H12057

NOAA FORM 76-35A
U.S. DEPARTMENT OF COMMERCE
NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION
NATIONAL OCEAN SERVICE

DESCRIPTIVE REPORT

Type of Survey: Hydrographic Multibeam & 200% Sidescan

Project No. : OPR-K354-KR-09

Registry No. : H12057

LOCALITY

State: Louisiana

General Locality: Gulf of Mexico

Sublocality: 20 NM S of Entrance to Timbalier Bay

2010

CHIEFS OF PARTY
Scott Croft, John Baker

LIBRARY & ARCHIVES

DATE:

NOAA FORM 77-28 (11-72)	U.S. DEPARTMENT OF COMMERCE NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION	REGISTRY No: H12057
	HYDROGRAPHIC TITLE SHEET	
		FIELD NUMBER: Sheet F

State: Louisiana

General Locality: Gulf of Mexico

Locality: 20 NM S of Entrance to Timbalier Bay

Scale: 1:10,000 Date of Survey: August 2009 - September 2009

Instructions Dated: June 2009 Project Number: OPR-K354-KR-09

Vessels: *M/V Andrew Charles*

Chiefs of Party: Scott Croft, John Baker

Surveyed by: C&C Technologies Personnel

Soundings taken by echosounder, hand lead line, or pole: Simrad EM3002 Multibeam Echosounder

Verification by: C&C Technologies Personnel ***Atlantic Hydrographic Branch (bold, red, italic)***

Soundings in: Feet: X Fathoms: _____ Meters: _____ at MLW: _____ MLLW: X

Remarks: Multibeam Hydrographic Survey of Sheet F
Data collection in meters, referenced to MLLW, later converted into feet
200% side scan sonar coverage
UTC time was used exclusively
Grab samples were taken
Tidal Zones: CGM366, 717, 718, 731, 732, 733, 734, 735, 749, 750, 364, WGM416
Tidal Station: 8762075 (Port Fourchon, LA)
Hcell compilation units in Feet at MLLW

NOAA FORM 77-28 SUPERSEDES FORM C & GS - 537

TABLE OF CONTENTS

APPENDICES

Appendix I	Danger to Navigation Reports
Appendix II	Survey Feature Report
Appendix III	Final Progress Sketch and Survey Outline
Appendix IV	Tides and Water Levels
Appendix V	Supplemental Survey Records and Correspondence

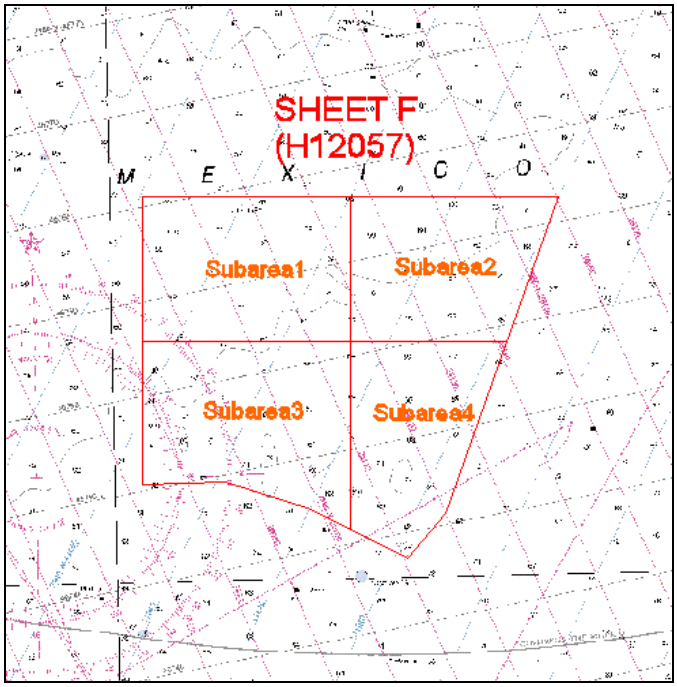
SEPARATES

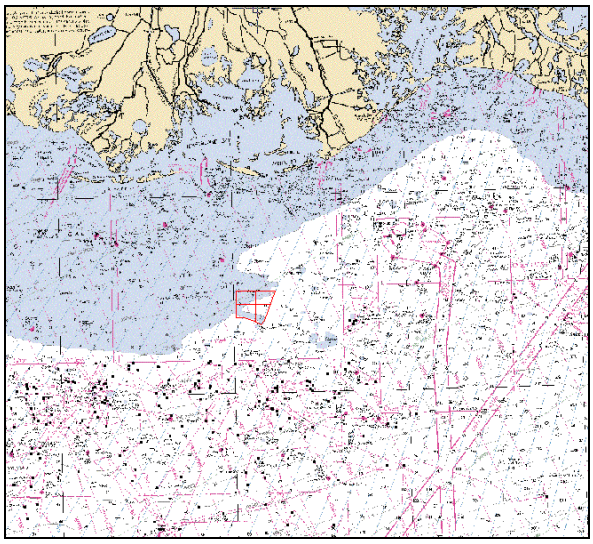
Filed digitally at AHB

Separates I	Acquisition and Processing Logs
Separates II	Sonar Contact Table Side Scan Data Reproductions Correlator Sheets
Separates III	Sound Velocity Profile Data
Separates IV	Statement of Work
Separates V	Crossline Comparisons

A. AREA SURVEYED

The survey area is located 20 NM S of Entrance to Timbalier Bay in the Gulf of Mexico. The following sketch shows the layout of Sheet F (H12057) of Project (OPR-K354-KR-09). Water depths in the survey area range from 58 feet to ~~74~~ *75* feet Mean Lower Low Water (MLLW). ***Concur.***





	Andrew Charles	Total
LNM Side Scan + Multibeam	550.55	550.55
LNM Crosslines	30.45	30.45
LNM Investigations	0.73	0.73

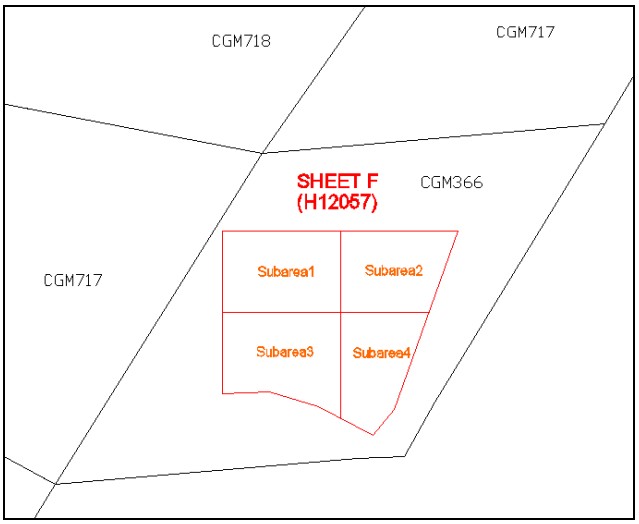
Number of bottom samples collected	19
Number of items investigated	1
Total square nautical miles	26.25

A.1 ACQUISITION DATES

August 31 2009
Sept 1-7 2009 ***Concur.***

A.2 SURVEY SUBAREAS

The survey area was broken down into four sub areas to allow for more efficient data processing and management. The sub areas were based on the predicted data set sizes prior to survey commencement. Tidal data from Port Fourchon, LA (8762075) was used as the source for corrections. The entire sheet falls within the CGM366 tide zone. Below is an image showing the layout of the tide zoning for this project. ***Concur.***



B. DATA ACQUISITION AND PROCESSING

B.1 EQUIPMENT

System	Manufacturer	Model
Multibeam Echo Sounder	Simrad	EM3002
Side Scan Sonar	Edgetech	4200
Single Beam Echo Sounder	ODOM	Echotrac MK III
Motion Sensor	CODA	F180
Primary Positioning System	CNAV	2050
Secondary Positioning System	CNAV	2050
Tertiary Positioning System	CODA	F180
Sound Speed at Transducer	Endeco	YSI
Sound Velocity Profiler	Seabird	SBE19 Plus

See Data Acquisition and Processing Report* for a detailed description of the equipment used for hydrographic operations. ***Included with survey deliverables.***

The *M/V Andrew Charles*, a 41.1-meter vessel, conducted survey operations for this project. The vessel is 10.3 meters wide with an approximate draft of 3.02 meters. A central reference point was established prior to the survey from which all relevant offsets were measured. Relevant offsets are presented in the following table.

METERS FROM CRP	Y(FORWARD)	X(STARBOARD)	Z(VERTICAL)
Primary CNAV	3.070	-0.376	-10.770
Secondary CNAV	3.070	0.275	-10.661
F180 Primary	3.070	-0.947	-10.752
F180 Secondary	3.070	1.053	-10.746
IMU	-0.248	1.038	-0.817
EM3002	1.326	1.835	4.008
Single Beam (Dual)	0.783	1.835	4.008
SSS Sheave	-26.022	-0.053	3.773

A detailed vessel description, vessel diagram, and patch test results are presented in the Data Acquisition and Processing Report*. ***Included with survey deliverables.***

B.2 QUALITY CONTROL* ***See also H-Cell Report**

In order to most efficiently carry out this survey, the survey lines were oriented roughly east west throughout the survey area. The side scan was operated with a range of 100 meters per channel, and line spacing was set to 90 meters. These parameters allowed us to effectively meet the criteria of 200 percent side scan coverage, using Technique 2, as set forth in Section 6.1 of the "Specifications and Deliverables" document. The angular sector on the multibeam was set so that the criterion of two times water depth, as well as all accuracy, resolution, and detection criteria as set forth in Sections 5.2 and 5.3 of the "Specifications and Deliverables" document, were met. ***Concur.***

The internal consistency of the multibeam depth values is quantified in the cross line statistics that were performed at the end of each main line. Cross lines were run prior to the collection of main line data so that quality control statistics could be performed on the data after each line. Based on pre-plot calculations, the total cross line miles was 30 nm, while the total main line miles was 551 nm. The cross lines comprised about 5% of the total data set as compared to the main scheme lines. Rerun line miles are not included in these totals. As can be seen in the sample statistics found in Separates V**, the main lines and cross lines depth values showed very good agreement. Each main line was compared to all cross lines for which there was overlapping data. The graphs shown in Separates V** are a random sample of the graphs that were produced. The graphs show the mean difference, RMS difference, and confidence interval for each beam. The results show that the multibeam data was repeatable with 90% of the soundings within about 8 to 14 centimeters across the swath. The four BASE surfaces for Sheet F were created at a scale of 1:10000 with a resolution of 2 meters. Soundings between the base surfaces agree to within 1 foot in all areas, with no

visible draft or tidal errors between the survey junctions. No further corrections to soundings is necessary. ***Concur.***

Multibeam quality control procedures are outlined in Section B.1 of the accompanying Data Acquisition and Processing Report*. ***Included with survey deliverables. **Submitted with original field reports.***

B.3 CORRECTIONS TO ECHO SOUNDINGS

No deviations from the Correction to Echo Soundings section in the Data Acquisition and Processing Report* occurred. ***Concur. *Included with survey deliverables.***

C. VERTICAL AND HORIZONTAL CONTROL* ***See also H-Cell Report***

Tide and water level corrections were determined and applied in accordance with Attachment #7 of the Statement of Work. Tidal zoning as set forth in the Statement of Work was applied. Data from Port Fourchon, LA (8762075) was used as the primary source of tides, while Grand Isle, LA (8761724) was used as a back up. Because there were no outages at the primary station during the survey, the secondary station was not used for any tidal corrections. The following table shows the tidal zone and correctors that were used for this sheet. Tidal data were processed using the 1983-01 epoch. ***Concur.***

Tide Zone	Reference Station	Primary/ Secondary	Time Corrector	Range Ratio
CGM366	8762075	PRIM	-12	1.05
CGM366	8761724	SEC	-48	1.23
CGM717	8762075	PRIM	-12	1.05
CGM717	8761724	SEC	-48	1.23
CGM718	8762075	PRIM	-12	1.05
CGM718	8761724	SEC	-42	1.23
CGM731	8762075	PRIM	-12	1.05
CGM731	8761724	SEC	-42	1.23
CGM732	8762075	PRIM	-6	1.09
CGM732	8761724	SEC	-42	1.27
CGM733	8762075	PRIM	-6	1.17

CGM733	8761724	SEC	-36	1.37
CGM734	8762075	PRIM	-6	1.09
CGM734	8761724	SEC	-36	1.27
CGM735	8762075	PRIM	-6	1.05
CGM735	8761724	SEC	-42	1.23
CGM749	8762075	PRIM	0	1.13
CGM749	8761724	SEC	-36	1.32
CGM750	8762075	PRIM	0	1.09
CGM750	8761724	SEC	-36	1.27
WGM416	8762075	PRIM	-6	1.21
WGM416	8761724	SEC	-36	1.42
CGM364	8762075	PRIM	-6	1.09
CGM364	8761724	SEC	-36	1.27

The horizontal datum for the survey is the North American Datum of 1983 (NAD 83). The projection is Universal Transverse Mercator (UTM) Zone 15 North. The vertical datum for the soundings is Mean Lower Low Water (MLLW). ***Concur.***

D. RESULTS AND RECOMMENDATIONS*

See also HCell Report

D.1 CHART COMPARISON

D.1.1 CHARTS AND NOTICES TO MARINERS

The following charts were used for comparison purposes.

Chart Number	Scale	Edition	Edition Date
11357	1:80,000	40	Jun 09
11340	1:458,596	74	Aug 09

The following table shows the last updated NM and LNM for each digital chart.

Chart Number	Corrected Through	
	NM	LNM
11357	Jun. 06/09	Jun. 02/09
11340	Aug 08/09	Jul 28/09

D.1.2 CHARTED FEATURES

There is only one charted feature found in the survey area, and it was not found during this survey. It is recommended that it be removed from the charts. These positions were taken from the charts, and are approximate. ***Concur.***

Charted Feature	Chart Number	Latitude	Longitude
Submerged Obstruction PA	11357	28°45'19.480"N	90°27'59.837"W

Charted Feature	Chart Number	Latitude	Longitude
Submerged Obstruction PA	11340	28°45'22.413"N	90°27'57.712"W

D.1.3 NOTICES TO MARINERS

The Notices to Mariners were reviewed from the last updated notice for each digital chart, to September 7, 2009. During that time, there were no notices to mariners issued for the charted area within the survey bounds.

D.1.4 CHARTED SOUNDINGS

Chart 11340

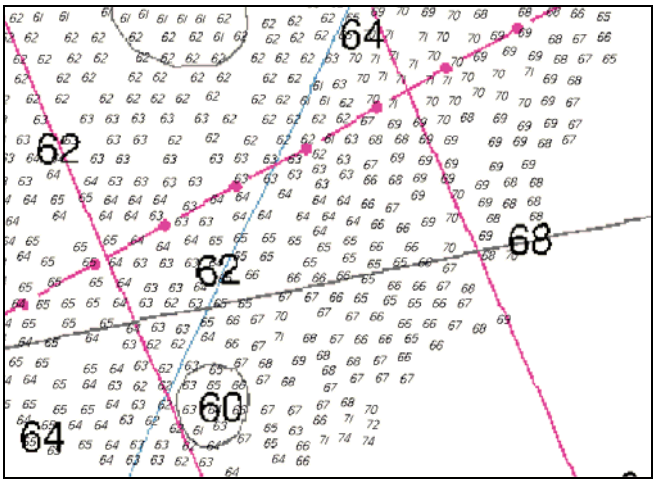
In general, surveyed soundings are 3-7 feet deeper than charted soundings.

Concur.

Chart 11357

In general, surveyed soundings are about 1-3 feet deeper than charted soundings. Some charted soundings in the southern part of the survey area, are up to 6 feet shoaler than the surveyed soundings. This can be seen in the image below.

Concur.



D.1.5 SHOALS AND HAZARDOUS FEATURES

There are no charted shoals within the survey bounds, and none were found during survey operations. No new hazardous features were found during this survey, and previously charted hazardous features are discussed in section D.1.2 of this report.* ***Do not concur. Three uncharted shoals found.***

****See also HCell Report Section D.2***

D.1.6 AWOIS ITEMS

No AWOIS items were assigned for full investigation within the H12057 survey area. ***Concur.***

D.1.7 INVESTIGATION ITEMS

One investigation was performed. This item was determined to be insignificant. ***Concur.***

D.1.8 DANGER TO NAVIGATION REPORTS

No Danger to Navigation Reports were issued. ***Concur.***

D.2 ADDITIONAL RESULTS

D.2.1 PRIOR SURVEYS

Comparison with prior surveys was not required under this Task Order. See Section D.1 for comparison to nautical charts. ***Concur.***

D.2.2 AIDS TO NAVIGATION

No Aids to Navigation are charted within the survey area. ***Concur.***

D.2.3 EXISTING INFRASTUCTURE

There is no charted infrastructure found in the survey area, and nothing was present at the time of survey. ***Do not concur. One pipeline is charted in the survey area. It was neither confirmed or disproved by the survey and should be retained as charted.***

D.2.4 OTHER PERTINENT INFORMATION

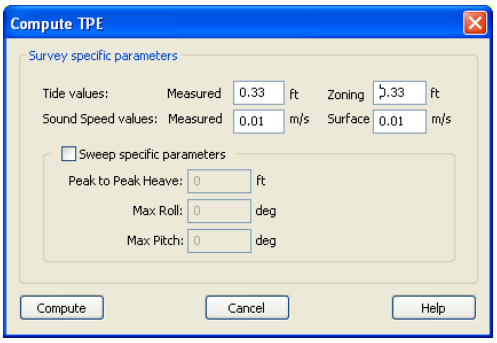
Draft corrections are verified on a daily basis, and entered into the multibeam collection software to be applied in real-time. Draft was entered directly into the single beam.

Four separate BASE surfaces were created for this project, one for each subarea. All four BASE surfaces were created at 2-meter resolution. ***Concur.***

All of the side scan data collected for this project has been layback corrected. Data should be imported into Caris using fish position and zero layback correction. ***Do not concur. The layback correction was necessary upon data conversion for accurate towfish positioning.***

An S57 feature file for bottom samples has been submitted in a Caris Notebook project. ***Concur.***

All TPE values were calculated using the following settings.


Compute TPE
Survey specific parameters
Tide values:
Measured
0.33
ft
Zoning
0.33
ft
Sound Speed values:
Measured
0.01
m/s
Surface
0.01
m/s
Sweep specific parameters
Peak to Peak Heave:
0
ft
Max Roll:
0
deg
Max Pitch:
0
deg
Compute
Cancel
Help

LETTER OF APPROVAL

REGISTRY NUMBER H12057

This report and the accompanying smooth sheet are respectfully submitted.

Field operations contributing to the accomplishment of the survey H12 057 were conducted under my direct supervision with frequent pe rsonal checks of progress and adequacy. This report and CARIS project have been closely reviewed an d are con sidered 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-09.

John Baker
Chief of Party
C&C Technologies
April 2010

APPENDIX I

DANGER TO NAVIGATION REPORTS

No Danger to Navigation Reports were issued.

APPENDIX II

SURVEY FEATURE REPORT

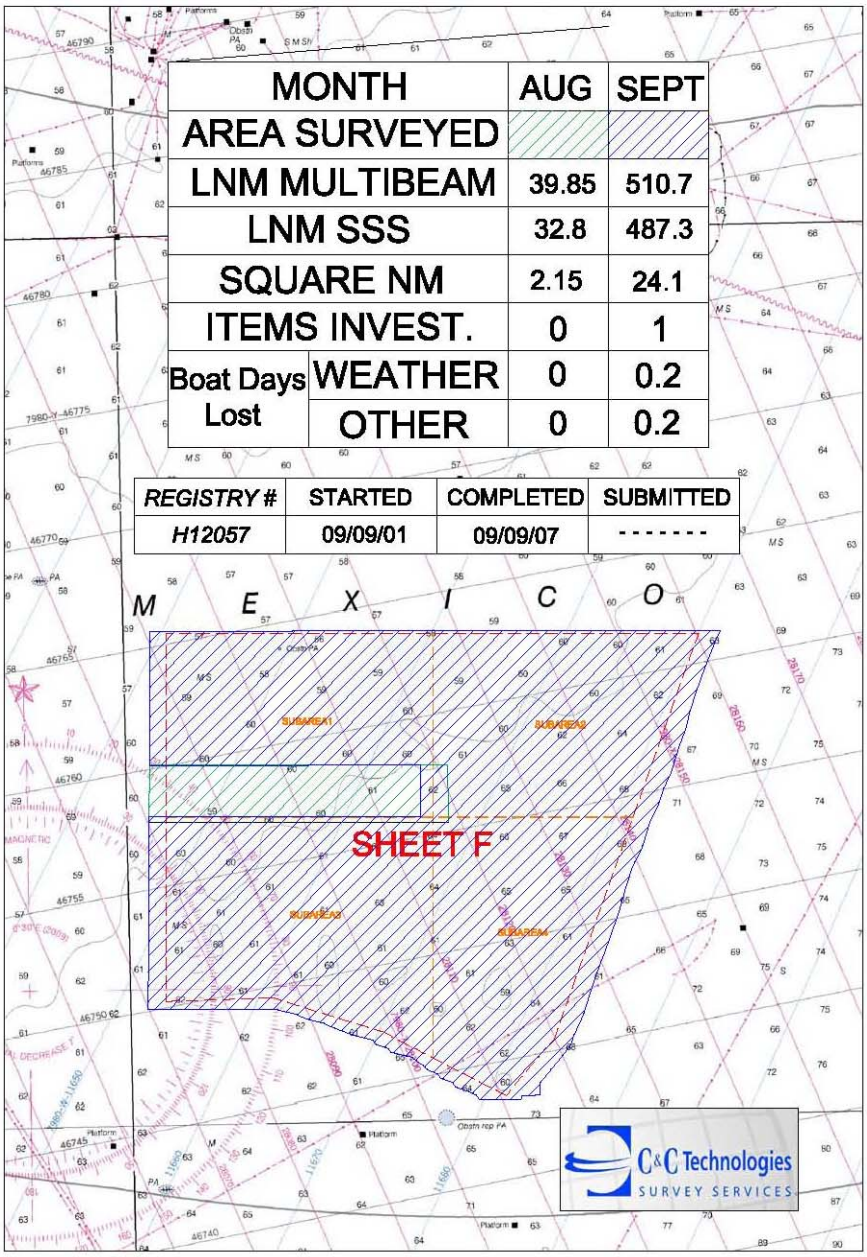
No AWOIS items were assigned for investigation within the H12057 survey area.

APPENDIX III

FINAL PROGRESS SKETCH AND SURVEY OUTLINE

A shapefile of the final survey outline for Sheet F (H12057) has been included in the DR folder inside the H12057_Report_Deliverables directory

OPR-K354-KR-09
H12057 Progress Sketch
(Sheet F)



APPENDIX IV

TIDES AND WATER LEVELS

The tidal data applied to all multibeam echo sounder data was downloaded from the following website:

http://tidesandcurrents.noaa.gov/station_retrieve.shtml?type=Historic%20Tide%20Data&state=Louisiana&id1=876

ABSTRACT OF TIMES OF HYDROGRAPHY

Project: OPR-K354-KR-09
Contractor Name: C & C Technologies, Inc.
Inclusive Dates: August 31st,2009 - September 7th,2009
Registry No.: H12057 (Sheet F)
Date: April 2010
Sheet Letter: F
Field Work is Complete
Time (UTC)

Date	Julian Day	Start	End	Year
8/31/2009	243	1123	2400	2009
9/1/2009	244	0000	2400	2009
9/2/2009	245	0000	0650	2009
9/3/2009	246	0244	2003	2009
9/4/2009	247	1209	2400	2009
9/5/2009	248	0000	2400	2009
9/6/2009	249	0000	1918	2009
9/7/2009	250	0033	2023	2009

APPENDIX V

SUPPLEMENTAL SURVEY RECORDS AND CORRESPONDANCE

There are no supplemental survey records or correspondence accompanying this report.

AHB COMPILATION LOG

General Survey Information	
REGISTRY No.	H12057
PROJECT No.	OPR-K354-KR-09
FIELD UNIT	M/V ANDREW CHARLES
DATE OF SURVEY	20090831 - 20090907
LARGEST SCALE CHART	***11357, edition 40, 20090601, 1:80,000***
SOUNDING UNITS	**feet**
COMPILER	Kyle S. Bates

Source Grids	**File Name** H:\Compilation\ H12057_K354_CC\AHB_H12057\
	E-SAR Final Products\GRIDS\H12057_Sub1_2m_Final.csar0
	E-SAR Final Products\GRIDS\H12057_Sub2_2m_Final.csar0
	E-SAR Final Products\GRIDS\H12057_Sub3_2m_Final.csar0
	E-SAR Final Products\GRIDS\H12057_Sub4_2m_Final.csar0
Surfaces	**File Name** H:\Compilation\ H12057_K354_CC\AHB_H12057\COMPILE\Working
Combined	**H12057_4m_Combined.hns**
Interpolated TIN	\Interpolated TIN**H12057_12m_InterpTIN.hns**
Shifted Interpolated TIN	\Shifted Surface**H12057_12m_InterpTIN_Shifted.hns**
Product Surface	\Product Surface**H12057_12m_Product_Surface.hns**
Final HOBs	**File Name** H:\Compilation\ H12057_K354_CC\AHB_H12057\COMPILE\Final_Hobs\
Survey Scale Soundings	**H12057_SS_Soundings.hob**
Chart Scale Soundings	**H12057_CS_Soundings.hob**
Contour Layer	**H12057_Contours.hob**
Feature Layer	**H12057_Features.hob**
Meta-Objects Layer	**H12057_MetaObjects.hob**
Blue Notes	**H12057_BlueNotes.hob**

Meta-Objects Attribution	
Acronym	**Value**
M_COVR	
CATCOV	Coverage Available
SORDAT	20090907
SORIND	US,US,graph,H12057
M_QUAL	
CATZOC	Zone of confidence U
INFORM	M/C Andrew Charles
POSACC	10 m
SORDAT	20090907
SORIND	US,US,graph,H12057
SUREND	20090907
SURSTA	20090831
DEPARE	
DRVALV 1	55.9
DRVALV2	74.3
SORDAT	20090907
SORIND	US,US,graph,H12057

SPECIFICATIONS:

I. COMBINED SURFACE:
   a. Number of ESAR Final Grids: 4
   b. Resolution of Combined (m): 4

II. SURVEY SCALE SOUNDINGS (SS):
   a. Radius
   b. Shoal biased
   c. Use Single-Defined Radius (mm at Map Scale): ; Radius Value = 1
   d. Queried Depth of All Soundings
      i. Minimum: 55.9 ft
      ii. Maximum: 74.3 ft

III. INTERPOLATED TIN SURFACE:
   a. Resolution (m): 12
   b. Linear
   c. Shifted value: -0.75 ft

IV. CONTOURS:
   a. Use a Depth List: H12057_NOAA_depth_curves_list.txt
   b. Line Object: DEPCNT
   c. Value Attribute: VALDCO

V. FEATURES:
   a. Total Number of Features: N/A
   b. Number of Insignificant Features: N/A

VI. CHART SURVEY SOUNDINGS (CS):
   a. Number of ENC CS Soundings: 69
   b. Radius
   c. Shoal biased
   d. Use Single-Defined Radius: m on the ground
      i. Radius Value (m): 1050
   e. Filter: Interpolated != 1
   f. Number Survey CS Soundings: 75

ATLANTIC HYDROGRAPHIC BRANCH
H-CELL REPORT to ACCOMPANY
SURVEY H12057 (2009)

This H-Cell Report has been written to supplement and/or clarify the original Descriptive Report (DR) and pass critical compilation information to the cartographers in the Marine Chart Division. Sections in this report refer to the corresponding sections of the Descriptive Report.

B. DATA ACQUISITION AND PROCESSING

B.2 QUALITY CONTROL

The four AHB source depth grids for the survey's nautical chart update were 2m resolution BASE surfaces (*.CSAR), which were combined at 4m resolution. The survey scale soundings were created from the combined surface at a single defined radius of 1mm at the largest scale chart covering the respective area of the survey (Chart 11357-1 scale 1:80,000). A TIN was created from the survey scale soundings, from which an interpolated surface of 12m resolution was generated. The chart scale soundings were derived from only the non-interpolated nodes of this surface to preserve absolute continuity between the charted depths, the survey scale soundings, and the original source grid. The chart scale soundings were selected using a single defined radius of 1050m (on the ground). The chart scale soundings are a subset of the survey scale soundings. The surface model was referenced when selecting the chart scale soundings, to ensure that the selected soundings portray the bathymetry within the common area.

The interpolated TIN surface of 12m resolution was shifted by the NOAA sounding rounding value of -0.75 feet. The shifted interpolated TIN was used to generate depth contours in feet (60 ft contour). The depth contours are forwarded to MCD for reference only. The contours were utilized during chart scale sounding selection and quality assurance efforts at AHB. The depth contours are incorporated into the SS H-Cell product as per 2009 H-Cell Specifications.

The compilation products (Final *.HOB files) for this survey are detailed in the H12057 AHB Compilation Log contained within this document. The Final HOB files include depth areas (DEPARE), depth contours (DEPCNT), soundings (SOUNDG), meta-objects (M_COVR and M_QUAL), cartographic Blue Notes ($CSYMB), and features (SBDARE).

As dictated by Hydrographic Technical Directive 2008-8, the Final HOB files were combined into two separate H-Cell files in S-57 format. Both S-57 files were exported from CARIS Bathy DataBASE in meters, and then converted from metric units into feet using CARIS S-57 Composer 2.2. Quality assurance and topology checks were conducted using CARIS S-57 Composer 2.2 and DKART Inspector 5.1 validation tests.

The final H-Cell products are two S-57 files, in Lat/Long NAD-83. The contents of these two H-Cell deliverables are listed in the table below:

TABLE 1 - Contents of H-Cell Files			
H12057_CS.000			**Scale 1:80,000**
Object Class Types	**Geographic**	**Cartographic**	**Meta**
S-57 Object Acronyms	DEPARE	$CSYMB	M_COVR
	SBDARE		M_QUAL
	SOUNDG		
H12057_SS.000			**Scale 1:10,000**
Object Class Types	**Geographic**		
S-57 Object Acronyms	DEPCNT		
	SOUNDG		

B.2.4 Junctions and Prior Surveys

Survey H12057 (2009) junctions with survey H12056 to the west and H12055 to the north. Most present survey depths compare within 1 foot of the junction survey depths to both the west and to the north.

B.4 DATA PROCESSING

The following software was used to process data at the Atlantic Hydrographic Branch:

CARIS Bathy DataBASE version 3.0/HF10
CARIS HIPS/SIPS version 7.0/SP2/HF8
CARIS S-57 Composer version 2.2/HF5
DKART Inspector version 5.1

C. HORIZONTAL AND VERTICAL CONTROL

The hydrographer makes adequate mention of horizontal and vertical control used for this survey in section C of the DR. The sounding datum for this survey is Mean Lower Low Water (MLLW), and the vertical datum is Mean High Water (MHW). Horizontal control used for this survey during data acquisition is based upon the North American Datum of 1983 (NAD83), UTM projection zone 15 North.

D. RESULTS AND RECOMMENDATIONS

D.1 CHART COMPARISON

11357 (40th Edition, June/09)
Timbalier and Terrebonne Bays
Corrected through NM 01/29/2011
Corrected through LNM 01/18/2011
Scale 1:80,000

ENC COMPARISON **US4LA31M**

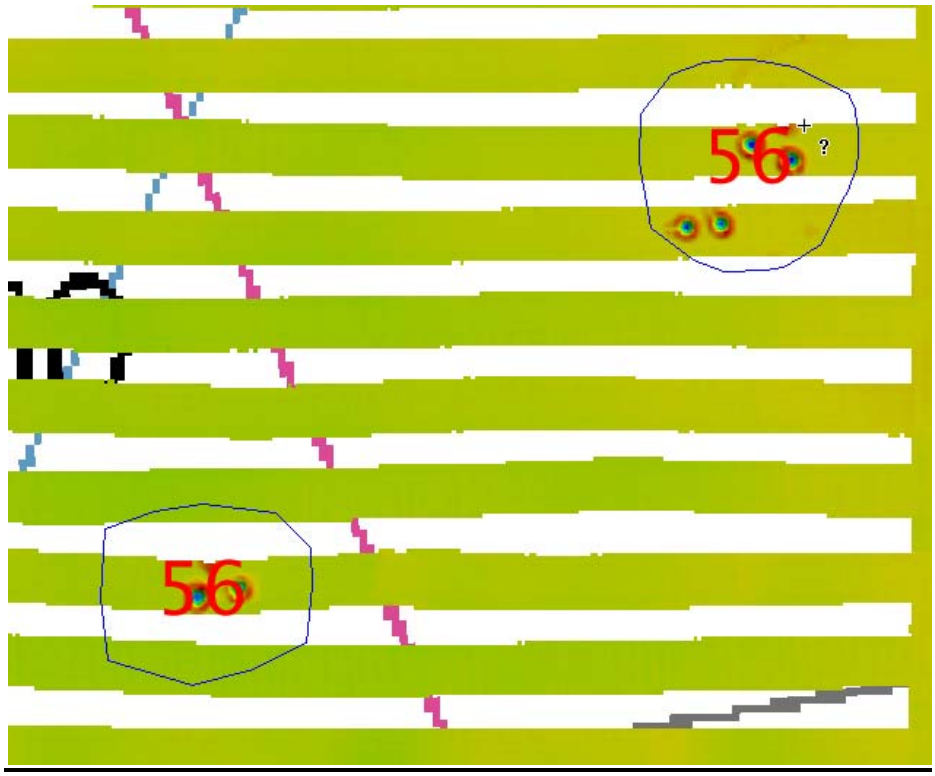
Timbalier and Terrebonne Bays
Edition 23
Application Date 2010/11/09
Issue Date 2011/01/18
Chart 11357

US4LA29M

Timbalier and Terrebonne Bays
Edition 13
Application Date 2011/04/08
Issue Date 2011/04/08
Chart 11357

D.2 ADDITIONAL RESULTS

Two 56ft soundings *(28-44.59N 91-27.93W and 28-44.35N 90-28.29W)* within the H12057 Hcell represent the least depths of the surrounding sea floor. The benthic mound like features or pock marks are sea floor sediment piles or mounds that were created when the offshore platform legs were retracted from the sea floor. It is recommended to represent these shoal soundings as chart scale depths within these common areas.



D.6 MISCELLANEOUS

Chart compilation was completed by Atlantic Hydrographic Branch personnel in Norfolk, Virginia. Compilation data will be forwarded to the Marine Chart Division in Silver Spring, Maryland. See section D.1 of this report for a list of the Raster Charts and Electronic Navigation Charts (ENC) used for compiling the present survey.

D.7 ADEQUACY OF SURVEY

The present survey is adequate to supersede the charted bathymetry within the common area. Any features not specifically addressed either in the H-Cell files or the Blue Notes should be retained as charted. Refer to section D and Appendix I and II of the DR for further recommendations by the hydrographer.

APPROVAL SHEET
H12057

Initial Approvals:

The completed survey has been inspected with regard to survey coverage, delineation of depth contours, disposition of critical depths, cartographic symbolization, and verification or disproval of charted data. All revisions and additions made to the H-Cell files during survey processing have been entered in the digital data for this survey. The survey records and digital data comply with National Ocean Service and Office of Coast Survey requirements except where noted in the Descriptive Report and the H-Cell Report.

All final products have undergone a comprehensive review per the Hydrographic Surveys Division Office Processing Manual and are verified to be accurate and complete except where noted.

Kyle Bates
2011.06.30
15:34:25 -04'00'

_____

Kyle S. Bates
Hydrographic Intern
Atlantic Hydrographic Branch

I have reviewed the H-Cell files, accompanying data, and reports. This survey and accompanying Marine Chart Division deliverables meet National Ocean Service requirements and standards for products in support of nautical charting except where noted.

Richard T. Brennan
2011.06.30 16:10:16 -04'00'

Approved: _____

CDR Richard T. Brennan, NOAA
Chief, Atlantic Hydrographic Branch