop.information@noaa.gov>; 'ocs.ecc@noaa.gov' <ocs.ecc@noaa.gov>
Cc: 'starla.robinson@noaa.gov' <starla.robinson@noaa.gov>; 'Robert M. Wallace Jr.' <rmw@oceansurveys.com>; John Bean (jrb@oceansurveys.com) <jrb@oceansurveys.com>; 'David Somers' <dts@oceansurveys.com>
Subject: NOAA Contract Hydrographic Survey - MMO Observation Records - Project OPR-K354-KR-18

All,

Attached is a .7z format zip file containing a tabulation of OSI's "trained observers" as well as 53 individual Marine Mammal Observation Logs. Observations were made during OSI's contract hydrographic survey entitled "Louisiana Coast", NOAA Project Number OPR-K354-KR-18. The period of the survey was May 28, 2018 through September 24, 2018.

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

The following table summarizes Ocean Surveys, Inc. staff who were onboard the *R/V Ocean Explorer* during NOAA Contract Survey entitled "Louisiana Coast" (Project OPR-K354-KR-18). The period of the survey was May 28, 2018 to September 24, 2018.

Personnel	Position	Marine Species Awareness Video View Date
Robert Wallace	Lead Hydrographer	May 2, 2016
John Bean	Senior Hydrographer	May 2, 2016
George Main Sr.	Captain	July 22, 2016
George Main III.	Captain	July 22, 2016
Joseph Tyler	Hydrographer	June 5, 2017
Logan Crouse	Hydrographer	July 21, 2017
Dalton Leonhardt	Hydrographer	August 18, 2017
David Vinick	Captain	May 10, 2018
Kenneth Zelvin	Captain	May 10, 2018
Corey Leamy	Hydrographic Survey Technician	May 15, 2018

From: Larisa Avens - NOAA Federal [mailto:larisa.avens@noaa.gov]
Sent: Thursday, October 25, 2018 11:59 AM
To: rmw@oceansurveys.com
Subject: Re: NOAA Contract Hydrographic Survey - Turtle Observation Records - Project OPR-K354-KR-18

Hi Bob,
Thank you for passing along the turtle sighting record.

Best,
Larisa

~~~~~~

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/

From: Bob Wallace [mailto:rmw@oceansurveys.com]
Sent: Wednesday, October 24, 2018 4:35 PM
To: 'larisa.avens@noaa.gov' <larisa.avens@noaa.gov>
Cc: 'ocs.ecc@noaa.gov' <ocs.ecc@noaa.gov>; 'starla.robinson@noaa.gov' <starla.robinson@noaa.gov>; 'Robert M. Wallace Jr.' <rmw@oceansurveys.com>; John Bean (jrb@oceansurveys.com) <jrb@oceansurveys.com>; 'David Somers' <dts@oceansurveys.com>
Subject: NOAA Contract Hydrographic Survey - Turtle Observation Records - Project OPR-K354-KR-18

All,

Attached is a .7z format zip file containing a tabulation of OSI's "trained observers" as well as one (1) Turtle Observation Log. The single observation was made during OSI's contract hydrographic survey entitled "Louisiana Coast", NOAA Project Number OPR-K354-KR-18. The period of the survey was May 28, 2018 through September 24, 2018.

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

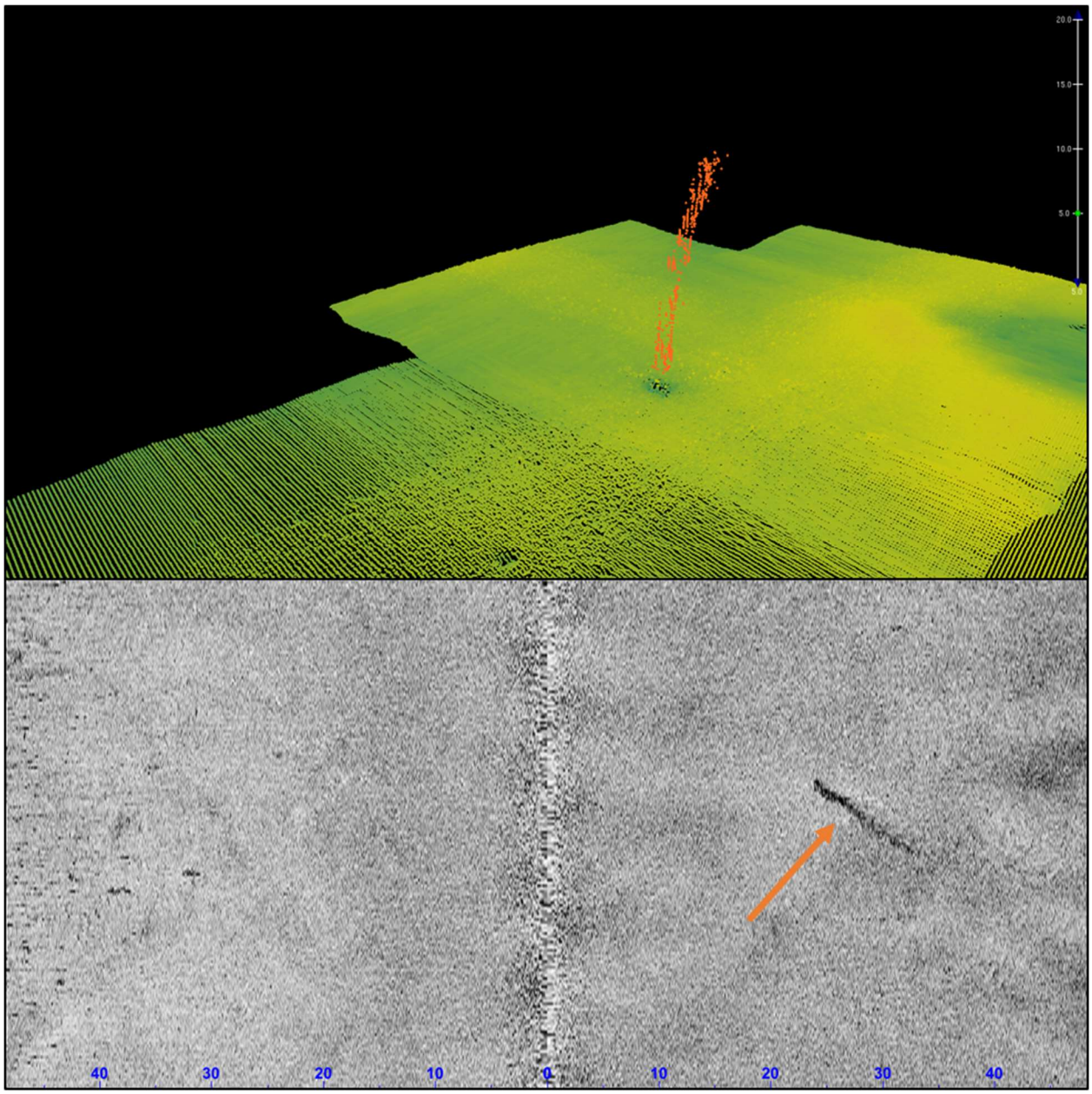
Regards, Bob Wallace

Robert M. Wallace Jr.
Project Manager

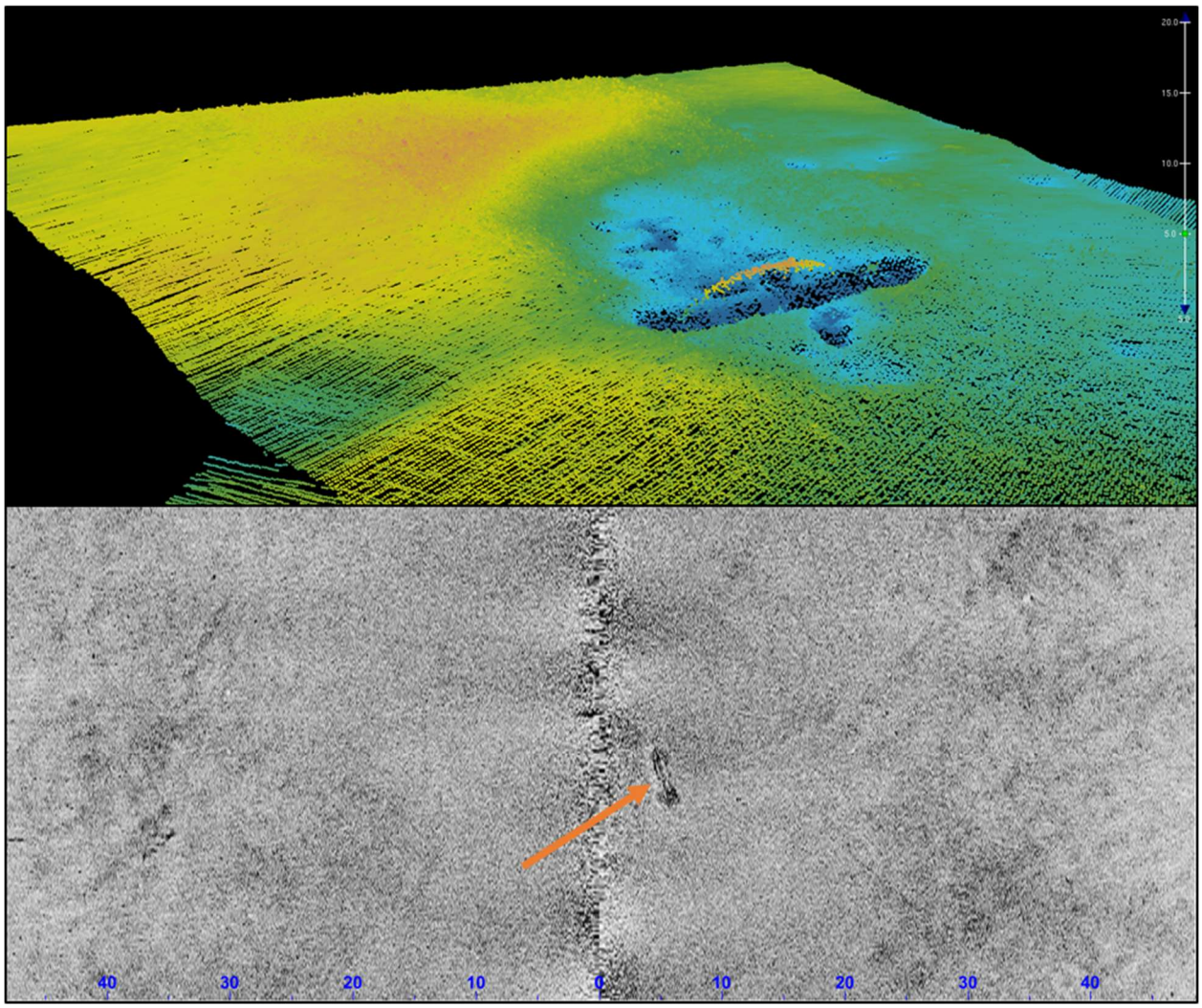
OCEAN SURVEYS, INC.
129 Mill Rock Road East, Old Saybrook, CT 06475
T 860-388-4631 x129 **M** 860-227-3099 **F** 860-388-5879
rmw@oceansurveys.com | www.oceansurveys.com
~~~~~~

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	29-17-09.48N	92-23-46.88W	410m to charted pipeline, 4m to BOEM-defined pipeline	N/A	2018/06/11 22:10	7.6	N/A	Seep observed at the end of an uncharted, BOEM-defined pipeline.
2	29-18-30.67N	92-19-10.16W	3.5	7	2018/06/09 2:36	7.0	0.2	3.5m to nearest charted pipeline.
3	29-17-54.00N	92-22-23.27W	2	10	2018/06/10 21:54	8.6	0.0	2m to nearest charted pipeline. Pipe is interpreted to be flush or below the natural bottom.

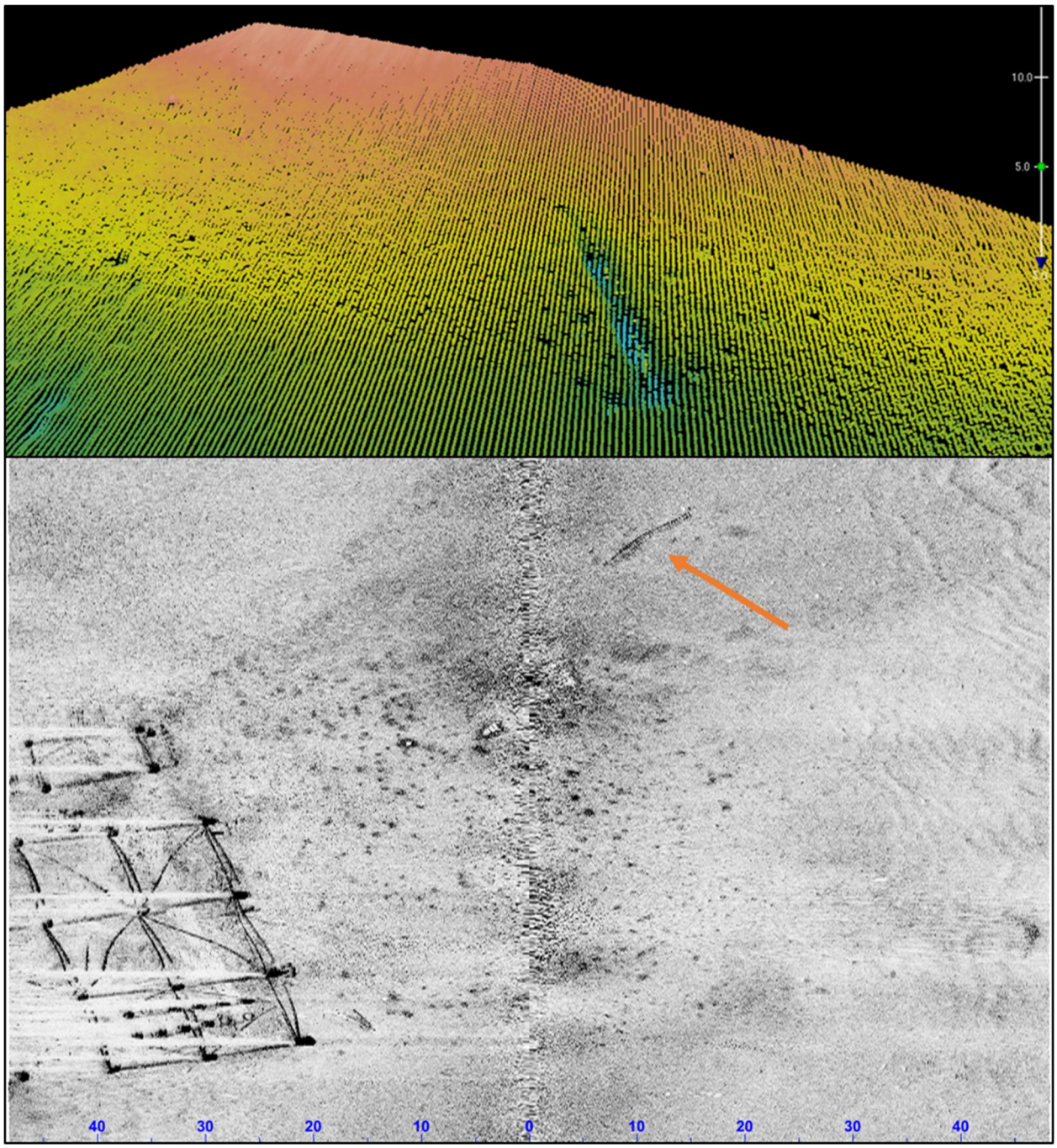
H13101 Non-DTON Seeps and Pipelines Report Image 1



H13101 Non-DTON Seeps and Pipelines Report Image 2



H13101 Non-DTON Seeps and Pipelines Report Image 3



From: Starla Robinson - NOAA Federal <Starla.Robinson@noaa.gov>
Date: 12/8/18 11:08 (GMT-05:00)
To: "John R. Bean" <jrb@oceansurveys.com>
Cc: Tim Osborn - NOAA Federal <tim.osborn@noaa.gov>
Subject: Re: OPR-K354-KR-18 Non-DTON Pipes and Seeps

Got them, thank you.

--
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 Acquisition: HSD Planned Hydrographic Surveys
Website Planning: OCS Survey Plans

On Fri, Dec 7, 2018 at 3:23 PM John R. Bean <jrb@oceansurveys.com> wrote:

> Hi Starla,
>
> Following up on our Non-DTON Pipes and Seeps reports. I sent the reports in separately by sheet on 16 November and copied Tim Osborn. Could you please acknowledge receipt for all 5 sheets (H1300, H13101, H13102, H13103, and H13200) for our project correspondence folder.
>
> Thanks,
>
> **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
>
> Follow us: LinkedIn | Twitter | Facebook

APPROVAL PAGE

H13101

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
- GeoPDF of survey products
- Collection of Backscatter mosaics

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.

Approved: MCGOVERN.MEGHAN.ELIZABETH.1284020495 Digitally signed by MCGOVERN.MEGHAN.ELIZABETH.1284020495 Date: 2020.02.06 14:47:07 -05'00'

Commander Meghan MCGovern, NOAA
Chief, Atlantic Hydrographic Branch