

H10659

NOAA FORM 78-35A

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-10-8-95

Registry No. H10659

LOCALITY

State RHODE ISLAND

General Locality RHODE ISLAND SOUND

Sublocality 0.5NM SOUTH OF POINT JUDITH

19 96

CHIEF OF PARTY

..... CDR. S. P. DeBow, NOAA

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DATE JUL 31 1998

HYDROGRAPHIC TITLE SHEET

H-10659

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-10-8-95
RU-5-96

State Rhode Island

General locality Rhode Island Sound

Locality 0.5 nm South of Point Judith

Scale 1:10,000 Date of survey Nov. 1, 1995 - Oct. 6, 1996

Instructions dated February 16, 1995 Project No. OPR-B302-RU-95-96

Vessel NOAA Ship RUDE S590

Chief of party CDR S.P. De Bow

Surveyed by CDR S.P. De Bow, LT C.L. Thacker, LTJG J.M. Klay, ST M.T. Lathrop, ST C.A. Neely

Soundings taken by:(echo sounder,hand lead,pole) Raytheon DSF-6000N Echosounder, Sea Bot 9001

Graphic record scaled by SPD, CLT, JMK, MTL & CAN

Graphic record checked by SPD, CLT, JMK, MTL & CAN

Protracted by _____ Automated plot by HP Design Jet 350C Plotter (AHB)

Verification by Atlantic Hydrographic Branch Personnel (AHB)

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

REMARKS: All times recorded in UTC.

The DSF-6000N was used as the primary sounding instrument, however the SEABAT 9001 shallow-water multibeam sonar system was employed for almost all item investigations and is documented as such.

Notes in the original Descriptive Report were made in red during office processing.

Awaits/surf check

7/16/98

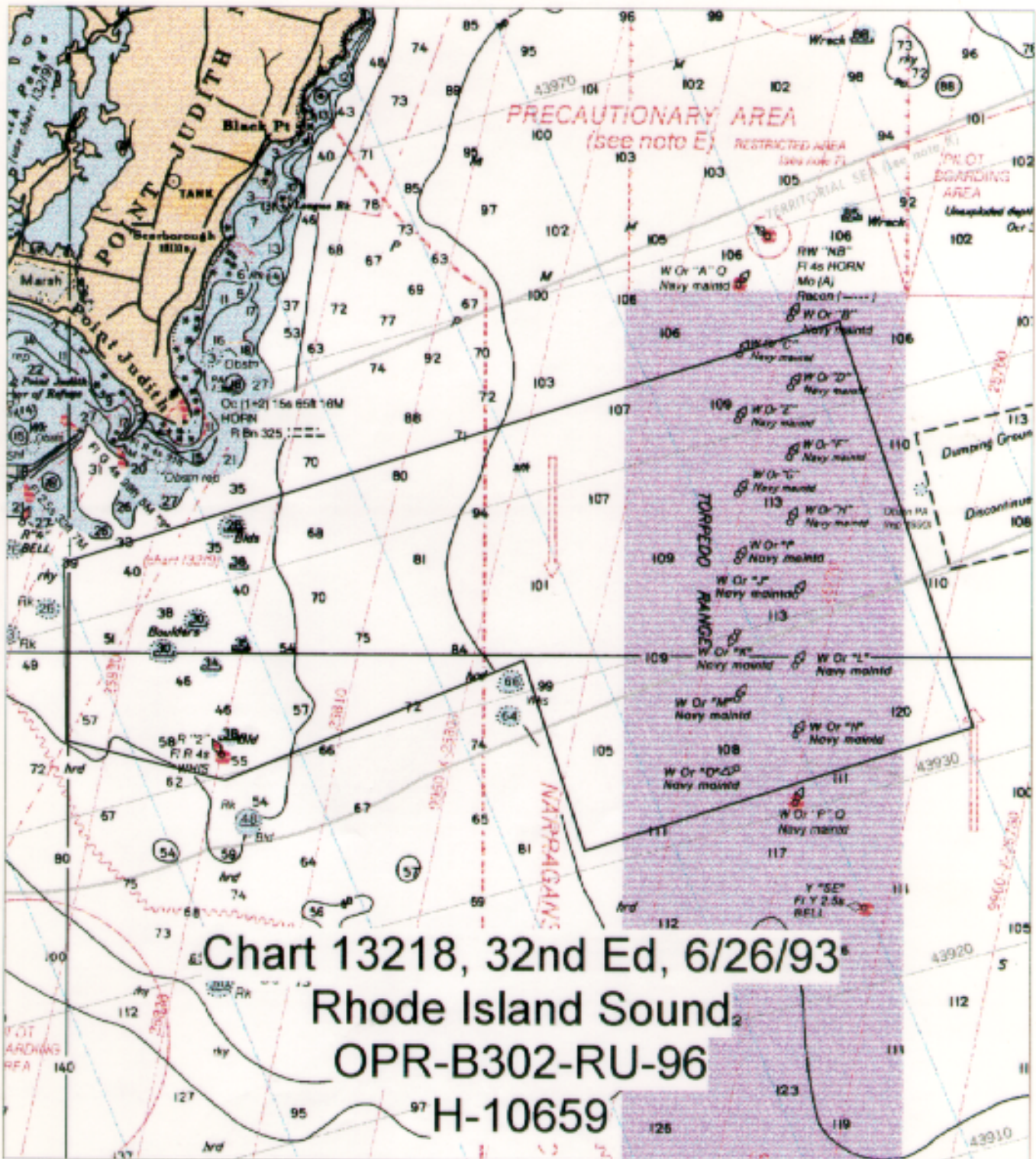


Chart 13218, 32nd Ed, 6/26/93⁶
 Rhode Island Sound²
 OPR-B302-RU-96
 H-10659

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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~~, April 27, 1995, Change No. 2, dated ~~July 13~~, 1995, and Change No. 3, dated June 14, 1996. June 26

A.4 This Descriptive Report covers the navigable area survey conducted on sheet "D" 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 ^{0.5}~~1.0~~ NM south of Pt. Judith, R.I. The survey is comprised of one sheet with the following exact boundaries:

- 1 SW Corner - 41°19'31"N, 071°21'19"W
- 2 NW Corner - 41°22'29"N, 071°22'36"W
- 3 NE Corner - 41°20'40"N, 071°30'00"W
- 4 SE Corner - 41°19'23"N, 071°30'00"W
- 5 SE Corner - 41°19'06"N, 071°28'29"W
- 6 S Corner - 41°19'58"N, 071°25'37"W
- 7 S Corner - 41°18'36"N, 071°25'02"W

B.2 Data collection for this survey began on November 1, 1995 (DN 305) and ended on October 06, 1996 (DN 280).

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 Evaluation Report

D.1 The following HDAPS software versions were used for data acquisition and processing on this survey during the 1995 field season:

Program	Version	Program	Version
BACKUP	2.00	LSTAWOIS	3.10
BLKEDIT	2.02	MAINMENU	1.20
CARTO	2.17	MAN DATA	3.03
CLASSIFY	2.12	NEWPOST	6.13
CONTACT	2.48	PLOTALL	2.32
CONVERT	3.65	PREDICT	2.01
DAS_SURV	6.80	PRESURV	7.11
DP	2.18	QUICK	2.07
EXCESS	4.32	RAMSAVER	1.02
FILESYS	3.31	REAPPLY	2.12
GRAFEDIT	1.06	ZOOMEDIT	2.33
INVERSE	2.02		

During the 1996 field season, Coastal Oceanographics' **HYPACK for Windows** (Version 5.9) was used for data acquisition and the following HDAPS software versions were used for data processing:

Program	Version	Program	Version
BACKUP	2.00	LSTAWOIS	3.12
BLKEDIT	2.03	MAINMENU	1.30
CARTO	2.18	MAN_DATA	3.05
CLASSIFY	2.14	NEWPOST	6.13
CONTACT	2.49	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 XTRUDE 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. This survey was split into two separate coverage areas due to the extreme change in water depth. The eastern portion was run at the 150-meter range scale with a line spacing of 240 meters to obtain complete area coverage and provide optimal contact resolution as per the Side Scan Sonar manual. The western portion was run at either 100-meter range scale or 75-meter range scale depending on water depth. The line spacing was kept at 120 meters for both the 100-meter and the 75-meter range scales since the switch in range scales took place on-line which would cause coverage holidays. Data collected with an EPE of 15 or greater were either rejected or smoothed during post-processing, so the maximum line spacing was never exceeded.

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 As per the Project Instructions, a 400-meter grid was developed to overlay the western half of this survey. The most significant contacts within each of the 400-meter "cells", as well as within the rest of the survey, were investigated (MAPINFO plots showing coverage are included in Separate VI)*. Investigations of significant side scan sonar contacts were conducted using both the echo sounder and the SEABAT to acquire data. The use of dual sounding instruments allowed an efficient means of conducting developments, since the SEABAT imagery enabled the operator to "see" a contact even if it was not directly beneath the echo sounder. The next line could then be chosen accordingly.

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), of which the shoalest was retained and deeper DP's rejected. The data for these investigations are summarized in the SEABAT Development Addendum and the list of selected soundings in Section N 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 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 SEABAT 9001 Development Addendum in Section N. *Copies of all 15 least depth listings and 3-D graphic images associated with these investigations are included in Separate VI.

* Data filed with original field records.

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
1995			
48	305	48	305-306
1	310	1	310-311
1996			
2	224	2	224-229
3	232	3	232-236
4	238	4	238-242
5	248	5	249-250
6	253	6	252-253, 255-257
7	260	7	260-261, 263-264
8	266	8	266, 268
13	280	13	280

b. Leadline Comparison

Field season 1995: A dual leadline comparison with the DSF-6000N was conducted during special project S-B900-RU-95 on:

DN 082 at 41°21.53'N and 070°46.91'W (41 ft depths)

The greatest variation between leadline and DSF soundings was 0.16 meters.

Field season 1996: 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.*

Field season 1995: Two types of leadline were used during the leadline-to-DSF-6000N comparison. The starboard leadline was a steel surveyor's tape graduated in feet with a fixed 5 lb weight at its end. A leadline corrector of 0.0 meters was assumed for this leadline. The port leadline was a traditional leadline made of cotton tiller with a stainless steel cable core. This leadline had a corrector of 0.25 feet up to the 45 foot mark and 0.26 feet for depths greater than 45 feet. Field season 1996: 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 feet). *Refer to Separate IV for data records.

*Data filed with original field 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 January 25, 1995 and again on ~~January 25~~ ^{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

Field season 1995: Heave data were acquired by a Datawell HIPPY heave, roll and pitch sensor (s/n 19128-C), and applied to HDAPS soundings in real time. During the 1996 field season 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.

* Data filed with original field records.

The subordinate station for predicted tides was:

NO.	PLACE	POSITION	TIME	HEIGHT
845-5083	Pt. Judith	41°21.8'N 71°29.4'W	+15 min	*0.84

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

Zoning for this project is consistent with the Project Instructions. A request for smooth tides was mailed on December 20, 1996. *Approved tides and zoning have been applied during office processing.*

H. CONTROL STATIONS *See also 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.

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 Tables #1, ^{and #2} 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 Tables #1 ^{and #2} are contained in Separate III. ~~Offset Table #2~~ was generated by AHB Personnel.

f. Offset and layback distances for the A-frame (tow point) are located in HDAPS Offset Tables #1 ^{and #2} and were applied on line (field season 1995) or applied during post-processing (field season 1996). These offsets, along with the cable length,

*Data filed with original field records.

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 11.61 nautical miles of crosslines was acquired for this survey, which represents 8% of the 152 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 m (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 *See also Evaluation Report*

L.1 H-10659 junctions with ^{one} ~~three~~ contemporary surveys: H-10648 ^{which} abuts the eastern edge, H-10424 abuts the western edge, and H-10378 abuts the southern edge. H-10659 junctions with two non-contemporary surveys: H-10424 to the west and H-10378 to the south.

L.2 The overall agreement of all junctions was excellent: the average difference in soundings was less than 0.5 meters.

M. COMPARISON WITH PRIOR SURVEYS *See also Evaluation Report*

A comparison with prior surveys will be performed by the Atlantic Hydrographic Branch as part of the office verification process. One line of mainscheme side scan sonar data on the present survey was extended into ^{junction} prior survey H-10378 to ascertain the status of the wreck charted as AWOIS 1874. The wreck was found as described in the dive investigation report in H-10378 at 41-19-47.82 N and 071-25-45.36 W. Since the item was fully resolved previously no further development of the unassigned AWOIS item was conducted. *Concur*

N. ITEM INVESTIGATION REPORTS

AWOIS No. 7490

Item Description: Obstruction (Rk) cleared by Wire Drag

Source: FE179WD (FE2/61WD)

AWOIS Position: 41°20'57.36"N, 071°28'26.99"W

Required Investigation: Full, 200% SSS, 100m radius

Charts Affected: 13215, 13218, 13219

Investigation

Date (s)/DN (s): DN 249, 266

Position Numbers: 17309-17311, 18758-18766

Positioned Determined by: DGPS

Investigation Summary: 200% side scan sonar, echo sounder, three SEABAT developments, and diver investigation made. Several contacts were located within the AWOIS circle but only the three most significant were developed. The AWOIS item was found to be contact #9962.0S (SEABAT #817, Diver #703).

METHOD	DEPTH (M)	DEPTH (FT)	FIX #	LATITUDE (N)	LONGITUDE (W)
Diver	8.79	28.92	703	41°20'58.405"	71°28'26.287"
SEABAT	8.87	28.5	817✓	41°20'58.548"	71°28'26.498"✓

Charting Recommendation

Hydrographer recommends charting the 28 foot ^{Seabat}~~diver~~ least depth, annotated as rock (Rk), in position 41°20'58.⁵⁴⁸405"N and 71°28'26.⁴⁹⁸287"W. The charted wire drag symbol with clearance of 28 feet surrounded by a danger curve and annotated as rock (Rk) in position 41°20'57.36"N and 071°28'26.99"W should be removed. *concur*

Remove (28) Rk in 41/20/57.36 N 71/28/26.99 W
 Add (28) Rk in 41/20/58.548 N 71/28/26.498 W

AWOIS No. 7491

Item Description: Obstruction (Rk) cleared by Wire Drag

Source: FE179WD (FE2/61WD)

AWOIS Position: 41°20'17.17"N, 071°28'46.19"W

Required Investigation: Full, 200% SSS, 150m radius

Charts Affected: 13215, 13218, ~~13219~~

Investigation

Date (s)/DN (s): DN 255, 264

Position Numbers: 17744-17755, 18656-18667

Positioned Determined by: DGPS

Investigation Summary: 200% side scan sonar, echo sounder, and four SEABAT developments completed. Several contacts were located within the AWOIS circle but only the four most significant contacts were developed. The AWOIS item was found to be contact #3491.1S (SEABAT #922).

METHOD	DEPTH (M)	DEPTH (FT)	FIX #	LATITUDE (N)	LONGITUDE (W)
SEABAT	9.97	32.318	922	41°20'16.446"	71°28'45.452"

Charting Recommendation

Hydrographer recommends charting 32 foot least depth, surrounded by a danger curve and annotated as rock (Rk) in position 41°20'16.446"N and 71°28'45.452"W, and that the charted wire drag symbol with clearance of 30 feet surrounded by a danger curve and annotated as rock (Rk) in position 41°20'17.17"N and 071°28'46.19"W be removed.

Concur

COMPILATION NOTES

Delete (30) Rk (Boulders on chart 13218) in 41/20/17.17N, 71/28/46.19W

Add (32) Rk in 41/20/16.446N, 71/28/45.452W

AWOIS NO. 7492

Item Description: Obstruction (Rk) cleared by Wire Drag

Source: FE179WD (FE2/61WD)

AWOIS Position: 41°20'03.37"N, 071°29'05.39"W

Required Investigation: Full, 200% SSS, 150m radius

Charts Affected: ~~13219~~ 13215, 13218

Investigation

Date (s)/DN (s): DN 256, 264

Position Numbers: 17935-17950, 18628-18630

Positioned Determined by: DGPS

Investigation Summary: 200% side scan sonar, echo sounder, and two SEABAT developments completed. Several contacts were located within the AWOIS circle but only the two most significant contacts were developed. The two developed contacts proved not to be the AWOIS item. Further investigation showed that the AWOIS item was found online while collecting 100% mainscheme side scan coverage. The item was inserted as SEABAT fix #40228. No further investigation was done.

METHOD	DEPTH (M)	DEPTH (FT)	FIX #	LATITUDE (N)	LONGITUDE (W)
SEABAT	9.8	32.1	40228	41°20'03.928"	71°29'04.949"

Charting Recommendation

Hydrographer recommends charting the 32 foot least depth, annotated as rock (Rk), in position 41°20'03.928"N and 71°29'04.949"W. The charted wire drag symbol with clearance of 30 feet surrounded by a danger curve and annotated as rock (Rk) in position 41°20'03.37"N and 071°29'05.39"W should be removed. *Concur*

COMPILATION NOTES

Delete (30) Rk in 41/20/03.37N 71/29/05.39W
Add (32) Rk in 41/20/03.928N 71/29/04.949W

AWOIS NO. 7493

Item Description: Obstruction (Rk) cleared by Wire Drag

Source: FE179WD (FE2/61WD)

AWOIS Position: 41°20'05.17"N, 071°28'21.59"W

Required Investigation: Full, 200% SSS, 100m radius

Charts Affected: 13215, 13218, ~~13219~~

Investigation

Date (s)/DN (s): DN 256, 266

Position Numbers: 17885-17887, 18806-18811

Positioned Determined by: DGPS

Investigation Summary: 200% side scan sonar, echo sounder, and two SEABAT developments completed. Several contacts were located within the AWOIS circle but only the two most significant contacts were developed. The AWOIS item was found to be contact #8595.1S (SEABAT #951).40199

METHOD	DEPTH	DEPTH	FIX #	LATITUDE	LONGITUDE
	(M) ^{10.7}	(FT)	40199	(N) ^{.135}	(W) ^{.787}
SEABAT	11.0	36 ^{35.1}	951	41°20'05.148"	71°28'22.706"

Charting Recommendation

Hydrographer recommends charting the 3⁵ foot least depth, annotated as rock (Rk), in position 41°20'05.¹³⁵148"N and 71°28'22.¹⁸⁷706"W. The charted wire drag symbol with clearance of 35 feet ~~surrounded by a danger curve~~ and annotated as rock (Rk) in position 41°20'05.17"N and 071°28'21.59"W should be removed.

Concur

COMPILATION NOTES

Delete (35) Rk in 41-20-05.17N 71-28|21.59W
Add (35) Rk in 41-20-05.135N 71-28-22.787W

AWOIS NO. 7494

Item Description: Obstruction (Rk) cleared by Wire Drag

Source: FE179WD (FE2/61WD)

AWOIS Position: 41°20'41.77"N, 071°28'23.39"W

Required Investigation: Full, 200% SSS, 100m radius

Charts Affected: 13215, 13218, 13219

Investigation

Date (s)/DN (s): DN 250, 266

Position Numbers: 17431-17435, 18731-18733, 18770-18778

Positioned Determined by: DGPS

Investigation Summary: 200% side scan sonar, echo sounder, and one SEABAT development completed. Several contacts were located within the AWOIS circle but only the most significant contact was developed. The AWOIS item was found to be contact #9531.3P (SEABAT #844).

METHOD	DEPTH (M)	DEPTH (FT)	FIX #	LATITUDE (N)	LONGITUDE (W)
SEABAT	12.3	40.3	844	41°20'41.584"	71°28'24.728"

Charting Recommendation

Hydrographer recommends charting the 40 foot least depth annotated as rock (Rk), in position 41°20'41.584"N and 71°28'24.728"W. The charted wire drag symbol with a clearance of 38 feet and annotated as rock (Rk) in position 41°20'41.77"N and 071°28'23.39"W should be removed. *Concur*

COMPILATION NOTES

Delete 38 Rk or (38) Rk in 41-20-41.77N, 71-28-23.39W
Add (40) Rk in 41-20-41.584N, 71-28-24.728W

AWOIS NO. 7495

Item Description: Obstruction (Rk) cleared by Wire Drag

Source: FE179WD (FE2/61WD)

AWOIS Position: 41°19'28.57"N, 071°28'28.19"W

Required Investigation: Full, 200% SSS, 100m radius

Charts Affected: 13215, 13218, ~~13219~~

Investigation

Date (s)/DN (s): DN 263

Position Numbers: 18278-18286, 18293-18298, 18305-18307

Positioned Determined by: DGPS

Investigation Summary: 200% side scan sonar, echo sounder, and four SEABAT developments completed. Several contacts were located within the AWOIS circle but only the four most significant contacts were developed. The AWOIS item was found to be contact #2233.8S (SEABAT #40056).

METHOD	DEPTH (M) <small>ft</small>	DEPTH (FT)	FIX #	LATITUDE (N)	LONGITUDE (W)
SEABAT	12.1	39 38	40056	41°19'30.670"	71°28'29.190"

Charting Recommendation

Hydrographer recommends charting the 3⁸ foot least depth, annotated as rock (Rk), in position 41°19'30.670"N and 71°28'29.190"W. The charted wire drag symbol with clearance of 38 feet and annotated as rock (Rk) in position 41°19'28.57"N and 071°28'28.19"W should be removed.

Concur

COMPILATION NOTES

Delete 38 Rk in 41-19-28.57N 71-28-28.19W
Add (38) Rk in 41-19-30.67N 71-28-29.19W

AWOIS NO. 7496

Item Description: Obstruction (Rk) cleared by Wire Drag

Source: FE179WD (FE2/61WD)

AWOIS Position: 41°19'58.57"N, 071°28'38.99"W

Required Investigation: Full, 200% SSS, 100m radius

Charts Affected: 13215, 13218, ~~13219~~

Investigation

Date (s)/DN (s): DN 256, 264, 266

Position Numbers: 17927-17934, 18600-18605, 18818-18820

Positioned Determined by: DGPS

Investigation Summary: 200% side scan sonar, echo sounder, and five SEABAT developments completed. Several contacts were located within the AWOIS circle but only the five most significant contacts were developed. The echosounder least depth is the shoaler of the two developments. The AWOIS item was found to be contact #3033.4S (SEABAT #959).

METHOD	DEPTH	DEPTH	FIX #	LATITUDE	LONGITUDE
	(M)	(FT)	.10	(N) .066	(W) .997
Echosounder	10.67	34.52	3074.04	41°20'02.089"	71°28'37.924"

Charting Recommendation

Hydrographer recommends charting the 34⁵ foot least depth, annotated as rock (Rk), in position 41°20'02.089"N and 71°28'37.924"W. The charted wire drag symbol with clearance of 34 feet and annotated as rock (Rk) in position 41°19'58.57"N and 071°28'38.99"W should be removed. *Concur*

COMPILATION NOTES

Delete 34 in 41-19-58.57N 71-28-38.99W
Add 35 Rk in 41-20-02.066N 71-28-37.997W

AWOIS NO. 7497

Item Description: Obstruction charted as 38 ft sounding

Source: FE179WD (FE2/61WD)

AWOIS Position: 41°20'19.56"N, 071°29'05.99"W

Required Investigation: Full, 200% SSS, 100m radius

Charts Affected: 13215, 13218, ~~13219~~

Investigation

Date (s)/DN (s): DN 255

Position Numbers: 17735-17740

Positioned Determined by: DGPS

Investigation Summary: 200% side scan sonar, echo sounder, and one SEABAT development completed. Several contacts were located within the AWOIS circle but only the one most significant contact was developed. The AWOIS item was found to be contact #3695.7P (SEABAT #919).

METHOD	DEPTH	DEPTH	FIX #	LATITUDE	LONGITUDE
	(M)	(FT)		(N)	(W)
SEABAT	11.80	37.30	919	41°20'20.114"	71°29'06.088"

Charting Recommendation

Hydrographer recommends charting the 37⁶ foot least depth, annotated as rock (Rk), in position 41°20'20.114"N and 71°29'06.088"W, and that the charted 38 foot sounding in position 41°20'19.56"N and 071°29'05.99"W should be removed. *concur*

COMPILATION NOTES

Delete 38 Rk or 38 Boulders in 41-20-19.56N 71-29-05.99W
Add (36) Rk in 41-20-20.15N 71-29-05.933W

AWOIS NO. 7498

Item Description: Obstruction (39 ft not charted)

Source: FE179WD (FE2/61WD)

AWOIS Position: 41°20'02.17"N, 071°28'16.19"W

Required Investigation: Full, 200% SSS, 100m radius

Charts Affected: ~~13215~~, 13218, ~~13219~~

Investigation

Date (s)/DN (s): DN 256

Position Numbers: 17877-17882

Positioned Determined by: DGPS

Investigation Summary: 200% side scan sonar, echo sounder, and one SEABAT development completed. Several contacts were located within the AWOIS circle but only the most significant contact was developed. The AWOIS item was found to be contact #8446.4S (SEABAT #949).

METHOD	DEPTH (M)	DEPTH (FT)	FIX #	LATITUDE (N)	LONGITUDE (W)
SEABAT	13.30	43.26	949	41°20'02.641"	71°28'16.168"

Charting Recommendation

Hydrographer recommends charting the 43 foot least depth, annotated as rock (Rk), in position 41°20'02.641"N and 71°28'16.168"W. Do NOT concur.

COMPILATION NOTES

Due to the scale of chart 13218 this rock cannot be shown on the chart. No charting changes are recommended.

AWOIS NO. 7499

Item Description: Obstruction (38 ft not charted)

Source: FE179WD (FE2/61WD)

AWOIS Position: 41°19'28.57"N, 071°28'19.19"W

Required Investigation: Full, 200% SSS, 100m radius

Charts Affected: 13215, 13218, ~~13219~~

Investigation

Date (s)/DN (s): DN 263

Position Numbers: 18269-18277, 18287-18289

Positioned Determined by: DGPS

Investigation Summary: 200% side scan sonar, echo sounder, and two SEABAT development completed. Several contacts were located within the AWOIS circle but only the two most significant contacts were developed. The two contacts developed were several feet deeper in depth than the reported AWOIS item, therefore the hydrographer does not feel that this item was fully developed. The shoalest depth found within the AWOIS circle was found to be contact #2020.4P (SEABAT #40051).
40242

METHOD	DEPTH (M)	DEPTH (FT)	FIX #	LATITUDE (N)	LONGITUDE (W)
SEABAT	14.52	47.466	40051	41°19'26.086"	71°28'18.898"

Charting Recommendation

In order to be conservative, the hydrographer recommends that no change to the chart be made in regards to this AWOIS. *Concur*

COMPILATION NOTES

No charting changes recommended

* See Appendix I for a complete copy of the Danger to Navigation Report, the details of which are summarized in the following table:

* THIS DEPTH AFFECTS THE FOLLOWING CHARTS:		
Chart 13205 (32nd Ed. 7 October 1995), Chart Scale 1:80,000		
Chart 13215 (14th Ed. 13 November 1993) Chart Scale 1:40,000		
Chart 13218 (33rd Ed. 23 March 1996) Chart Scale 1:80,000		
Chart 13219 (10th Ed. 27 April 1996) Chart Scale 1:15,000		
** DEPTH (ft)	LATITUDE	LONGITUDE
27 Rk (25) Rk	41°20'44.82"N 41-20-44.877N	071°29'20.38"W 71-29-20.301 Fix # 174/95

Chart a (25) Rk in the present survey location.
 * Updated depths should be viewed as preliminary information, subject to office review.

* use this information

** Depths reduced to feet at MLLW using predicted tides.

0.3 Comparison of Soundings

The overall correlation between charted soundings and survey depths is excellent, with average differences of approximately one foot in flat and slightly sloping areas and no more than two to three feet in areas with irregular bottoms.

A detailed examination of the survey data found a hard sandy sea floor on the eastern portion of the survey. As soon as the 60 foot contour was crossed to the west, in the general vicinity of Point Judith, the bottom immediately changed to boulders of various dimensions. Over 3500 side scan sonar contacts requiring more than 350 SEABAT developments were recorded in a 6 square nautical mile area approximately 1 nautical mile south of Point Judith. Prior wire drag surveys did not adequately depict the true condition of the sea floor

* Appended to this report

in this area. The shoalest depth found in the area was the 2¹⁵ foot reported as a Danger to Navigation (Section O.2).

O.4 Comparison of Non-Sounding Features

During the course of the survey a charted TANK on Point Judith Neck at approximate position 41° 23.419' N, 071°28.991' W was in the process of being demolished. A new water TANK has been erected nearby at 41°22.650' N, 071°29.368' W. Data on the new position was recorded by ship's personnel on November 12, 1996 with a hand-held Magellan non-differential GPS receiver, Model "NAV 5000 DLX," Serial Number 1C 011962 (See Appendix II).*

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 - See also the Evaluation Report

Non- Floating

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

Floating

Detached positions were taken on one (1) floating aid to navigation located in the boundaries of this survey. A comparison was made between the detached position of the buoy, Point Judith Lighted Whistle Buoy 2, LL # 19460, the 1996 edition of Light List, Volume I, published position, and the largest scale chart of the area. The buoy was found to deviate from its published or charted position by no more than a few meters. Mainly tug and barge traffic utilize this floating aid as a turning buoy from Block Island sound into Narragansett Bay. Since the present survey determined that numerous rocks exist inshore of the 60 foot contour, it would be advisable to move this buoy south by 0.6 nautical miles to ensure safe passage for these vessels. CMCUR

* Data filed with original field records.

R. STATISTICS

R.1 a. Number of Positions 21841
b. Lineal Nautical Miles of Sounding Lines:
 Nautical Miles of Survey With the Use
 of Side Scan Sonar 169.46
 Nautical Miles of Survey Without the Use
 of Side Scan Sonar 359.82
R.2 a. Square Nautical Miles of Hydrography
 per 100% of Coverage 14.5
b. Days of Production 34
c. Detached Positions 3
d. Bottom Samples 50
e. Tide Stations 2
g. Velocity Casts 10
j. SEABAT Item Investigations 400

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.

S.2 Fifty (50) 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 See Section O.2 for a danger to navigation noted during this survey.

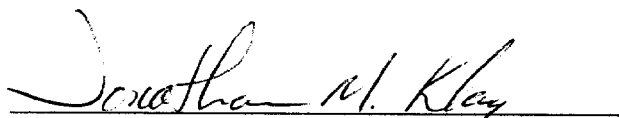
T.2 The RUDE is not aware of any construction or dredging that will affect results of this survey.

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.



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

RESPONSIBLE PERSONNEL															
TYPE OF ACTION	NAME														
OBJECTS INSPECTED FROM SEAWARD	S. P. De Bow, CDR, NOAA Corps Commanding Officer, NOAA Ship RUDE														
POSITIONS DETERMINED AND/OR VERIFIED															
FORMS ORIGINATED BY QUALITY CONTROL AND REVIEW GROUP AND FINAL REVIEW ACTIVITIES															
<p style="text-align: center;">INSTRUCTIONS FOR ENTRIES UNDER 'METHOD AND DATE OF LOCATION' (Consult <i>Photogrammetric Instructions No. 64.</i>)</p>															
<p>OFFICE</p> <p>I. OFFICE IDENTIFIED AND LOCATED OBJECTS Enter the number and date (including month, day, and year) of the photograph used to identify and locate the object. EXAMPLE: 75E(C)6042 8-12-75</p> <p>FIELD</p> <p>I. NEW POSITION DETERMINED OR VERIFIED Enter the applicable data by symbols as follows:</p> <table style="margin-left: 20px;"> <tr> <td>F - Field</td> <td>P - Photogrammetric</td> </tr> <tr> <td>L - Located</td> <td>Vis - Visually</td> </tr> <tr> <td>V - Verified</td> <td>5 - Field identified</td> </tr> <tr> <td>1 - Triangulation</td> <td>6 - Theodolite</td> </tr> <tr> <td>2 - Traverse</td> <td>7 - Planetable</td> </tr> <tr> <td>3 - Intersection</td> <td>8 - Sextant</td> </tr> <tr> <td>4 - Resection</td> <td></td> </tr> </table> <p>A. Field positions* require entry of method of location and date of field work. EXAMPLE: F-2-6-L 8-12-75</p> <p>*FIELD POSITIONS are determined by field observations based entirely upon ground survey methods.</p>	F - Field	P - Photogrammetric	L - Located	Vis - Visually	V - Verified	5 - Field identified	1 - Triangulation	6 - Theodolite	2 - Traverse	7 - Planetable	3 - Intersection	8 - Sextant	4 - Resection		<p>FIELD (Cont'd)</p> <p>B. Photogrammetric field positions** require entry of method of location or verification, date of field work and number of the photograph used to locate or identify the object. EXAMPLE: P-8-V 8-12-75 74L(C)2982</p> <p>II. TRIANGULATION STATION RECOVERED When a landmark or aid which is also a triangulation station is recovered, enter 'Triang. Rec.' with date of recovery. EXAMPLE: Triang. Rec. 8-12-75</p> <p>III. POSITION VERIFIED VISUALLY ON PHOTOGRAPH Enter 'V-Vis.' and date. EXAMPLE: V-Vis. 8-12-75</p> <p>**PHOTOGRAMMETRIC FIELD POSITIONS are dependent entirely, or in part, upon control established by photogrammetric methods.</p>
F - Field	P - Photogrammetric														
L - Located	Vis - Visually														
V - Verified	5 - Field identified														
1 - Triangulation	6 - Theodolite														
2 - Traverse	7 - Planetable														
3 - Intersection	8 - Sextant														
4 - Resection															
<p>ORIGINATOR</p> <p><input type="checkbox"/> PHOTO FIELD PARTY</p> <p><input checked="" type="checkbox"/> HYDROGRAPHIC PARTY</p> <p><input type="checkbox"/> GEODETIC PARTY</p> <p><input type="checkbox"/> OTHER (Specify)</p> <p>FIELD ACTIVITY REPRESENTATIVE</p> <p>OFFICE ACTIVITY REPRESENTATIVE</p> <p><input type="checkbox"/> REVIEWER</p> <p><input type="checkbox"/> QUALITY CONTROL AND REVIEW GROUP REPRESENTATIVE</p>															

NOAA FORM 76-40
(8-74)

Replaces C&GS Form 567.

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

~~NON-NAVIGATIONAL~~ LANDMARKS FOR CHARTS

ORIGINATING ACTIVITY

- HYDROGRAPHIC PARTY
 - GEODETIC PARTY
 - PHOTO FIELD PARTY
 - COMPILATION ACTIVITY
 - FINAL REVIEWER
 - QUALITY CONTROL & REVIEW GRP.
 - COAST PILOT BRANCH
- (See reverse for responsible personnel)

REPORTING UNIT
(If field party, Ship or Office)
NOAA Ship RUDE

LOCALITY
Point Judith

DATE
11/96

STATE
RHODE ISLAND

The following objects HAVE HAVE NOT been inspected from seaward to determine their value as landmarks.

OPR PROJECT NO.
OPR-B302-RU-96

DATUM
NAD 83

JOB NUMBER
H-10659

SURVEY NUMBER
H-10659

METHOD AND DATE OF LOCATION
(See instructions on reverse side)

OFFICE

POSITION

DESCRIPTION
(Record reason for deletion of landmark or aid to navigation.
Show triangulation station names, where applicable, in parentheses)

LATITUDE
° / ' / D.M. Meters

LONGITUDE
° / ' / D.P. Meters

FIELD

CHARTS
AFFECTED

CHARTING
NAME
TANK

Water Tank (White)

41-22 39.00 071-29 22.08

F-"GPS"-L

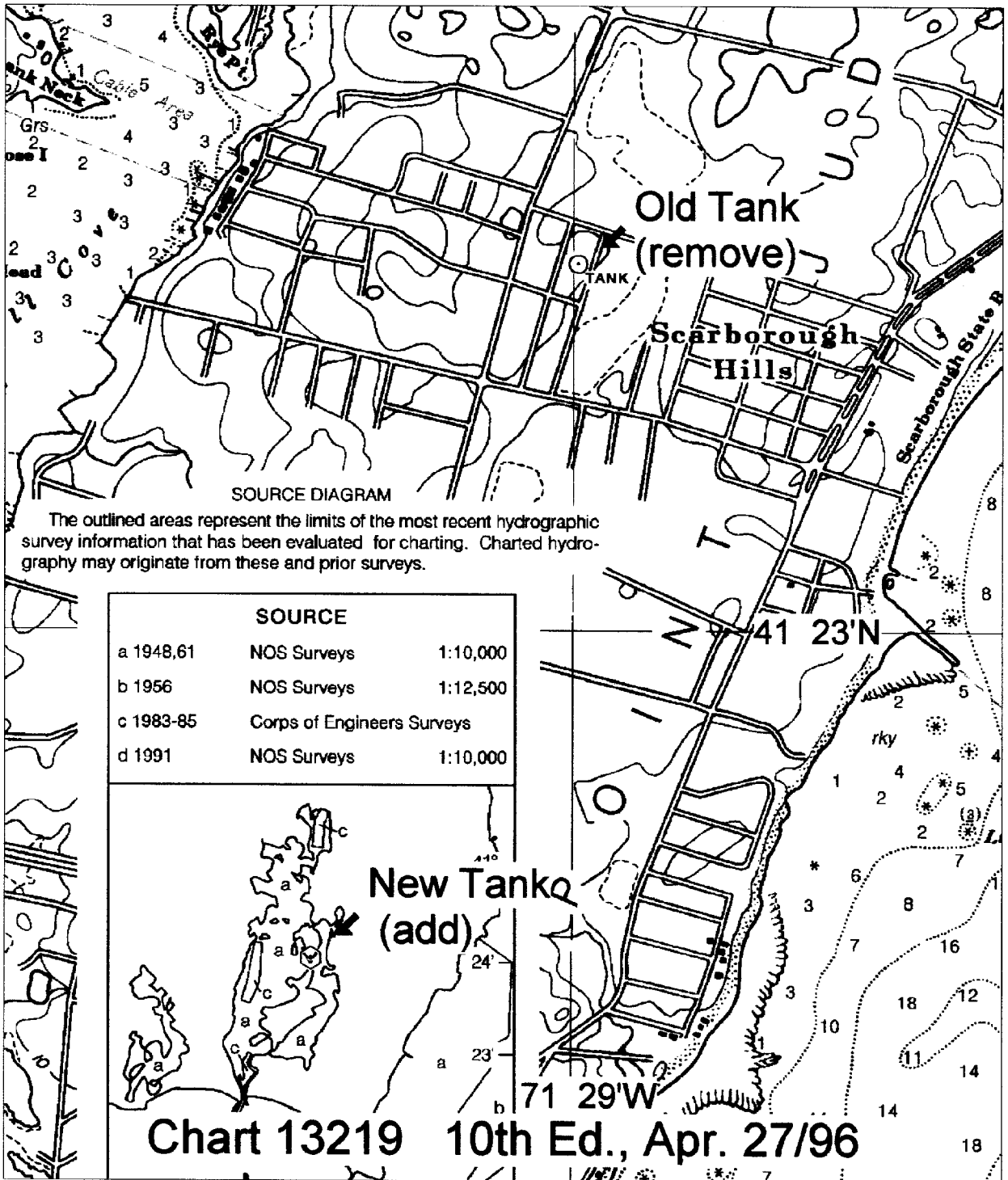
13218
13219

RESPONSIBLE PERSONNEL

TYPE OF ACTION		NAME		ORIGINATOR	
OBJECTS INSPECTED FROM SEAWARD		S. P. De Bow, CDR, NOAA Corps Commanding Officer, NOAA Ship RUDE		<input type="checkbox"/> PHOTO FIELD PARTY <input checked="" type="checkbox"/> HYDROGRAPHIC PARTY <input type="checkbox"/> GEODETIC PARTY <input type="checkbox"/> OTHER (Specify)	
POSITIONS DETERMINED AND/OR VERIFIED				FIELD ACTIVITY REPRESENTATIVE	
FORMS ORIGINATED BY QUALITY CONTROL AND REVIEW GROUP AND FINAL REVIEW ACTIVITIES				OFFICE ACTIVITY REPRESENTATIVE	
				<input type="checkbox"/> REVIEWER <input type="checkbox"/> QUALITY CONTROL AND REVIEW GROUP REPRESENTATIVE	

INSTRUCTIONS FOR ENTRIES UNDER 'METHOD AND DATE OF LOCATION'
(Consult Photogrammetric Instructions No. 64.)

<p>OFFICE</p> <p>I. OFFICE IDENTIFIED AND LOCATED OBJECTS Enter the number and date (including month, day, and year) of the photograph used to identify and locate the object. EXAMPLE: 75E(C)6042 8-12-75</p> <p>FIELD</p> <p>I. NEW POSITION DETERMINED OR VERIFIED Enter the applicable data by symbols as follows: F - Field L - Located V - Verified 1 - Triangulation 2 - Traverse 3 - Intersection 4 - Resection</p> <p>A. Field positions* require entry of method of location and date of field work. EXAMPLE: F-2-6-L 8-12-75</p> <p>*FIELD POSITIONS are determined by field observations based entirely upon ground survey methods.</p>	<p>FIELD (Cont'd)</p> <p>B. Photogrammetric field positions** require entry of method of location or verification, date of field work and number of the photograph used to locate or identify the object. EXAMPLE: P-8-V 8-12-75 74L(C)2982</p> <p>II. TRIANGULATION STATION RECOVERED When a landmark or aid which is also a triangulation station is recovered, enter 'Triang. Rec.' with date of recovery. EXAMPLE: Triang. Rec. 8-12-75</p> <p>III. POSITION VERIFIED VISUALLY ON PHOTOGRAPH Enter 'V-Vis.' and date. EXAMPLE: V-Vis. 8-12-75</p> <p>**PHOTOGRAMMETRIC FIELD POSITIONS are dependent entirely, or in part, upon control established by photogrammetric methods.</p>
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APPENDIX VII

APPROVAL SHEET

LETTER OF APPROVAL

REGISTRY NO. H-10659

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

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-10659

LOCALITY: Rhode Island, South of Judith Point

TIME PERIOD: November 1-7, 1995, August 11 - October 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: R2 & R1A

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



Final tide zone nodal point locations for OPR B302-RU-96.

Format: Longitude in decimal degrees (negative value denotes
Longitude West),
Latitude in decimal degrees
Tide Station (in recommended order of use)
Average Time Correction (in minutes)
Range Correction

		Tide Station Order	AVG Time Correction	Range Correction
Zone R1A				
-71.195161	41.455154	845-5083	-18	0.97
-71.037365	41.485599	845-2660	0	0.85
-70.944984	41.411412			
-71.557239	41.216011			
-71.56102	41.221189			
-71.195161	41.455154			
Zone R2				
-71.468611	41.395621	845-5083	0	1.00
-71.490534	41.366878	845-2660	+18	0.88
-71.504221	41.375363			
-71.515032	41.375438			
-71.51652	41.371493			
-71.566343	41.224734			
-71.56102	41.221189			
-71.195162	41.455154			
-71.468611	41.395621			
Zone R4				
-71.468611	41.395621	845-5083	-12	1.03
-71.457221	41.435097	845-2660	+6	0.91
-71.438477	41.44221			
-71.355307	41.449697			
-71.329535	41.464727			
-71.300958	41.468374			
-71.30035	41.48524			
-71.279677	41.492078			
-71.237629	41.526522			
-71.204863	41.528327			
-71.185434	41.481137			
-71.195162	41.455154			
-71.468611	41.395621			
Zone R5				
-71.421055	41.473173	845-2660	0	0.97
-71.434316	41.473173	845-5083	-18	1.10
-71.438477	41.44221			
-71.355307	41.449697			
-71.346404	41.465136			
-71.336602	41.480099			

-71.359418 41.480273
-71.37422 41.490285
-71.390873 41.487743
-71.392875 41.473173
-71.421055 41.473173

Zone R8

-71.348064 41.633805	845-2660	0	1.08
-71.336328 41.633874			
-71.310824 41.622643			
-71.326531 41.579228			
-71.368768 41.570545			
-71.382847 41.55566			
-71.443432 41.556281			
-71.464981 41.562483			
-71.457382 41.634426			
-71.348064 41.633805			

Zone R10A

-71.326531 41.579228	845-2660	0	1.04
-71.368768 41.570545			
-71.382847 41.55566			
-71.381272 41.533953			
-71.367847 41.537277			
-71.301824 41.537277			
-71.288446 41.567444			
-71.326531 41.579228			

**Final Zoning for OPR B302-RU-96
Rhode Island Sound Corridor, RI**

Zone R8
Time Corrector 0 mins
Range Corrector X1.08
Reference 8452660

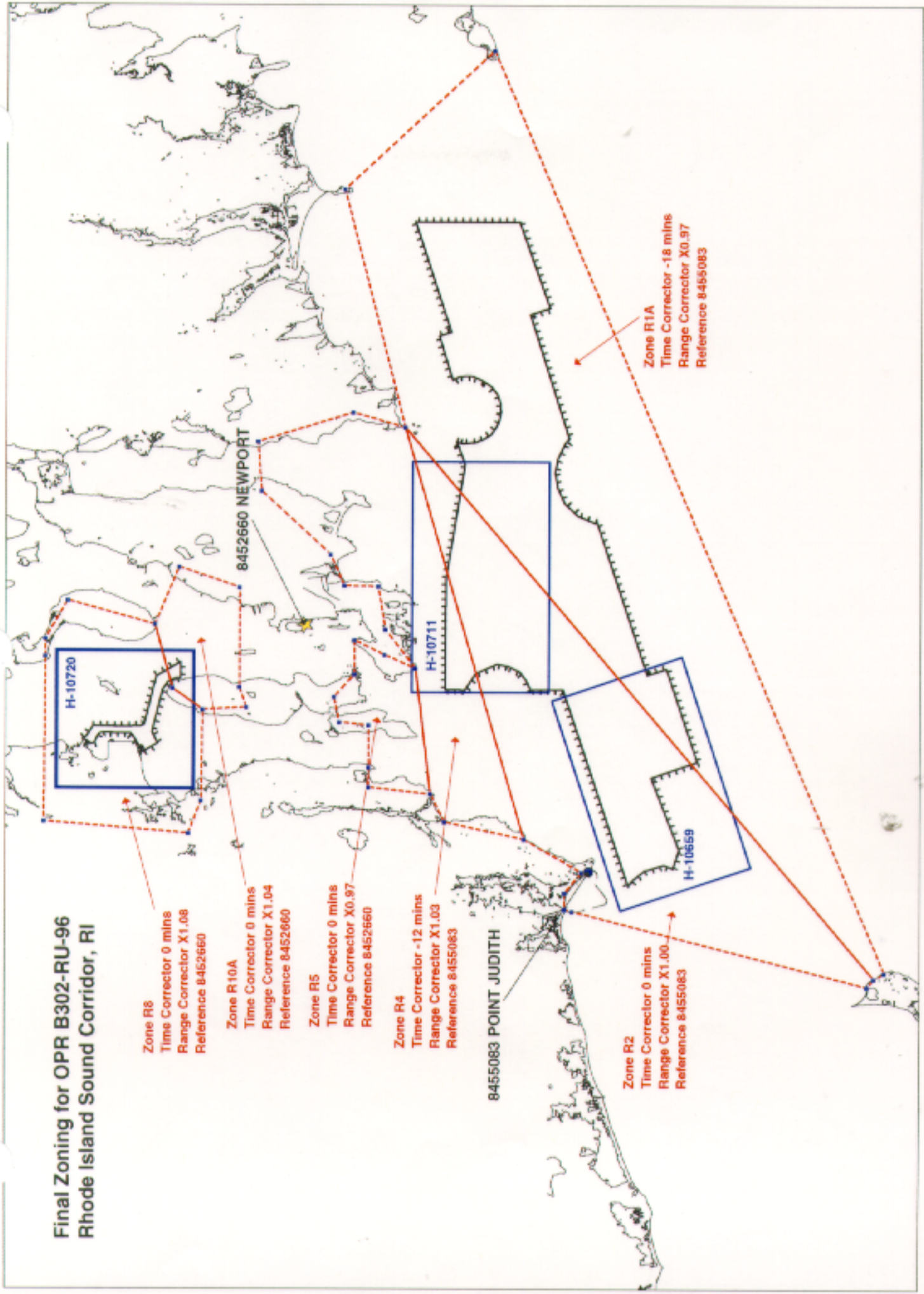
Zone R10A
Time Corrector 0 mins
Range Corrector X1.04
Reference 8452660

Zone R5
Time Corrector 0 mins
Range Corrector X0.97
Reference 8452660

Zone R4
Time Corrector -12 mins
Range Corrector X1.03
Reference 8455083

Zone R2
Time Corrector 0 mins
Range Corrector X1.00
Reference 8455083

Zone R1A
Time Corrector -18 mins
Range Corrector X0.97
Reference 8455083



GEOGRAPHIC NAMES

Name on Survey

A ON CHART NO. 13219, 13218, 13205
B ON PREVIOUS SURVEY
C ON U.S. QUADRANGLE MAPS
D FROM LOCAL INFORMATION
E ON LOCAL MAPS
F P.O. GUIDE OR MAP
G RAND McNALLY ATLAS
H U.S. LIGHT LIST
K

Name on Survey	A	B	C	D	E	F	G	H	K	
POINT JUDITH (title)	X		X							1
RHODE ISLAND (title)	X		X							2
RHODE ISLAND SOUND	X		X							3
										4
										5
										6
										7
										8
										9
										10
										11
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										24
										25

Approved

Clara C. Coy
Chief Geographer

JUN 17 1997

LETTER TRANSMITTING DATA

N/CS33-62-98

DATA AS LISTED BELOW WERE FORWARDED TO YOU BY
(Check):

ORDINARY MAIL AIR MAIL

REGISTERED MAIL EXPRESS

GBL (Give number) _____

TO:

CHIEF, DATA CONTROL GROUP, N/CS3x1
NOAA/NATIONAL OCEAN SERVICE
STATION 6815, SSMC3
1315 EAST-WEST HIGHWAY
SILVER SPRING, MARYLAND 20910-3282

DATE FORWARDED

10 JULY 98

NUMBER OF PACKAGES

ONE TUBE

NOTE: A separate transmittal letter is to be used for each type of data, as tidal data, seismology, geomagnetism, etc. State the number of packages and include an executed copy of the transmittal letter in each package. In addition the original and one copy of the letter should be sent under separate cover. The copy will be returned as a receipt. This form should not be used for correspondence or transmitting accounting documents.

H10659

RHODE ISLAND, RHODE ISLAND SOUND, 0.5NM SOUTH OF POINT JUDITH

1 (ONE) TUBE CONTAINING THE FOLLOWING:

- 1 SMOOTH SHEET FOR SURVEY H10659
- 1 ORIGINAL DESCRIPTIVE REPORT
- 4 DRAWING HISTORY FORMS (NOAA FORM #76-71) 1 EACH FOR CHARTS 13215, 13218, 13219, 13221
- 1 RECORD OF APPLICATION TO CHART FORM (NOAA FORM #75-96) FOR SURVEY H10659
- 1 H-DRAWING FOR NOS CHART 13215
- 1 H-DRAWING FOR NOS CHART 13218
- 1 H-DRAWING FOR NOS CHART 13219
- 1 H-DRAWING FOR NOS CHART 13221
- 1 COMPOSITE DRAWING FOR NOS CHART 13215
- 1 COMPOSITE DRAWING FOR NOS CHART 13218
- 1 COMPOSITE DRAWING FOR NOS CHART 13219
- 1 COMPOSITE DRAWING FOR NOS CHART 13221

FROM: (Signature)

Deborah A. Bland

RECEIVED THE ABOVE

(Name, Division, Date)

Return receipted copy to:

ATLANTIC HYDROGRAPHIC BRANCH
N/CS33
439 WEST YORK STREET
NORFOLK, VA 23510-1114

07/10/98

HYDROGRAPHIC SURVEY STATISTICS
REGISTRY NUMBER: H10659

NUMBER OF CONTROL STATIONS	2
NUMBER OF POSITIONS	21841
NUMBER OF SOUNDINGS	21841

	TIME-HOURS	DATE COMPLETED
PREPROCESSING EXAMINATION	42	06/05/97
VERIFICATION OF FIELD DATA	202.50	12/17/97
EVALUATION AND ANALYSIS	60	
FINAL INSPECTION	59	06/25/98
COMPILATION	59	07/10/98
TOTAL TIME	423	
ATLANTIC HYDROGRAPHIC BRANCH APPROVAL		06/30/98

**ATLANTIC HYDROGRAPHIC BRANCH
EVALUATION REPORT FOR H10659 (1995-96)**

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 2.01
MicroStation 95, version 5.05
I/RAS B, version 5.01

The smooth sheet was plotted using a Hewlett-Packard DesignJet 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 (11.478 meters or 1.15 mm at the scale of the survey) north in latitude and 1.810 seconds (42.092 meters or 4.21 mm at the scale of the survey) east in longitude.

L. JUNCTIONS

H10378 (1991)	to the southwest
H10424 (1991-92)	to the northwest
<u>H10648 (1995)</u>	<u>To the east</u>

A standard junction was effected between the present survey and survey H10648 (1995).

The smooth sheets for surveys H10378 (1991) and H10424 (1991-92) are archived at National Ocean Service (NOS) headquarters, Silver Spring, Maryland; therefore, a standard junction could not be made. In this case, the note "ADJOINS" has been shown on the present survey. Depths are in adequate agreement. Any adjustments to the depth curves will have to be made during chart compilation.

There are no contemporary surveys to the north, south, or west of the present survey.

M. COMPARISON WITH PRIOR SURVEYS

A comparison with prior surveys was not performed. This is in accordance with section 4. of the memorandum titled, "Changes to Hydrographic Survey Processing", dated May 24, 1995.

- O. COMPARISON WITH CHARTS 13205 (32nd Edition, Oct. 7/95)**
13215 (14th Edition, Nov. 13/93)
13218 (32nd Edition, June 26/93)
13219 (10th Edition, Apr. 27/96)
13221 (50th Edition, Apr. 15/95)

Hydrography

The charted hydrography originates with prior surveys and miscellaneous sources. The hydrographer makes an adequate comparison in section O. of the Descriptive Report. The following should be noted:

1. The following uncharted obstructions originate with the present survey:

<u>Depth</u> <u>ft/m</u>	<u>Latitude (N)</u>	<u>Longitude (W)</u>
49/15	41°19'17.31"	71°29'03.03"
43/13 ³	41°19'24.47"	71°28'08.83"
38/11 ⁸	41°19'38.37"	71°28'18.92"
41/12 ⁶	41°19'57.71"	71°28'06.19"
33/10 ¹	41°20'07.73"	71°28'44.67"
33/10 ¹	41°20'12.83"	71°28'54.09"
41/12 ⁷	41°20'26.15"	71°28'09.34"
38/11 ⁶	41°20'30.60"	71°28'16.09"
34/10 ⁵	41°20'34.58"	71°29'18.50"
41/12 ⁶	41°20'38.68"	71°28'15.00"
32/9 ⁹	41°20'40.70"	71°29'36.37"
36/11	41°20'40.79"	71°28'52.25"
29/9	41°20'45.40"	71°29'29.74"
35/10 ⁷	41°20'47.80"	71°28'36.98"
35/10 ⁸	41°20'49.73"	71°28'35.30"
32/9 ⁸	41°20'54.68"	71°28'30.78"

It is recommended that the above obstructions be charted with a danger curve in the present survey locations should the scale of the chart allow.

2. An uncharted obstruction with a depth of 40 feet (12² m), in Latitude 41°20'07.59"N, Longitude 71°28'15.30"W, was located by the field unit. Due to shoaler obstructions in the immediate vicinity, it is recommended that this obstruction not be charted.

3. A charted rock with a depth of 45 feet (13⁷ m), in Latitude 41°19'27.3"N, Longitude 71°29'07.5"W, on the 35th edition of chart 13218 is charted as a 45 foot (13⁷ m) depth in a rocky area, in Latitude 41°19'27.0"N, Longitude 71°29'11.4"W, on the 15th edition of chart 13215. The source of this feature is not readily ascertainable. Present survey depths in this area range from 48 to 58 feet (14⁶-17⁷ m). The present survey is not considered adequate to supersede this feature. It is recommended that the charts be revised to show a rock with a depth of 45 feet and a danger curve.

4. A charted danger curve and the note Rk (39 ft) (11⁹ m), in Latitude 41°19'15.58"N, Longitude 71°28'29.56"W, originates with H10378 (1991) as a side scan sonar contact. This rock is shown on the 35th edition of chart 13218 and the 15th edition of chart 13215. The field unit located a rock with a fathometer depth of 41 feet (12⁶ m), in Latitude 41°19'15.67"N, Longitude 71°28'29.43"W. The present survey is considered adequate to supersede the prior survey information. It is recommended that the charted feature be deleted from the charts, and a danger curve with the notation (Rk 41 ft) be charted in the present survey location.

5. A charted obstruction with a depth of 45 feet (13⁷ m), in Latitude 41°19'46.77"N, Longitude 71°29'14.76"W, originates with H10424 (1991-92) as a fathometer least depth on an obstruction. This feature is shown on the 15th and 35th editions of charts 13215 and 13218, respectively. Present survey depths in this area range from 42 to 53 feet (12⁸-16² m). This feature is considered disproved. It is recommended that the obstruction be deleted from the chart.

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

0.2. Danger to Navigation

The hydrographer identified one (1) danger to navigation and submitted information for inclusion into a

Local Notice to Mariners, to the Commander, First Coast Guard District, Boston, Massachusetts. A copy of the letter was forwarded to Chief, Nautical Data Branch, N/CS26, Silver Spring, Maryland. After office processing, a revised Danger to Navigation report was submitted to the First Coast Guard District. A copy of both Danger to Navigation Report is appended to the Descriptive Report.

P. ADEQUACY OF SURVEY

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

Q. AIDS TO NAVIGATION

The hydrographer located one floating aid to navigation within the limits of the present survey. This aid would more adequately serve its purpose if moved 0.6 nautical miles south of its present location, as recommended by the hydrographer.

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:

13215	(15 th Edition, Apr. 12/97)
13218	(35 th Edition, Oct. 25/97)
13219	(10 th Edition, Apr. 27/96)
13221	(51 st Edition, Sept 20/97)

During compilation of the above charts the following discrepancies were noted outside the present survey limits. These discrepancies should be investigated and shown correctly on all charts involved.

a. A charted rock with a depth of 34 feet and a danger curve, in Latitude 41°20'34"N, Longitude 71°30'01"W, is shown on the 35th edition of chart 13218. This feature is charted as a 34 foot depth, in Latitude 41°20'32.5"N, Longitude 71°30'03.0"W on the 15th edition of chart 13215 and as a rock with a depth of 35 feet and a danger curve, in

Latitude 41°20'31.9"N, Longitude 71°30'02.5"W on the 10th edition of chart 13219. The source of this item was not readily ascertained.

b. A charted rock with a depth of 51 feet and a danger curve, in Latitude 41°19'03"N, Longitude 71°29'14"W, is shown on the 35th edition of chart 13218. This feature is charted as a 51 foot depth on the 15th edition of chart 13215. This item originates with H10378 (1991) as a side scan sonar contact on a rock.

RUDE Processing Team

Richard W. Blevins

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



UNITED STATES DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration
 NATIONAL OCEAN SERVICE, Office of Coast Survey
 Atlantic Hydrographic Branch
 439 W. York Street
 Norfolk, VA 23510-1114

July 15, 1997

Commander
 First Coast Guard District
 Aids To Navigation Office
 408 Atlantic Avenue
 Boston, Massachusetts 02110-3350

Dear Sir,

The following item was previously reported as a danger to navigation on September 21, 1996:

REPORT OF DANGER TO NAVIGATION

Hydrographic Survey Registry Number...H-10659
 State.....Rhode Island
 General Locality.....Rhode Island Sound
 Locality.....0.5 NM South of Pt. Judith
 Project Number.....OPR-B302-RU-96
 Surveyed by.....NOAA Ship Rude

Object Addressed:

The 27-ft least depth reported in Latitude 41°20'44.82"N, Longitude 071°29'20.38"W (corrected to MLLW using predicted tides) on a rock, has been corrected during office processing to a depth of 25-ft in Latitude 41°20'44.82"W, Longitude 071°29'20.26"W @ MLLW using approved tides.

Affected Nautical Charts:

Chart Number	Edition No.	Date	Datum	Scale
13205	32	7 OCT 95	NAD 83	1:80,000
13215	15	12 APR 97	NAD 83	1:40,000
13218	34	5 OCT 96	NAD 83	1:80,000
13219	10	27 APR 96	NAD 83	1:15,000



Questions concerning this report should be directed to the
Atlantic Hydrographic Branch by calling 757-441-6746.

Sincerely,

A handwritten signature in cursive script, appearing to read "Nicholas E. Perugini".

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

September 21, 1996

Commander
First Coast Guard District
Aids To Navigation Office
408 Atlantic Avenue
Boston, Massachusetts 02110-3350

REPORT OF DANGER TO NAVIGATION

Dear Sir:

The NOAA Ship *RUDE* is currently conducting a hydrographic survey centered approximately 1.0 nautical mile south of Point Judith, Rhode Island. During the course of this survey, an obstruction was found which is not shown on the four charts which cover the area: chart 13205 (32nd Ed. 7 October 1995), chart 13215 (14th Ed. 13 November 1993), chart 13218 (33rd Ed. 23 March 1996), and chart 13219 (10th Ed. 27 April 1996). It is requested that this discrepancy be published in the Local Notice to Mariners.

The updated depth is given in the following table. The attached chartlet shows the plotted position of the depth. The least depth should be depicted as shown on the chartlet, surrounded by the "danger curve" with a "Rk" symbol attached. All information is preliminary and subject to office review.

This item was subject to hydrographic development using a Raytheon DSF-6000N survey echo sounder, a Reson SEABAT 9001 shallow-water multibeam sonar system, and a dive investigation using a diver least depth gauge. The resultant least depth was obtained from the SEABAT sonar system. The depth has been reduced to Mean Lower Low Water (MLLW) by applying predicted tide corrections. The horizontal datum is NAD 83.

This investigation was performed in support of the following hydrographic survey:

Hydrographic Survey Registry No....H-10659
State.....Rhode Island
General Locality.....Rhode Island Sound
Locality.....1.0 nm South of Pt. Judith
Project Number.....B302-RU-96
Surveyed by.....NOAA Ship *RUDE*

*** THIS DEPTH AFFECTS THE FOLLOWING CHARTS:**

Chart 13205 (32nd Ed. 7 October 1995),
Chart Scale 1:80,000

Chart 13215 (14th Ed. 13 November 1993)
Chart Scale 1:40,000

Chart 13218 (33rd Ed. 23 March 1996)
Chart Scale 1:80,000

Chart 13219 (10th Ed. 27 April 1996)
Chart Scale 1:15,000

** DEPTH (ft)	LATITUDE	LONGITUDE
27 Rk	41°20'44.82"N	071°29'20.38"W

*** Updated depths should be viewed as preliminary information, subject to office review.**

**** Depths reduced to feet at MLLW using predicted tides.**

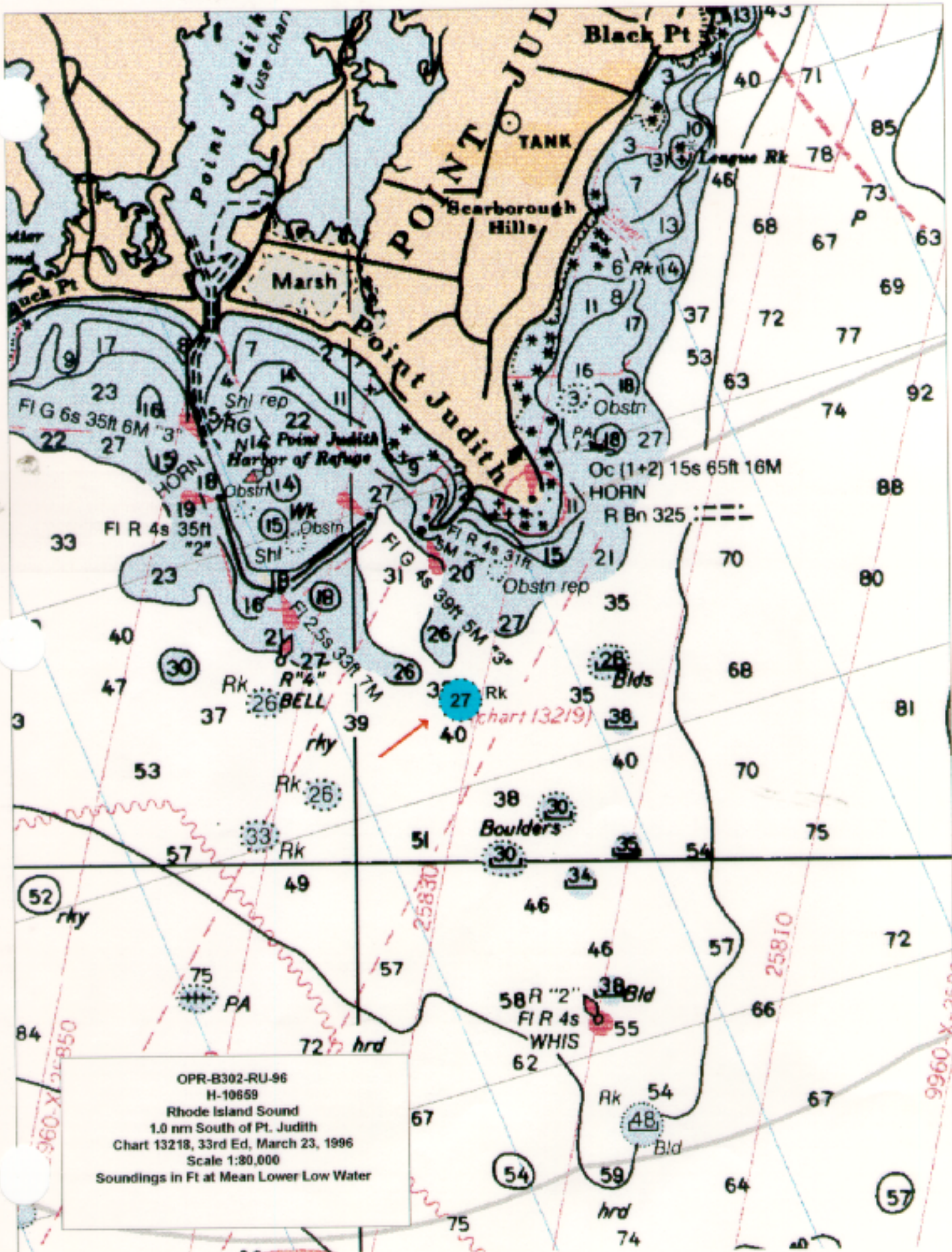
Contact either of the following personnel for further information:

Commanding Officer
NOAA Ship RUDE
439 West York St.
Norfolk, VA 23510
804-441-6386

Chief, Atlantic Hydrographic Branch
Atlantic Marine Center
439 W. York St.
Norfolk, VA 23510
804-441-6746

Sincerely,

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



OPR-B302-RU-96
 H-10659
 Rhode Island Sound
 1.0 nm South of Pt. Judith
 Chart 13218, 33rd Ed, March 23, 1996
 Scale 1:80,000
 Soundings in Ft at Mean Lower Low Water

APPROVAL SHEET
H10659

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 disproval 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.

Deborah A. Bland

Deborah A. Bland
Cartographer,
Atlantic Hydrographic Branch

Date: 29 June 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.

Andrew L. Beaver

Andrew L. Beaver
Lieutenant Commander, NOAA
Chief, Atlantic Hydrographic Branch

Date: 6/30/98

Final Approval:

Approved: Andrew A. Armstrong, III

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

Date: Jul 29, 1998

MARINE CHART BRANCH
RECORD OF APPLICATION TO CHARTS

FILE WITH DESCRIPTIVE REPORT OF SURVEY NO. H10659

INSTRUCTIONS

A basic hydrographic or topographic survey supersedes all information of like nature on the uncorrected chart.

1. Letter all information.
2. In "Remarks" column cross out words that do not apply.
3. Give reasons for deviations, if any, from recommendations made under "Comparison with Charts" in the Review.

CHART	DATE	CARTOGRAPHER	REMARKS
13219	7/9/98	D.A. Blane	Full Part After Marine Center Approval Signed Via Drawing No.
13221	7/9/98	D.A. Blane	Full Part After Marine Center Approval Signed Via Drawing No.
13215	7/9/98	D.A. Blane	Full Part After Marine Center Approval Signed Via Drawing No.
13218	7/9/98	D.A. Blane	Full Part After Marine Center Approval Signed Via Drawing No.
13219	8/12/98	Kennett	Full Part Before After Marine Center Approval Signed Via Drawing No. 16
13205	8/17/98	Kennett	Full Part Before After Marine Center Approval Signed Via Drawing No. 57
13215	8/13/98	Kennett	Full Part Before After Marine Center Approval Signed Via Drawing No. 16
13221	8/17/98	Kennett	Full Part Before After Marine Center Approval Signed Via Drawing No. 64
13218	8/14/98	Kennett	Full Part Before After Marine Center Approval Signed Via Drawing No. 73
12300	8/17/98	Kennett	Full Part Before After Marine Center Approval Signed Via Drawing No. 61