DESCRIPTIVE REPORT

Type of Survey: Basic Navigable Area
Registry Number: H12152

LOCALITY

State: Pennsylvania, Delaware, and New Jersey
General Locality: Delaware River
Sub-locality: Deepwater Point Range to Salem Cove

CHIEF OF PARTY
Bert Ho, OIC NRT5

DATE
LIBRARY & ARCHIVES
<table>
<thead>
<tr>
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<td><strong>(11-72)</strong></td>
<td><strong>NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION</strong></td>
<td><strong>H12152</strong></td>
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**HYDROGRAPHIC TITLE SHEET**

**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:** Pennsylvania, Delaware, and New Jersey
- **General Locality:** Delaware River
- **Sub-Locality:** Deepwater Point Range to Salem Cove
- **Scale:** 1:10,000
- **Date of Survey:** 10/26/09 to 12/08/09
- **Instructions Dated:** 10/02/09
- **Project Number:** S-D903-NRT5-09
- **Change No.1 Dated:** N/A
- **Change No.2 Dated:** N/A
- **Vessel:** NOAA NRT-5, S3002
- **Chief of Party:** Bert Ho, NOAA
- **Surveyed by:** NOAA Navigation Response Team 5 Personnel
- **Soundings by:** Kongsberg Simrad EM 3002 multibeam echosounder
  - Odom Echotrac CV/200 Vertical Beam Echosounder
- **Graphic record checked by:** N/A
- **Protracted by:** N/A
- **Automated Plot:** N/A
- **Verification by:** Atlantic Hydrographic Branch Personnel
- **Soundings in:** Feet at MLLW
  - *H-Cell Compilation units: Feet at MLLW*

**Remarks:**
1) All Times are UTC.
2) This is a Basic Navigable Area Hydrographic Survey.
3) Projection is UTM Zone 18.
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**DESCRIPTIVE REPORT**

to accompany

**HYDROGRAPHIC SURVEY H12152**

Scale of Survey: 1:10,000  
Year of Survey: 2009  
NOAA Navigation Response Team 5  
Bert Ho, Team Lead

---

### A. AREA SURVEYED

This hydrographic survey was conducted in accordance with Hydrographic Survey Letter Instructions for project S-D903-NRT5-09, H12152, Delaware River, Pennsylvania, New Jersey, and Delaware. The original instructions are dated October 2, 2009.

This Descriptive Report pertains to an area of approximately 2.00 SNM, of Delaware River from Deepwater Point Range to Salem Cove. The assigned registry number for this sheet is H12152, as prescribed in the Letter Instructions.

The purpose of the CY 2009-2010 operations in this area were to provide contemporary surveys to update National Ocean Service (NOS) nautical charts as the numerous ports on the Delaware River have been designated critical survey areas. *Concur.*

For complete survey limits, see figure A-1 on the following page.

<table>
<thead>
<tr>
<th>Linear measure</th>
<th>Value</th>
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<tr>
<td>Linear nautical miles of single beam only sounding lines - mainscheme only</td>
<td>85.69</td>
</tr>
<tr>
<td>Linear nautical miles of side scan sonar only lines - mainscheme only</td>
<td>59.4</td>
</tr>
<tr>
<td>Linear nautical miles of any combination of the above techniques</td>
<td>59.4</td>
</tr>
<tr>
<td>Linear nautical miles of crosslines from single beam and multibeam combined</td>
<td>6.30</td>
</tr>
<tr>
<td>Linear nautical miles of developments other than mainscheme lines</td>
<td>1.45</td>
</tr>
<tr>
<td>Linear nautical miles of shoreline/nearshore investigation</td>
<td>N/A</td>
</tr>
<tr>
<td>Number of bottom samples collected</td>
<td>0</td>
</tr>
<tr>
<td>Number of items investigated that required additional time/effort in the field beyond the above survey operations</td>
<td>NA</td>
</tr>
</tbody>
</table>

Total square nautical miles: 2.00

Dates of acquisition: October 26, 2009 to December 8, 2009
Figure A-1: Outline of survey area
B. DATA ACQUISITION AND PROCESSING

See Also H-Cell Report.

B.1 EQUIPMENT

Data were acquired by NOAA NRT-5 S3002. NOAA Survey Vessel S3002 is an approximately 9m aluminum SeaArk outboard driven vessel with an average multibeam transducer draft of 0.5 meters.

NOAA S3002 acquired both bathymetry and imagery data in the project area. Side scan sonar data were acquired with a towed Klein 3000 sonar system (SSS). Bathymetry data were acquired with both an Odom Echotrac C/V 200 Vertical Beam Echosounder (VBES), and a Kongsberg Simrad EM 3002 Multibeam Echosounder (MBES). Positioning and attitude were determined with a TSS POS/MV 320 (version 4) GPS aided inertial navigation system.

B.2 QUALITY CONTROL

B.2.1 Side Scan Sonar Quality Control

Daily confidence checks were made by observing the outer ranges of the side scan sonar image trace. A good check consisted of distinguishing linear contacts across the entire range of the side scan trace. Navigation data were reviewed, fliers were rejected with interpolation. Significant sand waves were noted throughout bends in the Delaware River and were used for confidence checks. Concur.

In accordance with the project instructions, 200% SSS bottom coverage was collected for this survey at 75m range scale. A SSS image mosaic was created at 1m resolution for submission (Table B-2). Concur.

B.2.2 Multibeam Echosounder Quality Control

Multibeam echosounder data were acquired at 100% coverage for SSS contact development, and areas deemed navigationally significant by the hydrographer. In order to successfully operate the EM3002 with the SIS software, sound speed casts were completed at the start of the survey day (and every 4 hours afterwards) and manually entered into the SIS program as an ASVP file, which is a Simrad format created by Velocwin. Surface sound velocity was provided by a 2nd Odom Digibar and it was fed directly into the SIS program in real time. There were no faults with the MBES system which adversely effected data integrity. Navigation data were reviewed; any fliers were rejected with interpolation. A small variable Navigation Timing error was noted after review of the data in post-processing within Caris’ subset editor. The Navigation error did not exceed the allowable horizontal error budget, but it should be noted that certain vertical features may appear to have multiple peaks. Least depths were taken from the shallowest.
sounding. For detailed discussion of MBES system calibrations, data acquisition, and data processing refer to this project’s DAPR*.  Included with H-Cell deliverables.

### B.2.3 Total Propagated Error

Total Propagated Error (TPE) parameters for sound speed and tide data for H12152 are shown in table B-1. The estimated tidal error contribution to the total survey error budget in the vicinity of Delaware River is included in the TCARI grid. Sound speed TPE values were used in accordance with HSTP guidelines regarding frequency of surface and water column sound speed measurements. Concur.

Table B-1. Total Propagated Error parameters as applied in Caris.

<table>
<thead>
<tr>
<th>Total Propagated Error Values</th>
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<tbody>
<tr>
<td><strong>Tide Values</strong></td>
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<tr>
<td>Measured</td>
</tr>
<tr>
<td>0.0</td>
</tr>
<tr>
<td><strong>Sound Speed Values</strong></td>
</tr>
<tr>
<td>Measured</td>
</tr>
<tr>
<td>4.0</td>
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### B.2.4 Fieldsheets and Navigation Surfaces

Caris HIPS combined uncertainty weighted CUBE surfaces were created for this project. For MBES data surfaces were created and submitted at 0.50m resolution. A combined uncertainty weighted CUBE surface was created for VBES data at 4.00m resolution. The MBES CUBE surface finalized weighted grid is included in the PSS. Both surfaces used the corresponding CUBE parameters for the appropriate resolution of the grid. Concur with clarification. See SAR Verification Notes.

### B.2.5 Single Beam Quality Control

Navigation data were reviewed, fliers were rejected with interpolation. There were no unusual events associated with the collection of VBES data for this project. Additional single beam data was acquired at the request of the Delaware River Pilots via the Navigation Manager (See special correspondence emails). The areas where additional data were acquired included an area just south of New Castle Flats on the Delaware side of Deepwater Point Range, and the survey area east of New Castle Range adjacent to Salem Cove.

Refer to this project’s DAPR for detailed discussion of VBES system calibrations, data acquisition, and data processing.
Table B-2: H12152 Bathymetry surfaces and Side Scan mosaic resolutions.

<table>
<thead>
<tr>
<th>Fieldsheet</th>
<th>Surface/Mosaic Name</th>
<th>Grid Type</th>
<th>Resolution</th>
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<tbody>
<tr>
<td>H12152</td>
<td>H12152_MBES_CUBE_50cm</td>
<td>Cube, Order 1</td>
<td>0.50m</td>
</tr>
<tr>
<td>H12152</td>
<td>H12152_MBES_CUBE_50cm_Final</td>
<td>Cube, Order 1</td>
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<td>Cube, Order 1</td>
<td>4.00m</td>
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<tr>
<td>H12152</td>
<td>H12152_VBES_CUBE_4m_Final</td>
<td>Cube, Order 1</td>
<td>4.00m</td>
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<tr>
<td>H12152</td>
<td>H12152_SSS_1m</td>
<td>SSS Mosaic</td>
<td>1.00m</td>
</tr>
</tbody>
</table>

B.2.6 Crosslines

For this survey 6.3 linear NM of VBES crosslines were acquired. This is approximately 7.4% of the mainscheme VBES bathymetry linear NM. A visual examination of approximately 10% of crossline-mainscheme common areas showed agreement between crosslines and mainscheme lines to within 1-2 feet. For a list of all crosslines acquired for this project, tabulated by DN and line file name, please refer to the processing logs located in the separates section of the DR submission package. *Concur.*

B.2.7 Junctions

Survey H12152 junctions with contemporary survey H12151. Visual examination of all junction areas showed agreement between bathymetry data to within 1 foot. *Concur.*

B.3 CORRECTIONS TO ECHO SOUNDING

All methods or instruments used were as described in the project DAPR. All sound velocity casts are included in the PSS. SV Casts were not used in post processing for MB data in Caris due to the acquisition software’s (SiS) requirement to use an ASVP in real time. Post processing with an svp applied in Caris was found to create a double corrections of the data. See email correspondence with HSTP regarding data acceptance. *Concur.*
Figure B-1: Caris QC report, IHO order 1% vs Beam Number.
C. VERTICAL AND HORIZONTAL CONTROL  \textit{See Also H-Cell Report}

C.1 VERTICAL CONTROL

The tidal datum for this project is Mean Lower Low Water (MLLW). The operating National Water Level Observation Network (NWLon) stations at Reedy Point, DE (8551910) and Philadelphia, PA (8545240) served as datum control for the survey area including determination at each subordinate station. The operating stations at Marcus Hook, PA (8540433), Tacony-Palmyra (8538886), Reedy Point, DE (8551910), and Philadelphia, PA (8545240) provided residuals for this project. A Request for Approved Tides was sent to N/OPS1 on October 29, 2009 (Appendix III). Verified tides from the N/OPS1 CO-OPS website were downloaded and applied to all sounding data via TCARI in Pydro. \textit{Concur.}

C.2 HORIZONTAL CONTROL

The horizontal datum used for this survey is the North American Datum of 1983 (NAD 83), projected using UTM zone 18. \textit{Concur.}

Sounding positional control was determined using the Global Positioning System (GPS) corrected by U.S. Coast Guard differential GPS (DGPS) beacon stations. The DGPS beacon used for this survey was Reedy Point, DE. No horizontal control stations were established for this survey.

Horizontal dilution of precision (HDOP) was monitored during acquisition, and did not exceeded 4.00. Adequate satellite coverage was maintained throughout the survey period.

D. RESULTS AND RECOMMENDATIONS  \* \textit{See Also H-Cell Report}

D.1 CHART COMPARISON

The charts affected by this survey are:

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<td>12277</td>
<td>34th</td>
<td>Sep. 2007</td>
<td>1:20,000</td>
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<tr>
<td>13003</td>
<td>49th</td>
<td>Apr. 2007</td>
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</table>
D.1.1 General Agreement with Charted soundings and RSD investigations

Sounding data generally agreed with charted depths to within 1-2 feet, navigationally significant differences from charted depths are addressed in Appendix II of this report. There were no RSD investigations in Sheet H12152.  Do not concur.  See H-Cell Report Section B.2.4.

Additional SB data were acquired at the request of the Delaware River Pilots via the Philadelphia Navigation Manager. See email regarding Additional_Anch_areas. Areas of survey included an area adjacent to Deepwater Point Range and an area east of New Castle Range next to Salem Cove.

D.1.2 AWOIS Items and Significant Contacts

There were 6 investigation AWOIS items assigned within the survey limits of H12152.  The search area was covered with 200% SSS and 100% MBES when able to be confirmed.  The updates to the AWOIS database were made in Pydro in the remarks and recommendations were added to the feature reports. See appendix II. Do not concur. See Appendix II – Survey Features Report.

D.1.3 Dangers to Navigation

There were no DToNs submitted for survey H12152.  Concur.

D.1.4 Charted Features

Hydrographer recommended changes to charted items are listed in Appendix II of this report as well as in the PSS.  All charted items not specifically addressed in Appendix II are recommended to be retained as charted by the hydrographer.

D.1.5 Charting Recommendations
Hydrographer recommendations for discreet items are included in Appendix II of this report as well as in the PSS. Survey H12152 is complete and adequate to supersede charted soundings in their common areas. *Concur.*
D.2 ADDITIONAL RESULTS

D.2.1 Aids to Navigation

The hydrographer recommends no modifications to any aids to navigation to note. All were verified as accurate.

D.2.2 Bridges and Overhead Cables

There is no bridge and no overhead cables in the survey area.

D.2.3 Submarine Cables and Pipelines

There are two charted cable areas and no pipeline areas within the survey area.
E.  APPROVAL SHEET

S-D903
Delaware River
Pennsylvania, New Jersey, Delaware

Delaware River
Survey Registry No. H12152

Field operations for this survey were conducted under my daily supervision with frequent checks of progress and adequacy. All fieldsheets, bathymetry models, this Descriptive Report, and all accompanying records and data are approved.

Submitted in association with this descriptive report has been a series of reports and data:

   2009 Data Acquisition and Processing Report (submitted with this report)
   2009 HSRR Memo (submitted with this report)

This survey is adequate to supersede all prior surveys in common areas, and for application to the relevant NOS nautical charts.

Respectfully,

________________________________
N/A, PST/NOAA
NRT-5

________________________________
Bert Ho, NOAA
Team Lead NRT-5
APPENDIX  I

DANGERS TO NAVIGATION REPORT

There were no DTON’s submitted for survey H12152.
Appendix II - Survey Feature Report

Registry Number: H12152
State: Delaware
Locality: Delaware River
Sub-locality: Deepwater Point Range to Salem Cove
Project Number: S-D903-NRT5-09

Charts Affected

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<td></td>
<td></td>
<td></td>
<td></td>
<td>NGA NTM: 07/18/2009 (08/01/2009)</td>
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<td>49th</td>
<td>04/01/2007</td>
<td>1:1,200,000 (13003_1)</td>
<td>[L]NTM: ?</td>
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* Correction(s) - source: last correction applied (last correction reviewed--"cleared date")

Features

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<th>Survey Longitude</th>
<th>AWOIS Item</th>
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<tr>
<td>1.1</td>
<td>17-ft Wreck - Charted</td>
<td>Wreck</td>
<td>5.27 m</td>
<td>39° 40' 03.9&quot; N</td>
<td>075° 32' 13.7&quot; W</td>
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<tr>
<td>1.2</td>
<td>8-ft Obstn - Modify Charted 10-ft Obstn</td>
<td>Obstruction</td>
<td>2.62 m</td>
<td>39° 35' 39.7&quot; N</td>
<td>075° 33' 30.9&quot; W</td>
<td>---</td>
</tr>
<tr>
<td>1.3</td>
<td>Charted 17-ft Rk- Update Depth</td>
<td>Rock</td>
<td>[None]</td>
<td>39° 40' 16.4&quot; N</td>
<td>075° 32' 10.6&quot; W</td>
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<tr>
<td>2.1</td>
<td>18-ft Obstn - Add to chart.</td>
<td>Obstruction</td>
<td>5.68 m</td>
<td>39° 40' 06.3&quot; N</td>
<td>075° 32' 18.8&quot; W</td>
<td>---</td>
</tr>
<tr>
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<td>14-ft Obstn - Add to chart.</td>
<td>Obstruction</td>
<td>4.49 m</td>
<td>39° 39' 50.1&quot; N</td>
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<td>---</td>
</tr>
<tr>
<td>2.3</td>
<td>7-ft Obstn - Add to chart.</td>
<td>Obstruction</td>
<td>2.34 m</td>
<td>39° 35' 08.3&quot; N</td>
<td>075° 33' 03.6&quot; W</td>
<td>---</td>
</tr>
<tr>
<td>2.4</td>
<td>15-ft Wreck - Add to chart</td>
<td>Wreck</td>
<td>4.67 m</td>
<td>39° 34' 51.6&quot; N</td>
<td>075° 32' 57.5&quot; W</td>
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<tr>
<td>2.5</td>
<td>18-ft Wreck - Add to chart</td>
<td>Wreck</td>
<td>5.51 m</td>
<td>39° 34' 51.4&quot; N</td>
<td>075° 32' 56.2&quot; W</td>
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</tr>
<tr>
<td>2.6</td>
<td>18ft Obstn- Add to chart.</td>
<td>Obstruction</td>
<td>5.69 m</td>
<td>39° 39' 30.7&quot; N</td>
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<tr>
<td>3.1</td>
<td>AWOIS 12216 - 16-ft Obstn - Update Chart.</td>
<td>Obstruction</td>
<td>5.02 m</td>
<td>39° 39' 18.7&quot; N</td>
<td>075° 33' 03.5&quot; W</td>
<td>12216</td>
</tr>
</tbody>
</table>

Generated by Pydro v11.8 (r3585) on Fri Sep 09 19:43:47 2011 [UTC]
1 - DR_Charted
1.1) 17-ft Wreck - Charted

Survey Summary

Survey Position: 39° 40' 03.9" N, 075° 32' 13.7" W
Least Depth: 5.27 m (= 17.29 ft = 2 fm 5.29 ft)
TPU (±1.96σ): THU (TPEh) ±1.963 m ; TVU (TPEv) ±0.220 m
Survey Line: h12152_sheetf / nrt5_s3002_em3002_mbes / 2009-307 / 005_1521
Profile/Beam: 280/129
Charts Affected: 12311_1, 13003_1

Remarks:
Area was covered with 200% SSS and 100% MBES. TCARI tides have been applied and data has been remerged. Charted wreck.

Feature Correlation

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<thead>
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<th>Feature</th>
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<th>Azimuth</th>
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</table>

Hydrographer Recommendations

Hydrographer recommends updating the LD to what was found in the data.

Cartographically-Rounded Depth (Affected Charts):
17ft (12311_1)
2 ¾fm (13003_1)

S-57 Data

Geo object 1:  Wreck (WRECKS)
Attributes:  CATWRK - 2:dangerous wreck
            QUASOU - 6:least depth known
            SORDAT - 20091208
SORIND - US,US.graph,H12152
TECSOU - 2,3:found by side scan sonar,found by multi-beam
VALSOU - 5.269 m
WATLEV - 3:always under water/submerged

Office Notes

Concur with clarification. Delete charted dangerous wreck, least depth known 18 feet. Chart dangerous wreck, least depth known 17 feet at the present survey position.
Feature Images
Figure 1.1.3

[Image file h:/compilation/h12152_d903_nrt5/ahb_h12152/sar/sar pss/images/sonar_da0002_u.tif does not exist.]
1.2) 8-ft Obstn - Modify Charted 10-ft Obstn

Survey Summary

Survey Position: 39° 35' 39.7" N, 075° 33' 30.9" W
Least Depth: 2.62 m (= 8.58 ft = 1 fm 2.58 ft)
TPU (±1.96σ): THU (TPEh) ±1.963 m; TVU (TPEv) ±0.218 m
Survey Line: h12152_sheetf / nrt5_s3002_em3002_mbes / 2009-307 / 019_1556
Profile/Beam: 413/127
Charts Affected: 12277_1, 12311_1, 13003_1

Remarks:
Area was covered with 200% SSS and 100% MBES. TCARI tides have been applied and data has been remerged. Charted obstruction.

Feature Correlation

<table>
<thead>
<tr>
<th>Address</th>
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<th>Range</th>
<th>Azimuth</th>
<th>Status</th>
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</table>

Hydrographer Recommendations

Item exists. Hydrographer recommends modifying the charted obstruction to reflect the LD from the data.

Cartographically-Rounded Depth (Affected Charts):
8ft (12277_1, 12311_1)
1 ¼fm (13003_1)

S-57 Data

Geo object 1: Obstruction (OBSTRN)
Attributes: QUASOU - 6:least depth known
SORDAT - 20091208
SORIND - US,US,graph,H12152
TECSOU - 2,3:found by side scan sonar,found by multi-beam
VALSOU - 2.616 m
WATLEV - 3:always under water/submerged

Office Notes

Concur with clarification. Feature appears to be sunken dredge pipe. Delete charted dangerous obstruction, least depth known 10 feet and add 8 ft obstruction at present survey position.
Feature Images

Figure 1.2.1

[Image file h:/compilation/h12152_d903_nrt5/ahb_h12152/sar/sar pss/images/sonar_da0001_m.tif does not exist.]
1.3) Charted 17-ft Rk- Update Depth

Survey Summary

Survey Position: 39° 40' 16.4" N, 075° 32' 10.6" W
Least Depth: [None]
TPU (±1.96σ): THU (TPEh) [None]; TVU (TPEv) [None]
GP Dataset: ChartGPs - Digitized
GP No.: 4
Charts Affected: 12311_1, 13003_1

Remarks:
Item not addressed.

Feature Correlation

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</table>

Hydrographer Recommendations

Item not fully covered. Rk verified within the SS data with measured depth of 16.73228 ft. Feature found as existing, chart should be updated with new value.

S-57 Data

Geo object 1: Underwater rock / awash rock (UWTROC)

Office Notes

Concur with clarification. Rock piles were verified in side scan data. Exact least depth not determined. Delete charted dangerous 17 ft underwater rock and add a 16 ft underwater rock, depth reported from ENC position.
Feature Images

Figure 1.3.1
2 - DR_UnCharted
2.1) 18-ft Obstn - Add to chart.

Survey Summary

Survey Position: 39° 40' 06.3" N, 075° 32' 18.8" W
Least Depth: 5.68 m (= 18.64 ft = 3.106 fm = 3 fm 0.64 ft)
TPU (±1.96σ): THU (TPEh) ±1.964 m ; TVU (TPEv) ±0.221 m
Survey Line: h12152_sheetf / nrt5_s3002_em3002_mbes / 2009-307 / 001_1523
Profile/Beam: 273/131
Charts Affected: 12311_1, 13003_1

Remarks:
Area was covered with 200% SSS and 100% MBES. TCARI tides have been applied and data has been remerged. Small obstruction.

Feature Correlation

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</table>

Hydrographer Recommendations

Current surrounding depths show feature to be significant. Defer to compilation for charting recommendation.

Cartographically-Rounded Depth (Affected Charts):

18ft (12311_1)
3fm (13003_1)

S-57 Data

Geo object 1: Obstruction (OBSTRN)
Attributes: QUASOU - 6:least depth known
SORDAT - 20091208
SORIND - US,US,graph,H12152
TECSOU - 2,3:found by side scan sonar,found by multi-beam
VALSOU - 5.680 m
WATLEV - 3: always under water/submerged

Office Notes

Concur with clarification. Chart dangerous obstruction, least depth known 18 feet at the present survey position.
Feature Images

Figure 2.1.1
Figure 2.1.2
2.2) 14-ft Obstn - Add to chart.

Survey Summary

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<th>Survey Position:</th>
<th>39° 39' 50.1&quot; N, 075° 32' 56.2&quot; W</th>
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</thead>
<tbody>
<tr>
<td>Least Depth:</td>
<td>4.49 m (= 14.73 ft = 2.456 fm = 2 fm 2.73 ft)</td>
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<tr>
<td>TPU (±1.96σ):</td>
<td>THU (TPEh) ±1.967 m ; TVU (TPEv) ±0.216 m</td>
</tr>
<tr>
<td>Survey Line:</td>
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</tr>
<tr>
<td>Profile/Beam:</td>
<td>221/25</td>
</tr>
<tr>
<td>Charts Affected:</td>
<td>12311_1, 13003_1</td>
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</tbody>
</table>

Remarks:
Area was covered with 200% SSS and 100% MBES. TCARI tides have been applied and data has been remerged. Ridge.

Feature Correlation

<table>
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<th>Range</th>
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</table>

Hydrographer Recommendations

Hydrographer recommends not charting this feature because LD is not significant enough to pose a hazard.

Cartographically-Rounded Depth (Affected Charts):

14ft (12311_1)
2 ½fm (13003_1)

S-57 Data

Geo object 1: Obstruction (OBSTRN)
Attributes: QUASOU - 6:least depth known
SORDAT - 20091208
SORIND - US,US,graph,H12152
TECSOU - 2,3:found by side scan sonar,found by multi-beam
VALSOU - 4.491 m
Office Notes

Do not concur. Feature is a linear obstruction which appears to be a sunken dredge pipe laying horizontally on the river bottom approximately 30 m in length and 1.5 m in width positioned in a north/south orientation. The feature was not completely ensonified during multibeam development, therefore the shoal depth of 14 ft could not be confirmed as the shoalest point or least depth on the obstruction. Chart dangerous linear obstruction, depth known 14 ft at the survey position.
Feature Images

Figure 2.2.1

[Image file h:/compilation/h12152_d903_nrt5/ahb_h12152/sar/sar_pss/images/sonar_da0001_m.tif does not exist.]
Figure 2.2.2
2.3) 7-ft Obstn - Add to chart.

**Survey Summary**

Survey Position: 39° 35' 08.3" N, 075° 33' 03.6" W
Least Depth: 2.34 m (= 7.68 ft = 1.281 fm = 1 fm 1.68 ft)
TPU (±1.96σ): THU (TPEh) ±1.966 m; TVU (TPEv) ±0.207 m
Survey Line: h12152_sheetf / nrt5_s3002_em3002_mbes / 2009-307 / 030_1609
Profile/Beam: 94/208
Charts Affected: 12277_1, 12311_1, 13003_1

Remarks:
Area was covered with 200% SSS and 100% MBES. TCARI tides have been applied and data has been remerged. Significant obstruction.

**Feature Correlation**

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**Hydrographer Recommendations**

Hydrographer recommends charting this obstruction with LD from data at location within data.

**Cartographically-Rounded Depth (Affected Charts):**

7ft (12277_1, 12311_1)
1 ¼fm (13003_1)

**S-57 Data**

Geo object 1: Obstruction (OBSTRN)
Attributes: QUASOU - 6:least depth known
SORDAT - 20091208
SORIND - US,US,graph,H12152
TECSOU - 2,3:found by side scan sonar,found by multi-beam
VALSOU - 2.342 m
WATLEV - 3: always under water/submerged

Office Notes

Concur with clarification. Chart dangerous obstruction, least depth known 7 feet at the present survey position.
Feature Images

Figure 2.3.1

[Image file h:/compilation/h12152_d903_nrt5/ahb_h12152/sar/sar pss/images/sonar_da0003_u.tif does not exist.]

[Image file h:/compilation/h12152_d903_nrt5/ahb_h12152/sar/sar pss/images/sonar_da0003_m.tif does not exist.]

[Image file h:/compilation/h12152_d903_nrt5/ahb_h12152/sar/sar pss/images/sonar_da0003_s.tif does not exist.]
Figure 2.3.2
2.4) 15-ft Wreck - Add to chart

Survey Summary

Survey Position: 39° 34' 51.6" N, 075° 32' 57.5" W
Least Depth: 4.67 m (= 15.31 ft = 2 fm 3.31 ft)
TPU (±1.96σ): THU (TPEh) ±1.969 m ; TVU (TPEv) ±0.225 m
Survey Line: h12152_sheetf / nrt5_s3002_em3002_mbes / 2009-307 / 041_1622
Profile/Beam: 7/1
Charts Affected: 12277_1, 12311_1, 13003_1

Remarks:
Area was covered with 200% SSS and 100% MBES. TCARI tides have been applied and data has been remerged. Wreck next to another wreck.

Feature Correlation

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</table>

Hydrographer Recommendations

Hydrographer recommends charting wreck at location within data with LD from data.

Cartographically-Rounded Depth (Affected Charts):
15ft (12277_1, 12311_1)
2 ½fm (13003_1)

S-57 Data

Geo object 1: Wreck (WRECKS)
Attributes: CATWRK - 2:dangerous wreck
QUASOU - 6:least depth known
SORDAT - 20091208
SORIND - US,US,graph,H12152
TECSOU - 2,3:found by side scan sonar,found by multi-beam
VALSOU - 4.668 m
WATLEV - 3:always under water/submerged

Office Notes

Concur with clarification. The dangerous wreck, least depth 15 ft is approximately 31 meters offshore to the west of another dangerous wreck with a least depth of 18 ft. Since both features are within a 75 meter diameter danger circle centered on the shoalest depth of the 15 ft wreck the features should be charted as plural wrecks, with a least depth known of 15 ft. Chart dangerous wrecks (plural), least depth known 15 feet and text "Wrecks" at the present survey position. See also Feature 2.5 - "18-ft Wreck - Wreck - Add to chart".
Feature Images

Figure 2.4.1

[Image file h:/compilation/h12152_d903_nrt5/ahb_h12152/sar/pss/images/sonar_da0002_u.tif does not exist.]

[Image file h:/compilation/h12152_d903_nrt5/ahb_h12152/sar/pss/images/sonar_da0002_m.tif does not exist.]

[Image file h:/compilation/h12152_d903_nrt5/ahb_h12152/sar/pss/images/sonar_da0002_s.tif does not exist.]
2.5) 18-ft Wreck - Add to chart

Survey Summary

Survey Position: 39° 34' 51.4" N, 075° 32' 56.2" W
Least Depth: 5.51 m (= 18.08 ft = 3.013 fm = 3 fm 0.08 ft)
TPU (±1.96σ): THU (TPEh) ±1.965 m ; TVU (TPEv) ±0.220 m
Survey Line: h12152_sheetf / nrt5_s3002_em3002_mbes / 2009-307 / 041_1622
Profile/Beam: 135/109
Charts Affected: 12277_1, 12311_1, 13003_1

Remarks:
Area was covered with 200% SSS and 100% MBES. TCARI tides have been applied and data has been remerged. Wreck, adjacent to another wreck.

Feature Correlation

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</tbody>
</table>

Hydrographer Recommendations

Hydrographer recommends charting this wreck at the location within data with the LD from data.

S-57 Data

Geo object 1: Wreck (WRECKS)
Attributes: CATWRK - 2:dangerous wreck
            QUASOU - 6:least depth known
            SORDAT - 20091208
            SORIND - US,US,graph,H12152
            TECSOU - 2,3:found by side scan sonar,found by multi-beam
            VALSOU - 5.511 m
            WATLEV - 3:always under water/submerged

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Office Notes

Concur with clarification. The dangerous wreck, least depth 18 ft is approximately 31 meters inshore to the east of another dangerous wreck with a least depth of 15 ft. Since both features are within a 75 meter diameter danger circle centered on the shoalest depth of the 15 ft wreck the features should be charted as plural wrecks, with a least depth known of 15 ft. Do not chart 18 ft Wreck deirectly. Chart dangerous wrecks (plural), least depth known 15 feet and text "Wrecks" at the present survey position of the 15 ft dangerous wreck. See also Feature 2.4 - "15-ft Wreck - Add to Chart".
Feature Images

Figure 2.5.1
Figure 2.5.3
2.6) **18ft Obstn- Add to chart.**

**Survey Summary**

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<tr>
<th>Survey Position:</th>
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</thead>
<tbody>
<tr>
<td>Least Depth:</td>
<td>5.69 m (= 18.66 ft = 3.111 fm = 3 fm 0.66 ft)</td>
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<tr>
<td>TPU (±1.96σ):</td>
<td>THU (TPEh) ±1.968 m ; TVU (TPEv) ±0.223 m</td>
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<td>73/228</td>
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<tr>
<td>Charts Affected:</td>
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</table>

**Remarks:**
Area was covered with 200% SSS and 100% MBES. TCARI tides have been applied and data has been remerged.

**Feature Correlation**

<table>
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**Hydrographer Recommendations**

Add 18-ft Obstn to chart. Item exists.

**Cartographically-Rounded Depth (Affected Charts):**

- 18ft (12311_1)
- 3fm (13003_1)

**S-57 Data**

<table>
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<tr>
<th>Geo object 1:</th>
<th>Obstruction (OBSTRN)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Attributes:</td>
<td>QUASOU - 6:least depth known</td>
</tr>
<tr>
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<td>SORDAT - 20091208</td>
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<tr>
<td></td>
<td>SORIND - US,US,graph,H12152</td>
</tr>
<tr>
<td></td>
<td>TECSOU - 2,3:found by side scan sonar,found by multi-beam</td>
</tr>
<tr>
<td></td>
<td>VALSOU - 5.689 m</td>
</tr>
</tbody>
</table>
WATLEV - 3: always under water/submerged

Office Notes

Concur with clarification. Chart dangerous obstruction, least depth known 18 feet at the present survey position.
Feature Images

Figure 2.6.1

Figure 2.6.2
### 3.1) AWOIS 12216 - 16-ft Obstrn - Update Chart.

#### Primary Feature for AWOIS Item #12216

**Search Position:** 39° 39' 18.9" N, 075° 33' 03.3" W  
**Historical Depth:** 5.49 m  
**Search Radius:** 50  
**Search Technique:** S2, MB, ES  
**Technique Notes:** [None]

**History Notes:**  
H111023/01--OPR-D307-KR; FOUND AN OBSTRUCTION IN LAT. 39/39/18.91N, LONG. 075/33/03.32W (NAD83) WITH A LEAST DEPTH OF 18' MLLW. (ENTERED 2/04 BY MBH)

#### Survey Summary

**Survey Position:** 39° 39' 18.7" N, 075° 33' 03.5" W  
**Least Depth:** 5.02 m (= 16.48 ft = 2.747 fm = 2 fm 4.48 ft)  
**TPU (±1.96σ):** THU (TPEh) ±1.968 m ; TVU (TPEv) ±0.225 m  
**Timestamp:** 2009-307.15:40:59.542 (11/03/2009)  
**Survey Line:** h12152_sheetf/nrt5_s3002_em3002_mbes/2009-307/017_1540  
**Profile/Beam:** 393/9  
**Charts Affected:** 12311_1, 13003_1

**Remarks:**  
Area was covered with 200% SSS and 100% MBES. TCARI tides have been applied and data has been remerged. Charted obstruction. AWOIS item #12216.

#### Feature Correlation

<table>
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Hydrographer Recommendations

Hydrographer recommends modifying this charted obstruction to reflect the LD from the data. -bsh

SAR: Confirm item exists. Defer to compilation for charting recommendations.

Cartographically-Rounded Depth (Affected Charts):
16ft (12311_1)
2 ¾fm (13003_1)

S-57 Data

Geo object 1: Obstruction (OBSTRN)
Attributes:
NINFOM - AWOIS 12216 - 16ft Obstn - Modify Chart
QUASOU - 6:least depth known
SORDAT - 20091208
SORIND - US,US,graph,H12152
TECSOU - 2,3:found by side scan sonar,found by multi-beam
VALSOU - 5.023 m
WATLEV - 3:always under water/submerged

Office Notes

Concur with clarification. Feature is AWOIS Item #12216. Delete charted dangerous obstruction, least depth 18 ft. Chart dangerous obstruction least depth 16 ft at the present survey position. Update AWOIS database.
Feature Images

Figure 3.1.1
APPENDIX III
PROGRESS SKETCH
APPENDIX III

PROGRESS SKETCH
APPENDIX  IV

TIDES AND WATER LEVELS
MEMORANDUM FOR: Chief, Requirements and Development Division, N/OPS1

FROM: LT Matthew Jaskoski, NOAA NRT-5 (N/CS53x5)

SUBJECT: Request for Approved Tides/Water Levels

Please provide the following data:

1. Tide Note
2. Final TCARI grid
3. Six Minute Water Level data (Co-ops web site)

Transmit data to the following:

NOAA/NOS/Atlantic Hydrographic Branch
N/CS33, Building #2
439 West York Street
Norfolk, VA 23510
ATTN: Chief AHB

These data are required for the processing of the following hydrographic survey:

Project No.: S-D903-NRT5-09
Registry No.: H12152
State: Delaware
Locality: New Castle, DE
Sublocality: Delaware River

Attachments containing:

1) an Abstract of Times of Hydrography,
2) digital MID MIF files of the track lines from Pydro

cc: N/CS33
<table>
<thead>
<tr>
<th>Year_DOY</th>
<th>Min Time</th>
<th>Max Time</th>
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<tbody>
<tr>
<td>2009_299</td>
<td>12:51:35</td>
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<td>12:25:06</td>
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<tr>
<td>2009_307</td>
<td>15:19:10</td>
<td>16:26:12</td>
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</tbody>
</table>
DATE: December 29, 2009

HYDROGRAPHIC BRANCH: Atlantic
HYDROGRAPHIC PROJECT: S-D903-NRT5-2009
HYDROGRAPHIC SHEET: H12152
LOCALITY: Delaware River, New Castle, DE
TIME PERIOD: October 26 - December 8, 2009

TIDE STATION USED: Tacony-Palmyra Bridge, NJ 853-8886
Lat. 40° 0.7' N Long. 75° 2.6' W
PLANE OF REFERENCE (MEAN LOWER LOW WATER): 0.000 meters
HEIGHT OF HIGH WATER ABOVE PLANE OF REFERENCE: 2.028 meters

TIDE STATION USED: Marcus Hook, PA 854-0433
Lat. 39° 48.7' N Long. 75° 24.6' W
PLANE OF REFERENCE (MEAN LOWER LOW WATER): 0.000 meters
HEIGHT OF HIGH WATER ABOVE PLANE OF REFERENCE: 1.720 meters

TIDE STATION USED: Philadelphia, PA 854-5240
Lat. 39° 56.0' N Long. 75° 8.5'
PLANE OF REFERENCE (MEAN LOWER LOW WATER): 0.000 meters
HEIGHT OF HIGH WATER ABOVE PLANE OF REFERENCE: 1.887 meters

TIDE STATION USED: Reedy Point, DE 855-1910
Lat. 39° 33.5' N Long. 75° 34.4'
PLANE OF REFERENCE (MEAN LOWER LOW WATER): 0.000 meters
HEIGHT OF HIGH WATER ABOVE PLANE OF REFERENCE: 1.683 meters

REMARKS: RECOMMENDED Grid
Please use the TCARI grid "D903NRT52009Final" as the final grid for project S-D903-NRT5-2009, H12152, during the time period between October 26 - December 8, 2010.

Refer to attachments for grid information.

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).

Note 2:
APPENDIX V
SUPPLEMENTAL SURVEY RECORDS AND CORRESPONDENCES
APPENDIX V
SUPPLEMENTAL SURVEY RECORDS AND CORRESPONDENCES

V.1. COAST PILOT REPORT, NOAA FORM 77-6

No corrections or additions required.

V.2. BOTTOM SAMPLE, NOAA FORM 75-44

No bottom samples were taken.

V.3. AIDS TO NAVIGATION, NOAA FORM 76-40

The hydrographer recommends no modifications to any aids to navigation to note. All were verified as accurate.
Hi Bert,

I have a question for you. There is an issue with the D903 project and it might mean that the final tides will be a few days late. When I created the error model for the Project Instruction 200 grid, the units used for the datum error were feet instead of meters. Unless it would cause a processing hangup, a modified grid with the corrected datum error values can be created and we could update it with the amended tides by the end of next week. Would you have an issue with making the correction and sending it with the final tides or have you already started processing the data?

Let me know what you think.

Thanks,

David

David Wolcott
Hydrographic Planning Team
NOS/CO-OPS
p: (310) 713-2890 x 153
Subject: EM 3002 and SVP cast application

From: Olivia.Hauser@noaa.gov

Date: Thu, 05 Nov 2009 10:13:45 -0500

To: Richard.T.Brennan@noaa.gov, CO.Thomas.Jefferson@noaa.gov, Edward.J.Vandenameele@noaa.gov, Michael.J.Annis@noaa.gov, Bert Ho <Bert.Ho@noaa.gov>

CC: Jack.Riley@noaa.gov, Caryn.Arnold@noaa.gov, Eric.M.Moore@noaa.gov, Kathryn.Simmons@noaa.gov, Stephen.Kuzirian@noaa.gov

Hello all,

I had a conversation with LCDR Brennan about the below question. Normally, NOAA has only accepted data where SV casts can be unflagged by expection. This newer configuration allows NOAA to review casts apply the SV cast post acquisition and after the data is already ingested as an ingest SV cast apply the SV cast. If not applied for the data the data remains as unreviewed. Normally it does apply correctly. The question is, is it OK for the OBSS to submit data that does not include SV data applied during pre-processing. CEDDTT recommends that the process in applied because it is not an SSP basis you cannot back the data out. Can we talk to configure Hypack to change what information is being saved so SVP can be applied to the data once in Caris?

Mike and Jack, any ideas?

Thanks.

Olivia

----- Original Message ----- 
From: Bert Ho <Bert.Ho@noaa.gov>
Date: Wednesday, November 4, 2009 10:07 am
Subject: Re: NRT5's mbes data
To: "Olivia.Hauser@noaa.gov" <Olivia.Hauser@noaa.gov>

> > Thanks, keep in mind that this will affect any MB that has an EM3002
> > running SiS.
> > >
> > > Sent from my mobile device.
> > >
> > > On Nov 4, 2009, at 9:27 AM, Olivia.Hauser@noaa.gov wrote:
> > >
> > > > Bert,
> > > > Sorry it has taken so long to get back to you. Things got crazy and
> > > > I dropped a couple of emails. I need to get up with Rick Brennan
> > > > about this one. I think we were OK last time we talked about it
> > > > with
> > > > Shep and EJ, but I will confirm for you. Thanks.
> > > > >
> > > > Olivia
> > > > > ----- Original Message ----- 
> > > > From: Bert <Bert.Ho@noaa.gov>
> > > > Date: Wednesday, October 28, 2009 5:51 pm
> > > > Subject: NRT5's mbes data
> > > > To: Olivia Hauser <Olivia.Hauser@noaa.gov>
> > > > Cc: Matthew Jaskoski <Matthew.Jaskoski@noaa.gov>, Lawrence T Krepp <Lawrence.T.Krepp@noaa.gov>
> > > > Pig Pen <John.Doroba@noaa.gov>
> > > >>
> > > > Hi Olivia,
> > > >>
> > > > I think we talked to you about this some time earlier this year...but
> > > > is
> > > > there any reason why our MB data would not be accepted without SVP's
> > > > applied during post-processing? Right now, the SiS system requires
> > > > an
> > > > ASVP to be applied during acquisition. I've post-processed data both
> > > > with and without an SVP and it appears that applying an SVP during
> > > > post-processing doubles the SVP and creates a "Chevron" shape in the
> > > > base surface. The data looks better without the SVP added in
> > > > post-processing.
> > > >>
> > > > Please let me know if AHB or HSTP has any issue with accepting data
> > > > without SVP's added in post-processing...in reality, its not data
> > > > without SVP, its just data with SVP corrections in real-time, and
> > > > not
> > > > corrected in post-processing. I will be adding this correspondence
> > > > and
> > > > your reply into all DR's for 2009-2010.
> > > >>
> > > > Thanks for your time and help.
> > > >>
> > > > -Bert
> > > > NRT5
Subject: Anch areas
From: Howard Danley <Howard.Danley@noaa.gov>
Date: Tue, 10 Nov 2009 14:58:14 -0500
To: Bert Ho <Bert.Ho@noaa.gov>

See the graphics below

-------- Original Message --------
Date:     Mon, 08 Jun 2009 10:12:59 -0400
From:     Stephen Roberts <s.a.roberts@comcast.net>
To:     Howard.Danley@noaa.gov

Howard,

It was good to see you the other day at the Mariner’s Advisory Committee meeting in Philadelphia. We really appreciate NOAA’s and your support for our area. With the resignation of Tom Sharp as Chairman, I was appointed to the position by Capt. Jim Roche. It should be announced sometime this week.

Thank you for your offer of tasking some out of channel surveying in our area. I have attached some images of charts with areas outlined in blue that we are interested in for the creation of new anchorages. We are also interested in a couple of areas to create emergency turning basins off of Tioga Marine Terminal and below the Tacony-Palmyra Bridge.

I look forward to a long and fruitful relationship with all of our friends at NOAA. Please feel free to contact me with any questions or if there is anything we can do for you.

Best regards,
Steve Roberts
Please survey areas East of Bellevue and Marus Hook Ranges, South of Anchorage #7.

Di have been observed astride the Delaware River Channel from Oldmans Point to the mouth of Oldmans Creek.
Please survey waters in and around Anchorage #5.

Please Survey area around Anchorage #10.
Anch areas

Please survey area to the West of New Castle and Cherry Island Range intersection.
Anch areas

Please survey areas near Petty Island.

Please survey for emergency turning basin.
Anch areas

Please survey area South of Tinicum and North of Billingsport Ranges.

Please survey area North of Anchorage #6.
**AHB COMPILATION LOG**

### General Survey Information
- **REGISTRY No.** H12152
- **PROJECT No.** S-D903-NRT5-09
- **FIELD UNIT** NOAA NRT-5
- **DATE OF SURVEY** 20091026 - 20091208
- **LARGEST SCALE CHART** 12277_1, edition 35, 20100701, 1:20,000
- **ADDITIONAL CHARTS** 12311_1, edition 45, 20081201, 1:40,000
- **SOUNDING UNITS** FEET AT MLLW
- **COMPILER** Dinah O. Morris

### Source Grids

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<td>H12152_VB_4m_Shallow_extracted.bag</td>
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### Surfaces

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### Final HOBs

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<tr>
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<tr>
<td>Chart Scale Soundings</td>
<td>H12152_CS_Soundings.hob</td>
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<td>Feature Layer</td>
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<tr>
<td>Blue Notes</td>
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<td>ENC Retain Soundings</td>
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### Meta-Objects Attribution

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<th>Value</th>
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<td>M_COVR</td>
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</tr>
<tr>
<td>CATCOV</td>
<td>SORDAT 20091208</td>
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<td>SORDAT</td>
<td>US,US,graph, H12152</td>
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<tr>
<td>SORIND</td>
<td></td>
</tr>
<tr>
<td>M_QUAL</td>
<td>6 – zone of confidence U (data not assessed)</td>
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<tr>
<td>CATZOC</td>
<td>INFORM NOAA NRT-5 S3002</td>
</tr>
<tr>
<td>POSACC</td>
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<td>US,US,graph, H12152</td>
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<td>SUREND</td>
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<td>SURSTA</td>
<td>20091026</td>
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<tr>
<td>DEPARE</td>
<td>7.684 ft</td>
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<td>DRVALV2</td>
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<td>M_CSCL</td>
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</tbody>
</table>
SPECIFICATIONS:

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

II. SURVEY SCALE SOUNDINGS (SS):
   a. Attribute Name: Depth
   b. Selection criteria: Radius, Shoal bias
   c. Radius value is: mm at map scale
      i. Use single-defined radius: N/A
      ii. And/Or use radius table file: H12152_SS_SSR_20k.txt

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

IV. CONTOURS:
    a. Attribute Name: Depth
    b. Use a Depth List: H12152_depth_contours.txt
    c. Output Options: Create contour lines
       i. Line Object: DEPCNT
       ii. Value Attribute: VALDCO
V. FEATURES:
   a. Number of Chart Features: 11
   b. Number of Non-Chart Features: 6

VI. CHART SURVEY SOUNDINGS (CS):
   a. Number of ENC CS Soundings: 89
   b. Attribute Name: Depth
   c. Selection criteria: Radius, Shoal bias
   d. Radius value is:
      i. Use single-defined radius: N/A
      ii. And/Or use radius table file:
         H12152_CS_SSR_20k.txt
         H12152_CS_SSR_40k.txt
   e. Number Survey CS Soundings: 87

VII. NOTES:
This H-Cell Report has been written to supplement and/or clarify the original Descriptive Report (DR) and pass critical compilation information to the cartographers in the Marine Chart Division. Sections in this report refer to the corresponding sections of the Descriptive Report.

A. **AREA SURVEYED**

B. **DATA ACQUISITION AND PROCESSING**

B.2 **QUALITY CONTROL**

The AHB source depth grids for the survey’s nautical chart update consisted of one 0.5m resolution MBES development BASE surface and one 4m resolution vertical beam shoal layer BASE surface, which were combined at 4m resolution. The survey scale soundings were created from the combined surface covering the respective area of the survey (Chart 12277_1 ~ 1:20,000; Chart 12311_1 ~ 1:40,000) using two sounding spacing range (SSR) files (all SSR values are included in the AHB Compilation Log section of this Descriptive Report). The survey scale soundings were imported into a “point cloud” grid. The chart scale soundings were derived directly from the survey scale soundings point cloud grid to preserve absolute continuity between the charted depths, the survey scale soundings, and the original source grid. The chart scale soundings were selected using a sounding spacing range (SSR) file. The chart scale soundings are a subset of the survey scale soundings. The surface model was referenced when selecting the chart scale soundings, to ensure that the selected soundings portray the bathymetry within the common area.

A UTM projected TIN surface was created from the survey scale soundings point cloud grid, from which an interpolated surface of 12m resolution was generated. The interpolated TIN surface of 12m resolution was shifted by the NOAA sounding rounding value of -0.75 feet. The shifted interpolated TIN was used to generate depth contours in feet (12 and 18). The depth contours are forwarded to MCD for reference only. The contours were utilized during chart scale sounding selection and quality assurance efforts at AHB. The depth contours are incorporated into the SS H-Cell product as per 2009 H-Cell Specifications.

The compilation products (Final *.HOB files) for this survey are detailed in the H12152 AHB Compilation Log contained within this document. The Final HOB files include depth areas (DEPARE), depth contours (DEPCNT), soundings (SOUNDG), meta-objects (M_COVR, M_QUAL, and M_CSCL), cartographic Blue Notes ($CSYMB), and features (OBSTRN, WRECKS, UWTROC).

As dictated by Hydrographic Technical Directive 2008-8, the Final HOB files were combined into two separate H-Cell files in S-57 format. Both S-57 files were exported from
CARIS S-57 Composer in feet. Quality assurance and topology checks were conducted using CARIS S-57 Composer and DKART Inspector validation tests.

The final H-Cell products are two S-57 files, in Lat/Long NAD-83. The contents of these two H-Cell deliverables are listed in the table below:

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<tr>
<th>TABLE 1 - Contents of H-Cell Files</th>
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<tr>
<td><strong>H12152_CS.000</strong></td>
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<tr>
<td><strong>Object Class Types</strong></td>
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<td>S-57 Object Acronyms</td>
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<table>
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<td>S-57 Object Acronyms</td>
<td>DEPCNT</td>
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<tr>
<td></td>
<td>SOUNDG</td>
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</tbody>
</table>

**B.2.4 Junctions and Prior Surveys**

Survey H12152 (2009) junctions with survey and H12151 (2010) to the north. Most present survey depths compare within 2 to 3 feet of charted hydrography to the north and south of the southern depth area (1:20,000). Charted hydrography varies as much as 10 feet in some areas of the south of the northernmost depth area (1:40,000). See images below.
B.4 DATA PROCESSING

The following software was used to process data at the Atlantic Hydrographic Branch:
- CARIS Bathy DataBase version 3.2/HF2
- CARIS HIPS/SIPS version 7.1/HF2
- CARIS S-57 Composer version 2.2/SP1/HF4
- DKART Inspector version 5.1
- HSTP Pydro version 11.8 (r3585)

C. HORIZONTAL AND VERTICAL CONTROL

The hydrographer makes adequate mention of horizontal and vertical control used for this survey in section C of the DR. The sounding datum for this survey is Mean Lower Low Water (MLLW), and the vertical datum is Mean High Water (MHW). Horizontal control used for this survey during data acquisition is based upon the North American Datum of 1983 (NAD83), UTM projection zone 18 North.

D. RESULTS AND RECOMMENDATIONS

D.1 CHART COMPARISON

12277 1 (35th Edition, JUL/10)
Chesapeake and Delaware Canal
Corrected through NM 08/20/2011
Corrected through LNM 08/16/2011
Scale 1:20,000

12311 1 (45th Edition, DEC/08)
Delaware River Smyrna River to Wilmington
Corrected through NM 08/27/2011
Corrected through LNM 08/23/2011
Scale 1:40,000

ENC COMPARISON

US5DE13M
Delaware River Smyrna to Wilmington
Edition 21
Application Date 2011/08/17
Issue Date 2011/08/17
Chart 12311

US5MD15M
Chesapeake and Delaware Canal
Edition 21
Application Date 2011/07/27
Issue Date 2011/07/27
Chart 12277

Version Updated 08/23/11
D.2 ADDITIONAL RESULTS

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

a. A charted 21 foot dangerous obstruction is charted on raster 12277_1 (1:20,000) at the southeastern corner of a general anchorage area. Multi-beam development data portrays this as a shoal point on a natural hard seafloor bottom. A 21 foot chart scale sounding has been added in the current position and the charted obstruction has been recommended to be deleted.

b. There were no bottom samples collected by the field. Three currently charted seabed areas were retained.
Version Updated 08/23/11

Raster 12277_1 (1:20,000)

Lat 39-35-10.74409N, Long. 075-33-18.07424W
c. An underwater rock (UWTROC) that is currently charted with a depth of 17 feet on raster 12311_1 (1:40,000) was not developed with MBES or VBES. A measure depth of 5.20 m (17 feet) has been measured utilizing HIPS and SIPS Side Scan Editor. However, this depth measurement is less shoal than the previously charted dangerous UWTROC. The depth of the previously surveyed UWTROC had a value of 16.73228 ft (5.09 m) and should have been charted as a 16 foot dangerous UWTROC.
D.6 MISCELLANEOUS

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

D.7 ADEQUACY OF SURVEY

The present survey is adequate to supersede the charted bathymetry within the common area. Any features not specifically addressed either in the H-Cell files or the Blue Notes should be retained as charted. Refer to section D and Appendix I and II of the DR for further recommendations by the hydrographer.
Initial Approvals:

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

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

2011.09.12
13:12:28
-04'00'

Dinah O. Morris
Hydrographic Survey Intern
Atlantic Hydrographic Branch

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

Richard T. Brennan
2011.09.16 18:22:31 -04'00'

Approved: ________________________________

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

Christopher Hare
HQ Survey Review
2011.09.26 15:02:45 -04'00'