

H12791

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

DESCRIPTIVE REPORT

Type of Survey: Navigable Area

Registry Number: H12791

LOCALITY

State(s): Louisiana

General Locality: Approaches to Atchafalaya Bay, LA

Sub-locality: 22 NM S of Point Au Fer

2015

CHIEF OF PARTY
Tara Levy

LIBRARY & ARCHIVES

Date:

U.S. DEPARTMENT OF COMMERCE NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION		REGISTRY NUMBER:
HYDROGRAPHIC TITLE SHEET		H12791
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:	Approaches to Atchafalaya Bay, LA	
Sub-Locality:	22 NM S of Point Au Fer	
Scale:	40000	
Dates of Survey:	09/06/2015 to 03/26/2016	
Instructions Dated:	07/14/2015	
Project Number:	OPR-K379-KR-15	
Field Unit:	C&C Technologies, An Oceaneering International Company	
Chief of Party:	Tara Levy	
Soundings by:	Multibeam Echosounder	
Imagery by:	Side Scan Sonar	
Verification by:	Atlantic Hydrographic Branch	
Soundings Acquired in:	meters at Mean lower low water (MLLW)	
Remarks:		

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

Descriptive Report to Accompany Survey H12791

Project: OPR-K379-KR-15

Locality: Approaches to Atchafalaya Bay, LA

Sublocality: 22 NM S of Point Au Fer

Scale: 1:40000

September 6, 2015 – March 26, 2016

C-Worker 6 & R/V *Sea Scout* & R/V *C-Wolf*

Chief of Party: Tara Levy

A. Area Surveyed

The survey area is located 22 NM S of Point Au Fer off the coast of Louisiana, USA.

A.1. Survey Limits

Data was acquired within the following survey limits:

Northwest Limit	Southeast Limit
29.023 N	28.934 N
91.425 W	91.321 W

Table 1: Survey Limits

Survey limits were designed as outlined in the Project Instructions and the HSSD.

A.2. Survey Purpose

The purpose of this survey is to provide a contemporary survey to update National Ocean Service (NOS) nautical charting products. Survey H12791 covers 27.34 square nautical miles (SNM) near the Atchafalaya River. The river is the only expanding river delta in North America and the Port of Morgan City has been working to deepen and maintain the channel. The project potentially covers altered area where depth contours may have migrated.

A.3. Survey Quality

The entire survey is adequate to supersede previous data.

A.1. Survey Coverage

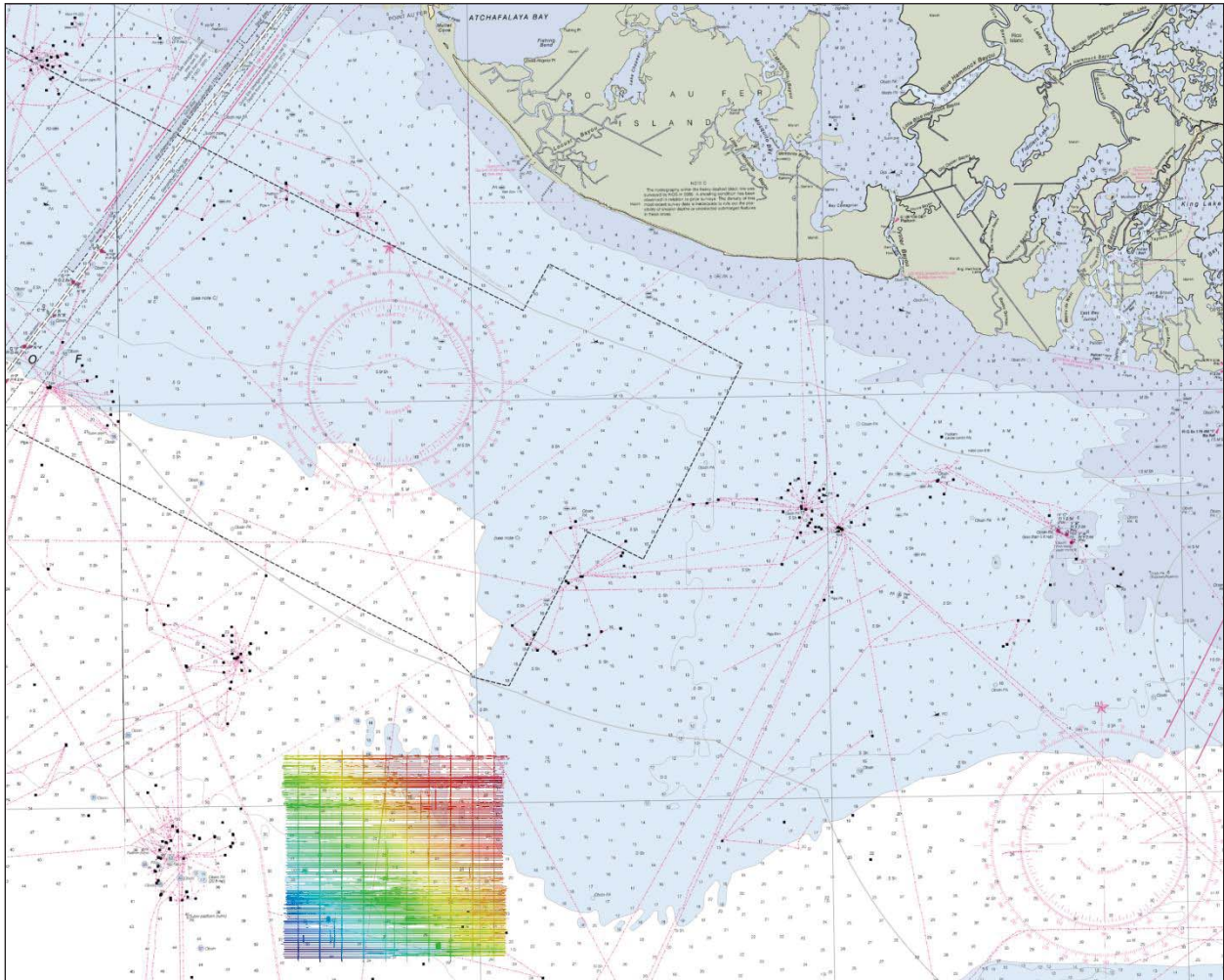


Figure 1. H12791 Survey Coverage

Survey coverage for H12791 (Figure 1) was collected in accordance with the requirements outlined in the Project Instructions and HSSD (2015). 100% side scan sonar (SSS) coverage was acquired with concurrent multibeam echosounder (MBES) data. A combination of complete MBES with backscatter and/or water column data and/or SSS data was collected for feature investigations.

A.2. Survey Statistics

The following table lists the mainscheme and crossline acquisition mileage for this survey. Note that these statistics exclude investigation, fill-in, feature disproval and rerun line mileage. Detached positions include position fixes associated with bottom samples, CTD's, leadlines and platform fixes.

	Hull ID	LAZ74232C313	1237094	JQN00023E708	Total
LNM	SBES Mainscheme	0	0	0	0
	MBES Mainscheme	0	0	0	0
	SSS Mainscheme	0	0	0	0
	SBES/MBES Combo Mainscheme	0	0	0	0
	SBES/SSS Combo Mainscheme	0	0	0	0
	MBES/SSS Combo Mainscheme	546.82	84.48	0	631.30
	SBES/MBES Combo Crosslines	0	52.48	0	52.48
	Lidar Crosslines	0	0	0	0
Number of Bottom Samples		0	8	0	8
Number of DPs		30	26	1	57
Number of Items Investigated by Dive OPs		0	0	0	0
Total Number of SNM		25.36	1.98	0.00	27.34

Table 2: Hydrographic Survey Statistics

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

15/09/06
15/09/07
15/09/08
15/09/09
15/09/10
15/09/16
15/09/17
15/09/18
15/09/19
15/09/20
15/09/21
15/09/26
15/10/09
15/10/28
15/10/29
15/10/30
15/11/30
15/12/01
15/12/02
15/12/08
15/12/09
15/12/10
16/01/25
16/01/30
16/01/31
16/02/01
16/02/20
16/02/21
16/02/22
16/03/26

Table 3: Dates of Hydrography

B. Data Acquisition and Processing

B.1. Equipment and Vessels

Refer to the OPR-K379-KR-15 Data Acquisition and Processing Report (DAPR) for additional information regarding survey systems as well as operational, processing and quality control procedures. A summary of the equipment and vessels used for this survey is provided below.

B.1.1. Vessels

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

Hull ID	LAZ74232C313	1237094	JQN00027E708
LOA	5.8 meters	40.84 meters	9.14 meters
Draft	0.9 meters	1.98 meters	0.76 meters

Table 4: Vessels Used

B.1.2. Equipment

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

Manufacturer	Model	Type
Kongsberg	EM2040C	MBES
Kongsberg	EM3002	MBES
Klein	5000 V2	SSS
EdgeTech	4200 P	SSS
EdgeTech	4125	SSS
Coda Octopus	F180	Attitude and Positioning System
Forum	OCTANS 3000	Gyrocompass and motion sensor
C-Nav	3050	Positioning System
AML	SV•Xchange	Sound Speed System
YSI Electronics	600R-BCR-C-T	Sound Speed System
Sea-Bird Electronics, Inc.	SBE 19 and SBE 19 Plus	Sound Speed System

Table 5: Major Systems Used

B.2. Quality Control

B.2.1. Crosslines

Crosslines were run perpendicular to mainscheme lines so that quality control statistics could be performed on the data after completion of mainscheme survey lines. The total crossline miles were 52.48 NM and the total mainline miles were 631.30 NM; investigation lines were not included in mainline totals. The crosslines comprise 8.31 percent of the total mainline miles.

Mainlines were compared to crosslines for which there was overlapping data (for Kongsberg .all files only) using C & C's proprietary Hydromap software. The graphs generated from the

comparison show the mean difference, RMS difference and confidence interval for each beam. Refer to the DAPR for additional information and Separates II Digital Data for sample graphical documentation.

The surface difference tool in CARIS HIPS was used to evaluate crossline and mainscheme line agreement; investigations were not included in the comparisons. The mainline BASE surface was used as Surface 1 and the crossline BASE surface as Surface 2. Statistical information about the difference surface was generated using the compute statistics tool (Figure 2). The analysis shows that greater than 97% of depth difference values are between -0.41 and 0.39 m. This is within the maximum allowable TVU for the depths of the comparison area (5.17 – 12.74 m) which ranges from ± 0.504 to ± 0.527 m. Factors contributing to depth difference values greater than ± 0.50 meters, include the following: changes bathymetry, which appears more prominently in the eastern portion of the survey area, overlap of the edges of MBES swaths and overlap of data with motion artifacts, which is evident in the southern portion of the survey area.

Statistical crossline information was also generated by comparing each of the crosslines to the depth layer of the 1-m BASE surface of the mainscheme survey lines using the CARIS QC report utility. In general, greater than 99% of crossline soundings fall within the selected Order 1a survey order, as outlined in the CARIS User Manual. Crossline comparisons generated with the CARIS QC report utility as well as the difference BASE surface are shown in the Separates II Digital Data\Checkpoint Summary & Crossline Comparisons folder.

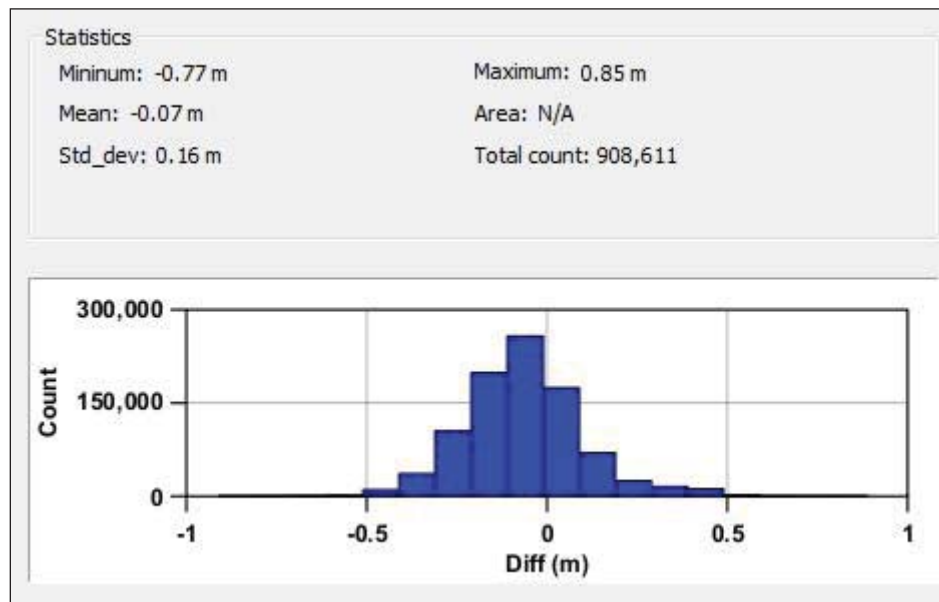


Figure 2. Crossline comparison statistical information and histogram output from CARIS compute statistics tool.

B.2.2. Junctions

Registry Number	Scale	Year	Field Unit	Relative Location
H12433	1:40,000	2012	C & C Technologies, Inc.	SE
H12434	1:40,000	2012	C & C Technologies, Inc.	E
H12436	1:40,000	2012	C & C Technologies, Inc.	S
H12556	1:40,000	2013	C & C Technologies, Inc.	SW
H12789	1:40,000	2015	C & C Technologies, Inc. An Oceaneering International Company	NW

Table 6. Junctioning Surveys

The areas of overlap between Sheets (Figure 3) were evaluated using the CARIS Difference Tool to ensure general agreement of depths. Junction analyses were conducted using 1 or 2 meter BASE surfaces and/or .bag files of all the Sheets. If necessary, data was further reviewed in Subset Editor.

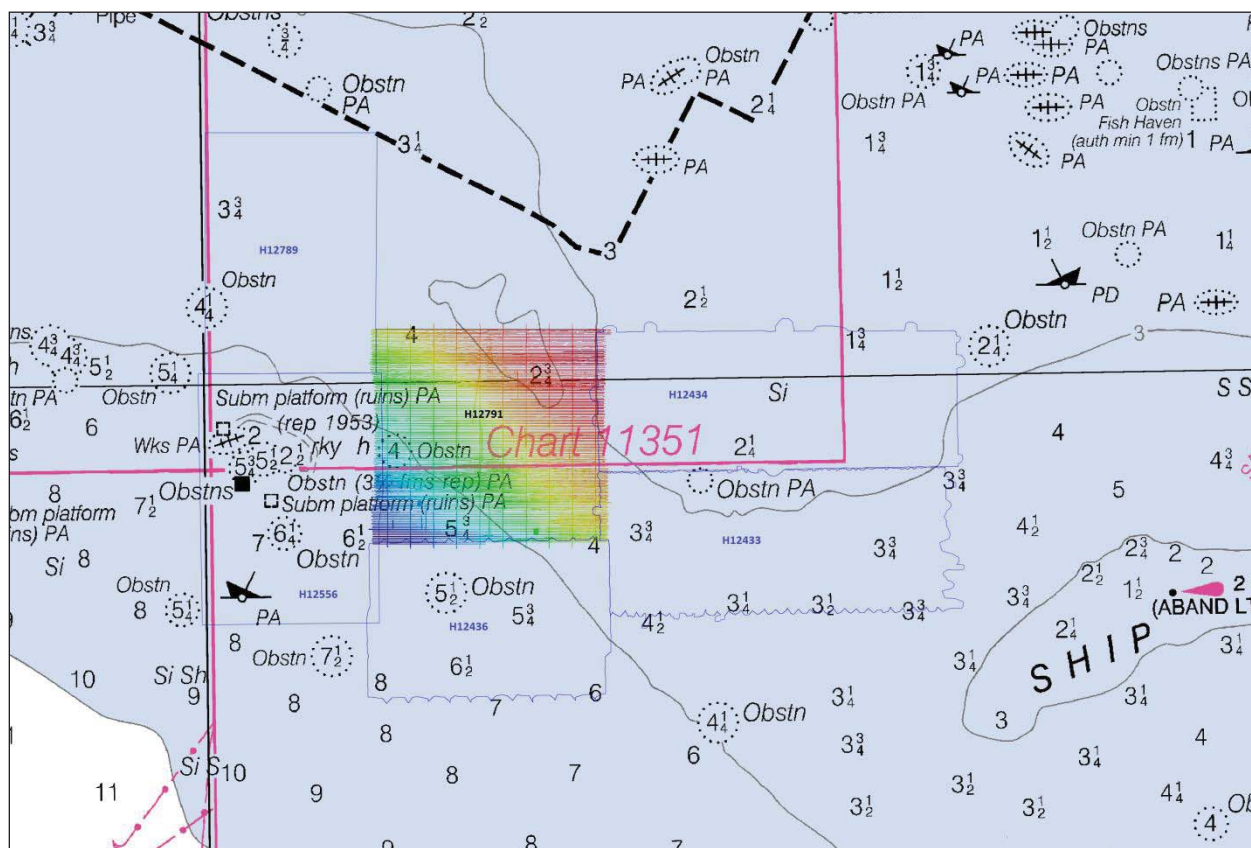


Figure 3. H12791 Junctions.

H12433

The northwest margin of H12433 borders the southeast margin in H12791. Two meter BASE surfaces were used for comparison purposes. Figure 4 shows statistical information for the junction generated with the CARIS compute statistics tool. Depths from survey H12791 generally agree well with depths from survey H12433 with 89% of depth difference values within ± 0.35 m.

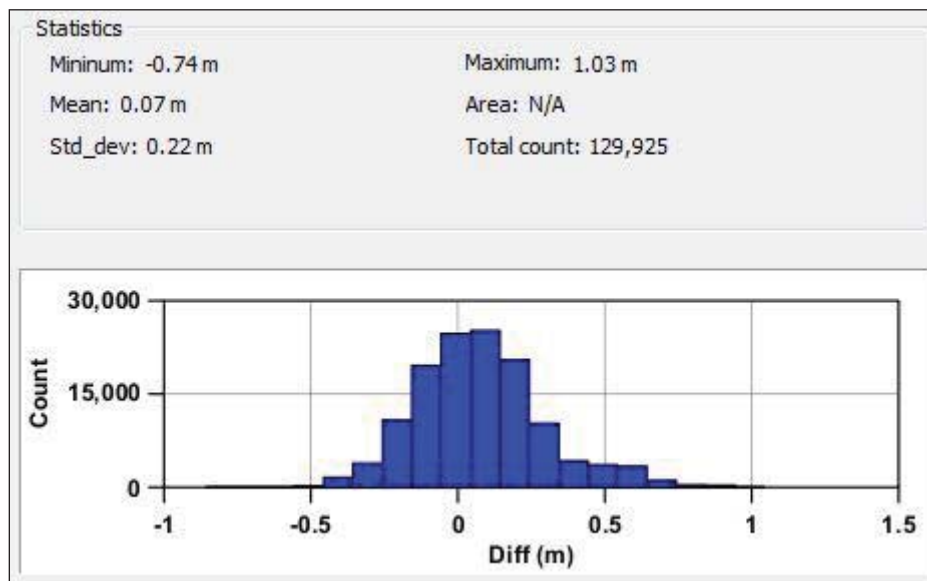


Figure 4. Statistical information and histogram output from CARIS Compute Statistics tool for the difference surface generated between H12791 and H12433 2-meter surfaces.

H12434

The western margin of survey H12434 borders the eastern margin of survey H12791. Two meter BASE surfaces were used for comparison purposes. Figure 5 shows statistical information for the junction generated with the CARIS compute statistics tool. Depths from survey H12791 generally agree well with depths from survey H12434 with 88% of depth difference values within ± 0.30 m. In the southern portion of overlap, survey H12434 shows depressions that are not present in H12791. Surveyed soundings from H12791 are shallower than those of H12434 in these areas. However, the majority of depth differences show a slight trend towards more positive values. This indicates that depths from H12791 are generally deeper than those of H12434, with nearly 95% of values between -0.19 and 0.41 m.

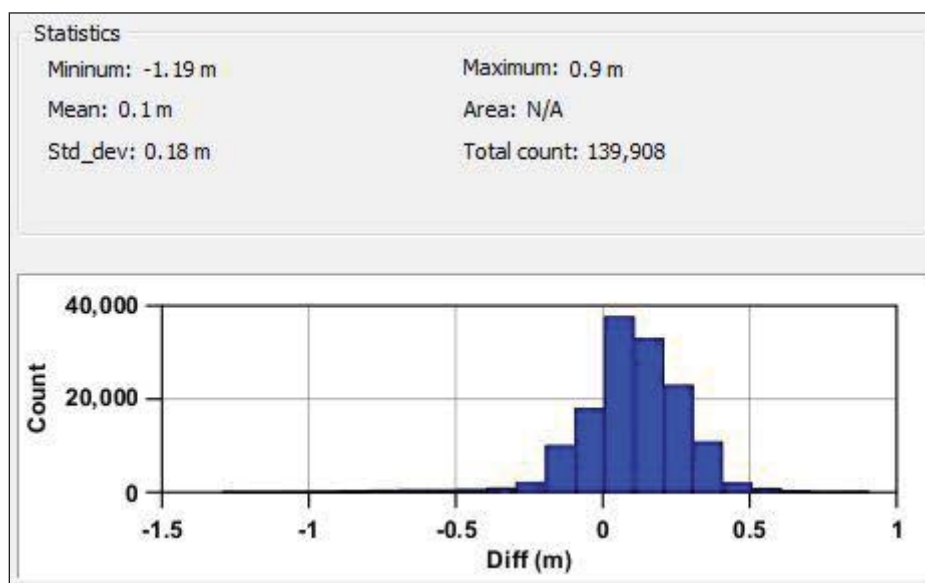


Figure 5. Statistical information and histogram output from CARIS Compute Statistics tool for the difference surface generated between H12791 and H12434 2-meter surfaces.

H12436

The northern margin of survey H12436 borders the southern margin of survey H12791. Two meter BASE surfaces were used for comparison purposes. Figure 6 shows statistical information for the junction generated with the CARIS compute statistics tool. The difference values exhibit a positive bias, which indicates overall deeper depths recorded in H12791 than in H12436 with nearly 90% of values falling in between 0.04 and 0.54 m.

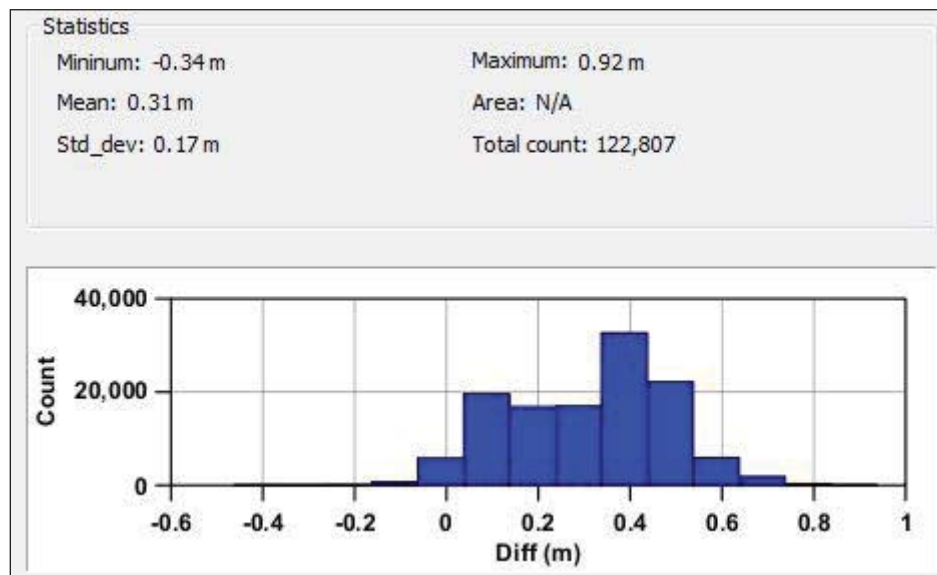


Figure 6. Statistical information and histogram output from CARIS Compute Statistics tool for the difference surface generated between H12791 and H12436 2-meter surfaces.

H12556

The eastern margin of survey H12556 borders the western margin of survey H12791. One meter BASE surfaces were used for comparison purposes. Figure 7 shows statistical information for the junction generated with the CARIS compute statistics tool. Depths from survey H12791 are generally shallower than those recorded from survey H12556 with 94% of depth differences between -0.54 and 0.06 m.

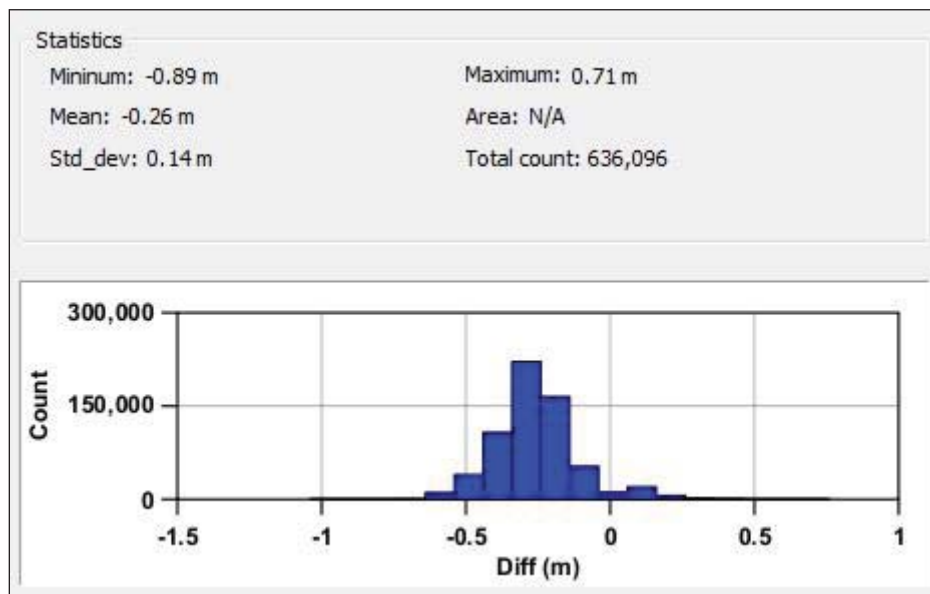


Figure 7. Statistical information and histogram output from CARIS Compute Statistics tool for the difference surface generated between H12791 and H12556 1-meter surfaces.

H12789

The southeast margin of survey H12789 borders the northwest margin of survey H12791. One meter BASE surfaces were used for comparison purposes. Figure 8 shows statistical information for the junction generated with the CARIS compute statistics tool. Depths from survey H12791 agree well with depths from survey H12789 with 99% of depth difference values within ± 0.30 m.

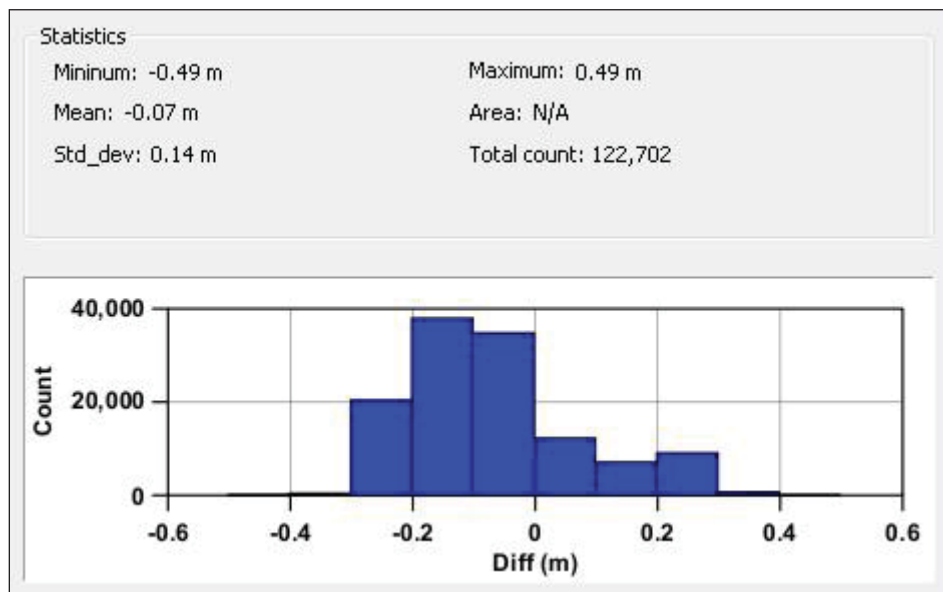


Figure 8. Statistical information and histogram output from CARIS Compute Statistics tool for the difference surface generated between H12791 and H12789 1-meter surfaces.

B.2.3. Sonar QC Checks

Odom single beam echosounders were continuously operated and monitored during the survey as an independent check on the multibeam bottom-detect. The R/V *Sea Scout* (Hull ID 1237094) is equipped with an Echotrac MK III, and the R/V *C-Wolf* (Hull ID JQN00027E708) is equipped with an ODOM CV-100. The C-Worker 6 (Hull ID LAZ74232C313) was not equipped with a single beam echosounder. However, a series of patch tests conducted by the C-Worker 6 and verification lines collected with the R/V *Sea Scout* over the same contact demonstrated the repeatability of depths obtained from the C-Worker 6; refer to the System Accuracy Test Reports for additional information.

B.2.4. Equipment Effectiveness

The angular coverage of the multibeam sonars was modified in order to moderate the effects of factors such as increased sea state or to increase coverage, if necessary. Any changes are documented in the acquisition logs. An 80 meter line spacing and operation of the SSS at 50 m range ensured 100% SSS coverage. Split lines were run in the event that environmental factors limited the effective range of the side scan sonar.

B.2.5. Factors Affecting Soundings

Weather, sea state, water column sound speed, thermoclines, and fish/marine life were all temporary factors that affected the data periodically throughout the duration of the survey; these are noted in the acquisition and processing logs.

B.2.6. Sound Speed Methods

Sea Bird Electronics SBE19 and SBE19plus CTDs were used for speed of sound measurements in the water column. Casts were conducted at least twice daily aboard the R/V *Sea Scout* and aboard the mothership associated with the C-Worker 6 ASV operations. Casts were conducted at least once daily on board the R/V *C-Wolf*. Casts were conducted more often as needed on all vessels. The multibeam data was corrected for the water column sound speed in real-time using the SIS control software. To determine the sound speed at the transducers, an Endeco YSI sonde was used on board the R/V *C-Wolf*, and AML SV•Xchange systems were used on board the R/V *Sea Scout* and C-Worker 6. The sound speed data and confidence checks are located in Separates II Digital Data\Sound Speed Data Summary.

B.2.7. Coverage Equipment and Methods

Complete Coverage, Option 2: SSS data and concurrent MBES data, as outlined in the HSSD (2015) was acquired in the survey area. 100% SSS coverage was acquired in accordance with the requirements stated in the project instructions for this survey. On board the R/V *Sea Scout* and C-Worker 6, MBES data was acquired with Kongsberg EM2040C echosounders and on board the R/V *C-Wolf*, MBES data was acquired with a Kongsberg EM3002 echosounder. A Klein 5000 V2 side scan sonar was used aboard the R/V *Sea Scout*, an EdgeTech 4200P side scan sonar was used aboard the R/V *C-Wolf* and an EdgeTech 4125 was used aboard the C-Worker 6. A combination of complete MBES with backscatter and/or water column data and/or SSS data was collected for feature investigations.

B.2.8. Density

According to section 5.2.2.2 of the HSSD (2015) at least 80% of all nodes on the surface shall be populated with at least 5 soundings for Complete Coverage Option 2 surveys. The Compute Statistics tool in CARIS HIPS was used to generate statistics about the density child layer for the following surface: H12791_MB_1m_MLLW_Final (Figure 9). A bin size of 1 was used and the data exported in ASCII format. The number of nodes in the first 4 bins were added together to determine the number of nodes that contain less than 5 soundings.

The H12791_MB_1m_MLLW_Final surface contains a total of 39,815,728 nodes and 39,663,416 nodes contain at least 5 soundings. Therefore, greater than 99.6% of all nodes on the surface contain at least 5 soundings.

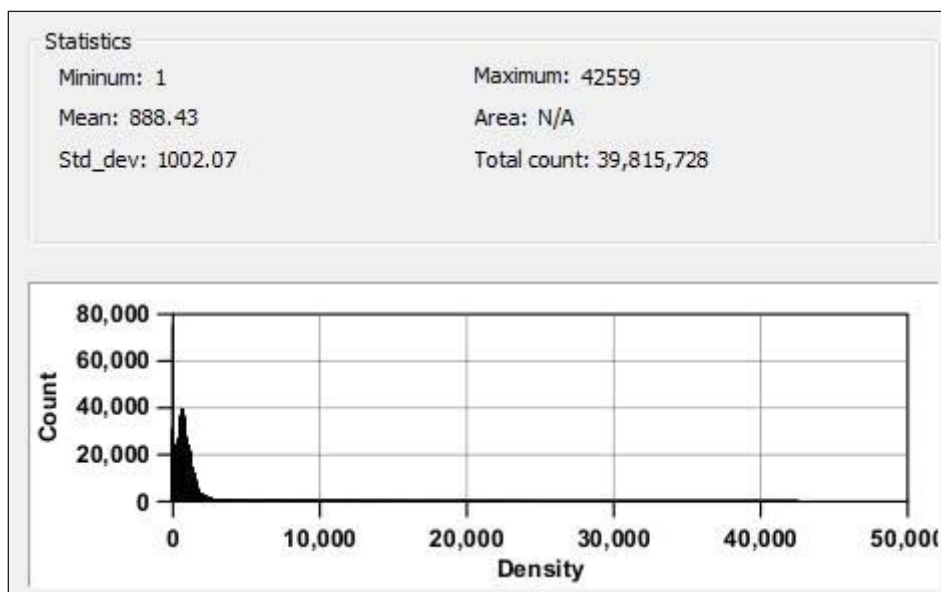


Figure 9. Statistical information about the density child layer of the H12791_MB_1m_MLLW_Final BASE surface, generated from the CARIS Compute Statistics tool.

B.2.9. Uncertainty

Uncertainty of all components of the sounding measurement are included in the CARIS vessel file and detailed in the DAPR.

The following survey specific parameters were used for this survey.

Measured	Zoning
0.037 m	0.075 m
0.1873 m	0.000 m

Table 7: Survey specific TPU values

Hull ID	Measured - CTD	Measured - MVP	Surface
1237094	2.00 m/s	n/a	0.8 m/s
JQN00023E707	2.00 m/s	n/a	0.8 m/s
LAZ74232C313	2.00 m/s	n/a	0.8 m/s

Table 8: Survey specific sound speed TPU values

CARIS HIPS was used to compute the Total Propagated Uncertainty (TPU) for each sounding. Data collected in 2015 (and in 2016 by the R/V *C-Wolf*) was processed with final verified tides and the zoning file. Specific TPU parameters for data processed with tide correctors are shown in the first row in Table 7. Data collected in 2016 by the R/V *Sea Scout* was processed using ellipsoid derived vertical correctors. Specific TPU parameters for data processed using ellipsoid derived vertical correctors are shown in the second row of Table 7.

An Uncertainty layer child layer is generated during BASE surface creation that shows the uncertainty at each node of the surface. For additional review and quality control, two new layers

were generated for each BASE surface that would become a finalized BASE surface. The two new layers were generated for the following surface: H12791_MB_1m_MLLW. The first layer was named <TVU_Maximum> and shows the maximum TVU at each node. The following formula was used during layer creation:

$$\sqrt{(0.5^2) + (0.013 * Depth)^2}$$

The second layer generated was named <Uncertainty_QC> and defined as the difference between the TVU_Maximum and Uncertainty layers. Positive values indicate that the uncertainty is less than the TVU_Maximum and that the data meet specifications, while negative values indicate that the uncertainty is greater than the TVU_Maximum and that the data do not meet specifications. The two layers could have been combined into one for the Uncertainty_QC, as was done for the finalized surfaces, but the TVU_Maximum layer also aided in determining the designation or examination status of critical soundings.

The uncertainty for the H12791_MB_1m_MLLW BASE surface ranges from 0.02 – 0.65 meters. There are four nodes of the H12791_MB_1m_MLLW BASE surface where the Uncertainty_QC layer of the BASE surface shows negative values. This indicates that the uncertainty values at these four nodes are greater than the maximum allowable TVU for each node. These four nodes are located in close proximity on line 262_5066_001 (Fig 10).

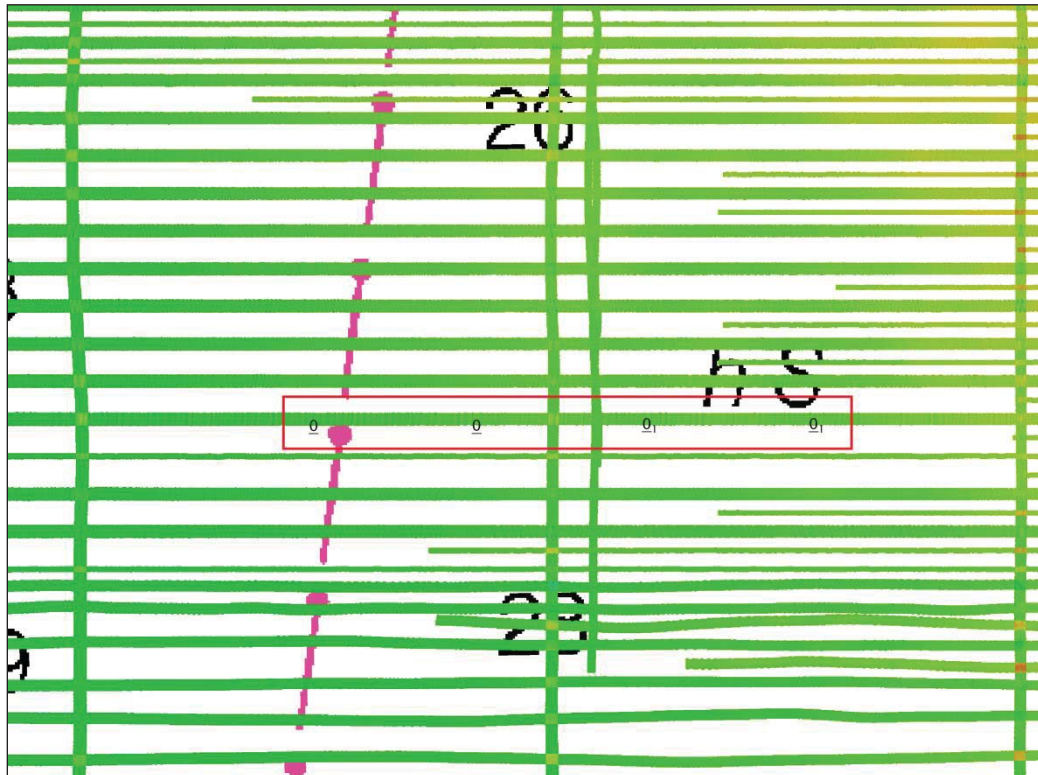


Figure 10. Four nodes of the H12791_MB_1m_MLLW surface where the uncertainty is greater than the maximum allowable TVU.

An Uncertainty_QC_Final layer was also generated for all finalized surfaces, defined by the equation below:

$$\sqrt{(0.5^2) + (0.013 * Depth)^2} - Uncertainty$$

The uncertainty for the H12791_MB_1m_MLLW_Final surface ranges from 0.2 to 1.29 meters. A text file was exported from CARIS and run through a python script to determine the percentage of Uncertainty_QC_Final values that are less than zero, which indicates that the uncertainty values at those nodes exceed specifications.

Analysis of the Uncertainty_QC_Final layer for the H12791_MB_1m_MLLW_Final BASE surface indicates that less than 0.0002% of nodes have an uncertainty greater than the maximum allowable TVU.

It was observed that the majority of uncertainty values are within specification for the unfinalized surfaces, but there is a larger portion of values that are out of specification when finalized. The reason is due to the finalization parameter, where the uncertainty is defined as the greater of either the standard deviation or uncertainty for a particular node.

Note that when the surfaces are finalized, the TVU_Maximum and Uncertainty_QC layers are retained but Uncertainty_QC layer does not reflect the new Uncertainty values of the finalized surface. These layers can be removed, but if the finalized BASE surface is recomputed, it appears that these layers will be regenerated (after closing and re-opening the project). For this reason, the layers were not removed from the finalized surfaces.

B.3. Echo Sounding Corrections

B.3.1. Corrections to Echo Soundings

All corrections to echo sounding (instrument corrections, static and dynamic draft, speed of sound, and attitude corrections) follow the procedures outlined in the accompanying Data Acquisition and Processing Report (DAPR).

B.3.2. Calibrations

Prior to initiating survey operations, a standard patch test was performed for each vessel to determine correctors for pitch, roll, and heading (additional calibrations were performed as necessary or for verification purposes). Squat and settlement tests were also conducted to determine the dynamic draft of the vessels. Refer to the Data Acquisition and Processing Report for additional information.

B.4. Backscatter

Backscatter was logged within each Kongsberg EM file collected aboard the R/V *Sea Scout* and R/V *C-Wolf*. This data was imported during CARIS conversion and reviewed when necessary. Backscatter mosaics of the EM3002 data were able to be generated using CARIS 9.0. The

EM2040C data was unable to be processed in CARIS 9.0. CARIS correspondence indicates that EM2040C backscatter data should be able to be processed in CARIS 9.1 but this has not been tested internally. The Kongsberg .all files were imported and backscatter mosaics generated using FMGT version 7.5.1. Several errors were encountered with the following lines: 344_5084a, 052_5019a-2.0, 053_5001a, H91-CB-11.0. Mosaics would not process with these lines and they were removed from the project. Processing limitations necessitated the generation of several small mosaics instead of a mosaic of the entire area.

Backscatter was logged within each .HSX file collected aboard the C-Worker 6. Although extensive testing and correspondence with Hypack and QPS was conducted, at this point in time the HSX files (converted to HS2 files) were only able to be processed in Hypack. Processing limitations necessitated the generation of mosaics by day instead of a mosaic of the entire area. Correspondence with QPS indicates that Qimera was able to make a GSF file for importation into FMGT, but this was not verified internally.

B.5. Data Processing

B.5.1. Software updates

Software updates are detailed in the DAPR. No further software updates occurred after the submission of the DAPR.

The following Feature Object Catalog was used: NOAA Extended Attribute Files V5_3_2.

B.5.2. Surfaces

The following CARIS surfaces were submitted: A one meter surface (un-finalized and finalized) was generated to fulfill the Complete Coverage requirement for this survey. A 2 meter surface was generated for junction analysis. A one meter BASE surface of the crosslines and a one meter BASE surface of the mainscheme survey lines were generated in order to conduct the crossline comparison analysis.

Surface Name	Surface Type	Resolution	Depth Range	Purpose
H12791_MB_1m_MLLW	Uncertainty	1 m	5.17 – 12.74 m	QC/Complete Coverage
H12791_MB_1m_MLLW_Final	Uncertainty	1 m	5.17 – 12.73 m	Complete Coverage
H12791_MB_2m_MLLW	Uncertainty	2 m	5.22 – 12.63 m	Junction Analysis
H12791_MB_Mainlines_1m_MLLW	Uncertainty	1 m	5.17 – 12.74 m	QC
H12791_MB_Crosslines_1m_MLLW	Uncertainty	1 m	5.44 – 12.14 m	QC

Table 9: CARIS surfaces

B.5.3. Data Cleaning Methodology

Data collected aboard the C-Worker 6 in particular was affected by inclement weather and considerable motion artifacts are present in some of the data. This was problematic for data cleaning. In an effort to expedite the cleaning and review process, the MBES data was cleaned utilizing a slightly different methodology than what is outlined in the DAPR. An uncertainty

surface was generated and a surface filter used with the following parameters: Threshold Type: Standard Deviation and Threshold value: 3.00. Deviations to this method as well as additional filtering on a line by line basis are detailed in the processing log. After the filter was applied, each line was reviewed individually in swath editor to ensure that the filter cleaned the data appropriately and did not remove any contacts. This accelerated the processing time while ensuring each line was reviewed.

B.5.4. Data Quality Control

After initial data cleaning, the surfaces were reviewed a second time for fliers using the standard deviation layer and the 3D display window, when necessary. All areas with a standard deviation of 0.25 m or higher were specifically examined. Higher standard deviation is generally associated with bathymetric features, contacts and/or areas of bathymetric change. Areas of noisy MBES data, although cleaned, can also show higher standard deviation as can areas of overlapping lines where depths do not compare well. The highest standard deviation of 0.80 m on the H12791_MB_1m_MLLW surface is located at 29.973 N, 91.415 W. This high standard deviation is associated with a contact that was submitted as a DtoN for survey H12791.

B.5.5. Additional Data Processing Notes

When initially opening the project on a new computer with a new directory letter, CARIS cannot resolve the data sources for day 160326 collected with the R/V *C-Wolf* (Figure 11). The user must reset the raw data location for this day only (Figure 12). This does not appear to affect data processing in any way.

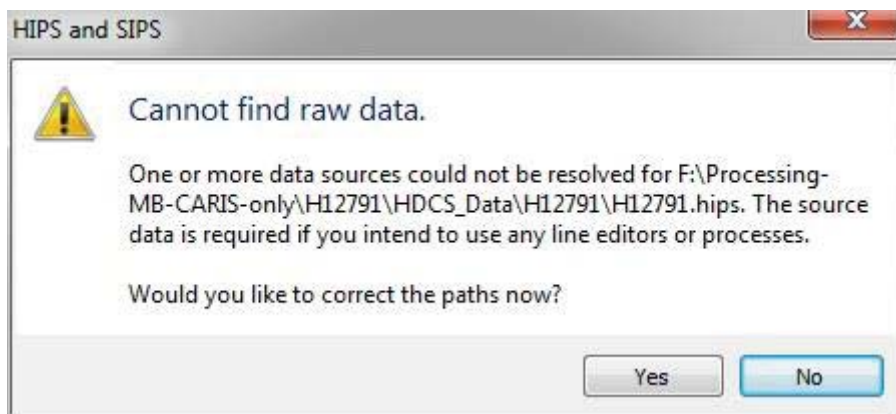


Figure 11. Display window from CARIS upon initially opening the project on a new computer/different directory.

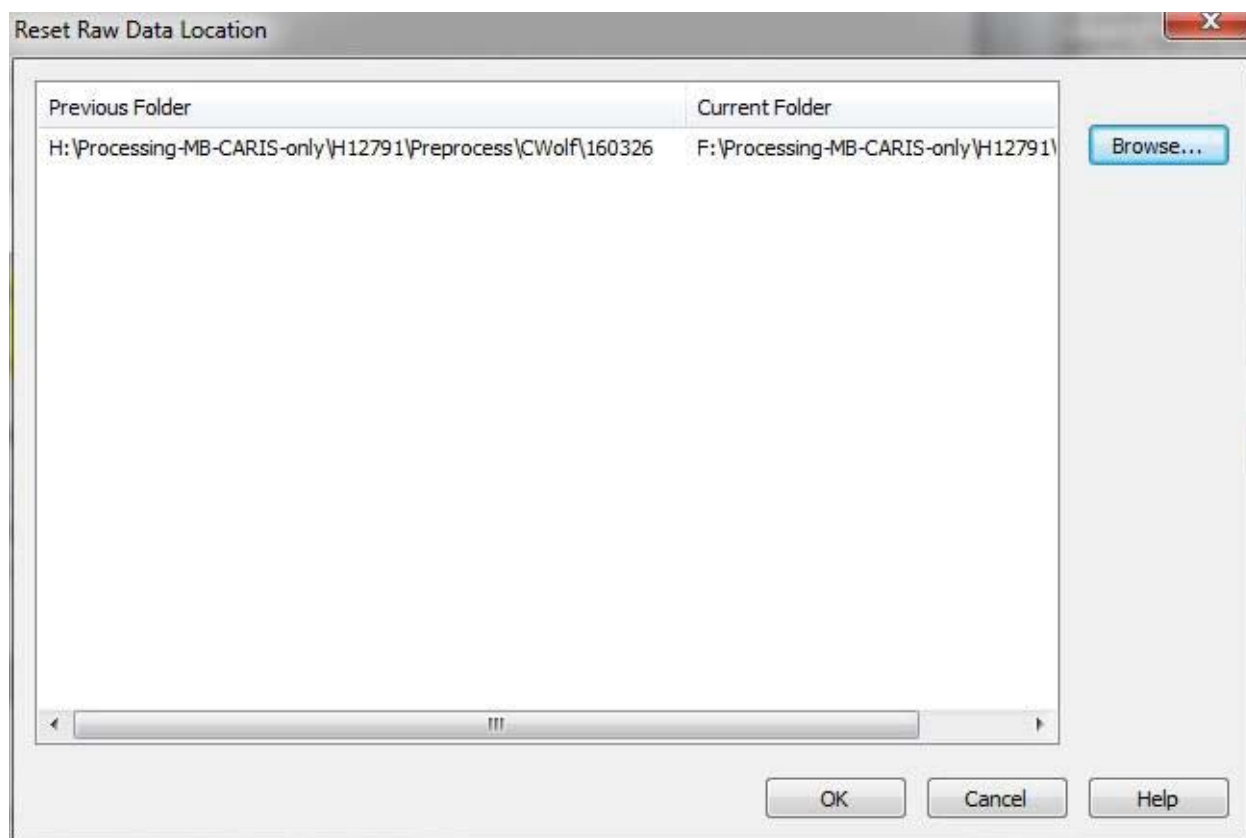


Figure 12. Reset raw data location window.

C. Vertical and Horizontal Control

A complete description of the horizontal and vertical control for the OPR-K379-KR-15 surveys is located within the accompanying Horizontal and Vertical Control Report (HVCR). A summary of the horizontal and vertical control is provided below.

C.1. Vertical Control

The vertical datum for this survey is Mean lower low water (MLLW).

C.1.1. Standard Vertical Control Methods Used:

C.1.1.1. Discrete Zoning

The following National Water Level Observation Network (NWLON) station(s) served as datum control of this survey.

Station Name	Station ID
LAWMA, Amerada Pass, LA	8764227

Table 10. Tide Stations



File Name	Status
8764227.tid	Verified

Table 11. Water Level Files (.tid)

File Name	Status
K379KR2015CORP.zdf	Final

Table 12: Tide Correctors (.zdf)

Preliminary zoning is accepted as the final zoning for project OPR-K379-KR-15 as outlined in the Tides and Water Levels Statement of Work section 1.5.1. This zoning was used for data collected in 2015 by the R/V *Sea Scout* and C-Worker 6 and data collected in 2016 by the R/V *C-Wolf*.

C.1.1.2. VDATUM

The file (Ellipsoid to Chart Datum) used to correct the data collected by the R/V *Sea Scout* in 2016 data is: GPS_HAE_Reduction_to_MLLW_SeaScout.tid

Data collected in 2016 by the R/V *Sea Scout* was corrected using primary C-Nav GPS ellipsoid heights reduced to MLLW. Refer to the DAPR for a detailed explanation.

C.2. Horizontal Control

The horizontal datum for this project is the North American Datum of 1983 (NAD83). All survey products are referenced to the Universal Transverse Mercator (UTM) zone 15 N, meters, projection.

C.2.1. PPK

Post- Processed Kinematic (PPK) GPS data was not used during post processing.

C.2.2. PPP

C & C Technologies' C-Nav network was used during survey operations. The C-Nav® Corrections Service is a global system for the distribution of dynamic DGNSS Precise Point Positioning corrections.

C.2.3. RTK

Real Time Kinematic DGPS was not used during survey operations.

C.2.4. DGPS

C & C Technologies' C-Nav network was used during survey operations. The C-Nav GPS systems aboard the vessels receive corrections through the C-Nav Subscription Services. This is

“a premier worldwide subscription service providing 5 cm or better positioning accuracy. GNSS corrections are broadcast via Inmarsat geostationary satellites, providing highly accurate and reliable positioning coverage from 72 degrees north to 72 degrees south latitude.” (<http://www.cnavgnss.com/products>)

D. Results and Recommendations

D.1. Chart Comparison

A combination of user defined color range charts and a selected sounding layer were used to compare surveyed soundings to charted depths. The selected sounding layer was generated as shoal-biased with a single defined radius of 150 meters to produce sufficient sounding density for comparisons purposes.

D.1.1. Raster Charts

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

Chart	Scale	Edition	Edition Date	LNLM Date	NM Date
11340	458596	79	02/2016	03/22/2016	03/26/2016
11356	80000	41	07/2014	03/22/2016	03/26/2016
11351	80000	43	03/2012	04/05/2016	04/09/2016

Table 13. Largest Scale Raster Charts

11340

No Local Notices to Mariners were issued within the survey bounds subsequent to the date of the project instructions and before the end of the survey. The last Local Notice to Mariners reviewed was LNM 15/16 8th Dist - Chart: 11340, Current Edition: 79 Print Date: Feb. /2016, Mississippi River to Galveston.

Surveyed soundings range from 2.83 – 6.97 fathoms (5.17 – 12.74 meters). Depths increase from northeast to southwest within the survey area. There are three charted depths within the survey bounds that are not associated with charted features such as obstructions. There is a 5 $\frac{3}{4}$ fathom depth in the southern portion of the survey area, a 2 $\frac{3}{4}$ fathom depth in the northeast corner of the survey area and a 4 fathom depth in the northwest corner of the survey area. Surveyed soundings generally compare well to within 1 – 1.5 feet of the 4 and 5 $\frac{3}{4}$ fathom charted depths. Surveyed soundings are generally deeper than the 2 $\frac{3}{4}$ fathom charted depth by 1.5 – 4.5 feet.

The 3 fathom contour on chart 11340 only just extends into the survey area in the far northeast portion of the survey area and an isolated region bounded by the 3 fathom contour extends into the survey area in the northeast corner of the survey area. The 5 fathom contour extends from northwest to southeast through the southwest corner of the survey area. A color range chart was used to compare surveyed soundings to charted depths (Figure 13).

The color range chart in CARIS can only be populated by values in meters. The following equations were used to determine the fathoms/feet/meters conversion:

$$\begin{aligned} 3 \text{ fathoms} &= 18 \text{ feet} = 5.4864 \text{ meters} \\ 5 \text{ fathoms} &= 30 \text{ feet} = 9.144 \text{ meters} \end{aligned}$$

However, according to section 5.1.2, the NOAA cartographic rounding (0.75 round value) can be applied when directly comparing to charted depths. For this reason, the following equations were used to determine the 0.75 round values for the contour comparison.

$$\begin{aligned} 2.75 \text{ fathoms} &= 16.5 \text{ feet} = 5.0292 \text{ meters} \\ 4.75 \text{ fathoms} &= 28.5 \text{ feet} = 8.6868 \text{ meters} \end{aligned}$$

It is evident from survey data, with the 0.75 soundings rounding used (Figure 13), that the 3 fathom contours are no longer present within this area and the 5 fathom contour has shifted northeast of its currently charted position (Figure 14).

Min	Max	Start	End
0	5.029		
5.029	8.687		
8.687	15		

Figure 13. User defined color range chart to compare surveyed soundings to 11340 charted contours.

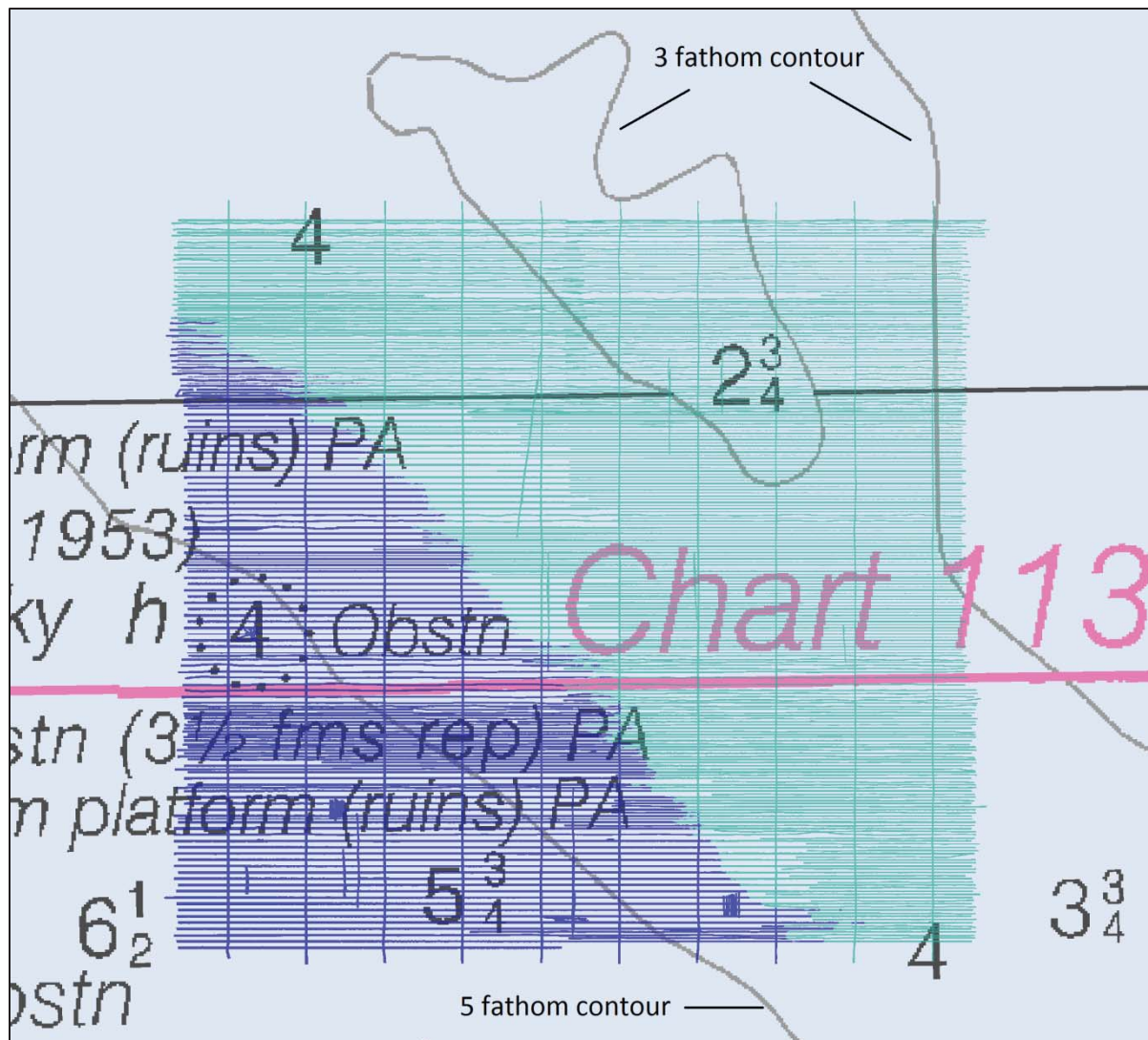


Figure 14. Comparison between surveyed soundings and charted 3 and 5 fathom contours. Light blue represents area between 2.75 fathoms (5.029 meters) and 4.75 fathoms (8.687 meters). Dark blue represents area where surveyed soundings are greater than 4.75 fathoms (8.687 meters).

11356

No Local Notices to Mariners were issued within the survey bounds subsequent to the date of the project instructions and before the end of the survey. The last Local Notice to Mariners reviewed was LNM 15/16 8th Dist - Chart: 11356, Current Edition: 41 Print Date: Jul. /2014, Isles Dernieres to Point au Fer.

Surveyed depths range from 16.98 to 41.82 feet (5.17 – 12.74 meters). In general, surveyed soundings are 1 – 3 feet deeper than charted depths throughout the survey area except in the east and northeast portions of the survey area where surveyed soundings can be 1 – 2 feet shallower than charted depths (Figure 15).

The 18 foot contour of chart 11356 extends north-south in the far northeast portion of the survey area and there are several isolated regions bounded by the 18 foot contour in the northeast corner of the survey area. The charted 30 foot contour extends from northwest to southeast through the southwestern corner of the survey area.

The color range chart in CARIS can only be populated by values in meters. The following equations were used to determine the fathoms/feet/meters conversion:

$$\begin{aligned}3 \text{ fathoms} &= 18 \text{ feet} = 5.4864 \text{ meters} \\5 \text{ fathoms} &= 30 \text{ feet} = 9.144 \text{ meters}\end{aligned}$$

However, according to section 5.1.2, the NOAA cartographic rounding (0.75 round value) can be applied when directly comparing to charted depths (Figure 16). For this reason, the following equations were used to determine the 0.75 round values for the contour comparison:

$$\begin{aligned}17.75 \text{ feet} &= 5.4102 \text{ meters} \\29.75 \text{ feet} &= 9.0678 \text{ meters}\end{aligned}$$

It is evident from survey data that the isolated 18 foot contours in the north-central portion of the survey area are no longer present. However, there are some isolated areas in the northeast corner of the survey area where surveyed soundings are less than 17.75 feet. The 30 foot contour has shifted northeast of the currently charted position (Figure 17).

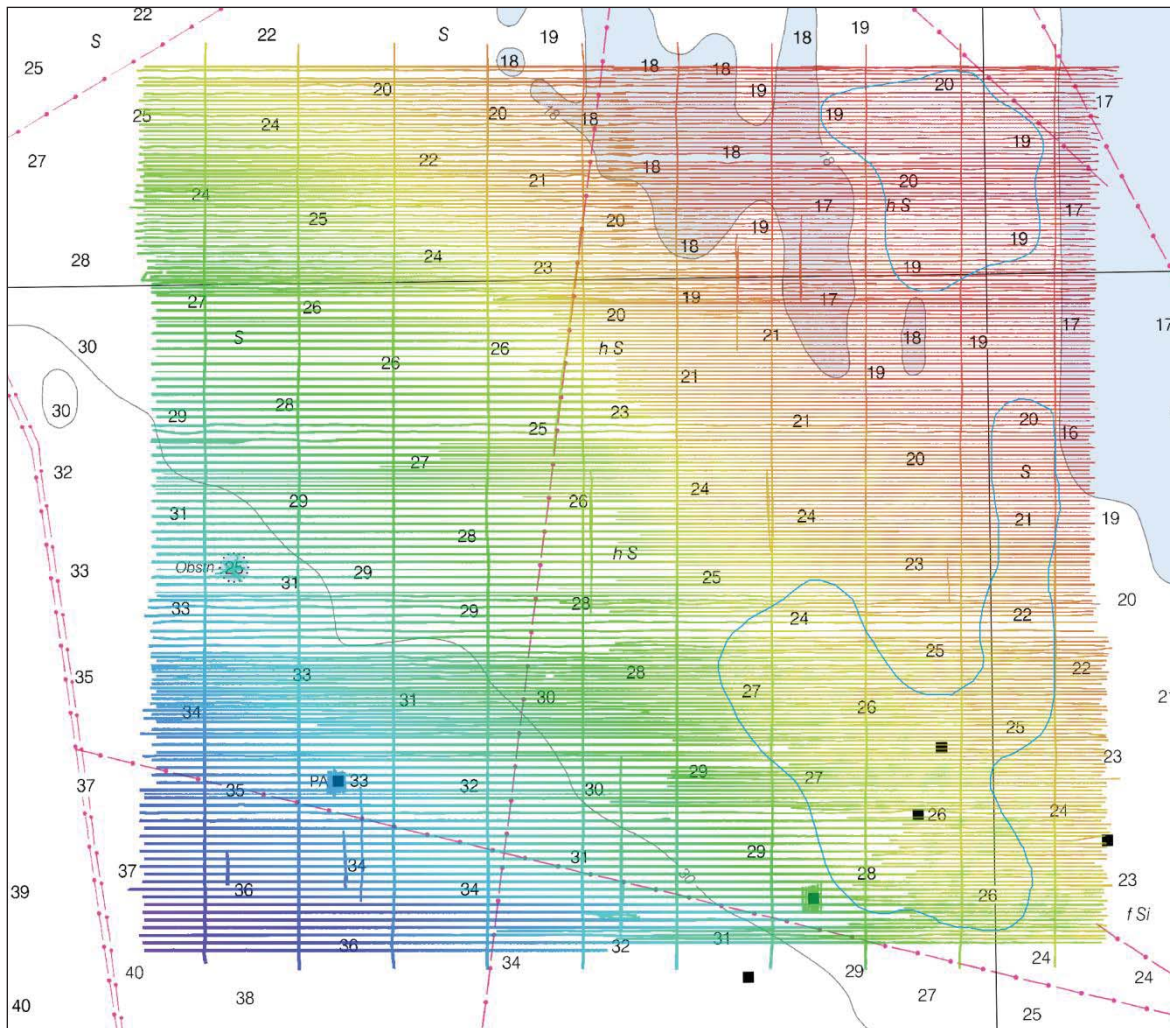


Figure 15. Comparison of surveyed soundings to charted depths. Areas in blue polygons represent areas where surveyed soundings are shallower than charted depths by 1 – 2 feet.

Min	Max	Start	End
0	5.41		
5.41	9.068		
9.068	15		

Figure 16. User defined color range chart to compare surveyed soundings to 11340 charted contours.

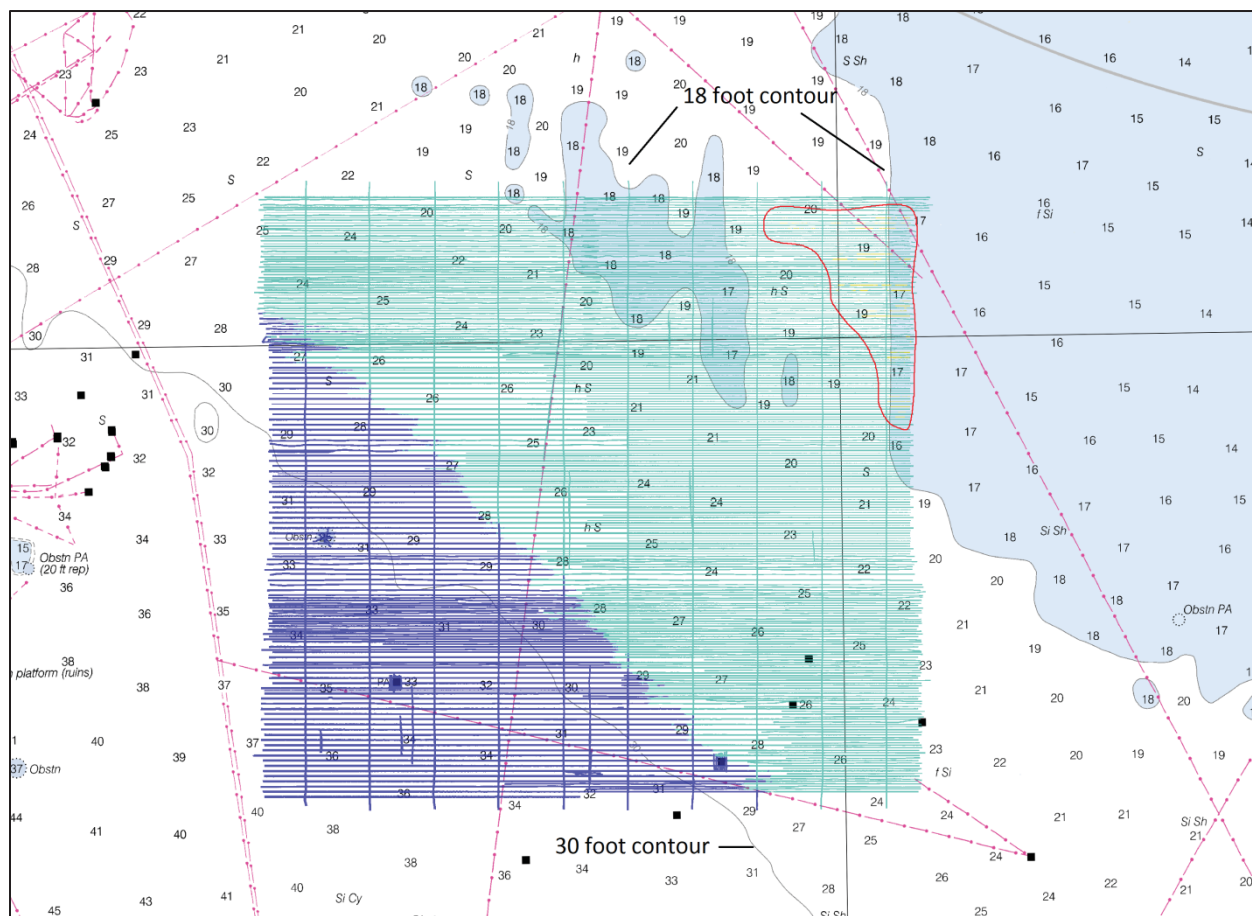


Figure 17. Comparison between surveyed soundings and 11356 charted depths, including the 18 and 30 foot contours. Yellow (inside red polygon) represents area where surveyed soundings are less than 17.75 feet (5.410 meters) Light blue represents area where surveyed soundings are between 17.75 feet (5.410 meters) and 29.75 feet (9.068 meters). Dark blue represents area where surveyed soundings are greater than 29.75 feet.

11351

No Local Notices to Mariners were issued within the survey bounds subsequent to the date of the project instructions and before the end of the survey. The last Local Notice to Mariners reviewed was LNM 15/16 8th Dist - Chart: 11351, Current Edition: 43 Print Date: Mar. /2012, Point au Fer and Marsh Island.

Chart 11351 covers the northern two-thirds of the survey area. Charted depths and contours closely match those of chart 11356 and the comparisons observed between surveyed soundings and charted depths of chart 11356 are generally valid for chart 11351. One exception exists in the chart overlap in the far eastern portion of the survey area where chart 11356 shows shallower depths than chart 11351 and a wider area encompassed by the 18 foot contour. Surveyed soundings are 2 feet shallower than the charted 20 foot depth of chart 11351.

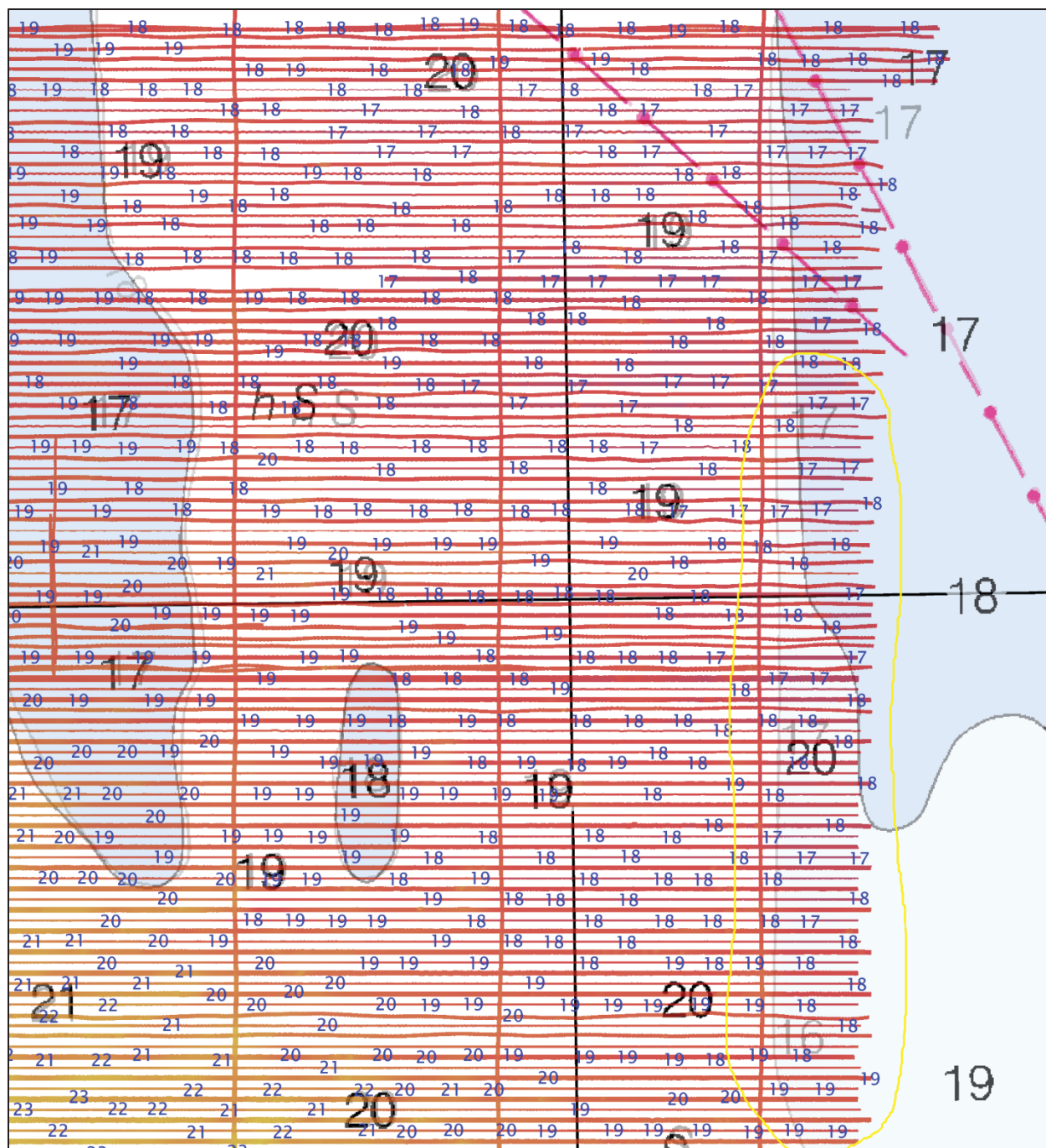


Figure 18. Chart 11351 (bold charted depths) over chart 11356 (faded charted depths) with survey bathymetry and selected soundings (in blue). Yellow polygon shows area where charted depths differ.

**D.1.2. Electronic Navigational Charts**

ENC Name	Scale	Edition	Update Application Date	Issue Date	Preliminary
US4LA21M	80000	27	2015-03-25	2016-04-01	NO
US4LA25M	80000	17	2013-09-19	2016-01-29	NO

*Table 14. Largest Scale ENC's*US4LA21M

ENC US4LA21M covers the northern two-thirds of the survey area. Depths on ENC US4LA21M generally match those of chart 11351 or are 1 foot shallower, particularly in the northeast corner of the survey area. Contours of ENC US4LA21M also match those of chart 11351. The observations made between surveyed soundings and depths on chart 11356 and 11351 are generally valid for the ENC.

US4LA25M

ENC US4LA25M covers the southern third of the survey area. Depths and contours on ENC US4LA21M generally match those of chart 11356 and the observations made between surveyed soundings and depths on chart 11356 are generally valid for the ENC. One exception where an ENC depth is greater than the charted depth of 11356 exists at 29.948 N, 91.326 W. Surveyed soundings more closely match the charted 24 foot depth of 11356 rather than the 26 foot charted depth of the ENC.

D.1.3. AWOIS Items

AWOIS item investigations were not assigned for this project.

D.1.4. Maritime Boundary Points

Maritime Boundary Points were not assigned for investigation within H12791 survey bounds.

D.1.5. Charted FeaturesChart 11340

In addition to three charted depths and the 3 and 5 fathom contours charted within the survey area (refer to the chart comparisons section above), there is one charted 4 fathom obstruction in the survey area. This obstruction was submitted as a DtoN for this survey. Refer to section D.1.7 and the Final Feature File for additional information.

Chart 11356

In addition to the charted depths and 18 and 30 foot charted contours (refer to the chart comparisons section above) there is one charted 25 foot obstruction within the survey area. This obstruction was submitted as a DtoN for this survey. There are also four charted pipelines that



extend to some degree through the survey area and four charted platforms (one PA) within the survey area. Refer to sections D.1.7, D.2.5 and D.2.7 as well as the Final Feature File for additional information.

Chart 11351

No additional charted features than what was previously described for charts 11340 and 11356 exist on chart 11351. Previously described feature remarks are valid for chart 11351.

US4LA21M

No additional features are observed on the ENC that are not charted on RNC 11356 or 11351. Previously described feature remarks are valid for ENC US4LA21M.

US4LA25M

No additional features are observed on the ENC that are not charted on RNC 11356 or 11351. Previously described feature remarks are valid for chart ENC US4LA25M.

D.1.6. Uncharted Features

One uncharted Danger to Navigation was submitted for survey H12791. Refer to the Final Feature File for additional information.

D.1.7. Dangers to Navigation

One Danger to Navigation was submitted for survey H12791. Refer to the Final Feature File for additional information.

D.1.8. Shoal and Hazardous Features

No additional shoal or hazardous features were observed visually or within survey data that have not been discussed in sections D.1.6, D.1.7, D.2.4, D.2.6 or D.2.7.

D.1.9. Channels

No channels are currently charted within the survey limits, and none were observed during survey operations.

D.1.10. Bottom Samples

Eight bottom samples were collected within the limits of H12791. Refer to Separates\Acquisition_&_Processing_Logs\Detached_Positions and the Final Feature File for additional information.



D.2. Additional Results

D.2.1. Shoreline Verification

There is no Shoreline Verification for this survey.

D.2.2. Prior Surveys

Prior survey data was not required to be evaluated for this survey.

D.2.3. Aids to Navigation

No Aids to Navigation are currently charted within the survey area, and none were observed either visually or within survey data.

D.2.4. Overhead Features

Overhead features do not exist for this survey.

D.2.5. Submarine Features

Four charted submarine pipelines extend to some degree through the H12791 survey area. A series of SSS contacts were identified along the pipeline that extends southwest-northeast through the central portion of the survey area (Fig 19). These contacts were insignificant and not pipeline exposures (Figure 20).

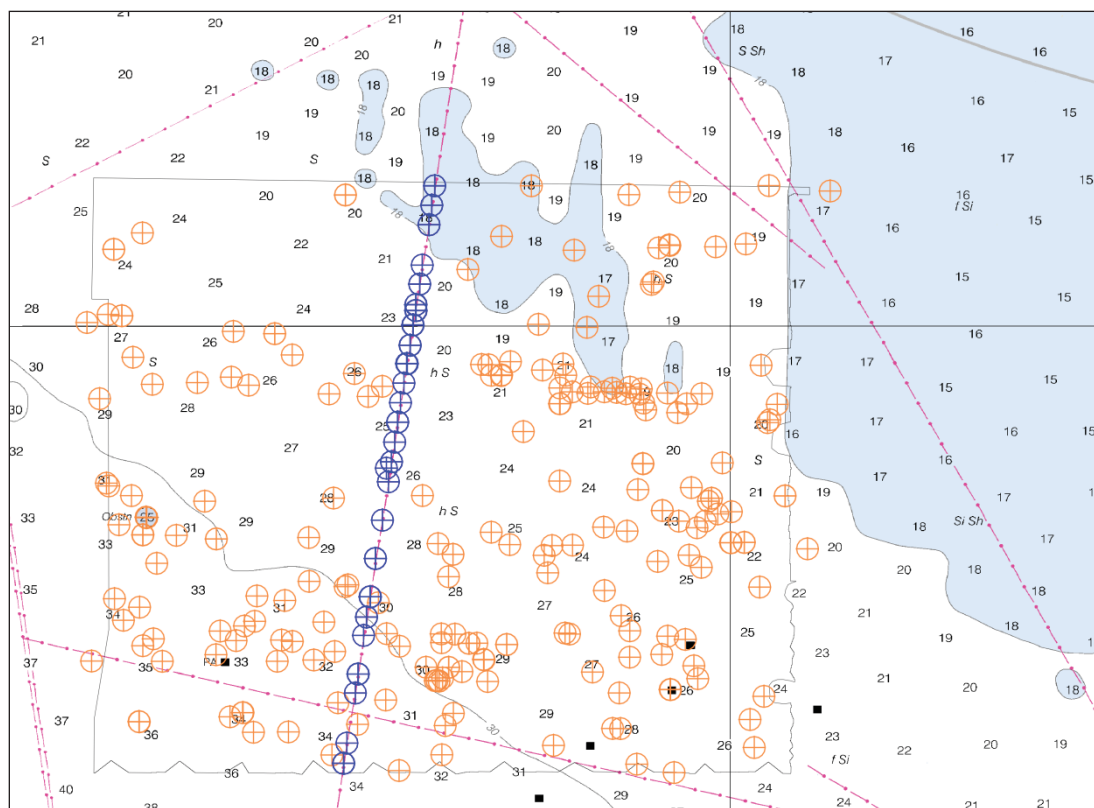


Figure 19. Series of SSS contacts identified along a pipeline within the survey bounds of H12791.



Figure 20. Typical SSS signature of contacts identified along a pipeline within the survey bounds of H12791

D.2.6. Ferry Routes and Terminals

No ferry routes or terminals are currently charted within the survey limits, and none were observed during survey operations.



D.2.7. Platforms

There are four platforms charted within the bounds of H12791. One platform was observed visually and within survey data near a currently charted platform. The three other platforms were not observed visually or within survey data and the hydrographer recommends removal from the chart. The CSF file contains two platforms associated with the one charted PA platform, which the hydrographer also recommends to remove. Feature disprovals were conducted over charted platforms that no longer exist. It is recognized that only a 120 m radius around the charted PA platform was covered with 200% SSS. No contacts were observed in either the 100% or 200% SSS data. Refer to the Final Feature File for additional information as well as Separates\I_Acquisition_ & _Processing_Logs\Detached_Positions.

D.2.8. Significant Features

The Final Feature File includes one additional obstruction that was not submitted as a Danger to Navigation. This obstruction meets the minimum measurement requirements according to surveyed soundings (2 m x 2 m x 1 m) for the Final Feature File.

The north/northeast portion of the survey area in particular is a dynamic area. Changes in SSS signatures and bathymetry over time were observed, for example, changes are evident between the time that the C-Worker 6 ASV collected data and the R/V *Sea Scout* collected split line data. These changes do not pose a danger to navigation. Refer to mosaics H12791_SSS_1of5 and H12791_SSS_3of5 in particular.

D.2.9. Construction and Dredging

No active dredging or construction was observed during survey operations.

D.3. Recommendations

D.3.1. New Survey Recommendations

No new surveys or investigations are recommended for this area.

D.3.2. Inset Recommendations

No new insets are recommended for this area.



E. Approval Sheet

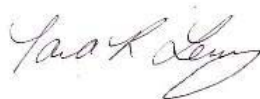
LETTER OF APPROVAL

REGISTRY NUMBER H12791

This report is respectfully submitted.

Field operations contributing to the accomplishment of the H12791 survey were conducted under my direct supervision with frequent personal checks of progress and adequacy. This report and CARIS project have been closely reviewed and are considered complete and adequate as per the Statement of Work.

This report is accompanied by the Data Acquisition and Processing Report for project OPR-K379-KR-15.



**Tara
Levy**

Digitally signed
by Tara Levy
Date: 2016.04.28
09:25:57 -05'00'

Tara Levy
Chief of Party
C & C Technologies
April 2016



Nicole Galloway
Geoscientist
C & C Technologies
April 2016

APPENDIX I

TIDES AND WATER LEVELS

FINAL TIDE NOTE and FINAL TIDE ZONING CHART

DATE: April 2016

HYDROGRAPHIC BRANCH: Atlantic

HYDROGRAPHIC PROJECT: OPR-K379-KR-15

HYDROGRAPHIC SHEET: H12791

LOCALITY: Approaches to Atchafalaya Bay

TIME PERIOD: September 6, 2015 – March 26, 2016

TIDE STATION USED: 8764227 LAWMA, LA

Lat. 29° 26.9' N Lon. 91° 20.3' W

PLANE OF REFERENCE (MEAN LOWER LOW WATER): 0.00 m

HEIGHT OF HIGH WATER ABOVE PLANE OF REFERENCE: 1.53 m

REMARKS: RECOMMENDED ZONING

Use zones identified as: WGM263, WGM264, WGM278

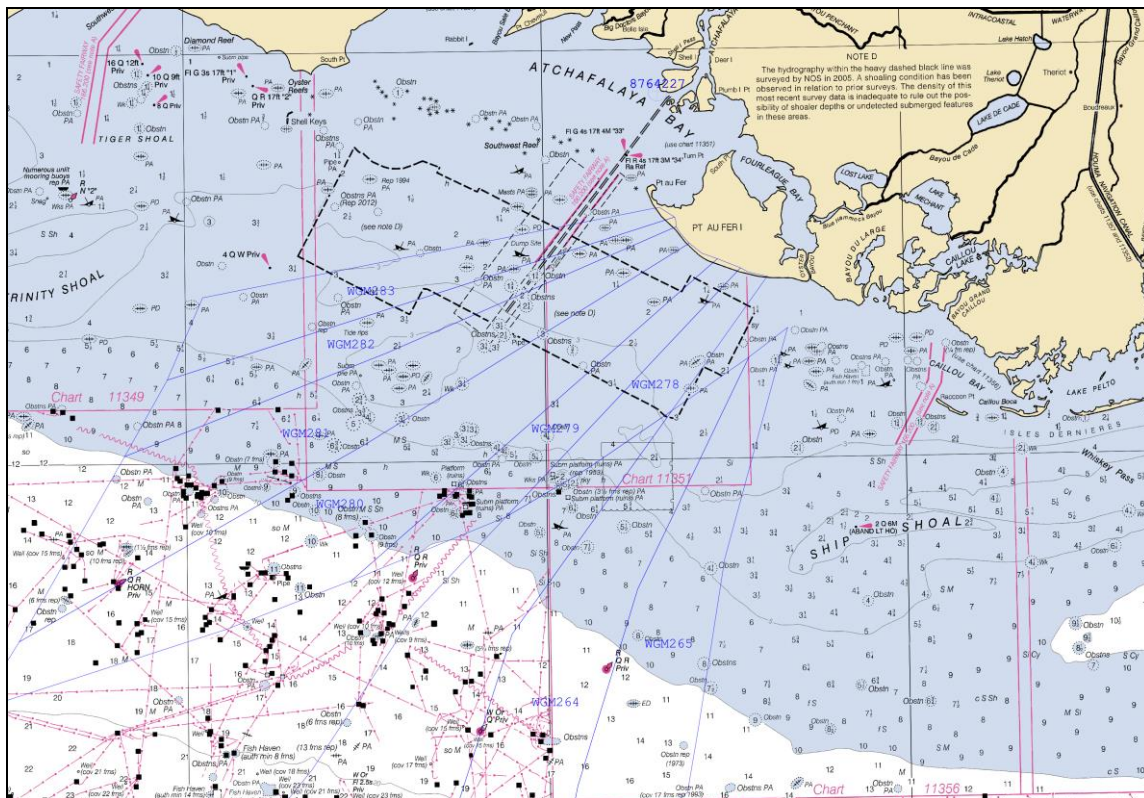


Figure 1. Final Tidal Zoning Chart

Note 1: Provided time series data are six minute time series data in meters, relative to MLLW and Greenwich Mean Time (GMT).

Note 2: For final processing, tidal zoning correctors were applied to verified observed data, acquired from the NOAA Tides and Currents website.

Note 3: For final processing of R/V *Sea Scout* data collected in 2016, ellipsoid derived vertical correctors were applied

APPENDIX II

SUPPLEMENTAL SURVEY RECORDS AND CORRESPONDENCE



H12791

James J. Miller <james.j.miller@noaa.gov>

Tue, Mar 21, 2017 at 12:00 PM

To: Christy Fandel <christina.fandel@noaa.gov>

Cc: Russell Quintero - NOAA Federal <russell.quintero@noaa.gov>, Starla Robinson - NOAA Federal <starla.robinson@noaa.gov>, Briana Welton - NOAA Federal <briana.welton@noaa.gov>, Castle Parker <castle.e.parker@noaa.gov>, Melody Ovard - NOAA Federal <melody.ovard@noaa.gov>, Megan Greenaway - NOAA Federal <megan.greenaway@noaa.gov>

Christy,

I complete agree with all of your points, and thank you for bringing up the question of whether the data is supported in older versions of FMGT. I checked all of the versions dating back to 2014 (prior to H12791) and unfortunately HSX files are not supported in any of the versions. The current version of FMGT supports the widest range of files: GSF, ALL, XTF, S7K, and 7K.

The good news is that much of the backscatter data for H12791 was already provided in .ALL format, which is compatible in FMGT. Only the C-Worker ASV data was provided in .HSX format.

Respectfully,
James

James J. Miller
Physical Scientist
NOAA Office of Coast Survey
Atlantic Hydrographic Branch
439 W York St | Norfolk, VA | 23510
757-441-6746 x 111

On Tue, Mar 21, 2017 at 11:40 AM, Christy Fandel <christina.fandel@noaa.gov> wrote:

All,

I apologize for the late response.

As James mentioned in his last email, neither NOAA or contractor field units are required to submit a backscatter mosaic per HSSD. It is my understanding this requirement will not be adopted until the 2018 publication of HSSD.

In an effort to maintain consistency between our NOAA and contractor project requirements and maintain the HSSD as the authoritative source for these requirements, I would *not* advocate that the addition of a backscatter mosaic or FMGT project be added as a deliverable in the SOW for contractor field units.

In this case, C&C should be required to re-submit the H12791 backscatter data in accordance with the 2015 HSSD Section 8.4.4 (*i.e.* in a format readable by IVS Fledermaus Geotoolbox). One note, it should be verified that the submitted files are not readable in the version of the FMGT Geotoolbox that was active at the time of submission. If a version update is the reason these files are not readable, we will need to reconsider the course of action.

All that said, I am not the COR for this task order, final guidance should come from the COR, Starla in conjunction with Emily Clark who is the contract specialist on this task order.

Christy

On Tue, Mar 21, 2017 at 11:12 AM, James J. Miller <james.j.miller@noaa.gov> wrote:

Russ,

Thank you, it will be very helpful to receive FMGT-compatible files from the field unit.

Regarding the other question, I wanted to clarify that the field units (contractors and NOAA ships) are not required to generate or provide a mosaic. They are only required to provide the backscatter lines in a format that is compatible with FMGT. I am not sure why Oceaneering decided to process their own backscatter data and create mosaics during

this project. They might not choose to go through that process again. But if a field unit does decide to go through this process for their own reasons, it would be helpful if they could voluntarily provide the resulting files to the branch.

Respectfully,
James

James J. Miller
Physical Scientist
NOAA Office of Coast Survey
Atlantic Hydrographic Branch
439 W York St | Norfolk, VA | 23510
[757-441-6746](tel:757-441-6746) x 111

On Tue, Mar 21, 2017 at 9:25 AM, Russell Quintero - NOAA Federal <russell.quintero@noaa.gov> wrote:

So I definitely think Starla should ask them to submit the needed files to be in compliance, not have AHB attempt to generate them through the acquisition of a new license. The deliverable was X, that's what is expected to be delivered.

As for the project files...I'll pass that along to all of the CORs as a lesson learned. Since they have to generate the mosaic anyway, they are making these files and submission of them shouldn't incur any additional cost while saving the HB time/money. I'll look into getting it added in for this year's SOW.

Lieutenant Russell Quintero, NOAA
Chief, Hydrographic Surveys Division Operations Branch
National Oceanic & Atmospheric Administration
1315 East-West Hwy, SSMC3 6217
Silver Spring, MD 20910
Cell: 970-481-2030

On Mon, Mar 20, 2017 at 4:41 PM, James J. Miller <james.j.miller@noaa.gov> wrote:

Russ,

You are understanding the situation correctly, and I agree with your assessment. On survey H12791 the backscatter data from the C-Worker ASV was not provided in a format compatible with FMGT, which is in noncompliance with 2015 HSSD Section 8.4.4. Fortunately this issue is isolated to the the C-Worker. The backscatter data from the other two platforms that were used for survey H12791 is compatible with FMGT.

The C-Worker backscatter data was logged in HSX format. Since HSX files are not compatible with FMGT, the field unit used Hypack to generate a backscatter mosaic. Depending on how the files were processed in Hypack, the backscatter project does not necessarily include GSF files. So even if the field unit provides their mosaic and Hypack backscatter project, it might not meet our need for both the mosaic and the GSF files. An alternative method of creating GSF files is described in the DR: "Correspondence with QPS indicates that Qimera was able to make a GSF file for importation into FMGT, but this was not verified internally."

B.4. Backscatter

Backscatter was logged within each Kongsberg EM file collected aboard the R/V *Sea Scout* and R/V *C-Wolf*. This data was imported during CARIS conversion and reviewed when necessary. Backscatter mosaics of the EM3002 data were able to be generated using CARIS 9.0. The

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Descriptive Report to Accompany Survey H12790
OPR-K379-KR-15



EM2040C data was unable to be processed in CARIS 9.0. CARIS correspondence indicates that EM2040C backscatter data should be able to be processed in CARIS 9.1 but this has not been tested internally. The Kongsberg .all files were imported and backscatter mosaics generated using FMGT version 7.5.1. Several errors were encountered with the following lines: 344_5084a, 052_5019a-2.0, 053_5001a, H91-CB-11.0. Mosaics would not process with these lines and they were removed from the project. Processing limitations necessitated the generation of several small mosaics instead of a mosaic of the entire area.

Backscatter was logged within each .HSX file collected aboard the C-Worker 6. Although extensive testing and correspondence with Hypack and QPS was conducted, at this point in time the HSX files (converted to HS2 files) were only able to be processed in Hypack. Processing limitations necessitated the generation of mosaics by day instead of a mosaic of the entire area. Correspondence with QPS indicates that Qimera was able to make a GSF file for importation into FMGT, but this was not verified internally.

As a first step, perhaps we can ask the field unit whether their Hypack backscatter project for the C-Worker already includes GSF files? If the project does not include GSF files, perhaps we could ask the field unit to conduct the necessary steps to provide the C-Worker backscatter data in any FMGT-compatible format? Or AHB could try generating GSF files in Qimera? I think the last option would require getting a Qimera license for AHB.

A related but separate question in the original email was regarding the backscatter data from the other two platforms in H12791, as well as the other surveys in project OPR-K379-KR-15 (H12787, H12788, H12789, H12790) which all did not include data from the C-Worker ASV. All of this backscatter data was logged in FMGT-compatible .ALL format, so the HSSD requirement was met. Yet it appears the field unit already created FMGT projects for all of this data, so we were inquiring about why the field unit was not permitted to voluntarily provide the FMGT projects, since it would have saved AHB a significant amount of processing time. Today Starla clarified that we are not permitted to accept deliverables beyond what is required in the HSSD and SOW, even if they are offered voluntarily.

Respectfully,
James

James J. Miller
Physical Scientist
NOAA Office of Coast Survey
Atlantic Hydrographic Branch
439 W York St | Norfolk, VA | 23510
757-441-6746 x 111

On Mon, Mar 20, 2017 at 2:33 PM, Russell Quintero - NOAA Federal <russell.quintero@noaa.gov> wrote:
It reads to me like the situation is this:

- 1) We submit the mosaic and GSF files to NCEI. This is our product here.
- 2) The HSSD requires FMGT compatible data.

The KR submitted data, but it did not meet the spec requirement for compatible data and the required product was neither delivered nor able to be reproduced after the fact by AHB.

I'm a little unclear on the question, and must admit I have not read this specific SOW yet...but it looks to me like they failed to deliver what was required. It's not a question of asking them to submit something additional, it's a matter of asking them to submit the expected deliverable.

Am I misunderstanding something? If not, Starla should reach out to them and ask for the GSF files and, if it was in the SOW, the mosaic.

Lieutenant Russell Quintero, NOAA
Chief, Hydrographic Surveys Division Operations Branch
National Oceanic & Atmospheric Administration
1315 East-West Hwy, SSMC3 6217
Silver Spring, MD 20910
Cell: 970-481-2030

On Mon, Mar 20, 2017 at 11:58 AM, Starla Robinson - NOAA Federal <starla.robinson@noaa.gov> wrote:
Hello folk, (adding Christy and Megan into the conversation)

James, you are correct we are not allowed to accept deliverables beyond the SOW. Like you said, C&C did offer their FMGT projects and products, but OPS decision was to still ask them not to submit. That conversation was mostly between Mike and Jasko.

LT Quintero, given that we need their products to meet the deliverable, could an exception can be made? How can we address this for future projects, since this seems to be a trend with C&C?

Thanks,
Starla

On Fri, Mar 17, 2017 at 4:19 PM, James J. Miller <james.j.miller@noaa.gov> wrote:
Hi Starla,

AHB has some questions regarding multibeam backscatter on survey H12791 (Oceaneering project OPR-K379-KR-15). Melody is currently conducting the SAR for this survey. She noted that the field unit collected much of the mainscheme multibeam data using the C-Worker, an autonomous surface vessel. According to the DAPR, the C-Worker logged backscatter in .HSX format, and mosaics were generated from the .HSX files using Hypack.

A.5.4. Backscatter

Backscatter was acquired and logged within each raw MB file. EM2040C .all files were recorded aboard the R/V *Sea Scout*, EM3002 .all files were recorded aboard the R/V *C-Wolf* and R/V *C-Ghost* and EM2040C .HSX files were recorded aboard the C-Worker 6. The backscatter from the .all files was imported during CARIS conversion and reviewed when necessary. The .all data was also imported into FMGT for verification and review. Backscatter mosaics from the HSX data were created using Hypack.

The DR provides additional information about backscatter logging and processing for the C-Worker, as well as the different process that was used for the other survey platforms.

B.4. Backscatter

Backscatter was logged within each Kongsberg EM file collected aboard the R/V *Sea Scout* and R/V *C-Wolf*. This data was imported during CARIS conversion and reviewed when necessary. Backscatter mosaics of the EM3002 data were able to be generated using CARIS 9.0. The

16



Descriptive Report to Accompany Survey H12790
OPR-K379-KR-15



EM2040C data was unable to be processed in CARIS 9.0. CARIS correspondence indicates that EM2040C backscatter data should be able to be processed in CARIS 9.1 but this has not been tested internally. The Kongsberg .all files were imported and backscatter mosaics generated using FMGT version 7.5.1. Several errors were encountered with the following lines: 344_5084a, 052_5019a-2.0, 053_5001a, H91-CB-11.0. Mosaics would not process with these lines and they were removed from the project. Processing limitations necessitated the generation of several small mosaics instead of a mosaic of the entire area.

Backscatter was logged within each .HSX file collected aboard the C-Worker 6. Although extensive testing and correspondence with Hypack and QPS was conducted, at this point in time the HSX files (converted to HS2 files) were only able to be processed in Hypack. Processing limitations necessitated the generation of mosaics by day instead of a mosaic of the entire area. Correspondence with QPS indicates that Qimera was able to make a GSF file for importation into FMGT, but this was not verified internally.

According to the 2015 HSSD (in effect during project OPR-K379-KR-15), multibeam backscatter data must be submitted in a format readable in FMGT. Since HSX files are not readable in FMGT, the field unit did not meet this specification for the C-Worker data. AHB attempted a work around by exporting GSF files from the Caris project, and importing the GSF files into FMGT. Unfortunately, the work around was not successful.

8.4.4 Backscatter Deliverables

The hydrographer shall submit raw backscatter data in a format readable by IVS Fledermaus Geocoder Toolbox. The raw backscatter data shall be delivered in the backscatter folder.

In correspondence with HSD OPS, the field unit offered to submit the processed backscatter projects and mosaics (made in FMGT and Hypack) in order to "avoid some issues we have experienced in the past with the files not being readable" (email attached). HSD OPS replied that the field unit should not include the backscatter projects or mosaics. This correspondence highlights two interesting topics.

1) Since HSX files are not compatible with FMGT, the field unit used Hypack to generate backscatter mosaics. Depending on how the files were processed in Hypack, the backscatter projects did or did not include GSF files. This is an important detail, because the branches send both backscatter mosaics and GSF files to NCEI. So even if the field unit had been permitted to submit the Hypack backscatter project, it might not have met our backscatter needs.

2) The field unit's FMGT projects represent a similar situation. Project OPR-K379-KR-15 consists of 5 surveys and over 100 square nautical miles of coverage, and the field unit used FMGT to process the backscatter for the vast majority of the project (everything except the portion of survey H12791 that was

acquired by the C-Worker ASV). If the field unit imported their .ALL files by pairing with the HDCS data, the FMGT projects did include the GSF files we need. This would have saved AHB very considerable processing time during the SAR. This situation is similar to the Hassler, which voluntarily provides FMGT projects and mosaics that generally don't require additional work at AHB.

After discussing this matter with Gene and Bri, we are curious why HSD OPS declined the field unit's offer to submit their backscatter projects? Perhaps the rules for contractors dictate that we cannot accept deliverables beyond what is required in the HSSD and SOW? We understand that we cannot *request* additional deliverables, but it is not clear whether we can *accept* additional deliverables that are offered voluntarily.

Respectfully,
James

James J. Miller
Physical Scientist
NOAA Office of Coast Survey
Atlantic Hydrographic Branch
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--

Physical Scientist
Hydrographic Surveys Division
Office of Coast Survey, NOAA
Christina.Fandel@noaa.gov
(301) 713 - 2702 x 133



Survey H12791 Rejection Notification or Waiver?

Starla Robinson - NOAA Federal <starla.robinson@noaa.gov>

Mon, Apr 24, 2017 at 10:11 AM

To: Briana Welton - NOAA Federal <briana.welton@noaa.gov>

Cc: Corey Allen - NOAA Federal <corey.allen@noaa.gov>, "Russell Quintero" <russell.quintero@noaa.gov>, James Miller - NOAA Federal <james.j.miller@noaa.gov>, Christina Fandel - NOAA Federal <christina.fandel@noaa.gov>

Following up on this the ASV Backscatter question... We are going to issue a waiver and take steps in future HSSD to address the issue. There are other KR that log backscatter in formats that we cannot access. Providing a waiver will be consistent with current practice.

Russell - Below is my draft. Does this need to be sent to Oceaneering through Emily?

Thanks,
Starla

"HSD waives the requirement that survey H12791 submits raw data readable by IVS Fledermaus Geocoder Toolbox, as required by the 2015 Hydrographic Survey Specifications and Deliverables (HSSD) Section 8.4.4 Backscatter Deliverables.

Please copy this guidance into the surveys correspondence folder.

Thank you,
Starla Robinson"

On Tue, Apr 11, 2017 at 6:27 PM, Briana Welton - NOAA Federal <briana.welton@noaa.gov> wrote:

All,

The KR did not record the full time-series backscatter from the EM2040 on CWorker 6. They recorded only the beam-averaged value into the RMB string of the .hsx file. That's not really my idea of backscatter, however, the PIs did not specify state what kind of backscatter to log and the 2015 HSSD does not either. (The 2016 HSSD specifically says time-series.) Even if they could provide mosaics, I don't think we'd want them given that the point of mosaics is to advertise the fact that there is raw backscatter to be had with the survey.

The only infraction/violation that I can tell is that they did not meet the requirement to provide FMGT-compatible files. In future, we should specify the exact type of backscatter we want, and would be so bold as to say that should include the number of samples to ensure we're sampling over the whole beam foot print but not over-sampling to clog up our storage drives.

V/r,

Bri

On Mon, Apr 10, 2017 at 5:29 PM, Starla Robinson - NOAA Federal <starla.robinson@noaa.gov> wrote:

AHB and OPS Chief (Oceaneering Removed),

C&C survey H12791 does not have raw data that can be read by FMGT, so they technically they failed the 2015 HSSD. They give two workarounds that would provide a processed file that could be read by FMGT, which would require purchase of a license purchase to pursue.

Do we want to waive the requirement or should I send the following survey rejection notification with a SAR? Could we waive the requirement on the condition that we use C&C's mosaics?

Thanks,
Starla

"Dear Oceaneering,

H12791 has failed the Survey Acceptance Review (SAR) in regards to 2015 Hydrographic Survey Specifications and Deliverables (HSSD) Section 8.4.4 Backscatter Deliverables. The raw data is not readable by IVS Fledermaus Geocoder Toolbox. The corrective action of converting the data to a readable format would satisfy the requirement. If not corrected performance will not meet some contractual requirements.

Thank you,
Starla Robinson"

8.4.4 Backscatter Deliverables

The hydrographer shall submit raw backscatter data in a format readable by IVS Fledermaus Geocoder Toolbox.
The raw backscatter data shall be delivered in the backscatter folder.

On Thu, Apr 6, 2017 at 4:19 PM, Galloway, Nicole <ngalloway@oceaneering.com> wrote:
Good afternoon Starla,

Sorry for the delay in my response, I have been in and out of the office for the past week. Today I went through my documentation and found that we do not currently have an FMGT project for the C-Worker data but had been working toward a solution for this. We had processed all backscatter data in Hypack, but due to processing limitations, each day had to be processed separately.

We attempted to export GSF files from Hypack to import into FMGT, but found that this did not work. We had extensive correspondence with both QPS and Hypack regarding the issue.

QPS development looked into the GSF files and found it was missing a critical element (sensor ID) that FMGT requires for processing. QPS suggested two workarounds:

- 1 - Qimera was able to produce a GSF file that imported into FMGT
- 2 - Use an XTF file exported from Hypack

We attempted to convert the HSX to XTF in Hypack but these did not import into FMGT.

Correspondence with Hypack is inconclusive. The sensor ID issue was passed on to Hypack and Hypack support mentioned they would talk to QPS, but nothing further (in 2015). The issue was re-addressed in 2016. The last correspondence (August 15, 2016) indicates that Hypack

 [H12791-C-Worker-backscatter.zip](#)

may have some fixes in place.

At this point in time, neither the Qimera nor Hypack 2017 workarounds have been assessed because we do not currently have licenses for these programs.

I have attached all QPS and Hypack correspondence as well as the mosaics we generated in Hypack (as a Google Drive link - please let me know if you have issues with the link).

Thank-you!
Nikki

On Tue, Apr 4, 2017 at 1:08 PM, Starla Robinson - NOAA Federal <starla.robinson@noaa.gov> wrote:
Hello Nikki,

You mentioned that you have generated FMGT projects and projects. Do you have them for the H12791 C-Worker data?

Thank you,
Starla

On Thu, Mar 3, 2016 at 5:22 PM, Nicole Galloway <ngalloway@oceaneering.com> wrote:
Hi Starla,

As per correspondence below, we will not include the backscatter mosaics with our project deliverables, but we have generated FMGT projects and products in order to ensure that the files import without issue. We can certainly make the projects/products available should you find the need for them.

Thanks!
Nikki

On 3/3/2016 9:08 AM, Starla Robinson - NOAA Federal wrote:

Hello Tara,

I figured that was the case. We would prefer you leave the multibeam backscatter mosaics out of the package.

Thank you,
Starla

On Thu, Mar 3, 2016 at 9:33 AM, Tara Levy <tlevy@oceaneering.com> wrote:

Starla,
Thank you for letting us know this. We have however processed the back-scatter so that we can avoid some issues we have experienced in the past with the files not being readable.
He have the back-scatter Mosaics completed even if they are not required can we still submit them or is it preferred that we do not?

--

Best regards,
Tara Levy
Division Manager ~NOAA

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Mobile (+1) [337-296-3029](tel:337-296-3029)
tlevy@oceaneering.com



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Thank you for your cooperation.

On 3/2/2016 1:49 PM, Starla Robinson - NOAA Federal wrote:

Hello Tara,

HSD OPS was recently notified that C & C (Oceaneering) has been submitting multibeam backscatter mosaics as part of their final deliverables. To clarify, following 8.4.4 of the Hydrographic Specifications and deliverables, submittal of backscatter mosaics is not required. The final deliverable for multibeam backscatter is the raw data files in a format readable by IVS Fledermaus Geocoder Toolbox.

Thank you,
Starla

--
*Starla D. Robinson, Physical Scientist
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National Oceanic Atmospheric Administration
Office: 301-713-2702 x125
Cell: 360-689-1431*

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*Starla D. Robinson, Physical Scientist
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Office: 301-713-2702 x125
Cell: 360-689-1431*

--
Best regards,

Nicole Galloway
Geoscientist
Phone (+1) 337 210 0000 ext. 3519
Mobile (+1) 603 978 7211
ngalloway@oceaneering.com



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--
*Starla D. Robinson, Physical Scientist
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--
Best regards,

Nicole Galloway
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--

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LCDR Briana Welton, NOAA
Office of Coast Survey
Chief, Atlantic Hydrographic Branch
439 W York St, Norfolk, VA 23510
office: 757-441-6746, ext 200
cell: 520-227-9269

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Office: 301-713-2702 x125
Cell: 360-689-1431
Website: [HSD Planned Hydrographic Surveys](#)

From: [OCS NDB - NOAA Service Account](#)
To: [Castle Parker - NOAA Federal](#)
Cc: [Matthew Jaskoski - NOAA Federal](#); [Michael Gonsalves - NOAA Federal](#); [Corey Allen - NOAA Federal](#); [Lucy Hick - NOAA Federal](#); [Starla Robinson - NOAA Federal](#); [Christina Fandel - NOAA Federal](#); [Tim Osborn - NOAA Federal](#); [Emily Clark - NOAA Federal](#); [NSD Coast Pilot](#); [Benjamin K Evans - NOAA Federal](#); [James Crocker - NOAA Federal](#); [Matt Kroll - NOAA Federal](#); [Nautical Data Branch](#); [Tara Wallace - NOAA Federal](#); [Pearce Hunt - NOAA Federal](#); [_NOS OCS PBA Branch](#); [_NOS OCS PBB Branch](#); [_NOS OCS PBC Branch](#); [_NOS OCS PBD Branch](#); [_NOS OCS PBE Branch](#); [_NOS OCS PBG Branch](#)
Subject: Re: H12791 DtoN #1 Submission to NDB
Date: Wednesday, March 30, 2016 7:55:42 AM
Attachments: [H12791 DtoN 1.zip](#)

L-208/16 and DD-27237 have been registered by the Nautical Data Branch and directed to Products Branch G for processing.

The DtoN reported is one submerged obstruction located in the Gulf of Mexico, 22 NM south of Point Au Fer, LA.

The following charts are affected:

11351 kapp 63

11356 kapp 62

11340 kapp 49

The following ENC's are affected:

US4LA21M

US3GC03M

References:

H12791

OPR-K379-KR-15

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

Nautical Data Branch/Marine Chart Division/
Office of Coast Survey/National Ocean Service/
Contact: ocs.ndb@noaa.gov



On Tue, Mar 29, 2016 at 12:53 PM, Castle Parker - NOAA Federal
<castle.e.parker@noaa.gov> wrote:

Good Day,

Please find the attached compressed file for survey H12791 DtoN report #1, containing a 25ft obstruction for submission to Nautical Data Branch (NDB) and Marine Chart Division

(MCD) for chart application.

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

If any question arise, please direct them back to me via email or phone ([757-441-6747](tel:757-441-6747) [x115](#)).

Thank you for your assistance with this matter.

Regards,

Gene Parker

Castle Eugene Parker

NOAA Office of Coast Survey

Atlantic Hydrographic Branch

Hydrographic Team Lead / Physical Scientist

castle.e.parker@noaa.gov

office [757-441-6746](tel:757-441-6746) [x115](#)

Subject: ASV

From: Lucy Hick - NOAA Federal <lucy.hick@noaa.gov>

Date: 11/24/2015 11:54 AM

To: Tara Levy <tlevy@oceaneering.com>

CC: Starla Robinson - NOAA Federal <Starla.Robinson@noaa.gov>, Christina Fandel - NOAA Federal <christina.fandel@noaa.gov>, Michael Gonsalves - NOAA Federal <michael.gonsalves@noaa.gov>, Corey Allen - NOAA Federal <corey.allen@noaa.gov>, Emily Clark - NOAA Federal <emily.clark@noaa.gov>

Hi Tara,

I'm drafting the response to NOAA's Acquisition and Grants Office (AGO) regarding C&C's request to ASV as a subcontractor and was hoping that you could clarify ASV's role in operations.

As I think I understand, ASV is simply providing the platform for acquisition (similar to how a vessel of opportunity would be utilized), while C&C is providing the survey equipment, acquisition, and processing personnel. Is this assumption correct?

Thanks for your continued patience while we work through this process and have a happy Thanksgiving.

Best Regards,
Lucy

--

Lucy Hick

Technical Advisor/Contracting Officer's Representative (COR)

Navigation Services Division | Office of Coast Survey

National Oceanic & Atmospheric Administration

(301) 713-2750 x179 | Lucy.Hick@noaa.gov

Subject: Re: C&C Subcontractor Request

From: Emily Clark - NOAA Federal <emily.clark@noaa.gov>

Date: 7/30/2015 12:38 PM

To: Christina Fandel - NOAA Federal <christina.fandel@noaa.gov>

CC: Tara Levy <tara.levy@cctechnol.com>, tlevy@oceaneering.com, Lucy Hick - NOAA Federal <lucy.hick@noaa.gov>, Mark Lathrop - NOAA Federal <mark.t.lathrop@noaa.gov>, Corey Allen - NOAA Federal <corey.allen@noaa.gov>, Starla Robinson - NOAA Federal <Starla.Robinson@noaa.gov>

Good Afternoon,

In regards to the first question about the subcontractor I am working to find out what the process would be to have this approved. I should have a firm plan to move forward with on this early next week. There are some high priority end of FY obligations I have taking up my time the rest of this week.

Regarding question two, Christy's response is correct. Switching the port to a small business-owned port will have no impact on this contract.

Further information is forthcoming.

Any other questions let me know.

Thanks

v/r,

Emily

On Tue, Jul 28, 2015 at 1:08 PM, Christina Fandel - NOAA Federal <christina.fandel@noaa.gov> wrote:
Emily,

During today's kick-off meeting for OPR-K379-KR-15 (Contract EA133C-14-CQ-0030), Tara Levy posed two questions that I am hoping you can help answer,

1. C&C would like to hire a subcontractor to assist with data acquisition, however, the proposed subcontractor was not on the initial pre-approved list of subcontractors associated with their contract. What is the process for approving the requested subcontractor?
2. C&C would like to switch the port in which they dock their vessel to a small business owned port. Is it correct to advise C&C that while the federal government supports small businesses, switching their port to a small business-owned port will have no impact on the contract?

Thank you for your guidance,

Christy

--

Christy Fandel
Physical Scientist
Hydrographic Survey Division

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Christina.Fandel@noaa.gov
[\(301\) 713-2702 x103](tel:(301)713-2702x103)

--

v/r,

Emily Clark

Contract Specialist
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Norfolk Federal Building
200 Granby Street, Suite 815
Norfolk, VA 23510

(: (757) 441-6875 | *: Emily.Clark@NOAA.gov | 7: (757) 440-3687

Subject: Re: Environmental Compliance/Marine Mammal Observers

From: Scott Croft <scott.croft@cctechnol.com>

Date: 7/30/2015 10:03 AM

To: Lucy Hick - NOAA Federal <lucy.hick@noaa.gov>, tlevy@oceanengineering.com

CC: Nicole Galloway <nicole.galloway@cctechnol.com>, Eric Berkowitz - NOAA Federal <eric.w.berkowitz@noaa.gov>, Corey Allen - NOAA Federal <corey.allen@noaa.gov>, Michael Gonsalves - NOAA Federal <michael.gonsalves@noaa.gov>, Starla Robinson - NOAA Federal <Starla.Robinson@noaa.gov>, Christina Fandel - NOAA Federal <christina.fandel@noaa.gov>, Emily Clark - NOAA Federal <emily.clark@noaa.gov>, Mark Lathrop - NOAA Federal <mark.t.lathrop@noaa.gov>

Lucy,

Thank you for this, we will be sure to follow this guideline.

--

Thanks,

Scott Croft
Sr. Manager AUV Services
C&C Technologies, Inc.
730 East Kaliste Saloom Road
Lafayette, LA 70508 USA
337 261 0660 Voice
337 261 0192 Fax
337 739 6116 Cell
www.cctechnol.com | www.oceanengineering.com

On 7/30/2015 9:53 AM, Lucy Hick - NOAA Federal wrote:

Scott & Tara,

Please see attached for a memo from Captain Berkowitz, which clarifies the 2015 Hydrographic Surveys Specifications and Deliverable (HSSD) environmental compliance requirements.

This memo formalizes the information that Christy Fandel recently provided regarding the process for declaring a crew member a "trained observer."

Please let me know if you have any additional questions.

Best Regards,
Lucy

--

Lucy Hick

Technical Advisor, Hydrographic Surveys Division
Office of Coast Survey | National Oceanic & Atmospheric Administration
(301) 713-2750 x179 | Lucy.Hick@noaa.gov

Subject: Re: H12787 DTON For review

From: Lucy Hick - NOAA Federal <lucy.hick@noaa.gov>

Date: 8/6/2015 8:59 AM

To: Tara Levy <tlevy@oceaneering.com>

CC: Castle Parker <castle.e.parker@noaa.gov>, Starla Robinson - NOAA Federal <starla.robinson@noaa.gov>, Christina Fandel - NOAA Federal <christina.fandel@noaa.gov>, Nikki Galloway <nicole.galloway@cctechonol.com>, Scott Croft <scroft@oceaneering.com>, "Jeremy L. Steward" <jeremy.steward@cctech.us>

Tara,

Thank you for bringing this to our attention. I have replied to AHB and asked they they begin processing this DTON, while they await the formal submission from C&C.

Best Regards,
Lucy

On Wed, Aug 5, 2015 at 6:38 PM, Tara Levy <tlevy@oceaneering.com> wrote:

Good Afternoon,

We observed was appears to be a piling sticking up out of the water approximately 2 feet. I have attached a document that we put together today. We are working on the S57 file here at the office since there were some issues with creating it in CARIS 9 on the boat. We will send you the S57 file and any additional information you as soon as possible. We felt that getting the information to you was more important than the format at this point.

Thanks

--

Tara Levy
Manager

NOAA Division

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United States

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Lucy Hick

Technical Advisor/Contracting Officer's Representative (COR)

Navigation Services Division | Office of Coast Survey

National Oceanic & Atmospheric Administration

(301) 713-2750 x179 | Lucy.Hick@noaa.gov

Subject: Re: H12789 depth differences

From: Starla Robinson - NOAA Federal <starla.robinson@noaa.gov>

Date: 3/31/2016 5:33 PM

To: Tara Levy <tlevy@oceaneering.com>

CC: Nicole Galloway <ngalloway@oceaneering.com>, Lucy Hick - NOAA Federal <lucy.hick@noaa.gov>, Corey Allen - NOAA Federal <corey.allen@noaa.gov>, Christina Fandel - NOAA Federal <christina.fandel@noaa.gov>, Emily Clark - NOAA Federal <emily.clark@noaa.gov>, Michael Gonsalves - NOAA Federal <michael.gonsalves@noaa.gov>

Hello Tara,

Would you please clarify what you mean by a "standard medium filter", describing the process using a ranges of numbers for the correctors, filters, and offsets?

Correct me if I am wrong:

The dynamic draft correctors were applied as normal in the hvf.

In the GPS water levels, dynamic draft is present in the HAE signal.

Does that mean the dynamic draft will be double applied?

Are there any navigationally significant features in the region that the least depth was determined using this method? If so is there a general shoal or deep bias?

Thanks,

Starla

On Tue, Mar 29, 2016 at 9:51 AM, Tara Levy <tlevy@oceaneering.com> wrote:

Starla,

The higher frequency noise was removed using a standard medium filter with no time window specified (due to using a small data set). A larger data set would have been filtered with a sliding time window.

The static draft component was applied, interpolated across the readings taken during the survey. The dynamic draft (squat offsets) were only applied in the vessel file in CARIS.

The corrections were applied to the data in CARIS as a .tid file in the form of [date, time, vertical correction] which was brought into CARIS in place of the 8764227 tide file.

--

Best regards,

Tara Levy

Division Manager ~NOAA

Direct (+1) 337-210-0612

Mobile (+1) 337-296-3029

tlevy@oceaneering.com



730 E Kaliste Saloom Rd | Lafayette, Louisiana | USA, Tel (+1) 337 210 0000 | oceanengineering.com

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Thank you for your cooperation.

On 3/28/2016 4:33 PM, Starla Robinson - NOAA Federal wrote:

Hello Tara and Nikki,

We had a meeting today to review Oceanengineering's approach to resolving chart datum and agreed it sounds good in principle. Please provide more detailed documentation on the manner in which you filtered out the **higher frequency noise**; whether the **draft offset** included both static and dynamic components; and the manner in which you apply these correctors in CARIS (EG: Custom HVF?).

Thank you,
Starla

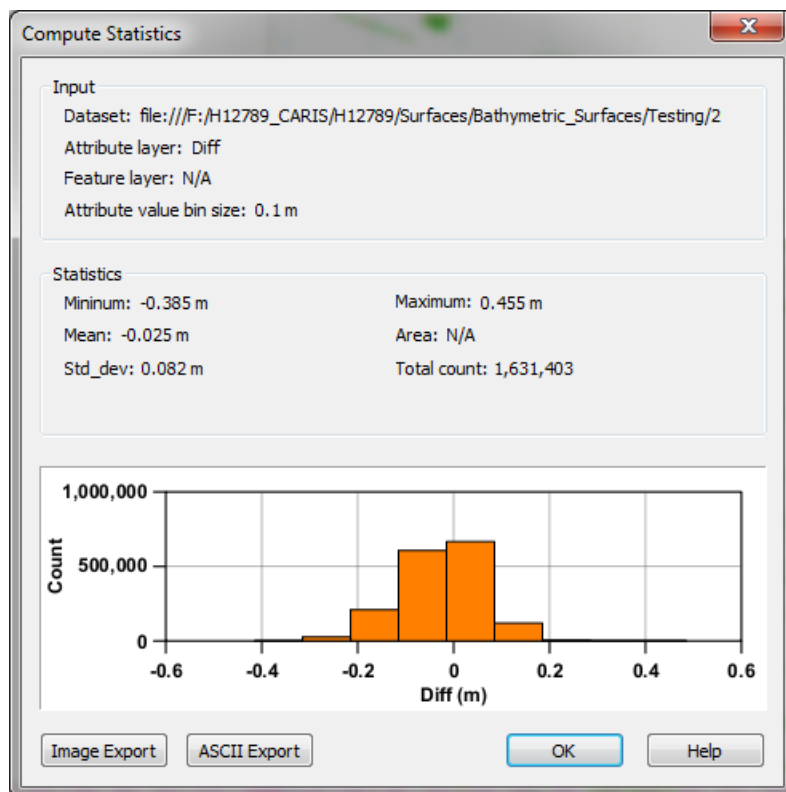
On Tue, Mar 22, 2016 at 4:55 PM, Nicole Galloway <ngalloway@oceanengineering.com> wrote:

Good afternoon Lucy,

We have conducted internal testing using ellipsoid derived vertical corrections utilizing the following basic workflow:

- process/extract the HAE data from the GPS
- filter and reduce the HAE data to remove data spikes, outliers, and higher frequency noise
- process the HAE data through VDatum to convert from ITRF08 into MLLW referenced height values
- apply static vertical offset to reduce antenna height to CRP
- apply draft offset relative to time to reduce height from CRP to water line
- re-sample data set to construct a uniform time series to use as a tide

We reprocessed all January data from H12789 and compared the surface to a surface comprised of all mainlines collected in 2015 with the following results:



The vertical uncertainty of the C-Nav 3050 using C-Nav subscription service corrections is 15 cm (95% CI) and the maximum cumulative uncertainty of the VDATUM region used (Louisiana/Mississippi) is 17.1 cm (68% CI). With this information we calculated the final uncertainty as shown below.

$$\sqrt{17.1^2 + \left(\frac{15}{1.96}\right)^2} = 18.73 \text{ cm}$$

This was used as the tide measurement error in CARIS with no zoning error applied.

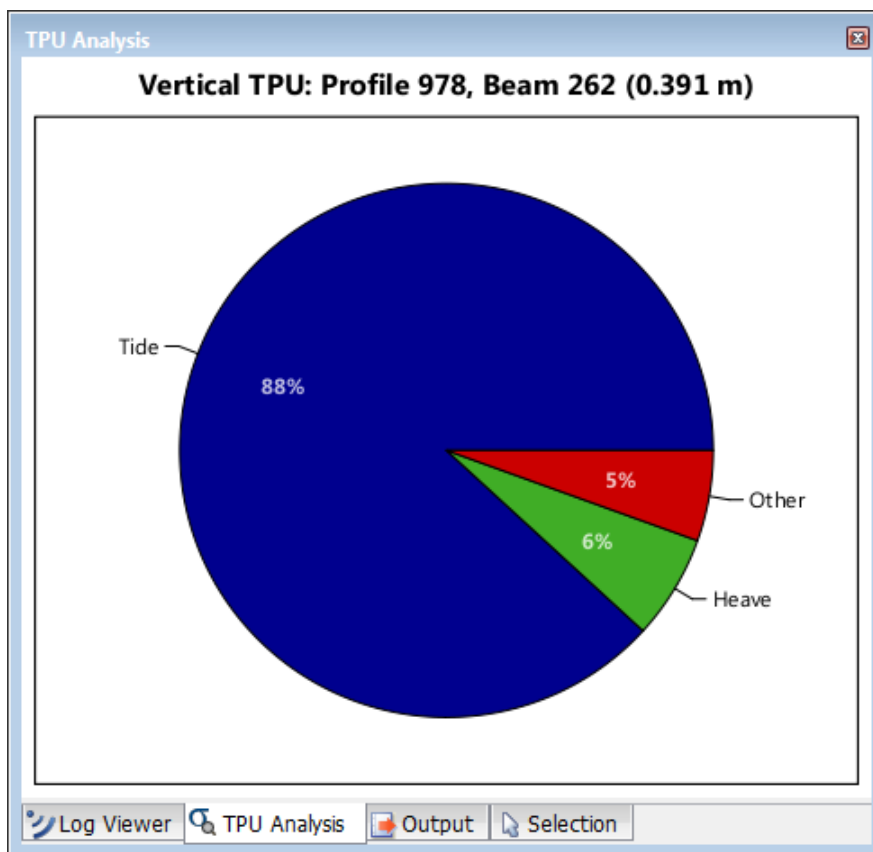
Compute TPU

Input	
Source	Selection
Tide	
Measure	0.1873000000000000 (m)
Zoning	0 (m)
Sound Speed	
Measured	2 (m/s)
Surface	0.8000000000000000 (m/s)
Uncertainty Source	
Source	Vessel
Position	Vessel
Sonar	Vessel
Heading	Vessel
Pitch	Vessel
Roll	Vessel
Vertical	Vessel
Tide	Static
Sweep parameters	
Peak to peak heave	0 (m)
Maximum Roll	0.0

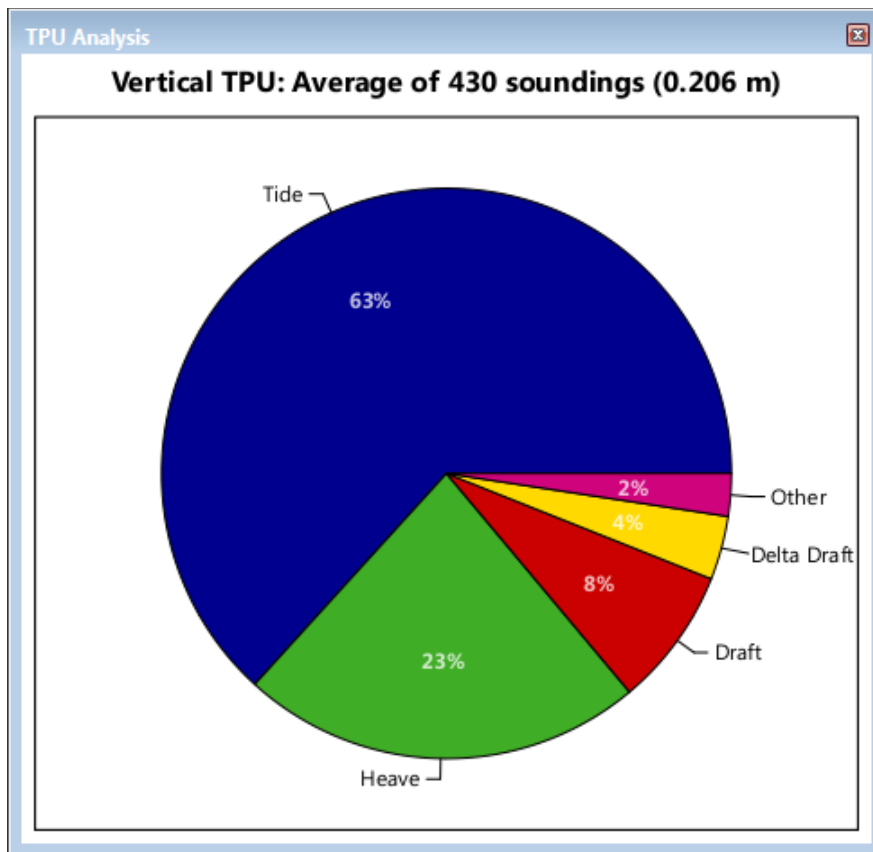
Input
Input properties.

OK Cancel Help

Not all data has been processed with the updated TPU but a sample shows that the Dp TPU is 0.391 m.



This is higher than the data processed with the tide TPU values (sample shown below).



The uncertainty of the data processed with ellipsoid vertical corrections is still within specification and the depths compare to the 2015 data well. We plan to move forward processing utilizing the above methodology.

Please let us know if you have any questions.

Thank-you,
Tara & Nikki

On 3/16/2016 12:18 PM, Lucy Hick - NOAA Federal wrote:

Tara & Nikki,

Thank you for forwarding the data comparison documents. HSD Ops has consulted with CO-OPS regarding the verified data from the LAWMA NWLON station. CO-OPS has confirmed that the published verified data meets their standards and that the water-level event in the data is "real", confirmed by data analysis of the redundant sensors and comparisons to neighboring stations.

Based on the analysis presented in your documents, it would appear the bulk of the data collected in January is out of specification as prescribed in the SOW and the HSSD. We are interested in hearing how Oceaneering intends to address this issue including any potential impacts to timeliness or data quality.

Best Regards,
Lucy

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Good morning,

I just wanted to check back in with you and see if you have had some time to look at the information we sent you on Friday or if you need anything else from us.

We are collecting our GPS with Nav Com corrections.

If we could have a phone call this afternoon or tomorrow that would be great.

Thank you,

--

Best regards,

Tara Levy
Division Manager ~NOAA

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Thanks,
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Starla,

Friday in the AM works best for both Nikki and me.

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Best regards,

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COOPs should have their assessment done this week. Should we set up a time to talk Friday? When is a good time?

Thank you,
Starla

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<ngalloway@oceanengineering.com> wrote:

Hi Starla,

At this point in Sheet 3 we are ready to do our final review of investigations and contacts with respect to the MB and most of the MB investigations were completed in the January, which comprise the data in question with depth differences described below.

We would like to confirm whether it is OK to proceed with Sheet 3 with the verified tide data on the NOAA tides and currents website prior to January 24th or if we need to wait for COOPs to finish their assessment.

Can we set up a phone call for later this week to discuss?

Thanks!
Nikki

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Hello Nikki,

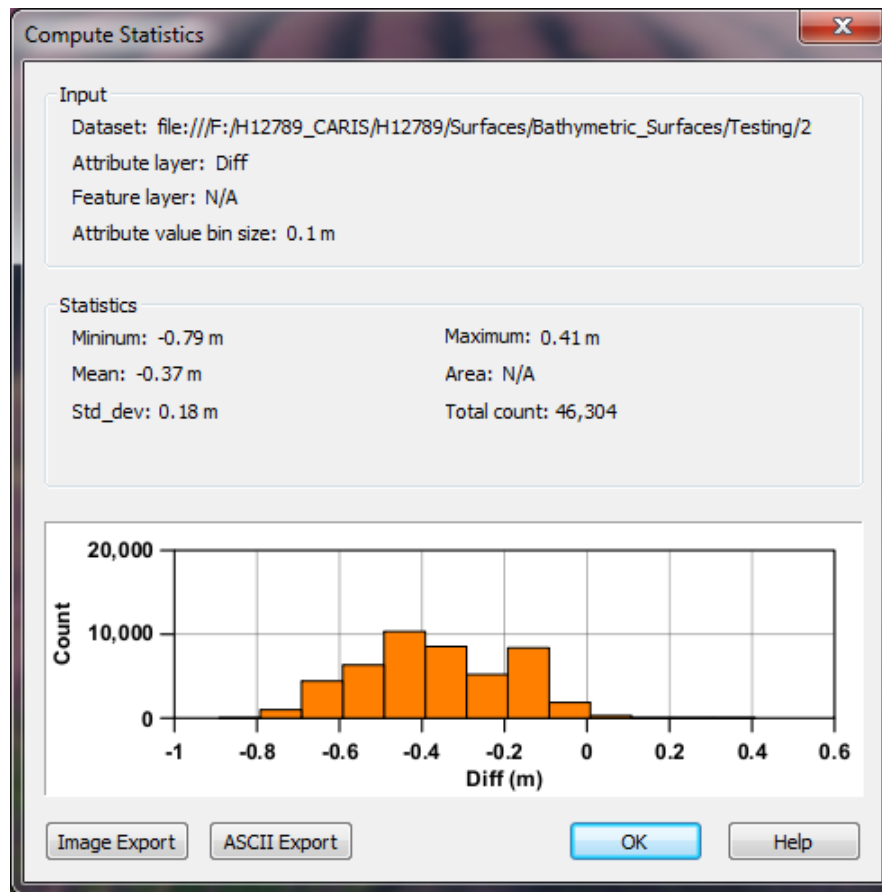
COOPs are reviewing the waterlevels right now, and should have an answer in the next day or so. They assure us we will have either verified tides or an alternative zoning file by March 17th. I will let you know when we know more.

Thanks,
Starla

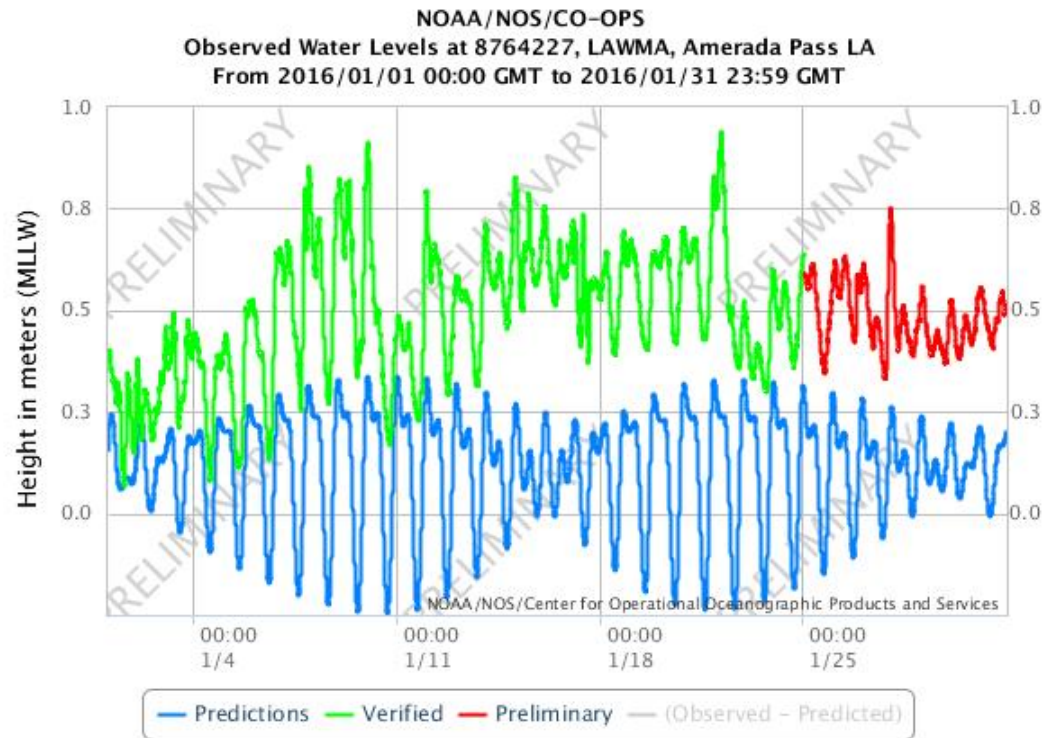
On Tue, Mar 8, 2016 at 9:40 AM, Nicole Galloway
<ngalloway@oceanengineering.com> wrote:

Good morning,

We have some concerns regarding the data in H12789 that is potentially related to tides. The majority of data for H12789 was collected between September 6 - October 11, 2015 but some additional clean-up work was conducted between January 8 - January 30, 2016. We noticed some discrepancy in the depths between data collected in 2015 and data collected in 2016 and investigated further. A surface was generated for the 2016 work and compared to the crosslines collected between 9/7/2015 and 9/26/2015. Below is a screen capture of the difference surface.



Some of these differences are large, >70 cm, and we think there may be a correlation to the tide data (below image for January). We are waiting on verified tides for data collected after 1/24/2016, but the tide signature before and after the 24th look similar. We would like to confirm the usage of verified tide data prior to the 24th.



Thank-you for your attention to this,
 Nikki

--

Best regards,

Nicole Galloway
 Geoscientist
 Phone [\(+1\) 337 210 0000](tel:+13372100000) ext. 3519
 Mobile [\(+1\) 603 978 7211](tel:+16039787211)
ngalloway@oceanneering.com



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Starla D. Robinson, Physical Scientist
NOS - OCS - HSD - Operations Branch
National Oceanic Atmospheric Administration
 Office: [301-713-2702](tel:3017132702) x125
 Cell: [360-689-1431](tel:3606891431)

--

Best regards,

Nicole Galloway

Geoscientist

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--

Lucy Hick

Technical Advisor/Contracting Officer's Representative (COR)

Navigation Services Division | Office of Coast Survey

National Oceanic & Atmospheric Administration

(301) 713-2750 x162 | Lucy.Hick@noaa.gov

--

Best regards,

Nicole Galloway

Geoscientist

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Cell: 360-689-1431*

Subject: Re: H12789 depth differences

From: Starla Robinson - NOAA Federal <starla.robinson@noaa.gov>

Date: 4/20/2016 3:31 PM

To: Tara Levy <tlevy@oceaneering.com>

Great! Receipt received.

On Wed, Apr 20, 2016 at 4:24 PM, Tara Levy <tlevy@oceaneering.com> wrote:

Starla,

I have attached outline of how we reduced the GPS data to MLLW.

Please confirm receipt and let me know if anything else needs clarification.

It looks like we are on schedule to get Sheet 3 out by the end of this week and so you should receive it by early next week and Sheet 5 is also coming along well. We are still shooting for April the 30th.

Thanks

--

Best regards,

Tara Levy

Division Manager ~NOAA

Direct (+1) 337-210-0612

Mobile (+1) 337-296-3029

tlevy@oceaneering.com



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Thank you for your cooperation.

On 4/20/2016 2:52 PM, Starla Robinson - NOAA Federal wrote:

Tara,

Could you resend that. I am not sure if it made it to us as intended.

Thanks,

Starla

On Wed, Apr 20, 2016 at 3:29 PM, Tara Levy <tlevy@oceaneering.com> wrote:

Starla,

The documentation I included as an attachment last week will be the same documentation I will use in the DR and DAPR.

--

Best regards,

Tara Levy

Division Manager ~NOAA

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Date: 4/20/2016 2:52 PM

To: Tara Levy <tlevy@oceaneering.com>

CC: Nicole Galloway <ngalloway@oceaneering.com>, Christina Fandel - NOAA Federal <christina.fandel@noaa.gov>, Michael Gonsalves - NOAA Federal <michael.gonsalves@noaa.gov>, Corey Allen - NOAA Federal <corey.allen@noaa.gov>, Lucy Hick - NOAA Federal <lucy.hick@noaa.gov>

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Office: 301-713-2702 x125
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From: Starla Robinson - NOAA Federal <starla.robinson@noaa.gov>

Date: 4/20/2016 12:21 PM

To: Nicole Galloway <ngalloway@oceanengineering.com>

CC: Tara Levy <tlevy@oceanengineering.com>, Christina Fandel - NOAA Federal <christina.fandel@noaa.gov>, Michael Gonsalves - NOAA Federal <michael.gonsalves@noaa.gov>, Corey Allen - NOAA Federal <corey.allen@noaa.gov>, Lucy Hick - NOAA Federal <lucy.hick@noaa.gov>

Thank you Nikki and Tara,

The agreement between the 2015 and 2016 is good. Please ensure that you fully document your procedure in the DR/DAPR.

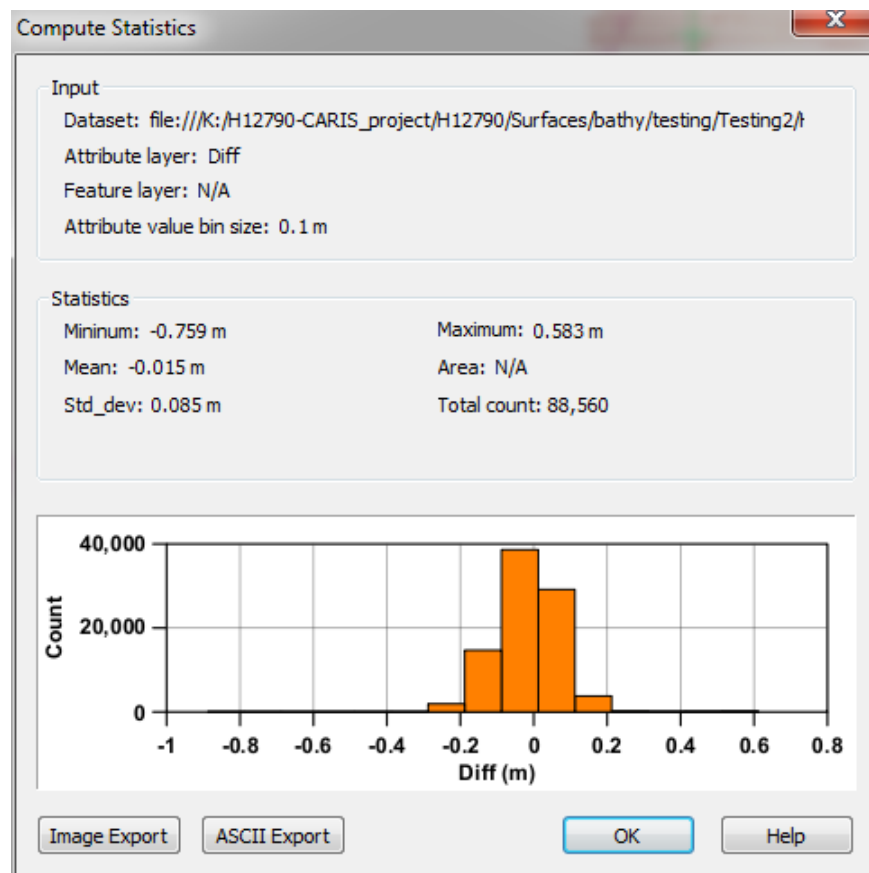
Thanks,
Starla

On Wed, Apr 13, 2016 at 10:02 AM, Nicole Galloway <ngalloway@oceanengineering.com> wrote:

Good morning,

We have re-processed the 2016 data and conducted internal testing with the new GPS HAE Reduction to MLLW file. The data agree well when compared to the data from 2015.

The below image shows the data from 2016 compared to the data from 2015 for H12790. Please note that the higher difference values are associated with features that are either present or not present on either the 2015 or 2016 data (e.i depressions that have filled in, etc.).



The below image shows the data from 2016 compared to the data from 2015 for H12789.



Please let us know if you have any questions,

Thanks!

Nikki & Tara

On 4/11/2016 12:54 PM, Starla Robinson - NOAA Federal wrote:

Hello Tara,

Let's meet at 10am Eastern time.

Thanks,
Starla

On Mon, Apr 11, 2016 at 12:16 PM, Tara Levy <tlevy@oceanengineering.com> wrote:

Christy,

Yes I am available tomorrow at 10am.

Will this be Central Time Or Eastern Time?

--

Best regards,

Tara Levy

Division Manager ~NOAA

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Thank you for your cooperation.

On 4/11/2016 9:51 AM, Christina Fandel - NOAA Federal wrote:

Hi Tara,

Thank you for clarifying your ERS processing steps. We still have some outstanding questions and would like to set up a meeting to discuss this further. Are you available to meet tomorrow, April 12, at 10 AM?

If so, please use our conference line, [1-866-914-4918](tel:1-866-914-4918) with passcode, 8187980.
Thank you,

Christy

On Tue, Apr 5, 2016 at 4:00 PM, Tara Levy <tlevy@oceanneering.com> wrote:
Good Afternoon Starla,

The depths processed with the new method do not affect the least depths on anything navigationally significant.

Thank you,

--

Best regards,

Tara Levy
Division Manager ~NOAA

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tlevy@oceanneering.com



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On 4/1/2016 11:32 AM, Tara Levy wrote:

Starla,
The standard medium filter that was used for the HAE data values only is as

follows:

1. Sort the data from low to high
2. Take the middle value

The offsets applied to the HAE were relative to the CRP.

The dynamic draft was not accounted for in the HAE. It could have been, as the static draft was, but we chose not to include it.

I can have the information regarding if the new method affected the least depths on anything that is navigationally significant either later on today or Monday. Currently we are running CARIS processing.

--

Best regards,

Tara Levy
Division Manager ~NOAA

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On 3/31/2016 5:33 PM, Starla Robinson - NOAA Federal wrote:

Hello Tara,

Would you please clarify what you mean by a "standard medium filter", describing the process using a ranges of numbers for the correctors, filters, and offsets?

Correct me if I am wrong:

The dynamic draft correctors were applied as normal in the hvf.
In the GPS water levels, dynamic draft is present in the HAE signal.
Does that mean the dynamic draft will be double applied?

Are there any navigationally significant features in the region that the least depth was determined using this method? If so is there a general shoal or deep bias?

Thanks,
Starla

On Tue, Mar 29, 2016 at 9:51 AM, Tara Levy <tlevy@oceanengineering.com> wrote:

Starla,

The higher frequency noise was removed using a standard medium filter with no time window specified (due to using a small data set). A larger data set would have been filtered with a sliding time window.

The static draft component was applied, interpolated across the readings taken during the survey. The dynamic draft (squat offsets) were only applied in the vessel file in CARIS.

The corrections were applied to the data in CARIS as a .tid file in the form of [date, time, vertical correction] which was brought into CARIS in place of the 8764227 tide file.

--

Best regards,

Tara Levy
Division Manager ~NOAA

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On 3/28/2016 4:33 PM, Starla Robinson - NOAA Federal wrote:

Hello Tara and Nikki,

We had a meeting today to review Oceanengineering's approach to resolving chart datum and agreed it sounds good in principle. Please provide more detailed documentation on the manner in which you filtered out the **higher frequency noise**; whether the **draft offset** included both static and dynamic components; and the manner in which you apply these correctors in CARIS (EG: Custom HVF?).

Thank you,
Starla

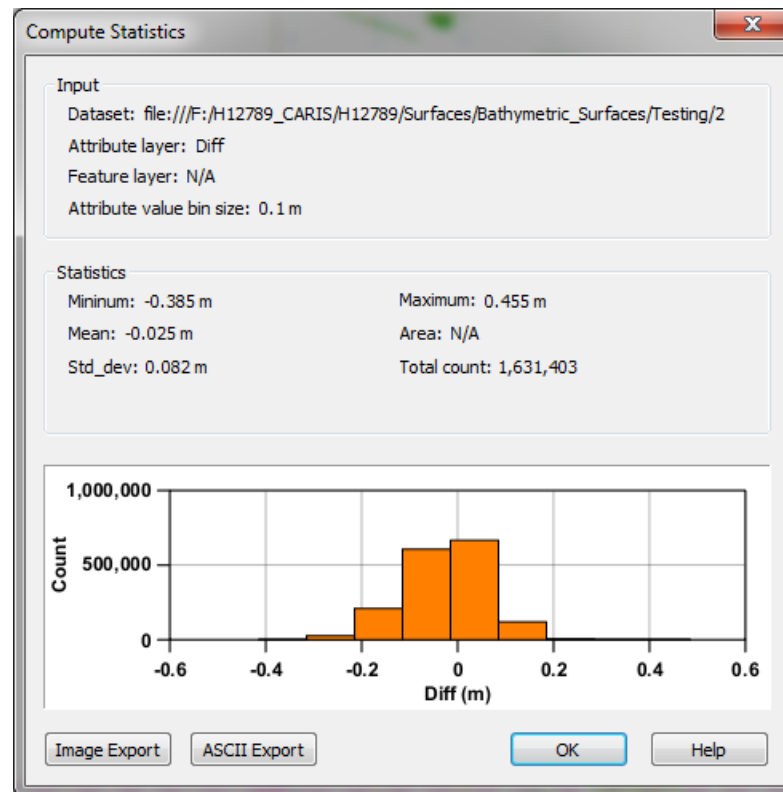
On Tue, Mar 22, 2016 at 4:55 PM, Nicole Galloway
<ngalloway@oceanengineering.com> wrote:

Good afternoon Lucy,

We have conducted internal testing using ellipsoid derived vertical corrections utilizing the following basic workflow:

- process/extract the HAE data from the GPS
- filter and reduce the HAE data to remove data spikes, outliers, and higher frequency noise
- process the HAE data through VDatum to convert from ITRFo8 into MLLW referenced height values
- apply static vertical offset to reduce antenna height to CRP
- apply draft offset relative to time to reduce height from CRP to water line
- re-sample data set to construct a uniform time series to use as a tide

We reprocessed all January data from H12789 and compared the surface to a surface comprised of all mainlines collected in 2015 with the following results:



The vertical uncertainty of the C-Nav 3050 using C-Nav subscription service corrections is 15 cm (95% CI) and the maximum cumulative uncertainty of the VDATUM region used (Louisiana/Mississippi) is 17.1 cm (68% CI). With this information we calculated the final uncertainty as shown below.

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This was used as the tide measurement error in CARIS with no zoning error applied.

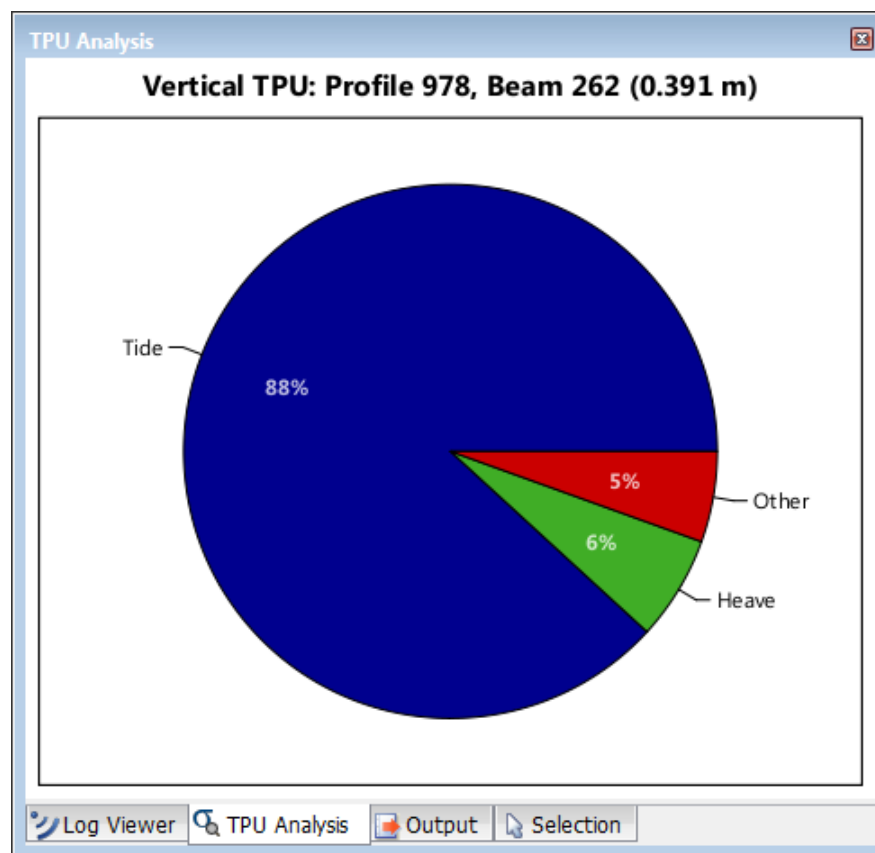
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Input	
Source	Selection
Tide	
Measure	0.1873000000000000 (m)
Zoning	0 (m)
Sound Speed	
Measured	2 (m/s)
Surface	0.8000000000000000 (m/s)
Uncertainty Source	
Source	Vessel
Position	Vessel
Sonar	Vessel
Heading	Vessel
Pitch	Vessel
Roll	Vessel
Vertical	Vessel
Tide	Static
Sweep parameters	
Peak to peak heave	0 (m)
Maximum Roll	0.0

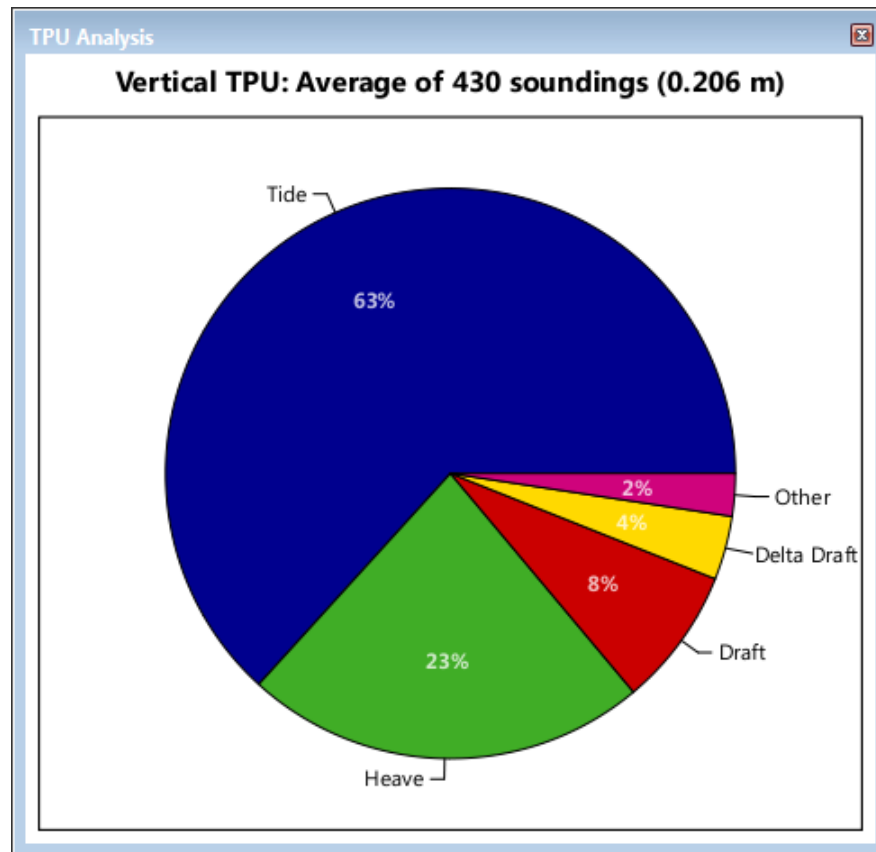
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This is higher than the data processed with the tide TPU values (sample shown below).



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Please let us know if you have any questions.

Thank-you,
Tara & Nikki

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Tara & Nikki,

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Best Regards,
Lucy

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If we could have a phone call this afternoon or tomorrow that would be great.

Thank you,

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Best regards,

Tara Levy
Division Manager ~NOAA

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Thanks,
Starla

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<tlevy@oceanneering.com> wrote:
Starla,

Friday in the AM works best for both Nikki and me.

--

Best regards,

Tara Levy
Division Manager ~NOAA

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We would like to confirm whether it is OK to proceed with Sheet 3 with the verified tide data on the NOAA tides and currents website prior to January 24th or if we need to wait for COOPs to finish their assessment.

Can we set up a phone call for later this week to discuss?

Thanks!
Nikki

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Hello Nikki,

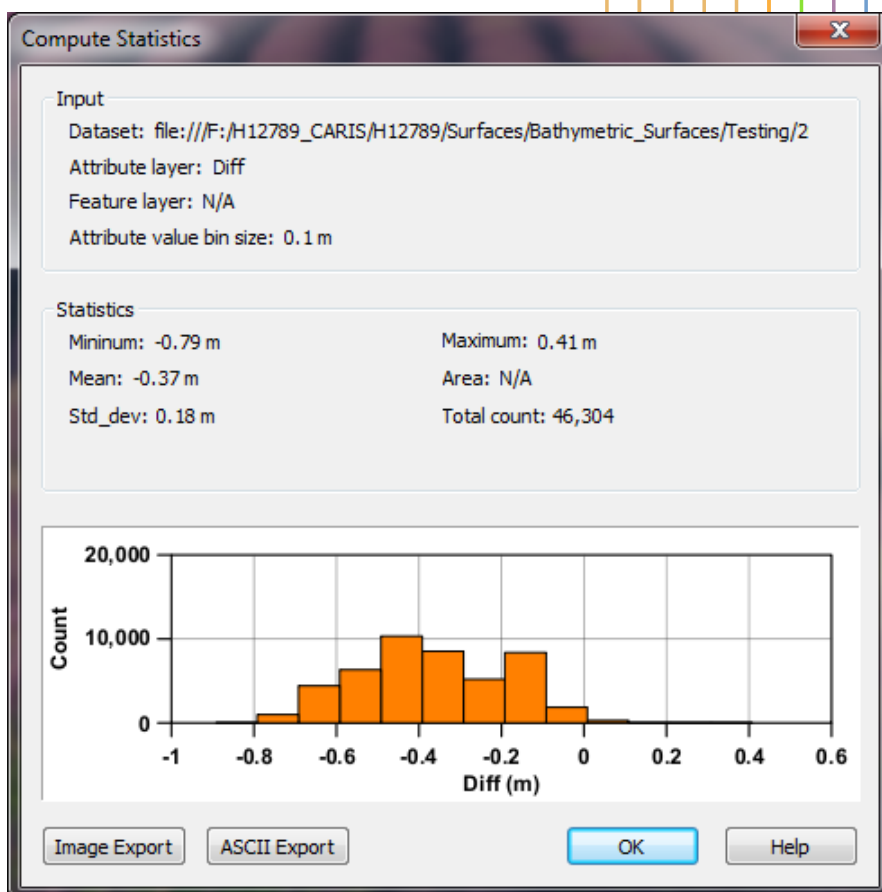
COOPs are reviewing the waterlevels right now, and should have an answer in the next day or so. They assure us we will have either verified tides or an alternative zoning file by March 17th. I will let you know when we know more.

Thanks,
Starla

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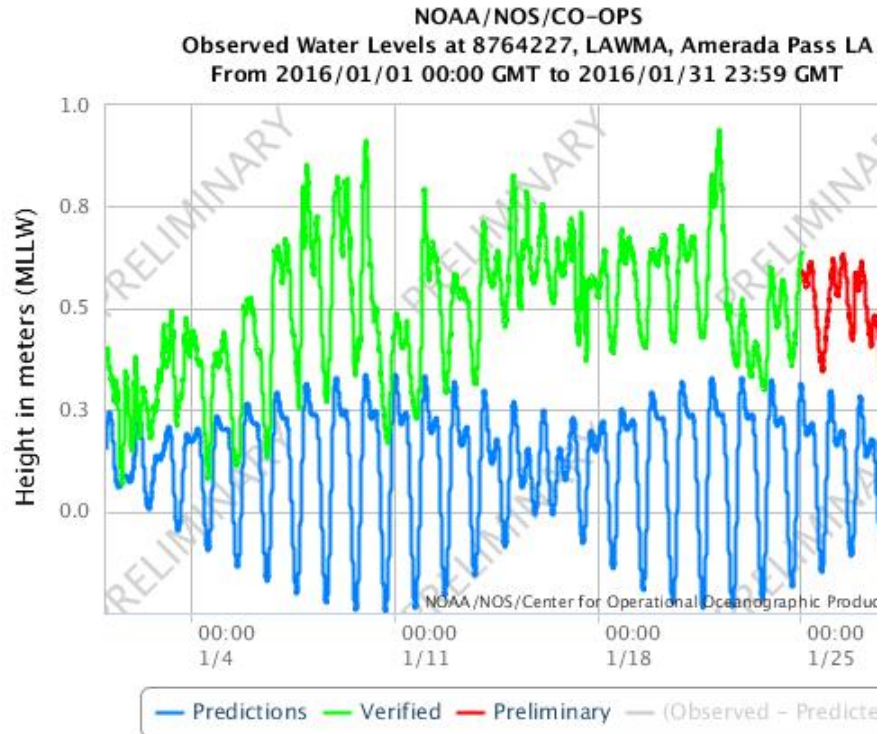
Good morning,

We have some concerns regarding the data in H12789 that is potentially related to tides. The majority of data for H12789 was collected between September 6 - October 11, 2015 but some additional clean-up work was conducted between January 8 - January 30, 2016. We noticed some discrepancy in the depths between data collected in 2015 and data collected in 2016 and investigated further. A surface was generated for the 2016 work and compared to the crosslines collected between 9/7/2015 and 9/26/2015. Below is a screen capture of the difference surface.



Some of these differences are large, >70 cm, and we think there may be a correlation to the tide data (below image)

for January). We are waiting on verified tides for data collected after 1/24/2016, but the tide signature before and after the 24th look similar. We would like to confirm the usage of verified tide data prior to the 24th.



Thank-you for your attention to this,
Nikki

--

Best regards,

Nicole Galloway

Geoscientist

Phone (+1) 337 210 0000 ext. 3519

Mobile (+1) 603 978 7211

ngalloway@oceaneering.com



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--

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--

Best regards,

Nicole Galloway

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--

Lucy Hick

Technical Advisor/Contracting Officer's Representative (COR)

Navigation Services Division | Office of Coast Survey

National Oceanic & Atmospheric Administration
(301) 713-2750 x162 | Lucy.Hick@noaa.gov

--

Best regards,

Nicole Galloway
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--

Physical Scientist
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Office of Coast Survey, NOAA
Christina.Fandel@noaa.gov
 [\(301\) 713 - 2702 x 211](tel:3017132702)

--

*Starla D. Robinson, Physical Scientist
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Best regards,

Nicole Galloway

Geoscientist

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--

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Subject: Re: H12791 DtoN Submission 1

From: Nicole Galloway <ngalloway@oceanengineering.com>

Date: 3/29/2016 10:41 AM

To: Castle Parker - NOAA Federal <castle.e.parker@noaa.gov>

CC: Lucy Hick - NOAA Federal <lucy.hick@noaa.gov>, Christina Fandel - NOAA Federal <christina.fandel@noaa.gov>, Starla Robinson - NOAA Federal <Starla.Robinson@noaa.gov>, Tara Levy <tlevy@oceanengineering.com>

Good morning Gene,

I reviewed both the hob and S-57 files this morning, and it looks like the hob file contains the desired information, but that information did not get saved upon export to S-57. I corrected the paths to the NOAA attribute files and it looks like the S-57 saved properly this time. I've attached it here. The date/time is also below.

20160326T164347

Sorry for the inconvenience and let me know if there's anything else you need.

Thank-you!

Nikki

On 3/29/2016 10:13 AM, Castle Parker - NOAA Federal wrote:

Hello Nikki,

I have reviewed the submitted feature and it is the shoalest depth within the common charted area. Can you provide me with an observed time (obstim)? (Format YYYYMMDDThhmmss) If you don't have the exact time, the date alone can be used. When I receive the time stamp, will process the DtoN and submit to NDB. An email reply with the date and time will suffice. There is no need to submit the feature a second time, as the original submission will work.

Thanks for your attention to this detail.

Regards,

Gene

Castle Eugene Parker

NOAA Office of Coast Survey

Atlantic Hydrographic Branch

Hydrographic Team Lead / Physical Scientist

castle.e.parker@noaa.gov

office (757) 441-6746 x115

From: Galloway, Nicole [mailto:ngalloway@oceanengineering.com]

Sent: Monday, March 28, 2016 4:11 PM

To: Lucy Hick - NOAA Federal; Christina Fandel - NOAA Federal; Starla Robinson - NOAA Federal; Tara Levy;

Castle.E.Parker@noaa.gov

Subject: H12791 DtoN Submission 1

Good Afternoon,

Attached is a zip file containing a .hob file, an S-57 file and images associated with one DtoN observed within survey data of H12791 (Sheet 5) of project OPR-K379-KR-15.

Please let us know if there is anything that may need to be modified and/or if you would like us to make an official DtoN submission.

Thank-you!

--

Best regards,

Nicole Galloway

Geoscientist

Direct [\(+1\) 337 261 0660](tel:+13372610660) ext. 3519

Mobile (+1) 603 978 7211

ngalloway@oceanneering.com



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--

Best regards,

Nicole Galloway

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—Attachments:—

H12791_DtoN1.000

2.4 KB

Subject: RE: H12791 DtoN Submission 1

From: Castle Parker - NOAA Federal <castle.e.parker@noaa.gov>

Date: 3/29/2016 10:13 AM

To: "Galloway, Nicole" <ngalloway@oceanneering.com>

CC: Lucy Hick - NOAA Federal <lucy.hick@noaa.gov>, Christina Fandel - NOAA Federal <christina.fandel@noaa.gov>, Starla Robinson - NOAA Federal <Starla.Robinson@noaa.gov>, Tara Levy <tlevy@oceanneering.com>

Hello Nikki,

I have reviewed the submitted feature and it is the shoalest depth within the common charted area. Can you provide me with an observed time (obstim)? (Format YYYYMMDDThhmmss) If you don't have the exact time, the date alone can be used. When I receive the time stamp, will process the DtoN and submit to NDB. An email reply with the date and time will suffice. There is no need to submit the feature a second time, as the original submission will work.

Thanks for your attention to this detail.

Regards,

Gene

Castle Eugene Parker

NOAA Office of Coast Survey

Atlantic Hydrographic Branch

Hydrographic Team Lead / Physical Scientist

castle.e.parker@noaa.gov

office (757) 441-6746 x115

From: Galloway, Nicole [mailto:ngalloway@oceanneering.com]

Sent: Monday, March 28, 2016 4:11 PM

To: Lucy Hick - NOAA Federal; Christina Fandel - NOAA Federal; Starla Robinson - NOAA Federal; Tara Levy;

Castle.E.Parker@noaa.gov

Subject: H12791 DtoN Submission 1

Good Afternoon,

Attached is a zip file containing a .hob file, an S-57 file and images associated with one DtoN observed within survey data of H12791 (Sheet 5) of project OPR-K379-KR-15.

Please let us know if there is anything that may need to be modified and/or if you would like us to make an official DtoN submission.

Thank-you!

--

Best regards,

Nicole Galloway

Geoscientist

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Subject: Re: LAWMA Tide Gauge

From: Christina Fandel - NOAA Federal <christina.fandel@noaa.gov>

Date: 2/3/2016 9:40 AM

To: Tara Levy <tlevy@oceaneering.com>

CC: Nikki Galloway <nicole.galloway@cctechonol.com>, Michael Gonsalves - NOAA Federal <michael.gonsalves@noaa.gov>, Lucy Hick - NOAA Federal <lucy.hick@noaa.gov>, Corey Allen - NOAA Federal <corey.allen@noaa.gov>, Starla Robinson - NOAA Federal <Starla.Robinson@noaa.gov>

Hi Tara,

Thank you for the update. The issue with the LAWMA tide gauge is that it is reporting water level values inconsistent with neighboring tide gauges. Therefore, verified data will not be produced until CO-OPS is able to resolve the issue, most likely within two weeks. If the issue can not be resolved, CO-OPS will furnish a revised zoning scheme. At this time, there is no need to suspend survey operations.

I will be sure to keep you informed of any updates.

Thank you and please let me know if you have any questions,

Christy

On Tue, Feb 2, 2016 at 2:20 PM, Tara Levy <tlevy@oceaneering.com> wrote:

Christina,

It was great to see you too! So much happening in such a short period of time.

What issue are you detecting with the LAWMA tide gauge? It looks to be working properly providing us the verified up to Jan 24th and preliminary up to this afternoon.

We have recently completed all the field work for sheets 1-4 and are... were working in sheet 5 until last night when the data quality became too poor to collect.

I think that we owe you a weekly progress e-mail which I will have to you later today.

We anticipated completing the field work at the end of Dec., however, data quality and weather have been a thorn in our side.

Please let us know if we need to suspend survey operations until the issue with the gauge is resolved.

--

Best regards,

Tara Levy
Division Manager ~NOAA

Direct (+1) [337-210-0612](tel:337-210-0612)

Mobile (+1) [337-296-3029](tel:337-296-3029)

tlevy@oceaneering.com



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Thank you for your cooperation.

On 2/2/2016 11:21 AM, Christina Fandel - NOAA Federal wrote:

Tara,

It was great to see you and Nikki last week at FPW.

Starla will be on leave until February 15 during which time I will serve as project manager for OPR-K379-KR-15.

We recently became aware of an issue with the LAWMA tide gauge which controls the zoning for your project. CO-OPS will send a field party to resolve the issue and anticipates the issue will be resolved within two weeks.

I understand survey sheets 3-5 may still require reruns and investigations, when was your anticipated acquisition period for this data?

Thank you,

Christy

--

Physical Scientist
Hydrographic Surveys Division
Office of Coast Survey, NOAA
Christina.Fandel@noaa.gov
(301) 713 - 2745 x146

--

Physical Scientist
Hydrographic Surveys Division
Office of Coast Survey, NOAA
Christina.Fandel@noaa.gov
(301) 713 - 2745 x146

Subject: Re: LAWMA Tide Station

From: Christina Fandel - NOAA Federal <christina.fandel@noaa.gov>

Date: 7/29/2015 4:16 PM

To: tlevy@oceanengineering.com

CC: Corey Allen - NOAA Federal <corey.allen@noaa.gov>, David Wolcott - NOAA Federal <david.wolcott@noaa.gov>, Starla Robinson - NOAA Federal <Starla.Robinson@noaa.gov>, Lucy Hick - NOAA Federal <lucy.hick@noaa.gov>

Hi Tara,

If C&C acquires survey data prior to the LAWMA station being operational, HSD OPS will work with CO-OPS to provide C&C with zoning data relative to the Freshwater Control Locks station. Therefore, please do not postpone operations as a result of the malfunctioning LAWMA station.

Thank you,

Christy

On Wed, Jul 29, 2015 at 4:04 PM, Tara Levy <tlevy@oceanengineering.com> wrote:

Christina,

When we are complete our mobilization at the dock today I will send the vessel offshore to do some side scan testing/calibration. Once that is complete I will have them monitor the tide gauge until we can confirm the tide data is available. We expect to be complete by the end of day Thursday possibly Friday.

So just to confirm we will need to make sure we have tide data showing online before we collect any multibeam data.

Thank you,

Tara Levy
Manager

NOAA Division

Office: 337.210.0000

Fax: 337.210.0003

Direct: 337.210.0612

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On 7/29/2015 8:19 AM, Christina Fandel - NOAA Federal wrote:

Hi Tara,

I wanted to give you an update regarding the LAWMA tide station. CO-OPS is aware that the LAWMA tide station has not been working properly and has arranged for the gauge to be examined on Thursday, July 30.

In the event that CO-OPS is unable to repair the LAWMA tide gauge, they will recompute the zoning for the Atchafalaya Bay project area using the Freshwater Control Locks 8766072 tide station as the control station. The Freshwater Control Locks tide station was added to the hydro hot list yesterday as a precaution.

After CO-OPS investigates the LAWMA station, we will provide you with either an updated tide file with Freshwater Control Locks as the control station or advise you to use the tide zoning file previously provided with LAWMA as the control station. In the event that CO-OPS will need to recompute zoning using Freshwater Control, they will be able to supply you with an updated zoning file by early next week. Irregardless, we do not anticipate either outcome should delay operations.

Thank you and please let me know if you have any questions,

Christy

--

Christy Fandel
Physical Scientist
Hydrographic Survey Division
Office of Coast Survey, NOAA
Christina.Fandel@noaa.gov
[\(301\) 713-2702](tel:(301)713-2702) x103

--

Christy Fandel
Physical Scientist
Hydrographic Survey Division
Office of Coast Survey, NOAA
Christina.Fandel@noaa.gov
[\(301\) 713-2702](tel:(301)713-2702) x103

Subject: Re: Letter in Response for Additional Sub-Contractor

From: Emily Clark - NOAA Federal <emily.clark@noaa.gov>

Date: 10/26/2015 1:46 PM

To: Tara Levy <tlevy@oceaneering.com>

CC: Starla Robinson - NOAA Federal <Starla.Robinson@noaa.gov>, Christina Fandel - NOAA Federal <christina.fandel@noaa.gov>, Lucy Hick - NOAA Federal <lucy.hick@noaa.gov>, Michael Gonsalves - NOAA Federal <michael.gonsalves@noaa.gov>, Corey Allen - NOAA Federal <corey.allen@noaa.gov>

Good Afternoon,

Following up on response required based on my previous email sent 10/15/15. I will try to give you a call and make sure that you did receive the information.

Thanks

v/r,

Emily

On Thu, Oct 15, 2015 at 8:57 AM, Emily Clark - NOAA Federal <emily.clark@noaa.gov> wrote:

Good Morning Tara,

NOAA has reviewed necessary information regarding C&C's request for use of an additional subcontractor in support of contract EA-133C-14-CQ-0030/T-0001. A letter addressing our request for additional information is attached.

Please review at your earliest convenience and provide a response to all by October 23, 2015.

Thanks

--

v/r,

Emily Clark

Contract Specialist

NOAA Eastern Region Acquisition Division

Norfolk Federal Building

200 Granby Street, Suite 815

Norfolk, VA 23510

(: [\(757\) 441-6875](tel:7574416875) | *: Emily.Clark@NOAA.gov | 7: [\(757\) 440-3687](tel:7574403687)

--

v/r,

Emily Clark

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Norfolk Federal Building
200 Granby Street, Suite 815
Norfolk, VA 23510

(: (757) 441-6875 | *: Emily.Clark@NOAA.gov | 7: (757) 440-3687

Subject: Re: Marine Mammal Observers

From: Starla Robinson - NOAA Federal <starla.robinson@noaa.gov>

Date: 7/24/2015 12:39 PM

To: tlevy@oceanengineering.com

CC: Lucy Hick - NOAA Federal <lucy.hick@noaa.gov>, Tara Levy <tara.levy@cctechnol.com>, Nicole Galloway <nicole.galloway@cctechnol.com>, Emily Clark - NOAA Federal <emily.clark@noaa.gov>, Michael Gonsalves - NOAA Federal <michael.gonsalves@noaa.gov>, Christina Fandel - NOAA Federal <christina.fandel@noaa.gov>

Hello Tara,

The Marine Mammal Memo and video are being put together right now. It will be in the mail soon.

Thanks,
Starla

On Fri, Jul 24, 2015 at 12:55 PM, Tara Levy <tlevy@oceanengineering.com> wrote:

Good day Lucy,

I just wanted to check and see if I should be expecting something in the mail... it could be up front... or if you were going to send in HTML.

We plan on starting our field work early/mid next week if possible.

Just thought I would touch base with you.

Thanks

Tara Levy
Manager

NOAA Division

Office: 337.210.0000

Fax: 337.210.0003

Direct: 337.210.0612

Cell: 337.296.3029

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On 7/7/2015 3:26 PM, Lucy Hick - NOAA Federal wrote:

Tara & Nikki,

I confirmed that it is our intention that meeting the "trained observer" requirement in HSSD 7.6 should not be onerous. Currently, we believe that observers can be trained by simply watching a video that will be provided by Coast Survey (we will be sending either a DVD or HTML link very soon).

We are confirming our interpretation with our NOAA Marine Mammal colleagues, but for now I would recommend that you do not need to send anyone to special training in order to meet the HSSD requirements.

Please let me know if you have any questions.

Best Regards,
Lucy

--

Lucy Hick

Operations Branch | Hydrographic Surveys Division

Office of Coast Survey | National Oceanic & Atmospheric Administration

(301) 713-2702 x107 | Lucy.Hick@noaa.gov

--

Starla D. Robinson, Physical Scientist

NOS - OCS - HSD - Operations Branch

National Oceanic Atmospheric Administration

Office: 301-713-7202 x125

Cell: 360-689-1431

Subject: Re: Multibeam Backscatter Mosaics

From: Starla Robinson - NOAA Federal <starla.robinson@noaa.gov>

Date: 3/3/2016 9:08 AM

To: Tara Levy <tlevy@oceaneering.com>

CC: Lucy Hick - NOAA Federal <lucy.hick@noaa.gov>, Christina Fandel - NOAA Federal <christina.fandel@noaa.gov>, "Galloway, Nicole" <ngalloway@oceaneering.com>, Corey Allen - NOAA Federal <corey.allen@noaa.gov>, Michael Gonsalves - NOAA Federal <michael.gonsalves@noaa.gov>

Hello Tara,

I figured that was the case. We would prefer you leave the multibeam backscatter mosaics out of the package.

Thank you,
Starla

On Thu, Mar 3, 2016 at 9:33 AM, Tara Levy <tlevy@oceaneering.com> wrote:

Starla,

Thank you for letting us know this. We have however processed the back-scatter so that we can avoid some issues we have experienced in the past with the files not being readable.

He have the back-scatter Mosaics completed even if they are not required can we still submit them or is it preferred that we do not?

--

Best regards,

Tara Levy
Division Manager ~NOAA

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Thank you for your cooperation.

On 3/2/2016 1:49 PM, Starla Robinson - NOAA Federal wrote:

Hello Tara,

HSD OPS was recently notified that C & C (Oceaneering) has been submitting multibeam backscatter mosaics as part of their final deliverables. To clarify, following 8.4.4 of the Hydrographic Specifications and deliverables, submittal of backscatter mosaics is not required. The final deliverable for multibeam backscatter is the raw data files in a format readable by IVS Fledermaus Geocoder Toolbox.

Thank you,
Starla

--

*Starla D. Robinson, Physical Scientist
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National Oceanic Atmospheric Administration
Office: 301-713-2702 x125
Cell: 360-689-1431*

--

*Starla D. Robinson, Physical Scientist
NOS - OCS - HSD - Operations Branch
National Oceanic Atmospheric Administration
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Cell: 360-689-1431*

Subject: Re: OPR-K379-KR-15 Hydro Hot List~ request addition of station 8764227

From: David Wolcott - NOAA Federal <david.wolcott@noaa.gov>

Date: 7/28/2015 10:00 AM

To: tlevy@oceaneering.com, Lucy Hick - NOAA Federal <Lucy.Hick@noaa.gov>, Starla Robinson - NOAA Federal <Starla.Robinson@noaa.gov>

CC: Hua Yang - NOAA Affiliate <hua.yang@noaa.gov>, _NOS CO-OPS OET Team <nos.coops.oetteam@noaa.gov>, HPT <nos.coops.hpt@noaa.gov>, Nikki Galloway <nicole.galloway@cctechnol.com>, Jim Wade <jew@cctechnol.com>, John Baker <john.baker@cctechnol.com>, Brad Dalgle <brad.daigle@cctechnol.com>

Hi Tara,

thanks for providing the contacts. I'm adding Lucy and Starla to this email chain so it's in their inbox, as well.

Regards,

David

On Tue, Jul 28, 2015 at 10:13 AM, Tara Levy <tlevy@oceaneering.com> wrote:

Thank you!

Tara Levy
Manager

NOAA Division

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On 7/28/2015 7:12 AM, Hua Yang - NOAA Affiliate wrote:

Hi Tara,

The station was just added to the Hydro Hot List.

Thanks a lot for your timely notice,

Hua Yang

Hydrographic Planning Team

NOAA/National Ocean Service

Center for Operational Oceanographic Products and Services

Station 7128

1305 East West Highway, SSMC4

Silver Spring, MD 20910

Office: [301-713-2890](tel:301-713-2890) x210

Email: Hua.Yang@noaa.gov

Web: <http://tidesandcurrents.noaa.gov/>

Hydro Hot List: <http://tidesandcurrents.noaa.gov/hydro.shtml>

On Mon, Jul 27, 2015 at 4:15 PM, Tara Levy <tlevy@oceaneering.com> wrote:

All,

Please add the following station to the Hydro Hot List for project OPR-K379-KR-15

Station : LAWMA,LA

Station ID: 8764227

Thank you

--

Tara Levy
Manager

NOAA Division

Office: [337.210.0000](tel:337.210.0000)

Fax: [337.210.0003](tel:337.210.0003)

Direct: [337.210.0612](tel:337.210.0612)

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--

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

1305 East-West Highway, 7133
Silver Spring, MD 20910
Office: 301-713-2890x153
Fax: 301-713-4437

Subject: Re: OPR--K379-KR-15 Sheet 5 Request extension

From: Lucy Hick - NOAA Federal <lucy.hick@noaa.gov>

Date: 1/22/2016 1:04 PM

To: Tara Levy <tlevy@oceanengineering.com>

CC: Starla Robinson - NOAA Federal <starla.robinson@noaa.gov>, Christina Fandel - NOAA Federal <christina.fandel@noaa.gov>, Michael Gonsalves - NOAA Federal <michael.gonsalves@noaa.gov>, Corey Allen - NOAA Federal <corey.allen@noaa.gov>

Hi Tara,

First, I wanted to let you know that Starla will be out of the office for the next month, and most of HSD will be at Field Procedures next week. I'm also planning to be out of the office, although my trip may be cancelled if the storm keeps me from flying out.

Regarding the request for an extension...we need to run this by AGO as only the Contract Office has the ability to grant an extension. I am aware that AGO has become reluctant to grant extensions in situations where delay was not caused by actions of the government or force majeure.

Looking at your spreadsheet, I see that you have recorded 99 day for weather. Can you elaborate more on this? Are these 99 days strictly when the weather in the survey area prevented data acquisition. Or does the 99 days include times when data acquisition could have occurred, but the ship had not yet returned to the survey area after working on a non-NOAA project. In other words, if the ship had remained in the NOAA survey area and not departed for another project, would acquisition have been able to resume earlier than it did?

Thank You,
Lucy

On Mon, Jan 18, 2016 at 5:30 PM, Tara Levy <tlevy@oceanengineering.com> wrote:

Lucy,

I would like to request an extension on the deliverables for OPR-K379-KR-15 Sheet 5 only.

Due to a later start in the year and unusually high number of weather days in Oct, Nov and Dec we are still doing our clean up work.

We hope to have all clean up work for Sheet 3 and 4 completed by the end of this month and investigations (~ 50 for sheet 3) and should therefore be able to have 1-4 submitted on time.

However sheet 5 has taken a bit more time to review and we still have a fair amount of clean up work and investigations to complete and feel that an extension until the end of April should provide us the time needed to complete it.

I have attached the most recent monthly Progress Report reflecting the weather days for the above mentioned months.

Please let me know if there is anything else you need from me.

--

Best regards,
Tara Levy
Division Manager ~NOAA

Direct (+1) [337-210-0612](tel:337-210-0612)
Mobile (+1) [337-296-3029](tel:337-296-3029)
tlevy@oceanengineering.com



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Thank you for your cooperation.

--

Lucy Hick

Technical Advisor/Contracting Officer's Representative (COR)
Navigation Services Division | Office of Coast Survey
National Oceanic & Atmospheric Administration
[\(301\) 713-2750 x162](tel:3017132750x162) | Lucy.Hick@noaa.gov

Subject: Re: OPR-K379-KR-15 Status update

From: Lucy Hick - NOAA Federal <lucy.hick@noaa.gov>

Date: 8/7/2015 8:11 AM

To: Tara Levy <tlevy@oceaneering.com>

CC: Starla Robinson - NOAA Federal <starla.robinson@noaa.gov>, Christina Fandel - NOAA Federal <christina.fandel@noaa.gov>, Matthew Jaskoski - NOAA Federal <matthew.jaskoski@noaa.gov>, "Jeremy L. Steward" <jeremy.steward@cctech.us>

Hi Tara,

Thanks for the update. Can you clarify if the issues with the SSS data quality is due to weather conditions/sea state, refraction, or something else.

Best Regards,
Lucy

On Thu, Aug 6, 2015 at 4:43 PM, Tara Levy <tlevy@oceaneering.com> wrote:

Lucy,

Due to poor data quality with ideal survey conditions, this afternoon we moved the Sea Scout to work on a couple other jobs for the weekend.

Since Tuesday 600 UTC we have not seen the side scan record improve. We collected some grab samples this morning and checked the locations of some platforms in the area before departing for the other work.

I just wanted to keep you informed of the survey operations We expect to return to NOAA work by crew change(Wednesday) of next week.

Please let me know if you require any other information.

--

Tara Levy
Manager

NOAA Division

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--

Lucy Hick

Technical Advisor/Contracting Officer's Representative (COR)

Navigation Services Division | Office of Coast Survey

National Oceanic & Atmospheric Administration

(301) 713-2750 x179 | Lucy.Hick@noaa.gov

Subject: RE: Shipwreck observed on transit to survey site

From: Castle Parker - NOAA Federal <castle.e.parker@noaa.gov>

Date: 12/29/2015 1:05 PM

To: nicole.galloway@cctechonol.com, Lucy Hick - NOAA Federal <lucy.hick@noaa.gov>, Christina Fandel - NOAA Federal <christina.fandel@noaa.gov>, Starla Robinson - NOAA Federal <Starla.Robinson@noaa.gov>

CC: Tara Levy <tlevy@oceaneering.com>

Thanks. Received the files and in midst of determining how to submit to NDB and MCD.

Regards,
Gene

-----Original Message-----

From: Nicole Galloway [<mailto:nicole.galloway@cctechonol.com>]

Sent: Tuesday, December 29, 2015 12:40 PM

To: Lucy Hick - NOAA Federal; Christina Fandel - NOAA Federal; Starla Robinson - NOAA Federal; Gene Parker

Cc: Tara Levy

Subject: Shipwreck observed on transit to survey site

Good Morning,

The survey crew visually observed a shipwreck with masts protruding from the water's surface while transiting to the survey site for project OPR-K379-KR-15. The wreck is located on a charted PA wreck but thought that this information might help update the chart in removing the 'PA' identifier.

MB was collected around the feature. Attached is a zip file with images, an S-57 file, .hob file and .csar file of the MB data.

We selected the 'partly submerged at high water' attribute because the masts are sticking out of the water but are not sure if this is the correct description as there is a substantial portion of the vessel subsurface. Let us know if you would prefer something else and/or if we need to update any other attributes.

A CARIS project with the MB data collected has been generated which we can also provide upon request.

We have not at this time contacted Tim Osborn, but please let us know if we should do that or if AHB will forward the information along.

We have also not submitted this to ahb.dton@noaa.gov because the feature is located on a charted wreck. Let us know if we should forward this along.

Thank-you,
Nikki

--

Nicole Galloway

Geoscientist

C&C Technologies, Inc.

Lafayette, LA 70508 USA

nicole.galloway@cctechonol.com

ngalloway@oceaneering.com

337-210-0000 (Ext. 3519)

Subject: Re: Tides update and extension status

From: Starla Robinson - NOAA Federal <starla.robinson@noaa.gov>

Date: 2/24/2016 3:25 PM

To: Tara Levy <tlevy@oceaneering.com>

CC: Christina Fandel - NOAA Federal <christina.fandel@noaa.gov>, Lucy Hick - NOAA Federal <lucy.hick@noaa.gov>, Nikki Galloway <ngalloway@oceaneering.com>, Jeremiah Steward <jsteward@oceaneering.com>, Emily Clark - NOAA Federal <emily.clark@noaa.gov>, Corey Allen - NOAA Federal <corey.allen@noaa.gov>, Michael Gonsalves - NOAA Federal <michael.gonsalves@noaa.gov>

Hello Tara,

The mod request has been sent, and there should be news by the end of the week. Emily said it should go through without issues.

The LAWMA inspection is scheduled March 7. We are communicating with COOPS to get a better timeline and game plan. Assuming a project end date of April 30th, when do you need final tides by? Could you give us a rough estimate of the magnitude of vertical artifact you are seeing?

Thank you,
Starla

On Tue, Feb 23, 2016 at 3:59 PM, Tara Levy <tlevy@oceaneering.com> wrote:

Lucy,

I just wanted to check in regarding the our tide gauge status and if the new tide data was available or maybe when you think it could be available.

We have data in sheet 4 and Sheet 5 that we would need to reprocess with new tide data (we currently see a notable difference in data depths).

Also is there any news on if the extension may be granted or not?

Thank you for your time,

--

--

Best regards,

Tara Levy
Division Manager ~NOAA

Direct (+1) 337-210-0612

Mobile (+1) 337-296-3029

tlevy@oceaneering.com



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Thank you for your cooperation.

--

*Starla D. Robinson, Physical Scientist
NOS - OCS - HSD - Operations Branch
National Oceanic Atmospheric Administration
Office: 301-713-7202 x125
Cell: 360-689-1431*

Subject: Re: Water column anomalies observed in H12789 of OPR-K379-KR-15

From: Tim Osborn - NOAA Federal <tim.osborn@noaa.gov>

Date: 3/25/2016 3:30 PM

To: Castle Parker - NOAA Federal <castle.e.parker@noaa.gov>

CC: Starla Robinson - NOAA Federal <Starla.Robinson@noaa.gov>, Lucy Hick - NOAA Federal <lucy.hick@noaa.gov>, Christina Fandel - NOAA Federal <christina.fandel@noaa.gov>, Matthew Jaskoski - NOAA Federal <matthew.jaskoski@noaa.gov>, Nicole Galloway <ngalloway@oceanengineering.com>, Tara Levy <tlevy@oceanengineering.com>, Kayla Johnson - NOAA Affiliate <kayla.johnson@noaa.gov>

Gene

Thank you and for the other notices.

I will forward.

Tim

On Mar 25, 2016, at 3:26 PM, Castle Parker - NOAA Federal <castle.e.parker@noaa.gov> wrote:

Subject: Re: XML DR 2015_02 Version Release

From: Starla Robinson - NOAA Federal <starla.robinson@noaa.gov>

Date: 11/13/2015 1:57 PM

To: Tara Levy <tlevy@oceaneering.com>

CC: Nicole Galloway <nicole.galloway@cctechonol.com>, Lucy Hick - NOAA Federal <lucy.hick@noaa.gov>, Christina Fandel - NOAA Federal <christina.fandel@noaa.gov>

My mistake. The version that was out at the beginning of the project was 2014_2. There was no 2015_1. So you can use 2014_2 or 2015_2.

Thank you,
Starla

On Fri, Nov 13, 2015 at 2:49 PM, Tara Levy <tlevy@oceaneering.com> wrote:

Starla,

Can you send us version 1 or are all changes covered in the second revision?

Thanks

Tara Levy
Manager

NOAA Division

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On 11/13/2015 10:10 AM, Starla Robinson - NOAA Federal wrote:

Hello Tara,

The updated 2015_02 XML schema to generate and validate descriptive reports has been uploaded to the [OCS XML Hydrographic Reports](#) webpage.

Attached to this email you will find a change list for the 2015_02 version of the schema.

As a reminder, any submitted xml files must validate against the most recent schema and stylesheet at the time the project instructions were issued (**Version 2015_01**). Version 2015_02 is not required but may have some useful updates.

Thank you,

Starla Robinson

--

*Starla D. Robinson, Physical Scientist
NOS - OCS - HSD - Operations Branch
National Oceanic Atmospheric Administration
Office: 301-713-7202 x125
Cell: 360-689-1431*

Subject: Sound Speed Cast Frequency

From: Christina Fandel - NOAA Federal <christina.fandel@noaa.gov>

Date: 9/18/2015 2:37 PM

To: Tara Levy <tlevy@oceaneering.com>

CC: Starla Robinson - NOAA Federal <Starla.Robinson@noaa.gov>, Lucy Hick - NOAA Federal <lucy.hick@noaa.gov>

Hi Tara,

I wanted to follow up with you about the frequency at which C&C is conducting sound speed casts for OPR-K379-KR-15. I believe it was mentioned during the site visit that the sound speed casts were being conducted about every 12 hours, is that correct? Thank you for the clarification,

Christy

--

Christy Fandel
Physical Scientist
Hydrographic Surveys Division
Office of Coast Survey, NOAA
Christina.Fandel@noaa.gov
[\(301\) 713-2702 x103](tel:(301)713-2702x103)

Subject: Verified LAWMA Data to be available first week of September

From: Christina Fandel - NOAA Federal <christina.fandel@noaa.gov>

Date: 8/25/2015 11:03 AM

To: Tara Levy <tlevy@oceaneering.com>

CC: Starla Robinson - NOAA Federal <Starla.Robinson@noaa.gov>, Lucy Hick - NOAA Federal <lucy.hick@noaa.gov>

Hi Tara,

CO-OPS notified HSD this morning that although the LAWMA tide gauge is reporting good data, verified water level data will not be available for August until the first week of September. Please let me know if this is an issue of concern, thank you,

Christy

--

Christy Fandel
Physical Scientist
Hydrographic Surveys Division
Office of Coast Survey, NOAA
Christina.Fandel@noaa.gov
(301) 713-2702 x103

Subject: Weather Days

From: Lucy Hick - NOAA Federal <lucy.hick@noaa.gov>

Date: 2/4/2016 8:53 AM

To: Tara Levy <tlevy@oceaneering.com>

CC: Christina Fandel - NOAA Federal <christina.fandel@noaa.gov>, Starla Robinson - NOAA Federal <Starla.Robinson@noaa.gov>, Corey Allen - NOAA Federal <corey.allen@noaa.gov>, Michael Gonsalves - NOAA Federal <michael.gonsalves@noaa.gov>, Emily Clark - NOAA Federal <emily.clark@noaa.gov>

Hi Tara,

We are still working with AGO on your request for an extension but need further clarification on how C&C calculates days lost to weather and equipment.

Are these days calculated per project, per vessel, per sheet, or some other method. For instance in your project statistics, for the month of December, you have recorded 25.99 days lost for weather, 7.92 days lost for equipment and 9 days at sea for a total of 41.91 days.

Thank You,
Lucy

Lucy Hick

Technical Advisor/Contracting Officer's Representative (COR)

Navigation Services Division | Office of Coast Survey

National Oceanic & Atmospheric Administration

(301) 713-2750 x162 | Lucy.Hick@noaa.gov

APPROVAL PAGE

H12791

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

- H12791_DR.pdf
- Collection of depth varied resolution BAGS
- Processed survey data and records
- H12791_GeoImage.pdf

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: _____

Lieutenant Commander Briana Welton Hillstrom, NOAA
Chief, Atlantic Hydrographic Branch