

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

DESCRIPTIVE REPORT

Type of Survey Hydrographic
Field No. David Evans and Associates, Inc.
Registry No. H12470

LOCALITY

State Mississippi
General Locality Approaches to Mississippi Sound
Sub-locality 9nm S of Horn Island Pass

2013

CHIEF OF PARTY

Jonathan L. Dasler, David Evans and Associates, Inc.

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DATE _____

NOAA Form 77-28 (11 72)	U.S. DEPARTMENT OF COMMERCE NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION	REGISTRY NUMBER:
HYDROGRAPHIC TITLE SHEET		H12470
INSTRUCTIONS: The Hydrographic Sheet should be accompanied by this form, filled in as completely as possible, when the sheet is forwarded to the Office.		
State:	Mississippi	
General Locality:	Approaches to Mississippi Sound	
Sub-Locality:	9nm S of Horn Island Pass	
Scale:	1:40,000	
Date of Survey:	September 16, 2012 to February 4, 2013	
Instructions Dated:	April 16, 2012	
Project Number:	OPR-J348-KR-12	
Field Unit:	R/V <i>Westerly</i>	
Chief of Party:	Jonathan L. Dasler, PE, PLS, CH	
Soundings by:	RESON 7125	
Imagery by:	EdgeTech 4200-FS	
Verification by:	Atlantic Hydrographic Branch	
Soundings Acquired in:	Meters at Mean Lower Low Water	
Remarks:	<p><i>NAD 83, UTM Zone 16, Meters, Times are UTC. The purpose of this contract is to provide NOAA with modern, accurate hydrographic survey data with which to update nautical charts of the assigned area.</i></p>	

The purpose of this survey is to provide contemporary surveys to update National Ocean Service (NOS) nautical charts. All separates are filed with the hydrographic data. Any revisions to the Descriptive Report (DR) generated during office processing are shown in bold red italic text. The processing branch maintains the DR as a field unit product, therefore, all information and recommendations within the body of the DR are considered preliminary unless otherwise noted. The final disposition of surveyed features is represented in the OCS nautical chart update products. All pertinent records for this survey, including the DR, are archived at the National Geophysical Data Center (NGDC) and can be retrieved via <http://www.ngdc.noaa.gov/>.

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Descriptive Report to Accompany Hydrographic Survey H12470

Project OPR-J348-KR-12

Locality: Approaches to Mississippi Sound, Mississippi

Sub-locality: 9nm S of Horn Island Pass

Scale 1:40,000

September 2012 – February 2013

David Evans and Associates, Inc.

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

A. AREA SURVEYED

David Evans and Associates, Inc (DEA) conducted hydrographic survey operations in the Approaches to Mississippi Sound, MS, 9nm S of Horn Island Pass. Survey H12470 was conducted in accordance with the *Statement of Work* (April 2, 2012) and *Hydrographic Survey Project Instructions* (April 16, 2012) for OPR-J348-KR-12.

A.1 Survey Limits

The extents of the H12470 survey limits are listed in Table 1.

Table 1. Survey Limits

Northeast Limit	Southwest Limit
30.111050 N	29.976358 N
88.470513 W	88.599200 W

A.2 Survey Purpose

The purpose of this survey is to provide National Oceanic Atmospheric Administration (NOAA) with modern, accurate hydrographic survey data with which to update nautical charts of the assigned area.

A.3 Survey Quality

The entire survey is adequate to supersede previous surveys.

A.4 Survey Coverage

The survey consisted of 200% side scan sonar coverage with concurrent multibeam. The survey polygon depicted in the Project Reference File (PRF) *OPR-J348-KR-12_PRF.000*, which was included with the *Hydrographic Survey Project Instructions* (April 16, 2012), was used to define the limits for each survey. The survey was conducted over 180-meter set line spacing per 100% coverage (100-meter side scan sonar range). Automated Wreck and Obstruction Information System (AWOIS) items identified by side scan sonar and significant side scan sonar contacts were developed with multibeam sonar to meet object detection coverage requirements for multibeam surveys. The coverage area (Figure 1) totaled 40.5 square nautical miles using a combination of side scan and multibeam survey methods.

A.5 Survey Statistics

Detailed survey statistics for H12470 are provided in Table 2.

Table 2. H12470 Hydrographic Survey Statistics

Survey Statistics	Combination MBES/SSS Mainscheme
MBES/SSS main scheme (nm)	984.2
Crosslines (MBES nm)	85.9
Additional full coverage MBES (nm)	0
Additional full coverage MBES crosslines (nm)	0
Number of item investigations that required additional survey effort	0
Number of bottom samples	3
Total number of square nautical miles	40.5

Data acquisition was conducted from September 16, 2012 (DN 260) to February 4, 2012 (DN 035). Table 3 lists specific dates of survey and patch test data acquisition. Patch test data used to determine system biases in support of the survey are also included with the digital deliverable. Survey data was not collected on patch test days unless also listed under dates of acquisition.

Table 3. H12470 Days of Acquisition

Dates of Acquisition	
September	16-17,20-29
October	6,10-12,17,20-21
November	1-4,9-10,27,30
January	20,25
February	1,4
Dates of Patch Test Acquisition	
May	23
July	2, 16
August	16
September	29
January	24-25
February	4

A.6 Shoreline

Shoreline investigation was not required for OPR-J348-KR-12.

A.7 Bottom Samples

Two (2) bottom samples were acquired on October 10, 2012 (DN 284) and one additional bottom sample was acquired January 20, 2013 (DN020). Approximate sample locations were included in the file PRF provided by the Hydrographic Surveys Division (HSD). The final sampling plan primarily used the provided locations with some modification of position to better characterize changes in bottom type delineated in the side scan imagery and to avoid sampling in the vicinity of submerged infrastructure such as pipelines or platforms. Results are included in Appendix II *Supplemental Survey Records and Correspondence*.

B. DATA ACQUISITION AND PROCESSING

B.1 Equipment and Vessels

The OPR-J348-KR-12 *Data Acquisition and Processing Report* (DAPR) submitted under separate cover, details equipment and vessel information as well as data acquisition and processing procedures used during this survey. There were no vessel or equipment configurations used during data acquisition that deviated from those described in the DAPR.

B.1.1 Vessels

The vessel used during this survey is listed in Table 4.

Table 4. Vessel Specifications

R/V <i>Westerly</i>	
	
IMO Number	1AR38CATK011
Official Number (O/N)	1231991
Builder	Armstrong Marine
Design	Catamaran
Year Built	2011
Weight	13 gross tons, 10 net tons
Length Overall	38'
Beam	16.5'
Draft, Maximum	4.6'
Cruising Speed	26 knots
Max Survey Speed	9 knots

B.1.2 Equipment

Equipment systems used during data acquisition are listed in Table 5.

Table 5. Equipment Used

Type	Manufacturer	Model
Multibeam Echosounder	RESON	7125-SV2
Side Scan Sonar	Edgetech	4200-FS
Surface Sound Speed	AML	Micro X / SV Xchange
Primary Sound Speed Profiler	Brooke Ocean	MVP-30 with AML Micro SVPT
Secondary Sound Speed Profiler	Sea-Bird	SEACAT SBE-19 CTD Profiler
Positioning & Attitude	Applanix	POS/MV 320 v4

B.2 Quality Control

Survey data show good internal consistency. As shown in Appendix II of the DAPR, the average weekly bar check difference was -0.002 meters with a standard deviation of 0.013 meters. Results from both crossline analysis and final Combined Uncertainty and Bathymetry Estimator (CUBE) surface uncertainty also indicate good internal consistency of the multibeam data.

B.2.1 Crosslines

A total of 85.9 nautical miles of crosslines, or 8.7% of all survey lines, were run for analysis of survey accuracy. Crosslines were run in a direction perpendicular to main scheme lines across the entire surveyed area, providing a good representation for analysis of consistency. All crosslines were used for crossline comparisons.

Crossline analysis was performed using the CARIS Hydrographic Information Processing System (HIPS) Quality Control (QC) Report tool, which compares crossline data to a gridded surface and reports results by beam number. Crosslines were compared to a 2-meter CUBE surface encompassing mainscheme data for the entire survey area. The QC Report tabular output and plot are included in Separate II *Digital Data*. The results of the analysis meet the requirements as stated in the 2012 National Ocean Service (NOS) Hydrographic Surveys Specifications and Deliverables (HSSD).

Additional crossline analysis was performed by computing a 2-meter CUBE surface from the crossline data. The surface was then differenced from a 2-meter CUBE surface comprised of all mainscheme, fill, and investigation data. The resultant difference surface was exported using the Base Surface to ASCII function and statistics were compiled on the ASCII data. The crossline analysis included 1,095,060 node comparisons with an average difference of -0.03 meters and standard deviation of 0.04 meters.

B.2.2 Uncertainty

Survey specific uncertainty parameters for tide and sound speed are included in Table 6. Additional discussion of these parameters is included in the DAPR.

Table 6. TPU Values for Tide and Sound Speed

Total Propagated Uncertainty Computation in CARIS HIPS*	
Tide Values	Uncertainty* (m)
Tide Value Measured	0.000
Tide Value Zoning	0.079
Sound Speed Values	Uncertainty* (m/s)
Sound Speed Measured (SN 7710)	1.000
Surface Sound Speed	0.500

*All uncertainty values listed at 1 sigma.

During surface finalization in HIPS, the "greater of the two" option was selected, where the calculated uncertainty from total propagated uncertainty (TPU) is compared to the standard deviation (StdDev) of the soundings influencing the node, and where the greater value is assigned as the final uncertainty of the node. The uncertainty of the finalized surface increased for nodes where the StdDev of the node was greater than the total propagated uncertainty. The resulting calculated uncertainty values of all nodes in the finalized surfaces range from 0.20 meters to 0.85 meters. The maximum uncertainty value is located on a wreck with a high standard deviation in the depth surface caused by gridding data over the steeply sloping feature.

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

As shown in Table 7, both uncertainty and the allowable error utilized have low average values and a tight StdDev. Values exceeding 100%, however, are significant outliers proven to be valid soundings that fail to meet specification. For the 2-meter CUBE surface, 100 nodes out of 6,919,002 fail to meet specification. The nodes which fail to meet specification were carefully reviewed in CARIS HIPS and found to coincide with areas of steep relief. Reviewing these regions in subset shows good agreement between survey lines and few anomalies. The high standard deviation, which results in the node being reported as out of specification, is considered an artifact of gridding data over a steep and irregular seafloor. As a result, all data are considered within specification.

Table 7. CUBE Uncertainty

CUBE Finalized Uncertainty Statistics						
	Uncertainty (m)			Allowable error utilized		
	Average	StdDev	Maximum	Average	StdDev	Maximum
2m CUBE	0.20	0.006	0.846	37%	0.012	152%
4m CUBE	0.21	0.010	0.546	36%	0.018	93%

B.2.3 Junctions

Survey H12470 junctions with other surveys from project OPR-J348-KR-12 and with a prior NOAA survey. These junction surveys are listed in Table 8. At the time of writing, junction analysis with OPR-J348-KR-12 survey H12471 had not been completed. Junction analysis with this survey will be discussed in the H12471 Descriptive Report.

Table 8. H12470 Junction Surveys

Junction Survey Registry Number	Scale	Year	Field Unit	Junction Direction
H11546	1:20,000	2006	TerraSond, Ltd.	North, Northeast
H12469	1:40,000	2012	David Evans and Associates, Inc.	East
H12471	1:40,000	2012	David Evans and Associates, Inc.	West

A 2-meter finalized H12470 surface, with no depth thresholds applied, was compared to the prior survey using CARIS Bathymetry DataBASE. This surface was created for quality control purposes and has not been submitted. The resultant difference surfaces were exported to ASCII and statistics compiled for the ASCII data. Statistics of each junction comparison are listed in Table 9.

Table 9. H12470 Junction Analysis Results

Junction Survey Registry Number	Number of Nodes Compared	Minimum Difference (m)	Maximum Difference (m)	Mean Difference (m)	Standard Deviation (m)
H11546	108660	-0.39	0.21	-0.17	0.05
H12469	48652	-0.07	0.12	0.02	0.02

H11546

Bathymetric Attributed Grids (BAG) for survey H11546 were downloaded from NOAA's National Geophysical Data Center (NGDC). The 2-meter finalized H12470 surface was compared to the prior survey using CARIS Bathymetry DataBASE. A qualitative review of the junctions showed no anomalous areas.

H12469

The 2-meter finalized surface from survey H12469 was compared to the H12470 surface using CARIS Bathymetry DataBASE. A qualitative review of the junction showed no anomalous areas in either junction.

B.2.4 Sonar QC Checks

Quality control is discussed in detail in Section B of the DAPR. The results from the positioning system comparison and bar-to-multibeam comparison are included in Separate I *Acquisition and Processing Logs*. The sound velocity profile (SVP) sensor weekly evaluation table can be found in Separate II *Sound Speed Data* of this report.

Multibeam data were reviewed at multiple levels of data processing including: CARIS HIPS conversion, subset editing, and analysis of anomalies revealed in CUBE surfaces. Submerged significant features identified during survey operations were noted in the acquisition logs, saved to Isis cursor log files, and then displayed during HIPS editing to act as a check during feature compilation. In addition to the field interpretation of side scan contacts, two independent post-processing reviews of the side scan data were conducted, and all significant contacts or potentially significant contacts tracked in a custom database.

B.2.5 Equipment Effectiveness

As discussed in the DAPR, results of daily roll tests were added to the project vessel file to account for a minor instability of the multibeam mount.

B.2.6 Factors Affecting Soundings

No other factors affected the sounding data.

B.2.7 Sound Speed Methods

An ODOM Brooke Ocean Technologies' MVP30 and a SeaBird Electronics SEACAT SBE-19 CTD profiler were the primary instruments used to acquire sound speed readings during multibeam operations. Moving vessel profiler (MVP) sound speed readings were measured at approximately 20-minute intervals during survey operations. Additional discussion of sound speed methods can be found in the OPR-J348-KR-12 DAPR.

B.2.8 Coverage Equipment and Methods

Survey speeds were maintained to meet or exceed along track coverage requirements throughout the survey.

Demonstration of 200% side scan sonar coverage was achieved by producing two separate 100% 50-centimeter resolution mosaics. Mosaics were thoroughly reviewed for holidays and areas of poor quality coverage due to biomass, vessel wakes, or other factors. A fill plan was created in order to acquire data where holidays and significant poor quality coverage existed.

Multibeam data were acquired in conjunction with side scan sonar collection. A fill plan was created for all holidays greater than three nodes long that extended across the entire multibeam track line.

B.2.9 Density

The sounding density requirement of 95% of all nodes, populated with at least three soundings per node, was verified by exporting the density child layer of each CUBE surface to an ASCII text file and compiling statistics on the density values. More than 99.3% of all final CUBE surface nodes contained three or more soundings. Density statistics of individual item investigation surfaces using Object Detection requirements were reviewed and surpassed the 95% requirement.

B.3 Echo Sounding Corrections

B.3.1 Corrections to Echo Soundings

Data reduction procedures for survey H12470 are detailed in the DAPR. Multibeam processing logs are included Separate I *Acquisition and Processing Logs* of this report.

B.3.2 Calibrations

No additional calibration tests were conducted beyond those discussed in the *OPR-J348-KR-12 DAPR*.

B.4 Backscatter

Multibeam backscatter was logged in Hypack 7K format but was not processed or evaluated. This data was included with the H12470 digital deliverables.

B.5 Data Processing

B.5.1 Software Updates

No software updates occurred after submission of the *OPR-J348-KR-12 DAPR*.

B.5.2 Surfaces

Bathymetric grids were created relative to Mean Lower Low Water (MLLW) in CUBE format using set line spacing and object detection resolution requirements as described in the NOS HSSD (April 2012).

Depth thresholds were applied during surface finalization as defined in the NOS HSSD (April 2012).

Table 10 lists the finalized CUBE surfaces submitted with this survey. The surface named “_INV,” is a combined surface comprised of all investigation data at object detection resolution. In addition, field sheets and surfaces were submitted for all significant individual investigations. The name of the investigation field sheets corresponds to the primary side scan sonar contact name. Least depths for all significant contact investigations were added to the final surface with a designated sounding. Additional designated soundings were added to depth surfaces as necessary in order to accurately represent the seafloor in accordance with NOS HSSD.

Table 10. H12470 Multibeam Surfaces

Surface Name	Resolution
H12470_2m_MLLW_1of4_Final	2.0m
H12470_4m_MLLW_2of4_Final	4.0m
H12470_50cm_MLLW_INV_3of4_Final	0.5m
H12470_1m_MLLW_INV_4of4_Final	1.0m

Side scan sonar mosaics were created for each 100% coverage at 50-centimeter resolution. Mosaics submitted with this survey are listed in Table 11.

Table 11. H12470 Side Scan Mosaics

Mosaic Name	Resolution
H12470_100Percent	0.5m
H12470_200Percent	0.5m

C. VERTICAL AND HORIZONTAL CONTROL

A complete description of the horizontal and vertical control for survey H12470 can be found in the OPR-J348-KR-12 *Horizontal and Vertical Control Report (HVCR)*, submitted under separate cover. A summary of horizontal and vertical control for this survey follows.

C.1 Vertical Control

The vertical datum for this project is MLLW. Additional information related to tides and tide correctors is included in Tables 12, 13, and 14.

Table 12. Tide Stations

Station Name	Station ID
Pascagoula NOAA Lab, MS	874-1533

Table 13. HIPS Water Level Files

File Name	Status
8741533.tid	Verified

Table 14. HIPS Zoning Files

File Name	Status
REVISED_J348KR2012CORP.zdf	Revised Final Zoning

C.2 Horizontal Control

The horizontal datum for this project is North American Datum of 1983 (NAD83) projected in Universal Transverse Mercator (UTM) Zone 16. All of the real-time navigation data were collected in Differential GPS (DGPS) mode. DGPS corrections were received from the U.S. Coast Guard (USCG) beacon at English Turn, Louisiana (293 kHz) or from the secondary beacon at Eglin, Florida (295 kHz). During survey operations, some DGPS outages from the primary beacon occurred. The system was set up to automatically switch to the secondary beacon when the primary signal was lost.

D. RESULTS AND RECOMMENDATIONS

D.1 Chart Comparison

The majority of the chart comparison was performed by comparing H12470 depths to a digital surface generated from electronic navigational charts (ENCs) covering the survey area. ENCs at the same scale band were merged prior to surface creation in an attempt to build a continuous model over the survey area. A 50-meter product surface was then generated from a triangular irregular network (TIN) created from the soundings, depth contours, and depth features for each ENC scale. An additional 50-meter HIPS product surface of the entire survey area was generated from the finalized 4-meter CUBE surface. The chart comparison was conducted by creating and reviewing the resultant difference surface.

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

D.1.1 Raster Charts

The raster chart comparison was performed by comparing the raster navigational charts (RNCs) covering the survey area to the corresponding ENCs which were subsequently compared to H12470 using difference surface techniques. These RNCs are listed in Table 15.

Table 15. RNCs Compared to H12470

Chart	Scale	Edition Number	Edition Date	LNM Date	NM Date
11373	1:80,000	50	08/01/2012	02/19/2013	02/23/2013
11366	1:250,000	15	08/01/2012	02/19/2013	02/23/2013

11373

Chart 11373 was compared to US4MS12M within the H12470 survey area. As depicted in Figure 2, multiple discrepancies were discovered during this comparison where ENC soundings were one foot shoaler than the corresponding RNC sounding. This appears to be an issue with implementation of NOAA sounding rounding rules (rounding at 0.75). When the ENC is set to display soundings in feet with default rounding (rounding at 0.5) the ENC and RNC soundings agree.

Charted differences determined by comparing surveyed depths to a digital surface of US4MS12M are discussed in Section D.1.2.

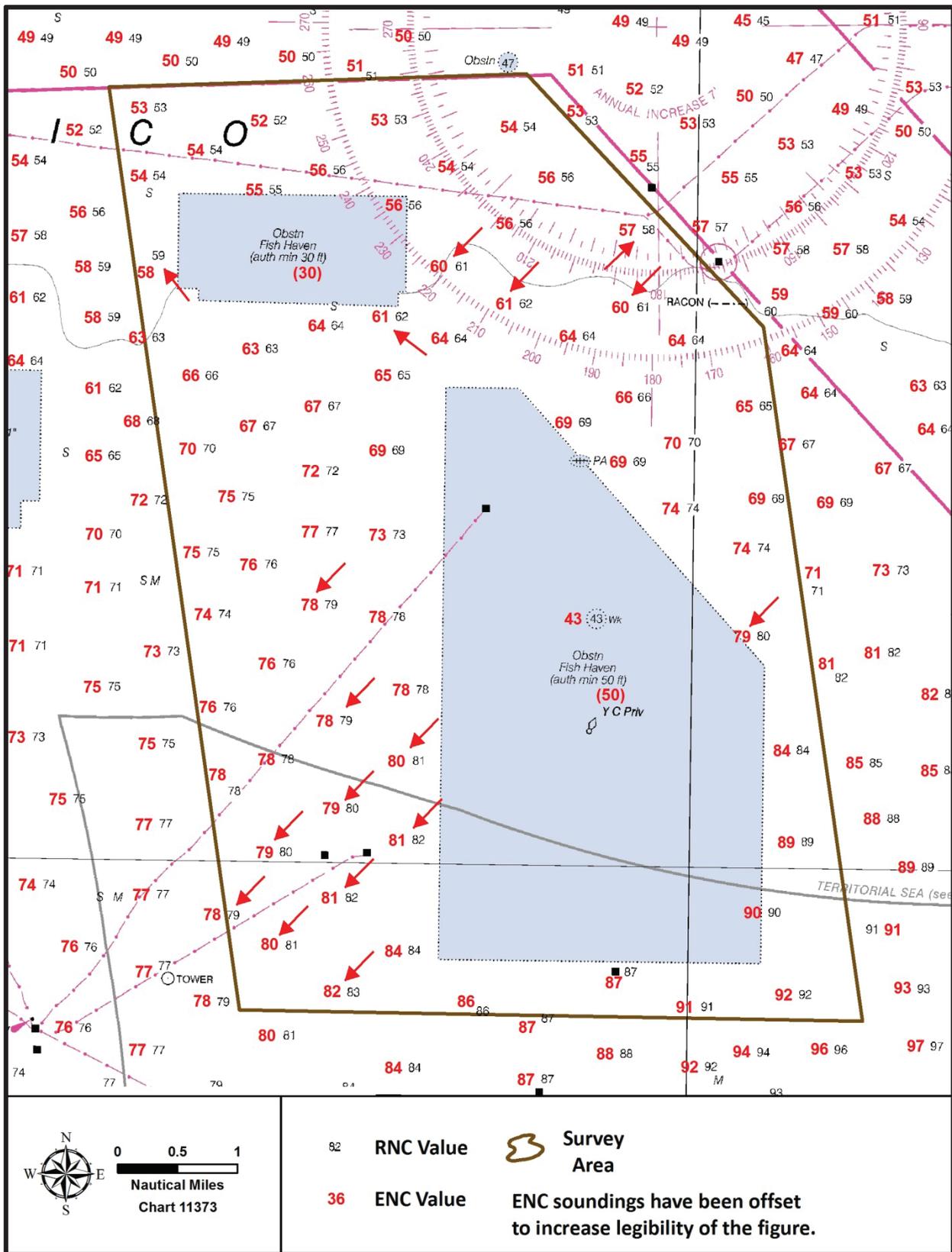


Figure 2. Sounding Discrepancies between 11373 and US4MS12M

11366

Chart 11366 corresponds to chart US3GC04M within the H12470 survey area. As depicted in Figure 3, chart 11366 matches ENC soundings within the survey area.

Charted differences in this area determined by comparing surveyed depths to a digital surface of US3GC04M are discussed in Section D.1.2.

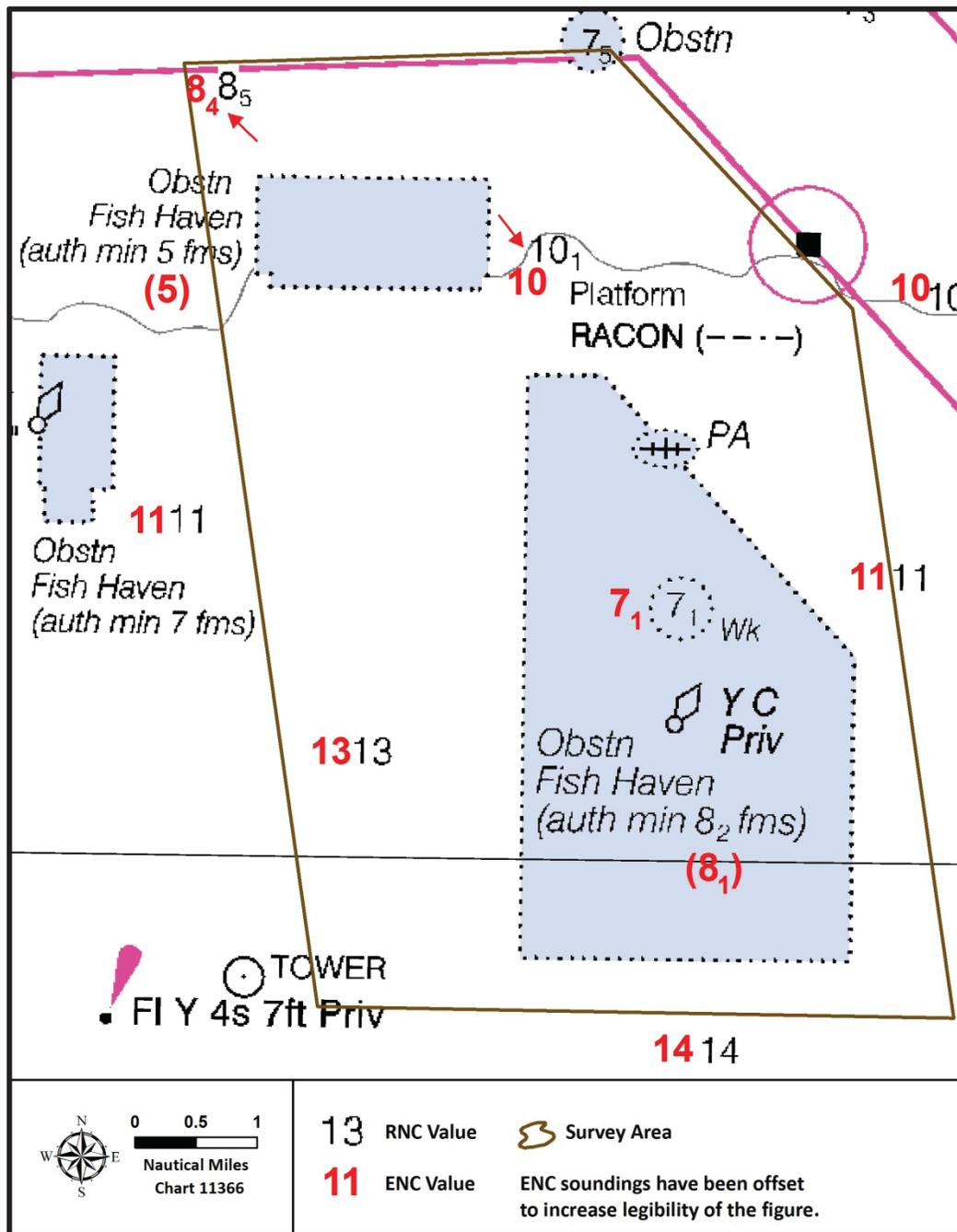


Figure 3. Sounding Discrepancies between 11366 and US3GC04M

D.1.2 Electronic Navigational Charts

Table 16 lists the ENC's compared to H12470.

Table 16. ENC's Compared to H12470

ENC Name	Scale	Edition Number	Update Application Date	Issue Date
US4MS12M	1:80,000	21	11/09/2012	02/15/2013
US3GC04M	1:250,000	48	11/06/2012	03/20/2013

US4MS12M

Surveyed depths from H12470 are generally 0 feet to 6 feet shoaler than charted and 0 feet to 3 feet deeper than charted. The maximum depth differences, which are up to 40 feet deeper than charted, are located within two charted fish havens with authorized minimum depths. A large section of the survey area is covered by sand, which appears to have migrated since the area was last surveyed. Figure 4 depicts the difference in feet between H12470 and ENC US4MS12M.

US3GC04M

The difference surface created from the small scale chart shows surveyed depths are generally one fathom shoaler to one fathom deeper than charted (Figure 5). The largest discrepancies between the survey and the ENC are within the fish havens.

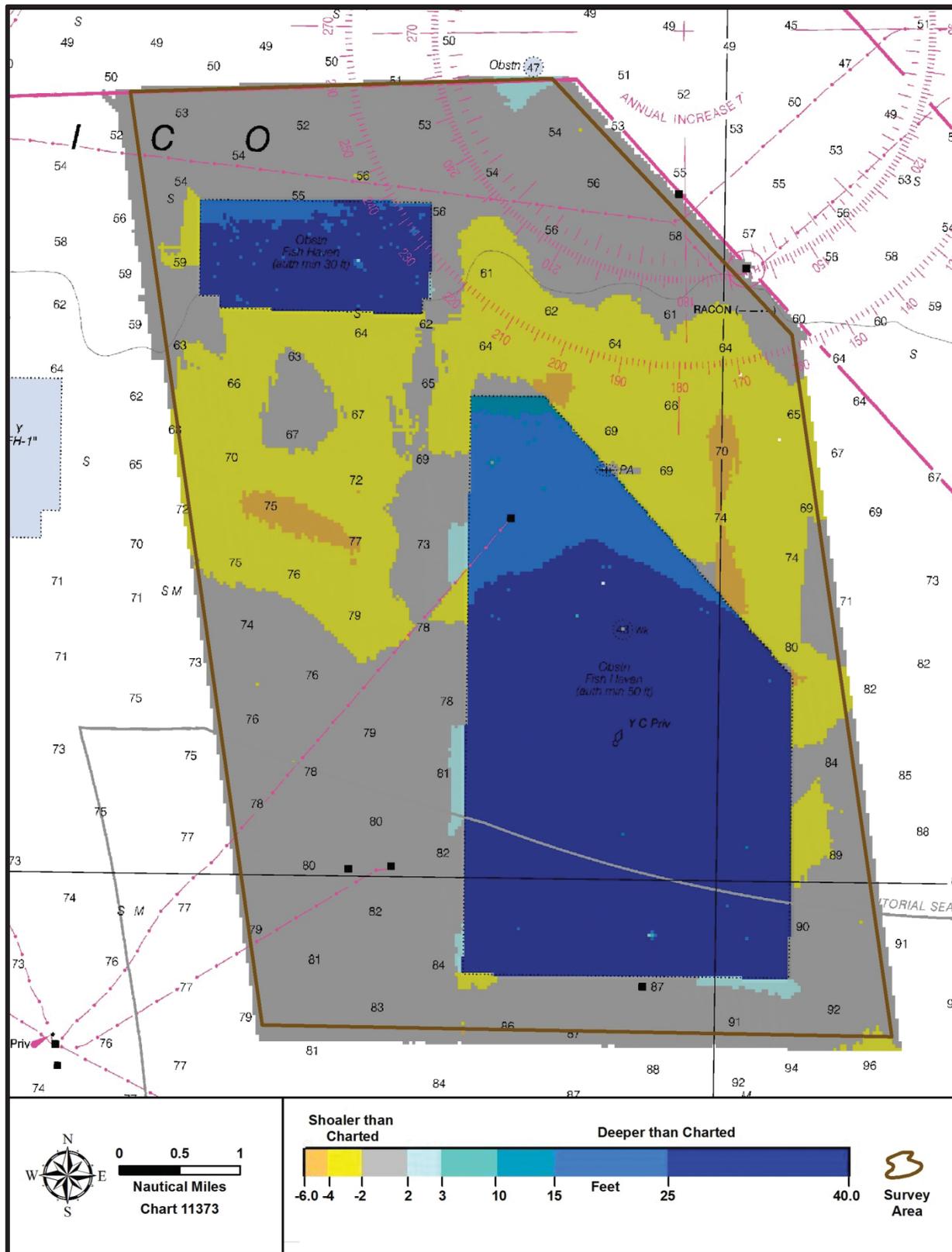


Figure 4. Depth Difference between H12470 and chart US4MS12M

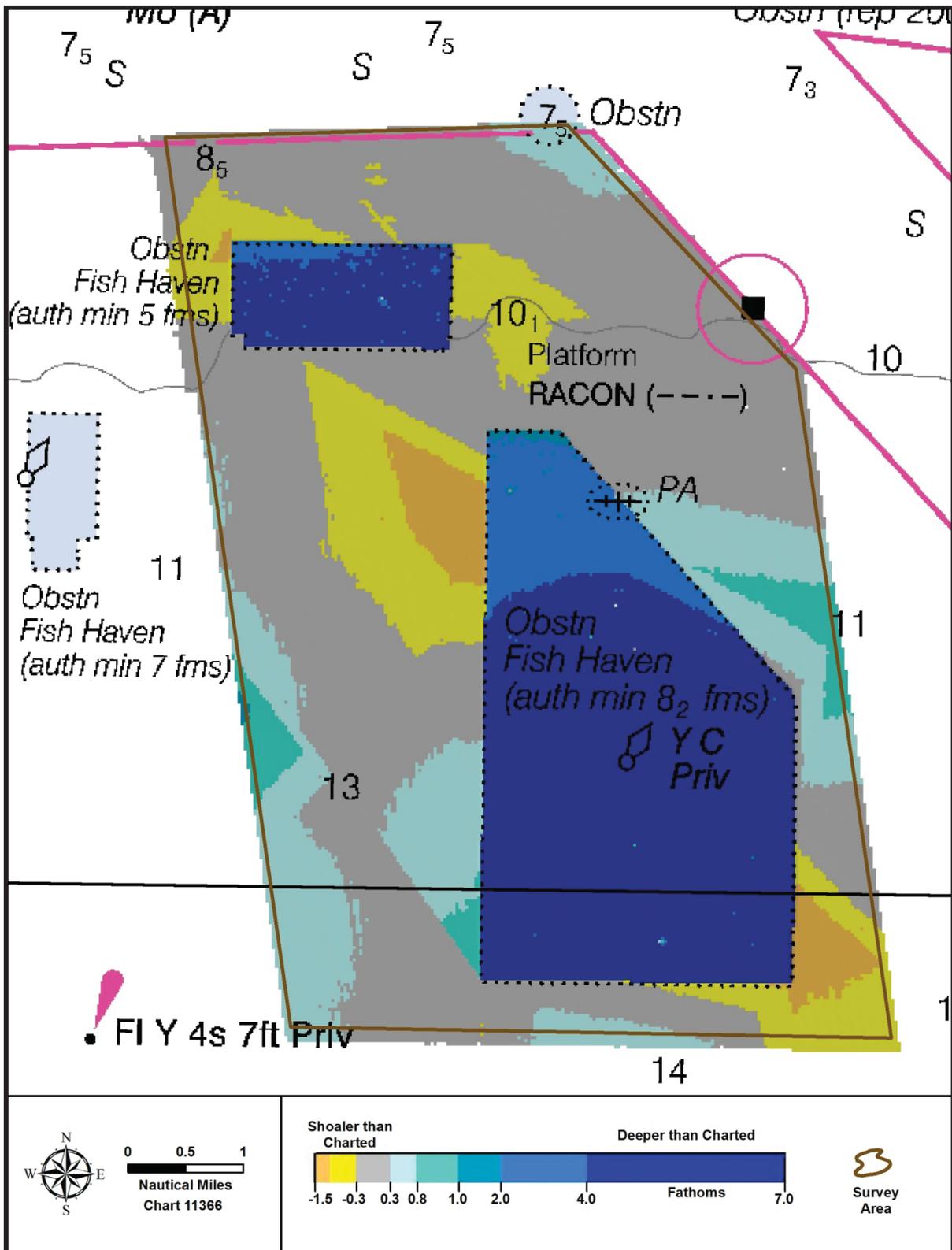


Figure 5. Depth Difference between H12470 and chart US3GC04M

D.1.3 AWOIS Items

One (1) AWOIS item was assigned for full investigation within survey H12470.

14965

The online AWOIS database does not include #14965. It is charted as a Wreck PA (Position Approximate). Survey H12470 has disproved this item with 200% side scan coverage. It is recommended that the Wreck be removed from the charts and the AWOIS database be updated with findings from the H12470 survey. The charted Wreck PA (Position Approximate), depth unknown representing AWOIS #14965 as depicted in the CSF, has been included in the Final Feature File with a description of 'Delete'.

D.1.4 Charted Features

As previously discussed, the survey area contains one charted Wreck PA (AWOIS item 14965). The survey area does not contain any submerged charted features labeled as PD (Position Doubtful), ED (Existence Doubtful), or Reported. Charted features assigned in the CSF are included in the H12470 File Feature File and denoted with the Assignment Flag of 'Assigned'.

D.1.5 Uncharted Features

The Final Feature File includes one wreck, submitted as Danger to Navigation (Dton) #1, denoted with the description of 'New'.

D.1.6 Dangers to Navigation

One (1) Dton was reported for this survey and has been submitted to Atlantic Hydrographic Branch (AHB). The Dton, which has been reviewed by AHB, is included in the S-57 feature file and should be charted as depicted in the file. The charting status of the Dton at time of Descriptive Report submission is included in Table 17. The Dton report and related correspondence is located in Appendix II *Supplemental Survey Records and Correspondence*.

Table 17. H12470 Dton Charting Status

Dton	Feature	Applied to Raster Chart	Applied to ENC	AHB Submitted to MCD
1	Wreck	Yes	Yes	Yes

D.1.7 Shoal and Hazardous Features

No shoals or potentially hazardous features were located within the H12470 survey area.

D.1.8 Channels

The H12470 survey area does not contain any anchorage areas, maintained navigation channels or channel lines. The northern and northeast edges of H12470 border charted safety fairway (33 CFR 166.200).

D.2 Additional Results

D.2.1 Shoreline

Shoreline investigation was not assigned in the *OPR-J348-KR-12 Hydrographic Survey Project Instructions or Statement of Work*.

D.2.2 Prior Surveys

Aside from previously discussed comparison to junction survey H11546 no other comparisons with prior surveys were conducted.

D.2.3 Aids to Navigation

Charted buoy *Y C Priv* was not found during the survey and is considered disproved. The buoy is listed with the attribute “delete” in the feature file.

D.2.4 Overhead Features

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

D.2.5 Submarine Features

The H12470 survey area contains four charted pipelines. It is recommended that all charted pipelines within the survey area be retained as charted.

D.2.6 Ferry Routes and Terminals

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

D.2.7 Platforms

The H12470 survey coverage encompassed six charted platforms. Three (3) of these platforms were disproved with side scan coverage and/or visual disproval by the survey party. They have been included in the Final Feature File with the recommendation to ‘Delete’. The other platforms were found 15 meters to 128 meters from their charted positions and are included in the feature file with recommendation to ‘Update’.

D.2.8 Significant Features

No additional information of scientific or practical value was observed during the survey. No anomalous tidal or environmental conditions were observed during the survey that impacted the quality of the survey.

D.2.9 Construction and Dredging

There were no construction or dredging activities observed during survey operations.

E. APPROVAL SHEET

The letter of approval for this report and accompanying data follows on the next page.



DAVID EVANS
AND ASSOCIATES INC.

LETTER OF APPROVAL
OPR-J348-KR-12
REGISTRY NO. H12470

This report and the accompanying data are respectfully submitted.

Field operations contributing to the accomplishment of survey H12470 were conducted under my direct supervision with frequent personal checks of progress and adequacy. This report and associated data have been closely reviewed and are considered complete and adequate as per the OPR-J348-KR-12 *Statement of Work Statement* (April 2, 2012) and *Hydrographic Survey Project Instructions* dated April 16, 2012.

Digitally signed by Jon Dasler
DN: cn=Jon Dasler, o=David Evans and
Associates, Inc., ou=Marine Services
Division, email=jld@deainc.com, c=US
Date: 2013.04.16 12:28:42 -07'00'

Jonathan L. Dasler, PE, PLS, CH
ACSM/THSOA Certified Hydrographer
Chief of Party

Digitally signed by Jason Creech
DN: cn=Jason Creech, o=David Evans
and Associates, Inc., ou=Marine Services
Division, email=jasc@deainc.com, c=US
Date: 2013.04.16 12:29:24 -07'00'

Jason Creech
Lead Hydrographer

David Evans and Associates, Inc.
February 2013

F. TABLE OF ACRONYMS

ACSM	American Congress on Surveying and Mapping
AHB	Atlantic Hydrographic Branch
ASCII	American Standard Code for Information Interchange
AWOIS	Automated Wreck and Obstruction Information System
BAG	Bathymetric Attributed Grids
CTD	Conductivity, Temperature, and Depth
CUBE	Combined Uncertainty and Bathymetry Estimator
DAPR	Data Acquisition and Processing Report
DEA	David Evans and Associates, Inc
DGPS	Differential Global Positioning System
DN	Day Number
DtoN	Danger to Navigation
ED	Existence Doubtful
ENC	Electronic Navigational Charts
GPS	Global Positioning System
HIPS	Hydrographic Information Processing System
HSD	Hydrographic Surveys Division
HSSD	Hydrographic Surveys Specifications and Deliverables
HVCR	Horizontal and Vertical Control Report
IHO	International Hydrographic Organization
IMO	International Maritime Organization
LNM	Local Notice to Mariners
MBES	Multibeam Echo Sounder
MCD	Marine Chart Division
MLLW	Mean Lower Low Water
MVP	Moving Vessel Profiler
NAD83	North American Datum of 1983
nm	Nautical Mile
NOAA	National Oceanic Atmospheric Administration
NOS	National Ocean Service
PA	Position Approximate, Position Approximate
PD	Position Doubtful
PE	Professional Engineer, Professional Engineer
PLS	Professional Land Surveyor
PRF	Project Reference File
QC	Quality Control
R/V	Research Vessel
RNC	Raster Navigational Chart
SSS	Side Scan Sonar
StdDev	Standard Deviation
SVP	Sound Velocity Profile
THSOA	The Hydrographic Society of America
TIN	Triangular Irregular Network
TPU	Total Propagated Uncertainty
USCG	US Coast Guard
UTM	Universal Transverse Mercator

APPENDIX I
TIDES AND WATER LEVELS

Project: OPR-J348-KR-12 Registry No: H12470

Contractor Name: David Evans and Associates, Inc.

Date: November 2012

Sheet Number: 5

Inclusive Dates: September 16, 2012 - February 04, 2013

Time (UTC)

Day Number	Date	Start Time	End Time
260	09/16/2012	17:28:10	21:08:39
261	09/17/2012	12:17:49	17:45:36
264	09/20/2012	12:09:49	20:29:48
265	09/21/2012	12:03:11	20:27:02
266	09/22/2012	11:49:56	21:07:35
267	09/23/2012	11:46:37	21:07:48
268	09/24/2012	11:57:13	21:09:59
269	09/25/2012	11:55:09	21:02:34
270	09/26/2012	11:59:40	21:05:24
271	09/27/2012	12:13:24	21:10:40
272	09/28/2012	12:19:55	20:51:29
273	09/29/2012	14:14:32	20:10:20
280	10/06/2012	12:43:20	18:28:14
284	10/10/2012	18:12:18	19:28:46
285	10/11/2012	12:24:55	19:58:00
286	10/12/2012	12:59:12	20:31:20
291	10/17/2012	13:23:05	20:40:02
294	10/20/2012	12:45:09	20:31:57
295	10/21/2012	12:40:57	20:47:55
306	11/01/2012	14:46:33	20:17:11
307	11/02/2012	12:13:51	17:45:21
308	11/03/2012	12:25:23	20:56:22
309	11/04/2012	17:36:17	20:26:02
314	11/09/2012	13:24:25	21:46:37
315	11/10/2012	13:21:33	18:24:00
332	11/27/2012	13:16:01	19:16:54
335	11/30/2012	13:00:53	15:17:54
25	01/25/2013	15:54:44	19:18:29
32	02/01/2013	13:46:32	20:57:29
35	02/04/2013	13:22:13	13:44:12

H12470

FINAL TIDE NOTE and FINAL TIDE ZONING CHART

DATE: February 4, 2013

HYDROGRAPHIC BRANCH: Atlantic

HYDROGRAPHIC PROJECT: OPR-J348-KR-12

HYDROGRAPHIC SHEET: H12470

LOCALITY Approaches to Mississippi Sound, Mississippi

SUB-LOCALITY: 9nm S of Horn Island Pass

TIME PERIOD:	September	16-17,20-29
	October	6,10-12,17,20-21
	November	1-4,9-10,27,30
	January	25
	February	1,4

TIDE STATIONS USED: 8741533, Pascagoula NOAA Lab, MS
Lat. 30° 22.0 N, Lon. 88° 33.7' W

PLANE OF REFERENCE (MEAN LOWER LOW WATER): 0.000 meters

HEIGHT OF MEAN HIGH WATER (8741533) ABOVE PLANE OF REFERENCE: 0.440 meters¹

¹ MLLW 6.674m Mean Lower-Low Water
MHW 7.114m Mean High Water

http://tidesandcurrents.noaa.gov/data_menu.shtml?unit=0&format=Apply+Change&stn=8741533+Pascagoula+Noaa+Lab%2C+MS&type=Datums

**FINAL TIDE ZONING
H12470
OPR-J348-KR-12**

Zone	Time Corrector (Mins)	Range Ratio	Reference Station
CGM38A	-18	0.93	8741533
CGM38	-24	0.93	8741533
CGM122	-6	1.00	8741533

NOTE: Final soundings were reduced to chart datum using a David Evans and Associates, Inc. revised version of the zoning scheme provided with the project instructions.

APPENDIX II

SUPPLEMENTAL SURVEY RECORDS AND CORRESPONDENCE

No supplemental records or correspondence

APPENDIX III

FEATURE REPORT

Danger to Navigation - one

AWOIS - one

Maritime boundary - none

Wrecks - none

H12470 Danger to Navigation

Registry Number: H12470
State: Mississippi
Locality: Approaches to Mississippi Sound
Sub-locality: 9 NM South of Horn Island Pass
Project Number: OPR_J348-KR-12
Survey Date: 09/16/2012 - 02/04/2013

Charts Affected

Number	Edition	Date	Scale (RNC)	RNC Correction(s)*
11373	51st	01/01/2014	1:80,000 (11373_1)	USCG LNM: 4/15/2014 (4/15/2014) NGA NTM: 4/9/2011 (4/26/2014)
11366	11th	01/01/2008	1:250,000 (11366_1)	[L]NTM: ?
11360	43rd	11/01/2008	1:456,394 (11360_1)	[L]NTM: ?
1115A	43rd	11/01/2008	1:456,394 (1115A_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	H12470 DtoN #1: 10 meter tall wreck	Wreck	13.29 m	30° 02' 04.9" N	088° 30' 55.3" W	---

1 - DTON

1.1) H12470 DtoN #1: 10 meter tall wreck

DANGER TO NAVIGATION

Survey Summary

Survey Position: 30° 02' 04.9" N, 088° 30' 55.3" W
Least Depth: 13.29 m (= 43.60 ft = 7.267 fm = 7 fm 1.60 ft)
TPU ($\pm 1.96\sigma$): THU (TPEh) [None] ; TVU (TPEv) [None]
Timestamp: 2013-035.00:00:00.000 (02/04/2013)
Dataset: H12470_DTON.000
FOID: 0_ 0001867419 00001(FFFE001C7E9B0001)
Charts Affected: 11373_1, 11366_1, 1115A_1, 11360_1, 11006_1, 411_1

Remarks:

WRECKS/remrks: FS 271-141156-P. H12470 DtoN #1. Wreck rising approximately 10.0m above the natural bottom inside a charted fish haven. The wrecks least depth is shoaler than the fish havens authorized minimum.

Feature Correlation

Source	Feature	Range	Azimuth	Status
H12470_DTON.000	0_ 0001867419 00001	0.00	000.0	Primary

Hydrographer Recommendations

[None]

Cartographically-Rounded Depth (Affected Charts):

43ft (11373_1)

7 ¼fm (1115A_1, 11360_1, 11006_1, 411_1)

7fm 1ft (11366_1)

S-57 Data

Geo object 1: Wreck (WRECKS)
Attributes: CATWRK - 2:dangerous wreck
 NINFOM - Chart wreck
 QUASOU - 6:least depth known

SORDAT - 20130204

SORIND - US,US,graph,H12470

TECSOU - 3:found by multi-beam

VALSOU - 13.290 m

WATLEV - 3:always under water/submerged

Office Notes

SAR Note: The wreck is visible in the full MBES coverage data. The DTON was submitted by the field unit on 1/17/2013.

COMPILE: Wreck has a value of sounding of 43.6 feet, less than the authorized limit of the fish haven obstruction. Chart wreck at survey position. Wreck had not been applied to ENC US4MS12M or RNC 11373 at time of Compilation.

Feature Images

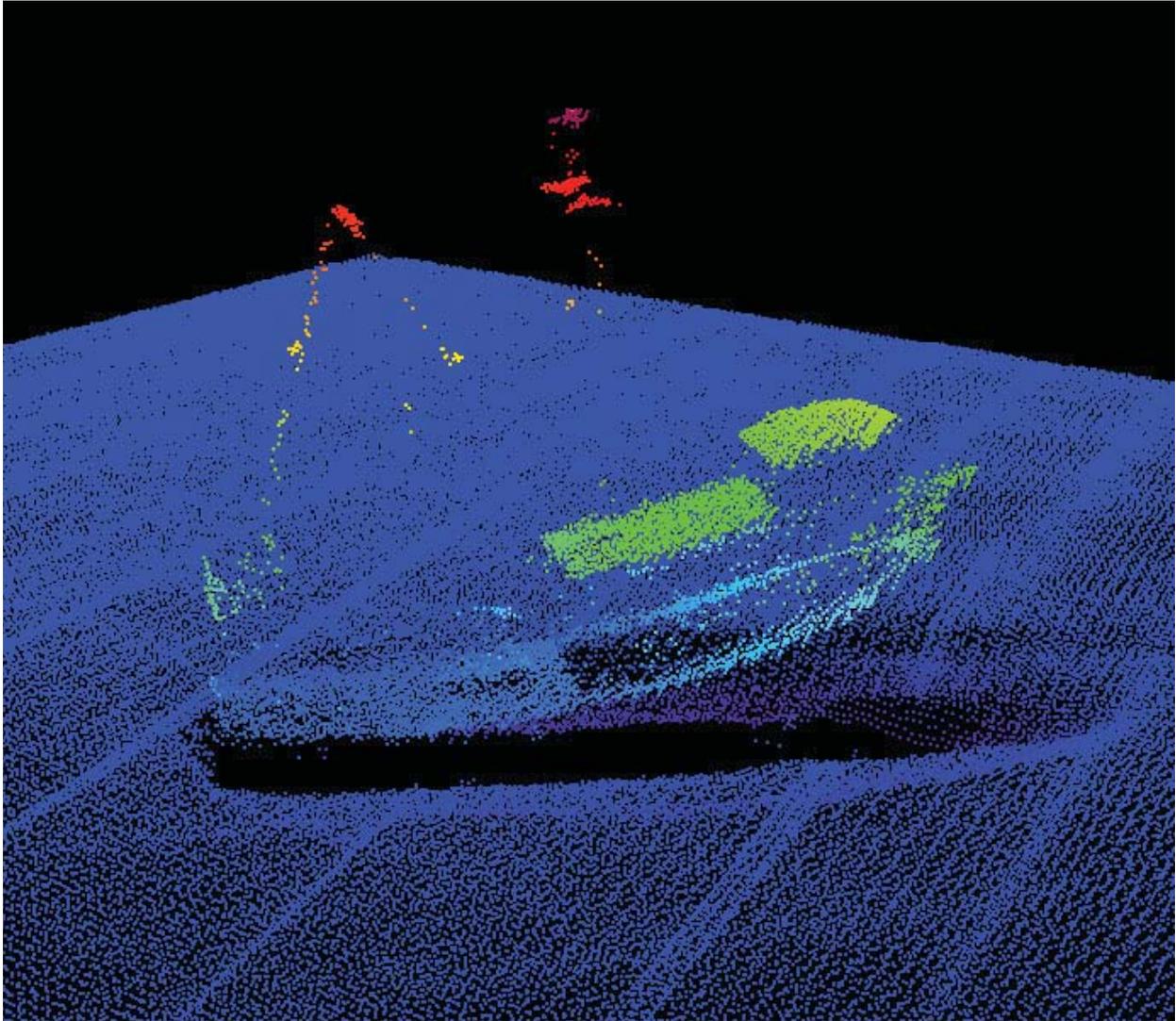


Figure 1.1.1

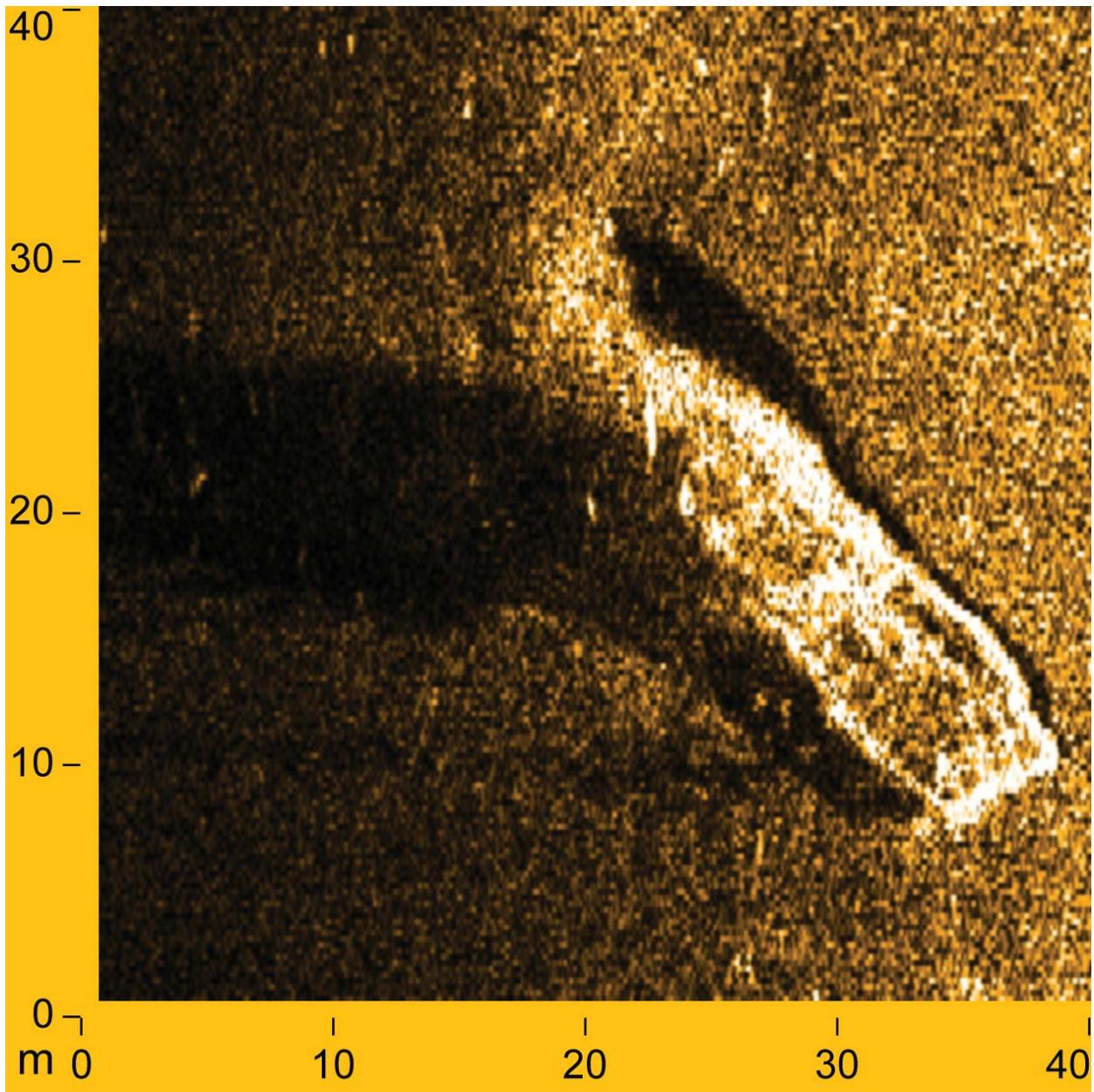


Figure 1.1.2

H12470 AWOIS

Registry Number: H12470
State: Mississippi
Locality: Approaches to Mississippi Sound
Sub-locality: 9 NM South of Horn Island Pass
Project Number: OPR-J348-KR-12
Survey Date: 09/16/2012 - 02/04/2013

Charts Affected

Number	Edition	Date	Scale (RNC)	RNC Correction(s)*
11373	51st	01/01/2014	1:80,000 (11373_1)	USCG LNM: 4/15/2014 (4/15/2014) NGA NTM: 4/9/2011 (4/26/2014)
11366	11th	01/01/2008	1:250,000 (11366_1)	[L]NTM: ?
11360	43rd	11/01/2008	1:456,394 (11360_1)	[L]NTM: ?
1115A	43rd	11/01/2008	1:456,394 (1115A_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	OBSTRUCTION	AWOIS	[no data]	[no data]	[no data]	---

1 - AWOIS

1.1) AWOIS #14965 - OBSTRUCTION

No Primary Survey Feature for this AWOIS Item

Search Position: 30° 03' 23.3" N, 088° 31' 05.9" W
Historical Depth: [None]
Search Radius: 200
Search Technique: MB, S2
Technique Notes: [None]

History Notes:

OPR-J348-KR-12-- WRECK PA

Survey Summary

Charts Affected: 11373_1, 11366_1, 1115A_1, 11360_1, 11006_1, 411_1

Remarks:

[None]

Feature Correlation

Source	Feature	Range	Azimuth	Status
AWOIS_EXPORT	AWOIS # 14965	0.00	000.0	Primary

Hydrographer Recommendations

[None]

S-57 Data

[None]

Office Notes

SAR Note: Do not concur with the interpretation of this feature as a wreck. Data is interpreted as an OBSTRN; feature is tripod shaped. The AWOIS description does not include information that is populated in the INFORM attribute. The feature is surveyed approximately 57 meters to the northwest of location provided in the AWOIS listing and Project Files Composite Source File.

COMPILE: Delete charted wreck. Wreck is within the bounds of charted fish haven.

APPROVAL PAGE

H12470

Data meet or exceed current specifications as certified by the OCS survey acceptance review process. Descriptive Report and survey data except where noted are adequate to supersede prior surveys and nautical charts in the common area.

The following products will be sent to NGDC for archive

- H12470_DR.pdf
- Collection of depth varied resolution BAGS
- Processed survey data and records
- H12470_GeoImage.pdf

The survey evaluation and verification has been conducted according current OCS Specifications, and the survey has been approved for dissemination and usage of updating NOAA's suite of nautical charts.



Approved: _____

LT Matthew Jaskoski, NOAA
Chief, Atlantic Hydrographic Branch