H12847

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

DESCRIPTIVE REPORT

Type of Survey:	Basic Hydrographic Survey
Registry Number:	H12847

LOCALITY

State(s):	Louisiana
General Locality:	Gulf of Mexico
Sub-locality:	3 NM East of Grand Gosier Islands

2015

CHIEF OF PARTY
Jonathan L. Dasler, PE, PLS, CH

LIBRARY & ARCHIVES

Date:

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

REGISTRY NUMBER:

HYDROGRAPHIC TITLE SHEET

H12847

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:	**Gulf of Mexico**
Sub-Locality:	**3 NM East of Grand Gosier Islands**
Scale:	**20000**
Dates of Survey:	**08/19/2015 to 10/30/2015**
Instructions Dated:	**08/07/2015**
Project Number:	**OPR-J377-KR2-15**
Field Unit:	**David Evans and Associates, Inc.**
Chief of Party:	**Jonathan L. Dasler, PE, PLS, CH**
Soundings by:	**Reson 7125 SV2**
Imagery by:	**EdgeTech 4200-HF**
Verification by:	**Atlantic Hydrographic Branch**
Soundings Acquired in:	**meters at Mean Lower Low Water**

Remarks:

NAD83, UTM Zone 16 North, Meters, Times are UTC. The purpose of this contract is to provide NOAA with modern, accurate hydrographic survey data with which to update nautical charts of the assigned area.

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/.

Table of Contents

List of Tables

List of Figures

Descriptive Report to Accompany Survey H12847

Project: OPR-J377-KR2-15

Locality: Gulf of Mexico

Sublocality: 3 NM East of Grand Gosier Islands

Scale: 1:20000

August 2015 - October 2015

David Evans and Associates, Inc.

Chief of Party: Jonathan L. Dasler, PE, PLS, CH

A. Area Surveyed

David Evans and Associates, Inc. (DEA) conducted hydrographic survey operations in the Gulf of Mexico north of Pass a Loutre, Louisiana. Survey H12847 was conducted in accordance with the Statement of Work (July 30, 2015) and Hydrographic Survey Project Instructions (August 7, 2015).

The Hydrographic Survey Project Instructions reference the National Ocean Service (NOS) Hydrographic Surveys Specifications and Deliverables Manual (HSSD), 2015 as the technical requirements for this project.

A.1 Survey Limits

Data were acquired within the following survey limits:

Northwest Limit	Southeast Limit
29° 36' 19.25" N 89° 5' 22.45" W	29° 25' 42.04" N 88° 58' 40.17" W

Table 1: Survey Limits

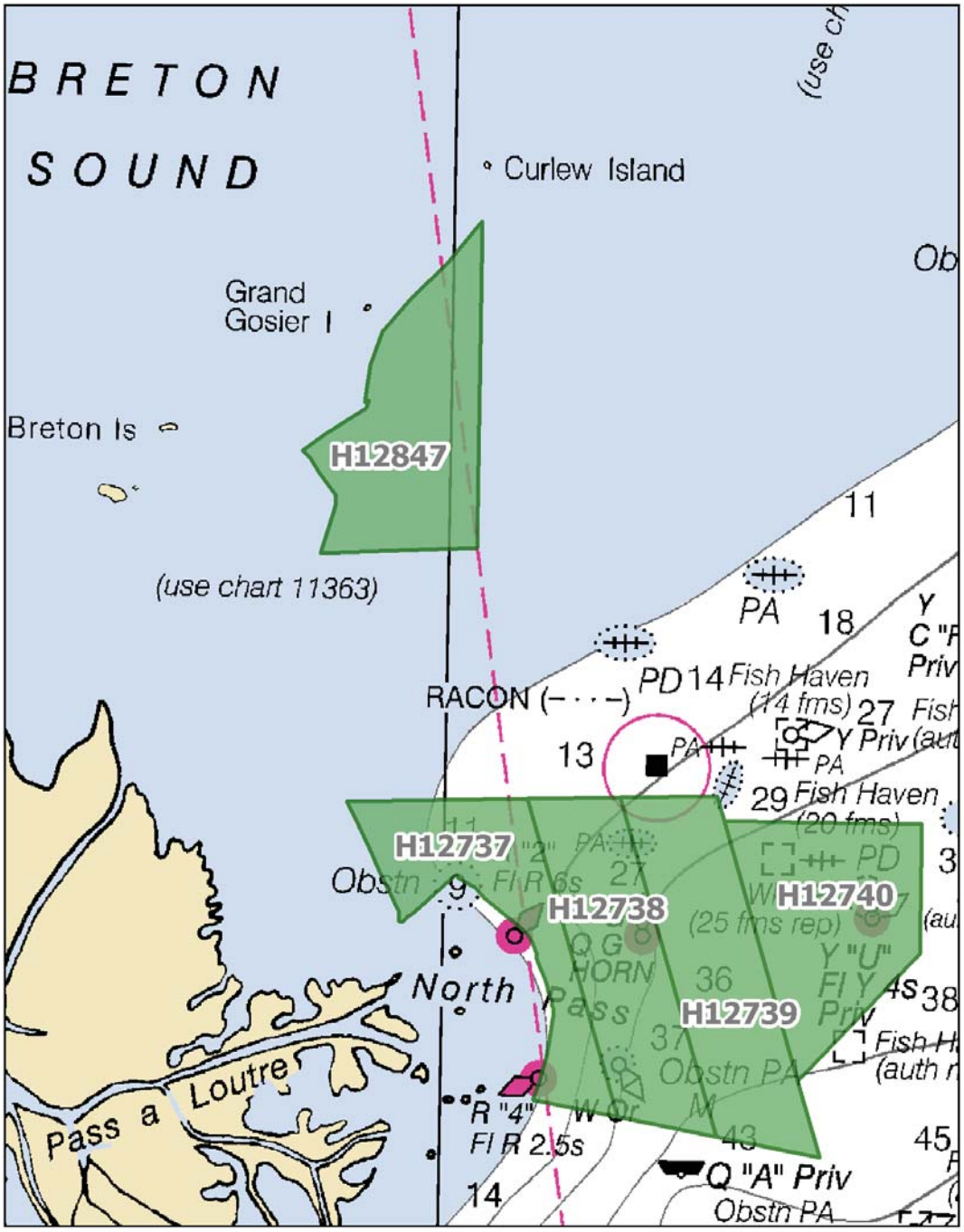


Figure 1: OPR-J377-KR2-15 Assigned Survey Areas

Survey Limits were acquired in accordance with the requirements in the Project Instructions and the HSSD.

A.2 Survey Purpose

The purpose of this project is to provide contemporary surveys to update NOS nautical charting products. This project area is located in a highly trafficked area and covers approximately 81 SNM of emerging critical areas and 31 SNM of priority 3 areas as identified in the 2012 NOAA Hydrographic Survey Priorities. This project is located southeast of Breton Sound, LA and encompasses approximately 146 SNM of survey area.

A.3 Survey Quality

The entire survey is adequate to supersede previous data.

A.4 Survey Coverage

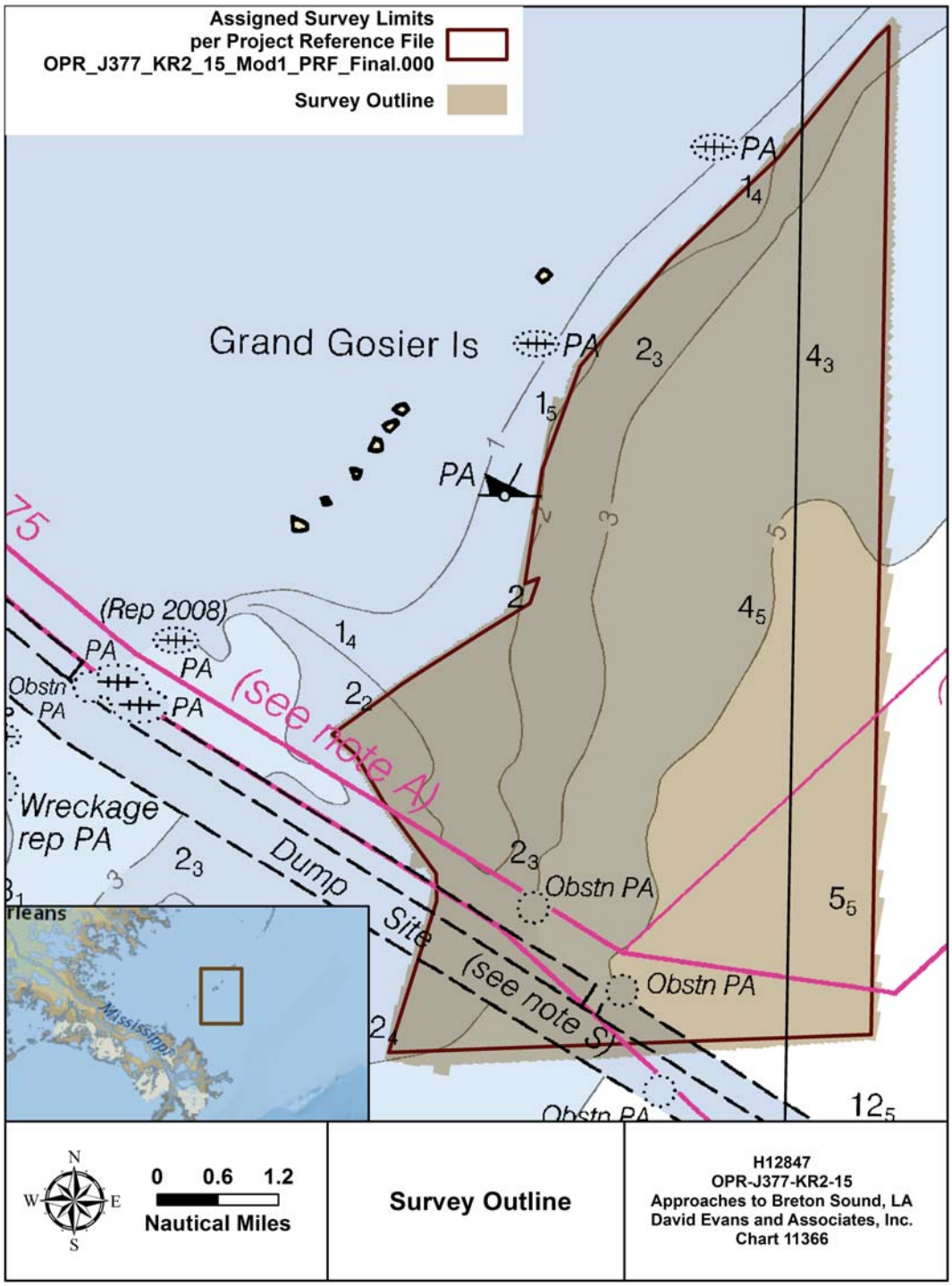


Figure 2: H12847 Survey Outline

The survey consisted of 100 percent side scan sonar coverage with concurrent multibeam echosounder (MBES) and backscatter. This coverage type follows Option 2 of the Complete Coverage requirement specified in Section 5.2.2.2 of the 2015 HSSD. Significant side scan sonar contacts were developed with multibeam sonar to meet Complete Coverage coverage requirements for multibeam surveys. Survey coverage was obtained within the Project Reference File (PRF) for the survey area (OPR_J377_KR2_15_Mod1_PRF_Final.000).

A.5 Survey Statistics

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

	HULL ID	*S/V Blake*	*Total*
LNM	**SBES Mainscheme**	0	0
	MBES Mainscheme	32.93	32.93
	Lidar Mainscheme	0	0
	SSS Mainscheme	46.29	46.29
	SBES/SSS Mainscheme	0	0
	MBES/SSS Mainscheme	907.62	907.62
	SBES/MBES Crosslines	41.99	41.99
	Lidar Crosslines	0	0
Number of Bottom Samples			16
Number of AWOIS Items Investigated			0
Number Maritime Boundary Points Investigated			0
Number of DPs			0
Number of Items Investigated by Dive Ops			0
Total SNM			35.00

Table 2: Hydrographic Survey Statistics

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

Survey Dates	Day of the Year
08/19/2015	231
08/20/2015	232
08/21/2015	233
08/22/2015	234
08/23/2015	235
08/24/2015	236
08/25/2015	237
08/26/2015	238
08/27/2015	239
10/28/2015	301
10/29/2015	302
10/30/2015	303

Table 3: Dates of Hydrography

B. Data Acquisition and Processing

B.1 Equipment and Vessels

The OPR-J377-KR2-15 Data Acquisition and Processing Report (DAPR), previously submitted with survey H12739, details equipment and vessel information as well as data acquisition and processing procedures. There were no vessel or equipment configurations used during data acquisition that deviated from those described in the DAPR.

B.1.1 Vessels

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

Hull ID	*S/V Blake*
LOA	83 feet
Draft	4.5 feet

Table 4: Vessels Used

Figure 3: S/V Blake

B.1.2 Equipment

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

Manufacturer	Model	Type
Reson	7125 SV2	MBES
Edgetech	4200-HF	SSS
Applanix	POS/MV 320 v4	Positioning & Attitude
Rolls Royce	MVP30-350 with AML Micro SV&P	Primary Sound Speed Profiler
AML	Micro SV Xchange	Surface Sound Speed
Sea-Bird Electronics	SEACAT SBE 19-03 CTD	Secondary Sound Speed Profiler

Table 5: Major Systems Used

B.2 Quality Control

B.2.1 Crosslines

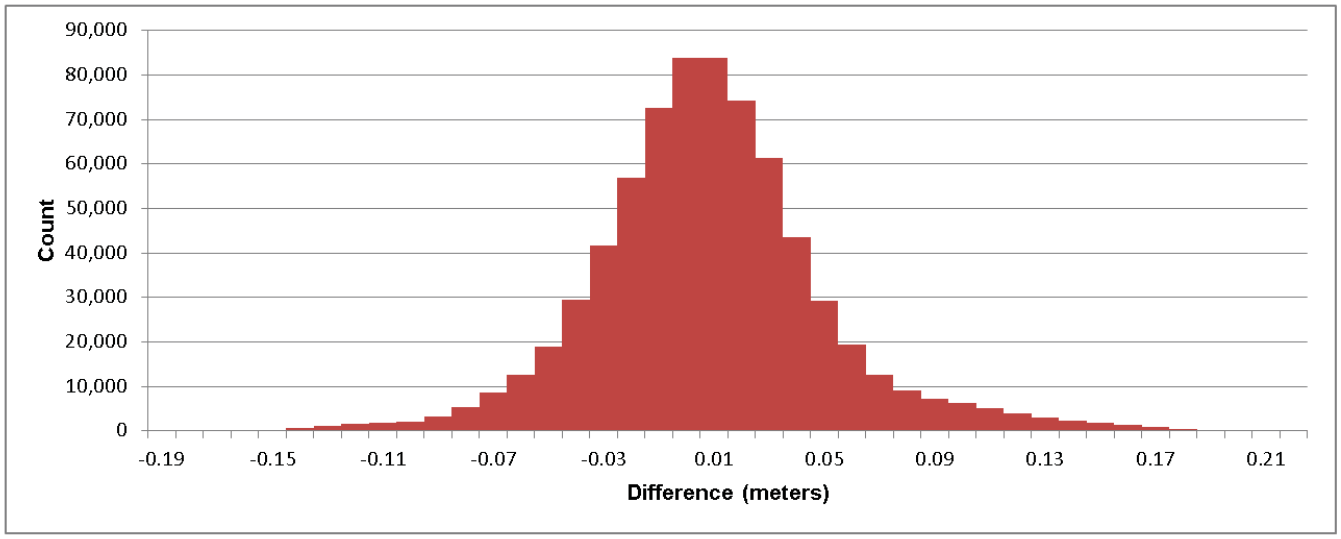
Crosslines acquired for this survey totaled 4% of mainscheme acquisition.

Crosslines were run in a direction perpendicular to main scheme lines across the entire surveyed area, providing a good representation for analysis of consistency. All crosslines were used for crossline comparisons.

Crossline analysis was performed using the CARIS Hydrographic Information Processing System (HIPS) Quality Control (QC) Report tool, which compares crossline data to a gridded surface and reports results by beam number. Crosslines were compared to a 4-meter CUBE surface encompassing mainscheme data for the entire survey area. The QC Report tabular output and plot are included in Separate II. The results of the analysis meet the requirements as stated in the 2014 HSSD.

Additional crossline analysis was performed by computing a 1-meter CUBE surface from the crossline data. The surface was then differenced from a 1-meter surface comprised of all mainscheme, fill, and investigation data. The resultant difference surface was exported using the Base Surface to ASCII function and statistics were compiled on the ASCII data.

Results from the crossline to mainscheme difference analysis are depicted in Figure 4. Outliers from the difference analysis were reviewed in HIPS subset editor and found to occur over vertical features and depressions in the seafloor which were not completely represented in the crossline surface. In some cases the magnitude of the differences was increased by sound speed and sonar tilt artifacts which are further discussed in Section B.2.6.



Mean:	0.01 m	Standard Deviation:	0.04 m
Minimum:	-0.19 m	Bin size:	0.1 m
Maximum:	0.22 m	Number of Nodes:	706,129

Figure 4: H12847 Crossline Differences

B.2.2 Uncertainty

The following survey specific parameters were used for this survey:

Measured	Zoning
0.00 meters	0.117 meters

Table 6: Survey Specific Tide TPU Values

Hull ID	Measured - CTD	Measured - MVP	Surface
S/V Blake	n/a meters/second	1.0 meters/second	0.5 meters/second

Table 7: Survey Specific Sound Speed TPU Values

Additional discussion of these parameters is included in the DAPR.

During surface finalization in HIPS, the "greater of the two" option was selected, where the calculated uncertainty from total propagated uncertainty (TPU) is compared to the standard deviation of the soundings influencing the node, and where the greater value is assigned as the final uncertainty of the node. The

uncertainty of the finalized surfaces increased for nodes where the standard deviation of the node was greater than the total propagated uncertainty.

The resulting calculated uncertainty values of all nodes in the finalized 1-meter Complete Coverage multibeam surface range from 0.244 meters to 0.863 meters with a standard deviation of 0.002 meters.

To determine if surface grid nodes met International Hydrographic Organization (IHO) Order 1 specification, a ratio of the final node uncertainty to the allowable uncertainty at that depth was determined. As a percentage, this value represents the amount of error budget utilized by the uncertainty value at each node. Values greater than 100% indicate nodes exceeding the allowable IHO uncertainty.

For the 1-meter Complete Coverage multibeam surface, the allowable uncertainty utilized ranges from 46% to 169%. The mean allowable uncertainty for the surface is 48% with a standard deviation of 0.005. In total 105 nodes out of 41,774,101 fail to meet specification.

Nodes that were reported out of specification were coincident with areas of high depth standard deviation with steep slopes or high relief. All uncertainty values were within allowable specification prior to surface finalization when standard deviation was incorporated into the solution when it was greater than the node uncertainty.

B.2.3 Junctions

Survey H12847 junctions with surveys D00142, H12733, H12734, and H12735.

Prior survey D00142 was a hydrographic reconnaissance survey which used a vertical beam echosounder with 1,000-meter line spacing to evaluate chart adequacy. The Bathymetric Attributed Grids (BAGs) for survey D00142 were downloaded from NOAA's National Geophysical Data Center (NGDC) website for comparison with H12847. The finalized H12847 surfaces were compared to the junction survey by generating a difference surface with CARIS Base Editor.

DEA received a waiver from the Hydrographic Surveys Division (HSD) on December 8, 2015 which removed the junction analysis requirement for surveys H12733, H12734, and H12735. A copy of this waiver is included in Appendix II of this report.

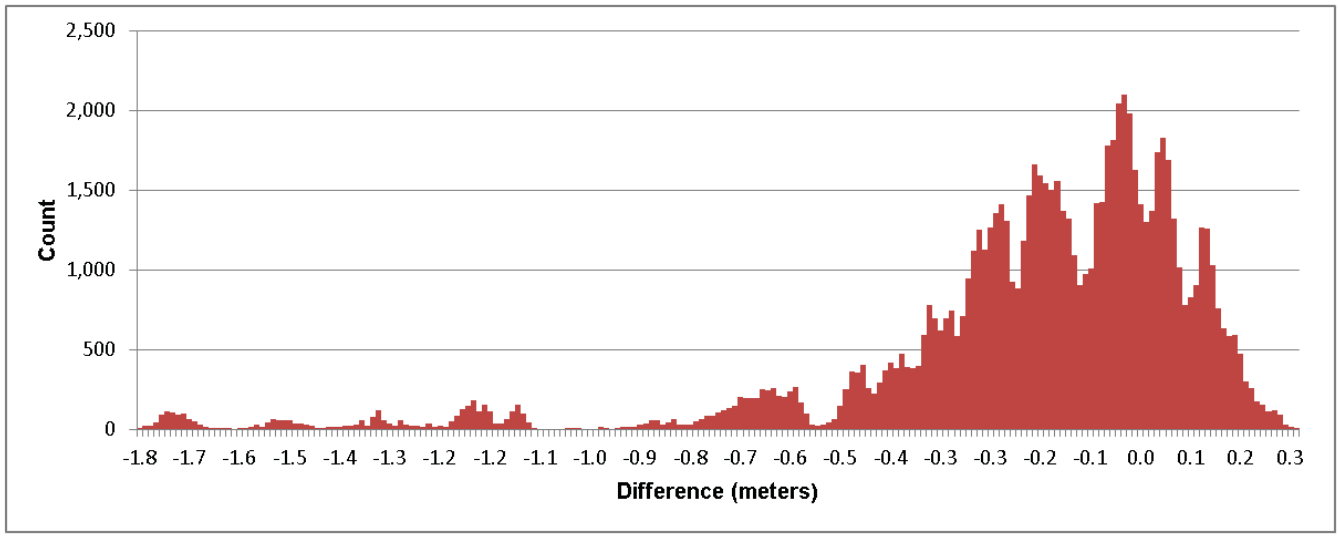
The following junctions were made with this survey:

Registry Number	Scale	Year	Field Unit	Relative Location
D00142	1:20000	2008	Terrasond, Ltd.	SW
H12733	1:20000	2015	Oceans Surveys, Inc.	SW
H12734	1:20000	2015	Oceans Surveys, Inc.	S
H12735	1:20000	2015	Oceans Surveys, Inc.	SE

Table 8: Junctioning Surveys

D00142

H12847 survey depths generally range from 30 centimeters deeper than D00142 to 30 centimeters shoaler than D00142. Greater deviations occur within the de-authorized Mississippi River-Gulf Outlet where survey depths are as much as 1.8 meters shoaler than D00142.



Mean:	-0.183 m	Standard Deviation:	0.33 m
Minimum:	-1.784 m	Bin size:	0.01 m
Maximum:	0.299 m	Number of Nodes:	83,273

Figure 5: Junction results between H12847 1-meter and D00142 5-meter bathy grids

H12733

Junction requirement waived by HSD.

H12734

Junction requirement waived by HSD.

H12735

Junction requirement waived by HSD.

B.2.4 Sonar QC Checks

Quality control is discussed in detail in Section B of the DAPR. Results from weekly position checks and weekly multibeam bar checks are included in Separate I Acquisition and Processing Logs of this report. Sound speed checks can be found in Separate II Sound Speed Data Summary of this report.

Multibeam data were reviewed at multiple levels of data processing including: CARIS HIPS conversion, subset editing, and analysis of anomalies revealed in CUBE surfaces.

B.2.5 Equipment Effectiveness

Navigation Data Gaps

Periodically, survey lines contained navigation timing gaps which were likely caused by a Hypack write delay during acquisition. Survey lines containing navigation data gaps greater than one second were updated with real-time navigation data extracted from the POS/MV .000 files.

The following survey lines use real-time navigation from .000 files to remove navigation data gaps: 2015BL2312041, 2015BL2320015, 2015BL2320441, 2015BL2320835, 2015BL2321142, 2015BL2341401, 2015BL2342022, 2015BL2350910, 2015BL2351109, 2015BL2351330, and 2015BL2370305.

Additional discussion on this issue can be found in the Section B.4 of the DAPR.

DN238 Navigation Latency

A latency related offset was observed during processing of multibeam data acquired on August 26, 2015 (DN 238). After looking into this issue the hydrographer observed a clock drift in the navigation records in the recorded Hypack files. This offset was removed after applying real-time navigation data extracted from the POS/MV .000 files.

The cause of the Hypack clock drift was not discovered, but it was determined that it stopped at the end of DN238 survey operations when Hypack was closed and reopened. The timing of the remaining H12847 data was reviewed and no clock drift was detected.

The following survey lines use real-time navigation from .000 files to remove Hypack related latencies: 2015BL2380013, 2015BL2380037, 2015BL2380105, 2015BL2380130, 2015BL2380209, 2015BL2380225, 2015BL2380252, 2015BL2380328, 2015BL2380411, 2015BL2380453, 2015BL2380541, 2015BL2380625, 2015BL2380711, 2015BL2380758, 2015BL2380845, 2015BL2380934, 2015BL2381024, 2015BL2381110, 2015BL2381158, 2015BL2381242, 2015BL2381310, 2015BL2381328, 2015BL2381400, 2015BL2381424, 2015BL2381520, 2015BL2381610, 2015BL2381655, 2015BL2381744, 2015BL2381831, 2015BL2381918, 2015BL2382004, 2015BL2382049, 2015BL2382132, 2015BL2382215, 2015BL2382252, 2015BL2382340, and 2015BL2382351.

B.2.6 Factors Affecting Soundings

There were no other factors that affected corrections to soundings.

B.2.7 Sound Speed Methods

Sound Speed Cast Frequency: Approximately 15-minute intervals.

A Rolls Royce Moving Vessel Profiler (MVP) was the primary instrument used to acquire sound speed readings during multibeam operations. MVP sound speed readings were measured at approximately 15-minute intervals during survey operations. Additional discussion of sound speed methods can be found in the DAPR.

There are two sound speed profiles which are more than 250 meters outside of the survey area. These profiles were acquired with the survey vessel's MVP at the ends of survey lines prior to or after a line turn. Casts are valid and have been applied to hydrography. Profile names: 08/22/2015 00:17, 08/24/2015 19:10.

B.2.8 Coverage Equipment and Methods

Survey speeds were maintained to meet or exceed along-track sounding density and side scan sonar ensonification requirements.

Side scan mosaics were thoroughly reviewed for holidays and areas of poor quality coverage due to biomass, vessel wakes, or other factors. A fill plan was created in order to acquire side scan data where holidays and significant poor quality coverage existed. Significant side scan sonar contacts were developed with multibeam sonar to obtain a least depth of the contact using Complete Coverage requirements.

B.2.9 Density

The sounding density requirement of 80% of all nodes, populated with at least five soundings per node, was verified by exporting the density child layer of each CUBE surface to an ASCII text file and compiling statistics on the density values. More than 99.0% of all final CUBE surface nodes contained five or more soundings.

B.3 Echo Sounding Corrections

B.3.1 Corrections to Echo Soundings

Data reduction procedures for survey H12847 are detailed in the DAPR. A summary multibeam processing log is included in Separate I of this report.

B.3.2 Calibrations

The following calibrations were conducted after the initial system calibration discussed in the DAPR:

Calibration Type	Date	Reason
MBES (400kHz)	2015-10-28	Routine calibration test
MBES (400kHz)	2015-10-30	End of project calibration test

Table 9: Calibrations not discussed in the DAPR.

The H12847 survey was still active at time of DAPR submission. Additional calibration tests not reported in the DAPR are included in Table 9. A revision to DAPR Appendix II, which includes these additional calibration tests and results from new weekly bar checks, has been included with the H12847 deliverables.

B.4 Backscatter

Multibeam backscatter was logged in Hypack 7K format and included with the H12847 digital deliverables. Data were processed periodically in CARIS HIPS to evaluate backscatter quality but the processed data is not included with the deliverables.

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: 5.3.2

B.5.2 Surfaces

The following surfaces and/or BAGs were submitted to the Processing Branch:

Surface Name	Surface Type	Resolution	Depth Range	Surface Parameter	Purpose
H12847_MB_1m_MLLW	CUBE	1 meters	3.63 meters - 12.90 meters	NOAA_1m	Complete Coverage
H12847_MB_1m_MLLW_Final	CUBE	1 meters	3.63 meters - 12.90 meters	NOAA_1m	Finalized Complete Coverage
H12847_100Percent	Mosaic	1 meters	-	N/A	100- percent coverage
H12847_200Percent	Mosaic	1 meters	-	N/A	Second 100- percent coverage for charted feature disprovals

Table 10: Submitted Surfaces

Bathymetric grids were created relative to Mean Lower Low Water (MLLW) in CUBE format using Complete Coverage resolution requirements as described in the HSSD.

C. Vertical and Horizontal Control

A complete description of the horizontal and vertical control for survey H12847 can be found in the OPR-J377-KR2-15 Horizontal and Vertical Control Report (HVCR) submitted with this report. A summary of horizontal and vertical control for this survey follows.

C.1 Vertical Control

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

Standard Vertical Control Methods Used:

The following National Water Level Observation Network (NWLON) stations served as datum control for this survey:

Station Name	Station ID
Dauphin Island, AL	873-5180

Table 11: NWLON Tide Stations

File Name	Status
8735180.tid	Verified Observed

Table 12: Water Level Files (.tid)

File Name	Status
J377KR22015CORP_Rev.zdf	Final

Table 13: Tide Correctors (.zdf or .tc)

C.2 Horizontal Control

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

The projection used for this project is NAD83 UTM Zone 16 North.

During survey operations, some Differential Global Positioning System (DGPS) outages from the primary beacon (293 kHz) occurred. The system was manually switched to the secondary beacon (295 kHz) when the primary signal was lost. No data was acquired during DGPS beacon outages.

The following DGPS Stations were used for horizontal control:

DGPS Stations
English Turn, LA (293 kHz)
Eglin Air Force Base, FL (295 kHz)

Table 14: USCG DGPS Stations

D. Results and Recommendations

D.1 Chart Comparison

The majority of the chart comparison was performed by comparing H12847 depths to a digital surface generated from electronic navigational charts (ENCs) covering the survey area. A 50-meter product surface was generated from a triangular irregular network (TIN) created from the soundings, depth contours, and depth features for each ENC scale. An additional 50-meter HIPS product surface of the entire survey area was generated from the finalized MBES CUBE surfaces. The chart comparison was conducted by creating and reviewing the resultant difference surface. The chart comparison also included a review of all assigned charted features within the survey area.

The raster navigational chart (RNC) comparison was performed by manually comparing the RNC covering the survey area to the corresponding ENC and identifying discrepancies between the two chart formats.

The electronic and raster versions of the relevant charts used during the comparison were reviewed to check that all US Coast Guard (USCG) Local Notice to Mariners (LNMs) issued during survey acquisition and impacting the survey area were applied and addressed by this survey.

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
11353	1:40000	7	03/2014	12/15/2015	12/05/2015
11363	1:80000	44	02/2013	12/15/2015	12/05/2015

Table 15: Largest Scale Raster Charts

11353

Harbor chart 11353 was compared to US5LA24M within the H12847 survey area. The ENC includes a small open 12-foot contour around a charted 12-foot sounding on the northern edge of the charted Spoil area. The contour is not portrayed on the corresponding RNC, which is likely due to the scale of the RNC. No other differences were observed between the charts.

11363

Approach chart 11363 was compared to US4LA34M within the H12847 survey area. No differences were observed between the charts.

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?
US5LA24M	1:40000	39	09/19/2014	10/26/2015	NO
US4LA34M	1:80000	29	01/06/2015	11/05/2015	NO

Table 16: Largest Scale ENCs

US5LA24M

In general, surveyed depths range from ten feet deeper to 2 feet shoaler than charted on ENC US4LA24M. More extreme changes resulted from the migration of a shoal in the northern extent of the survey area just east of Grand Gosier Island. Shoaling of up to 8 feet and deepening of up to 19 feet was observed in this area. This shoaling is further discussed in Section D.1.8 of this report.

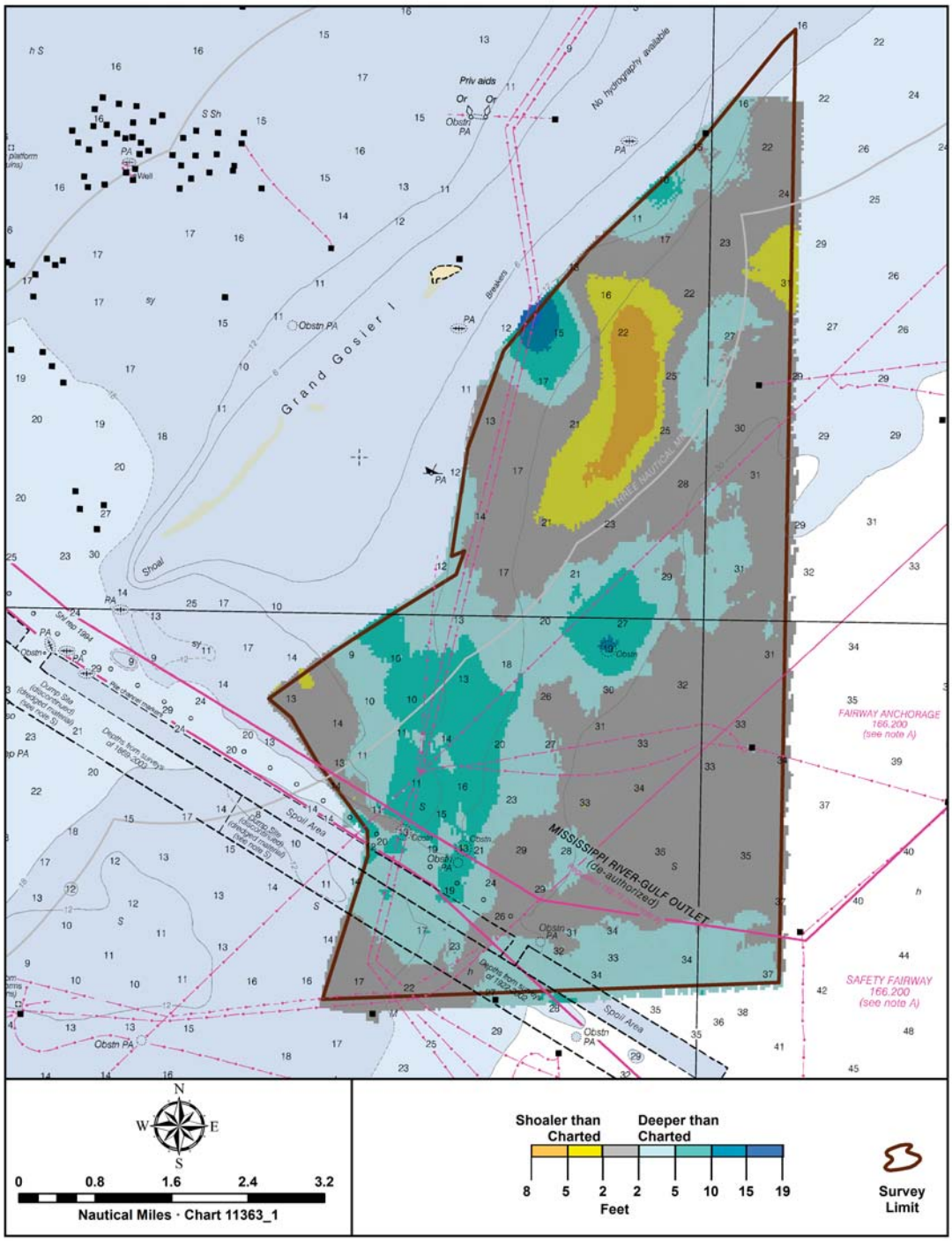


Figure 6: Depth Difference between H12847 and chart US5LA24M

US4LA34M

Chart comparison with US4LA34M shows similar results to the comparison with US5LA24M.

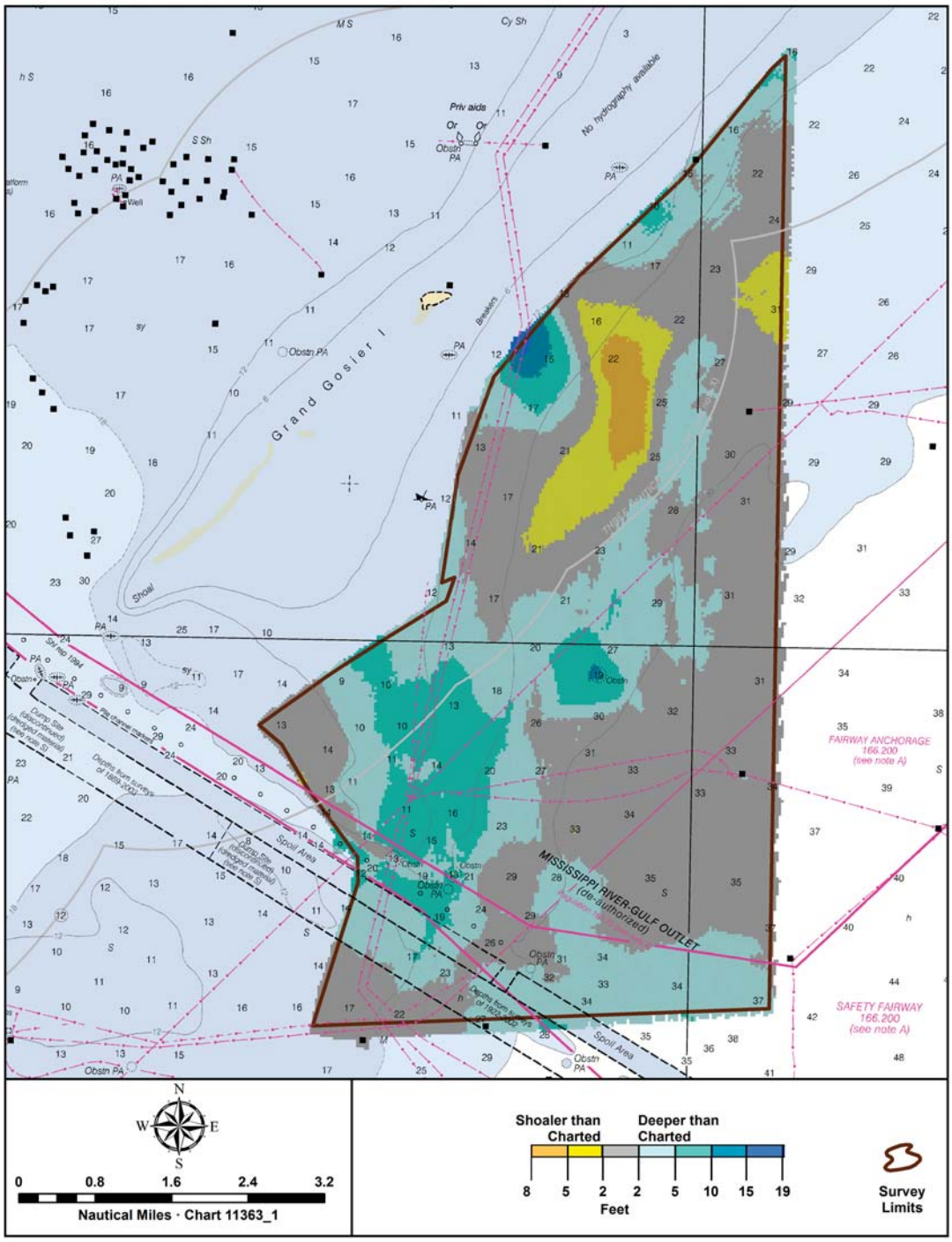


Figure 7: Depth Difference between H12847 and chart US4LA34M

D.1.3 AWOIS Items

No AWOIS Items were assigned for this survey.

D.1.4 Maritime Boundary Points

No Maritime Boundary Points were assigned for this survey.

D.1.5 Charted Features

Two Obstructions Position Approximate (PA) charted within the de-authorized Mississippi River-Gulf Outlet have been disproved by the survey.

The survey area does not contain any charted features labeled as Reported, Position Doubtful (PD), or Existence Doubtful (ED). All charted and surveyed features within the H12847 survey area are portrayed in the FFF.

D.1.6 Uncharted Features

All uncharted features are portrayed in the FFF as surveyed and attributed with the description of 'New'.

D.1.7 Dangers to Navigation

Five Dangers to Navigation (DtoNs) were submitted for this survey.

H12847 DtoN 01 reported an uncharted obstruction within the survey area. This feature has been added to the charts using preliminary survey information.

H12847 DtoN 02 reported an uncharted obstruction within the survey area. This feature has been added to the charts using preliminary survey information.

H12847 DtoN 03 reported an uncharted obstruction within the survey area. This feature has been added to the charts using preliminary survey information.

H12847 DtoNs 04 and 05 reported sections of pipeline which are visibly exposed above the seabed in the multibeam data. While not a direct hazard to surface navigation these exposed pipelines were submitted using the DtoN process in order to facilitate the review and reporting of the exposed pipelines. An email on this subject from the project's Contracting Officer's Technical Representative (COTR) is included in the OPR-J377-KR2-15 Project Correspondence.

D.1.8 Shoal and Hazardous Features

Shoal migration east of Grand Gosier Island has resulted in the seaward migration of the 12-foot and 18-foot contours by 1 to 2 kilometers. These changes are depicted in Figure 8.

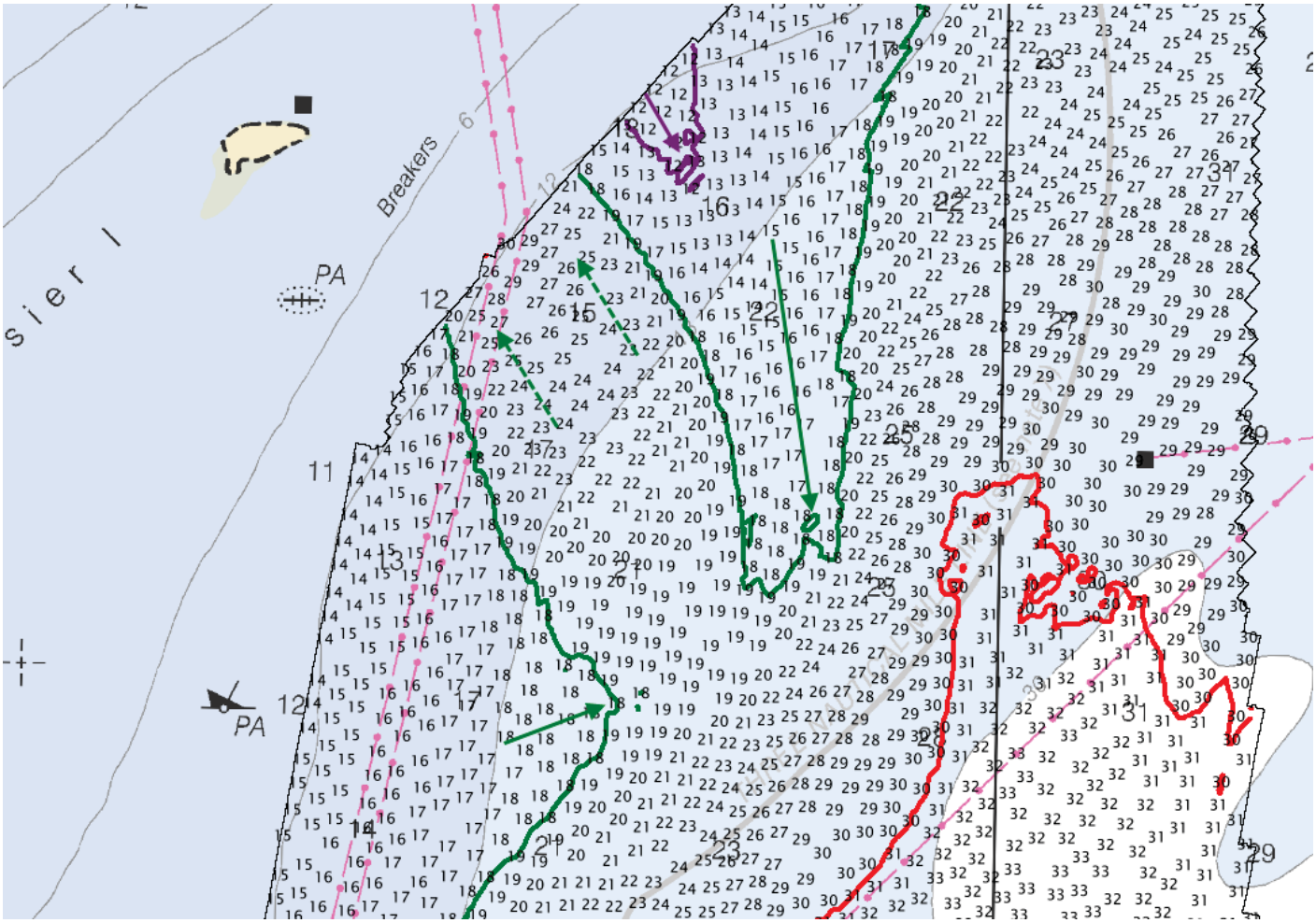


Figure 8: Shoal Migration east of Grand Gosier Island

D.1.9 Channels

The H12847 survey area does not contain any maintained navigation channels or channel lines. The survey area does encompass parts of a charted safety fairway (33 CFR 166.200), fairway anchorage (33 CFR 166.200, and the Mississippi River-Gulf Outlet (de-authorized) (Regulation 162.75). The Mississippi River-Gulf Outlet is abbreviated as MRGO, though this abbreviation is not used on the charts.

There is an inconsistency in the charting of MRGO on the band 4 and band 5 ENCs covering the survey area. MRGO is depicted as a Caution Area feature on US5LA24M with geographic extents matching the corresponding RNC 11353_2. MRGO is depicted on US4LA34M as a Sea Area feature with extents much smaller than the corresponding RNC 11363_1. The US4LA34M Sea Area feature attribution also

lacks reference to the de-authorization of the outlet. The hydrographer recommends that these charting inconsistencies be resolved when the survey is applied to the charts.

D.1.10 Bottom Samples

Sixteen bottom samples were acquired on August 27, 2015 (DN239). The sampling plan followed suggested sample locations included in the PRF provided by the Hydrographic Surveys Division.

D.2 Additional Results

D.2.1 Shoreline

No shoreline investigation was performed for this survey. The OPR-J377-KR2-15 Project Instructions required a limited shoreline verification, but there was no shoreline junction with the survey area.

D.2.2 Prior Surveys

Other than the previously mentioned junction analysis no other comparisons with prior surveys were conducted.

D.2.3 Aids to Navigation

Five special purpose beacons charted within the Mississippi River-Gulf Outlet (de-authorized) have been disproved. These features have been included in the FFF with description of ‘Delete’.

D.2.4 Overhead Features

There were no overhead bridges, cables, or other structures which would impact overhead clearance in the survey area.

D.2.5 Submarine Features

Multiple pipelines are charted within the survey area and are visible in the survey data and bathymetric surfaces. In some areas, pipelines are exposed above the seabed or there is evidence of pipeline burial beneath the seabed. Sections of pipeline (charted) which are visibly exposed were reported as a DtoN and are included in the H12847 FFF as pipeline features. These features were submitted to the processing branch using the DtoN process so that the proper authorities could be notified about the condition of the pipelines.

In some areas the alignment of charted pipelines deviates from the alignment of pipelines depicted in the Bureau of Ocean Energy Management (BOEM) / Bureau of Safety and Environmental Enforcement (BSEE) Gulf of Mexico online web service for OCS (Outer Continental Shelf) oil and gas pipelines. The

hydrographer recommends that the deviation be resolved to ensure that the charts depict the correct location of the submerged pipelines.

No submarine cables or tunnels were charted or located within the H12847 survey area.

D.2.6 Ferry Routes and Terminals

There were no ferry routes or terminals within the survey area.

D.2.7 Platforms

Two platforms were found within 40 meters (2 millimeters at survey scale) of their charted position and have been included in the FFF with a description of 'Retain'. Three charted platforms were disproved by the survey and included in the FFF with description of 'Delete'.

D.2.8 Significant Features

What appears to be a small natural gas discharge was observed in the side scan data and subsequently investigated with MBES. The approximate location of this discharge was 29-28-58.014N 89-03-49.907W, which is approximately 800 meters from the nearest charted pipelines. As shown in Figure 9, all MBES returns on the plume have been rejected in order to accurately depict the seafloor.

There was no additional information of scientific or practical value observed during the survey. There were no unusual submarine features or anomalous tidal or environmental conditions observed during the survey that impacted the quality of the survey or worthy of charting.

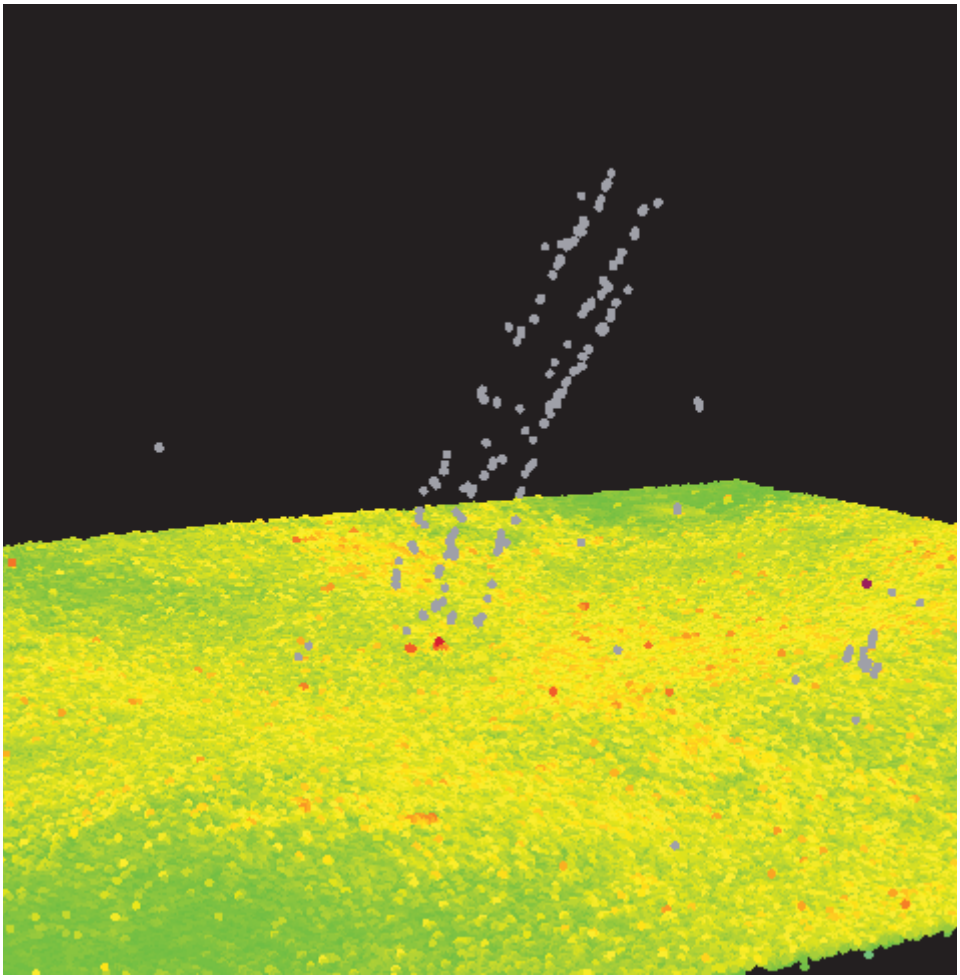


Figure 9: MBES Data on Possible Natural Gas Discharge from the Seafloor

D.2.9 Construction and Dredging

No construction or dredging activities were observed during survey operations.

D.2.10 New Survey Recommendation

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

D.2.11 Inset Recommendation

No new insets are recommended for this area.

E. Approval Sheet

As Chief of Party, Field operations for this hydrographic survey were conducted under my direct supervision, with frequent personal checks of progress and adequacy. I have reviewed the attached survey data and reports.

All field sheets, this Descriptive Report, and all accompanying records and data are approved. All records are forwarded for final review and processing to the Processing Branch.

The survey data meets or exceeds requirements as set forth in the NOS Hydrographic Surveys and Specifications Deliverables Manual, Statement of Work, and Hydrographic Survey Project Instructions. These data are adequate to supersede charted data in their common areas. This survey is complete and no additional work is required.

Report Name	Report Date Sent
OPR-J377-KR2-15 Data Acquisition and Processing Report	2015-10-06
OPR-J377-KR2-15 Horizontal and Vertical Control Report	2016-01-19

Approver Name	Approver Title	Approval Date	Signature
Jonathan L. Dasler, PE, PLS, CH	NSPS/THSOA Certified Hydrographer, Chief of Party	01/18/2016	Digitally signed by Jon Dasler DN: cn=Jon Dasler, o=David Evans and Associates, Inc., ou=Marine Services Division, email=jld@deainc.com, c=US Date: 2016.01.15 14:10:02 -08'00'
Jason Creech, CH	NSPS/THSOA Certified Hydrographer, Charting Manager / Project Manager	01/18/2016	Digitally signed by Jason Creech DN: cn=Jason Creech, o=David Evans and Associates, Inc., ou=Marine Services Division, email=jasc@deainc.com, c=US Date: 2016.01.15 14:10:33 -08'00'
Mick Hawkins	Lead Hydrographer	01/18/2016	Digitally signed by Mick Hawkins DN: cn=Mick Hawkins, o=David Evans and Associates, Inc., ou, email=msha@deainc.com, c=US Date: 2016.01.15 14:12:40 -08'00'
Kathleen Schacht	MBES Data Processing Manager	01/18/2016	Digitally signed by Kathleen Schacht DN: cn=Kathleen Schacht, o=David Evans and Associates, Inc., ou, email=kmsc@deainc.com, c=US Date: 2016.01.15 14:13:20 -08'00'

F. Table of Acronyms

Acronym	Definition
AHB	Atlantic Hydrographic Branch
AST	Assistant Survey Technician
ATON	Aid to Navigation
AWOIS	Automated Wreck and Obstruction Information System
BAG	Bathymetric Attributed Grid
BASE	Bathymetry Associated with Statistical Error
CO	Commanding Officer
CO-OPS	Center for Operational Products and Services
CORS	Continually Operating Reference 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
FFF	Final Feature File
FOO	Field Operations Officer
FPM	Field Procedures Manual
GAMS	GPS Azimuth Measurement Subsystem
GC	Geographic Cell
GPS	Global Positioning System
HIPS	Hydrographic Information Processing System
HSD	Hydrographic Surveys Division
HSSD	Hydrographic Survey Specifications and Deliverables

Acronym	Definition
HSTP	Hydrographic Systems Technology Programs
HSX	Hypack Hysweep File Format
HTD	Hydrographic Surveys Technical Directive
HVCR	Horizontal and Vertical Control Report
HVF	HIPS Vessel File
IHO	International Hydrographic Organization
IMU	Inertial Motion Unit
ITRF	International Terrestrial Reference Frame
LNM	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	Executive Officer
ZDA	Global Positiong System timing message
ZDF	Zone Definition File

APPENDIX I

TIDES AND WATER LEVELS

H12847
TIMES OF HYDROGRAPHY

Project: OPR-J377-KR2-15
Contractor Name: David Evans and Associates, Inc.
Date: October 30, 2015
Inclusive Dates: August 19, 2015 - October 30, 2015
Field work is complete
Time (UTC)

Day Number	Date	Start Time	End Time
231	08/19/2015	11:58:54	23:51:29
232	08/20/2015	0:15:03	23:53:43
233	08/21/2015	0:06:11	22:43:18
234	08/22/2015	0:22:31	23:40:13
235	08/23/2015	0:14:08	23:09:00
236	08/24/2015	0:37:41	23:48:15
237	08/25/2015	0:16:35	23:58:17
238	08/26/2015	0:13:43	23:52:45
239	08/27/2015	1:27:57	10:55:01
302	10/29/2015	11:39:42	20:49:04
303	10/30/2015	0:11:55	0:28:37

H12847
FINAL TIDE NOTE AND ZONING

DATE: October 30, 2015

HYDROGRAPHIC BRANCH: Atlantic Hydrographic Branch
HYDROGRAPHIC PROJECT: OPR-J377-KR2-15
HYDROGRAPHIC SURVEY: H12847

LOCALITY: Approaches to Breton Sound, LA
SUB-LOCALITY: 3 NM East of Grand Gosier Islands

TIME PERIOD [1] : August 19, 2015 - October 30, 2015

TIDE STATIONS USED:

Station Name	Station ID	Type	Latitude	Longitude
Dauphin Island, AL	873-5180	Control	30° 15.0' N	88° 4.5' W

PLANE OF REFERENCE (MEAN LOWER LOW WATER) :

0.000m

HEIGHT OF MEAN HIGH WATER ABOVE PLANE OF REFERENCE:

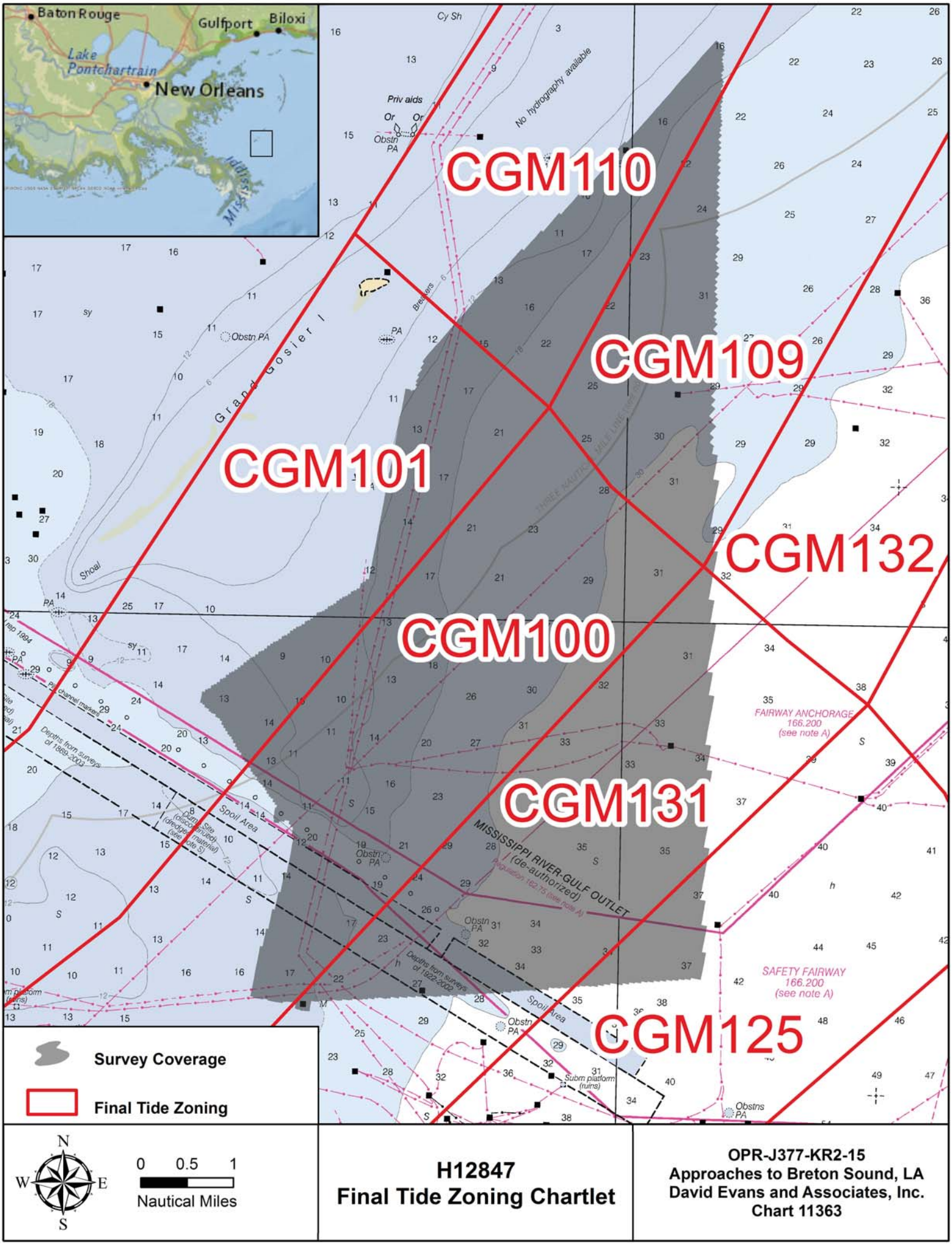
0.361m

FINAL ZONING AND TIDAL REDUCERS TO CHART DATUMN:

Zone	Time Corrector (Mins)	Range Ratio
CGM100	-36	1.04
CGM101	-30	1.04
CGM109	-36	1.13
CGM110	-24	1.13
CGM125	-60	1.00
CGM131	-48	1.00
CGM132	-48	1.13

[1] Please refer to the comprehensive list in attached Times of Hydrography.

http://tidesandcurrents.noaa.gov/datums.html?units=1&epoch=0&id=8735180&name=Dauphin+Island&state=AL



H12847
Final Tide Zoning Chartlet

OPR-J377-KR2-15
Approaches to Breton Sound, LA
David Evans and Associates, Inc.
Chart 11363

APPENDIX II

SUPPLEMENTAL SURVEY RECORDS AND CORRESPONDENCE

From: Emily Clark - NOAA Federal <emily.clark@noaa.gov>
Sent: Tuesday, December 08, 2015 12:11 PM
To: Jason Creech; Jon Dasler; Christina Fandel - NOAA Federal; Lucy Hick - NOAA Federal
Subject: DEA Junction Waiver Request Approval
Attachments: OPR-J377-KR2-15-MOD1_OSI_Junction_Analysis_Waiver.doc

Good Afternoon,

Please see memorandum attached waiving the OSI Junction analysis for T-0002 under contract EA-133C-14-CQ-0037.

Respond when you have an opportunity acknowledging receipt of this information.

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 | ✉: Emily.Clark@NOAA.gov | 🖷: (757) 440-3687

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

December 4, 2015

MEMORANDUM FOR: Jason Creech
Lead Hydrographer
David Evans and Associates

FROM: Lucy Hick
Contracting Officer Representative
Navigation Services Division

SUBJECT: Junction Analysis Waiver: OPR-J377-KR2-15 Mod 1 Survey H12847

The requirement to perform a junction analysis with surveys H12733, H12734, and H12735 is waived for OPR-J377-KR2-15 Mod 1 Survey H12847.

Per the project instructions for OPR-J377-KR2-15 Mod 1 Survey H12847 and in accordance with the 2015 Hydrographic Surveys Specifications and Deliverables document, a junction analysis is still required with D00142 for survey H12847.

Please use this memo as supplemental correspondence and record to note the following requirement waiver.

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

December 4, 2015

MEMORANDUM FOR: Jason Creech
Lead Hydrographer
David Evans and Associates

FROM: Lucy Hick
Contracting Officer Representative
Navigation Services Division

SUBJECT: Junction Analysis Waiver: OPR-J377-KR2-15 Mod 1 Survey H12847

The requirement to perform a junction analysis with surveys H12733, H12734, and H12735 is waived for OPR-J377-KR2-15 Mod 1 Survey H12847.

Per the project instructions for OPR-J377-KR2-15 Mod 1 Survey H12847 and in accordance with the 2015 Hydrographic Surveys Specifications and Deliverables document, a junction analysis is still required with D00142 for survey H12847.

Please use this memo as supplemental correspondence and record to note the following requirement waiver.

From: Christina Fandel - NOAA Federal <christina.fandel@noaa.gov>
Sent: Thursday, December 10, 2015 8:26 AM
To: Jason Creech
Cc: Lucy Hick - NOAA Federal; Castle Parker - NOAA Federal
Subject: HTD 2015-04: Revision of Feature Flagging Guidance in 2015 HSSD
Attachments: HTD2015-04_RevisionOfFeatureFlaggingGuidance.pdf

Jason,

Attached is Hydrographic Technical Directive 2015-04 which provides guidance on the update vs. new/delete feature attribution for changes to the geometry of a charted features.

Considering HTD 2015-04 was released following the award for OPR-J377-KR2-15, you will not be required to adhere to this document for OPR-J377-KR2-15.

Please include this email in your correspondence folder upon submission of H12847.

Thank you,

Christy

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

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

November 19, 2015 HTD 2015-04

MEMORANDUM FOR: Distribution

FROM: Captain Eric W. Berkowitz , NOAA
Chief, Hydrographic Surveys Division

SUBJECT: Hydrographic Technical Directive 2015-04

TITLE: Revision of Feature Flagging Guidance in 2015 HSSD

EFFECTIVE DATE: November 19, 2015

SECTION 1. PURPOSE

This policy change permits field units to flag line and area objects using the NOAA S-57 Extended Attribute *descrp* = "Update" when extents are redefined by bathymetry, e.g. ledges, reefs, or foul areas. The current HSSD requirement is to flag modified features as "Delete", and create a "New" feature with modified geometry. Use of the "update" flag in place of the current practice of duplicating features to create separate "delete" and "new" features will reduce the number of objects in the Final Feature File and simplifies comunicating changes to charted area and line features.

SECTION 2. POLICY

This HTD modifies the direction in the "NOAA Mandatory and Conditional Attribution" table on page 142 of Section 8.2 of the 2015 HSSD. Under this revised policy, field units are permitted to flag line and area features as "Update" when geometric extents have been redefined by bathymetry. Extensive changes to line and area features by means of flaging a feature as "Delete" and creating a "New" feature in its place is still permissible.

The decision to update an existing feature rather than flag the original "Delete" and create a new feature in its place should be driven by the extent of the proposed change to the feature and is left to the the discretion of the hydrographer.

The usage of the Remarks field shall be used to communicate intent. For example, a revised ledge remarks could read:

Update: "Extents of charted ledge revised per bathymetry"
Delete: "Charted ledge disproved"
New: "New ledge"

Note that this HTD does not affect the treatment of point features. Point features with a new position shall continue to be addressed using the "New/Delete" method as prescribed in the HSSD.

SECTION 3. RESPONSIBILITIES

HSD Operations Branch to maintain HTD until change has been reviewed during the 2016 HSSD update cycle.

SECTION 4. GENERAL

(Not applicable)

SECTION 5. EFFECT ON OTHER ISSUANCES

This Directive revises section 8.2 'S-57 Format Features Deliverables' of the April 2015 NOS Hydrographic Surveys Specifications and Deliverables.

Please contact Katrina Wyllie (katrina.wyllie@noaa.gov), HSD Operations Branch, with any questions or comments concerning this Directive.

Distribution:
(1) Hydrographic Surveys Division
(2) NOAA Ship *Rainier*
(3) NOAA Ship *Fairweather*
(4) NOAA Ship *Thomas Jefferson*
(5) NOAA Ship *Ferdinand Hassler*
(6) Chief, Navigation Services Division
(7) C&C Technologies
(8) David Evans and Associates
(9) eTrac
(10) Fugro
(11) Leidos
(12) Ocean Surveys
(13) TerraSond
(14) Williamson and Associates

APPROVAL PAGE

H12847

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

- H12847_DR.pdf
- Collection of depth varied resolution BAGS
- Processed survey data and records
- H12847_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: Briana Welton Hillstrom Digitally signed by HILLSTROM.BRIANA.WELTON.1267667531 Date: 2018.01.12 14:31:07 -05'00'

Commander Briana W. Hillstrom, NOAA
Chief, Atlantic Hydrographic Branch