H12605

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

DESCRIPTIVE REPORT

Type of Survey:	Basic Hydrographic Survey
Registry Number:	H12605

LOCALITY

State(s):	Delaware
General Locality:	Delaware Bay
Sub-locality:	Offshore North Cape Henlopen

2013

CHIEF OF PARTY
Commander Lawrence T. Krepp, NOAA

LIBRARY & ARCHIVES

Date:

U.S. DEPARTMENT OF COMMERCE NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION	REGISTRY NUMBER:
HYDROGRAPHIC TITLE SHEET	**H12605**

INSTRUCTIONS: The Hydrographic Sheet should be accompanied by this form, filled in as completely as possible, when the sheet is forwarded to the Office.

State(s):	**Delaware**
General Locality:	**Delaware Bay**
Sub-Locality:	**Offshore North Cape Henlopen**
Scale:	**20000**
Dates of Survey:	**06/18/2013 to 06/29/2013**
Instructions Dated:	**05/03/2013**
Project Number:	**OPR-D332-TJ-13**
Field Unit:	**NOAA Ship *Thomas Jefferson***
Chief of Party:	**Commander Lawrence T. Krepp, NOAA**
Soundings by:	**Multibeam Echo Sounder**
Imagery by:	**Multibeam Echo Sounder Backscatter**, **Side Scan Sonar**
Verification by:	***Atlantic Hydrographic Branch***
Soundings Acquired in:	**meters at Mean Lower Low Water**

Remarks:

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 Survey H12605

Project: OPR-D332-TJ-13

Locality: Delaware Bay

Sublocality: Offshore North Cape Henlopen

Scale: 1:20000

June 2013 - June 2013

NOAA Ship *Thomas Jefferson*

Chief of Party: Commander Lawrence T. Krepp, NOAA

A. Area Surveyed

This survey was conducted at the entrance of Delaware Bay, in the vicinity of Cape Henlopen, DE.

A.1 Survey Limits

Data were acquired within the following survey limits:

Northwest Limit	Southeast Limit
38° 57" 34.4' N 75° 10" 43.2' W	38° 48" 35.9' N 75° 1" 36.1' W

Table 1: Survey Limits

OPR-D332-TJ-13
H12605 Survey Limits

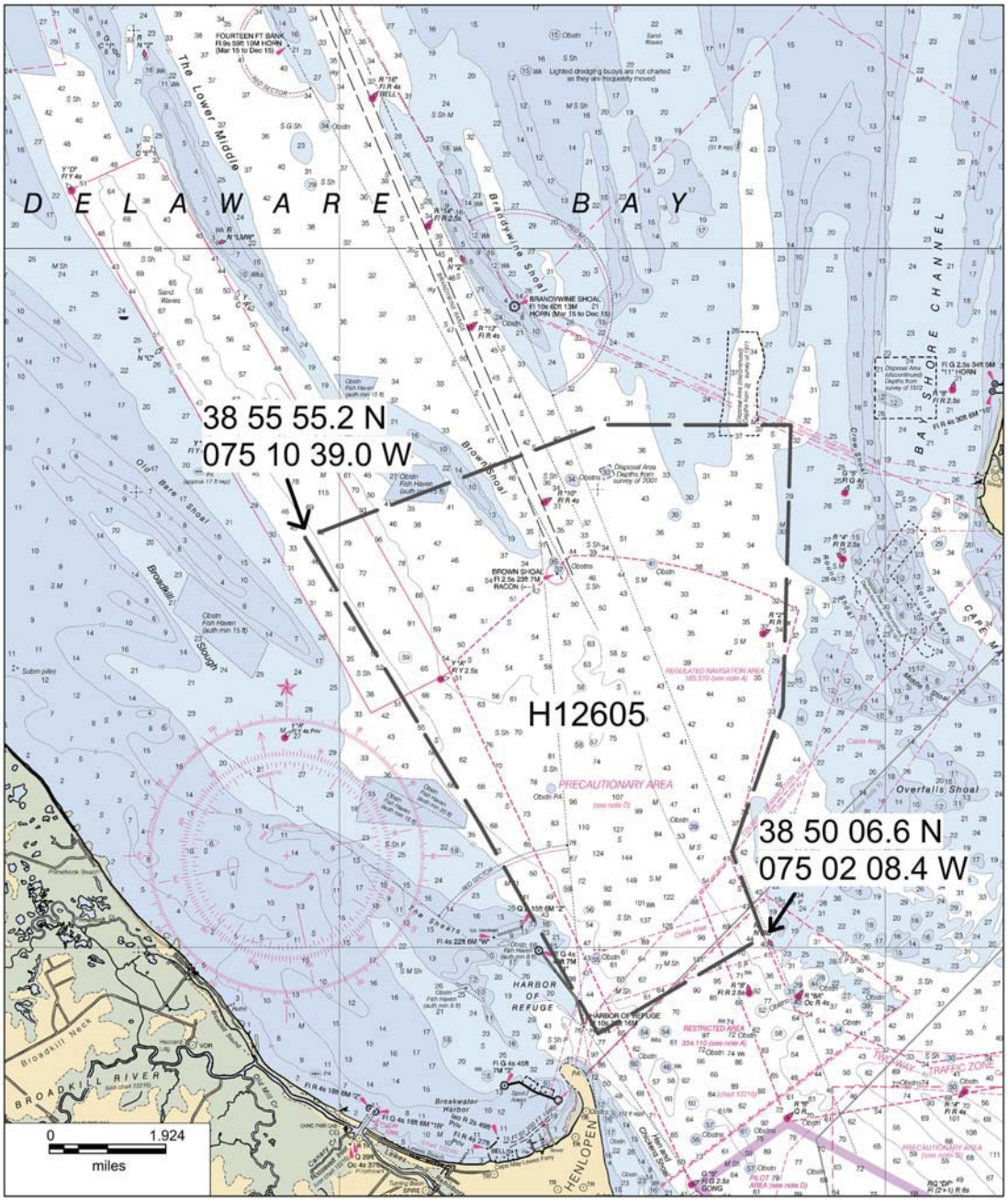


Figure 1: H12605 Survey Limits

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

A.2 Survey Purpose

The purpose of this survey is to provide contemporary bathymetric and hydrographic data in support of National Ocean Service (NOS) projects to update nautical charting products in response to Hurricane Sandy. The project which this survey supports will cover approximately 385 square nautical miles addressing approximately 31 square nautical miles of the NHSP critical area and 273 square nautical miles of the NHSP of re-survey. This specific survey covers an area of approximately 39 square nautical miles.

A.3 Survey Quality

The entire survey is adequate to supersede previous data.

A.4 Survey Coverage

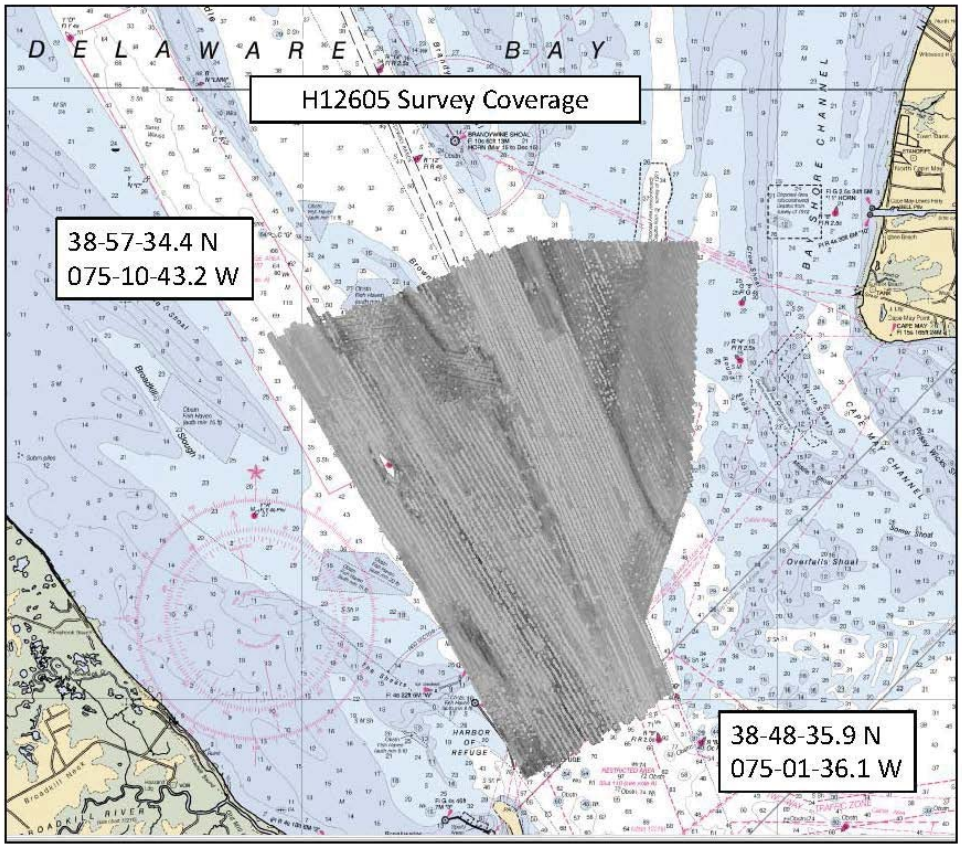


Figure 2: H12605 Coverage

Survey Coverage requirements were modified after dissemination of Final Project Instructions for project OPR-D332-TJ-13. See Appendix II for further information. One holiday exists in the 100% side scan coverage around the Yellow "A" buoy located at position 38-53-50.5 N and 075-08-10.73 W. No backscatter data was collected by S222 during the course of the survey due to a malfunction in the RESON 7125-ROV topside unit.

A.5 Survey Statistics

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

	Vessel	***Total***
LNM	**SBES Mainscheme**	0
	MBES Mainscheme	5.0
	Lidar Mainscheme	0
	SSS Mainscheme	0
	SBES/MBES Combo Mainscheme	0
	SBES/SSS Combo Mainscheme	0
	MBES/SSS Combo Mainscheme	1271.80
	SBES/MBES Combo Crosslines	110.84
	Lidar Crosslines	0
Number of Bottom Samples		0
Number AWOIS Items Investigated		20
Number Maritime Boundary Points Investigated		0
Number of DPs		0
Number of Items Items Investigated by Dive Ops		0
Total Number of SNM		38.79

Table 2: Hydrographic Survey Statistics

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

Survey Dates	Julian Day Number
06/18/2013	169
06/19/2013	170
06/20/2013	171
06/21/2013	172
06/22/2013	173
06/24/2013	175
06/25/2013	176
06/26/2013	177
06/27/2013	178
06/28/2013	179
06/29/2013	180

Table 3: Dates of Hydrography

B. Data Acquisition and Processing

B.1 Equipment and Vessels

Refer to the Data Acquisition and Processing Report (DAPR) for a complete description of data acquisition and processing systems, survey vessels, quality control procedures and data processing methods. Additional information to supplement sounding and survey data, and any deviations from the DAPR are discussed in the following sections.

B.1.1 Vessels

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

Hull ID	***3102***	***3101***	***S222***
LOA	31 feet	31 feet	208 feet
Draft	5.2 feet	5.2 feet	15 feet

Table 4: Vessels Used

All vessels acquired Multibeam, Side Scan Sonar, Surface Sound Speed, Sound Velocity, and Attitude data in the course of survey operations. S222 collected Sound Speed Data using a Moving Vessel Profiler and winch system. HSL 3101 and 3102 acquired Sound Speed Data using Seabird Conductivity-Temperature-Depth (CTD) sensors.

B.1.2 Equipment

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

Manufacturer	Model	Type
AML Oceangraphic	AML Smart SV&P	Sound Speed System
Klein	5000 v2	Side Scan Sonar (SSS)
Reson	7125 ROV	Multibeam Echo Sounder (MBES)
Reson	7125 SV1	Multibeam Echo Sounder (MBES)
Seabird	SBE Seacat 19+ Series CTD	Conductivity, Temperature, and Depth Sensor
Applanix	POS M/V v4	Positioning and Attitude System
Brook Ocean Technology	MVP 100	Sound Speed System
AML Oceangraphic	AML SV&T Sound Speed Probe	Sound Speed System

Table 5: Major Systems Used

Vessel configurations, equipment operations, and data acquisition & processing were consistent with specifications described in the DAPR.

B.2 Quality Control

B.2.1 Crosslines

Crosslines, acquired for this survey, totalled 9% of mainscheme acquisition.

S222, HSL 3101, and HSL 3102 collected combined totals of 1264.12 linear nautical miles of mainscheme MBES lines and 110.85 linear nautical miles of MBES crosslines, equating to a survey-wide crosslines-mainscheme ratio of 0.09. Crosslines were compared to mainscheme lines using a difference surface, created in CARIS BASE Editor. Two 4m CUBE Surfaces were created, both in CARIS HIPS, one using only mainscheme MBES lines and the other using only crossline MBES lines. The two CUBE surfaces were then

differenced in CARIS BASE Editor. Statistical analysis of the resultant surface was conducted using CARIS Surface Statistic tools included in BASE Editor. Analysis yielded a mean difference value of 0.1 m and a standard deviation of 0.1 m. These values comply with section 5.2.4.3 of the HSSD (2013 ed).

B.2.2 Uncertainty

The following survey specific parameters were used for this survey:

Measured	Zoning
0 meters	0.140 meters
0 meters	0.085 meters

Table 6: Survey Specific Tide TPU Values

Hull ID	Measured - CTD	Measured - MVP	Surface
HSL 3101	4 meters/second	N/A meters/second	0.2 meters/second
HSL 3102	4 meters/second	N/A meters/second	0.2 meters/second
S222	1 meters/second	1 meters/second	0.2 meters/second

Table 7: Survey Specific Sound Speed TPU Values

The values used to calculate Total Propagated Uncertainty values for survey H12605 varied based on the method used to reduce soundings to chart datum.

For data reduced via a separation mode, Total Propagated Uncertainties were derived using a combination of: real time uncertainties for vessel motion; a priori values for equipment and vessel characteristics; an a priori value for the separation model; and field assigned values for sound speed uncertainties. The real time uncertainties for vessel motion include roll, pitch, gyro, navigation, and elevation. The uncertainties in these measurements were recorded as part of the POSPac IAPPK 3D positional solution and were applied to the soundings via an SBET RMS file generated by Applanix POSPac. Uncertainties for sonar mounting and vessel speed were assigned using the a priori values found in Appendix 4, table 4.9 of the NOAA Field Procedures Manual (FPM, ed 2013), and applied to the data via the CARIS HIPS Hydrographic Vessel File. The uncertainty associated with the VDatum separation model was supplied by the Hydrographic Services Division's Operations Branch. Finally, the uncertainty associated with sound speed measurements is based on the frequency and location of CDT casts, in accordance with the guidance set by Appendix 4 of the FPM (ed 2013).

For data reduced via water level modeling, Total Propagated Uncertainties used a POSPac IAPPK solution for horizontal positioning, but used a zoned tide grid for vertical positioning. Uncertainty values for real time roll, pitch, gyro, and navigation remain the same, as do uncertainties from sonar mounting, vessel speed, and sound speed measurements. However, uncertainties for tide gauge measurement, tidal datum computation error, and tidal zoning error were provided by the Center for Operational Oceanographic Products and

Services (CO-OPS). The CO-OPS uncertainty value was provided at the 95% confidence interval. It was divided by 1.96 to provide the 1-sigma value needed by CARIS.

Total Propagated Uncertainty values were evaluated to ensure compliance with section 5.1.3 of NOAA Hydrographic Survey Specification and Deliverables (HSSD). Maximum allowable uncertainty for each node was calculated in CARIS BASE Editor. The resultant 'iho_order1_compliance' layer was inspected for any areas where calculated uncertainty values exceeded the maximum allowed uncertainty. Uncertainty values for all 7,404,041 nodes evaluated on the 4m finalized grid were within IHO uncertainty requirements.

Total Propagated Uncertainty values for 41 total survey lines were computed using Vessel Uncertainity Settings instead of ERS derived RMS Values. These lines are listed in the file titled 'H12605_norms.pdf' in Appendix II of this report.

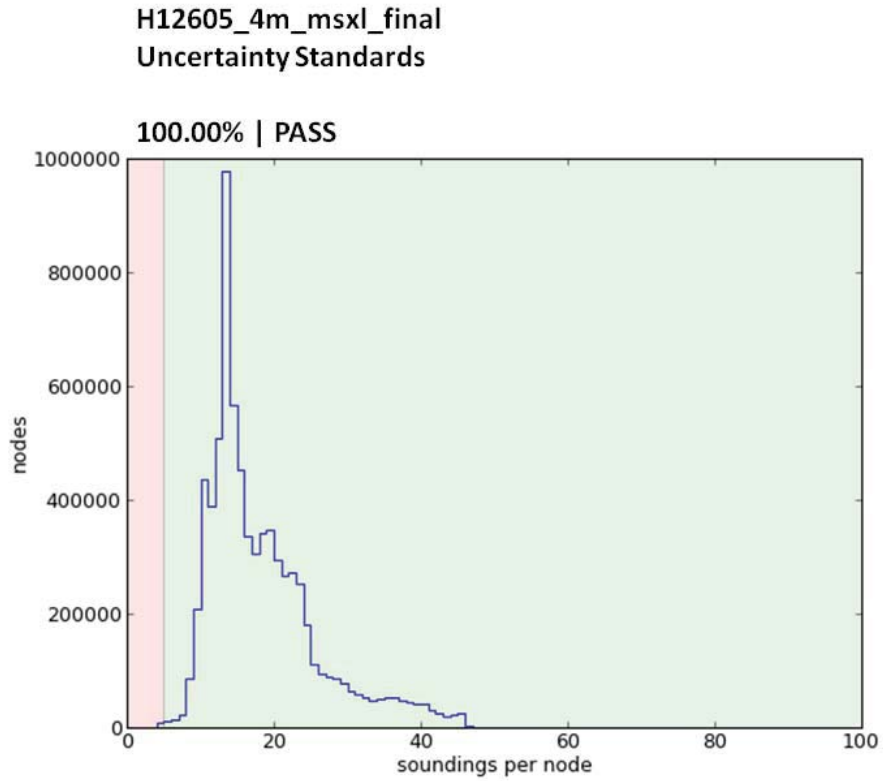


Figure 3: H12605 Uncertainty Statistics

B.2.3 Junctions

Three contemporary surveys junction with Survey H12605. Surveys H12568, H12569, and H12570 were conducted during the same field season and as part of the same project as H12605. Survey H11647 was conducted by SAIC in 2007; however, surfaces for this survey were not available for direct comparison.

The following junctions were made with this survey:

Registry Number	Scale	Year	Field Unit	Relative Location
H11647	1:20000	2007	SAIC	S
H12570	1:20000	2013	NOAA Ship THOMAS JEFFERSON	S
H12569	1:20000	2013	NOAA Ship THOMAS JEFFERSON	E
H12568	1:20000	2013	NOAA Ship THOMAS JEFFERSON	E

Table 8: Junctioning Surveys

H11647

Bathymetric surfaces and/or data were not available for direct junction comparison for Survey H11647.

H12570

The difference values between surveys H12605 and H12570 ranged from -5.748 m and 4.451 m. The mean difference was 0.007 m and the standard deviation was 0.197 m. The maximum and minimum difference values were examined and determined to be the result of noise (fliers). Evidence of sand wave migration was present in the junction comparison. Differences of up to approximately 8 ft were observed as the result of the migration of the peaks of sand waves.

H12569

The difference values between surveys H12605 and H12569 ranged from -5.941 m and 1.825 m. The mean difference was 0.007 m and the standard deviation was 0.131 m. The maximum and minimum difference values were examined and determined to be the result of noise (fliers) in the junction portion of Survey H12569.

H12568

The difference values between surveys H12605 and H12568 ranged from -0.674 m and 4.204 m. The mean difference was -0.002 m and the standard deviation was 0.123 m. The maximum and minimum difference values were examined and determined to be the result of noise (fliers) in the junction portion of Survey H12568.

B.2.4 Sonar QC Checks

Sonar system quality control checks were conducted as detailed in the quality control section of the DAPR.

B.2.5 Equipment Effectiveness

There were no conditions or deficiencies that affected equipment operational effectiveness.

B.2.6 Factors Affecting Soundings

Errors Due to Sound Velocity

A refraction artifact appears in the MB data collected by S222 RESON 7125 for H12605. The refraction error appears as either upward or downward bowing of the MB swath, which has caused vertical jumps in the CUBE reference surface as well as a striping effect in the standard deviation child layer.

Errors Likely Due To Issues in MBES Beam Formation

An artifact of unconfirmed cause appears in the MB data collected by the S222 Reson 7125 ROV unit. The artifact has two distinct characteristics; the first appears as a sharp upward or downward spike on the starboard edge of the MB swath, the second appears as an elongated ‘S’ shape across the swath. Figure 4 shows a typical example. The field unit has encountered the ‘S’ shape in previous projects, and has historically attributed the artifact to an error in the 7125’s sectoring and beam steering algorithm. The outerbeam spike has not been observed before, but the periodic appearance across several different projects leads the field to believe it also stems from a systemic error in the 7125’s beam formation. Both types of beam forming errors have caused vertical jumps in the CUBE surface.

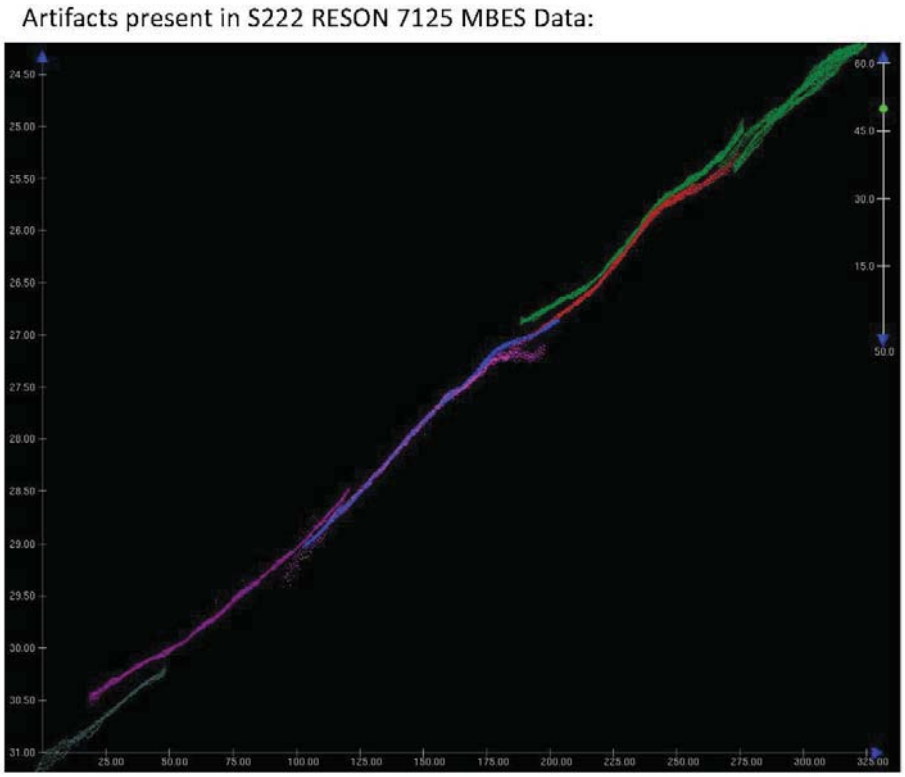


Figure 4: S222 MBES Artifacts

Delayed Heave Issues

A total of three lines were processed without Delayed Heave applied. This was due to insufficient SBET coverage. Reference the file titled 'H12605_notrueheave.pdf' in Appendix II of this report for additional information.

GPS Tide Issues

A total of 41 lines were processed using Zoned Tide correctors (in lieu of ERS correctors) due to either insufficient ERS SBET coverage or the existence of unresolved issues with the SBET solutions. Reference the file titled 'H12605_ zonedtides.pdf' in Appendix II of this report for additional information.

B.2.7 Sound Speed Methods

Sound Speed Cast Frequency: Casts were conducted in such a manner as to comply with the procedures outlined in the DAPR. Several lines in Survey H12605 deviated from the casting frequency requirements

outlined in the DAPR. These lines are listed in the file titled 'H12605_castndwtdeviations.pdf' in Appendix II of this report. No adverse effects in overall data quality were noticed upon examination of the lines affected.

Sound speed casts were applied to the data using nearest in distance within time.

B.2.8 Coverage Equipment and Methods

All equipment and survey methods were used as detailed in the DAPR.

B.2.9 Density Requirements for Survey H12605

Density requirements for H12605 were analyzed using NOAA's Standards Compliance Review script. It was found that 99.9% of finalized surface nodes contain five or more soundings.

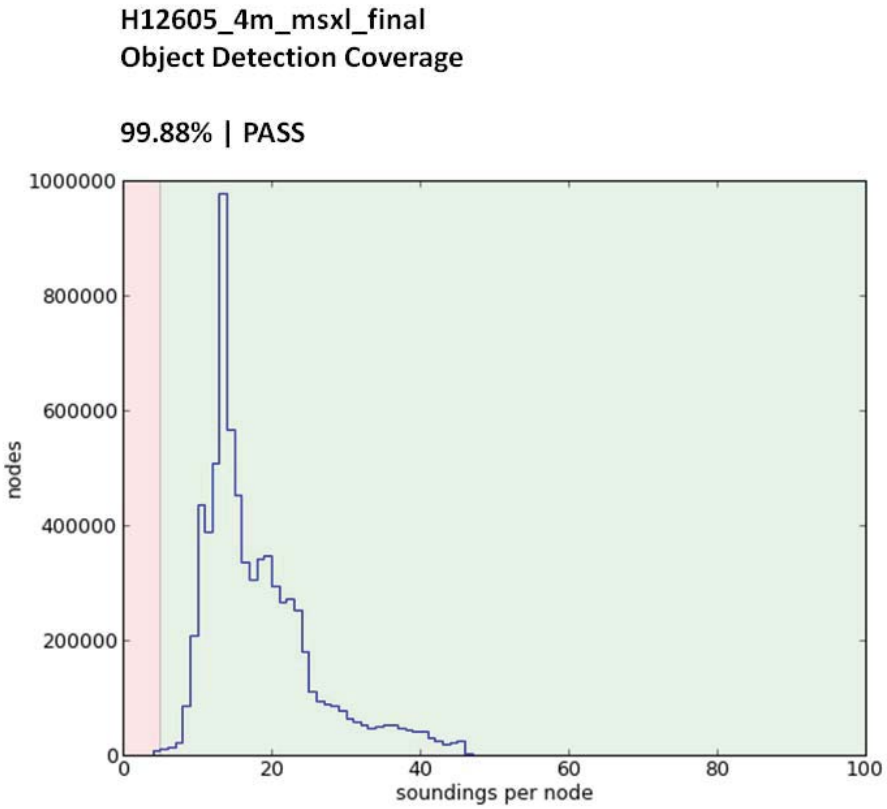


Figure 5: H12605 Density Requirements

B.2.10 Sand Wave Migration in the vicinity of Brown Shoal

Poor correlation of sandwaves in the vicinity of the southern point of Brown Shoal was observed in data collected between DN 171 and DN 179. The phenomenon is particularly evident south of the 13ft sounding located at 38-56-13.15 N and 075-07-12.97 W. The phenomenon is assessed to be the result of dynamic sandwave formation caused by an active local submarine geomorphology. Brown Shoal obstructs the movement of large volumes of the water moving in and out of Delaware Bay and large currents were observed in the area. The lack of correlation of sandwaves in the area was assessed to be the result of these conditions.

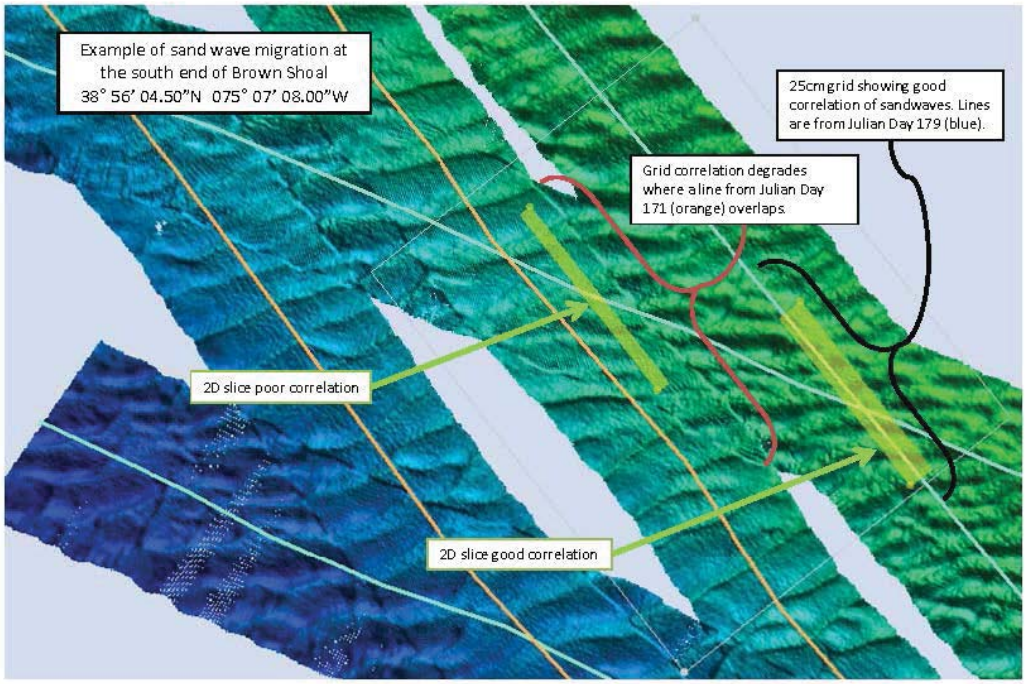


Figure 6: H12605 Sand Waves

B.3 Echo Sounding Corrections

B.3.1 Corrections to Echo Soundings

All data reduction procedures conform to those detailed in the DAPR.

B.3.2 Calibrations

All sounding systems were calibrated as detailed in the DAPR.

B.4 Backscatter

Raw Backscatter was logged as a .7k file and has been sent to the Processing Branch. One line of backscatter data per vessel per day was processed by the field unit. Backscatter data collected with S222 was unusable due to a malfunction in the 7125 ROV topside unit used to collect MBES bathymetric data.

B.5 Data Processing

B.5.1 Software Updates

The following software updates occurred after the submission of the DAPR:

Manufacturer	Name	Version	Service Pack	Hotfix	Installation Date	Use
Caris	HIPS/SIPS	8.0.6	N/A	N/A	03/20/2014	Processing

Table 9: Software Updates

The following Feature Object Catalog was used: V5.3.2

Caris HIPS 8.0.6 was used to process bathymetric data. Caris HIPS was updated in the course of survey operations. Updated versions of Caris HIPS were not used in the interest of consistency in data processing.

B.5.2 Surfaces

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

Surface Name	Surface Type	Resolution	Depth Range	Surface Parameter	Purpose
H12605_MB_1m_MLLW_combined.csar	CUBE	1.0 meters	20 meters - 40 meters	NOAA_1m	Object Detection
H12605_MB_50cm_MLLW_combined.csar	CUBE	0.5 meters	3.4 meters - 47.6 meters	NOAA_0.5m	Object Detection
H12605_MB_4m_MLLW_final.csar	CUBE	4.0 meters	3.4 meters - 47.6 meters	NOAA_4m	MBES TracklineSBES Set Line Spacing

Surface Name	Surface Type	Resolution	Depth Range	Surface Parameter	Purpose
H12605_sss_100%.csar	SSS Mosaic	1.0 meters	0 meters - 0 meters	N/A	100% SSS
H12605_sss_200%.csar	SSS Mosaic	1.0 meters	0 meters - 0 meters	N/A	200% SSS

Table 10: Submitted Surfaces

This survey was processed using the Combined Uncertainty and Bathymetry Estimator (CUBE) algorithm. Per section 5.2.2.1 of NOAA HSSD Manual (2013 ed), MBES surfaces were gridded according to the Project Instructions for OPR-D332-TJ-13 guidelines for 200% side scan sonar with set multibeam line spacing. Side Scan coverage mosaics were created at 1m resolution. Combined Surfaces were generated for features and developments, in accordance with arrangements made with personnel from Atlantic Hydrographic Branch.

C. Vertical and Horizontal Control

No Horizontal and Vertical Control Report has been generated for Survey H12605.

C.1 Vertical Control

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

Standard Vertical Control Methods Used:

Discrete Zoning

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

Station Name	Station ID
Cape May, NJ	8536110
Lewes, DE	8557380

Table 11: NWLON Tide Stations

File Name	Status
8536110	Final Approved
8537121	Final Approved
8557380	Final Approved

Table 12: Water Level Files (.tid)

File Name	Status
D332TJ2013CORP	Final

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

A request for final approved tides was sent to N/OPS1 on 07/17/2013. The final tide note was received on 07/30/2014.

Preliminary zoning was accepted as the final zoning for project OPR-D332-TJ-2013 after analysis by CO-OPS.

Non-Standard Vertical Control Methods Used:

VDatum

Ellipsoid to Chart Datum Separation File:

2013_D332_VDatum_Ellip_MLLW

C.2 Horizontal Control

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

The projection used for this project is 18N.

The following PPK methods were used for horizontal control:

Smart Base

The following CORS Stations were used for horizontal control:

HVCR Site ID	Base Station ID
VAWI	VAMI
MOR5	MOR5
COVX	COVX
NJCM	NJCM
NJGT	NJGT
NCBX	NCBX
DEMI	DEMI
NJBR	NJBR
MOR6	MOR6
DNRC	DNRC
NJCM	NJCM
DEDO	DEDO
RED5	RED5

Table 14: CORS Base Stations

The Reedy Point DGPS station was used as the primary DGPS beacon. The Sandy Hook DGPS station was used at times of outages or poor signal reception with the primary DGPS beacon.

The following DGPS Stations were used for horizontal control:

DGPS Stations
Reedy Point (309 kHz)
Sandy Hook (286 kHz)

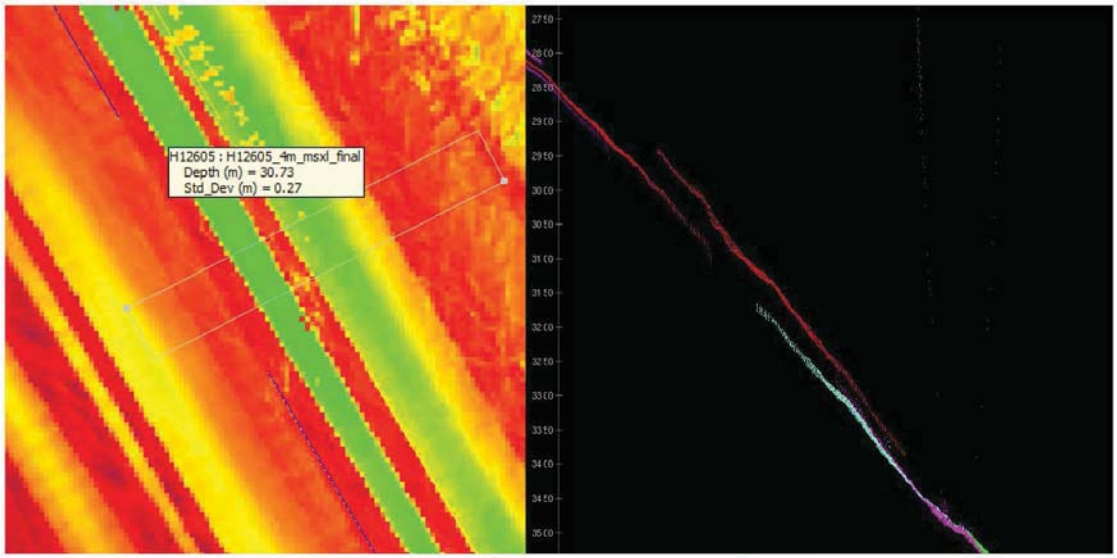
Table 15: USCG DGPS Stations

C.3 Additional Horizontal or Vertical Control Issues

3.3.1 Vertical Offset Connected To Dynamic Draft of S222

A vertical offset was observed in several lines of data collected on several days at or around times of maximum local currents. Survey lines were planned and executed in patterns which roughly aligned with local current patterns. This line plan alleviated the affects of cross current but increased the difference in vessel speed-through-the-water when surveying with and against the local current. The difference in speed may have been as great as 5.0 kts. Figure 7 contains an example of the phenomena. While the effect did not manifest in violations of IHO requirements for Total Propagated Uncertainty for surfaces, the effect my have caused offsets as great as 0.5 m and was apparent when depths were processed with both ERS and Discrete Zone tide correctors.

Vertical offset observed for lines run with and against max currents at reciprocal headings in succession:



Vessel	Heading	Max Time
TJ_S222_RESON7125_STBD_2013	329.35	2013-06-25 03:41:22
TJ_S222_RESON7125_STBD_2013	149.55	2013-06-25 03:07:22

Figure 7: Vertical Offset Likely Caused By Issues Connected Dynamic Draft Correctors for S222.

D. Results and Recommendations

D.1 Chart Comparison

Chart comparisons for survey H12605 were conducted by visual comparison and by using a difference surface of the 4m final grid differenced against an interpolated TIN surface of ENC soundings. Two areas showed signs of significant deviance from charted depths: an area in vicinity of 38-54.76 N and 075-08.86 W; and the charted disposal area 1.5 NM North-east of Brown Shoal Light. Figure 8 represents the results of the chart comparison, generated as described above. Areas shoaler than the interpolated surface are represented by red while areas deeper than the interpolated surface are represented by blue.

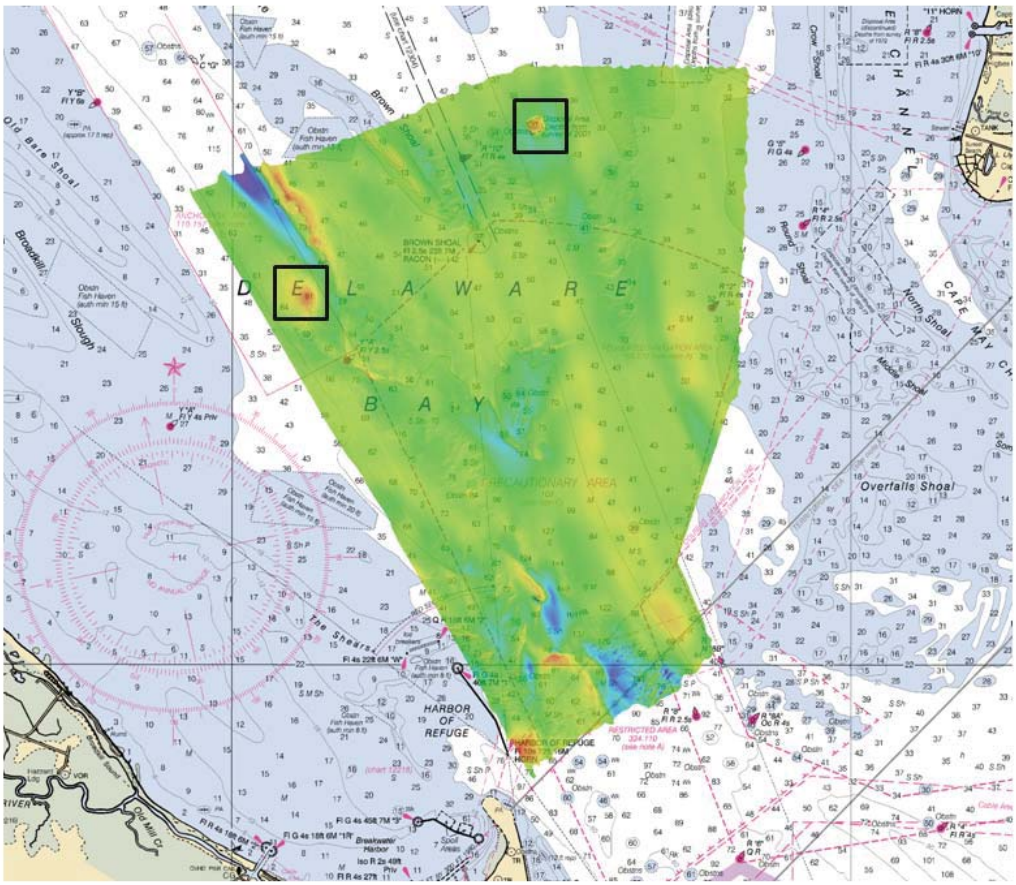


Figure 8: Charted Soundings vs. Actual Depth Difference Surface

D.1.1 Raster Charts

The following are the largest scale raster charts, which cover the survey area:

Chart	Scale	Edition	Edition Date	LNM Date	NM Date
12304	1:80000	46	05/2011	05/10/2011	05/14/2011
12214	1:80000	49	11/2010	11/02/2010	11/06/2010

Table 16: Largest Scale Raster Charts

12304

It is recommended that Survey H12605 supersede all charted depths on chart 12304.

12214

It is recommended that Survey H12605 supersede all charted depths on chart 12214.

D.1.2 Electronic Navigational Charts

The following are the largest scale ENCs, which cover the survey area:

ENC	Scale	Edition	Update Application Date	Issue Date	Preliminary?
US4DE11M	1:80000	27	01/10/2013	02/13/2013	NO
US5DE10M	1:40000	15	01/09/2013	01/09/2013	NO
US5NJ24M	1:10000	10	01/15/2013	01/15/2013	NO

Table 17: Largest Scale ENCs

US4DE11M

It is recommended that Survey H12605 supersede all charted depths on chart US4DE11M.

US5DE10M

It is recommended that Survey H12605 supersede all charted depths on chart US5DE10M.

US5NJ24M

It is recommended that Survey H12605 supersede all charted depths on chart US5NJ24M.

D.1.3 AWOIS Items

A total of 20 AWOIS items were assigned in Survey H12605. Reference the Final Feature File for additional details.

D.1.4 Maritime Boundary Points

No Maritime Boundary Points were assigned for this survey.

D.1.5 Charted Features

A total of 9 charted significant features were verified in Survey H12605. Reference the Final Feature File for additional details.

D.1.6 Uncharted Features

A total of 16 uncharted significant features were found in Survey H12605. Reference the Final Feature File for additional details.

D.1.7 Dangers to Navigation

One Danger to Navigation was found at the charted disposal area 1.5 NM North-east of Brown Shoal Light. Danger to Navigation Reports are included in Appendix II of this report.

D.1.8 Shoal and Hazardous Features

An area of potentially hazardous shoaling was identified at the 30ft disposal area located at latitude 38-56-48.6 N and longitude 075-05-06.01 W. Reference the the Danger to Navigation Report included in Appendix II for further information.

D.1.9 Channels

The Brandywine Range portion of the Delaware River Channel extends into the northern section of Survey H12605. The minimum published depth for the maintained portion of this portion of the channel is 39.8 ft (left outside quarter). The minimum published depth in the channel agrees with surveyed depths to within a tenth of a foot (0.10 ft). Least depth found in the channel was 39.74 ft. Reference figure 8 for further details.

Southern portion of the Brandywine Range portion of the Delaware River Channel
(red colour reflects depths less than 40 feet)

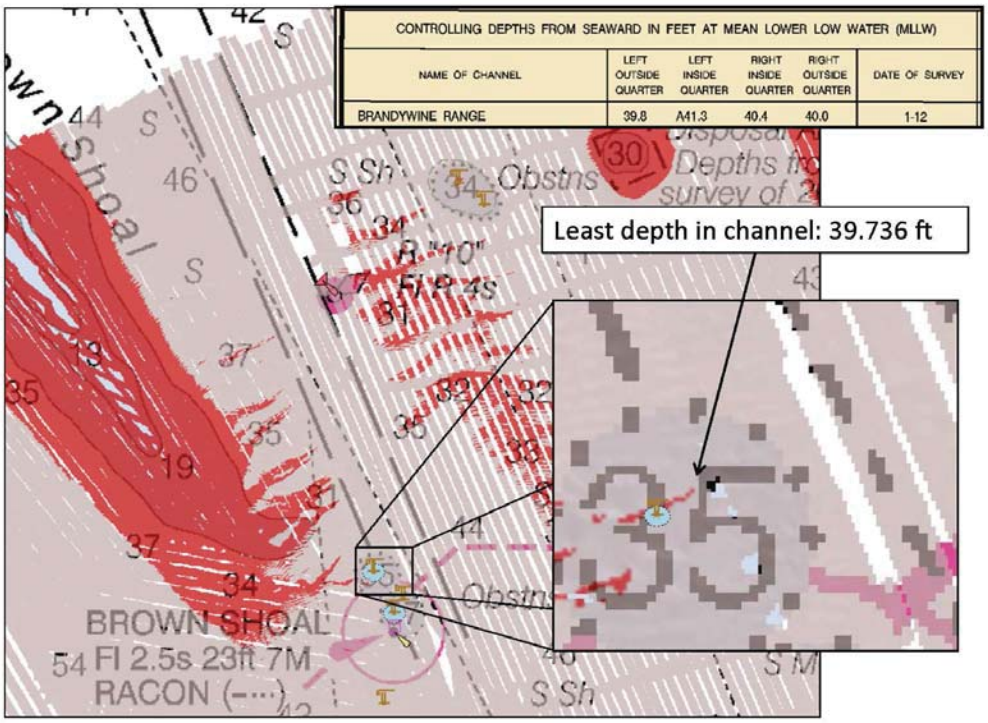


Figure 9: Least Depth Surveyed in Brandywine Range

D.1.10 Bottom Samples

No bottom samples were required for this survey.

D.2 Additional Results

D.2.1 Shoreline

No shoreline existed within the extents of the Sheet Area.

D.2.2 Prior Surveys

Prior survey comparisons exist for this survey, but were not investigated.

D.2.3 Aids to Navigation

Four Aids to Navigation are located within the survey area. Each Aid to Navigation within the extents of the Survey Area was found to be in place and serving its intended purpose.

D.2.4 Overhead Features

No overhead features exist for this survey.

D.2.5 Submarine Features

No submarine features exist for this survey.

D.2.6 Ferry Routes and Terminals

Ferry routes exist in the Survey Area. Ferries operate from terminals located in Lewes, DE and Cape May, NJ. Established and frequently used ferry routes cross the southern portion of the Survey Area in a generally Southeast to Northwest direction. No ferry terminals existed within the survey sheet limits.

D.2.7 Platforms

No platforms exist for this survey.

D.2.8 Significant Features

Large sand waves with peak-to-trough heights of over 10m were observed in the southern portion of the survey area.

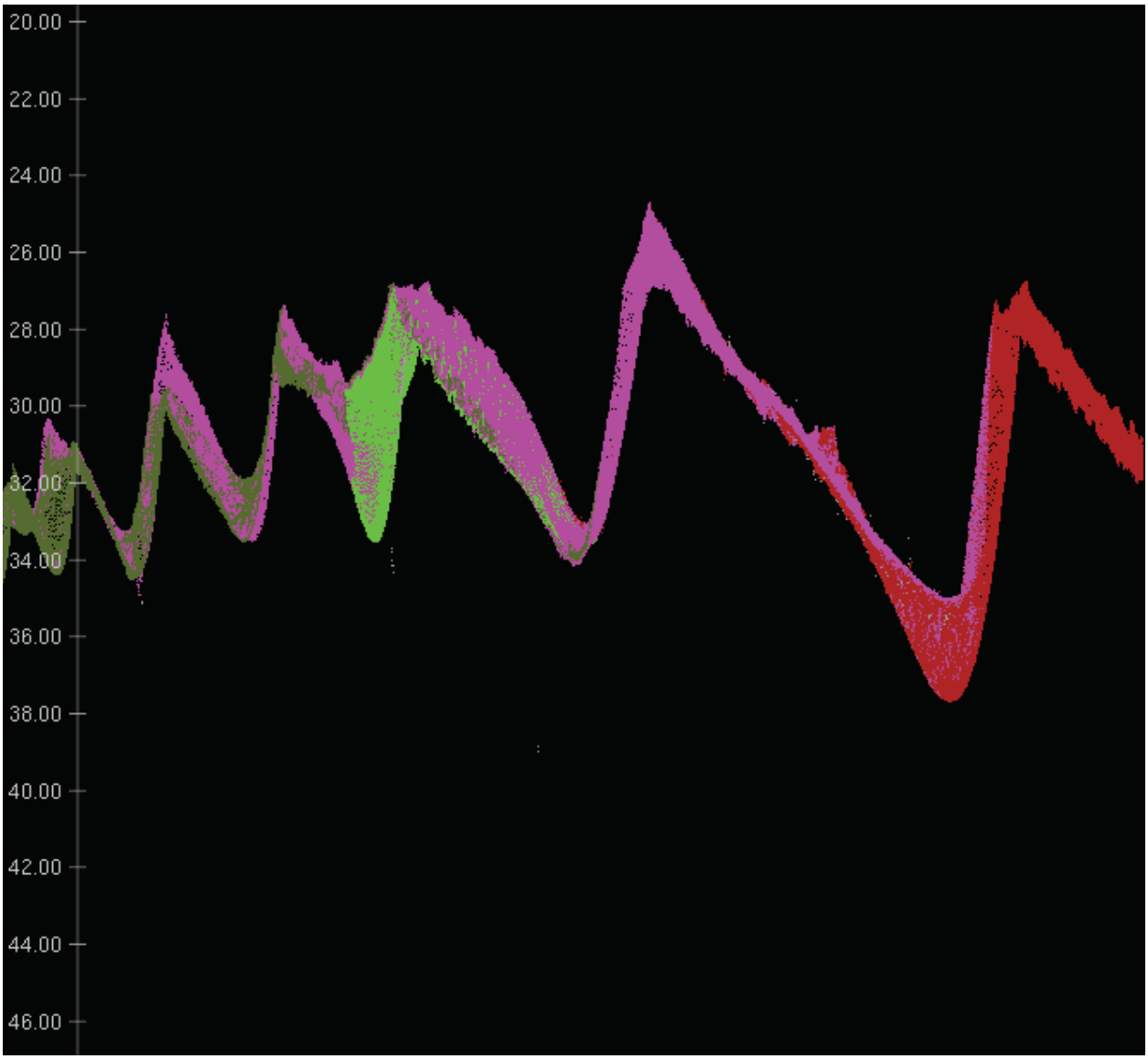


Figure 10: H12605 Sand Waves

D.2.9 Construction and Dredging

No present or planned construction or dredging exist within the survey limits.

D.2.10 New Survey Recommendations

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

D.2.11 New Inset Recommendations

No new insets are recommended for this area.

E. Approval Sheet

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

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

The survey data meets or exceeds requirements as set forth in the NOS Hydrographic Surveys and Specifications Deliverables Manual, Field Procedures Manual, Letter Instructions, and all HSD Technical Directives. These data are adequate to supersede charted data in their common areas. This survey is complete and no additional work is required with the exception of deficiencies noted in the Descriptive Report.

Approver Name	Approver Title	Approval Date	Signature
CDR James Crocker, NOAA	Commanding Officer	04/25/2014	Digitally signed by James Crocker DN: cn=James Crocker, o=CO, NOAA Ship Thomas Jefferson, ou=CDR/NOAA, email=james.m.crocker@noaa.gov, c=US Date: 2014.05.07 16:23:51 -04'00'
LT Megan Guberski, NOAA	Field Operations Officer	04/25/2014	Megan R. Guberski LT NOAA
LTJG Charles Wisotzkey, NOAA	Sheet Manager	04/25/2014	Charles J. Wisotzkey 2014.05.07 19:40:22 Z

F. Table of Acronyms

Acronym	Definition
AHB	Atlantic Hydrographic Branch
AST	Assistant Survey Technician
ATON	Aid to Navigation
AWOIS	Automated Wreck and Obstruction Information System
BAG	Bathymetric Attributed Grid
BASE	Bathymetry Associated with Statistical Error
CO	Commanding Officer
CO-OPS	Center for Operational Products and Services
CORS	Continually Operating Reference Staiton
CTD	Conductivity Temperature Depth
CEF	Chart Evaluation File
CSF	Composite Source File
CST	Chief Survey Technician
CUBE	Combined Uncertainty and Bathymetry Estimator
DAPR	Data Acquisition and Processing Report
DGPS	Differential Global Positioning System
DP	Detached Position
DR	Descriptive Report
DTON	Danger to Navigation
ENC	Electronic Navigational Chart
ERS	Ellipsoidal Referenced Survey
ERZT	Ellipsoidally Referenced Zoned Tides
FFF	Final Feature File
FOO	Field Operations Officer
FPM	Field Procedures Manual
GAMS	GPS Azimuth Measurement Subsystem
GC	Geographic Cell
GPS	Global Positioning System
HIPS	Hydrographic Information Processing System
HSD	Hydrographic Surveys Division
HSSD	Hydrographic Survey Specifications and Deliverables

Acronym	Definition
HSTP	Hydrographic Systems Technology Programs
HSX	Hypack Hysweep File Format
HTD	Hydrographic Surveys Technical Directive
HVCR	Horizontal and Vertical Control Report
HVF	HIPS Vessel File
IHO	International Hydrographic Organization
IMU	Inertial Motion Unit
ITRF	International Terrestrial Reference Frame
LNM	Local Notice to Mariners
LNM	Linear Nautical Miles
MCD	Marine Chart Division
MHW	Mean High Water
MLLW	Mean Lower Low Water
NAD 83	North American Datum of 1983
NAIP	National Agriculture and Imagery Program
NALL	Navigable Area Limit Line
NM	Notice to Mariners
NMEA	National Marine Electronics Association
NOAA	National Oceanic and Atmospheric Administration
NOS	National Ocean Service
NRT	Navigation Response Team
NSD	Navigation Services Division
OCS	Office of Coast Survey
OMAO	Office of Marine and Aviation Operations (NOAA)
OPS	Operations Branch
MBES	Multibeam Echosounder
NWLON	National Water Level Observation Network
PDBS	Phase Differencing Bathymetric Sonar
PHB	Pacific Hydrographic Branch
POS/MV	Position and Orientation System for Marine Vessels
PPK	Post Processed Kinematic
PPP	Precise Point Positioning
PPS	Pulse per second

Acronym	Definition
PRF	Project Reference File
PS	Physical Scientist
PST	Physical Science Technician
RNC	Raster Navigational Chart
RTK	Real Time Kinematic
SBES	Singlebeam Echosounder
SBET	Smooth Best Estimate and Trajectory
SNM	Square Nautical Miles
SSS	Side Scan Sonar
ST	Survey Technician
SVP	Sound Velocity Profiler
TCARI	Tidal Constituent And Residual Interpolation
TPU	Total Porpagated Error
TPU	Topside Processing Unit
USACE	United States Army Corps of Engineers
USCG	United Stated Coast Guard
UTM	Universal Transverse Mercator
XO	Executive Officer
ZDA	Global Positiong System timing message
ZDF	Zone Definition File

APPENDIX I

TIDES AND WATER LEVELS

UNITED STATES DEPARMENT OF COMMERCE
National Oceanic and Atmospheric Administration
National Ocean Service
Silver Spring, Maryland 20910

TIDE NOTE FOR HYDROGRAPHIC SURVEY

DATE : July 30, 2013

HYDROGRAPHIC BRANCH: Atlantic
HYDROGRAPHIC PROJECT: OPR-D332-TJ-2013
HYDROGRAPHIC SHEET: H12605

LOCALITY: Offshore North Cape Henlopen, Delaware Bay
TIME PERIOD: June 18-29, 2013

TIDE STATION USED: 8536110 Cape May, NJ
Lat. 38° 58.1' N Long. 74° 57.6' W
PLANE OF REFERENCE (MEAN LOWER LOW WATER): 0.000 meters
HEIGHT OF HIGH WATER ABOVE PLANE OF REFERENCE: 1.527 meters

TIDE STATION USED: 8557380 Lewes, DE
Lat. 38° 46.9' N Long. 75° 7.2' W
PLANE OF REFERENCE (MEAN LOWER LOW WATER): 0.000 meters
HEIGHT OF HIGH WATER ABOVE PLANE OF REFERENCE: 1.290 meters

REMARKS: RECOMMENDED ZONING

Preliminary zoning is accepted as the final zoning for project OPR-D332-TJ-2013

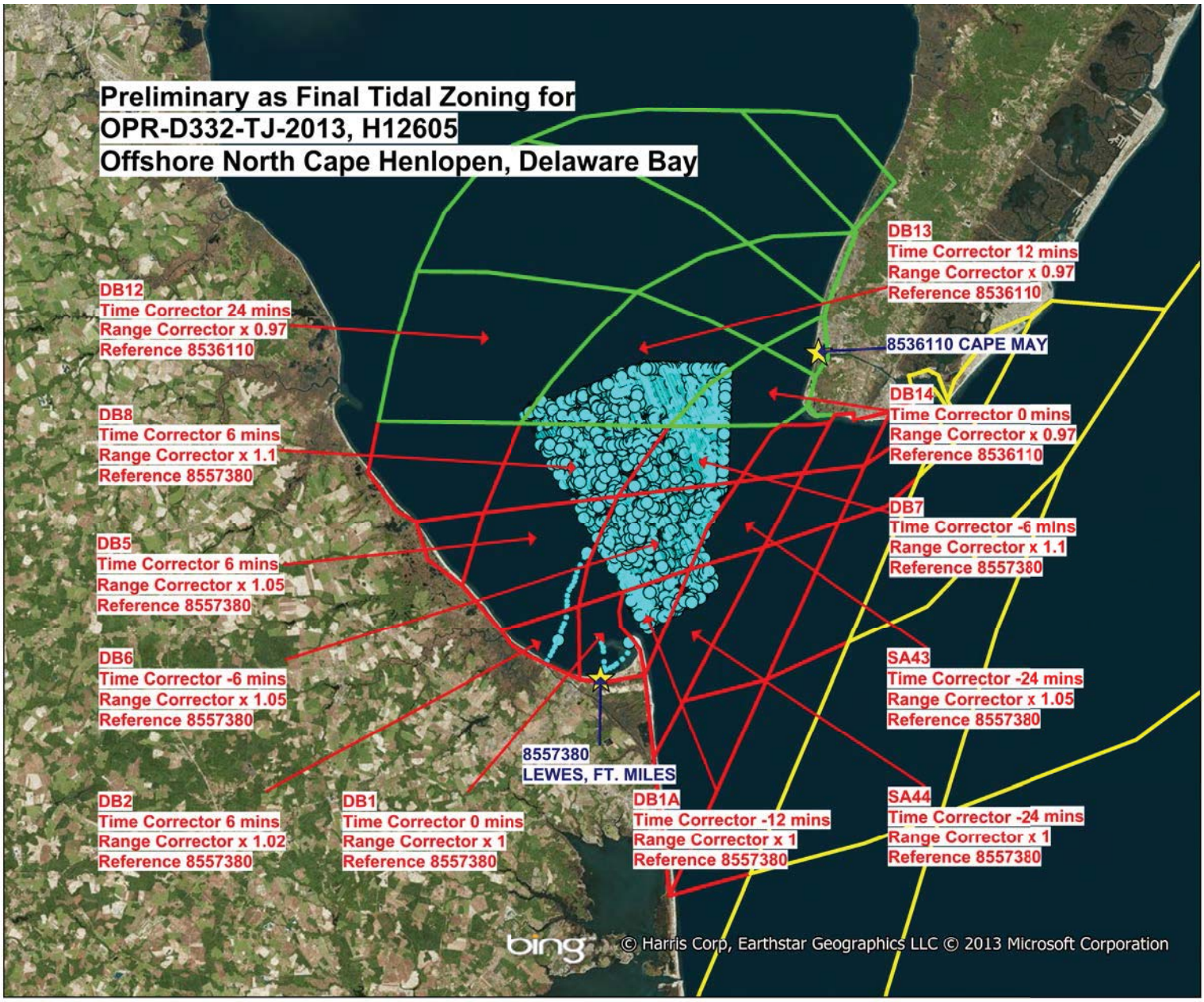
Please use the zoning file "D332TJ2013CORP" submitted with the project instructions for D332TJ2013. Zones DB1, DB1A, DB2, DB5, DB6, DB7, DB8, DB12, DB13, DB14, SA43 and SA44 are the applicable zones for H12605.

Note 1: Provided time series data are tabulated in metric units (meters), relative to MLLW and on Greenwich Mean Time on the 1983-2001 National Tidal Datum Epoch (NTDE).

HOVIS.GERALD.THOMAS.1365860250

Digitally signed by HOVIS.GERALD.THOMAS.1365860250
DN: c=US, o=U.S. Government, ou=DoD, ou=PKI, ou=OTHER, cn=HOVIS.GERALD.THOMAS.1365860250
Date: 2013.08.05 11:36:34 -04'00'

CHIEF, PRODUCTS AND SERVICES BRANCH


Preliminary as Final Tidal Zoning for
OPR-D332-TJ-2013, H12605
Offshore North Cape Henlopen, Delaware Bay
DB13
Time Corrector 12 mins
Range Corrector x 0.97
Reference 8536110
DB12
Time Corrector 24 mins
Range Corrector x 0.97
Reference 8536110
8536110 CAPE MAY
DB14
Time Corrector 0 mins
Range Corrector x 0.97
Reference 8536110
DB8
Time Corrector 6 mins
Range Corrector x 1.1
Reference 8557380
DB7
Time Corrector -6 mins
Range Corrector x 1.1
Reference 8557380
DB5
Time Corrector 6 mins
Range Corrector x 1.05
Reference 8557380
DB6
Time Corrector -6 mins
Range Corrector x 1.05
Reference 8557380
SA43
Time Corrector -24 mins
Range Corrector x 1.05
Reference 8557380
8557380
LEWES, FT. MILES
DB2
Time Corrector 6 mins
Range Corrector x 1.02
Reference 8557380
DB1
Time Corrector 0 mins
Range Corrector x 1
Reference 8557380
DB1A
Time Corrector -12 mins
Range Corrector x 1
Reference 8557380
SA44
Time Corrector -24 mins
Range Corrector x 1
Reference 8557380
bing
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APPENDIX II

SUPPLEMENTAL SURVEY RECORDS AND CORRESPONDENCE

Data Deliverable for H12605

1 message

Megan Guberski - NOAA Federal <megan.guberski@noaa.gov> Tue, Apr 1, 2014 at 10:16 AM
To: Castle Parker - NOAA Federal <castle.e.parker@noaa.gov>
Cc: Abigail Higgins - NOAA Federal <abigail.higgins@noaa.gov>, Charles Wisotzkey - NOAA Federal <charles.j.wisotzkey@noaa.gov>

Mr. Parker,

This email is to inform the Atlantic Hydrographic Branch that survey H12605, under project OPR-D332-TJ-13, is being submitted without raw POS data, or raw backscatter data. The data was submitted to NGDC in Nov 2013, then deleted from the Thomas Jefferson's servers.

A copy of this correspondence will be in the placed in Appendix II of the Descriptive Report. Please let me know if you have any questions or concerns.

Very Respectfully,
LT Guberski

--
LT Megan Guberski, NOAA
Operations Officer, NOAA Ship *Thomas Jefferson*
439 W. York Street
Norfolk, VA 23510
cell: 757 647-0187
land: 757 451-6322

March 11, 2014

MEMORANDUM FOR: CDR James M. Crocker, NOAA
Commanding Officer, NOAA Ship *Thomas Jefferson*

FROM: Jeffrey Ferguson
Chief, Hydrographic Surveys Division

SUBJECT: Vertical Datum Transformation Technique,
OPR-D332-TJ-13, Approaches to Delaware Bay, DE

Hydrographic surveys H12605 is approved for vertical reduction to chart datum, Mean Lower Low Water (MLLW), using the NOAA Vertical Datum Transformation (VDatum) (http://vdatum.noaa.gov) derived separation (SEP) model provided on the project CD/DVD.

Approval of VDatum, in lieu of the NOAA Center for Operational Oceanographic Products and Services (CO-OPS) TCARI package as per the Project Instructions, is based on your recommendation and the review of comparison results you included in your memos from March 7, 2014, Subject "H12605 Interim Deliverables".

The results of the data analysis show that ellipsoidally referenced survey (ERS) techniques with VDatum used as the vertical datum reducer to MLLW in this area indicate a better internal consistency of the survey data and produces final sounding values that meet or exceed horizontal and vertical specifications for hydrographic surveys.

The comparison techniques are in line with the procedures that were developed and approved as part of the CSDL Ellipsoidally Referenced Survey (ERS) project. These procedures and deliverables in the NOS Hydrographic Surveys Specifications and Deliverables Manual and Field Procedures Manual documents.

You shall include a description of your ERS processing procedures and the comparisons you conducted between ERS and traditional tides in the appropriate Descriptive Report (DR), Horizontal and Vertical Control Report and/or Data Acquisition and Processing Report.

This memo and your memo, shall be included in the supplemental correspondence Appendix of the DR.

Megan Guberski - NOAA Federal <megan.guberski@noaa.gov>

D332 Requirements

Megan Greenaway - NOAA Federal <Megan.Greenaway@noaa.gov> Thu, Sep 5, 2013 at 11:08 AM
To: _OMAO MOA OPS Thomas Jefferson <OPS.Thomas.Jefferson@noaa.gov>
Cc: Marc Moser - NOAA Federal <Marc.S.Moser@noaa.gov>, Corey Allen - NOAA Federal <Corey.Allen@noaa.gov>

Megan,
I spoke with Marc and Corey regarding coverage requirements for D332. The 200% SSS coverage with MBES set line spacing is acceptable for the work you have already covered in waters deeper than 20m. OPS does not want the TJ to go back and pick up the splits.

As far as moving forward with the remainder of the project, how many more sheets do you have which would be affected by the greater than 20m requirement? OPS will let you decide if it is more efficient to conduct 100% complete MBES in these areas or if it is more efficient to conduct 200% SSS with MBES set line spacing as you have been doing. Keep in mind that 100% MBES with backscatter is more useful to a broader range of users. However, you should determine what is efficient for the TJ.

Let me know if you have any further questions.
Megan

APPENDIX III

SURVEY FEATURES REPORT

Dangers to Navigation - one
AWOIS - eight
Maritime Boundaries - none
Wrecks - two

H12605 Danger to Navigation

Registry Number: H12605
State: Delaware
Locality: Delaware Bay
Sub-locality: Offshore of North Cape Henlopen
Project Number: OPR-D332-TJ-13
Survey Date: 06/18/2013 - 06/29/2013

Charts Affected

Number	Edition	Date	Scale (RNC)	RNC Correction(s)*
12304	45th	02/01/2008	1:80,000 (12304_1)	[L]NTM: ?
12214	48th	10/01/2007	1:80,000 (12214_1)	[L]NTM: ?
12200	49th	06/01/2007	1:419,706 (12200_1)	[L]NTM: ?
13003	49th	04/01/2007	1:1,200,000 (13003_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	17 ft Obstruction	Obstruction	5.16 m	38° 56' 50.2" N	075° 05' 05.1" W	---

1 - DtoN

1.1) 17 ft Obstruction

DANGER TO NAVIGATION

Survey Summary

Survey Position:	38° 56' 50.2" N, 075° 05' 05.1" W
Least Depth:	5.16 m (= 16.92 ft = 2.820 fm = 2 fm 4.92 ft)
TPU (±1.96σ):	**THU (TPEh)** [None] ; **TVU (TPEv)** [None]
Timestamp:	2013-180.00:00:00.000 (06/29/2013)
Dataset:	H12605_DTON.000
FOID:	0_ 0000158373 00001(FFFE00026AA50001)
Charts Affected:	12214_1, 12304_1, 12200_1, 13003_1

Remarks:

OBSTRN/remrks: Obstruction marks the least depth in a charted Disposal Area. Significant shoaling observed within the charted area, as well as outside currenly charted bounds. Least depth found using MBES. Soundings reduced to MLLW via ellipsoid heights and a VDatum separation model. Update chart.

Feature Correlation

Source	Feature	Range	Azimuth	Status
H12605_DTON.000	0_ 0000158373 00001	0.00	000.0	Primary

Hydrographer Recommendations

Update charts.

Cartographically-Rounded Depth (Affected Charts):

17ft (12214_1, 12304_1)

2 ¾fm (12200_1, 13003_1)

S-57 Data

Geo object 1:	Obstruction (OBSTRN)
Attributes:	NINFOM - Chart obstruction
	QUASOU - 6:least depth known
	SORDAT - 20130629
	SORIND - US,US,graph,H12605

TECSOU - 3:found by multi-beam

VALSOU - 5.157 m

WATLEV - 3:always under water/submerged

Office Notes

SAR: Feature was ensonified with MBES. Feature is considered significant and verified as per survey data. Defer the final charting disposition to AHB Compile Team.

COMPILE: Delete charted 17 ft obstruction. Chart new 17 ft obstruction at survey position.

Feature Images

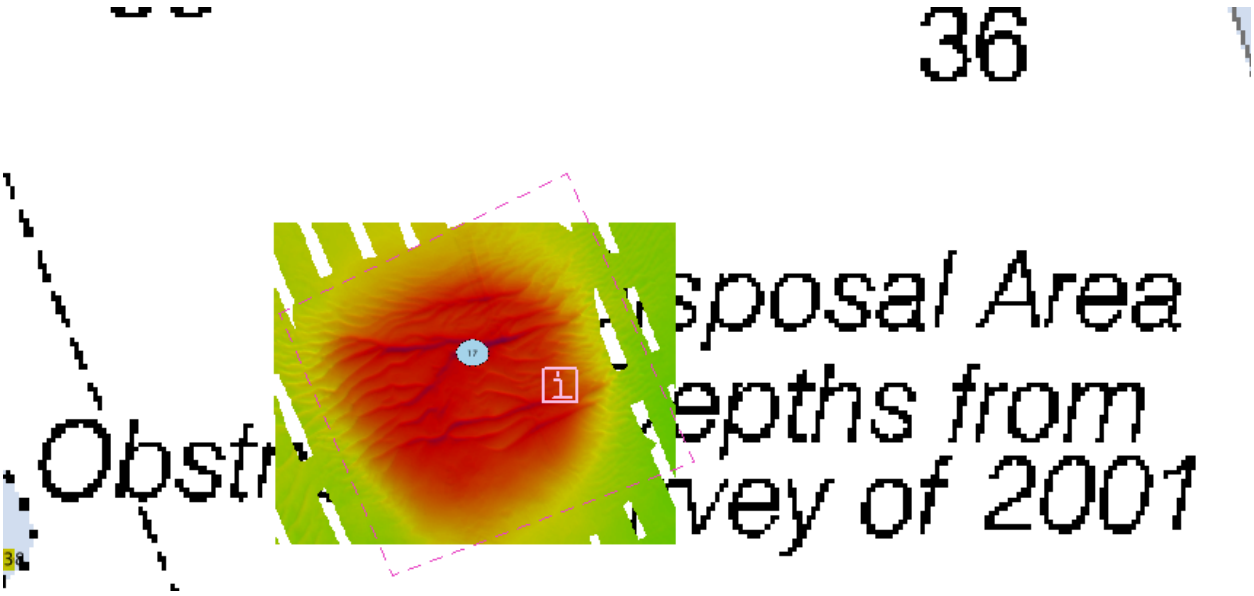

Figure 1.1.1

H12605 AWOIS

Registry Number: H12605
State: Delaware
Locality: Delaware Bay
Sub-locality: Offshore of North Cape Henlopen
Project Number: OPR-D332-TJ-13
Survey Dates: 06/18/2013 - 06/29/2013

Charts Affected

Number	Edition	Date	Scale (RNC)	RNC Correction(s)*
12216	28th	04/01/2008	1:40,000 (12216_1)	[L]NTM: ?
12304	45th	02/01/2008	1:80,000 (12304_1)	[L]NTM: ?
12214	48th	10/01/2007	1:80,000 (12214_1)	[L]NTM: ?
12200	49th	06/01/2007	1:419,706 (12200_1)	[L]NTM: ?
13003	49th	04/01/2007	1:1,200,000 (13003_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	AWOIS 8401	Obstruction	12.44 m	38° 55' 23.9" N	075° 06' 02.0" W	8401
1.2	AWOIS 11948 and 11949	Obstruction	10.99 m	38° 56' 40.2" N	075° 05' 52.0" W	11949
1.3	AWOIS 11074	Wreck	15.81 m	38° 53' 23.8" N	075° 05' 33.7" W	11074
1.4	AWOIS 11076	Obstruction	19.67 m	38° 53' 25.7" N	075° 05' 20.8" W	11076
1.5	AWOIS 11077	GP	[None]	38° 49' 49.9" N	075° 05' 18.2" W	
1.6	AWOIS 9935	Wreck	31.86 m	38° 50' 38.4" N	075° 04' 30.8" W	9935
1.7	AWOIS 11958	Obstruction	12.71 m	38° 55' 30.2" N	075° 04' 18.8" W	11958
1.8	AWOIS 11075	Obstruction	12.27 m	38° 51' 44.6" N	075° 03' 30.5" W	11075
2.1	AWOIS 11074	Wreck	15.81 m	38° 53' 23.8" N	075° 05' 33.7" W	---
2.2	AWOIS 9935	Wreck	31.86 m	38° 50' 38.4" N	075° 04' 30.8" W	---

1 - AWOIS Features

1.1) AWOIS 8401

Feature for AWOIS Item #8401

Search Position:	38° 55' 23.9" N, 075° 06' 02.0" W
Historical Depth:	12.44 m
Search Radius:	[unknown]
Search Technique:	Type: UNKNOWN, Itemstatus: COMPLETED, Searchtype: INFORMATION, Technique: S2 MBES
Technique Notes:	

History Notes:

History

" HISTORY LNM31/84-- DELAWARE BAY - MAIN CHANNEL - SUNKEN BARGE; A ì 300-FOOT BARGE IS SUNK IN APPROX. POSITION LAT. 38-55.4N LONG. ì 75-06.15W 100 FEET NW OF DELAWARE BAY MAIN CHANNEL LIGHT 9 (LLNR ì 2099). WRECK LIES PARALLEL TO THE WESTERN EDGE OF SHIPPING ì CHANNEL MARKED BY 3-FOOT SQUARE ORANGE MARKERS ATTACHED TO THE ì CORNERS OF THE BARGE. MOTOR VESSEL ""DEL BAY"" ON SCENE FOR DIVE ì OPS. AND POLLUTION MONITORING. BUOY TEMPORARILY ESTABLISHED IN ì APPROX. POSITION LAT. 38-55-24.2N LONG. 75-05-58.7W IN 41 FEET. ì BLACK WITH GREEN REFLECTIVE MATERIAL Q F G 4NM. MAMED DELAWARE ì BAY MAIN CHANNEL WRECK LIGHTED BUOY ""WR 11"" (LLNR 2100.50). NOTE: IN 1992 LIGHT LIST PAGE 16 BUOY IS GREEN LIGHTED WRECK ì BUOY ""WR 9"". (ENT 2/17/93 SJV) H10234/94-- OPR-D368-WH; ADDITIONAL WORK. CHARTED WRECK LOCATED ì IN LAT. 38-55-24.42N LONG. 75-06-00.73W. DIVER LD 11.5 METERS ì (37 FEET). EXTENDS 6 FEET OFF THE BOTTOM. LORAN-C RATES (9960 ì CHAIN): W=15827.1 X=27175.1 Y=42721.7 Z=59262.8. VISIBILITY ì WAS 1-2 FEET. EVALUATOR RECOMMENDS CHARTING A 37 WK AS SURVEYED. ì (UP 8/28/95 SJV) H10926/99-00-- OPR-D392-WH; 200% SIDE SCAN SONAR SEARCH OBTAINED 27 CONTACTS (ALSO 12 USACE CONTACTS). SWMB LD OF 37 FEET (12.9 METERS) IN LAT. 38-55-24.46N LONG. 75-06-00.77W. EVALUATOR RECOMMENDS DELETING CHARTED 37WKS AND CHARTING 37OBSTNS AS SURVEYED. (UP 4/15/02 SJV) DESCRIPTION **** COE SIDE SCAN SONAR SURVEYS CONDUCTED IN 1988 1989 AND 1990 LOCATED SCATTERED DEBRIS."

Survey Summary

Survey Position:	38° 55' 23.9" N, 075° 06' 02.0" W
Least Depth:	12.44 m (= 40.81 ft = 6.802 fm = 6 fm 4.81 ft)
TPU (±1.96σ):	**THU (TPEh)** [None] ; **TVU (TPEv)** [None]
Timestamp:	2013-180.00:00:00.000 (06/29/2013)
Dataset:	H12605_AWOIS_charted.000
FOID:	0_ 0000158357 00001(FFFE00026A950001)
Charts Affected:	12214_1, 12304_1, 12200_1, 13003_1

Remarks:

OBSTRN/remrks: AWOIS feature 8401 observed using 200% SSS and concurrent MBES. Soundings reduced to MLLW via ellipsoid heights and a VDatum separation model.

Feature Correlation

Source	Feature	Range	Azimuth	Status
H12605_AWOIS_charted.000	0_ 0000158357 00001	0.00	000.0	Primary

Hydrographer Recommendations

Update chart and AWOIS database.

Cartographically-Rounded Depth (Affected Charts):

41ft (12214_1, 12304_1)

6 ¾fm (12200_1, 13003_1)

S-57 Data

Geo object 1: Obstruction (OBSTRN)

Attributes:

NINFOM - Chart obstruction

QUASOU - 6:least depth known

SORDAT - 20130629

SORIND - US,US,graph,H12605

TECSOU - 2,3:found by side scan sonar,found by multi-beam

VALSOU - 12.439 m

WATLEV - 3:always under water/submerged

Office Notes

SAR: Feature was ensonified with object detect SSS and MBES. Feature is considered significant and verified as per survey data. Feature was relocated to correlate with HDCS data during the SAR

COMPILE: Delete charted 37 ft obstruction. Chart new 40.8 ft obstruction at survey position.

Feature Images

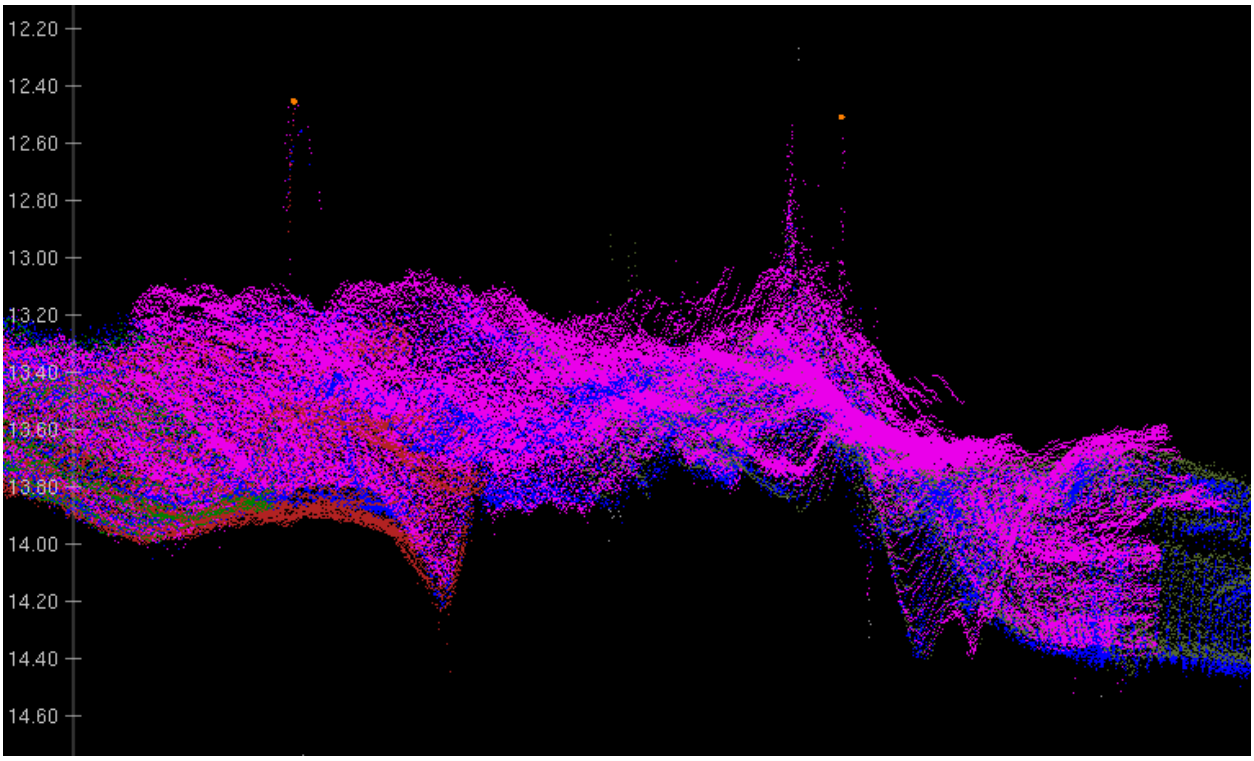

Figure 1.1.1

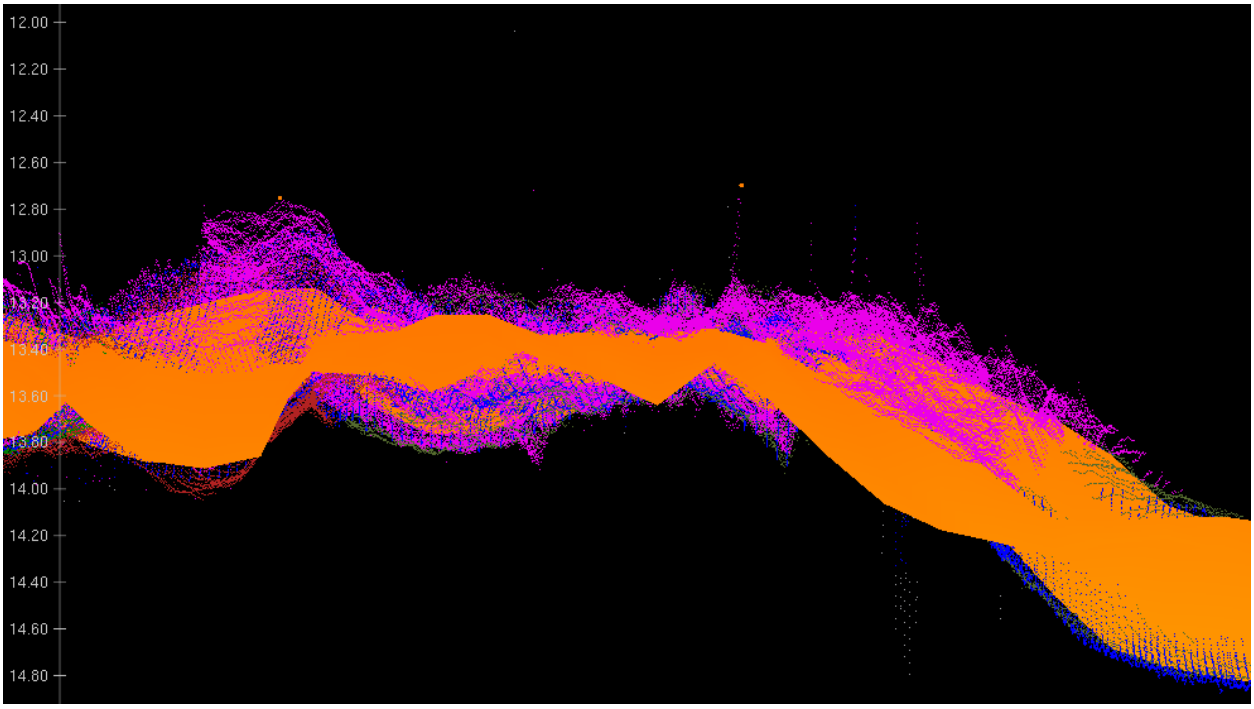

Figure 1.1.2

1.2) AWOIS 11948 and 11949

Feature for AWOIS Item #11949

Search Position: 38° 56' 40.2" N, 075° 05' 52.0" W

Historical Depth: 10.99 m

Search Radius: [unknown]

Search Technique: Type: OBSTRUCTION, Itemstatus: COMPLETED, Searchtype: INFORMATION, Technique: S2 MBES

Technique Notes:

History Notes:

History

H11081/01-02--OPR-D307-KR-00; OBSTRUCTION FOUND IN LAT. 38/56/42.55N LONG. 075/05/46.04W (NAD83) WITH A LEAST DEPTH OF 34.777 FEET MLLW. (ENTERED 9/03 BY MBH)

Survey Summary

Survey Position: 38° 56' 40.2" N, 075° 05' 52.0" W

Least Depth: 10.99 m (= 36.06 ft = 6.010 fm = 6 fm 0.06 ft)

TPU (±1.96σ): **THU (TPEh)** [None] ; **TVU (TPEv)** [None]

Timestamp: 2013-180.00:00:00.000 (06/29/2013)

Dataset: H12605_AWOIS_charted.000

FOID: 0_ 0000158353 00001(FFFE00026A910001)

Charts Affected: 12214_1, 12304_1, 12200_1, 13003_1

Remarks:

OBSTRN/remrks: AWOIS feature 11948 observed using 200% SSS and concurrent MBES. Soundings reduced to MLLW via ellipsoid heights and a VDatum separation model. Update AWOIS database.

Feature Correlation

Source	Feature	Range	Azimuth	Status
H12605_AWOIS_charted.000	0_ 0000158353 00001	0.00	000.0	Primary

Hydrographer Recommendations

Update chart and AWOIS database.

Cartographically-Rounded Depth (Affected Charts):

36ft (12214_1, 12304_1)

6fm (12200_1, 13003_1)

S-57 Data

Geo object 1:	Obstruction (OBSTRN)
Attributes:	NINFOM - Chart obstruction area
	QUASOU - 6:least depth known
	SORDAT - 20130629
	SORIND - US,US,graph,H12605
	TECSOU - 2,3:found by side scan sonar,found by multi-beam
	VALSOU - 10.992 m
	WATLEV - 3:always under water/submerged

Office Notes

SAR: Feature was ensonified with object detect SSS and MBES. Feature is considered significant and verified as per survey data. Defer the final charting disposition to AHB Compile Team.

COMPILE: Delete charted obstruction area. Chart new obstruction area at survey position.

1.3) AWOIS 11074

Feature for AWOIS Item #11074

Search Position:	38° 53' 23.8" N, 075° 05' 33.7" W
Historical Depth:	15.81 m
Search Radius:	[unknown]
Search Technique:	Type: UNKNOWN, Itemstatus: COMPLETED, Searchtype: INFORMATION, Technique:
Technique Notes:	

History Notes:

History

HISTORY H10917/00--OPR-D392-WH; SIDE SCAN SONAR CONTACT LOCATED DURING MAIN SCHEME HYDROGRAPHY. DIVER INVESTIGATION FOUND REMAINS OF A WRECK. LD OF 50.9 FEET (15.5 METERS) LOCATED IN LAT. 38-53-23.92N LONG. 75-05-33.67W. EVALUATOR RECOMMENDS CHARTING A 50WK AS SURVEYED. (ENT 9/13/01 SJV)

Survey Summary

Survey Position:	38° 53' 23.8" N, 075° 05' 33.7" W
Least Depth:	15.81 m (= 51.87 ft = 8.646 fm = 8 fm 3.87 ft)
TPU (±1.96σ):	**THU (TPEh)** [None] ; **TVU (TPEv)** [None]
Timestamp:	2013-180.00:00:00.000 (06/29/2013)
Dataset:	H12605_AWOIS_charted.000
FOID:	0_ 0000158359 00001(FFFE00026A970001)
Charts Affected:	12214_1, 12304_1, 12200_1, 13003_1

Remarks:

WRECKS/remrks: AWOIS feature 11074 observed using 200% SSS and concurrent MBES. Soundings reduced to MLLW via ellipsoid heights and a VDatum separation model.

Feature Correlation

Source	Feature	Range	Azimuth	Status
H12605_AWOIS_charted.000	0_ 0000158359 00001	0.00	000.0	Primary

Hydrographer Recommendations

Update chart and AWOIS database.

Cartographically-Rounded Depth (Affected Charts):

52ft (12214_1, 12304_1)

8 ½fm (12200_1, 13003_1)

S-57 Data

Geo object 1:	Wreck (WRECKS)
Attributes:	CATWRK - 2:dangerous wreck
	NINFOM - Chart wreck
	QUASOU - 6:least depth known
	SORDAT - 20130629
	SORIND - US,US,graph,H12605
	TECSOU - 2,3:found by side scan sonar,found by multi-beam
	VALSOU - 15.811 m
	WATLEV - 3:always under water/submerged

Office Notes

SAR: Feature was ensonified with object detect SSS and MBES. Feature is considered significant and verified as per survey data. Defer the final charting disposition to AHB Compile Team.

COMPILE: Delete charted 50 ft wreck. Chart new 51.9 ft wreck at survey position.

Feature Images

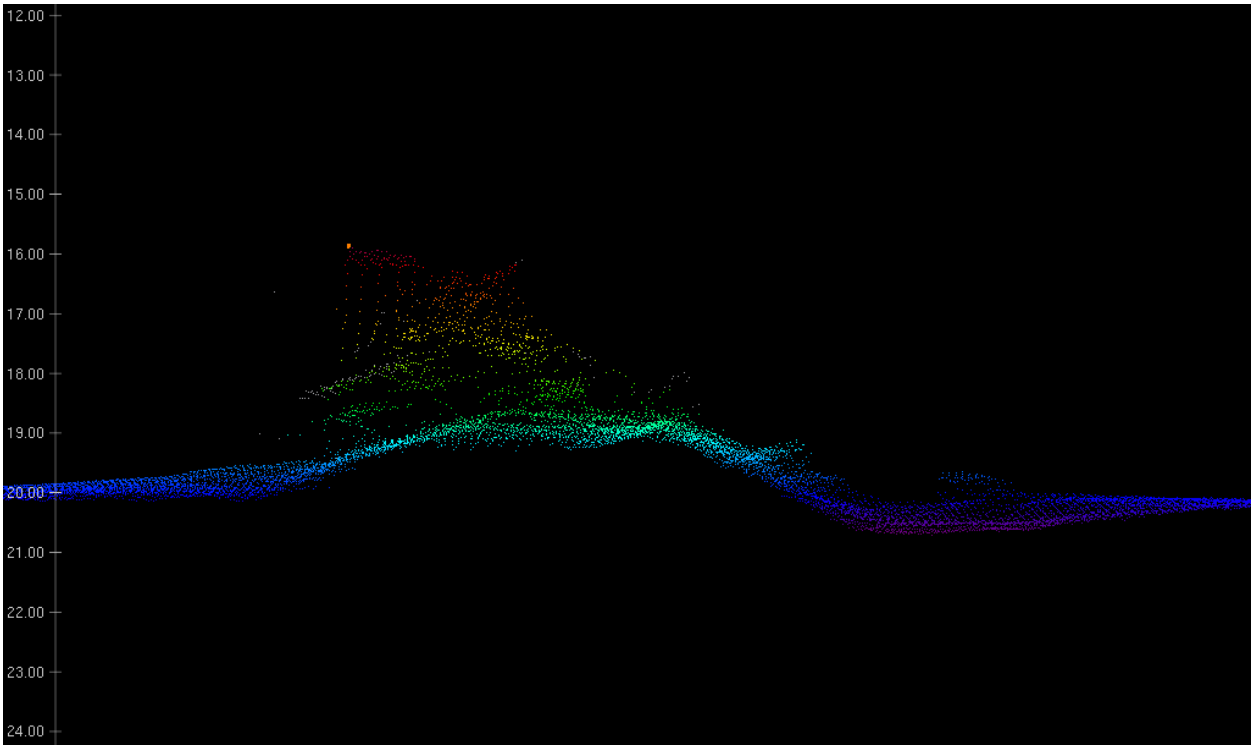

Figure 1.3.1

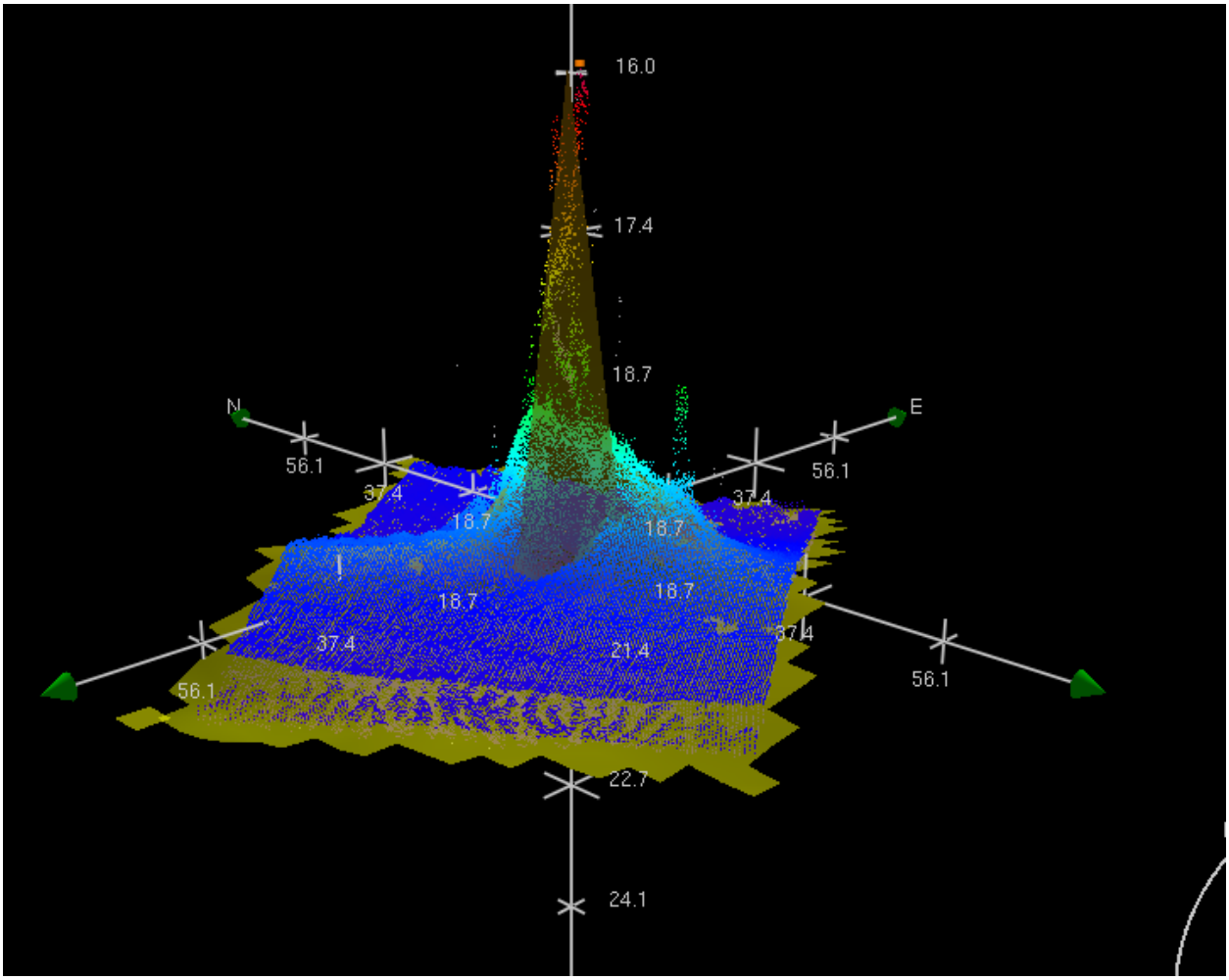
16.0
17.4
18.7
N
E
56.1
37.4
18.7
56.1
37.4
18.7
18.7
18.7
37.4
37.4
21.4
56.1
56.1
22.7
24.1

Figure 1.3.2

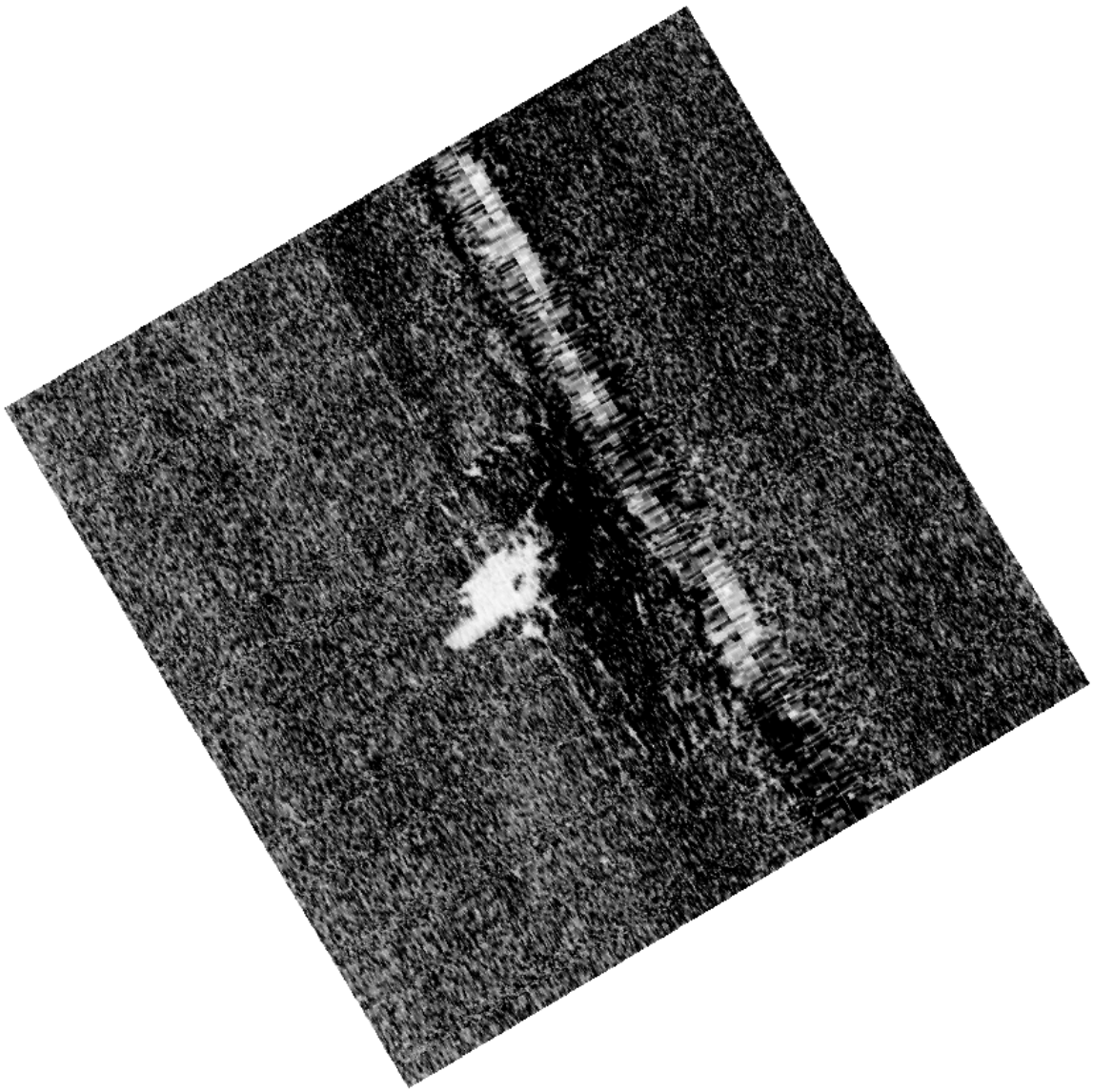

Figure 1.3.3

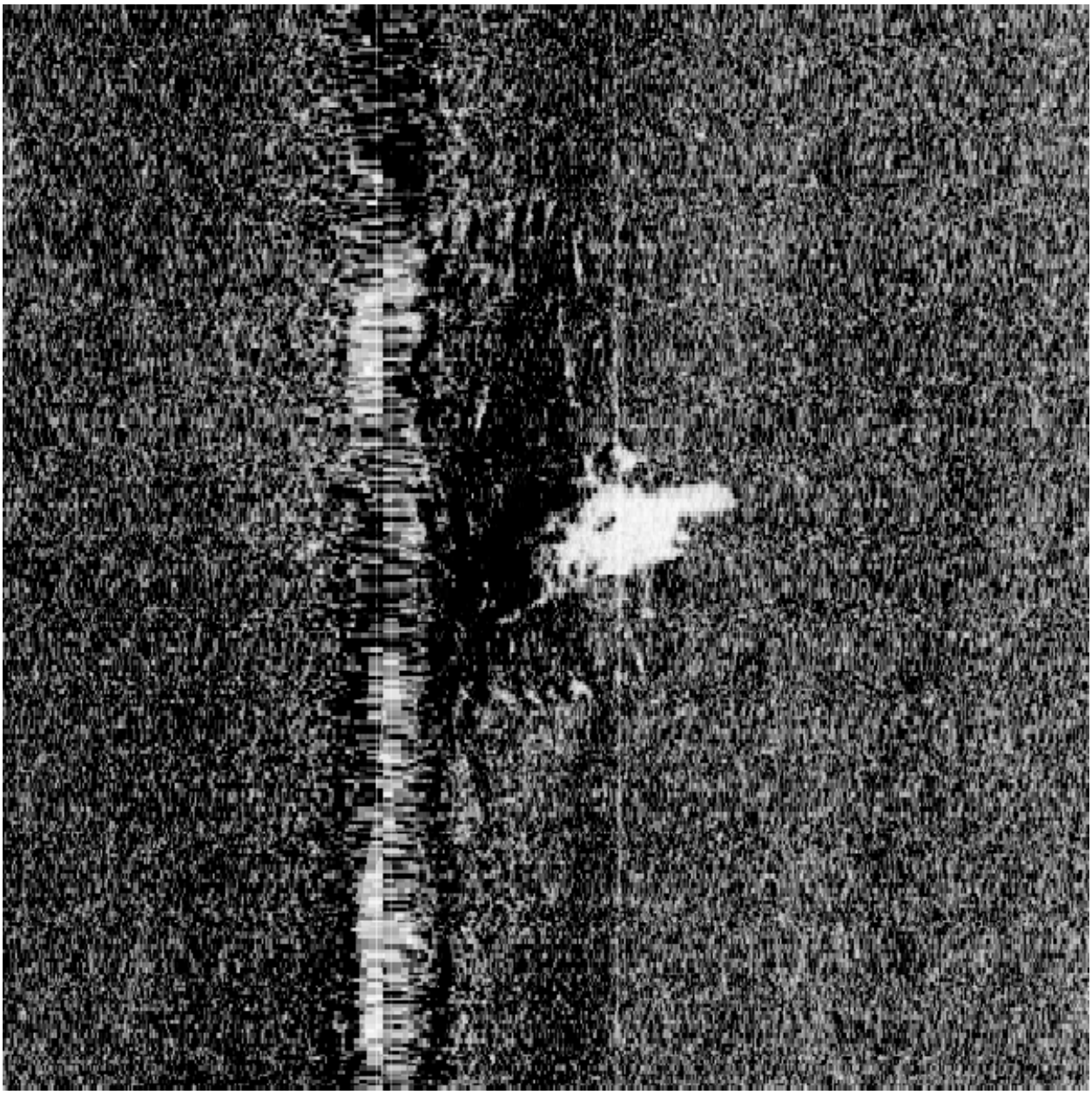

Figure 1.3.4

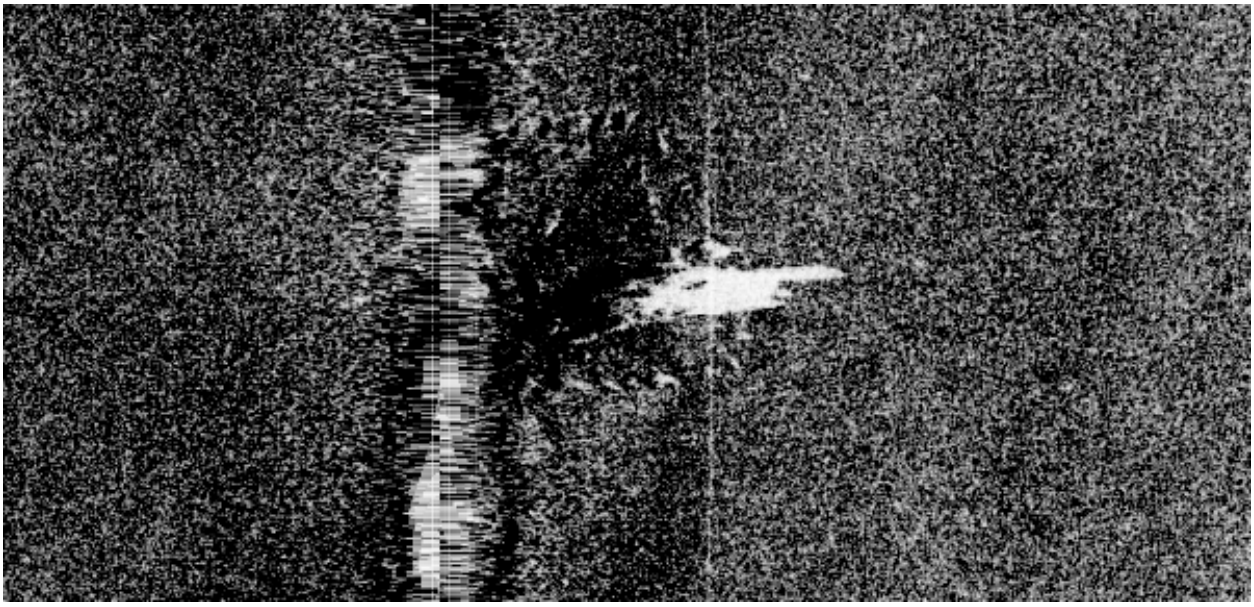

Figure 1.3.5

1.4) AWOIS 11076

Feature for AWOIS Item #11076

Search Position:	38° 53' 25.7" N, 075° 05' 20.8" W
Historical Depth:	19.67 m
Search Radius:	[unknown]
Search Technique:	Type: OBSTRUCTION, Itemstatus: COMPLETED, Searchtype: INFORMATION, Technique: S2 MBES
Technique Notes:	

History Notes:

History

HISTORY H10917/00-- OPR-D392-WH; SIDE SCAN SONAR CONTACT FOUND DURING MAIN SCHEME HYDROGRAPHY. ECHO SOUNDER DEVELOPMENT CONDUCTED TO VERIFY CONTACT'S HEIGHT AND POSITION. ECHO SOUNDER LD OF 64 FEET (19.5 METERS) LOCATED IN LAT. 38-53-25.68N LONG. 75-05-20.49W. EVALUATOR RECOMMENDS CHARTING A 64OBSTN AS SURVEYED. (ENT 9/13/01 SJV)

Survey Summary

Survey Position:	38° 53' 25.7" N, 075° 05' 20.8" W
Least Depth:	19.67 m (= 64.53 ft = 10.755 fm = 10 fm 4.53 ft)
TPU (±1.96σ):	**THU (TPEh)** [None] ; **TVU (TPEv)** [None]
Timestamp:	2013-180.00:00:00.000 (06/29/2013)
Dataset:	H12605_AWOIS_charted.000
FOID:	0_ 0000158355 00001(FFFE00026A930001)
Charts Affected:	12214_1, 12304_1, 12200_1, 13003_1

Remarks:

OBSTRN/remrks: AWOIS feature 11076 observed using 200% SSS and concurrent MBES. Soundings reduced to MLLW via ellipsoid heights and a VDatum separation model.

Feature Correlation

Source	Feature	Range	Azimuth	Status
H12605_AWOIS_charted.000	0_ 0000158355 00001	0.00	000.0	Primary

Hydrographer Recommendations

Update chart and AWOIS database.

Cartographically-Rounded Depth (Affected Charts):

64ft (12214_1, 12304_1)

10 ¾fm (12200_1, 13003_1)

S-57 Data

Geo object 1:	Obstruction (OBSTRN)
Attributes:	NINFOM - Chart obstruction
	QUASOU - 6:least depth known
	SORDAT - 20130629
	SORIND - US,US,graph,H12605
	TECSOU - 2,3:found by side scan sonar,found by multi-beam
	VALSOU - 19.668 m
	WATLEV - 3:always under water/submerged

Office Notes

SAR: Feature was ensonified with object detect SSS and MBES. Feature is considered significant and verified as per survey data. Defer the final charting disposition to AHB Compile Team.

COMPILE: Delete 64 ft charted obstrcution. Chart as 64 foot sounding.

Feature Images

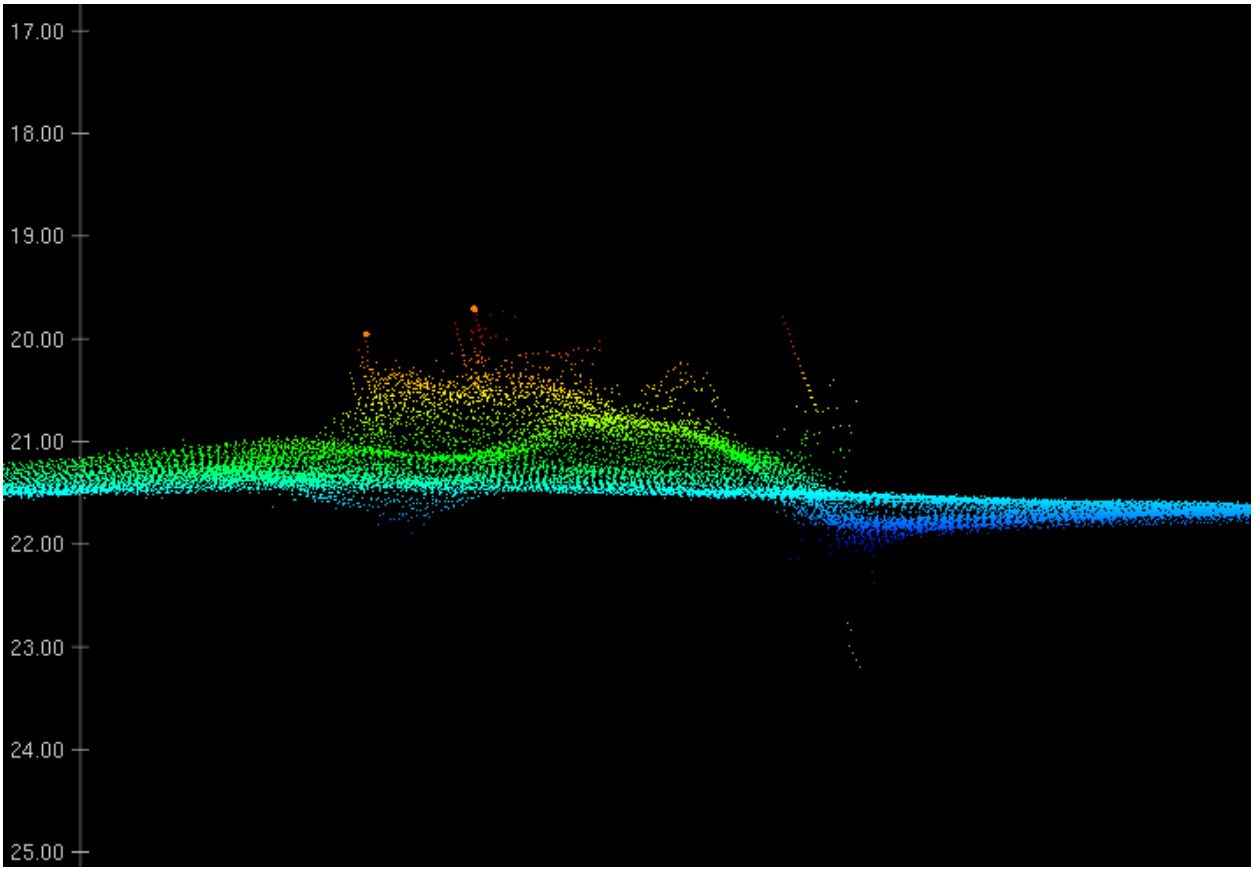

Figure 1.4.1

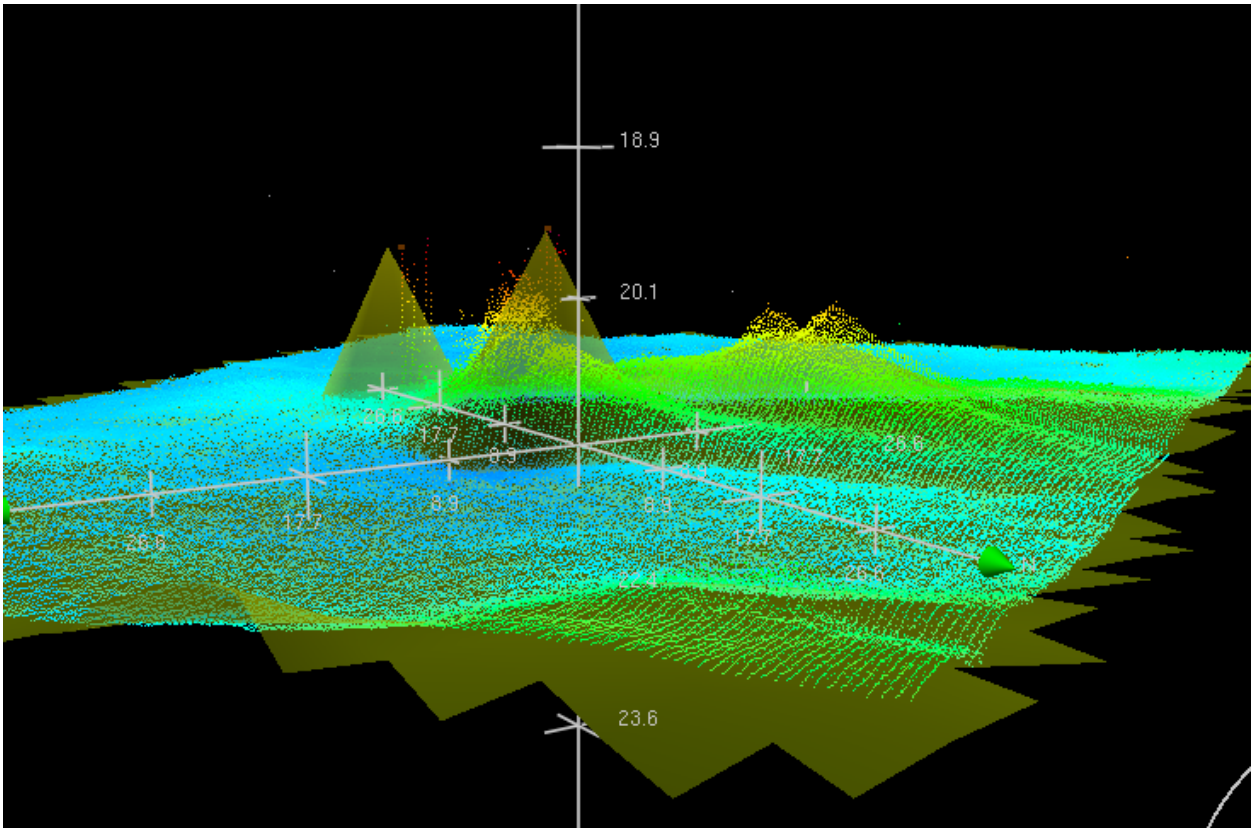

Figure 1.4.2

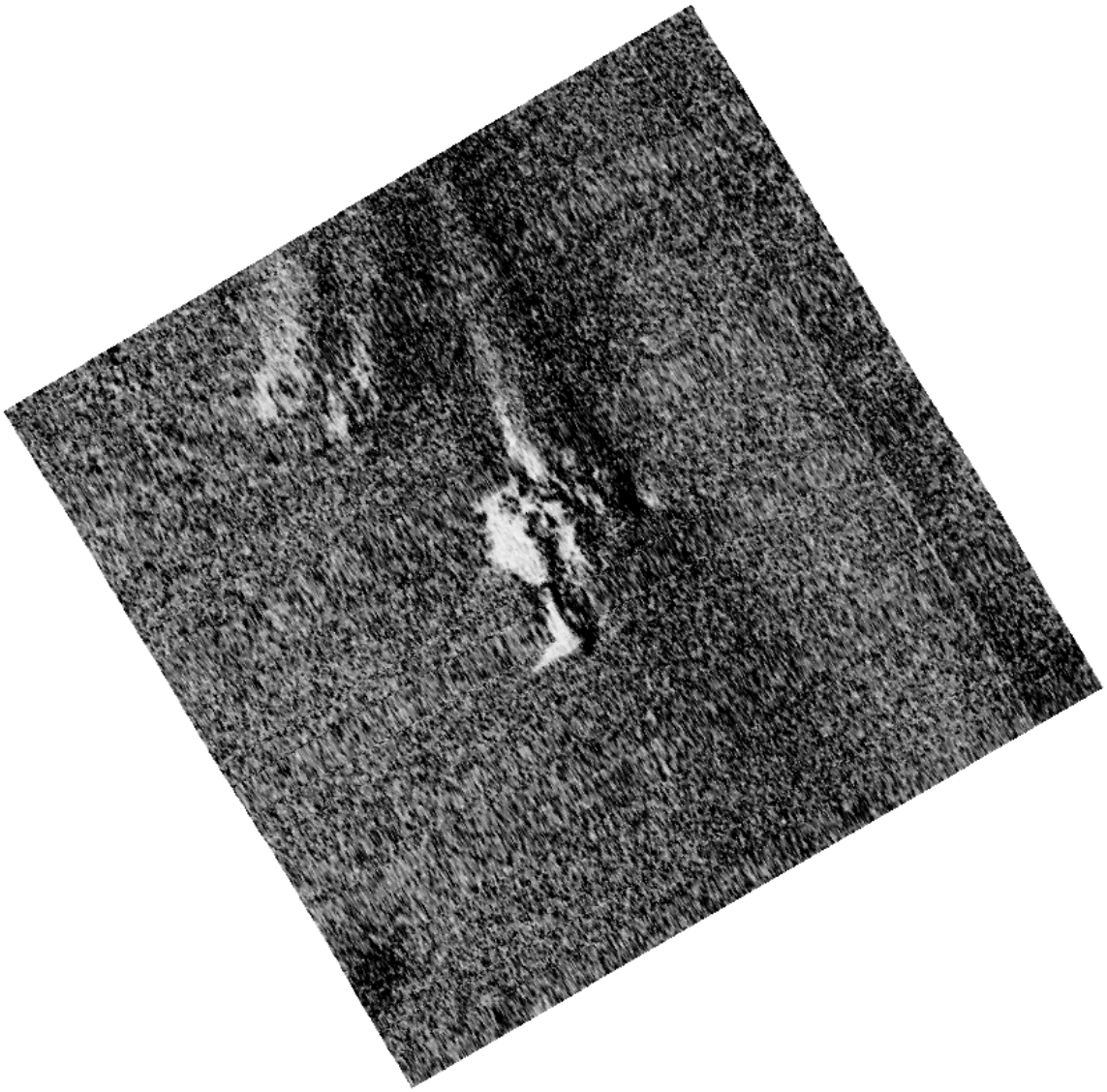

Figure 1.4.3

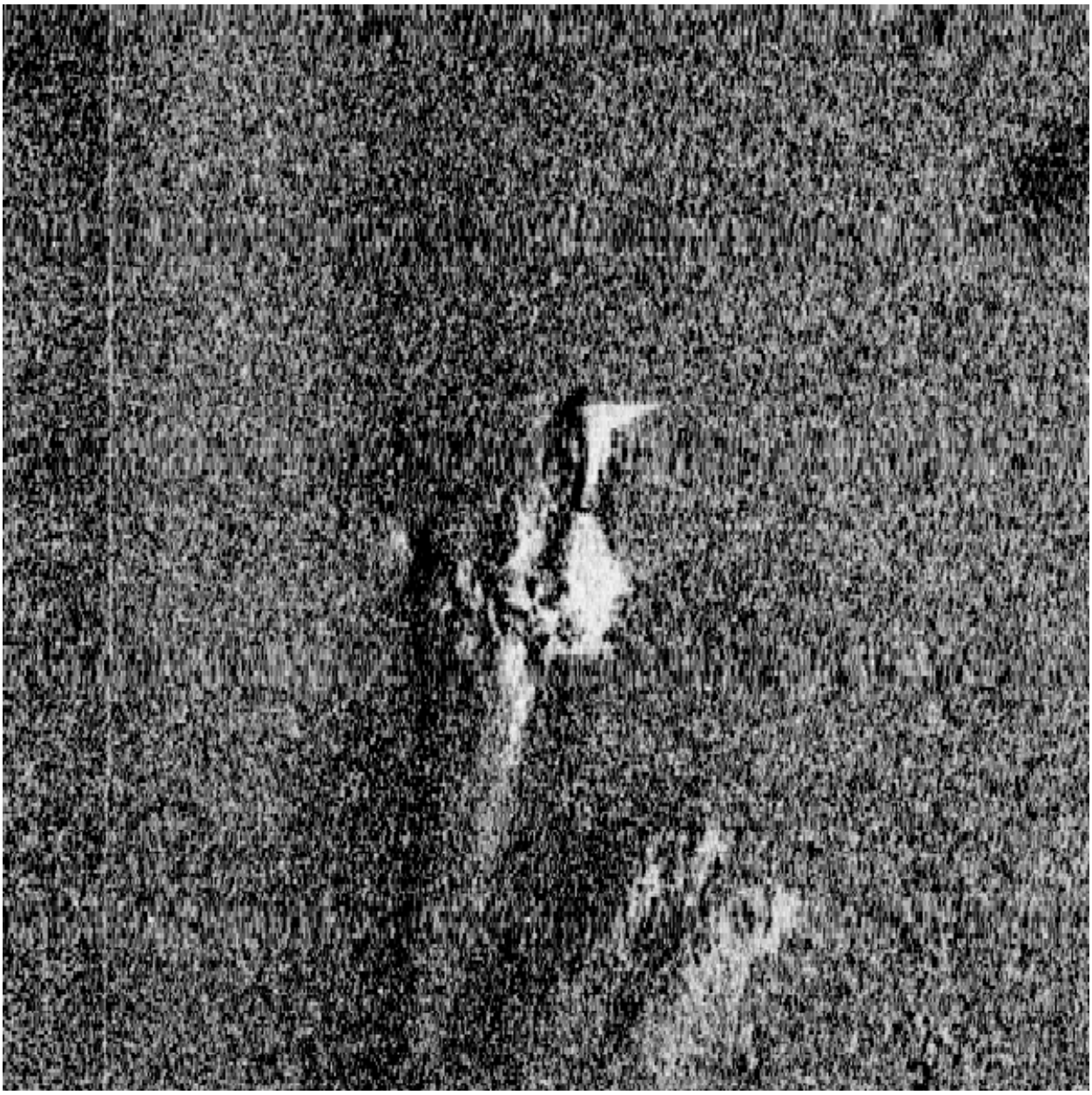

Figure 1.4.4

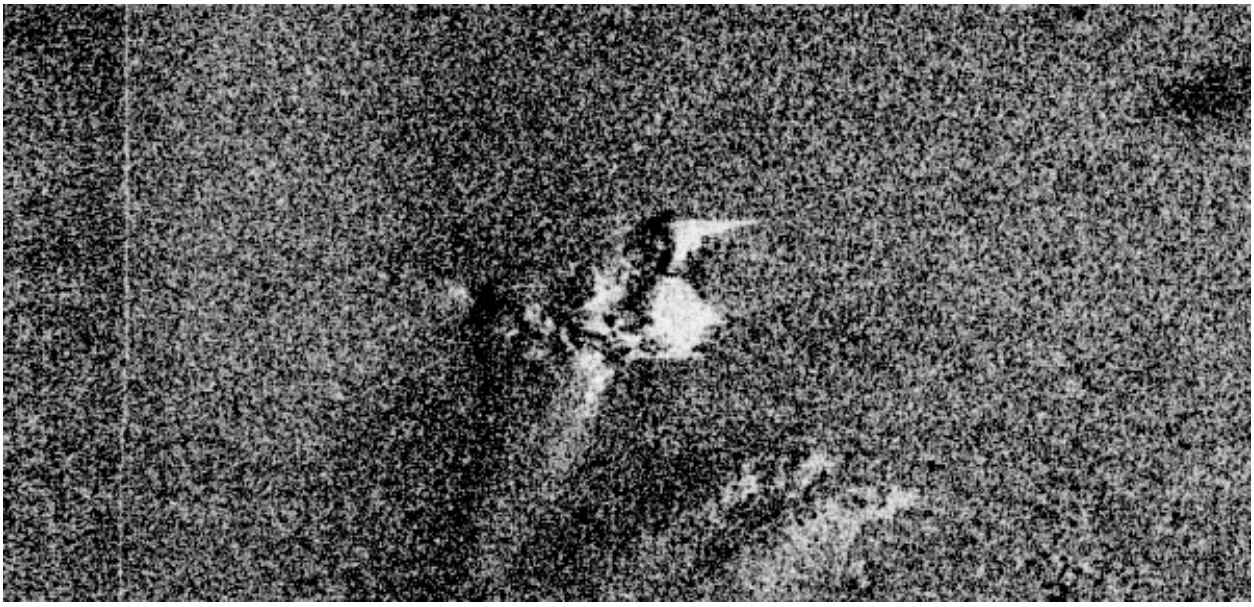

Figure 1.4.5

1.5) AWOIS 11077

Feature for AWOIS Item

Search Position: 38° 49' 49.9" N, 075° 05' 18.2" W
Historical Depth: [None]
Search Radius: [unknown]
Search Technique: [unknown]
Technique Notes:

History Notes:

[unknown]

Survey Summary

Survey Position: 38° 49' 49.9" N, 075° 05' 18.2" W
Least Depth: [None]
TPU (±1.96σ): **THU (TPEh)** [None] ; **TVU (TPEv)** [None]
Timestamp: 1981-001.00:00:00.000 (01/01/1981)
Dataset: H12605_AWOIS_charted.000
FOID: 0_ 0000158349 00001(FFFE00026A8D0001)
Charts Affected: 12216_1, 12214_1, 12304_1, 12200_1, 13003_1

Remarks:

$CSYMB/remrks: AWOIS 11077 unobserved using using 200% SSS and concurrent MBES. Update AWOIS database.

Feature Correlation

Source	Feature	Range	Azimuth	Status
H12605_AWOIS_charted.000	0_ 0000158349 00001	0.00	000.0	Primary

Hydrographer Recommendations

Delete.

S-57 Data

Geo object 1: Cartographic symbol ($CSYMB)

Attributes: NINFOM - Delete obstruction

NTXTDS - ENC US5DE10M,ED15,Update 7

Office Notes

Delete obstruction, AWOIS 11077, from charted position.

1.6) AWOIS 9935

Feature for AWOIS Item #9935

Search Position:	38° 50' 38.4" N, 075° 04' 30.8" W
Historical Depth:	31.86 m
Search Radius:	[unknown]
Search Technique:	Type: STAR DUST, Itemstatus: COMPLETED, Searchtype: INFORMATION, Technique: S2 MBES
Technique Notes:	

History Notes:

History

" HISTORY LNM14/92-- HAZARD TO NAVIGATION CONSISTING OF A 90-FOOT F/V THE ì ""STAR DUST"". SUNK IN APPROX. POS. LAT. 38-50.2N LONG. 75-04.1W ì OFF CAPE HENLOPEN IN 125 FEET OF WATER. MARINERS ARE ADVISED TO ì TRANSIT THE AREA WITH CAUTION. (ENT 6/27/97 SJV) H10917/00-- OPR-D392-WH; SUBMERGED WRECK LOCATED DURING MAINSCHEME HYDR0GRAPHY IN LAT. 38-50-12.0N LONG. 75-04-31.01W. ECHOSOUNDER DEVELOPMENT WAS CONDUCTED TO VERIFY POSITION AND HEIGHT. ECHOSOUNDER LD OF 102.4 FEET (31.2 METERS). EVALUATOR RECOMMENDS DELETING CHARTED WRECK IN 38-50-12.0N LONG. 75-04-06.0W AND CHARTING A 102WK AS SURVEYED. (UP 9/12/01 SJV) F00467/00-- OPR-D392-WH; WRECK LOCATED BY SIDE SCAN SONAR. SWMB LD OF 101 FEET LOCATED IN LAT. 38-50-38.5N LONG. 75-04-30.83W. THIS POSITION IS APPROX. 1000 METERS FROM THE CHARTED POSITION. EVALUATOR RECOMMENDS DELETING CHARTED SUBMERGED DANGEROUS WRECK PA AND CHARTING A NON-DANGEROUS SUBMERGED WRECK COVERED 101 FEET AS SURVEYED (101WK). UP 3/1/02 SJV)"

Survey Summary

Survey Position:	38° 50' 38.4" N, 075° 04' 30.8" W
Least Depth:	31.86 m (= 104.53 ft = 17.422 fm = 17 fm 2.53 ft)
TPU (±1.96σ):	**THU (TPEh)** [None] ; **TVU (TPEv)** [None]
Timestamp:	2013-180.00:00:00.000 (06/29/2013)
Dataset:	H12605_AWOIS_charted.000
FOID:	0_ 0000158358 00001(FFFE00026A960001)
Charts Affected:	12216_1, 12214_1, 12304_1, 12200_1, 13003_1

Remarks:

WRECKS/remrks: AWOIS 9935 observed using 200% side scan with concurrent MBES. Soundings reduced to MLLW via ellipsoid heights and a VDatum separation model.

Feature Correlation

Source	Feature	Range	Azimuth	Status
H12605_AWOIS_charted.000	0_ 0000158358 00001	0.00	000.0	Primary

Hydrographer Recommendations

Update chart.

Cartographically-Rounded Depth (Affected Charts):

104ft (12216_1, 12214_1, 12304_1)

17ft (12200_1, 13003_1)

S-57 Data

Geo object 1: Wreck (WRECKS)

Attributes:

CATWRK - 1:non-dangerous wreck

NINFOM - Chart wreck

QUASOU - 6:least depth known

SORDAT - 20130629

SORIND - US,US,graph,H12605

TECSOU - 2,3:found by side scan sonar,found by multi-beam

VALSOU - 31.862 m

WATLEV - 3:always under water/submerged

Office Notes

SAR: Feature was ensonified with object detect SSS and MBES. Feature is considered significant and verified as per survey data. Defer the final charting disposition to AHB Compile Team.

COMPILE: Delete 101 ft charted wreck. Chart new 104.5 ft wreck at survey position.

Feature Images

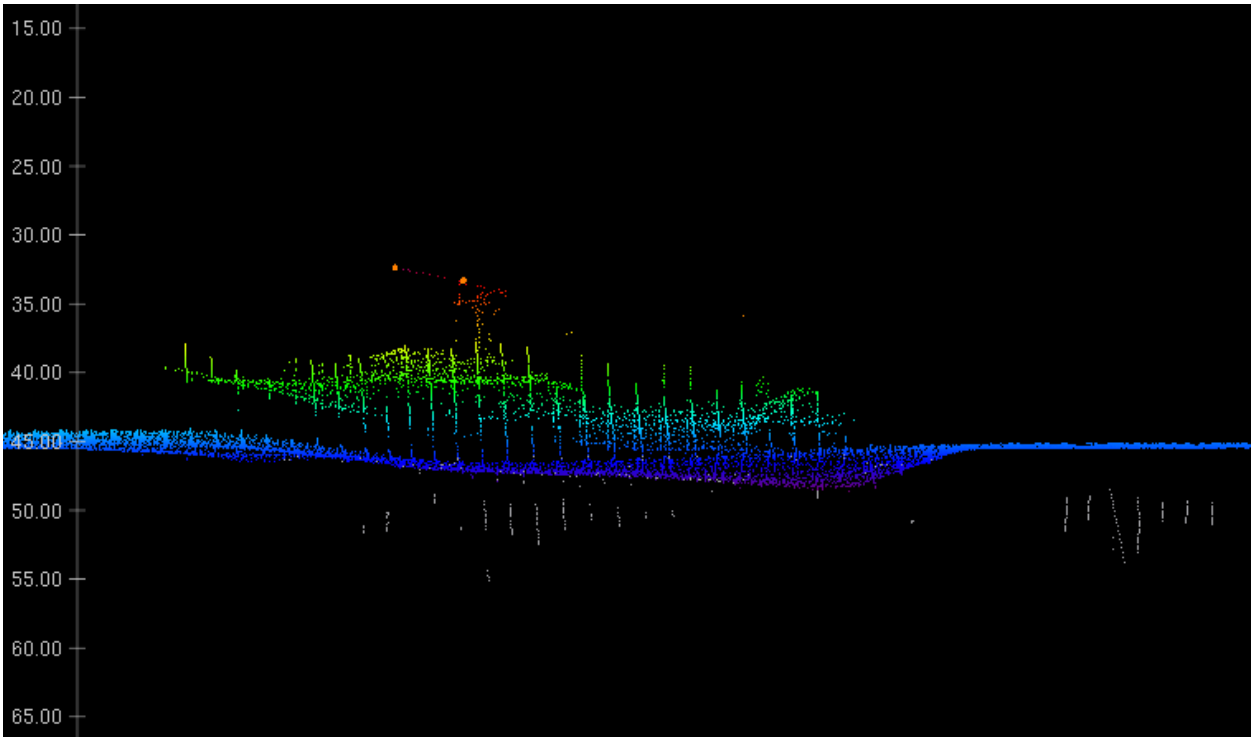

Figure 1.6.1

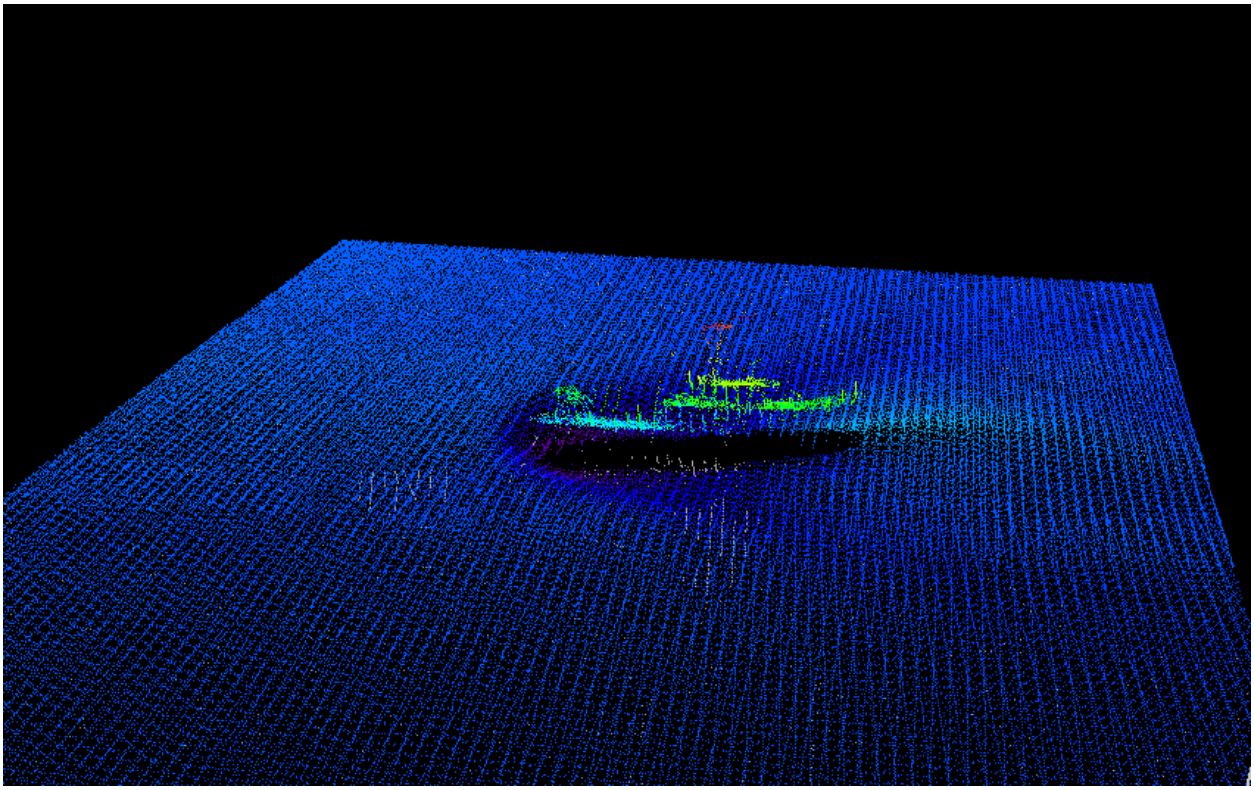

Figure 1.6.2

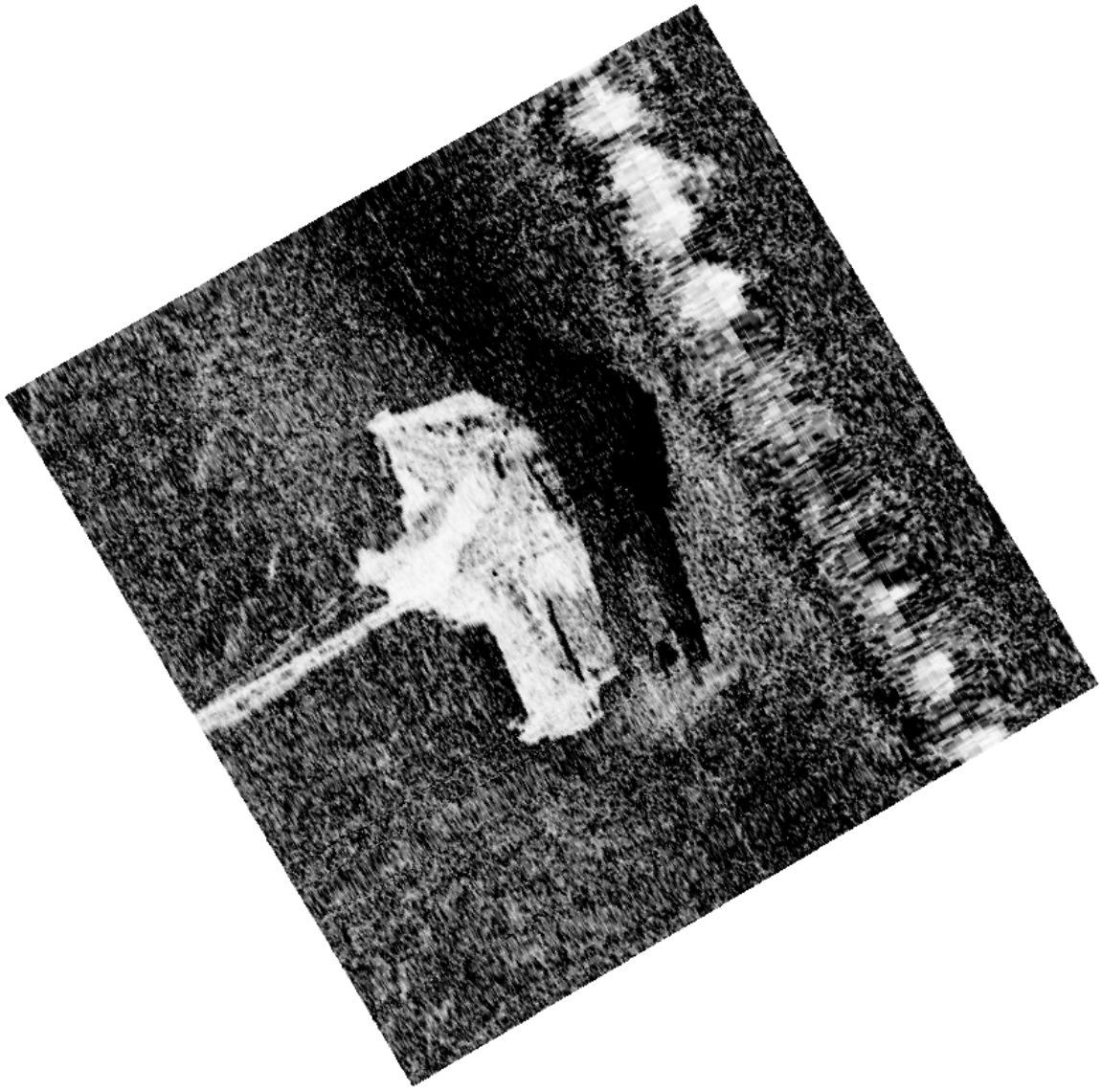

Figure 1.6.3

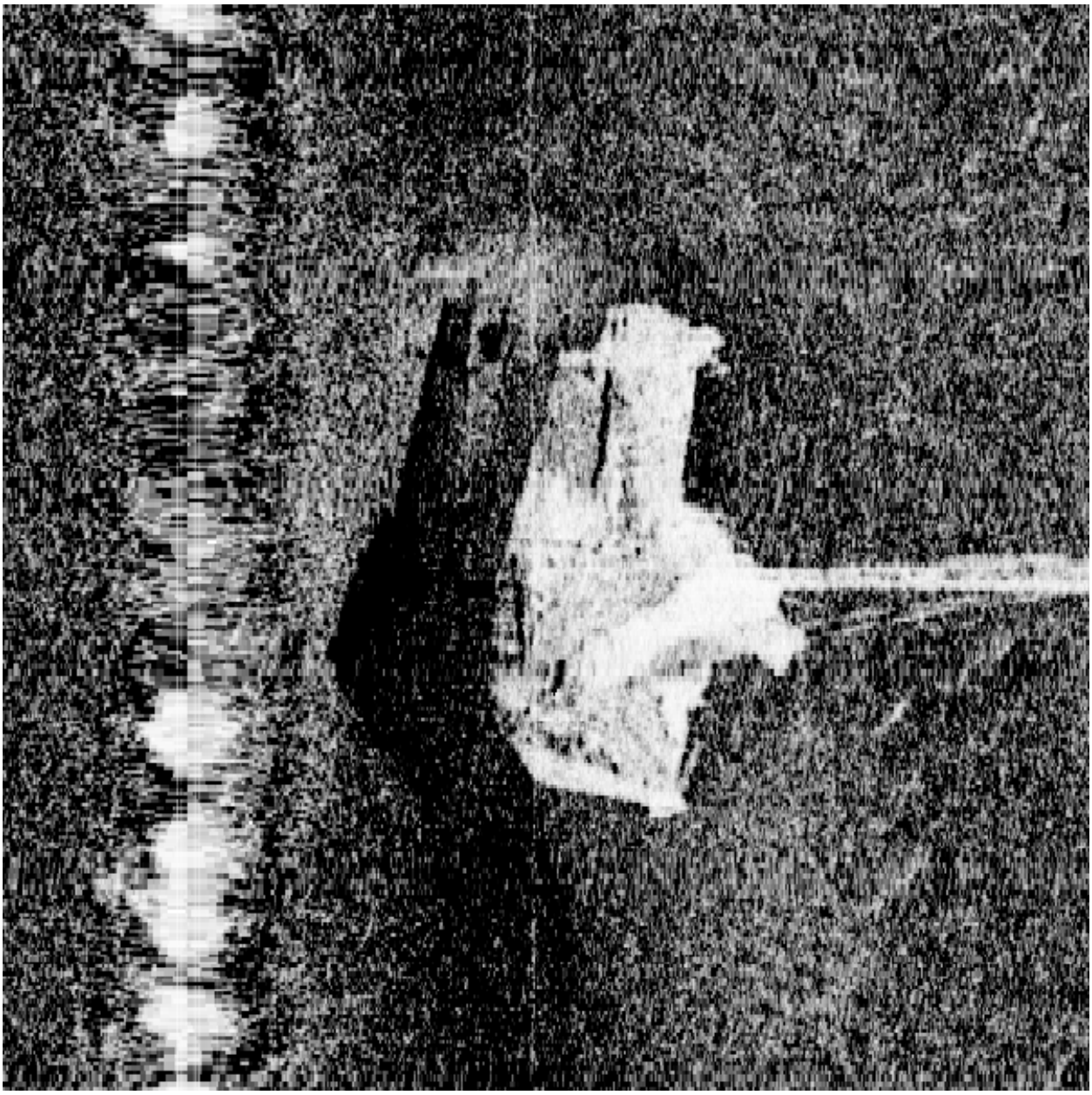

Figure 1.6.4

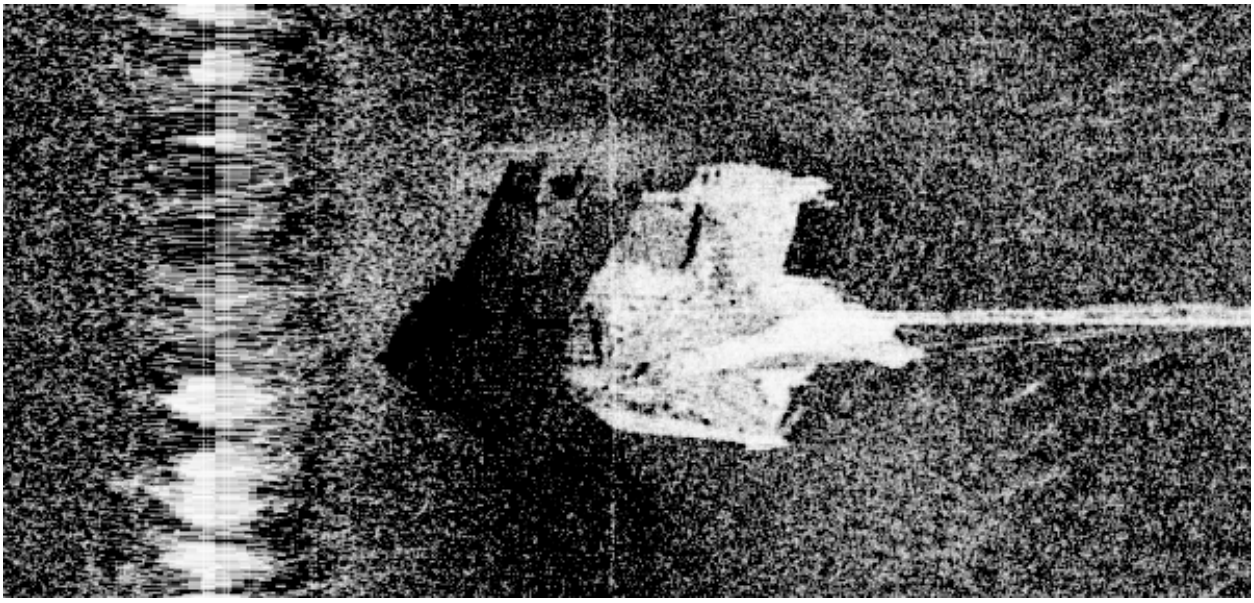

Figure 1.6.5

1.7) AWOIS 11958

Feature for AWOIS Item #11958

Search Position:	38° 55' 30.2" N, 075° 04' 18.8" W
Historical Depth:	12.71 m
Search Radius:	[unknown]
Search Technique:	Type: OBSTRUCTION, Itemstatus: COMPLETED, Searchtype: INFORMATION, Technique: S2 MBES
Technique Notes:	

History Notes:

History

H11081/01-02--OPR-D307-KR-00; OBSTRUCTION FOUND IN LAT. 38/55/30.13N LONG. 075/04/18.69W (NAD83) WITH A LEAST DEPTH OF 41.503 FEET MLLW. (ENTERED 9/03 BY MBH)

Survey Summary

Survey Position:	38° 55' 30.2" N, 075° 04' 18.8" W
Least Depth:	12.71 m (= 41.68 ft = 6.947 fm = 6 fm 5.68 ft)
TPU (±1.96σ):	**THU (TPEh)** [None] ; **TVU (TPEv)** [None]
Timestamp:	2013-180.00:00:00.000 (06/29/2013)
Dataset:	H12605_AWOIS_charted.000
FOID:	0_ 0000158356 00001(FFFE00026A940001)
Charts Affected:	12214_1, 12304_1, 12200_1, 13003_1

Remarks:

OBSTRN/remrks: AWOIS feature 11958 observed using 200% SSS and concurrent MBES. Soundings reduced to MLLW via ellipsoid heights and a VDatum separation model.

Feature Correlation

Source	Feature	Range	Azimuth	Status
H12605_AWOIS_charted.000	0_ 0000158356 00001	0.00	000.0	Primary

Hydrographer Recommendations

Update chart and AWOIS database.

Cartographically-Rounded Depth (Affected Charts):

41ft (12214_1, 12304_1)

7fm (12200_1, 13003_1)

S-57 Data

Geo object 1:	Obstruction (OBSTRN)
Attributes:	NINFOM - Chart obstruction
	QUASOU - 6:least depth known
	SORDAT - 20130629
	SORIND - US,US,graph,H12605
	TECSOU - 2,3:found by side scan sonar,found by multi-beam
	VALSOU - 12.705 m
	WATLEV - 3:always under water/submerged

Office Notes

SAR: Feature was ensonified with object detect SSS and MBES. Feature is considered significant and verified as per survey data. The feature has the appearance of a benthic mound. Defer the final charting disposition to AHB Compile Team.

COMPILE: Delete charted 41 ft obstruction. Chart new 41.7 ft obstruction at survey position.

Feature Images

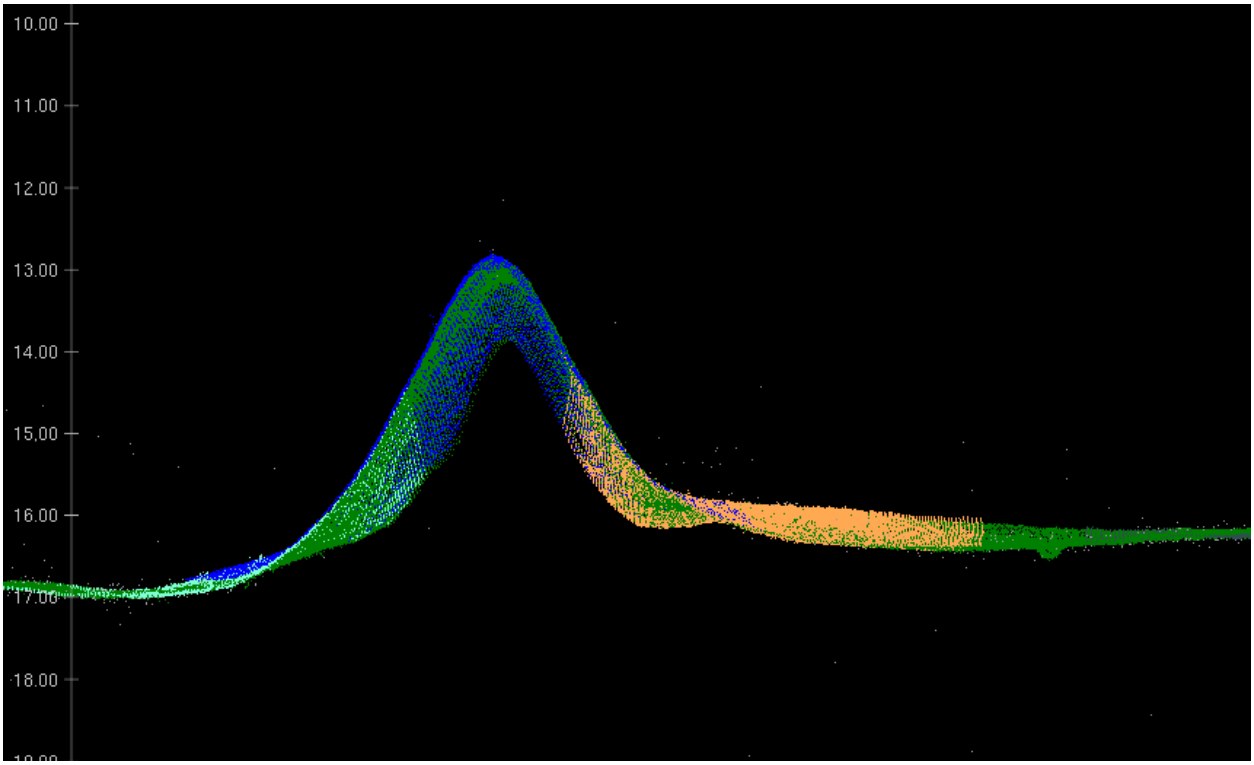

Figure 1.7.1

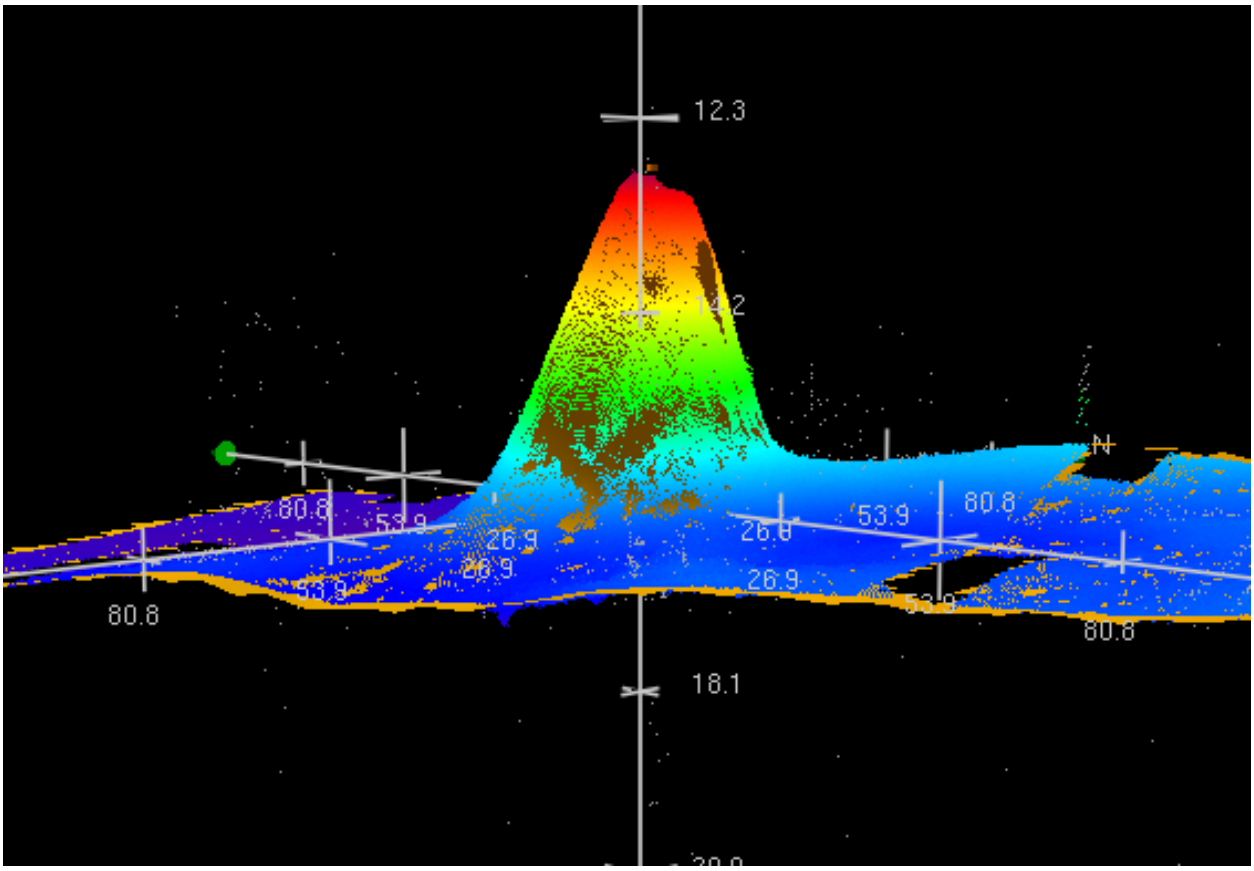

Figure 1.7.2

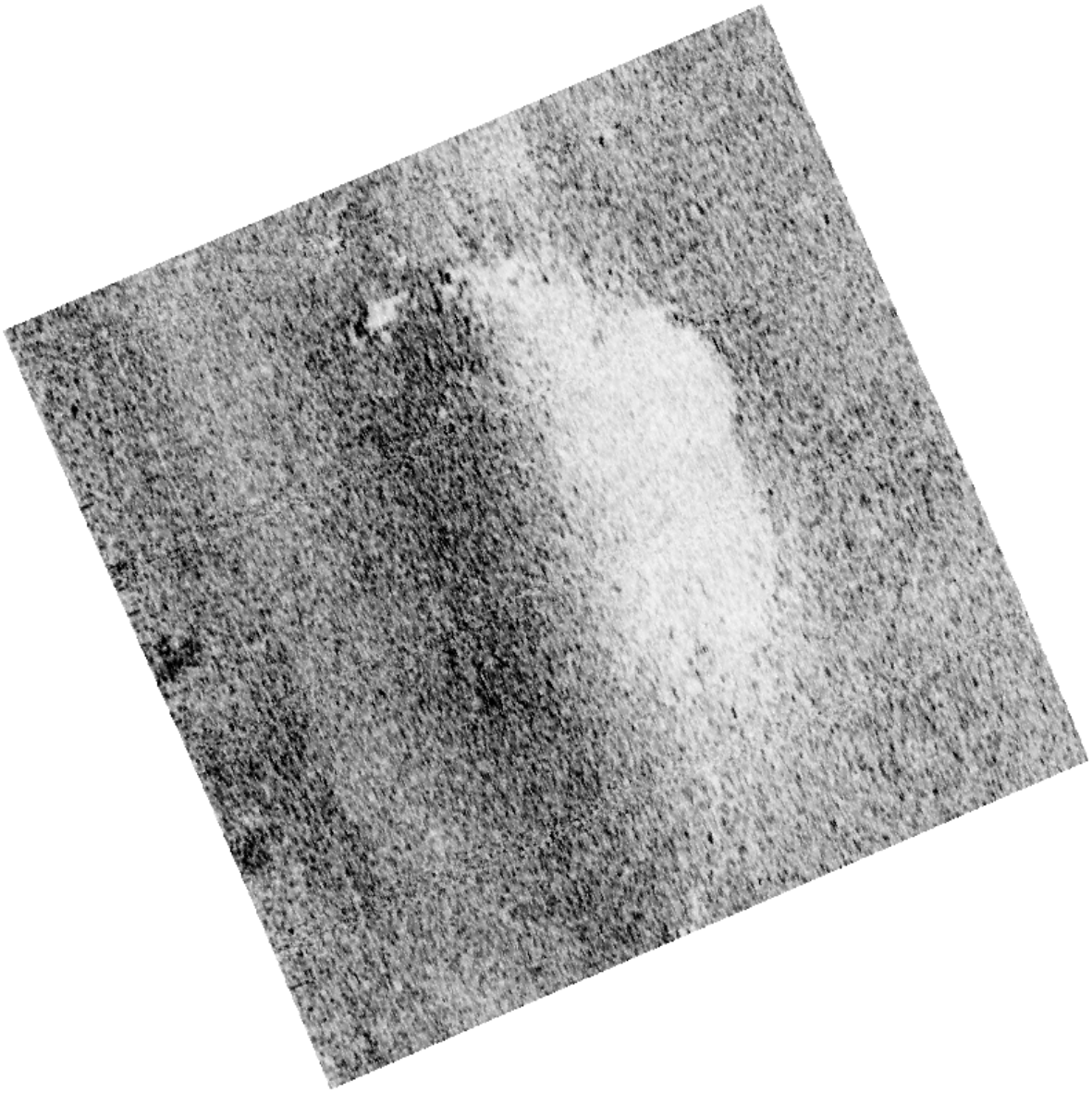

Figure 1.7.3

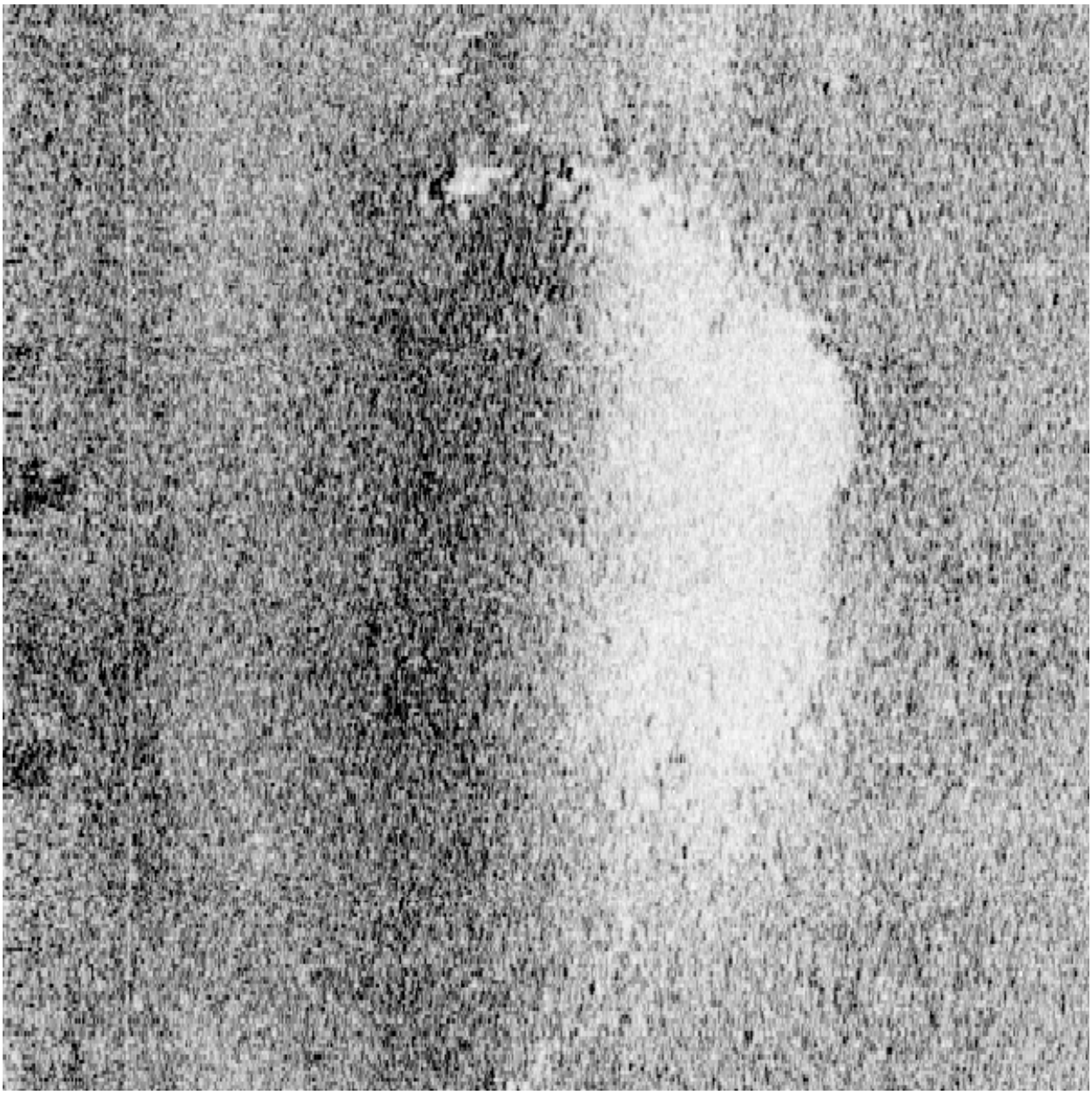

Figure 1.7.4

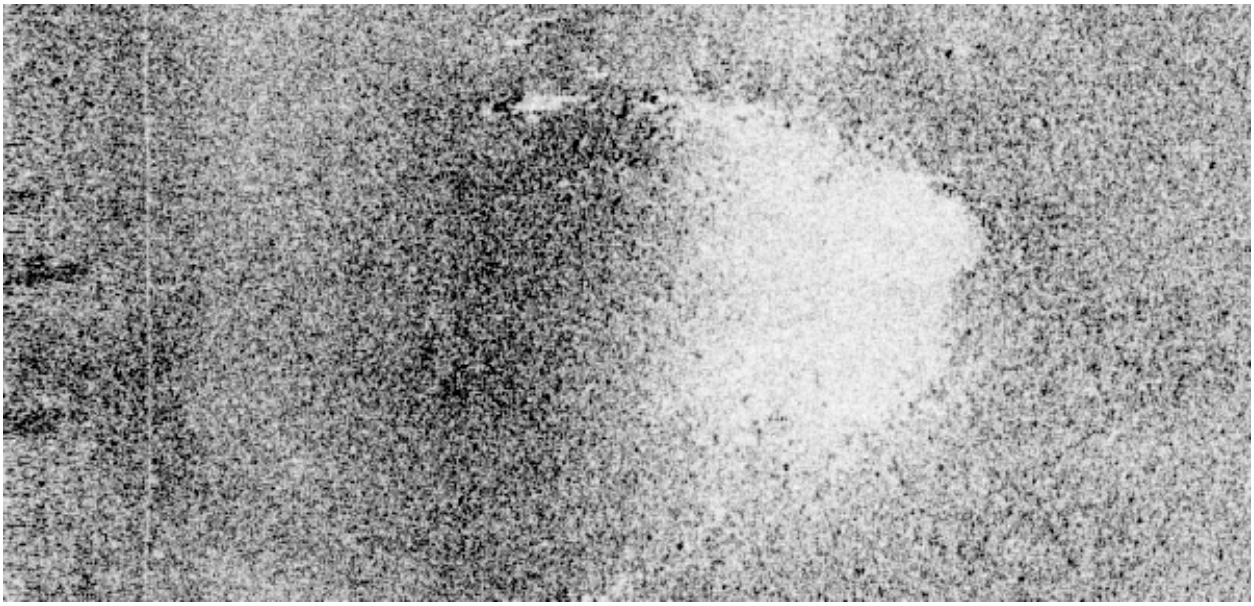

Figure 1.7.5

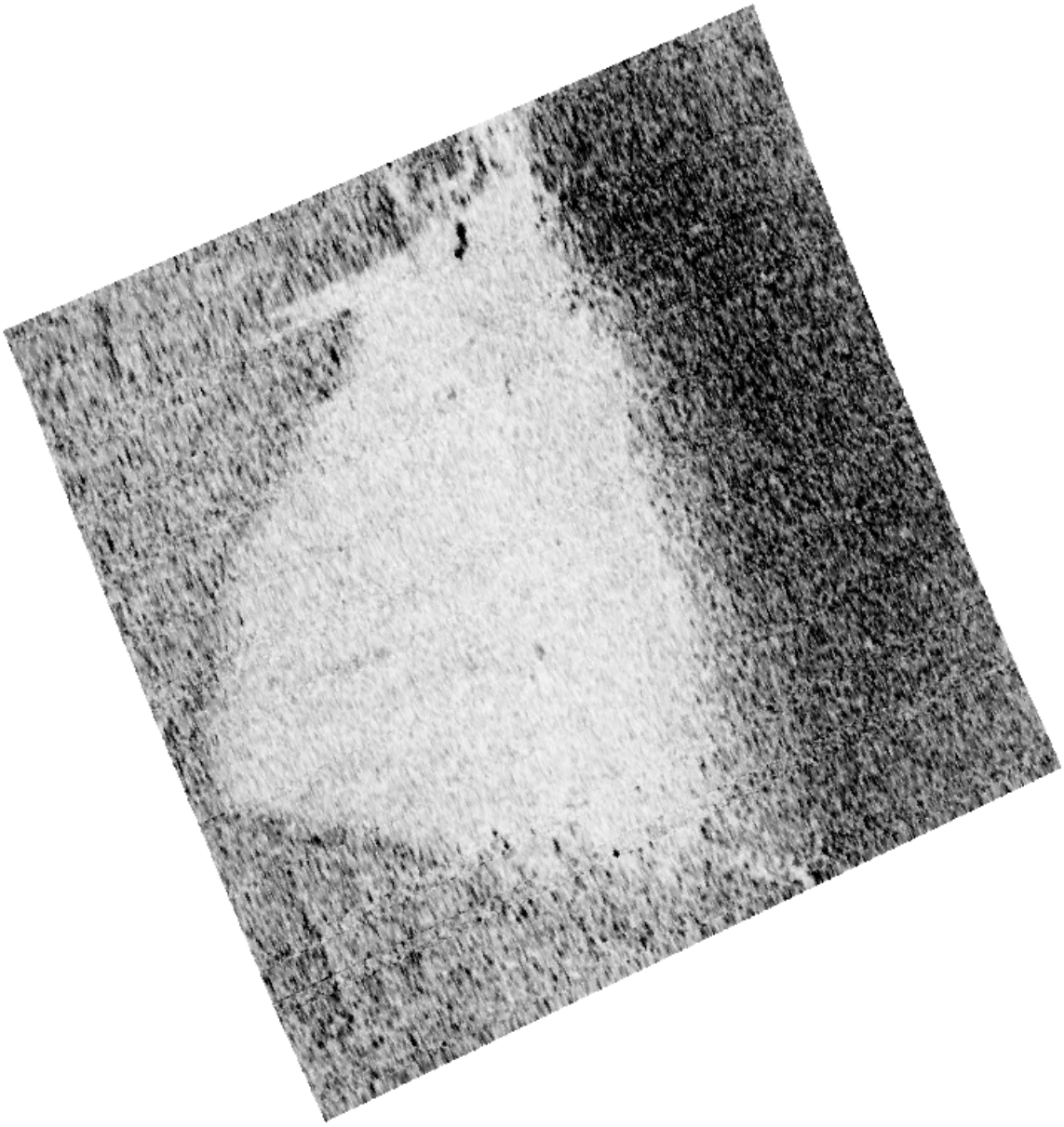

Figure 1.7.6

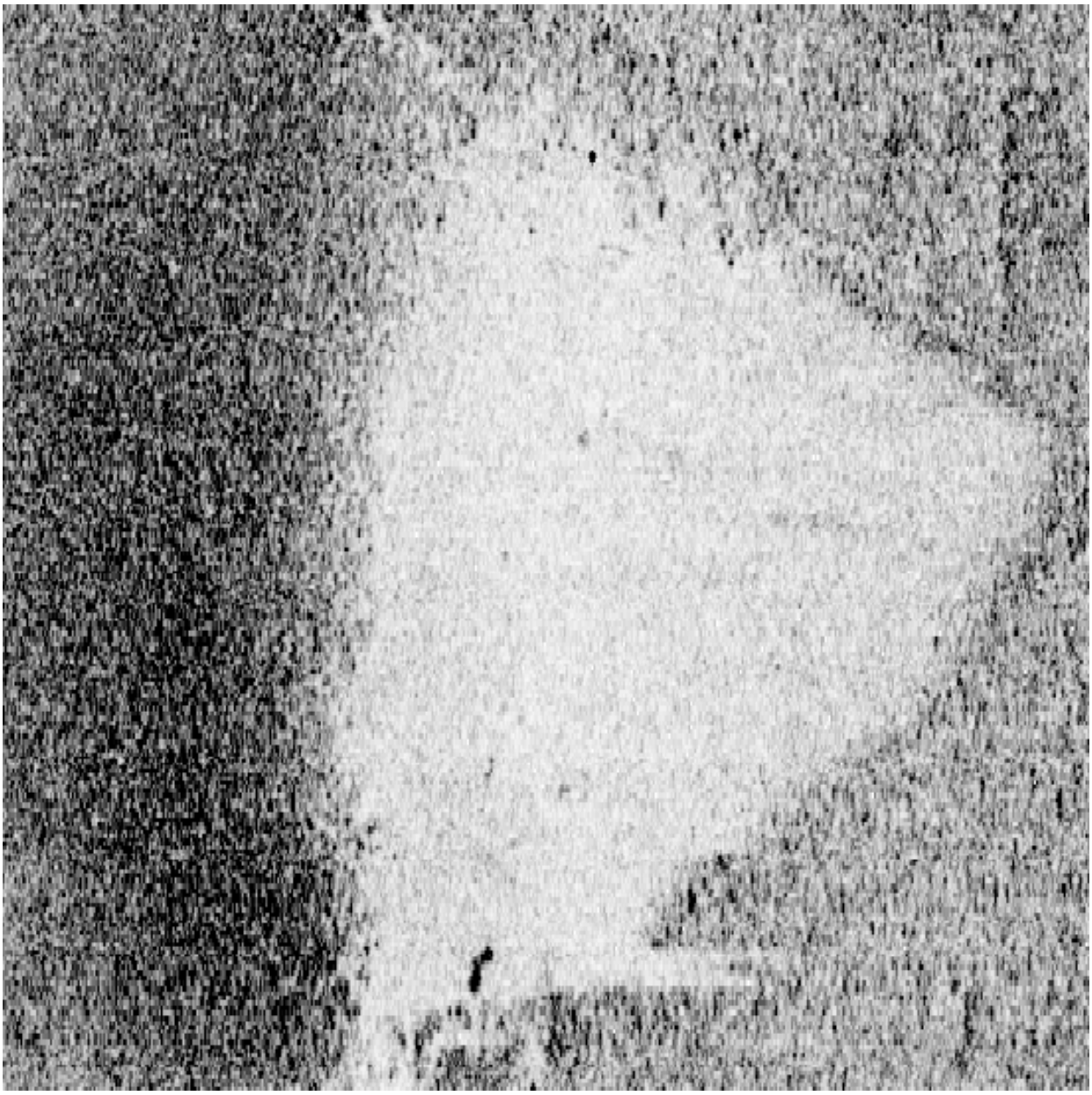

Figure 1.7.7

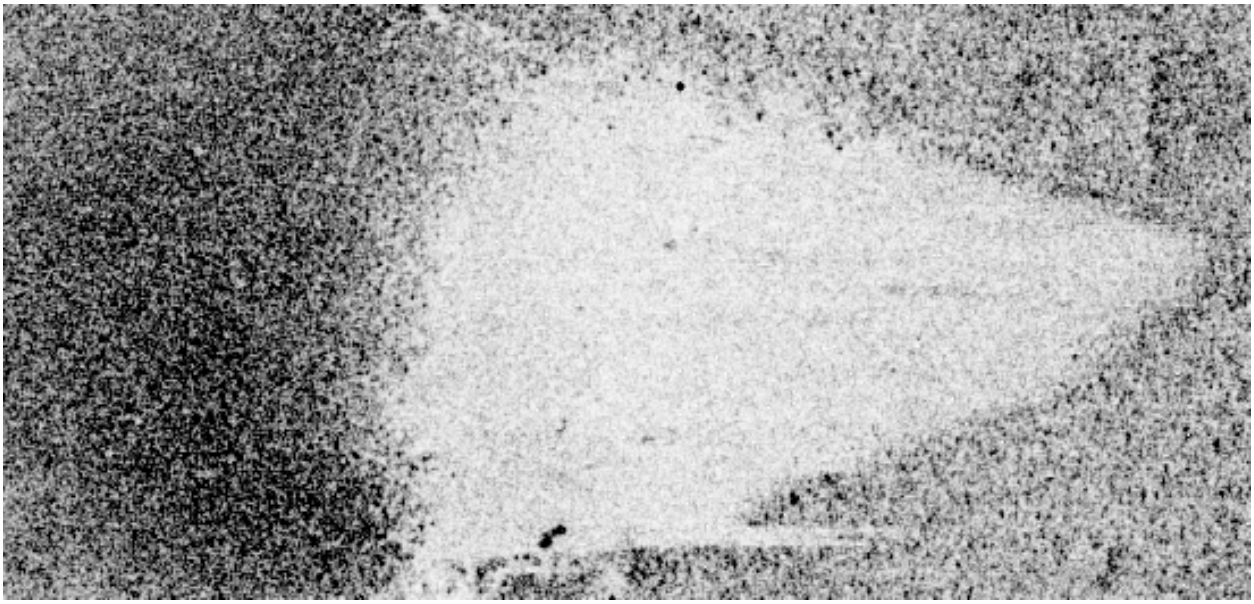

Figure 1.7.8

1.8) AWOIS 11075

Feature for AWOIS Item #11075

Search Position: 38° 51' 44.6" N, 075° 03' 30.5" W

Historical Depth: 12.27 m

Search Radius: [unknown]

Search Technique: Type: OBSTRUCTION, Itemstatus: COMPLETED, Searchtype: INFORMATION, Technique: S2 MBES

Technique Notes:

History Notes:

History

HISTORY H10917/00--OPR-D392-WH; SIDE SCAN SONAR CONTACT LOCATED DURING MAIN SCHEME HYDROGRAPHY. ECHO SOUNDER DEVELOPMENT CONDUCTED TO VERIFY CONTACT'S POSITION AND HEIGHT. ECHO SOUNDER LD OF 38.6 FEET (11.8 METERS) IN LAT. 38/51/44.00N LONG. 75-03-30.46W. EVALUATOR RECOMMENDS CHARTING A 390BSTN AS SURVEYED. (ENT 9/13/01 SJV)

Survey Summary

Survey Position: 38° 51' 44.6" N, 075° 03' 30.5" W

Least Depth: 12.27 m (= 40.25 ft = 6.708 fm = 6 fm 4.25 ft)

TPU (±1.96σ): **THU (TPEh)** [None] ; **TVU (TPEv)** [None]

Timestamp: 2013-180.00:00:00.000 (06/29/2013)

Dataset: H12605_AWOIS_charted.000

FOID: 0_ 0000158354 00001(FFFE00026A920001)

Charts Affected: 12214_1, 12304_1, 12200_1, 13003_1

Remarks:

OBSTRN/remrks: Previously charted feature found using 200% SSS and concurrent MBES. Soundings reduced to MLLW via ellipsoid heights and a VDatum separation model.

Feature Correlation

Source	Feature	Range	Azimuth	Status
H12605_AWOIS_charted.000	0_ 0000158354 00001	0.00	000.0	Primary

Hydrographer Recommendations

Update chart and AWOIS database.

Cartographically-Rounded Depth (Affected Charts):

40ft (12214_1, 12304_1)

6 ¾fm (12200_1, 13003_1)

S-57 Data

Geo object 1:	Obstruction (OBSTRN)
Attributes:	NINFOM - Chart obstruction
	QUASOU - 6:least depth known
	SORDAT - 20130629
	SORIND - US,US,graph,H12605
	TECSOU - 2,3:found by side scan sonar,found by multi-beam
	VALSOU - 12.267 m
	WATLEV - 3:always under water/submerged

Office Notes

SAR: Feature was ensonified with object detect SSS and MBES. Feature is considered significant and verified as per survey data. Defere the final charting disposition to AHB Compile Team.

COMPILE: Delete charted 39 ft obstruction. Chart new 40.2 ft obstruction at survey position.

Feature Images

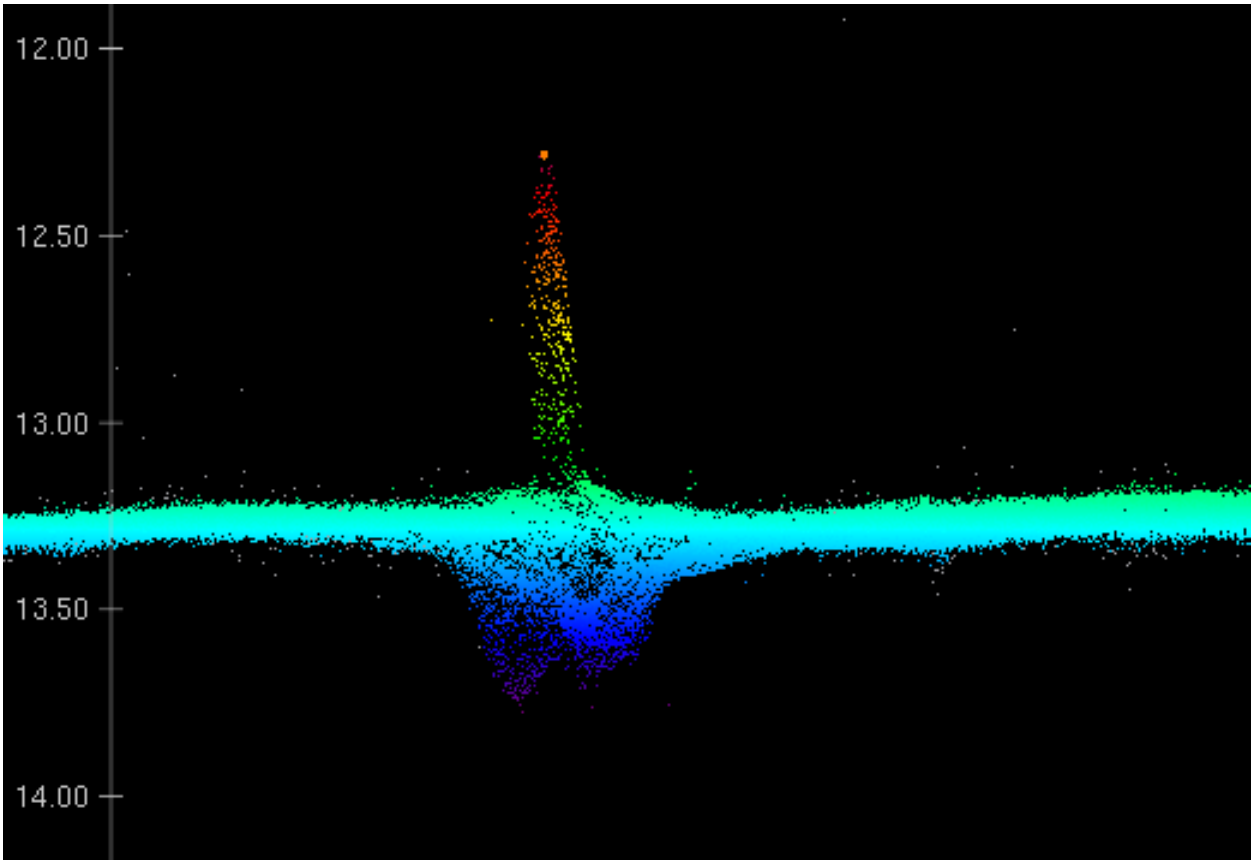

Figure 1.8.1

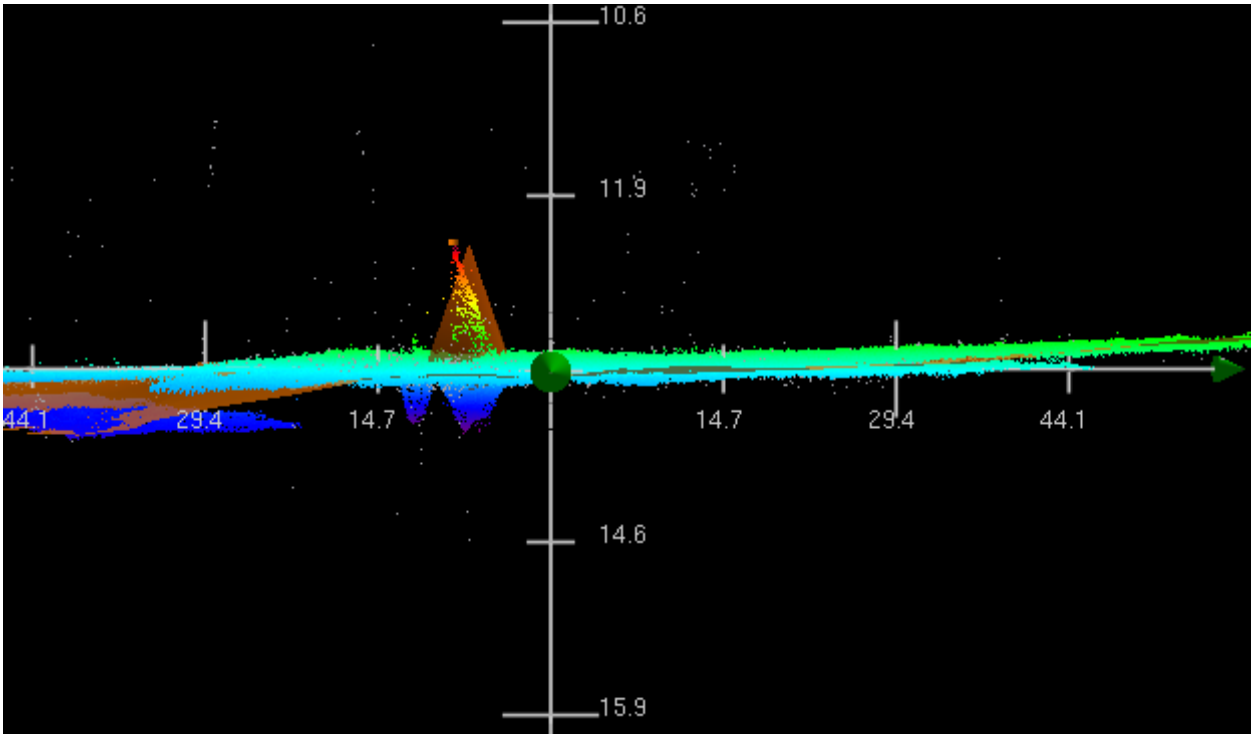

Figure 1.8.2

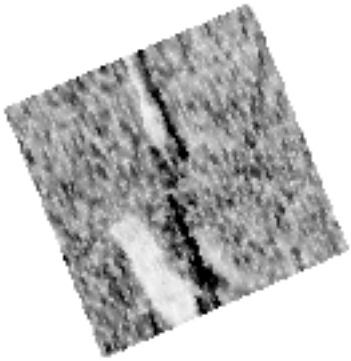

Figure 1.8.3

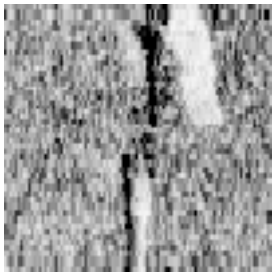

Figure 1.8.4

Figure 1.8.5

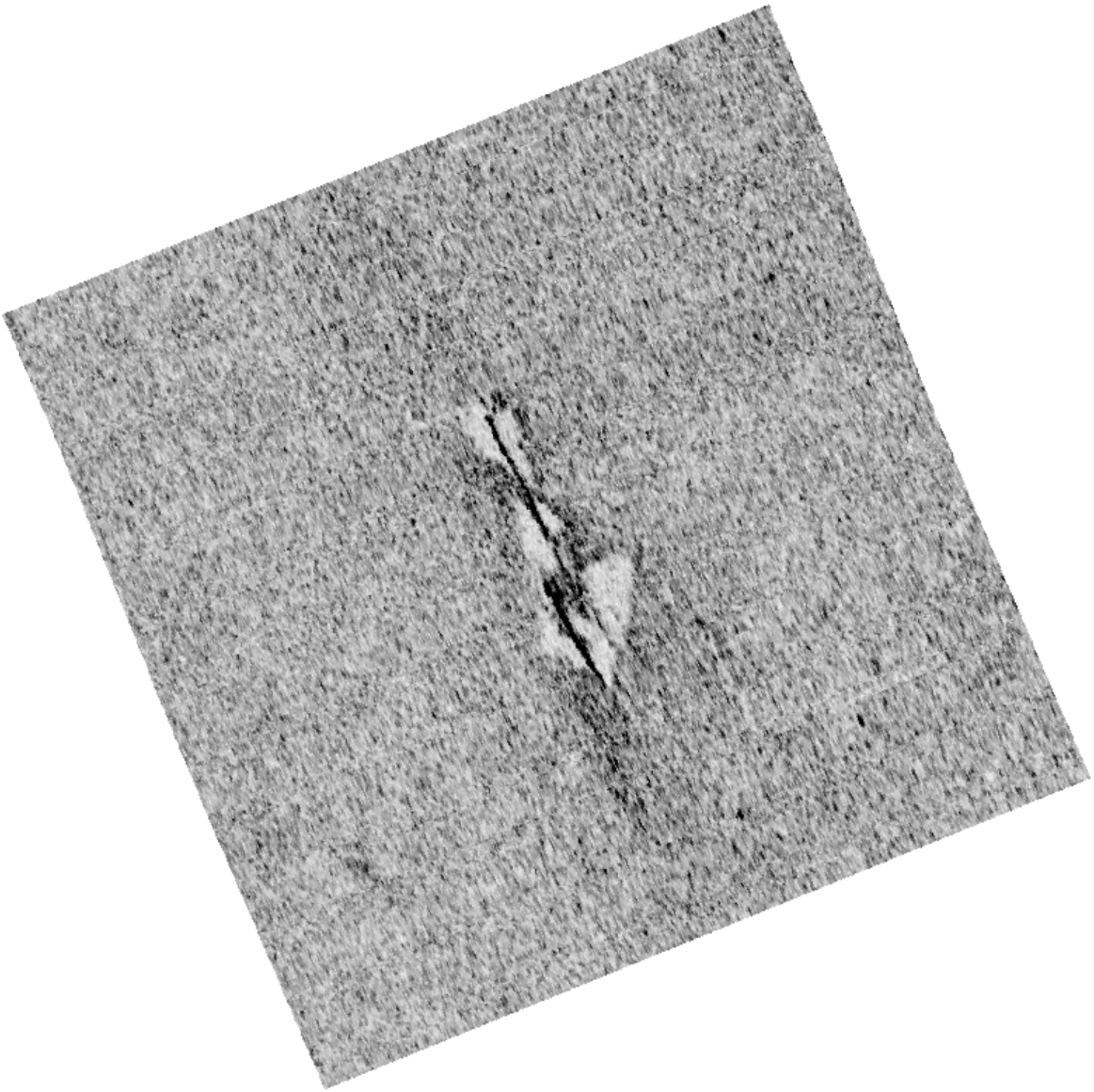

Figure 1.8.6

Figure 1.8.7

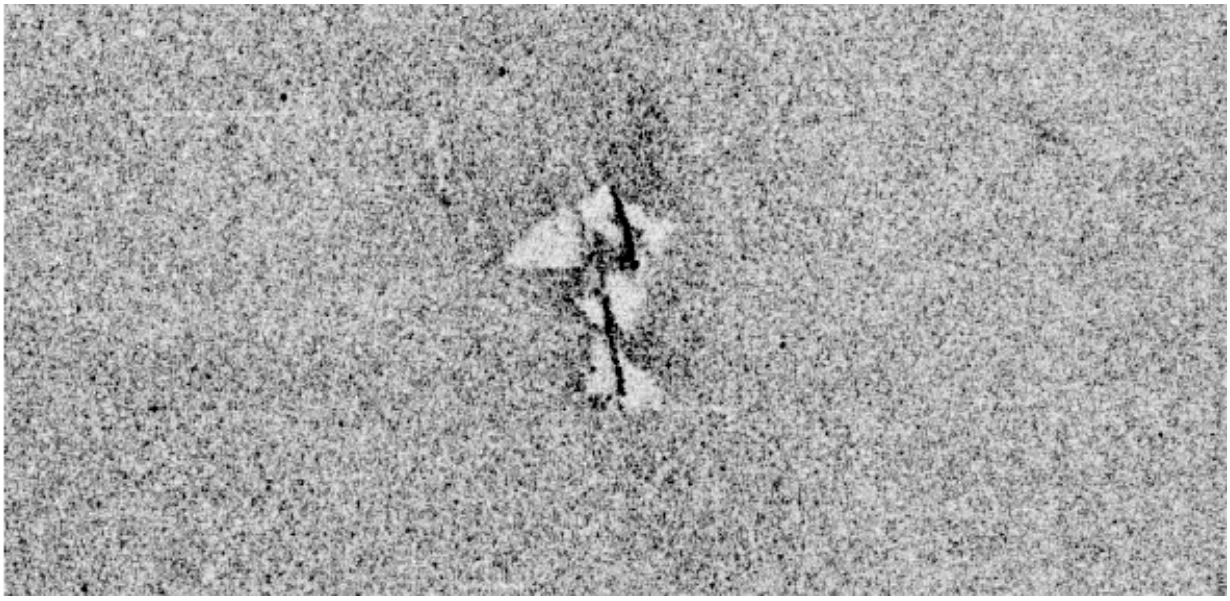

Figure 1.8.8

2 - Wreck Features

2.1) AWOIS 11074

Survey Summary

Survey Position:	38° 53' 23.8" N, 075° 05' 33.7" W
Least Depth:	15.81 m (= 51.87 ft = 8.646 fm = 8 fm 3.87 ft)
TPU (±1.96σ):	**THU (TPEh)** [None] ; **TVU (TPEv)** [None]
Timestamp:	2013-180.00:00:00.000 (06/29/2013)
Dataset:	H12605_AWOIS_charted.000
FOID:	0_ 0000158359 00001(FFFE00026A970001)
Charts Affected:	12214_1, 12304_1, 12200_1, 13003_1

Remarks:

WRECKS/remrks: AWOIS feature 11074 observed using 200% SSS and concurrent MBES. Soundings reduced to MLLW via ellipsoid heights and a VDatum separation model.

Feature Correlation

Source	Feature	Range	Azimuth	Status
H12605_AWOIS_charted.000	0_ 0000158359 00001	0.00	000.0	Primary

Hydrographer Recommendations

Update chart and AWOIS database.

Cartographically-Rounded Depth (Affected Charts):

52ft (12214_1, 12304_1)

8 ½fm (12200_1, 13003_1)

S-57 Data

Geo object 1:	Wreck (WRECKS)
Attributes:	CATWRK - 2:dangerous wreck
	NINFOM - Chart wreck
	QUASOU - 6:least depth known
	SORDAT - 20130629
	SORIND - US,US,graph,H12605
	TECSOU - 2,3:found by side scan sonar,found by multi-beam

VALSOU - 15.811 m

WATLEV - 3:always under water/submerged

Office Notes

SAR: Feature was ensonified with object detect SSS and MBES. Feature is considered significant and verified as per survey data. Defer the final charting disposition to AHB Compile Team.

COMPILE: Delete charted 50 ft wreck. Chart new 51.9 ft wreck at survey position.

Feature Images

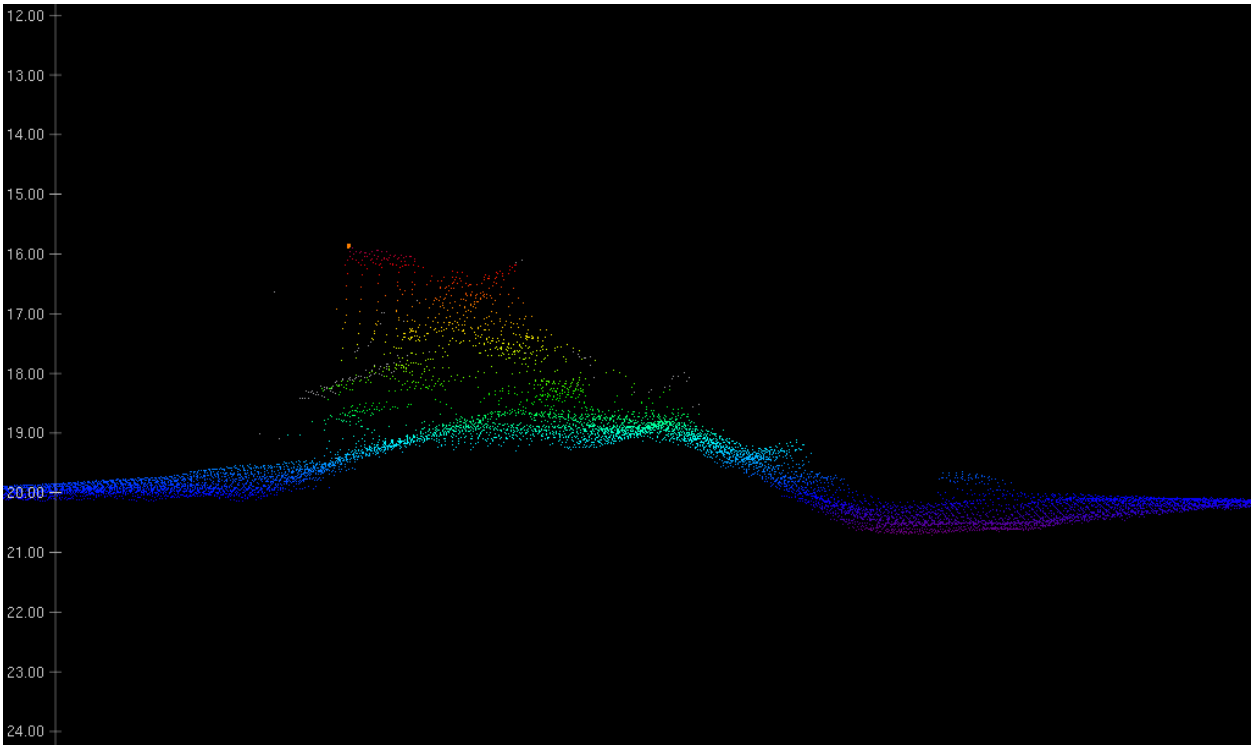

Figure 2.1.1

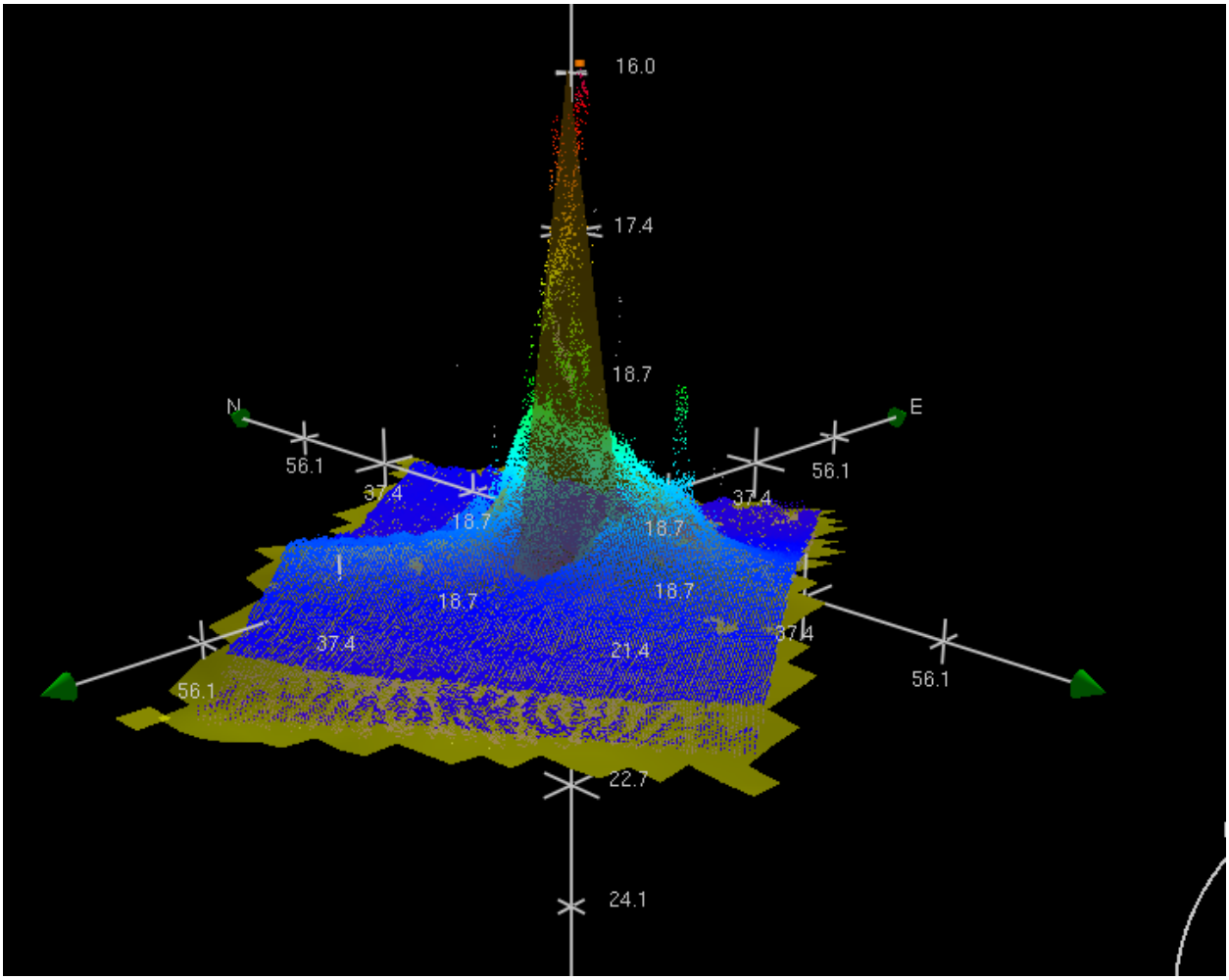
16.0
17.4
18.7
N
E
56.1
37.4
18.7
18.7
56.1
37.4
18.7
18.7
37.4
21.4
56.1
56.1
22.7
24.1

Figure 2.1.2

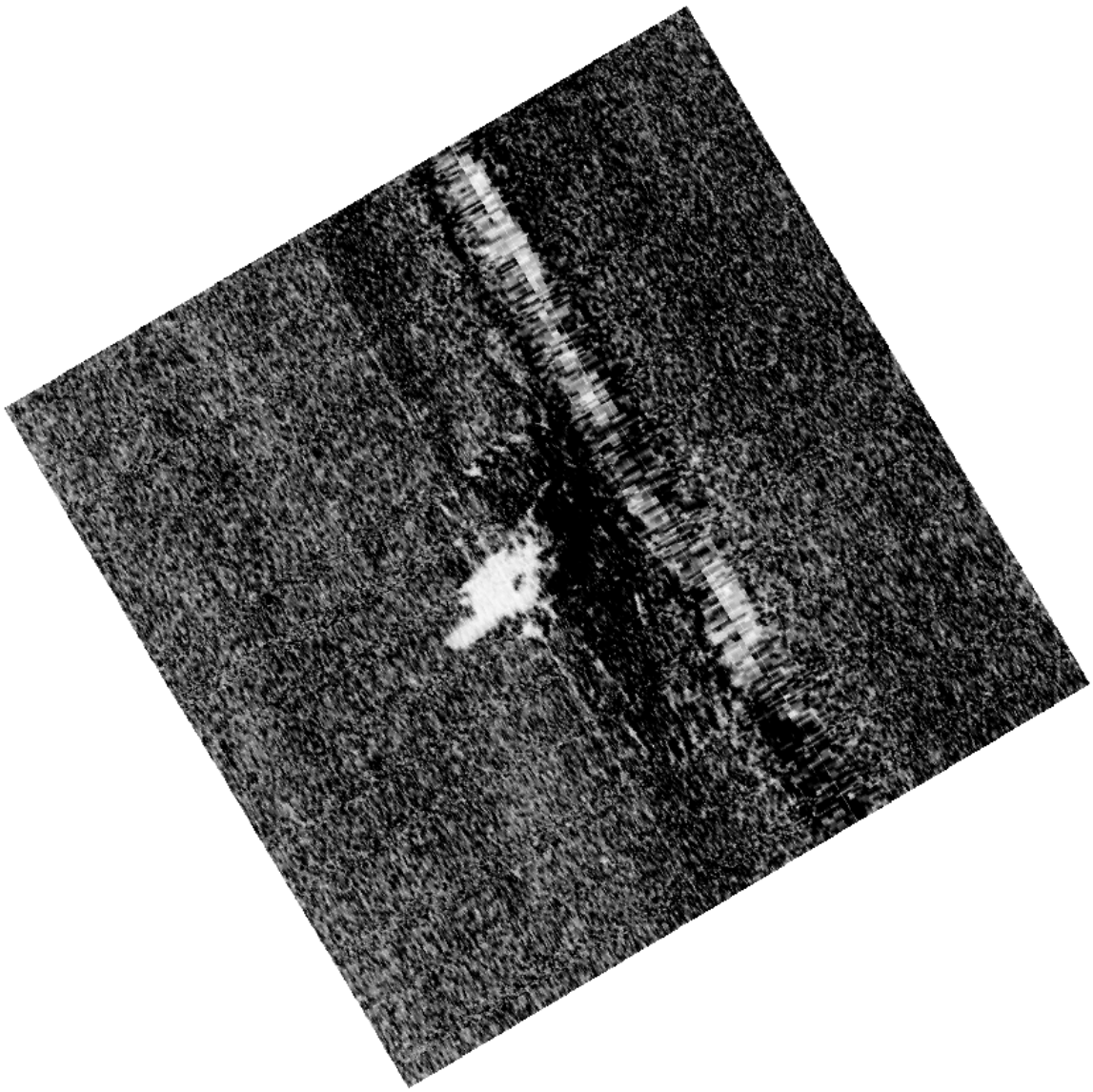

Figure 2.1.3

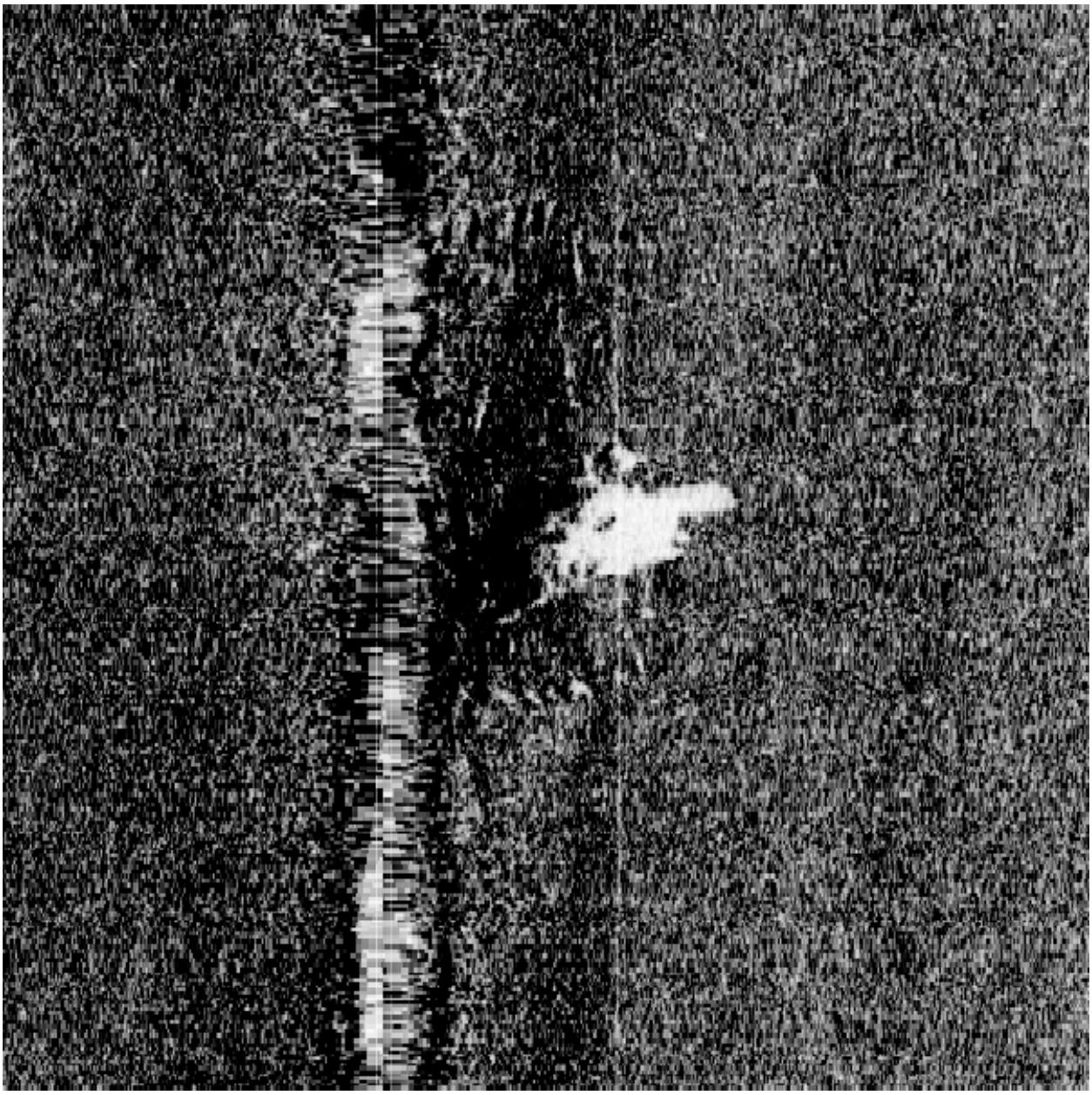

Figure 2.1.4

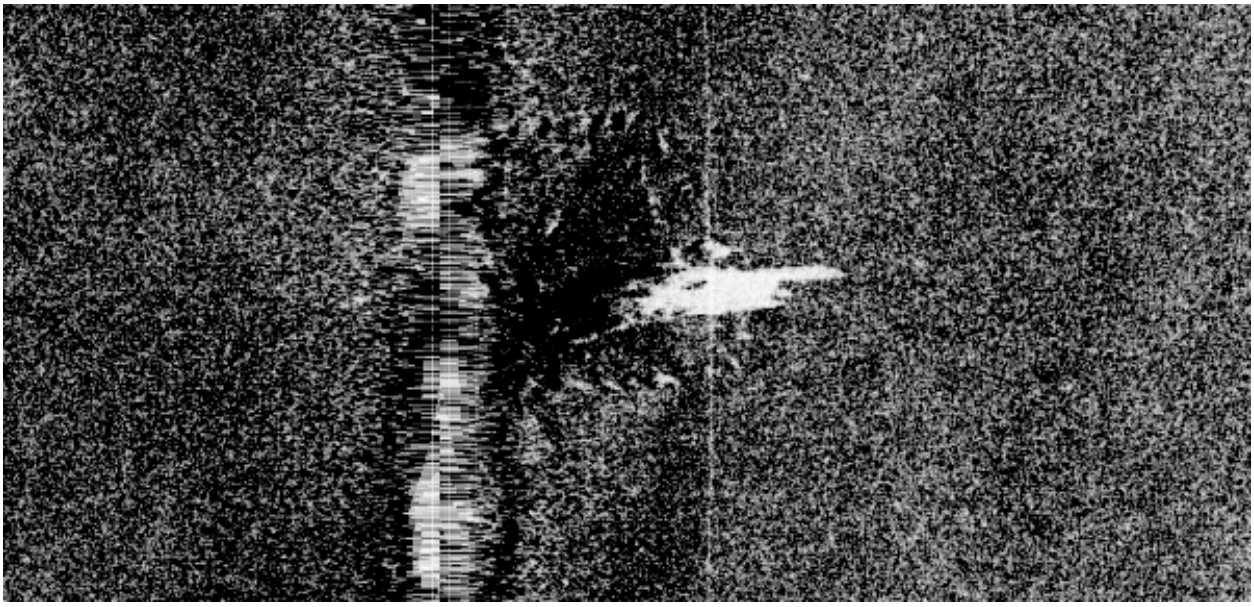

Figure 2.1.5

2.2) AWOIS 9935

Survey Summary

Survey Position:	38° 50' 38.4" N, 075° 04' 30.8" W
Least Depth:	31.86 m (= 104.53 ft = 17.422 fm = 17 fm 2.53 ft)
TPU (±1.96σ):	**THU (TPEh)** [None] ; **TVU (TPEv)** [None]
Timestamp:	2013-180.00:00:00.000 (06/29/2013)
Dataset:	H12605_AWOIS_charted.000
FOID:	0_ 0000158358 00001(FFFE00026A960001)
Charts Affected:	12216_1, 12214_1, 12304_1, 12200_1, 13003_1

Remarks:

WRECKS/remrks: AWOIS 9935 observed using 200% side scan with concurrent MBES. Soundings reduced to MLLW via ellipsoid heights and a VDatum separation model.

Feature Correlation

Source	Feature	Range	Azimuth	Status
H12605_AWOIS_charted.000	0_ 0000158358 00001	0.00	000.0	Primary

Hydrographer Recommendations

Update chart.

Cartographically-Rounded Depth (Affected Charts):

104ft (12216_1, 12214_1, 12304_1)

17ft (12200_1, 13003_1)

S-57 Data

Geo object 1:	Wreck (WRECKS)
Attributes:	CATWRK - 1:non-dangerous wreck
	NINFOM - Chart wreck
	QUASOU - 6:least depth known
	SORDAT - 20130629
	SORIND - US,US,graph,H12605
	TECSOU - 2,3:found by side scan sonar,found by multi-beam

VALSOU - 31.862 m

WATLEV - 3:always under water/submerged

Office Notes

SAR: Feature was ensonified with object detect SSS and MBES. Feature is considered significant and verified as per survey data. Defer the final charting disposition to AHB Compile Team.

COMPILE: Delete 101 ft charted wreck. Chart new 104.5 ft wreck at survey position.

Feature Images

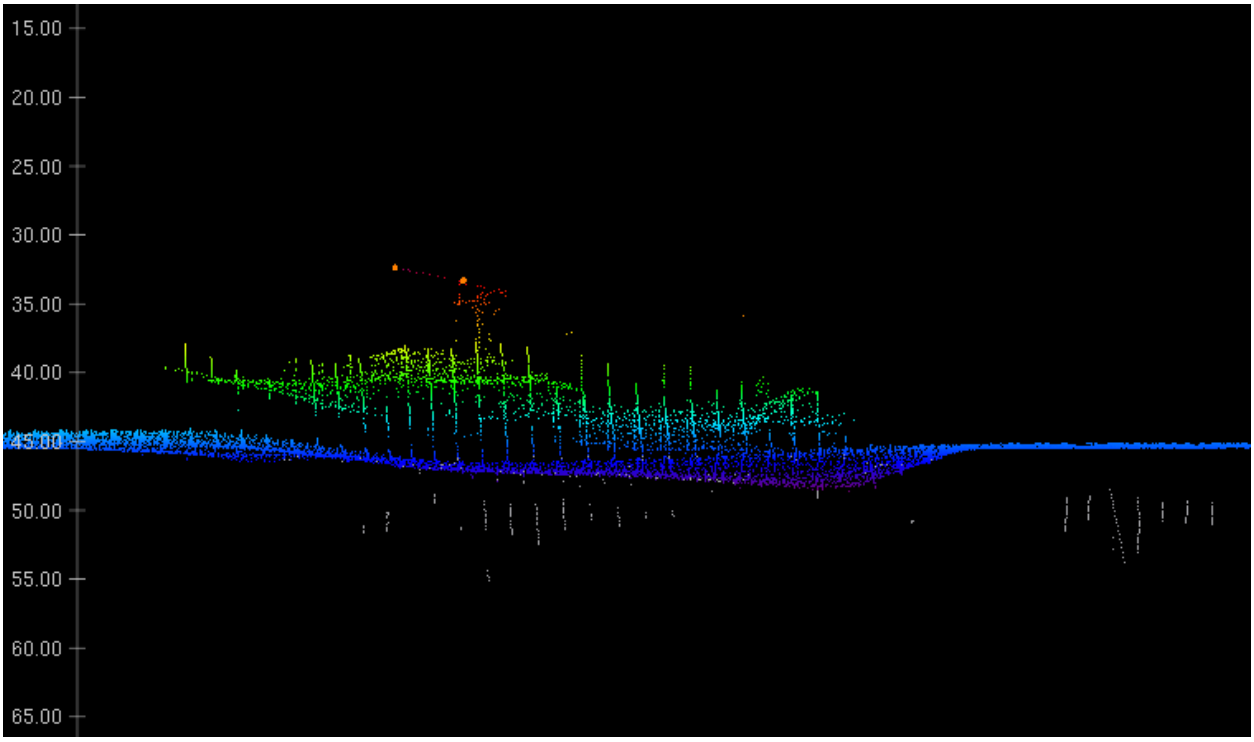

Figure 2.2.1

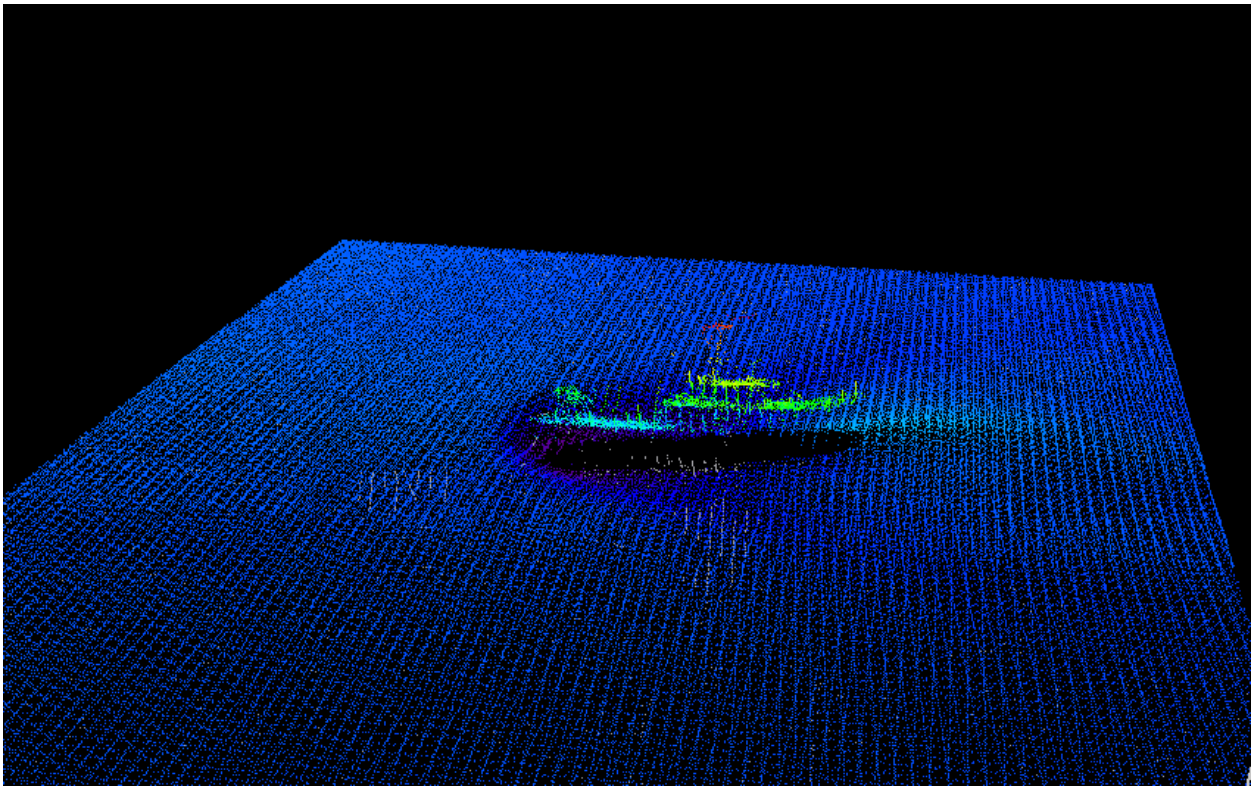

Figure 2.2.2

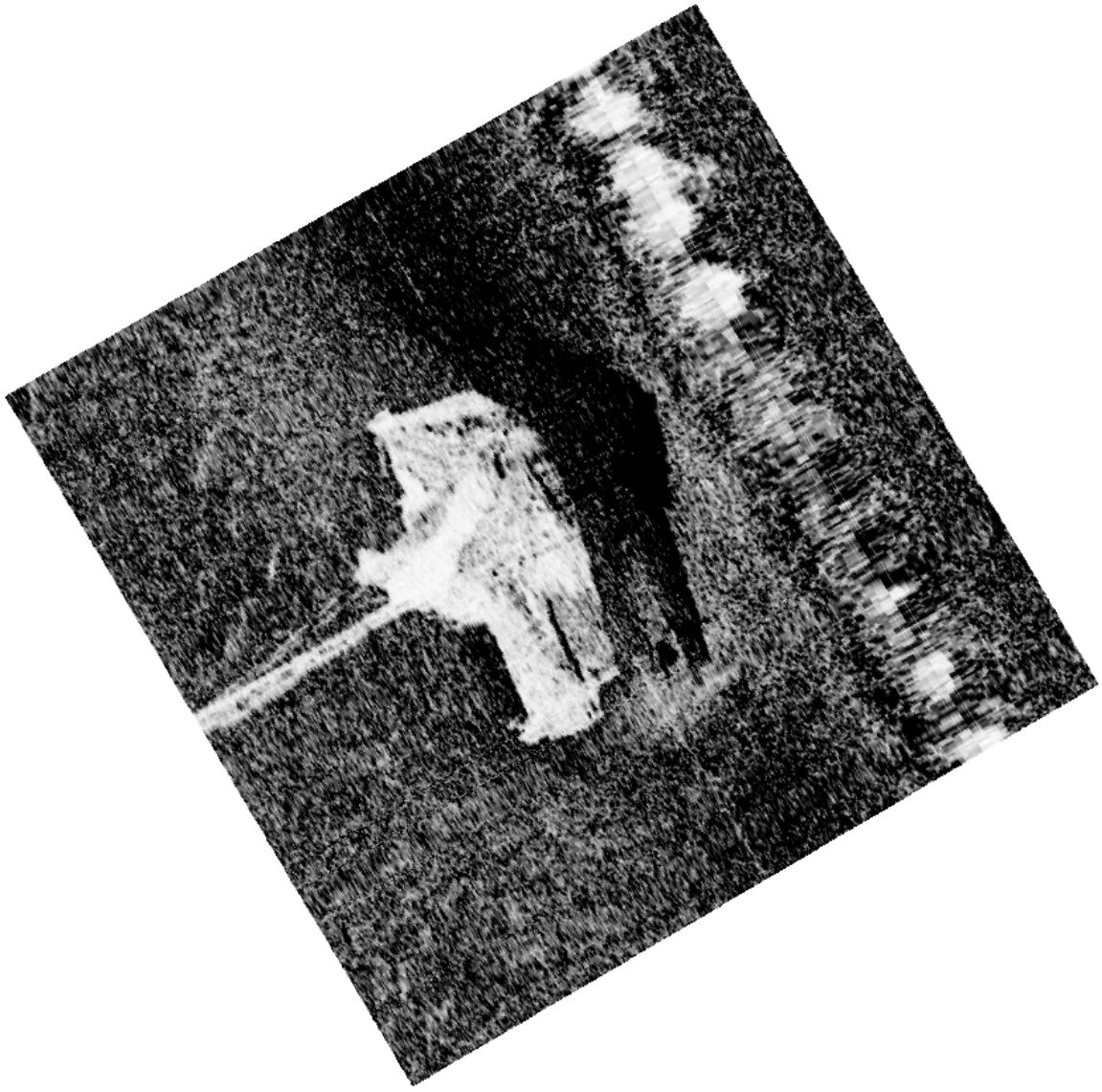

Figure 2.2.3

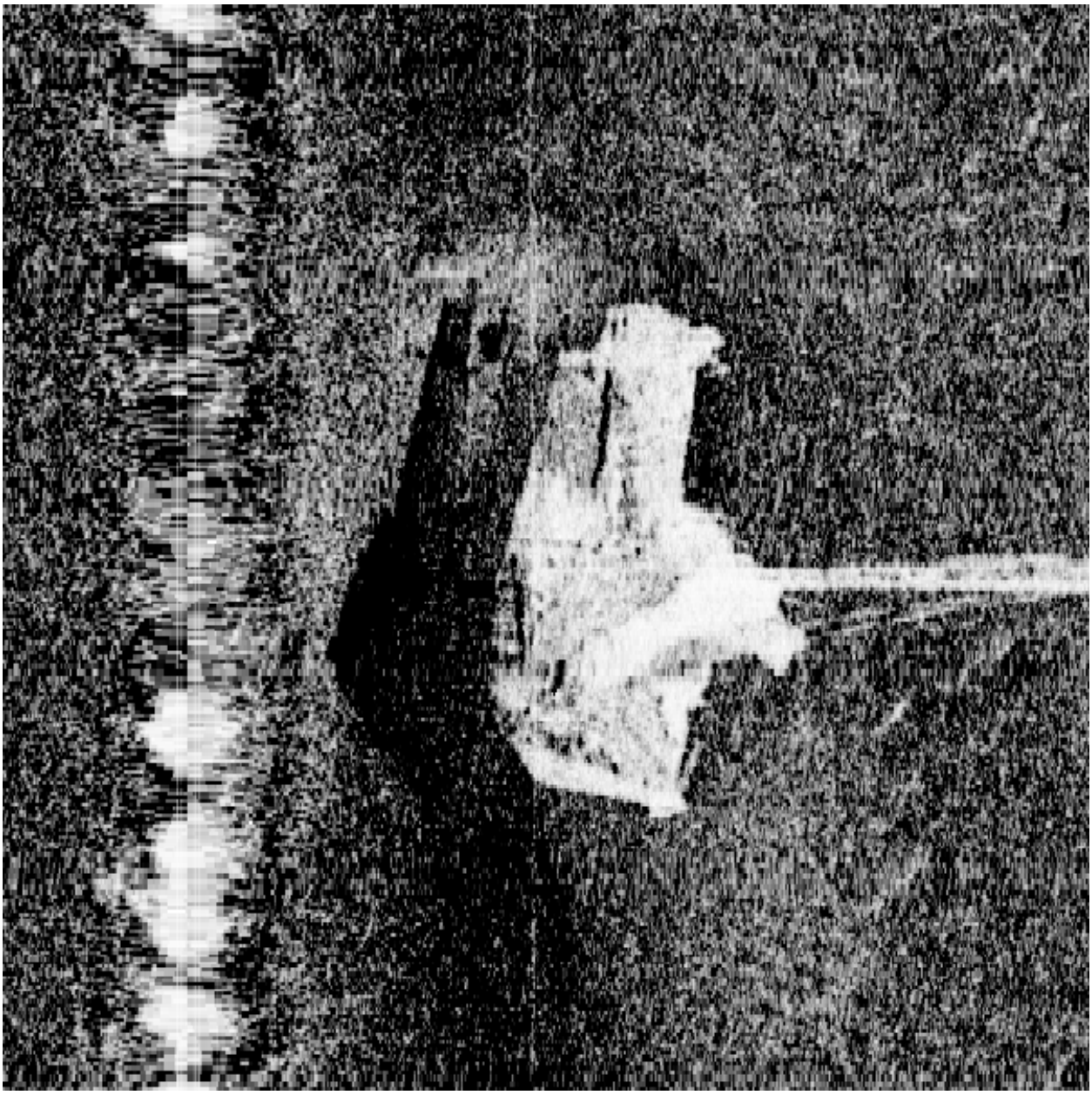

Figure 2.2.4

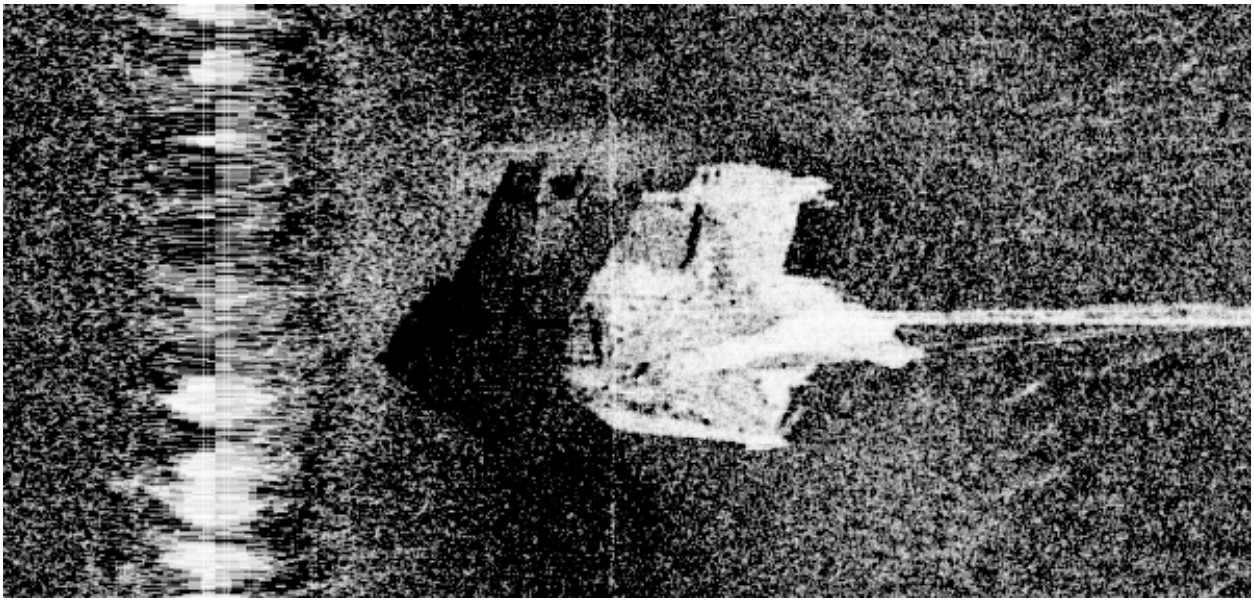

Figure 2.2.5

APPROVAL PAGE

H12605

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

- H12605_DR.pdf
- Collection of depth varied resolution BAGS
- Processed survey data and records
- H12605_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: 

Lieutenant Commander Matthew Jaskoski, NOAA
Chief, Atlantic Hydrographic Branch