

NOAA FORM 77-28 (11-72)	U.S. DEPARTMENT OF COMMERCE NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION	REGISTRY NO. H11023
<p align="center">HYDROGRAPHIC TITLE SHEET</p>		FIELD NO. D
<p>INSTRUCTIONS - The Hydrographic Sheet should be accompanied by this form, filled in as completely as possible, when the sheet is forwarded to the Office.</p> <p>State <u>Delaware –New Jersey</u></p> <p>General locality <u>Delaware River</u></p> <p>Locality <u>Liston Point to New Castle</u></p> <p>Scale <u>1:20,000</u> Date of survey <u>26 March 2001 – 3 December 2001</u></p> <p>Instructions Dated <u>27 October 2000</u> Project No. <u>OPR-D307-KR-00/01</u></p> <p>Vessel <u>R/V OceanExplorer US905425</u></p> <p>Chief of Party <u>WALTER S. SIMMONS</u></p> <p>Surveyed by <u>Walter Simmons, Steven Lemke, Paul Donaldson, Gary Davis, George Ghiorse, Rick Nadeau</u></p> <p>Soundings taken by <u>echo sounder</u> hand lead, pole <u>MULTIBEAM RESON SEABAT 8101</u></p> <p>Graphic record scaled by survey personnel _____</p> <p>Graphic record checked by survey personnel _____</p> <p>Protracted by _____ Automated plot by <u>HP1055CM</u></p> <p>Verification by <u>Atlantic Hydrographic Branch Personnel</u></p> <p>Soundings in fathoms, <u>feet</u>, meters at MLW, <u>MLLW</u></p> <p><i>Notes in red in the Descriptive Report were made during office processing.</i></p>		
<p>REMARKS: Contract # 50-DGNC-0-90015</p> <p>Contractor: Science Applications International Corp., 221 Third Street; Newport, RI 02840</p> <p>Subcontractor: McKim & Creed, 860 Greenbrier Circle, Suite 202, Chesapeake, VA 23320</p> <p>Subcontractor: LCMF, 139 East 51st Ave., Anchorage, AK 99503</p> <p>Times: All times are recorded in UTC</p> <p>Purpose: To provide NOAA with modern, accurate hydrographic survey data with which to update the nautical charts of the assigned area.</p>		

Science Applications International Corporation (SAIC) warrants only that the survey data acquired by SAIC and delivered to NOAA under Contract 50-DGNC-0-90015 reflects the state of the sea floor in existence on the day and at the time the survey was conducted.

Table of Contents

	Page
A. AREA SURVEYED	1
B. DATA ACQUISITION AND PROCESSING.....	3
B.1 Equipment.....	3
Survey Vessel.....	3
Major Systems	4
B.2 Quality Control	4
B.3 Corrections to Echo Soundings.....	7
C. VERTICAL AND HORIZONTAL CONTROL	7
D. RESULTS AND RECOMMENDATIONS.....	7
D.1 Chart Comparison.....	7
Charted Depths.....	8
Chart 12311.....	8
Chart 12304.....	9
Chart 12277.....	9
Depth Curves	9
Chart 12311.....	9
Chart 12304.....	10
Chart 12277.....	10
Ranges.....	10
*Deepwater Point Range (Chartlets 12311 1 & 2)	10
*Bulkhead Bar Range (Chartlets 12311 2 & 3).....	10
*New Castle Range (Chartlets 12311 3, 5, 6, & 8 and Chartlets 12277 2, 3, 5, & 6).....	10
*Reedy Island Range (Chartlets 12311 9, 10, 11, & 12 and Chartlet 12277 7)	10
*Baker Range (Chartlets 12311 12 and 13).....	10
*Liston Range above Ship John Light (Chartlets 12311 13, & 16 and Chartlet 12304 1).....	10
*Chesapeake & Delaware Canal (Chartlet 12311 8 and Chartlet 12277 3)	11
*Bulkhead Shoal Channel (Chartlets 12311 6, 7, & 8 and Chartlets 12277 3 & 4)	11
Anchorage Areas.....	11
*General Anchorage #2(Charlots 12311 10, 11, & 13).....	11
*General Anchorage #3 (Chartlets 12311 8 & 9 and 12277 5 & 7).....	11
*General Anchorage #4 (Chartlets 12311 8 and 12277 3, 4 & 5)	11
*General Anchorage #5 (Charts 12311-4 & 5 and 12277-1, 2 & 3).....	12
Navigational Aids	12
AWOIS Items, Wrecks and Obstructions	12
AWOIS 1370	12
AWOIS 1377	14
AWOIS 1379	16
AWOIS 1381	17
AWOIS 1383	18
AWOIS 1389	20
AWOIS 1390	21
AWOIS 1396	22

AWOIS 3256	23
AWOIS 9994	24
AWOIS 9995	24
AWOIS 10749 and 10750.....	25
Pier Ruins at Delaware City.....	26
Pier Ruins off Reedy Island	27
Danger to Navigation Reports	27
Uncharted Wrecks and Obstructions	28
Charted Shoals	31
* Baker Shoal (Chartlets 12311 11 & 12).....	31
Black Ditch Bar.....	31
* Reedy Island Bar (Chartlets 12311 8, 9 & 10 and 12277 5 & 7).....	32
* Bulkhead Shoal (Chartlets 12311 1 & 2).....	32
* Goose Island Flats (Chartlet 12311 1)	32
* Pea Patch Shoal (Chartlet 12277 3)	32
Cable Areas.....	32
Pipeline Areas	33
Overhead Cables	33
Bottom Composition.....	34
D.2 Additional Results.....	34
Aids to Navigation	34
Dredging	34
E. APPROVAL SHEET	35
APPENDIX I. DANGER TO NAVIGATION REPORTS.....	36
* APPENDIX II. LIST OF GEOGRAPHIC NAMES	46
* APPENDIX III. PROGRESS SKETCH.....	47
* APPENDIX IV. TIDES AND WATER LEVELS	48
* APPENDIX V. SUPPLEMENTAL SURVEY RECORDS, CHART CORRECTION LETTER, & CORRESPONDENCE	50

** Filed with the original field data.*

List of Tables

	Page
Table A 1. Dates of multibeam data acquisition (UTC) in calendar and Julian days.....	1
Table B 1. Major Systems by Manufacturer and Model Number.....	3
Table B 2. Survey Vessel Characteristics.....	3
Table A B3. Cross Line Comparisons, All Maine Data vs Cross Line Nadir Reference.....	5
Table A B4. Junction Analysis H11070 vs. H11023 (all comparisons).....	6
Table A B5. Junction Analysis H11070 vs. H11023 (flat bottom).....	6
Table D-1. Uncharted Wrecks and Obstructions on H11023.....	28
Table D-2. H11023 Bottom Sample Characteristics.....	34
Table Appendix IV- 1. Abstract Times of Hydrography, H11023.....	49

List of Figures

	Page
Figure A 1. H11023 Survey Bounds.....	2
Figure B 1. Histogram of Selected Soundings by Beam Number – H11023.....	4
Figure B 2. Histogram of Percentage of Selected Soundings by Beam Number-H11023.....	4
Figure D 1. Multibeam coverage of AWOIS 1370 search radius.....	13
Figure D 2. Side scan image of AWOIS 1370.....	13
Figure D 3. Multibeam coverage and features of AWOIS 1377 search radius.....	14
Figure D 4. Photograph of AWOIS 1377 at tide one foot above MLLW showing Buoy R “WR10R”.....	15
Figure D 5. Photograph of AWOIS 1377 at tide one foot above MLLW.....	15
Figure D 6. Multibeam coverage and features of AWOIS 1397 search radius.....	16
Figure D 7. Multibeam coverage and features of AWOIS 1847 1381 search radius.....	18
Figure D 8. Multibeam coverage of AWOIS 1383 search radius.....	19
Figure D 9. Multibeam coverage of AWOIS 1389 search radius.....	20
Figure D 10. Multibeam coverage and features of AWOIS 1390 search radius.....	21
Figure D 11. Side Scan image of AWOIS 1390.....	21
Figure D 12. Multibeam coverage and features of AWOIS 1396 search radius.....	22
Figure D 13. Multibeam coverage and features of AWOIS 3256 search radius.....	23
Figure D 14. Multibeam coverage and features of AWOIS 10749 and 10750 radii.....	25
Figure D 15. Side scan image of pier ruins at Delaware City from survey day 091.....	26
Figure D 16. Side scan image of pier ruins at Delaware City from survey day 213.....	26
Figure D 17. Side scan image of pier ruins off Reedy Island from survey day 143.....	27
Figure Appendix V 1. Example 1, North 100% coverage @ 70m range, showing green 15ft contour.....	52
Figure Appendix V 2. Example 2, North 100% coverage @ 70m range, showing green 15ft contour.....	53
Figure Appendix V 3. Example 3, North 100% coverage @ 70m range, showing green 15ft contour.....	53
Figure Appendix V-4. Pea Patch Island Multibeam Grid with Soundings and Contacts.....	55

Figure Appendix V-5. Pea Patch Island Chart 12277 with Soundings and Contacts.....56

List of Figures

	Page
Figure Appendix V-6 Charted Obstructions, Multibeam Grid with Soundings and Contacts.....	58
Figure Appendix V-7. Obstruction, Chart 12311 with Soundings and Contacts.....	59

**Descriptive Report to Accompany
Hydrographic Survey H11023
Scale 1:20,000, Surveyed 2001
R/V OceanExplorer
Science Applications International Corporation (SAIC)
Walter S. Simmons, Hydrographer**

Project Number: OPR-D307-KR-00/01

Dates of Instructions: 27 October 2000
12 July 2001

Original: 50-DGNC-0-90015

Task Order #4: 56-DGNC-1-33004

Dates of Supplemental Instructions: None

Sheet Letter: D

Registry Number: H11023

Purpose: To provide NOAA with modern, accurate hydrographic survey data with which to update the nautical charts of the assigned area.

A. AREA SURVEYED

Description:

The area surveyed was a section of the Delaware River and Bay extending between Liston Point and New Castle. Included were the northern end of Liston Range, Baker Range, Reedy Island Range, New Castle Range Bulkhead Bar Range and the southern tip of Deepwater Point Range. Also included were Bulkhead Shoal Channel, Reedy Island Bar, Bulkhead Shoal and the Goose Island Flats.

Table A-1. Dates of multibeam data acquisition (UTC) in calendar and Julian days

Calendar Date	Julian Days
03/26/2001 – 03/29/2001	085 – 088
03/31/2001 – 04/03/2001	090 – 093
04/05/2001 – 04/07/2001	095 – 097
04/11/2001 – 04/16/2001	101 – 106
05/20/2001 – 05/23/2001	140 – 143
08/01/2001	213
08/03/2001	215
08/17/2001	229
11/28/2001 – 12/04/2001	332 – 338

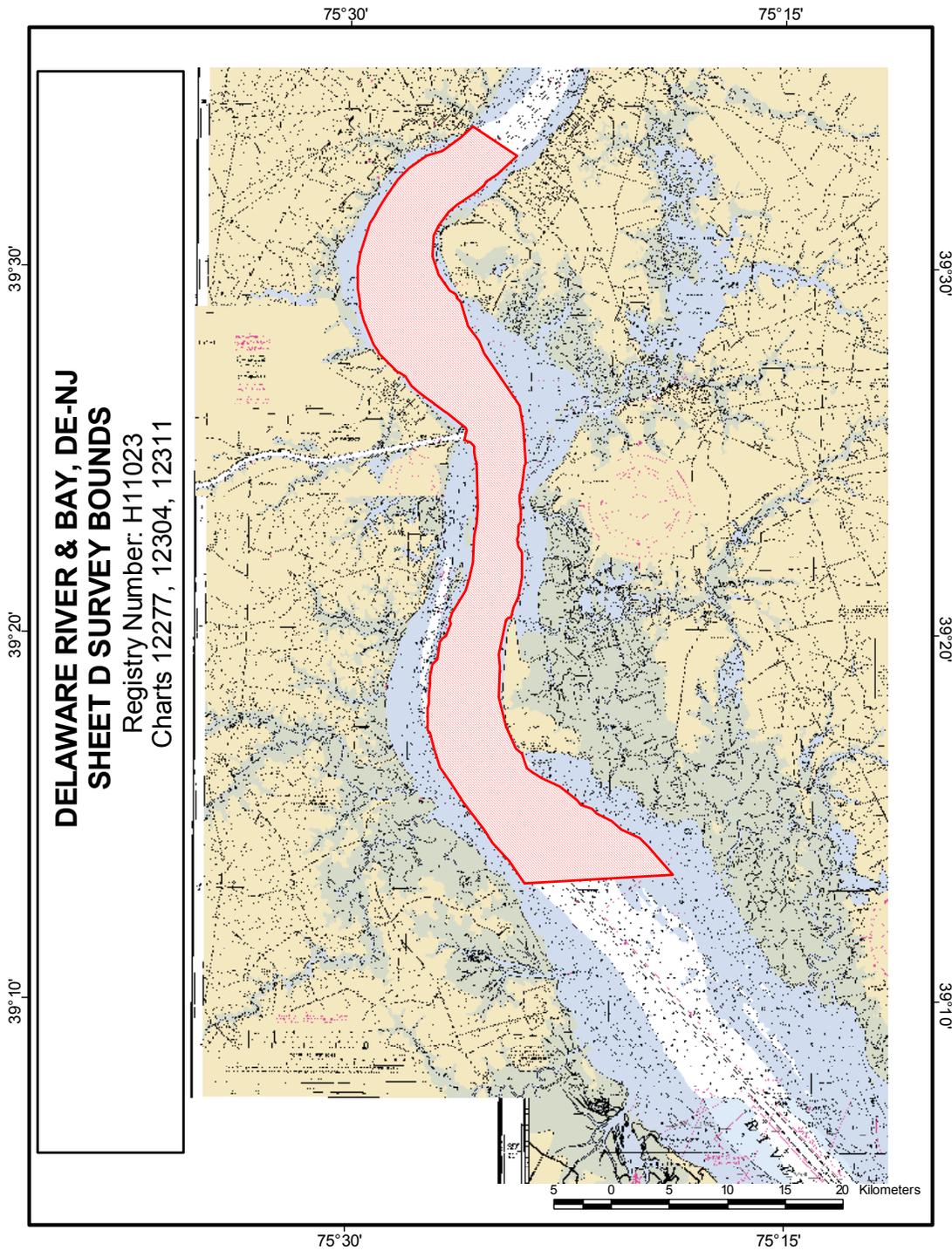


Figure A-1. H11023 Survey Bounds

B. DATA ACQUISITION AND PROCESSING *See also the Evaluation Report.*

B.1.1 EQUIPMENT

A detailed description of the systems used to acquire and process these data has been included in the separate Data Acquisition and Processing Report for OPR-D307-KR-00/01.* There were no variations from the configuration described therein. The information below summarizes the larger report. **Filed with the original field data.*

Table B-1. Major Systems by Manufacturer and Model Number

	Manufacturer / Model Number	Subsystem
Multibeam Sonar	RESON SeaBat 8101	Transducer 8101 Processor R6042 Controller Processing Unit
Side Scan Sonar	Klein 2000 Towfish	K-Wing Depressor, Transceiver/Processing Unit (TPU)
Vessel Attitude System	TSS POS/MV Inertial Navigation System	
Positioning System	TSS POS/MV	
	Trimble 7400 GPS Receiver	
	Trimble Probeacon Differential Beacon Receiver	
	Leica MX41R Differential Beacon Receiver	
Sound Velocity System	Brooke Ocean Technology Ltd., Moving Vessel Profiler-30	Applied Microsystems Ltd. Smart SV and Pressure Sensor

Survey Vessel

The *R/V OceanExplorer* was the platform for multibeam sonar, side scan sonar and sound velocity data collection. The main cabin of the vessel was used as the data collection center. All data were shipped to the Data Processing Center in the SAIC Newport, RI office for data processing. The POS/MV IMU was mounted on the vessel, centerline just forward and above the RESON 8101 transducer, below the main deck. The multibeam sounder transducer was mounted on the keel. Table B-2 is a list of vessel characteristics for the *R/V OceanExplorer*.

Table B-2. Survey Vessel Characteristics

Vessel Name	LOA (Ft)	Beam (Ft)	Draft (Ft)	Max Speed	Gross Tonnage	Power (Hp)	Registration Number
<i>R/V OceanExplorer</i>	60'	16'4"	6'	17 kn	56	1100	US905425

Major Systems

SAIC used their Integrated Survey System (**iss2000**) to acquire and process these survey data. Mission planning was conducted on UNIX and Linux platforms, while data acquisition and survey control were accomplished in a WindowsNT environment. Multibeam processing was performed on UNIX and Linux systems. Side scan data were reviewed on a WindowsNT platform using Triton-Elics' Isis software, while they were mosaiced in **iss2000** on a UNIX or Linux platform.

B.1.2 QUALITY CONTROL

There were 36.7 linear nautical miles of cross lines surveyed and 681.5 linear nautical miles of main scheme lines surveyed resulting in 5.4 percent coverage by cross lines. The following histograms represent the distribution of selected soundings by beam number. Figure B-1 illustrates the number of selected soundings versus beam number while Figure B-2 illustrates the percentage of selected soundings versus beam number.

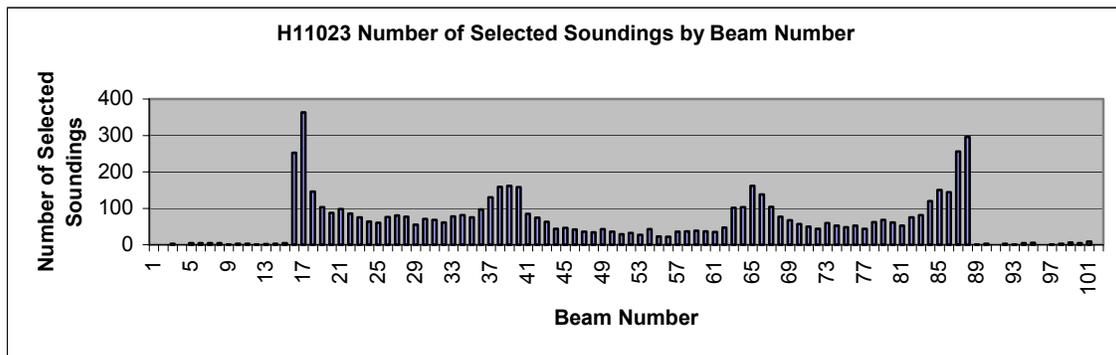


Figure B-1. Histogram of Selected Soundings by Beam Number – H11023

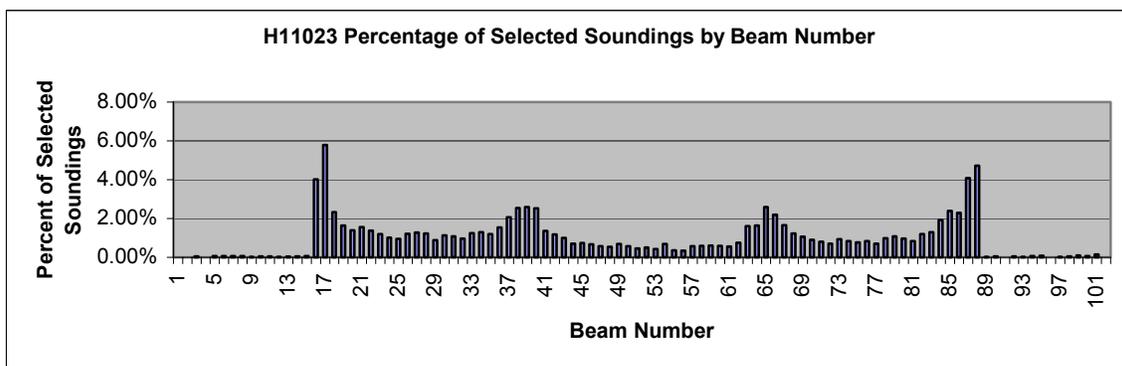


Figure B-2. Histogram of Percentage of Selected Soundings by Beam Number-H11023

Comparisons of all crossing data comparing main scheme to the cross line near nadir reference in H11023 (Table B-3) show that 95.1% of comparisons are within 40 centimeters, 96.7% of comparisons are within 50 centimeters. The comparisons greater than 50 centimeters are accounted for by the normal small DGPS position scatter in areas

of steep slope, sand waves and features. The comparison difference of greater than 240 centimeters is at the east shore of Pea Patch Island where depths change from 11.1 meters to 2.9 meters over a horizontal distance of 15 meters.

Table B-3. Cross Line Comparisons, All Main Data vs Cross Line Nadir Reference

Depth Difference Range		All		Positive		Negative		Zero Count
		Count	Percent	Count	Percent	Count	Percent	
0cm to	5cm	4003	38.38	1832	32.49	1712	39.52	459
5cm to	10cm	2311	60.54	1154	52.95	1157	66.23	
10cm to	15cm	1618	76.05	922	69.3	696	82.29	
15cm to	20cm	826	83.97	540	78.88	286	88.9	
20cm to	25cm	492	88.69	318	84.52	174	92.91	
25cm to	30cm	395	92.47	273	89.36	122	95.73	
30cm to	35cm	155	93.96	107	91.26	48	96.84	
35cm to	40cm	126	95.17	87	92.8	39	97.74	
40cm to	45cm	90	96.03	71	94.06	19	98.18	
45cm to	50cm	73	96.73	65	95.21	8	98.36	
50cm to	60cm	106	97.75	83	96.68	23	98.89	
60cm to	70cm	78	98.49	59	97.73	19	99.33	
70cm to	80cm	36	98.84	29	98.24	7	99.49	
80cm to	90cm	27	99.1	22	98.63	5	99.61	
90cm to	100cm	24	99.33	19	98.97	5	99.72	
100cm to	110cm	17	99.49	16	99.26	1	99.75	
110cm to	120cm	12	99.61	10	99.43	2	99.79	
120cm to	130cm	10	99.7	7	99.56	3	99.86	
130cm to	140cm	11	99.81	7	99.68	4	99.95	
140cm to	150cm	4	99.85	4	99.75	0	99.95	
150cm to	160cm	10	99.94	9	99.91	1	99.98	
160cm to	170cm	3	99.97	2	99.95	1	100	
170cm to	180cm	1	99.98	1	99.96	0	100	
180cm to	190cm	1	99.99	1	99.98	0	100	
190cm to	200cm	0	99.99	0	99.98	0	100	
200cm to	220cm	0	99.99	0	99.98	0	100	
220cm to	240cm	0	99.99	0	99.98	0	100	
240cm to	250cm	1	100	1	100	0	100	
Totals		10430	100.00%	5639	54.07%	4332	41.53%	459
								4.40%

The H11023 survey junctions with survey H11070. Table B-4 depicts the junction analysis using all comparisons in the common area between H11070 and H11023. These comparisons show 96.9% were within 30 centimeters and 98.8% were within 40 centimeters. The normal small DGPS position scatter in areas of steep slope, sand waves and features accounts for differences exceeding 40 centimeters. This is illustrated in

junction analysis using comparisons in areas of relatively flat bottom (Table B-5). These comparisons show 97.7% were within 20 centimeters and 99.5% were within 25 centimeters. They also show that the NOAA zoning was adequate. The channel was being actively dredged during the H11070 survey.

Table B-4. Junction Analysis H11070 vs. H11023 (all comparisons)

Difference Range		All		Positive		Negative		Zero
		Count	Percent	Count	Percent	Count	Percent	Count
0cm to	5cm	2428	40.37	1093	41.78	1077	34.3	258
5cm to	10cm	1513	65.53	676	67.62	837	60.96	
10cm to	15cm	1003	82.21	451	84.86	552	78.54	
15cm to	20cm	472	90.06	207	92.78	265	86.97	
20cm to	25cm	265	94.46	100	96.6	165	92.23	
25cm to	30cm	146	96.89	38	98.05	108	95.67	
30cm to	35cm	63	97.94	14	98.59	49	97.23	
35cm to	40cm	53	98.82	17	99.24	36	98.38	
40cm to	45cm	26	99.25	10	99.62	16	98.89	
45cm to	50cm	18	99.55	5	99.81	13	99.3	
50cm to	60cm	18	99.85	4	99.96	14	99.75	
60cm to	70cm	6	99.95	1	100	5	99.9	
70cm to	80cm	2	99.98	0	100	2	99.97	
80cm to	90cm	0	99.98	0	100	0	99.97	
90cm to	100cm	0	99.98	0	100	0	99.97	
100cm to	110cm	0	99.98	0	100	0	99.97	
110cm to	120cm	0	99.98	0	100	0	99.97	
120cm to	130cm	0	99.98	0	100	0	99.97	
130cm to	140cm	0	99.98	0	100	0	99.97	
140cm to	150cm	0	99.98	0	100	0	99.97	
150cm to	160cm	1	100	0	100	1	100	
160cm to		0	100	0	100	0	100	
	Totals	6014	100.00%	2616	43.50%	3140	52.21%	258
								4.29%

Table B-5. Junction Analysis H11070 vs. H11023 (flat bottom)

Difference Range		All		Positive		Negative		Zero
		Count	Percent	Count	Percent	Count	Percent	Count
0cm to	5cm	1068	53.08	499	44.47	420	56.68	149
5cm to	10cm	534	79.62	320	72.99	214	85.56	
10cm to	15cm	273	93.19	201	90.91	72	95.28	
15cm to	20cm	90	97.66	71	97.24	19	97.84	
20cm to	25cm	36	99.45	26	99.55	10	99.19	
25cm to	30cm	9	99.9	4	99.91	5	99.87	
30cm to	35cm	1	99.95	1	100	0	99.87	
35cm to	40cm	0	99.95	0	100	0	99.87	
40cm to	45cm	0	99.95	0	100	0	99.87	
45cm to	50cm	1	100	0	100	1	100	
50cm to	60cm	0	100	0	100	0	100	
	Totals	2012	100.00%	1122	55.77%	741	36.83%	149
								7.41%

Detail of comparisons at selected crossings in different areas of H11023, comprising approximately 1% of the crossings in the survey, are listed in the Separates Section V* to this report. These comparisons were made over relatively flat bottom, and reflect mainscheme and crossline soundings taken on several different days.

B.1.3 CORRECTIONS TO ECHO SOUNDINGS

Please refer to the Data Acquisition and Processing Report for a description of all corrections applied to echo soundings. There were no deviations from the corrections described therein.

C. VERTICAL AND HORIZONTAL CONTROL *See also the Evaluation Report*

NOAA tide station 8551910 Reedy Point, Delaware was the source of verified water level heights for determining correctors to soundings.

These survey data were collected in horizontal datum NAD-83, using the UTM-18 projection. The following equipment was used for positioning on the *R/V OceanExplorer*:

- TSS POS/MV, Serial Number 314
- Trimble 7400 DSi GPS Receiver, Serial Number 3815A22469

Differential correctors were from the U.S. Coast Guard Stations at Cape Henlopen, Delaware and Reedy Point, Delaware. Daily position confidence checks were established using a Trimble DGPS. A real-time monitor raised an alarm when the two DGPS positions differed by more than 10 meters horizontally. Positioning confidence checks were well within the allowable inverse distance of less than 5 meters.

Please refer to the Vertical and Horizontal Control Report for detailed descriptions of the procedures and systems used to attain hydrographic positioning. There were no variations from the procedures described therein.

D. RESULTS AND RECOMMENDATIONS *See also the Evaluation Report.*

D.1 CHART COMPARISON

H11023 was compared to the following charts:

- 12311, 41st Edition, 15 September 2001, at a scale of 1:40,000 corrected through U.S. Coast Guard Fifth District Local Notice to Mariners #51/01 (NTM_12_19_01).
- 12304, 41st Edition, 22 April 2000, at a scale 1:80,000, corrected through U.S. Coast Guard Fifth District Local Notice to Mariners #51/01 (NTM_12_19_01).

** Filed with the original field data.*

- 12277, 29th Edition, 15 May 1999 at a scale of 1:20,000, corrected through U.S. Coast Guard Fifth District Local Notice to Mariners #51/01 (NTM_12_19_01).

Recommend reconstruction of the listed charts using data from this survey.

The following discrepancies were noted during chart comparisons:

Charted Depths

Chart 12311

In the vicinity of a charted 37 feet in position 39° 39' 00.39"N 075° 32' 53.70"W, NAD83, is a depth of 40 feet in H11023 (See Chartlet 12311 1). **Concur.**

In the vicinity of a charted 17 feet in position 39° 38' 05.42"N 075° 35' 34.00"W, NAD83, is a depth of 21 feet in H11023 (See Chartlet 12311 3). **Concur.**

In the vicinity of a charted 32 feet in position 39° 36' 36.64"N 075° 34' 52.78"W, NAD83, is a depth of 27 feet in H11023 (See Chartlet 12311 4). **Concur.**

In the vicinity of a charted 12 feet in position 39° 36' 18.30"N 075° 35' 32.06"W, NAD83, is a depth of 17 feet in H11023 (See Chartlet 12311 4). **Concur. Retain the charted 12-ft sounding.**

In the vicinity of a charted 43 feet in position 39° 33' 01.57"N 075° 32' 33.64"W, NAD83, is a depth of 46 feet in H11023 (See Chartlet 12311 8). **Concur.**

In the vicinity of a charted 37 feet in position 39° 32' 33.40"N 075° 32' 18.06"W, NAD83, is a depth of 42 feet in H11023 (See Chartlet 12311 9). **Concur.**

In the vicinity of a charted 50 feet in position 39° 31' 40.48"N 075° 33' 01.09"W, NAD83, is a depth of 41 feet in H11023 (See Chartlet 12311 10). **Concur.**

In the vicinity of a charted 34 feet in position 39° 30' 03.42"N 075° 33' 06.95"W, NAD83, is a depth of 30 feet in H11023 (See Chartlet 12311 11). **Concur.**

In the vicinity of a charted 24 feet in position 39° 28' 19.25"N 075° 33' 10.90"W, NAD83, is a depth of 16 feet in H11023 (See Chartlet 12311 12). **Concur.**

In the vicinity of a charted 22 feet in position 39° 27' 34.53"N 075° 32' 10.57"W, NAD83, is a depth of 19 feet in H11023 (See Chartlet 12311 13). **Concur.**

In the vicinity of a charted 16 feet in position 39° 27' 17.72"N 075° 32' 04.78"W, NAD83, is a depth of 13 feet in H11023 (See Chartlet 12311 13). **Concur.**

In the vicinity of a charted 25 feet in position 39° 26' 58.60"N 075° 32' 40.83"W, NAD83, is a depth of 28 feet in H11023 (See Chartlet 12311 13). **Concur.**

In the vicinity of a charted 45 feet in position 39° 26' 45.06"N 075° 33' 07.66"W, NAD83, is a depth of 35 feet in H11023 (See Chartlet 12311 13). **Concur.**

In the vicinity of a charted 18 feet in position 39° 26' 34.79"N 075° 31' 02.85"W, NAD83, is a depth of 14 feet in H11023 (See Chartlet 12311 14). **Concur.**

Chart 12304

No depth discrepancies were noted in the comparison with Chart 12304. **Concur.**

Chart 12277

In the vicinity of a charted 38~~9~~ feet in position 39° 35' 48.20"N 075° 34' 15.11"W, NAD83, is a depth of 24 feet in H11023 (See Chartlet 12277 1). **Concur.**

In the vicinity of a charted 31 feet in position 39° 35' 42.90"N 075° 34' 08.11"W, NAD83, is a depth of 13 feet in H11023 (See Chartlet 12277 1). **Concur.**

In the vicinity of a charted 43~~4~~ feet in position 39° 33' 03.68"N 075° 32' 35.78"W, NAD83, is a depth of 48 feet in H11023 (See Chartlet 12277 6). **Concur.**

In the vicinity of a charted 43 feet in position 39° 33' 01.00"N 075° 32' 34.14"W, NAD83, is a depth of 47 feet in H11023 (See Chartlet 12277 6). **Concur.**

In the vicinity of a charted 43~~45~~ feet in position 39° 32' 55.26"N 075° 32' 34.57"W, NAD83, is a depth of 50 feet in H11023 (See Chartlet 12277 6). **Concur.**

Depth Curves

It is recommended that all depth curves be reconstructed using the results from this survey. **Concur.**

Chart 12311

There is good correlation between the charted depth curves and the depth curves from H11023 except in the following locations:

In the vicinity of 39° 36' 06.18"N 075° 34' 34.01"W, NAD83, there is a 6-foot sounding in H11023 that falls between the charted 12 and 18-foot depth curves (See Chartlet 12311 5). **Concur.**

The charted 18-foot closed depth curve in the vicinity of 39° 28' 34.45"N to 39° 28' 05.98"N and 075° 32' 47.24"W to 075° 33' 00.96"W, NAD83, should be smaller. Most of the soundings in H11023 are less than 18 feet (See Chartlet 12311 12). **Concur.**

The charted 18-foot depth curve in the vicinity of 39° 28' 14.5"N 075° 32' 38.34"W, NAD83, should not extend to the north (See Chartlet 12311 12). **Concur.**

The charted 18-foot depth curve in the vicinity of 39° 27' 22.66"N 075° 31' 52.94"W, NAD83, should not extend to the east-southeast (See Chartlets 12311 13 and 14). **Concur.**

Chart 12304

There is good correlation between the charted depth curves and the depth curves from H11023. **Concur.**

Chart 12277

There is good correlation between the charted depth curves and the depth curves from H11023 except in the following locations:

In the vicinity of 39° 36' 06.18"N 075° 34' 34.01"W, NAD83, there is a 6-foot sounding in H11023 that falls on the charted 18-foot curve (See Chartlets 12277 1). **Concur.**

Ranges

Deepwater Point Range (Chartlets 12311 1 & 2)

There were no soundings found within the Deepwater Point Range with a least depth less than what is in the controlling depths table. **Concur.**

Bulkhead Bar Range (Chartlets 12311 2 & 3)

There were no soundings found within the Bulkhead Bar Range with a least depth less than what is in the controlling depths table. **Concur.**

New Castle Range (Chartlets 12311 3, 5, 6, & 8 and Chartlets 12277 2, 3, 5, & 6)

There were no soundings found within the New Castle Range with a least depth less than what is in the controlling depths table. **Concur.**

Reedy Island Range (Chartlets 12311 9, 10, 11, & 12 and Chartlet 12277 7)

There were no soundings found within the Reedy Island Range with a least depth less than what is in the controlling depths table. **Concur.**

Baker Range (Chartlets 12311 12 and 13)

In the left inside quarter in the vicinity of 39° 27' 55.13"N 075° 33' 44.605"W, NAD83, there is a surveyed obstruction with a least depth of 42 feet which is less than the controlling depth of 44.1 feet. **Concur. See Dangers to Navigation appended to this report.**

Liston Range above Ship John Light (Chartlets 12311 13, & 16 and Chartlet 12304 1)

There were no soundings found within the Liston Range above Ship John Light with a least depth less than what is in the controlling depths table. **Concur.**

Chesapeake & Delaware Canal (Chartlet 12311 8 and Chartlet 12277 3)

In the left outside quarter in the vicinity of 39° 33' 43.93"N 075° 33' 39.37"W, NAD83, to 39° 33' 45.60"N 075° 33' 25.67"W, NAD83, the depths are less than the tabulated depth of 34.9 feet. **Do not concur. Shoal depths discussed are the side of the channel.**

Bulkhead Shoal Channel (Chartlets 12311 6, 7, & 8 and Chartlets 12277 3 & 4)

There were no soundings found within the Bulkhead Shoal Channel with a least depth less than what is noted on the chart as 33.5 feet, December 1994. **Concur.**

Anchorage Areas*General Anchorage #2(Chartlets 12311 10, 11, & 13)*

General Anchorage Area #2, centered in the vicinity of 39° 30' 00.00"N 075° 32' 56.15"W, NAD83, lies between Reedy Island Range and Artificial Island. The soundings from H11023 showed that the depths ranged from 15 feet in the northeast corner to 43 feet in the northwest corner. Three significant features were located inside the anchorage area ranging from 1 to 2 feet above the bottom. It is recommended that the obstructions within the anchorage area be plotted with the sounding and the symbol OBSTN. **Concur in part. See features 384, 418 and 474, page 30 , of this report.**

The anchorage area overlaps a pipeline area in southeast corner where there is a pipeline identified as features 473, 481 and 482. It is recommended that the pipeline be plotted with the pipeline symbol in the anchorage area. **These features are not shown on the present survey. No change in charting is recommended.**

General Anchorage #3 (Chartlets 12311 8 & 9 and 12277 5 & 7)

General Anchorage #3, centered in the vicinity of 39° 32' 37.62"N 075° 32' 52.80"W, NAD83, lies between Reedy Island Range and the Delaware shore. The soundings from H11023 showed that the depths ranged from 23 feet in the southwest corner to 56 feet along the eastern boundary. Two significant features were located inside the anchorage area ranging from 1 to 4 feet above the bottom. It is recommended that the obstructions within the anchorage area be plotted with the sounding and the symbol OBSTN. **Concur in part. See section D.1, Uncharted Wrecks and Obstns, 5. of the Evaluation Report.**

General Anchorage #4 (Chartlets 12311 8 and 12277 3, 4 & 5)

General Anchorage #4, centered in the vicinity of 39° 34' 08.22"N 075° 33' 50.39"W, NAD83, lies between Bulkhead Shoal Channel and Dutch Neck, Delaware. The soundings from H11023 showed that the depths ranged from ~~47~~**15** feet along the west side to 33 feet in the Southeast corner. Ten significant features were located inside the anchorage area ranging from 2 to 13 feet above the bottom. It is recommended that the obstructions within the anchorage area be plotted with the sounding and the symbol OBSTN. **Concur in part. Seven are considered insignificant. See AWOIS items 10749 and 10750, feature 105, pages 25 and 28 of this report.**

Two wrecks, features 191 and 192, were located inside the anchorage. It is recommended that the wrecks be plotted with the sounding and the symbol Wks. **Concur in part. Only one wreck. See feature 191, page 29, of this report for charting recommendation.**

General Anchorage #5 (Charts 12311-4 & 5 and 12277-1, 2 & 3)

General Anchorage #5, centered in the vicinity of 39° 35' 00.00"N 075° 33' 13.27"W, NAD83, lies between New Castle Range and Marsh Point, New Jersey. The soundings from H11023 showed that the depths ranged from 12 feet in the northeast corner to 47 feet along the western boundary. **Concur.** Eleven significant features were located inside the anchorage area ranging from 1 to 2 feet above the bottom. It is recommended that the obstructions within the anchorage area be plotted with the sounding and the symbol OBSTN. **Do not concur. There are no obstructions within the limits of the anchorage area. Chart present survey soundings.**

Navigational Aids

All aids to navigation shown on the listed charts that fall within the boundaries of H11023 were sufficient for their intended purpose. **Concur. See also page 34 of this report.**

AWOIS Items, Wrecks and Obstructions*AWOIS 1370 Lat/Long: 39/28/16.90, 75/34/29.23*

The eastern half of the 100-meter search radius of AWOIS Item 1370 was surveyed with 200% side scan coverage and partial multibeam coverage in H11023. The item was located in the side scan data at 39° 28' 13.83"N 075° 34' 28.69"W, NAD83, was measured to be 1.2 feet high, and identified as contact number 2001/143150213. The wreck is on the east side and at the base of the Reedy Island Dike. There were no visible structures above the water. No multibeam data was collected over the wreck. Recommend removal of charted exposed wreck symbol and chart a submerged wreck symbol (See Chartlet 12311 12). **Presently charted as a dangerous sunken wreck. No change in charting is recommended.**

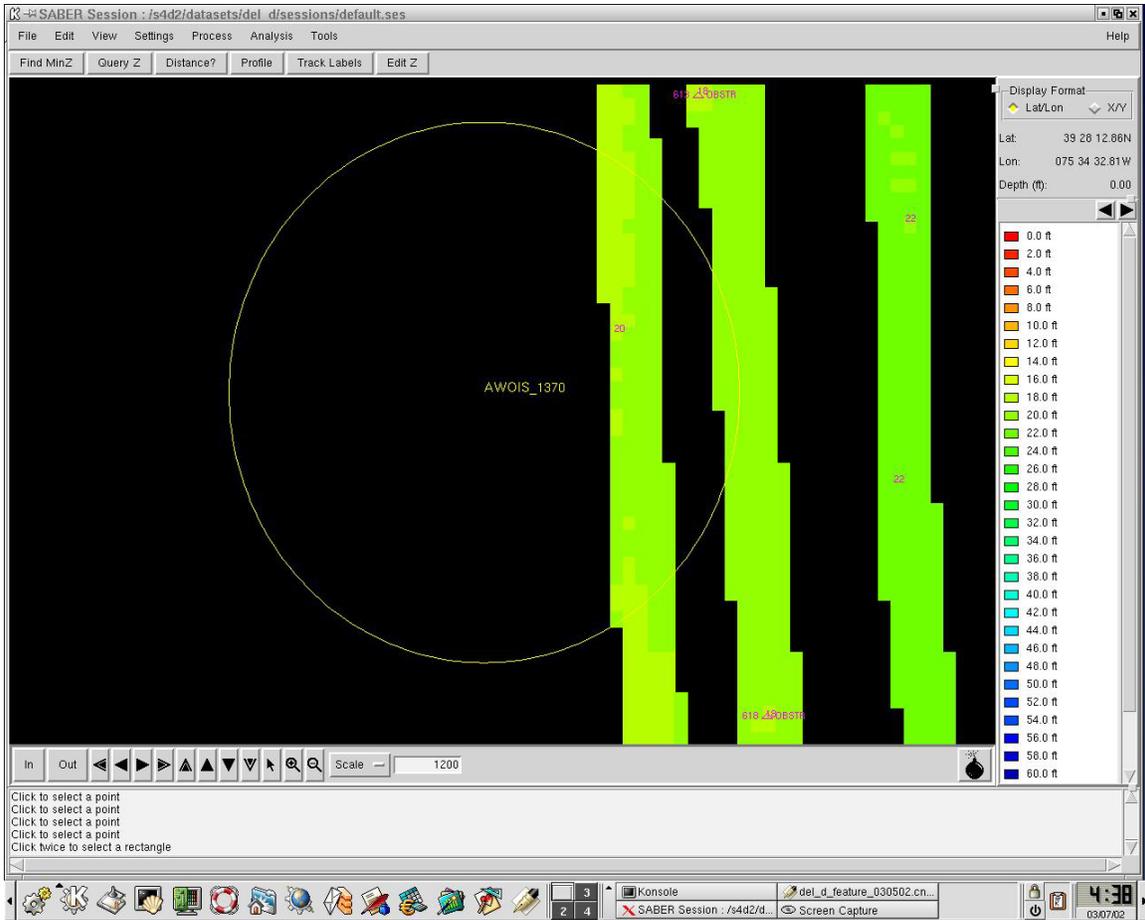


Figure D-1. Multibeam coverage of AWOIS 1370 search radius.

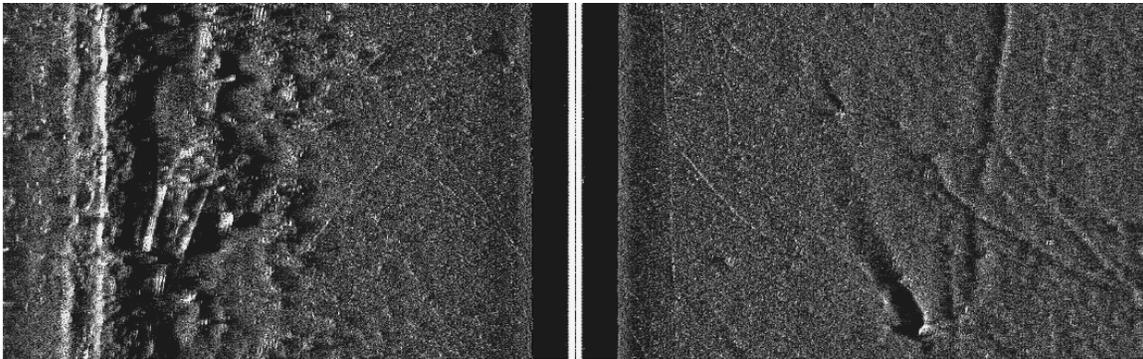


Figure D-2. Side scan image of AWOIS 1370.

AWOIS 1377 Lat/Long: 39/32/12.77, 75/32/26.72

Part of the 75-meter search radius of AWOIS Item 1377 was surveyed with 200% side scan coverage and partial multibeam coverage in H11023. The wreck was still exposed (0.59 – 0.79 meters) at MLLW and was a danger to navigation. It was located and is identified as Features 274, 275, and 276. No multibeam data was collected over the wreck. Recommend removal of charted dangerous submerged wreck, and charting as wreck, uncovers at chart datum symbol at 39° 32' 12.78"N 075° 32' 25.55"W, NAD83 (See Chartlet 12311 9). **Concur. Revise dangerous sunken wreck (PA) to a visible wreck.**

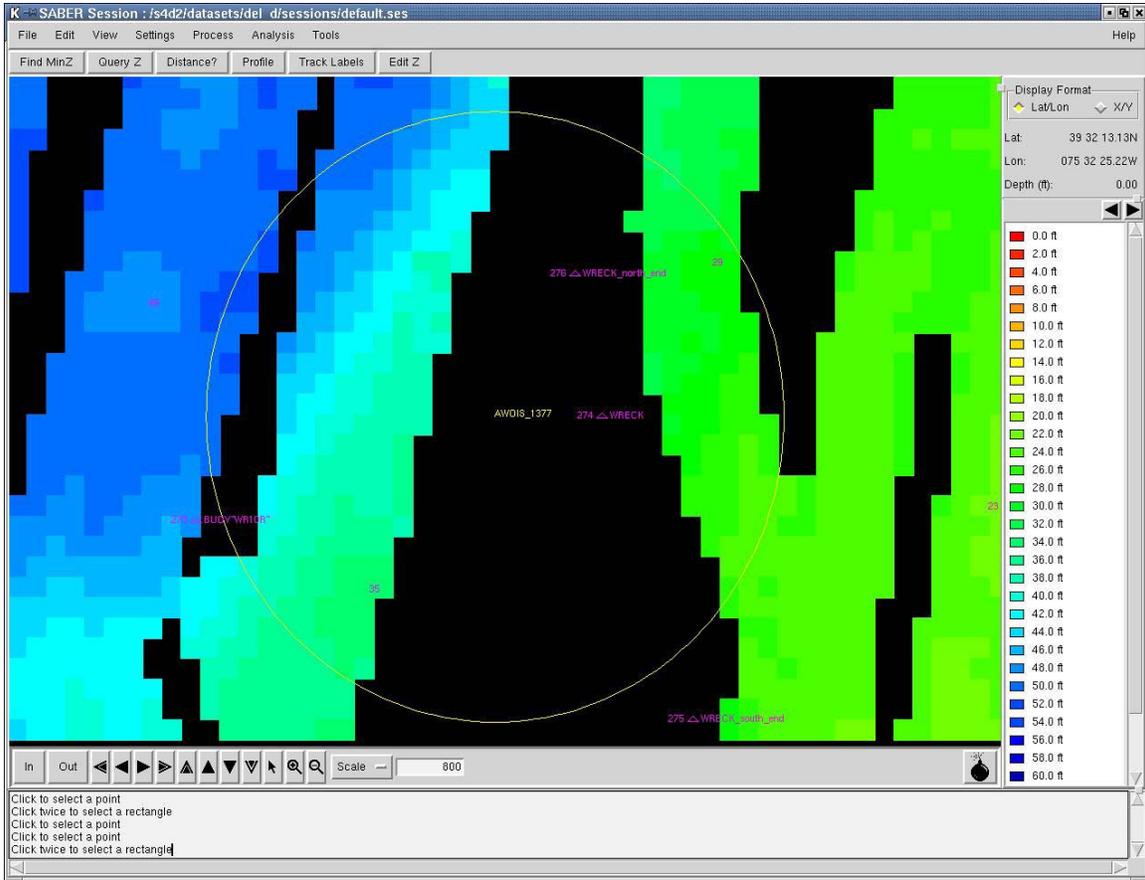


Figure D-3. Multibeam coverage and features of AWOIS 1377 search radius



Figure D-4. Photograph of AWOIS 1377 at tide one foot above MLLW showing Buoy R “WR10R”



Figure D-5. Photograph of AWOIS 1377 at tide one foot above MLLW

AWOIS 1379 Lat/Long: 39/32/21.40, 75/33/02.72 (Wreck, barge)

The 300-meter search radius of AWOIS Item 1379 was surveyed with 200% side scan coverage and partial multibeam coverage in H11023. The item was not located in either the multibeam or the side scan data. Three other features were identified within the search radius:

- Features 360 and 361 are a 1.6 foot high linear object with least depth 26.75 feet, located in the vicinity of 39° 32' 15.55"N 075° 33' 05.42"W, NAD83. **Insignificant. Do not chart.**
- Feature 560 is a 2.1 foot high object with least depth 18.04 feet at 39° 32' 20.80"N 075° 33' 09.52"W, NAD83, 163 meters at 263° from the listed position for AWOIS 1379). **Insignificant. Do not chart.**

The item is not charted on Chart 12311 and based on the results of H11023, recommend that it not be charted (See Chartlet 12311 9). **Concur. No change in charting is recommended.**

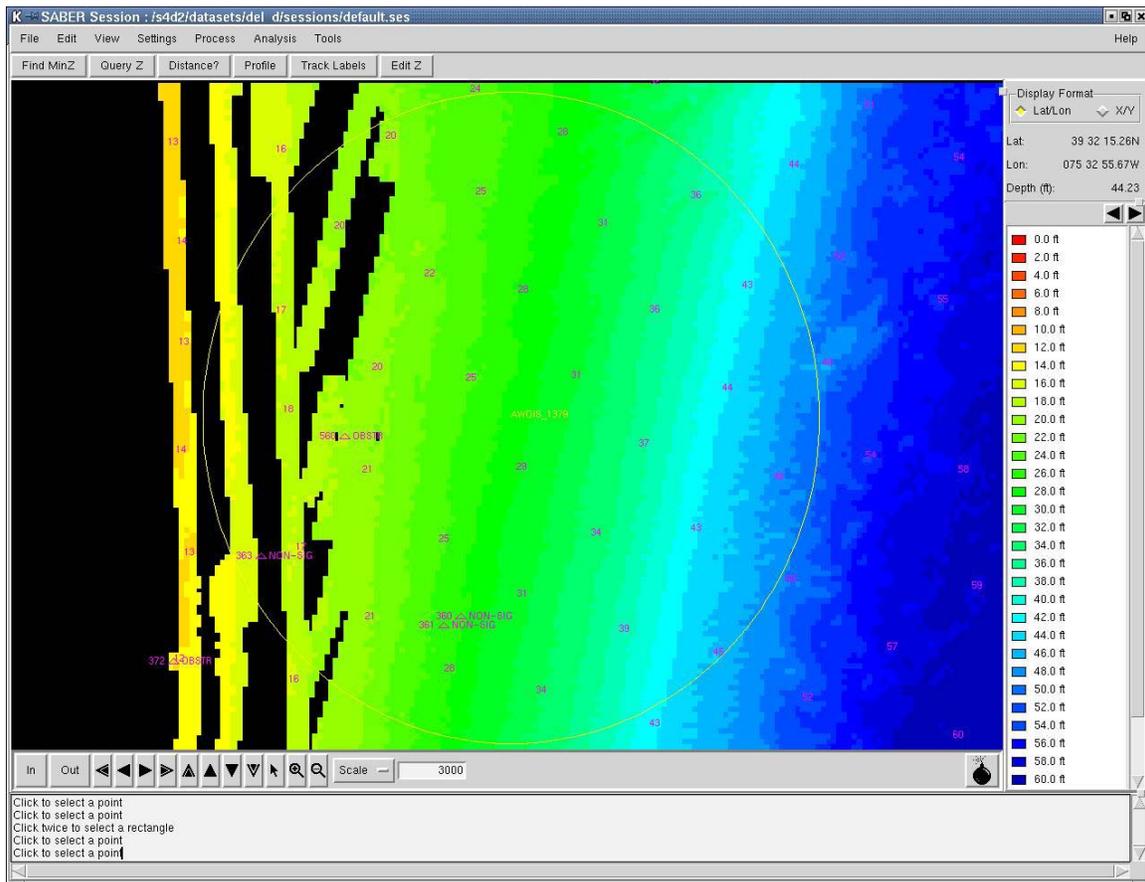


Figure D-6. Multibeam coverage and features of AWOIS 1379 search radius

AWOIS 1381 Lat/Long: 39/33/20.40, 75/32/58.72

The 500-meter search radius of AWOIS Item 1381 was surveyed with 200% side scan coverage and 100% multibeam coverage in H11023. The item was not located in either the multibeam or the side scan data. Eight features were identified within the search radius:

- Feature 98 is a 5.1 foot high object with least depth 38.22 feet at 39° 33' 15.52"N 075° 32' 38.96"W. HAD83, 495 meters at 108° from the listed position of AWOIS 1381. **Concur. See also section D.1, Uncharted Wrecks and Obstructions, 5. of the Evaluation Report.**
- Feature 426 is a 3.5 foot high object with least depth 35.14 feet at 39° 33' 04.88"N 075 32' 55.02"W, NAD83, 485 meters at 170° from the listed position of AWOIS 1381. **Concur. Insignificant.**
- Feature 427 is a 1.7 foot high object with least depth 21.19 feet at 39° 33' 16.54"N 075 22' 14.21"W, NAD83, 390 meters at 252° from the listed position of AWOIS 1381. **Concur. Insignificant.**
- Features 392, 393, and 394 are three small objects the highest (392) is 1.8 feet high with least depth 18.64 feet at 39° 33' 15.04"N 075 33' 14.61"W, NAD83, 415 meters at 247° from the listed position of AWOIS 1381. **Concur. Insignificant. See also page 30 for feature 392.**
- Feature 564 is a 2.7 foot high object with least depth 36.19 feet at 39° 33' 16.59"N 075° 33' 02.83"W, NAD83, 156 meters at 221° from the listed position for AWOIS 1381). **Concur. Insignificant.**

The item is charted as a reported obstruction on Charts 12311 and ~~12307~~**12277**. Based on the results of H11023, recommend removal of the charted Obstn rep, danger circle, and blue tint (Chartlets 12311 8 & 9, and 12277 7). **Concur. Delete the dangerous Obstn rep.**

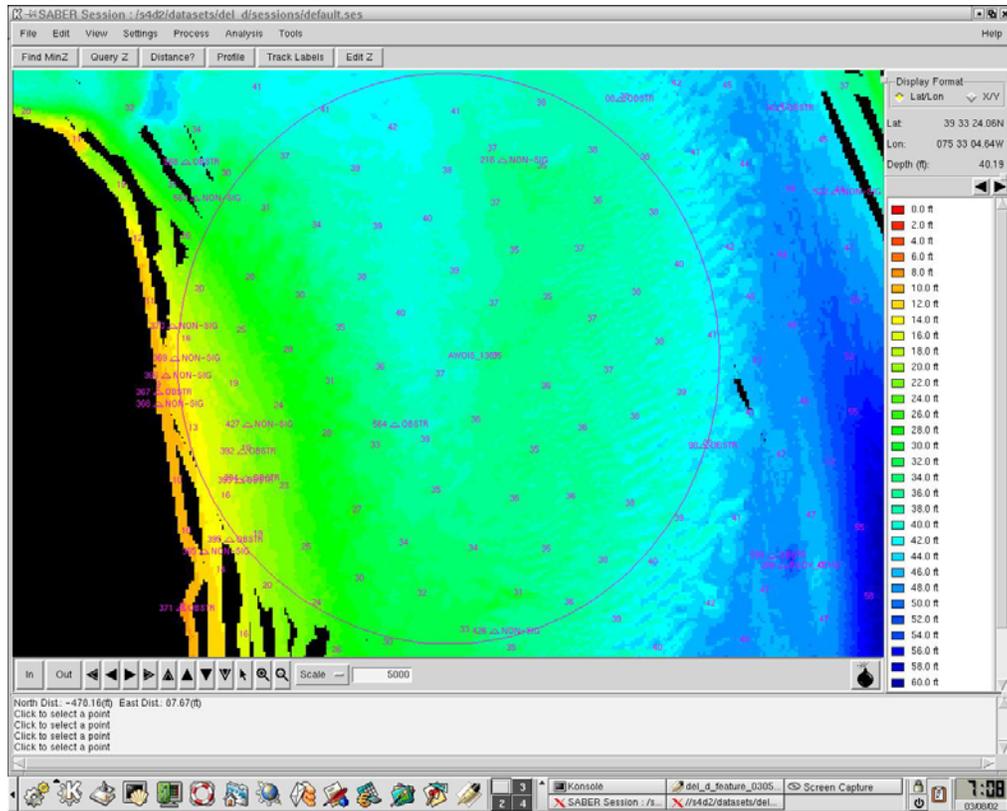


Figure D-7. Multibeam coverage and features of ~~AWOIS 1817~~ search radius
AWOIS 1381

AWOIS 1383 Lat/Long: 39/35/22.70, 75/33/50.22

The 100-meter search radius of AWOIS Item 1381³ was surveyed with 200% side scan coverage and 100% multibeam coverage in H11023. The item was not located in either the multibeam or the side scan data. See Chart Correction Letter, (**appended to this report**) Charts 12277 and 12311, dated 3 January 2002 (Appendix V)* for coverage and recommendations.

Recommend removal of the charted 24 foot sounding, Rks symbol, danger symbol, and blue tint (see Chartlets 12311 6 and 12277 2). **Latest editions of charts 12277 and 12311 have been updated. No change in charting. Rock notations in the vicinity of Lat. 39/35/23.16N, Long. 75/33/53.34W are to be retained**

***Appended to this report.**

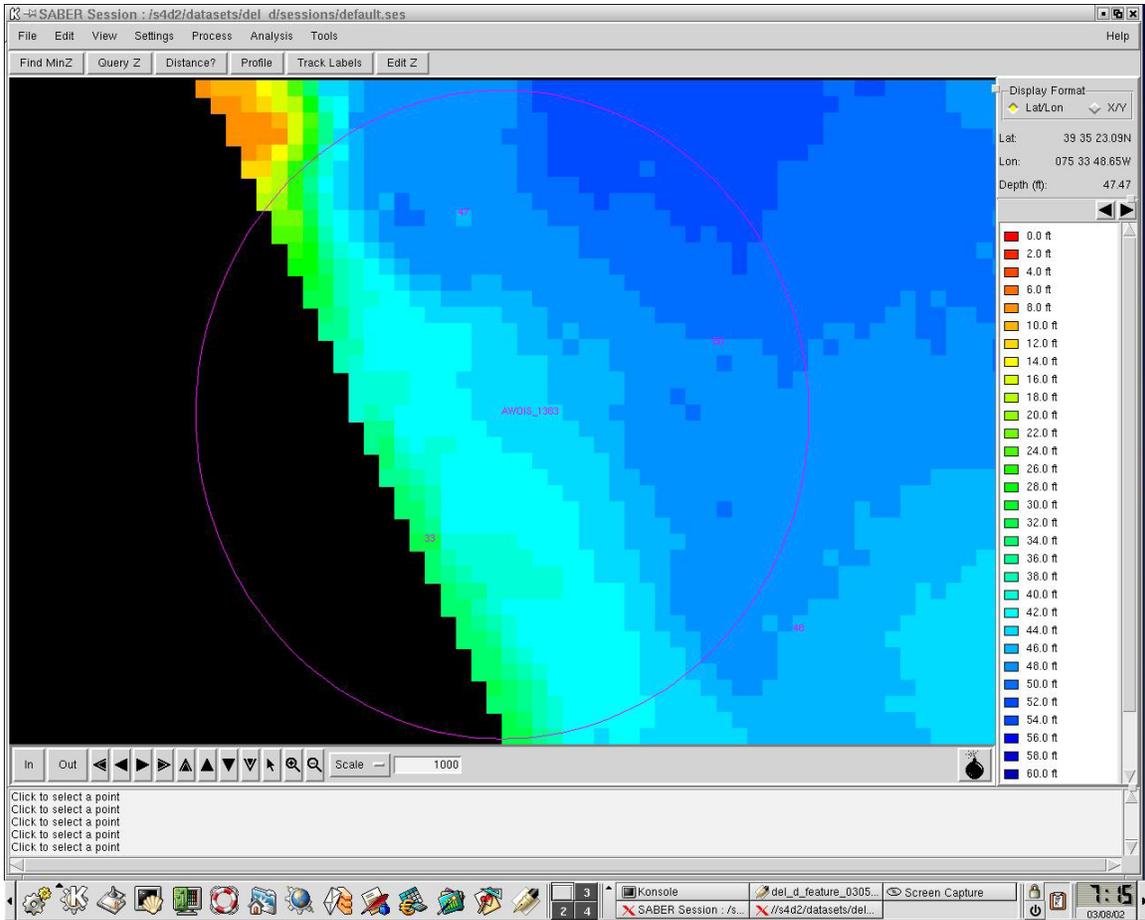


Figure D-8. Multibeam coverage of AWOIS 1383 search radius

AWOIS 1389 Lat/Long: 39/36/38.90, 75/34/14.72

The 150-meter search radius of AWOIS Item 1384⁹ was partially surveyed with side scan coverage and multibeam in H11023. The item was not located in either the multibeam or the side scan data. The item is charted as a submerged dolphin on chart 12311. H11023 did not sufficiently cover the search area to prove or disprove the item. Recommend retaining the item as charted (see Chartlet 12311). **Concur. Retain pile symbol (ED).**

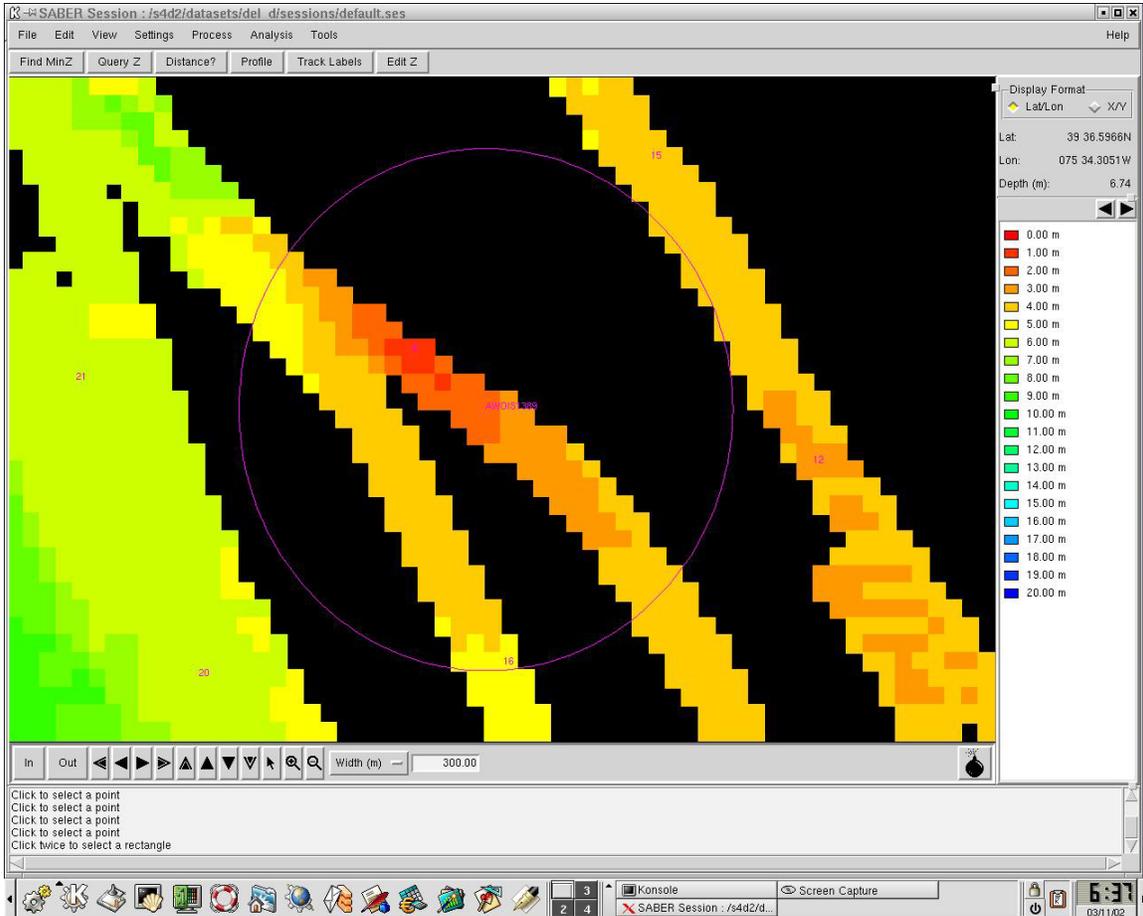


Figure D-9. Multibeam coverage of AWOIS 1389 search radius

AWOIS 1390 Lat/Long: 39/36/45.40, 75/34/15.72

The western half of the 150-meter search radius of AWOIS Item 1390 was surveyed with 200% side scan coverage and partial multibeam coverage in H11023. The item was located at 39° 36' 45.48"N 075° 34' 17.67"W, NAD83, and is identified as side scan contact 142/182110. The item is charted on Chart 12311 as submerged dolphins. Recommend retaining the submerged dolphin description and moving the dolphin symbol to 39° 36' 45.48"N 075° 34' 17.67"W, NAD83 (See Chartlet 12311 5). **Concur in part. Retain Subm dols and symbol as charted. Delete notation "ED".**

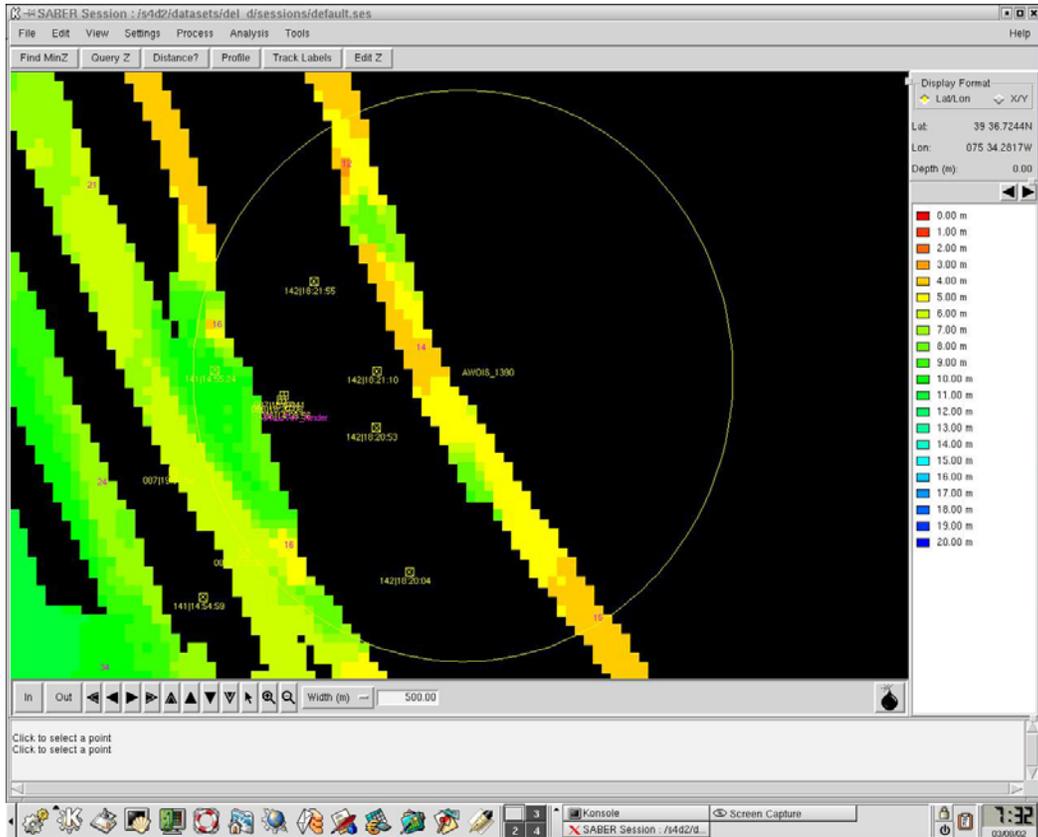


Figure D-10. Multibeam coverage and features of AWOIS 1390 search radius

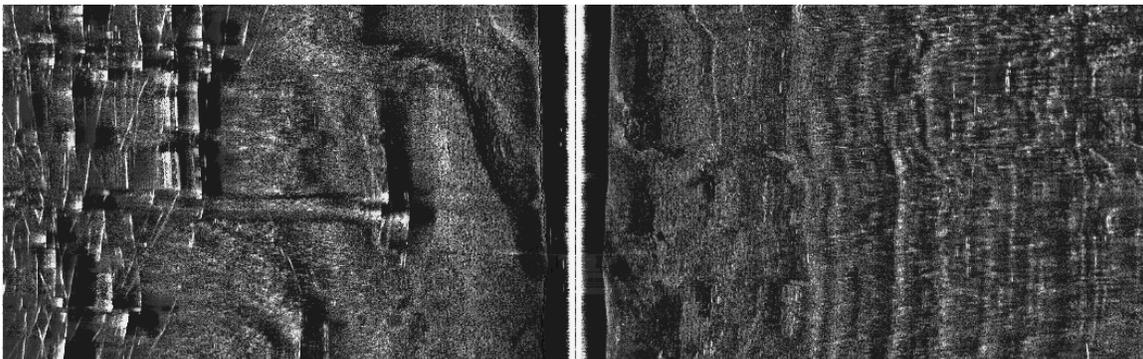


Figure D-11. Side Scan image of AWOIS 1390

AWOIS 1396 Lat/Long: 39°38'16.79", 75°34'33.35" (Wreck)

The southeast half of the 150-meter search radius of AWOIS Item 1396 was surveyed with 200% side scan coverage and partial multibeam coverage in H11023. The item was located at 39° 38' 18.09"N 075° 34' 30.92"W, NAD83, with a minimum depth of 16.93 feet and is identified as Feature 272. The item is not charted on Chart 12311.

Recommend item not be charted. A mound with least depth 16.54 feet is just offshore of feature 272. **Concur. Chart a 16-ft sounding in Lat: 39°38'17.98", Long:75°34'30.92" should the scale of the chart allow.**

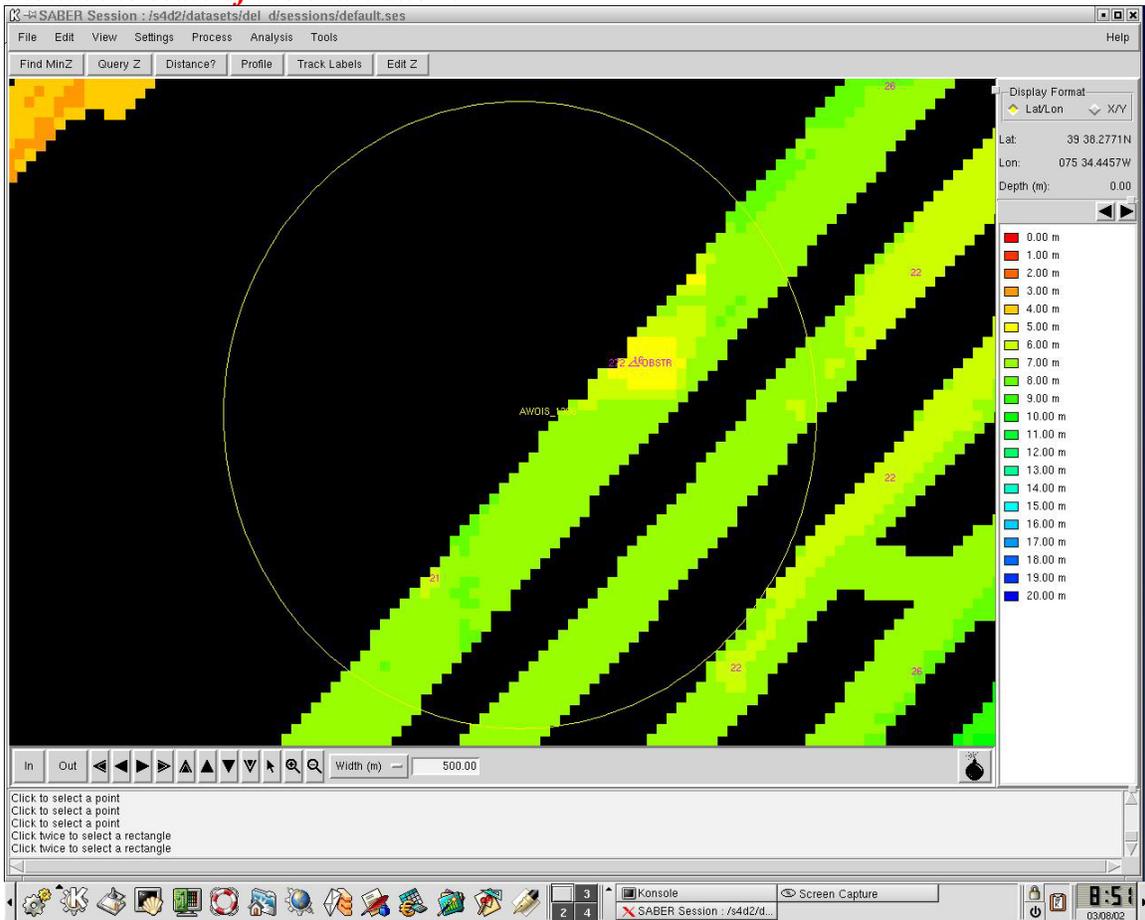


Figure D-12. Multibeam coverage and features of AWOIS 1396 search radius

AWOIS 3256 Lat/Long: 39/28/07.40, 75/32/33.72 (sounding)

The eastern half of the 250-meter search radius of AWOIS Item 3256 was surveyed with 200% side scan coverage and partial multibeam coverage in H11023. The item was located at 39° 28' 07.23"N 075° 32' 37.79"W, NAD83, with a minimum depth of ~~45~~16 feet and is identified as Feature 493. The item is not charted on Chart 12311. Recommend charting sounding with the symbol "Obstn" (See Chart 12311 12). **Do not concur. Chart present survey soundings.**

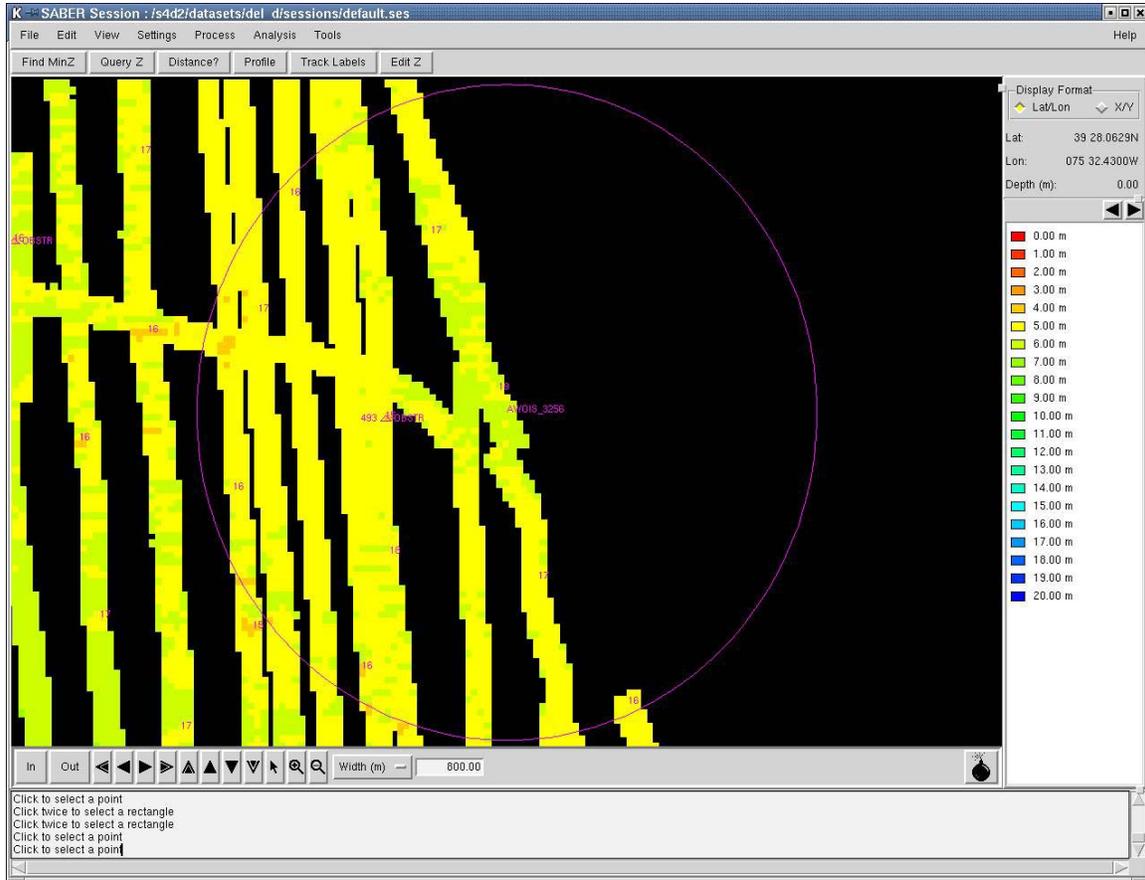


Figure D-13. Multibeam coverage and features of AWOIS 3256 search radius

AWOIS 9994 Lat/Long: 39/35/28.00, 75/33/55.50 (obstruction)

The 100-meter search radius of AWOIS Item 9994 was surveyed with 200% side scan coverage and 100% multibeam coverage in H11023. The item was not located in either the multibeam or the side scan data. See Chart Correction Letter (***appended to this report***), Charts 12277 and 12311, dated 3 January 2002 (Appendix V).*

Recommend removal of the charted 29, 37, and 39-foot soundings, Rks symbol, danger symbol, and blue tint (see Chartlets 12311 6 and 12277 2). ***See item 1. of the Chart Correction Letter appended to this report.***

AWOIS 9995 Lat/Long: 39/36/32.70, 75/34/26.43

The 250-meter search radius of AWOIS Item 9995 was surveyed with 200% side scan coverage and 100% multibeam coverage in H11023. See chart correction letter, charts 12277 and 12311 dated 3 January 2002 (Appendix V) for coverage and recommendation. ***See item 2. of the Chart Correction Letter appended to this report.***

****Filed with the original field data.***

AWOIS 10749 and 10750 **Lat/Long: 39/34/02.40, 75/33/42.73 and 39/34/00.00, 75/33/38.73**

The 150-meter search radii of AWOIS Items 10749 and 10750 was surveyed with 200% side scan coverage and 100% multibeam coverage in H11023. The items were located at the following positions:

- AWOIS 10749 - 39° 34' 02.47"N 075° 33' 44.02"W, NAD83, with a minimum depth of 12 and is identified as Feature 107. **Concur.**
- AWOIS 10750 - 39° 34' 00.42"N 075° 33' 40.21"W, NAD83, with a minimum depth of 14 feet and is identified as Features 106 and 108. **Concur.**

The items are charted on Charts 12311 and 12277 as a 14-foot and 15-foot shoal areas in the General Anchorage No. 4. Recommend charting the obstructions, and soundings from H11023 (See Chartlets 12311 8 and 12277 3 & 5). **Concur in part. The items are considered as bottom. Chart as 12-ft and 14-ft depths respectively.**

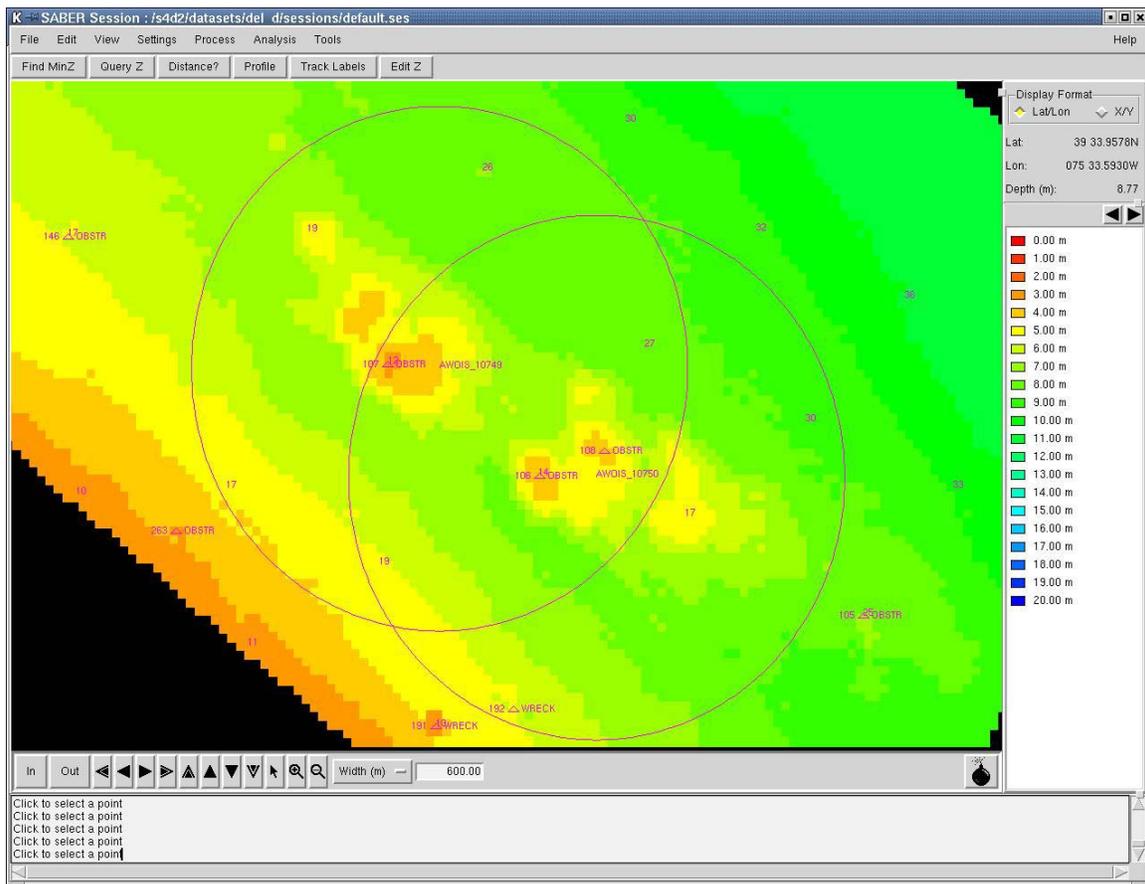


Figure D-14 .Multibeam coverage and features of AWOIS 10749 and 10750 search radii

Pier Ruins at Delaware City

The charted pier ruins in the vicinity of 39° 34' 28.84"N 075° 34' 45.46"W, NAD83, were outside the multibeam coverage but in the side scan data from H11023. The ruins are identified as side scan contacts 091/142520, 091/142522, and 213/145951. It is recommended that they be retained as charted on charts 12311 and 12207 (see Chartlets 12311 6 and 12277 4). **Concur.**

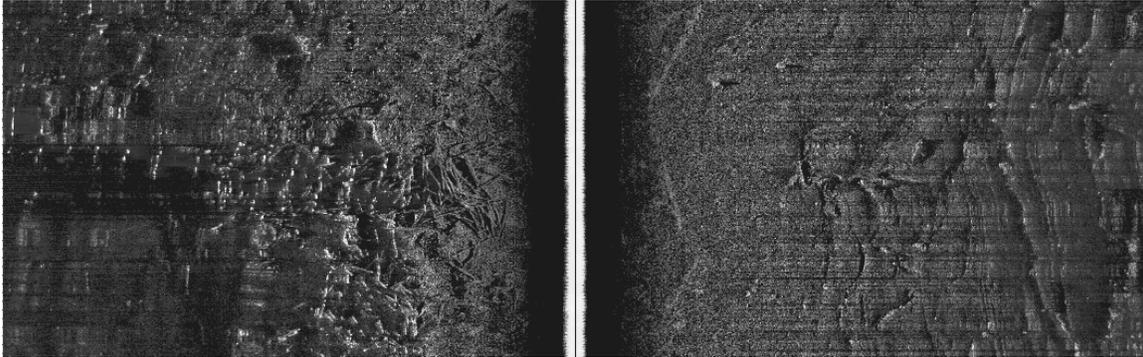


Figure D-15. Side scan image of pier ruins at Delaware City from survey day 091

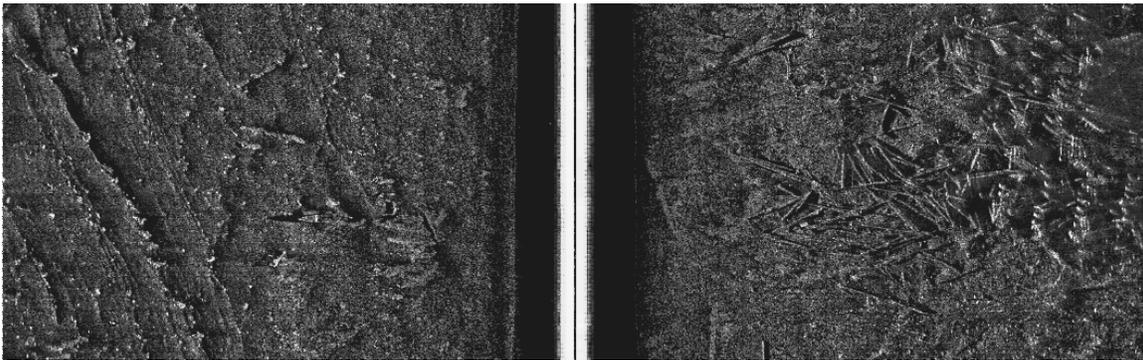


Figure D-16. Side scan image of pier ruins at Delaware City from survey day 213

Pier Ruins off Reedy Island

The charted pier ruins in the vicinity of 39° 30' 51.70"N 075° 33' 32.73"W, NAD83, were outside the multibeam coverage but in the side scan data from H11023. The ruins are identified as side scan contacts 143/133822, and 143/133845. It is recommended that they be retained as charted on charts 12311 and 12207. **Concur.**

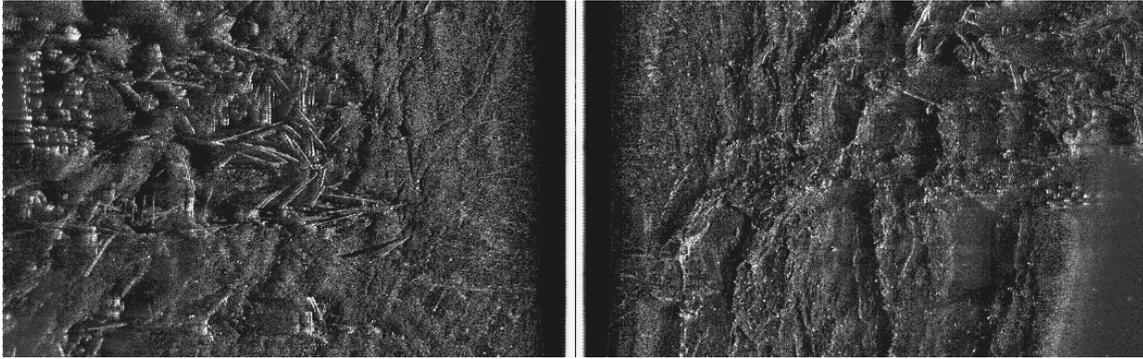


Figure D-17. Side scan image of pier ruins off Reedy Island from survey day 143

Danger to Navigation Reports *See also the Evaluation Report.*

Two “Danger to Navigation Reports” were submitted for H11023 that affected charts 12311 and 12277. Only the second of these dangers was charted on chart 12311 used for the chart comparison.

- Report 1 was submitted in April 2001, and reported a submerged dangerous wreck with a least depth of 14 feet at 39° 34' 25.67"N 075° 34' 35.35"W, NAD83 (see Correlator Sheet* for Feature 171 and Chartlets 12311 8 and 12277 3). During the items investigation data processing, the least depth on the wreck was surveyed at 13 feet at 39° 34' 25.68"N 075° 34' 35.21"W, NAD83. It is recommended that the shoalest sounding (13 feet) be charted with the submerged wreck symbol on Charts 12311 and 12277. **Concur. Chart a dangerous 13 Wk. See also feature 171, pg. 29 of this report.**
- Report 2 was submitted in July 2001, and reported an obstruction with a least depth of 42 feet at 39° 27' 55.13"N 075° 33' 44.65"W, NAD83 (see Correlator Sheet* for Feature 146 and Chartlet 12311 12). During the items investigation the location and least depth was confirmed. It is recommended that the charted dangerous submerged obstruction with a surveyed depth of 42 feet be retained on Chart 12311 at 39° 27' 55.13"N 075° 33' 44.65"W, NAD83. **Concur.**

***Filed with the original field data.**

Uncharted Wrecks and Obstructions

The following Table lists the uncharted wrecks and Obstructions located in H11023 along with charting recommendations (see feature Correlator sheets, found in section II of the Separates Binder, for images) ***Filed with the original field records.***

¹ ***Insignificant. See also the E&A Report, Uncharted Wrecks and Obstructions, paragraph 1.***

² ***See also the E&A Report, Uncharted Wrecks and Obstructions, paragraph 2.***

Table D-1. Uncharted Wrecks and Obstructions on H11023

Feature Number	Feature Position (NAD83)	Least Depth (Feet)	Charting Recommendations
7	39° 33' 50.87"N 075°32' 58.79"W	37.63	Obstruction, chart sounding and label "Obstn" <i>Concur. Chart a 37 Obstn</i>
22	39° 36' 29.15"N 075°34' 13.36"W	18.64	Obstructions, chart sounding and label "Obstns" ¹
29	39° 39' 09.17"N 75° 33' 07.92"W	21.65	Obstruction, chart sounding and label "Obstn" ¹
46	39° 37' 14.42 26 "N 075°34' 32.30"W	25.39 28	Obstructions, chart sounding and label "Obstns" ¹
55	39° 35' 39.53"N 075°33' 30.90"W	9.91 10	Obstructions, chart sounding and label "Obstns" <i>Concur. Chart a 10 Obstn</i>
67	39° 36' 01.60"N 075°33' 44.06"W	10.27	Obstructions, chart sounding and label "Obstns" <i>Concur. Chart a 10 Obstn</i>
72	39° 34' 51.40"N 075°32' 56.12"W	17.26	Obstructions, chart sounding and label "Obstns" ¹
82	39° 34' 34.11"N 075°32' 47.81"W	20.83 21	Obstructions, chart sounding and label "Obstns" <i>Charted. Submitted as a DtoN by AHB</i>
96	39° 34' 54.26"N 075°32' 52.28"W	12.24	Obstructions, chart sounding and label "Obstns" ²
105	39° 33' 57.86"N 075°33' 31.95"W	24.87 25	Obstructions, chart sounding and label "Obstns" <i>Concur. Chart a 25 Obstn</i>
106	39° 34' 00.43"N 075°33' 40.15"W	14.27	Obstructions, chart sounding and label "Obstns" ¹ <i>See AWOIS 10749, page 25</i>
107	39° 34' 02.47"N 075°33' 44.02"W	12.73	Obstructions, chart sounding and label "Obstns" ¹ <i>See AWOIS 10750, page 25</i>
112	39° 34' 26.79"N 075°34' 27.02"W	20.05	Obstructions, chart sounding and label "Obstns" ²
115	39° 34' 43.25"N 075°34' 55.48"W	29.46	Obstruction, chart sounding and label "Obstn" ²
118	39° 35' 32.71"N 075°35' 39.43"W	17.55	Obstruction, chart sounding and label "Obstn" ¹
127	39° 35' 22.45"N 075°35' 25.07"W	13.12	Obstruction, chart sounding and label "Obstn" ¹

Feature Number	Feature Position (NAD83)	Least Depth (Feet)	Charting Recommendations
138	39° 36' 52.69"N 075°35' 46.04"W	17.26	Obstruction, chart sounding and label "Obstn" ¹
139	39° 36' 56.98"N 075°35' 43.57"W	17.59	Obstructions, chart sounding and label "Obstns" ¹
144	39° 38' 38.20"N 075°34' 55.63"W	15.49	Obstruction, chart sounding and label "Obstn" Concur. Chart a 15 Obstn
145	39° 38' 16.70"N 075°35' 12.64"W	18.44	Obstruction, chart sounding and label "Obstn" ¹
146	39° 34' 04.80"N 075°33' 52.15"W	17.29	Obstructions, chart sounding and label "Obstns" ¹
152	39° 34' 35.80"N 075°34' 45.88"W	22.64	Obstruction, chart sounding and label "Obstn" ¹
155	39° 34' 40.17"N 075°34' 54.55"W	24.44	Obstructions, chart sounding and label "Obstns" ²
163	39° 34' 37.99"N 075°34' 52.69"W	19.85 20	Obstructions, chart sounding and label "Obstns" ²
171	39° 34' 25.68"N 075°34' 35.21"W	12.96 13	Wreck chart sounding and label "Wk" Concur. See also DtoN report #1, page 27
182	39° 34' 18.58"N 075°34' 20.29"W	15.91 16	Obstructions, chart sounding and label "Obstns" ¹
191	39° 33' 55.76"N 075°33' 42.77"W	10.20	Wrecks, chart sounding and label "Wks" Concur. Chart a 10 Wk
219	39° 36' 37.54"N 075°36' 11.82"W	22.57	Obstructions, chart sounding and label "Obstns" ¹
220	39° 37' 04.80"N 075°36' 10.96"W	18.54	Obstruction, chart sounding and label "Obstn" ¹
221	39° 37' 25.18"N 075°36' 03.49"W	16.47	Obstruction, chart sounding and label "Obstn" ¹
226	39° 38' 15.74"N 075°34' 51.31"W	10.56	Obstruction, chart sounding and label "Obstn" ¹
235	39° 38' 59.74"N 075°34' 05.62"W	22.08	Obstructions, chart sounding and label "Obstns" ²
248	39° 36' 57.50"N 075°35' 04.00"W	22.83	Wreck, chart sounding and label "Wk" ¹
258	39° 39' 00.73"N 075°33' 27.93"W	16.54	Obstructions, chart sounding and label "Obstns" Concur. Chart a 16 Obstn
269	39° 38' 16.54"N 075°33' 38.68"W	15.35	Obstructions, chart sounding and label "Obstns" ¹
270	39° 38' 34.91"N 075°33' 01.77"W	12.24	Obstructions, chart sounding and label "Obstns" ¹

Feature Number	Feature Position (NAD83)	Least Depth (Feet)	Charting Recommendations
271	39° 38' 42.63"N 075°32' 51.41"W	17.03	Obstructions, chart sounding and label "Obstns" ¹
291	39° 36' 36.98"N 075°36' 07.97"W	20.73	Obstructions, chart sounding and label "Obstns" ¹
292	39° 36' 39.09"N 075°36' 08.57"W	18.73	Obstructions, chart sounding and label "Obstns" Concur. Chart an 18 Obstn
294	39° 35' 30.49"N 075°35' 28.99"W	11.84 12	Obstruction, chart sounding and label "Obstn" Concur. Chart a 12 Obstn
300	39° 31' 34.70"N 075°33' 07.10"W	35.86 36	Obstructions, chart sounding and label "Obstns" ¹
349	39° 30' 35.40"N 075°33' 30.33"W	28.58	Obstructions, chart sounding and label "Obstns" ¹
352	39° 30' 31.18"N 075°33' 35.44"W	22.47	Obstructions, chart sounding and label "Obstns" ¹
382	39° 31' 59.57"N 075°32' 28.37"W	27.49	Wreck, chart sounding and label "Wk" Concur. Chart a 27 Wk
384	39° 29' 07.21"N 075°33' 26.93"W	24.05	Obstruction, chart sounding and label "Obstn" Concur. Chart a 24 Obstn
392	39° 33' 15.04"N 075°33' 14.61"W	18.64	Obstructions, chart sounding and label "Obstns" ¹
418	39° 30' 46.24"N 075°32' 42.21"W	21.82 22	Obstructions, chart sounding and label "Obstns" ¹ Concur. Chart a 22 Obstn
430	39° 38' 39.59"N 075°32' 57.16"W	17.59	Obstructions, chart sounding and label "Obstns" ¹
441	39° 27' 28.89"N 075°33' 22.07"W	30.09	Obstruction, chart sounding and label "Obstn" Concur. Chart a 30 Obstn
465	39° 25' 21.22"N 075°30' 32.29"W	25.46 27	Obstruction, chart sounding and label "Obstn" ¹
467	39° 25' 52.50"N 075°31' 06.36"W	25.56 27	Obstruction, chart sounding and label "Obstn" ¹
469	39° 27' 10.76"N 075°32' 26.74"W	26.90	Obstruction, chart sounding and label "Obstn" ¹
474	39° 29' 03.00"N 075°33' 04.43"W	20.70	Pipeline, chart sounding only Concur. Should the scale of the chart allow.
475	39° 29' 02.20"N 075°33' 01.60"W	19.68	Pipeline, chart sounding only Concur. Should the scale of the chart allow.
480	39° 29' 00.31"N 075°32' 46.60"W	11.75	Pipeline chart sounding only Concur. Should the scale of the chart allow.
484	39° 28' 26.06"N 075°32' 57.25"W	15.68	Obstruction, chart sounding and label "Obstn" Concur. Chart a 15 Obstn

Feature Number	Feature Position (NAD83)	Least Depth (Feet)	Charting Recommendations
485	39° 28' 11.56"N 075°32' 50.37"W	16.21	Obstruction, chart sounding and label "Obstn" ¹
489	39° 27' 15.35"N 075°32' 14.32"W	20.31	Obstruction, chart sounding and label "Obstn" <i>Concur. Chart a 20 Obstn</i>
493	39° 28' 07.23"N 075°32' 37.79"W	15.35 ⁷⁸ <i>16</i>	Obstruction, chart sounding and label "Obstn" ¹
496	39° 26' 13.12"N 075°32' 41.37"W	27.33	Obstruction, chart sounding and label "Obstn" <i>Concur. Chart a 27 Obstn</i>
498	39° 25' 57.09"N 075°32' 22.74"W	30.77	Obstruction, chart sounding and label "Obstn" ¹
502	39° 27' 53.83"N 075°34' 13.74"W	23.00	Obstruction, chart sounding and label "Obstn" ¹
527	39° 34' 15.83"N 075°32' 29.68"W	15.06	Obstruction, chart sounding and label "Obstn" <i>Concur. Chart a 15 Obstn</i>
538	39° 26' 44.30"N 075°33' 27.64"W	29.72	Obstruction, chart sounding and label "Obstn" ¹
561	39° 32' 33.59"N 075°33' 10.18"W	16.96 <i>17</i>	Obstructions, chart sounding and label "Obstns" ¹
582	39° 34' 20.35"N 075°32' 25.52"W	12.27	Obstruction, chart sounding and label "Obstn" <i>Concur. Chart a 12 Obstn</i>
588	39° 38' 10.69"N 075°33' 48.42"W	20.14	PIPELINE, chart sounding only <i>Chart present survey soundings.</i>
619	39° 30' 52.48"N 075°32' 13.27"W	9.71	Obstruction, chart sounding and label "Obstn" ¹
620	39° 31' 54.58"N 075°32' 17.27"W	12.93 <i>13</i>	Obstruction, chart sounding and label "Obstn" ²
625	39° 39' 21.85"N 075°33' 05.84"W	13.68 <i>22</i>	Obstructions, chart sounding and label "Obstns" ¹
629	39° 29' 20.11"N 075°34' 18.52"W	14.86 <i>15</i>	Obstruction, chart sounding and label "Obstn" ¹

Charted Shoals

Baker Shoal (Chartlets 12311 11 & 12)

The charted boundary for Baker Shoal is valid and has remained stable. Recommend redrawing the depth curves around the shoal based on the results of H11023. *Concur.*

Black Ditch Bar

The charted boundary for Black Ditch bar is valid and has remained stable. Recommend redrawing the depth curves around the shoal based on the results of H11023. *Concur.*

Reedy Island Bar (Chartlets 12311 8, 9 & 10 and 12277 5 & 7)

The charted boundary for Reedy Island Bar is valid and has remained stable. Recommend redrawing the depth curves around the shoal based on the results of H11023.

Do not concur. Reedy Island Bar is outside the limits of the present survey.

Bulkhead Shoal (Chartlets 12311 1 & 2)

The charted boundary for Bulkhead Shoal is valid and has remained stable. Recommend redrawing the depth curves around the shoal based on the results of H11023. ***Concur.***

Goose Island Flats (Chartlet 12311 1)

The charted boundary for Goose Island Flats is valid and has remained stable. Recommend redrawing the depth curves around the shoal based on the results of H11023.

Concur.

Pea Patch Shoal (Chartlet 12277 3)

The charted boundary for Pea Patch Shoal is valid and has remained stable. Recommend redrawing the depth curves around the shoal based on the results of H11023. ***Concur.***

Cable Areas

Unburied submarine cables were detected in the side scan imagery in the cable area that runs across the Delaware River from the vicinity of 39° 39' 19.74"N 075° 33' 49.58"W, NAD83, (New Castle, Delaware) to the vicinity of 39° 38' 44.34"N 075° 32' 44.02"W, NAD83, (Kelly Point, New Jersey). ***Concur. Retain as charted.***

Unburied submarine cables were detected in the side scan imagery in the cable area that runs across the Delaware River from the vicinity of 39° 35' 36.71"N 075° 33' 58.30"W, NAD83, (Pea Patch Island, Delaware) to the vicinity of 39° 36' 16.81"N 075° 33' 18.10"W, NAD83, (Fort Mott, New Jersey). ***Concur. Retain as charted.***

Unburied submarine cables were detected in the side scan imagery in the cable area that runs into the Delaware River from the vicinity of 39° 36' 16.81"N 075° 33' 18.10"W, NAD83, (Fort Mott, New Jersey) to the vicinity of 39° 35' 29.55"N 075° 33' 24.91"W, NAD83, and then back to the New Jersey north of Mill Creek in the vicinity of 39° 35' 38.54"N 075° 32' 18.84"W, NAD83. ***Concur. Retain as charted.***

Unburied submarine cables were detected in the side scan imagery in the cable area that runs across the Delaware River from the vicinity of 39° 35' 14.40"N 075° 34' 25.56"W, NAD83, (Pea Patch Island, Delaware) to the vicinity of 39° 34' 24.23"N 075° 34' 46.10"W (Delaware City, Delaware). Features 172, 173, 174 show a submarine cable entering a conduit pipe that leads to the shore. ***Concur. Retain as charted.***

Pipeline Areas

A pipeline was surveyed in H11023 in the pipeline area in the vicinity of 39° 38' 12.94"N 075° 33' 31.91"W, NAD83, between Killcohook National Wildlife Refuge and Miles Creek. The pipeline is identified as features 589, 590, 591, 592, and 593. During the Items investigation, the pipeline was surveyed from its terminus in deep water to as close to shore as safe navigation would allow. Multibeam coverage of the pipeline extends from 39° 38' 15.76"N 075° 33' 40.87"W, NAD83, to features 589, 591, 590, 592, 593, and ends at 39° 38' 10.22"N 075 33' 37.43"W, NAD 83.

A second pipeline was located to the southeast, just outside the designated pipeline area in the vicinity of 39° 38' 12.94"N 075° 33' 31.91"W, NAD83. The pipeline is identified as features 588, 596, and 597. During the Items investigation, the pipeline was surveyed from its terminus in deep water to as close to shore as safe navigation would allow. It is recommended that the pipeline be charted from 39° 38' 11.06"N 075° 33' 48.64"W, NAD83, to features 588, 597, 596, and end at 39° 38' 07.10"N 075 33' 43.84"W, NAD 83. **Concur. Recommend revision of charted Pipeline Area limits.**

A pipeline was surveyed in H11023 in the pipeline area in the vicinity of 39° 36' 33.70"N 075° 34' 10.19"W, NAD83 33.70 75 at the north end of Goose Island Flats. The pipeline is identified as features 52, 53, and 533. During the Items investigation, the pipeline was surveyed from its terminus in deep water to as close to shore as safe navigation would allow. Multibeam coverage of the pipeline extends from 39° 36' 31.58"N 075° 34' 06.94"W, NAD83, to features 53, 52, 533 and ends at 39° 36' 34.62"N 075° 34' 04.49"W, NAD83. **Concur. Retain as charted.**

A pipeline was surveyed in H11023 in the pipeline area in the vicinity of 39° 29' 02.54"N 075° 33' 01.53"W, NAD83, at Artificial Island. The pipeline is identified as features 473, 474, 475, 476, 477, 478, 479, 480, 481, and 482. During the Items investigation, the pipeline was surveyed from its terminus in deep water to as close to shore as safe navigation would allow. It is recommended that the pipeline be charted from 482, 481, 473, 474, 475, 476, 477, 479, 478, 480 ending at 39° 29' 00.94'N 075° 32' 41.65"W, NAD83. **Pipeline Area limits are currently charted. No change in charting is recommended.**

Overhead Cables

There is an overhead power cable from the vicinity of 39° 36' 40.79"N 075° 36' 45.89"W, NAD83, north of Hamburg Cove on the Delaware side to the vicinity of 39° 36' 46.48"N 075° 33' 58.72"W, NAD83, north of Finns Point on the New Jersey side. The Authorized clearance is 50 feet, 223 feet over the main channel. The actual clearance was not surveyed in H11023. **Concur. Retain as charted.**

Bottom Composition

There were 17 bottom samples taken to verify the bottom types charted for H11023. The following table compares information for each sample collected to the charted bottom type.

Table D-2. H11023 Bottom Sample Characteristics

Bottom Sample Number	Bottom Sample Position (NAD83)		Depth of Bottom Sample (m)	Observed Bottom Type	Charted Bottom Type
	Latitude (N)	Longitude (W)			
BSd-1	39° 25' 12.33"	75° 31' 38.39"	6.77	M	Cy S
BSd-2	39° 25' 15.66"	75° 29' 30.51"	4.80	M Silt	M
BSd-3	39° 25' 48.85"	75° 29' 22.96"	4.54	M	M Sh
BSd-4	39° 26' 12.16"	75° 30' 17.50"	6.40	Silt	M S Sh
BSd-5	39° 25' 32.93"	75° 30' 50.86"	9.25	Cl Sh	Cy
BSd-6	39° 25' 49.94"	75° 32' 29.59"	8.43	Blk M S	Cy
BSd-7	39° 26' 31.57"	75° 31' 16.32"	5.35	Sh	M Sh
BSd-8	39° 26' 27.78"	75° 31' 57.17"	9.72	Cl	Cy M
BSd-9	39° 26' 40.01"	75° 33' 28.99"	8.00	Cl H	Cy
BSd-10	39° 26' 50.93"	75° 32' 23.32"	9.44	Blk M S	Cy
BSd-11	39° 27' 07.49"	75° 31' 42.55"	5.09	Cl S Sh	S Cy
BSd-12	39° 27' 11.01"	75° 32' 48.17"	8.72	Brn M S	Cy
BSd-13	39° 28' 02.07"	75° 32' 44.15"	6.00	S	M
BSd-14	39° 30' 49.90"	75° 32' 14.12"	4.57	Brn M S	M
BSd-15	39° 32' 46.39"	75° 32' 41.95"	16.32	S	M
BSd-16	39° 38' 15.89"	75° 35' 15.94"	6.15	Brn M	M
BSd-17	39° 39' 13.08"	75° 33' 45.51"	8.44	Brn M	M

It is recommended that the bottom type charted be updated where necessary based on the results of H11023.

D.2 ADDITIONAL RESULTS

Shoreline verification was not required for this survey. Comparison with prior surveys was not required under this contract. See Section D.1 Chart Comparison for comparison to the nautical charts.

Aids to Navigation *See also the Evaluation Report.*

U.S. Coast Guard aids to navigation were found on station as charted. These aids adequately serve their intended purpose.

Dredging

The U.S. Army Corps of Engineers was actively dredging in Liston Range during and after this survey.

E. APPROVAL SHEET

April 3, 2002

LETTER OF APPROVAL

REGISTRY NUMBER H11023

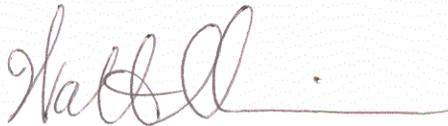
This report and the accompanying smooth sheet and digital data are respectfully submitted.

Field operations contributing to the accomplishment of survey H11023 were conducted under my direct supervision with frequent personal checks of progress and adequacy. This report and smooth sheet have been closely reviewed and are considered complete and adequate as per the Statement of Work.

Reports previously submitted to NOAA for this project include:

<u>Report</u>	<u>Submission Date</u>
Data Acquisition and Processing Report	02/08/2002
Vertical and Horizontal Control Report	03/02/2002
Tides and Water Levels Package	01/03/2002

SCIENCE APPLICATIONS INTERNATIONAL CORPORATION



Science Applications International Corporation
Walter S. Simmons
Hydrographer
Monday, April 3, 2002

APPENDIX I. DANGER TO NAVIGATION REPORTS

Danger to Navigation Report

Hydrographic Survey Registry Number: H11023

State: Delaware-New Jersey

Locality: Delaware River

Sub-Locality: Liston Point to New Castle

Project Number: OPR-D307-KR-2000

Depths are reduced to Mean Lower Low Water using verified tides based on preliminary zoning. Positions are based on NAD-83. There were four passes over this object on three days showing it coming up to 14 feet. Position was obtained using DGPS from a US Coast Guard Station.

Charts affected: 12277 Chesapeake and Delaware Canal 1:20,000
12311 Delaware River-Smyrna R. to Wilmington 1:40,000

The following item was found during hydrographic survey operations:

<u>FEATURE</u>	<u>DEPTH (FT)</u>	<u>LATITUDE(N)</u>	<u>LONGITUDE(W)</u>
1. Wreck	44 13	39 34 25.674	075 34 35.347

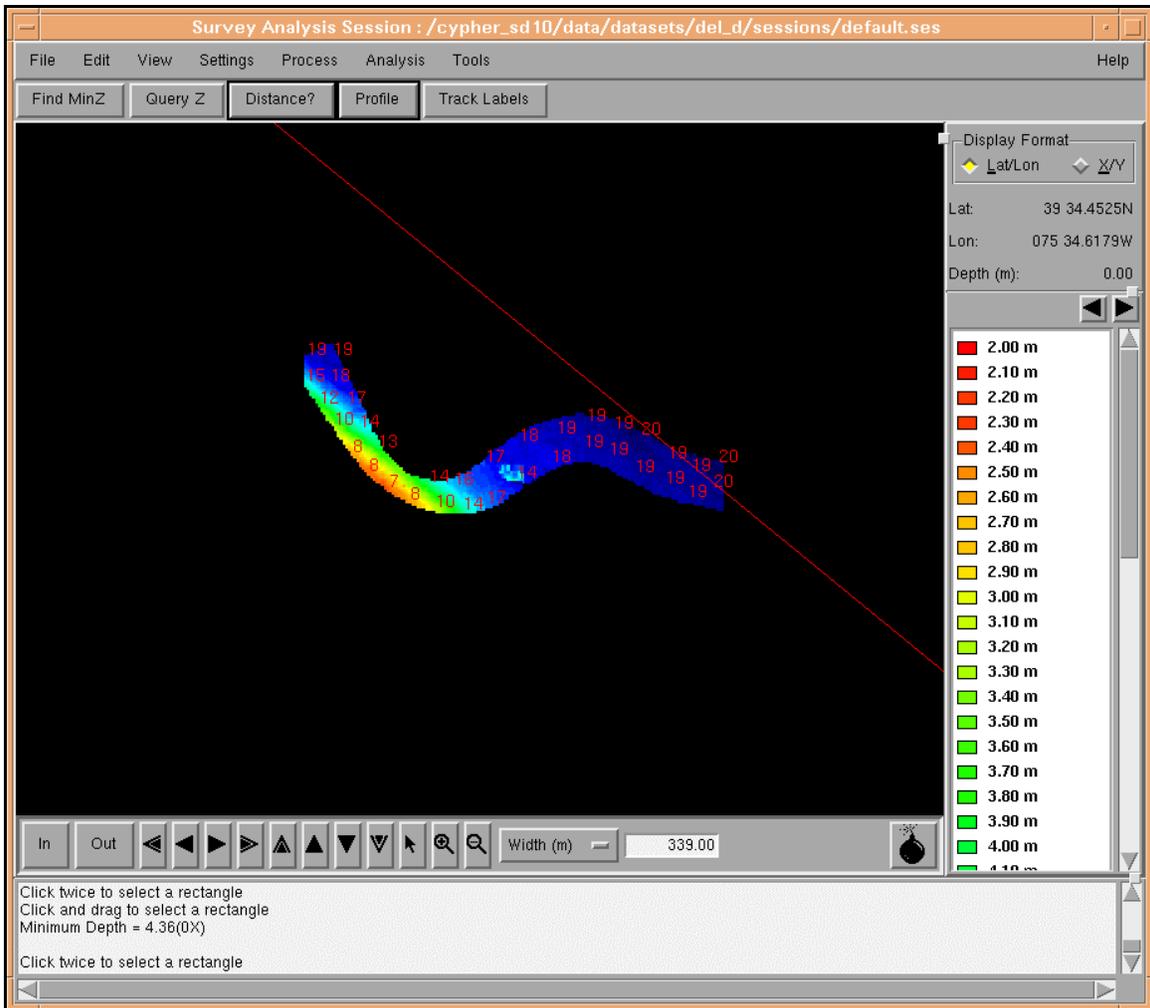


Figure Appendix I-1. Obstruction *Wreck* with Soundings

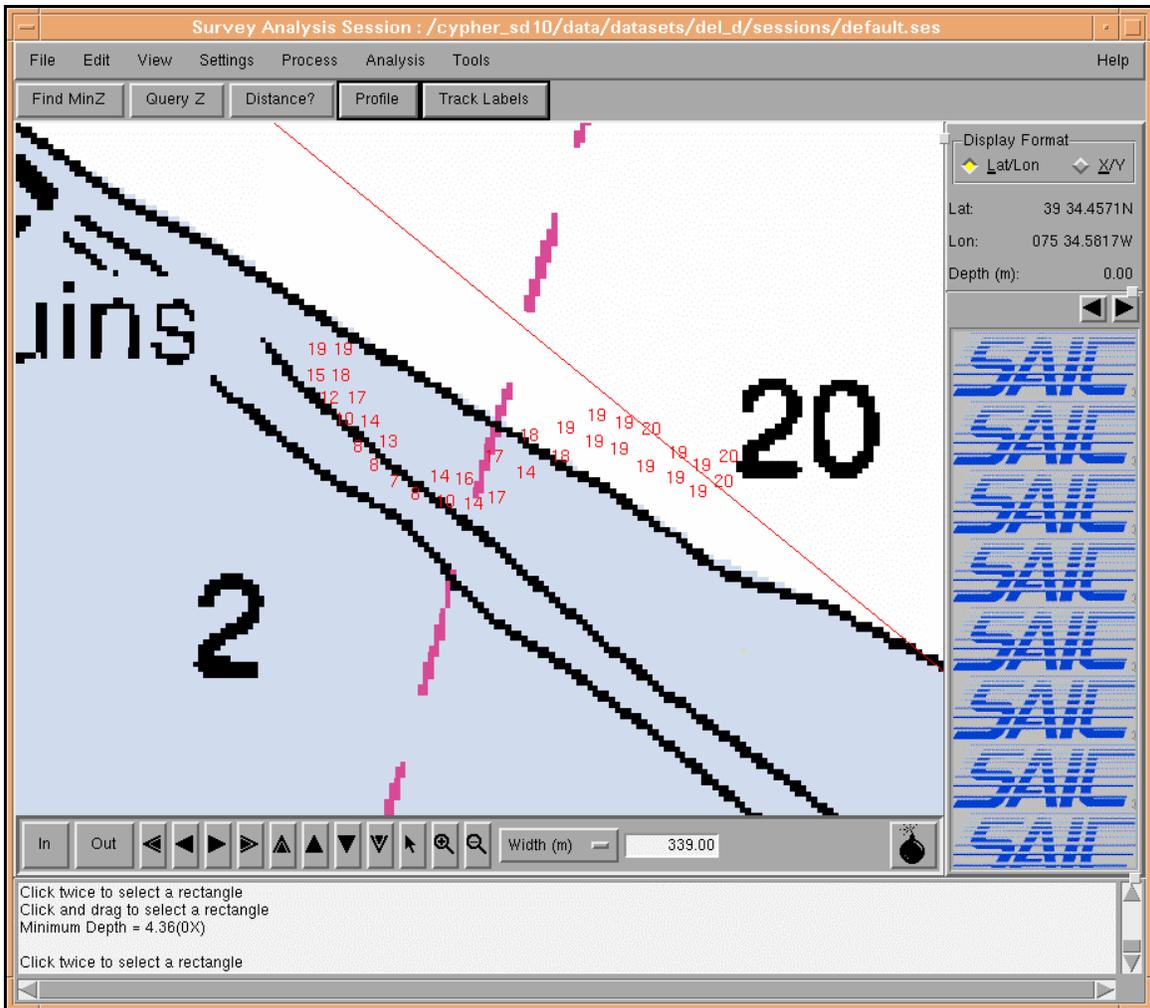


Figure Appendix I-2. Soundings over Chart ~~13223~~ 12277

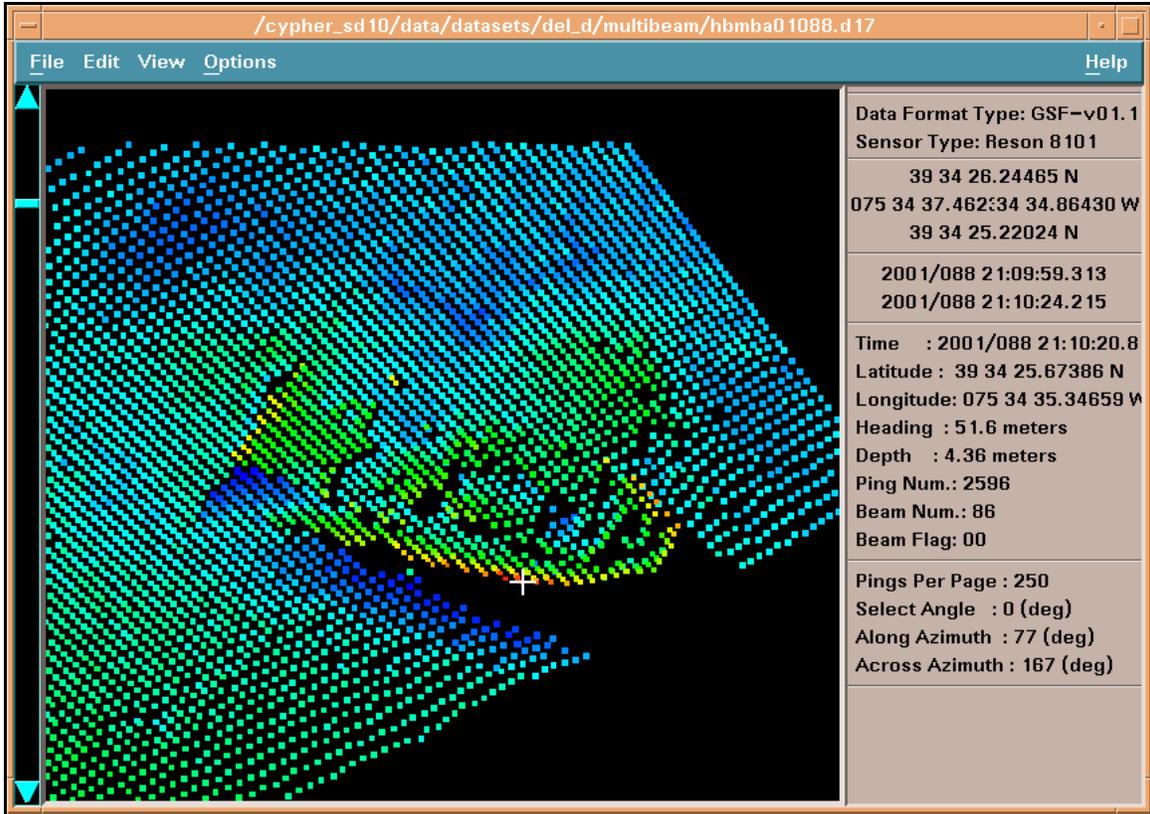


Figure Appendix I-3. Obstruction *Wreck* Top View

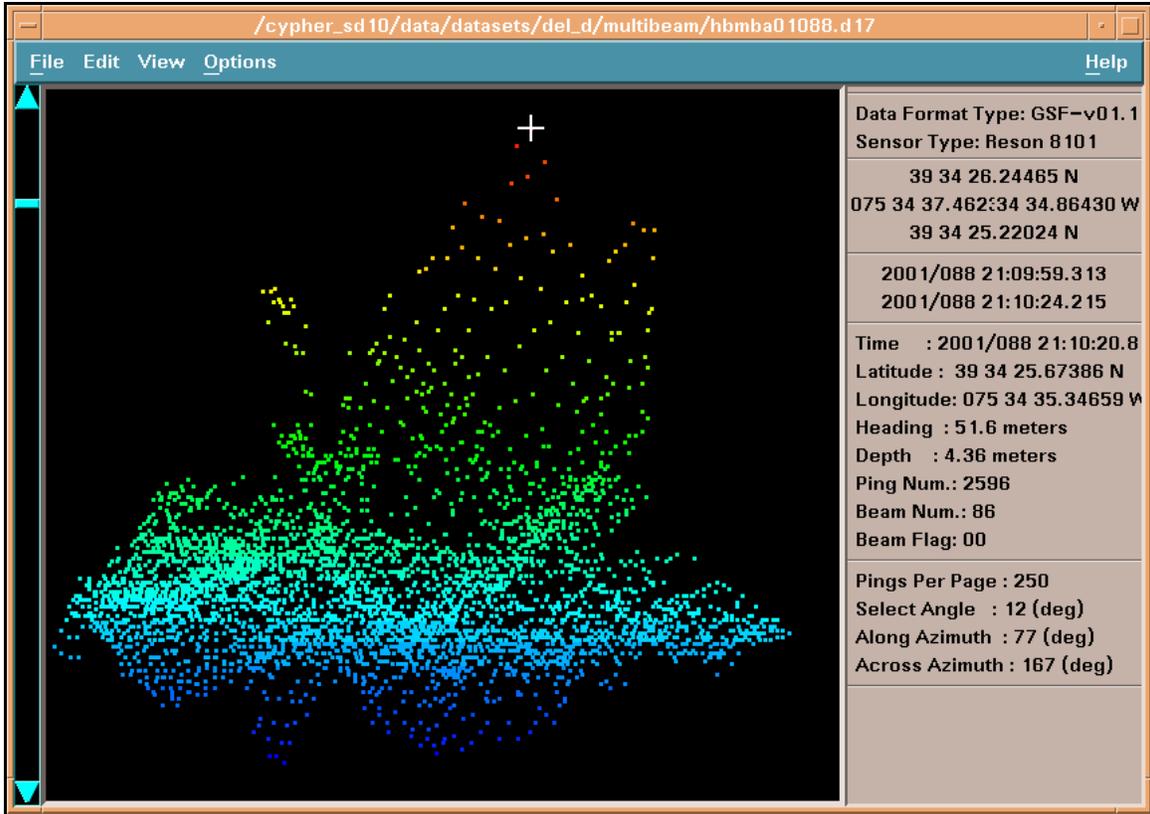


Figure Appendix I-4. ~~Obstruction~~ **Wreck** view from the East

Danger to Navigation Report

Hydrographic Survey Registry Number: H11023

State: Delaware-New Jersey

Locality: Delaware River

Sub-Locality: Liston Point to New Castle

Project Number: OPR-D307-KR-2000

Depths are reduced to Mean Lower Low Water using verified tides based on preliminary zoning. Positions are based on NAD-83 and were obtained using DGPS from a US Coast Guard Station. These data show a height of 2.31 meters and a minimum depth of 12.88 meters / 42 feet.

Charts affected: 12311 Delaware River-Smyrna R. to Wilmington 1:40,000

The following item was found during hydrographic survey operations:

<u>FEATURE</u>	<u>DEPTH (FT)</u>	<u>LATITUDE(N)</u>	<u>LONGITUDE(W)</u>
1. Obstruction	42	39 27 55.13	075 33 44.65

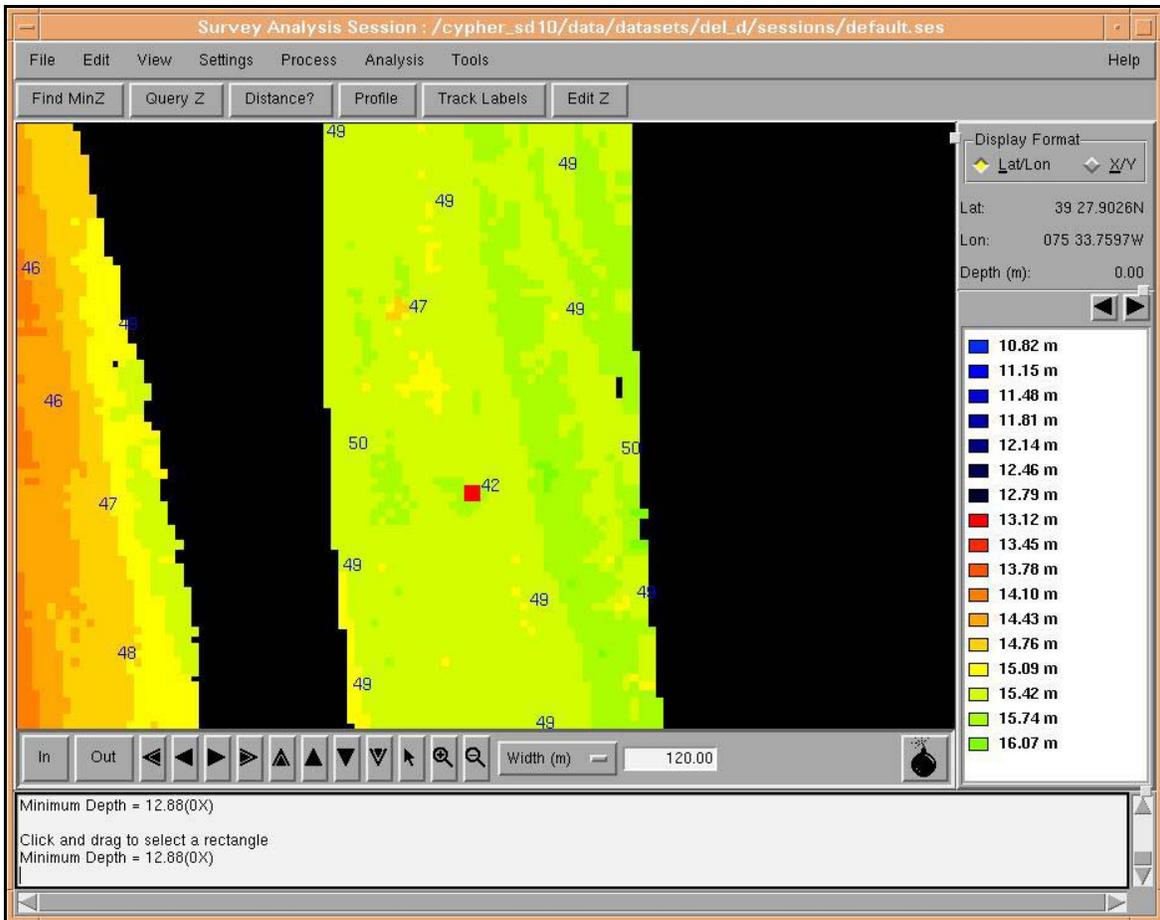


Figure Appendix I-5. Gridded Depth with Soundings

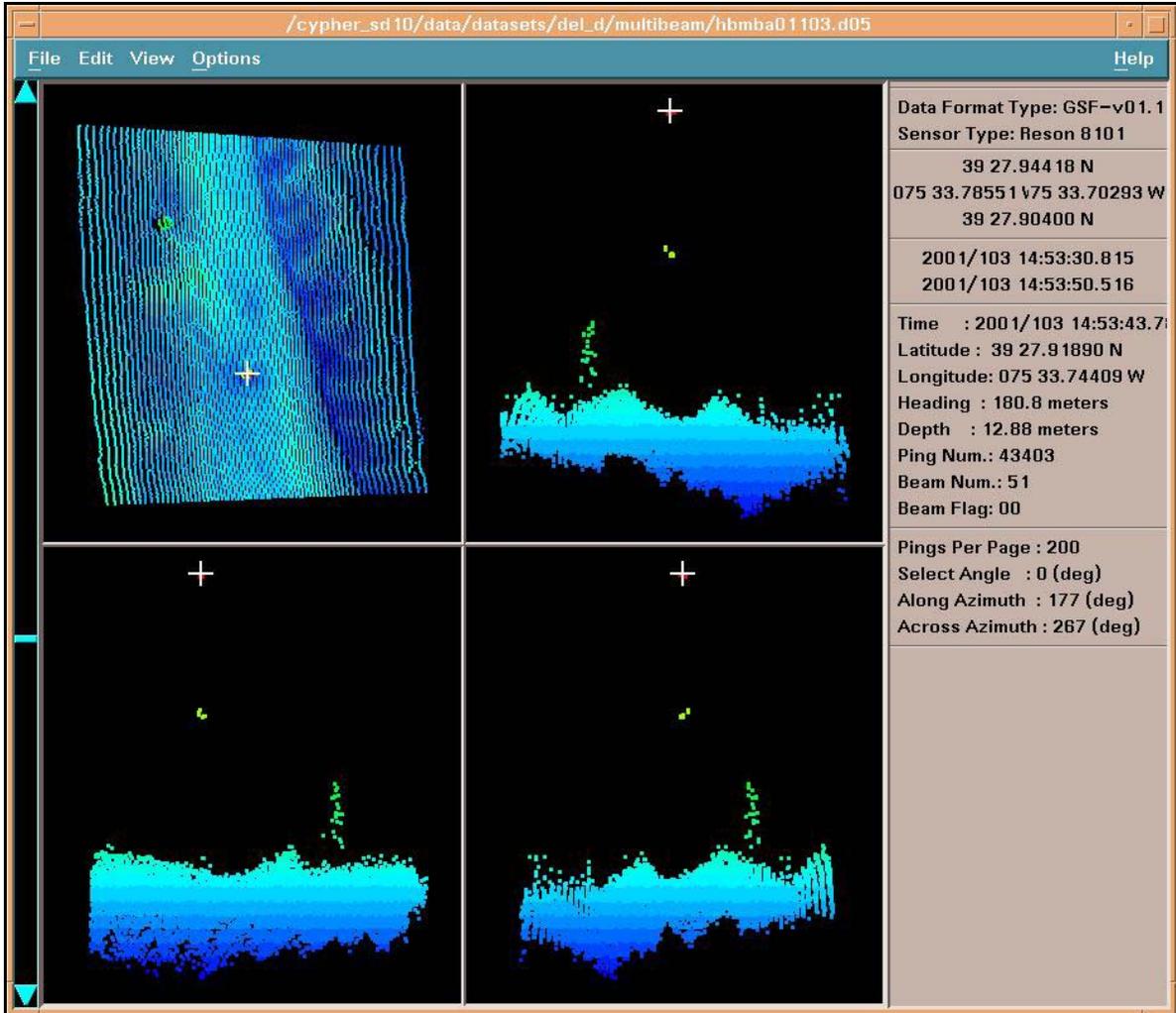


Figure Appendix I-7. Obstruction with Cursor at Top Beam.

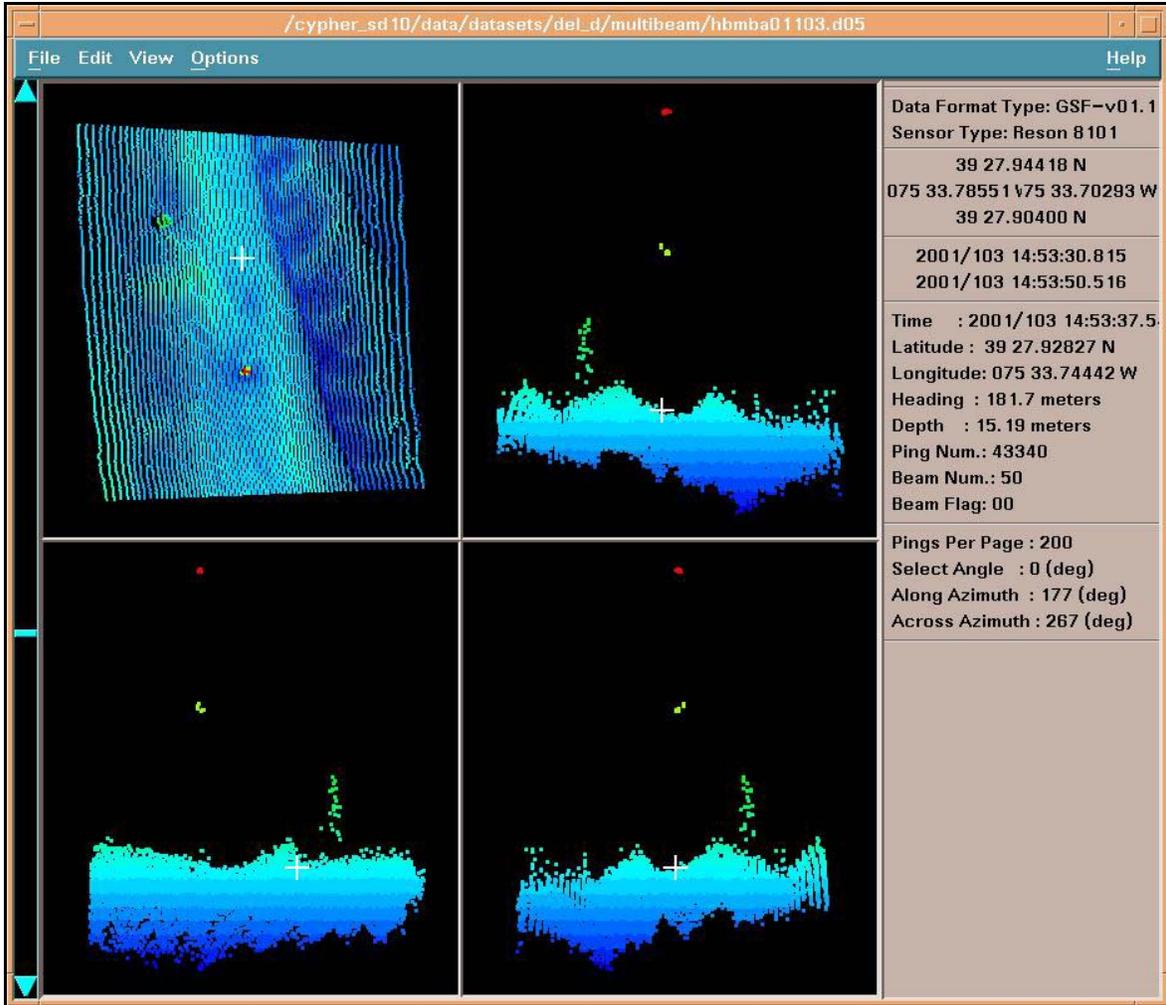


Figure Appendix I-8. Obstruction with Cursor at Surrounding Depths.

CHART CORRECTION LETTER

Charts 12277 and 12311

January 3, 2002

In order to get some information developed in the survey of H11023 to the chart in a timely manner SAIC is forwarding this letter in advance of submission of the final products. This report covers two portions of the New Castle Range of the Delaware River Channel on Charts 12277 and 12311.

1. At the east side of Pea Patch Island, the 24, 29, 37, and 39 foot Rocks charted in the channel near 39 35 26.5N 075 33 52.6W do not exist. This area was surveyed with 200% side scan and 100% multibeam sounder coverage. Figure Appendix V-4 shows the Multibeam depth grid with an overlay of selected soundings and side scan contacts. Figure Appendix V-5 shows Chart 12277 with the same overlay of selected soundings and side scan contacts. Contact positions are indicated by a blue square. An X through the square indicates the contact was judged to be non-significant. A + in the square indicates the contact was correlated to a multibeam feature. Contact 086/12:08:19 was correlated to the 42 foot sounding to the west. Contacts 086/12:10:20 and 096/17:00:25 were correlated to the 42 foot sounding to the east. And contact 096/16:41:32 was correlated to the 38 foot sounding to the west.

Note that, outside the channel to the west, the bottom shoals rapidly to soundings of 7 and 8 feet. The area of charted rocks in the channel is actually the deepest section of the channel. However, the controlling depth for the west half the channel is a sand wave field north of the charted rocks with least depth of 38 feet in 39 35 32.43N 075 33 55.28W.

Recommend removal of the 24, 29, 37, and 39 foot Rocks charted in the channel near 39 35 26.5N 075 33 52.6W. ***Concur. Not shown on the latest editions of charts 12277 and 12311.***

Recommend charting the 38 foot sounding in 39 35 32.43N 075 33 55.28W. ***Do not concur. Revision of the tabulation for New Castle Range, left outside quarter, lists a controlling depth of 38 feet.***

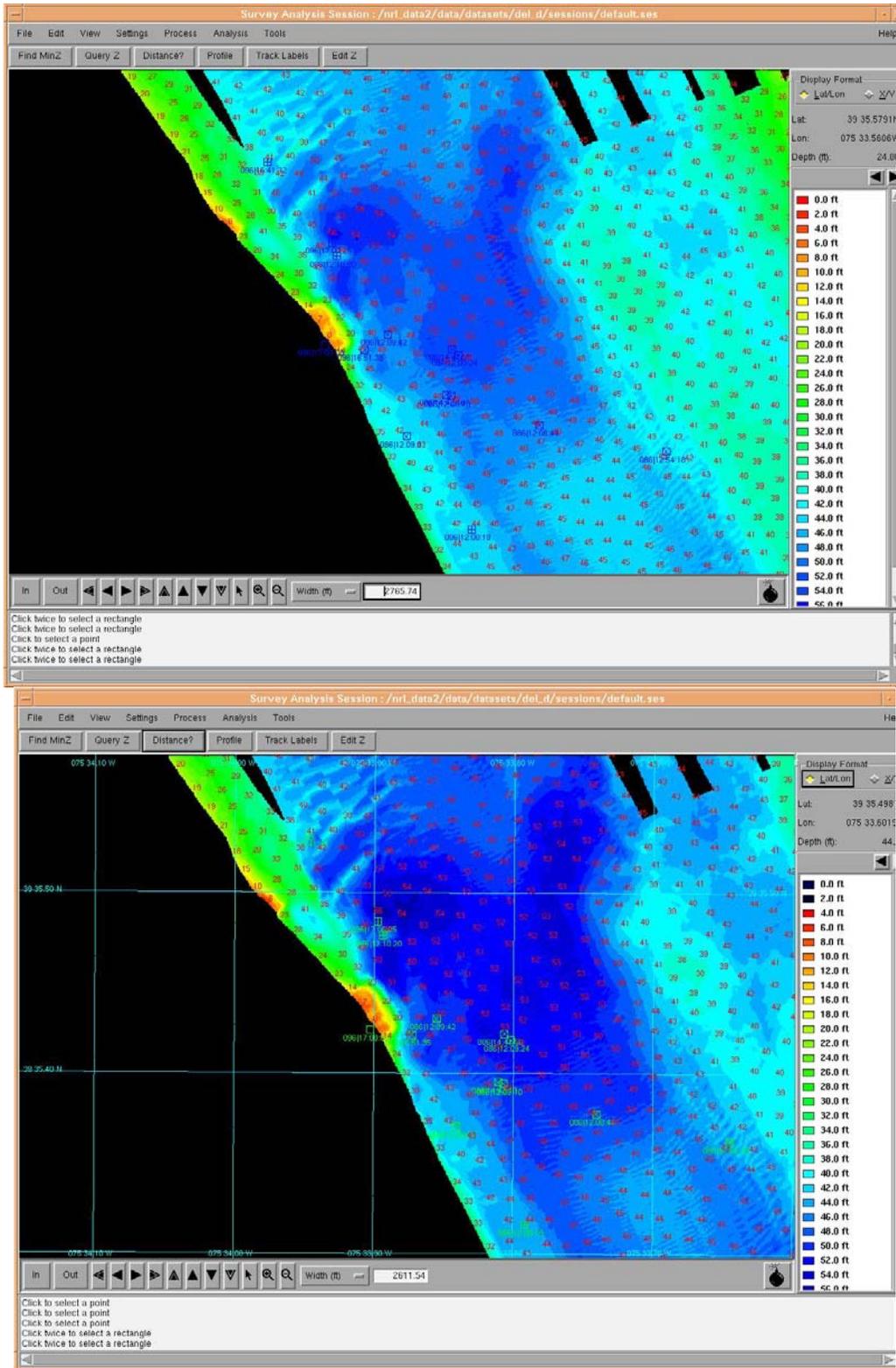


Figure Appendix V-4. Pea Patch Island Multibeam Grid with Soundings and Contacts

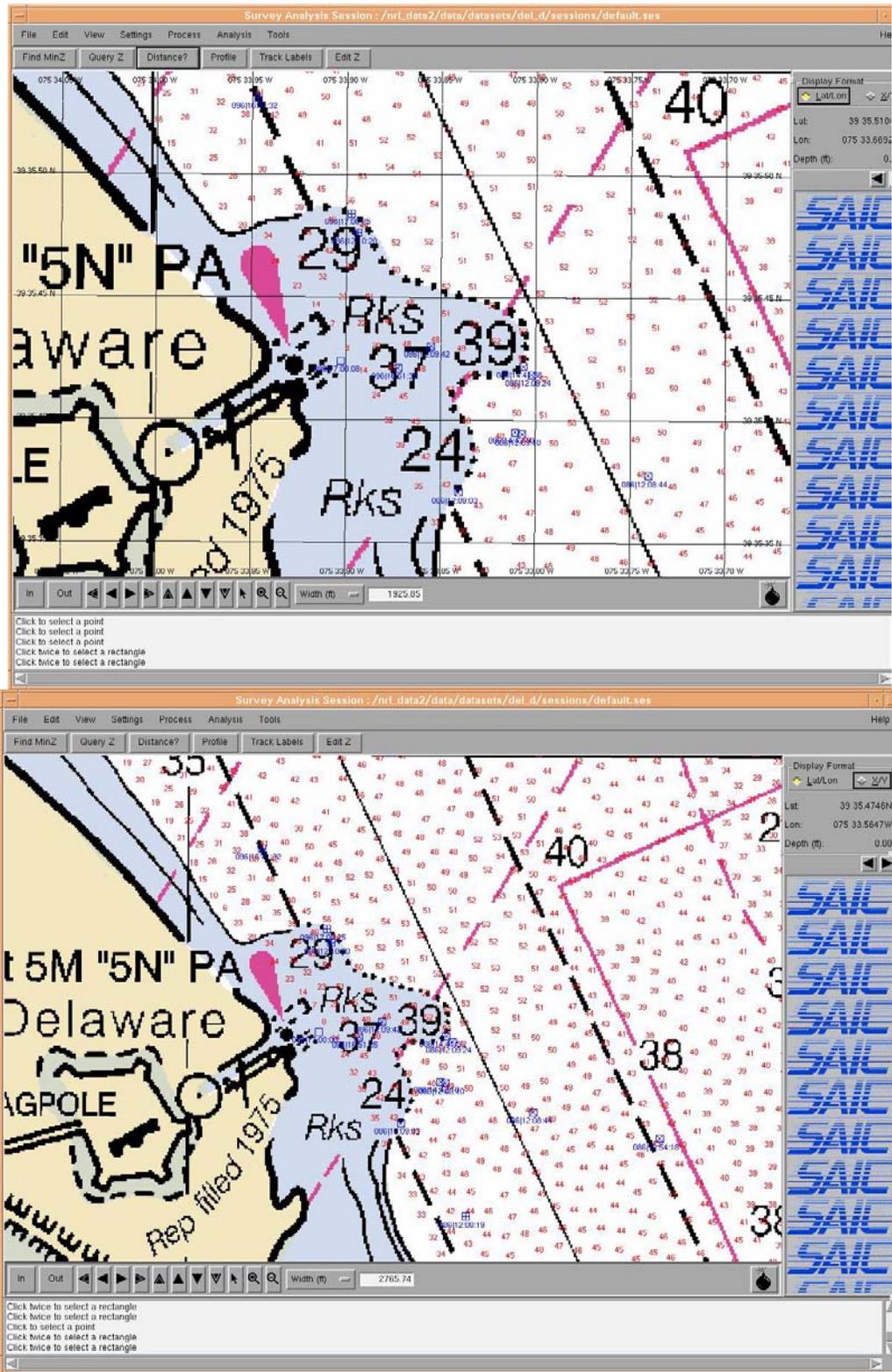


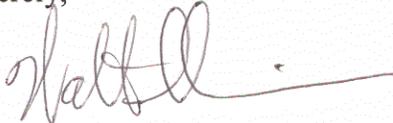
Figure Appendix V-5. Pea Patch Island Chart 12277 with Soundings and Contacts

2. The dangerous Obstruction charted in the channel near 39 36 33.1N 075 34 26.9W does not exist. This area was surveyed with 200% side scan and 100% multibeam sounder coverage. Figure Appendix V-6 shows the Multibeam depth grid with an overlay of selected soundings and side scan contacts. Figure Appendix V-7 shows Chart 12311 with the same overlay of selected soundings and side scan contacts. Contact positions are indicated by a blue square. An X through the square indicates the contact was judged to be non-significant. A + in the square indicates the contact was correlated to a multibeam feature.

Contact 087/19:04:38, outside the channel to the east, was correlated to a 38 foot sounding, Feature #38. Contacts 086/12:22:15; 12:22:13; 14:23:03; and 14:28:07 are correlated to a 42 foot sounding in the west half of the channel, feature #520. Contacts 086/16:24:56; 21:20:25; 21:20:30; 21:20:37; 21:20:40; and 21:20:46 are correlated to a 29 foot sounding outside the channel to the west, feature #531.

Recommend removal of the dangerous Obstruction charted in the channel near 39 36 33.1N 075 34 26.9W. *CONCUR. HAS BEEN DELETED FROM THE LATEST EDITIONS OF CHARTS 12277 AND 12311.*

Sincerely,



Science Applications International Corporation
Walter S. Simmons
Senior Engineer, Lead Hydrographer

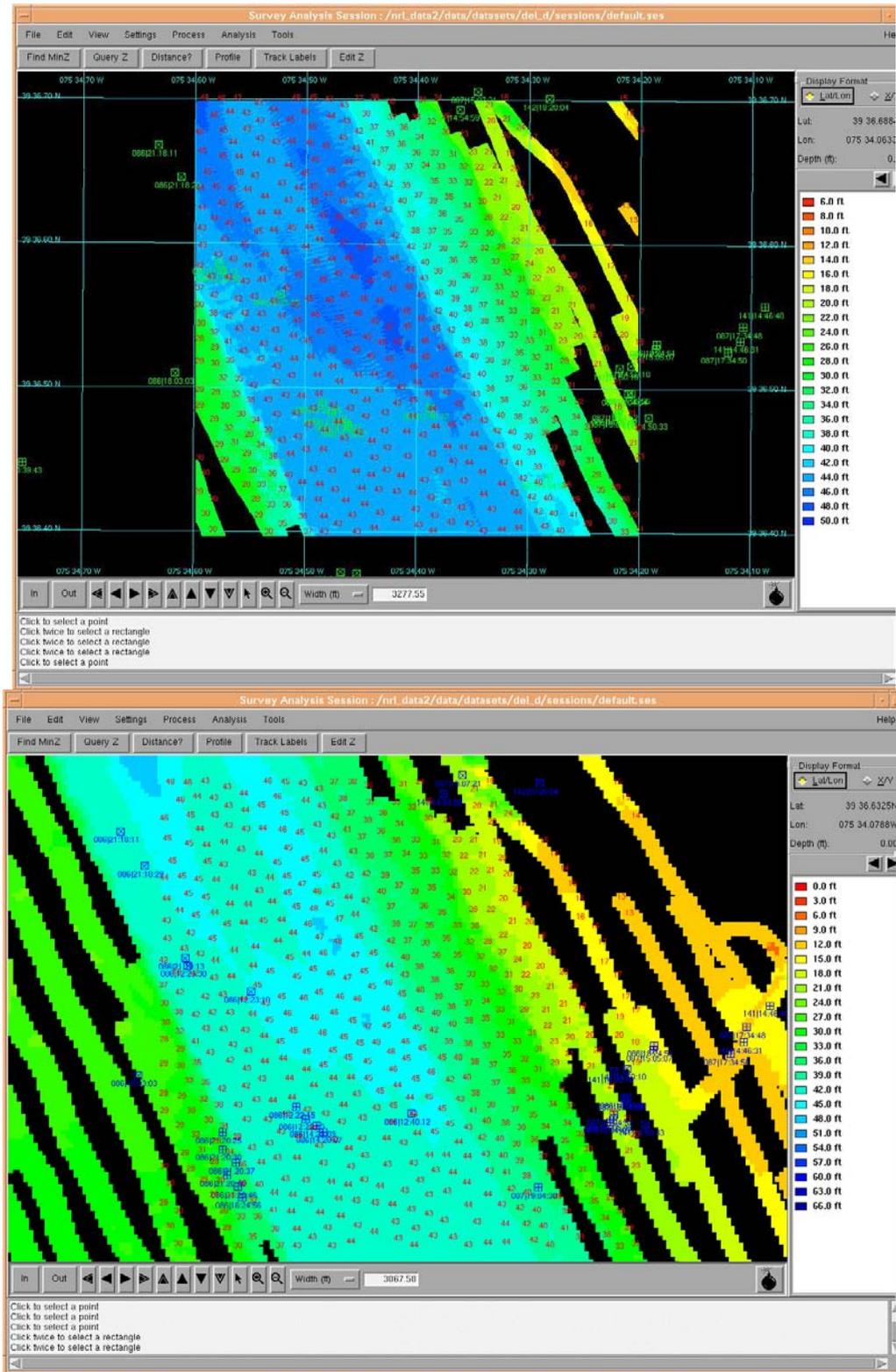


Figure Appendix V-6. Charted Obstructions, Multibeam Grid with Soundings and Contacts

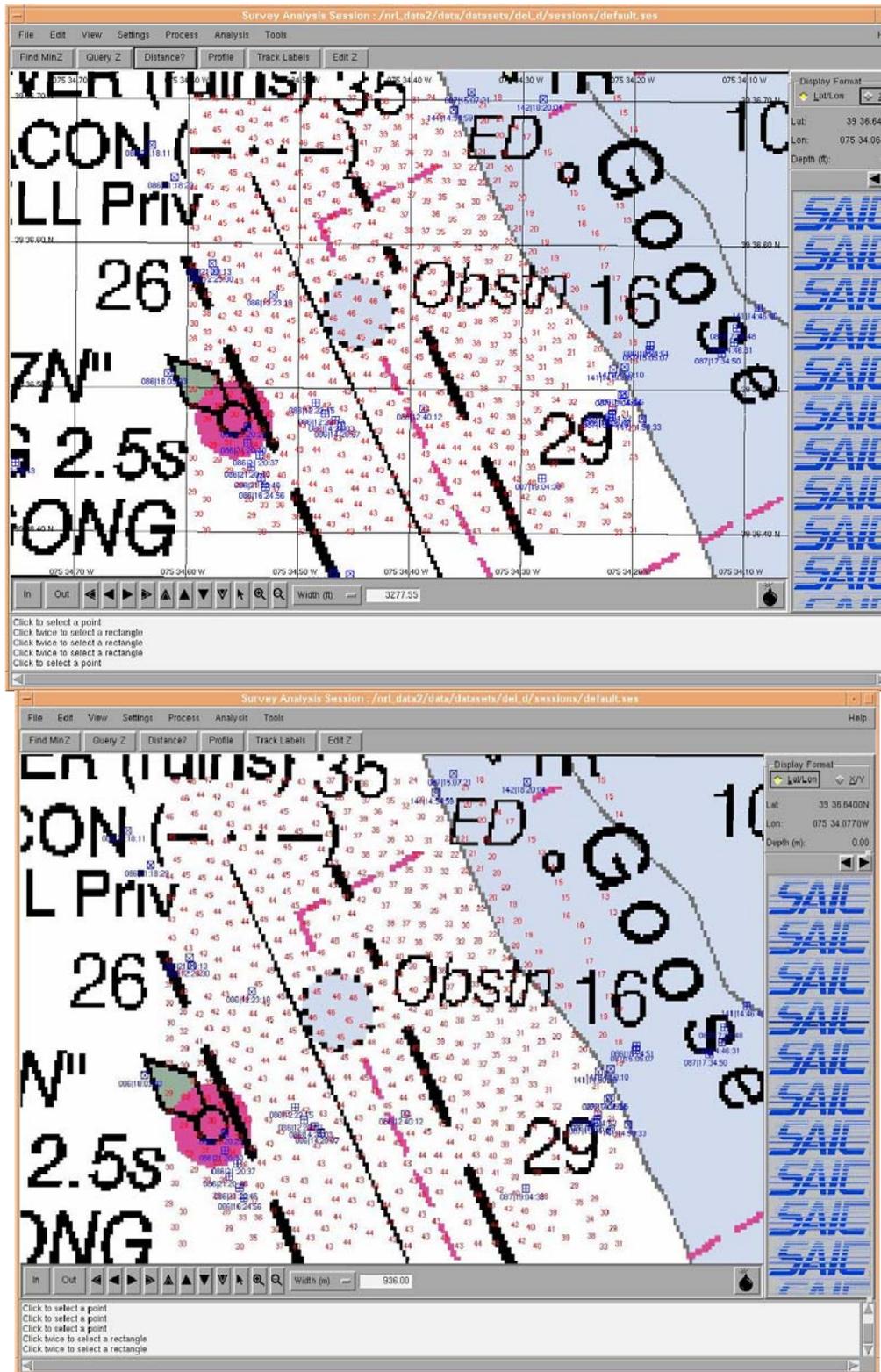


Figure Appendix V-7. Obstruction, Chart 12311 with Soundings and Contacts

**ATLANTIC HYDROGRAPHIC BRANCH
EVALUATION REPORT FOR H11023 (2001)**

This Evaluation Report has been written to supplement and/or clarify the original Descriptive Report and required revisions on the Contractor (KR) Preliminary Smooth sheet (PSS). Sections in this report refer to the corresponding sections of the Descriptive Report.

B. DATA ACQUISITION AND PROCESSING

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

AutoCad version R14
CARIS HIPS/SIPS version 5.3
MapInfo, version 6.5
Microstation J, version 7.1
I/RAS B, version 5.01

The smooth sheet was plotted using a Hewlett Packard DesignJet 2500CP plotter.

C. VERTICAL AND HORIZONTAL CONTROL

Horizontal control used for this survey during data acquisition is based upon the North American Datum of 1983 (NAD 83). Office processing of this survey is based on these values.

D. RESULTS AND RECOMMENDATIONS

D.1 COMPARISON WITH CHARTS 12311 (42nd Ed., Aug/03)

Corrected through NM Jul 26/03

Corrected through LNM Jul 8/03

12277 (32nd Ed., Jul/03)

Corrected through NM Jun 21/03

Corrected through LNM Jun 10/03

The charted hydrography originates with the prior surveys and requires no further consideration. The hydrographer makes adequate chart comparisons in Section D.1 of the Descriptive Report. The following should be noted:

1. Numbered features discussed but not listed on pages 28 to 31 in the Descriptive Report are filed with the original field data.

2. The depths shown on chart 12277 in the vicinity of

Latitude 39°34'41.80"N, Longitude 75°35'13.00"W at the north end of the Delaware City Branch Channel are in good agreement with the present survey. Because these charted depths show a better portrayal, it is recommended that these depths be retained.

3. The charted submerged dolphin in Latitude 39°34'46.90"N, Longitude 75°35'08.19"W is not considered verified nor disproved by the present survey. It is recommended that the submerged dolphin be retained as charted.

Dangers to Navigation

Two Danger to Navigation Reports were submitted by the hydrographer to the Marine Chart Division, N/CS3x1, Silver Spring, Maryland. Copies of these reports are appended to the Descriptive Report. The following should be noted:

1. A third danger to navigation report was submitted to the Marine Chart Division, N/CS3x1, Silver Spring, Maryland, during office processing and is appended to this report. It is a dangerous Obstruction with a depth of 21 feet in Latitude 39°34'34.11"N, Longitude 75°32'47.81"W. The obstruction is shown on the latest edition of charts 12277 and 12311. No change in charting is recommended.

Uncharted Wrecks and Obstructions

1. The hydrographer located numerous obstructions that are shown on the contractor's smooth sheet which are considered to be insignificant or bottom configuration. These obstructions are not shown on the approved smooth sheet.

2. Numerous additional valid obstructions shown on the contractor's smooth sheet exist throughout the survey area. These obstructions are also shown on the approved smooth sheet. Only the obstructions that are the most significant to navigation are charted as obstructions. Some obstructions shown on the approved smooth sheet are charted as soundings without the notation *Obstn* in order to avoid chart clutter.

3. An uncharted obstruction with a depth of 10 feet in Latitude 39°36'06.86"N, Longitude 75°33'43.92"W was located but not discussed by the hydrographer. It is recommended that a dangerous obstruction with a depth of 10 feet be charted as shown on the present survey.

4. An uncharted obstruction with a depth of 18 feet in Latitude 39°39'18.91"N, Longitude 75°33'03.32"W was located but not discussed by the hydrographer. It is recommended that a dangerous obstruction with a depth of 18 feet be charted as shown on the present survey.

5. Two uncharted obstructions were located by the hydrographer in General Anchorage #3. Only one, feature 98, a dangerous obstruction with a least depth of 38 feet in Latitude 39°33'15.52"N, Longitude 75°32'38.96"W, is considered significant and is shown on the present survey. It is recommended that a dangerous 38 foot obstruction be charted as shown on the present survey.

D.2 ADDITIONAL RESULTS

Aids to Navigation

The two Hamburg Cove trestle lights are not considered adequately located by the hydrographer. The lights are not shown on the approved smooth sheet. The charted lights seem adequate to serve their intended purposes.

Except as noted above, the present survey is adequate to supersede the charted hydrography within the common area.

COMPARISON WITH PRIOR SURVEYS

A comparison with prior surveys was not done during office processing in accordance with section 4. of the memorandum titled "Changes to Hydrographic Survey Processing", dated May 24, 1995.

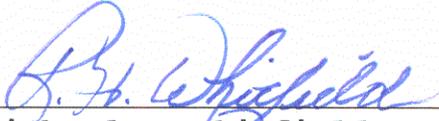
ADEQUACY OF SURVEY

This is an adequate hydrographic/side scan sonar/multibeam survey. No additional field work is recommended.

MISCELLANEOUS

Chart compilation was done by Atlantic Hydrographic Branch personnel, in Norfolk, Virginia. Compilation data will be forwarded to Marine Chart Division, Silver Spring, Maryland. The following NOS Charts were used for compilation of the present survey:

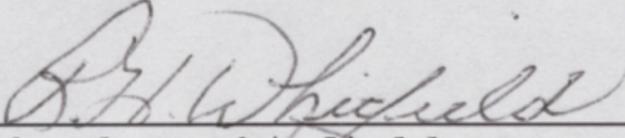
12277	(32 nd Ed., Jul/03)	Corrected through NM Jun 21/03
		Corrected through LMN Jun 10/03
12311	(42 nd Ed., Aug/03)	Corrected through NM Jul 26/03
		Corrected through LNM Jul 08/03



Richard H. Whitfield
Cartographer
Verification of field data
Evaluation and Analysis

APPROVAL SHEET
H11023 (2001)

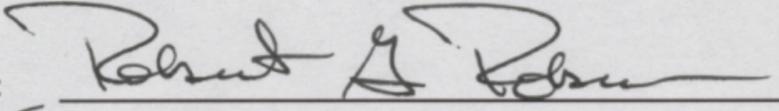
The completed survey has been inspected with regard to survey coverage, delineation of depth curves, development of critical depths, cartographic symbolization, and verification or disproval of charted data. All revisions and additions made to the smooth sheet during survey processing have been entered in the digital data for this survey. The survey records and digital data comply with NOS requirements except where noted in the Evaluation Report.



Richard H. Whitfield
Cartographer,
Atlantic Hydrographic Branch

Date: 1/22/04

I have reviewed the smooth sheet, accompanying data, and reports. This survey and accompanying digital data meet or exceed NOS requirements and standards for products in support of nautical charting except where noted in the Evaluation Report.

Approved: 
for Emily B. Christman
Commander, NOAA
Chief, Atlantic Hydrographic Branch

Date: 1/23/2004

AW015 ✓ SURF ✓ 2/12/04 by MBH

REPORT OF DANGERS TO NAVIGATION

Hydrographic Survey Registry Number: **H11023**

Survey Title: State: Delaware-New Jersey
 Locality: Delaware Bay and River
 Sublocality: Liston Point to New Castle

Project Number: OPR-D307-KR-2000

Field Unit: *R/V OceanExplorer* US905425 SAIC

Survey Dates: March 26, 2001 to December 3, 2001

Soundings are reduced to Mean Lower Low Water (MLLW) using approved tides.
Horizontal datum is North American Datum 83 (NAD 83).

Charts affected: **12311**, 41st Ed., Sep. 15, 2001, 1:40,000

DANGERS TO NAVIGATION

<u>Feature</u>	<u>Depth (FT)</u>	<u>Latitude (N)</u>	<u>Longitude (W)</u>
Obstruction	21	39°34'34.11" N	-075°32'47.81" W

Questions concerning this report should be directed to the Chief, Atlantic Hydrographic Branch at (757) 441-6746.

