

H11814

NOAA FORM 76-35A

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

DESCRIPTIVE REPORT

Type of Survey **Hydrographic Survey**
Field No. **H11814**
Registry No. **OPR-J977-TE-08**

LOCALITY

State **Louisiana**
General Locality **Breton Sound**
Sub-locality **3 NM E of California Point**

2009

CHIEF OF PARTY
Joseph Talbott

LIBRARY & ARCHIVES

DATE

NOAA FORM 77-28 (11-72) <div style="text-align: center; margin-top: 10px;"> U.S. DEPARTMENT OF COMMERCE NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION </div> <div style="text-align: center; margin-top: 20px;"> <h2 style="margin: 0;">HYDROGRAPHIC TITLE SHEET</h2> </div>	REGISTRY No <div style="text-align: center; font-size: 1.2em; font-weight: bold;">OPR-J977-TE-08</div>
INSTRUCTIONS - The Hydrographic Sheet should be accompanied by this form, filled in as completely as possible, when the sheet is forwarded to the Office.	FIELD No. H11814

State Louisiana

General Locality Breton Sound

Sub-Locality 3 NM East of California Point

Scale 1:20,000 Date of Survey June 22, 2008 – January 27, 2009

Instructions dated July 18, 2008 Project No. OPR-J977-TE-08

Vessel M/V Thomas R. Dowell and M/V Bella Marie

Chief of party Joseph Talbott

Surveyed by TerraSond Ltd.

Soundings by echo sounder, lead line, pole Singlebeam and Multibeam Echosounder, Side Scan Sonar

Graphic record scaled by N/A

Graphic record checked by N/A Automated Plot N/A

Verification by *Atlantic Hydrographic Branch Personnel*

Soundings in fathoms feet at MLW MLLW Meters *Feet* at MLLW

REMARKS: Contract No.: DG133C-05-CQ-1079

Contractor: TerraSond Ltd. All times recorded in UTC

1617 South Industrial Way, Suite 3 Palmer, AK 99645

Datum and Projection: NAD83, UTM 16N Bold, Italic, Red notes in the Descriptive Report were made during office processing. H-Cell units in feet at MLLW.

DESCRIPTIVE REPORT

OPR-J977-TE-08



Registry Number: H11814

M/V Thomas R. Dowell

M/V Bella Marie

Survey: D

State: Louisiana

General Locality: Breton Sound

Sublocality: 3 NM East of California Point

Survey Dates: June 22, 2008 – January 27, 2009

Lead Hydrographer: Joseph C. Talbott

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Descriptive Report to Accompany Hydrographic Survey H11814

Survey D

June 22, 2008 – January 27, 2009

TerraSond Ltd.

Lead Hydrographer: Joseph C. Talbott

A. AREA SURVEYED

A singlebeam echo sounder and sidescan sonar survey was conducted in Breton Sound, Louisiana in accordance with the NOAA, National Ocean Service, Statement of Work (SOW), Side Scan Sonar Services, OPR-J977-TE-08, dated July 18, 2008. **Concur.**

The purpose of this project was to provide NOAA with accurate hydrographic survey data suitable for item detection and debris mapping in the assigned area and to provide NOAA with modern, accurate hydrographic survey data with which to update the nautical charts of the assigned area. The project area was approximately 25 square nautical miles and was located 3 nautical miles east of California Point, in the Mississippi River Delta, in the State of Louisiana. **Concur.**

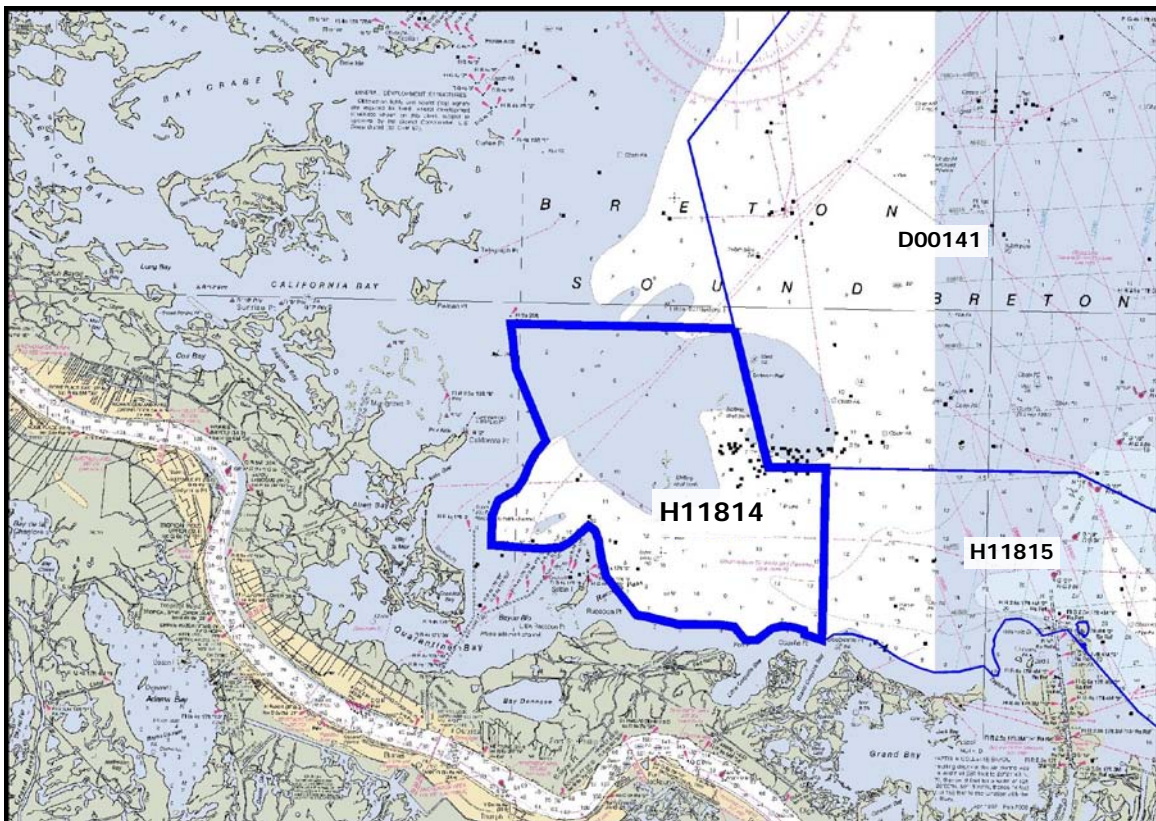


Figure 1 – Overview of H11814 with Chart 11364, 41st Edition, December 2005. Soundings in feet.

The project area is located in Breton Sound which has an active shrimp and oyster fishery and contains numerous oil and gas structures. The project area is located immediately east of the Ostrica Locks and channel which provides a minor access route between the Mississippi River and Breton Sound. The channel is shallow and relatively narrow. The primary users of this route are small fishing vessels operating out of Buras, LA on the West Bank of the Mississippi River. **Concur.**

Full bottom coverage, consisting of 100% side scan sonar was achieved within the limits of hydrography for this survey. Although the statement of work specified coverage at 200%, the Contracting Officers Technical Representative (COTR) authorized the survey to be conducted using a lower limit of 50 meters on the side scan range setting. This resulted in less than 200% coverage in water depths of less than 5 meters (Table 1). **Concur.**

Table 1 - Estimate of effective scanning range as a function of towfish height off of the sea floor.

Side Scan Sonar – Towfish Height vs. Effective Scanning Range			
Range Scale	Water Depth	Approximate Height of Towfish	Estimate of Effective Scanning Range ¹
50 m	5 m	4 m	50 m
50 m	4 m	3 m	38 m
50 m	3 m	2 m	25 m
50 m	2 m	1 m	13 m

¹ NOAA, NOS Hydrographic Surveys Specifications and Deliverables, April 2007, Section 6.2.3.

The side scan imagery was used to locate marine debris and obstructions and the singlebeam echo sounder data was used to update the charts covering the project area. Shallow water multibeam sonar was used to develop contact information and to obtain a least depth over debris and obstructions determined to be hazardous to navigation or candidates for removal based on criteria set forth by the NOAA / FEMA Marine Debris Project Office. This survey has a maximum depth of 6.5 meters and a minimum depth of 0.4 meters below the Mean Lower Low Water (MLLW) tidal datum. **Concur.**

For complete survey limits, refer to Figure 1 on the preceding page. **Concur.**

B. DATA ACQUISITION AND PROCESSING *See also the H-Cell Report*

B.1. Equipment

Bathymetry and side scan imagery for this survey was acquired using the hydrographic survey vessels *M/V Bella Marie* and *M/V Thomas R. Dowell*. **Concur.**

M/V Thomas R. Dowell

The *M/V Thomas R. Dowell* is an aluminum hulled survey vessel, 10.2 meters length overall with a 2.9 meter beam and a 0.4 meter draft. The *Dowell* is powered by two four-stroke 150 HP Honda outboard motors. Auxiliary electrical service is provided by a 3 KW Honda generator. The primary survey systems used on the *M/V Thomas R. Dowell* are listed in Table 2. **Concur.**

Table 2 - Major systems used aboard the *M/V Thomas R. Dowell*.

VESSEL <i>M/V Thomas R. Dowell</i> LOA: 10.2 m, BEAM 2.9 m, DRAFT: 0.4 m	
Equipment	Manufacturer & Model
Singlebeam echo sounder	Odom Hydrotrac
Sidescan sonar	EdgeTech 4200 FSL
Positioning	Trimble DSM-232
Sound speed	Odom Digibar Pro
Vessel course and pitch	Hemisphere Crescent V100

M/V Bella Marie

The *M/V Bella Marie* is an aluminum hulled vessel, 11.9 meters length overall with a 4.3 meter beam and a 0.8 meter draft. The *Bella Marie* is powered by two 350 HP Volvo D-6 diesel engines with outdrive propulsion. Auxiliary electrical service is provided by a 13 KW Isuzu Marathon generator. The primary survey systems used on *M/V Bella Marie* are listed in Table 3. **Concur.**

Table 3 - Major systems used aboard the *M/V Bella Marie*.

VESSEL <i>M/V Bella Marie</i> LOA: 11.9 m, BEAM 4.3 m, DRAFT: 0.8 m	
Equipment	Manufacturer & Model
Multibeam sonar	Reson SeaBat 8101
Singlebeam echo sounder	Odom Hydrotrac
Sidescan sonar	EdgeTech 4200 FS
Positioning	Kongsberg Maritime Seatex Seapath 200
Sound speed	Odom Digibar Pro
Vessel attitude	Kongsberg Maritime Seatex MRU 5

Equipment performance details are provided in the Data Acquisition and Processing Report* (DAPR), Sections A. Equipment and B. Quality Control. ***Included with survey deliverables.**

B.2. Quality Control

B.2.1. Side Scan Sonar

No conditions with the potential for adversely affecting data integrity were encountered with the side scan sonar suite on the *M/V Bella Marie* or the *M/V Thomas R. Dowell* during this survey. **Concur.**

Environmental conditions during the survey were a major factor impacting data quality. Shallow water, combined with high temperatures in the summer, resulted in significant refraction artifacts in the side scan record which varied both spatially and temporally. The proximity to the Mississippi River produced pockets of fresh water in Breton Sound which added another layer of complexity to the refraction problem. In addition to these factors, a high spring runoff contributed to an already high biomass in the water column. The resultant turbidity significantly reduced the effective side scan sonar range. All of these elements varied in space and time and the result was often excellent data, followed by unusable data, followed by good data in the course of a single survey line. The procedures which were used to address these data quality issues included:

1. Rejecting portions of lines which were unusable and rerunning these sections as “gaps.”
2. Surveying early in the day in areas known to have significant refraction problems due to solar radiation.
3. Completing areas that were consistently problematic in the early winter months when the water temperatures had cooled and the amount of biomass was lower.

Daily confidence checks of the side scan sonar operation were conducted by recording a screen shot of the side scan waterfall display which included the side scan image and all operational settings. The confidence checks were performed when distinctive bottom features (e.g. trawl scars, pipelines, submerged vessels, etc.) were continuously visible in the record from the maximum range of one channel to the maximum range of the other channel. A rub test was performed on the port and starboard channels, high and low frequency panel, of the side scan transducer prior to deployment to ensure adequate signal return. **Concur.**

A detailed discussion of side scan sonar system calibrations, data acquisition, and processing is provided in the Data Acquisition and Processing Report* (DAPR) for OPR-J977-TE-08, Paragraphs A. Equipment and B. Quality Control. ***Included with survey deliverables.**

B.2.2. Vertical Beam Echo Sounder (VBES)

No conditions with the potential for adversely affecting data integrity were encountered on the *M/V Bella Marie* or the *M/V Thomas R. Dowell* with the VBES suite during this survey. **Concur.**

VBES confidence checks were conducted on a weekly basis, when possible. The confidence checks consisted of a single depth deployment of a bar check apparatus at a fixed distance below the VBES transducer to check for drift in the VBES system index

value. No significant drift in the index value was observed during the course of the survey. **Concur.**

A detailed discussion of VBES system calibrations, data acquisition, and processing is provided in the Data Acquisition and Processing Report* (DAPR) for OPR-J977-TE-08, Paragraphs A. Equipment and B. Quality Control. ***Included with survey deliverables.**

B.2.3.

B.2.4. Shallow Water Multibeam

No conditions with the potential for adversely affecting data integrity were encountered on the *M/V Bella Marie* with the shallow water multibeam suite used during this survey. **Concur.**

Multibeam confidence checks were conducted on the *M/V Bella Marie* to verify proper operation of the multibeam suite on an as needed basis. The confidence checks were performed by comparing nadir beam depths with the depths measured with the VBES. The results of these comparisons and the line acquisition logs detailing aspects of quality control for each survey line are contained in ***SEPARATES I: ACQUISITION AND PROCESSING LOGS** of this report. **Concur. *Data filed with original field records.**

A detailed discussion of multibeam system calibrations, patch tests, data acquisition, and processing is provided in the Data Acquisition and Processing Report ** (DAPR) for OPR-J977-TE-08, Paragraphs A. Equipment and B. Quality Control. ****Data Included with survey deliverables.**

B.2.5. Crosslines

302 mainscheme lines totaling 1021 lineal nautical miles and 33 lines totaling 82 lineal nautical miles of crosslines were run during the 2008 survey of H11814. The ratio of the lineal nautical miles of crosslines to the lineal nautical miles of mainscheme lines, at 11.8 %, exceeds the 8% required by “NOAA, NOS Hydrographic Surveys Specifications and Deliverables,” April 2007, Section 5.1.4. **Concur.**

Crossline analysis was conducted by creating a BASE surface of the mainscheme lines and a separate BASE surface using the crosslines. The surfaces were then compared and the difference between the surfaces was computed. **Concur.**

26,671 surface difference values were analyzed in H11814 and 100% of these values were within the allowable error based on water depth. **Concur.**

A comprehensive explanation of the crossline analysis process is in the Data Acquisition and Processing Report* (DAPR) for OPR-J977-TE-08, Paragraphs A. Equipment and B. Quality Control. ***Included with survey deliverables.**

B.2.6. Contemporary Survey Junctions

H11814 junctions with two other contemporary surveys. The easterly limits of H11814 junctions with the westerly limits of H11815 (OPR-J977-TE-08). H11814 also junctions with D00141, a singlebeam reconnaissance survey along its eastern boundary. **Concur.**

Five meter BASE surfaces were created for each survey in the area of overlap. CARIS Subset Editor was then used to analyze the difference between sounding values for each sheet at each survey junction. The soundings are in general agreement between the surveys. No adjustments are recommended based on the junction analysis. **Concur.**

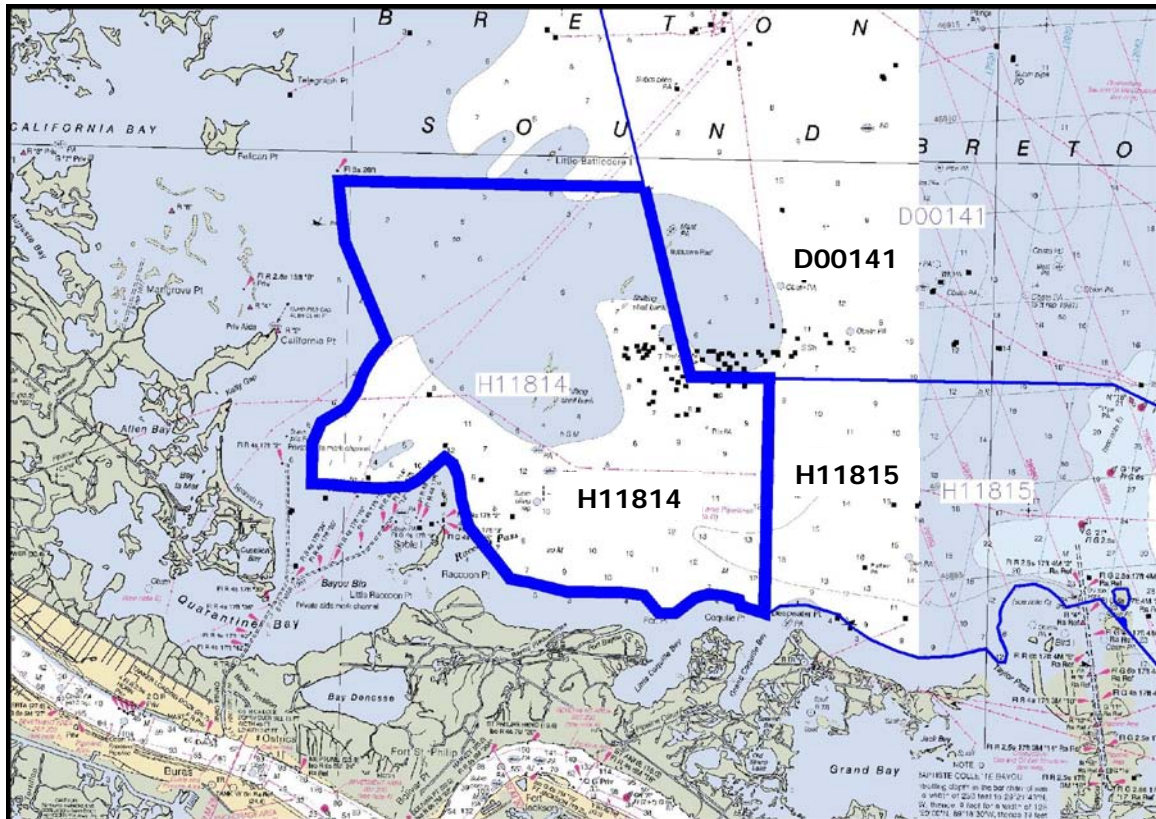


Figure 2 – Overview of survey area showing the junction locations of H11814 with H11815, and D00141 (OPR-J977-TE-08). Chart 11364, 41st Edition, December 2005.

B.3. Corrections to Echo Soundings

Survey H11814 was performed in conjunction with five other surveys in Project OPR-J977-TE-08. Any change to the corrections to echo soundings affects all surveys in the area and is described in detail in the DAPR*. ***Included with survey deliverables. Concur.**

Sounding data were reduced using zoning provided by NOAA/CO-OPS under the SOW with verified tides for the National Water Level Observation Network (NWLON) stations at Pilot Station East, LA (8760922) located at the Gulf of Mexico end of Southwest Pass, Bay Waveland Yacht Club, MS (8747437), Gulfport Harbor, MS (8745557) and two supplemental stations established for this survey. One supplemental station, Devon Energy Facility, LA (8760417) was installed by David Evans & Associates (DEA) under S-J977-KR-DEA-2008 but was maintained in continuous operation until the completion of OPR-J977-TE-08. The second supplemental station, Olga Compressor Station, LA

(8760889) was installed, maintained, and removed by TerraSond Ltd. in conjunction with survey operations conducted for OPR-J977-TE-08. Refer to the Horizontal and Vertical Control Report* (HVCR) for OPR-J977-TE-08, Paragraph A.5. Tide Correctors and Zoning, for tidal zoning methods and operations. **Included with survey deliverables. Concur.*

B.4. Data Processing

The final depth information for H11814 was submitted as a collection of CARIS BASE surfaces which best represented the seafloor at the time of the 2008 / 2009 survey. All possible measures were taken to ensure the data was correctly processed and the appropriate designated soundings, representing the least depth of significant contacts, were selected and retained in the finalized surfaces. *Concur with clarification. Some features and designated soundings edited and updated accordingly to ensure proper representation in the BASE surfaces and the feature file.*

One short singlebeam survey line was determined to contain a corrupted raw data file during post processing. The sidescan data collected concurrently with the corrupted singlebeam data was satisfactory. No contacts were found in the side scan data collected. The singlebeam data was deleted and the side scan data was retained. The corrupted data was collected during a line 225 meters in length immediately adjacent to the survey boundary. The discovery was made after the survey team had departed the area and it was not possible to re-run the line. *Concur.*

Table 4 - Rejected survey line details.

Vessel	Julian Day	Time	Line Number	Line Length
M/V Bella Marie	2008-319	1504	2008BE3191500_9001	225 m

Four digital products were submitted for the H11814. Two CARIS BASE uncertainty surfaces, one 5.0 meter resolution surface covering the entire survey area in which the finalized uncertainty was the greater of either the standard deviation of sounding values, or *a priori* uncertainty values and one 0.5 meter resolution surface for each multibeam development. Two sun-illuminated Digital Terrain Models (DTM) were also submitted. A 5.0 meter resolution DTM represented the singlebeam data and a 0.5 meter DTM was submitted for each multibeam target development. *Concur.*

The naming convention used for each grid was:

CARIS BASE Uncertainty Surface:

H11814_5m.hns

- 5m represents the 5.0 m resolution

H11814_05m_MB.hns

- 05m represents the 0.5 m resolution
- MB represents multibeam

Sun-Illuminated DTM:

H11814_5m.tif (singlebeam data)

- 5m represents the 5.0 m resolution

H11814_05m.tif (multibeam data)

- 05m represents the 0.5 m resolution

The Data Acquisition and Processing Report* (DAPR) for OPR-J977-TE-08, Paragraphs A. Equipment – Data Collection; and B. Quality Control contain a detailed discussion of the steps followed when acquiring and processing the 2008 survey data. **Included with survey deliverables.*

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

Sounding data were tide adjusted using final tide levels for National Water Level Observation Network (NWLON) stations at Pilot Station East, LA (8760922) located at the Gulf of Mexico end of Southwest Pass, Bay Waveland Yacht Club, MS (8747437), Gulfport Harbor, MS (8745557) and two supplemental stations: the historic USC&GS tide station at Devon Energy Facility, North Pass, LA (876-0417) and Olga Compressor Station, Grand Bay, LA (876-0889) The final zoning methodology is described in detail in the project wide HVCR*. *Concur. *Included with survey deliverables.*

The horizontal control datum used for this survey is the North American Datum of 1983 (NAD 83). The projection used was UTM, Zone 16 North. *Concur.*

Sounding position control was determined using a Differential Global Positioning System (DGPS). The primary source of navigation correctors was the United States Coast Guard DGPS station at English Turn, LA, StaID 292. Correctors from the USCG differential DGPS station at Mobile Point, AL, StaID 300, were used when the English Turn station was unavailable. A summary of weekly DGPS confidence checks is provided in ***SEPARATES I: ACQUISITION AND PROCESSING LOGS* included with this report. *Concur.*

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

D.1. Chart Comparison

The chart comparison for H11814 was performed by examining all raster navigational charts (RNC) and electronic navigation charts (ENC) covering the survey area and comparing charted depths with surveyed depths at the same location. CARIS HIPS was used to create 5 meter resolution soundings from the survey data which were used as a foreground layer with the RNC or ENC in the background. Each charted depth was compared with the 2008 / 2009 survey soundings at, or closest to, the same location. The RNC / ENC depth and the shoalest corresponding 2008 / 2009 survey sounding was then analyzed to determine trends. All depths were recorded in feet and, where the survey depth was deeper or shallower than the charted depth by a factor greater than or equal to 10% of the water depth, the position, charted depth, survey depth and an image showing the depths being compared were included in ****APPENDIX V: SUPPLEMENTAL RECORDS AND CORRESPONDENCE.* *Concur.*

Local Notice to Mariners (LNM) updates were applied to all RNC's and ENC's during the survey of H11814 to ensure the field observations represented the most current published information available. LNM number 08-08-2009 dated February 26, 2009 was the last LNM reviewed for this project. *Concur.*

***Data filed with original field records.*

****Data appended to this report.*

There were 7 features submitted as Dangers to Navigation (DTON) for the 2008 / 2009 survey. A copy of each DTON is included in **APPENDIX I: DANGER TO NAVIGATION REPORTS. **Concur with clarification. Only six D toNs were submitted to AHB as per SOW. DtoN1 Wreck submitted directly to USCG; DtoN 2-6 submitted to AHB. *Data appended to this report.***

All survey data were compared to the data published in the Raster Navigational Chart (RNC) and Electronic Navigation Chart (ENC) listed in Table 5 and Table 6. Figure 3 and Figure 4 show the survey limits with respect to the RNC's and ENC's used for chart comparison. **Concur.**

Table 5 - Raster Navigational Charts used during chart comparisons.

Chart	Scale	Edition Number	Issue Date
11364	1:80,000	42	September 2007

Table 6 - Electronic Navigation Charts used during chart comparisons.

Cell Name	Chart	Scale	Edition Number	Issue Date
US4LA35M	16664	1:80,000	23	May 29, 2008

All charted features were investigated visually, with side scan sonar and singlebeam echosounder as appropriate. High levels of turbidity and biomass limited visibility in the water column to a few inches over the entire survey area and the ability to visually examine features in the water was significantly reduced, even in very shallow water. **Concur.**

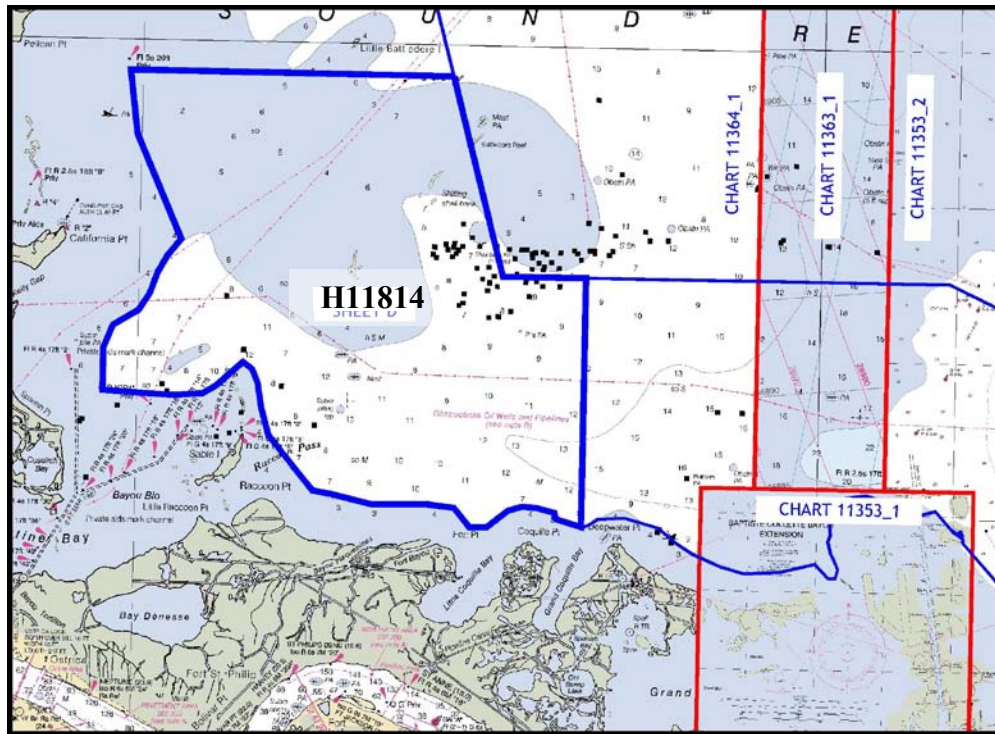


Figure 3- Survey limits of H11814 shown with RNC's 11353, 5th Edition, 11363, 41st Edition and 11364, 42nd Edition.

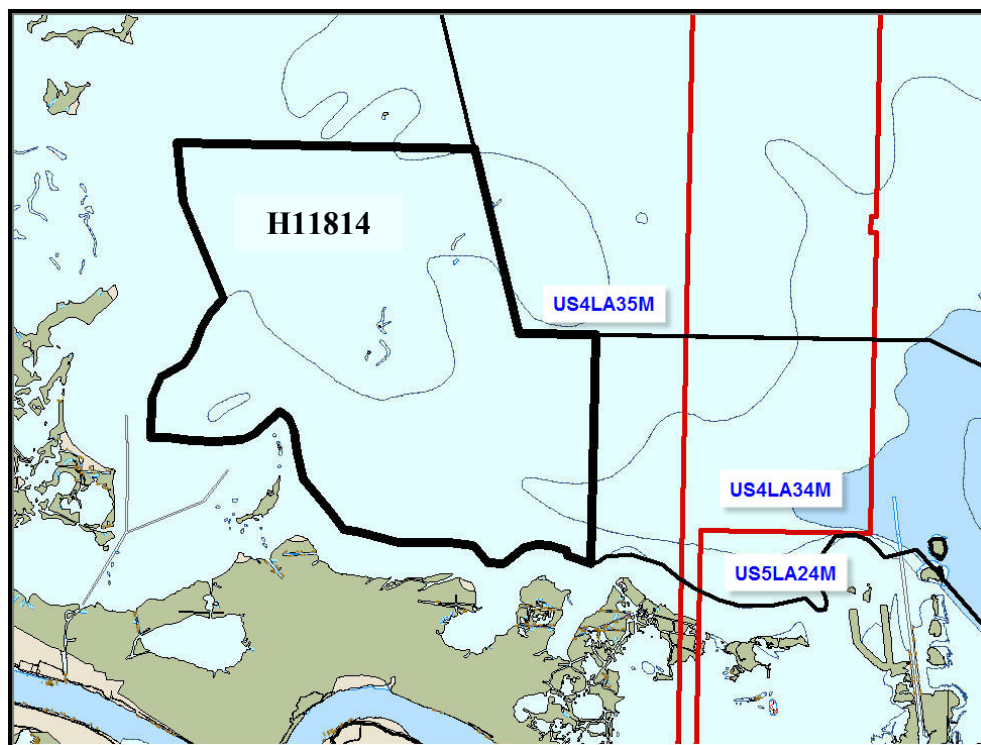


Figure 4- Survey limits of H11814 shown with ENC US4LA34M, 1st Edition, US4LA35M, 23rd Edition and ENC US5LA24M, 24th Edition.

Paragraphs D.1.1 through D.1.5 detail specific discrepancies between the charts and the 2008 / 2009 survey data.

D.1.1. New Features

The 2008 / 2009 survey identified 10 features which are not currently charted. An overview of H11814 showing the location of the new features is shown in Figure 5 and a detailed description is contained in Table 7.

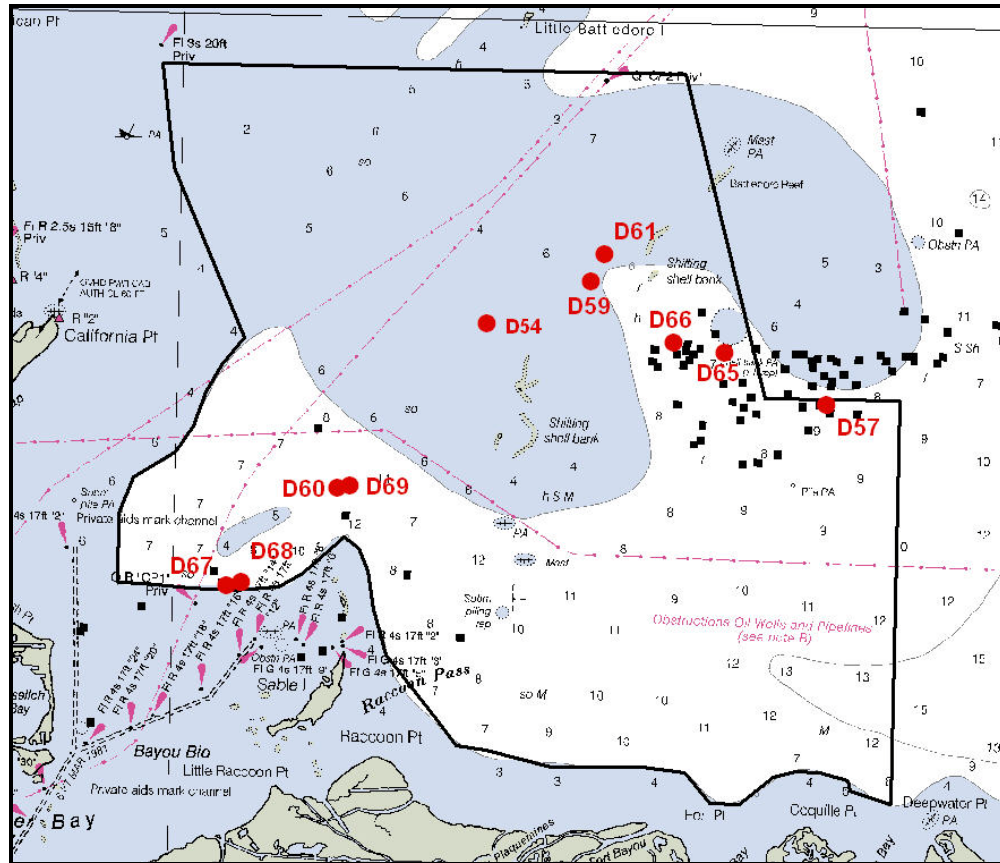


Figure 5 - Overview of H11814 showing locations of uncharted features. Chart 11364, 42nd Edition.
Depths in feet. Concur with clarification. The positions of D67 and D68 should be swapped in Figure 5 to correlate with Table 7.

Table 7 - Detailed description of uncharted features shown in Figure 5 positioned during OPR-J977-TE-08 survey in H11814.

Feature ¹	Latitude	Longitude	Least Depth	Description
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Feature ¹	Latitude	Longitude	Least Depth	Description
D54	29° 27' 33.88" N	089° 27' 11.33" W	1.92 m <i>6.299 ft</i>	Uncharted wreck. DTON submitted. <i>Concur. DTON 1- shown on latest edition of the chart. Recommend delete charted 4 ft wreck and add 6 ft wreck at the present survey position. See Appendix 1.</i>
D57	29° 26' 58.50" N	089° 24' 05.42" W	N/A	Uncharted piling. <i>Concur. Add visible pile. See H-Cell Report Section D.1.1.a.</i>
D59	29° 27' 54.64" N <i>29° 27' 53.92" N</i>	089° 26' 15.28" W <i>089° 26' 15.29" W</i>	2.50 m <i>2.51 m</i> <i>8.245 ft</i>	Uncharted obstruction. <i>Do not concur. Feature not recommended for charting. See H-Cell Report Section D.1.1.b.</i>
D60	29° 26' 14.15" N	089° 28' 30.60" W	1.977 m <i>6.486 ft</i>	Uncharted obstruction. <i>Concur with clarification. Recommend delete charted 5 foot obstruction and Obstn (rep 2008) note. It is recommended to add a 6 ft obstruction at the present survey location. DTON 6 - shown on latest edition of the chart. See Appendix 1.</i>
D61	29° 28' 07.75" N <i>07.7556</i>	089° 26' 08.21" W <i>08.2140</i>	Awash <i>Covers and Uncovers</i>	Uncharted obstruction. <i>Concur with clarification. DTON submitted to MCD and is shown on the chart as Obstn (uncovers). Recommend to delete the charted Obstn (uncovers) and add an obstruction (uncovers) Rep 2009 in the present survey position. DTON 3A</i>

Feature ¹	Latitude	Longitude	Least Depth	Description
D65	29° 27' 22.44" N	089° 25' 01.67" W	1.18 m ² <i>3.872 ft</i>	Uncharted obstruction. DTON submitted. <i>Do not concur. No DTON was received at AHB and obstruction has not been applied to the chart. Obstruction is in close proximity to charted platform and obstruction area. No changes to charting recommended.</i>
D66	29° 27' 26.33" N	089° 25' 29.33" W	1.43 m² <i>1.776m</i> <i>5.826ft</i>	Uncharted obstruction. DTON submitted. <i>Do not concur. DTON not sent to MCD due to close proximity to charted platform. No changes to charting recommended.</i>
D67	29° 25' 28.53" N	089° 29' 21.97" W	1.59 m ²	Uncharted obstruction. DTON submitted. <i>Concur with clarification. No DTON was received at AHB and obstruction has not been applied to the chart. SSS is source. Recommend to add Obstn symbol and note Obstns (rep 2009) in present survey location to cover items D67 and D68.</i>
D68	29° 25' 26.57" N	089° 29' 30.34" W	1.19m ²	Uncharted obstruction. DTON submitted. <i>Do not concur. No DTON was received at AHB, and obstruction has not been applied to the chart. SSS is source. Do not chart due to close proximity to above obstn and charted platform.</i>
D69	29° 26' 15.11" N	089° 28' 23.83" W	2.645 m	Uncharted obstruction. <i>Do not concur. In close proximity to Feature D60. Do not chart.</i>

¹Feature designator corresponds to the identification number used in the master contact file (APPENDIX V: SUPPLEMENTAL RECORDS AND CORRESPONDENCE: D.1. CHART COMPARISON).

²Least depth determined from side scan record.

Table 8 - Nautical charts, raster and electronic, which require updating to include the uncharted features.

Chart Number	Scale	Edition Number	Edition Date
11364	1:80,000	42	September 2007

ENC	Chart	Scale	Edition Number	Issue Date
US4LA35M	11364	1:80,000	23	May 29, 2008

The hydrographer recommends updating the charts listed in Table 8 to include the new features positioned during the 2008 / 2009 survey.

D.1.2. Changed Features

Area Features

There are four (4) charted area features in H11814 described as “shifting shell banks” or “shell banks.” Two of the features, listed as A and D in Table 9 and illustrated in Figure 6, were not found during the 2008 / 2009 survey and are recommended for removal from the chart (refer to paragraph D.1.3. Disproved Features). *Concur delete intertidal areas and Shifting shell bank notes. Update area based on present survey data.*

Two features, identified as B and C in Figure 6 and Table 9, appear on the chart in close proximity to similar features appearing in the survey data. The data source which produced the charted features was not known at the time of the 2008 / 2009 survey. This limits the validity of speculation regarding any possible migratory trends of the charted features. *Concur with conditions. Both Feature B and Feature C were disproven by the present survey. It is recommended that the intertidal area and shifting shell bank note are deleted. It is further recommended that the obstruction area and the shell bank PA (1 ft rep) note are deleted from the chart. It is also recommended that the area is updated with present survey data.*

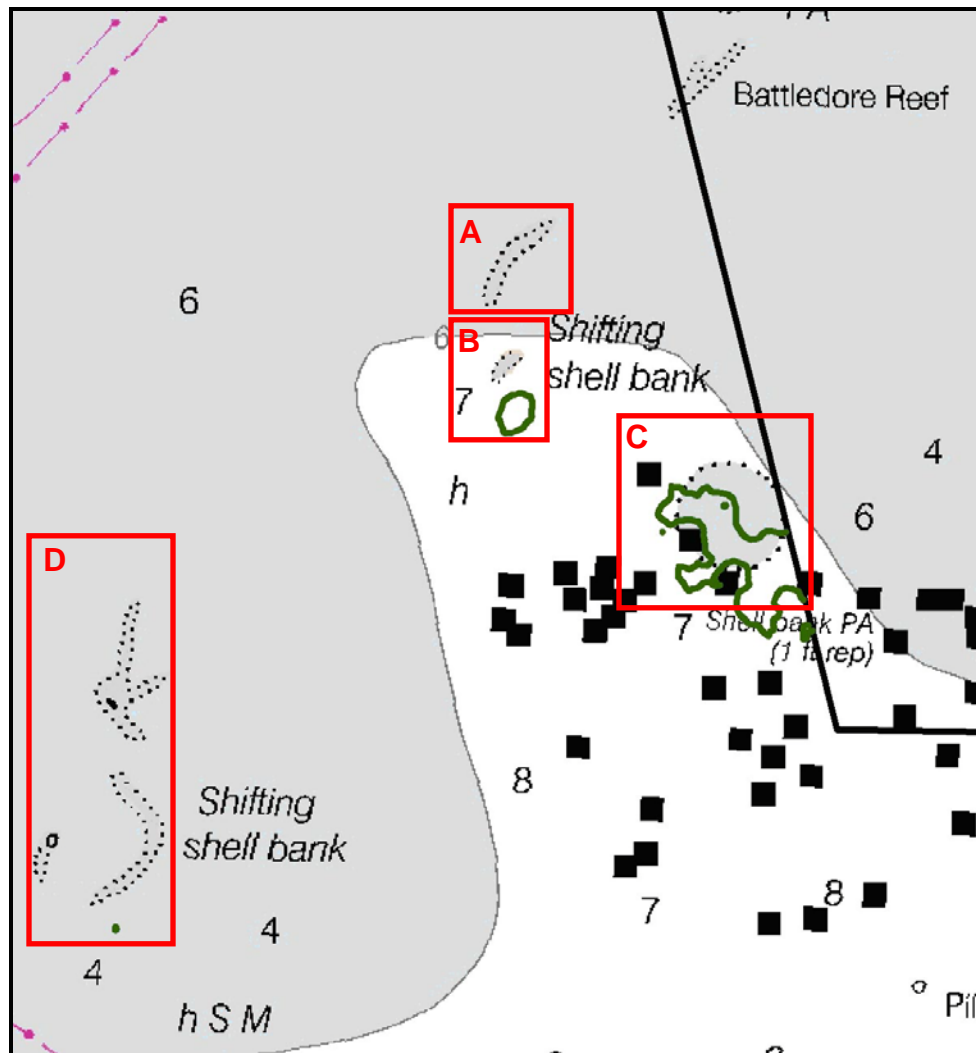


Figure 6 - Charted shoal features in H11814. Chart 11364, 42nd Edition. Depths in feet.

Table 9 - Charted area features in H11814.

Feature	Charted Feature	Charted Depth	Survey Depth	Remarks
A	Shifting Shell Bank	Not specified	8 - 9 ft	Not found. <i>Concur. Delete intertidal area.</i>
B	Shifting Shell Bank	Not specified	7 - 8 ft	Possible shift south. <i>Do not concur. Delete intertidal area and Shifting shell bank note.</i>

Feature	Charted Feature	Charted Depth	Survey Depth	Remarks
C	Shell Bank PA	(1 ft rep)	5 ft	Supported by survey data. <i>Do not concur. Delete obstruction area and the shell bank PA (1 ft rep) note from the chart.</i>
D	Shifting Shell Bank	Not specified	6 – 9 ft	Not found. <i>Concur. Delete intertidal area and Shifting shell bank note.</i>

The feature immediately south of charted feature “B”, and shown in detail in Figure 7, may be the current position of the charted feature but it could also represent an entirely new feature. No bottom samples were taken directly on the indicated feature but samples collected in the vicinity were high in shell content and this tends to corroborate the charted “shell bank” attribute. *Do not concur. Insufficient evidence to support existence of shell bank. Recommend to remove feature from the chart and chart shoal sounding data per present survey findings.*

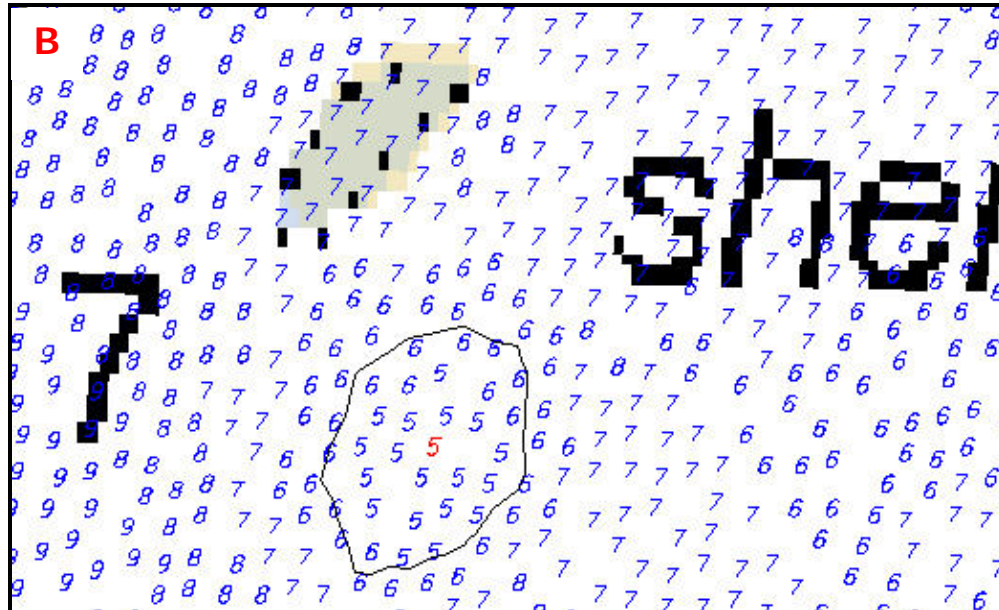


Figure 7- Reported shoaling area "B" in H11814. The 6-foot contour is shown by the grey line. Chart 11364, 42nd Edition. Depths in feet.

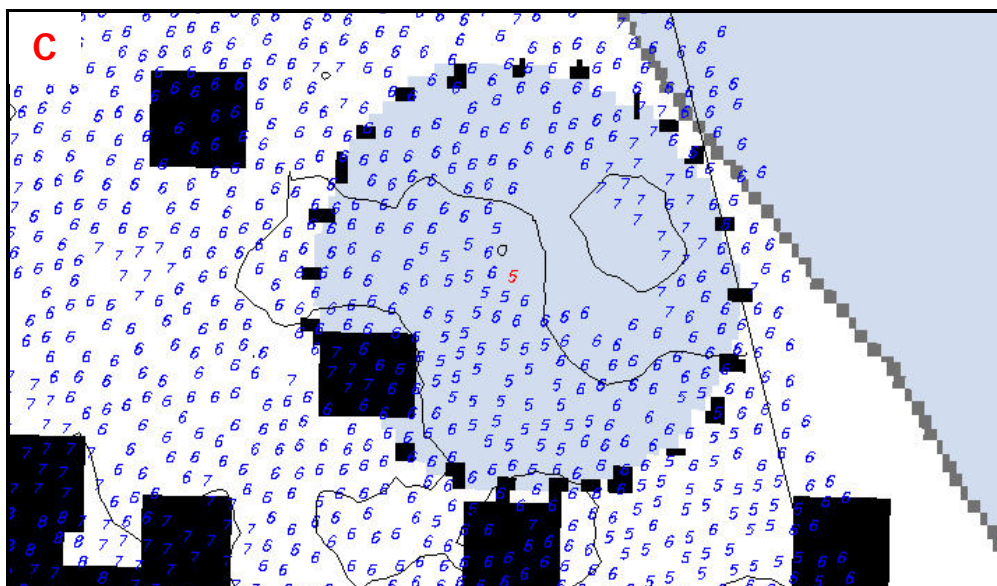


Figure 8- Reported shoaling area "C" in H11814. The 6 and 7-foot contours are shown by the grey lines. Chart 11364, 42nd Edition. Depths in feet. Note: the large blank space in the center of the feature is occupied by a large, multi-platform, oil related structure.

The feature charted as "shell bank PA (1 ft rep)", shown in detail in Figure 8, was found to be generally in the same position as charted. The "1 ft rep" depth was not supported by the 2008 / 2009 survey as the shoalest depth found in the vicinity of the feature during the survey was five (5) feet. It is significant to note that a large, multi-platform, oil related structure was located within the charted feature and the depths within the perimeter of the structure could not be measured. *Concur with conditions. A rea not t thoroughly investigated to disprove its existence. Retain obstruction area feature and Shell bank PA (1 ft rep) note.*

The shallow waters of Breton Sound are located in a very dynamic depositional and erosional environment. They are also subject to frequent major storm events which modify the bathymetry on a grand scale. *Concur.*

They hydrographer recommends that *the latest editions of* RNC 11364, 42nd Edition and ENC US4LA35M, 23rd Edition be updated to reflect the location and depths of the area features positioned during the 2008 / 2009 survey *present survey findings. Concur.*

D.1.3. Disproved Features

Point Features

Four (4) features, which appear on *the latest editions of* RNC 11364, 42nd Edition and ENC US4LA35M, 23rd Edition within the boundaries of H11814, were searched for but not found during the 2008 / 2009 survey. The locations of these features are shown in Figure 9 and a detailed description of the features is contained in Table 10. A complete listing of all features investigated in H11814 is provided in **APPENDIX V: SUPPLEMENTAL RECORDS AND CORRESPONDENCE: D.1. CHART COMPARISON II: SURVEY FEATURES REPORT. Concur. *Data appended to this report.*

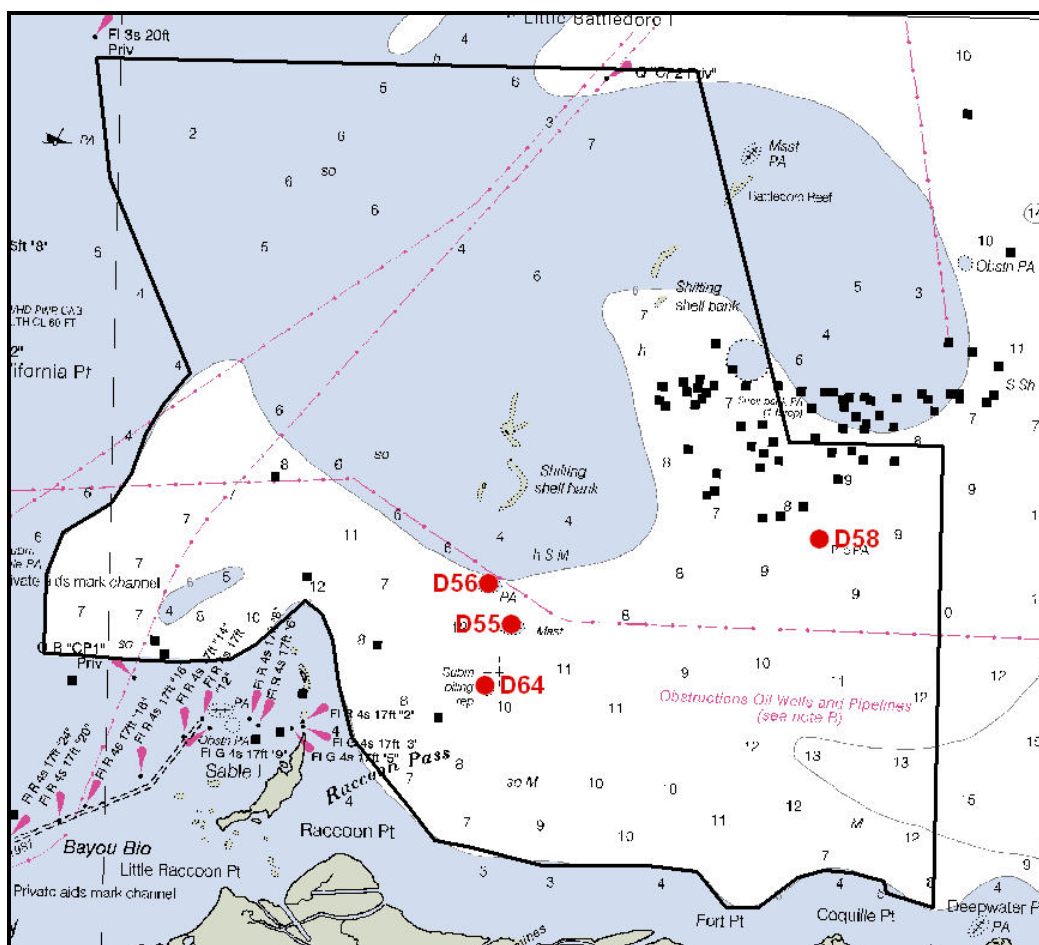


Figure 9 - Overview of H11814 showing the locations of charted featured which were searched for but not found during OPR-J977-TE-08. RNC 11364, 42nd Edition. Depths in feet.

Table 10 - Detailed description of charted features shown in Figure 9 searched for but not found during OPR-J977-TE-08 survey in H11814.

Feature ¹	Latitude	Longitude	Description	Remarks
D55	29° 25' 43.00"	89° 26' 48.65 .646"	Wreck	Searched for with SSS. Not found. Concur. Delete charted wreck.
D56	29° 26' 00.00"	89° 27' 00.00"	Wreck	Searched for with SSS. Not found. Concur. Delete charted wreck.
D58	29° 26' 21.07 20.310"	89° 24' 23.38 .285"	Piling	Searched for visually and with SSS. Not found. Concur. Delete charted piling.
D64	29° 25' 17.60"	89° 27' 00.342"	Submerged piling rep PA	Searched for visually and with SSS. Not found. Delete charted submerged piling.

¹Feature designator corresponds to the identification number used in the master contact file (APPENDIX V: SUPPLEMENTAL RECORDS AND CORRESPONDENCE: D.1. CHART COMPARISON).

The hydrographer recommends that *the latest editions of* RNC 11364, ~~42nd Edition~~ and ENC US4LA35M, ~~23rd Edition~~ be updated with the 2008 / 2009 survey data and that the features listed in Table 10 be removed from the charts. *Concur.*

Area Features

Two (2) shoaling areas, list as “shifting shell banks” are indicated on the raster navigational charts covering H11814. The features, listed as A, Da and Db in Table 11 and shown in detail ~~with~~ *on the latest edition of* chart 11364, ~~41st Edition~~ in Figure 10 through Figure 12, were not found during the 2008 / 2009 survey. The bathymetry in all three locations was uniform and the sounding density was adequate to disprove the existence of shoaling features at the specified locations. The hydrographer recommends that the charted features be removed from chart 11364, ~~41st Edition~~. *Concur, remove intertidal areas listed below and update areas with present survey findings.*

Table 11- Charted shoaling areas reported in H11816.

Feature	Latitude	Longitude	Charted Depth	Survey Depth
A	29° 28' 14.59" N	089° 25' 43.24" W	Not specified	8 – 9 ft
Da	29° 27' 05.25" N	089° 26' 52.36" W	Not specified	10 ft
Db	29° 26' 38.48" N	089° 26' 45.69" W	Not specified	7 – 9 ft

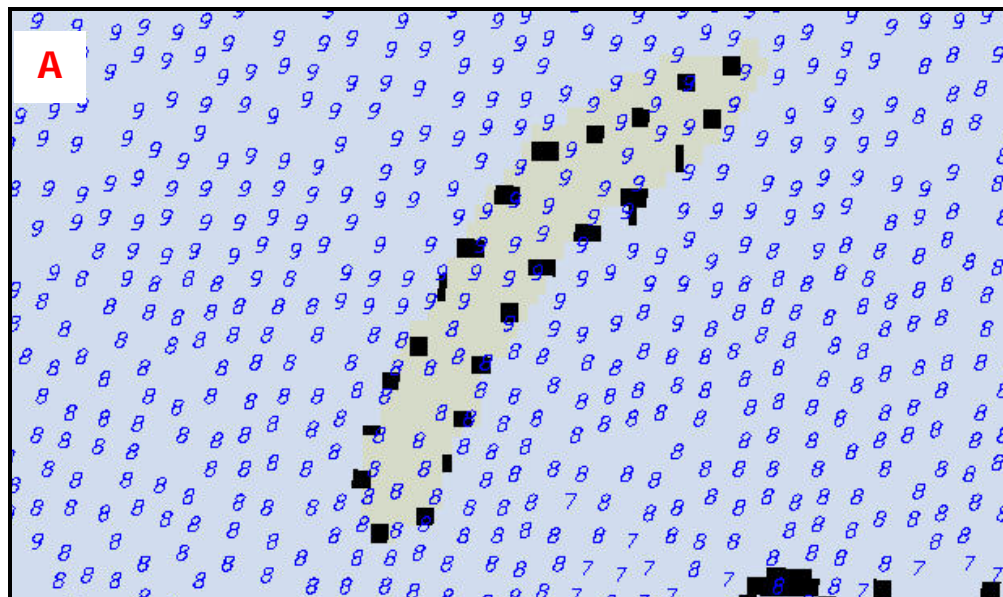


Figure 10- Reported shoaling area "A" in H11814. Chart 11364, 42nd Edition. Depths in feet.

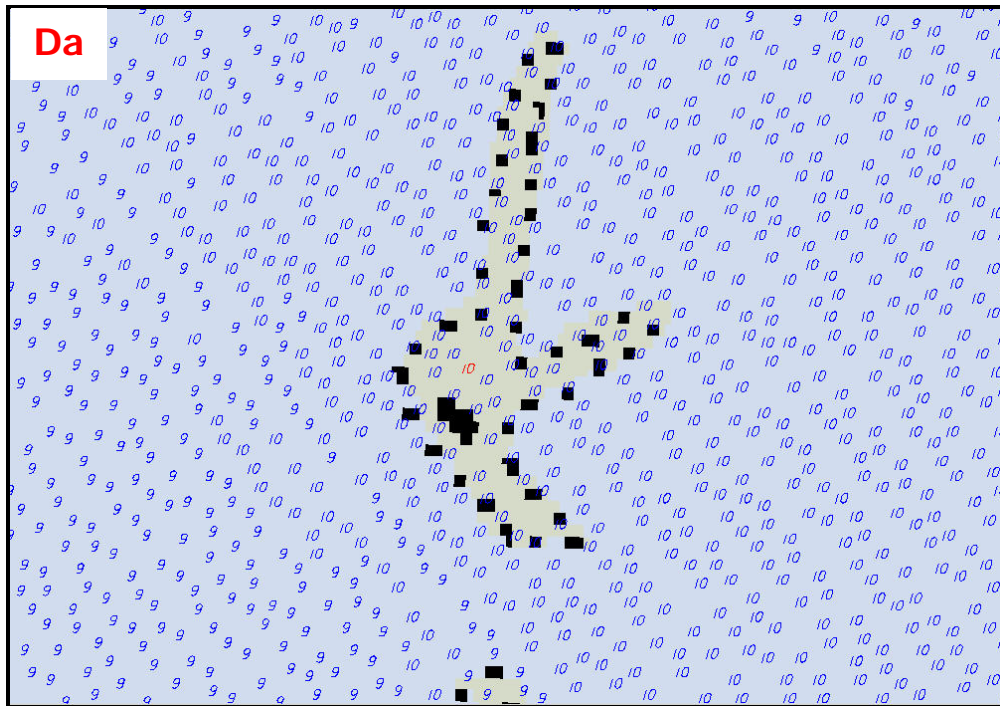


Figure 11- Reported shoaling area "D", northern portion, in H11814. Chart 11364, 42nd Edition.
Depths in feet.

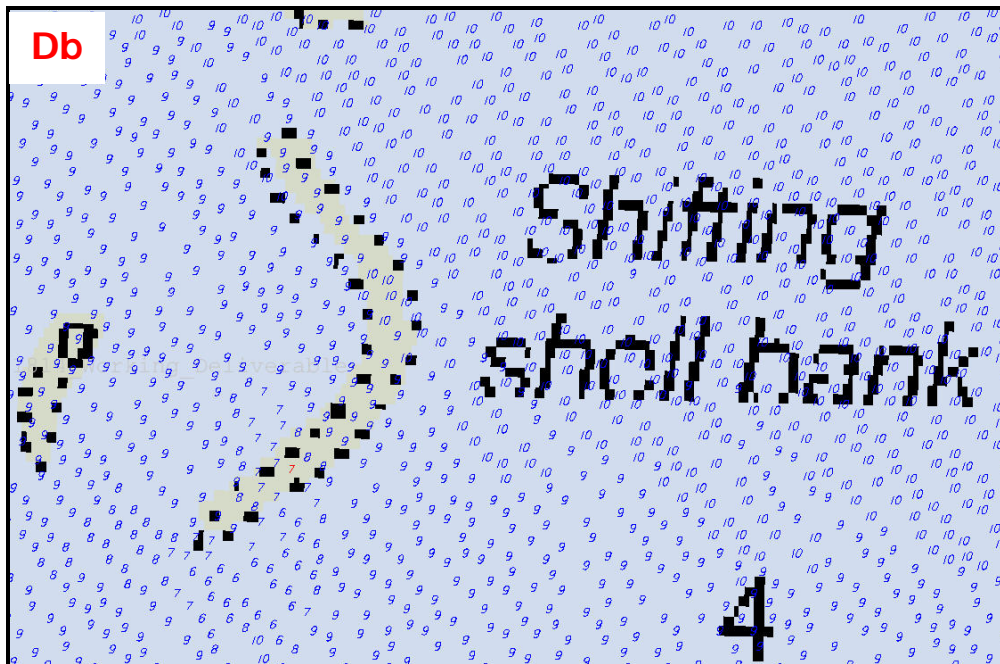


Figure 12 - Reported shoaling area "D", southern portion, in H11814. Chart 11364, 42nd Edition.
Depths in feet.

D.1.4. Soundings

The 2008 / 2009 survey depths differ significantly from the depths depicted on the RNC and ENC covering H11814. The result of this comparison is summarized in Table 12. A complete listing of all charted and survey depths used in this comparison is located in ***APPENDIX V: SUPPLEMENTAL RECORDS AND CORRESPONDENCE: DA.1.4. SOUNDINGS. Concur. *Data appended to this report.**

Table 12- Summary of charted depths compared with surveyed depths.

Chart	Total Charted Depths¹	Chart Shoaler than Survey	Chart Deeper than Survey
11364	53	41 (77%)	12 (23%)
US4LA35M	46	34 (74%)	12 (26%)

¹This includes only the charted depths which varied from the survey data by $\geq 10\%$ of the water depth.

Generally, the 2008 / 2009 survey data indicate that the water depths in H11814 are deeper than the depths depicted on the charts covering the area. The sounding density of the survey adequately delineated the bathymetry in H11814 and the hydrographer recommends updating *the latest edition of* RNC 11364, 42nd-Edition and ENC US4LA35M, 24th-Edition, to reflect the 2008 / 2009 survey data. **Concur.**

D.1.5. Trends and Changeable Areas

The 2008 / 2009 survey contours were compared with the charted contours in H11814. The charts used for this comparison are shown in Figure 13 and Figure 14.

The contours generated from the 2008 / 2009 survey data differ significantly from the contours depicted on the RNC and the ENC covering the survey area. H11814 is located in a very dynamic coastal environment which is subject to significant erosion, deposition and along-shore sediment transportation on a recurring, short-term, basis. Local watermen have reported changes in the bathymetric and surface feature character of Chandeleur Sound with each hurricane that has impacted the area in the past 25 years. **Concur.**

Figure 13 - OPR-J977-TE-08 survey contours for survey H11815 shown with raster navigational chart 11364, 42nd Edition. Depths in feet.

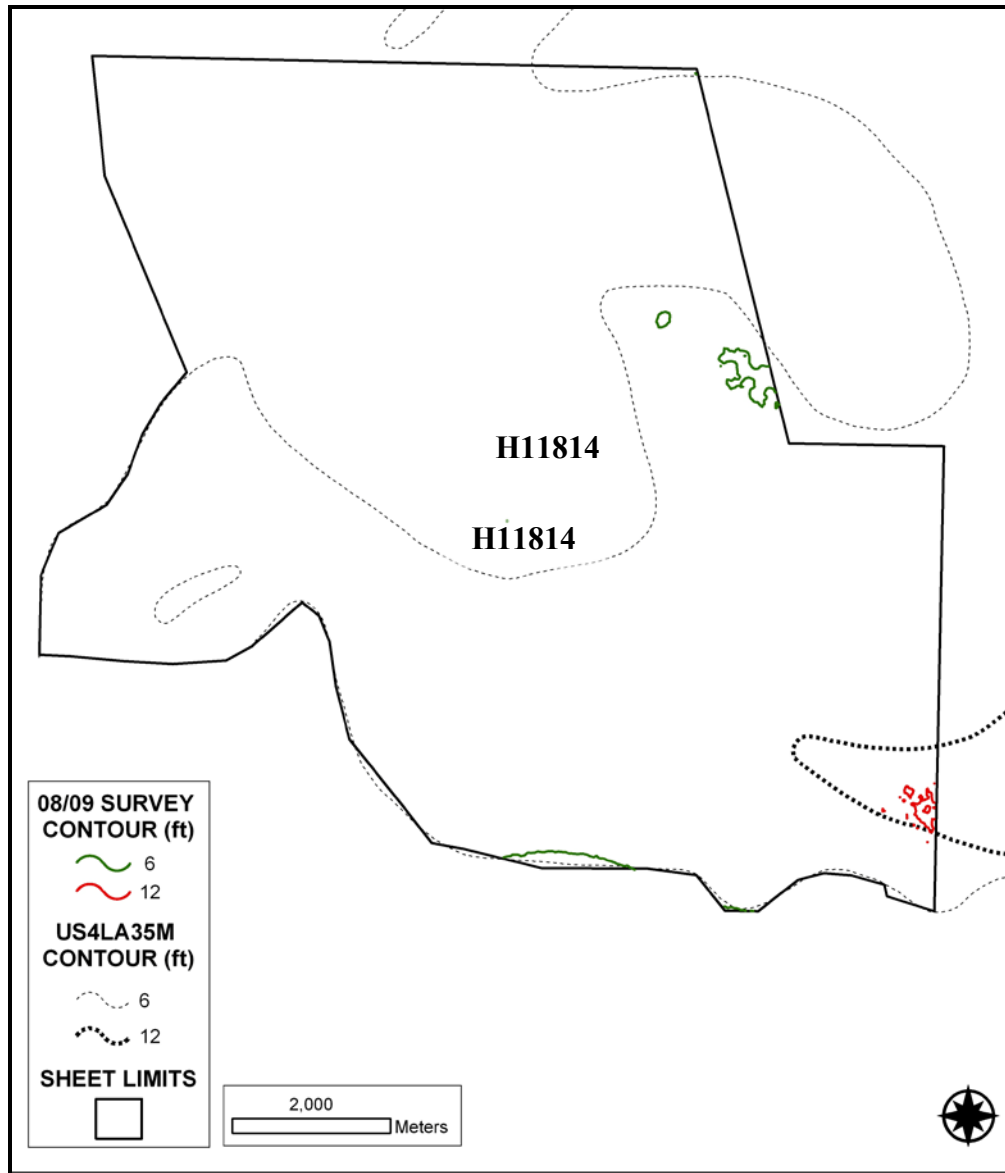


Figure 14 - OPR-J977-TE-08 survey contours for the southern portion of survey D00142 shown with electronic navigation chart 11361, US4LA35M, 23rd Edition.

D.2. Additional Results

D.2.1. AWOIS Items Summary

Investigation of Automated Wreck and Obstruction Information System (AWOIS) items was not required under this task order. **Concur.**

The online AWOIS data base (<http://www.nauticalcharts.noaa.gov/hsd/awois.html>) was examined and no AWOIS records were found which fell within the survey boundaries. **Concur.**

D.2.2. Aids to Navigation

One (1) non-floating aid to navigation was located within the boundaries of H11814. Unless otherwise noted, this aid to navigation appeared as charted, matched the Light List and charted characteristics and served its intended purpose. *Concur with conditions. The beacon should be retained as charted; the associated light should be deleted and replaced with a light in the charted position, with an amber colored light instead of a white light, based on present survey findings.*

Refer to *APPENDIX V: SUPPLEMENTAL RECORDS AND CORRESPONDENCE for a tabular listing and description of all aids to navigation in H11814. *Concur. *Data appended to this report.*

D.2.3. Drilling Structures

Thirty-nine (39) oil and gas related structures were shown on *the latest edition of* RNC 11364, ~~42nd Edition~~ within the boundaries of H11814. All structures were positioned using DGPS in conjunction with CARIS Notebook. *Thirty (30)* charted structure positions were verified as charted. Nine (9) charted structures were searched for but not found. *Forty-five (45)*~~43~~ uncharted structures were positioned as “new” features. *Concur.*

Refer to *APPENDIX II: SURVEY FEATURE REPORT for a tabular listing of all oil and gas related structures in H11814 and their associated graphics files. *Concur. *Data appended to this report.*

D.2.4. Comparison with Prior Surveys

A comparison with prior surveys was not required under this task order. *Concur.*

D.2.5. Bottom Samples

Five (5) bottom samples were collected in H11814. The samples were distributed geographically to obtain a full representation of the bottom characteristics as specified in “NOAA Hydrographic Surveys Specifications and Deliverables”, Section 7.1 as modified by the SOW. *Do not concur. NOS HSSD and SOW specify for bottom sample spacing to not exceed 2000 meters. H11814 bottom sample spacing is in excess of 3500 meters.*

Refer to *APPENDIX V: SUPPLEMENTAL RECORDS AND CORRESPONDENCE for a tabular listing and description of all bottom samples collected in H11814. *Concur. *Data appended to this report.*

D.2.6. Bridges and Overhead Cables

There are no bridges or overhead cables in the survey area. *Concur.*

D.2.7. Submarine Cables and Pipelines

Numerous submarine pipelines, active and abandoned, crisscross the survey area. These pipelines connect wellheads, production and distribution platforms, compressor stations and extend to the shore. Specific identification of individual pipelines was not pursued during OPR-J977-TE-08. Many exposed pipelines were identified as targets in the side scan sonar record and are included in *SEPARATES V: SIDE SCAN CONTACT LISTING AND IMAGES OF SIGNIFICANT CONTACTS. *Concur. *Data filed with original field records.*

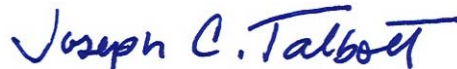
LETTER OF APPROVAL

REGISTRY NO. H11814

This report and the accompanying digital data are respectfully submitted.

Field operations contributing to the accomplishment of survey H11814 were conducted under my direct supervision with frequent personal checks of progress and adequacy. This report, digital data, and accompanying records have been closely reviewed and are considered complete and adequate as per the Statement of Work. Other reports submitted with this survey include the Data Acquisition and Processing Report and the Horizontal and Vertical Control Report.

I believe this survey is complete and adequate for its intended purpose.



Joseph C. Talbott, Lead Hydrographer
TerraSond Ltd.

Date April 28, 2009



APPENDIX I

Danger To Navigation Reports

REPORT OF DANGER TO NAVIGATION

Hydrographic Survey Registry Number: H11814

Survey Title: State: Louisiana
Locality: Chandeleur and Breton Sound
Sublocality: Southwest Breton Sound

Project Number: OPR-J977_TE-08
Survey dates: June 22, 2008 - Present
Survey Danger Acquisition Date and Time: November 20, 2008; 1647 UTC

Feature is reduced to Mean Lower Low Water using predicted NOAA tides and positioned on NAD 83.

Chart affected: 11364 42nd Edition/September 1, 2007, scale 1:80,000, NAD 83

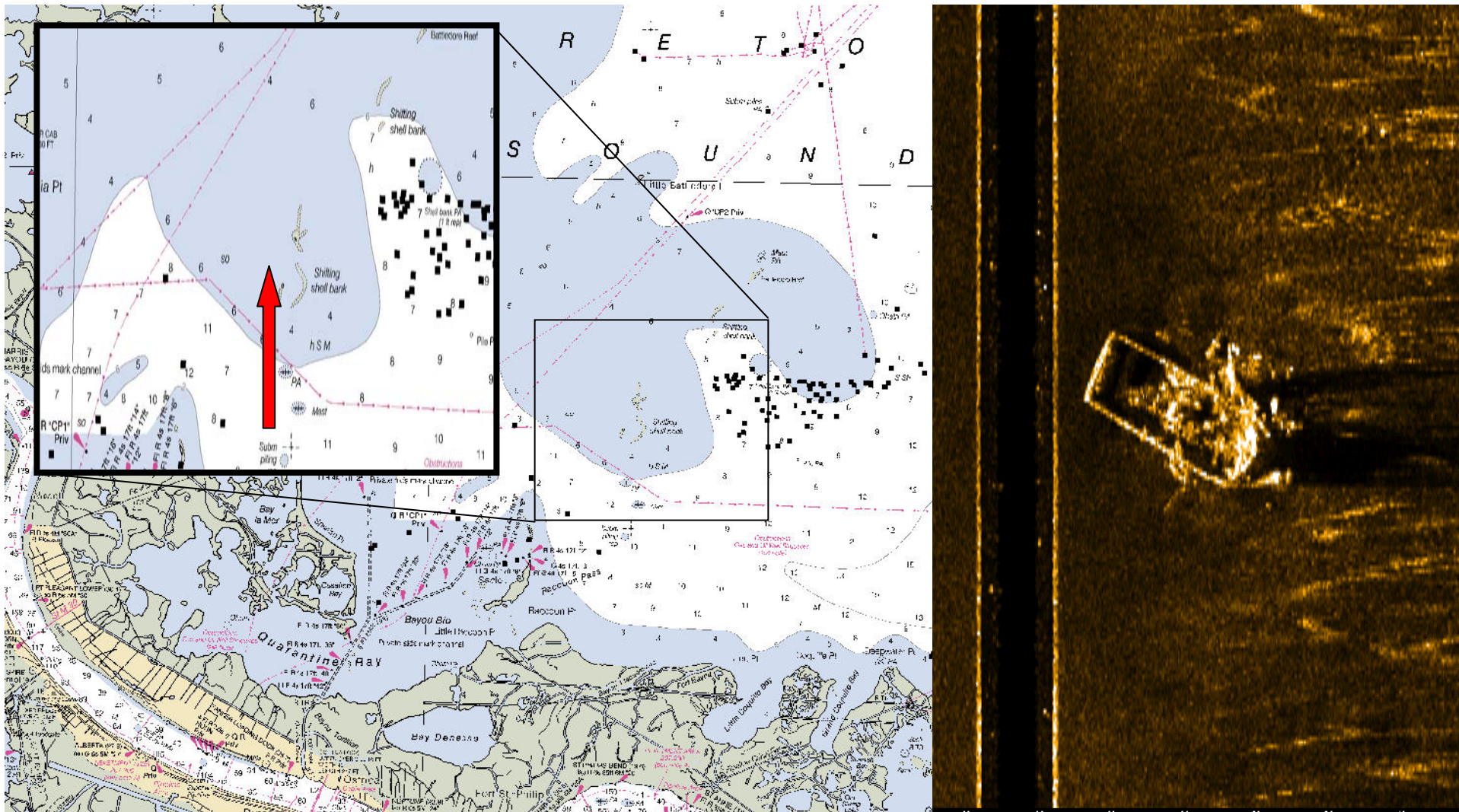
DANGER TO NAVIGATION

FEATURE	DEPTH (FT)	LATITUDE (N)	LONGITUDE (W)
Uncharted wreck	4.5 6.299 (1.92 m)	29/27/33.88	89/27/11.330

Dimensions of uncharted wreck are; length= 50ft, width= 15.7 ft, and height= 4.5 ft.
Obstruction is marked with a white buoy.

Questions concerning this report should be directed to Terrasond (907) 745-7215.

DTON #1: Shown on latest edition of the chart. Concur with clarification. Recommend delete charted 4 foot dangerous wreck. It is recommended to add a 6 ft dangerous wreck at the present survey location.



Uncharted Wreck found in Breton Sound with least depth of ~~4.5~~ **6.3** feet, corrected using predicted NOAA tides.

Chartlet 1 of 1 Sheet D

TERRASOUND
TERRESTRIAL AND SEA FLOOR MAPPING

Project: OPR-J977-TE-08
Survey: H11814
State: Louisiana
Locality: Breton Sound
Sub-locality: SW Breton Sound
Survey Scale: 1:20,000

Sounding Units: Feet
Sounding Datum: MLLW
Horizontal Datum: NAD 83
Projection: UTM 16N
Central Meridian: 153° 00' 00.00W
Scale Factor: 0.9996

R/V Bella Marie

November 20, 2008

H11814 DtoN#2 5-ft Obstruction

Registry Number: H11814
State: Louisiana
Locality: Breton Sound
Sub-locality: 3 NM East of California Point
Project Number: OPR-J977-TE-08
Survey Date: 11/20/2008

Charts Affected

Number	Edition	Date	Scale (RNC)	RNC Correction(s)*
11364	42nd	09/01/2007	1:80,000 (11364_1)	USCG LNM: 10/28/2008 (12/02/2008) NGA NTM: 10/18/2008 (12/06/2008)
11366	11th	01/01/2008	1:250,000 (11366_1)	[L]NTM: ?
11360	42nd	02/01/2007	1:456,394 (11360_1)	[L]NTM: ?
1115A	42nd	02/01/2007	1:456,394 (1115A_1)	[L]NTM: ?
11340	72nd	07/01/2007	1:458,596 (11340_1)	[L]NTM: ?
1116A	72nd	07/01/2007	1:458,596 (1116A_1)	[L]NTM: ?
11006	32nd	08/01/2005	1:875,000 (11006_1)	[L]NTM: ?
411	52nd	09/01/2007	1:2,160,000 (411_1)	[L]NTM: ?

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

Features

No.	Name	Feature Type	Survey Depth	Survey Latitude	Survey Longitude	AWOIS Item
1.1	5-ft Obstruction #2.1	GP	1.71 m	29° 26' 51.0" N	089° 23' 59.0" W	---

1 - Danger To Navigation

1.1) 5-ft Obstruction #2.1**DANGER TO NAVIGATION****Survey Summary**

Survey Position: 29° 26' ~~51.0~~ **50.99"** N, 089° 23' 59.0" W
Least Depth: 1.71 m (= 5.61 ft = 0.935 fm = 0 fm 5.61 ft)
TPU ($\pm 1.96\sigma$): **THU (TPEh)** [None] ; **TVU (TPEv)** [None]
Timestamp: 2008-325.14:13:56.000 (11/20/2008)
GP Dataset: H11814_DtoN#2.xls
GP No.: 1
Charts Affected: 11364_1, 11366_1, 1115A_1, 11360_1, 1116A_1, 11340_1, 11006_1, 411_1

Remarks:

Feature is reduced to Mean Lower Low Water using verified NOAA tides and positioned on NAD 83. Feature is an uncharted pipeline that is elevated above the sea floor. Dimensions of obstruction are; length= 51.4 ft, width= 2.6 ft, and height= 2.89 ft.

Feature Correlation

Address	Feature	Range	Azimuth	Status
H11814_DtoN#2.xls	1	0.00	000.0	Primary

Hydrographer Recommendations

Chart 5-ft Obstruction at the surveyed location. **Concur with conditions.**

Cartographically-Rounded Depth (Affected Charts):

5ft (11364_1)

0 ¾fm (1115A_1, 11360_1, 1116A_1, 11340_1, 11006_1, 411_1)

0fm 5ft (11366_1)

S-57 Data

Geo object 1: Obstruction (OBSTRN)
Attributes: CATOBS - 1:snag / stump
 INFORM - 5-ft Obstrn
 QUASOU - 6:least depth known

SORDAT - 20081120

SORIND - US,US,survey,H11814

TECSOU - 1,2:found by echo-sounder,found by side scan sonar

VALSOU - 1.71 m

VERDAT - 12:Mean lower low water

WATLEV - 3:always under water/submerged

Office Notes

DTON #2: Concur with conditions. Dangerous 5 ft obstruction is shown on the latest edition of the chart. Delete charted 5 ft dangerous obstruction. Add 5 foot dangerous obstruction (rep 2009) in presesnt survey location. Source of feature is SSS contact This Danger submission was preliminary. The feature was not disproved nor investigated. The submitted bathymetric grid does not include the submitted Danger feature. The submitted side scan sonar imagery proves the existance of the feature.

Feature Images

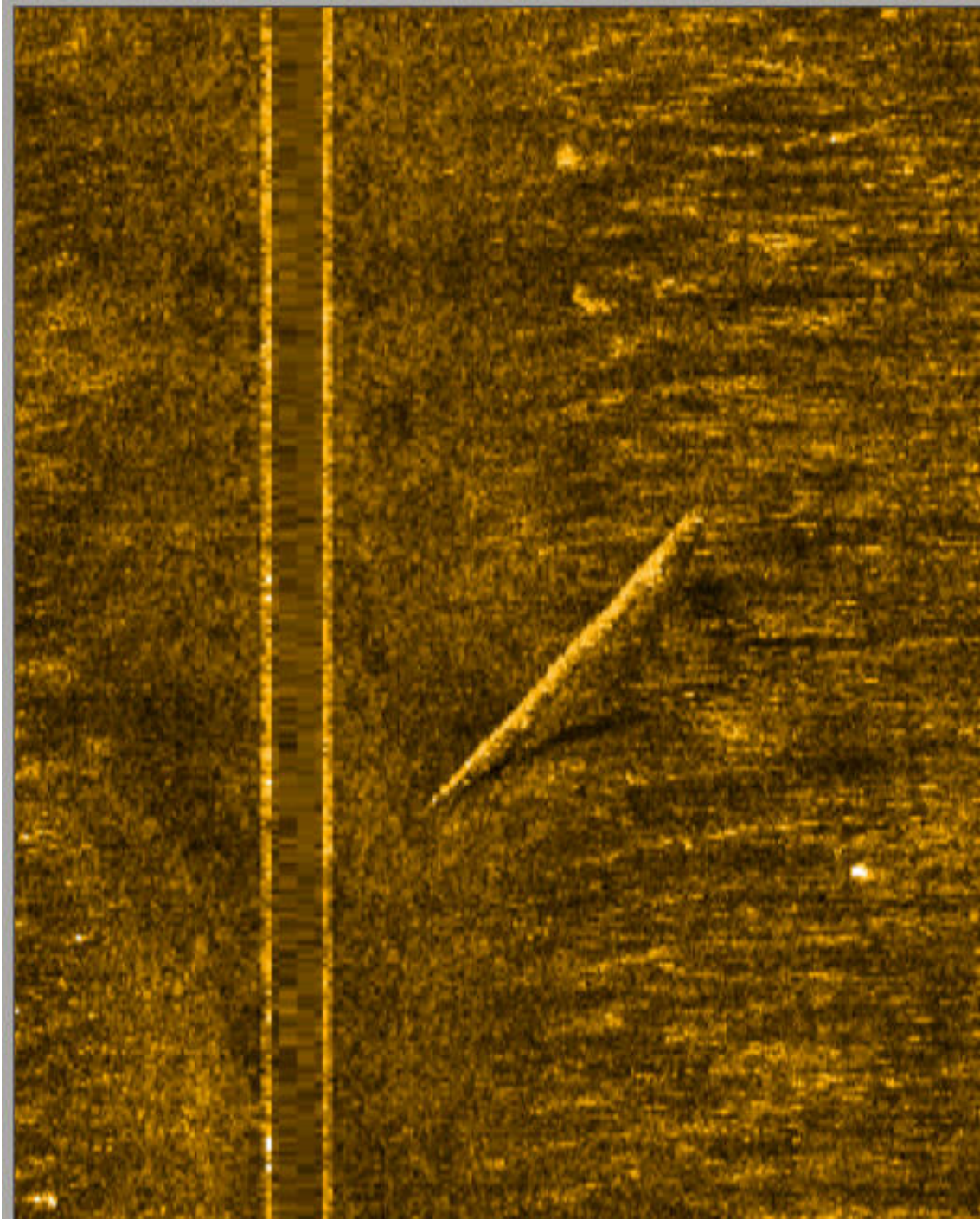


Figure 1.1.1

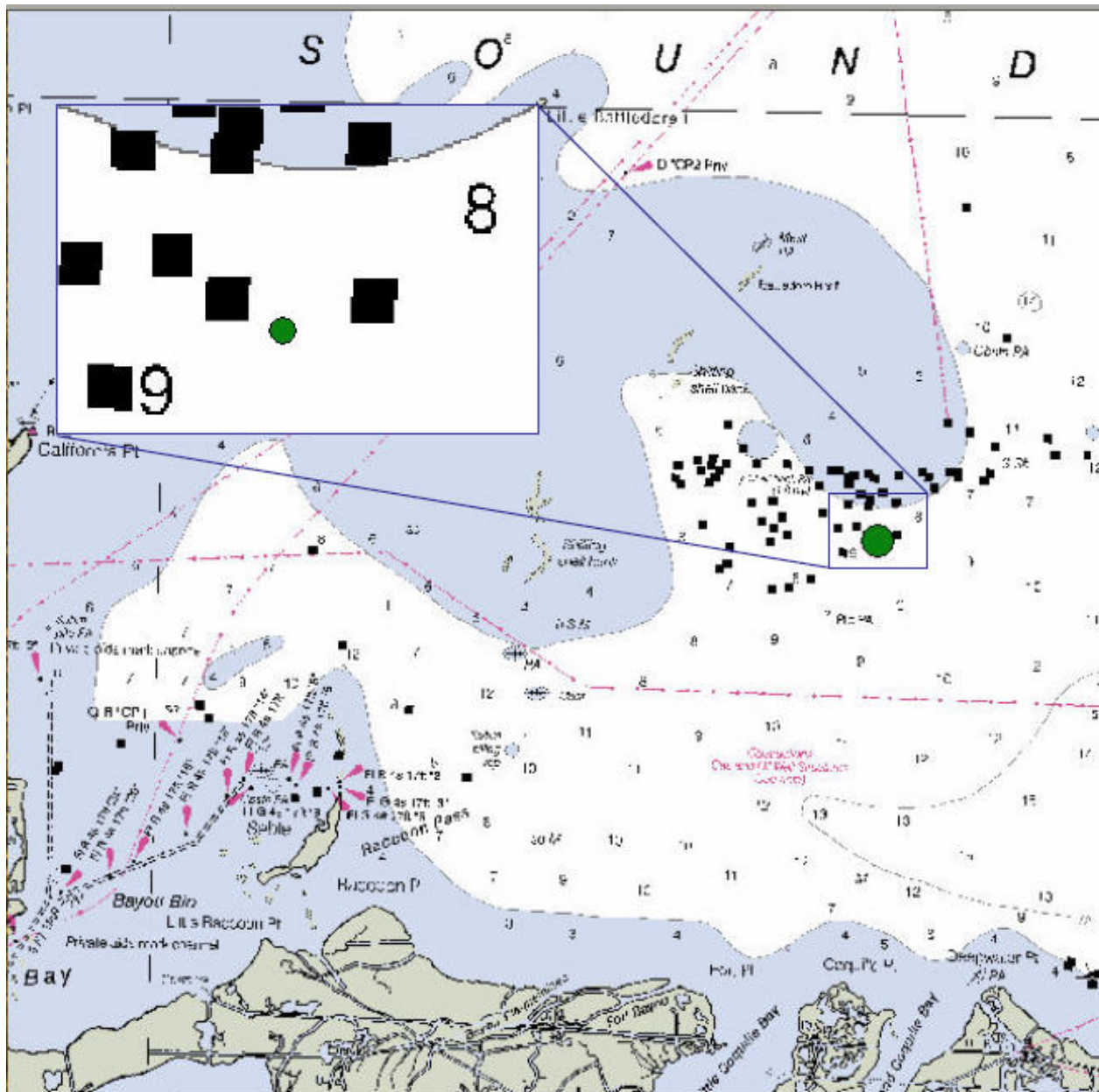


Figure 1.1.2

REPORT OF DANGER TO NAVIGATION

Hydrographic Survey Registry Number: H11814

Survey Title: State: Louisiana
Locality: Breton Sound
Sublocality: 3NM East of California Point

Project Number: OPR-J977_TE-08
Survey dates: June 22, 2008 - Present
Survey Danger Acquisition Date and Time: December 03, 2008; 1904 UTC

Feature is reduced to Mean Lower Low Water using verified NOAA tides and positioned on NAD 83.

Chart affected: 11364 42nd Edition/September 1, 2007, scale 1:80,000, NAD 83

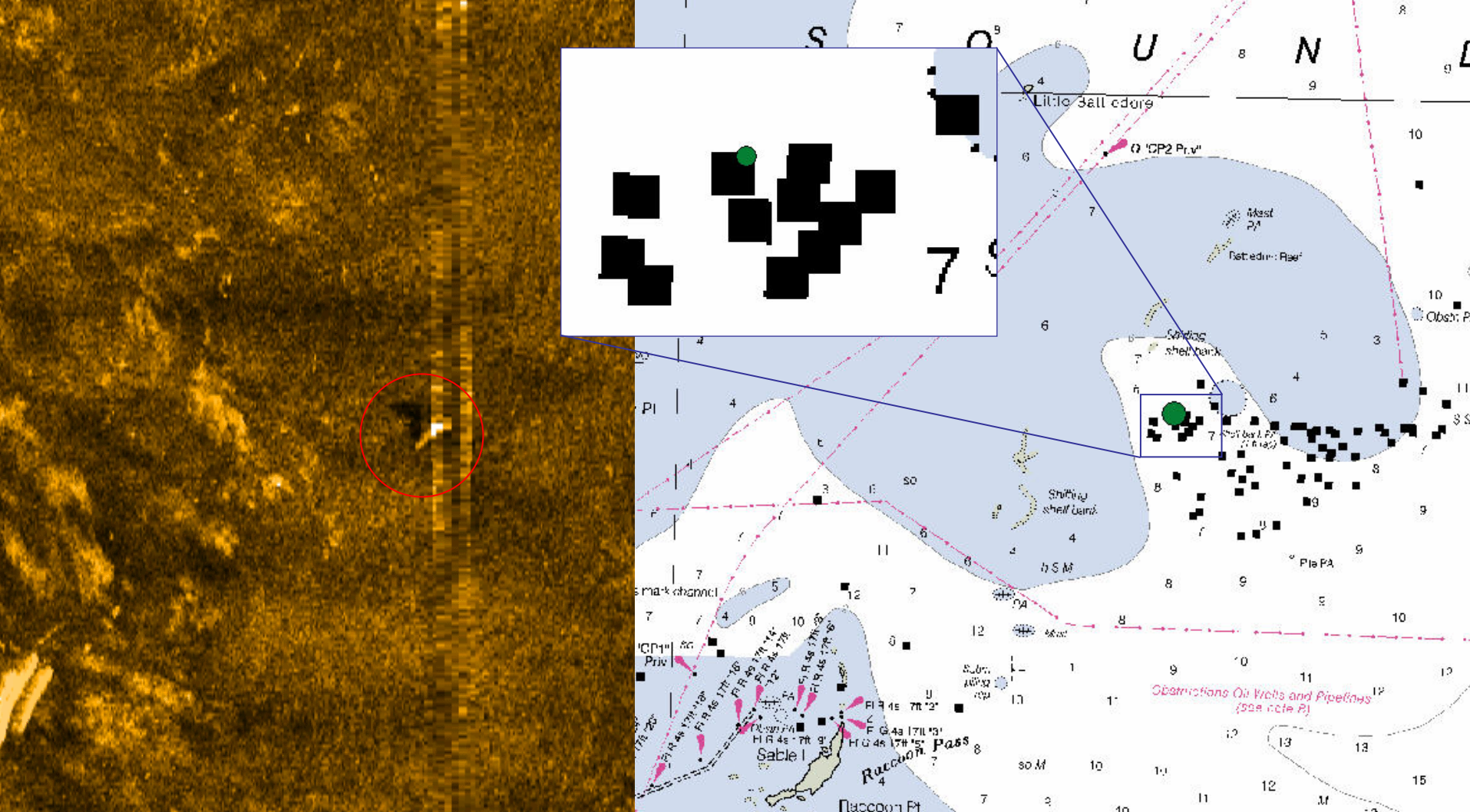
DANGER TO NAVIGATION

FEATURE	DEPTH (FT)	LATITUDE (N)	LONGITUDE (W)
Obstruction	4.4 5.826 (1.776m)	29/27/26. 33	89/25/29. 33

Dimensions of obstruction are; length= 8.9ft, width= 2.0ft, and height= 4.1ft. Obstruction is 114ft NE of a platform.

Questions concerning this report should be directed to Terrasond (907) 745-7215.

DTON #3. Not submitted by AHB to MCD due to close proximity to charted platform. No changes to charting recommended.



Obstruction found in Breton Sound with least depth of ~~4.4~~ **5.826** feet, corrected using verified NOAA tides.

Chartlet 1 of 1 Sheet D

REPORT OF DANGER TO NAVIGATION

Hydrographic Survey Registry Number: H11814

Survey Title: State: Louisiana
Locality: Breton Sound
Sublocality: 3NM East of California Point

Project Number: OPR-J977_TE-08
Survey dates: June 22, 2008 - Present
Survey Danger Acquisition Date and Time: December 4, 2008; 1622 UTC

Water depth is reduced to Mean Lower Low Water using predicted NOAA tides and the obstruction is positioned on NAD 83.

Chart affected: 11364 42nd Edition/September 1, 2007, scale 1:80,000, NAD 83

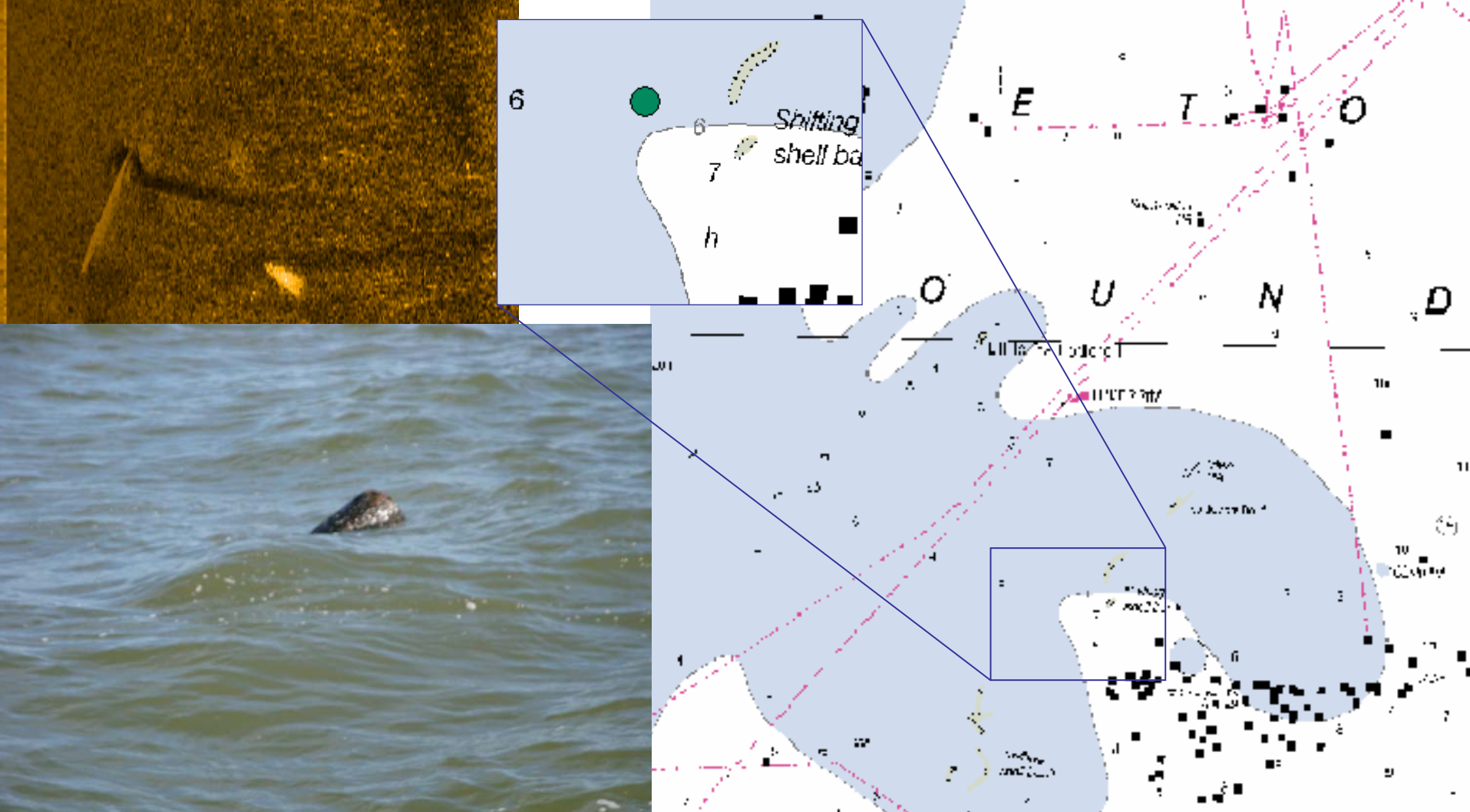
DANGER TO NAVIGATION

FEATURE	DEPTH (FT)	LATITUDE (N)	LONGITUDE (W)
Obstruction	N/A	29/28/08 07.756	89/26/08 .214

Dimensions of obstruction are length= 28.2ft and width= 4.3ft. The obstruction covers and uncovers therefore a depth value is not applicable.

Concur with clarification. DTON #3A submitted to MCD. This obstruction is shown on the chart as an Obsn symbol at the present survey position. Recommend to delete charted obstruction symbol and add an obstruction symbol and the note (uncovers) Rep 2009 at the present survey position.

Questions concerning this report should be directed to Terrasond (907) 745-7215.



Obstruction found in Breton Sound covers and uncovers.

Chartlet 1 of 1 Sheet D

H11814 DtoN #4-5

Registry Number: H11814
State: Louisiana
Locality: Breton Sound
Sub-locality: 3NM East of California Point
Project Number: OPR-J977-TE-08
Survey Dates: 12/04/2008 - 12/06/2008

Charts Affected

Number	Edition	Date	Scale (RNC)	RNC Correction(s)*
11364	42nd	09/01/2007	1:80,000 (11364_1)	USCG LNM: 10/28/2008 (12/02/2008) NGA NTM: 10/18/2008 (12/06/2008)
11366	11th	01/01/2008	1:250,000 (11366_1)	[L]NTM: ?
11360	42nd	02/01/2007	1:456,394 (11360_1)	[L]NTM: ?
1115A	42nd	02/01/2007	1:456,394 (1115A_1)	[L]NTM: ?
11340	72nd	07/01/2007	1:458,596 (11340_1)	[L]NTM: ?
1116A	72nd	07/01/2007	1:458,596 (1116A_1)	[L]NTM: ?
11006	32nd	08/01/2005	1:875,000 (11006_1)	[L]NTM: ?
411	52nd	09/01/2007	1:2,160,000 (411_1)	[L]NTM: ?

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

Features

No.	Name	Feature Type	Survey Depth	Survey Latitude	Survey Longitude	AWOIS Item
1.1	7-ft Obstruction DtoN#4	Obstruction	2.19 m	29° 25' 34.0" N	089° 26' 09.0" W	---
1.2	Obstruction (Covers and Uncovers) DtoN#5	Obstruction	[None]	29° 27' 56.0" N	089° 26' 15.0" W	---

1 - Danger To Navigation

1.1) 7-ft Obstruction DtoN#4**DANGER TO NAVIGATION****Survey Summary**

Survey Position: 29° 25' 34.0" N, 089° 26' 09.0" W
Least Depth: 2.19 m (= ~~7.19~~ **6.8898** ft = 1.198 fm = 1 fm 1.19 ft)
TPU ($\pm 1.96\sigma$): **THU (TPEh)** [None] ; **TVU (TPEv)** [None]
Timestamp: 2008-339.19:01:43.000 (12/04/2008)
GP Dataset: H11814_DtoN#4-5.xls
GP No.: 1
Charts Affected: 11364_1, 11366_1, 1115A_1, 11360_1, 1116A_1, 11340_1, 11006_1, 411_1

Remarks:

Feature is reduced to Mean Lower Low Water using verified NOAA tides and positioned on NAD 83.
 Dimensions of obstruction are; length= 46.8 ft, width= 2.0 ft, and height= 2.3 ft.

Feature Correlation

Address	Feature	Range	Azimuth	Status
H11814_DtoN#4-5.xls	1	0.00	000.0	Primary

Hydrographer Recommendations

Chart 7-ft obstruction

Cartographically-Rounded Depth (Affected Charts):

7ft (11364_1)
 1 ¼fm (1115A_1, 11360_1, 1116A_1, 11340_1, 11006_1, 411_1)
 1fm 1ft (11366_1)

S-57 Data

Geo object 1: Obstruction (OBSTRN)
Attributes: OBJNAM - 7-ft Obstruction
 QUASOU - ~~6: least depth known~~ **9: value reported (not confirmed)**
 SORDAT - 20081204

SORIND - US,US,survey,H11814

TECSOU - ~~1,2:found by echo-sounder~~,found by side scan sonar

VALSOU - 2.19 m

VERDAT - 12:Mean lower low water

WATLEV - 3:always under water/submerged

Office Notes

Concur with conditions. DTON #4. Delete charted 7 ft dangerous obstruction. Add 7 foot dangerous obstruction (rep 2009) in presesnt survey location. Source of feature is SSS contact. This Danger submission was preliminary. The feature was not disproved nor investigated. The submitted bathymetric grid does not include the submitted Danger feature. The submitted side scan sonar imagery indicates the feature to exist as an exposed pipeline.

Feature Images

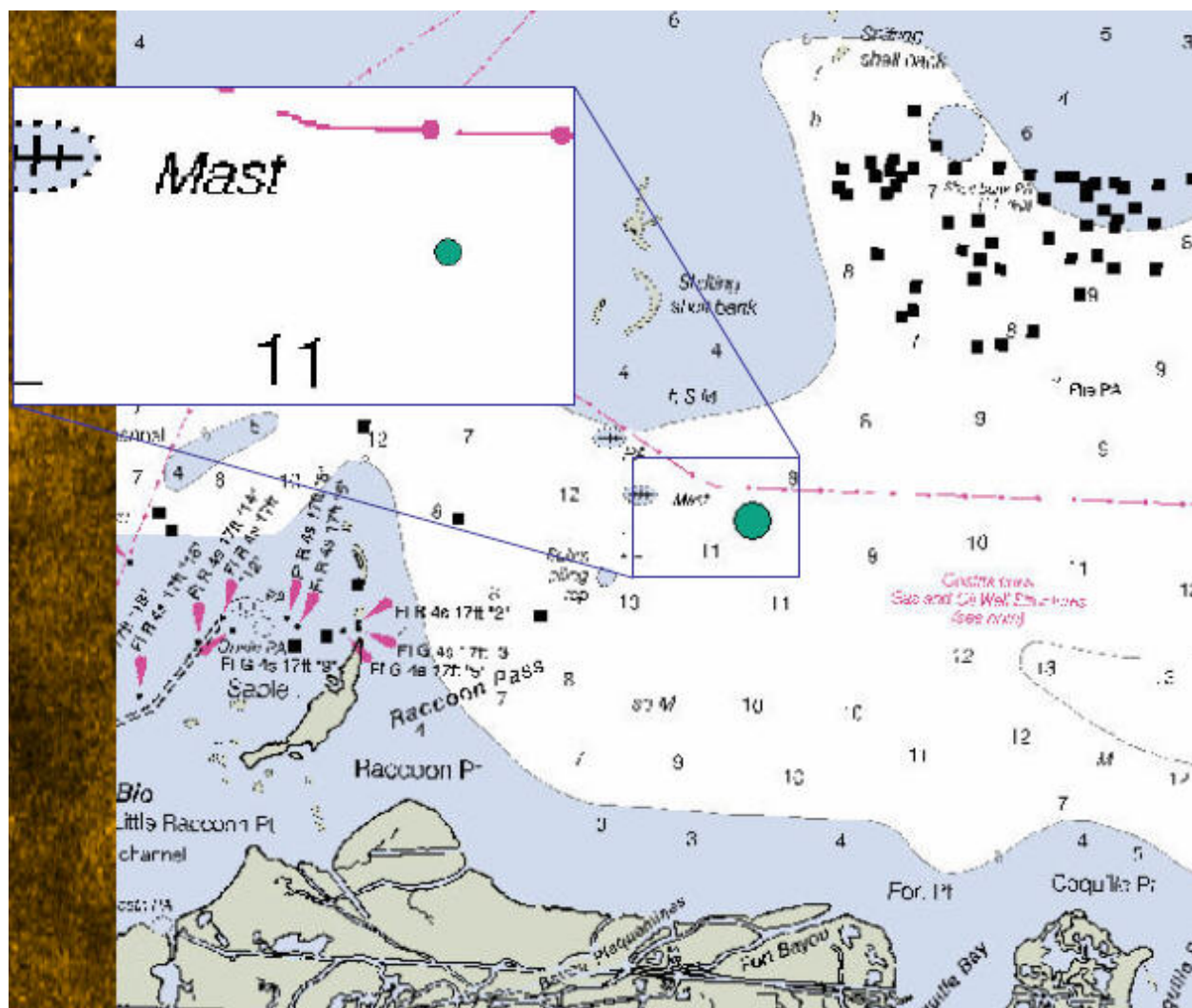


Figure 1.1.1

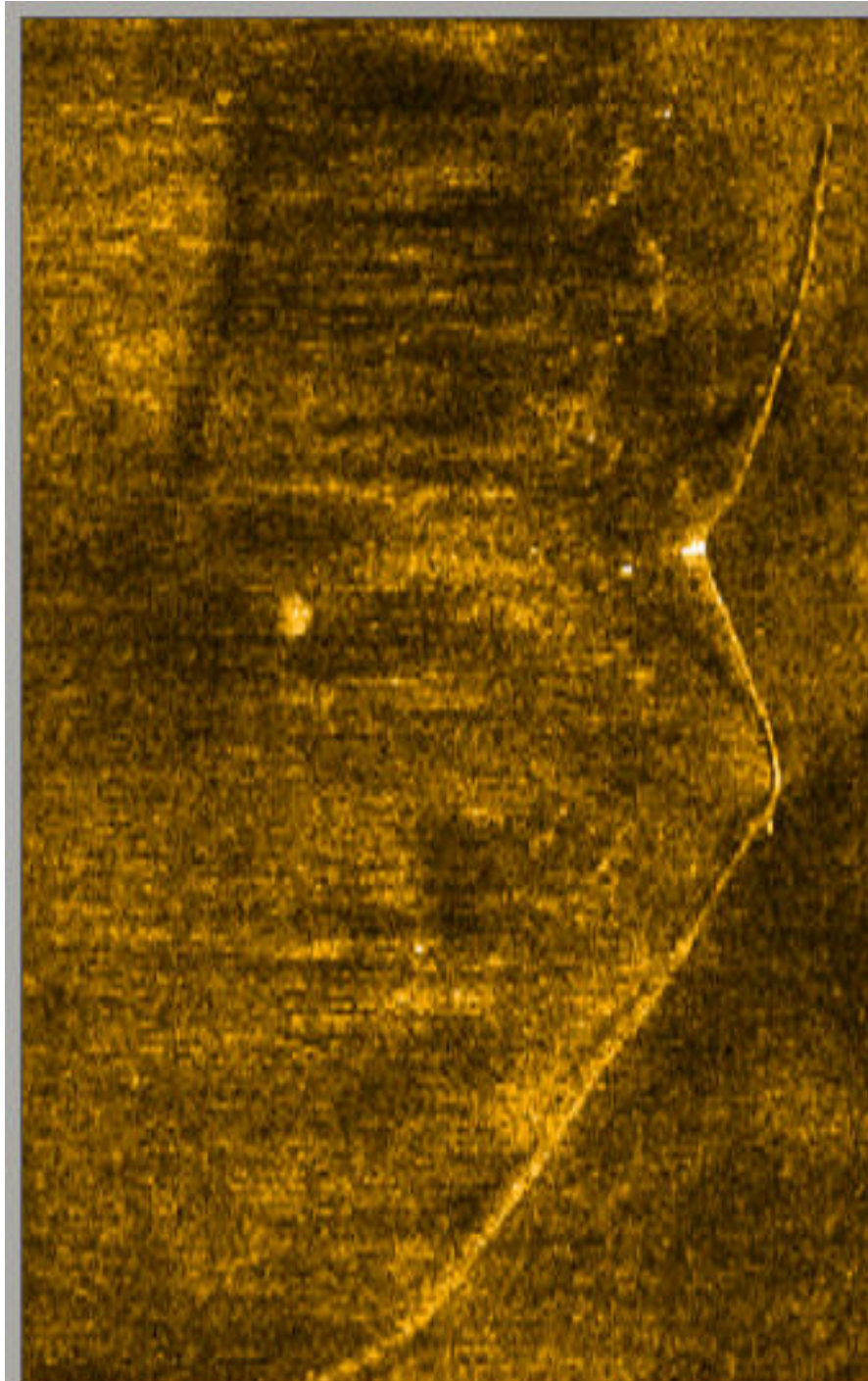


Figure 1.1.2

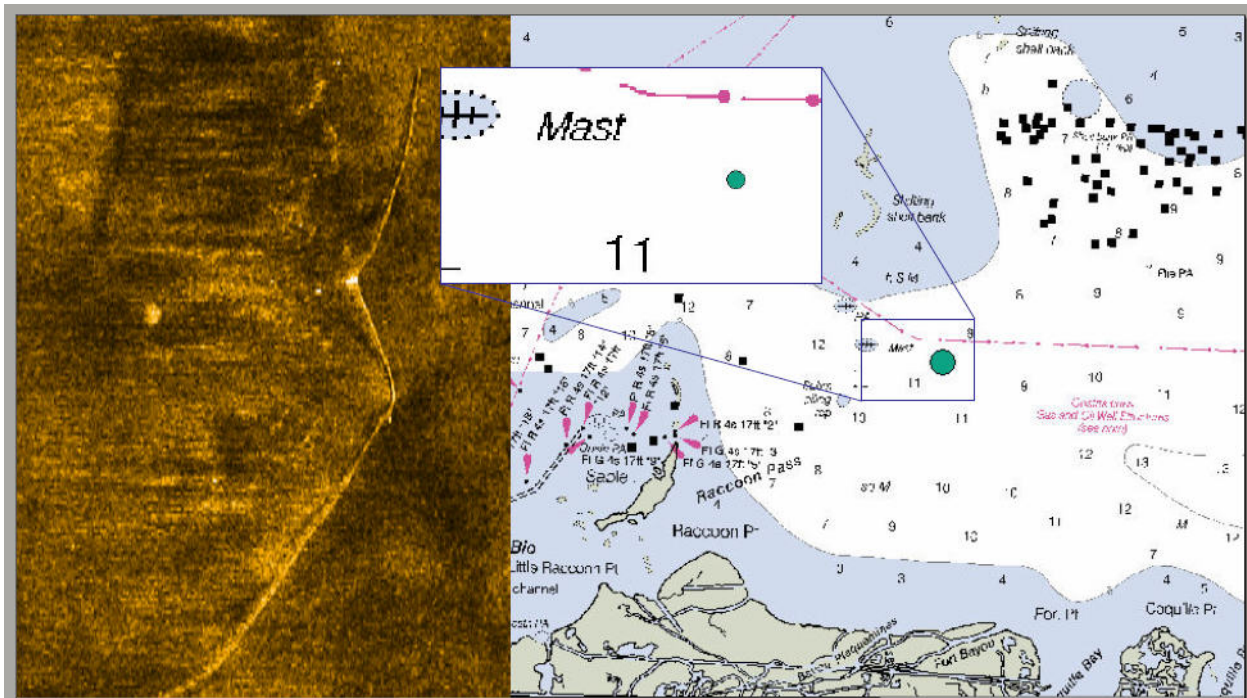


Figure 1.1.3

1.2) Obstruction (Covers and Uncovers) DtoN#5

DANGER TO NAVIGATION

Survey Summary

Survey Position: 29° 27' 56.0" N, 089° 26' 15.0" W
Least Depth: [None]
TPU ($\pm 1.96\sigma$): THU (TPEh) [None] ; TVU (TPEv) [None]
Timestamp: 2008-341.15:47:15.000 (12/06/2008)
GP Dataset: H11814_DtoN#4-5.xls
GP No.: 2
Charts Affected: 11364_1, 11366_1, 1115A_1, 11360_1, 1116A_1, 11340_1, 11006_1, 411_1

Remarks:

Water depth is reduced to Mean Lower Low Water using verified NOAA tides and the obstruction is positioned on NAD 83.

Dimensions of obstruction are length= 10.7ft and width= 3.9ft. The obstruction covers and uncovers therefore a depth value is not applicable. There is another obstruction located approximately 16.4ft ~~north~~ **south** of the reported obstruction. The water depth in this area is 9.4ft.

Feature Correlation

Address	Feature	Range	Azimuth	Status
H11814_DtoN#4-5.xls	2	0.00	000.0	Primary

Hydrographer Recommendations

Chart obstruction (covers and uncovers).

S-57 Data

Geo object 1: Obstruction (OBSTRN)
Attributes: OBJNAM - Obstruction (covers and uncovers)
 QUASOU - ~~1:depth known~~ **Value is unknown**
 SORDAT - 20081206
 SORIND - US,US,survy,H11814
 TECSOU - ~~1,2:found by echo-sounder,~~ found by side scan sonar

VERDAT - 12:Mean lower low water

WATLEV - 4:covers and uncovers

H11814 DtoN #4-5

1 - Danger To Navigation

Office Notes

Concur with clarification. DTON #5. submitted to MCD. This obstruction shown on the chart as an Obstn (uncovers) at the present survey position. Recommend to delete charted Obstn (uncovers) and add an obstruction symbol and the note (uncovers) rep 2009 at the present survey position. See also H-Cell Report Section D.1.2.a.

Feature Images

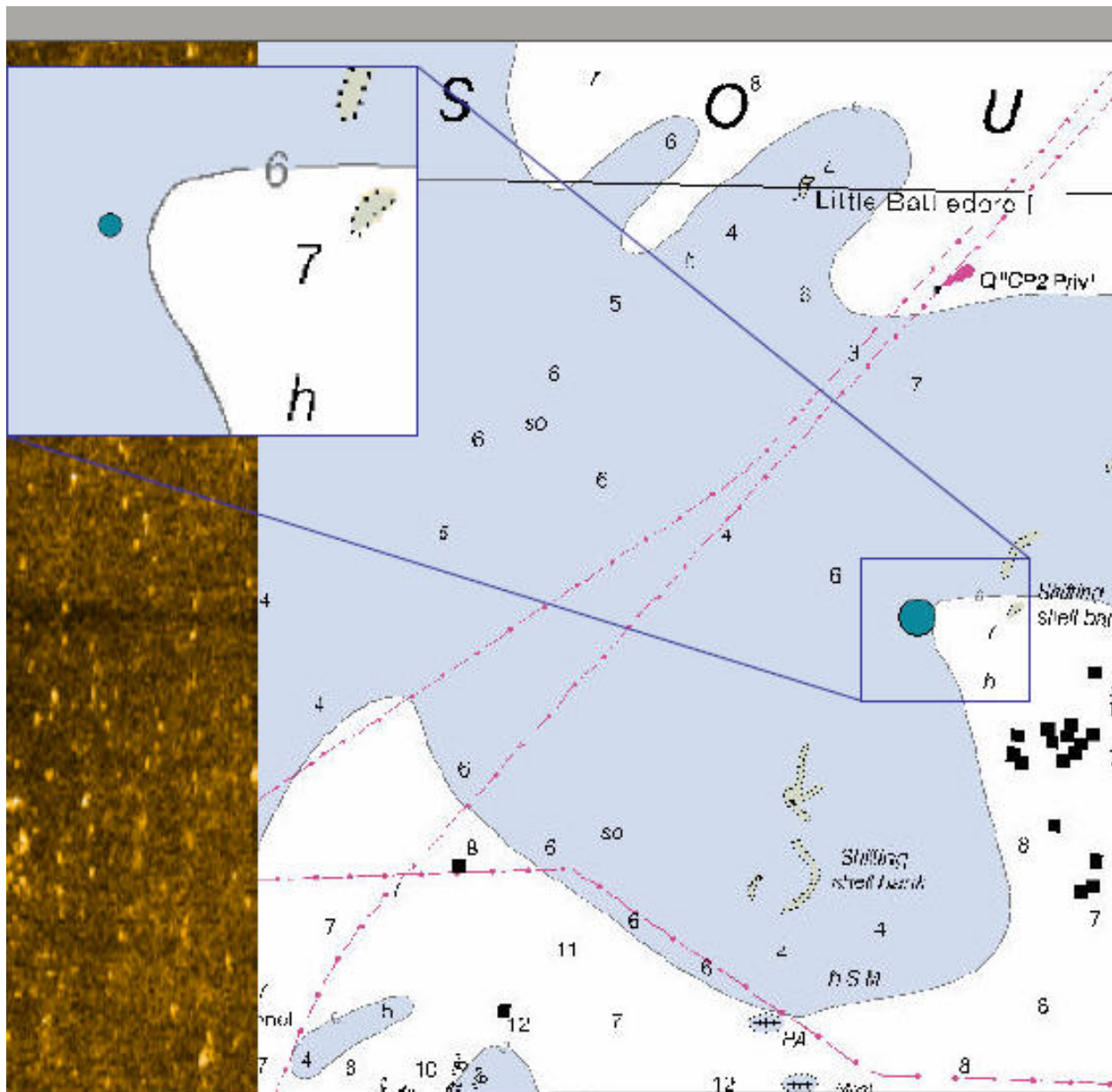


Figure 1.2.1

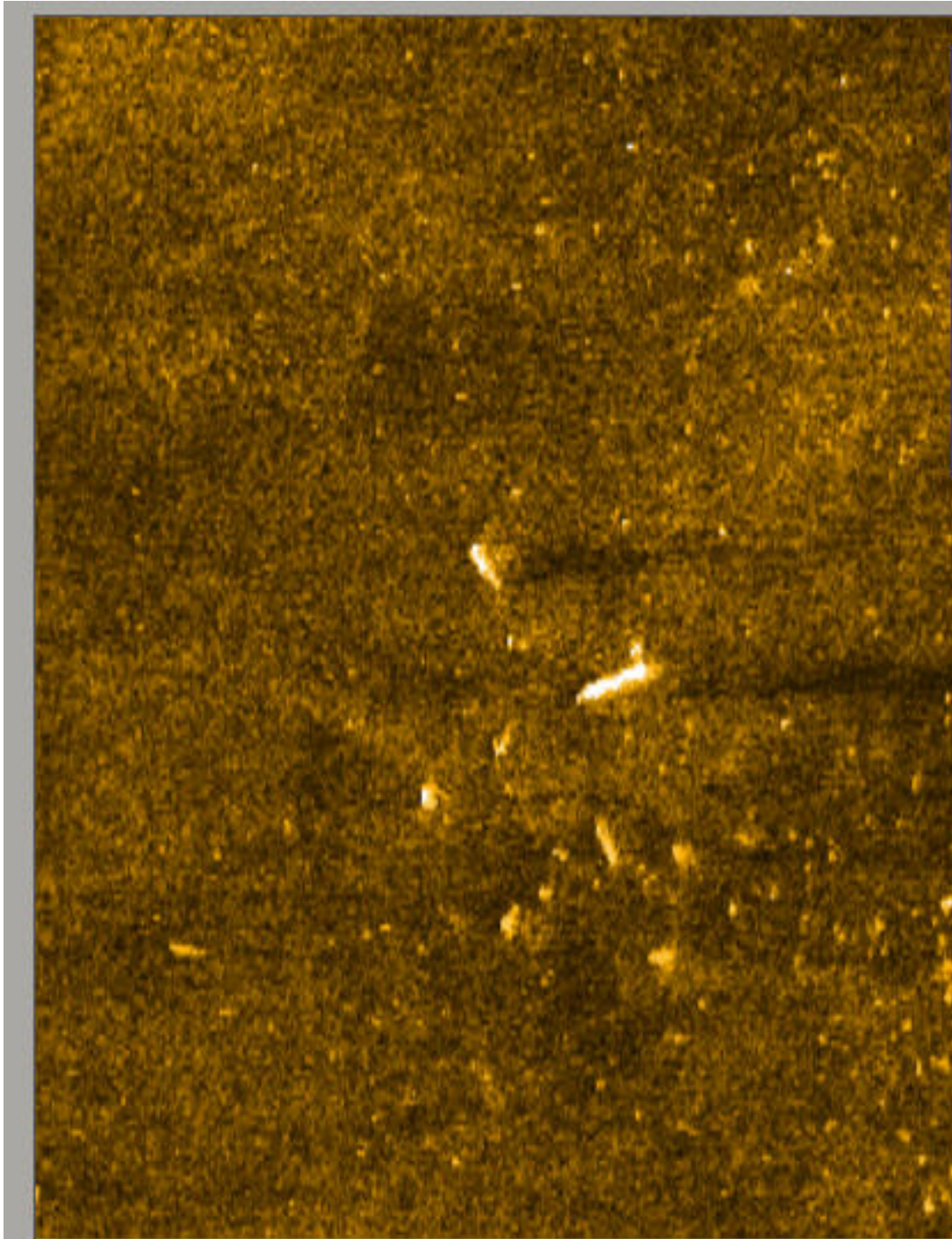
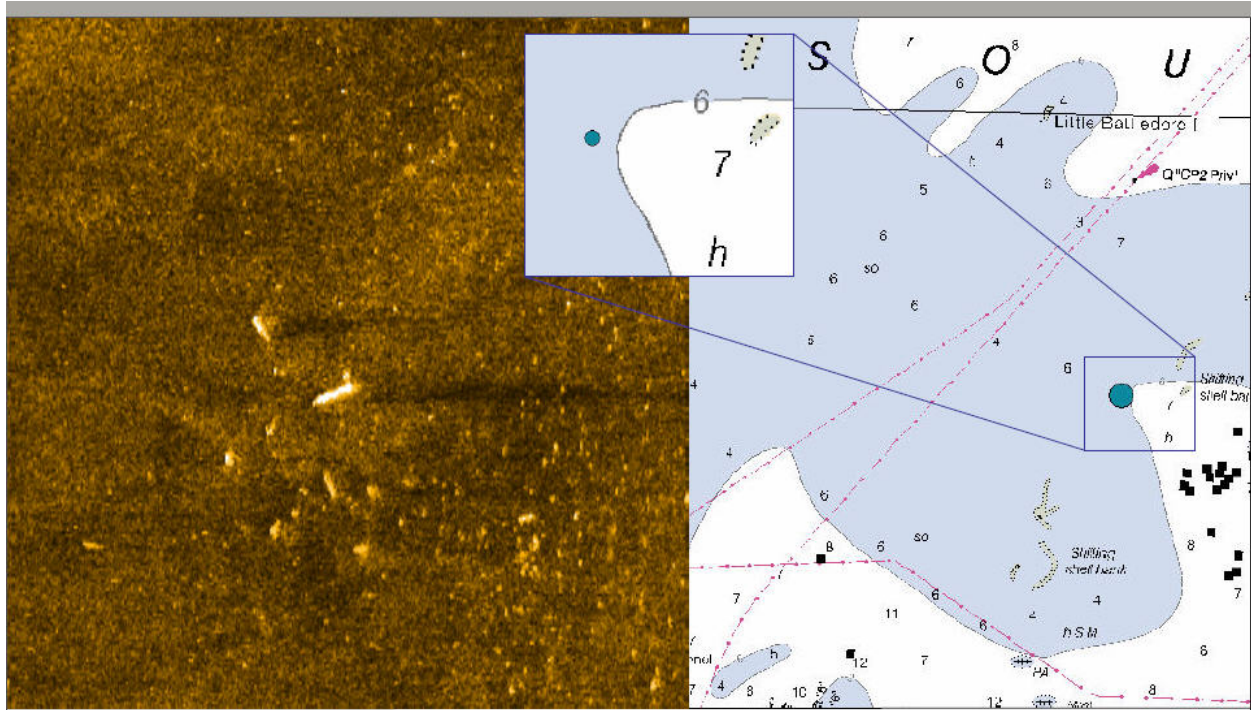


Figure 1.2.2

*Figure 1.2.3*

H11814 DtoN #6

Registry Number: H11814
State: Louisiana
Locality: Breton Sound
Sub-locality: 3NM East of California Point
Project Number: OPR-J977-TE-08
Survey Date: 12/16/2008

Charts Affected

Number	Edition	Date	Scale (RNC)	RNC Correction(s)*
11364	42nd	09/01/2007	1:80,000 (11364_1)	USCG LNM: 10/28/2008 (12/02/2008) NGA NTM: 10/18/2008 (12/06/2008)
11366	11th	01/01/2008	1:250,000 (11366_1)	[L]NTM: ?
11360	42nd	02/01/2007	1:456,394 (11360_1)	[L]NTM: ?
1115A	42nd	02/01/2007	1:456,394 (1115A_1)	[L]NTM: ?
11340	72nd	07/01/2007	1:458,596 (11340_1)	[L]NTM: ?
1116A	72nd	07/01/2007	1:458,596 (1116A_1)	[L]NTM: ?
11006	32nd	08/01/2005	1:875,000 (11006_1)	[L]NTM: ?
411	52nd	09/01/2007	1:2,160,000 (411_1)	[L]NTM: ?

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

Features

No.	Name	Feature Type	Survey Depth	Survey Latitude	Survey Longitude	AWOIS Item
1.1	5-ft Obstruction DtoN#6	Obstruction	1.58 m	29° 26' 14.0" N	089° 28' 31.0" W	---

1 - Danger To Navigation

1.1) 5-ft Obstruction DtoN#6

DANGER TO NAVIGATION

Survey Summary

Survey Position: 29° 26' 14.0~~15~~" N, 089° 28' 31.0 ~~30.60~~" W
Least Depth: 1.58 ~~1.977~~ m (= 5.20 ~~6.48~~ ft = 0.866 fm = 0 ~~1.0~~ fm 5.20 ft)
TPU ($\pm 1.96\sigma$): THU (TPEh) [None] ; TVU (TPEv) [None]
Timestamp: 2008-351.18:30:46.000 (12/16/2008)
GP Dataset: H11814_DtoN#5.xls
GP No.: 1
Charts Affected: 11364_1, 11366_1, 1115A_1, 11360_1, 1116A_1, 11340_1, 11006_1, 411_1

Remarks:

Feature is reduced to Mean Lower Low Water using verified NOAA tides and positioned on NAD 83.
 Dimensions of obstruction are; length= 10.1ft, width= 9.6ft, and height= 4.4ft.

Feature Correlation

Address	Feature	Range	Azimuth	Status
H11814_DtoN#5.xls	1	0.00	000.0	Primary

Hydrographer Recommendations

Recommend charting ~~5~~- 6 ft obstruction.

Cartographically-Rounded Depth (Affected Charts):

~~5~~ 6ft (11364_1)

~~1.0~~ fm (1115A_1, 11360_1, 1116A_1, 11340_1, 11006_1, 411_1)

S-57 Data

Geo object 1: Obstruction (OBSTRN)
Attributes: QUASOU - 6:least depth known
 SORDAT - 20081215
 SORIND - US,US,survey,H11814

TECSOU - 1,2:found by echo-sounder,found by side scan sonar

VALSOU - ~~1.584~~ **1.977** m

VERDAT - 12:Mean lower low water

WATLEV - 3:always under water/submerged

Office Notes

DTON #6. Shown on latest edition of the chart. Delete charted 5 ft dangerous obstruction (rep 2008).

Add 6 foot dangerous obstruction in presesnt survey location.

H11814 DtoN #6

1 - Danger To Navigation

Feature Images

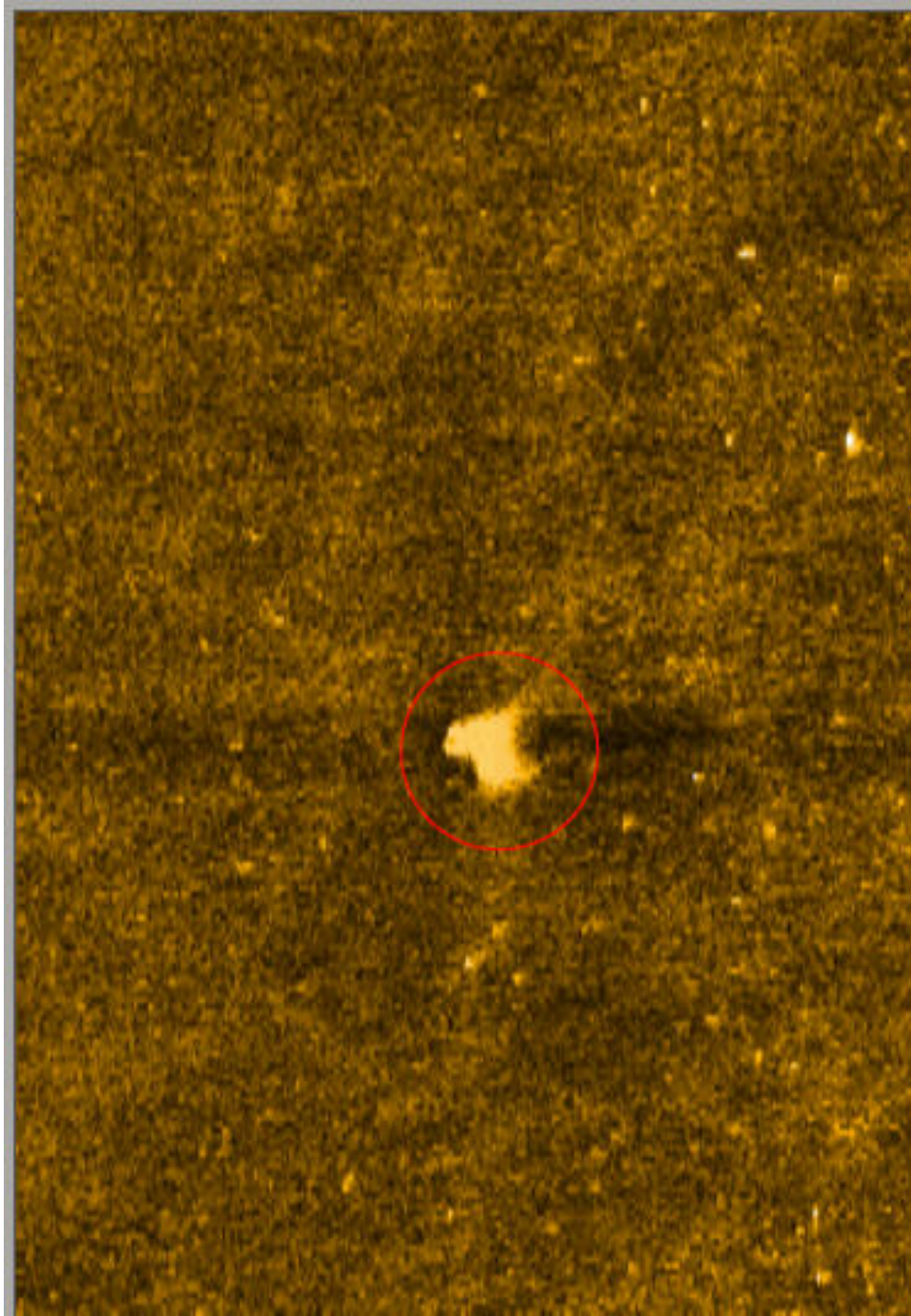


Figure 1.1.1

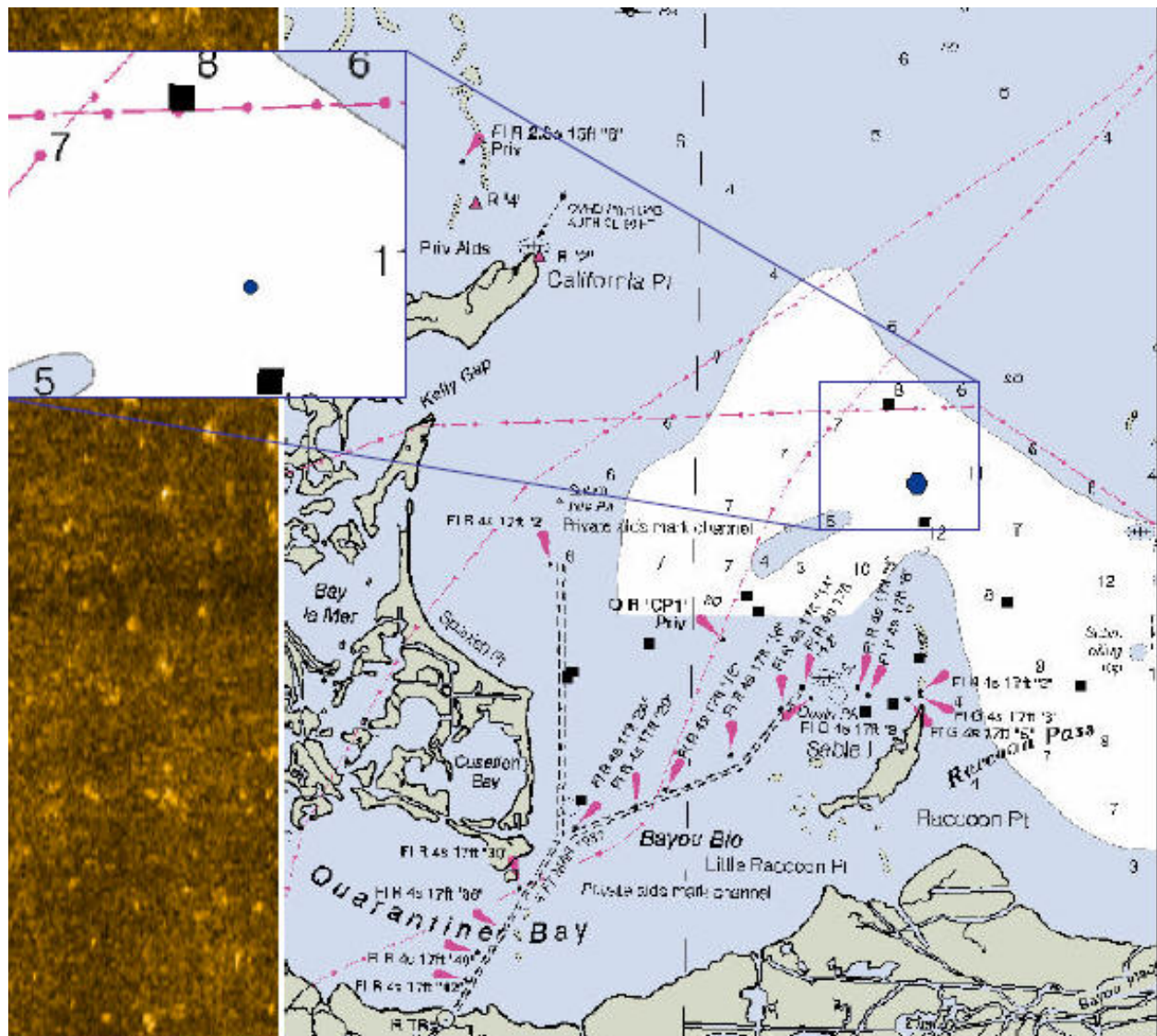
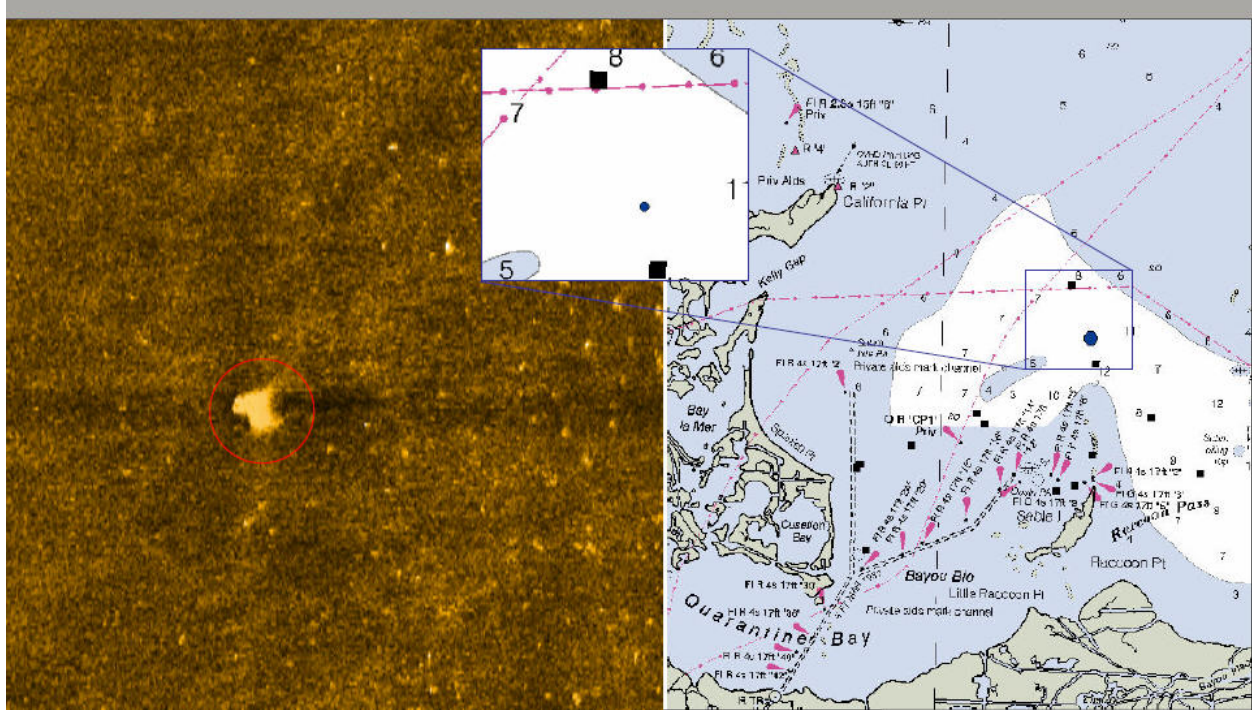


Figure 1.1.2

*Figure 1.1.3*



APPENDIX II

Survey Feature Report

AWOIS

There were no Automated Wrecks and Obstructions (AWOIS) features assigned for review in H11814.

A comprehensive search of the NOAA / NOS online AWOIS database, <http://www.nauticalcharts.noaa.gov/hsd/awois.html>, did not produce any features that were located within the survey limits of H11814.

D.1. Chart Comparison

Features

Charted features investigated and new features positioned during OPR-J977-TE-08 are listed in Table 1.

Table 1 - All features and significant contacts located in H11814 during OPR-J977-TE-08.

Feature	Latitude (N)	Longitude (W)	Charts Affected	Description
D1	29° 29' 31.52 2 "	89° 26' 09 .59 88 "	11364_1 US4LA35M	California Bay Pipeline light CP-2. Position agrees with Chart. Light color is amber <u>not</u> white as listed. Privately maintained. USCG Light List Number 11505. **
D2	29°26'46.96 7 "	89°24'32.94 3 "	11364_1 US4LA35M	Uncharted oil or gas related structure. ***
D3	29°26'32.57 8 "	89°24'34.8 89 "	11364_1 US4LA35M	Uncharted oil or gas related structure. ***
D4	29°26'44.94 .950"	89°24'18.83 .840"	11364_1 US4LA35M	Uncharted oil or gas related structure. ***
D5	29°26'48.38 9 "	89°25'04.32 1 .317"	11364_1 US4LA35M	Uncharted oil or gas related structure. ***
D6	29°25'55.89 .846"	89°27'23.45 5 "	11364_1 US4LA35M	Uncharted oil or gas related structure. ***
D7	29°26'14.37 1 "	89°28'22.4 43 "	11364_1 US4LA35M	Uncharted oil or gas related structure. ***
D8	29°26'52.55 4 "	89°25'18.68 .691"	11364_1 US4LA35M	Uncharted oil or gas related structure. ***
D9	29°25'00.77 87 "	89°27'17.36 7 "	11364_1 US4LA35M	Uncharted oil or gas related structure. ***
D10	29°25'10.32 .334"	89°27'12.62 .618"	11364_1 US4LA35M	Uncharted oil or gas related structure. ***
D11	29°24'46.11 6 "	89°27'53.70 7 "	11364_1 US4LA35M	Uncharted oil or gas related structure. ***
D12	29°25'26.48 9 "	89°28'11.48 .476"	11364_1 US4LA35M	Uncharted oil or gas related structure. ***

Feature	Latitude (N)	Longitude (W)	Charts Affected	Description
D13	29°25'46.14 5 "	89°27'58.34 9 "	11364_1 US4LA35M	Uncharted oil or gas related structure. ***
D14	29°25'44.91 7 "	89°28' 07.928 .931"	11364_1 US4LA35M	Uncharted oil or gas related structure. ***
D15	29°25'52.65 7 "	89°28' 08.874 "	11364_1 US4LA35M	Uncharted oil or gas related structure. ***
D16	29°26' 03.930 .929"	89°28' 07.928 .928"	11364_1 US4LA35M	Uncharted oil or gas related structure. ***
D17	29°26'12.17 4 "	89°28' 01.354 .349"	11364_1 US4LA35M	Uncharted oil or gas related structure. ***
D18	29°26'25.38 .393"	89°28'14.08 3 "	11364_1 US4LA35M	Uncharted oil or gas related structure. ***
D19	29°26'11.73 6 "	89°28'21.68 .676"	11364_1 US4LA35M	Uncharted oil or gas related structure. ***
D20	29°25'46.39 3 "	89°28'47.52 5 "	11364_1 US4LA35M	Uncharted oil or gas related structure. ***
D21	29°25'53.55 .562"	89°28'48.69 2 "	11364_1 US4LA35M	Uncharted oil or gas related structure. ***
D22	29°25'56.57 .969"	89°28'50.54 2 "	11364_1 US4LA35M	Uncharted oil or gas related structure. ***
D23	29°25'52.79 .785"	89°29' 06.784 .783"	11364_1 US4LA35M	Uncharted oil or gas related structure. ***
D24	29°25'30.54 3 "	89°30' 04.039 .045"	11364_1 US4LA35M	Uncharted oil or gas related structure. ***
D25	29°25'32.71 1 "	89°30'23.05 .049"	11364_1 US4LA35M	Uncharted oil or gas related structure. ***
D26	29°25'45.44 .155"	89°29'59.79 .786"	11364_1 US4LA35M	Uncharted oil or gas related structure. ***
D27	29°26' 09.700 .698"	89°29' 00.308 .314"	11364_1 US4LA35M	Uncharted oil or gas related structure. ***
D28	29°26'20.45 2 "	89°28'44.44 .120"	11364_1 US4LA35M	Uncharted oil or gas related structure. ***

Feature	Latitude (N)	Longitude (W)	Charts Affected	Description
D29	29°26'34.38 .391"	89°28'51.51 .507"	11364_1 US4LA35M	Uncharted oil or gas related structure. ***
D30	29°27'55.762"	89°26'16.048"	11364_1 US4LA35M	Uncharted oil or gas related structure. ***
D31	29°26'42.272"	89°24'52.196"	11364_1 US4LA35M	Uncharted oil or gas related structure. ***
D32	29°27'05.2814 .745"	89°25'13.73 .745"	11364_1 US4LA35M	Uncharted oil or gas related structure. ***
D33	29°27'29.737"	89°25'32.533"	11364_1 US4LA35M	Uncharted oil or gas related structure. ***
D34	29°27'21.407"	89°25'31.64 .635"	11364_1 US4LA35M	Uncharted oil or gas related structure. ***
D35	29°27'22.524"	89°25'15.276"	11364_1 US4LA35M	Uncharted oil or gas related structure. ***
D36	29°27'22.820"	89°25'04.656"	11364_1 US4LA35M	Uncharted oil or gas related structure. ***
D37	29°27'23.09 .088"	89°25'00.4004 .088"	11364_1 US4LA35M	Uncharted oil or gas related structure. ***
D38	29°27'32.731"	89°25'10.32 .331"	11364_1 US4LA35M	Uncharted oil or gas related structure. ***
D39	29°27'33.787"	89°24'57.046"	11364_1 US4LA35M	Uncharted oil or gas related structure. ***
D40	29°27'43.357"	89°25'27.66 .657"	11364_1 US4LA35M	Uncharted oil or gas related structure. ***
D41	29°27'55.24 .250"	89°25'30.879"	11364_1 US4LA35M	Uncharted oil or gas related structure. ***
D42	29°27'56.726"	89°25'28.93 .928"	11364_1 US4LA35M	Uncharted oil or gas related structure. ***
D43	29°28'01.880 .876"	89°25'23.50 .514"	11364_1 US4LA35M	Uncharted oil or gas related structure. ***
D44	29°27'54.03 .044"	89°25'12.696"	11364_1 US4LA35M	Uncharted oil or gas related structure. ***

Feature	Latitude (N)	Longitude (W)	Charts Affected	Description
D45	29° 26' 39.58 .570"	89° 25' 18.178"	11364_1 US4LA35M	Charted oil or gas related structure which was searched for but not found during the 2008 / 2009 survey. *
D46	29° 26' 47.46 .454"	89° 24' 16.11 .096"	11364_1 US4LA35M	Charted oil or gas related structure which was searched for but not found during the 2008 / 2009 survey. *.
D47	29° 26' 35.84 .837"	89° 24' 32.116"	11364_1 US4LA35M	Charted oil or gas related structure which was searched for but not found during the 2008 / 2009 survey. *
D48	29° 26' 48.67 .642"	89° 25' 13.29 .343"	11364_1 US4LA35M	Charted oil or gas related structure which was searched for but not found during the 2008 / 2009 survey. *
D49	29° 26' 30.85 29.858"	89° 24' 51.45 .103"	11364_1 US4LA35M	Charted oil or gas related structure which was searched for but not found during the 2008 / 2009 survey. *
D50	29° 25' 05.199 04.948"	89° 27' 23.15 .011"	11364_1 US4LA35M	Charted oil or gas related structure which was searched for but not found during the 2008 / 2009 survey. *
D51	29° 25' 34.56 .428"	89° 27' 52.58 .513"	11364_1 US4LA35M	Charted oil or gas related structure which was searched for but not found during the 2008 / 2009 survey. *
D52	29° 26' 02.439 .422"	89° 28' 26.34 .486"	11364_1 US4LA35M	Charted oil or gas related structure which was searched for but not found during the 2008 / 2009 survey. *
D53	29° 27' 27.529"	89° 25' 22.379"	11364_1 US4LA35M	Charted oil or gas related structure which was searched for but not found during the 2008 / 2009 survey. *
D54	29° 27' 33.88"	89° 27' 11.33"	11364_1 US4LA35M	Uncharted wreck. New feature. DTON submitted. . Concur with clarification. Recommend delete charted 4 foot wreck. It is recommended to add a 6 ft wreck at the present survey location. DTON1 - shown on latest edition of the chart. See Appendix 1.
D55	29° 25' 43.00"	89° 26' 48.65 .646"	11364_1 US4LA35M	Charted wreck. Searched for but not found during the 2008 / 2009 survey. *
D56	29° 26' 00.00"	89° 27' 00.00"	11364_1 US4LA35M	Charted wreck. Searched for but not found during the 2008 / 2009 survey. *
D57	29° 26' 58.501"	89° 24' 05.42 .418"	11364_1 US4LA35M	Uncharted piling. New feature. Concur. Add visible pile. See H-Cell Report Section D.1.1.a..
D58	29° 26' 21.07 20.310"	89° 24' 23.38 .285"	11364_1 US4LA35M	Charted piling PA. Searched for but not found during the 2008 / 2009 survey. *

Feature	Latitude (N)	Longitude (W)	Charts Affected	Description
D59	29° 27' 54.64" 29° 27' 53.92"	89° 26' 15.28" 89° 26' 15.29"	11364_1 US4LA35M	Uncharted Obstruction. New feature. Do not concur. Obstruction not recommended for charting as it is an 8 ft depth in 9 feet of water. Not considered significant. See H-Cell Report Section D.1.1.b.
D60	29° 26' 14.15"	89° 28' 30.60"	11364_1 US4LA35M	Uncharted Obstruction. New feature. Concur with clarification. Recommend delete charted 5 foot obstruction and Obstn (rep 2008) note. It is recommended to add a 6 ft obstruction at the present survey location. DTON6 - shown on latest edition of the chart. See Appendix 1.
D61	29° 28' 07.75 6 "	89° 26' 08.21 4 "	11364_1 US4LA35M	Uncharted Obstruction. New feature. Concur with clarification. DTON was submitted to MCD and is shown on the chart as an Obstn symbol at the present survey position. Recommend to delete charted obstruction symbol and add an obstruction symbol (uncovers) rep 2009 note at the present survey position. DTON3A
D62				Feature ID not used
D63				Feature ID not used
D64	29° 25' 17.60"	89° 27' 00.34 2 "	11364_1 US4LA35M	Charted submerged piling reported PA. Searched for but not found during the 2008 / 2009 survey. *
D65	29° 27' 22.44"	89° 25' 01.67"	11364_1 US4LA35M	Uncharted Obstruction. New feature. Do not concur. No DTON was received at AHB and obstruction does not exist on the chart. Obstruction is in close proximity to charted platform. No changes to charting recommended.
D66	29° 27' 26.33"	89° 25' 29.33"	11364_1 US4LA35M	Uncharted Obstruction. New feature. Do not concur. DTON not sent to MCD due to close proximity to charted platform. No changes to charting recommended. DTON3
D67	29° 25' 28.53 6 "	89° 29' 21.97 9 "	11364_1 US4LA35M	Uncharted Obstruction. New feature. Concur with clarification. No DTON was received at AHB and obstruction is not on latest edition of the chart. Recommend to add obstruction symbol and Obstns (rep 2009) note in present survey position. Source is SSS contact. (Label obstns to include Feature D68 below.)

Feature	Latitude (N)	Longitude (W)	Charts Affected	Description
D68	29° 25' 26.57"	89° 29' 30.34"	11364_1 US4LA35M	Uncharted Obstruction. New feature. <i>Do not concur. No DTON was received at AHB and obstruction is not on latest edition of the chart. Do not chart. Too close to charted platform and feature D67 above.</i>
D69	29° 26' 15.11"	89° 28' 23.83"	11364_1 US4LA35M	Uncharted Obstruction. New feature. <i>Do not concur. Do not chart. In close proximity to Feature D60.</i>

****Concur. Delete charted feature, update area with present survey findings.***

***** Concur with conditions. Light color is amber rather than white. Delete charted light; add light in charted position with amber light. Retain beacon as charted.***

******Concur. Add present survey feature.***

Oil Related Structures *See also H-Cell Report Section D.2.3.*

39 charted petroleum industry related structures (e.g. drilling structures, production platforms, well heads, etc.) appear within the survey boundaries of H11814 on Raster Navigational Chart 11364, 42nd Edition, dated September 2007 and Electronic Navigation Chart (ENC) US4LA35M, updated May 2008. The position of each charted structure was examined in the field and, except as noted in Table 1 and Table 2, all of the charted information was determined to be correct as represented on the charts.

Nine (9) charted structures were searched for but not found. These structures should be removed from the chart(s).

Table 1 –Petroleum industry structures that appear on the raster chart or ENC in H11814 that were not found during OPR-J977-TE-08.

Survey Date	Time (UTC)	Latitude (N)	Longitude (W)	Comments
11/4/2008	1709	29° 26' 39.58 .570"	89° 25' 18.178"	Structure searched for but not found. <i>Concur. Delete charted feature and update area with present survey data.</i>
11/4/2008	1630	29° 26' 47.46 .454"	89° 24' 16.11 .096"	Structure searched for but not found. <i>Concur. Delete charted feature and update area with present survey data.</i>
11/4/2008	1630	29° 26' 35.84 .837"	89° 24' 32.116"	Structure searched for but not found. <i>Concur. Delete charted feature and update area with present survey data.</i>
11/4/2008	1700	29° 26' 48.67 .642"	89° 25' 13.29 .343"	Structure searched for but not found. <i>Concur. Delete charted feature and update area with present survey data.</i>
11/4/2008	1712	29° 26' 30.85 29.858"	89° 24' 51.45 .103"	Structure searched for but not found. <i>Concur. Delete charted feature and update area with present survey data.</i>
11/4/2008	1831	29° 25' 05.199 04.948"	89° 27' 23.15 .011"	Structure searched for but not found. <i>Concur. Delete charted feature and update area with present survey data.</i>
11/4/2008	1901	29° 25' 34.56 .428"	89° 27' 52.58 .513"	Structure searched for but not found. <i>Concur. Delete charted feature and update area with present survey data.</i>
11/4/2008	1934	29° 26' 02.439 .422"	89° 28' 26.34 .486"	Structure searched for but not found. <i>Concur. Delete charted feature and update area with present survey data.</i>
1/8/2009	1425	29° 27' 27.529"	89° 25' 22.379"	Structure searched for but not found. <i>Concur. Delete charted feature and update area with present survey data.</i>

Forty-three (43) uncharted petroleum industry structures were positioned in H11814. These structures should be added to the chart(s).

Table 2 – Petroleum industry structures positioned in H11814 during OPR-J977-TE-08 that do not appear on the raster chart or ENC.

Survey Date	Time (UTC)	Latitude (N)	Longitude (W)	Comments
11/4/2008	1615	29°26'46.967"	89°24'32.943"	Structure does not appear on the chart of the area. <i>*Concur. Add platform.</i>

Survey Date	Time (UTC)	Latitude (N)	Longitude (W)	Comments
11/4/2008	1620	29°26'32.57 7 "	89°24'34.8 9 "	Structure does not appear on the chart of the area. <i>*Concur. Add platform.</i>
11/4/2008	1628	29°26'44.94 50 "	89°24'18.83 40 "	Structure does not appear on the chart of the area. <i>*Concur. Add platform.</i>
11/4/2008	1656	29°26'48.38 9 "	89°25' 04.321 .317"	Structure does not appear on the chart of the area. <i>*Concur. Add platform.</i>
11/4/2008	1736	29°25'55.89 46 "	89°27'23.45 5 "	Structure does not appear on the chart of the area. <i>*Concur. Add platform.</i>
11/4/2008	1738	29°26'14.37 1 "	89°28'22.43 .443"	Structure does not appear on the chart of the area. <i>*Concur. Add platform.</i>
11/4/2008	1701	29°26'52.55 4 "	89°25'18.68 91 "	Structure does not appear on the chart of the area. <i>*Concur. Add platform.</i>
11/4/2008	1829	29°25' 00.778 7 "	89°27'17.36 7 "	Structure does not appear on the chart of the area. <i>*Concur. Add platform.</i>
11/4/2008	1832	29°25'10.32 34 "	89°27'12.62 18 "	Structure does not appear on the chart of the area. <i>*Concur. Add platform.</i>
11/4/2008	1846	29°24'46.11 64 "	89°27'53.70 66 "	Structure does not appear on the chart of the area. <i>*Concur. Add platform.</i>
11/4/2008	1856	29°25'26.48 9 "	89°28'11.48 76 "	Cox Operating LLC Quarantine Bay Field SN 142617. Structure does not appear on the chart of the area. <i>*Concur. Add platform.</i>
11/4/2008	1908	29°25'46.14 5 "	89°27'58.34 9 "	Structure does not appear on the chart of the area. <i>*Concur. Add platform.</i>
11/4/2008	1909	29°25'44.91 7 "	89°28' 07.928 .931"	Structure does not appear on the chart of the area. <i>*Concur. Add platform.</i>
11/4/2008	1913	29°25'52.65 7 "	89°28' 08.871 4 "	Structure does not appear on the chart of the area. <i>*Concur. Add platform.</i>
11/4/2008	1916	29°26' 03.930 .929"	89°28' 07.928 6 "	Structure does not appear on the chart of the area. <i>*Concur. Add platform.</i>
11/4/2008	1919	29°26'12.17 4 "	89°28' 01.351 .349"	Structure does not appear on the chart of the area. <i>*Concur. Add platform.</i>
11/4/2008	1927	29°26'25.38 .393"	89°28'14.08 3 "	Structure does not appear on the chart of the area. <i>*Concur. Add platform.</i>

Survey Date	Time (UTC)	Latitude (N)	Longitude (W)	Comments
11/4/2008	1934	29°26'11.73 6 "	89°28'21.68 76 "	Structure does not appear on the chart of the area. <i>*Concur. Add platform.</i>
11/4/2008	1953	29°25'46.39 3 "	89°28'47.52 5 "	Structure does not appear on the chart of the area. <i>*Concur. Add platform.</i>
11/4/2008	1955	29°25'53.55 62 "	89°28'48.69 2 "	Structure does not appear on the chart of the area. <i>*Concur. Add platform.</i>
11/4/2008	1955	29°25'56. 57 .969"	89°28'50.54 2 "	Structure does not appear on the chart of the area. <i>*Concur. Add platform.</i>
11/4/2008	2000	29°25'52.79 85 "	89°29'06.78 13 "	Structure does not appear on the chart of the area. <i>*Concur. Add platform.</i>
11/4/2008	2015	29°25'30.5 43 "	89°30'04.039 45 "	Devon Production co. SI QQ195 No 177 SN 89919. Structure does not appear on the chart of the area. <i>*Concur. Add platform.</i>
11/4/2008	2018	29°25'32.71 1 "	89°30'23.05 .049"	Structure does not appear on the chart of the area. <i>*Concur. Add platform.</i>
11/4/2008	2028	29°25'25'45.14 .155"	89°29'59.79 .786"	Structure does not appear on the chart of the area. <i>*Concur. Add platform.</i>
11/4/2008	2052	29°26'09.700 .698"	89°29'00.308 .314"	Structure does not appear on the chart of the area. <i>*Concur. Add platform.</i>
11/4/2008	2055	29°26'20.45 2 "	89°28'44.11 .120"	Structure does not appear on the chart of the area. <i>*Concur. Add platform.</i>
11/4/2008	2058	29°26'34.38 91 "	89°28'51.51 07 "	Structure does not appear on the chart of the area. <i>*Concur. Add platform.</i>
11/4/2008	1945	29°27'55.76 2 "	89°26'16.04 8 "	Structure does not appear on the chart of the area. <i>*Concur. Add platform.</i>
11/4/2008	1715	29°26'42.27 2 "	89°24'52.19 6 "	Structure does not appear on the chart of the area. <i>*Concur. Add platform.</i>
1/8/2009	1347	29°27'05.28 14 "	89°25'13.73 45 "	Structure does not appear on the chart of the area. <i>*Concur. Add platform.</i>
1/8/2009	1406	29°27'29.73 7 "	89°25'32.53 3 "	Structure does not appear on the chart of the area. <i>*Concur. Add platform.</i>
1/8/2009	1413	29°27'21.40 7 "	89°25'31.64 35 "	Structure does not appear on the chart of the area. <i>*Concur. Add platform.</i>

Survey Date	Time (UTC)	Latitude (N)	Longitude (W)	Comments
1/8/2009	1420	29°27'22.52 4 "	89°25'15.27 6 "	Structure does not appear on the chart of the area. <i>*Concur. Add platform.</i>
1/8/2009	1430	29°27'22.82 0 "	89°25'04.65 6 "	Structure does not appear on the chart of the area. <i>*Concur. Add platform.</i>
1/8/2009	1431	29°27'23.09 88 "	89°25' 00.400 4 "	Structure does not appear on the chart of the area. <i>*Concur. Add platform.</i>
1/8/2009	1436	29°27'32.73 1 "	89°25'10.32 31 "	Structure does not appear on the chart of the area. <i>*Concur. Add platform.</i>
1/8/2009	1439	29°27'33.78 7 "	89°24'57.04 6 "	Structure does not appear on the chart of the area. <i>*Concur. Add platform.</i>
1/8/2009	1452	29°27'43.35 7 "	89°25'27.66 57 "	Structure does not appear on the chart of the area. <i>*Concur. Add platform.</i>
1/8/2009	1508	29°27'55. 24 .250"	89°25'30.87 9 "	Structure does not appear on the chart of the area. <i>*Concur. Add platform.</i>
1/8/2009	1509	29°27'56.72 6 "	89°25'28.93 28 "	Structure does not appear on the chart of the area. <i>*Concur. Add platform.</i>
1/8/2009	1510	29°28' 01.880 .876"	89°25'23. 50 .514"	Structure does not appear on the chart of the area. <i>*Concur. Add platform.</i>
1/8/2009	1512	29°27'54.03 44 "	89°25'12.69 6 "	Structure does not appear on the chart of the area. <i>*Concur. Add platform.</i>



APPENDIX III

Progress Sketch

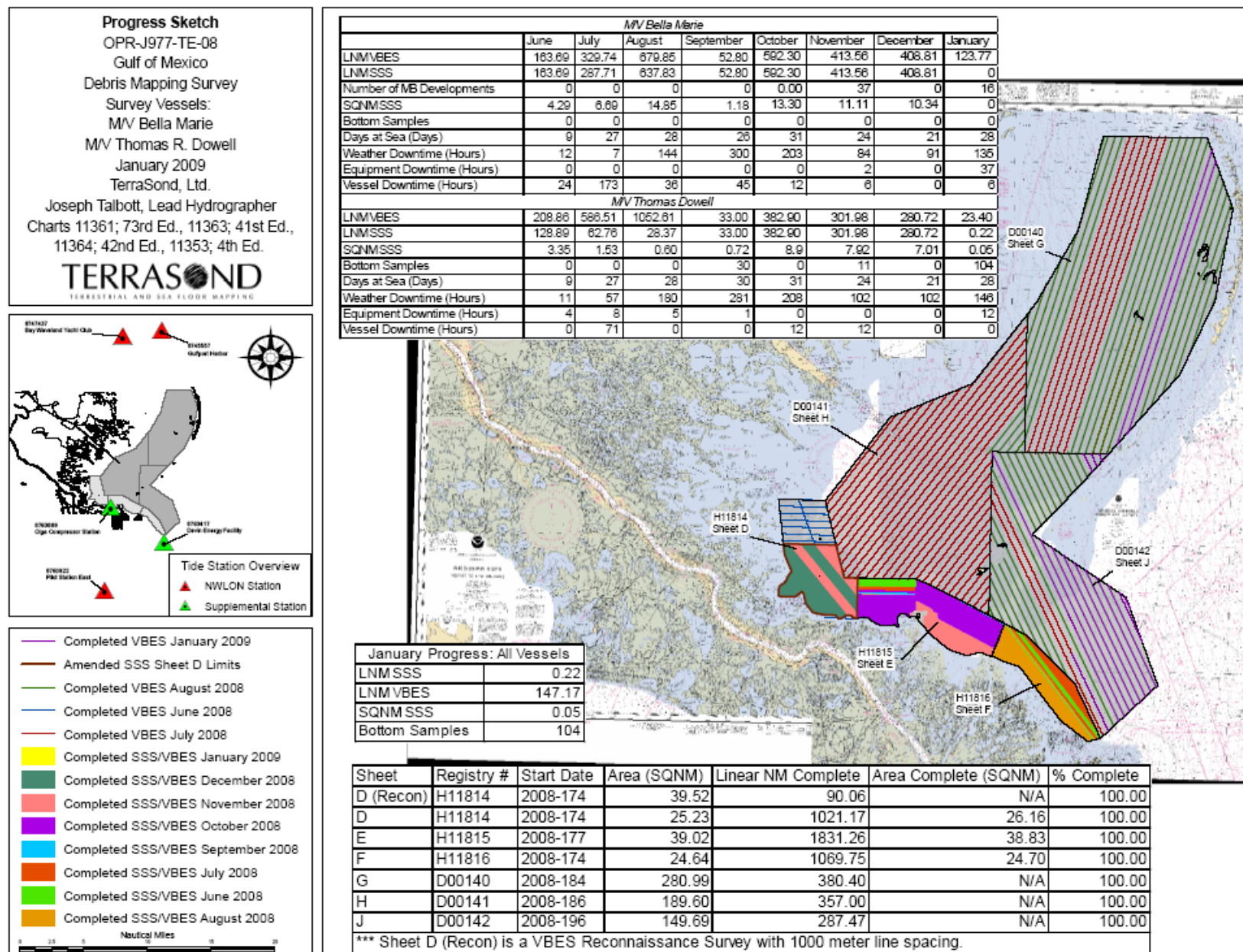


Figure 1-Final Progress Sketch for OPR-J977-TE-08



APPENDIX IV

Tides and Water Levels

Abstract of Times Hydrography

Project: OPR-J977-TE-08

Registry No.: H11814

Table 1 – Sheet D Times of Hydrography: Inclusive Dates: June 22, 2008 – January 27, 2009.

START		END	
Day (Julian)	Time (UTC)	Day (Julian)	Time (UTC)
2008-174	1310	2008-174	2113
2008-175	1445	2008-175	2124
2008-176	1340	2008-176	1642
2008-177	1352	2008-177	2056
2008-319	1354	2008-319	2202
2008-322	1336	2008-322	2220
2008-324	1306	2008-324	2202
2008-325	1341	2008-325	2149
2008-328	1407	2008-328	2134
2008-329	1302	2008-329	2104
2008-338	1349	2008-338	2154
2008-339	1313	2008-339	2137
2008-341	1318	2008-341	1905
2008-342	1343	2008-342	2122
2008-343	1334	2008-343	2151
2008-344	1430	2008-344	1540
2008-348	1342	2008-348	2119
2008-349	1337	2008-349	2116
2008-350	1358	2008-350	2058
2008-351	1505	2008-351	2113
2008-352	1701	2008-352	2201
2008-353	1551	2008-353	2053
2009-014	1420	2009-014	1741

START		END	
Day (Julian)	Time (UTC)	Day (Julian)	Time (UTC)
2009-017	1627	2009-017	1832
2009-018	1410	2009-018	1758
2009-024	1432	2009-024	1849
2009-027	1351	2009-027	1640

FINAL TIDE NOTE and FINAL TIDE ZONING CHART**DATE:** February 1, 2009**HYDROGRAPHIC BRANCH:** Atlantic**HYDROGRAPHIC PROJECT:** OPR-J977-TE_08**HYDROGRAPHIC SHEET:** H11814**LOCALITY:** 3NM East of California Point, LA**TIME PERIOD:** June 22, 2008 – January 27, 2009**TIDE STATION USED:**

Station No.	Station Name	Latitude	Longitude
8760889	Olga Compressor Station, Grand Bay, LA	29° 23.1' N	089° 22.8' W

PLANE OF REFERENCE (MEAN LOWER LOW WATER): 0.000 meters**HEIGHT OF HIGH WATER ABOVE PLANE OF REFERENCE:**

Station No.	Station Name	MHW
8760889	Olga Compressor Station, Grand Bay, LA	0.392 m

REMARKS: RECOMMENDED ZONING

Use zone(s) identified as: CGM143, CGM160, CGM161, CGM162, CGM163, CGM164, CGM204, and CGM205

Refer to Figure for zoning information.

Note 1: Provided time series data are tabulated in metric units (Meters), relative to MLLW and on Universal Time, Coordinated (UTC).

Note 2: Pilot Station East, LA (8760922) served as datum control for subordinate tide stations but was not used to supply MLLW correctors for this hydrographic survey. The datum for this station was updated in February 2009.

Final Tidal Zoning for OPR-J977-TE-08

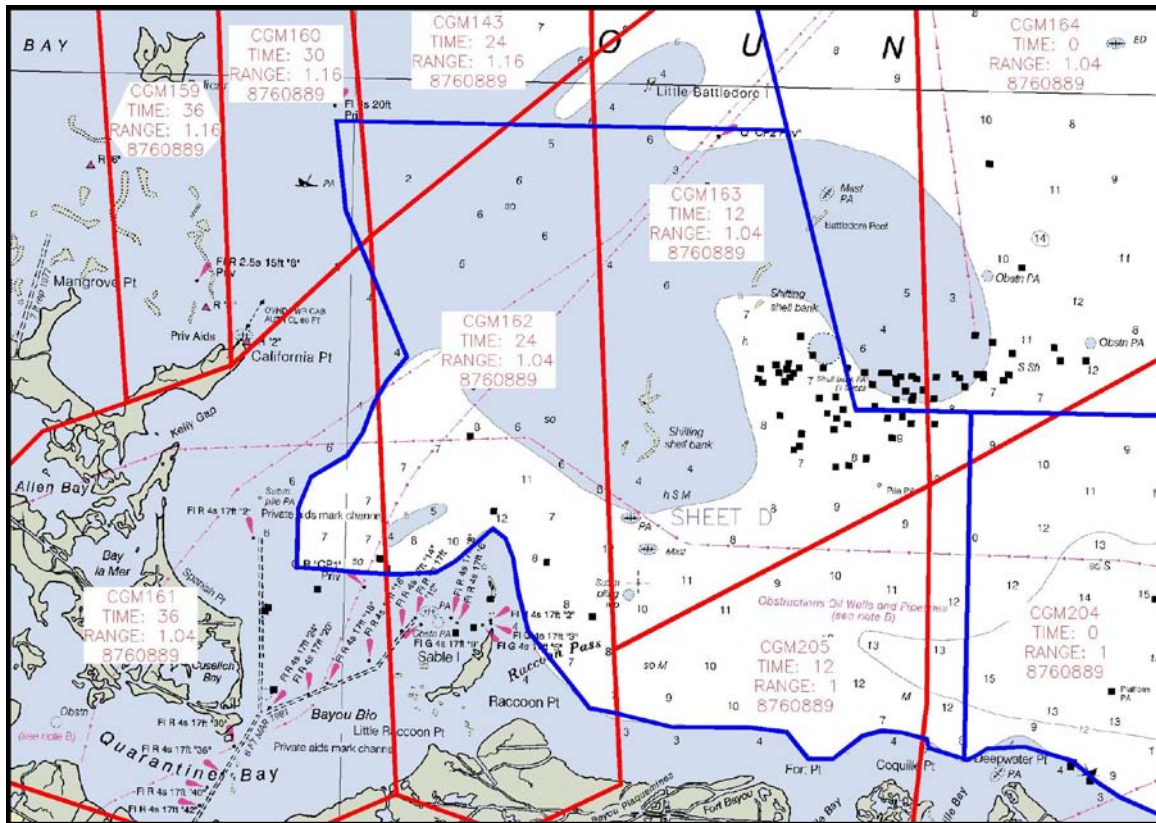


Figure 1 - Final Tidal Zoning Chart for OPR-J977-TE-08, Sheet H11814 with Chart 11364, 41st Edition, December 2005. Soundings in feet.



Descriptive Report for Tidal Zoning

OCS Project: S-J977-KR-TERRA-2008
Client: Terrasond, Ltd.
JOA Work Order: 115
Primary Tide Stations for Project: 8760922 Pilot Station East, LA (*datum control only*)
8747437 Bay Waveland Yacht Club, MS (*not used in final zoning*)
8745557 Gulfport Harbor, MS

Tertiary Tide Stations for Project: 8760417 Devon Energy Facility, LA
8760889 Olga Compressor Station, LA

Submitted by: Mike Zieserl
Email: mike@joasurveys.com

Preliminary Zoning

The preliminary zoning from CO-OPS generally shows the tide range increasing from about 0.3m to 0.5m from south to north, while the tide generally progresses from east to west taking nearly 3 hours to move through the survey area.

Preliminary tidal zoning from CO-OPS was based on the following NWLON stations:

- 8745557 Gulfport Harbor, MS
- 8747437 Bay Waveland, MS
- 9760922 Pilot Station East, LA

Final Zoning

The preliminary zoning was edited to make the zoning factors relative to the following tide stations:

- 8745557 Gulfport Harbor, MS (NWLON)
- 8760889 Olga Compressor Station (tertiary)
- 8760417 Devon Energy Facility (tertiary)

A comparison of the GT at the three tide stations showed that the preliminary zoning essentially had the range ratios modeled correctly. Looking at the difference in time of the tides between these three stations also showed that the time offsets were nearly correct as well.

GT for the 3 zones where the tide stations are located

	Gulfport Harbor	Olga Compressor	Devon Energy
--	-----------------	-----------------	--------------

Preliminary Zoning	0.53	0.39	0.36
Actual	0.53	0.40	0.37
Final Zoning	0.53	0.40	0.37

Time change in minutes between the tide stations

	Gulfport Harbor to Olga	Devon Energy to Olga Compressor
Preliminary Zoning	84	114
Actual	50 (1 sigma = 88min)	112 (1 sigma = 88min)
Final Zoning	84	114

The final zoning was not edited to reflect the measured time change between Olga and Gulfport Harbor (determined by comparing times of high and low tides) because the standard deviation of the measured time difference was so large. During the development of the final zoning, the measured time change between Gulfport and Olga was used to modify the time offsets as a test, and it did not improve the discrete shift at the zoning boundary between these two tide stations. Therefore, the preliminary zoning scheme was generally maintained, and the zoning factors were simply edited to reference these stations. The geometry of the zoning was not changed, with the exception of 15 zones that were deleted because they were not required for the survey area.

The deleted zones are listed below:

CGM151	CGM152	CGM99	CGM100	CGM101	CGM102
CGM103	CGM104	CGM105	CGM106	CGM107	CGM108
CGM74	CGM73A	CGM73			

The Bay Waveland NWLON was removed from the zoning because the tide station did not have verified data on several occasions during survey operations. Gulfport Harbor and Olga Compressor station were used to cover the zones that had been assigned to Bay Waveland.

Changed these zones to reference Gulfport instead of Bay Waveland:

CGM124	CGM125	CGM126	CGM127	CGM128	CGM129
CGM130	CGM131	CGM132	CGM133	CGM134	

Changed these zones to reference Olga instead of Bay Waveland:

CGM135	CGM136	CGM137	CGM138	CGM139	CGM140
CGM141	CGM142	CGM143	CGM159	CGM160	

Zoned tides covering the entire time period of the survey were compared at the boundary between Olga Compressor and Devon Energy at CGM260, and at the boundary of Olga Compressor and Gulfport Harbor at CGM134. The zoned tides from Devon and Olga compare passably. The average of the differenced zoned tides (excluding the 2 hurricanes) is about 1cm, with a standard deviation of 8cm.

The comparison of zoned tides between Olga and Gulfport at CGM134 do not match nearly as well. The water seems to behave much differently at Gulfport and Bay Waveland then it does at Olga or Devon.

The average of the difference between the two zoned tides (excluding the 2 hurricanes) is 6cm. Starting in September, the Olga MLLW tide data seems to be consistently higher than the Gulfport MLLW data, possibly indicating a seasonal difference between these two areas, or a difference in the datum epoch. The standard deviation of the difference is 13cm.

Recommendations

For future hydrographic survey projects, COOPS should include the time and range contours, as well as any boundary conditions that are used to develop the preliminary zoning, with the SOW. This would make zoning revision much more straight forward. Currently, the time and range contours have to be recomputed from the preliminary zoning factors, and some guesswork is involved.

In addition, COOPS should include the historic station summary files they use to create the preliminary zoning. It can be difficult to understand, much less perform meaningful revision to the preliminary tidal zoning without the justifying data that went into creating it.

For future surveys in this area, it may be beneficial to install a tide station at the NE boundary of the project, near the Chandeleur Islands, to help bridge the difference between the water levels in the south (Olga and Devon) and north (Bay Waveland and Gulfport).

While the tide range is rather small, and fairly slow to change across the project area, the time of the tide changes much more, and is much more erratic depending on local weather conditions. Instead of discrete tide zones, averages of water levels from two or more tide stations, weighted for importance, may produce better results, and smoother transitions between zone boundaries.



APPENDIX V

Supplemental Survey Records and Correspondence

Aids to Navigation

One (1) charted non-floating privately maintained aid to navigation (ATON) was located in H11814. The position of this ATON was compared with Raster Navigational Chart 11364, 42nd Edition, dated September 2007 and Electronic Navigation Chart (ENC) US4LA35M, updated May 2008. Except as noted, this ATON, listed in Table 1, was found as charted and served its intended purpose.

Table 1 – Charted floating and non-floating Aids to Navigation located in D00141.

USCG Light List Number	Date	Time (UTC)	Latitude (N)	Longitude (W)	Comments
11505	1/8/2009	1522	29° 29' 31.52"	89° 26' 09.59"	California Bay Pipeline light CP-2 agrees with Chart. Light is privately maintained. <i>Concur with conditions. Light color is amber rather than white. Delete charted light; add light in charted position with amber light. Retain beacon as charted.</i>

Bottom Samples

Five (5) bottom samples were collected bottom samples were collected in H11814 pursuant to OPR-J977-TE-08. The samples were distributed geographically to obtain a full representation of the bottom characteristics as specified in NOAA Hydrographic Surveys specifications and Deliverables, Section 7.1 dated April 2007 as amended by the Statement of Work for OPR-J977-TE-08 dated July 18, 2008.

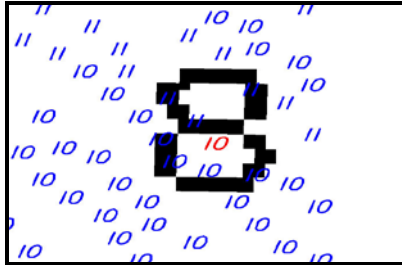
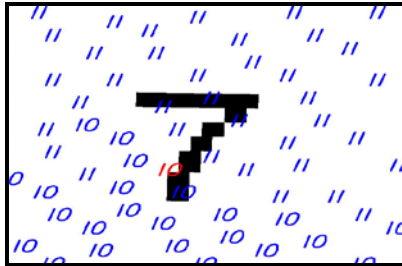
Point Number	Date	Time (UTC)	Depth (m)	Latitude (N)	Longitude (W)	Color	Surface Description	Nature of Surface	Secondary Nature of Surface
D1	11/4/2008	1750	2.5	29° 25' 43.13 3 ³ ''	89° 25' 56.14 14 ¹³⁹ ''		Fine	Sand	Broken Shells
D2	11/4/2008	1950	3	29° 25' 52.02 02 ⁰¹⁸ ''	89° 28' 26.84 84 ⁸³⁶ ''	Grey		Clay	
D3	11/4/2008	2120	2.7	29° 27' 50.56 56 ⁵⁵⁹ ''	89° 28' 27.84 2 ² ''	Grey		Silt/Ooze	Clay
D4	1/8/2009	1505	2.1	29° 28' 00.24 5 ⁵ ''	89° 25' 57.99 0 ⁰ ''			Shells	Fine Sand
D5	11/4/2008	1545	3.5	29° 25' 43.37 0 ⁰ ''	89° 23' 28.69 0 ⁰ ''	Grey		Clay	

A.1. Compare to Chart

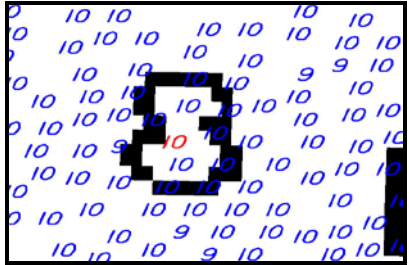
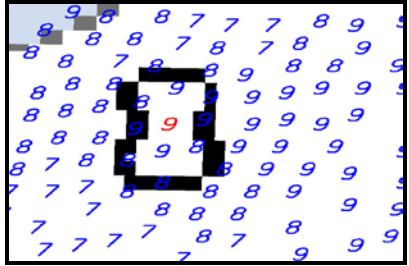
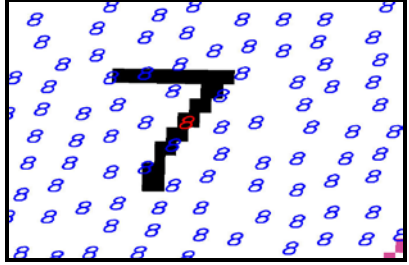
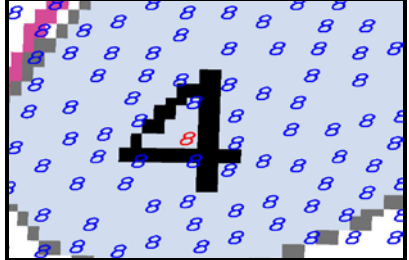
A.1.4. Soundings

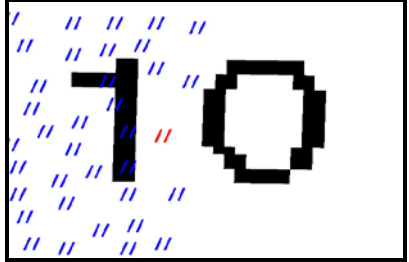
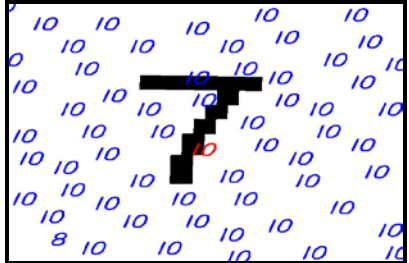
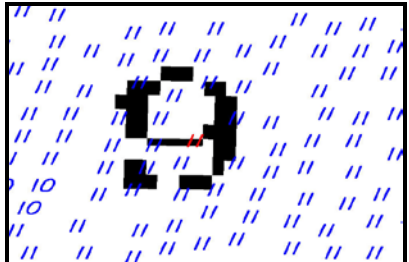
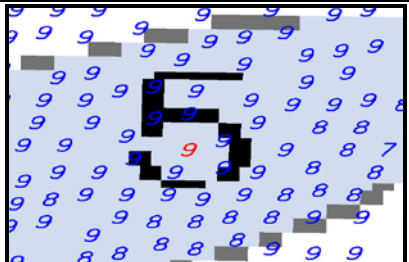
The 2008 / 2009 survey depths were compared with the charted depths in H11814. The charts used for this comparison included raster navigational chart 11364, 42nd Edition, dated September 2007 and electronic navigation chart US4LA35M, 23rd Edition, dated May 29, 2008. Tables 1 through 4 contain detailed information for each survey depth that differed from the charted depth by greater than 10% of the water depth at the charted position. The tables are separated by the respective chart and are further classified by whether the charted depth is shoaler or deeper than the survey depth. *All charted depths within the limits of H11814 will be superseded by present survey soundings.*

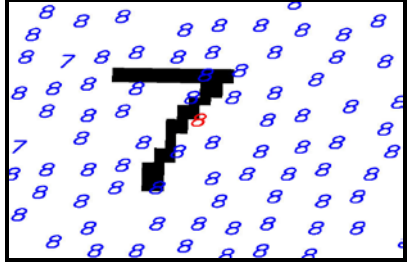
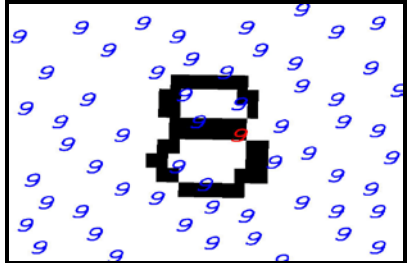
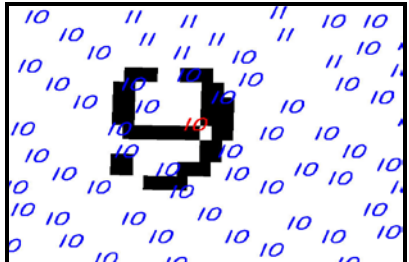

Table 1 - Charted depths are shoaler than OPR-J977-TE-08 survey depths. Chart 11364, 41st Edition, December 2005.

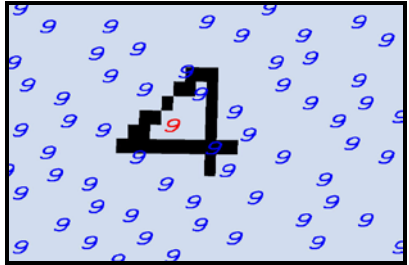
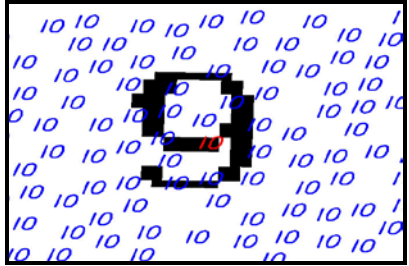
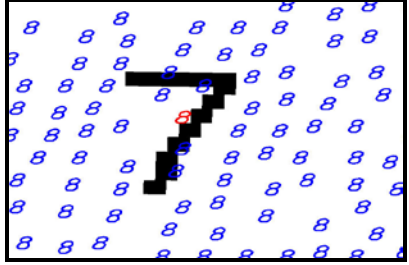
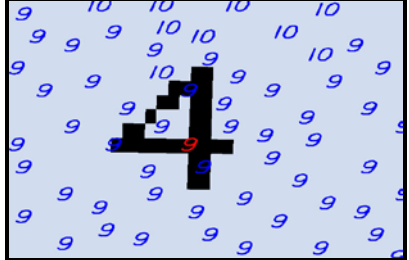
Latitude	Longitude	Chart	Charted Depth	Survey Depth	Image
29° 23' 59.38" N	089° 23' 27.83" W	11364, 41 st Edition, December 2005	8 ft	10 ft	
29° 24' 09.21" N	089° 24' 18.47" W	11364, 41 st Edition, December 2005	7 ft	10 ft	

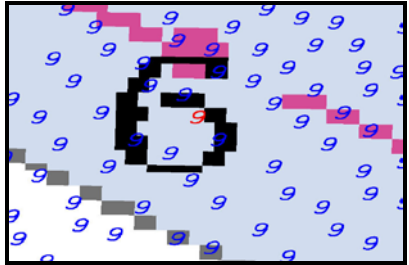
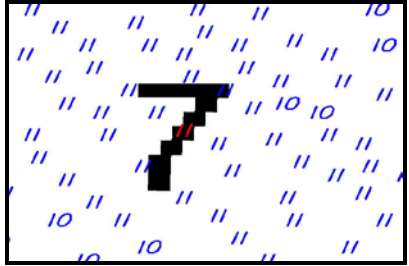
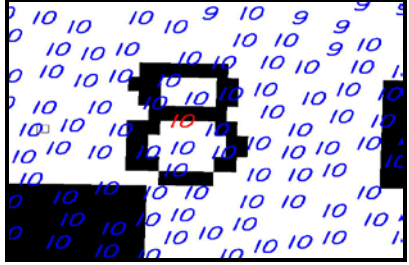
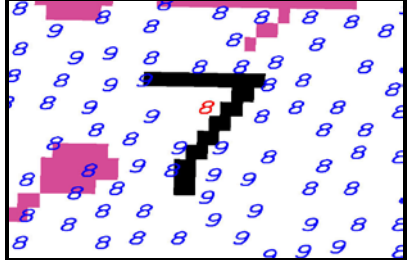
Latitude	Longitude	Chart	Charted Depth	Survey Depth	Image
29° 24' 36.70" N	089° 25' 31.83" W	11364, 41 st Edition, December 2005	10 ft	11 ft	
29° 24' 38.50" N	089° 27' 35.06" W	11364, 41 st Edition, December 2005	7 ft	8 ft	
29° 24' 44.88" N	089° 27' 12.12" W	11364, 41 st Edition, December 2005	8 ft	9 ft	
29° 25' 11.18" N	089° 27' 38.87" W	11364, 41 st Edition, December 2005	8 ft	9 ft	

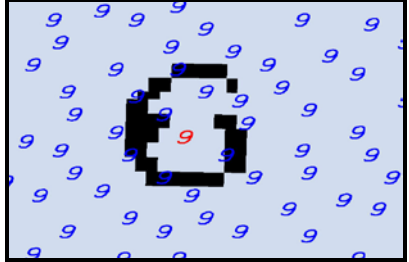
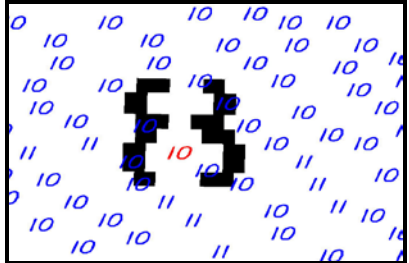
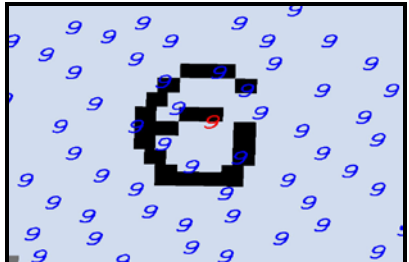
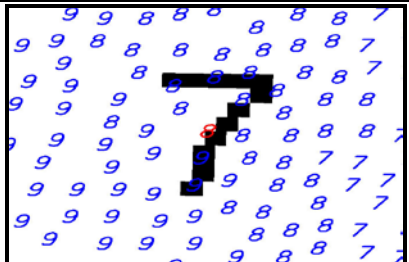
Latitude	Longitude	Chart	Charted Depth	Survey Depth	Image
29° 25' 35.44" N	089° 28' 00.07" W	11364, 41 st Edition, December 2005	8 ft	10 ft	
29° 25' 44.32" N	089° 29' 16.53" W	11364, 41 st Edition, December 2005	8 ft	9 ft	
29° 25' 44.45" N	089° 29' 44.99" W	11364, 41 st Edition, December 2005	7 ft	8 ft	
29° 25' 45.64" N	089° 29' 30.97" W	11364, 41 st Edition, December 2005	4 ft	8 ft	

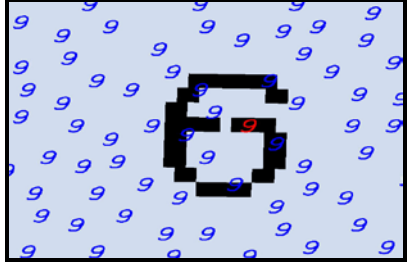
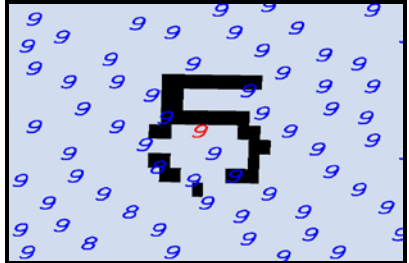
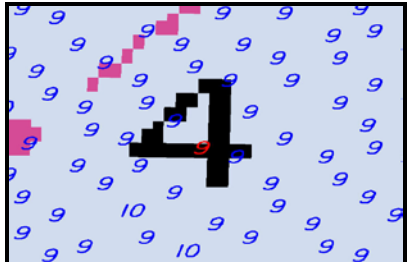

Latitude	Longitude	Chart	Charted Depth	Survey Depth	Image
29° 25' 51.43" N	089° 23' 24.91" W	11364, 41 st Edition, December 2005	10 ft	11 ft	
29° 25' 58.22" N	089° 27' 49.34" W	11364, 41 st Edition, December 2005	7 ft	10 ft	
29° 25' 58.75" N	089° 24' 05.80" W	11364, 41 st Edition, December 2005	9 ft	11 ft	
29° 25' 59.96" N	089° 29' 04.41" W	11364, 41 st Edition, December 2005	5 ft	9 ft	

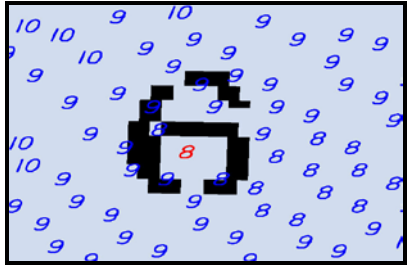
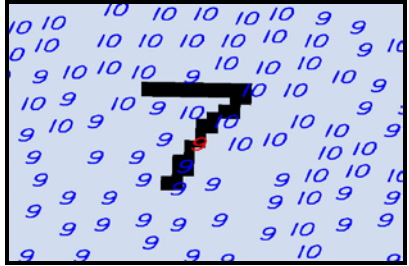
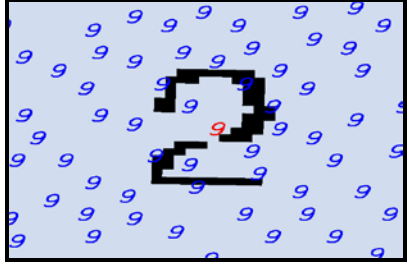
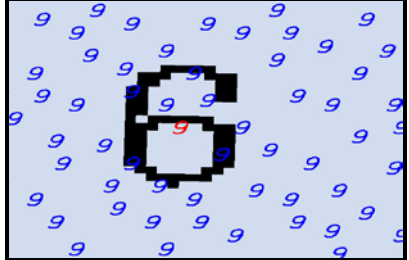
Latitude	Longitude	Chart	Charted Depth	Survey Depth	Image
29° 26' 05.80" N	089° 29' 44.98" W	11364, 41 st Edition, December 2005	7 ft	8 ft	
29° 26' 05.94" N	089° 25' 29.13" W	11364, 41 st Edition, December 2005	8 ft	9 ft	
29° 26' 07.72" N	089° 24' 48.87" W	11364, 41 st Edition, December 2005	9 ft	10 ft	
29° 26' 15.32" N	089° 27' 20.41" W	11364, 41 st Edition, December 2005	6 ft	9 ft	

Latitude	Longitude	Chart	Charted Depth	Survey Depth	Image
29° 26' 19.34" N	089° 26' 55.44" W	11364, 41 st Edition, December 2005	4 ft	9 ft	
29° 26' 23.62" N	089° 23' 46.17" W	11364, 41 st Edition, December 2005	9 ft	10 ft	
29° 26' 25.09" N	089° 29' 23.78" W	11364, 41 st Edition, December 2005	7 ft	8 ft	
29° 26' 26.53" N	089° 26' 22.38" W	11364, 41 st Edition, December 2005	4 ft	9 ft	

Latitude	Longitude	Chart	Charted Depth	Survey Depth	Image
29° 26' 27.91" N	089° 27' 43.63" W	11364, 41 st Edition, December 2005	6 ft	9 ft	
29° 26' 31.48" N	089° 25' 12.78" W	11364, 41 st Edition, December 2005	7 ft	11 ft	
29° 26' 35.04" N	089° 24' 39.52" W	11364, 41 st Edition, December 2005	8 ft	10 ft	
29° 26' 35.87" N	089° 29' 02.60" W	11364, 41 st Edition, December 2005	7 ft	8 ft	

Latitude	Longitude	Chart	Charted Depth	Survey Depth	Image
29° 26' 48.06" N	089° 28' 12.41" W	11364, 41 st Edition, December 2005	6 ft	9 ft	
29° 26' 51.32" N	089° 25' 37.18" W	11364, 41 st Edition, December 2005	8 ft	10 ft	
29° 27' 10.69" N	089° 28' 40.83" W	11364, 41 st Edition, December 2005	6 ft	9 ft	
29° 27' 53.16" N	089° 25' 49.61" W	11364, 41 st Edition, December 2005	7 ft	8 ft	

Latitude	Longitude	Chart	Charted Depth	Survey Depth	Image
29° 28' 08.44" N	089° 26' 39.44" W	11364, 41 st Edition, December 2005	6 ft	9 ft	
29° 28' 17.91" N	089° 28' 49.83" W	11364, 41 st Edition, December 2005	5 ft	9 ft	
29° 28' 18.54" N	089° 27' 16.08" W	11364, 41 st Edition, December 2005	4 ft	9 ft	
29° 28' 34.74" N	089° 27' 58.08" W	11364, 41 st Edition, December 2005	6 ft	9 ft	

Latitude	Longitude	Chart	Charted Depth	Survey Depth	Image
29° 28' 44.92" N	089° 28' 39.17" W	11364, 41 st Edition, December 2005	6 ft	8 ft	
29° 29' 03.27" N	089° 26' 15.73" W	11364, 41 st Edition, December 2005	7 ft	9 ft	
29° 29' 04.67" N	089° 29' 24.54" W	11364, 41 st Edition, December 2005	2 ft	9 ft	
29° 29' 04.85" N	089° 28' 14.55" W	11364, 41 st Edition, December 2005	6 ft	9 ft	

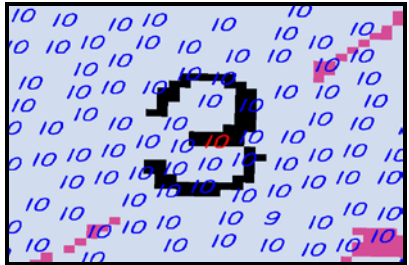
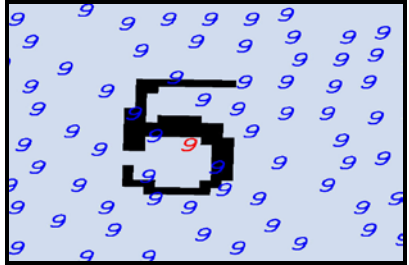
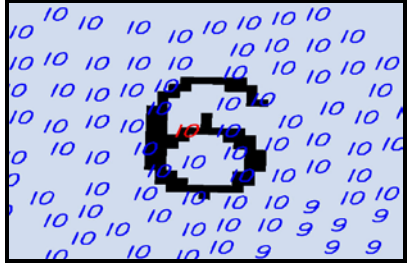
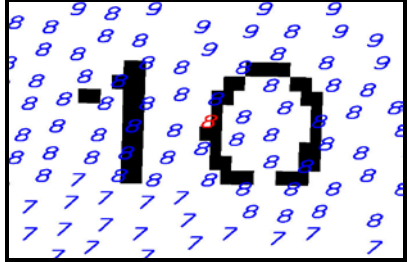
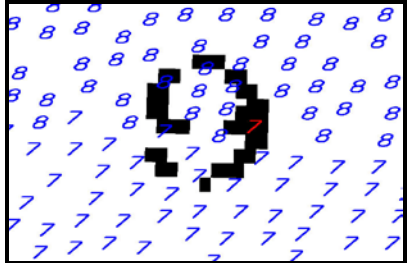
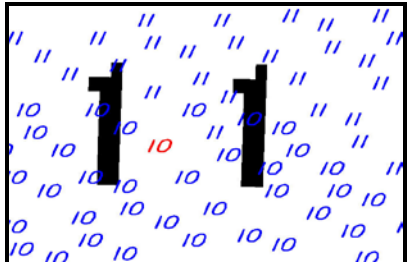


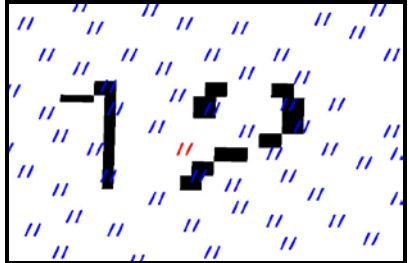
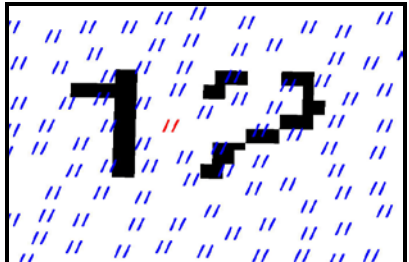
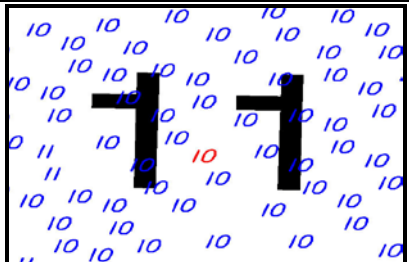
Latitude	Longitude	Chart	Charted Depth	Survey Depth	Image
29° 29' 12.21" N	089° 26' 35.69" W	11364, 41 st Edition, December 2005	3 ft	10 ft	
29° 29' 25.04" N	089° 27' 54.61" W	11364, 41 st Edition, December 2005	5 ft	9 ft	
29° 29' 29.08" N	089° 26' 53.20" W	11364, 41 st Edition, December 2005	6 ft	10 ft	

Table 2 - Charted depths are deeper than OPR-J977-TE-08 survey depths. Chart 11364, 41st Edition, December 2005.

Latitude	Longitude	Chart	Charted Depth	Survey Depth	Image
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Latitude	Longitude	Chart	Charted Depth	Survey Depth	Image
29° 24' 16.61" N	089° 25' 52.43" W	11364, 41 st Edition, December 2005	10 ft	8 ft	
29° 24' 20.14" N	089° 26' 31.98" W	11364, 41 st Edition, December 2005	9 ft	7 ft	
29° 24' 23.12" N	089° 25' 09.38" W	11364, 41 st Edition, December 2005	11 ft	10 ft	
29° 24' 49.32" N	089° 23' 43.07" W	11364, 41 st Edition, December 2005	13 ft	11 ft	

Latitude	Longitude	Chart	Charted Depth	Survey Depth	Image
29° 24' 51.68" N	089° 24' 24.86" W	11364, 41 st Edition, December 2005	13 ft	11 ft	
29° 24' 54.45" N	089° 24' 53.90" W	11364, 41 st Edition, December 2005	12 ft	11 ft	
29° 25' 16.57" N	089° 23' 35.55" W	11364, 41 st Edition, December 2005	12 ft	11 ft	
29° 25' 24.65" N	089° 26' 23.54" W	11364, 41 st Edition, December 2005	11 ft	10 ft	

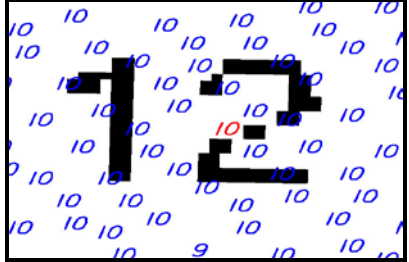
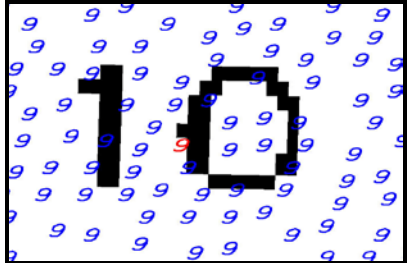
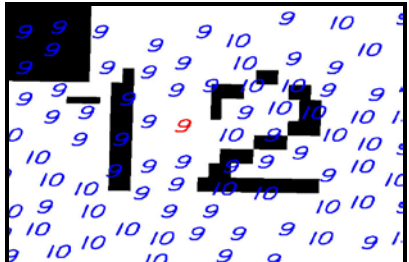
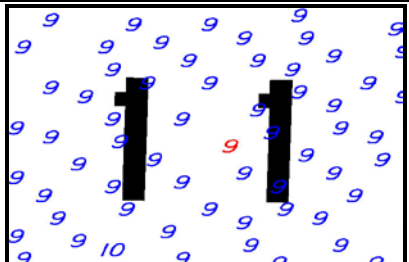
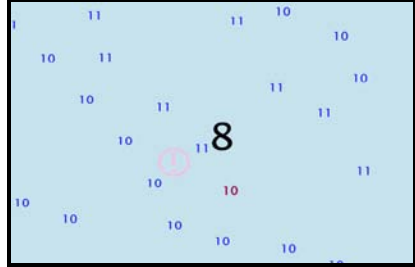

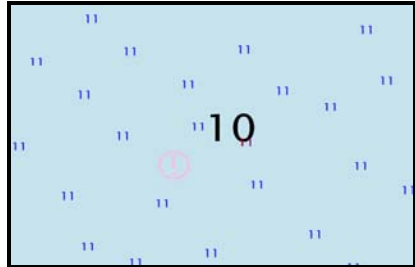
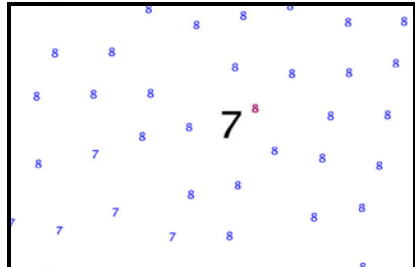
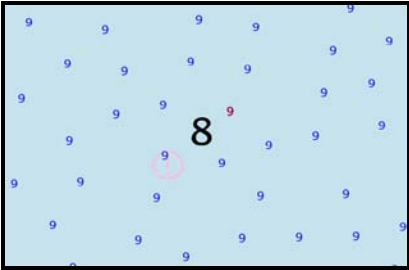
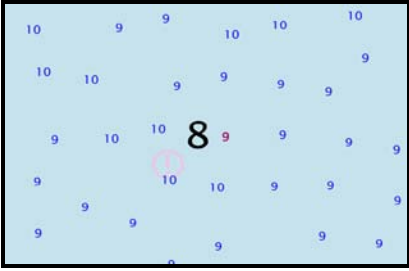
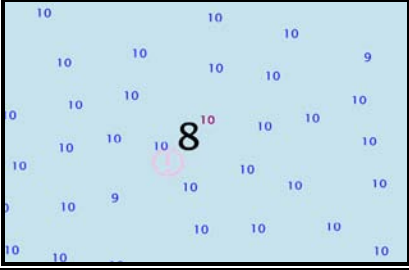

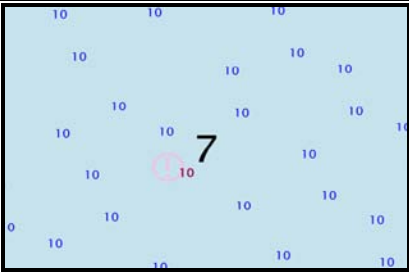
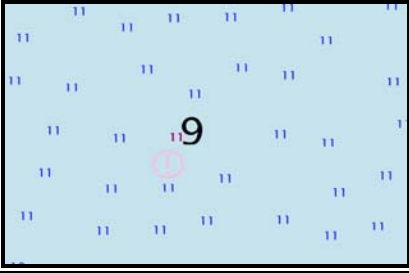


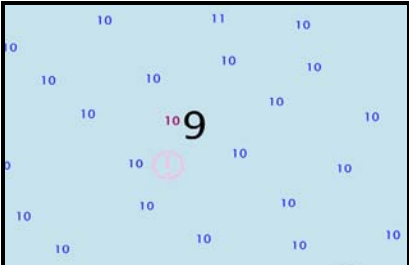
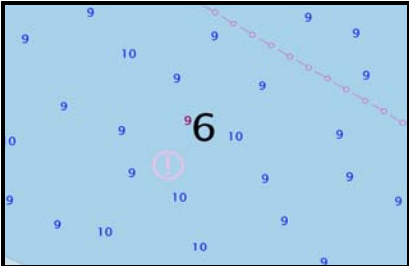


Latitude	Longitude	Chart	Charted Depth	Survey Depth	Image
29° 25' 41.28" N	089° 27' 12.52" W	11364, 41 st Edition, December 2005	12 ft	10 ft	
29° 25' 43.39" N	089° 28' 51.53" W	11364, 41 st Edition, December 2005	10 ft	9 ft	
29° 25' 57.81" N	089° 28' 21.52" W	11364, 41 st Edition, December 2005	12 ft	9 ft	
29° 26' 19.06" N	089° 28' 05.17" W	11364, 41 st Edition, December 2005	11 ft	9 ft	

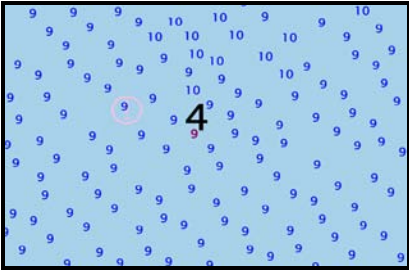
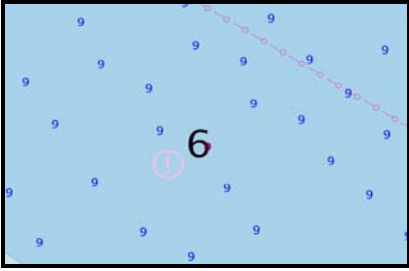
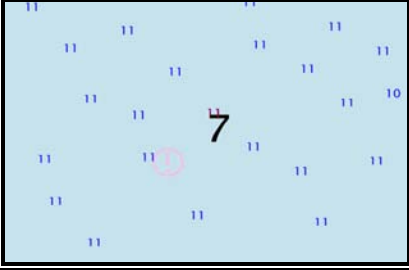
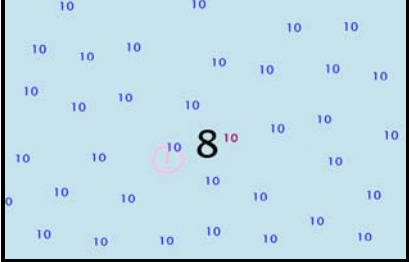
Table 3 - Charted depths are shoaler than OPR-J977-TE-08 survey depths. Electronic Navigation Chart US4LA35M, 23rd Edition, May 29, 2008.

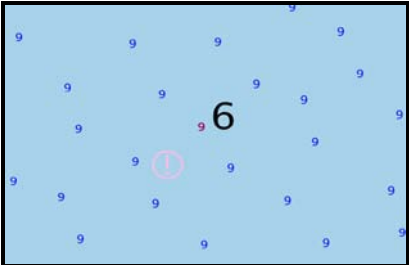
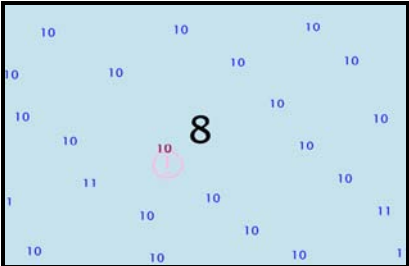
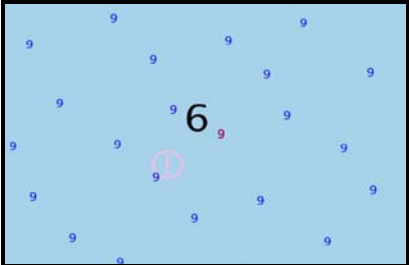
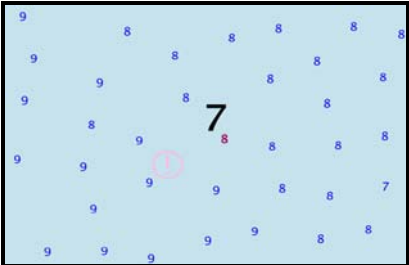
Latitude	Longitude	Chart	Charted Depth	Survey Depth	Image
29° 23' 59.48" N	089° 23' 27.92" W	US4LA35M, 23 rd Edition, May 29, 2008	8 ft	10 ft	
29° 24' 10.40" N	089° 24' 19.93" W	US4LA35M, 23 rd Edition, May 29, 2008	7 ft	10 ft	
29° 24' 36.70" N	089° 25' 31.76" W	US4LA35M, 23 rd Edition, May 29, 2008	10 ft	11 ft	
29° 24' 39.31" N	089° 27' 35.51" W	US4LA35M, 23 rd Edition, May 29, 2008	7 ft	8 ft	





Latitude	Longitude	Chart	Charted Depth	Survey Depth	Image
29° 24' 45.92" N	089° 27' 11.93" W	US4LA35M, 23 rd Edition, May 29, 2008	8 ft	9 ft	
29° 25' 11.23" N	089° 27' 38.88" W	US4LA35M, 23 rd Edition, May 29, 2008	8 ft	9 ft	
29° 25' 36.82" N	089° 27' 59.72" W	US4LA35M, 23 rd Edition, May 29, 2008	8 ft	10 ft	
29° 25' 46.99" N	089° 29' 30.86" W	US4LA35M, 23 rd Edition, May 29, 2008	4 ft	8 ft	

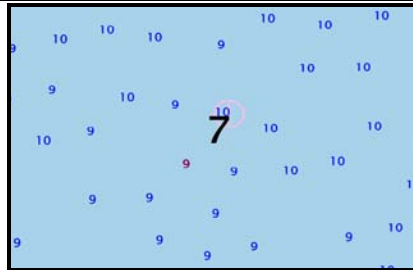
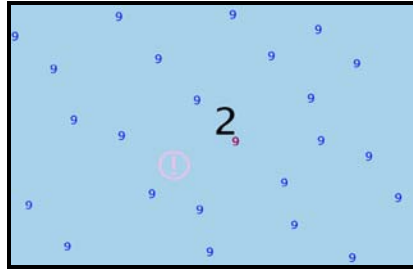
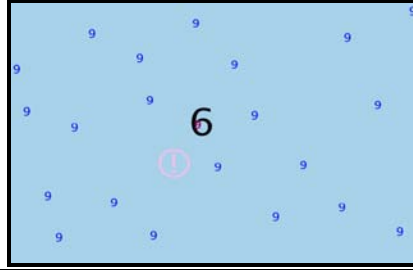
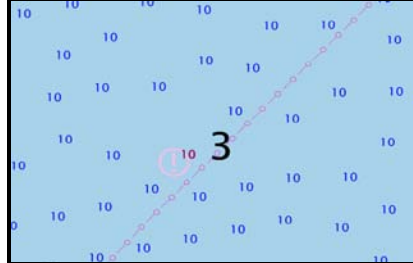
Latitude	Longitude	Chart	Charted Depth	Survey Depth	Image
29° 25' 58.93" N	089° 27' 50.42" W	US4LA35M, 23 rd Edition, May 29, 2008	7 ft	10 ft	
29° 25' 59.59" N	089° 24' 06.73" W	US4LA35M, 23 rd Edition, May 29, 2008	9 ft	11 ft	
29° 26' 01.28" N	089° 29' 04.49" W	US4LA35M, 23 rd Edition, May 29, 2008	5 ft	9 ft	
29° 26' 06.54" N	089° 25' 30.18" W	US4LA35M, 23 rd Edition, May 29, 2008	8 ft	9 ft	

Latitude	Longitude	Chart	Charted Depth	Survey Depth	Image
29° 26' 08.39" N	089° 24' 50.17" W	US4LA35M, 23 rd Edition, May 29, 2008	9 ft	10 ft	
29° 26' 15.40" N	089° 27' 20.39" W	US4LA35M, 23 rd Edition, May 29, 2008	6 ft	9 ft	
29° 26' 20.58" N	089° 26' 54.74" W	US4LA35M, 23 rd Edition, May 29, 2008	4 ft	9 ft	
29° 26' 24.79" N	089° 23' 47.29" W	US4LA35M, 23 rd Edition, May 29, 2008	9 ft	10 ft	

Latitude	Longitude	Chart	Charted Depth	Survey Depth	Image
29° 26' 27.17" N	089° 26' 23.17" W	US4LA35M, 23 rd Edition, May 29, 2008	4 ft	9 ft	
29° 26' 28.75" N	089° 27' 43.90" W	US4LA35M, 23 rd Edition, May 29, 2008	6 ft	9 ft	
29° 26' 32.17" N	089° 25' 13.55" W	US4LA35M, 23 rd Edition, May 29, 2008	7 ft	11 ft	
29° 26' 35.88" N	089° 24' 39.11" W	US4LA35M, 23 rd Edition, May 29, 2008	8 ft	10 ft	

Latitude	Longitude	Chart	Charted Depth	Survey Depth	Image
29° 26' 48.84" N	089° 28' 12.95" W	US4LA35M, 23 rd Edition, May 29, 2008	6 ft	9 ft	
29° 26' 52.33" N	089° 25' 38.14" W	US4LA35M, 23 rd Edition, May 29, 2008	8 ft	10 ft	
29° 27' 10.73" N	089° 28' 40.76" W	US4LA35M, 23 rd Edition, May 29, 2008	6 ft	9 ft	
29° 27' 53.19" N	089° 25' 49.60" W	US4LA35M, 23 rd Edition, May 29, 2008	7 ft	8 ft	

Latitude	Longitude	Chart	Charted Depth	Survey Depth	Image
29° 28' 08.98" N	089° 26' 40.45" W	US4LA35M, 23 rd Edition, May 29, 2008	6 ft	9 ft	
29° 28' 17.96" N	089° 28' 49.82" W	US4LA35M, 23 rd Edition, May 29, 2008	5 ft	9 ft	
29° 28' 34.82" N	089° 27' 58.09" W	US4LA35M, 23 rd Edition, May 29, 2008	6 ft	9 ft	
29° 28' 45.73" N	089° 28' 39.92" W	US4LA35M, 23 rd Edition, May 29, 2008	6 ft	8 ft	

Latitude	Longitude	Chart	Charted Depth	Survey Depth	Image
29° 29' 03.48" N	089° 26' 16.71" W	US4LA35M, 23 rd Edition, May 29, 2008	7 ft	9 ft	
29° 29' 04.72" N	089° 29' 24.56" W	US4LA35M, 23 rd Edition, May 29, 2008	2 ft	9 ft	
29° 29' 05.69" N	089° 28' 14.99" W	US4LA35M, 23 rd Edition, May 29, 2008	6 ft	9 ft	
29° 29' 12.86" N	089° 26' 36.80" W	US4LA35M, 23 rd Edition, May 29, 2008	3 ft	10 ft	

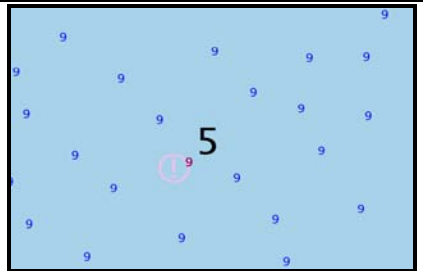
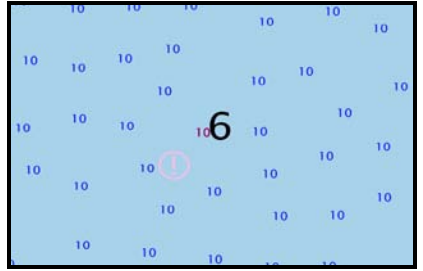
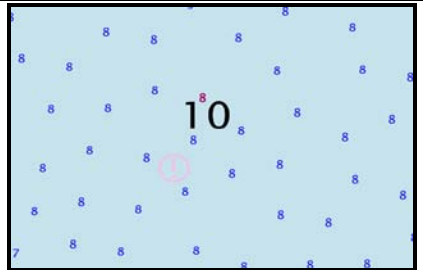
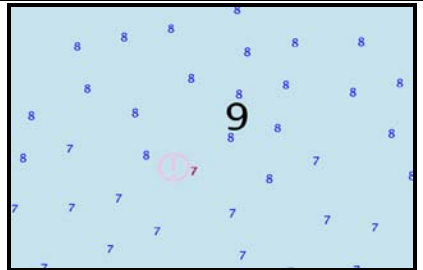
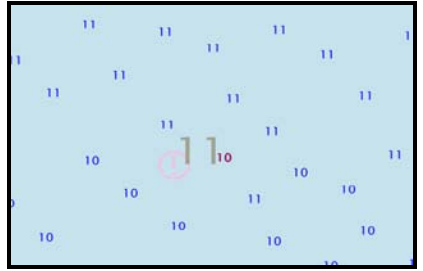

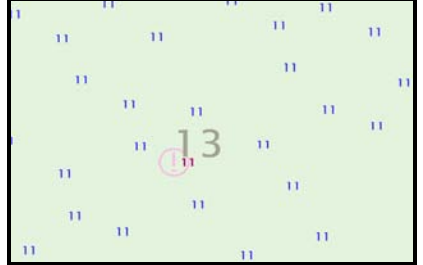
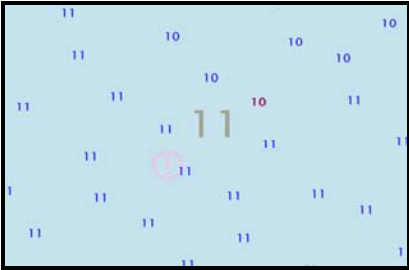
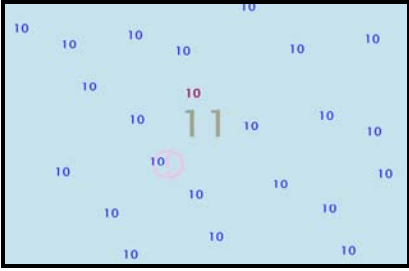
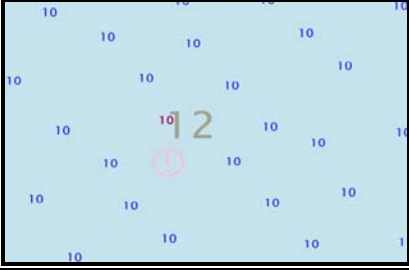

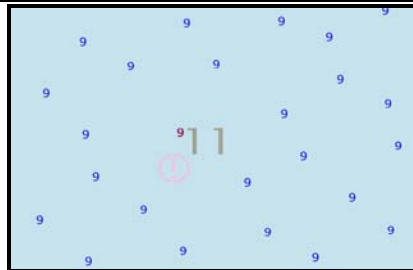
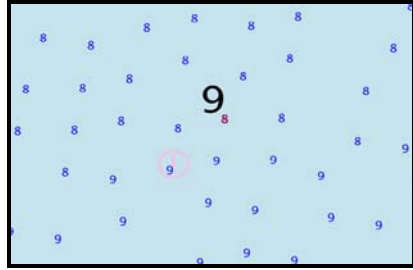

Latitude	Longitude	Chart	Charted Depth	Survey Depth	Image
29° 29' 25.37" N	089° 27' 55.60" W	US4LA35M, 23 rd Edition, May 29, 2008	5 ft	9 ft	
29° 29' 29.13" N	089° 26' 53.14" W	US4LA35M, 23 rd Edition, May 29, 2008	6 ft	10 ft	

Table 4 - Charted depths are deeper than OPR-J977-TE-08 survey depths. Electronic Navigation Chart US4LA35M, 23rd Edition, May 29, 2008.

Latitude	Longitude	Chart	Charted Depth	Survey Depth	Image
29° 24' 17.50" N	089° 25' 52.25" W	US4LA35M, 23 rd Edition, May 29, 2008	10 ft	8 ft	

Latitude	Longitude	Chart	Charted Depth	Survey Depth	Image
29° 24' 19.98" N	089° 26' 34.40" W	US4LA35M, 23 rd Edition, May 29, 2008	9 ft	7 ft	
29° 24' 24.46" N	089° 25' 08.47" W	US4LA35M, 23 rd Edition, May 29, 2008	11 ft	10 ft	
29° 24' 49.39" N	089° 23' 43.19" W	US4LA35M, 23 rd Edition, May 29, 2008	13 ft	11 ft	
29° 24' 51.73" N	089° 24' 24.79" W	US4LA35M, 23 rd Edition, May 29, 2008	13 ft	11 ft	

Latitude	Longitude	Chart	Charted Depth	Survey Depth	Image
29° 25' 10.33" N	089° 25' 58.15" W	US4LA35M, 23 rd Edition, May 29, 2008	11 ft	10 ft	
29° 25' 26.58" N	089° 26' 23.59" W	US4LA35M, 23 rd Edition, May 29, 2008	11 ft	10 ft	
29° 25' 42.06" N	089° 27' 13.84" W	US4LA35M, 23 rd Edition, May 29, 2008	12 ft	10 ft	
29° 25' 57.86" N	089° 28' 21.56" W	US4LA35M, 23 rd Edition, May 29, 2008	12 ft	9 ft	

Latitude	Longitude	Chart	Charted Depth	Survey Depth	Image
29° 26' 20.06" N	089° 28' 06.51" W	US4LA35M, 23 rd Edition, May 29, 2008	11 ft	9 ft	
29° 26' 46.61" N	089° 24' 11.18" W	US4LA35M, 23 rd Edition, May 29, 2008	9 ft	8 ft	
29° 27' 17.89" N	089° 25' 08.31" W	US4LA35M, 23 rd Edition, May 29, 2008	7 ft	6 ft	

Subject: OPR-J977-TE-08 Demonstration of SSS coverage

Date: Fri, 13 Mar 2009 17:08:03 -0800

From: James DePasquale <jdepasquale@terrasond.com>

To: Nick Forfinski <Nicholas.A.Forfinski@noaa.gov>

CC: gene_parker <Castle.E.Parker@noaa.gov>, Thomas Newman <tnewman@terrasond.com>, Brian Busey <bbusey@terrasond.com>, Daniel Seamount <dseamount@terrasond.com>, Kathleen Mildon <kmildon@terrasond.com>

Nick,

Pursuant to our conversation this morning, the following will demonstrate how we tracked our SSS coverage for OPR-J977-TE-08 using Chesapeake Technology Inc. SonarWiz.MAP SSS processing software. As I mentioned, SonarWiz.MAP has a tool which reads every layer of 100% SSS coverage and displays this information via a geotiff in which every 100% layer is represented by a different colored pixel. Here is the verbiage from the SonarWiz.MAP User's Manual describing the coverage report tool:

Coverage:

The Coverage Report creates either an HTML (B.xls) (B (default) or PDF file that

summarizes a number of aerial parameters including:

Per-Line Statistics Including:

- File Name
- Area Covered
- Perimeter
- Line Length
- Per cent of Total Coverage

Total Survey Coverage Statistics including:

- Grid Area
- Grid Area without data
- Area Mapped at 100 Pct
- Area Mapped at 200 Pct
- Area Mapped at 300 Pct
- Area Mapped > 300 Pct and a
- Color-coded image illustrating the coverage statistics

As well a GeoTiff will be created and placed in the Project root directory.

We have assembled several images and ArcGIS files from a small portion of the survey as an example. First, please visit our FTP site at ftp://ftp.terraond.com/_Clients/NOAA/OPR-J977-TE-08/







Username: terra\OPR-J977-TE-08

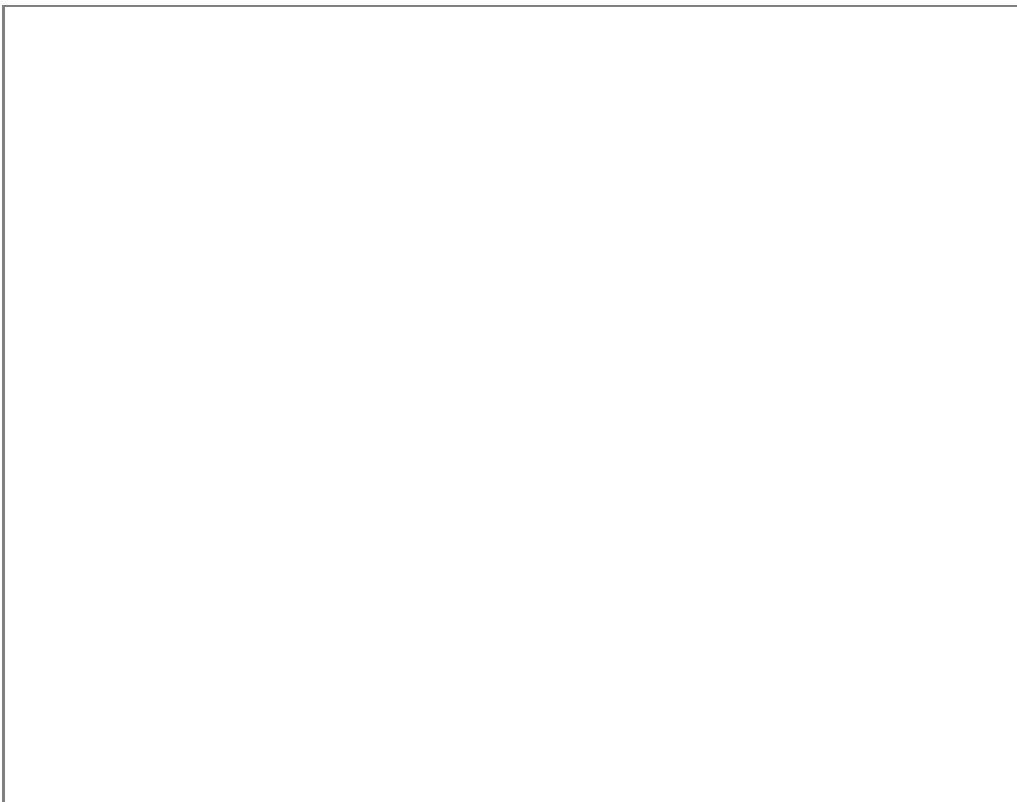
Password: Dragonfly&

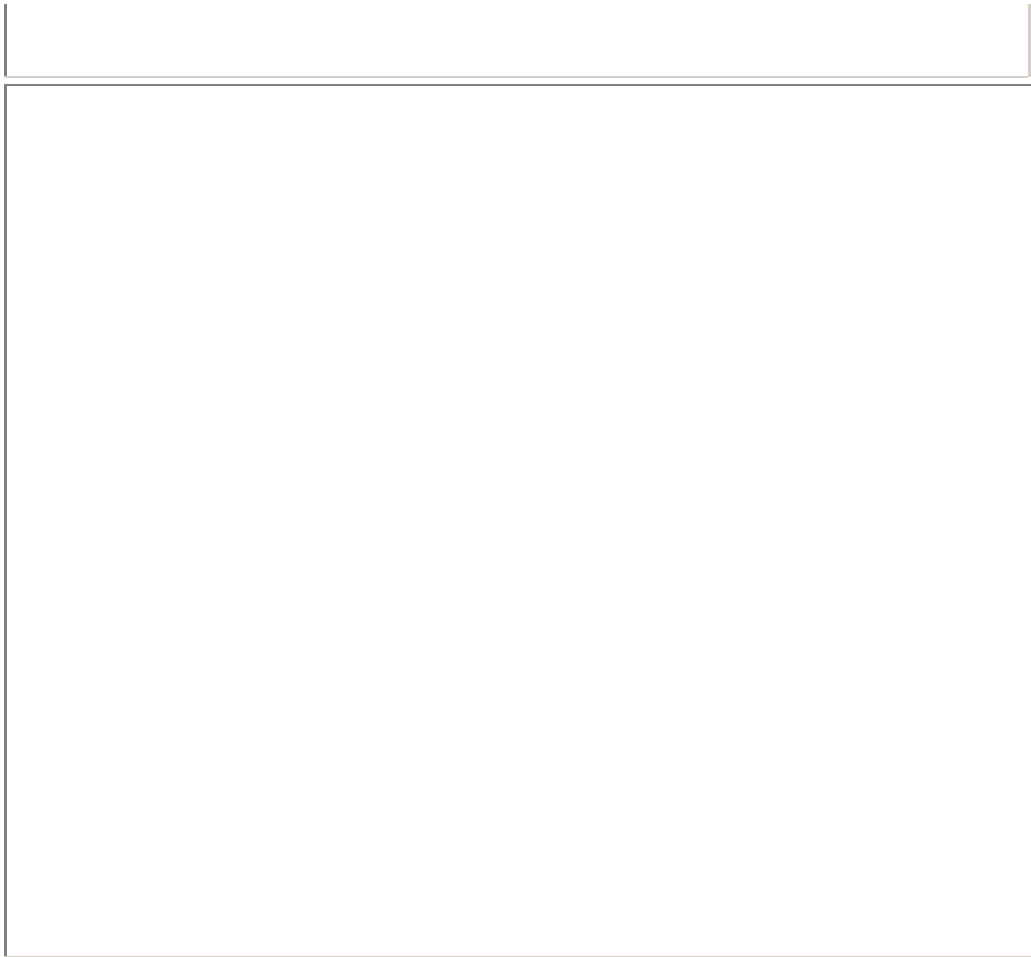
Download the contents of the folder entitled **For_Nick_Forfinski**. In it is an ArcGIS map document containing the images described below (georeferenced) and a shapefile of survey track lines for your use in understanding the efficacy of the SonarWiz.MAP coverage tool. Copy the entire folder to your C:/ and the .mxd will open.

The following images are included:

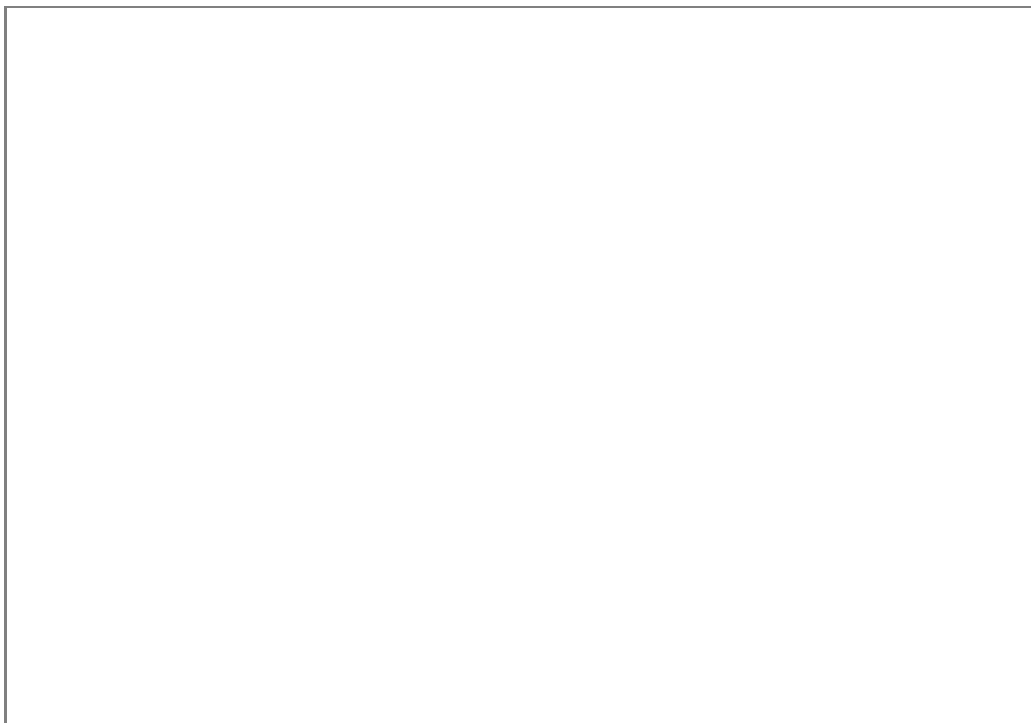
1. AreaofIntrest_showing_SSS_Lines.png: A graphic showing a selection of SSS lines from OPR-J977-TE-08 used for this demonstration.

2. First100percentCoverage.png/ First100percentMosaic.png: An overlay of 6 survey lines and their corresponding SonarWiz.MAP coverage geotiff and mosaic. We have separated two 100% layers of coverage for the purpose of this demonstration. However, our actual line spacing was roughly 40 meters, so at 50 meter range scale every two adjacent survey track lines had an across track overlap of 60 meters. These lines represent the  first  100% coverage. Yellow areas represent 100% coverage and the red   represent narrow areas of 200% coverage. You will note in the images to follow that our line spacing was such that these   ultimately wind up with 300% coverage.



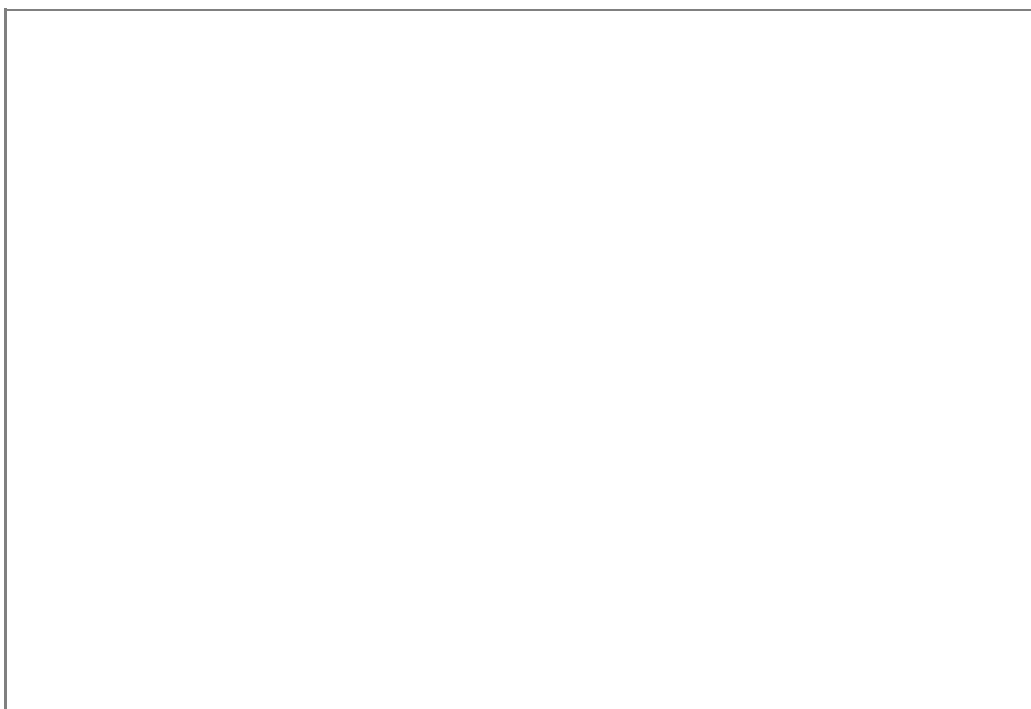


3. Second100percentCoverage.png Second100percentMosaic.png /: The second ☐ \$B!H ☐ (B100% ☐ \$B! ☐ (B set of lines and their corresponding SonarWiz.MAP coverage geotiff.





4. Full_percentage_Coverage.png: The SonarWiz.MAP coverage geotiff resulting from both sets of 100% coverage lines. The survey track lines are omitted from this image in order to clearly demonstrate the areas of $\geq 300\%$ coverage.





Thus, while the lower limit of minimum 50 meter range scale resulted in an **effective** scanning range less than 50 meters in many areas of the survey, the area ensonified by 200% coverage is appropriately represented by the SonarWiz.MAP coverage tool. We sincerely hope you will accept sheet-wide coverage geotiffs as a demonstration of coverage in lieu of two separate mosaics. Please feel free to call me at your convenience if I can provide you with any more information.

Sincerely,

Jim DePasquale

Hydrographic Processing Manager

TerraSond Ltd

Terrestrial and Seafloor Mapping

1617 South Industrial Way Suite 3, Palmer, Alaska 99645

(907) 745-7215 Office (907) 745-7273 FAX

(907) 232-0537 Cell

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This email was scanned and found virus free by GFI on 13/3/2009.

Subject: OPR-J977-TE-08 Demonstration of SSS coverage

Date: Tue, 17 Mar 2009 14:05:43 -0800

From: James DePasquale <jdepasquale@terrasond.com>

To: Nick Forfinski <Nicholas.A.Forfinski@noaa.gov>, Mark T Lathrop <Mark.T.Lathrop@noaa.gov>

CC: Castle E Parker <Castle.E.Parker@noaa.gov>, Anne Dollard <Adollard@terrasond.com>, Thomas Newman <tnewman@terrasond.com>, Daniel Seamount <dseamount@terrasond.com>, Brian Busey <bbusey@terrasond.com>, Raj Bhangu <rbhangu@terrasond.com>, Kathleen Mildon <kmildon@terrasond.com>

Hi Nick-

Thanks so much for your thoughtful analysis; I really appreciate hearing how you folks work with our data and it's great to learn how the specs and deliverables fit into your workflows. We do a lot of head scratching on our end trying to make sure we're meeting the specs and this type of input helps a lot.

To address your comments:

1. I've spoken with Jim, and I gather that the two-different-mosaics concept was not incorporated into the acquisition/processing workflow because of a previous discussion about modifying the required line spacing (Jim, is that a fair summary?...I personally wasn't included in those earlier discussions). Was there also a change to the required deliverables?

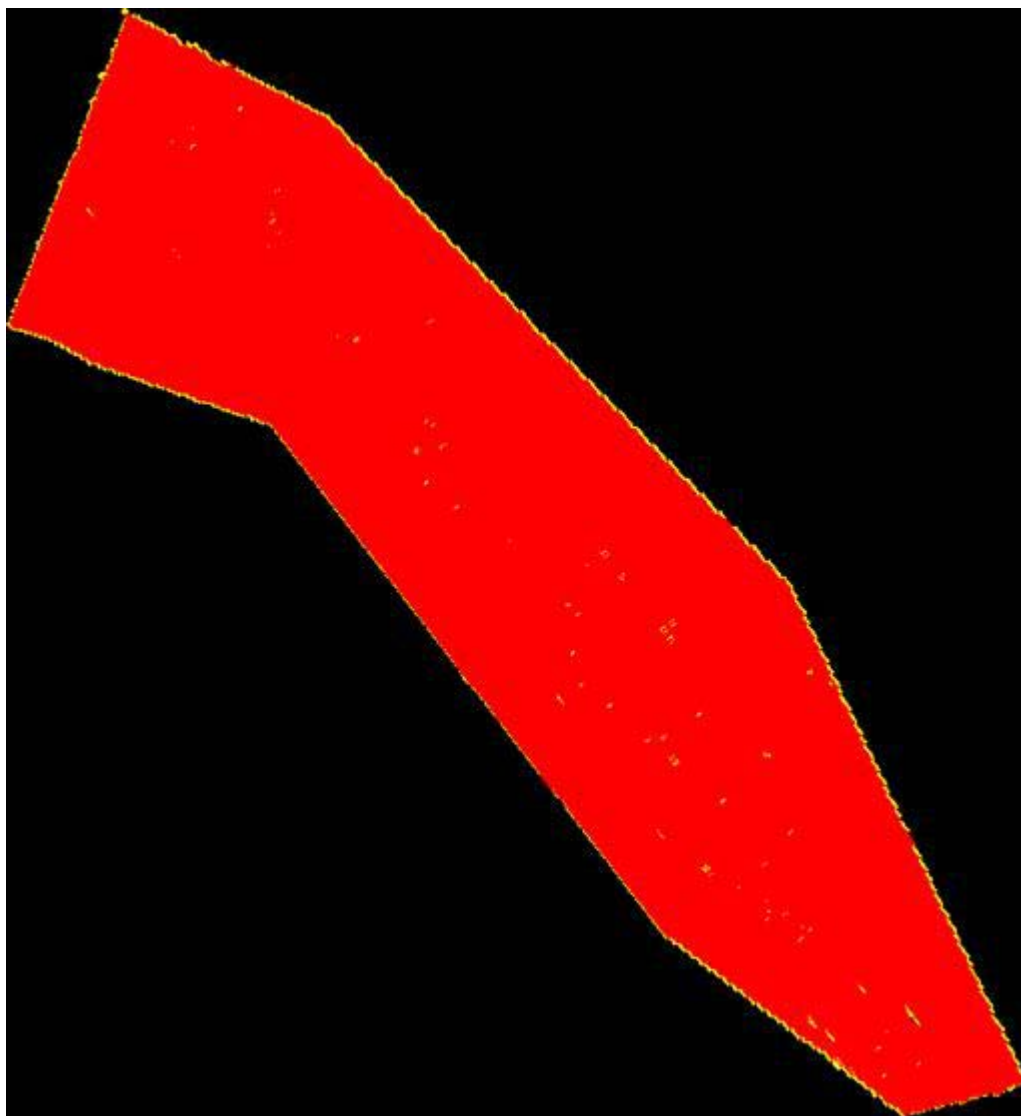
- In order to meet budget requirements we had to decrease the linear nautical miles for the survey. Therefore we submitted a work plan which identified a minimum range scale of 50 meters throughout the project. As we often worked in depths shallower than 3 meters, this meant we surveyed with 50 meter range scale in areas where 25 meter range scale would otherwise be required, based on the 8% to 20% of depth towfish height requirement. This situation will be reported in OPR-J977-TE-08 DAPR Sec. A.1.1 Coverage.

2. Potential complications interpreting the coverage geotiff:

- The lines (or portions thereof) you used as an example would be rejected by our processing department due to the compression and stretching of pixels in the inside/outside of curves. You will note the lines we provided in the example below are straight; they are actual lines run in OPR-J977-TE-08 and are representative of the entire project. If our vessel had to swerve off line to avoid another vessel or obstruction, we would typically resurvey that area if possible. It is highly unlikely, however, that we would follow the curve of one line with an adjacent line.
- Technically, we interpret the 100% holiday you refer to in the mosaic image as 200% coverage due to the overlap of adjacent lines, based on Specs and Deliverables Sec. 6.1 Coverage; **Technique 2: Conduct two, separate 100-percent coverages wherein the vessel track lines during the second coverage split the difference between the track lines of the first 100% coverage.** Based on your image, the two adjacent lines overlap by roughly 30-40% and we would be able to detect an object in both. Therefore, we do not interpret this area as a holiday.
- Practically speaking, if you analyze mosaics to this level of detail, then you will spend a great deal of time with either mosaics or the coverage report for this project. We ran this survey with the understanding that we would not achieve 200% coverage in some areas. This was usually due to the quality of the SSS record, not the fact that we did not actually ensound an area. During the ten months we spent on the water for this survey, we experienced two hurricanes, a flood and an oil spill while surveying in six feet of water in a very large freshwater inflow (i.e. the Mississippi River). Needless to say, data quality was hard to come by. One of the reasons we processed with SonarWiz.MAP is the ability to split sonar files in the mosaic display window with a mouse click (This is not available in Caris SIPS). This way, we could reject portions of lines in which object detection criteria

were not met due to poor data quality. In some areas, this left us with 100% coverage. If we did not identify a target in these 100% areas and the linear distance was less than 250 meters, we did not collect 200% coverage. Nonetheless, we processors sent the acquisition crews back to resurvey a great deal of area simply to get that one layer of acceptable data (often to their chagrin). This also resulted in increasing the number of SSS files by several times; each time we used the SonarWiz.MAP split tool we split the files in two, or more often, into several files. Multiply that by hundreds of tracklines and you will better understand how labor intensive it would be to reassemble them into separate mosaics.

- Here is a sheet-wide coverage report:



As you can see, there are many "holes" of 100% coverage due to either to the situation described above or the need to avoid oil rigs. You will not, however, find a target identified in these areas. If we included the portions of lines rejected due to poor data quality, much area would reflect $\geq 200\%$ and little, if any, would reflect $< 200\%$.

3. The mosaics are also useful for feature/data verification purposes

- As a processor, I can truly appreciate your position that using a mosaic for verification purposes can be more efficient than burrowing into Caris projects. If we knew you folks used the mosaics for this purpose, perhaps we could have adjusted our processing workflow to produce them by the end of the project for this reason. However, except for these valuable conversations we have with you and Gene, we plan mainly by the spec "B" (Bs).

In summary, because the conditions in OPR-J977-TE-08 required that the survey be effectively conducted as set line spacing rather than 200% coverage, we maintain that the SonarWiz.MAP coverage report is an adequate demonstration of coverage. We used it for every Monthly Progress Sketch as well as the Final Survey Outline for both our 2008 NOAA contracts. As far as the value of a mosaic for feature/data verification purposes, might I suggest we submit a 1- meter resolution full coverage mosaic? SonarWiz.MAP has essentially the same mosaic display tools (shine through, average etc..) as Caris SIPS and we could easily export sheet-wide geotiffs for this purpose. Finally, I wonder if there would be any way you could visit our Palmer, AK office sometime in the near future and we could sit down together and look at these issues in more detail, as well as generally compare processing notes and ideas? We have always benefited from meeting with our NOAA representatives and it is great to have an opportunity to talk processing face to face.

We apologize for any inconvenience and sincerely appreciate your time and attention to this matter.

Best Regards,

Jim DePasquale

Hydrographic Processing Manager

TerraSond Ltd

Terrestrial and Seafloor Mapping

1617 South Industrial Way Suite 3, Palmer, Alaska 99645

(907) 745-7215 Office (907) 745-7273 FAX

(907) 232-0537 Cell

www.terrasond.com

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

From: Nick Forfinski [mailto:Nicholas.A.Forfinski@noaa.gov]

Sent: Monday, March 16, 2009 1:34 PM

To: James DePasquale; Mark T Lathrop

Cc: Castle E Parker

Subject: Re: OPR-J977-TE-08 Demonstration of SSS coverage

Hi Jim and Mark. I thought I'd write you both to get us all on the same page.

To catch you up real quick, Mark...Terrasond is wondering if it's OK to deviate slightly from the specs

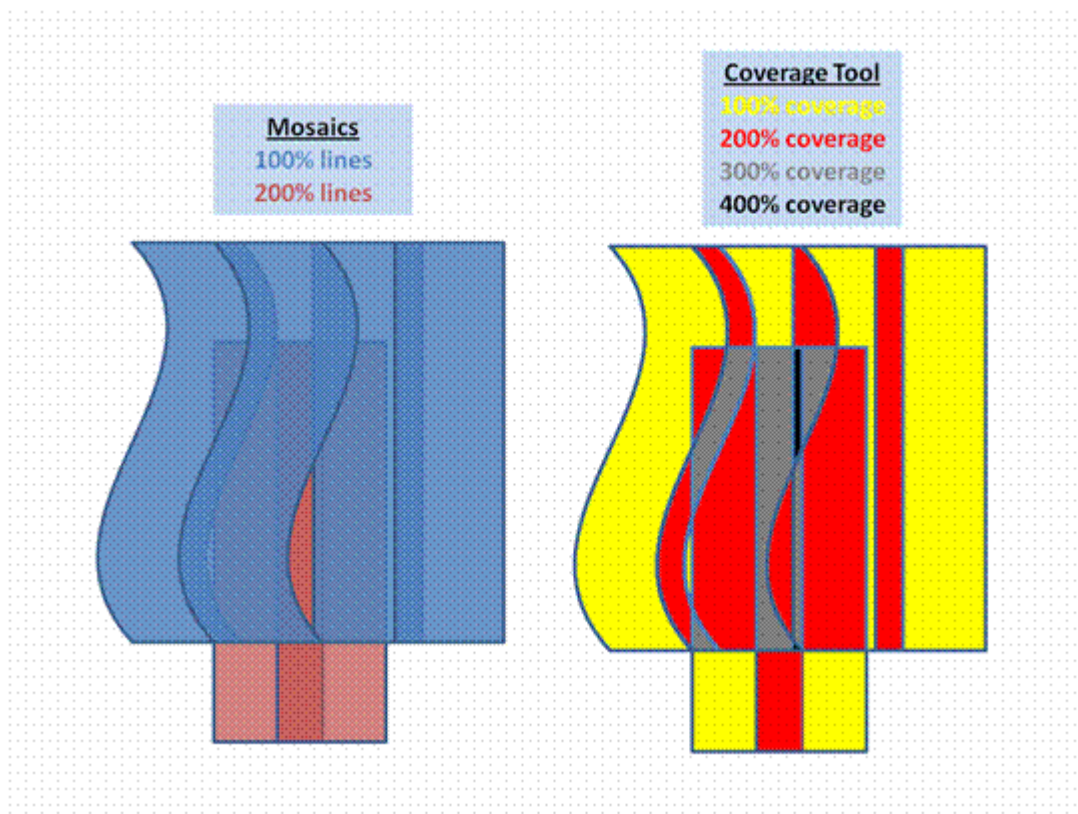
and deliverables' method of demonstrating side scan coverage. Jim's wondering if they can submit a "coverage geotiff" as generated by a coverage tool within the SonarWiz.MAP program, instead of two separate mosaics (a 100% and a 200% mosaic). (Jim has assembled a series of images to illustrate the SonarWiz.MAP coverage tool.)

I've spoken with Jim, and I gather that the two-different-mosaics concept was not incorporated into the acquisition/processing workflow because of a previous discussion about modifying the required line spacing (Jim, is that a fair summary?...I personally wasn't included in those earlier discussions). Was there also a change to the required deliverables?

Jim has indicated that producing the separate mosaics would take a significant amount of effort, which would delay the submission of the project, and he has also demonstrated that the tool can provide a clear demonstration of coverage in certain cases; however, from a branch-verification perspective, I recommend that we uphold the specs and deliverables' requirement for submitting two separate mosaics, for two main reasons:

(1) *Potential complications interpreting the coverage geotiff*

The graphic below illustrates a common holiday scenario that could be difficult to evaluate using only the coverage geotiff. The image on the right is the hypothetical coverage geotiff of the theoretical dataset on the left. (Jim, would you agree?) Whereas the 100% holiday is easily observable in the "mosaics view", on the left, the same holiday is not readily apparent in the "coverage tool view", on the right. In addition to being labeled as an area of 200%, the 100% holiday looks a lot like other areas of "200% coverage" that are not holidays. Only when the variously colored polygons are viewed in relation to the 100% and 200% track lines does the holiday reveal itself. I believe having to interpret the coverage geotiff in this simple example adds an undue level of complexity.



(2) *The mosaics are also useful for feature/data verification purposes*

Although the specs and deliverables state the mosaics are for demonstration of coverage purposes, we at the branch often also use the mosaics for feature verification and general QC purposes. Field-submitted mosaics are particularly useful in cases where the submitted data are not immediately Caris friendly (i.e., have to be converted to HDCS format).

As the COR for this project, Mark, do you have any specific guidance or suggestions?

Please me know if either of you have any questions or comments.

Nick

James DePasquale wrote:

Nick,

Pursuant to our conversation this morning, the following will demonstrate how we tracked our SSS coverage for OPR-J977-TE-08 using Chesapeake Technology Inc. SonarWiz.MAP SSS processing software. As I mentioned, SonarWiz.MAP has a tool which reads every layer of 100% SSS coverage and displays this information via a geotiff in which every 100% layer is represented by a different colored pixel. Here is the verbiage from the SonarWiz.MAP User□\$B!G□(Bs Manual describing the coverage report tool:

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The Coverage Report creates either an □\$B!H□(B.xls□\$B!I□(B (default) or PDF file that summarizes a number of aerial parameters including:

Per-Line Statistics Including:

□\$B!|□(B File Name

□\$B!|□(B Area Covered

□\$B!|□(B Perimeter

□\$B!|□(B Line Length

□\$B!|□(B Per cent of Total Coverage

Total Survey Coverage Statistics including:

□\$B!|□(B Grid Area

□\$B!|□(B Grid Area without data

□\$B!|□(B Area Mapped at 100 Pct

□\$B!|□(B Area Mapped at 200 Pct

□\$B!□(B Area Mapped at 300 Pct

□\$B!□(B Area Mapped > 300 Pct and a

□\$B!□(B Color-coded image illustrating the coverage statistics

As well a GeoTiff will be created and placed in the Project root directory.

We have assembled several images and ArcGIS files from a small portion of the survey as an example. First, please visit our FTP site at <ftp://ftp.terraond.com/ Clients/NOAA/OPR-J977-TE-08/>

Username: terra\OPR-J977-TE-08

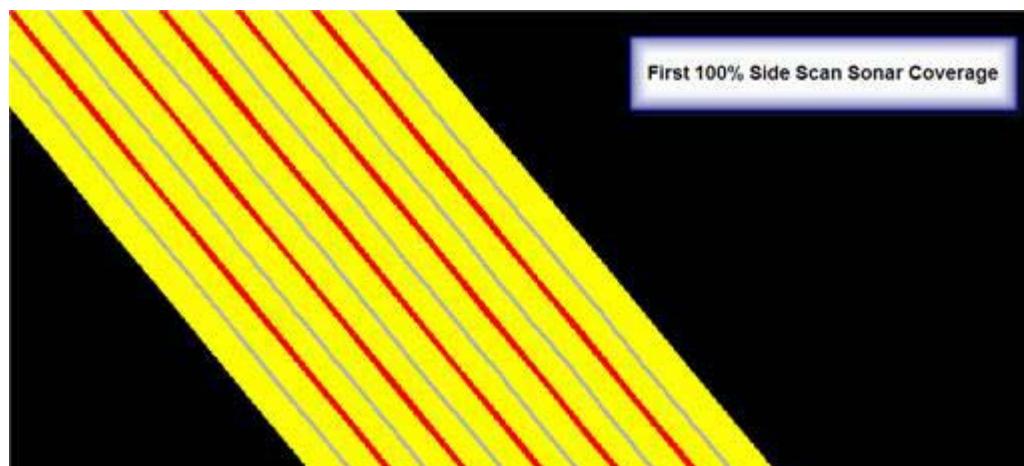
Password: Dragonfly&

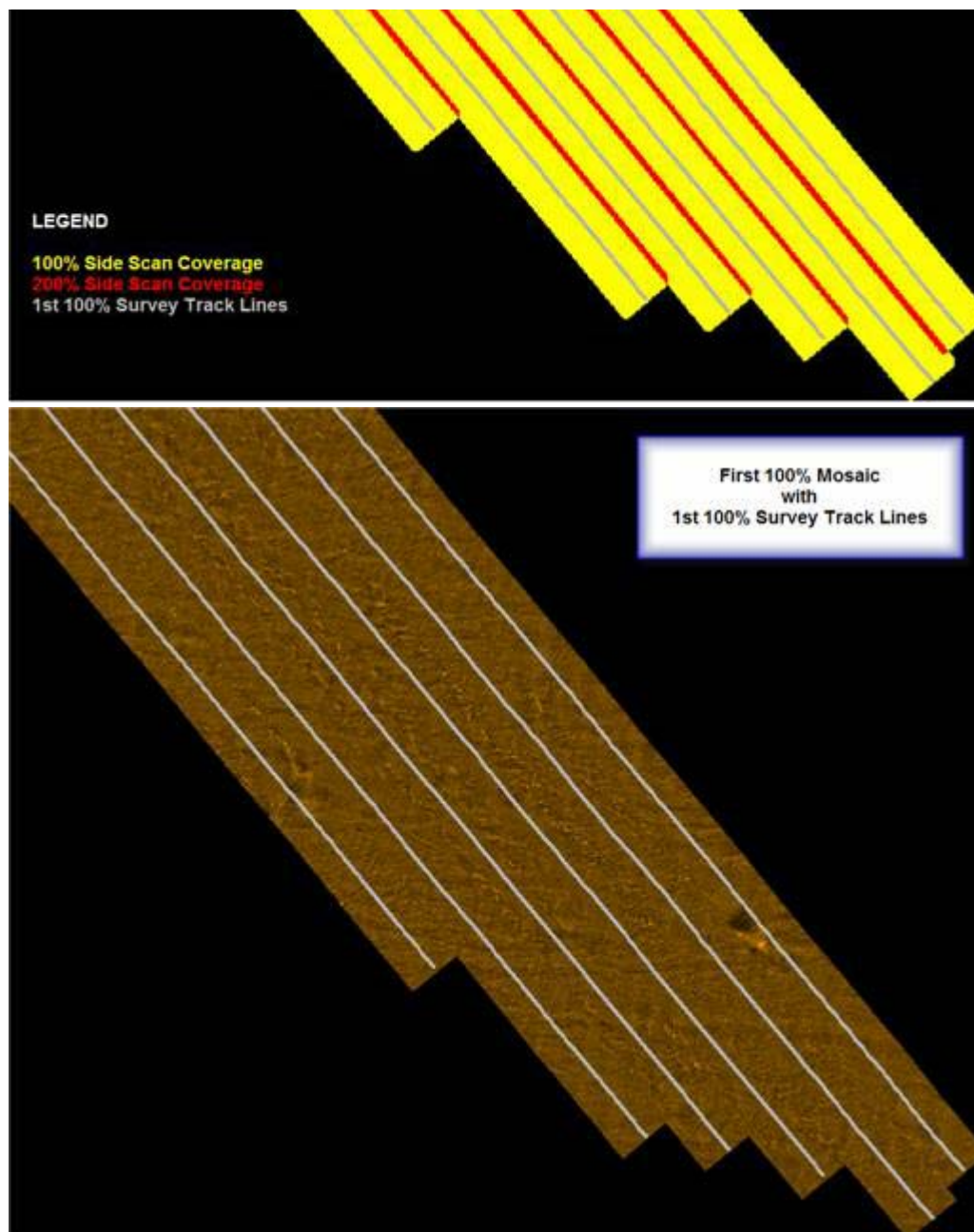
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The following images are included:

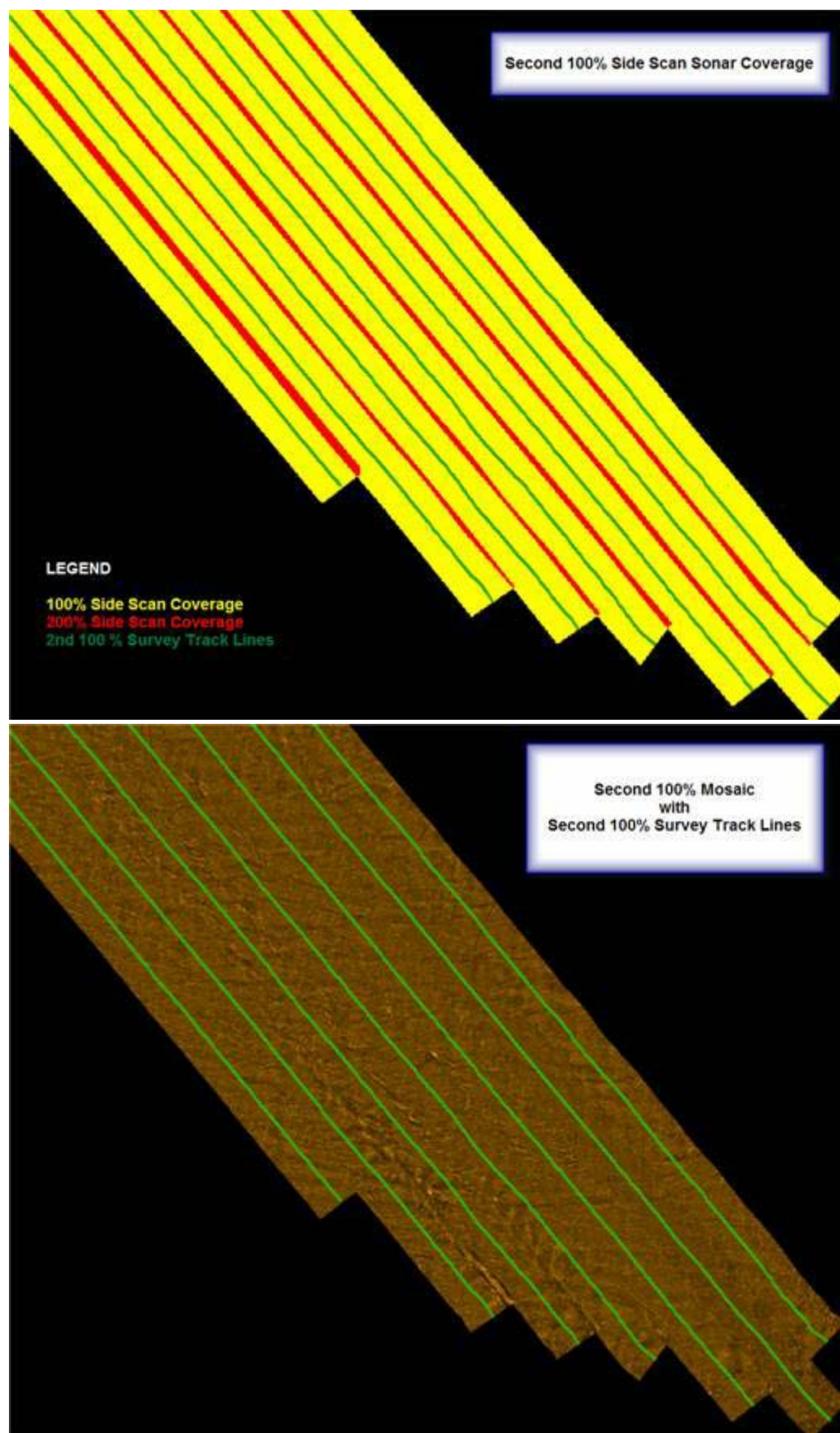
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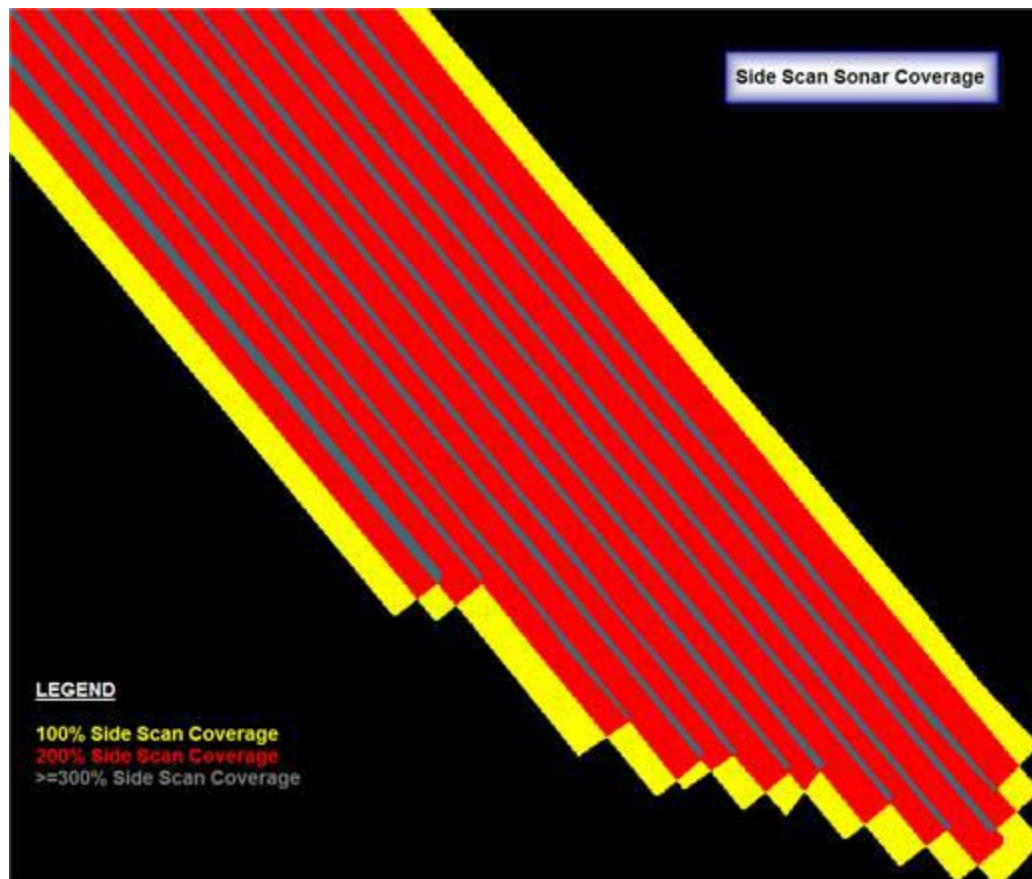


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4. Full_percentage_Coverage.png: The SonarWiz.MAP coverage geotiff resulting from both sets of 100% coverage lines. The survey track lines are omitted from this image in order to clearly demonstrate the areas of

>=300% coverage.



Thus, while the lower limit of minimum 50 meter range scale resulted in an **effective** scanning range less than 50 meters in many areas of the survey, the area encompassed by 200% coverage is appropriately represented by the SonarWiz.MAP coverage tool. We sincerely hope you will accept sheet-wide coverage geotiffs as a demonstration of coverage in lieu of two separate mosaics. Please feel free to call me at your convenience if I can provide you with any more information.

Sincerely,

Jim DePasquale

Hydrographic Processing Manager

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Subject: Re: Terrasond survey H11814
From: "Mark.T.Lathrop" <Mark.T.Lathrop@noaa.gov>
Date: Tue, 12 Jan 2010 14:38:09 -0500
To: Matthew Wilson <Matthew.Wilson@noaa.gov>
CC: "Castle.E.Parker" <Castle.E.Parker@noaa.gov>

Matt,

Sheet D was reduced to 25 sq nm due to the great expense of surveying in that area. Their transit time was getting longer and it had become unsafe for them to transit at night, shortening their survey day. There had been several revisions to this project and you ended up with a prior SOW. I've attached the updated one.

Mark

Matthew Wilson wrote:

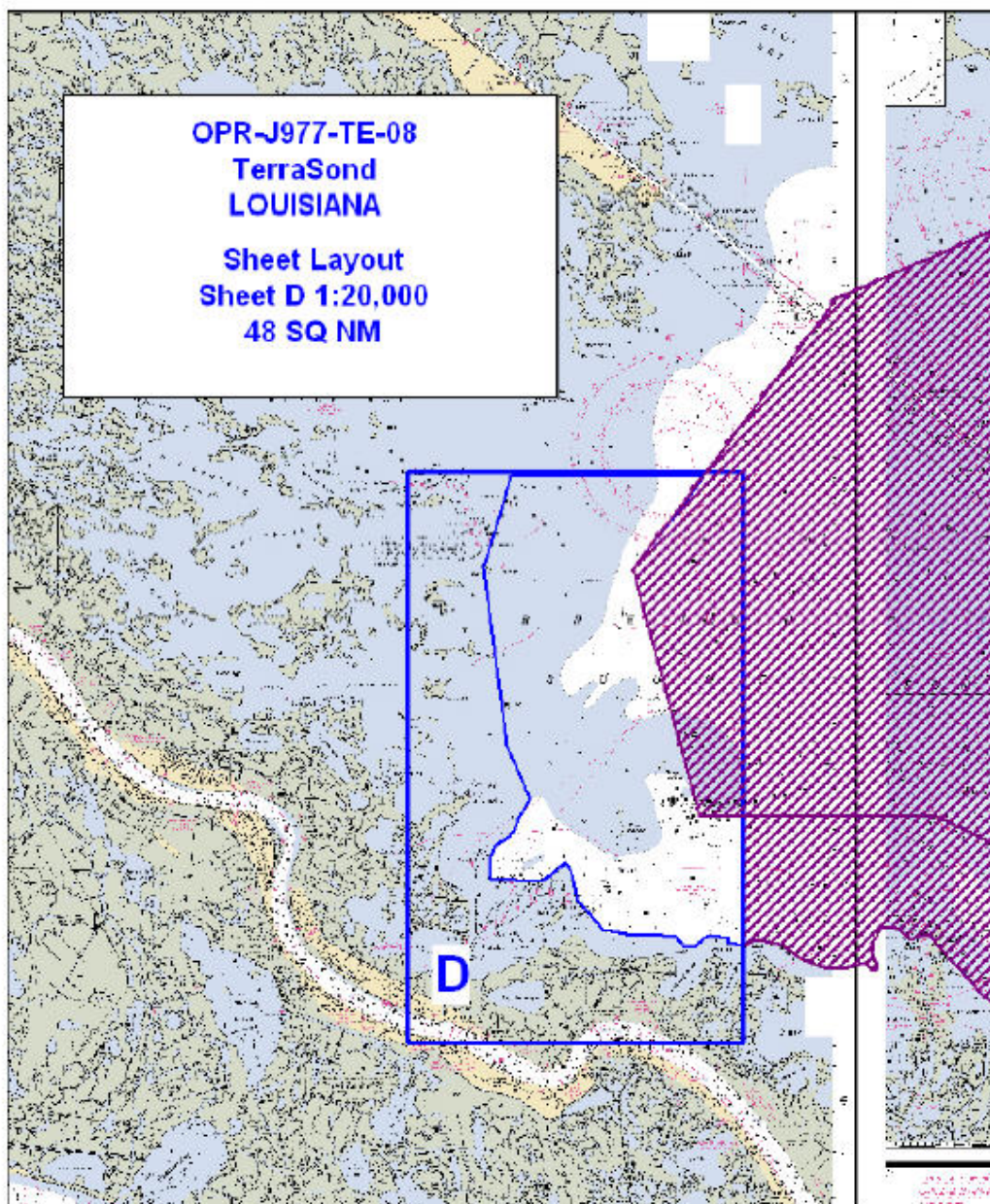
Mark,

I'm currently conducting the review of Terrasond survey H11814 of Project OPR-J977-TE-08 and had a few questions I was hoping you could help me out with. There are 3 different Statement of Works included in the submission:

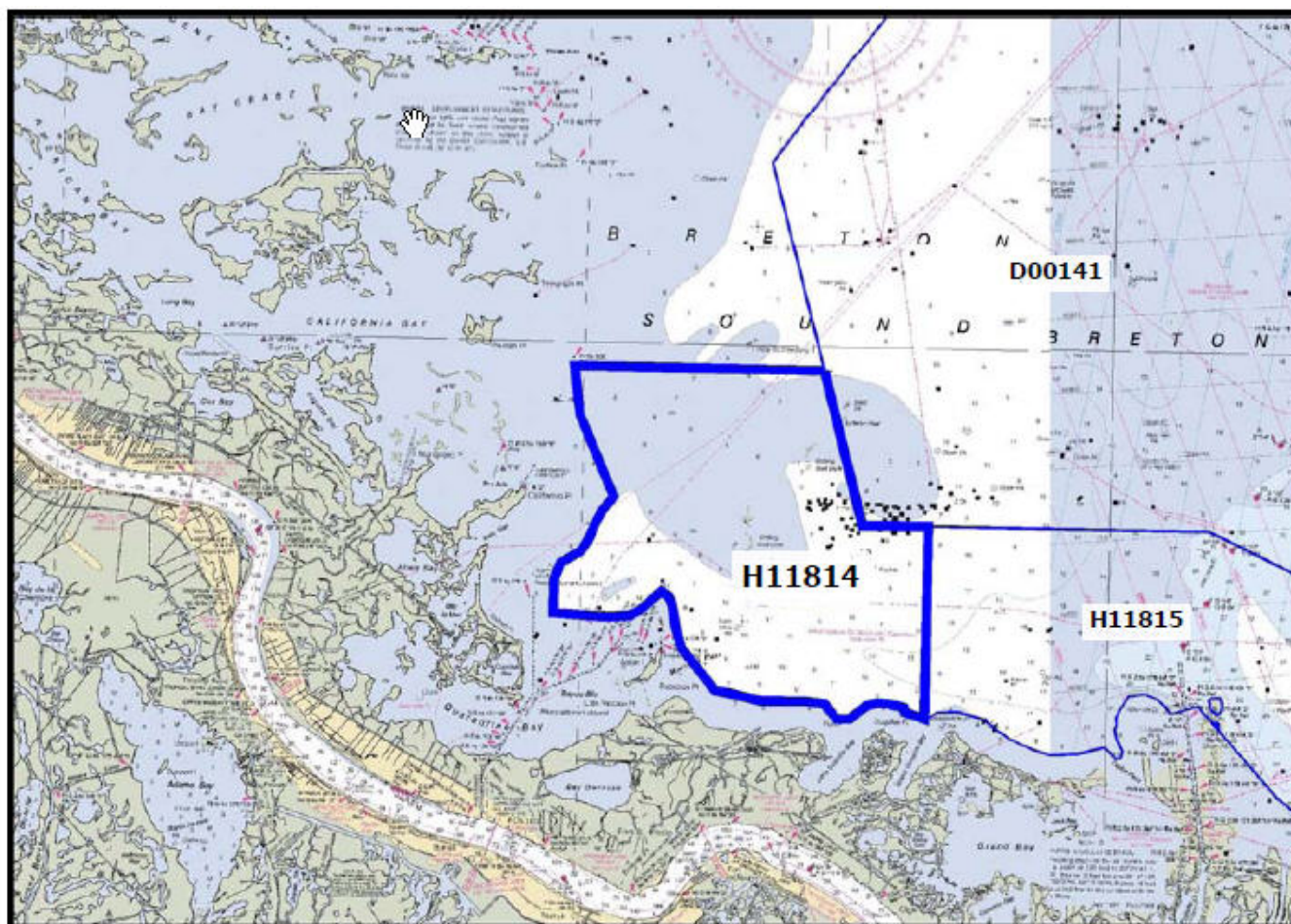
Name	Size	Type	Date Modified
 Debris Mapping Modification to add Sheet D	438 KB	Adobe Acrobat Doc...	9/27/2008 5:18 PM
 H11814 Separates III - Statement of Work	6,305 KB	Adobe Acrobat Doc...	4/23/2009 5:16 PM
 OPR-J977-TE-08_SOW_Change1_04212008	2,909 KB	Adobe Acrobat Doc...	4/23/2008 8:00 AM
 OPR-J977-TE-08_SOW_Sheet D	4,294 KB	Adobe Acrobat Doc...	10/5/2008 11:49 AM
 SeparatesIII	139 KB	Microsoft Office Wo...	4/23/2009 4:54 PM

Any information you could provide regarding these various versions of SOW and what the SOW Changes were (Change #1 on April 21, 2008 and Change #2 on July 18, 2008) would be appreciated. It appears Change #2 affected the survey limits however the updated sheet layout in the most recent SOW is unchanged (see diagram below).

Sheet Layout screen capture from April 21, 2008 version of SOW:



The DR and submitted data reflect these limits:



I cannot find anything within the submitted documentation from Terrasond to explain why this deviation occurred. Would you be able to provide me with the necessary documentation that authorized this change and the reasons why?

Thanks very much,

Matt

OPR-J977-TE-08_SOW_Sheet D revised.pdf

Content-Type: application/pdf
Content-Encoding: base64

AHB COMPILATION LOG

General Survey Information	
REGISTRY No.	H11814
PROJECT No.	OPR-J977-TE-08
FIELD UNIT	TerraSond Ltd.
DATE OF SURVEY	June 22, 2008 – January 27, 2009
LARGEST SCALE CHART	11364, edition 43, 20090901, 1:80,000
ADDITIONAL CHARTS	
SOUNDING UNITS	Feet at MLLW
COMPILER	Deborah A. Bland

Source Grids	File Name
	H:\Compilation\H11814_J977_TERRA\AHB_H11814\
	E-SAR Final Products\GRIDS\ H11814_ MBES _50cm_Final.hns
	E-SAR Final Products\GRIDS\ H11814_VBES_5m_Final.hns
	E-SAR Final Products\GRIDS\ H11814_5m_Final_Shoal_Extracted.hns
Surfaces	File Name
	H:\Compilation\ H11814_J977_TERRA\AHB_H11814\COMPILE\Working
<i>Combined</i>	H11814_5m_Combined.hns
<i>Interpolated TIN</i>	\Interpolated TIN\H11814_5m_InterpTIN.hns
<i>Shifted Interpolated TIN</i>	
<i>Product Surface</i>	
Final HOBs	File Name
	H:\Compilation\ H11814_J977_TERRA\AHB_H11814\COMPILE\Final_Hobs\
<i>Survey Scale Soundings</i>	H11814_SS.hob
<i>Chart Scale Soundings</i>	H11814_CS.hob
<i>Contour Layer</i>	H11814_Contours.hob
<i>Feature Layer</i>	H11814_Features.hob
<i>Meta-Objects Layer</i>	H11814_Meta_Objects.hob
<i>Blue Notes</i>	H11814_BlueNotes.hob
<i>ENC Retain</i>	H11814_ENC_Retain.hob

Meta-Objects Attribution	
Acronym	Value
M_COVR	
CATCOV	Coverage available
SORDAT	20090127
SORIND	US,US,graph,H11814
M_QUAL	
CATZOC	Zone of confidence U
INFORM	M/V Thomas R. Dowell, M/V Bella Marie
POSACC	10
SORDAT	20090127
SORIND	US,US,graph,H11814
SUREND	20090127
SURSTA	20080622
DEPARE	

[Type text]

This Document is for Office Process use only and is intended to supplement, not supersede or replace, information/recommendations in the Descriptive or Evaluation Reports

DRVALV 1	2.86417
DRVALV2	12.20144
SORDAT	20090127
SORIND	US,US,graph,H11814
CSCS	
CSCALE	
SORDAT	
SORIND	

SPECIFICATIONS:

- I. COMBINED SURFACE:
 - a. Number of ESAR Final Grids: 2
 - b. Resolution of Combined (m): 5m
- II. SURVEY SCALE SOUNDINGS (SS): 10763
 - a. Radius
 - b. Shoal biased
 - c. Use Single-Defined Radius (mm at Map Scale): ; Radius Value = 1
 - d. Queried Depth of All Soundings
 - i. Minimum: **2.86417**
 - ii. Maximum: **12.20144**
- III. INTERPOLATED TIN SURFACE:
 - a. Resolution (m): 5m
 - b. Linear
 - c. Shifted value: -0.229 m (-0.75 ft) [-0.229m (feet), (≤ 10 fathoms)]
[-1.372m (fathoms), (> 10 fathoms)]
- IV. CONTOURS:
 - a. Use a Depth List: H11814_NOAA_depth_curves_list.txt
 - b. Line Object: DEPCNT
 - c. Value Attribute: VALDCO
- V. FEATURES:
 - a. Total Number of Features: 97 FEATURES TOTAL: 30 charted platforms retained/7 charted seabed area characteristics retained/ 1 charted beacon retained/45 new platforms/5 new seabed area characteristics /6 new obstructions/1 new wreck/1 new pile/1 new light
 - b. Number of Insignificant Features: 2
- VI. CHART SURVEY SOUNDINGS (CS):
 - a. Number of ENC CS Soundings: 66
 - b. Radius 1:80000
 - c. Shoal biased
 - d. Use Single-Defined Radius: m on the ground
 - i. Radius Value (m): 17
 - ii. Or use a Sounding Space Range Table (if applicable): HXXXXX_SSR.txt
 - e. Filter: Interpolated != 1
 - f. Number Survey CS Soundings: **90**

VII. Notes:

[Type text]

**ATLANTIC HYDROGRAPHIC BRANCH
H-CELL REPORT to ACCOMPANY
SURVEY H11814 (2009)**

This H-Cell Report has been written to supplement and/or clarify the original Descriptive Report. Sections in this report refer to the corresponding sections of the Descriptive Report.

B. DATA ACQUISITION AND PROCESSING

B.2. Quality Control

B.2.6. Contemporary Survey Junctions

Survey H11814 (2008-2009) junctions with survey H11815 (2008-2009) to the southeast. Present survey soundings compare within 0 to 1 foot with the junctional survey depths. Survey H11814 (2008-2009) junctions with survey D00141 (2008-2009) to the northeast. Present survey soundings compare within 0 to 1 foot with the junctional survey depths.

B.4. Data Processing

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

CARIS HIPS/SIPS version 6.1 SP2 HF 8
CARIS Bathy Manager version 2.1 SP1 HF 1-10
CARIS Bathy Manager version 2.3 Build 192 HF 1-16
CARIS HOM version 3.3 SP3
CARIS S57 Composer version 2.1 HF 1-3
dKart Inspector version 5.0 Build 732 SP1

B.4.1. H-Cell Processing

The AHB source depth grid for the survey's nautical chart update product entailed the field's original 50cm multibeam grid and the 5m_shoal extracted vertical beam grid, combined at 5 meter resolution. The survey scale selected soundings were extracted from the 5m combined grid at sounding radius density scales of one millimeter at the chart scale of 1:80,000. The selected sounding set is approximately 10 to 20 times the number of charted depths. The chart scale selected soundings are a subset of the survey scale selected soundings. The bathymetry surface model was referenced when selecting the chart scale soundings, to ensure that the selected soundings portrayed the bathymetry within the common area.

Depth contours were created from an interpolated TIN created from the 5m_InterpTin_Shifted Surface (-0.75 feet) to accommodate NOAA sounding rounding rules. 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 pre-compilation products or components (Stand Alone HOB files (SAHOB)) are detailed in the Pre-Compile Process Log attached at the end of this document. The SAHOB files included depth contours (DEPCNT), depth area (DEPARE), sounding selections (SOUNDG), features (LIGHTS, OBSTRN, OFSPLF, PILPNT, SBDARE, WRECKS), H11814_ENC_Features_Retain (BCNSPP, OBSTRN, OFSPLF, SBDARE), Meta objects (M_COVR, M_QUAL), and cartographic Blue Notes (\$CSYMB).

All of the components with the exception of the survey scale sounding selection and depth contours were inserted into one feature layer (including the Bluenotes, as dictated by Hydrographic Technical Directive 2008-8), and this layer was exported into S-57 format to create the H-Cell deliverable. Similarly, the survey scale sounding selection and depth contours were exported into S-57 format separately, and then both S-57 files were processed in CARIS HOM to convert the metric units to feet. The final products are two S-57 files, in Lat/Lon NAD-83, one that contains the chart soundings, all the features, Meta objects, and Bluenotes (H11814_CS.000), and one that contains the survey scale sounding selection and depth contours (H11814_SS.000). Finally, quality assurance checks were made utilizing CARIS S-57 Composer version 2.1 HF 4 validation checks and DKART INSPECTOR, version 5.0 Build 732 SP1, tests.

Chart compilation was performed by Atlantic Hydrographic Branch personnel in Norfolk, Virginia. Compilation data will be forwarded to Marine Chart Division, Silver Spring, Maryland.

H11814 CARIS H-Cell final deliverables include the following products:

H11814_CS.000	1:80,000 Scale	H11814H-Cell with Chart Scale Selected Soundings
H11814_SS.000	1:20,000 Scale	H11814Survey Scale Soundings

C. VERTICAL AND HORIZONTAL CONTROL

A Horizontal and Vertical Control Report (HVCR) was submitted for OPR-K387-KR-07, survey H11814.

Final vertical correction processing was completed by the field unit with no additional correction required by Atlantic Hydrographic Branch. The field unit personnel applied verified water levels in conjunction with the preliminary tidal zoning which was accepted as the final zoning for H11814. Sounding datum is Mean Lower Low Water (MLLW). 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

11364 (43rd Edition, Sep/09)

Mississippi River

Venice to New Orleans

Corrected through NM 06/12/2010

Corrected through LNM 06/08/2010

Scale 1:80,000

ENC Comparison

US4LA35M

Mississippi River

Venice to New Orleans

Edition 29

Application Date 2010-04-29

Issue Date 2010-06-03

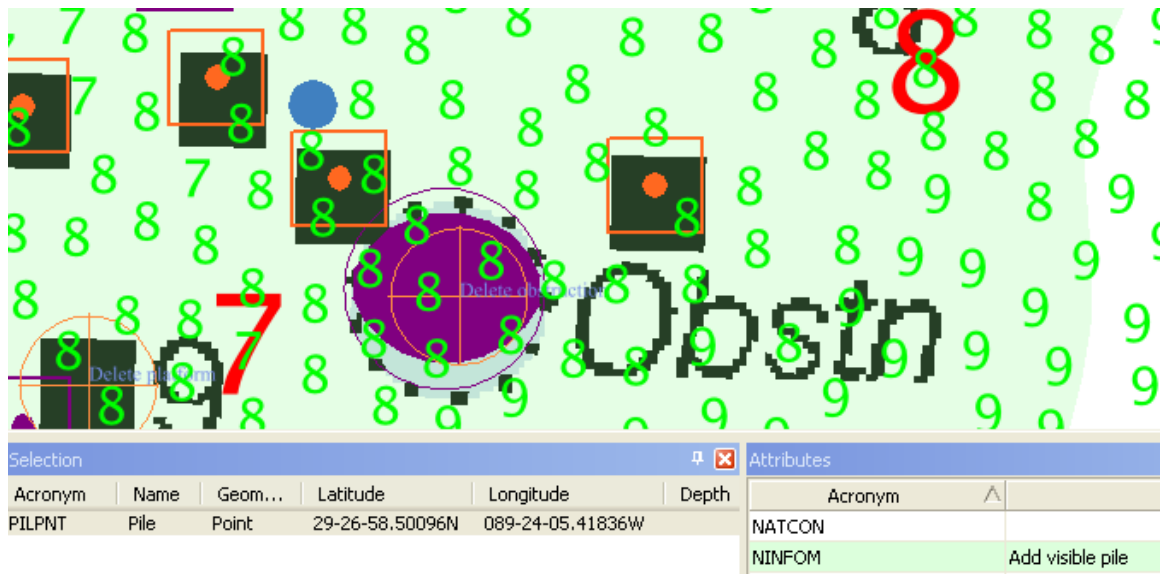
Chart 11364

Hydrography

The charted hydrography originates with prior surveys and requires no further consideration. The hydrographer makes adequate chart comparisons in section “D” and Appendix 1&2 of the Descriptive Report. The following exceptions are noted:

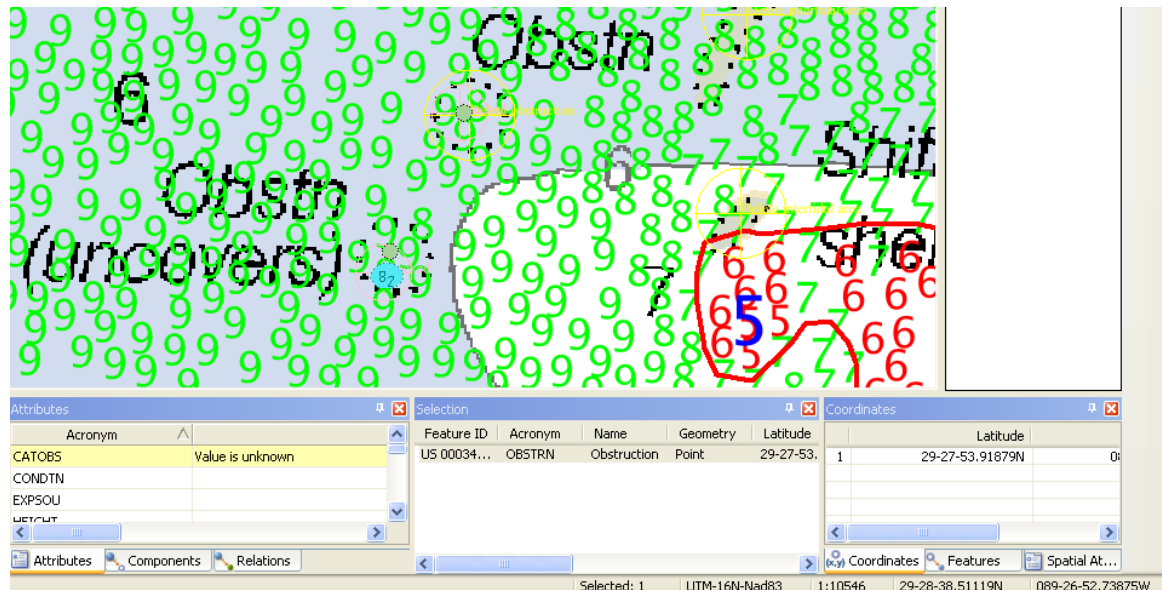
D.1.1. New Features

a. Feature D57 was submitted by the field as an uncharted pile in Latitude 29° 26' 58.5010"N, Longitude 89° 24' 05.4184"W. This feature was not submitted as a DTON and it is not written up in Appendix 1. The feature is, however, mentioned in the Descriptive Report. This feature is in close proximity to two charted platforms and a new 5 foot dangerous obstruction feature. There is no background information to support this pile nor is there any side scan sonar indication of this feature, so it was likely found through a visual sighting. It is visible on up to date orthoimagery of the area. It is recommended that a visible pile is charted in the above present survey location.

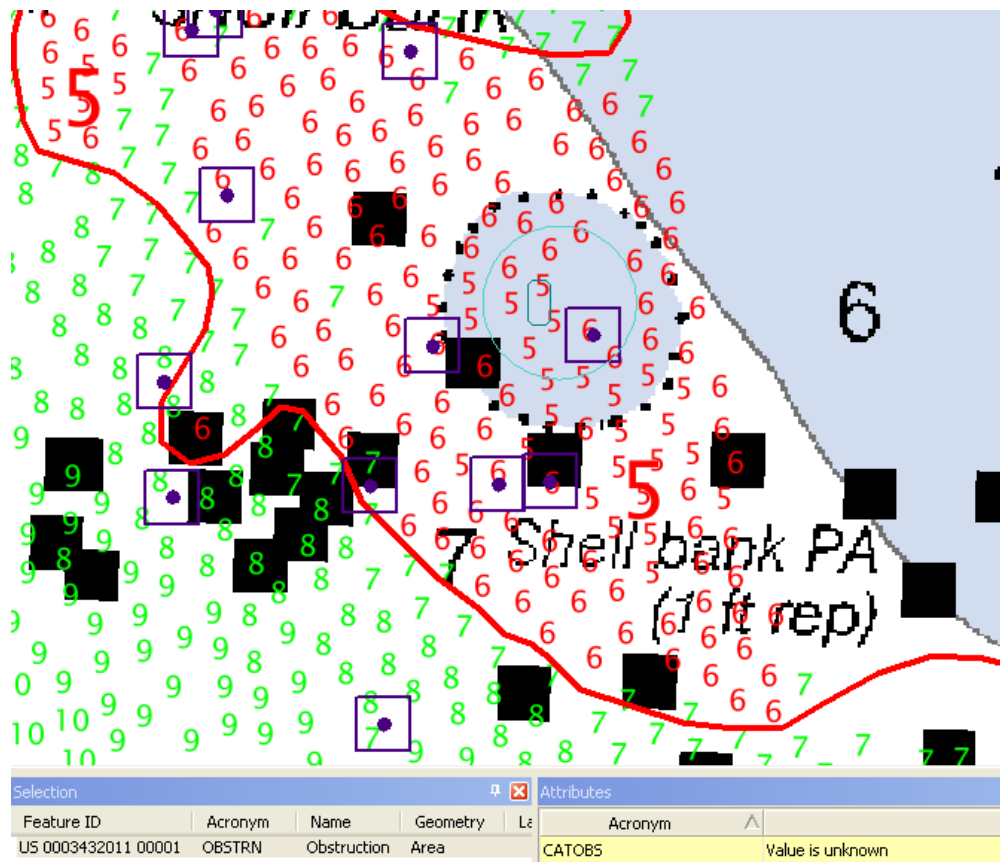


b. Feature D59 was submitted by the field as an 8.245 ft (2.51m) dangerous submerged obstruction in Latitude 29° 27' 53.92"N, Longitude 89° 26' 15.29"W. This is an 8 foot depth in 9 feet of water; it is not a danger to navigation and there are other significant features in close proximity to this feature. It is therefore recommended that this feature is

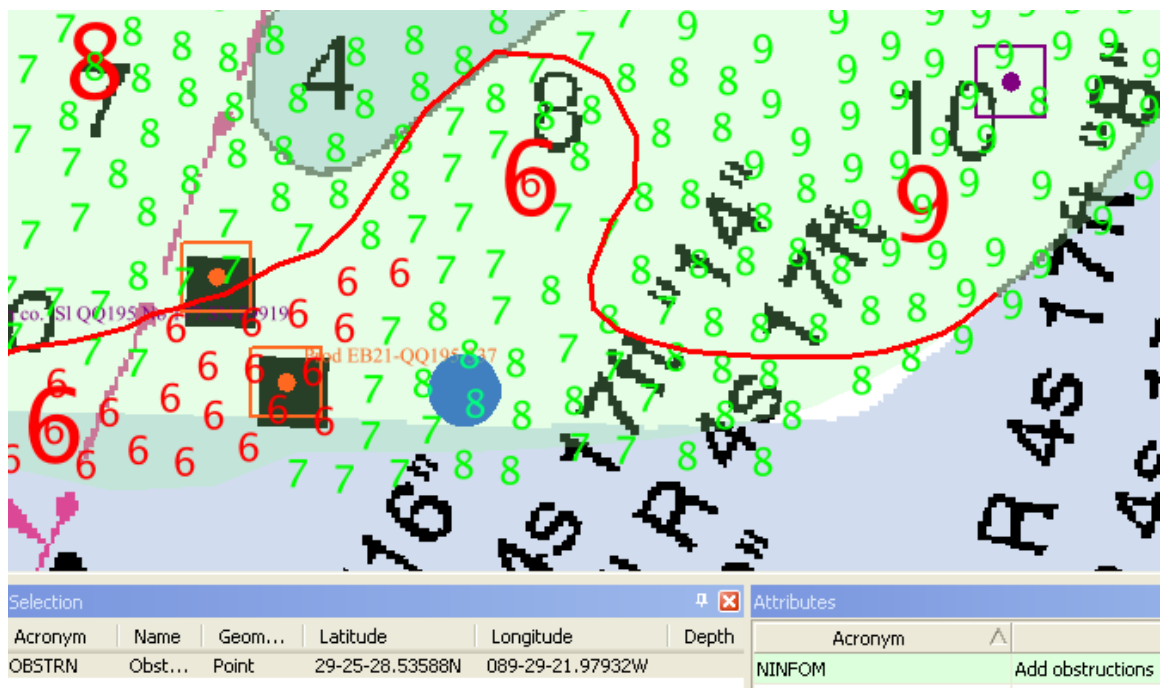
not charted as an obstruction and it is further recommended that the chart is updated with present survey data in this area.



c. Feature D65 is listed as an uncharted obstruction in Latitude 29° 27' 22.44"N, Longitude 89° 25' 01.67"W in the Descriptive Report. There was no DTON submitted by the field for this feature and it has not been applied to the chart. This feature is in close proximity to a charted platform and an Obstruction (Shell bank PA, 1 ft reported). Present survey depths in the area are 5 and 6 feet. This feature is not recommended for charting. No changes to charting are necessary.



d. Features D67 and D68 are listed as uncharted obstruction in Latitude 29° 25' 28.536"N, Longitude 89° 29' 21.979"W and Latitude 29° 25' 26.57"N, Longitude 89° 29' 30.34"W, respectively, in the Descriptive Report. There were no DTONs submitted to AHB for these features and they have not been applied to the chart. These features are in close proximity to a charted platform and each other. Present survey depths in the area are 7 and 8 feet. These features were found by side scan sonar and a final least depth was not determined for either feature. It is recommended that an obstruction symbol and the note Obstns (Rep 2009) are charted in Latitude 29° 25' 28.536"N, Longitude 89° 29' 21.979"W. The Obstns label will cover both features.



D.1.2. Changed Features

a. An obstruction (uncovers) symbol and note charted in Latitude 29° 27' 56.000"N, Longitude 89° 26' 15.000"W originates with the present survey as DTON #5, which was submitted directly to MCD. No further investigation of this item was done by the field and the source of the item is visual sighting and side scan sonar. It is recommended that the charted obstruction (uncovers) symbol and note are deleted from the chart. It is further recommended that an Obstruction (uncovers) Rep 2009 symbol and note are added in the present survey location of Latitude 29° 27' 56.000"N, Longitude 89° 26' 15.000"W. This obstruction is located in very close proximity to an uncharted offshore platform in Latitude 29° 27' 55.762"N, Longitude 89° 26' 16.048"W. See also Appendix I.

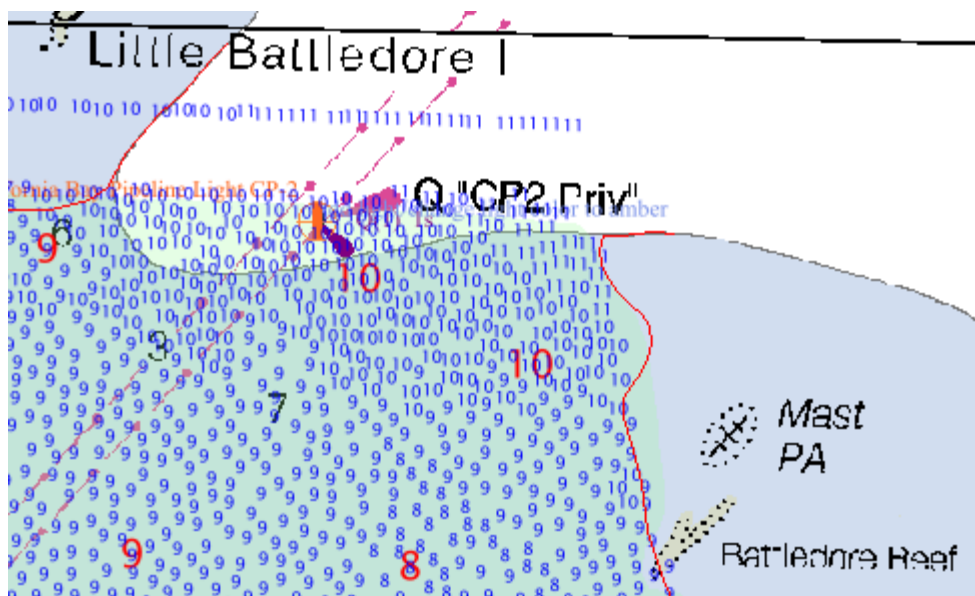
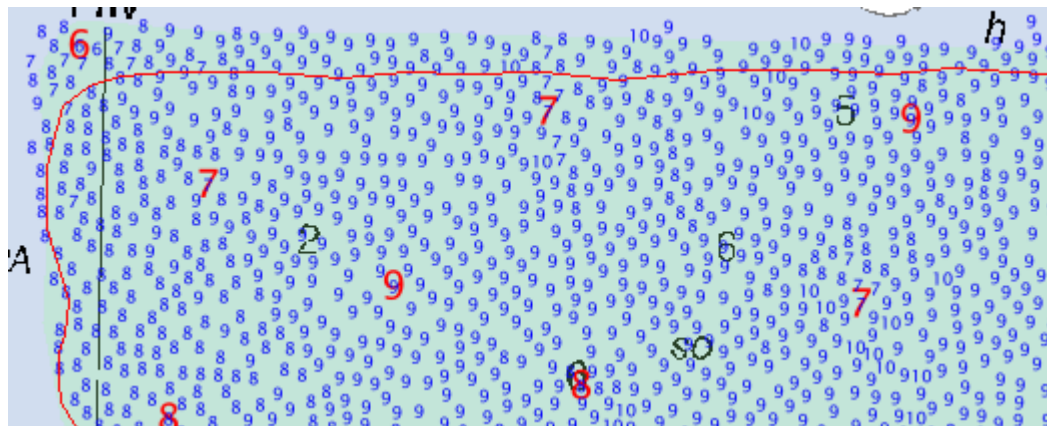
b. A dangerous 5 foot obstruction charted in Latitude 29° 26' 50.99"N, Longitude 89° 23' 59.000"W originates with the present survey as DTON #2, which was submitted directly to MCD. No further

investigation of this item was done by the field and the source of the item is side scan sonar. It is recommended that the charted dangerous 5 foot obstruction is deleted from the chart. It is further recommended that a dangerous 5 foot obstruction and note Rep 2009 are added in the present survey location. This obstruction is located in very close proximity to two charted offshore platforms. See also Appendix I.

D.1.5. Trends and Changeable Areas

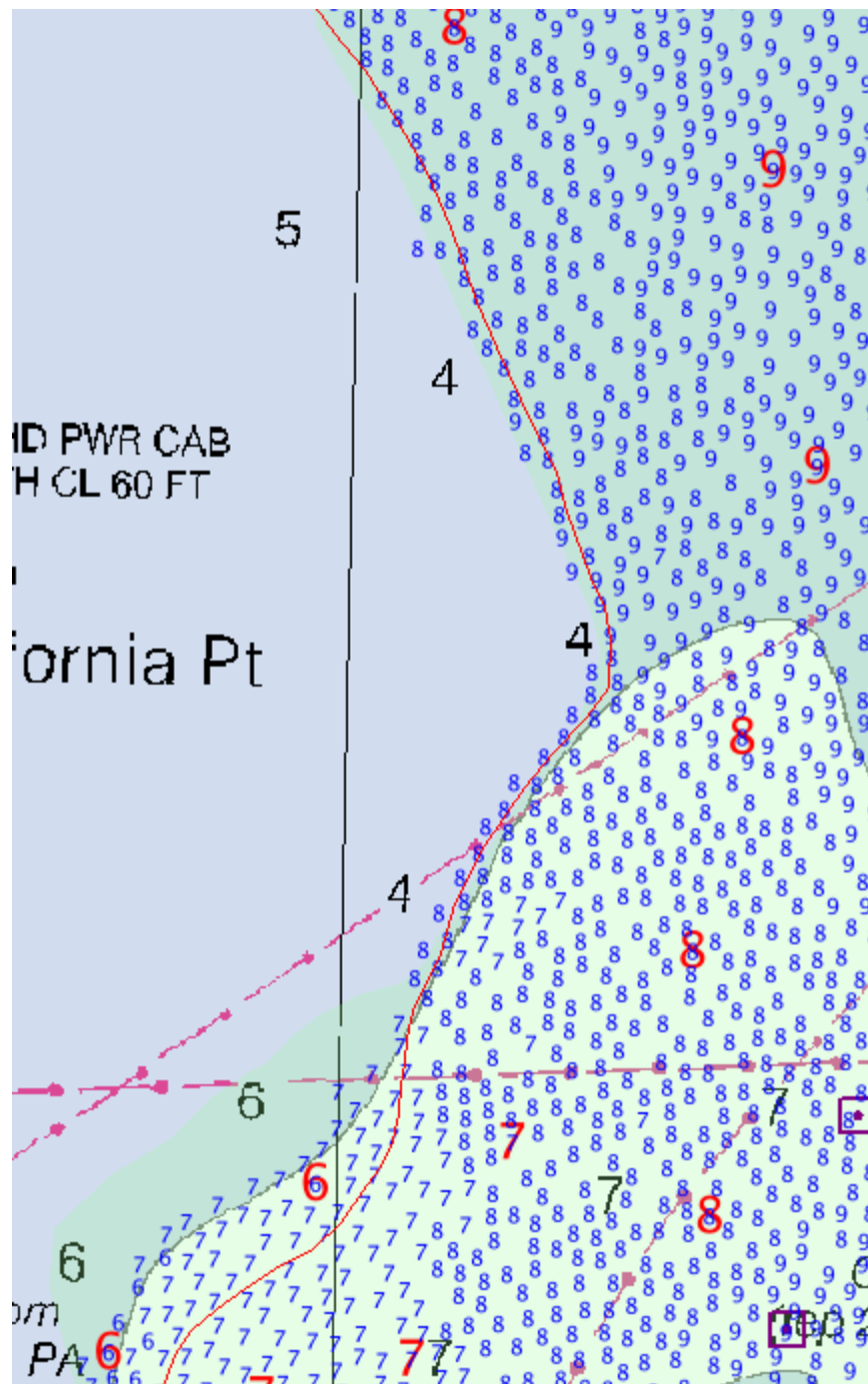
The surveyor did not develop the six foot curve and hence the recommended contour conforms to the survey limits as seen below:

a. Present survey depths compare within 3 to 7 feet with charted hydrography to the north, where present survey depths are 7 to 9 feet in areas with charted depths of 2 to 6 feet. The 6 foot contour has changed in the vicinities of Little Battledore Island and Battledore Reef. The 6 foot contour is conforming to the limits of the present survey.

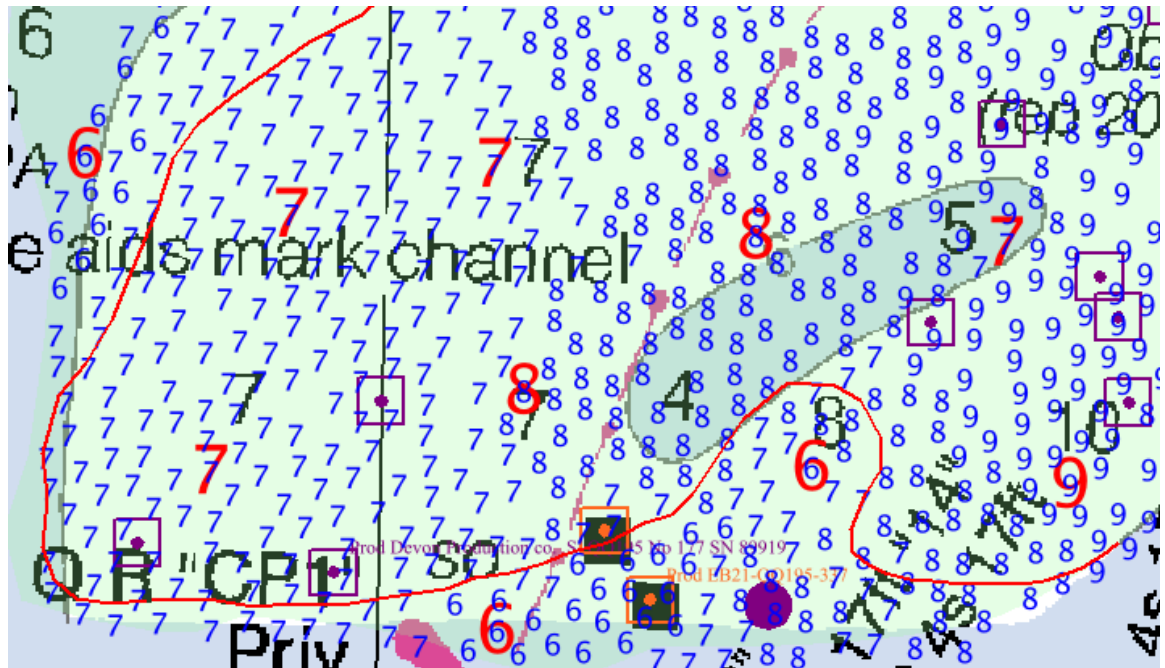


b. Present survey depths compare within 3 to 4 feet with charted hydrography to the west, where present survey depths are 7 to 9 feet in areas with charted depths of 4 to 6 feet. The 6 foot contour now extends

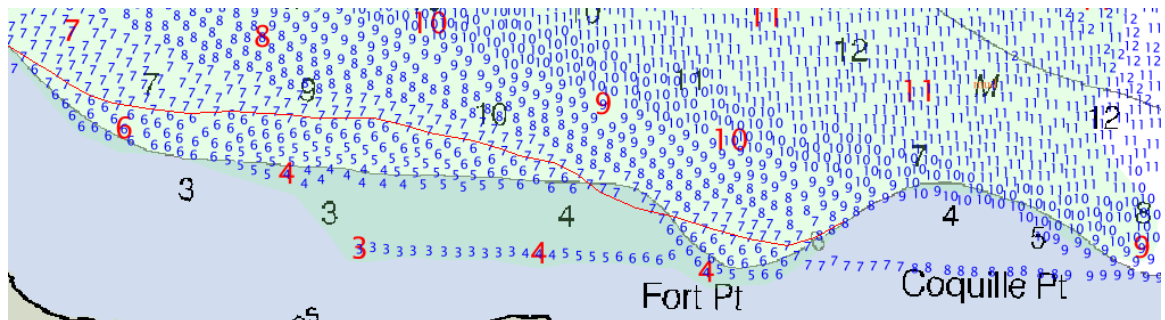
north at California Point instead of turning east. Again the 6 foot contour is conforming to the limits of the present survey.



c. To the southwest, present survey depths and charted depths agree within 0 to 4 feet. Present survey depths of 6 to 10 feet are in areas with charted depths of 4 to 12 feet.



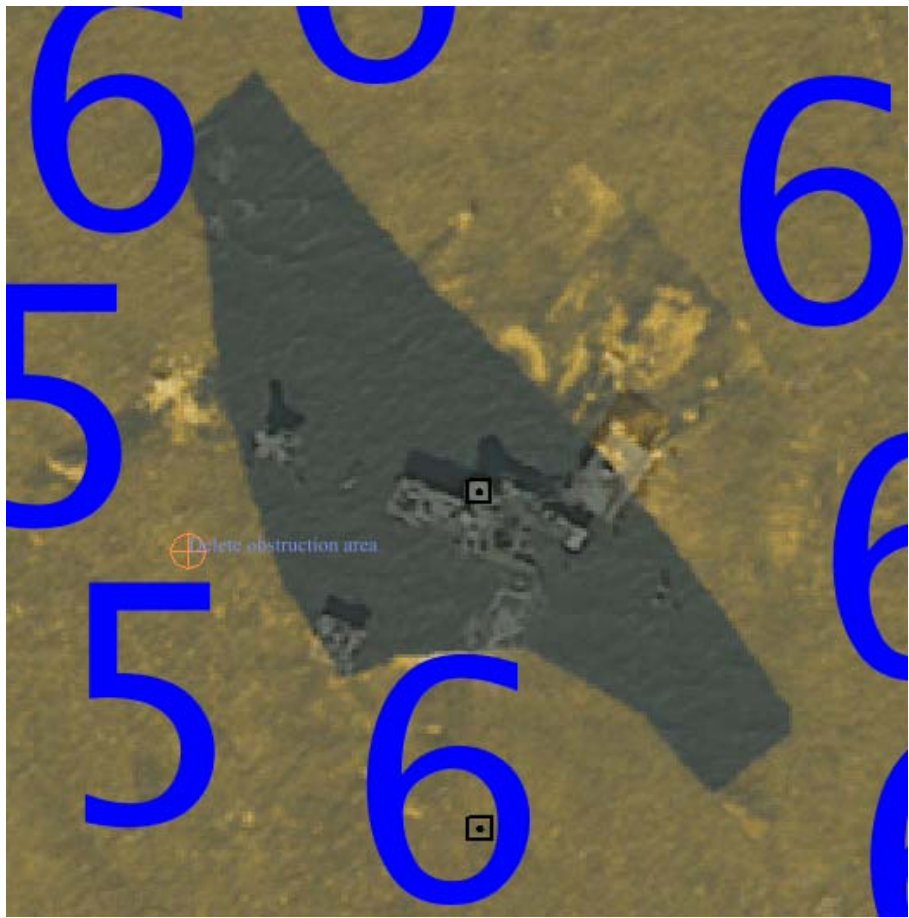
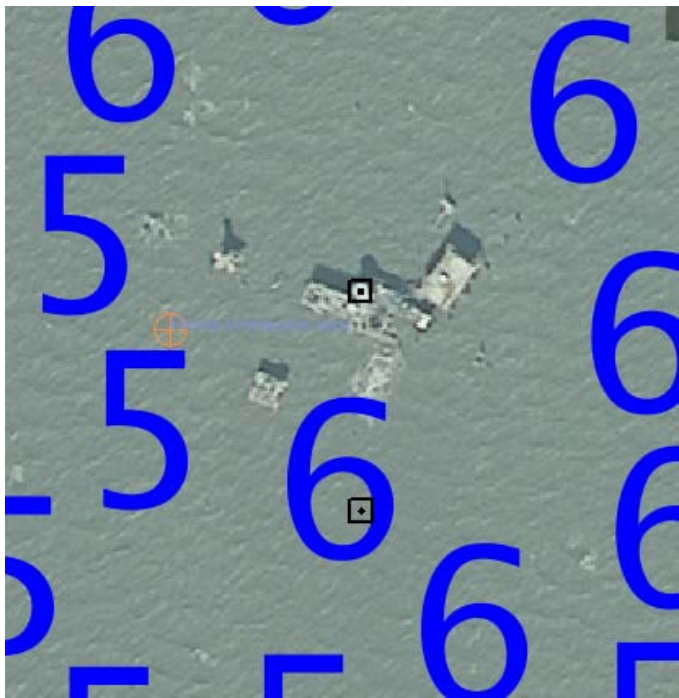
d. To the south, present survey depths range from 4 to 12 feet in areas with charted depths of 3 to 13 feet. Present survey depths and charted depths agree within 0 to 3 feet.



D.2.3. Drilling Structures

a. See Appendix II, Section D.1.D2 – D44, of this Report for a listing of new platforms which were positioned during present survey operations. It is recommended that they be added to the chart and ENC in their present survey location.

b. In addition to the listing in Appendix II, a platform in Latitude 29°27'36.71712"N, Longitude 089°24'57.12768"W is not charted and was not designated as a new platform by the field. This platform was seen in side scan sonar imagery collected during the present survey and orthoimagery of the survey area. It is recommended that this platform is added to the chart and ENC in the present survey location.



c. Also, in addition to the listing in Appendix II, a platform in Latitude 29°27'04.22221"N, Longitude 089°24'11.60706"W is not charted and was not designated as a new platform by the field. This platform was seen in side scan sonar imagery collected during the present survey and orthoimagery of the survey area. It is recommended that this platform is added to the chart and ENC in the present survey location.



d. See Appendix II, Section D.1.D45 – D53, of this Report for a listing of platforms which were found to no longer exist by the present survey, visible inspection, sidescan sonar, multibeam investigation and/or orthoimagery. It is recommended that they be deleted from the chart and ENC.

e. The following platforms were found to exist as charted by the present survey, by visible inspection, sidescan sonar, multibeam investigation and/or orthoimagery. It is recommended that they be retained as charted on the chart and ENC:

<u>Platform Latitude</u>	<u>Platform Longitude</u>
29-27-42.76800N	089-25-15.15720W
29-27-32.31720N	089-25-07.29840W
29-27-26.52480N	089-25-29.99640W
29-27-25.65360N	089-25-00.28560W
29-27-25.22880N	089-25-15.24720W
29-27-24.59520N	089-25-40.00080W
29-27-24.43680N	089-25-23.25720W
29-27-22.37400N	089-25-28.42680W
29-27-22.16160N	089-25-19.08480W
29-27-19.72800N	089-25-21.23040W
29-27-18.72360N	089-25-41.48400W
29-27-17.58600N	089-25-24.40560W
29-27-16.49880N	089-25-38.21880W
29-27-09.51480N	089-24-52.06320W
29-27-08.45640N	089-25-02.30880W
29-27-02.42640N	089-24-47.16720W
29-27-00.36360N	089-24-57.23280W
29-26-59.54280N	089-24-09.99000W
29-26-58.50960N	089-25-27.18480W
29-26-58.19280N	089-24-19.20600W
29-26-57.50520N	089-24-51.09480W
29-26-55.46760N	089-24-04.09320W
29-26-55.46760N	089-23-49.13160W
29-26-54.35880N	089-24-44.11440W
29-26-51.63360N	089-24-53.06040W
29-26-43.53720N	089-28-42.65760W
29-26-41.49960N	089-25-14.25000W
29-26-31.68600N	089-24-42.90480W
29-25-34.56120N	089-29-37.93920W
29-25-28.77960N	089-29-33.33840W

D.2.8. Danger to Navigation Reports

Ten (10) Dangers to Navigation were found during the present survey and submitted by the field unit. It is recommended that these features be added to the chart and ENC as detailed in the Descriptive Report and Sections D.1.1., D.1.2., and Appendix I of this report.

No Dangers to Navigation were found during processing of the survey in AHB.

D.3. MISCELLANEOUS

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

D.4. 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, the Blue Notes, or the H-Cell Report, should be retained as charted. Refer to the Descriptive Report for further recommendations by the hydrographer.

APPROVAL SHEET
H11814

Initial Approvals:

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

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

Deborah A. Bland
Cartographer
Atlantic Hydrographic Branch

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

Approved: _____
Richard Brennan
Lieutenant Commander, NOAA
Chief, Atlantic Hydrographic Branch