### Type of Survey
- Shallow Water Multibeam Hydrographic and Side Scan Sonar Survey

### Project No.
- OPR-J364-KR-09-A

### Registry No.
- H12060

### LOCALITY

- **State**: Florida

- **General Locality**: Gulf of Mexico

- **Sub-locality**: 16 NM SW of Pensacola

### 2009-2010

**CHIEF OF PARTY**

George G. Reynolds
<table>
<thead>
<tr>
<th>HYDROGRAPHIC TITLE SHEET</th>
<th>REGISTRY NO.</th>
</tr>
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<tbody>
<tr>
<td><strong>State</strong></td>
<td>Florida</td>
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<tr>
<td><strong>General Locality</strong></td>
<td>Gulf of Mexico</td>
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<tr>
<td><strong>Sub-Locality</strong></td>
<td>16 NM SW of Pensacola Bay Entrance</td>
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<tr>
<td><strong>Scale</strong></td>
<td>1:10,000</td>
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<tr>
<td><strong>Date of Survey</strong></td>
<td>October 23, 2009 to May 8, 2010</td>
</tr>
<tr>
<td><strong>Instructions Dated</strong></td>
<td>September 21, 2009</td>
</tr>
<tr>
<td><strong>Project No.</strong></td>
<td>OPR-J364-KR-09-A</td>
</tr>
<tr>
<td><strong>Vessel</strong></td>
<td>R/V Able II – Registration Number CT4788BB</td>
</tr>
<tr>
<td></td>
<td>R/V Ferrel - Official Number1182802</td>
</tr>
<tr>
<td><strong>Chief of Party</strong></td>
<td>George G. Reynolds</td>
</tr>
<tr>
<td><strong>Soundings by</strong></td>
<td>Reson Seabat 7101</td>
</tr>
<tr>
<td><strong>echo sounder</strong></td>
<td></td>
</tr>
<tr>
<td><strong>Verification by</strong></td>
<td>Michael J. Engels Atlantic Hydrographic Personnel</td>
</tr>
<tr>
<td><strong>Soundings in</strong></td>
<td>Meters (MLLW)</td>
</tr>
<tr>
<td></td>
<td>H-Cell Compilation units in feet at MLLW</td>
</tr>
</tbody>
</table>

**REMARKS:** All Times Recorded in UTC

Data Recorded and Presented relative to UTM Zone 16 North

Original SOW modified by January 21, 2010 Amendment of Solicitation (Refer to Separate III of the Descriptive Report.)

Contractor: Ocean Surveys, Inc.
91 Sheffield St.
Old Saybrook, CT 06475

*Red. bold. italic. remarks made during office. processing.*
THE INFORMATION PRESENTED IN THIS REPORT AND THE ACCOMPANYING BASE SURFACE REPRESENTS THE RESULTS OF A SURVEY PERFORMED BY OCEAN SURVEYS, INC. DURING THE PERIOD OF 23 OCTOBER 2009 TO 08 MAY 2010 AND CAN ONLY BE CONSIDERED AS INDICATING THE CONDITIONS EXISTING AT THAT TIME. REUSE OF THIS INFORMATION BY CLIENT OR OTHERS BEYOND THE SPECIFIC SCOPE OF WORK FOR WHICH IT WAS ACQUIRED SHALL BE AT THE SOLE RISK OF THE USER AND WITHOUT LIABILITY TO OSI.
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E.  APPROVAL SHEET

APPENDICES  Included with H-Cell deliverables

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

SEPARATES  Data filed with original field records.

I  Acquisition and Processing Logs
II  Sound Speed Data
III  Statement of Work
IV  Cross Line Comparisons
V  Side Scan Contact Listing
INTRODUCTION

The purpose of this survey is to provide NOAA with modern, accurate hydrographic survey data to update the nautical charts of the Gulf of Mexico, in the Safety Fairway southwest of Pensacola Bay, Florida.

A. AREA SURVEYED

Figure 1. H12060 survey area overlain on RNC 11382 and RNC 11376. Multibeam colored by depth coverage image was developed from a 5-meter surface.
This survey provides hydrographic data for the Gulf of Mexico waters southwest of the Pensacola Bay Entrance. These survey junctions with contemporary Survey H12061 to the east and Survey H11584 to the west. The general locations of the survey limits are presented in Table 1. The survey area includes the Safety Fairway southwest of Pensacola Bay and south of Perdido Pass. Survey data were acquired to meet requirements specified in the contract Statement of Work (SOW, September 21, 2009; amended January 21, 2010), and NOS Hydrographic Surveys Specifications and Deliverables, April 2009 (HSSD 2009). Two hundred percent (200%) side scan sonar (SSS) coverage, with concurrent shallow water multibeam echo sounder (SWMB) coverage were collected with set line spacing to water depths of approximately 80 feet. Additional SWMB coverage was obtained as necessary to provide a least depth for all significant SSS contacts and assigned AWOIS investigation items. The final survey area covers 27.25 square nautical miles (Figure 1).

After award of the original Task Order, NOAA decreased the size of the H12060 survey area to minimize overlap between this survey and recently completed survey H11584. The H12060 western survey limit was shifted east reducing the assigned study area by 14 square nautical miles (see Modification of Contract, Modification No. 001 included on page 23 of Separate III).* The new western survey limit is discussed in the project correspondence dated Feb 16 and March 25, 2010 included on page 19 and 23 of Appendix V** of this report. Modification of the survey area resulted in the deletion of nine (9) of 13 AWOIS items included in the Project Instructions.

The square mileage removed from the original Survey H12060 assignment was appended to the eastern end of OPR-J364-KR-09, Survey H12157 (Sheet D).

### Table 1

<table>
<thead>
<tr>
<th>Northern Limit Latitude (N)</th>
<th>Southern Limit Latitude (N)</th>
<th>Western Limit Longitude (W)</th>
<th>Eastern Limit Longitude (W)</th>
</tr>
</thead>
<tbody>
<tr>
<td>30-13-40</td>
<td>30-09-24</td>
<td>87-38-09</td>
<td>87-23-29</td>
</tr>
</tbody>
</table>

The mainscheme SSS/SWMB tracklines were run parallel to the safety fairway boundary lines (Figure 2). SSS tracklines were separated by one-half the distance required for 100% coverage plus an allowance for overlap and trackline maintenance. Trackline offset and accompanying SSS range scale settings are presented in Table 2. Survey trackline statistics are indicated in Table 3A and Table 3B.

Initial onsite system calibration was performed on October 23, 2009 for the \textit{R/V Able II} and April 5, 2010 for the \textit{R/V Ferrel}. AWOIS investigation and cross line data were acquired from the \textit{R/V Able II} on February 18-19 (DN 049-050). Twelve (12) bottom samples were acquired from the \textit{R/V Able II} on February 21, 2010 (DN 052). Mainscheme data cross line

*Data filed with original field records.

**Included with H-Cell deliverables.
data, additional calibration data and significant target development were acquired from the *R/V Ferrel* on the following dates: April 6-9, 18-23, 27-30, and May 5-6, 8, 2010 [Calendar Day Numbers (DN) 096-099, 108-113, 117-120, 125-126, 128 (2010)].

![Figure 2](image.png)

Figure 2. H12060 survey area with SSS/SWMB tracklines in black overlaid on RNC 11382 and RNC 11376.

### Table 2

**H12060 Survey Line Spacing**

<table>
<thead>
<tr>
<th>Water Depths (meters)</th>
<th>Trackline Offset (meters)</th>
<th>SSS Range Scale (meters)</th>
</tr>
</thead>
<tbody>
<tr>
<td>10-20</td>
<td>42</td>
<td>50</td>
</tr>
<tr>
<td>10-25</td>
<td>42, 55, 65</td>
<td>75</td>
</tr>
</tbody>
</table>
### Table 3A

**H12060 R/V Able II Survey Trackline Statistics**

<table>
<thead>
<tr>
<th>Concurrent MB/SSS Lineal NM</th>
<th>Multibeam Only Lineal NM</th>
<th>Additional Developments Lineal NM</th>
<th>Cross Lines Lineal NM</th>
<th>Square Nautical Miles Covered</th>
<th>Bottom Samples Acquired</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>0</td>
<td>0</td>
<td>41.73</td>
<td>0</td>
<td>12</td>
</tr>
</tbody>
</table>

### Table 3B

**H12060 R/V Ferrel Survey Trackline Statistics**

<table>
<thead>
<tr>
<th>Concurrent MB/SSS Lineal NM</th>
<th>Multibeam Only Lineal NM</th>
<th>Additional Developments Lineal NM</th>
<th>Cross Lines Lineal NM</th>
<th>Square Nautical Miles Covered</th>
<th>Bottom Samples Acquired</th>
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</thead>
<tbody>
<tr>
<td>860.1</td>
<td>276.8</td>
<td>54.08</td>
<td>23.09</td>
<td>27.25</td>
<td>0</td>
</tr>
</tbody>
</table>

#### B. DATA ACQUISITION AND PROCESSING

*See also the H-Cell Report.*

Refer to OPR-J364-KR-09 Data Acquisition and Processing Report (DAPR)* for a complete description of data acquisition and processing systems, survey vessels, quality control procedures and data processing methods. Additional information to supplement sounding and survey data, and any deviations from the DAPR* are included in this descriptive report.

**B.1 Equipment**

Survey operations were conducted from two platforms: OSI’s *R/V Able II* and Reservoir Geophysical’s *R/V Ferrel*. The *R/V Able II* is a 7.6-meter fiberglass vessel, with a 3-meter beam and 0.8-meter draft. The vessel is powered by twin 150 HP outboard engines. The *R/V Ferrel* R-492 is a 44.5-meter steel vessel, with a 9.8-meter beam and 1.8-meter draft and powered by two 375 HP CAT D 353 diesel engines. Table 4 summarizes the primary equipment used to acquire SWMB and SSS data. All equipment was installed, calibrated and operated in accordance with the DAPR. *

*Included with H-Cell deliverables.*
Table 4
H12060 Primary Survey Equipment

<table>
<thead>
<tr>
<th>System</th>
<th>Manufacturer</th>
<th>Model/Version No.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Multibeam Echo Sounder</td>
<td>Reson</td>
<td>7101</td>
</tr>
<tr>
<td>Side Scan Sonar</td>
<td>Klein</td>
<td>5000</td>
</tr>
<tr>
<td>Moving Vessel Profiler</td>
<td>ODIM</td>
<td>MVP30</td>
</tr>
<tr>
<td>Sound Speed Profiler</td>
<td>Sea-Bird</td>
<td>SeaCAT SBE 19</td>
</tr>
<tr>
<td>Sound Speed Profiler</td>
<td>Sea-Bird</td>
<td>SeaCAT SBE 19+</td>
</tr>
<tr>
<td>Sound Speed Sensor (Real-Time Surface Sound Speed)</td>
<td>Sea-Bird</td>
<td>MicroCAT SBE37</td>
</tr>
<tr>
<td>Primary Navigation DGPS</td>
<td>Applanix/Trimble</td>
<td>POS MV 320 V.4</td>
</tr>
<tr>
<td>Secondary Navigation DGPS</td>
<td>Trimble</td>
<td>MS750</td>
</tr>
<tr>
<td>Vessel Attitude and Heading</td>
<td>Applanix/Trimble</td>
<td>POS MV 320 V.4</td>
</tr>
<tr>
<td>Multibeam acquisition, trackline control, position fixing</td>
<td>HYPACK, Inc.</td>
<td>Survey (V 9.0-9.1.0.0) and Hysweep (V 9.0.26.0) 2009</td>
</tr>
<tr>
<td>SSS acquisition</td>
<td>Chesapeake Technology, Inc.</td>
<td>SonarWiz V4.04.0061</td>
</tr>
<tr>
<td>U.S.C.G. Differential Beacon Receivers (2)</td>
<td>Trimble</td>
<td>Probeacon</td>
</tr>
<tr>
<td>Survey GPS</td>
<td>Trimble</td>
<td>5700</td>
</tr>
<tr>
<td>Bar Check</td>
<td>OSI</td>
<td>Lead Disk</td>
</tr>
<tr>
<td>SSS Cable Payout Indicator</td>
<td>Hydrographic Consultants</td>
<td>SCC16”</td>
</tr>
<tr>
<td>Tide Gauge</td>
<td>Hazen</td>
<td>HTG5000</td>
</tr>
</tbody>
</table>

The R/V Able II acquired SWMB cross line data and AWOIS development data on February 18 and 19 (DN 049 and DN 050) and collected bottom samples on February 21 (DN 052). The remainder of the survey was completed from the R/V Ferrel. The same Reson 7101 echo sounder was used to acquire SWMB from both platforms. No SSS data were acquired with the R/V Able II.

The primary deviation in survey methods between platforms was the incorporation of the ODIM Moving Vessel Profiler on the R/V Ferrel. Sea-Bird SeaCAT SBE 19/19+ profiler CTD units were used to acquire sound speed profiles aboard the R/V Able II. The SBE 19/19+ units were used on both vessels to acquire comparison cast data.

B.2 Quality Control (QC)

B.2.1 System Calibration

SWMB system calibration surveys (patch tests) were performed on each platform prior to the start of data acquisition. The initial patch test for the R/V Able II was performed on October 23, 2009 (DN 296) in Pensacola Bay, north of the survey area. Multiple interim patch tests
were performed throughout the period of the “small boat” survey. A post-survey patch test was performed on February 23, 2010 (DN 054) to verify the original alignment values.

The initial patch test for the R/V Ferrel was performed on April 5, 2010 (DN 095) southeast of the entrance to Pensacola Bay. A post-survey patch test was performed on May 12 (DN 132) to verify the original alignment values.

For both platforms transducer draft and echo sounder function was confirmed by means of bar checks and “spot checks” with a calibrated lead line performed prior to the start of survey operations and at weekly intervals during the course of the survey. Concur

B.2.2 SWMB Cross Lines

A total of 64.82 lineal nautical miles of cross line data were acquired. During the two day period between February 18-19 (DNs 049-050) the R/V Able II logged 41.73 nautical miles of cross line information. On April 6 (DN 096) and April 21 (DN 111) the R/V Ferrel acquired a combined total of 23.09 nautical miles of cross line data. The cross line mileage factor is 7.54% of the 860.1 nautical miles of mainscheme tracklines. Concur

Statistical quality control information was generated by comparing each of the cross lines to the final combined 2-meter x 2-meter CARIS BASE (Bathymetry Associated with Statistical Error) surface. Cross line comparisons generated with the CARIS QC Report utility are presented in Separate IV. *

Cross line comparisons showed excellent agreement with the finalized BASE surface generated from the mainscheme survey lines. All cross line soundings considered in the analyses met IHO Order 1 uncertainty standards. Overall, there was good agreement between overlapping line and day-to-day sounding coverage as observed in the BASE surface depth and standard deviation layers.

B.2.3 Data Quality Review

B.2.3.1 CARIS BASE Surface Standard Deviation and Uncertainty

The standard deviation and uncertainty BASE surfaces were reviewed to direct sounding editing and evaluated to search for systematic errors, sporadic noise (fish, water column disturbances, etc.), and areas that warranted additional investigation (bathymetric features). In general, the final combined uncertainty BASE surfaces generated from the higher of the standard deviation or uncertainty values were appropriate for the bathymetric relief observed in the survey area. Highest standard deviation values were observed over rock and

*Data filed with original field records.
obstruction features and steep slopes. The CARIS QC BASE surface report utility was used to evaluate IHO uncertainty for the final combined 2-meter BASE surface. Results from the QC BASE surface report indicate that 99.999% of the nodes from the final combined 2-meter surface meet IHO Order 1 uncertainty specifications. QC BASE surface reports for all final surfaces are included in Separate IV.*

B.2.3.2 SSS Imagery and Contacts

Contacts with approximately 1-meter heights and greater were identified in 2 x 100% coverage SSS imagery and attributed with feature classifications and descriptive remarks if applicable. A custom CARIS ContactFeatures.hcf was created for feature classification when positioning contacts and is submitted with the session data. Contacts were classified according to SSS shadow height and surrounding depths as specified in the SOW and HSSD (Table 5). All contacts were correlated and evaluated in the CARIS HIPS/SIPS map window with respect to BASE surfaces, contours and charted information. Each significant contact was examined in the CARIS subset editor and a sounding was designated for the representative least depth of each contact (or Primary/Secondary contact pair). All significant contacts were developed with additional SWMB coverage to meet the object detection sounding density as specified in the HSSD 2009. A tabulation of all side scan contacts, individual contact images, and supporting correlation tools (spreadsheet and database format) are presented in Separate V.* Isolated shoal features that were outstanding or navigationally significant with respect to the surrounding depths are represented and attributed in the S-57 feature file (i.e. OBSTRN, WRECKS, UWTROC).

### Table 5

<table>
<thead>
<tr>
<th>Surrounding Depth or Area (meters)</th>
<th>Significant Contact Height (meters)</th>
</tr>
</thead>
<tbody>
<tr>
<td>≤ 20</td>
<td>≥ 1.0</td>
</tr>
<tr>
<td>&gt; 20</td>
<td>10% of surrounding depth</td>
</tr>
</tbody>
</table>

B.2.4 Survey Junctions  
See also the H-Cell Report.


B.2.4.1 H12060-H12061 Junction

There is an approximate overlap of 1 kilometer between bathymetric data from Survey H12060, acquired with the R/V Ferrel, and H12061, acquired with the R/V Able II. Depths from the Combined Final 2-meter BASE surfaces from Surveys H12061 and H12060 were

*Data filed with original field records.*
compared in CARIS HIPS. Further analyses consisting of a surface-to-surface comparison (Figure 3) and statistical analysis (Figure 4) were performed using 10-meter by 10-meter surfaces from Surveys H12060 and H12061. Depths from H12060 showed excellent agreement with depths from H12061. Depth discrepancies generally equaled 20 centimeters or less and the average difference between surveys equaled -0.02 meters. Concur

Figure 3. Surface-to-surface difference map comparing Survey H12060 to Survey H12061 overlaid on RNC 11382. Difference values are based on 10-meter by 10-meter data sampling. Grey areas represent depth differences of less than 0.10 meters. The maximum difference between surfaces is -0.31 meters. Concur
Figure 4. Surface-to-surface difference histogram comparing Survey H12060 to Survey H12061. Difference values are based on 10-meter by 10-meter data sampling. Average difference between surveys is -0.02 meters with a standard deviation of ±0.06 meters. Ninety-four (94) percent of the difference values were within 2 sigma of the mean.

B.2.4.2 H12060-H11584 Junction

There is an approximate overlap of 300 meters between bathymetric data from Survey H12060, acquired with the R/V Ferrel, and Survey H11584, acquired with the R/V Davidson (TerraSond, Ltd.). Analyses consisting of a surface-to-surface comparison (Figure 5) and statistical analysis (Figure 6) were performed using 10-meter by 10-meter surfaces from Survey H12060 and H11584. Considering the time elapsed between surveys, depths from H12060 showed good agreement with depths from H11584. Depth discrepancies generally equaled 35 centimeters or less and the average difference between surveys equaled -0.07 meters. Concur
Figure 5. Surface-to-surface difference map comparing Survey H12060 to Survey H11584 overlaid on RNC 11376. Difference values are based on 10-meter by 10-meter data sampling. Grey areas represent depth differences of less than 0.10 meters. The maximum difference between surfaces is -0.54 meters. Concur
Figure 6. Surface-to-surface difference histogram comparing Survey H12060 to Survey H11584. Difference values are based on 10-meter by 10-meter data sampling. Average difference between surveys is -0.07 meters with a standard deviation of ±0.06 meters. Ninety-six (96) percent of the difference values were within 2 sigma of the mean. Concur

Possible reasons for the slight discrepancy between surveyed depths include the time elapsed between surveys and the tide source. The surveys were conducted almost four years apart. The controlling tide station for Survey H12060 was Pensacola, FL (872-9840). According to the Survey H11584 Descriptive Report, the controlling tide stations were Dauphin Island, AL (873-8151 and 873-8150), and Pascagoula NOAA Lab, MS (874-1533). Online research indicates that the Dauphin Island, AL, tide stations are actually designated 873-5181 and 873-5180. Concur

B.2.5 Unusual Conditions/Factors Affecting Soundings/Imagery

The sound speed profiles measured throughout the limits of Survey H12060 showed high variability. Sound speed changes in the water column were time and space dependent and were primarily attributed to the influx of fresh water from Pensacola Bay. This variability caused refraction in the side scan imagery and, at times, influenced the outer beams of the multibeam swath. To ensure that this phenomenon did not compromise the quality of the final dataset, various steps were taken by both the collection team and the processing team.
Sound speed profiles were viewed during acquisition to assist in identifying the depths in the water column where refraction may be more severe due to rapid changes in sound speed. “Plateaus” and “bulges” in the profile served as indicators of depths prone to higher refraction and the SSS operator attempted to fly the towfish at depths above or below the refractive lens (Figure 7). *Concur*

![Sample sound speed profile from Survey H12060. The profile data were useful in determining a practical height at which to fly the towfish in an effort to reduce refraction effects.](image)

Figure 7. Sample sound speed profile from Survey H12060. The profile data were useful in determining a practical height at which to fly the towfish in an effort to reduce refraction effects.

In areas of extreme refraction, flying the SSS fish a meter to a meter and a half below the threshold specified in the HSSD 2009 (8% of the SSS range) improved image quality. Confidence checks recorded throughout periods where the towfish was outside the specified depth range established that there was no degradation of image quality and target identification across the width of the SSS image. Contacts observed during these periods were subsequently investigated using the multibeam system. *Concur*
In some areas, flying the fish below the specified depth range did not help to improve image quality. In these areas, the range scale of the SSS was lowered and the line plan adjusted accordingly to ensure full 200% coverage. Concur

For the first few days of mainscheme line data collection on the R/V Ferrel, April 7 – April 9, 2010 (DNs 097-099), severe refraction hindered SSS acquisition. All attempts to minimize the refraction effects, such as flying the fish at different heights above the seafloor including below the specified depth range, did not help to improve image quality. Side scan imagery collected on these dates was rejected and was not used for contact selection or included in the coverage mosaics with one exception. A small portion of the side scan data from survey line 097-113135-228 collected on April 7 (DN 097) was re-accepted since it provided the best imagery of a significant contact, number 097-11310006, submitted as a Danger to Navigation (DTON). The survey area covered by the rejected SSS lines was re-surveyed using a 75 meter range scale and the line plan was adjusted accordingly to ensure full 200% coverage was obtained. The SWMB data from April 7 – April 9 (DNs 097–099) were retained and are included in the final bathymetric deliverables. Concur

On May 5, 2010 (DN 125), the SSS range scale was reduced to 50 meters between 9:25 and 16:00 UTC to avoid the effects of refraction in the outer swath. The line plan was adjusted accordingly to ensure full 200% coverage was obtained. All changes in SSS range settings were recorded in the acquisition log found in Separate I. Concur

The variability in the sound speed profile also affected the SWMB data. To overcome this problem, the field team took frequent sound speed casts to accurately portray the sound speed conditions. Casts were taken at both ends of a given survey area and interspersed in the middle as appropriate. The frequency of MVP casts typically ranged from 20 to 60 minutes. Surface sound speed values were displayed in the HYSWEEP survey window and recorded in the data file. The surface values were monitored throughout the survey for variations that indicated a new sound speed profile was needed. Concur

The method selected in CARIS HIPS to sound speed correct the multibeam lines was determined based on the spatial and temporal changes observed in sound speed profiles over the course of the day. Some lines were corrected using individual casts as recommended by the field team. However, the majority of the lines were sound speed corrected using CARIS HIPS’ “Nearest in Distance Within Time” method. The day to day sound speed correction method is noted in the daily processing logs. Despite the efforts taken to reduce sound speed artifacts, refraction effects were evident in the outer beams. Multibeam swaths for mainscheme survey lines were filtered to 60 degrees from nadir in order to reduce sound speed related uncertainty. Concur

During SWMB acquisition with the R/V Ferrel, the Reson 7101 would experience periodic bursts of motion-induced noise or “blowouts” that typically affected between 2 to 4 sequential profiles, and in most cases required the entire swath to be rejected in processing. Efforts were made to reduce this noise, including adjustments to system gain and power, in
addition to the multibeam pole fairing that was installed to reduce cavitation effects. The frequency of the noise bursts would typically increase as sea-state worsened. Therefore, operations were suspended when the frequency or length of blowouts became too high.

All multibeam data were closely reviewed by the processor in CARIS HIPS using both the Swath Editor and Subset Editor to identify and remove the noisy data. The coverage surfaces were then reviewed for any holidays that exceeded the coverage requirement that no gaps in surfaces be greater than 3 nodes (HSSD 2009). Per e-mail correspondence with the COTR on September 16, 2009 (see Appendix V) OSI was instructed that grid resolutions of 2m for depths less than 20 meters and 4m for depths 20 - 40 meters are acceptable. If holidays were found that exceeded the tolerances, additional multibeam fill-in lines were collected. A final holiday check was performed using, CARIS’ BASE Surface QC Report and those results can be found in Separate IV. **

*Data attached to this report.
**Data filed with original field records.

Large schools of fish and pods of dolphins were frequently seen in both the multibeam and SSS data (Figures 8 and 9). Fish and dolphins were noted in the acquisition log by the field team, and these areas were carefully reviewed during data processing. If seen on only one side scan line, the contact was designated as fish. If visible in 200% side scan coverage with a significant height, the contact was investigated with object detection multibeam coverage to verify or disprove the presence of a feature. Concur

![Figure 8](image_url)

Figure 8. Examples of fish encountered in the side scan imagery.

![Figure 9](image_url)

Figure 9. Examples of dolphins encountered in the side scan imagery.
Tide data were highly susceptible to local meteorological conditions. Verified water levels recorded at the Pensacola tide gauge (872-9840) often deviated from predicted values by ±0.2 meters (Figure 10). These deviations appear to be dependent on local weather conditions and were observed during periods of high winds (10–20 knots) and high surf (2–4 foot seas) offshore with choppy conditions reported for Pensacola Bay.

Figure 10. Top: Observed tide data was up to 0.2 meters higher than predicted tide data during April 7-9, 2010 (DNs 097-099), which corresponds with a period of south winds blowing 10 to 15 knots.

A vertical offset is apparent in the final combined 2-meter BASE surface’s standard deviation layer where SWMB acquired on April 7-9 (DNs 097-099) overlaps SWMB acquired on April 28-29, 2010 (DNs 118-119), as shown in Figure 11. Multibeam data collected on April 7-9 (DNs 097-099) were approximately 0.1-0.2 meters shallower than the overlapping data (Figure 12), and multibeam data collected on April 28-29 (DNs 118-119) were approximately 0.1-0.15 meters deeper than the overlapping survey lines (Figure 13). The tidal offset did not exceed the allowable IHO Order 1 error budget at the survey depths of 10 meters (0.52 meters) to 20 meters (0.56 meters). *Concur*
Figure 11. Tidal offset discrepancy between multibeam survey lines depicted on the standard deviation layer of the final combined 2-meter BASE surface. The east side of the figure (OSI sub-survey area A3) includes multibeam data collected on both April 7-9 (DN 97-99) and April 18-21 (DN 108-111). Standard Deviation color range scale is set to 0 to 1 meter in CARIS HIPS in order to emphasize the areas of higher standard deviation especially at the intersection of OSI’s sub-survey areas A2 (April 28-29, DN 118-119, west side) and A3 (April 7-9, DN 97-99, east side) show in Figure 11 inset. RNC 11382 is displayed in the background.

OSI undertook a brief water level analysis in an attempt to understand and validate the vertical offset depicted in Figures 11–13. Utilizing the Applanix POSPac MMS software, water level data, at the location of the survey vessel, were derived employing the Post-Processed Virtual Reference Station (PPVRS) technique. These water level data were compared to coincidental zone-corrected, verified water level data from the Pensacola tide gauge. The analysis in fact demonstrated that the departure of the PPVRS-derived water level data from the zone-corrected, verified water levels is generally consistent in magnitude and direction with the offset displayed in Figure 12 and Figure 13.
Figure 12. An example of the tidal offset between mainscheme survey lines collected on April 7, 2010 (DN 097) (yellow) and April 19, 2010 (DN 109) (purple) displayed in CARIS HIPS Subset Editor. Depths and distances are in meters.

Figure 13. An example of the tidal offset between a mainscheme survey lines collected on April 29, 2010 (DN 119) (blue) and April 20, 2010 (DN 110) (orange) displayed in CARIS HIPS Subset Editor. Depths and distances are in meters.
B.2.6 Sounding Coverage, Equipment and Methods

As noted in Table 4, a Reson Model 7101 multibeam echo sounder was employed to acquire sounding data. The system was configured to operate using 511 equidistant beams. Due to the shallow conditions throughout the site, the multibeam system ping rate was maintained at a relatively high rate. The combination of the high beam number and ping rate ensured the system had no trouble meeting mainscheme along track and grid node density requirements at typical survey speeds. Concur

For contact developments requiring “Object Detection” coverage, the survey vessel was operated at a survey speed typically less than 6 knots. The Reson 7101 swath width was narrowed to 120 degrees while maintaining the 511 beam setting. Multiple near-nadir passes were run for each contact development to make certain that extremely dense, high quality soundings were available for least depth determination. Concur

B.3 Corrections to Echo Soundings

Preliminary patch test values were calculated in the field and final values were verified in CARIS HIPS.

Corrections to echo soundings were performed in accordance with the DAPR. However, on the R/V Able II, additional multibeam echo sounder calibrations were completed due to variability in roll alignment noted during preliminary processing. The minute roll offset variation is attributed to the act of deploying and recovering the transducer pole each day. Once the irregular roll offset was revealed, a routine of acquiring roll calibration each day prior to data acquisition was instituted. The CARIS Hydrographic Vessel File (HVF)s was updated when changes in the roll bias value were observed. Concur

Alignment correctors for the R/V Ferrel remained unchanged for the duration of survey operations. Latency and attitude bias values calculated from the initial patch test were confirmed by a final patch test conducted after data acquisition was complete.

On the R/V Able II, all comparison casts taken with the Secondary CTD units were removed from the concatenated SVP files prior to sound speed correction of the multibeam data. The office processors’ initials were appended to the end of the file name to indicate that the raw concatenated SVP file had been updated.

B.3.1 Static Draft Corrections

Static draft values were measured prior to survey operations each day and recorded in the acquisition log. The static draft was also measured before and after each fueling. The CARIS vessel configuration file was updated with daily time tags and static draft values. Static draft corrections were applied during the merge process. Generally, the static draft values did not vary more than 0.05 meters between daily measurements, except for larger differences in water level between measurements taken before and after fueling.
B.4  Data Processing

B 4.1  Survey Coverage

This survey was conducted to develop 200% SSS coverage within the survey limits along with concurrent SWMB, aka “skunk stripe” bathymetry. Full multibeam coverage of the survey area was not required. All potentially significant features located with mainscheme SSS or SWMB were developed with high density, near nadir multibeam sonar data to meet the HSSD requirement of “Object Detection Coverage.” Concur

B 4.2  Coverage BASE Surfaces and Mosaics

Survey H12060 was divided into two field sheets (Figure 14 and Table 6) based upon the number of nodes (limited by CARIS HIPS) per field sheet (less than 25 million nodes). The required grid resolution for Survey H12060 was 2 meters for depths less than 20 meters and 4 meters for depths of 20-40 meters, per email correspondence from NOAA dated September 16, 2009 (see Appendix V).* Surfaces were generated in CARIS HIPS using the “Shallow Configuration” under the CUBE Parameters’ Advanced settings menu. A 2-meter combined sounding field sheet is also included in the deliverables. This sheet, “H12060_Full_Combined_2m,” includes the gridded soundings from the two sub-area field sheets shown in Figure 14. Concur

Employing the choice SSS imagery as discussed in Section B.2.5., a 1-meter resolution coverage mosaic field sheet was created for each 100% SSS coverage. Concur

![Figure 14. H12060 final sub-area sounding field sheet layout.](image)

*Data attached to this report.*
**Table 6**

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<tr>
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<th>Resolution (meters)</th>
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<td>10-26</td>
<td>SWMB coverage</td>
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<td>SSS coverage</td>
</tr>
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</table>

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

**C.1 Vertical Control**

The vertical datum for this project is Mean Lower Low Water (MLLW). The operating National Water Level Observation Network (NWLON) station at Pensacola, FL (872-9840) serves as datum control for Survey H12060.

The survey area is located within Zones CGM29 and CGM37 as provided in the preliminary tidal zoning scheme included with the project SOW CD. Based on the results of cross line analysis, it appears that the time and range factors as provided in the preliminary zoning scheme, are adequate. *Concur*

OSI home office and field personnel monitored preliminary tide data available on the NOAA CO-OPS website. The NOAA Pensacola (872-9840) gauge experienced a series of preliminary tide gaps between February 17 and 18 (DNs 048 and 049). The largest gap was 5 hours in length, but did not coincide with data acquisition. All gaps were filled by CO-OPS prior to issuance of verified tide data. *Concur*

Verified zoning and tides were applied during field operations. *Concur*

**C.2 Horizontal Control**

The horizontal datum for this project is the North American Datum of 1983 (NAD83). All data products are referenced to Latitude/Longitude or Universal Transverse Mercator (UTM) Zone 16, meters. *Concur*

All mainscheme line and item investigation position data were acquired using an Applanix POS-MV operating in Differential GPS (DGPS) mode. The unit was configured to receive USCG Differential beacon correctors from Eglin Air Force Base, FL. Differential beacon correctors from the U.S. Coast Guard station in Mobile Point, AL, were used by the secondary navigation system to facilitate real-time horizontal control confidence checks. Initial dynamic draft and patch calibration data (for each vessel) were acquired with the POS-MV operating in RTK GPS mode.
Prior to and during the course of the survey the accuracy of the primary positioning system was verified by means of a physical measurement to a project horizontal control point established at each vessel’s berth. The horizontal control points were established using the National Geodetic Survey’s Online Positioning Users Service (OPUS). Position confidence checks were accomplished daily on R/V Able II and at least bi-weekly, during fuel or weather stops, for the R/V Ferrel. Refer to the DAPR and Horizontal and Vertical Control Report (HVCR) for additional details.

D. RESULTS AND RECOMMENDATIONS  See also the H-Cell Report.

D.1 Chart Comparison  Refer to Appendix I –Dangers to Navigation Report and Appendix II – Survey Features Report for verified feature information and final feature disposition.

Chart comparisons were performed in CARIS HIPS/SIPS, Notebook and Easy View using surface models, contours and soundings that were generated from the combined final BASE surface. The latest editions of the NOAA NOS Raster Nautical Charts (RNC) and Electronic Nautical Charts (ENC) were downloaded from the NOAA Coast Survey WWW site (http://www.nauticalcharts.noaa.gov/) weekly during survey operations, and when the survey was completed for final comparisons. The RNCs and ENCs used for final comparisons, summarized in Table 7, were downloaded on June 15, 2010 and are submitted with the survey data.

The Local Notice to Mariners (LNM) and Notice to Mariners (NM) issued during the survey period (October 23, 2009 to May 8, 2010) were reviewed for significant updates. Coast Guard District 8 LNM 19/2010 (May 12, 2010) was the final notice reviewed for this project.

Table 7
H12060 Affected Charts

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<th>ENC</th>
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<td>43rd, Nov./08</td>
<td>US3GC05</td>
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<td>1:80,000</td>
<td>54th, Nov./09</td>
<td>US4AL11</td>
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</table>

D.1.1 General Chart Comparison

In general, surveyed depths agreed with charted soundings and the 60-foot depth curve within 3 feet (1 meter). Specific differences are discussed in the detailed chart comparisons below.
A large number of uncharted, 3-16 foot (1-5 meter) tall obstructions were identified in the Safety Fairway with the majority of the obstructions located in the eastern side of the survey area (Figure 15). Of the obstructions, four were submitted as dangers to navigation (DTON) on June 25, 2010. The DTON Report is included in Appendix I.* All obstructions with significant heights relative to the surrounding depth were included in the S-57 feature file (H12060_S57_Feature.000). The majority of the obstructions found in the Fairway had a strong side scan return and appeared to be tall, slender, triangular features (Figure 16).

Figure 15. The least depth positions of charted and uncharted obstructions from Survey H12060 are shown in red overlain on RNC 11382. All depths are in feet.

Figure 16. An example of the triangular obstructions surveyed within the Safety Fairway displayed in (a) CARIS HIPS Subset Editor with soundings colored by survey line and (b) as side scan imagery exported from CARIS SIPS. All depths and distances are in feet. The obstruction is located at 30-12-48.05 N, 87-24-44.01W. See Appendix II and H-Cell Report for charting recommendations.

A majority of the charted obstructions and wrecks within the survey area were included as AWOIS investigation items and are discussed in detail under Appendix II, Survey Feature Report. *

*Data attached to this report.
- High-resolution data from this survey provide more detailed delineations of depth areas and individual features.

D.1.2 Detailed Chart Comparison and Charted Features

The chart feature listed below is common to Charts 11382 and 1115A. (Soundings in feet and fathoms)

- H12060-1: A 72-foot/12½-fathom Obstrn PA charted at 30-11-21.98N, 87-27-21.00W was disproved with 200% SSS and complete SWMB. A new obstruction with a least depth of 59.4 feet/9.9 fathoms (18.1 meters) was developed at 30-11-15.76N, 87-27-22.79W approximately 180 meters southwest of the center of the charted obstruction. The new obstruction is over 12 feet/2 fathoms shoaler than the reported depth of the Obstrn PA. It is included as an OBSTRN object in the S-57 feature file (H12060_S57_Feature.000). See AWOIS Item #7879 under Appendix II – Survey Feature Report for additional information. Concur – Data attached to this report.

The chart feature listed below is common to Charts 11382 and 11376. (Soundings in feet)

- H12060-2: A 38-foot Obstrn charted at 30-09-01.20N, 87-37-22.70W was verified with object detection coverage SWMB. A least depth of 40.3 feet (12.3 meters) was developed at 30-09-01.28N, 87-37-22.84W; two feet deeper than charted. It is included as an OBSTRN object in the S-57 feature file (H12060_S57_Feature.000). See AWOIS Item #14306 under Appendix II – Survey Feature Report for additional information. Concur – Data attached to this report.

Chart 11382 (Soundings in feet)

- H12060-3: Two charted obstructions in the northeast corner of the survey area were verified with 200% SSS and object detection coverage SWMB. The 46-foot and 44-foot Obstrns are located in the junction area with contemporary Survey H12061 and were submitted as Dangers to Navigation under Survey H12061 by OSI on March 26, 2010. Data from Survey H12060 verify the positions and depths of the charted obstructions, with least depths of 45.3 feet (13.8 meters) and 44.4 feet (13.5 meters) developed at 30-13-25.15N, 87-23-37.45W and 30-13-02.38N, 87-23-31.05W, respectively (Figure 17). The obstructions are included in the S-57 feature file (H12060_S57_Feature.000). See Appendix II for final charting recommendations.
Figure 17. (a) The surveyed least depths on the charted obstructions are shown in red overlain on RNC 11382. Depths are in feet. On the right, the side scan imagery for the charted obstructions: (b) Contact 108-2140001 over the 46-foot Obstn and (c) Contact 109-19260007 over the 44-foot Obstn.

- H12060-4: The northern portion of a meandering Obstn Fish Haven* intersects the Safety Fairway near the center of the survey area. The Obstn Fish Haven references “note C” on RNC 11382 for its controlling depth which states “The minimum cleared depth in the Safety Fairway area is 47 feet.” The least depth surveyed within the charted obstruction area was 55.1 feet (16.8 meters) at 30-11-29.67N, 87-30-22.88W. However, an obstruction** with a least depth of 44.8 feet (13.7 meters) with an approximate height of 19 feet (5.8 meters) off the bottom was developed at 30-10-46.74N, 87-31-03.06W, 350 feet (100 meters) outside the obstruction area (Figure 18). A portion of the obstruction is detached from the base, indicating it may be a submerged buoy or floating debris attached to a solid structure. Side scan imagery from overlapping lines confirm the presence of an obstruction with a long, thin shadow (Figure 19). No other obstructions were identified within the Fish Haven. It is recommended that the charted Obstn Fish Haven limits be updated to include the new obstruction and the minimum depth for the area be changed to 45 feet. Do not concur - *See H-Cell Report section D.2.2) for final charting recommendation of Fish Haven. **See Appendix II for final charting recommendation of new feature.
Figure 18. The location of the obstruction least depth shown in red in relation to the Obstn Fish Haven on RNC 11382. The survey limit line is shown in green and all depths are in feet.

Figure 19. (a) The new 45-foot obstruction displayed in CARIS HIPS Subset Editor with soundings colored by survey line; depth and distance units are in feet. (b, c) Side scan sonar imagery of the obstruction from two overlapping survey lines, contacts 111-16500001 and 117-15080001, respectively.
H12060-5: A 41-foot Wk charted at 30-12-07.18N, 87-36-16.72W was verified with object detection coverage SWMB. A least depth of 39.8 feet (12.1 meters) was developed at 30-12-07.60N, 87-36-15.80W (Figure 20). A WRECK object is included in the S-57 feature file (H12060_S57_Features.000). See AWOIS Item #7895 under Appendix II – Survey Feature Report for additional information. Data attached to this report.

Figure 20. (a) The wreck as it appears in a 50-centimeter resolution CUBE Surface colored by depth in CARIS HIPS with the designated least depths shown in red. (b) The wreck least depth position in reference to RNC 11382. All depths are in feet.

H12060-6: A new shoaling trend was observed between charted 52- and 55-foot soundings (Figure 21). Surveyed depths over the shoal ranged between 45 and 50 feet (13.7 and 15.2 meters). Two obstructions were developed on the shoal: a 46.0-foot (14.0-meters) obstruction at 30-13-03.30N, 87-24-20.13W and a 45.2-foot (13.8-meters) obstruction at 30-13-06.06N, 87-24-08.22W. The obstructions are included as OBSTRN objects in the S-57 feature file (H12060_S57_Features.000). See H-Cell Report D.2.1) for final charting recommendations.
Figure 21. H12060 soundings overlain on RNC 11382. Depths ≤ 50 feet surveyed over the new shoal are highlighted in red with the least depth soundings on the two obstructions highlighted in green. All depths are in feet.
• H12060-7: A new shoaling trend was observed in the vicinity of a charted 44-foot depth with an approximate position of 30-11-10.8N, 87-36-21.0W. Survey depths measuring 39-40 feet (11.8-12.2 meters) were developed between charted 44- and 42-foot soundings (Figure 22). **Concur**

Figure 22. H12060 soundings overlain on RNC 11382. Depths ≤ 40 feet surveyed over the shoal are highlighted in red. The survey limit line is shown in green and all depths are in feet.

• H12060-8: A new shoaling trend was observed between charted 75-, 79- and 72-foot soundings in the vicinity of 30-10-57N, 87-29-03W (Figure 23). Survey depths over the shoal ranged between 66 and 72 feet (20.1 and 21.9 meters). A large obstruction with a least depth of 66.1 feet (20.1 meters) was developed at 30-11-00.05N, 87-28-58.91W (Figure 24). The obstruction is included as an OBSTRN object in the S-57 feature file (H12060_S57_Features.000). [See H-Cell Report section D.2.1](#) for final charting recommendation.
Figure 23. H12060 soundings overlain on RNC 11382. Depths ≤ 72 feet surveyed over the shoal are highlighted in red with the least depth sounding on the obstruction highlighted in green. The survey limit line is shown in green; all depths are in feet.
A new shoal was observed extending between charted soundings of 55 and 52 feet in the vicinity of 30-12-46N, 87-28-25W. Survey depths over the shoal ranged between 43 and 50 feet (Figure 25). Four obstructions were developed over the shoal and are included in the S-57 feature file as OBSTRN objects. Their least depths and positions are listed below.

The least depth for the surrounding shoal was 43.1 feet (13.1 meters) developed at 30-12-43.15N, 87-28-15.43W on a small obstruction (Figure 26). See Appendix II for final charting recommendation.

Two triangular obstructions with least depths of 45.8 feet (14.0 meters) were developed at 30-12-42.97N, 87-28-15.43W* and 30-12-41.85N, 87-28-21.97W. *

A triangular obstruction with a least depth of 44.0 feet (13.4 meters) was developed at 30-12-53.26N, 87-28-50.52W approximately 200 feet outside the Safety Fairway.*

*See H-Cell Report section D.2.1) for final charting recommendations.
Figure 25. H12060 soundings overlain on RNC 11382. Depths ≤ 50 feet surveyed over the shoal are highlighted in red with the least depth soundings on the obstructions highlighted in green. The survey limit line is shown in green; all depths are in feet.
Figure 26. (a) The 43-foot obstruction displayed in CARIS HIPS Subset Editor with soundings colored by survey line; depth and distance units are in feet. (b, c) Side scan sonar imagery of the obstruction from two overlapping survey lines, contacts 108-19010002 and 108-22080010, respectively.

- H12060-10: As indicated under the General Chart Comparison section, a large number of objects with significant heights of 6 feet (2 meters) or greater were developed within the survey limits. The obstructions submitted as DTON are discussed in detail under Section D.1.5 and in Appendix I – DTON.* A number of the other obstructions were significantly shallower than charted soundings, but were not submitted as DTON due their depth in relation to nearby charted soundings (Figure 27) and their proximity to obstructions actually submitted at DTON. These obstructions are listed below:

  o An obstruction with a least depth of 61.7 feet (18.8 meters) was developed at 30-12-01.38N, 87-26-20.53W in the vicinity of a charted 67-foot sounding.

  * Data attached to this report.

  **See H-Cell Report D.2.1) for final charting recommendation.**
- An obstruction with a least depth of 65.9 feet (20.1 meters) was developed at 30-11-31.00N, 87-26-11.75W between charted soundings of 78 and 70 feet. 

*See H-Cell Report section D.2.1) for final charting recommendation.*

- An obstruction with a least depth of 70.1 feet (21.4 meters) was developed at 30-11-25.42N, 87-25-39.62W off-shore of a charted 78-foot sounding. *Determined insignificant during office processing. Shoaler depths in vicinity. Do not chart.*

- An obstruction with a least depth of 49.4 feet (15.1 meters) was developed at 30-12-11.57N, 87-28-09.06W in the vicinity of a charted 60-foot depth curve and a 52-foot sounding. 

*See H-Cell Report section D.2.1) for final charting recommendation.*

- An obstruction with a least depth of 56.7 feet (17.3 meters) was developed at 30-11-10.51N, 87-28-15.42W in between charted soundings of 60 and 67 feet. 

*See H-Cell Report section D.2.1) for final charting recommendation.*

- At the western end of the survey area, an obstruction with a least depth of 37.8 feet (11.5 meters) was developed at 30-10-58.78N, 87-36-33.04W in the vicinity of a charted 44-foot sounding. 

*See Appendix II for final charting recommendation.*

---

**Figure 27.** Obstruction least depths are shown in red overlain on RNC 11382. All depths are in feet.

**Chart 1115A (Soundings in fathoms)**
• H12060-11: In general surveyed depths agreed with the charted 10-fathom depth curve within 1 fathom (1.8 meters). *Concur*

D.1.3 Controlling and Tabulated Depths

Not applicable for this survey.

D.1.4 AWOIS Items  *See Appendix II for final charting recommendations.*

There were four (4) AWOIS item investigations assigned within the survey area (Table 8). All AWOIS items were investigated employing either 200% SSS along with 100% multibeam coverage or with object detection multibeam coverage exclusively.

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</table>

See Appendix II – Survey Feature Report, for complete reporting on AWOIS Item investigation. *Concur – Data attached to this report.*

D.1.5 Dangers to Navigation (DTON)

One DTON report was generated for four (4) features. A summary is presented in Table 9 and a copy of the report is included in Appendix I. *See Appendix I for final charting recommendations.*

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</table>
### Item # | Feature | Depth Feet | Depth Meters | Latitude (N) | Longitude (W) | Description
--- | --- | --- | --- | --- | --- | ---
3 | Obstruction | 56.9 | 17.4 | 30-11-33.39 | 87-25-12.93 | Obstruction in Fairway Southwest of Pensacola Bay
4 | Obstruction | 56.8 | 17.3 | 30-11-47.05 | 87-27-24.43 | Obstruction in Fairway Southwest of Pensacola Bay

#### D.2 Additional Results

**D.2.1 Shoreline Verification**

Shoreline verification was not required for this survey.

**D.2.2 Comparison with Prior Surveys**

A comparison with prior surveys was not required for this survey.

**D.2.3 Aids to Navigation (ATON)**

There were no Aids to Navigation within the survey area.

**D.2.4 Restricted Data**

Not applicable for this survey.

**D.2.5 Other Data**

**D.2.5.1 Bottom Characteristics** *See H-Cell Report section D.2.3) for additional information.*

Twelve (12) bottom samples were acquired to determine bottom characteristics. Bottom samples were spaced at approximately 2000-meter intervals in accordance with the SOW. A table listing the positions and descriptions of the bottom samples is included in Appendix V. A position and description of each sample are provided as attributed SBDARE objects in the S-57 feature file. Digital images with identification reference numbers are submitted with the survey data and referenced in the S-57 PICREP attribute.

**D.2.6 S-57 Feature File**

**D.2.6.1 S-57 Chart Features File**

Many uncharted obstructions were identified and delineated in the SSS data, SWMB data, and BASE surfaces. An S-57 feature file (H12060_S-57_Features.000/.hob) was created to emphasize navigationally significant objects discovered during the survey, update charted
objects and to provide information for these objects that could not be portrayed in the BASE surfaces. All S-57 features were attributed in accordance with guidance provided in the SOW and HSSD. Table 10 describes the attribute mapping for the S-57 feature file.

Table 10
S-57 Chart Features Attribute Mapping

<table>
<thead>
<tr>
<th>S-57 Attribute</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>VALSOU</td>
<td>Corrected least depth</td>
</tr>
<tr>
<td>TECSOU</td>
<td>Technique used to develop VALSOU</td>
</tr>
<tr>
<td>INFORM</td>
<td>Unique Critical Sounding ID</td>
</tr>
<tr>
<td>SORDAT</td>
<td>Survey Date</td>
</tr>
<tr>
<td>SORIND</td>
<td>Survey reference – registry ID</td>
</tr>
<tr>
<td>PICREP</td>
<td>Contact image file name</td>
</tr>
<tr>
<td>userid*</td>
<td>Unique Contact ID</td>
</tr>
<tr>
<td>remrks*</td>
<td>Acquisition or processing remarks</td>
</tr>
<tr>
<td>recomd*</td>
<td>Charting recommendations</td>
</tr>
</tbody>
</table>

*These attributes are available in the CARIS Notebook HOB file format.

D.2.6.2 S-57 Contact File

All contacts are submitted in an S-57 attributed Notebook HOB file of SCSYMB objects. Table 11 describes the attribute mapping for the S-57 contact file.

Table 11
S-57 Contact Attribute Mapping

<table>
<thead>
<tr>
<th>S-57 Attribute</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>INFORM</td>
<td>Corrected least depth (m)</td>
</tr>
<tr>
<td>SORDAT</td>
<td>Survey Date</td>
</tr>
<tr>
<td>SORIND</td>
<td>Survey reference – registry ID</td>
</tr>
<tr>
<td>PICREP</td>
<td>Contact image file name</td>
</tr>
<tr>
<td>TXTDSC</td>
<td>Unique Critical Sounding ID (Line-beam-ping)</td>
</tr>
<tr>
<td>userid*</td>
<td>Unique Contact ID (Line-ping-offset)</td>
</tr>
<tr>
<td>remrks*</td>
<td>Acquisition or processing remarks</td>
</tr>
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<td>recomd*</td>
<td>Charting recommendations</td>
</tr>
</tbody>
</table>

*These attributes are available in the CARIS Notebook HOB file format.
D.2.6.3 S-57 Critical Sounding File

All critical soundings are submitted in an S-57 attributed Notebook HOB file of $CSYMB objects. Table 12 describes the attribute mapping for the S-57 critical soundings file.

### Table 12
**S-57 Critical Soundings Attribute Mapping**

<table>
<thead>
<tr>
<th>S-57 Attribute</th>
<th>Value</th>
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</thead>
<tbody>
<tr>
<td>INFORM</td>
<td>Corrected least depth (m)</td>
</tr>
<tr>
<td>SORDAT</td>
<td>Survey Date</td>
</tr>
<tr>
<td>SORIND</td>
<td>Survey reference – registry ID</td>
</tr>
<tr>
<td>PICREP</td>
<td>Contact or feature image file name</td>
</tr>
<tr>
<td>TXTDSC</td>
<td>Unique Contact ID (Line-ping-offset)</td>
</tr>
<tr>
<td>userid*</td>
<td>Unique Critical Sounding ID (Line-beam-ping)</td>
</tr>
<tr>
<td>remrks*</td>
<td>Acquisition or processing remarks</td>
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<tr>
<td>recomd*</td>
<td>Charting recommendations</td>
</tr>
</tbody>
</table>

*These attributes are available in the CARIS Notebook HOB file format.*
E. APPROVAL SHEET

LETTER OF APPROVAL
REGISTRY NO. H12060

This report and the accompanying data are respectfully submitted.

Field operations contributing to the accomplishment of Survey H12060 were conducted under my direct supervision with frequent personal checks of progress and adequacy. This report and associated data have been closely reviewed and are considered complete and adequate as per the Statement of Work.

George G. Reynolds
Ocean Surveys, Inc.
Chief of Party – H12060
August 24, 2010

Project-wide reports, the Data Acquisition and Processing Report (DAPR) and the Horizontal and Vertical Control Report (HVCR), were submitted with contemporary survey H12061 on August 24, 2010. They are named as follows:

<table>
<thead>
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<th>Report Name</th>
<th>Date of Report</th>
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</thead>
<tbody>
<tr>
<td>OPR-J364-KR-09_DAPR.pdf</td>
<td>August 18, 2010</td>
</tr>
<tr>
<td>OPR-J364-KR-09_HVCR.pdf</td>
<td>August 18, 2010</td>
</tr>
</tbody>
</table>
APPENDIX I

DANGERS TO NAVIGATION
H12060 APPENDIX I DTONs

Registry Number: H12060
State: Florida
Locality: Gulf of Mexico
Sub-locality: 16 NM SW of Pensacola Bay Entrance
Project Number: J364-KR-09-A
Survey Dates: 04/07/2010 - 04/19/2010

Charts Affected

<table>
<thead>
<tr>
<th>Number</th>
<th>Edition</th>
<th>Date</th>
<th>Scale (RNC)</th>
<th>RNC Correction(s)*</th>
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<tbody>
<tr>
<td>11382</td>
<td>41st</td>
<td>05/01/2010</td>
<td>1:80,000 (11382_1)</td>
<td>USCG LNM: 3/29/2011 (7/19/2011) NGA NTM: 11/19/2005 (7/30/2011)</td>
</tr>
<tr>
<td>1115A</td>
<td>43rd</td>
<td>11/01/2008</td>
<td>1:456,394 (1115A_1)</td>
<td>[L]NTM: ?</td>
</tr>
<tr>
<td>11360</td>
<td>43rd</td>
<td>11/01/2008</td>
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<td>11006</td>
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* Correction(s) - source: last correction applied (last correction reviewed--“cleared date”)

Features

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<th>No.</th>
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<th>Survey Depth</th>
<th>Survey Latitude</th>
<th>Survey Longitude</th>
<th>AWOIS Item</th>
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<tbody>
<tr>
<td>1.1</td>
<td>57 ft SOUNDG</td>
<td>Shoal</td>
<td>17.35 m</td>
<td>30° 11’ 33.4” N</td>
<td>087° 25’ 12.9” W</td>
<td>---</td>
</tr>
<tr>
<td>1.2</td>
<td>56 ft SOUNDG</td>
<td>Obstruction</td>
<td>17.25 m</td>
<td>30° 11’ 47.1” N</td>
<td>087° 27’ 24.4” W</td>
<td>---</td>
</tr>
<tr>
<td>1.3</td>
<td>41 ft Obstn</td>
<td>Obstruction</td>
<td>12.65 m</td>
<td>30° 12’ 39.9” N</td>
<td>087° 26’ 15.3” W</td>
<td>---</td>
</tr>
<tr>
<td>1.4</td>
<td>45 ft SOUNDG</td>
<td>Shoal</td>
<td>13.81 m</td>
<td>30° 12’ 45.8” N</td>
<td>087° 25’ 25.1” W</td>
<td>---</td>
</tr>
</tbody>
</table>

Generated by Pydro v11.8 (r3585) on Wed Sep 14 17:10:39 2011 [UTC]
1 - DTON
1.1) 57 ft SOUNDG

DANGER TO NAVIGATION

Survey Summary

Survey Position: 30° 11’ 33.4” N, 087° 25’ 12.9” W
Least Depth: 17.35 m (= 56.93 ft = 9 fm 2.93 ft)
TPU (±1.96σ): THU (TPEh) ±3.925 m ; TVU (TPEv) ±0.474 m
Timestamp: 2010-097.05:17:36.637 (04/07/2010)
Profile/Beam: 7054/149
Charts Affected: 11382_1, 1115A_1, 11360_1, 11006_1, 411_1

Remarks:
Obstruction surveyed within safety fairway.

Feature Correlation

<table>
<thead>
<tr>
<th>Address</th>
<th>Feature</th>
<th>Range</th>
<th>Azimuth</th>
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<td>Secondary (grouped)</td>
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</table>

Hydrographer Recommendations

Chart 57 obstruction in present survey location.

Cartographically-Rounded Depth (Affected Charts):
57ft (11382_1)
9 ½fm (1115A_1, 11360_1, 11006_1, 411_1)

S-57 Data

Geo object 1: Sounding (SOUNDG)
Attributes: TECSOU - 3:found by multi-beam
Office Notes

Do not concur - The feature was submitted as a DToN and is currently charted on 11382; 41st. Ed., May/2010 and smaller scale charts as a dangerous obstruction, least depth 57 feet. The feature is in the vicinity of shoaler items, and should not be charted. Delete charted 57 ft Obstn and danger curve. Chart a 57 ft sounding at the present survey position.
1.2) 56 ft SOUNDG

DANGER TO NAVIGATION

Survey Summary

Survey Position: 30° 11' 47.1" N, 087° 27' 24.4" W
Least Depth: 17.25 m (= 56.58 ft = 9 fm = 9 fm 2.58 ft)
TPU (±1.96σ): THU (TPEh) ±3.925 m; TVU (TPEv) ±0.482 m
Timestamp: 2010-097.11:59:06.443 (04/07/2010)
Profile/Beam: 15135/121
Charts Affected: 11382_1, 1115A_1, 11360_1, 11006_1, 411_1

Remarks:
Obstruction found in safety fairway.

Feature Correlation

<table>
<thead>
<tr>
<th>Address</th>
<th>Feature</th>
<th>Range</th>
<th>Azimuth</th>
<th>Status</th>
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<td>h12060/ferrel_sss_0_cti_200/2010-097/097-113135-228</td>
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</table>

Hydrographer Recommendations

Chart 56 obstruction in present survey location.

Cartographically-Rounded Depth (Affected Charts):
56 ft (11382_1)
9 ¼ fm (1115A_1, 11360_1, 11006_1, 411_1)

S-57 Data

Geo object 1: Obstruction (OBSTRN)
Attributes: QUASOU - 6:least depth known
TECSOU - 3:found by multi-beam
VALSOU - 17.247 m
WATLEV - 3:always under water/submerged

Office Notes

Do not concur - The feature was submitted as a DToN and is currently charted on 11382; 41st. Ed., May/2010 and smaller scale charts as a dangerous obstruction, least depth 57 feet. Office processing determined that the least depth is shoaler by one foot. The feature is in the vicinity of shoaler items, and should not be charted. Delete charted 57 ft Obstn and danger curve. Chart a 56 ft sounding at the present survey position.
1.3) 41 ft Obstn

**DANGER TO NAVIGATION**

**Survey Summary**

Survey Position: 30° 12' 39.9" N, 087° 26' 15.3" W  
Least Depth: 12.65 m (= 41.49 ft = 6 fm 5.49 ft)  
TPU (±1.96): THU (TPEh) ±3.924 m; TVU (TPEv) ±0.465 m  
Profile/Beam: 17387/331  
Charts Affected: 11382_1, 1115A_1, 11360_1, 11006_1, 411_1  
Remarks: obstruction surveyed in the safety fairway

**Feature Correlation**

<table>
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<tr>
<th>Address</th>
<th>Feature</th>
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<th>Azimuth</th>
<th>Status</th>
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</thead>
<tbody>
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<tr>
<td>h12060/ferrel_sss_0_cti_100/2010-109/109-221205-219</td>
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<td>166.22</td>
<td>289.5</td>
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<tr>
<td>h12060/ferrel_sss_0_cti_100/2010-109/109-211636-217</td>
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</tr>
</tbody>
</table>

**Hydrographer Recommendations**

Chart 41 obstruction in present survey location  

**Cartographically-Rounded Depth (Affected Charts):**  
41ft (11382_1)  
6 ¾fm (1115A_1, 11360_1, 11006_1, 411_1)
S-57 Data

Geo object 1: Obstruction (OBSTRN)

Attributes:
- QUASOU - 6: least depth known
- TECSOU - 3: found by multi-beam
- VALSOU - 12.646 m
- WATLEV - 3: always under water/submerged

Office Notes

Concur with clarification. Shown on chart 11382; 41st. Ed., May/2010 as a dangerous obstruction, least depth 41 feet. Currently uncharted on ENC US4FL71M. Retain as charted on raster charts and add to ENC at present survey position.
Feature Images

Figure 1.3.1
1.4) 45 ft SOUNDG

DANGER TO NAVIGATION

Survey Summary

Survey Position: 30° 12' 45.8" N, 087° 25' 25.1" W
Least Depth: 13.81 m (= 45.29 ft = 7 fm 3.29 ft)
TPU (±1.96σ): THU (TPEh) ±3.924 m ; TVU (TPEv) ±0.465 m
Timestamp: 2010-109.20:03:02.541 (04/19/2010)
Profile/Beam: 29178/183
Charts Affected: 11382_1, 1115A_1, 11360_1, 11006_1, 411_1

Remarks:
Obstruction with a height off the bottom of 6 feet.

Feature Correlation

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<tr>
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<th>Feature</th>
<th>Range</th>
<th>Azimuth</th>
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<tbody>
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</tr>
</tbody>
</table>
Hydrographer Recommendations

Chart 45 obstruction in present survey depth.

Cartographically-Rounded Depth (Affected Charts):
45ft (11382_1)
7 ½fm (1115A_1, 11360_1, 11006_1, 411_1)

S-57 Data

Geo object 1: Sounding (SOUNDG)
Attributes: TECSOU - 3:found by multi-beam

Office Notes

Do not concur - The feature was submitted as a DToN and is currently charted on 11382; 41st. Ed., May/2010 and smaller scale charts as a dangerous obstruction, least depth 45 feet. The feature is in the vicinity of shoaler items, and should not be charted. Delete charted 45 ft Obstn and danger curve. Chart a 45 ft sounding at the present survey position.
APPENDIX II

SURVEY FEATURES REPORT
H12060 APPENDIX II AWOIS

Registry Number: H12060
State: Florida
Locality: Golf of Mexico
Sub-locality: 16 NM SW of Pensacola Bay Entrance
Project Number: J364-KR-09-A
Survey Dates: 02/19/2010 - 07/20/2011

Charts Affected

<table>
<thead>
<tr>
<th>Number</th>
<th>Edition</th>
<th>Date</th>
<th>Scale (RNC)</th>
<th>RNC Correction(s)*</th>
</tr>
</thead>
<tbody>
<tr>
<td>11382</td>
<td>41st</td>
<td>05/01/2010</td>
<td>1:80,000 (11382_1)</td>
<td>USCG LNM: 3/29/2011 (7/19/2011)</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>NGA NTM: 11/19/2005 (7/30/2011)</td>
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<tr>
<td>1115A</td>
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<td>11/01/2008</td>
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* Correction(s) - source: last correction applied (last correction reviewed--"cleared date")

Features

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<th>Survey Longitude</th>
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1 - AWOIS
1.1) AWOIS #7895 - 40 ft Wk

Survey Summary

Survey Position: 30° 12' 07.6" N, 087° 36' 15.8" W
Least Depth: 12.14 m (= 39.84 ft = 6.64 fm = 6 fm 3.84 ft)
TPU (±1.96σ): THU (TPEh) ±3.922 m ; TVU (TPEv) ±0.480 m
Timestamp: 2010-050.16:32:41.528 (02/19/2010)
Survey Line: h12060 / ableii_7101_511 / 2010-050 / 2010ab0501631_1202
Profile/Beam: 957/79
Charts Affected: 11382_1, 1115A_1, 11360_1, 11006_1, 411_1

Remarks:
A 41-foot Wk charted at 30-12-07.18N, 87-36-16.72W was verified with object detection coverage SWMB. A least depth of 39.8 feet (12.1 meters) was developed

Feature Correlation

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Hydrographer Recommendations

Chart 40 ft wreck in present survey location.

Cartographically-Rounded Depth (Affected Charts):
40ft (11382_1)
6 ½fm (1115A_1, 11360_1, 11006_1, 411_1)

S-57 Data

Geo object 1: Wreck (WRECKS)
Attributes: CATWRK - 2:dangerous wreck
            QUASOU - 6:least depth known
            TECSOU - 3:found by multi-beam
            VALSOU - 12.143 m
WATLEV - 3: always under water/submerged

**Office Notes**

Concur with clarification - Delete 41 Wk and danger curve. Add 40 ft Wk and danger curve in present survey position.
1.2) AWOIS #14306 - 40 ft Obstrn

Survey Summary

Survey Position: 30° 09' 01.3" N, 087° 37' 22.8" W
Least Depth: 12.24 m (= 40.16 ft = 6.694 fm = 6 fm 4.16 ft)
TPU (±1.96σ): THU (TPEh) ±3.922 m ; TVU (TPEv) ±0.464 m
Timestamp: 2010-050.18:31:11.660 (02/19/2010)
Survey Line: h12060 / ableii_7101_511 / 2010-050 / 2010ab0501830_1194
Profile/Beam: 361/197
Charts Affected: 11376_1, 11382_1, 1115A_1, 11360_1, 11006_1, 411_1

Remarks:
AWOIS Item #14306, a charted 38-foot Obstrn (RNC 11382), was verified. The search area defined by a 100-meter radius was investigated with object detection SWMB coverage.

Feature Correlation

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Hydrographer Recommendations

It is recommended that the charted obstruction be updated with the new least depth.

Cartographically-Rounded Depth (Affected Charts):
40ft (11376_1, 11382_1)
6 ¾fm (1115A_1, 11360_1, 11006_1, 411_1)

S-57 Data

Geo object 1: Obstruction (OBSTRN)
Attributes: QUASOU - 6:least depth known
TECSOU - 3:found by multi-beam
VALSOU - 12.242 m
WATLEV - 3:always under water/submerged
Office Notes

Concur with clarification - Delete 38 Obstn and danger curve. Add 40 ft Obstn and danger curve in present survey position.
**1.3) AWOIS #7879**

**Survey Summary**

**Survey Position:** 30° 11' 21.3" N, 087° 27' 22.2" W  
**Least Depth:** 21.95 m (= 72.01 ft = 12.002 fm = 12 fm 0.01 ft)  
**TPU (±1.96σ):** THU (TPEh) [None] ; TVU (TPEv) [None]  
**Timestamp:** 2011-201.16:37:27 (07/20/2011)  
**GP Dataset:** ChartGPs - Digitized  
**GP No.:** 1  
**Charts Affected:** 11382_1, 1115A_1, 11360_1, 11006_1, 411_1

**Remarks:**
AWOIS History: LNM24/86--OBSTRUCTION LOCATED IN LAT 30-11-21.27N, LONG 87-27-22.25W. PRELIMINARY FIELD DATA. 
FE288/86--OPR-J217-HFP-84; OBSTRUCTION LOCATED IN LAT. 30-11-21.27N LONG. 87-27-22.25W. ECHO SOUNDER DEPTH OF 72.0 FEET. EVALUATOR DOES NOT CONSIDER THIS OBSTRUCTION TO BE THE ITEM SOUGHT (PROPANE TANKS IN LAT. 30-11-16.70N, LONG. 87-27-22.50W AS REPORTED BY FRED GIVENS, PLEASURE ISLAND DIVE CENTER. HE HAS DOVE ON THESE TANKS SET ON A REEF KNOWN LOCALLY AS "DUTCH BANKS" WITH A DEPTH OF 78 FEET. LORAN-C RATES, 7980 CHAIN: W=13118.2, Y=47076.7) EVALUATOR RECOMMENDS CHARTING NON-DANGEROUS SUBMERGED OBSTRUCTIONS, PA AS SURVEYED AND CONSIDERS THE PROPANE TANKS UNVERIFIED. (ENT. 11/13/90, SJV) 
FE361SS/91-- OPR-J452-HE; SIDE SCAN SONAR SEARCH NEGATIVE. EVALUATOR RECOMMENDS DELETING FROM CHART. (UP 3/22/93, SJV)

AWOIS Item #7879 - The search area defined by a 200-meter radius was covered with 200% SSS and 100% SWMB. No obstructions resembling propane tanks were found by the side scan or multibeam sonar systems in the vicinity of the reef referred to as “Dutch Banks.”

**Feature Correlation**

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**Hydrographer Recommendations**

AWOIS Item #7879, charted as “Obstns PA 72ft rep 1986,” was disproved (RNC 11382)

**Cartographically-Rounded Depth (Affected Charts):**
72ft (11382_1)  
12fm (1115A_1, 11360_1, 11006_1, 411_1)
S-57 Data

Geo object 1: Obstruction (OBSTRN)
Attributes: TECSOU - 3:found by multi-beam
VALSOU - 21.95 m

Office Notes

Concur - Delete charted Obstns PA, 72 ft rep 1986.
Feature Images

Obstns PA
72ft rep 1986

67

Figure 1.3.1
1.4) AWOIS #13383

Survey Summary

Survey Position: 30° 09' 54.0" N, 087° 34' 42.0" W  
Least Depth: 14.33 m (= 47.01 ft = 7.836 fm = 7 fm 5.01 ft)  
TPU (±1.96σ): THU (TPEh) [None] ; TVU (TPEv) [None]  
GP Dataset: ChartGPs - Digitized  
GP No.: 2  
Charts Affected: 11382_1, 1115A_1, 11360_1, 11006_1, 411_1

Remarks:
AWOIS History: LNM 41/05, CGD08 -- A 52-foot by 16-foot submerged obstruction has been reported in a safety fairway in the Gulf of Mexico in approximate position 30-09-54.0N 087-34-42.0W. The obstruction is reported to be covered by approximately 47 feet of water and is not marked. Mariners are urged to use extreme caution in this area. UPDATED 10/18/2005 JCM.

AWOIS Item #13383 - The search area defined by a 200-meter radius was investigated with object detection SWMB coverage and partial SSS coverage. No evidence of an obstruction matching the reported specifications was found in the side scan or multibeam data.

Feature Correlation

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Hydrographer Recommendations

AWOIS Item #13383 was disproved.

Cartographically-Rounded Depth (Affected Charts):
47ft (11382_1)
7¾fm (1115A_1, 11360_1, 11006_1, 411_1)

S-57 Data

[None]
Office Notes

Concur - No item shown on chart 11382, 41st. Edition, May/10. No change in charting is recommended.
H12060 APPENDIX II CHARTED

Registry Number: H12060
State: Florida
Locality: Gulf of Mexico
Sub-locality: 16 NM SW of Pensacola Bay Entrance
Project Number: J364-KR-09-A
Survey Dates: 04/08/2010 - 04/09/2010

Charts Affected

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

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<tr>
<td>1.2</td>
<td>44 ft Obstn</td>
<td>Obstruction</td>
<td>12.96 m</td>
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<td>087° 23’ 31.1&quot; W</td>
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</table>
1 - CHARTED
1.1) 46 ft Obstn

Survey Summary

Survey Position: 30° 13' 25.2" N, 087° 23' 37.5" W
Least Depth: 13.80 m (= 45.27 ft = 7 fm 3.27 ft)
TPU (±1.96σ): THU (TPEh) ±3.924 m  ; TVU (TPEv) ±0.471 m
Profile/Beam: 40121/382
Charts Affected: 11382_1, 1115A_1, 11360_1, 11006_1, 411_1

Remarks:
DTON from survey H12061.

Feature Correlation

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Hydrographer Recommendations

Chart 45 obstruction and danger curve.

Cartographically-Rounded Depth (Affected Charts):
45ft (11382_1)
7 ½fm (1115A_1, 11360_1, 11006_1, 411_1)

S-57 Data

Geo object 1: Obstruction (OBSTRN)
Attributes: QUASOU - 6:least depth known
Office Notes

Concur with clarification. Feature is DToN from contemporary junction survey H12061 within the overlap region with H12060. Shown on chart 11382; 41st. Ed., May/2010 and smaller scale charts as a dangerous obstruction, least depth 46 feet. Office processing determined that the least depth obtained during H12060 is shoaler than the initial DToN submission to MCD. Delete charted dangerous obstruction, least depth 46 feet. Chart a dangerous obstruction, least depth 45 feet at the present survey position.
Feature Images

Figure 1.1.1
1.2) 44 ft Obstn

Survey Summary

Survey Position: 30° 13' 02.4" N, 087° 23' 31.1" W
Least Depth: 12.96 m (= 42.53 ft = 7.089 fm = 7 fm 0.53 ft)
TPU (±1.96σ): THU (TPEh) ±3.925 m ; TVU (TPEv) ±0.491 m
Profile/Beam: 1337/487
Charts Affected: 11382_1, 1115A_1, 11360_1, 11006_1, 411_1

Remarks:
DTON from survey H12061.

Feature Correlation

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Hydrographer Recommendations

Chart 42 obstruction in present survey location.

Cartographically-Rounded Depth (Affected Charts):
42ft (11382_1)
7fm (1115A_1, 11360_1, 11006_1, 411_1)

S-57 Data

Geo object 1: Obstruction (OBSTRN)
Attributes: QUASOU - 6:least depth known
TECSOU - 3:found by multi-beam
VALSOU - 12.964 m
WATLEV - 3:always under water/submerged
Office Notes

Concur with clarification. Feature is DToN from contemporary junction survey H12061 within the overlap region with H12060. Shown on chart 11382; 41st. Ed., May/2010 and smaller scale charts as a dangerous obstruction, least depth 44 feet. Office processing determined that the least depth obtained during H12060 is shoaler by two feet than the initial DToN submission to MCD. Delete charted dangerous obstruction, least depth 44 feet. Chart a dangerous obstruction, least depth 42 feet at the present survey position.
Feature Images

Figure 1.2.1
Registry Number: H12060
State: Florida
Locality: Golf of Mexico
Sub-locality: 16 NM SW of Pensacola Bay Entrance
Project Number: J364-KR-09-A
Survey Dates: 04/28/2010 - 05/08/2010

Charts Affected

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

Features

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1.1) 38 ft Obstn

Survey Summary

Survey Position: 30° 10' 58.8" N, 087° 36' 33.0" W
Least Depth: 11.52 m (= 37.80 ft = 6.300 fm = 6 fm 1.80 ft)
TPU (±1.96σ): THU (TPEh) ±3.923 m ; TVU (TPEv) ±0.466 m
Profile/Beam: 40759/377
Charts Affected: 11382_1, 1115A_1, 11360_1, 11006_1, 411_1

Remarks:
An obstruction with a least depth of 37.8 feet (11.5 meters) was developed.

Feature Correlation

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<th>Feature</th>
<th>Range</th>
<th>Azimuth</th>
<th>Status</th>
</tr>
</thead>
<tbody>
<tr>
<td>h12060/ferrel_7101_511_ed/2010-118/2010fe1182115_121</td>
<td>40759/377</td>
<td>0.00</td>
<td>000.0</td>
<td>Primary</td>
</tr>
<tr>
<td>Working/HOB's/updated/H12060_S57_Features.000</td>
<td>1C1C0000BEA80001</td>
<td>0.13</td>
<td>180.0</td>
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</tr>
<tr>
<td>h12060/ferrel_sss_0_cti_100/2010-118/118-211509-121</td>
<td>0001</td>
<td>2.50</td>
<td>349.2</td>
<td>Secondary (grouped)</td>
</tr>
<tr>
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<td>3.07</td>
<td>287.7</td>
<td>Secondary (grouped)</td>
</tr>
</tbody>
</table>

Hydrographer Recommendations

Chart 38 obstruction in present survey location.

Cartographically-Rounded Depth (Affected Charts):
38ft (11382_1)
6 ¼fm (1115A_1, 11360_1, 11006_1, 411_1)

S-57 Data

Geo object 1: Obstruction (OBSTRN)
Attributes: QUASOU - 6:least depth known
TECSOU - 3:found by multi-beam
VALSOU - 11.521 m
WATLEV - 3:always under water/submerged
Office Notes

Concur - Add 38 ft Obstr and danger curve in present survey position.
Feature Images

Figure 1.1.1
1.2) 43 ft Obstn

Survey Summary

Survey Position: 30° 13' 03.9" N, 087° 25' 27.8" W
Least Depth: 13.31 m (= 43.66 ft = 7.276 fm = 7 fm 1.66 ft)
TPU (±1.96σ): THU (TPEh) ±3.922 m ; TVU (TPEv) ±0.466 m
Profile/Beam: 485/397
Charts Affected: 11382_1, 1115A_1, 11360_1, 11006_1, 411_1

Remarks:
This feature was included in the feature file 000 but was not discussed in the Descriptive Report or Appendix II.

Feature Correlation

<table>
<thead>
<tr>
<th>Address</th>
<th>Feature</th>
<th>Range</th>
<th>Azimuth</th>
<th>Status</th>
</tr>
</thead>
<tbody>
<tr>
<td>h12060/ferrel_7101_511_ed/2010-128/2010fe1281405_908</td>
<td>485/397</td>
<td>0.00</td>
<td>000.0</td>
<td>Primary</td>
</tr>
<tr>
<td>h12060/ferrel_sss_0_citi_200/2010-108/108-195445-610</td>
<td>0003</td>
<td>1.63</td>
<td>121.4</td>
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<tr>
<td>h12060/ferrel_sss_0_citi_100/2010-108/108-230430-611</td>
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<td>4.21</td>
<td>018.7</td>
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</tr>
</tbody>
</table>

Hydrographer Recommendations

[None]

Cartographically-Rounded Depth (Affected Charts):
43ft (11382_1)
7 ¼fm (1115A_1, 11360_1, 11006_1, 411_1)

S-57 Data

Geo object 1: Obstruction (OBSTRN)
Attributes: QUASOU - 6:least depth known
            TECSOU - 3:found by multi-beam
            VALSOU - 13.307 m
WATLEV - 3: always under water/submerged

Office Notes

Add 43 ft Obstn and danger curve in present survey position.
1.3) 45 ft Obstn

Survey Summary

Survey Position: 30° 10' 46.7" N, 087° 31' 03.1" W
Least Depth: 13.66 m (= 44.83 ft = 7.472 fm = 7 fm 2.83 ft)
TPU (±1.96σ): THU (TPEh) ±3.922 m ; TVU (TPEv) ±0.468 m
Profile/Beam: 303/434
Charts Affected: 11382_1, 1115A_1, 11360_1, 11006_1, 411_1

Remarks:
An obstruction with a least depth of 44.8 feet (13.7 meters) with an approximate height of 19 feet (5.8 meters) off the bottom was developed.

Feature Correlation

<table>
<thead>
<tr>
<th>Address</th>
<th>Feature</th>
<th>Range</th>
<th>Azimuth</th>
<th>Status</th>
</tr>
</thead>
<tbody>
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<td>000.0</td>
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<td>h12060/ferrel_sss_0_cti_200/2010-113/113-083558-148</td>
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<td>131.26</td>
<td>226.9</td>
<td>Secondary (grouped)</td>
</tr>
</tbody>
</table>

Hydrographer Recommendations

Chart 45 Obstruction in present survey location.

Cartographically-Rounded Depth (Affected Charts):
45ft (11382_1)
7 ½fm (1115A_1, 11360_1, 11006_1, 411_1)

S-57 Data

Geo object 1: Obstruction (OBSTRN)
Attributes: QUASOU - 6:least depth known
            TECSOU - 3:found by multi-beam
            VALSOU - 13.665 m
WATLEV - 3: always under water/submerged

Office Notes

Concur - Add 45 ft Obstn and danger curve in present survey position.
APPENDIX III

FINAL PROGRESS SKETCH
Final Survey Outline.
Appendix IV

Tides and Water Levels
Abstract of Times of Hydrography

The following table, “Abstract of Times of Hydrography,” summarizes the days in which data were collected that contribute to the final accepted data set.

<table>
<thead>
<tr>
<th>Date</th>
<th>Day Number</th>
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<th>Max. Time UTC</th>
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<td>15:04:23</td>
<td>21:20:06</td>
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<tr>
<td>02/19/10</td>
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<td>97</td>
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<td>00:49:53</td>
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<tr>
<td>05/06/10</td>
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<td>00:30:40</td>
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<tr>
<td>05/08/10</td>
<td>128</td>
<td>13:38:08</td>
<td>23:49:49</td>
</tr>
</tbody>
</table>

The COTR was notified via e-mail and telephone communications that the OSI field team was ready to commence survey operations. The COTR subsequently instructed CO-OPS to begin providing OSI with verified tides. Email correspondence concerning the tide gauge follows.
Hi Kathleen,

The Pensacola gauge is reporting intermittent data gaps. A large gap occurs between 0542 GMT on 2/17/10 and 1324 GMT on 2/17/10.

Regards

George
Verified tides are available through 2/15/10 (DN 046).

DAUPHIN ISLAND

NOAA/NOS/CO-OPS
Preliminary Water Level (Alt) vs. Predicted Plot
8735180 Dauphin Island, AL
from 2010/02/17 - 2010/02/18

Preliminary tides are available through today (DN049).

NOAA/NOS/CO-OPS
Verified Water Level vs. Predicted Plot
8735180 Dauphin Island, AL
from 2010/02/15 - 2010/02/16

Verified tides are available through 2/15/10 (DN 046).

From:   George Reynolds
To:   kathleen Jamison
Subject:  Pensacola Tide Gauge Inoperable 4/5/10
Date:   Tuesday, April 06, 2010 11:45 AM

Hi Kathleen,

The Pensacola tide gauge has not reported preliminary water level data over the past 24 hours.

Regards
George
George,

I've passed this on to CO-OPS. In today's CORMS morning report, they noted that several stations have had similar outages, so this may simply be a satellite communications issue. I'll let you know what I hear back.

Ben

George Reynolds wrote:

Hi Ben,

I understand that Kathleen is out of the office this week. Please pass this information on to Co-Ops when you can.

Thanks
George
Hi Kathleen,

The Pensacola tide gauge has not reported preliminary water level data over the past 24 hours.

Regards
George

http://tidesandcurrents.noaa.gov/cgi-bin-mp/data_plot.cgi?mins=&datum=6&unit=0&stn=8729840&bdate=20100405&edate=20100406&data_type=wl&relative=&type=Tide%20Data&shift=g&plot_size=large&relative=&wl_sensor_hist=W1&plot_backup=" >

LCDR Ben Evans, NOAA
Chief, Data Acquisition and Control Branch (N/CS35) NOAA Office of Coast Survey
SSMC3, Station 6815
1315 East West Highway
Silver Spring, MD 20910
voice: (301) 713-2700 x111
fax: (301) 713-4533
cell: (240) 687-4602

From: ggr@oceansurveys.com [mailto:ggr@oceansurveys.com]  
Sent: Thursday, April 08, 2010 12:26 PM  
To: Bob Wallace; Michael J. Engels  
Subject: Fw: PENSACOLA GOES TRANSMISSION ISSUES - update for 4/8

Brett's quick detective work by phone yesterday seems to have resolved the problems at Pensacola - thanks a bunch, Brett! Let's see if all goes well today. Back data was loaded yesterday and is available on the preliminary data web page.

No need for an emergency repair trip at this time, Brad and Marty.

George, you should be good to go with the surveying.
Tom

Brett Gregory wrote:
Hello,

After checking the Satlink parameters I found that the Plat. ID was missing completely (see attached screen capture). I have also attached a screen of the time stamp on the setup file (12/22/2009 18:43:24).

Battery voltage was appended to the message as well (screen capture). Transmit time was off by one second (00:02:31) should be 00:2:30. I changed these settings and attached screens of the corrections, GOES transmissions should now resume.

Thanks,

Brett Gregory
Data is being ingest for all sensors, but there multiple data gaps for all of the sensors for April 7th, 2010. However for April 8th, there are only a couple of single point data gaps, if any.

Hailemichael Teklai

Thomas.Landon@noaa.gov wrote:
Brett's quick detective work by phone yesterday seems to have resolved the problems at Pensacola - thanks a bunch, Brett! Let's see if all goes well today. Back data was loaded yesterday and is available on
the preliminary data web page.

No need for an emergency repair trip at this time, Brad and Marty.

George, you should be good to go with the surveying.

Tom

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Battery voltage was appended to the message as well (screen capture). Transmit time was off by one second (00:02:31) should be 00:2:30. I changed these settings and attached screens of the corrections, GOES transmissions should now resume.

Thanks,
Brett Gregory

Thomas F. Landon
National Water Level Program Product Lead Engineering Division, CO-OPS
N/OPS1, SSMC4, Station 6409
1305 East West Highway
Silver Spring, MD 20910
301-713-2897 x191 v
301-713-4465 fx
Appendix V

Supplemental Survey Records and Correspondence
Bottom Samples

Bottom samples were obtained at required grid node locations (i.e. 2000 meters across site and 1200 meters in anchorages in water depth less than 100 feet per the HSSD 2009). Sediment grab locations are included as a separate S-57 feature file (H12060_Bottom_Samples.hob).

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<thead>
<tr>
<th>OSI Bottom Sample Designation</th>
<th>Latitude, N (NAD83)</th>
<th>Longitude, W (NAD83)</th>
<th>Depth (meters)</th>
<th>Description</th>
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<td>A-01</td>
<td>30-10-30.93</td>
<td>87-37-39.40</td>
<td>7.3</td>
<td>Fine, Light Brown, Sand</td>
</tr>
<tr>
<td>A-02</td>
<td>30-10-42.26</td>
<td>87-36-24.43</td>
<td>7.2</td>
<td>Fine, Light Brown, Sand</td>
</tr>
<tr>
<td>A-03</td>
<td>30-10-53.32</td>
<td>87-35-12.08</td>
<td>7.5</td>
<td>Fine, Orange/Yellow, Sand</td>
</tr>
<tr>
<td>A-04</td>
<td>30-11-04.55</td>
<td>87-33-58.51</td>
<td>8.2</td>
<td>Fine, Light Brown, Sand with Shells</td>
</tr>
<tr>
<td>A-05</td>
<td>30-11-15.49</td>
<td>87-32-44.74</td>
<td>9.2</td>
<td>Fine, Light Brown, Sand and Clay</td>
</tr>
<tr>
<td>A-06</td>
<td>30-11-26.76</td>
<td>87-31-30.88</td>
<td>9.2</td>
<td>Fine, Light Brown, Sand with Shells</td>
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<td>9.1</td>
<td>Fine, Light Brown, Sand with Shells</td>
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<td>87-26-36.06</td>
<td>12.1</td>
<td>Fine, Light Brown, Sand and Clay</td>
</tr>
<tr>
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<td>30-12-22.21</td>
<td>87-25-22.37</td>
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<td>87-24-08.87</td>
<td>10.0</td>
<td>Fine, Light Brown, Sand</td>
</tr>
</tbody>
</table>
Correspondence

E-mail correspondence between OSI and the COTR follows.

From: kathleen.jamison [mailto:Kathleen.Jamison@noaa.gov]
Sent: Wednesday, September 16, 2009 3:59 PM
To: George Reynolds
Subject: Specs & Deliverables requirements

Hi George,

After discussing the multibeam resolution requirements detailed in the 2009 Specs & Deliverables, 5.1.2, and taking into consideration your concerns about meeting some of the coverage specifications, we have decided on the following minimum requirements for your current project in the Gulf of Mexico:

For main scheme multibeam bathymetry acquired concurrently with 200% side scan coverage ("skunk stripe"):

* Grid resolutions of 2m for depths less than 20 meters and 4m for depths 20 - 40 meters are acceptable.
* Minimum sounding density shall be 3 soundings per node.
* Small holidays in the multibeam coverage due to mid-water targets or attitude dynamics are acceptable where adjacent soundings show no evidence of significant shoaling, and the 200% side scan coverage does not indicate the presence of a feature.

For multibeam developments of targets identified in side scan sonar:

* Coverage as per the "Complete Multibeam Coverage" specification (Section 5.1.2.2) over the feature and the immediate surrounding seabed.

Regarding tools for demonstrating sounding density:

* You may use any method to evaluate the density and resolution requirements you would like, provided that you can demonstrate these results to NOAA.
* For the purposes of this requirement, NOAA will not differentiate between the soundings actually falling within the square grid cell, and the soundings within the circular capture radius (provided the maximum sounding propagation distance is set to no greater than the grid resolution divided by sqrt(2), as required by the Specs and Deliverables)
* We note that the density layer feature in CARIS may be helpful.
Also very important:

1) The exemptions to the Specs & Deliverables listed above apply only to survey OPR-J364-KR-09. Any future projects must adhere to requirements detailed in the latest version of the Specs & Deliverables. Exemptions are granted only on a case-by-case basis.
2) All deviations from the Specs & Deliverables must be detailed in the Descriptive Report and DAPR as appropriate.

Please let me know if you have any further questions.

--
Kathleen Jamison
Physical Scientist, Data Acquisition Control Branch Hydrographic Surveys
Division NOAA Kathleen.Jamison@noaa.gov 301.713.2700 x109
From: "kathleen.jamison" <Kathleen.Jamison@noaa.gov>
Date: Fri, 23 Oct 2009 14:35:37
To: George Reynolds<ggr@oceansurveys.com>
Subject: Re: Pensacola Inlet Questions

George,

Here are the answers to your questions:

1) & 2) Yes, the assigned AWOIS items outside of the main survey area are still to be investigated. AWOIS search radii are independent of survey limits. The 4m inshore boundary rule for the regular survey area doesn't apply for AWOIS items. Safety is the number one guiding principle when investigating AWOIS items in shallow areas. As a general rule, the full area (as defined by the search radius in the AWOIS database) must be surveyed even if some or all falls outside the survey limits. However, this only applies if the area can be surveyed safely.

This is particularly important for items for which a portion of the search area falls inshore of the survey limits, such as the item (#436) located in the shallow area of Caucus Shoal. Please only survey the portion of the search area in which it is safe to operate, and explain any area that is not covered in the DR. For any of these AWOIS items that are located in areas shoaler than the survey limits, we would not second-guess the decision of the hydrographer and vessel operator if they determined that it was not safe to survey the portion of the search area inshore of the 4m contour. Additionally, note that some items may be investigated using visual inspection (VS) in the case where MB or SSS are too dangerous. For the items where only MB, S2 or S4 are listed as investigation technique options, use your best judgement -- if MB or SSS would be too dangerous, then a visual inspection, even if not listed as an option in the AWOIS database, would be better than nothing. The point of AWOIS items is often to confirm the existence of a charted feature, and this can sometimes be done with a visual inspection.

3) The coverage area for the main survey is contained within the limits of the project area as shown on the Project CD and as illustrated in the Project Instructions. When I wrote the instructions, I included a USCG request from over two years ago to survey "from LB12 through the turn and toward the Pensacola-Mobile cut." I was assuming that they meant part of the area that had been assigned, but upon a closer look, I'd like to get this confirmed. I'll contact our regional navigation manager down there next week to find out exactly what the Coast Guard meant (sometimes they speak a different language from us NOAA folk).

But as far as you are concerned, the survey area does not change, it is as you have it on the Project CD (with 4m curve as the inshore limit of the main survey).

I hope this answers your questions. I'll be in the office for all of next week for any questions you might have as you get started on the survey. Here's hoping for good weather!

Kathleen
George Reynolds wrote:
Hi Kathleen,

Thanks for your schedule update. By the way, there is no rush regarding the answers to our questions; we have several days of work to do before we commence data collection operations.

Regards
George

-----Original Message-----
From: kathleen.jamison [mailto:Kathleen.Jamison@noaa.gov]
Sent: Thursday, October 22, 2009 4:41 PM
To: George Reynolds
Subject: Re: Pensacola Inlet Questions

Hi George,

Sorry to just get back to you now. I'll need tomorrow morning to check on all three of these questions.

Another thing -- while we are on Continuing Resolution (CR) for FY10 at NOAA, we aren't able to schedule any new trips. I'd still like to come down the first week after Thanksgiving, but I may have to postpone, or book with just a week or two notice. I'm sorry about the inconvenience, but rest assured we will find a good time that works for everyone.

I'll get back in touch by tomorrow afternoon.

Kathleen

George Reynolds wrote:

Hi Kathleen,

We have a few questions to clarify survey tasks near Pensacola inlet.

Attached are two PDFs that can be referenced when considering the questions below.

1. There are 18 AWOIS items located outside of the assigned survey limits, six of which are well inside the inlet in very shallow or no water locations. At least one AWOIS item (#436) appears to fall within the survey area but on a very shallow area of Caucus Shoal. Please confirm that coverage for AWOIS items that fall outside of our survey area limits is required?
2. Is the offshore 4M contour an acceptable stopping point for the survey of Caucus Shoal?

3. Per the Project Instructions "Purpose and Location" section: "Additionally, the US Coast Guard has requested a survey at the entrance to Pensacola Bay due to shoaling from LB12 through the turn and toward the Pensacola-Mobile cut." Our assigned survey area does not extend north of LB12. (Note: The geographic name "Pensacola-Mobile Cut" is not shown on the RNC or ENC charts). Is coverage of this area required? If so please provide new survey boundary limits.

Thanks

George

--

Kathleen Jamison
Physical Scientist, Data Acquisition Control Branch Hydrographic Surveys
Division NOAA Kathleen.Jamison@noaa.gov 301.713.2700 x109
From: kathleen.jamison [mailto:Kathleen.Jamison@noaa.gov]  
Sent: Friday, December 18, 2009 11:50 AM  
To: George Reynolds  
Subject: J364 Previously Surveyed Area

George,

Here is the previously surveyed area that will no longer be a part of your J364-KR-09 project. I will send you the new equivalent area to the east of the project area along the FL Safety Fairway when I return after the holiday, as well as any sheet adjustments to A, B or D.

--

Kathleen Jamison  
Physical Scientist, Data Acquisition Control Branch Hydrographic Surveys  
Division NOAA Kathleen.Jamison@noaa.gov 301.713.2700 x109
### AMENDMENT OF SOLICITATION/MODIFICATION OF CONTRACT

<table>
<thead>
<tr>
<th></th>
<th></th>
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<td>Jan 21, 2010</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

6. Issued By

- **ACQUISITION & GRANTS OFFICE OF A6**
  - 1355 EAST WOOD ST., SSMC 1 RM 6300
  - SILVER SPRING, MD 20910

7. Administered By (if other than item 6)

- **NCS/NMFS/OAR ACQUISITION DIVISION OF A65**
  - 1355 EAST WOOD ST., SSMC 4 RM 7141
  - SILVER SPRING, MD 20910

**CATHARINE A. PERREN**

- 301-713-0820 164

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**OCEAN SURVEYS, INC.**

- SHEFFIELD STREET
  - BALTIMORE, MD 21208

**Vendor ID:** 00012711

**DUNS:** 084798149

**CAGE:** 3Y156

---

**Code:** Facility Code

**X:** 6A. Amendment of Solicitation No.

**X:** 6B. Date (See Item 11f)

**X:** 10A. Modification of Contract/Order No.

**X:** 10B. Date (See Item 11f)

**X:** Jul 28, 2009

---

**11. THIS ITEM ONLY APPLIES TO AMENDMENTS OF SOLICITATIONS**

- The above numbered solicitation is amended as set forth in item 14. The hour and date specified for receipt of Offers [ ] is extended [ ] is not extended. Offers must acknowledge receipt of this amendment prior to the hour and date specified in the solicitation or as amended, by one of the following methods:
  - By correcting omissions and returning copies of the amendment;
  - By acknowledging receipt of this amendment on each copy of the offer submitted;
  - By separate letter or telegram which includes a reference to the solicitation and amendment numbers. FAILURE OF YOUR ACKNOWLEDGMENT TO BE RECEIVED AT THE PLACE DESIGNATED FOR THE RECEIPT OF OFFERS PRIOR TO THE HOUR AND DATE SPECIFIED MAY RESULT IN REJECTION OF YOUR OFFER. If, by virtue of this amendment you desire to change an offer already submitted, such change may be made by telegram or other rapid means at any time prior to the opening hour and date specified.

---

**13. THIS ITEM APPLIES ONLY TO MODIFICATIONS OF CONTRACT/ORDERS**

- IT MODIFIES THE CONTRACT/ORDER NO. AS DESCRIBED IN ITEM 14.

---

**X:** A. The above order is issued pursuant to (Specify authority). The changes set forth in item 14 are made in the Contract Order No. in item 10A.

**X:** B. The above numbered Contract/Order is modified to reflect the administrative changes (such as changes in paying office, appropriation date, etc.)

**X:** C. A new contract/Order is entered into pursuant to authority of

**X:** D. (Specify type of modification and authority)

**E. IMPORTANT:** Contractor [ ] is not [ ] is required to sign this document and return copies to the issuing office.

- Description of Amendment/Modification (Organized by UCF section headings, including solicitation/contract subject matter where feasible)

---

The above referenced task order is hereby modified as follows:

Add 14 square nautical miles to the east side of the survey area and remove 14 square nautical miles from the west side of the survey area.

---

Signature of person authorized to sign:

[Signature]

- Name and Title of Signer (Type or Print)
  - JOHN WHITFIELD
  - CONTRACT SPECIALIST

- Date Signed
  - 301-713-0820 1X35

- Signature of Contracting Officer
  - [Signature]

---

PREVIOUS EDITIONS UNUSABLE

- VSN 7540-01-15240770

- Prescribed by GSA FAR (48 CFR) 53.243

---

-14-

**DR – Appendix V**
<table>
<thead>
<tr>
<th>Item No.</th>
<th>Supplies/Services</th>
<th>Quantity</th>
<th>Unit</th>
<th>Unit Price</th>
<th>Amount</th>
</tr>
</thead>
<tbody>
<tr>
<td>0001</td>
<td>An independent contractor and not as an agent of the Government, provide hydrographic survey of the Florida and Alabama Safety Fairways in the Gulf of Mexico using Side Scan Sonar and Multibeam Sonar. The following equipment is being added to this task order: Klein 5000 V1 Side Scan Sonar</td>
<td>1</td>
<td>EA</td>
<td>3,013,668.43</td>
<td>3,013,668.43</td>
</tr>
</tbody>
</table>

Contractor Signature
Date

Accounting and Appropriation Data:
1409 28K6BS P00 0013 010301031 009900030000000025 3000000000000000
US$ 3,013,668.43
Hi Kathleen,
Per our discussion attached is an image showing the new project limits of the western most AWOIS locations.

Regards
George
From: Kathleen.Jamison@noaa.gov
To: George Reynolds
Subject: Re: AWOIS Items Beyond Project Limits
Date: Thursday, February 18, 2010 1:03:21 PM

George,

As we discussed yesterday on the phone, I am confirming that the nine westernmost AWOIS items that are now outside of the new project limits are not to be investigated.

Kathleen

-----Original Message-----
From: George Reynolds [ggr@oceansurveys.com]
Date: Tuesday, February 16, 2010 3:31 PM
Subject: AWOIS Items Beyone Project Limits
To: Kathleen Jamison <Kathleen.Jamison@noaa.gov>

Hi Kathleen,

Per our discussion attached is an image showing the new project limits of the western most AWOIS locations.

Regards
George
George,

See embedded remarks below.

-Kathleen

George Reynolds wrote:

Hi Kathleen,

Just a couple of discussion topics that we would like your input on.

Data collection for Pensacola Sheet B is complete and we are compiling the final deliverables. We have also completed the DAPR for Sheet B data which were obtained from a small boat, thus the Sheet B DAPR covers only small boat operations. The remaining Sheets (A, C and D) will be completed using both small and large vessels. We are planning to write a separate DAPR that will cover large vessel operations. This approach will allow us to complete and deliver Sheet B products independently of Sheets A, C and D. Is this approach acceptable?

I spoke with Gene Parker about this one. He suggested that, along with the DR for Sheet B, you should submit a DAPR now, since it is really only Section A - equipment and vessels specs, offsets, system bias calibrations, etc - that will change. Then, you would submit an appended DAPR along with Sheets A, C and D. The appended DAPR would stand on record as the "final" DAPR with the small AND large boat information. That way there would be just one DAPR on the project, not two, which would cause less confusion down the line. AHB would prefer this option, since a staggered sheet submission is generally better anyway, as it allows the branch to review the initial sheet and report submission and reply with feedback.

As you know the specs and deliverables requires that sound speed profilers "must be recalibrated when the survey is complete if the completion date is later than six months from the date of last re-calibration." The sound speed instruments we employed during Sheet B operations are just outside the six-month window for re-calibration; one unit was 4 days and the 2nd unit was 12 days beyond the re-calibration due date on the last day of Sheet B data collection operations. (We are replacing both units with newly calibrated instruments for Sheets A, C and D). The Sheet B instruments passed the VelociWin comparison cast criteria throughout the survey including the last day of data collection operations. Given this information we request that NOAA extend the six-month re-calibration criteria by 12 days.
for Sheet B. This extension will allow us to move forward with the Sheet B DR without having to wait 4 to 6 weeks for Sea-Bird to issue re-calibration reports.

Along the same lines, it would be better to submit Sheet B and the DR as soon as possible to AHB rather than wait out the 4-6 weeks to get the calibration reports back for the small boat instruments. So, for this time only, you may forgo the re-calibration of the small boat CTDs, since they are only 4 and 12 days over the 6-month window and you are not planning to use them during the large boat operations. Instead, if you already have the newly calibrated instruments for Sheets A, C, and D, you could do a single comparison of the Sheet B instruments to the newly calibrated instruments to see that they provide the same results.

The Pensacola tide gage is reporting inconsistent data. No survey data are currently being impacted; however, now may be a good time to service the gage if CO-OPS thinks it is appropriate.

Co-ops said thanks for letting them know and they will keep an eye on it. If the issue doesn't resolve itself, HPT will determine whether the gaps are fillable or if they need to do any gauge repairs.

Regards,

George

--
Kathleen Jamison
Physical Scientist, Data Acquisition Control Branch Hydrographic Surveys Division NOAA
Kathleen.Jamison@noaa.gov 301.713.2700 x109
George,

Yes, those are the correct survey boundaries. I had drawn the border slightly to the east, kind of near the "bend" in the fairway, but it doesn't really matter, since your survey for 2010 will continue and cover it somehow.

Kathleen

From: George Reynolds [mailto:ggr@oceansurveys.com]
Sent: Wednesday, March 24, 2010 4:41 PM
To: 'kathleen.jamison'
Subject: Updated Survey Boundary for Sheets A and D

Hi Kathleen,

Attached are shape files depicting our understanding of the new survey limits for Sheets A & D. We have updated the survey boundaries per Amendment No. 001 (Removed 14 square nautical miles on the west side and added 14 square nautical miles on the east side).

Please confirm that you are in agreement with revised boundaries.

The new easterly limit of Sheet D falls inside The Preliminary Tidal Zoning received for this project (OPR-J364-KR-2009), so no further tide zoning definitions should be required.

Thanks,
George
-----Original Message-----
From: kathleen.jamison [mailto:Kathleen.Jamison@noaa.gov]
Sent: Friday, April 30, 2010 5:31 PM
To: George Reynolds
Subject: Re: Answers

As per our phone discussion:

1) The "exceptions" we have given for the FY09 work does not apply to the FY10 survey work. If adjustments need to be made to the FY10 project requirements that conflict with the 2010 Specs & Deliverables, that will be done on a case-by-case basis.

2) We concur with each of your statements below (#1-4).

3) #4 is the only topic that also applies to the 2010 survey sheets - you do not need to add cross lines just to reach the 4% if you are doing re-runs or fill-ins to the original line spacing. If your cross lines do not meet the 4% requirement, please explain this in the DR briefly - you can cite this email as documented permission from your COTR (that goes for any variation from the specs that is discussed and approved by your COTR - just document it!).

Have a great weekend - tell your crew to stay safe and listen to the Coast Guard - I'll be keeping my eye on what's happening to Pensacola regarding the spill, but please let me know if you hear of any useful information from the scene.

Regards,
Kathleen

George Reynolds wrote:
> Hi Kathleen,
> 
> Thanks for following up on our discussion topics.
> 
> For your reference, the following is a copy of our notes from the meeting aboard the Ferrel.
> 
> 1. In water depths of greater than 20 meters, occasional SSS refraction is not a concern assuming that line spacing results in "Complete multibeam coverage".
> 
> 2. In water depths of ?20m, refraction is acceptable only if, by means of confidence checks along the line, we are able to determine that we can
> see features across the entire record. This will not apply in the event
> that the refraction is sporadic as we will not have a "standard" by which to
> judge the effects of refraction. "Complete multibeam coverage" will not
> suffice to replace the object detection capabilities of the SSS in ≤20m.
> Only "object detection multibeam coverage" would serve in place of SSS.
>
> 3. During skunk stripe SSS/MB surveying the multibeam density
> requirement in water depths 20M and less is 5 soundings/1m cell with cell
> size increasing to 5% of water depth after 20m per "complete multibeam
> coverage" standards. Due to our "exception", we are required to populate
> cells with three soundings (<20m water = 2m cell, >20m water = 4m cell).
> Per
> "complete multibeam coverage" standards, holidays may span no more than 3
> nodes (cells). Therefore, with the exception of the cases presented below,
> we are allowed 6m of along track holiday in <20m and 12m of along track
> holiday in >20m before we have to go back and fill-in the holiday. NOAA
> suggested that "common sense" should also be one of the tools that we use
> when making decisions on this subject.
>
> Larger holidays than described above may be acceptable if:
> Exception 1: We have overlapping coverage from adjacent swaths that
> populate some of the cells that would have been populated by the swath
> that
> experienced the blowout.
> Exception 2: We have partial coverage within the blowout area and are
> able to confidently retain some of the soundings within the blowout.
> Again, common sense should prevail.
>
> 4. Tie line percentage requirement applies to the planned or proposed
> line plan, not the actual line plan implemented. In other words, if we plan
> on line spacing for 100M SSS and end up having to do in-fills to meet
> coverage requirements due to site conditions (i.e refraction), no
> additional tie lines are required to reach the 4% lineal nautical miles run
> for the additional trackline miles.
>
> If you have any questions on the above please let me know.
>
> Looking forward to talking with you later today.
Hi George,

I will give you a call shortly to follow up on this email. Now that you have worked out the degraded imagery issues in Sheet A (to where contacts can be reliably observed in the imagery), I'd like to clarify which questions you still would like official answers on.

For now, I can confirm two issues that we discussed last week and/or on our site visit:

1) Modification to Project Instructions permitting substitution of "Complete" multibeam echosounder coverage for 200% side scan sonar with concurrent "Set Line Spacing" multibeam in depths greater than 20 m.

2) Task award for OPR-J364-KR-10. The official word from the contracting office is "on or before May 22," although I have emphasized to them that this area is a priority, and to award the task order as soon as possible, so I'm hoping for something closer to May 15, although of course I cannot say for sure.

Will you be suspending operations or making modifications in the spill aftermath? I had thought there wouldn't be much worry in Pensacola, at least in the near term while the oil will hit land in Louisiana and doesn't seem to be moving north east, but then I read that Pensacola is constructing a boom for the bay. Needless to say, the spill is causing quite the stir around here as we scramble to make our resources available to the Coast Guard!

--
Kathleen Jamison
Physical Scientist, Data Acquisition Control Branch
Hydrographic Surveys Division
NOAA
Kathleen.Jamison@noaa.gov
301.713.2700 x109
Hi George,

Thanks so much for providing such a great office visit experience earlier this week. I believe we were able to accomplish quite a bit, and I appreciate your gathering Bob and Bonnie to help out with everything.

Here are a few answers to the DR Questions (with input from Gene Parker at AHB):

Q. Should OSI include charting recommendations for item investigations other than AWOIS items?
A. Yes, the hydrographer (OSI) should make charting recommendations whenever it would be helpful.

Q. Should the title sheet state “feet” or “meters” at the bottom of the page?
A. It should be listed as “meters” – all processing is done in metric, and should only be converted to feet or fathoms following H-Cell compilation at the production branch.

Q. Is there any reason to continue putting the bold blue registry number on the cover page? It is not required in the Specs & Deliverables or the Statement of Work.
A. No, it is not mandatory – this is a relic from the hard copy days when the DR was placed in a folder horizontally for reference.

Q. Should OSI submit difference surfaces (images, graphics and explanations) in the DR for survey junctions?
A. Yes – the images and graphics often say more than the text.

Q. Is there any requirement for OSI to make Coast Pilot or ATON Report (for MCD) submissions?
A. No, there is no requirement for contractors to make submit separate Coast Pilot or ATON Reports. A SAR question flagged as a yellow “Not Applicable” does not affect the SAR score.

Q. How much should the “correspondence” section in Appendix 5 contain?
A. Only pertinent and relative information, e.g., where the production branch or the COTR provides guidance regarding “exceptions” or changes in
deliverables as required by the Statement of Work or Specs & Deliverables. Do not include information regarding DTONs in Appendix 5 – Appendix 1 DTON Report is sufficient.

Let me know if there's a question I missed, or if you have any further questions. I'm also going to start cc'ing Lori Knell on these emails, since she will be taking over my COTR duties while I am on my detail.

--
Kathleen Jamison
Physical Scientist, Data Acquisition Control Branch Hydrographic Surveys Division NOAA Kathleen.Jamison@noaa.gov 301.713.2700 x109
# H12060 AHB Compilation Log

## General Survey Information

<table>
<thead>
<tr>
<th>Registry No.</th>
<th>H12060</th>
</tr>
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<tbody>
<tr>
<td>Project No.</td>
<td>OPR-J364-KR-09-A</td>
</tr>
<tr>
<td>Field Unit</td>
<td>Ocean Surveys, Inc.</td>
</tr>
<tr>
<td>Date of Survey</td>
<td>20091023 - 20100508</td>
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<tr>
<td>Largest Scale Chart</td>
<td>12382, Edition 41, 20100501, 1:80,000</td>
</tr>
<tr>
<td>Additional Charts</td>
<td>NA</td>
</tr>
<tr>
<td>Sounding Units</td>
<td>(Feet)</td>
</tr>
<tr>
<td>Compiler</td>
<td>Norris A. Wike</td>
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## Source Grids

### Surfaces

<table>
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<tr>
<td>Combined</td>
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<tr>
<td>Interpolated TIN</td>
</tr>
<tr>
<td>Shifted Interpolated TIN</td>
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</table>

## File Name

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<tr>
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<tbody>
<tr>
<td>Survey Scale Soundings</td>
<td>H12060_SS_Soundings.hob</td>
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<tr>
<td>Chart Scale Soundings</td>
<td>H12060_CS_Soundings.hob</td>
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<td>Contour Layer</td>
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<td>Feature Layer</td>
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<tr>
<td>Meta-Objects Layer</td>
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<td>Blue Notes</td>
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<td>ENC Retain</td>
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## Meta-Objects Attribution

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<th>Acronym</th>
<th>Value</th>
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<td>M_COVR</td>
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</tr>
<tr>
<td>CATCOV</td>
<td>1 – coverage available</td>
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<tr>
<td>SORDAT</td>
<td>20100508</td>
</tr>
<tr>
<td>SORIND</td>
<td>US,US,graph,H12060</td>
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</table>

<table>
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</thead>
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<tr>
<td>CATZOC</td>
<td>6 – zone of confidence U (data not assessed)</td>
</tr>
<tr>
<td>INFORM</td>
<td>R/V ABLE II, R/V FERREL</td>
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<tr>
<td>POSACC</td>
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<td>20100508</td>
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<tbody>
<tr>
<td>DRVALV 1</td>
<td>34.0 FT</td>
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<tr>
<td>DRVALV 2</td>
<td>85.0 FT</td>
</tr>
<tr>
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<td>20100508</td>
</tr>
<tr>
<td>SORIND</td>
<td>US,US,graph,H12060</td>
</tr>
</tbody>
</table>
SPECIFICATIONS:

I. **COMBINED SURFACE:**
   a. Number of ESAR Final Grids: 2
   b. Resolution of Combined (m): 4 m

II. **SURVEY SCALE SOUNDINGS (SS):**
   a. Attribute Name: Depth
   b. Selection criteria: Radius, Shoal bias
   c. Radius value is: mm at map scale
      i. Use single-defined radius: 1
      ii. And/Or use radius table file: H12060_SS_SSR.txt
          
          | Distance (mm) | Radius (m) | Scale |
          |--------------|------------|-------|
          | 0.000000     | 20.1168    | 1.0   |
          | 20.11681     | 30.0       | 1.2   |

   d. Queried Depth of All Soundings
      i. Minimum: 35.4820 ft
      ii. Maximum: 84.2208 ft

III. **INTERPOLATED TIN SURFACE:**
   a. Resolution (m): 12M
   b. Interpolation method: Natural Neighbor
   c. Shift value: -0.75 ft

IV. **CONTOURS:**
   a. Attribute Name: Depth contours
   b. Use a Depth List: H12060_depth_contours.txt
      
      | Distance (ft)      | Depth (m) |
      |--------------------|-----------|
      | 18.2880            | 1.00      |
      | 27.4320            | 2.00      |
   c. Output Options: Create contour lines
      i. Line Object: DEPCNT
      ii. Value Attribute: VALDCO

V. **FEATURES:**
   a. Number of Chart Features: 8 [all features included in H-Cell]
   b. Number of Non-Chart Features: 29 [all features submitted by field & not included in H-Cell]

VI. **CHART SURVEY SOUNDINGS (CS):**
   a. Number of ENC CS Soundings: 61
   b. Attribute Name: Depth
   c. Selection criteria: Radius, Shoal bias
   d. Radius value is: Distance on the ground (m)
      i. Use single-defined radius: NA
      ii. And/Or use radius table file: H12060_CS_SSR_80k.txt
         
         | Distance (m) | Radius (m) | Scale |
         |--------------|------------|-------|
         | 0.000000     | 10.0000    | 1000  |
         | 10.000001    | 18.2880    | 1200  |
         | 18.288001    | 30.4800    | 1300  |
   e. Number Survey CS Soundings: 76

VII. **NOTES:**
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 AHB source depth grids for the survey’s nautical chart update were two 2m resolution BASE surfaces (*.CSAR), which were combined at 4m resolution. The survey scale soundings were created from the combined surface using a sounding spacing range (SSR) file (all SSR values are included in the AHB Compilation Log section of this Descriptive Report). The survey scale soundings were imported into a “point cloud” grid. The chart scale soundings were derived directly from the survey scale soundings point cloud grid 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 sounding spacing range (SSR) file. 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.

A UTM projected TIN surface was created from the survey scale soundings point cloud grid, from which an interpolated surface of 12m resolution was generated. 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). 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 H12060 AHB Compilation Log contained within this document. The Final HOB files include depth areas (DEPARE), depth contours (DEPCNT), soundings (SOUNDG), meta-objects (M_COVR, M_QUAL), cartographic Blue Notes (SCSYM),, and features (OBSTRN, WRECKS),

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 S-57 Composer in feet. Quality assurance and topology checks were conducted using CARIS S-57 Composer and DKART Inspector 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>
<thead>
<tr>
<th>TABLE 1</th>
<th>Contents of H-Cell Files</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>H12060_CS.000</td>
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<tr>
<td>Object Class Types</td>
<td>Geographic</td>
</tr>
<tr>
<td>S-57 Object Acronyms</td>
<td>DEPARE</td>
</tr>
<tr>
<td></td>
<td>OBSTRN</td>
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<tr>
<td></td>
<td>SBDARE</td>
</tr>
<tr>
<td></td>
<td>SOUNDG</td>
</tr>
</tbody>
</table>

**B.2.4 Junctions and Prior Surveys**

Survey H12060 (2009-2010) junctions with survey H12061 (2010) to the east. Most present survey depths compare within 1 foot of junction survey depths to the east. Present survey depths compare within 1 foot of the charted hydrography to the north, south and west.

**B.4 DATA PROCESSING**

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

- CARIS Bathy DataBASE version 3.2/HF2
- CARIS HIPS/SIPS version 7.1/HF2
- CARIS S-57 Composer version 2.2/SP1/HF4
- DKART Inspector version 5.1
- HSTP Pydro version 11.8 (r3585)

**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 16 North.
D. RESULTS AND RECOMMENDATIONS

D.1 CHART COMPARISON

11382 (41st. Edition, May/10)
Pensacola Bay and Approaches
Corrected through NM 08/27/2011
Corrected through LNM 08/16/2011
Scale 1:80,000

ENC COMPARISON
US4FL71M
Pensacola Bay and Approaches
Edition 7
Application Date 2010/04/05
Issue Date 2010/07/06
Chart 11382

D.2 ADDITIONAL RESULTS

The charted hydrography originates with prior surveys and requires no further consideration. The hydrographer makes adequate chart comparisons in section D and Appendix I and II of the DR. The hydrographer recommends that any charted features not specifically addressed either in the H-Cell files or the Blue Notes should be retained as charted. The following exceptions are noted:

1) Several obstructions were located by the field unit. During office processing the obstructions were changed to soundings to represent the shoalest depths in the area. The nature of the area does not warrant the saturation of all these obstructions. The following is a list of these obstructions:

<table>
<thead>
<tr>
<th>Obstruction</th>
<th>Latitude N</th>
<th>Longitude W</th>
<th>Charting Recommendation</th>
</tr>
</thead>
<tbody>
<tr>
<td>70 ft</td>
<td>30-10-52.26</td>
<td>087-29-56.01</td>
<td>Do not chart</td>
</tr>
<tr>
<td>64 ft</td>
<td>30-11-28.07</td>
<td>087-27-56.35</td>
<td>Do not chart</td>
</tr>
<tr>
<td>65 ft</td>
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47 ft 30-12-27.01 087-26-17.35 47
53 ft 30-12-32.46 087-22-11.08 53
44 ft 30-12-43.15 087-28-15.43 44
50 ft 30-12-48.06 087-24-44.00 50
43 ft 30-12-53.26 087-28-50.51 43
52 ft 30-12-57.68 087-27-54.60 52
45 ft 30-13-06.06 087-24-08.21 45
45 ft 30-13-16.69 087-24-44.40 45

It is recommended that the above soundings be charted unless otherwise noted.

2) A charted Obstn Fish Haven area in the vicinity of Latitude 30-11-00.00N, Longitude 087-31-06.00W was investigated by 200% SSS and SWMB. No depths were determined shoaler than the minimum cleared depth of 47 feet. It is recommended that the Obstn Fish Haven be retained.

3) The field unit collected a total of 12 bottom samples. All charted seabed characteristics were superseded by the survey findings. Four seabed characteristics were used for charting and the remaining 8 seabed characteristics are filed with this report.

4) The following areas show several differences in ENC US4FL7M and chart 11382, 41st. Ed., May/2010 charted depths:
It is recommended that chart 11382, 41st Ed., May 2010 and ENC US4FL7M sounding differences be deferred to MCD for reconciliation.

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.
Initial Approvals:

The completed survey has been inspected with regard to survey coverage, delineation of depth contours, and 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.

Norris Wike
Cartographer
Atlantic Hydrographic Branch

Digitally signed by Norris Wike
DN: cn=Norris Wike, o=NOAA,
ou=AHB,
email=norris.a.wike@noaa.gov, c=US
Date: 2011.09.27 14:25:35 -04'00'

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
2011.10.31 13:04:13 -04'00'

Approved For:

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