H12558

NOAA Form 76-35A

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

DESCRIPTIVE REPORT

Type of Survey: Navigable Area

Registry Number: H12558

LOCALITY

State: Louisiana

General Locality: Louisiana Coast, LA

Sub-locality: 35 NM West of Ship Shoal

2015

CHIEF OF PARTY
Tara Levy

LIBRARY & ARCHIVES

Date:

NOAA FORM 77-28
(11-72)

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

REGISTRY NUMBER:

HYDROGRAPHIC TITLE SHEET

H12558

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:	**Louisiana**
General Locality:	**Louisiana Coast, LA**
Sub-Locality:	**35 NM West of Ship Shoal**
Scale:	**40000**
Dates of Survey:	**05/29/2014 to 01/07/2015**
Instructions Dated:	**04/16/2013**
Project Number:	**OPR-K354-KR-13**
Field Unit:	**C & C Technologies**
Chief of Party:	**Tara Levy**
Soundings by:	**Multibeam Echo Sounder**
Imagery by:	**Side Scan Sonar Multibeam Echo Sounder**
Verification by:	**Atlantic Hydrographic Branch**
Soundings Acquired in:	**meters at *MLLW***
H-Cell Compilation Units:	**meters at *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 Geophysical Data Center (NGDC) and can be retrieved via http://www.ngdc.noaa.gov/.

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Descriptive Report to Accompany Survey H12558

Project: OPR-K354-KR-13

Locality: Louisiana Coast, LA

Sublocality: 35 NM West of Ship Shoal

Scale: 1:40000

May 2014 - January 2015

C & C Technologies

Chief of Party: Tara Levy

A. Area Surveyed

The survey area is located 35 NM SW of Ship Shoal off the coast of Louisiana, USA.

A.1 Survey Limits

Data was acquired within the following survey limits:

Northeast Limit	Southwest Limit
28.911 91.519	28.811 91.695

Table 1: Survey Limits

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

A.2 Survey Purpose

Survey H12558 covers 39.08 square nautical miles (SNM) in a high commercial traffic area with a high concentration of platforms and pipelines in the Gulf of Mexico. The purpose of this survey is to provide a contemporary survey to update National Ocean Service (NOS) nautical charting products. A significant portion of the SNM for this project is considered critical survey area as designated in the NOAA Hydrographic Survey Priorities, 2012 edition and contains potentially unreliable depths from 1934 – 1936 surveys.

A.3 Survey Quality

The entire survey is adequate to supersede previous data.

A.4 Survey Coverage

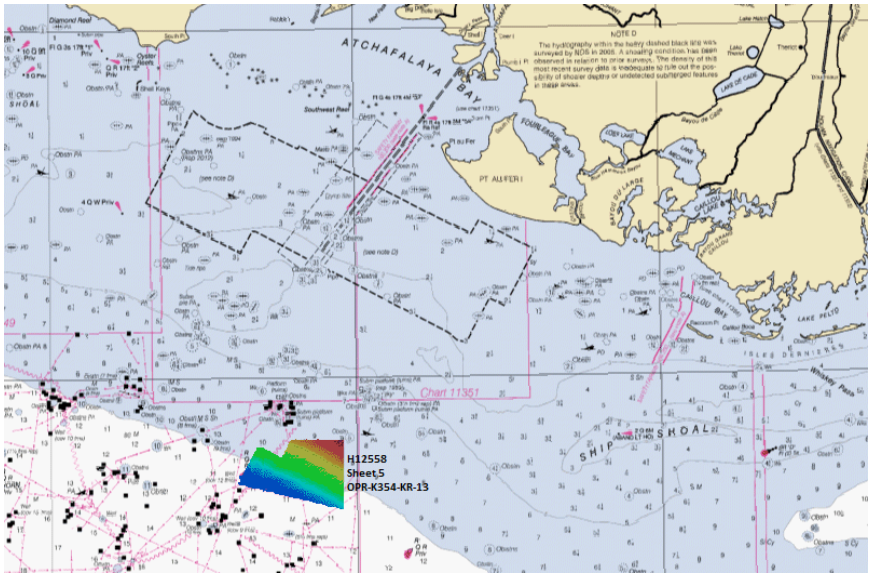

Figure 1: H12558 Survey Coverage

Survey coverage for H12558 (Figure 1) was in accordance with the requirements of the Project Instructions and HSSD. 200% SSS with concurrent MBES data was acquired in the survey area.

A.5 Survey Statistics

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

	HULL ID	***1237094***	***Total***
LNM	**SBES Mainscheme**	0	0
	MBES Mainscheme	0	0
	Lidar Mainscheme	0	0
	SSS Mainscheme	0	0
	SBES/MBES Combo Mainscheme	0	0
	SBES/SSS Combo Mainscheme	69.0	69.0
	MBES/SSS Combo Mainscheme	832.7	832.7
	SBES/MBES Combo Crosslines	0	0
	Lidar Crosslines	0	0
Number of Bottom Samples			6
Number of DPs			30
Number of Items Items Investigated by Dive Ops			0
Total Number of SNM			39.08

Table 2: Hydrographic Survey Statistics

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

Survey Dates
05/29/2014
06/05/2014
06/06/2014
06/07/2014
06/08/2014
06/09/2014
06/24/2014
06/25/2014
06/26/2014
06/29/2014
06/30/2014
07/01/2014
07/02/2014
07/03/2014
07/05/2014
07/06/2014
07/07/2014
01/07/2015

Table 3: Dates of Hydrography

A.6 Shoreline

Shoreline does not exist for this survey.

A.7 Bottom Samples

Six (6) bottom samples were collected within the limits of H12558.

B. Data Acquisition and Processing

B.1 Equipment and Vessels

Refer to the OPR-K354-KR-13 Data Acquisition and Processing Report (DAPR) for additional information regarding survey systems as well as operational, processing and quality control procedures. Additional and supplemental information is included in this descriptive report.

B.1.1 Vessels

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

Hull ID	***1237094***
LOA	40.84 meters
Draft	1.98 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
Klein	5000 V2	SSS
Coda Octopus	F180	Attitude and Positioning System
C-Nav	3050	Positioning 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. It was recognized post-survey operations that the crossline to mainline mileage had been originally miscalculated. The R/V Sea Scout acquired additional crossline data on January 7, 2015 to sufficiently meet the 8% requirement. The total crossline miles were 69.0 NM and the total mainline miles were 832.7 NM; investigation lines and fill-ins were not included in mainlines totals. The crosslines comprise 8.28 percent of the total main line miles.

Mainlines were compared to crosslines for which there was overlapping data 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; fill-ins and 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 98% of depth difference values are between -0.222 and 0.278 m. This is well within the maximum allowable TVU for the depths of the comparison area (16.47 – 23.02 m) which ranges from ±0.546 – ±0.590 m.

Statistical crossline information was also generated by comparing each of the crosslines to the depth layer of a 1-m BASE surface of the mainscheme survey lines using the CARIS QC report utility. In general, greater than 99% of crossline soundings were considered to meet IHO Order 1a standards. 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.

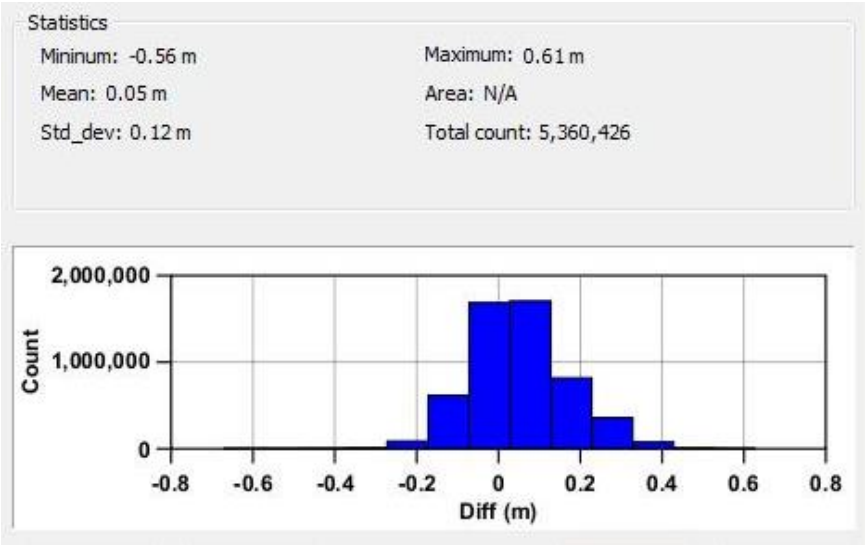

Figure 2: Crossline comparison statistical information and histogram output from CARIS compute statistics tool.

B.2.2 Uncertainty

The following survey specific parameters were used for this survey:

Measured	Zoning
0.009meters	0.102meters

Table 6: Survey Specific Tide TPU Values

Hull ID	Measured - CTD	Measured - MVP	Surface
1237094	2.00meters/second	n/a	0.8meters/second

Table 7: Survey Specific Sound Speed TPU Values

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

B.2.3 Junctions

The following junctions were made with this survey:

Registry Number	Scale	Year	Field Unit	Relative Location
H11475	1:40000	2005	R/V DAVIDSON	W
H11468	1:40000	2005	R/V DAVIDSON	W
H12555	1:40000	2013	C&C Technologies	E
H12557	1:4000	2013	C&C Technologies	N

Table 8: Junctioning Surveys

<u>H11475</u>

The areas of overlap between Sheets (Figure 3) were evaluated using the CARIS Difference Tool to ensure general agreement of depths. If necessary, data was further reviewed in Subset Editor. Junction analyses were conducted between contemporary Sheets using 1 meter BASE surfaces. A 2-m BASE surface was generated for junction analysis between H12558 and H11475 and H11468. The western margin of H12558 borders the southeastern margin of H11475. H12558 was compared to H11475_2m_MLLW_6of16 and H11475_2m_MLLW_16of16. The differences were exported from CARIS using the BASE surface to ASCII option and combined in Microsoft Excel. Figure 4 shows the histogram output from Excel. The

data from H12558 is generally deeper than the data from H11475 but 92% of depth difference values are between -0.2 and 0.4 m. More extreme depth differences do exist, mainly within the comparison with H11475_2m_MLLW_16of16. These appear to be systematically associated with mainline data that are slightly shallower than surrounding data within the H11475_2m_MLLW_16of16 BASE surface; this could be due to the utilization of three different echosounder systems during H11475 survey operations, which is noted in the H11475 Descriptive Report.

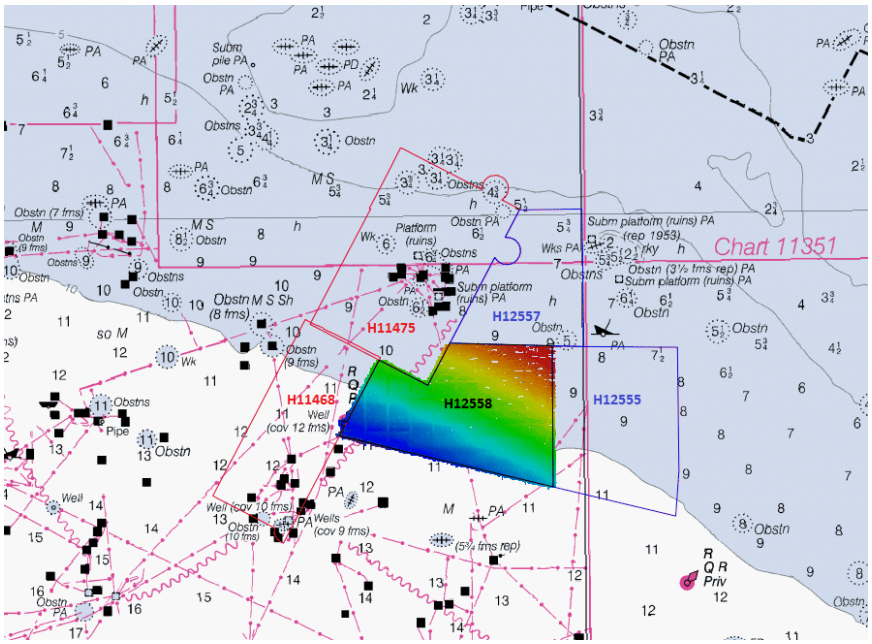

Figure 3: H12558 Junctions.

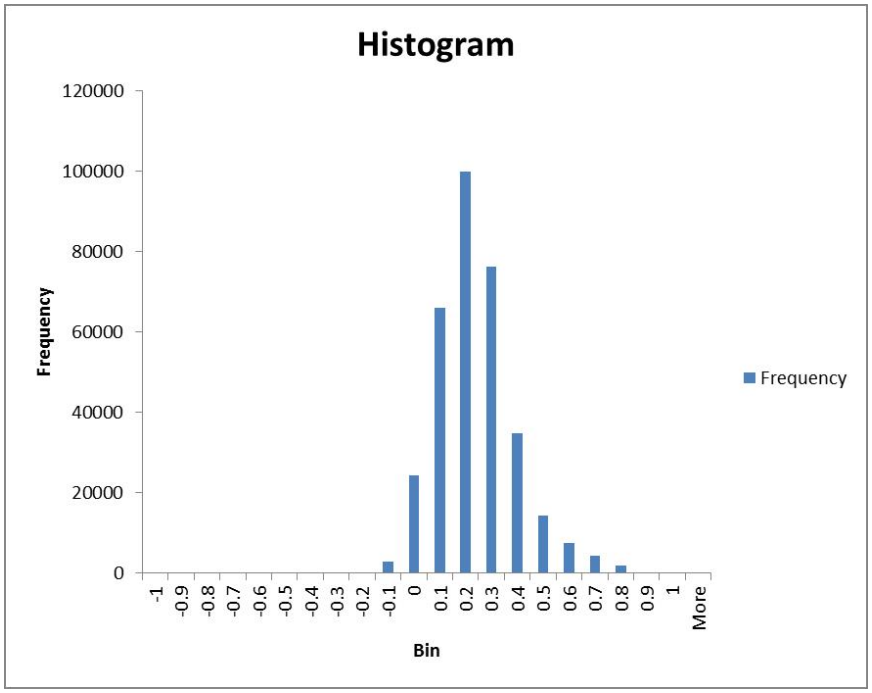

Figure 4: Statistical information and histogram output from CARIS Compute Statistics tool for the difference surface generated between H12558 and H11475.

H11468

The western margin of H12558 borders the northeastern margin of H11468. Figure 5 shows statistical information for the junction generated with the CARIS compute statistics tool. The depth differences generally show good agreement with 97% of depth difference values between -0.318 and 0.382 m.

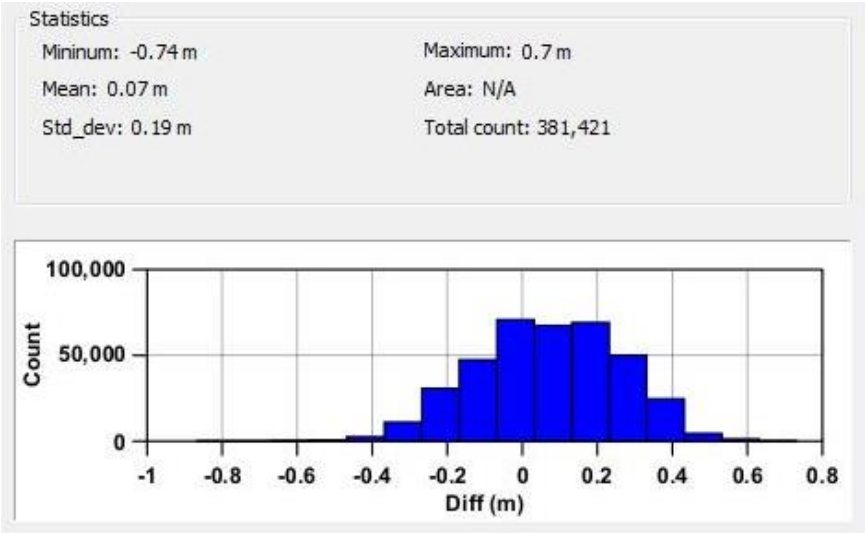

Figure 5: Statistical information and histogram output from CARIS Compute Statistics tool for the difference surface generated between H12558 and H11468.

H12555

The eastern margin of H12558 borders the western margin of H12555. Figure 6 shows statistical information for the junction generated with the CARIS compute statistics tool. The depth differences show good agreement with 99% of depth difference values between -0.26 and 0.24 m.

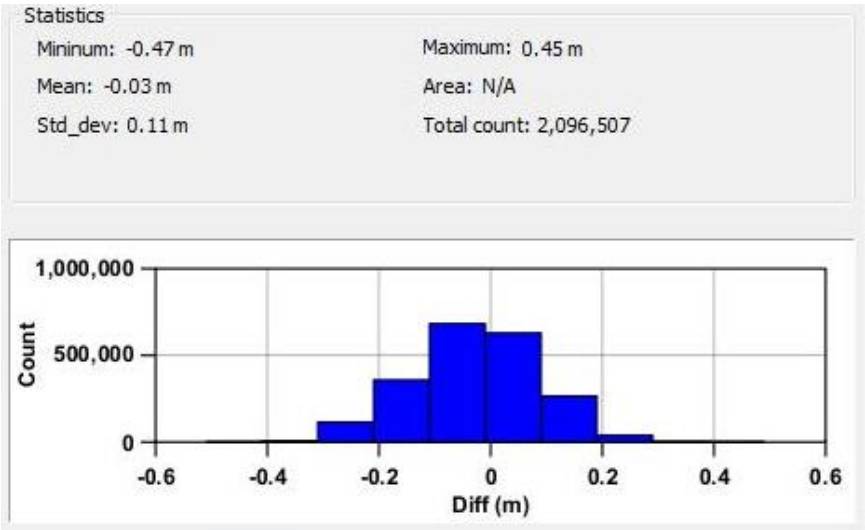

Figure 6: Statistical information and histogram output from CARIS Compute Statistics tool for the difference surface generated between H12558 and H12555.

H12557

The northern margin of H12558 borders the southern margin of H12557. Figure 7 shows statistical information for the junction generated with the CARIS compute statistics tool. The depth differences show good agreement with 99% of depth difference values between -0.155 and 0.145 m.

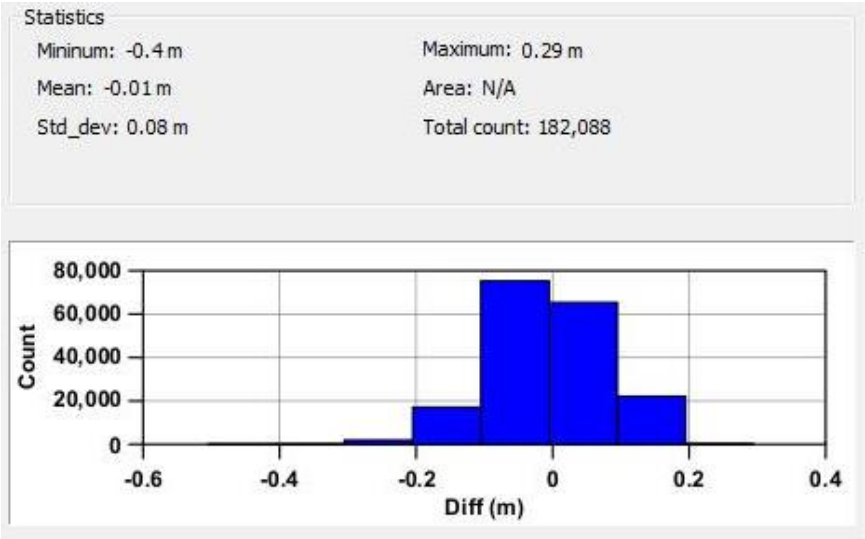

Figure 7: Statistical information and histogram output from CARIS Compute Statistics tool for the difference surface generated between H12558 and H12557.

B.2.4 Sonar QC Checks

An Odom Echotrac MK III single beam echosounder was continuously operated and monitored during the survey as an independent check on the multibeam bottom-detect.

B.2.5 Equipment Effectiveness

B.2.5.1Equipment Effectiveness

The angle of the multibeam sonars could be modified in order to moderate the effects of factors such as increased sea state or to increase coverage; any changes are documented in the acquisition logs. If necessary, the line plan was modified in the field and the SSS line spacing updated to accommodate changes in data quality and expedite data collection.

B.2.6 Factors Affecting Soundings

B.2.6.1 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.2.7 Sound Speed Methods

Sound Speed Cast Frequency: Sea Bird Electronics SBE19 CTDs were used for speed of sound measurements. Casts were conducted at least twice daily and more often as needed. The multibeam data was corrected for the water column sound speed in real-time using the SIS control software. Endeco YSI sondes were used to determine the sound speed at the transducers. The sound speed data and confidence checks are located in Separates II Digital Data\Sound Speed Data Summary.

B.2.8 Coverage Equipment and Methods

Main survey lines were oriented east/west throughout the survey area. 200% SSS with concurrent MBES was acquired in the survey area in accordance with the requirements stated in the project instructions for this survey. SSS data were acquired with a Klein 5000 V2 towfish and MBES data were acquired with a Kongsberg EM2040C echosounder.

B.2.9 Density

According to section 5.2.2.3 of the HSSD (2013) at least 95% of all nodes on the surface shall be populated with at least 3 soundings for Set Line Spacing multibeam coverage. The Compute Statistics tool in CARIS HIPS was used to generate statistics about the density child layer of the H12558_MB_4m_MLLW_Final surface (Figure 8). A bin size of 1 was used and the data exported in ASCII format. The number of nodes in the first 2 bins were added together to determine the number of nodes that contain less than 3 soundings. 6,705,010 nodes contain at least 3 soundings and the total number of nodes in the surface is 6,720,849. Therefore, greater than 99% of all nodes on the surface contain at least 3 soundings.

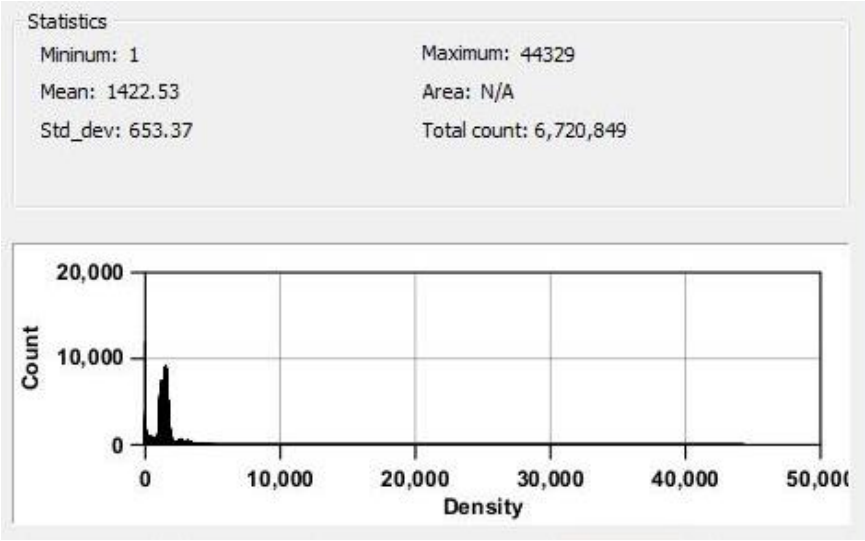

Figure 8: Statistical information about the density child layer of the H12558_ MB_4m_MLLW_Final BASE surface, generated from the CARIS Compute Statistics tool.

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 DAPR.

B.3.2 Calibrations

Prior to initiating survey operations, a standard patch test was performed to determine correctors for pitch, roll, and heading; additional calibrations were performed as necessary. A squat and settlement test was also conducted. Refer to the Data Acquisition and Processing Report for additional information.

B.4 Backscatter

Backscatter was logged within each raw Kongsberg EM file. This data was imported during CARIS conversion and reviewed when necessary.

B.5 Data Processing

B.5.1 Software Updates

There were no software configuration changes after the DAPR was submitted.

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

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

B.5.2 Surfaces

The following CARIS surfaces were submitted to the Processing Branch:

Surface Name	Surface Type	Resolution	Depth Range	Surface Parameter	Purpose
H12558_MB_4m_MLLW	Uncertainty	4 meters	16.48 meters - 22.91 meters	n/a	Set Line Spacing MBES
H12558_MB_4m_MLLW_Final	Uncertainty	4 meters	16.48 meters - 22.91 meters	n/a	Set Line Spacing MBES
H12558_MB_1m_MLLW	Uncertainty	1 meters	16.47 meters - 23.02 meters	n/a	QC/Junction
H12558_MB_2m_MLLW	Uncertainty	2 meters	16.48 meters - 23.04 meters	n/a	Junction
H12558_MB_Mainlines_1m_MLLW	Uncertainty	1 meters	16.47 meters - 23.02 meters	n/a	QC
H12558_MB_Crosslines_1m_MLLW	Uncertainty	1 meters	16.48 meters - 22.82 meters	n/a	QC

Table 9: CARIS Surfaces

The following CARIS surfaces were submitted. A 4-m BASE surface of all the lines was generated to fulfill the requirement for Set Line Spacing MB coverage, specified in section 5.2.2.3 in the HSSD (2013). A 1-m BASE surface of all the lines was generated for QC purposes as well as for junctions. A 2-m BASE surface was also generated for junction analysis. 1-m BASE surfaces were generated for the crosslines and mainlines separately in order to conduct the crossline comparison analysis.

After initial data cleaning, the surfaces were reviewed a second time for fliers using the standard deviation layer and the 3D display window. Higher standard deviation is generally associated with bathymetric features, contacts and/or areas of bathymetric change. Noisy MB data, although cleaned, can also show higher standard deviation. The standard deviation for the H12558_MB_4m_MLLW_Final does not exceed 0.26 m.

C. Vertical and Horizontal Control

C.1 Vertical Control

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

C.2 Horizontal Control

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

D. Results and Recommendations

D.1 Chart Comparison

D.1.1 Raster Charts

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

Chart	Scale	Edition	Edition Date	LNM Date	NM Date
11340	1:458596	78	08/2014	01/05/2015	01/10/2014

Table 10: Largest Scale Raster Charts

11340

Two Local Notice to Mariners were issued within the survey bounds subsequent to the date of the project instructions (04/16/2013) and before the end of the survey (07/07/2014), with additional data collected on Jan 9th 2015. These are LNM 34/13 8th Dist from 08/29/2013 issued to delete Apache Platforms 102-69 and 102-70. Depths range from 9.00 to 12.59 fathoms (54.03 to 75.53 feet) and depths increase from northeast to southwest. Surveyed soundings match the partially surveyed 9 fathom charted depth in the northeast corner of the survey area but are shallower than charted 10 foot depth to the west by 1 to 2 feet. Surveyed soundings are progressively deeper than charted depths from northeast to southwest. Surveyed soundings are 5 feet deeper than the charted 9 fathom depth in the northeast portion of the survey area and 5 feet to 1 fathom deeper than the 10 fathom depth in the southeast portion of the survey area. Surveyed soundings are 1 fathom deeper than the 10 fathom depth in the center of the survey area and the partially surveyed 11 fathom depth in the southwest corner of the survey area. The 10-fathom (60-foot) contour extends from northwest to southeast through the survey area. A user defined color range map was used to evaluate the contour with 0 – 18.288 m depths in blue and depths greater than 18.288 m in green. It is evident that depths greater than 10 fathoms extend northeast from the currently charted contour by 2 to 3 nautical miles (Figure 9).

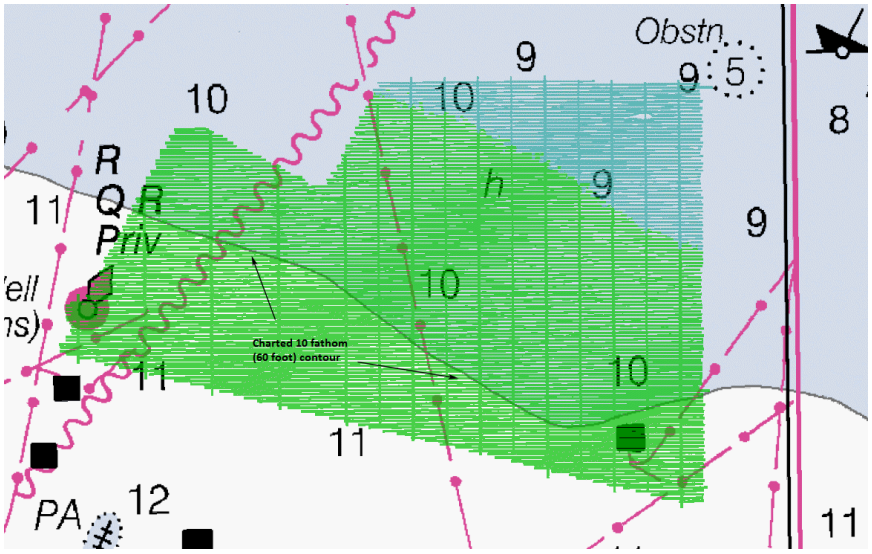

Figure 9: Comparison between the charted 10 fathom (60 foot) contour and surveyed soundings shows that surveyed soundings greater than 10 fathoms (60 feet) extend northeast of the charted contour by 2 to 3 nautical miles. Surveyed soundings 0 – 18.288 m in blue and surveyed soundings greater than 18.288 m in green; 18.288 represents 10 fathoms (60 feet).

D.1.2 Electronic Navigational Charts

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

ENC	Scale	Edition	Update Application Date	Issue Date	Preliminary?
US3GC03M	1:458596	46	08/27/2013	12/15/2014	NO

Table 11: Largest Scale ENCs

US3GC03M

The three 10 fathom depths on chart 11340 correspond to 9 fathoms 5 feet on the ENC; the other charted depths are the same on the ENC as the RNC and the observations made for the RNC are valid for the ENC. Surveyed soundings generally match the charted 9 fathom 5 foot depth in the northern portion of the survey area but surveyed soundings are up to 7 feet deeper than the other two charted 9 fathom 5 foot depths.

D.1.3 AWOIS Items

Number of AWOIS Items Addressed: 1
Number of AWOIS Items Not Addressed: 0

One (1) AWOIS item, 12808, is located just outside the western bounds of the survey area and was assigned. Full MBES and 200% SSS coverage were acquired within the 200 m AWOIS search radius. The history states that this item is a well, covered by 12 fathoms of water and marked by a privately maintained lighted buoy. One MBES line (H58-fill-4) shows an indication of a potential feature in the MB and backscatter at the location of the buoy, but this is not confirmed in adjacent MBES or SSS lines. No feature was observed visually and the hydrographer recommends removal from the chart.

D.1.4 Charted Features

Chart 11340

One (1) charted platform exists in the survey area as well as one cable and several pipelines; refer to sections D.2.7 and D.2.5, respectively, for additional information. One (1) AWOIS item with an associated buoy located just outside the western bounds of the survey area were assigned for investigation; refer to section D.1.3 and D.2.3, respectively, for additional information.

D.1.5 Uncharted Features

No uncharted features that would warrant addition to the chart were observed during survey operations.

D.1.6 Dangers to Navigation

No Dangers to Navigation were submitted for this survey.

D.1.7 Shoal and Hazardous Features

No shoal areas were observed within the survey area.

D.1.8 Channels

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

D.2 Additional Results

D.2.1 Shoreline

Shoreline does not exist within the survey area.

D.2.2 Prior Surveys

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

D.2.3 Aids to Navigation

One (1) Aid to Navigation is currently charted partially within the western survey area limits in association with AWOIS item 12808. This buoy was not observed during survey operations and the hydrographer recommends removal from the chart.

D.2.4 Overhead Features

Overhead features do not exist for this survey.

D.2.5 Submarine Features

Several pipelines and one submarine cable are charted within the survey area. Features potentially representative of exposed pipeline were observed in the SSS and MBES data (refer to the Final Feature File for additional information).

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

No platforms were observed either visually or within survey data. There is one currently charted platform that the hydrographer recommends removing from the chart. Refer to the Final Feature File for additional information. Two Local Notice to Mariners were issued within the survey bounds (LNM 34/13 8th Dist) on 08/29/2013 to delete Apache Platforms 102-69 and 102-70. Polygons delineated from the SSS data around areas that includes disturbed seabed, depressions and small contacts are located at the position of these removed platforms (Figures 10 and 11). Review of internal data confirms the removal of these platforms in the summer of 2013. Internal data also indicates that the two pipelines between the platforms have been abandoned (in place).

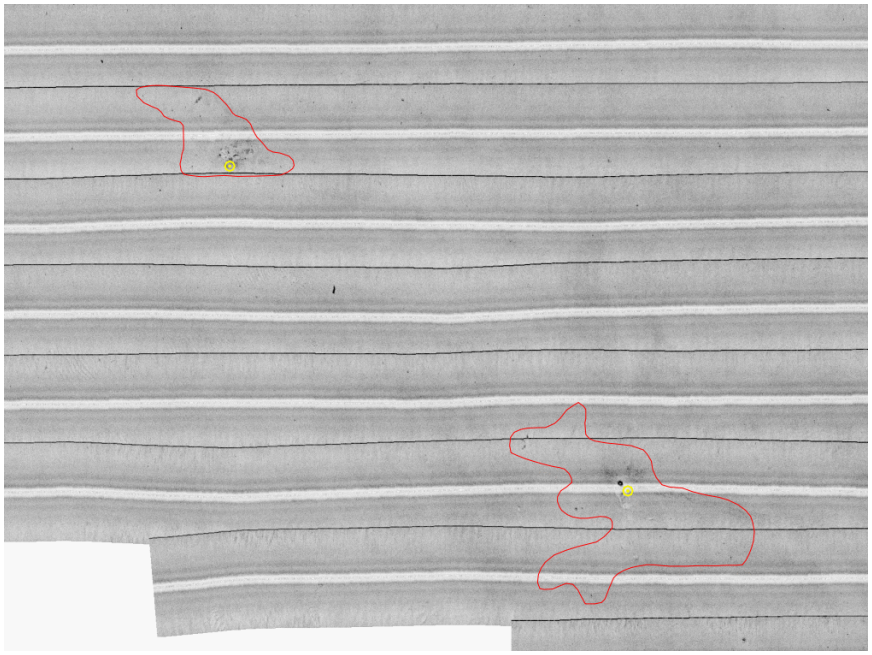

Figure 10: Yellow circles indicate position of LNM issued to remove platforms. Red polygons indicate areas delineated from SSS around disturbed seabed/depressions/small contacts.

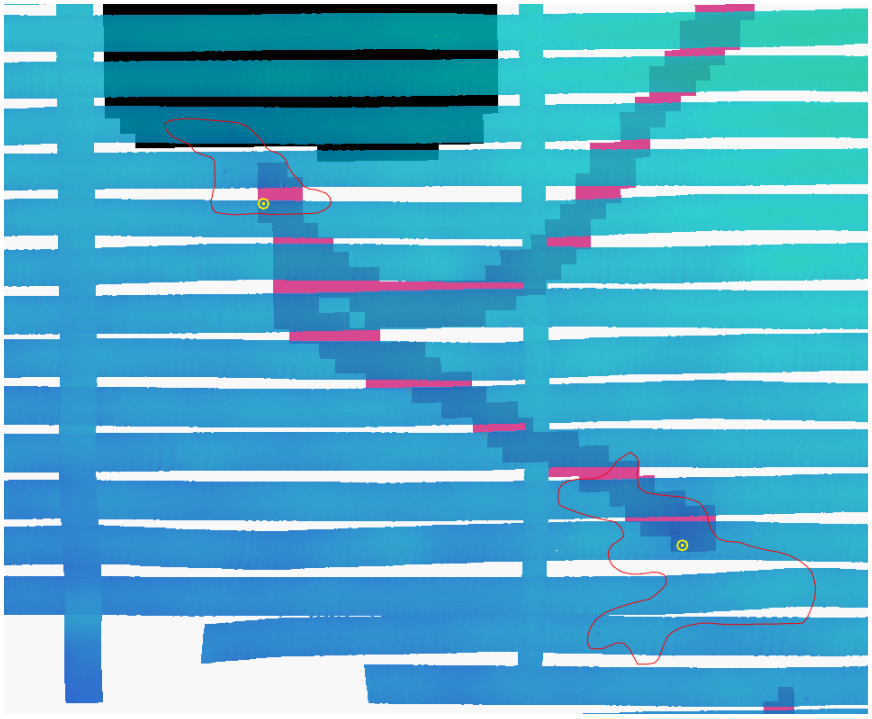

Figure 11: Yellow circles indicate position of LNM issued to remove platforms. Red polygons indicate areas delineated from SSS around disturbed seabed/depressions/small contacts.

D.2.8 Significant Features

No anomalous environmental conditions were observed during the survey.

D.2 Construction and Dredging

No active dredging or construction was observed during survey operations.

E. Approval Sheet

Field operations contributing to the accomplishment of the H12558 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-K354-KR-13.

Approver Name	Approver Title	Approval Date	Signature
Tara Levy	Chief of Party	01/20/2015	
Nicole Galloway	Geoscientist	01/20/2015	

F. Table of Acronyms

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

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

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

APPENDIX I

TIDES AND WATER LEVELS

FINAL TIDE NOTE and FINAL TIDE ZONING CHART

DATE: January 2015

HYDROGRAPHIC BRANCH: Atlantic
HYDROGRAPHIC PROJECT: OPR-K354-KR-13
HYDROGRAPHIC SHEET: H12558

LOCALITY: 35 NM West of Ship Shoal

TIME PERIOD: May 29, 2014 – July 7, 2014, January 7, 2015

TIDE STATION USED: 8764227 LAWMA, Amerada Pass, LA
Lat. 29° 27.0' N Lon. 91° 20.3' W

PLANE OF REFERENCE (MEAN LOWER LOW WATER): 0.00 m
HEIGHT OF HIGH WATER ABOVE PLANE OF REFERENCE: 0.947 m

REMARKS: RECOMMENDED ZONING
Use zones identified as: WGM279, WGM289, WGM263 and WGM264

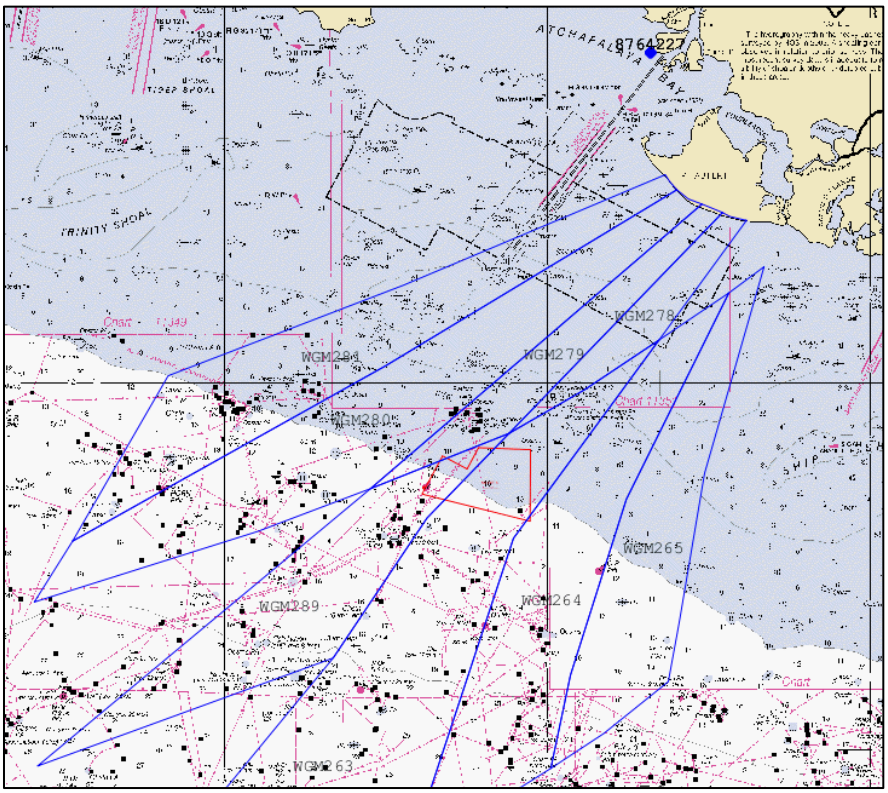

Figure 1. Final Tidal Zoning Chart

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.

ABSTRACT OF TIMES OF HYDROGRAPHY

Project: OPR-K354-KR-13 Registry No.: H12558
Contractor Name: C & C Technologies, Inc.
Date: January 2015
Sheet Number: 5
Inclusive Dates: May, 2014 - July, 2014 and January 7, 2015
Field Work is Complete

Time (UTC)

Day (yy/mm/dd)	Julian Day	Start	End	Year
14/05/29	149	1256	1543	2014
14/06/05	156	1257	2332	2014
14/06/05	156	2353	2400	2014
14/06/06	157	0000	1221	2014
14/06/06	157	1254	2400	2014
14/06/07	158	0000	0047	2014
14/06/07	158	0116	0635	2014
14/06/07	158	0711	0815	2014
14/06/07	158	1008	1337	2014
14/06/07	158	1409	2400	2014
14/06/08	159	0000	0608	2014
14/06/08	159	1157	2400	2014
14/06/09	160	0000	0010	2014
14/06/09	160	0042	0707	2014
14/06/09	160	0742	1816	2014
14/06/24	175	2315	2340	2014
14/06/24	175	2357	2400	2014
14/06/25	176	0000	0117	2014
14/06/25	176	0155	0158	2014
14/06/25	176	0521	1803	2014
14/06/26	177	0305	1410	2014
14/06/26	177	1429	2053	2014
14/06/29	180	2330	2400	2014
14/06/30	181	0000	2400	2014
14/07/01	182	0000	1235	2014
14/07/01	182	1252	1444	2014
14/07/01	182	1520	2400	2014
14/07/02	183	0000	0108	2014
14/07/03	184	0847	0901	2014
14/07/03	184	0931	1424	2014
14/07/05	186	0810	0830	2014
14/07/05	186	1459	2400	2014
14/07/06	187	0000	1854	2014
14/07/06	187	1947	2316	2014
14/07/06	187	2358	2400	2014
14/07/07	188	0000	0752	2014
15/01/07	007	0622	0939	2015
15/01/07	007	1014	1055	2015

APPENDIX II

SUPPLEMENTAL SURVEY RECORDS AND CORRESPONDENCE

Subject:
[NOAA] OPR-K354-KR-13Final_Outline Sheet 5 (H12558)
From:
Tara Levy <tara.levy@cctechnol.com>
Date:
7/30/2014 4:47 PM
To:
_NOS OCS Survey Outlines <survey.outlines@noaa.gov>, "Turner, Paul" <paul.turner@noaa.gov>
CC:
noaa@cctechnol.com

Please see attached final survey outline for Sheet 5 (H12558) of project OPR-K354-KR-13.
Any questions please contact me.

--
Tara Levy

C&C Technologies, Inc
730 E. Kaliste Saloom Rd.
Lafayette, LA, USA 70508
337-210-0000 (Ext. 3518)
337-210-0612 (direct line)
337-296-3029 (cell)
337-261-0192 (Fax)

tara.levy@cctech.us

Attachments:
H12558_FinalSurveyOutline.000 2.5 KB
H12558_FinalSurveyOutline.hob 1.0 KB

Subject: Re: OPR-K354-KR-13 Extra data collected
From: Tara Levy <tara.levy@cctechnol.com>
Date: 1/15/2015 8:18 AM
To: Paul Turner - NOAA Federal <paul.turner@noaa.gov>, "tara.levy@cctech.us" <tara.levy@cctech.us>
CC: Nikki Galloway <nicole.galloway@cctechnol.com>, Michael Gonsalves - NOAA Federal <michael.gonsalves@noaa.gov>

Thank you Paul,
We will make those changes in all the deliverables needed.

Tara Levy

C&C Technologies, Inc
730 E. Kaliste Saloom Rd.
Lafayette, LA, USA 70508
337-210-0000 (Ext. 3518)
337-210-0612 (direct line)
337-296-3029 (cell)
337-261-0192 (Fax)

tara.levy@cctech.us

On 1/15/2015 5:25 AM, Paul Turner - NOAA Federal wrote:

> Good morning Tara & Nikki-
>
> My suggestion and recommendation would be to maintain consistency within the deliverable and update the SORDAT to January 9th for this survey. I realize that leaves a large 'gap' in time however this will encompass the entire duration of times of hydrogrpahy on this survey.
>
> Please let me know if you have any follow-up questions regarding this.
>
> Thanks,
>
> Paul
>
> On Tue, Jan 13, 2015 at 3:22 PM, Tara Levy <tara.levy@cctechnol.com> wrote:
>
>> Paul,
>> While completing our final-final review it was noted that we were not compliant with the Specs and deliverables regarding the percentage of tie line miles, the line spacing was changed in the field depending on the data quality so that we could keep on working, which put us off by 2-3%. We decided, since we were passing thru the survey area, to collect a few more lines in sheet 5 and sheet 2.
>>
>> The question we have is regarding the attribute in the final feature file, the SORDAT (source date for the end of the project). Would we keep this the same as previously reported, July 7th and note that extra data was collected on Jan 9th OR change the end of the survey date to match the day when the last tie-lines were collected.

Please advise,

--
Tara Levy

C&C Technologies, Inc
730 E. Kaliste Saloom Rd.
Lafayette, LA, USA 70508
337-210-0000 (Ext. 3518)
337-210-0612 (direct line)
337-296-3029 (cell)
337-261-0192 (Fax)

tara.levy@cctech.us

Vanessa Miller - NOAA Federal <vanessa.miller@noaa.gov>

H12558 Backscatter Issues

3 messages

Vanessa Miller - NOAA Federal <vanessa.miller@noaa.gov> Fri, Jul 17, 2015 at 1:00 PM
To: Castle Parker - NOAA Federal <castle.e.parker@noaa.gov>

Gene,

I am completing the SAR for survey H12558. The survey is straight forward with minimum significant features. While processing backscatter, I determined that the *.all files do not contain header information. With the exception of those listed in folder

V:\Surveys\H12558_K354_CC_13\OPR-K354-KR-13_Lousiana_Coast_LA\H12558\Data\Preprocess\Bathymetry\MBES\150107,

backscatter information cannot be processed using FMGT. Below are images of the error messages that resulted from processing H12558 *.all files to extract backscatter information.

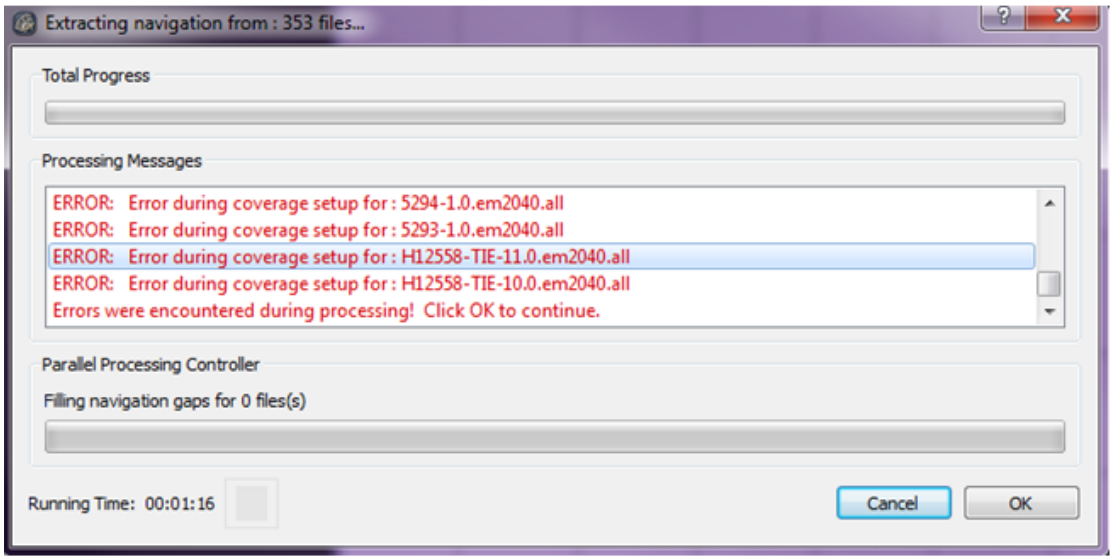

Figure 1: FMGT Error Message #1

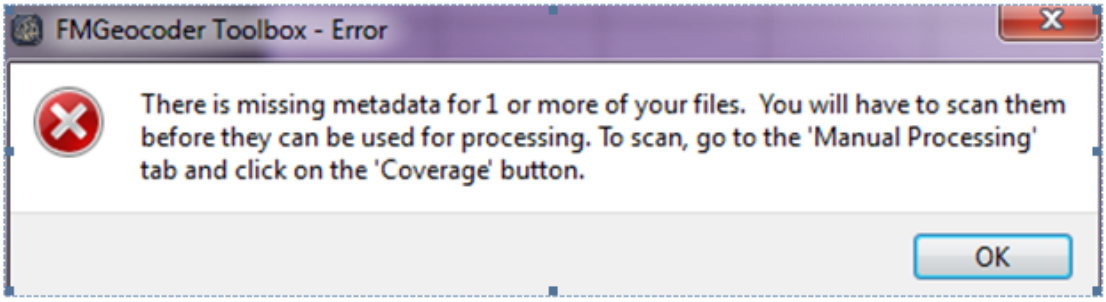

Figure 2: FMGT Error Message #2

```
CARIS - Simrad dump utility                                  Linked
28-Jan-2014


disk loc: 0x0, length 880, opcode: 0x49
EM 3000 Installation Start Datagram # 1
2015/01/07 26925.40
Main Serial Number: 131
Second Head Serial Number: 10528
WLZ=4.776,SMH=131,STC=2,S1X=-1.860,S1Y=-3.230,S1Z=7.068,S1H=
0.050,S1P=0.000,S1R=0.388,S2X=-1.870,S2Y=3.210,S2Z=7.127,S2H=
1.250,S2P=0.429,S2R=0.540,GO1=2.00,GO2=0.00,R1S=131,R2S=0,TSV=
1.01 130904,RSV=1.00 120928,BSV=1.2.0 130429,PSV=1.1.3
131206,DSV=3.1.6 130104,DDS=3.5.9 130926,OSV=SIS 4.1.5,DSX=
0.000,DSY=0.000,DSZ=0.000,DSD=0,DSO=0.000000,DSF=
1.000000,DSH=NI,P1M=1,P1T=0,P1Q=1,P1X=-5.669,P1Y=-0.155,P1Z=-
5.442,P1D=0.000,P1G=WGS84,P2M=0,P2T=0,P2Q=1,P2X=-5.530,P2Y=
1.880,P2Z=-4.720,P2D=0.000,P2G=WGS84,P3M=0,P3T=0,P3Q=1,P3X=-
0.320,P3Y=-0.300,P3Z=-0.120,P3D=0.000,P3G=WGS84,P3S=1,MSX=-
0.320,MSY=-0.300,MSZ=-0.120,MRP=RP,MSD=0,MSR=0.000,MSP=0.000,MSG=
0.000,NSX=0.000,NSY=0.000,NSZ=0.000,NRP=RP,NSD=0,NSR=0.000,NSP=
0.000,NSG=0.000,MAS=1.000,GCG=0.000,APS=0,AHS=2,ARO=2,AHE=2,CLS=
1,CLO=0,PPS=2,VSN=0,VSE=0,VSU=3001,VTE=0,VTU=3000,VSI=
195.0.0.180,VSM=255.255.0.0,
```

H12558-TIE-112-1.0.em2040.all

Figure 3: Header information extracted from 1 of only 5 lines that properly converted.

```
CARIS - Simrad dump utility                                  Linked 28-Jan-2014


disk loc: 0x0, length 200, opcode: 0x55
SVP Datagram: 2014-06-05, 59170.04
Profile Time: 2014-06-05,    47.16
Number of entries:  21
    0.00:   1529.1
    0.66:   1529.1
    1.90:   1529.2
    2.52:   1529.3
    3.41:   1529.5
    4.48:   1529.4
    6.08:   1529.7
    6.97:   1529.7
    8.21:   1530.4
    8.74:   1531.2
   10.26:   1532.3
   10.70:   1532.3
   13.19:   1533.4
   13.72:   1534.6
   14.26:   1536.3
   14.79:   1537.3
   15.50:   1537.6
   16.92:   1536.5
   21.01:   1536.7
   60.00:   1538.4
12000.00:   1538.0

disk loc: 0xcc, length 112, opcode: 0x50
EM 3000 Position Datagram # 1
2014/06/05 59170.00
System type: 3  (Inactive)  Lat:  28.81854715  Long:  -91.52256290  Gyro: 265.91
Height: -19.628
GPS Time: 59170.000
GPS String: GPGGA,162610.00,2849.112830,N,09131.353780,W,2,10,0.8,-19.628,M,,,1,0001*02

disk loc: 0x140, length 8040, opcode: 0x58
XYZ88 Datagram model:  2045  2014-06-05, 59169.971  Depth Datagram # 1
Number of depths: 400, ping number   16875
Serial Number: 131
Sound velocity: 1530.20
Sampling Rate:  30637.3
Transducer depth:    2.19
  #   Across /  Along / Depth / Detection / Ref. (dB) / Quality
  1   -37.91     3.95   19.10     0x01       -24.4     0x0D (P)
  2   -37.73     3.95   19.11     0x01       -18.0     0x0C (P)
  3   -37.62     3.95   19.14     0x01       -26.3     0x0B (P)
  4   -37.39     3.95   19.12     0x01       -24.2     0x13 (P)
  5   -37.22     3.94   19.13     0x01       -27.6     0x36 (P)
  6   -37.04     3.94   19.13     0x01       -22.7     0x0D (P)
  7   -36.78     3.94   19.08     0x01       -29.3     0x11 (P)
  8   -36.63     3.94   19.10     0x01       -22.2     0x0C (P)
  9   -36.52     3.94   19.14     0x01       -23.1     0x07 (P)
 10   -36.38     3.94   19.16     0x01       -23.5     0x0F (P)
 11   -36.25     3.94   19.19     0x01       -24.6     0x20 (P)
 12   -36.04     3.94   19.18     0x01       -23.2     0x0A (P)
 13   -35.85     3.94   19.17     0x01       -22.1     0x07 (P)
 14   -35.72     3.94   19.20     0x01       -24.3     0x1B (P)
 15   -35.36     3.94   19.09     0x01       -26.1     0x16 (P)
 16   -35.11     3.94   19.05     0x01       -22.6     0x0F (P)
 17   -35.02     3.93   19.10     0x01       -24.8     0x06 (P)
 18   -34.88     3.93   19.13     0x01       -26.6     0x06 (P)
 19   -34.74     3.93   19.15     0x01       -26.7     0x0B (P)
 20   -34.62     3.93   19.18     0x01       -24.8     0x09 (P)
 21   -34.48     3.93   19.21     0x01       -33.6     0x0A (P)
 22   -34.16     3.93   19.13     0x01       -28.3     0x0C (P)
 23   -34.07     3.93   19.18     0x01       -31.3     0x0A (P)
 24   -33.87     3.93   19.17     0x01       -26.8     0x11 (P)
 25   -33.64     3.93   19.14     0x01       -30.4     0x0B (P)
```

Figure 4: Example of “dumped” data; example indicative of all other *.all files that did not successfully convert

Respectfully,

Vanessa Self Miller
Hydrographer/Physical Scientist
Atlantic Hydrographic Branch
439 West York St.
Norfolk, VA 23510
757-441-6746 x102

Castle Parker - NOAA Federal <castle.e.parker@noaa.gov> Mon, Jul 20, 2015 at 4:06 PM
To: Nicole Galloway <nicole.galloway@cctechnol.com>
Cc: Matthew Jaskoski - NOAA Federal <matthew.jaskoski@noaa.gov>, Michael Gonsalves - NOAA Federal <michael.gonsalves@noaa.gov>, Paul Turner - NOAA Federal <paul.turner@noaa.gov>, Vanessa Miller - NOAA Federal <Vanessa.Miller@noaa.gov>

Good day Nikki,

AHB has encountered an issue with H12558 Simrad files. We are attempting to process the Simrad files with Fledermaus for the backscatter mosaic. During the final stages of the SAR Vanessa Miller has found that the H12558 Simrad files with the embedded backscatter intensities are missing the header information on all the submitted files with the exception of day 150107. Reference the email below for the error messages and details. I have confirmed the fact that header information of which Fledermaus reads is missing for the following days:

140529, 140605, 140606, 140607, 140608, 140609, 140624, 140625, 140629, 140630, 140701, 140702, 140703, 140705, 140706

…basically all survey days with the exception of day 150107.

AHB is requesting that the H12558 Simrad files are checked on your end and validate the missing information. If the MB files are missing the header info at C&C, AHB requests that the files get corrected and resubmitted to AHB.

Please respond as necessary.

Thanks and 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 x115

From: Vanessa Miller - NOAA Federal [mailto:vanessa.miller@noaa.gov]
Sent: Friday, July 17, 2015 1:01 PM
To: Castle Parker - NOAA Federal
Subject: H12558 Backscatter Issues

[Quoted text hidden]

Nicole Galloway <nicole.galloway@cctechnol.com> Tue, Jul 21, 2015 at 5:45 PM
Reply-To: nicole.galloway@cctechnol.com
To: Castle Parker - NOAA Federal <castle.e.parker@noaa.gov>
Cc: Matthew Jaskoski - NOAA Federal <matthew.jaskoski@noaa.gov>, Michael Gonsalves - NOAA Federal <michael.gonsalves@noaa.gov>, Paul Turner - NOAA Federal <paul.turner@noaa.gov>, Vanessa Miller - NOAA Federal <Vanessa.Miller@noaa.gov>, Tara Levy <tara.levy@cctechnol.com>

Good evening Gene,

We have been looking into this issue, and have validated that the information is missing from our files as well. The analyst who can help us potentially resolve this issue is currently out of the office. We can update you when he is back in the office as to the status of this.

Thank-you,
Nikki
[Quoted text hidden]

[Quoted text hidden]
[Quoted text hidden]
[Quoted text hidden]

757-441-6746 x102

--
Nicole Galloway
Geoscientist
C&C Technologies, Inc.
Lafayette, LA 70508 USA
email: nicole.galloway@cctechnol.com
337-210-0000 (Ext. 3537)

APPENDIX III

SURVEY FEATURES REPORT

DTON - 0
AWOIS - 1
WRECK - 0
Maritime Boundaries - 0

H12558 Feature Report

Registry Number: H12558
State: Louisiana
Locality: Louisiana Coast, LA
Sub-locality: 35 NM West of Ship Shoal
Project Number: OPR-K354-KR-13
Survey Dates: 05/29/2014 - 01/07/2015

Charts Affected

Number	Edition	Date	Scale (RNC)	RNC Correction(s)*
11340	73rd	08/01/2008	1:458,596 (11340_1)	[L]NTM: ?
1116A	73rd	08/01/2008	1:458,596 (1116A_1)	[L]NTM: ?
411	52nd	09/01/2007	1:2,160,000 (411_1)	[L]NTM: ?

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

Features

No.	Name	Feature Type	Survey Depth	Survey Latitude	Survey Longitude	AWOIS Item
1.1	AWOIS #12808	GP	[None]	28° 51' 30.3" N	091° 41' 16.3" W	12808
1.2	AWOIS #12808	GP	[None]	28° 51' 30.3" N	091° 41' 15.8" W	12808

1 - AWOIS Features

1.1) AWOIS #12808

Feature for AWOIS Item #12808

Search Position: 28° 51' 30.3" N, 091° 41' 16.3" W

Historical Depth: [None]

Search Radius: 200

Search Technique: Type: OBSTRUCTION, Itemstatus: ASSIGNED, Searchtype: FULL, Technique: S2 MB VS

Technique Notes:

History Notes:

History

CGD8 LNM 05/96; REPORTS THE EXISTANCE OF A WILL COVERED BY 12 FATHOMS AND LLIGHTED BUOY Q R RED (PRIV MAINTAINED) SIGN: SH - EI-152-1 (SHELL 137-28) IN LAT. 28/51/26.3 N. LON. 091/41/18.2 W.(NAD83) H11468--The AWOIS radius of this search item was not completed due to limited time and survey priorities. Therefore retain as charted (RES 5/09/08).

Survey Summary

Survey Position: 28° 51' 30.3" N, 091° 41' 16.3" W

Least Depth: [None]

TPU (±1.96σ): **THU (TPEh)** [None] ; **TVU (TPEv)** [None]

Timestamp: 2002-305.00:00:00.000 (11/01/2002)

Dataset: H12558_Feature_Report.000

FOID: US 0000303986 00001(02260004A3720001)

Charts Affected: 1116A_1, 11340_1, 411_1

Remarks:

$CSYMB/remrks: obstruction (wellhead) not observed either visually or within survey data

Feature Correlation

Source	Feature	Range	Azimuth	Status
H12558_Feature_Report.000	US 0000303986 00001	0.00	000.0	Primary

Hydrographer Recommendations

remove from chart

S-57 Data

Geo object 1:	Cartographic symbol ($CSYMB)
Attributes:	INFORM - AWOIS 12808
	NINFOM - Delete charted obstruction.
	NTXTDS - Chart 11340, ED78, NTM 20150808
	SORDAT - 20150107
	SORIND - US,US,graph,Chart 11340

Office Notes

SAR NOTES: Ensonified with object detect SSS and MBES. No evidence of this feature was found. This feature is considered as disproved. Compile: Concur. Delete charted obstruction.

1.2) AWOIS #12808

Feature for AWOIS Item #12808

Search Position: 28° 51' 30.3" N, 091° 41' 15.8" W

Historical Depth: [None]

Search Radius: 200

Search Technique: Type: OBSTRUCTION, Itemstatus: ASSIGNED, Searchtype: FULL, Technique: S2 MB VS

Technique Notes:

History Notes:

History

CGD8 LNM 05/96; REPORTS THE EXISTANCE OF A WILL COVERED BY 12 FATHOMS AND LLIGHTED BUOY Q R RED (PRIV MAINTAINED) SIGN: SH - EI-152-1 (SHELL 137-28) IN LAT. 28/51/26.3 N. LON. 091/41/18.2 W.(NAD83) H11468--The AWOIS radius of this search item was not completed due to limited time and survey priorities. Therefore retain as charted (RES 5/09/08).

Survey Summary

Survey Position: 28° 51' 30.3" N, 091° 41' 15.8" W

Least Depth: [None]

TPU (±1.96σ): **THU (TPEh)** [None] ; **TVU (TPEv)** [None]

Timestamp: 2002-305.00:00:00.000 (11/01/2002)

Dataset: H12558_Feature_Report.000

FOID: US 0000303987 00001(02260004A3730001)

Charts Affected: 1116A_1, 11340_1, 411_1

Remarks:

$CSYMB/remrks: buoy not observed either visually or within survey data

Feature Correlation

Source	Feature	Range	Azimuth	Status
H12558_Feature_Report.000	US 0000303987 00001	0.00	000.0	Primary

Hydrographer Recommendations

remove from chart

S-57 Data

Geo object 1:	Cartographic symbol ($CSYMB)
Attributes:	INFORM - AWOIS 12808
	NINFOM - Delete charted buoy.
	NTXTDS - Chart 11340, ED78, NTM 20150808
	SORDAT - 20150107
	SORIND - US,US,graph,Chart 11340

Office Notes

SAR NOTES: Ensonified with object detect SSS and MBES. No evidence of this feature was found. This feature is considered as disproved. Compile: Concur. Delete charted buoy.

APPROVAL PAGE

H12558

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 NGDC for archive

- H12558_DR.pdf
- Collection of depth varied resolution BAGS
- Processed survey data and records
- H12558_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 Matthew Jaskoski, NOAA
Chief, Atlantic Hydrographic Branch