

10424

10424

Diagram No. 1210-4

NOAA FORM 76-35A

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

DESCRIPTIVE REPORT

Type of Survey ... Side Scan Sonar
Field No. RU-10-3-91
Registry No. H-10424

LOCALITY

State Rhode Island
General Locality .. Block Island Sound
Sublocality Between Point Judith
and Block Island

1991

CHIEF OF PARTY
LCDR N.E. Perugini

LIBRARY & ARCHIVES

DATE June 15, 1993

★ U.S. GOV. PRINTING OFFICE: 1987-756-980

CP-2
13219
13215
13205
13218
12300

13006 N.C.

HYDROGRAPHIC TITLE SHEET

~~FE-36255~~

H-10424

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-10-3-91

State Rhode Island

General locality Block Island Sound

Locality Between Point Judith and Block Island

Scale 1:10,000 (SMOOTH PLOT 1:20,000) Date of survey June 27 - August 6, 1991

Instructions dated March 11, 1991 Project No. OPR-B660-RU-91

Vessel NOAA Ship RUDE (9040)

Chief of party LCDR Nicholas E. Perugini

Surveyed by N. E. Perugini, J.E. Rix, P.L. Schattgen, M.J. Oberlies, J.A. Illg

Soundings taken by echo sounder, HOLOGRAPHIC Pneumatic depth gauge M.A. Sramek

Graphic record scaled by NEP, JER, PLS, MJO, JAI, MAS

Graphic record checked by NEP, JER, PLS, MJO, JAI, MAS

Protracted by NA Automated plot by NA SYNTHETIC 1201 PLOTTER (AMS)

Verification by NA ATLANTIC HYDROGRAPHIC SECTION

Soundings in meters at MLLW

REMARKS: All times recorded in UTC

AWOIS items: 1873, 7480, 7474, 1872, 7415

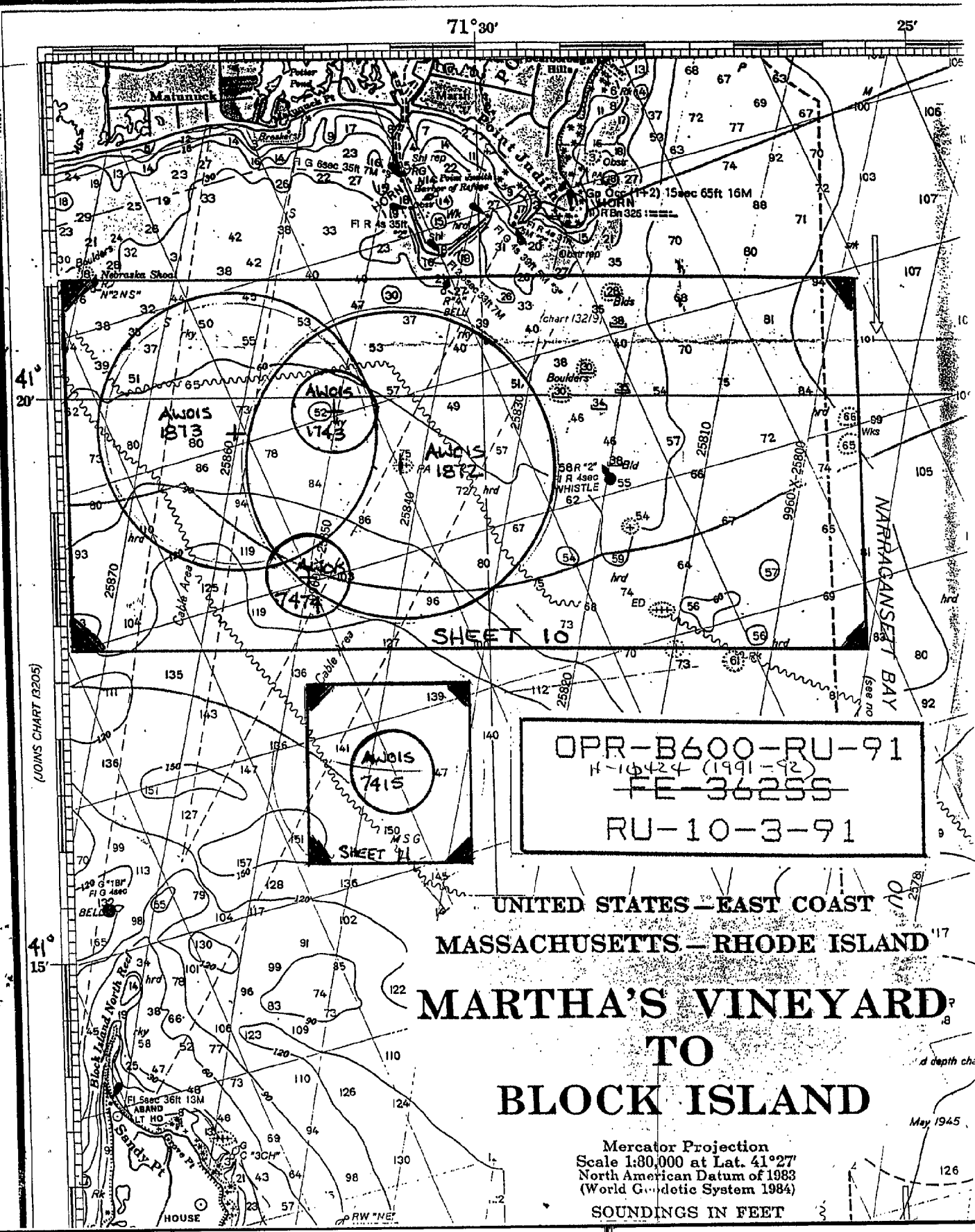
AWOIS and SURF

8/4/93 MCR

NOTES IN THE DESCRIPTIVE REPORT WERE MADE IN RED DURING OFFICE PROCESSING.

SOUNDINGS IN FEET

218. TORAN-C OVER PRINTED



OPR-B600-RU-91
 H-10424 (1991-92)
 FE-36255
 RU-10-3-91

UNITED STATES - EAST COAST
 MASSACHUSETTS - RHODE ISLAND
**MARTHA'S VINEYARD
 TO
 BLOCK ISLAND**

Mercator Projection
 Scale 1:80,000 at Lat. 41°27'
 North American Datum of 1983
 (World Geodetic System 1984)
 SOUNDINGS IN FEET

May 1945

TABLE OF CONTENTS

A. <u>PROJECT</u>	2
B. <u>AREA SURVEYED</u>	3
C. <u>SURVEY VESSELS</u>	3
D. <u>AUTOMATED DATA ACQUISITION AND PROCESSING</u>	4
E. <u>SONAR EQUIPMENT</u>	5
F. <u>SOUNDING EQUIPMENT</u>	7
G. <u>CORRECTIONS TO SOUNDINGS</u>	8
H. <u>CONTROL STATIONS</u>	11
I. <u>HYDROGRAPHIC POSITION CONTROL</u>	12
J. <u>SHORELINE</u>	16
K. <u>CROSSLINES</u>	16
L. <u>JUNCTIONS</u>	16
M. <u>COMPARISON WITH PRIOR SURVEYS</u>	17
N. <u>COMPARISON WITH THE CHART</u>	20
AWOIS 1872	20
AWOIS 1873	22
AWOIS 7474	23
AWOIS 7480	28
AWOIS 7415	33
	35
O. <u>ADEQUACY OF SURVEY</u>	35
P. <u>AIDS TO NAVIGATION</u>	35
Q. <u>STATISTICS</u>	35
R. <u>MISCELLANEOUS</u>	36
S. <u>RECOMMENDATIONS</u>	36
T. <u>REFERRAL TO REPORTS</u>	36

A. PROJECT

A.1 This survey was conducted in accordance with Hydrographic Project Instructions OPR-B660-RU, Southern New England Coast, Connecticut and New York.

A.2 The original date of the instructions is March 11, 1991.

A.3 There were no changes to the project instructions which affect this survey.

A.4 A sheet letter was not specified in the project instructions.

A.5 Project OPR-B660-RU-91 responds to requests from the Northeast Marine Pilots, Inc., of Newport, Rhode Island to disprove or verify and provide least depths for certain wrecks and obstructions in Long Island, Block Island, and Rhode Island Sounds. Also, the U.S. Navy, as well as state and local governments have requested updated bathymetric and hydrographic survey data of this area for use in proposed studies and in the construction of new charts.

B. AREA SURVEYED

B.1 This survey is located between Point Judith, Rhode Island and Block Island North Reef, in Block Island Sound. Depths in the survey area are between 10 and 45 meters (35^{2/3} and 150^{1/8} feet).

The primary traffic in the area is tug-and-barge transports, transiting between Long Island Sound and points to the East (Buzzard's Bay and Boston). Also, there is a significant amount of ferry traffic between the East side of Block Island and Point Judith, Rhode Island. Small pleasure craft transit the area as well.

B.2 Five AWOIS items were investigated during this survey:

1872, 1873, 7415, 7474, 7480,

extending from latitude 41° 16.7' to 41° 19.8' North and from longitude 071° 31.0' to 071° 33.0' West.

B.3 Data acquisition began on June 27, 1991 (DOY 178) and concluded on August 6, 1991 (DOY 218). ADDITIONAL WORK WAS ACCOMPLISHED IN 1992. SEE DESCRIPTIVE REPORT ADDENDUM.

C. SURVEY VESSELS

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

<u>VESSELS</u>	<u>ELECTRONIC DATA PROCESSING NUMBER</u>	<u>PRIMARY FUNCTION</u>
NOAA Ship RUDE (S590)	9040	Hydrography/ Side Scan Operations
RUDE Launch (RU3)	1290	Diving Operations

C.2 No unusual vessel configurations or problems were encountered.

D. AUTOMATED DATA ACQUISITION AND PROCESSING

D.1 Survey data acquisition and processing were accomplished using the HDAPS system with the following software versions:

Program	Version	Dates Used
SURVEY	6.00	Jun 27 - Jul 5
SURVEY	6.03	Jul 5 - Aug 6
DAS_SURV	6.02	Jun 27 - Jul 5
DAS_SURV	6.04	Jul 5 - Aug 6
POSTSUR	5.12	Jun 27 - Jul 5
POSTSUR	5.14	Jul 5 - Aug 6

D.2 Other software includes VELOCITY 1.11 dated March 9, 1990 used to generate sound velocity corrector tables, and MTEN (dated between 1985 and 1986) for horizontal control verification and establishment.

D.3 Nonstandard automated acquisition or processing methods were not employed during this survey.

E. SONAR EQUIPMENT

E.1 Side scan sonar operations were conducted using an EG&G Model 260 slant range corrected side scan sonar recorder and a Model 272-T (single frequency) towfish. All side scan operations were conducted from the RUDE (vessel # 9040). The following list shows equipment serial numbers and corresponding dates used:

Equipment Type	Serial Number	Dates Used
Recorder	0011443	June 27 - July 23
	0012105	July 25 - August 6
Towfish	0011908 (Single Freq)	June 27 - August 6

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

E.3 The 100 Khz frequency was used throughout this survey.

E.4 a) The 100 meter range scale was used for all main scheme side scan coverage, except AWOIS item 7415 which utilized both the 100 and 150 meter range scales. The 50 and 75 meter range scales were used during contact development for a higher definition side scan record.

Line spacing for main scheme coverage was determined using the formula provided in section 7.3.2.1 of the Field Procedures Manual:

$$(LS_{max} = 2RS - 2ECR_{max}).$$

The predicted maximum error circle radius (ECR) did not exceed 15 meters within the survey area, so a maximum line spacing of 170 meters was established for the 100 meter range scale, and 270 meters for the 150 meter range scale (AWOIS 7415).

b) Daily confidence checks were obtained by towing the fish past previously located contacts or noting recognizable bottom characteristics at the edges of the sonar record.

c) Refer to the individual AWOIS investigation procedures (section N) for required and actual side scan coverage.

d) During the entire survey, intermittent interference due to thermoclines was encountered. This interference did not substantially degrade the return for extended time periods, and the RUDE is confident that the 30-meter overlap ensured complete side scan coverage for disproved items.

e) The towfish was deployed from the stern during the entire survey.

E.5 Refer to section M.5 for contact selection, investigation, and development procedures.

E.6 Overlap was checked both on-line using the real-time plot and during processing with the edited swath plot. All holidays were filled in by running additional side scan sonar lines.

F. SOUNDING EQUIPMENT

F.1 All hydrographic soundings were acquired using a Raytheon 6000N digital survey fathometer (DSF). One DSF 6000N was used during the entire survey: S/N A106N.

F.2 All diver-determined least depths were measured with a pneumatic depth gauge. RUDE is equipped with two 3-D Instruments Inc. Precision Direct Drive Depth Gauges:

- | | |
|--------------------------------|-------------|
| 1) 0- 70 fsw (feet salt water) | S/N 142697 |
| 2) 0-140 fsw | S/N 8606822 |

The 0-70 fsw gauge was used for all dive investigations during this survey since none of the least depths exceeded 21 meters (approximately 70 feet).

NOTE: ^{TWO} No diver determined least depths were used as final least depths. ~~SIX~~ Five dives were made during this survey: four on developments, one on AWOIS 7480. Echosounder least depths proved shoaler or equal to all least depths by pneumatic depth gauge.

NOTE: ONE DIVE MADE ON DEVELOPMENT #10 ON ID 192 WAS NOT COUNTED AND IS NOT INCLUDED IN THE DIVE REPORTS. SEE SURVEY RECORDS FOR DAY 192.

F.3 Refer to section G.4 for information on pneumatic depth gauge system checks.

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

G. CORRECTIONS TO SOUNDINGS

G.1 a) The velocity of sound through water was determined using a Digibar Sound Velocity Probe (S/N 169), made by Odom. Data Quality Assurance Tests were conducted before each velocity cast to ensure the meter was within tolerance.

All data were processed using Velocity 1.11 software. The computed velocity correctors were entered into the HDAPS sound velocity tables and applied on-line to both high and low frequency soundings. Sound velocity correctors applied to this survey were obtained on the following dates:

Cast Number	DOY	Latitude	Longitude	HDAPS Table #	Applied to Days
8	170	41° 18.6' N	71° 24.8' W	8	178-179
9	190	41° 18.1' N	71° 32.9' W	9	182-197
10	203	41° 17.2' N	71° 31.0' W	10	198-206
11	218	41° 16.3' N	71° 16.7' W	11	218

b) There was no variation in the DSF-6000N instrument initial.

c) No instrument correctors to the DSF-6000N were required.

d) Two dual lead line comparisons with the DSF-6000N were made:

April 25, 1991 at 41° 35.6'N 71° 21.3'W (25 ft depths)
July 22, 1991 at 41° 20.9'N 71° 29.1'W (35 ft depths)

The greatest variation between leadline and DSF soundings was less than 0.2 meters for both comparisons. Considering the ship's motion and the scope in the leadline from current, this is excellent agreement and provides an adequate check that the echosounder was functioning properly. Also, comparisons between diver determined least depth by pneumatic depth gauge and DSF soundings over items (with prominent features) were normally within 0.5 meters after reduction. For these reasons, correctors from direct comparison were determined to be zero.

e) All sounding correctors were applied to both the narrow (100 kHz) and wide (24 kHz) beams.

f) During the winter 1988 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 height above the waterline was determined for this point. The ship's static draft was thereby calculated to be exactly 2.26 meters (7.4 feet). This draft value was applied to the sounding data via the HDAPS offset table.

g) Settlement and squat correctors for the RUDE were determined on the Elizabeth River, Norfolk, Virginia on March 13, 1991. 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. Both runs were averaged and applied to soundings through the HDAPS offset table.

However, the actual corrector values derived from these data were computed incorrectly and consequently used for this survey. This problem was resolved by using the HDAPS program "REAPPLY". See section G.2 for a detailed explanation of this situation.

h) Heave data were acquired by a Datawell heave, roll and pitch sensor (S/N 19128-C), and were applied to soundings in real time. Only the heave corrections were applied to the plotted soundings.

G.2 The HDAPS program "REAPPLY" was used to reapply corrector tables to soundings. An evaluation of the most appropriate tables for each day's data was made, and compared to the tables actually used. New tables were then applied to those days which differed.

As stated in section G.1.g, settlement and squat values were computed incorrectly and used in the HDAPS offset table during this survey. The "REAPPLY" program was used to correct this problem. Offset table #3 was changed to show the adjusted settlement and squat correctors, and then the table was reapplied to all soundings acquired during this survey.

G.3 As stated in paragraph G.2, corrector tables were reapplied to soundings during processing, so that the most relevant correctors were applied to plotted soundings. The corrected offset table #3 was reapplied to all soundings.

G.4 The ship's shallow water (0-70 fsw) and deep water (0-140 fsw) pneumatic depth gauges were calibrated by Instruments East, Inc. of Norfolk, VA on January 31, 1991. Corrector data from the calibrations were plotted graphically, but were not applied to pneumatic depths because they were less than 0.1 meters (see plots in Separate IV).*

Periodic system checks were performed on the gauges as illustrated HSG 55. Rarely did the gauges check when substantial currents were present. Since the currents in the survey area were fairly strong and seemingly constant, it became practice to perform system checks on the gauges during times of ideal conditions. Therefore, days of use do not correspond to days on which the checks were performed. Since the shallow water gauge (0-70 fsw) measured all dive least depths, only checks performed on that gauge are included in Separate IV.*

* DATA FILED WITH FIELD RECORDS.

G.5 Generally, sea conditions greater than one meter affected the fathogram, creating a trace of constant peaks and deeps. But the application of heave correctors to raw echo soundings appeared to accurately represent true depths.

G.6 a) The tidal datum for this project is mean lower low water. The operating tide station at Newport, Rhode Island (845-2660) served as direct control for datum determination. Station (845-5083), located at Point Judith, RI served as reference station for predicted tides. Data for Newport tides were provided on floppy magnetic disk before the start of the project.

b) The height and time correctors listed below were taken from Table 2 of the East Coast of North and South America Tide Predictions, and applied to the digital tide data using the HDAPS software:

NO.	PLACE	TIME		HEIGHT	
		High water	Low water	High water	Low water
1191	Point Judith Harbor of Refuge	-10 min	+17 min	* 0.88	* 0.86

Tidal correctors were applied on-line using the HDAPS predicted tide tables 6, 7, and 8.

c) Zoning for this project is consistent with the project instructions.

A request for smooth tides was mailed on October 2, 1991.
APPROVED TIDES WERE APPLIED TO PRESENT SURVEY DURING OFFICE PROCESSING.
See Separate IV for all data records concerning corrections to soundings. DATA FILED WITH FIELD RECORDS.

H. CONTROL STATIONS SEE ALSO SECTION 2.9. OF THE EVALUATION REPORT.

H.1 The horizontal datum for this project is the North American Datum of 1983 (NAD 83).

H.2 The list of Horizontal Control Stations is located in Appendix III.

H.3 Newly established horizontal control stations were surveyed using standard NGS approved surveying techniques; primarily the Geodetic Direct and Resection procedures. These data were then entered into the NGS software "MTEN", which computed the Latitude and Longitude of the new station using the NAD 83 ellipsoid.

Existing stations were verified by comparing observed horizontal angles and distances (to known stations) with angles and distances provided by inverse computations using "MTEN".

All horizontal control stations used during this survey are Third-order, Class I.

H.4 All horizontal control work was conducted within the "Providence" NGS Quadrant.

H.5 Refer to the Horizontal Control Report (submitted to N/CG 233 under separate cover) for specific procedures and sites surveyed by the RUDE.

H.6 There were no photogrammetric problems, positioning problems or unconventional survey methods pertinent to this survey.

I. HYDROGRAPHIC POSITION CONTROL SEE ALSO SECTION 2.9. OF THE EVALUATION REPORT.

I.1 Falcon Mini-Ranger equipment was the primary positioning system during this survey. A single ARGO range was used with three Falcon ranges during the first 3 days of data acquisition (DOY's 178-182). After this point, three and four LOP Falcon was used exclusively for positioning. The following table illustrates when the positioning systems were used:

ARGO/Falcon (Hybrid Mode -3 Falcon, 1 ARGO)	DOY 178-182 (to fix 194)
Falcon (4 LOP)	DOY 183-218

I.2 At no time during this survey did the maximum residual consistently exceed 5 meters (0.5 mm at the survey scale), nor did the 95% confidence error circle radius consistently exceed 15 meters (1.5 mm at the survey scale).

I.3 Control Equipment:

ARGO:

Cubic Western Data ARGO DM54.

Serial Numbers:

Shipboard System:

RPU R-1083665

ALU A-047852

CDU C-1083312

Warren Point Station (201):

RPU R-0980211

ALU A-097895

Block Island Station (202):

RPU R-0682571

ALU A-039127

Mini-Ranger:

Falcon 484 by Motorola Inc.

Serial Numbers:

RPU F-0246

R/T F-3409

R/S: E-2969 (code 6)

F-3241 (code 4)

E-2907 (code 3)

E-2926 (code 8)

F-3244 (code 5)

I.4 Calibration descriptions for both positioning systems follow:

ARGO/Falcon (Hybrid):

The "secondary by primary" calibration procedure was used to calibrate the ARGO system through the HDAPS calibration screen. The computer calculated a position using Mini-Ranger ranges

(primary system), and correctors were simultaneously displayed for each of the ARGO LOP's (secondary system). These correctors were then manually applied to the raw ARGO rates by using the delta function. This procedure was iterated until each ARGO rate had a residual of zero. Refer to section 3.3.1.2 of the Field Procedures Manual for a more detailed explanation of this procedure.

Secondary by primary calibrations were conducted at the beginning of each day the ARGO system was utilized:

DOY's 178, 179, 182.

Refer to Separate III for ARGO calibration data.

Falcon Mini-Ranger:

As stated in section 3.1.3.3 of the Field Procedures Manual, a continuous critical system check is obtained "when data are acquired with three or more LOP's and ECR and maximum residual criteria are being met as required in section 3.1.3.1" (of the same manual). RUDE routinely conducted survey operations using at least three LOP's, and all other positioning criteria were met as required (see section I.2).

A pre-project baseline calibration of the Mini-Ranger system was conducted at the Atlantic Marine Center on March 6, 1991. Two baseline calibrations were conducted in Bristol, RI on June 2 and July 14, 1991 and one in Newport, RI on October 19, 1991. See the Electronic Control Report submitted under separate cover for data records of the calibrations.

I.5 Only the Falcon system required calibration data to be applied to raw ranges. The range corrector and minimum acceptable signal strength (MASS) for each Mini-Ranger Reference Station were entered into the HDAPS system using the Pre-Survey Computed-Observed (C-O) table. These tables provided the mechanism by which HDAPS automatically applies the proper range corrector and removes from the position computation those LOP's with signal strengths below MASS.

Baseline correctors were incorrectly applied to Falcon ranges when C-O table #3 was not updated:

First: when code 5 (on station 115) was not entered into the table before use (DOY 182-184)

Second: after DOY 188 (the third baseline calibration), during a four day period (DOY 190-193) the "old" correctors were applied.

The overall effect of this condition on vessel positioning is minimal, since resulting differences never exceeded 5 meters (see following tabulations). Because the effect was less than 0.5 mm at the scale of the survey, no positions were recomputed.

The following table illustrates the problem data. All corrector problems were encountered on HDAPS sheet 10, and affect AWOIS items 1872 and 1873 only:

DOY	Codes with Erroneous Correctors	Activity/Remarks
182	5	Main scheme SS coverage (1st 100%)
183	5	Main scheme SS coverage (1st 100%)
184	5	Main scheme SS coverage (1st 100%)
190	4,5,6,8	Main scheme SS coverage (1st and 2nd 100%)
191	4,5,6,8	Main scheme SS coverage (2nd 100%)
192	4,5,6,8	Dive ops and Development work
193	4,5,6,8	SS Holiday Coverage

To determine the magnitude of positioning error for these days, the HDAPS utility "PREDICT ECR'S" was utilized. 14 positions were entered separately using the "Go to a Point" function key, and the difference between range corrector values was entered using the "Select Bias" function key. The program computed a second position using the bias values, and displayed the differences between actual and biased positions. The following table shows the bias value computations, positions used, and differences in position for the tested positions:

Bias Computation:

Station Number	Code	Applied Corrector (meters)	Actual Corrector (meters)	Difference (meters)	Bias Values * (meters)
<u>(DOY 182-184)</u>					
115	5	0.0	-2.31	-2.31	-3
<u>(DOY 190-193)</u>					
111	4	-0.20	-3.94	-3.74	-4
113	6	+0.46	-3.50	-3.96	-4
114	8	-0.56	-3.36	-2.80	-3
115	5	-2.31	-4.18	-1.87	-2

* The Predict ECR's program accepts whole numbers only, so the next larger integers were used.

Position Difference:

(Code 5 Incorrect)			(Codes 4,5,6,8 Incorrect)		
DOY	Fix Number	Delta Position (meters)	DOY	Fix Number	Delta Position (meters)
182	197	3.4	190	470	2.6
	233	2.7		555	1.5
183	272	3.0	191	652	2.1
	326	1.5		820	3.5
184	394	1.5	192	887	4.2
	448	<u>1.2</u>		941	3.2
Average = 2.2 m			193	1010	4.0
				1052	<u>3.6</u>
			Average = 3.1 m		

As shown above, position errors caused by bad corrector values never exceeded 5 meters, and averaged even less. Based on the minimal differences shown here, positions were not recomputed with updated corrector values.

I.6 a) There were no unusual methods of operating or calibrating electronic positioning equipment.

b) There were no occurrences of equipment malfunctions or substandard operation.

c) There were no unusual atmospheric conditions that may have affected data quality.

d) There were no occurrences of weak signals or poor geometric configurations of a duration to significantly compromise data quality.

e) See section I.5 for problems with the C-0 table.

f) Antenna positions were corrected for offset and layback, and referenced to the position of the DSF 6000N transducer. These correctors were entered in the HDAPS Offset table, and applied during acquisition in the positioning algorithm. Refer to Separate III for a copy of offset table 3, which was the only table used during this survey.*

g) Offset and layback distances for the A-frame (tow point) were entered in the HDAPS Offset table and applied on-line. 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. Refer to Separate III for offset table number 3.*

* DATA FILED WITH FIELD RECORDS.

J. SHORELINE SEE ALSO SECTION 2.D. OF THE EVALUATION REPORT.

No field sheets encompassed shoreline.

K. CROSSLINES SEE ALSO SECTION 3.A. OF THE EVALUATION REPORT.

K.1 The percentage of cross-lines to main scheme lines is approximately 50 percent, as each side scan area was covered completely in both the North-South and East-West directions.

K.2 The agreement between mainscheme and crosslines is very good, generally less than 0.2 meters (0.5 feet), and rarely exceeding 0.5 meters (1.5 feet).

K.3 No significant differences between mainscheme and crosslines were noted.

K.4 The same sounding equipment was used to run both the mainscheme and crosslines.

L. JUNCTIONS SEE ALSO SECTION 5. OF THE EVALUATION REPORT.

L.1 The following survey conducted by the RUDE junctions with this survey:

Registry #:	H-10378
Scale:	1:10,000
Date:	1991
Location:	South of Point Judith, East of this survey.

L.2 Agreement at junctions between this survey and H-10378 was very good, generally within 0.5 meters. See section N for use of side scan sonar data from survey H-10378 for AWOIS item 1872.

L.3 No significant differences were noted.

L.4 No adjustments to soundings from survey H-10378 are recommended.

M. COMPARISON WITH PRIOR SURVEYS SEE SECTIONS 6.9. AND 6.10 OF THE EVALUATION REPORT.

M.1 The following prior surveys are applicable to this survey:

Survey Registry #	Date	Scale
H-8615	1963	1:10,000
H-7640	1948	1:10,000
H-6443	1939	1:40,000

M.2 AWOIS investigation information can be found in section N.

M.3 One overlay was generated at a 1:40,000 scale (NAD 83) to compare survey depths to both prior survey and charted depths. This overlay was the primary tool utilized for comparisons with Survey H-6443 and chart 13215 (1:40,000). Comparisons between prior surveys H-8615 and H-7640 and the current survey were not made, since very few soundings were acquired within the bounds of the prior surveys.

The overall quality of agreement across the survey area varies substantially: not more than 1.2 meters (4 feet), and normally less than 0.6 meters (2 feet).

M.4 The majority of soundings acquired during this survey were deeper than depths from prior surveys and chart 13215. This difference is most likely a combination of factors, such as the use of predicted tides for survey soundings and conservative selection of charted depths from prior surveys. Also, the differences seem to be greater approaching Point Judith (and shore). After the application of approved tides, some of the discrepancies should be resolved.

M.5 A comprehensive examination of significant features from prior surveys was not undertaken. Rather, all side scan sonar contacts identified during the 200% coverage were evaluated for further development, based on procedures outlined below.

Refer to Separate V for page-sized development plots.

No significant contacts were discovered during the search for the Southern AWOIS item (7415). CONCUR

The excessive number of contacts identified within the areas of the four Northern items (AWOIS items 1872, 1873, 7474, 7480) required special procedures in determining significance for further development, both on-line and during processing. Guidelines provided in the project instructions (section 6.13.1) addressed this problem with the following requirements:

- In depths of water less than or equal to 20 meters, contacts with computed target heights of at least 1 meter should be considered for further investigation

- In depths of water greater than 20 meters, contacts with computed target heights rising above the bottom at least 10 percent of the depth should be considered for further investigation.
- When significant contacts are closer than 3.3 millimeters apart using the largest scale chart of the area, investigate the contact with the shoalest apparent depth (this equates to 132 meters for the 1:40,000 scale chart)
- It may not be cost effective to investigate all contacts. In this case, the contacts with the highest computed target heights should be selected for further investigation.

Following these guidelines, 180 significant side scan sonar contacts were logged during main scheme side scan sonar coverage. The investigation of all contacts was impractical, so the following criteria were established for determining which contacts were most significant:

1. Develop contacts which fall in the general vicinity of the reported positions of AWOIS items.
2. Develop features which have clearly identifiable "hits" on both the 100 percent and 200 percent coverage. Features with computed heights over 3 meters were given priority.
3. Generally, develop contacts with higher heights off the bottom in shallower water.
4. Give more credence to contact heights which were recorded on the mid-range side scan sonar trace over those which were located close to the centerline of the trace.

The area was covered by 200 percent side scan and all contacts were logged either on-line or during processing. These contacts were then plotted, and a determination was made using the above criteria as to which contacts warranted further development. The following is the basic development procedure:

- First, 50 meter side scan passes were run for a more detailed trace and a more accurate height computation
Note: this phase of the development was not utilized when original side scan position was adequate
- Then, echosounder development, typically with 10 meter line spacing to determine the extent of the feature
- And, diver investigation and least depth by pneumatic depth gage if the echosounder development was inconclusive, or the feature was very prominent

Using this system, 13 features were developed (numbered 1 to 13). A summary of the developments follows:

Dev #	LD (M)	Position No.	Least Depth GP	50-M SS Dev	Echo-Snd Dev	Dive Dev	Dive Descrip
1	16.4 ⁴ 16.2	1605.3 1597.1	41° 19' 39.36 ⁸ " N 71° 29' 32.25" W	N	Y	N	
2	14.4 12.8	11.5 1607.3	41° 19' 52.14 ^{φ1} " N 71° 29' 40.33 ⁴⁵ " W	N	Y	N	
3	13.9 14.0	1653.5 ⁴	41° 19' 46.75 ⁷ " N 71° 29' 14.76" W	Y	Y	N	
4	15.6 ⁴	1659.2	41° 19' 26.06 ⁷ " N 71° 29' 12.62 ³ " W	Y	Y	N	
5	14.5	1624.2	No Least Depth Item insignificant				
6	17.4	1679	41° 19' 14.70 ² " N 71° 29' 51.76" W	Y	Y	N	
7	19.4 ⁴ 19.7	1699	41° 18' 34.36 ⁸ " N 71° 29' 57.39 ⁸⁴ " W	Y	Y	Y	Boulder
8	12.9 13.3	1702	41° 20' 19.05 ⁶ " N 71° 30' 11.75 ⁶ " W	N	Y	N	
9	12.8	601 900	41° 20' 19.21 ³ " N 71° 30' 39.21 ⁴ " W	Y	Y	Y	Boulder
10	10.4 ⁴ 10.1	604 904.1	41° 20' 07.61 ⁸⁴ " N 71° 30' 34.93 ^{35.06} " W	Y	Y	Y	Boulder
11	12.8 ⁷ 12.8	1672.φ 1638.2	41° 20' 22.83 ⁹ " N 71° 33' 23.08 ^{3φ 27.97} " W	N	Y	N	
12	21.1	1721	41° 19' 52.66 ⁸ " N 71° 33' 23.08" W	N	Y	N	
13	8.φ 7.9	603 1551.3	41° 20' 44.78 ⁸¹ " N 71° 30' 32.37 ⁹ " W	Y	Y	Y	Boulder

NOTE: Listed least depths for developments 7, 9, 10, and 13 are from echosounder development. Dive least depths (by pneumatic depth gauge) were deeper or equal to echosounder least depths.

M.6 As stated in section M.5 above, individual prior survey features were not investigated. However, the RUDE feels the above list represents the most significant features located within the survey area, and recommends that they supersede charted depths from prior surveys.

M.7 The RUDE is aware of no authoritative non-NOS surveys of the area covered during this survey.

N. COMPARISON WITH THE CHART SEE ALSO SECTION 7.9. OF THE EVALUATION REPORT.

This project consists of five AWOIS items: 1872, 1873, 7415, 7474, and 7480. Items 7474 and 7480 were located, items 1872, 1873, and 7415 were disproved.

↳ SEE 1992 WORK ON THIS AWOIS ITEM SECTION N. OF THE ADDENDUM.
Because of the large overlapping search radii of AWOIS 1872 and 1873 (2500 and 2000 meters respectively), these items were placed on one HDAPS sheet (number 10). AWOIS items 7474 and 7480 (whose search areas are both within the combined area of items 1872 and 1873) were also placed on HDAPS sheet 10.

Refer to section M.3 for comparisons with prior survey depths (sections N.11 and N.12).

AWOIS 1872

Sheet 10

N.1 Item Description

The "Skimmer I", a 48 foot fishing vessel reported sunk in 80 feet of water in 1973, charted as a dangerous wreck, PA.

N.2 Item Location

Geographic position provided was: 41° 19' 24.36" N
71° 30' 58.20" W

N.3 Source of Item

Local Notice to Mariners number 48 in 1973.

N.4 Largest Scale Chart Affected

Chart 13215, scale 1:40,000, 12th edition, dated June 23, 1990.

N.5 Investigation Procedures

Survey requirements called for 200% side scan sonar coverage of a 2500-meter radius area, echosounder development, and diver investigation if found.

This survey junctions with the prior RUDE survey H-10378, on which side scan coverage had been completed just prior to the search for this item. No evidence of the wreck was seen during that survey, so the area of overlap (Southeast section of AWOIS 1872) was not searched again during this survey. Refer to side scan coverage from survey H-10378 for the area not covered during this survey.

N.6 Investigation Results

This item has been disproved based on 200 percent side scan coverage over the search area. Refer to section M.5 for contact investigation procedures. CONCOR

N.7 Explanation for Position Difference

Not applicable.

N.8 Least Depth Information

Not applicable.

N.9 Charting Recommendation

Delete the currently charted "dangerous wreck (PA)" symbol. *CONCUR*

N.10 Danger to Navigation Report

Not applicable.

AWOIS 1873 SEE ALSO SECTION N. OF THE ADDENDUM
FOR INFORMATION ON THIS ITEM.

Sheet 10

N.1 Item Description

An uncharted wreck (barge) reported sunk in 1927 in 69 feet of water. Originally marked by a buoy with 8 feet exposed.

N.2 Item Location

Geographic position provided was: 41° 19' 44.36" N
71° 32' 48.20" W

N.3 Source of Item

Notice to Mariners number 48 and 51 in 1927.

N.4 Largest Scale Chart Affected

Chart 13215, scale 1:40,000, 12th edition, dated June 23, 1990.

N.5 Investigation Procedures

Survey requirements called for 200% side scan sonar coverage of a 2000-meter radius area, echosounder development, and diver investigation if found. The entire area was covered in the North-south and East-west directions.

N.6 Investigation Results

This item has been disproved based on 200 percent side scan coverage over the search area. Refer to section M.5 for contact investigation procedures. → DO NOT CONCUR - SEE 1992 WORK.

N.7 Explanation for Position Difference

Not applicable.

N.8 Least Depth Information

Not applicable.

N.9 Charting Recommendation

Take no action since the item is not currently charted. DO NOT CONCUR
SEE 1992 WORK.

N.10 Danger to Navigation Report

Not applicable.

N.1 Item Description

An obstruction, reported as a coal pile with timbers.

N.2 Item Location

Geographic position provided was: 41° 18' 25.00" N
 71° 32' 04.00" W

N.3 Source of Item

Reported by Mr. Tim Coleman and published in Notice to Mariners number 41 in 1989. Loran-C rates were also provided by Mr. Coleman and are the source of the charted position.

N.4 Largest Scale Chart Affected

Chart 13215, scale 1:40,000, 12th edition, dated June 23, 1990.

N.5 Investigation Procedures

Survey requirements called for 200% side scan sonar coverage of a 700-meter radius area about the Loran-C position, echosounder development, and diver investigation if found. A DP was taken while the ship held station at the Loran-C coordinates, and a 700 meter radius circle was scribed about the position.

The item was located by side scan sonar and thoroughly developed by echosounder. A bottom sample was taken while the ship held position directly over the pile, to verify the content of the feature. This feature was not investigated by divers because it had no defined peak and posed no danger to navigation.

N.6 Investigation Results

The bottom sample obtained from the feature positively identified it as the coal pile reported by Mr. Coleman. A DP was recorded over the position, and the least depth was determined from the echosounder development. That information is shown below:

FIX NUMBER- 1342.2

LATITUDE- 41° ^{18 28.19} ~~19' 51.17"~~ N

LONGITUDE- 71° 32' ⁵ ~~11.94"~~ W

LEAST DEPTH (MLLW)- 31.0¹ meters (102 Ft)
 PLOTTED: 31.0 m (102 FT)

N.7 Explanation for Position Difference

This feature was located approximately 175 meters from the listed position. This difference is minimal, considering the assigned

position was scaled from Loran-C rates on the 1:80,000 scale chart.

N.8 Least Depth Information

See section ^NM.6.

N.9 Charting Recommendation

Delete the presently charted obstruction symbol, ^{CONCUR} and ~~chart the echosounder least depth listed above (after application of approved tides)~~, AND CHART A NON-DANGEROUS SUBMERGED OBSTRUCTION WITH A KNOWN DEPTH OF 31 m (101 FT), 31 OBSTR, IN PRESENT SURVEY LOCATION.

N.10 Danger to Navigation Report

This item was not reported as a danger to navigation.

N.1 Item Description

An unknown wreck, locally referred to as the "Brass Wreck", charted as a dangerous wreck with depth unknown, PA.

N.2 Item Location

Geographic position provided was: 41° 19' 50.36" N
 71° 31' 45.20" W

N.3 Source of Item

Reported by Mr. Tim Coleman as the "Brass Wreck". Loran-C rates provided by Mr. Coleman are the source of the charted position.

N.4 Largest Scale Chart Affected

Chart 13215, scale 1:40,000, 12th edition, dated June 23, 1990.

N.5 Investigation Procedures

Survey requirements called for 200% side scan sonar coverage of a 700-meter radius area about the Loran-C position, echosounder development, and diver investigation if found.

The wreck was located and investigated by divers, who determined least depth by pneumatic depth gauge.

N.6 Investigation Results

The wreck was located using side scan sonar and investigated by divers on 19 July, 1991 for identification and least depth determination. Least depth information for the item is as follows:

FIX NUMBER-	1418. ² ₃
LATITUDE-	41° 19' 51. ⁹ ₁₇ " N
LONGITUDE-	71° 31' 54.84" W
LEAST DEPTH (MLLW)-	19. ⁵ ₆ meters (64FT)

NOTE: This least depth information is from echosounder development, ~~but is equal to the diver-determined least depth.~~
AND IS SHOALER THAN

N.7 Explanation for Position Difference

This wreck was located approximately 200 meters from the listed position. This difference is minimal, considering the assigned position was scaled from Loran-C rates on the 1:80,000 scale chart.

N.8 Least Depth Information

See section "N.6".

N.9 Charting Recommendation

Delete the currently charted symbol (dangerous wreck, depth unknown, PA), and chart symbol ~~29~~²⁶ from Chart Number 1: "Sunken wreck, ~~not~~ dangerous to surface navigation" at the position listed above, with least depth from above (after application of approved tides). CONCUR

CHART AS A DANGEROUS SUNKEN WRECK WITH A KNOWN DEPTH OF 195m (645 FT)
N.10 Danger to Navigation Report 195WK, AND A DANGER CURVE IN PRESENT

SURVEY LOCATION,
This item was not reported as a danger to navigation.

N.1 Item Description

An uncharted coal pile.

N.2 Item Location

Geographic position provided was: 41° 16' 42.37" N
71° 31' 04.19" W

N.3 Source of Item

Reported by Mr. Richard Taracka as a coal pile, presumably the same coal pile reported by Mr. Coleman (AWOIS 7474). Loran-C rates provided by Mr. Taracka are the source of the charted position.

N.4 Largest Scale Chart Affected

Chart 13215, scale 1:40,000, 12th edition, dated June 23, 1990.

N.5 Investigation Procedures

Survey requirements called for 200% side scan sonar coverage of a 700-meter radius area about the Loran-C position, echosounder development, and diver investigation if found.

Two hundred percent side scan sonar coverage using the 150 and 100 meter range scales was completed on this item. There was no echosounder development or diver investigation since the item was not found, and no significant contacts were discovered.

N.6 Investigation Results

This item has been disproved. No significant contacts that resembled a coal pile were seen on the side scan record.

Note: it seems Mr. Coleman and Mr. Taracka were reporting the same coal pile, but differences between their individual Loran-C receivers (from which the GP was scaled) created a position difference (Taracka's position 2.8 nautical miles from Coleman's, bearing 160°). This same relationship was seen during survey FE-363SS with AWOIS item 1856 (the wreck "Annapolis"), between the located position (near the Loran-C rates provided by Mr. Coleman) and the position Mr. Taracka reported. The RUDE's Loran-C receiver seems to agree with Mr. Coleman's receiver.

N.7 Explanation for Position Difference

Not applicable since the item was not found, but refer to section N.6 above for the RUDE's explanation of the two different positions (and AWOIS numbers) for this item.

N.8 Least Depth Information

Not applicable.

N.9 Charting Recommendation

Take no action, since this item is not charted and seems to be the same item as AWOIS 7474. *CONCUR*

N.10 Danger to Navigation Report

Not applicable.

O. ADEQUACY OF SURVEY SEE ALSO SECTION 9. OF THE EVALUATION REPORT.

O.1 All AWOIS items investigated during this survey have been resolved, IN COMBINATION WITH ADDITIONAL WORK OF 1992. CONCUR

O.2 There are no parts of this survey that are considered incomplete or substandard, IN COMBINATION WITH ADDITIONAL WORK OF 1992. CONCUR

P. AIDS TO NAVIGATION SEE ALSO SECTION 7. b. OF THE EVALUATION REPORT.

P.1 The RUDE conducted no correspondence with the U.S. Coast Guard regarding floating aids to navigation.

P.2 No aids to navigation were investigated for positioning during this survey.

P.3 No other aids were located during the survey.

P.4 No bridges, overhead cables or overhead pipelines are located within the survey area.

P.5 Several charted cable lanes and cable areas cross the survey area, running primarily between Point Judith and Block Island, Rhode Island. However, no cables were detected during survey operations, and are assumed buried.

P.6 No ferry terminals are located within the survey area.

Q. STATISTICS

Q.1	a) Number of positions	1716
	b) Lineal nautical miles:	
	side scan sonar	204
	sounding lines	4
Q.2	a) square nautical miles of hydrography	11
	b) days of production	18
	c) detached positions	14
	d) bottom samples	0
	e) tide stations	1
	f) current stations	0
	g) velocity casts	4
	h) magnetic stations	0
	i) XBT drops	0

R. MISCELLANEOUS

R.1 During this survey the Differential Global Positioning System (DGPS) was used in a test mode, where positions were logged simultaneously with Falcon Mini-Ranger data. DGPS positions were compared with the Falcon positions in a post survey mode. Comparisons made during this survey proved that the accuracy of DGPS positioning meets requirements for a 1:10,000 scale survey. DGPS was later used as the primary positioning system for a basic hydrographic survey, based on the test results of this survey.

R.2 Bottom samples were not required for this project.

S. RECOMMENDATIONS *SEE ALSO SECTION 9. OF THE EVALUATION REPORT,*

S.1 No survey inadequacies have been noted and no further field work is recommended for this area.

S.2 The RUDE is aware of no construction or dredging that will affect results of this survey.

S.3 Provided that the application of approved tides will not substantially alter survey data, no further investigation of the survey area is recommended. However, after the application of approved tides, another comparison should be made between current depths and prior survey depths to determine the adequacy of charted depths. *ADDITIONAL WORK WAS ACCOMPLISHED IN 1992, SEE ADDENDUM.*

Also, depths by pneumatic depth gauge should be checked with echosounder least depths, and the shoaler should be charted. ✓

All soundings acquired during this survey should supersede previously charted depths.

T. REFERRAL TO REPORTS

RUDE Electronic Control Report - 1991 Field Season
(submitted to N/CG244 concurrent with this survey)

Horizontal Control Report - 1991 Field Season
(submitted to N/CG23322)

All ancillary data will be submitted at the conclusion of project OPR-B660-RU-92, including the following:

- Currents (Circulation Surveys)
- Magnetic Data
- LORAN-C Chart Verification
- Coast Pilot Review
- User Evaluation Survey
- Chart Inspection Reports

APPENDIX VII. APPROVAL SHEET

LETTER OF APPROVAL

REGISTRY NO. FE-36288-11-10424

Field operations contributing to the accomplishment of this survey were conducted under my supervision with frequent personal checks of progress and adequacy. This report and field sheets have been closely reviewed and are considered complete and adequate for charting.

Nicholas E. Perugini

Nicholas E. Perugini, LCDR NOAA
Commanding Officer
NOAA Ship RUDE

HYDROGRAPHIC TITLE SHEET

H-10424
(Addendum to)

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-10-3-91

State Rhode Island

General locality Block Island Sound

Locality Between Point Judith and Block Island

Scale 1:20,000 - PLOTTED Date of survey June 11, 1992

Instructions dated February 12, 1992 Project No. OPR-B660-RU-92

Vessel NOAA Ship Rude S590 (9040)

Chief of party LCDR N. E. Perugini

Surveyed by P.L. Schattgen, J.A. Illig, R.T. Brennan, D.E. Williams

Soundings taken by echo sounder, hand lead, pole

Graphic record scaled by NEP, PLS, JAI, RTB, DEW

Graphic record checked by NEP, PLS, JAI, RTB, DEW

Protracted by N/A Automated plot by N/A XYNETICS (2 dpl) PLOTTED (AHS)

Verification by N/A ATLANTIC HYDROGRAPHIC SECTION Personnel

Soundings in meters at MLLW

REMARKS: All times are in Coordinated Universal Time

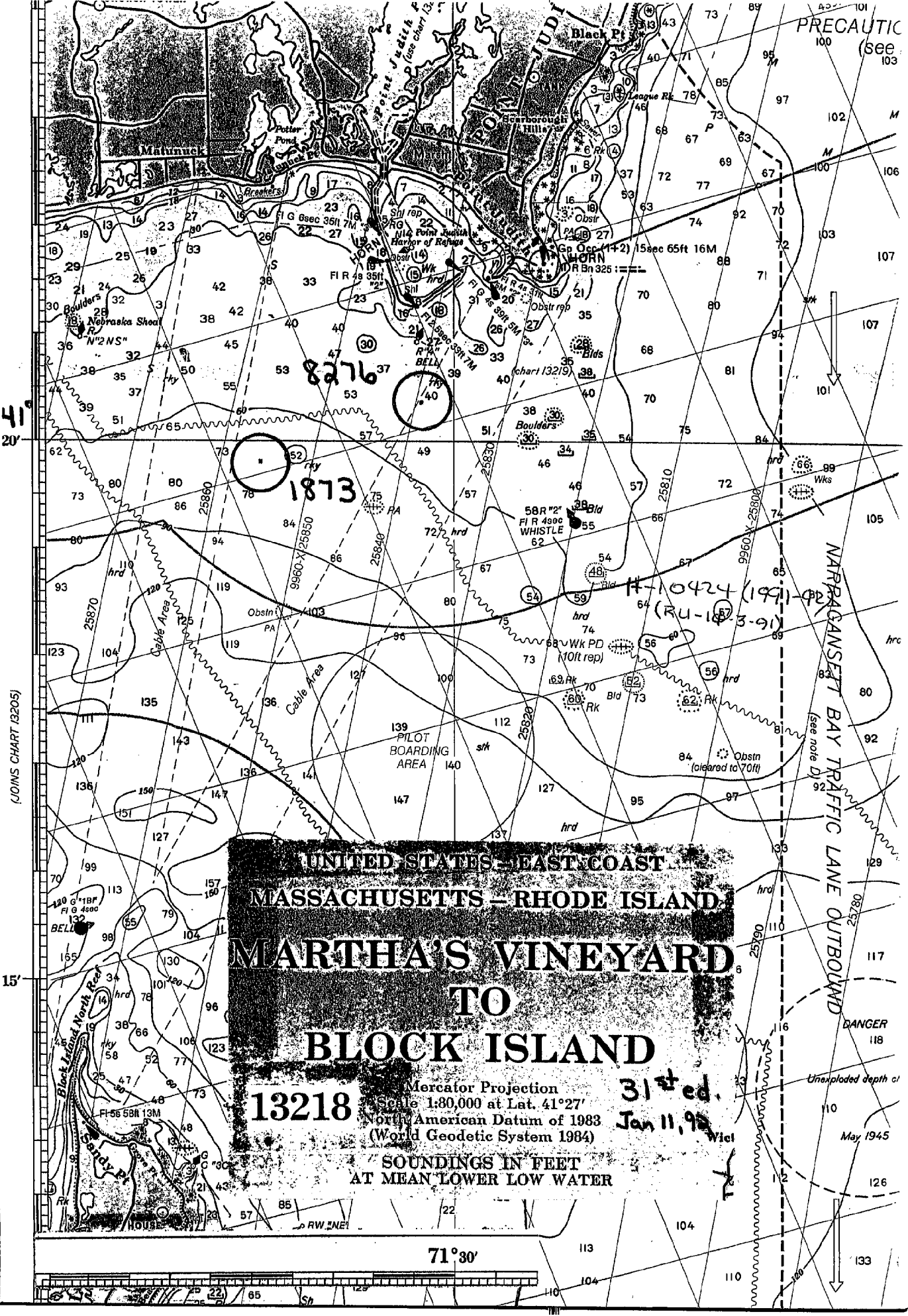
This survey addresses AWOIS 1873 and 8276

AWOIS and SURF

8/4/93 MCR

NOTES IN THE DESCRIPTIVE REPORT WERE MADE IN RED DURING

OFFICE PROCESSING



PRECAUTIC (see 103)

41° 20'

LOW'S CHART (3205)

15'

UNITED STATES - EAST COAST MASSACHUSETTS - RHODE ISLAND MARTHA'S VINEYARD TO BLOCK ISLAND

13218

Mercator Projection
Scale 1:80,000 at Lat. 41°27'
North American Datum of 1983
(World Geodetic System 1984)

31st ed.
Jan 11, 95

SOUNDINGS IN FEET
AT MEAN LOWER LOW WATER

NARRAQUANSETT BAY TRAFFIC LANE OUTBOUND

DANGER
Unexploded depth of
May 1945

71° 30'

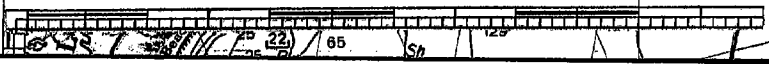


TABLE OF CONTENTS

A. <u>PROJECT</u>	Page:2
B. <u>AREA SURVEYED</u>	Page:2
C. <u>SURVEY VESSELS</u>	Page:3
D. <u>AUTOMATED DATA ACQUISITION AND PROCESSING</u>	Page:4
E. <u>SONAR EQUIPMENT</u>	Page:4
F. <u>SOUNDING EQUIPMENT</u>	Page:4
G. <u>CORRECTIONS TO SOUNDINGS</u>	Page:5
H. <u>CONTROL STATIONS</u>	Page:7
I. <u>HYDROGRAPHIC POSITION CONTROL</u>	Page:7
J. <u>SHORELINE</u>	Page:9
K. <u>CROSSLINES</u>	Page:9
M. <u>COMPARISON WITH PRIOR SURVEYS</u>	Page:9
N. <u>COMPARISON WITH THE CHART</u>	Page:10
O. <u>ADEQUACY OF SURVEY</u>	Page:14
P. <u>AIDS TO NAVIGATION</u>	Page:14
Q. <u>STATISTICS</u>	Page:15
R. <u>MISCELLANEOUS</u>	Page:16
S. <u>RECOMMENDATIONS</u>	Page:16
T. <u>REFERRAL TO REPORTS</u>	Page:16

A. PROJECT

A.1 This survey was conducted under project OPR-B660-RU-92 at the request of the Chief, Atlantic Hydrographic Section. The request was transmitted via letter to the Chief, Operations Section, Nautical Charting Division.

A.2 The original date of the instructions is February 12, 1992.

A.3 The following changes are relevant to this project:

Change No. 1, dated April 2, 1992, authorized the implementation of the Pilot Partnership Processing Project.

Change No. 2, dated April 14, 1992, states that all AWOIS item surveys shall be at the scale of 1:20,000 when the largest scale chart of the area is smaller than 1:20,000. When the largest scale chart of the area is 1:20,000 or larger, the scale of the survey shall be 1:10,000.

Change No. 3, dated June 12, 1992, updated the AWOIS descriptions of items 1873 and 8276 to reflect the additional work required to resolve them.

A.4 There is no sheet letter.

A.5 This survey consisted of additional work resulting from preprocessing of survey H-10424 (originally FE-362SS) completed by the NOAA Ship RUDE during the 1991 field season. Two items were identified that required additional work in order to chart them properly. The scale of the survey is 1:20,000.

B. AREA SURVEYED

B.1 This survey consists of two items located approximately 2.0 nautical miles SW of Point Judith, Rhode Island. These items are identified on the chartlet preceding the table of contents of this descriptive report.

B.2 The approximate limits of this survey are within a one mile radius of 41° 20' 00" N and 071° 31' 00" W.

B.3 Data acquisition began and was completed on June 11, 1992 (DOY 163).

C. SURVEY VESSELS

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

<u>VESSELS</u>	<u>ELECTRONIC DATA PROCESSING NUMBER</u>	<u>PRIMARY FUNCTION</u>
NOAA Ship RUDE (S590)	9040	Hydrography/ Side Scan Operations
RUDE Launch (RU3)	1290	Diving Operations

C.2 No unusual vessel configurations or problems were encountered.

D. AUTOMATED DATA ACQUISITION AND PROCESSING

D.1 Survey data acquisition and processing were accomplished using the HDAPS system with the following software versions:

Program	Version	Dates Used
SURVEY	6.10	Entire Survey
DAS_SURV	6.20	Entire Survey
POSTSUR	5.20	Entire Survey

D.2 Other software includes VELOCITY 1.11 dated March 9, 1990 used to generate sound velocity corrector tables.

D.3 There was no nonstandard automated data acquisition or processing methods used.

E. SONAR EQUIPMENT

E.1-E.4 Side scan sonar operations were not conducted for data acquisition on either of the two items. It was used only for reconnaissance on the barge and to verify the position of the dive buoy dropped on that item. No data was acquired during these occasions and therefore sections E.1 through E.4 are not applicable.

E.5 One item was investigated by echosounder development. The other item was investigated by divers.

E.6 Processing procedures were straight forward since only two distinct contacts, the two of interest, were found during this survey.

F. SOUNDING EQUIPMENT

F.1 All hydrographic soundings were acquired using a Raytheon 6000N Digital Survey Fathometer (DSF). One DSF 6000N was used during the entire survey: S/N A106N.

F.2 One diver investigation was conducted during this survey. Divers did not determine a least depth on it by use of a pneumatic depth gauge.

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

F.4 Both the 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) The velocity of sound through water was determined using a Digibar Sound Velocity Probe (S/N 169), made by Odom. A Data Quality Assurance Test was conducted before the velocity cast to ensure the meter was within tolerance.

All data were processed using Velocity 1.11 software. The computed velocity correctors were entered into the HDAPS sound velocity table and applied on-line to both high and low frequency soundings. The sound velocity correctors applied to this survey are based on the cast recorded on the following date:

Cast Number	Date	Latitude	Longitude	HDAPS Table #	Applied to Days
07	162	41° 26.7' N	71° 07.9' W	07	163

b) There was no variation in the DSF-6000N instrument initial.

c) No instrument correctors to the DSF-6000N were required.

d) A dual lead line comparison with the DSF-6000N was made in the project area.

DN 097 at 41° 26.0' N 71° 15.0' W (75 ft depths)

The greatest variation between leadline and DSF soundings was 0.2 meters. Considering the ship's motion and the wire angle in the leadline from current (approximately 5°), this is excellent agreement and provides an adequate check that the echosounder was functioning properly. Data from these comparisons are found in Separate IV.

Both of the leadlines used in the leadline to DSF 6000 comparison were calibrated by steel tape prior to the above comparison. An average leadline correction of -0.3 feet was applied in comparisons between the DSF-6000 and the ship's leadlines.

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

f) During the winter 1988 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 height above the waterline was determined for this point. The ship's static draft was thereby calculated to be exactly 2.26 meters (7.4 feet). This draft value was applied to the sounding data via the HDAPS offset table.

g) Settlement and squat correctors for the RUDE were determined on the Elizabeth River, Norfolk, Virginia on March 13,

1991. 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 toward and away runs were averaged and applied to soundings through the HDAPS offset table.

h) Heave data were acquired by a Datawell heave, roll and pitch sensor (S/N 19128-C), and were applied to soundings in real time. Only the heave corrections were applied to the plotted soundings.

See Separate IV for data records.

G.2 There were no unusual or unique methods or instruments used for correcting echo soundings.

G.3 No correctors needed to be reapplied after the survey.

G.4 A pneumatic depth gauge was not used in conjunction with this survey.

G.5 Generally, sea conditions greater than one meter affected the sounding record, creating a trace of constant peaks and dips. Application of heave correctors to raw echo soundings appeared to accurately represent true depths.

G.6 a) The tidal datum for this project is Mean Lower Low Water. The operating tide station at Newport, Rhode Island (845-2660) served as direct control for datum determination. This station also served as the reference station for predicted tides. Data for predicted tides were provided on floppy magnetic disk before the start of the project.

b) 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 the HDAPS software. The subordinate station for predicted tides was:

NO.	PLACE		TIME		HEIGHT	
			High water	Low water	High water	Low water
1149	Sakonnet	41°28'N 71°12'W	-0 13	-0 01	*0.88	*0.86

Tidal correctors were applied on-line using the HDAPS predicted tide table number 6.

c) Zoning for this project is consistent with the project instructions.

A request for smooth tides was mailed on July 8, 1992.

APPROVED TIDES WERE APPLIED DURING OFFICE PROCESSING.

H. CONTROL STATIONS SEE ALSO SECTION 2.9. OF THE EVALUATION REPORT.

H.1 The horizontal datum for this project is the North American Datum of 1983 (NAD 83).

H.2 This survey was conducted solely with the use of Differential Global Positioning System (DGPS).

H.3 No horizontal control stations were established for this survey.

H.4 DGPS was used for the entire survey area.

H.5 No horizontal control report will be submitted for this survey.

H.6 There are no photogrammetric problems, positioning problems or unconventional survey methods pertinent to this survey.

I. HYDROGRAPHIC POSITION CONTROL SEE ALSO SECTION 2.9. OF THE EVALUATION REPORT.

I.1 This survey was conducted entirely with the use of the DGPS.

I.2 Accuracy requirements were met as specified by section 3.4 of the Field Procedures Manual (FPM). Never during survey activities did the expected positional error (EPE) exceed 8.1 meters. This is within the authorized maximum of 1.5 mm at the scale of the survey or 30 meters for this survey. The HDOP never exceeded 2 while the authorized maximum is 3.7 as derived by the formula in the FPM. At all times at least four satellites were used for positioning.

I.3 Control Equipment:

Ashtech GPS Sensors (1)

S/N CD0000458769

Firmware Version: 1E03 Receiver Version: TD08

Magnavox MX50R DGPS Receiver

S/N 036

I.4 A DGPS system performance check was conducted with correctors received from Montauk Point on DOY 162, the day prior to data acquisition for this survey. This procedure was completed approximately 20 nautical miles to the east in an area with an established Falcon Mini-Ranger network. By using HDAPS's Position Data and Quality Figures program within the Survey environment, three consecutive DGPS performance checks were obtained. All three recorded DGPS/Falcon positions compared to each other within the maximum allowable inverse distance (ΔP_{max}) between the two as computed by HDAPS. The results of this performance check are included in SEPARATE III.

I.5 No calibration data were applied to the raw positioning

I.6 a) See section I.2 and I.4 for DGPS operating procedures and adequacy standards.

b) There were no occurrences of equipment malfunctions or substandard operation.

c) There were no occurrences of unusual atmospheric conditions that may have affected data quality.

d) When the DGPS position degraded beyond the authorized limits outlined in section I.2, survey activities were suspended and any data acquired during these periods were rejected.

e) No systematic errors were detected that required adjustments.

f) Antenna positions were corrected for offset and layback, and referenced to the position of the DSF 6000N transducer. These correctors were located in the HDAPS Offset table, and applied on-line to the positioning algorithm. Refer to Separate III for a copy of offset table 1. *DATA FILED WITH FIELD RECORDS.*

g) No data were acquired with the use of the side scan sonar.

J. SHORELINE SEE ALSO SECTION 2.6. OF THE EVALUATION REPORT.
No field sheets encompassed any shoreline.

K. CROSSLINES SEE ALSO SECTION 3.9. OF THE EVALUATION REPORT.
Insufficient data were acquired to facilitate a comparison of
mainscheme (north-south) and crossline (east-west) soundings.

L. JUNCTIONS SEE ALSO SECTION 5. OF THE EVALUATION REPORT.
This survey does not junction with any current surveys.

M. COMPARISON WITH PRIOR SURVEYS SEE ALSO SECTION 6. OF THE
EVALUATION REPORT.
The comparison between soundings from this survey and prior
surveys is to be addressed by the Atlantic Hydrographic Section.

N. COMPARISON WITH THE CHART SEE ALSO SECTION 7.9. OF THE EVALUATION REPORT.
AWOIS 8276 Rock or Boulder

N.1 The object of this investigation was a rock or boulder that was located during 1991 survey FE-362SS, later renamed H-10424. It is within the search radius for AWOIS 1872. Its height computed from the side scan sonar trace was 6.3 meters. Echosounder development, which proved to be insufficient, found it to have a height of less than one meter. An additional investigation of this item was requested given the disparity between the heights.

N.2 Item Location

Geographic position provided was: 41° 20' 19.05" N
71° 30' 11.75" W

N.3 Source of Item

Letter dated June 4, 1992 from the Chief, Atlantic Hydrographic Section. This item is located within the search radius of AWOIS 1872 which was investigated by NOAA Ship RUDE during 1991 survey FE-362SS, later renamed H-10424.

N.4 Largest Scale Chart Affected

Chart 13218, scale 1:80,000, edition 31 dated January 11, 1992.

N.5 Investigation Procedures

This item was surveyed solely by echosounder development. The geographic position was used as a point of reference and echosounder development lines were run in a north-south direction with 5 meter spacing. Part way through the investigation the DGPS survey window closed, data with poor navigation were rejected and the investigation had to be resumed later in the same manner.

N.6 Investigation Results

This item was found very close to the geographic position provided.

N.7 Explanation for Position Difference

Difference in position is insignificant.

N.8 Least Depth Information

Least depth information for the item is as follows:

FIX NUMBER- ~~13.3~~ 3013
LATITUDE- 41° 20' 19.⁴⁹071" N
LONGITUDE- 71° 30' 11.¹⁶155" W
LEAST DEPTH (MLLW)- 9.3 Meters (with ^{smooth} predicted tides)
30 Feet

N.9 Charting Recommendation

Chart a ³⁰ 31 foot ^(93m) sounding ^{ON A ROCK} based on the above information. CONCUR

N.10 Danger to Navigation Report

None submitted.

N.11 In keeping with past practice, an attempt was made to compare soundings from this survey with charted depths. The ⁴⁷ average survey sounding acquired during this survey was 46.8 feet (14.3 meters). This compares well with the charted depths found in and around the search radius. These charted depths range from 39 feet to 49 feet, as found on chart 13218.

N.12 This section is not applicable given the limited extent of this item. It has been addressed in section N.11. This section is reserved for basic survey items.

N. COMPARISON WITH THE CHART SEE ALSO SECTION 7.9. OF THE EVALUATION REPORT.
AWOIS 1873 Barge

N.1 The object of this investigation was a possible sanded-in barge overlooked during the investigation of AWOIS 1873. That investigation was part of survey FE-362SS, later renamed H-10424. The original investigation resulted in disproving the barge based on 200% side scan sonar coverage with negative results. During processing of H-10424 by the Atlantic Hydrographic Section the barge was found during the routine check scanning of the side scan sonar records.

N.2 Item Location

Geographic position provided was: 41° 19' 47.05" N
71° 32' 20.95" W

N.3 Source of Item

Letter dated June 4, 1992 from the Chief, Atlantic Hydrographic Section. This item was originally AWOIS 1873 investigated during 1991 survey FE-362SS, later renamed H-10424.

N.4 Largest Scale Chart Affected

Chart 13218, scale 1:80,000, edition 31 dated January 11, 1992.

N.5 Investigation Procedures

Initially several side scan sonar lines were run by the geographic position of this item, without acquiring data. No data were acquired because of substandard navigation due to DGPS being outside of authorized survey parameters. The sonargram was used to compute a position for the barge. Once adequate navigation returned, an echosounder line was run by the computed position to facilitate dropping a dive buoy.

A dive investigation was next completed and the buoy placed in a central position on the barge by the divers. After the divers were recovered the ship was positioned next to the buoy and several detached positions were obtained over the barge.

N.6 Investigation Results

The side scan sonar image and diver investigation proved the presence of the wreck. It is not a danger of navigation given its rise of less than one meter above the sea floor.

Divers swam the entire wreck and found it to be approximately 40 meters long by 10 meters wide. It lies in an east-west direction and is heavily sanded-in with only its beams exposed about 8" above the bottom. The shoalest point of the wreck was what appeared to be a bollard lying on its side rising less than one meter from the bottom. Some fishing net was snagged on the wreck

and some coal was found nearby, perhaps its cargo. No dive report is submitted for this item since a least depth was not obtained by divers. This section summarizes their findings and together with section N.8 a dive report is unnecessary.

N.7 Explanation for Position Difference

Difference in position is insignificant.

N.8 Least Depth Information

Least depth information for the item is as follows:

FIX NUMBER- ~~113~~ 3102.35
LATITUDE- 41° 19' 47.¹⁶577" N
LONGITUDE- 71° 32' 21.^{20.80}484" W
LEAST DEPTH (MLLW)- 21.4⁶ Meters (with ^{smooth} predicted tides)
71 feet

N.9 Charting Recommendation

Chart a ~~symbol~~ for sunken wreck, not dangerous to navigation WITH A KNOWN *
based on the above information. CONCUR * DEPTH OF 71 FT (21.6m)

N.10 Danger to Navigation Report

None submitted. *shown*

N.11 In keeping with past practice, an attempt was made to compare soundings from this survey with charted depths. The average survey sounding acquired during this survey was 71.3 feet (21.7 meters). This compares well with the charted depths found just outside the search radius. These charted depths range from 73 feet to 78 feet, as found on chart 13218.

N.12 This section is not applicable given the limited extent of this item. It has been addressed in section N.11. This section is reserved for basic survey items.

O. ADEQUACY OF SURVEY SEE ALSO SECTION 9. OF THE EVALUATION REPORT.

O.1 All items investigated during this survey have been addressed.

O.2 There is no part of this survey that is considered incomplete or substandard.

P. AIDS TO NAVIGATION SEE ALSO SECTION 7. D. OF THE EVALUATION REPORT.

P.1 The RUDE conducted no correspondence with the U.S. Coast Guard regarding floating aids to navigation.

P.2 No aids to navigation were investigated for positioning during this survey.

P.3 No aids not already listed in the Light List were located during this survey.

P.4 No bridges, overhead cables or overhead pipelines are located within the survey area.

P.5 No submarine cables, pipelines or ferry routes are located within the survey area.

P.6 No ferry terminals are located within the survey area.

Q. STATISTICS

Q.1	a) Number of positions	37
	b) Lineal nautical miles of sounding lines	
	-nautical miles of survey with the use of the side scan sonar	0
	-nautical miles of survey without the use of the side scan sonar	1.47
Q.2	a) square nautical miles of hydrography	0
	b) days of production	1
	c) detached positions	1
	-1 for diver investigation	
	d) bottom samples	0
	e) tide stations	0
	f) current stations	0
	g) velocity casts	0
	h) magnetic stations	0
	i) XBT drops	0

R. MISCELLANEOUS

R.1 a) No evidence of silting was found during this survey.

b) No evidence of unusual submarine features was found during this survey.

c) No evidence of anomalous tidal conditions was found during this survey.

d) No evidence of unusual currents was found during this survey.

e) No evidence of magnetic anomalies was found during this survey.

R.2 Bottom sampling was not required for this project.

S. RECOMMENDATIONS SEE ALSO SECTION 9. OF THE EVALUATION REPORT.

S.1 No survey inadequacies have been noted.

S.2 The RUDE is aware of no construction or dredging that will affect results of this survey.

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

T. REFERRAL TO REPORTS

No other reports have been submitted in conjunction with this survey.

CONTROL STATIONS as of 16 Apr 1992

No	Type	Latitude	Longitude	H Cart	Freq	Vel	Code	MM/DD/YY	Station Name
202	A	041:09:10.210	071:39:02.019	0	250	1646.7	299670.0	2 06/26/91	BLOCK IS. SE LIGHTHOUSE OFFSET, 1991
201	A	041:07:42.568	071:10:22.144	0	250	1646.7	299670.0	1 06/26/91	WARREN OFFSET, 1991
111	F	041:21:15.270	071:30:26.376	7	250	0.0	0.0	6 06/26/91	MAIN BARRR CTR LT 2 1948 MAIN BR C LT 2, 1948
113	F	041:21:39.621	071:28:53.624	20	250	0.0	0.0	8 06/26/91	PT JUDITH LIGHT OFFSET 2, 1991
114	F	041:13:39.514	071:34:39.030	16	250	0.0	0.0	5 06/26/91	BLOCK ISLAND N LIGHT OFFSET, 1991
115	F	041:18:14.966	071:51:30.696	18	250	0.0	0.0	5 06/26/91	WATCH HILL LIGHT OFFSET #1, 1991
116	F	041:21:54.267	071:35:42.104	8	250	0.0	0.0	4 07/15/91	GREEN HILL BEACH, 1991
117	F	041:18:14.045	071:51:30.699	18	250	0.0	0.0	3 07/16/91	WATCH HILL LIGHT OFFSET #2, 1991

ALL FIELD POSITIONS

APPENDIX VII. APPROVAL SHEET

LETTER OF APPROVAL

REGISTRY NO. H-10424

Field operations contributing to the accomplishment of this survey were conducted under my supervision with frequent personal checks of progress and adequacy. This report and field sheets have been closely reviewed and are considered complete and adequate for charting.



Nicholas E. Perugini, LCDR NOAA
Commanding Officer
NOAA Ship RUDE



UNITED STATES DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration
NATIONAL OCEAN SERVICE
Coast and Geodetic Survey
Rockville, Maryland 20852

MAY 4 1992

MEMORANDUM FOR: Rudolph D. Sanocki
Chief, Hydrographic Processing Unit
FROM: *Kenneth W. Wellman*
Kenneth W. Wellman
Acting Chief, Data Control Section
SUBJECT: Assignment of Registry Number

Per telephone request the following Field Examination registry number, FE-362SS is rescinded and reassigned as H-10424 in accordance with the information listed below:

<u>Rescinded</u> <u>Registry No.</u>	<u>Field No.</u>	<u>Locality</u>	<u>Project No.</u>
FE-362SS	RU-10-3-91	RHODE ISLAND BLOCK ISLAND SOUND BETWEEN POINT JUDITH AND BLOCK ISLAND	OPR-B660
<u>Reassigned as</u> <u>Registry No.</u>	<u>Field No.</u>	<u>Locality</u>	<u>Project No.</u>
H-10424	RU-10-3-91	RHODE ISLAND BLOCK ISLAND SOUND BETWEEN POINT JUDITH AND BLOCK ISLAND	OPR-B660

cc: N/CG241 - M. Riddle
N/CG245 - D. Hennick
AMC1 - R. Matsushige
AMC-RU - N. Perugini
PMC1x2 - D. Cole





UNITED STATES DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration
NATIONAL OCEAN SERVICE
Office of Ocean and Earth Sciences
Rockville, Maryland 20852

TIDE NOTE FOR HYDROGRAPHIC SURVEY

DATE: February 11, 1992

MARINE CENTER: Atlantic

OPR: B660-RU-91

HYDROGRAPHIC SHEET: FE-362SS

LOCALITY: Rhode Island, Block Island Sound, Between Point Judith
and Block Island

TIME PERIOD: June 27 - July 18, 1991

TIDE STATION USED: 845-5083 Point Judith, Rhode Island
Lat. $41^{\circ} 21.8'N$ Lon. $71^{\circ} 29.4'W$

PLANE OF REFERENCE (MEAN LOWER LOW WATER): 6.34 ft.

HEIGHT OF HIGH WATER ABOVE PLANE OF REFERENCE: 3.2 ft.

REMARKS: RECOMMENDED ZONING

1. West of a line between Sandy Point, Block Island and Point Judith, Rhode Island, times are direct and apply a x0.85 height ratio to Point Judith, Rhode Island (845-5083).
2. East of a line between Sandy Point, Block Island and Point Judith, Rhode Island, times are direct and apply a x0.94 height ratio to Point Judith, Rhode Island (845-5083).

Note: Times are tabulated in Eastern Standard Time.

for Brett Curran
CHIEF, DATUMS SECTION





UNITED STATES DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration
NATIONAL OCEAN SERVICE
Office of Ocean and Earth Sciences
Rockville, Maryland 20852

TIDE NOTE FOR HYDROGRAPHIC SURVEY

DATE: August 5, 1992

MARINE CENTER: Atlantic

OPR: B660-RU-92

HYDROGRAPHIC SHEET: H-10424 (Addendum to)

LOCALITY: Rhode Island, Block Island Sound, Between Point Judith
and Block Island

TIME PERIOD: June 11, 1992

TIDE STATION USED: 845-0768 Sakonnet Yacht Club, Rhode Island
Lat. 41° 27.9'N Lon. 71° 11.6'W

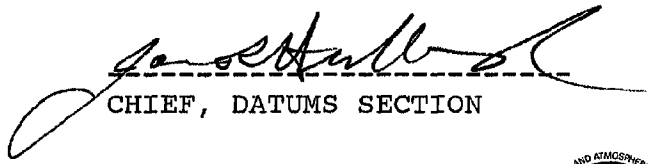
PLANE OF REFERENCE (MEAN LOWER LOW WATER): 8.13 ft.

HEIGHT OF HIGH WATER ABOVE PLANE OF REFERENCE: 3.3 ft.

REMARKS: RECOMMENDED ZONING

1. West of a line between Sandy Point, Block Island and Point Judith, Rhode Island, apply a -10 minute time correction and a x 0.81 range ratio to Sakonnet Point, Rhode Island (845-0768).
2. East of a line between Sandy Point, Block Island and Point Judith, Rhode Island, apply a -10 minute time correction and a x0.90 range ratio to Sakonnet Point, Rhode Island (845-0768).

Note: Times are tabulated in Eastern Standard Time.


CHIEF, DATUMS SECTION



GEOGRAPHIC NAMES

H-10424

Name on Survey	Source of Name										
	A	B	C	D	E	F	G	H	K		
BLOCK ISLAND (title)											1
BLOCK ISLAND SOUND (title)											2
JUDITH, POINT (title)											3
RHODE ISLAND (title)											4
											5
											6
											7
											8
											9
											10
											11
											12
											13
											14
											15
											16
											17
											18
											19
											20
											21
											22
											23
											24
											25

Approved:

Charles E. Harrington
Chief Geographer - N/C&S

FEB 23 1993

N/CG244-34-93

LETTER TRANSMITTING DATA

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

- ORDINARY MAIL AIR MAIL
 REGISTERED MAIL EXPRESS
 GBL (Give number) _____

TO:

NOAA/National Ocean Service
 Chief, Data Control Section
 N/CG243, Station 6813, SSMC3
 1315 East-West Highway
 Silver Spring, Maryland 20910

CG243
Blvd.,

DATE FORWARDED

4 May 1993

NUMBER OF PACKAGES

1 Box, 1 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.

H-10424 OPR-B660-RU-91
Rhode Island, Block Island Sound
Between Point Judith and Block Island

Pkg. 1 TUBE

- 1 Final Smooth Sheet
- 1 Final Position Overlay
- 3 Final excess levels
- 1 Original Descriptive Report

Pkg. 1 Box

- 1 Accordion file containing Fathograms, Data Printouts, for VESNO 590 for DN's 178, 179, 182, 183, 184, 190, 191, 192, 193, 196, 197, 198, 199, 200, 203, 204, 206, 218
- 1 Accordion file containing supplemental field data
- 3 Binders containing Data removed from original Descriptive Report
- 1 Binder containing FINAL POSITION PRINTOUT
- 1 Binder containing FINAL SOUNDING PRINTOUT and L-File
- 1 Envelope containing Data removed from FINAL PRINTOUTS

FROM: (Signature)

Norris A. Wike



RECEIVED THE ABOVE
(Name, Division, Date)

Return receipted copy to:

Atlantic Hydrographic Section, N/CG24411
 439 W. York Street
 Norfolk, VA 23510-1114



JUN 15 1993

05/13/93

HYDROGRAPHIC SURVEY STATISTICS
REGISTRY NUMBER: H-10424

NUMBER OF CONTROL STATIONS	8
NUMBER OF POSITIONS	1762
NUMBER OF SOUNDINGS	8233

	TIME-HOURS	DATE COMPLETED
PREPROCESSING EXAMINATION	184	10/07/92
VERIFICATION OF FIELD DATA	239	02/19/93
ELECTRONIC DATA PROCESSING	56	
QUALITY CONTROL CHECKS	101	
EVALUATION AND ANALYSIS	66	04/23/93
FINAL INSPECTION	12	05/03/93
TOTAL TIME	658	
ATLANTIC HYROGRAPHIC SECTION APPROVAL		05/12/93

**COAST AND GEODETIC SURVEY
ATLANTIC HYDROGRAPHIC SECTION
EVALUATION REPORT**

SURVEY NO.: H-10424

FIELD NO.: RU-10-3-91

Rhode Island, Block Island Sound, Between Point Judith and
Block Island

SURVEYED: June 27 through August 6, 1991 and June 11, 1992

SCALE: 1:10,000

PROJECT NO.: OPR-B660-RU-91

SOUNDINGS: EG&G Model 260 Side Scan Sonar, Pneumatic Depth
Gauge, and RAYTHEON DSF 6000N Fathometer

CONTROL: ARGO DM-54 (Hybrid Range/Range with Falcon), MOTOROLA
Falcon 484 Mini-Ranger (Range/Range), and ASHTECH
Global Positioning System (GPS) Sensor/MAGNAVOX MX50R
Differential Global Positioning System (DGPS)
Receiver (Differential Mode)

Chief of Party.....N. E. Perugini

Surveyed by.....J. E. Rix
.....P. L. Schattgen
.....M. J. Oberlies
.....J. A. Illg
.....R. T. Brennan
.....M. A. Sramek
.....D. E. Williams

Automated Plots by.....XYNETICS 1201 Plotter (AHS)

1. INTRODUCTION

a. This is primarily a side scan sonar survey. A RAYTHEON DSF-6000N fathometer was operated concurrently with the side scan sonar. In cases where the side scan sonar was used to determine the estimated depth of a feature, the item is shown on the present survey with the upper case letter 'A' in parenthesis. Depths on these items were estimated by scaling heights off the bottom from side scan sonar records. Positions were determined by computing offsets from the vessel's track. This note is shown on the present survey in proximity to the title block. See also memorandum titled, "Showing Estimated Side Scan Sonar Depths on Smooth Sheets", dated 23 February 1989, for an explanation of the note shown on the survey smooth sheet. In a few cases, fathometer developments were conducted to search for items found on the sonargrams. In these cases, the fathometer data was used in positioning the items, determining their significance, and for

determining the least depth of some items. The hydrography acquired by this survey is considered adequate for charting.

b. This survey was originally registered as FE-362SS. The registry number FE-362SS was rescinded and the registry number H-10424 was assigned. A copy of the memorandum rescinding the original registry number and assignment of the new registry number is appended to the Descriptive Report.

c. Survey data was acquired at a scale of 1:10,000. The smooth sheet is plotted at the scale of 1:20,000 in order to show all data on a single smooth sheet.

d. Corrections and notes made by the evaluator to the Descriptive Report are in red ink.

2. CONTROL AND SHORELINE

a. Control is adequately discussed in Sections H. and I. of the Descriptive Reports.

Horizontal control used for this survey during data acquisition is based upon the North American Datum of 1983 (NAD 83). Office processing of this survey is based on these values. 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 smooth plots on the NAD 27 move the projection lines 0.370 seconds (11.41 meters or 0.57 mm at the plotted scale of the survey) north in latitude and 1.797 seconds (41.81 meters or 2.09 mm at the plotted scale of the survey) east in longitude.

b. No shoreline was drawn on the smooth sheet.

3. HYDROGRAPHY

a. Where crossings occur, there is adequate agreement.

b. The standard depth curves were drawn in their entirety.

c. The investigation of features and least depths is not considered adequate due to the large number of rocks and obstructions that are shown as estimated depths on side scan sonar contacts.

4. CONDITION OF SURVEY

The smooth plots and accompanying overlays, survey records, and reports adequately conform to the requirements of the HYDROGRAPHIC MANUAL, the SIDE SCAN SONAR MANUAL, and the FIELD PROCEDURES MANUAL. The following should be noted:

There are a large number of rocks and obstructions with estimated depths that were located using side scan sonar and are shown on the smooth sheet. These contacts should have been resolved by conventional methods.

5. JUNCTIONS

A standard junction was effected between the present survey and survey H-10378 (1991).

6. COMPARISON WITH PRIOR SURVEYS

a. Hydrographic

H-6443 (1939)	1:40,000
H-7640 (1948)	1:10,000
H-8615 (1961-63)	1:10,000

Prior survey H-6443 (1939) is common to most of the present survey. Only the northern part of the present survey is not covered by the prior survey. In general, the present and prior depths in the common area agree within 0⁶ m (2 ft) except in the northeastern portion of the common area where prior depths may be deeper by as much as 5⁸ m (19 ft). The prior survey does not indicate the rocky and irregular bottom configuration shown on the present survey. The differences may be attributed to improved surveying methods and equipment.

Prior survey H-7640 (1948) is common to the northern portion of the present survey area. In general, the present and prior depths in the common area agree within 0⁶ m (2 ft) with the prior depths usually being shoaler. The bottom configuration in the common area is rocky and irregular. Only two features out of the numerous features found by the present survey were indicated by this prior survey. In both cases the present soundings are significantly shoaler. The largest difference between prior and present hydrography is 4³ m (14 ft). The differences may be attributed to improved surveying methods and equipment.

Prior survey H-8615 (1961-63) is common to the northwestern portion of the present survey. In general, the

present and prior depths in the common area agree within 0⁶ m (2 ft) with the prior depths usually being shoaler. The bottom configuration in the common area is rocky and irregular. None of the numerous features found by the present survey are shown on the prior survey. The following should be noted:

A charted 37-ft (11³ m) sounding, in Latitude 41°20'28.0"N, Longitude 71°33'51.8"W, originates with the prior survey. This sounding was not located by the present survey. Surrounding depths range from 42 to 52 feet (12⁸ to 15⁸ m). This sounding is between present survey sounding lines and could have been missed. The sounding was brought forward from the prior survey to supplement the present survey. No change in charting status is recommended.

Differences between prior and present survey may be attributed to improved surveying methods and equipment.

Except as noted, the present survey is adequate to supersede the prior surveys in the common areas.

b. Wire Drag

H-4005WD (1917-19)	1:50,000
H-4041WD (1918-19)	1:20,000
H-4098WD (1919)	1:20,000
FE-179WD (1961)	1:10,000
<u>FE-270WD (1984)</u>	<u>1:20,000</u>

1) Two groundings and one sounding originate with prior survey H-4005WD (1917-19) in the area common to the present survey. The prior survey is common to all or a portion of AWOIS Items #1872, #1873, #7474, and #7480. The following should be noted:

a) A charted 97-ft (29⁶ m) sounding, in Latitude 41°18'28.0"N, Longitude 71°32'12.0"W, originates with the prior survey as a 97 foot (29⁶ m) sounding. The sounding is in proximity to AWOIS Item #7474. Present survey depths range from 31 to 33m. It is recommended that the charted sounding be deleted from the chart, and the area be charted as shown on the present survey. See also pages 23-24 of the Descriptive Report for a discussion of and charting recommendation for AWOIS Item #7474.

b) A charted 52-ft (15⁸ m) sounding, in Latitude 41°19'51.0"N, Longitude 71°31'55.0"W, originates with the prior survey as a grounding at 52 feet (15⁸ m). The sounding

is in proximity to AWOIS Item #7480. It is recommended that the charted sounding be deleted from the chart, and the area be charted as shown on the present survey. See also pages 28-29 of the Descriptive Report for a discussion of and charting recommendation for AWOIS Item #7480.

c) A charted 49-ft (14^9 m) sounding, in Latitude $41^{\circ}19'56.0''N$, Longitude $71^{\circ}30'27.0''W$, originates with the prior survey as a grounding at 49 ft (14^9 m). The present survey found a rock with an estimated depth of 13^8 m (45 ft), in Latitude $41^{\circ}19'55.70''N$, Longitude $71^{\circ}30'26.83''W$, using side scan sonar. It is recommended that the rock be charted in accordance with Cartographic Order 004/89, dated July 3, 1989.

There are no conflicts between prior survey effective depths and present survey depths.

2) There are no hangs or groundings originating with prior survey H-4041WD (1918-19) in the common area.

There are no conflicts between prior survey effective depths and present survey depths.

3) Prior wire drag survey H-4098WD (1919) is common to the present survey and covers a part of the areas of AWOIS Items #1873 and #7474. The following should be noted:

A charted 51-ft (15^5 m) sounding on a hang, in Latitude $41^{\circ}20'35.6''N$, Longitude $71^{\circ}33'21.0''W$, is in present survey depths ranging from 16^1 to 16^8 m (53 to 55 ft). This prior sounding is in a rocky area and falls between present survey sounding lines. It is a good possibility that the present survey could have missed a feature. The prior sounding has been brought forward from the prior survey to supplement the present survey. No change in charting status is recommended. It is also recommended that additional work be done to verify or disprove the existence of this sounding.

Two present survey estimated depths are in conflict with prior survey effective clearance depths. These features are:

a) An obstruction with an estimated depth of 14^8 m (45 ft), in Latitude $41^{\circ}20'34.72''N$, Longitude $71^{\circ}32'50.49''W$ was located by the present survey using side scan sonar. The prior survey shows a clearance depth of 51 feet (15^5 m) in the area. The difference is possibly due to the differences in surveying techniques and the conflicting present depths being estimated depths. It is recommended that

an obstruction with a reported depth 14⁸ m (48 ft) be charted as required by Cartographic Order 004/89, dated July 4, 1989.

b) An ^{rock}obstruction with an estimated depth of 14⁹ m (49 ft), in Latitude 41°20'32.03"N, Longitude 71°32'46.72"W, was located by the field unit using side scan sonar. The prior survey shows a clearance depth of 51 feet (15⁵ m) in this area. The difference is possibly due to the differences in surveying techniques and the conflicting present depths being estimated depths. It is recommended that the ^{rock}obstruction be charted in accordance with Cartographic Order 004/89, dated July 4, 1989.

4) Prior survey FE-179WD (1961) has no hangs or groundings in the area common to the present survey, and is common to the eastern portion of AWOIS Item #1872.

There are no conflicts between the prior survey effective depths and the present survey depths.

5) Prior survey FE-270WD (1984) is common a portion AWOIS Item #7415. Section 6.a. of the Evaluation Report of this prior survey states, "The side scan sonar contacts found by the present survey within the corridor all have computed reduced depths greater than the project depth and therefore do not warrant charting."

7. COMPARISON WITH CHARTS 13215 (12th Edition, June 23/90)
13219 (7th Edition, Nov. 1/86)

a. Hydrography

The charted hydrography originates with the previously discussed prior surveys. The previously addressed prior surveys require no further consideration. Charting recommendations concerning all AWOIS items are adequately discussed in sections N. of the Descriptive Reports (1991 & 1992).

The present survey is adequate to supersede charted data within the common areas of the items investigated except as noted in sections 6.a. and 6.b. of this report.

b. Aids to Navigation

No fixed or floating aids to navigation were located during survey operations.

8. COMPLIANCE WITH INSTRUCTIONS

This survey adequately complies with the Project Instructions.

9. ADDITIONAL FIELD WORK

This is an adequate side scan sonar survey. Additional field work is recommended to resolve the numerous estimated depths plotted on this survey using conventional methods and to resolve the items discussed in sections 6.a. and 6.b. of this report.

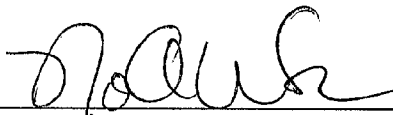
Reginald L. Keene
Reginald L. Keene
Cartographic Technician
Verification of Field Data

Maurice B. Hickson, III
Maurice B. Hickson, III
Cartographer
Evaluation and Analysis

APPROVAL SHEET
H-10424

Initial Approvals:

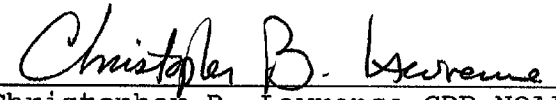
The completed survey has been inspected with regard to survey coverage, delineation of depth curves, development of critical depths, cartographic symbolization, and verification or disproof of charted data. The digital data have been completed and all revisions and additions made to the smooth sheet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



N. A. Wike
Cartographer
Atlantic Hydrographic Section

Date: 11 MAY 93

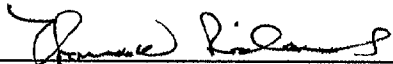
I have reviewed the smooth sheet, accompanying data, and reports. This survey and accompanying digital data meet or exceed NOS requirements and standards for products in support of nautical charting except where noted in the Evaluation Report.



Christopher B. Lawrence, CDR, NOAA
Chief, Atlantic Hydrographic Section

Date: 12 May 1993

Final Approval:

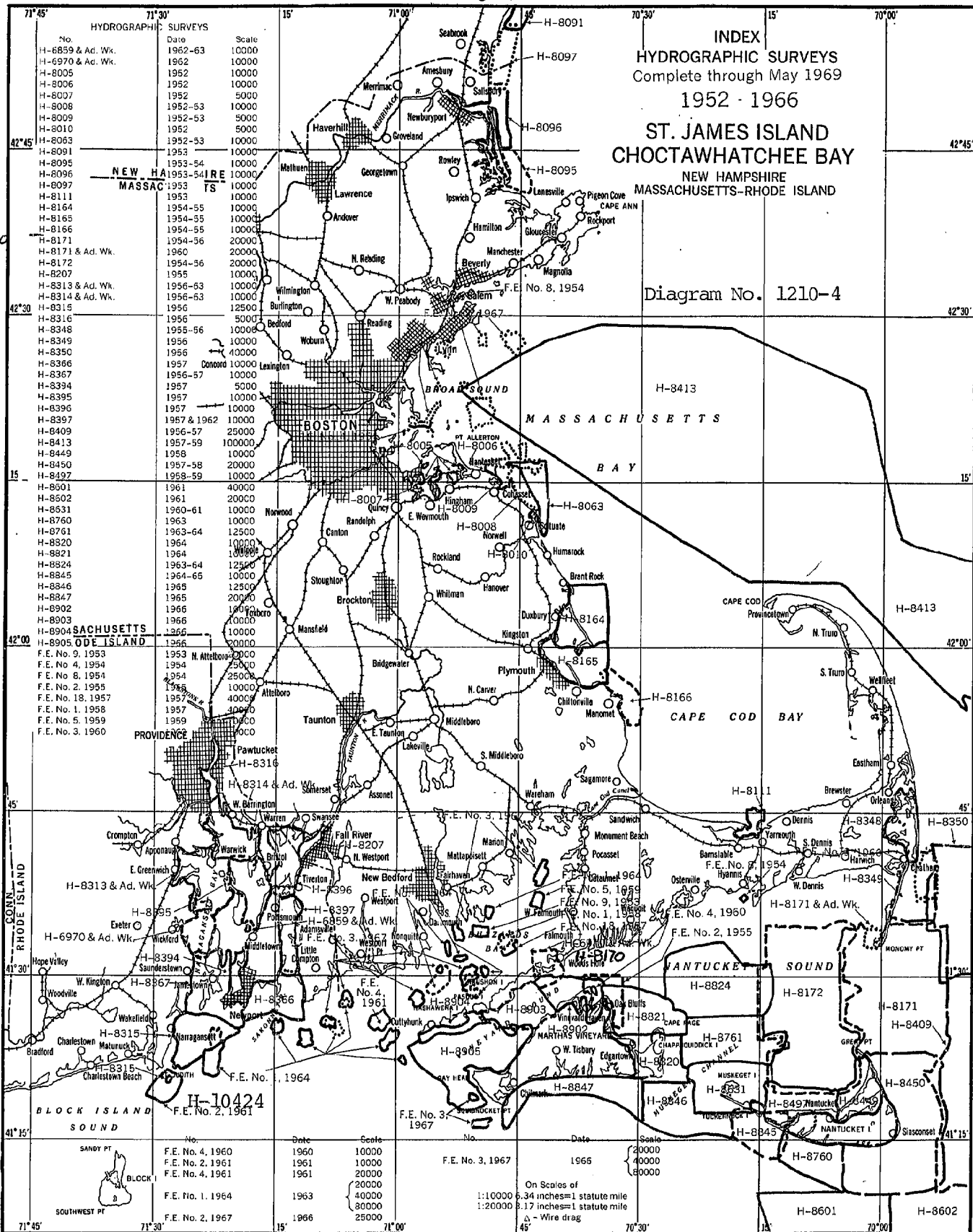
Approved: 

for J Austin Yeager
Rear Admiral, NOAA
Director, Coast and Geodetic Survey

Date: 12-15-94

DEPARTMENT OF COMMERCE
 Environmental Science Services Administration
 U.S. Coast and Geodetic Survey
 Washington, D.C.

Hydrographic Index No. 62 Q



HYDROGRAPHIC SURVEYS

No.	Date	Scale
H-6859 & Ad. Wk.	1952-63	10000
H-6970 & Ad. Wk.	1952	10000
H-8005	1952	10000
H-8006	1952	10000
H-8007	1952	5000
H-8008	1952-53	10000
H-8009	1952-53	5000
H-8010	1952	5000
H-8063	1952-53	10000
H-8091	1953	10000
H-8095	1953-54	10000
H-8096	1953-54	10000
H-8097	1953	10000
H-8111	1953	10000
H-8164	1954-55	10000
H-8165	1954-55	10000
H-8166	1954-55	10000
H-8171	1954-56	20000
H-8171 & Ad. Wk.	1960	20000
H-8172	1954-56	20000
H-8207	1955	10000
H-8313 & Ad. Wk.	1956-63	10000
H-8314 & Ad. Wk.	1956-63	10000
H-8315	1956	12500
H-8316	1956	5000
H-8348	1955-56	10000
H-8349	1956	10000
H-8350	1956	40000
H-8366	1957	10000
H-8367	1956-57	10000
H-8394	1957	5000
H-8395	1957	10000
H-8396	1957	10000
H-8397	1957 & 1962	10000
H-8409	1956-57	25000
H-8413	1957-59	100000
H-8449	1958	10000
H-8450	1957-58	20000
H-8497	1958-59	10000

MASSACHUSETTS

No.	Date	Scale
H-8601	1961	40000
H-8602	1961	20000
H-8631	1960-61	10000
H-8760	1963	10000
H-8761	1963-64	12500
H-8820	1964	10000
H-8821	1964	10000
H-8824	1963-64	12500
H-8845	1964-65	10000
H-8846	1965	12500
H-8847	1965	20000
H-8902	1966	10000
H-8903	1966	10000
H-8904	1966	10000
H-8905	1966	10000

MASSACHUSETTS

No.	Date	Scale
F.E. No. 9, 1953	1953	20000
F.E. No. 4, 1954	1954	12500
F.E. No. 8, 1954	1954	25000
F.E. No. 2, 1955	1955	10000
F.E. No. 18, 1957	1957	40000
F.E. No. 1, 1958	1957	40000
F.E. No. 5, 1959	1959	10000
F.E. No. 3, 1960	1960	10000

MASSACHUSETTS

No.	Date	Scale
F.E. No. 4, 1960	1960	10000
F.E. No. 2, 1961	1961	10000
F.E. No. 4, 1961	1961	20000
F.E. No. 1, 1964	1963	20000
F.E. No. 2, 1967	1966	25000

INDEX
 HYDROGRAPHIC SURVEYS
 Complete through May 1969
 1952 - 1966
ST. JAMES ISLAND
CHOCTAWHATCHEE BAY
 NEW HAMPSHIRE
 MASSACHUSETTS-RHODE ISLAND

Diagram No. 1210-4

MASSACHUSETTS

CAPE COD BAY

NANTUCKET SOUND

On Scales of
 1:10000 6.34 inches=1 statute mile
 1:20000 3.17 inches=1 statute mile
 Δ - Wire drag

MARINE CHART BRANCH
RECORD OF APPLICATION TO CHARTS

FILE WITH DESCRIPTIVE REPORT OF SURVEY NO. H-10424

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
13215	9-9-93	Jenny Schumacher	Full Part Before After Marine Center Approval Signed Via CRITICAL ONLY Drawing No. 14
13219	4/24/95	L. Ahern PS	Full Part Before After Marine Center Approval Signed Via Drawing No. 15
13215	4/24/95	L. Ahern PS	Full Part Before After Marine Center Approval Signed Via Drawing No. 15, Then 13219
13218	4/25/95	L. Ahern PS	Full Part Before After Marine Center Approval Signed Via Drawing No. 70 Then 13215
13210	6-19-95	B. Stannard	Full Part Before After Marine Center Approval Signed Via Drawing No. 57 Appl Thru Chrt 13218 # 70
13205	8-22-95	B. Stannard PS	Full Part Before After Marine Center Approval Signed Via Drawing No. 55 Appl Thru Chrt 13215 # 15
			Full Part Before After Marine Center Approval Signed Via Drawing No.
			Full Part Before After Marine Center Approval Signed Via Drawing No.
			Full Part Before After Marine Center Approval Signed Via Drawing No.
			Full Part Before After Marine Center Approval Signed Via Drawing No.
			Full Part Before After Marine Center Approval Signed Via Drawing No.
			Full Part Before After Marine Center Approval Signed Via Drawing No.