

H10711

NOAA FORM 76-35A	
U.S. DEPARTMENT OF COMMERCE NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION NATIONAL OCEAN SERVICE	
DESCRIPTIVE REPORT	
Type of Survey	Hydrographic Side Scan Sonar
Field No.	RU-10-5-96
Registry No.	H-10711
LOCALITY	
State	Rhode Island
General Locality	Rhode Island Sound
Sublocality	3.0 NM SE of Brenton Point
19 96	
CHIEF OF PARTY CDR S. P. De Bow	
LIBRARY & ARCHIVES	
DATE	MAY 27 1998

NOAA FORM 77-28
(11-72)

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

REGISTER NO.

H-10711

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.

FIELD NO.

RU-10-5-96

State Rhode Island

General locality Rhode Island Sound Corridor

Locality 3.0 NM Southeast of Brenton Point

Scale 1:10,000 Date of survey 4 September - 6 November 1996

Instructions dated 14 June 1996 Project No. OPR-B302-RU

Vessel NOAA Ship RUDE, EDP 9040

Chief of party Commander Samuel P. De Bow, NOAA

Surveyed by CDR S.P. De Bow, LT C.L. Thacker, LTJG J.M. Klay, LT J.G. Evjen, LCDR J.E. Lowell

Soundings taken by: (echo sounder, hand lead, etc.) Raytheon DSF-6000N echo sounder, SEABAT 9001

Graphic record scaled by CLT, JMK, JEL, ST M.T. Lathrop, ST C.A. Neely

Graphic record checked by SPD, CLT, JEL, JGE, MTL, CAN

Protracted by _____ Automated plot by Bruning Zeta Model 936 (FIELD)

Verification by ATLANTIC HYDROGRAPHIC BRANCH PERSONNEL

Soundings in (fathoms, feet, or meters at MLW or MLLW) FEET meters at MLLW

REMARKS:

All times recorded in UTC.

The DSF-6000N echosounder was used as the primary sounding instrument.

The SEABAT 9001 shallow water multibeam sonar system was employed for item investigations and 100% multibeam coverage.

NOTES IN THE DESCRIPTIVE REPORT WERE MADE IN RED

DURING OFFICE PROCESSING

Surf/June 5/13/98

mcr

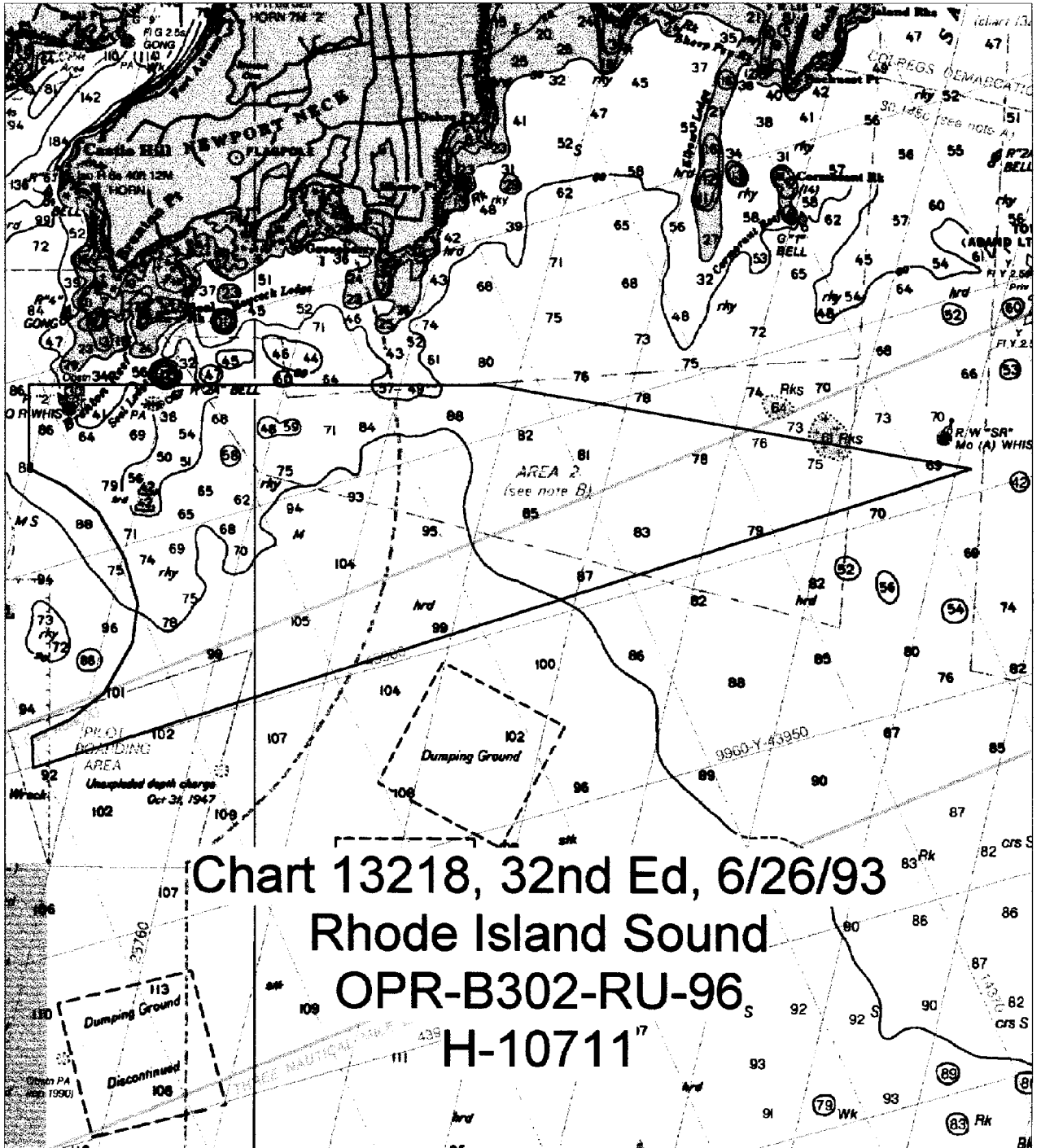


Chart 13218, 32nd Ed, 6/26/93
Rhode Island Sound
OPR-B302-RU-96
H-10711¹⁷

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APPENDICES

SEPARATES - *FILED WITH THE ORIGINAL FIELD RECORDS*

A. PROJECT

A.1 This survey was conducted in accordance with Hydrographic Project Instructions OPR-B302-RU, Rhode Island Sound Corridor, Rhode Island and Massachusetts.

A.2 The original instructions are dated February 16, 1995.

A.3 There have been four changes to the original instructions, three of which affect this survey: Change No. 1, dated ~~May 10,~~ ^{APR. 27} 1995, Change No. 2, dated ~~July 13,~~ ^{APR. 27} 1995, and Change No. 3, dated June 14, 1996. Change No. 4, dated October 8, 1996 had no affect.

A.4 This Descriptive Report covers the navigable area survey conducted on sheet "E" of project OPR-B302-RU in Rhode Island Sound Corridor as specified in the Project Instructions.

A.5 This portion of project OPR-B302-RU responds to requests from the Northeast Marine Pilots to survey areas in Rhode Island Sound. The Corridor is heavily used by a variety of commercial and pleasure craft with maximum drafts of up to 40 feet. The area was last surveyed by the Coast and Geodetic Survey between 1939 and the mid-1950's.

B. AREA SURVEYED

B.1 This survey covers an offshore area approximately 3.0 NM southeast of Brenton Point, R.I. The survey is comprised of one sheet with the following exact boundaries:

- 1 NW Corner - 41°26'07"N, 071°22'09"W
- 2 SW Corner - 41°23'20"N, 071°22'07"W
- 3 E Corner - 41°25'31"N, 071°13'07"W
- 4 N Corner - 41°26'07"N, 071°17'41"W

B.2 Data collection for this survey began on September 4, 1996 (DN 248) and ended on November 06, 1996 (DN 311).

C. SURVEY VESSELS

C.1 The following vessels were used during this survey:

Vessel	EDP Number	Primary Function
NOAA Ship RUDE (S590)	9040	Hydrography, Side Scan Operations and SEABAT Investigations
RUDE Whaler	1290	Diving Operations

C.2 During the ship's January 1994 dry-dock period, the RUDE was outfitted with a pivoting armature to carry the transducers for the Reson SEABAT 9001 shallow-water multibeam sonar system. This armature was mounted on the port side of the ship, approximately amidships. Since the transducers were not designed for permanent deployment, the arm was rotated into the down, or operating, position only during times of data acquisition.

D. AUTOMATED DATA ACQUISITION AND PROCESSING *SEE ALSO THE EVALUATION*

D.1 Coastal Oceanographics' **HYPACK for Windows** (Version 5.9) *Report* was used for data acquisition and the following HDAPS software versions were used for data processing:

Program	Version	Program	Version
BACKUP	2.00	LSTAWOIS2	3.11
BLKEDIT	2.03	MAINMENU	1.30
CARTO	2.17	MAN DATA	3.05
CLASSIFY	2.14	NEWPOST	6.13
CONTACT	2.51	PLOTALL	2.37
CONVERT	3.67	PREDICT	2.01
DAS_SURV	6.83	PRESURV	7.14
DP	2.19	QUICK	2.09
EXCESS	4.33	RAMSAVER	1.02
FILESYS	3.46	REAPPLY	2.13
GRAFEDIT	1.10	ZOOMEDIT	2.36
INVERSE	2.02		

D.2 The SEABIRD SBE-19 sound velocity profile unit was utilized in conjunction with **SEASOFT 3.3M** and **SEACAT 2.0** software. The program **VELOCITY** (Version 2.11, September 21, 1994) was used to process the collected data and calculate velocity correctors. The **REFRACT** subroutine corrects SEABAT multiple slant range

depths for sound velocity and corrects position of soundings (cross track distance) for refraction.

D.3 Triton Corporation's **ISIS** software (Version 2.16) was used to acquire SEABAT multibeam and digital side scan sonar data. SEABAT data was processed onboard the RUDE using the XTFRUDE software developed by HTP. A single least depth was generated for each SEABAT investigation and later entered into HDAPS via the **HSDUtils Convert 15 point files** program. Graphic plots of the SEABAT imagery were created using **SURFER for Windows** (Version 6.00), a commercial off-the-shelf graphics package.

The conversion software to translate HYPACK data into HDAPS-compatible format was supplied by NOAA's Hydrographics Surveys Division. The **HSDUtils Convert Hypack Data** program was revised numerous times during the course of the survey.

E. SONAR EQUIPMENT

E.1 The RUDE conducted all side scan sonar operations, using an EG&G Model 260 image-corrected side scan sonar recorder and a 100 kHz Model 272-T towfish.

E.2 The side scan sonar towfish was configured with a 20° beam depression, which is the normal setting and yields the optimum beam correction.

E.3 The 100 kHz frequency was used throughout the survey.

E.4 a. Given the average depth of water in the survey area, both the 100-meter and 75-meter range scales were used, at a line spacing of 160 meters and 120 meters respectively, to obtain complete area coverage and provide optimal contact resolution. Data acquired with an EPE of 15 or greater were either rejected or smoothed during post-processing, so the maximum line spacing was never exceeded. There were, however, a few places where, because of the density of lobster pots or the presence of fish traps, the ship was unable to satisfy the line spacing limit of 100 meters. In all cases, 200% side scan coverage was acquired.

b. Confidence checks were obtained whenever features such as sand waves, buoy anchors and lobster pots were encountered. These features were routinely annotated on the sonar grams.

c. Two hundred percent side scan coverage was completed for this survey. Areas of reduced coverage occasionally occurred when the ship was forced to maneuver for traffic or obstacles in the water, such as lobster pots. These areas were easily recognized because the swath plot clearly showed the lack of overlap between adjoining swaths. Holiday coverage was run to fill in these gaps, and all side scan coverage was ultimately checked with smooth plots to ensure proper overlap between adjoining lines.

d. There were occasions when the side scan sonar towfish became entangled in lobster trap buoy lines, temporarily whiting out the sonar gram. On these occasions, the towfish was brought on board, inspected, and serviced as necessary. All affected data were subsequently rejected and re-run.

e. The towfish was deployed exclusively from the stern during this survey.

E.5 Investigations of bottom features were conducted using both the echo sounder and the SEABAT to acquire data. Areas of dense side scan contacts were covered with 100% SEABAT, while isolated significant contacts were investigated separately.

Regions of the sheet to survey with 100% SEABAT multibeam sonar coverage were delineated by hand plotting dense areas of boulders and rock ledges from the side scan sonar records (first 100% coverage) onto the HDAPS swath plot. Polygonal "cells" were then constructed around the delineated areas, breaking continuous linear regions into smaller cells with roughly equal shoal depths. Coordinates of the polygons were picked off and entered into MAPINFO, where lines were created to fill each cell using supplementary MAPBASIC tools provided by HSD. Line spacing was set to 1.5 times the nominal water depth from mainscheme hydrography. This line spacing provided for sufficient overlap in shoal areas, as the SEABAT 9001 has a swath width of 2.0 times the water depth. Lines were generally oriented perpendicular to bottom contours so depth was equal across the swath width.

On line, data collection was identical to normal hydrography, with close attention paid to sea conditions and vessel cross-track error. Any anomalies or bad data were noted on line. During processing, HYPACK data was converted to HDAPS format as before, and also into HPS format. The HPS format data was used with the HSD MAPINFO tools developed by LT(JG) Shepard Smith to produce multi-beam swath plots showing extent of coverage. In this utility, swath width is generated using water depth below the DSF6000 transducer, which is at the same depth as the SEABAT

transducer and near nadir of the swath. A conservative 42° beam half-angle (84° total instead of 90°) is used to minimize holiday errors due to irregular bathymetry. Roll, from the TSS, and transducer offsets are applied. As well as confirming 100% coverage, lines for holiday coverage could easily be made on top of the swath plot over each individual holiday. HYPACK/DSF6000 hydro was also processed as usual.

Processing of the SEABAT data was extremely time consuming. Original line files were first replayed in ISIS and 'snipped' into several shorter line files containing distinct features, if needed. This step was necessary due to the single feature approach of the HTP processing software (XTFRUDE), where a *.lst file with the 15 least depths for the input line file is the end product. These 15 least depths are generally clustered within a few meters, and dividing the line files into segments made for a rough gridding effect. Each file was then processed separately using the HTP program XTFRUDE. The shoalest of the 15 soundings was entered into HDAPS as a scaled DP, resulting in 1799 DP's. MAPINFO plots showing excessed SEABAT DPs overlaying a raster image of the applicable chart were printed to help with chart comparisons and AWOIS item investigations. Plots showing SEABAT multibeam coverage were created in MAPINFO, analyzed on-screen for holidays, and a final paper plot was made. These field products are included (Separate I).*

Isolated contacts were scanned and entered into HDAPS for investigation as in previous surveys. The use of dual sounding instruments on these isolated contacts was an efficient means of conducting developments. Since the accuracy of the SEABAT unit was verified in previous field seasons through rigorous echosounder/SEABAT comparisons, a greater reliance was placed upon the unit during this survey. If the imagery showed that a contact had been fully ensonified by the SEABAT, the investigation would typically be called complete, even without an exhaustive echosounder development. Some items were developed more than once with the SEABAT. Generally all of these developments produced an HDAPS Detached Position(DP). The data for these investigations are summarized in the Development Abstract in Separate V* and the DP/Remarks listing in Separate VI* of this report.

F. SOUNDING EQUIPMENT

F.1 All hydrographic soundings were acquired using a Raytheon Model 6000N Digital Survey Echosounder (DSF-6000N). As authorized by the Project Instructions, the Reson SEABAT 9001 shallow-water multibeam sonar system was used to determine

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NOAA Ship RUDE

Descriptive Report

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precise least depths over significant contacts discovered during routine side scan sonar operations. (Refer to the Descriptive Report for H-10686, section F.1, for a detailed description of the SEABAT system.) A summary of all SEABAT investigations conducted for this survey is contained in the Development Abstract in Separate V.* Copies of conversion abstracts, significant 15 least depth listings and 3-D graphic images associated with these investigations are included in Separate VI.* Significant investigations are detailed in Section N.

F.2 During dive investigations, least depths were measured with a MOD III diver gauge (s/n 68336) supplied by the Electronic Engineering Division at the Atlantic Marine Center.

F.3 There were no faults in sounding equipment which affected the accuracy or quality of the data.

F.4 Both high (100 kHz) and low (24 kHz) frequency sounding data were recorded during data acquisition. Only high frequency soundings were plotted.

G. CORRECTIONS TO SOUNDINGS

G.1 a. Sound Velocity Correctors

The velocity of sound through water was measured using a Sea-Bird SBE 19 Seacat Profiler (s/n 1251). Velocity casts were conducted weekly without exception. Seacat Data Quality Assurance Tests were conducted after each respective velocity cast to ensure that the units were operating within tolerance.

All data were processed using program **VELOCITY**. Computed velocity correctors were entered into the HDAPS sound velocity table and re-applied during post-processing to both high and low frequency soundings. SEABAT sound velocity and refraction correctors were generated through the **REFRACT** subroutine and applied during post-processing.

The following velocity casts supplied correctors for this survey:

Cast Number	DN	HDAPS Table	Applied to Days
5	248	5	249
10	268	10	268-271
11	274	11	274-277
12	280	12	280-284
15	291	15	290-292
17	296	17	296-299
18	302	18	302-306
20	308	20	308-311

b. Leadline Comparison

A dual leadline comparison with the DSF-6000N was conducted during this project on:

DN 142 at 40°31.05'N and 073°51.27'W (41 ft depths)

The greatest variation between leadline and DSF soundings was 0.44 meters, and averaged .19 meters.

Considering the ship's motion and the wire angle (approximately 5°) in the leadline from the current, both comparisons were considered a good agreement value and provided an adequate check that the echo sounder was functioning properly. Data from these comparisons can be found in Separate IV.*

Both leadlines were traditional leadlines made of cotton tiller with a stainless steel core. Refer to separate IV* for data records on leadline correction values.

All sounding correctors were applied to both the narrow (100 kHz) and wide (24 kHz) DSF-6000N beams.

c. Static Draft

During the ship's winter 1994 dry-dock period, an exact vertical measurement was taken from the DSF transducer to a fixed point on the bridge wing. After the ship was re-floated, the point's height above the waterline was determined. The ship's static draft was thereby calculated to be exactly 2.12 meters (7.0

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feet). Refer to Separate IV* for data records. Measurements taken on May 14, 1996 confirmed the accuracy of this draft value. This draft corrector was applied to all sounding data through the HDAPS offset table.

d. Dynamic Draft (Settlement and Squat Correctors)

Settlement and squat correctors for the RUDE were determined on the Elizabeth River, Norfolk, VA on March 13, 1996. An observer, stationed with a level on a pier, measured changes in relative height by sighting to a staff held at the longitudinal position of the ship's transducer. The ship steamed directly toward and then away from the observer. The values obtained from the toward and away runs were averaged and applied to soundings through the HDAPS Offset Table #1. Refer to Separate IV* for data records.

e. Heave, Roll, and Pitch Correctors

Heave, roll, and pitch data were acquired by a **TSS Model 335B Motion Sensor (s/n 542)**. Heave corrections were applied to HYPACK soundings during the HYPACK-to-HDAPS conversion. Heave, roll and pitch correctors were collected on line and applied to all SEABAT soundings during post-processing. Refer to Separate IV* for data records.

f. Tide Correctors

The tidal datum for this project is Mean Lower Low Water. The operating tide station at Newport, RI (845-2660) served as both direct control for datum determination and as the reference station for predicted tides. Data for predicted tides were provided on floppy disk before the start of the project. Tidal data used during data acquisition were obtained from Table 2 of the East Coast of North and South America Tide Predictions and applied to the digital tide data using HDAPS software. Tidal correctors were applied in post processing using HDAPS predicted tide tables numbers. *APPROVED TIDES AND ZONING WERE APPLIED DURING OFFICE PROCESSING*

The subordinate station for predicted tides was:

NO.	PLACE	POSITION	TIME	HEIGHT
845-5083	Pt. Judith	41°21.8'N 71°29.4'W	+7 min	*0.87

The RUDE employed no unusual or unique methods or instruments to correct echo soundings.

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Zoning for this project is consistent with the Project Instructions. A request for smooth tides was mailed on December 20, 1996.

H. CONTROL STATIONS *SEE ALSO THE EVALUATION REPORT.*

The horizontal datum for this survey is the North American Datum of 1983 (NAD 83). No horizontal control stations were used or established for this survey.

I. HYDROGRAPHIC POSITION CONTROL

I.1 This survey was conducted exclusively using the Global Positioning System (GPS) corrected by the U.S. Coast Guard Differential GPS reference station network. Differential correctors were supplied from USCG radiobeacon transmitters, precluding the need for shore-based horizontal control stations.

I.2 Accuracy requirements were met as specified by the Hydrographic Manual and Field Procedures Manual (FPM). The Horizontal Dilution of Precision (HDOP) and Expected Position Error (EPE) specified by the FPM were monitored during on-line data collection. If the positioning degraded beyond the acceptable limits while on-line, the data were either smoothed or rejected, depending on the extent of the affected data.

I.3 Differential GPS Equipment:

<u>Unit A</u>	<u>Unit B</u>
Ashtech GPS Sensor	Ashtech GPS Sensor
s/n 700417B1083	s/n 700417B1003
Firmware Version 1E89D-P	Firmware Version 1E89D-P
Magnavox MX50R	Magnavox MX50R
DGPS Receiver s/n 078	DGPS Receiver s/n 080

Correctors were received from the Montauk, NY, and Chatham, MA radiobeacons for the entire survey.

I.4 Daily performance checks were conducted using the Shipboard Data Integrity Monitor program ("**SHIPDIM**", Version 2.1), according to section 3.4.5 of the FPM. See SHIPDIM PERFORMANCE CHECKS in Separate III* for weekly system checks. The program MONITOR was run twelve (12) hours recording data from the Montauk DGPS beacon. Refer to Separate III* for plots.

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I.5 The application of calibration data to the raw positioning data was not required, since DGPS was the primary positioning system.

I.6 a. There were no unusual methods used to operate or calibrate electronic positioning equipment.

b. There were no equipment malfunctions.

c. No systematic errors were detected which required adjustments.

d. The maximum allowed HDOP of 3.55 was never exceeded.

e. Antenna positions were corrected for offset and layback, and referenced to the position of the DSF-6000N echosounder transducer. These correctors are located in HDAPS Offset Table #1, and were applied on line to the positioning algorithm (field season 1995) and were applied during post-processing (field season 1996). A copy of Offset Table #1 is contained in Separate III. *FILED WITH THE ORIGINAL FIELD RECORDS*

f. Offset and layback distances for the A-frame (tow point) are located in HDAPS Offset Table #1 and were applied on line (field season 1995) or applied during post-processing (field season 1996). These offsets, along with the cable length, towfish height, and depth of water, were used by the HDAPS system to compute the position of the towfish.

J. SHORELINE

No shoreline is contained within the boundaries of this survey.

K. CROSSLINES

A combined total of 19.54 nautical miles of crosslines was acquired for this survey, which represents 14.5% of the 134.42 nautical miles of the first 100% side scan mainscheme coverage.

An excessed plot of mainscheme soundings, superimposed with crosslines, was used to conduct mainscheme to crossline comparisons. Soundings at intersections were compared to all other soundings within a 5 mm (50 meter) radius. Based on this procedure, agreement between mainscheme and crossline soundings was found to be excellent, especially in areas of flat or slightly sloping relief. The majority of compared soundings fell within one foot of each other, but in areas of numerous

boulders, an occasional difference of four to six feet was noted.

L. JUNCTIONS

L.1 H-10711 junctions with two contemporary surveys:
H-10648⁽¹⁹⁹⁵⁾ abuts the southern edge and H-10605⁽¹⁹⁹⁵⁾ abuts the
southeastern edge.

L.2 The overall agreement of all junctions was excellent: the average difference in soundings was less than 0.5 meters. However, due to changes in the method of delineating limits, there is no sounding overlap with H-10605 and the eastern part of H-10648. This results in some areas with a greater than 100-meter gap between soundings. *CONCERN*

M. COMPARISON WITH PRIOR SURVEYS *SEE ALSO THE EVALUATION REPORT*

A comparison with prior surveys will be performed by the Atlantic Hydrographic Branch as part of the office verification process.

N. ITEM INVESTIGATION REPORTS

AWOIS No. 1901

Item Description: Sounding, surrounded by the danger curve and cleared by wire drag to 42 feet

Source: H7029/48WD

AWOIS Position: 41°25'15.37"N, 071°21'04.18"W

Required Investigation: Full, 200% SSS, 200m radius

Charts Affected: 13218, 13221

Investigation

Date (s)/DN (s): October 22-23, 28, November 4; DN 296-297, 302, 309

Position Numbers: Investigated as part of "E" Cell 100% SEABAT coverage.

Positioned Determined by: DGPS

Investigation Summary: 200% side scan sonar, echo sounder, and 100% SEABAT development. Several items were identified during the SEABAT coverage and entered into HDAPS as scaled DPs. The least depth listed below was found approximately 70 meters to the SE of the AWOIS position. See Separate *I** for enlarged excess plots of SEABAT and hydro depths over a chart raster image.

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METHOD	DEPTH (M)	DEPTH (FT)	FIX #	LATITUDE (N)	LONGITUDE (W)
SEABAT	12.0	42	41289	41°25'15.594"	71°21'01.181"
Echosounder	14.22	46	16900.0	41°25'15.559"	71°21'01.259"

Charting Recommendation

The Hydrographer recommends charting the SEABAT 42-foot least depth surrounded by the danger curve at 41°25'15.594", 071°21'01.181". The charted sounding, cleared by wire drag at 41°25'15.37"N, 071°21'04.18"W, should be removed. *CANCEL*

COMPILATION NOTES

CHART AS A ~~42~~ 46, RY DUE TO ROCKY BOTTOM

AWOIS No. 1903

Item Description: Sounding, surrounded by the danger curve and cleared by wire drag to 42 feet

Source: H7029/48WD

AWOIS Position: 41°25'22.37"N, 071°21'01.18"W

Required Investigation: Full, 200% SSS, 200m radius

Charts Affected: 13218, 13221

Investigation

Date (s)/DN (s): October 17-18, 22-23, 28, November 3-4; DN 291-292, 296-297, 302, 308-309

Position Numbers: Investigated as part of "E" and "C" Cell 100% SEABAT coverage. Remainder of circle: 18775-18816

Positioned Determined by: DGPS

Investigation Summary: 200% side scan sonar, echo sounder, and 100% SEABAT development. Several items were identified during the SEABAT coverage and entered into HDAPS as scaled DPs. The least depth listed below was found approximately 50 meters to the SE of the AWOIS position. See excess plots in Separate I.*

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METHOD	DEPTH (M)	DEPTH (FT)	FIX #	LATITUDE (N)	LONGITUDE (W)
SEABAT	13.0	42	41288	41°25'20.622"	71°21'00.662"
Echosounder	12.9	42	19020.1	41°25'20. ⁸⁰⁰ 787 "	71°21'00. ³⁰⁰ 601 "

Charting Recommendation

The Hydrographer recommends charting the Echo sounder 42-foot least depth surrounded by the danger curve at 41°25'20.⁸⁰⁰~~787~~", 71°21'00.³⁰⁰~~601~~". The charted sounding, cleared by wire drag at 41°25'22.37"N, 071°21'01.18"W, should be removed. *CONDE*

COMPILATION NOTES

*BECAUSE OF ROCKY BOTTOM
CHART AS A (42) SK*

AWOIS No. 1909

Item Description: Uncharted wreck of the "BELVILLE"

Source: "A Guide to Sunken Shipwrecks in American Waters", A. L. Lonsdale and H. R. Kaplan, 1964.

AWOIS Position: 41°26'00.37"N, 071°20'52.18"W

Required Investigation: Information only

Charts Affected: 13218, 13221, 13223

Investigation

Date (s)/DN (s): October 16-18, November 4; DN 290-292, 309

Position Numbers: Investigated as part of "E" Cell 100% SEABAT coverage.

Positioned Determined by: DGPS

Investigation Summary: 200% side scan sonar, echo sounder, and 100% SEABAT development. Several items were identified during the SEABAT coverage and entered into HDAPS as scaled DPs. No wreckage was identified in this area.

Charting Recommendation

Although the item was assigned as information only, the Hydrographer recommends the wreck remain uncharted. *Conced*

COMPILATION NOTES

AWOIS No. 7222

Item Description: Position Approximate (PA) Wreck, Dangerous to surface navigation

Source: NM45/68, reported to be a fishing vessel

AWOIS Position: 41°26'00.37"N, 071°20'58.18"W

Required Investigation: Full, 200% SSS, 350m radius

Charts Affected: 13218, 13221, 13223

Investigation

Date (s)/DN (s): October 16-18, 28, November 4; DN 290-292, 302, 309

Position Numbers: Investigated as part of "B" Cell 100% SEABAT coverage. Remainder of circle: 18817-18902, 19022-19063

Positioned Determined by: DGPS

Investigation Summary: 200% side scan sonar, echo sounder, and 100% SEABAT development. Several items were identified during the SEABAT coverage and entered into HDAPS as scaled DPs. One dive was conducted using the MOD III Least Depth Gauge. Divers found a large rock plateau of considerable extent. Due to the size of the plateau it was not certain that the least depth was measured by divers. Since 100% multibeam coverage was achieved in this area the SEABAT least depths are more reliable on this feature. The least depths listed below were found approximately 330 meters to the N of the AWOIS position close to Seal Ledge. See Separate I for enlarged excess plots of AWOIS areas.

METHOD	DEPTH (M)	DEPTH (FT)	FIX #	LATITUDE (N)	LONGITUDE (W)
SEABAT	5.23	17	41731	41°26'10.046"	71°20'51.948"
Echosounder	5.5	18	19060.1	41°26'10.324"	71°20'52.434"
Dive	7.88	25	604	41°26'07.187"	71°20'47.334"

Charting Recommendation

The Hydrographer recommends charting the 100% SEABAT least depths determined during the present survey. The charted position approximate, (PA), Wreck, Dangerous to surface navigation at 41°26'00.37"N, 071°20'58.18"W, should be removed. *Remove*

COMPILATION NOTES

DELETE
(PA)

Not AWOIS

Item Description: Uncharted Wreck

Source: N/A

AWOIS Position: N/A

Required Investigation: Information only

Charts Affected: 13218, 13221, 13223

Investigation

Date (s)/DN (s): October 29-30; DN 303-304

Position Numbers: 18658-18667

Positioned Determined by: DGPS

Investigation Summary: 200% side scan sonar, echo sounder, SEABAT development, and diver investigation. Divers found the wreck of stern trawler (length = 60 feet, beam = 20 feet) sitting on the bottom on an even keel. A least depth was measured by divers with the MOD III depth gauge on the mast but the data was not recorded adequately in the survey records. The SEABAT data from the table below should be used for charting purposes. *Concur*

METHOD	DEPTH (M)	DEPTH (FT)	FIX #	LATITUDE (N)	LONGITUDE (W)
SEABAT	22.2 ₀	73 ₂	41665	41°25'54.562"	71°18'05.921"
Echosounder	22.9 ₈	75	18663.1	41°25'54.400"	71°18'05.934"
Dive	N/A	N/A	600 <i>267</i>	41°25'54.559"	71°18'06.261"

Charting Recommendation

The Hydrographer recommends charting the symbol of a Wreck (Wk), not dangerous to surface navigation, at the SEABAT 73-foot least depth position of 41°25'54.562" N, 71°18'05.921" W. *Concur*

COMPILATION NOTES

CHART A 73 Wk

In the northern and western areas of the sheet, the bottom changed to boulders of various dimensions scattered on bedrock ridges and ledges. This area was surveyed with 100% multibeam coverage, as described in Section E, to accurately portray the true geomorphology of the bottom. Prior surveys did not adequately depict the condition of the sea floor in this area. Differences with charted soundings of 10 feet or more occur in several places, and it is the recommendation of the hydrographer that digital data from this survey be used to supersede all prior soundings. Listed below are some of the more significant differences observed between the present survey and charted soundings:

Charted Depth (ft)	Surveyed Depth (ft)	Detached Position	Surveyed Latitude (N)	Surveyed Longitude (W)	
41-45	35	40228	41°25'58.658"	71°21'31.012"	
68	62 ₀	40754	41°25'56.431"	71°20'21.329"	
68	62 ₂	41775	41°25'55.056"	71°20'24.284"	*
55	45	40776	41°25'57.902"	71°20'31.210"	
68	47 ₆	41650	41°26'09.793"	71°20'13.103"	
74	62 ₀	41468	41°24'51.004"	71°20'57.274"	
93	83	41758	41°25'04.297"	71°20'35.186"	*
65	55	41778	41°25'23.720"	71°20'34.690"	

Information pertaining to the hydrographic development of significant side scan sonar contacts, including SEABAT 9001 multibeam sonar investigations, is contained in the Development Abstract and DP/Remarks listing in Separate VI. *FILED WITH ORIGINAL FIELD RECORDS*

** NOT SHOWN ON PRESENT SURVEY BECAUSE EQUAL OR SHALDER SOUNDINGS ARE IN THE IMMEDIATE VICINITY*

O. COMPARISON WITH THE CHART

SEE ALSO THE EVALUATION REPORT

O.1. The following charts are affected by this survey:

Chart 13218

"Martha's Vineyard to Block Island"

32nd ed. June 26, 1993

Scale: 1:80,000

Chart 13221

"Narragansett Bay"

50th ed. April 15, 1995

Scale: 1:40,000

Chart 13223

"Narragansett Bay Including Newport Harbor"

34th ed. January 28, 1995

Scale: 1:20,000

O.2 No Danger to Navigation reports were submitted for this survey.

O.3 Comparison of Soundings

A detailed examination of the survey data found a hard sandy sea floor on the southeastern portion of the survey. The overall correlation between charted soundings and survey depths in this area is excellent, with average differences of approximately one foot. In the northern and western areas of the sheet, the bottom changed to boulders of various dimensions scattered on bedrock ridges and ledges. This area was surveyed with 100% multibeam coverage as described in Section E. Prior surveys did not adequately depict the true condition of the sea floor in this area. Differences with charted soundings of 10 feet or more occur in several places, and it is the recommendation of the hydrographer that digital data from this survey be used to supersede all prior soundings.

O.5 No other changes to the scale, coverage, or format of the published charts for this area are recommended.

P. ADEQUACY OF SURVEY

SEE ALSO THE EVALUATION REPORT.

This survey is complete and fully adequate to supersede prior survey data in common areas.

Q. AIDS TO NAVIGATION

Non- Floating

No non-floating aids to navigation exist within the limits of this survey.

Floating

Two floating aids to navigation located on the sheet, R"2", and R"2A", were not positioned due to an operational oversight. The charted Light List positions appeared to be correct when the vessel surveyed in close proximity to the buoys.

R. STATISTICS

R.1 a.	Number of Positions	22257
b.	Lineal Nautical Miles of Sounding Lines:	465.49
	Nautical Miles of Survey With the Use	
	of Side Scan Sonar279.15
	Nautical Miles of Survey Without the Use	
	of Side Scan Sonar186.34
R.2 a.	Square Nautical Miles of Hydrography	
	per 100% of Coverage	12.5
b.	Days of Production	26
c.	Detached Positions	3
d.	Bottom Samples	32
e.	Tide Stations	2
g.	Velocity Casts	7
j.	SEABAT Item Investigations	1799

S. MISCELLANEOUS *SEE ALSO THE EVALUATION REPORT.*

S.1 No evidence of silting was found during this survey.

No evidence of anomalous tides or tidal current conditions was found during this survey.

An area of fixed fishing gear delimited by four mooring buoys was located at approximately 41°25'40"N, 071°17'57"W caused a small holiday in the hydro data.

S.2 Thirty-two (32) bottom samples were obtained during this survey. As directed by the Project Instructions, all bottom samples were inspected and recorded, but none were submitted to the Smithsonian Institution.

T. RECOMMENDATIONS

T.1 No dangers to navigation were noted during this survey.

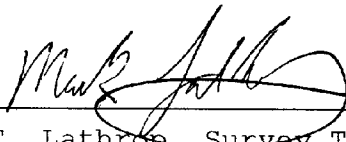
T.2 The RUDE is not aware of any construction or dredging that will affect results of this survey.

T.3 No further investigation of the survey area is recommended.

U. REFERRAL TO REPORTS

Reference is made in section F to the Descriptive Report for H-10686 for a detailed explanation of the SEABAT System.

This report and the accompanying field sheets are respectfully submitted.



Mark T. Lathrop, Survey Technician



Jonathan M. Klay, LT, NOAA
Field Operations Officer
NOAA Ship RUDE

APPENDIX III

LIST OF HORIZONTAL CONTROL STATIONS

No horizontal control stations were needed for this survey since Differential GPS was employed exclusively for all positioning control. The geographic positions for the two Differential GPS radio beacons used during this survey are as follows:

Montauk Point, NY	41°04'02.046"N 071°51'38.268"W
Chatham, MA	41°40'16.297"N 069°57'00.162"W

APPENDIX VII

APPROVAL SHEET

LETTER OF APPROVAL

REGISTRY NO. H-10711

This report and the accompanying field sheets are respectfully submitted.

Field operations contributing to the accomplishment of this Navigable Area survey were conducted under my direct supervision with frequent personal checks of progress and adequacy. All field sheets and reports were reviewed in their entirety and all supporting records were checked as well.

This survey was completed with 200% side scan sonar coverage and is more than adequate to supersede ALL prior surveys in common areas. The survey is considered complete and adequate for nautical charting.



Samuel P. De Bow, CDR, NOAA
Commanding Officer
NOAA Ship RUDE



UNITED STATES DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration
NATIONAL OCEAN SERVICE
Office of Ocean and Earth Sciences
Silver Spring, Maryland 20910

TIDE NOTE FOR HYDROGRAPHIC SURVEY

DATE: May 19, 1997

MARINE CENTER: Atlantic

HYDROGRAPHIC PROJECT: OPR-B302-RU

HYDROGRAPHIC SHEET: H-10711

LOCALITY: Rhode Island, Rhode Island Sound,
3.0 Nautical Miles SE of Brenton Point

TIME PERIOD: September 4 - November 6, 1996

TIDE STATION USED: 845-5083 Point Judith, R.I.
Lat. $41^{\circ} 21.8'N$ Lon. $71^{\circ} 29.4'W$
PLANE OF REFERENCE (MEAN LOWER LOW WATER): 0.000 m
HEIGHT OF HIGH WATER ABOVE PLANE OF REFERENCE: 0.969 m

TIDE STATION USED: 845-2660 Newport, R.I.
Lat. $41^{\circ} 30.3'N$ Lon. $71^{\circ} 19.6'W$
PLANE OF REFERENCE (MEAN LOWER LOW WATER): 0.000 m
HEIGHT OF HIGH WATER ABOVE PLANE OF REFERENCE: 1.116 m

REMARKS: RECOMMENDED ZONING

Use zone(s) identified as: R1A, R2, R4 & R5

Refer to attachment(s) for zoning information.

Note: Provided time series data are tabulated in metric units (meters) and on Greenwich Mean Time.



CHIEF, TIDAL ANALYSIS BRANCH



GEOGRAPHIC NAMES

Name on Survey	ON CHART NO. 13223, 13221, 13218 ON PREVIOUS SURVEY ON U.S. QUADRANGLE MAPS FROM LOCAL INFORMATION ON LOCAL MAPS P.O. GUIDE OR MAP GRAND McNALLY ATLAS U.S. LIGHT LIST										
	A	B	C	D	E	F	G	H	K		
RHODE ISLAND (title)											1
RHODE ISLAND SOUND	X		X								2
SEAL LEDGE	X		X								3
											4
											5
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											25

[Signature]
Chief Surveyor

OCT 21 1997

05/14/98

HYDROGRAPHIC SURVEY STATISTICS
REGISTRY NUMBER: H-10711

NUMBER OF CONTROL STATIONS	2
NUMBER OF POSITIONS	22257
NUMBER OF SOUNDINGS	22257

	TIME-HOURS	DATE COMPLETED
PREPROCESSING EXAMINATION	93	08/26/97
VERIFICATION OF FIELD DATA	111	12/11/97
EVALUATION AND ANALYSIS	37	
FINAL INSPECTION	36	04/21/98
COMPILATION	53	05/01/98
TOTAL TIME	330	
ATLANTIC HYDROGRAPHIC BRANCH APPROVAL		04/21/98

**ATLANTIC HYDROGRAPHIC BRANCH
EVALUATION REPORT FOR H-10711 (1996)**

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

D. AUTOMATED DATA ACQUISITION AND PROCESSING

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

Hydrographic Processing System
NADCON, version 2.10
SiteWorks, version 2.1
MicroStation, version 5.0
I/RAS B, version 5.01

The smooth sheet was plotted using an Hewlett Packard Design Jet 350C plotter.

H. CONTROL STATIONS

Horizontal control used for this survey during data acquisition is based upon the North American Datum of 1983 (NAD 83). The smooth sheet has been annotated with ticks showing the computed mean shift between the North American Datum of 1983 (NAD 83) and the North American Datum of 1927 (NAD 27).

To place the survey on the NAD 27 datum, move the projection lines 0.372 seconds (11.488 meters or 1.14 mm at the scale of the survey) north in latitude and 1.824 seconds (42.355 meters or 4.23 mm at the scale of the survey) east in longitude.

L. JUNCTIONS

H-10605 (1995) southeast
H-10648 (1995) southwest

An adequate discussion for the surveys listed above can be found in section L. of the Descriptive Report.

There are no contemporary surveys to the north, and west of the present survey. Present survey depths are in harmony with the charted hydrography to the north, west.

M. COMPARISON WITH PRIOR SURVEYS

A comparison with prior surveys was not done during office processing in accordance with in accordance with section 4. of the memorandum titled *Changes to Hydrographic Survey Processing* dated May 24, 1995. The following should be noted:

1. Charted dangerous rocks, two 30-ft rocks (9¹m and 9³m)

and one 32-ft rock (9⁷m), in the vicinity of Latitude 41°26'00"N, Longitude 71°21'45"W originate with FE-368SS (1991-92) as AWOIS item #7486. This area was developed by the present survey. The charted 32-ft rock in Latitude 41°25'58.10"N, Longitude 71°21'44.64"W is not considered disproved by the present survey. Present survey depths in the immediate vicinity of the 32-ft rock are 33 feet. The 32-ft rock has been brought forward from the prior survey to supplement the present survey. The present survey located a 30-ft rock and a 28-ft rock in Latitude 41°26'04.35"N, Longitude 71°21'43.70"W and Latitude 41°26'01.26"N, Longitude 71°21'43.89"W, respectively. It is recommended that the two dangerous 30-ft rocks be deleted from the chart and a 30-ft rock (30Rk) and a 28-ft rock (28Rk) be charted as shown on the present survey. It is also recommended that the dangerous 32-ft rock (32Rk) be retained as charted.

2. A charted 61-ft rock (18⁷m) in Latitude 41°25'45.88"N, Longitude 071°14'32.31"W originates with FE372SS (1992) as AWOIS item #7263. Present survey depths in the area are 63 to 73 feet. The 61-ft rock is not considered verified by the present survey and has been brought forward from the prior survey to supplement the present survey. It is recommended that the charted 61-ft rock, danger curve, and the notation "rky" be retained as charted.

3. A charted 73-ft rock (22⁵m) in Latitude 41°25'39.6"N, Longitude 071°14'23.8"W originates with FE-372SS (1992) as AWOIS item #7263. The rock is not considered verified by the present survey and has been brought forward from the prior survey to supplement the present survey. It is recommended that the 73-ft rock (73 Rk) be retained as charted.

With the exceptions noted above, the present survey is considered adequate to supersede the prior survey in the common area.

O. COMPARISON WITH CHARTS 13218 (32nd Edition, Jun 26, 1993)
13221 (50th Edition, Apr 15, 1995)
13223 (34th Edition, Jan 28, 1995)

Hydrography

The charted hydrography originates with prior surveys and miscellaneous sources. The hydrographer makes adequate comparison in sections N. and O.3., pages 18 and 19 of the Descriptive Report.

The present survey is considered adequate to supersede the charted hydrography in the common area.

P. ADEQUACY OF SURVEY

This is an adequate hydrographic/side scan sonar survey; no additional work is recommended.

S. MISCELLANEOUS

Chart compilation using the present survey data was done by Atlantic Hydrographic Branch personnel in Norfolk, Virginia. Compiled data will be forwarded to Hydrographic Survey Division, Silver Springs, Maryland upon completion of the project.

The following NOS charts were used for compilation of the present survey: 13223 (35th Ed., Mar 29/97)
13221 (51st Ed., Sep 20/97)

H-10711

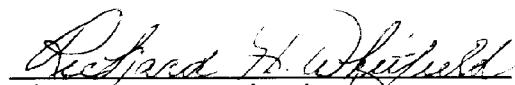
Richard W. Blevins

Richard W. Blevins
Cartographer
Verification of Field Data
Evaluation and Analysis

APPROVAL SHEET
H-10711


Initial Approvals:

The completed survey has been inspected with regard to survey coverage, delineation of depth curves, development of critical depths, cartographic symbolization, and verification or disapproval of charted data. The digital data have been completed and 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

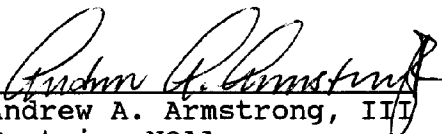
Date: 4/21/98

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.


Nicholas E. Perugini, CDR, NOAA
Chief, Atlantic Hydrographic Branch

Date: 4-21-98

Final Approval:

Approved: 
Andrew A. Armstrong, III
Captain, NOAA
Chief, Hydrographic Surveys Division

Date: May 21, 1998

