

10422

10422

Diagram No. 1210-4

NOAA FORM 76-35A

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

DESCRIPTIVE REPORT

Type of Survey Hydrographic/Side Scan Sonar
Field No. RU-20-3-92
Office No..... H-10422

LOCALITY

State Rhode Island
General Locality Rhode Island Sound
Locality Six NM South of
Sakonnet Point

19.92

CHIEF OF PARTY

..... LCDR N.E. Perugini

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DATE November 6, 1992

☆U.S. GOV. PRINTING OFFICE: 1980-766-230

EL/G

CO-2

13218

12300

13006 n.c.

HYDROGRAPHIC TITLE SHEET

H-10422

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-20-3-92

State Rhode Island

General locality Rhode Island Sound

Locality Six NM South of Sakonnet Point

Scale 1:20,000 Date of survey April 8 to May 1, 1992

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

Vessel NOAA Ship RUDE S590 (9040)

Chief of party LCDR Nicholas E. Perugini

Surveyed by P.L. Schattgen, M.J. Oberlies, J.A. Illg, D.E. Williams

Soundings taken by echo sounder, ~~XXX XXXXXX~~ EG46 MODEL 260 pneumatic depth gauge SIDE SCAN SONAR

Graphic record scaled by NEP, PLS, MJO, UAW, DEW

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

Protracted by NA Automated plot by XYMETRIS PLOTTER NA 1201 (AHS)

Verification by NA ATLANTIC HYDROGRAPHIC SECTION

Soundings in ~~fathoms~~ ^{meters} ~~xxx~~ at MHW MLLW

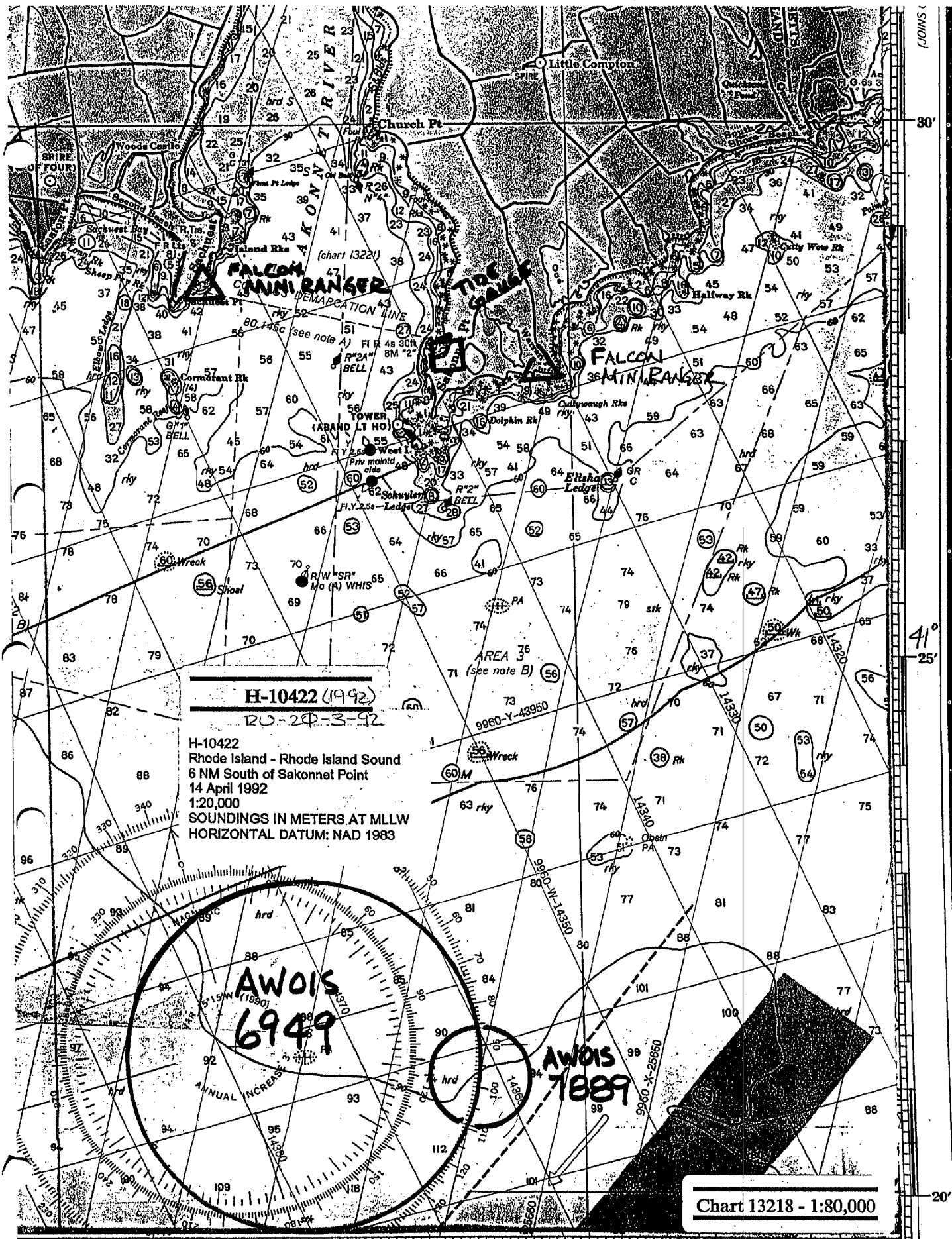
REMARKS: All times are in Coordinated Universal Time

This survey addresses AWOS numbers 7889 and 6949

NOTES IN THE DESCRIPTIVE REPORT WERE MADE IN REQ DURING OFFICE PROLESSING.

AWOS/SURF 11/19/92 MCR

57-1-3-97
R.W.W.



H-10422 (1992)
RU-20-3-92

H-10422
 Rhode Island - Rhode Island Sound
 6 NM South of Sakonnet Point
 14 April 1992
 1:20,000
 SOUNDINGS IN METERS AT MLLW
 HORIZONTAL DATUM: NAD 1983

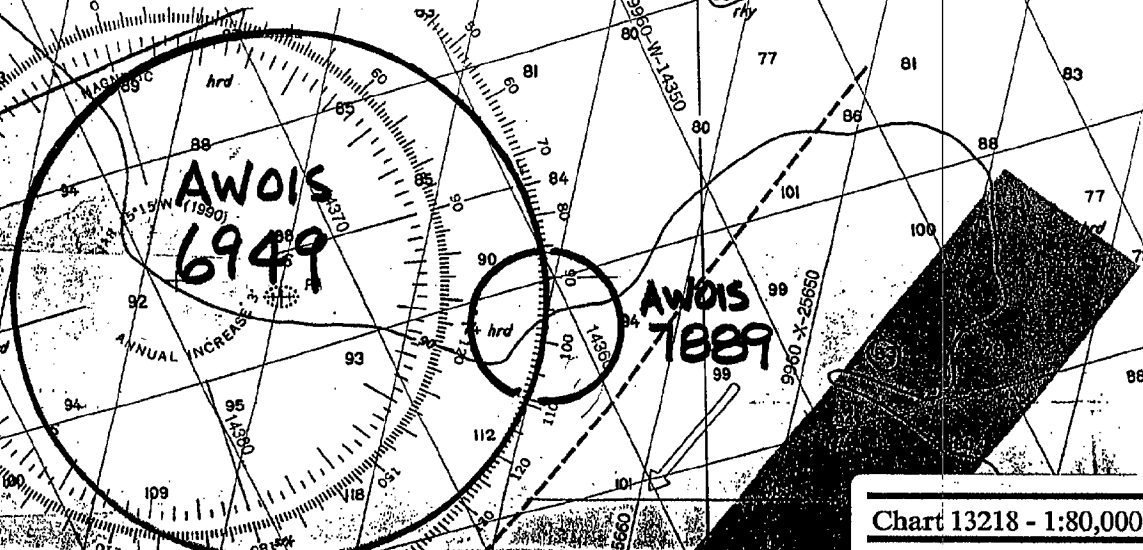


Chart 13218 - 1:80,000

FROM CHART 13218

SOUNDINGS IN FEET

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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 February 12, 1992. ✓

A.3 The following two changes to the project instructions have been issued: ✓

Change No. 1 is dated April 2, 1992

Change No. 2 is dated April 14, 1992.

Change No. 2 outlines items pertaining to the "Pilot Partnership Processing Project". This program has been developed by the Atlantic Hydrographic Section and the RUDE in order to promote timely processing of survey data, both on the RUDE and at the Atlantic Hydrographic Section.

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

A.5 Project OPR-B660-RU responds to requests from the Northeast Marine Pilots, Inc., of Newport, Rhode Island, to verify or disprove certain wrecks and obstructions in Long Island, Block Island, and Rhode Island Sounds. The U.S. Navy, as well as state and local governments, have also requested updated bathymetric and hydrographic survey data of the area. ✓

B. AREA SURVEYED

B.1 This survey encompasses two items located approximately 6 nautical miles south of Sakonnet Point, Rhode Island. These items are identified on the chartlet preceding the table of contents of this descriptive report.

Vessel traffic through the area is characterized by tugs and barges transiting between Long Island Sound and Buzzards Bay. In addition, lobster and fishing boats were observed in the area.

B.2 The approximate limits of this survey are within 3000 meters of 41° 21' 18" N and 071° 13' 28" W.

B.3 Data acquisition began on April 8, 1992 (DN 099) and concluded on May 1, 1992 (DN 122).

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 were used.

D. AUTOMATED DATA ACQUISITION AND PROCESSING

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

Program	Version	Dates Used
SURVEY	6.10	April 8 - May 1, 1992
DAS_SURV	6.20	April 8 - May 1, 1992
POSTSUR	5.20	April 8 - May 1, 1992

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 On April 13, 1992, between fix numbers 501 and 502 the HDAPS plotter failed. This caused the HDAPS to crash and the RAM Saver program had to be used to recover the data. Side scan operations were continued without the plotter through April 15, 1992, therefore no on line plot exists for fixes 502 through 606. On DN 106 the on line data plot was continued on a semi-smooth plot.

A prototype program was used on the HDAPS to organize the side scan contacts into an abstract. There were no other nonstandard automated acquisition or processing methods used.

E. SONAR EQUIPMENT

E.1 All side scan operations were conducted from the RUDE (vessel # 9040). Side scan sonar operations were conducted using two EG&G towfish and one Model 260 slant range corrected side scan sonar recorder. The dates of use for the towfish a Model 272-T (single frequency) and a Model 272-TD (dual frequency) are tabulated below with serial numbers.

Equipment Type	Serial Number	Dates Used
Recorder	0012104	Entire Survey
Towfish	11908 (Single Freq)	April 8 - April 9 DN 99 DN 100
Towfish	10823 (Dual Freq)	April 10 - May 1 DN 101 DN 122

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 Both towfish were operated at 100 Khz frequency throughout this survey.

E.4 a) The search radii of AWOIS 6949 and 7889 overlap and were searched for simultaneously. The 150 meter range scale was used for the 1st and 2nd 100% of main scheme coverage. Line spacing of 270 meters was used for the 1st and 2nd 100% side scan coverage. The 1st and 2nd 100% of side scan coverage were run in the same orientation and offset by 135 meters (half the line spacing). The logic for running this scheme in the same orientation was that the line spacing requirements for a basic survey could be met.

Features observed on the sonograms and echograms were logged and then further developed after the completion of the 1st and 2nd 100% of side scan coverage. An exception to this scheme was the wreck of tug boat described in section N. This wreck was further developed using 75 and 50 meter range scales and then developed further with the echo sounder. This wreck was determined not to be the subject of AWOIS 6949.

Predicted ECR values were generated using the HDAPS function "Predict ECR" for control station configurations used in this survey. No predicted ECR value was greater than 9 meters for the entire survey area. Thus the maximum line spacing computed by the above equation was 186 meters. RUDE used a 270 meter line spacing which yielded an effective swath overlap of 30 meters. Printouts of "Predict ECR" values supporting the above calculation are included in SEPARATE V.*

* DATA FILED WITH FIELD RECORDS.

b) Confidence checks were obtained by noting recognizable bottom characteristics at the edges of the sonar range scale and by towing past a wreck which lies in the search area.

c) The search areas for both AWOIS items were covered with 200% side scan sonar. This does not include the coverage obtained during developments.

d) Two factors affected the quality of the sonargrams. As the survey progressed, a problem with the EG&G recorder caused the sonar image to slightly degrade. Vertical white lines were noted on the sonargram and the numbers indicating the times and fixes also became illegible. This recorder has since been returned to AMC EED for repair. Although the record was slightly degraded during the latter period of the survey, small boulders were still very visible and easy to identify. It is the RUDE's opinion that the quality of the survey was not affected by this problem. CONCUR

The second problem involved an area which would "white out" the sonar trace. This area was located in the southern hemisphere of the search area and extended as a narrow band around a segment which ran approximately 070°T. This white out area appeared on most main scheme lines. Increasing gain settings did not alleviate the problem.

Upon the recommendation of the Atlantic Hydrographic Section Pilot Project Representative, three lines were run in order to try to obtain an acceptable image. The lines recommended by AHS generally ran in a 067° orientation. The main segment was defined by the following geographic coordinates:

41° 20.5'N 071° 11.4'W and 41° 19.7'N 071° 13.9'W

Three lines were run over the area in question. During this process, an attempt was made to improve the quality of the trace by the following procedures:

- 1.) adjusting the gain settings
- 2.) running at a reduced range scale
- 3.) running at a reduced speed
- 4.) changing the fish height
- 5.) running the area in opposite directions
- 6.) using the 500 KHz frequency

None of these modifications substantially improved the image. CONCUR

It is the ship's opinion that the bottom in this area is a poor reflector of acoustic energy. We do not believe that the light trace was caused by equipment malfunction since distinctive bottom characteristics, such as sand waves, were clearly seen at the eastern end of the lines. Bottom slope did not cause the problem since we ran adjacent lines in different directions over the same area. CONCUR

If a substantial object, such as a wreck, did exist in this area, it would appear as a significant black mark on the sonargram. Although we did see several small black marks, we believe none of those were of any consequence. We feel the lack of a high quality trace in this area does not justify the retention of the charted wreck. *CONCUR*

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

E.5 Contacts that were suspected of being the object of the AWOIS investigation were investigated by echosounder development and multiple side scan sonar passes. There were two diver investigations conducted during this survey. Refer to section N.5 of the individual investigation discussions for specific contact development procedures. ✓

E.6 Overlap was checked on-line using the real-time plot and the edited swath plot. Holidays were covered with additional side scan sonar passes. ✓

Two contact plots are submitted with this survey. The first plot shows all contacts logged during survey operations, while the second plot shows only those contacts with heights greater than two meters. The latter plot was used to determine which contacts were "significant" enough to warrant further investigation. *CONCUR*

The boulder field located in the eastern part of the survey area required special techniques to determine which contacts were most significant.* The following factors were taken into account when making these determinations:

- i. Contact height - Those with heights greater than three meters were given high priority. ✓
- ii. Multiple hits - Those contacts which were seen on adjacent passes and developments were given high priority. ✓
- iii. Proximity - In areas where contacts were clustered, only the most prominent contact was developed. ✓
- iv. Offsets - Contact heights computed with mid-range and greater offsets were given more credence than those with smaller offsets. ✓

* SEE ALSO SECTION 7.9.1) OF THE EVALUATION REPORT.

F. SOUNDING EQUIPMENT

F.1 Two Raytheon DSF-6000 echo sounders were used on this survey. Dates of use and serial numbers are as follows: ✓

<u>DSF-6000 S/N</u>	<u>From</u>	<u>To</u>
B050N *	April 8 DN 99	April 16 DN 107
A106N	April 17 DN 108	May 1 DN 122

* DSF-6000 S/N fail prior to commencing survey operations on April 17, DN 108.

F.2 One diver investigation was conducted during this survey utilized the ship's pneumatic depth gauge. No other sounding apparatus was used to collect soundings. ✓

F.3 There were no faults in soundings equipment that affected the accuracy/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. The Digibar Sound Velocity Probe s/n 169, was calibrated by the manufacturer, Odom Hydrographic Systems, Inc. on February 13, 1992. This calibration data can be found in SEPARATE IV. DATA FILED WITH FIELD RECORDS.

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 casts recorded on the following dates:

Cast Number	DN	Latitude	Longitude	HDAPS Table #	Applied to Days
01	97	41° 28.4 N	71° 19.0 W	01	99 - 101
02	106	41° 19.4' N	71° 11.4' W	020	104 - 112
03	120	41° 20.0' N	71° 12.7' W	03	113 - 122

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 was done with both DSF-6000Ns used during this survey. (s/n B050N and s/n A106N).

DSF-6000N s/n B050N

April 6, 1992 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.

DSF-6000N s/n A106N

April 12, 1992 at 41° 19.5' N 71° 13.4' W (85 ft depths)

The greatest variation between leadline and DSF soundings was 0.4 meters. Considering the ship's motion and the wire angle in the leadline from current (approximately 7°), this is excellent agreement and provides an adequate check that the echosounder was functioning properly.

Both lead lines used 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 lead lines.

Data from these comparison are in Separate IV. DATA FILED WITH FIELD RECORDS.

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.

A problem with the recording of heave correctors occurred with approximately three percent of the data on this survey. At random times, zero heave corrector would be recorded for periods of four selected soundings. It could not be determined if this was a problem with the ship's Hippy or with the HDAPS software. An abstract of data with "heave lock" problems is included in Separate IV. DATA FILED WITH FIELD RECORDS.

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

G.3 The following tabulation indicates which velocity tables were used for data collection and which velocity tables were used during final field processing. ✓

VELOCITY CAST APPLICATIONS

DN	VELOCITY CAST NO.	
	ON-LINE	FINAL
099 - 101	#1	#1
104 - 112	#2	n/a
113 - 120	#2	#3
121 - 122	#3	n/a

These correctors from these casts were used throughout the entire survey area. No special zoning was required.

G.4 The ship's deep water (0-140 fsw) pneumatic depth gauge was calibrated on October 3, 1991, by the manufacturer. Correctors from the calibration were not applied to pneumatic depths because all correctors were less than 0.1 meters. This calibration data can be found in SEPARATE IV.*

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.

Prior to each use of the pneumatic depth gauge it was compared to lead line s/n RUDE-1. The pneumatic depth gauge orifice, was securely attached to the 0 ft mark on the lead line. The lead line was then lowered into the water, stopping every five feet (down and up) to compare the lead line, to the pneumatic depth gauge. Current, wind and sea conditions contributed significantly to the discrepancies indicated in the comparison. Wire angles observed during the comparisons are listed on the raw data sheets. These comparisons are in SEPARATE IV.*

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	-0 13	-0 01	*0.88	*0.86

Tidal correctors were applied on-line using the HDAPS predicted tide table number 4.

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

A request for approved tides was mailed on May 2, 1992.**

** APPROVED TIDES APPLIED DURING OFFICE PROCESSING.

* 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 No horizontal control stations were established for this survey. Existing NGS stations were used. All horizontal control stations used during this survey are third-order with the exception of Beavertail Lighthouse Offset. ✓

H.4 All horizontal control stations are within NGS Quadrant N0410712. All are referenced to the NAD 83 Horizontal Datum. ✓

H.5 See Appendix III for the letter addressing horizontal control submitted for this project. DATA FILED WITH FIELD RECORDS. ✓

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

I. HYDROGRAPHIC POSITION CONTROL

I.1 This survey was conducted entirely with the use of the Falcon Mini-Ranger system. ✓

I.2 Accuracy requirements were met as specified by the Hydrographic Manual and Field Procedures Manual (FPM). ✓

I.3 Control Equipment: ✓

Mini-Ranger:

Falcon 484 by Motorola Inc.

Serial Numbers:

RPU	F-0246		
R/T	F-3409		
R/S:	F-3222	(code 4)	-1.2
	F-3296	(code 5)	-2.9
	F-3217	(code 9)	-7.3
	F-3241	(code 8)	+0.1

I.4 Calibration procedures for the positioning system is as follows: ✓

As stated in section 3.1.3.3 of the Field Procedures Manual for Hydrographic Surveying, 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 DN 71. These data are included in Separate III. DATA FILED WITH FIELD RECORDS.

I.5 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 was entered into the HDAPS system using the Pre-Survey C-0 Table. This table 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. Overall, calibration data applied to the raw Mini-Ranger ranges was adequate and effective. ✓

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

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

c) Fog was encountered on four consecutive days (DN 111 through DN 114) during the course of the survey. Falcon signal strengths were noticeably less, but still above MASS, and survey operation continued.

There were no other occurrences of 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) 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. Offset table 1 is on file with the Atlantic Hydrographic Section.*

g) Offset and layback distances for the A-frame (tow point) were located 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. Offset table 1 is on file with the Atlantic Hydrographic Section.*

* DATA FILED WITH FIELD RECORDS.

Handwritten signature and date: 4/13/92

J. SHORELINE SEE SECTION 2.6. OF THE EVALUATION REPORT.

The field sheet does not encompass any shoreline. ✓

K. CROSSLINES SEE SECTION 3.9. OF THE EVALUATION REPORT.

Crosslines for this survey were run on two different days. The crosslines run on DN 115, are approximately 0.5 meters shoaler than the main scheme soundings. The crosslines run on DN 118, agree within 0.2 meters of the main scheme soundings. Predicted tides is the likely cause for this slight discrepancy.

L. JUNCTIONS SEE SECTION 5. OF THE EVALUATION REPORT

This survey does not junction with any current surveys. ✓

M. COMPARISON WITH PRIOR SURVEYS SEE SECTION 6. OF THE EVALUATION REPORT.

This section is to be addressed by the Atlantic Hydrographic Section. ✓

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

N.1 Chart Affected by Survey

Comparisons between the current survey and the following large scale chart of the area were made.

Chart 13218, 31st Ed.
Date: January 11, 1992
Scale: 1:80,000

No Notice to Mariners affected the survey area on this chart

N.2 AWOIS Items - Background Information

This survey began as a field examination survey which called for the resolution of AWOIS Items 6949 and 7889. Background information concerning these items follow:

AWOIS 6949

Charted Feature: Dangerous Submerged Wreck (PA)

Source: LNM 39/84 - 34 Ft Fishing Vessel in 86 ft
SSW of Sakonnet Point

Charted Position: 41° 21' 18.37" N, 71° 13' 28.16" W (NAD 83)

Survey Requirements: 3000 m Radius, 200% side scan coverage

AWOIS 7889

Charted Feature: 60 foot sounding reported 1990

Source: CL578/90 - Navy minesweeper reported 2 ridges
on echo sounder. The shoal was approximately
61 feet at MLLW.

Charted Position: 41° 21' 04.78" N, 71° 11' 28.74" W (NAD 83)

Survey Requirements: 700 m search radius, 400 percent SS
coverage

N.3 Preliminary Investigation Procedures

The initial search for these two items was combined into one survey as the two search circles overlapped. The smaller feature's search area (AWOIS 7889) overlapped the portion of the larger search area.

The first 100 percent side scan sonar coverage was run in a North/South direction. The 150 meter side scan sonar range scale was utilized for the entire first 100 percent. The following observations were made upon completion of this portion of the survey:

1. The bottom in the western two thirds of the search area was quite regular and few contacts were logged.
2. A wreck was discovered in the southwest quadrant of the survey area (Development 1). Divers identified the wreck as an old tugboat, perhaps 60 to 80 feet in length. It was obviously not the fishing vessel that was the original subject of the investigation. No trace of the fishing vessel was apparent.
3. A boulder field was discovered in the eastern part of the survey area. This area was quite likely the origin of the Navy's original report. SEE ALSO SECTIONS (6.4. AND 7.4.1) OF THE EVALUATION REPORT.

At this time, a decision was made to proceed with the second 100% sonar coverage in the same North/South orientation. The scope of the investigation was then changed to that of a basic survey.

N.4 Method of Development

After the second 100% was completed, two contact plots were constructed. One plot showed all the contacts which were logged in the area while the second plot displayed only those contacts which had computed heights greater than 2 meters above the bottom. This second plot was more useful as it only showed contacts which might have some significance (a height greater than 10% of the water depth).

From the contact plots, thirteen areas were identified for further side scan sonar developments. These areas were numbered 2 through 13. The submerged tugboat had already been investigated and designated Development 1. Developments 9, 10, and 12 had their origins from questionable "strays" on the echo sounder record. Side scan sonar passes eventually proved all of the echo sounder strays were not real bottom features.

A three tier approach was used to investigate the significant contacts:

- 1) The contacts were re-examined at the 75 meter range scale. Contacts were then re-evaluated for significance.

2) Significant contacts were developed by echo sounder investigation. If more than one contact fell within one of the original side scan sonar search areas, the echo sounding investigation was given an alphabetical designation. For example, developments 7A, 7B, 7C...7I are all individual echo sounder developments which fall within the original side scan investigation area which was designated development 7.

Most contacts required five meter echo sounding line spacing to adequately determine a least depth. In several cases, the ship tried to drift over the contact position and take detached positions when the boulder appeared on the echo sounding record.

3) In addition to the submerged tugboat (development 1), only one other contact was investigated by divers. This contact was designated development 4. The contact presented a unique image on the sonagram and it was suspected of being a wreck. Divers found it to be a boulder.

N.5 Development Results

The results of all developments are abstracted on the following pages. Development 1 (submerged tugboat) and development 4 (dive on boulder) are discussed in detail.

The least depth within the survey area was found to be ^{20.9}21.0 m (68.9⁶ft) at position 1172 (Development 7I). SEE ALSO 7.A.1) OF THE EVALUATION REPORT.

N.6 Comparison to Chart 13218, 31st Ed, Jan 11, 1992 (1:80,000)

In order to perform comparisons between charted depths and survey soundings, a 1:80,000 comparison sheet was constructed. Positions of 17 depths were scaled off the chart and entered into a cartographic table. The table was then plotted on a sheet of mylar. This sheet was overlaid on the chart to ensure positions and depths were scaled off accurately.

Depths within the cartographic table were changed from feet to meters and then re-plotted on a sheet of mylar at the scale of the current survey.

Ten of the seventeen charted depths agree with the current survey depths within 0.2 meters. All but two charted depths agree within 0.9 meters. Charted depths appear to be slightly shoaler than current survey depths.

N.7 Discrepancies Between the Chart and the Current Survey

Three major discrepancies exist between the chart and the current survey.

- i. The current survey found no evidence which supported the existence of the 34-foot fishing vessel described in AWOIS 6949. *CONCUR* ✓
- ii. The charted 60-foot depth as described in AWOIS 7889 was also not discovered. *CONCUR* ✓
- iii. The least depth on the current survey, (~~21.0~~^{24.9} m, 68.⁶ ft, Dev 7I) is shoaler than the currently charted 74 foot depth near this position. *CONCUR* ✓

N.8 Survey Conclusions and Charting Recommendations

No Dangers to Navigation Report was issued in conjunction with this survey.

The following charting recommendations are made:

- i. Delete the wreck (PA) from the chart (AWOIS 6949). *CONCUR* ✓
- ii. Add the non-dangerous wreck based on Development 1.* ✓
** SEE PAGE 22 OF THIS REPORT*
- iii. Delete the sixty foot shoal reported by the Navy minesweeper (AWOIS 7889). We believe their depth was inaccurately measured or the shoal may exist outside the survey area. *CONCUR* ✓
It is quite likely the boulder field in the eastern part of the survey area extends to the northeast toward Sakonnet Point. Although the AWOIS 7889 search area was not run with 400 percent coverage, we are confident that all the significant features have been adequately defined. *CONCUR*
- iv. Base all future chart depths on soundings from this survey. ✓
Add a note of "Bld" indicating the boulder area to the chart. *SEE ALSO SECTIONS 6.9. AND 7.9.1) OF THE EVALUATION REPORT.*

N.9 Development Abstracts and Writeups

DEVELOPMENT #1

DEV1.1 This development originated as contact (371.19P) while searching for AWOIS 6949. The contact was first discovered on the 150 meter range scale and then developed at lesser scales. Dive investigation of this contact revealed it to be the wreck of a 60 to 80 foot long tug boat and not the a 34 ft fishing vessel, the object of AWOIS 6949. The least depth of this contact was determined by echo sounder. ✓

DEV1.2 Item Location ✓

This was an uncharted wreck, so no position was provided.

DEV1.3 Source of Item ✓

Source of this item is unknown.

DEV1.4 Largest Scale Chart Affected ✓

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

DEV1.5 Investigation Procedures ✓

This contact was found while conducting the first 100% side scan sonar coverage for AWOIS 6949. Further reconnaissance was completed on the 50 meter range scale and the decision was made to conduct a dive investigation on this item.

The divers indicated that the wreck was a tug boat 60 to 80 feet in length, lying in a NE SW orientation. The tug is in one piece and rests upright on her keel in 90 ft of water. The divers swam the entire wreck and determined the shoalest point to be on the tug's stack, as measured with the divers depth gauge. The wreck was marked with the divers taught line buoy and then developed with the ships echo sounder.

DEV1.6 Investigation Results ✓

A least depth for this item was determined by echo sounder development. Least depth information for this contact is as follows:

FIX	386.1
LATITUDE	41° 20' 54.5 ⁷ " N
LONGITUDE	71° 14' 33.92" W
LEAST DEPTH (MLLW)	23.9 ^{24.1} meters

LORAN Coordinates:

Master 9960	W-14382.5	X-25698.2	Y-43931.2	Z-60156.6
SNR: 877	825	939	858	523

DEV1.7 Explanation for Position Difference ✓

Not applicable.

DEV1.8 Least Depth Information ✓

See section "DEV1.6".

DEV1.9 Charting Recommendation ✓

IT IS RECOMMENDED THAT A WRECK WITH A KNOWN DEPTH OF 24.1 METERS
~~This feature should be charted as a non-dangerous wreck.~~
(24'WK) BE CHARTED IN PRESENT SURVEY LOCATION.

DEV1.10 Danger to Navigation Report ✓

None submitted. This item is not a danger to navigation. CONCUR ✓

DEVELOPMENT #4

DEV4.1 This development originated as contact 61⁶5.15S while searching for AWOIS 6949. The contact was first discovered on the 150 meter range scale and then developed at lesser scales. A dive investigation of this contact revealed it to be a rock. ✓

DEV4.2 Item Location ✓

This was previously uncharted.

DEV4.3 Source of Item ✓

Source of this item is unknown.

DEV4.4 Largest Scale Chart Affected ✓

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

DEV4.5 Investigation Procedures ✓

This contact was found while conducting the first 100% side scan sonar coverage for AWOIS 6949. Further development was conducted with the 50 meter range scale and the decision was made to conduct a dive investigation of this item.

The divers indicated that this item was a round rock, covered with marine growth. The divers depth gauge indicated 75 ft at the top of the rock and 82 ft at the base. The bottom around the rock consists of coarse brown sand. The least depth of this rock was determined by pneumatic depth gauge was 22.3⁵ meters and the position was determined by D.P. No. 980, taken on the dive buoy which the diver placed on top of the rock.

DEV4.6 Investigation Results

A least depth for this item was determined by pneumatic depth gauge. Least depth information for this contact is as follows:

FIX	980
LATITUDE	41° 22' 21.6 ² 0" N
LONGITUDE	71° 12' 10.5 ⁸ 7" W
LEAST DEPTH (MLLW)	22.2 ³ meters (predicted tides)

LORAN Coordinates: Not observed, SNR very low on master.

DEV4.7 Explanation for Position Difference

Not applicable.

DEV4.8 Least Depth Information

The least depth of this item was determined with the ship pneumatic depth gauge and found to be 22.2 meters.

DEV4.9 Charting Recommendation

IT IS RECOMMENDED THAT A ROCK WITH A KNOWN DEPTH OF 22.3 METERS
~~This feature should be charted as a 22.2 meter sounding.~~

(22³RK) BE CHARTED IN PRESENT SURVEY LOCATION.

DEV4.10 Danger to Navigation Report

None submitted. This feature is not a danger to navigation.

DEVELOPMENTS: H-10422

Dev	Side Scan Contact Numbers	SS Dev Posns	Hydro Dev Posns	Least Depth(m)	LD Pos	Geographic Position	Remarks
1	371.19P, 376.18S 780.13P	376-383	384-402	24.0 ¹	386.1	41° 20' 54.5 ⁷ " 71° 14' 33.92"	subm wk (dive) NO DIVE CC 268 PERFORMED
2	723.47S, 313.38S	864-867	None	----	----	-----	Not sig
3	710.39S, 858.21S	858-861	None	----	----	-----	Not sig
4	616.15S, 524.03P 884.215P, 886.20S	880-891	976-981	22.2 ³	980	41° 22' 21.60 ⁷ " 71° 12' 10.57 ⁸ "	Boulder (dive) CC 263
5	949.23S 574.09P	947-950	1215-1216 982-1009	23.8 ⁷	988.1	41° 22' 13.38 ⁴⁰ " 71° 11' 25.26 ⁷ "	Boulder CC 263
6A	868.085P, 868.095P 874.26S, 504.58S	868-879	1013-1031	26.0	1025.2	41° 21' 40.37 ⁹ " 71° 12' 20.25"	Boulder CC 263
6B	613.44S, 521.34P 868.31P, 871.57P 878.22S	868-879	1032-1041	25.1 ⁰	1032.1	41° 21' 40.71 ³ " 71° 12' 11.74 ⁵ "	Boulder CC 263

DEVELOPMENTS: H-10422

Dev	Side Scan Contact Numbers	SS Dev Posns	Hydro Dev Posns	Least Depth(m)	ID Pos	Geographic Position	Remarks
7A	942.39S, 703.11S 698.03S	905-946	1042-1049	24.2	1042.1	41° 21' 19.7 ³ 1" 71° 10' 58.48 ⁹ "	Boulder cc 263
7B	560.55S, 939.01P	905-946	1050-1067	27.0	1064.1	41° 21' 10.32 ⁴ " 71° 11' 19.69 ^{7φ} "	Boulder cc 263
7C	546.20P, 582.55P 929.37S	905-946	1068-1079	23.7	1068.1	41° 20' 56.52 ⁴ " 71° 11' 46.45 ⁶ "	Boulder cc 263
7D	578.31S	905-946	1080-1095	28.0	1080.2	41° 20' 52.54 ⁶ " 71° 11' 27.48 ⁹ "	Boulder cc 263
7E	534.36S, 593.21S	905-946	1096-1107	26.7	1100.2	41° 20' 44.26 ⁷ " 71° 11' 54.74"	Boulder cc 263
7F	517.59S	905-946	1108-1123	29.2 ¹	1108.2	41° 20' 38.75 ⁷ " 71° 12' 05.46 ⁷ "	Boulder cc 263
7G	479.16S, 632.37P 908.42P, 913.51P	905-946	1124-1131	30.4 ³	1124.2	41° 20' 27.85 ⁷ " 71° 12' 40.86 ⁸ "	Boulder cc 263
7H	934.11P	905-946	1132-1151	24.0 ²	519.1	41° 21' 02.28 ⁹ " 71° 12' 07.33"	Boulder cc 263

DEVELOPMENTS: H-10422

Dev	Side Scan Contact Numbers	SS Dev Posns	Hydro Dev Posns	Least Depth(m)	LD Pos	Geographic Position	Remarks
7I	592.11S	905-946	115^z-1173	21.0	1173	41° 21' 08.87" 71° 11' 53.54"	Boulder -ee-263
8	898.04P, 902.57P 900.16P, 597.28S	894-909	1174-1199	29.9	1184.2	41° 20' 03.68" 71° 11' 59.95" ^{1P} ₂	Boulder cc 263
9	Fatho Spike (1) (449.5)	862-863	None	---	---	-----	Not seen
10	Fatho Spike (2) (809.6)	850-853	None	---	---	-----	Not seen
11	854.17S, 856.18P 759.17P	854-857	None	---	---	-----	Not sig.
12	Fatho Spike (854.57)	892-893	None	---	---	-----	Not sig.
13	736.09P	1217-1220	None	---	---	-----	Not sig.

O. ADEQUACY OF SURVEY SEE SECTION 8. OF THE EVALUATION REPORT.

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

O.2 There are no parts of the survey that are considered incomplete or substandard. ✓

P. AIDS TO NAVIGATION SEE SECTION 7.C. 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	920	-
	b) Lineal nautical miles of sounding lines		-
	-nautical miles of survey with the use of the side scan sonar	156.56	-
	-nautical miles of survey without the use of the side scan sonar	29.87	-
Q.2	a) square nautical miles of hydrography	8.26	-
	b) days of production	15	-
	c) detached positions	2	-
	-one for diver investigation		
	d) bottom samples	12	-
	e) tide stations	1	-
	f) current stations	0	-
	g) velocity casts	2	-
	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) The tidal current tables for the area predict currents to be generally one knot. Observations by divers confirmed both time and speed of the predicted currents. ✓

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

R.2 Of the 12 bottom samples taken, none were submitted to the Smithsonian Institution. ✓

S. RECOMMENDATIONS

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 1 Jun 1992

No	Type	Latitude	Longitude	H	Cart	Freq	Vel	Code	MM/DD/YY	Station Name
121	F	041:26:57.711	071:23:57.797	20	250	0.0	0.0	9	04/01/92	BEAVERTAIL LIGHT OFFSET, 1991
130	F	041:28:37.725	071:14:27.579	17	250	0.0	0.0	8	04/02/92	SACHUEST, 1940
131	F	041:27:40.811	071:10:19.818	19	250	0.0	0.0	5	04/02/92	WARREN RESET, 1940
132	F	041:24:52.193	070:56:58.452	10	250	0.0	0.0	7	03/01/91	CUTTYHUNK LIGHTHOUSE, 1904

APPENDIX VII. APPROVAL SHEET

LETTER OF APPROVAL

REGISTRY NO. H-10422

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



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: July 17, 1992

MARINE CENTER: Atlantic

OPR: B660-RU-92

HYDROGRAPHIC SHEET: H-10422

LOCALITY: Rhode Island, Rhode Island Sound, Six Miles South of
Sakonnet Point

TIME PERIOD: April 8 - May 1, 1992

TIDE STATION USED: 845-0768 Sakonnet Yacht Club, Rhode Island
Lat. $41^{\circ} 27.9'N$ Lon. $71^{\circ} 11.6'W$

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

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

REMARKS: RECOMMENDED ZONING

East of $71^{\circ} 23.0'W$ Longitude, west of $71^{\circ} 0.0'W$ Longitude, south
of $41^{\circ} 30.0'N$ Latitude and north of $41^{\circ} 18.0'N$ Latitude, times are
direct and apply a x0.92 range ratio to Sakonnet Yacht Club, Rhode
Island (845-0768).

Note: Times are tabulated in Eastern Standard Time.


CHIEF, DATUMS SECTION



GEOGRAPHIC NAMES

Name on Survey	ON CHART NO. 13218 13221 ON PREVIOUS SURVEY NO. ON U.S. QUADRANGLE MAPS FROM LOCAL INFORMATION ON LOCAL MAPS P.O. GUIDE OR MAP ATLAS GRAND MCNALLY U.S. LIGHT LIST											
	A	B	C	D	E	F	G	H	K			
RHODE ISLAND (title)	X											1
RHODE ISLAND SOUND (title)	X											2
SAKONNET POINT (title)	X											3
												4
												5
												6
												7
												8
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												25

Approved:

Charles A. Harrington
 Chief Geographer - N/Ch 2x5

JUN 29 1992

LETTER TRANSMITTING DATA

N/CG244-82-92

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

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

TO:

Chief, Data Control Section, N/CG243
 NOAA/National Ocean Service
 Room 151, WSC-2, 6015 Executive Blvd.,
 Rockville, Maryland 20852

DATE FORWARDED

5 November 1992

NUMBER OF PACKAGES

1 Boxes, 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-10422

Rhode Island, Rhode Island Sound,
Six NM South of Sakonnet Point

Ekg. Tube

- 1 Final Smooth Sheet**
- 1 Final Position Overlay**
- 2 Excess Sounding Overlays**
- 1 Final Field Sheets**
- 2 Original Descriptive Report**

Ekg. Box

- 1 Accordion file containing fathograms, data printouts, and sonargrams for VESNO 9040 for JD's--99-101, 104-105**
- 1 Accordion file containing fathograms, data printouts, and sonargrams for VESNO 9040 for JD's--106-107, 111, 112 no sonargrams, 113-115, 118-119 no sonargrams, 120, 122**
- 1 Cahier containing FINAL POSITION PRINTOUT, FINAL SOUNDING PRINTOUT and L-FILE**
- 1 Envelope containing Supplemental Data Removed from Original Descriptive Report**
- 1 Binder containing Separates for survey H-10422**

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

D. S. Clark
 11/6/92

11/04/92

HYDROGRAPHIC SURVEY STATISTICS
REGISTRY NUMBER: H-10422

NUMBER OF CONTROL STATIONS	4
NUMBER OF POSITIONS	730
NUMBER OF SOUNDINGS	3353

	TIME-HOURS	DATE COMPLETED
PREPROCESSING EXAMINATION	268	06/19/92
VERIFICATION OF FIELD DATA	73	10/16/92
ELECTRONIC DATA PROCESSING	20	
QUALITY CONTROL CHECKS	27	
EVALUATION AND ANALYSIS	19	10/29/92
FINAL INSPECTION	6	10/23/92
TOTAL TIME	413	
ATLANTIC HYDROGRAPHIC SECTION APPROVAL		10/29/92

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

SURVEY NO.: H-10422

FIELD NO.: RU-20-3-92

Rhode Island, Rhode Island Sound, Six NM South of Sakonnet Point

SURVEYED: 8 April through 1 May 1992

SCALE: 1:20,000

PROJECT NO.: OPR-B660-RU-92

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

CONTROL: MOTOROLA Falcon Mini-Ranger (Range/Range)

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

Surveyed by.....P. L. Schattgen
.....M. J. Oberlies
.....J. A. Illg
.....D. E. Williams

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

1. INTRODUCTION

a. The purpose of this survey was to verify or disprove assigned Automated Wreck and Obstruction Information System (AWOIS) items #6949 and #7889.

b. Automated Wreck and Obstruction Information System item #7889, a charted 60-ft (18² meters) sounding, reported 1990 was investigated during the present survey. The area was determined to be a boulder field. The field unit performed a 200% side scan sonar investigation within a 700 meters search radius. The requirements were for a 400% side scan sonar investigation. A discussion with Lieutenant Commander John Wilder, NOAA, NCG/241, (301)-443-8752, September 11, 1992, on the nature of the area has allowed the requirement to be reduced to a 200% side scan sonar investigation. See section N., pages 17-20 of the Descriptive Report for charting recommendations.

c. This is a side scan sonar survey. A RAYTHEON DSF-6000N Fathometer was operated concurrently with the side scan sonar.

d. No unusual problems were encountered during office processing.

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

2. CONTROL AND SHORELINE

a. Control is adequately discussed in sections H. and I. of the Descriptive Report.

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 plots have been annotated with ticks showing the computed mean shift between the survey datum and the North American Datum of 1927 (NAD 27). To place this survey on the NAD 27 datum move the projection lines 0.378 seconds (11.661 meters or 0.58 mm at the scale of the survey) north in latitude, and 1.839 seconds (42.744 meters or 2.14 mm at the scale of the survey) east in longitude.

b. There is no shoreline within the limits of the present survey.

3. HYDROGRAPHY

a. Soundings at crossings are in excellent agreement and comply with the criteria found in sections 4.6.1. and 6.3.4.3. of the HYDROGRAPHIC MANUAL.

b. The standard 25 and 30 meter depth curves were drawn in their entirety.

c. The development of the bottom configuration and determination of least depths of items located and shown on the smooth plots is considered adequate.

4. CONDITION OF SURVEY

The smooth sheet accompanying overlays, hydrographic records and reports conform to the requirements of the HYDROGRAPHIC MANUAL and the FIELD PROCEDURES MANUAL.

The field unit developed a HDAPS program "CORRELATOR" to aid in determining contacts which may be the same. This program computes the distance between all contacts in the contact list and records all contacts within a specified distance. This allows the field unit to determine significant contacts for additional work. This program should be utilized by all field units performing side scan operations.

5. JUNCTIONS

There are no contemporary junctional surveys or junctional requirements in the Project Instructions.

6. COMPARISON WITH PRIOR SURVEYS

a. Hydrographic

H-6444 (1939) 1:40,000

Prior survey H-6444 (1939) covers the present survey in its entirety. The present survey depths range from 20⁹ meters (68.5 feet) to 37 meters (121.4 feet). Prior survey depths range from 24⁹ meters (82 feet) to 36³ meters (119 feet) and show a general trend of being 0³ to 0⁶ meters (1 to 2 feet) shoaler than present survey soundings. The 20⁹ meters depth shown on the present survey is a sounding on a rock, in a boulder field. The rock and boulder field were determined by the present survey. A discussion of the 20⁹Rk and boulder field can be found in section 7.a.1) of this report. Additional shoal depths shown on the smooth sheet as rocks are discussed in section 7.a.2) of this report.

The difference between the above prior survey and the present survey may be attributed to echo sounding technology employed.

The present survey is adequate to supersede the above prior survey within the common areas.

b. Wire Drag

H-4006WD (1917) 1:20,000

There are no hangs or groundings common to survey H-4006WD (1917) and the present survey. There are no conflicts between effective depths of survey H-4006WD (1917) and the present survey soundings.

The present survey is adequate to supersede the above prior survey within the common areas.

7. COMPARISON WITH CHART 13218 (31st. Ed., 11 Jan. 1992)
13221 (47th. Ed., 23 Mar. 1991)

a. Hydrography

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

1) An uncharted boulder field in the vicinity of Latitude 41°21'00.0"N, Longitude 71°11'30.0"W was investigated by the field unit. The limits of the boulder field were determined from the sonargrams during office processing and are shown on the present survey. A rock with a minimally observed depth of 20⁹ meters, in Latitude 41°21'08.68"N, Longitude 71°11'53.61"W was located by the present survey. The 20⁹Rk falls within the limits of the boulder field. It is recommended that the 20⁹Rk, limits of the boulder field, and the notation "blds" be charted as shown on present survey.

2) Several non-dangerous submerged rocks were located by the present survey. It is recommended that the appropriate amount of rocks be charted in consideration to chart scale.

The present survey is adequate to supersede the charted hydrography within the common areas.

b. Dangers to Navigation

There were no dangers to navigation submitted by the field unit on this survey. No dangers were noted during office processing.

c. Aids to Navigation

No aids to navigation were investigated during this survey and there are no aids charted in the survey area.

8. COMPLIANCE WITH INSTRUCTIONS

This is an excellent survey and complies with the Project Instructions.

9. ADDITIONAL FIELD WORK

No additional work is required.

Franklin L. Saunders

Franklin L. Saunders, Cartographic Technician

Norris A. Wike

Norris A. Wike, Cartographer

RUDE Processing Team
Verification and Evaluation and Analysis

APPROVAL SHEET
H-10422

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 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.

R. D. Sanocki
R. D. Sanocki
Chief, Hydrographic Processing Unit
Atlantic Hydrographic Section

Date: Oct 29, 1992

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

Date: Oct. 29, 1992

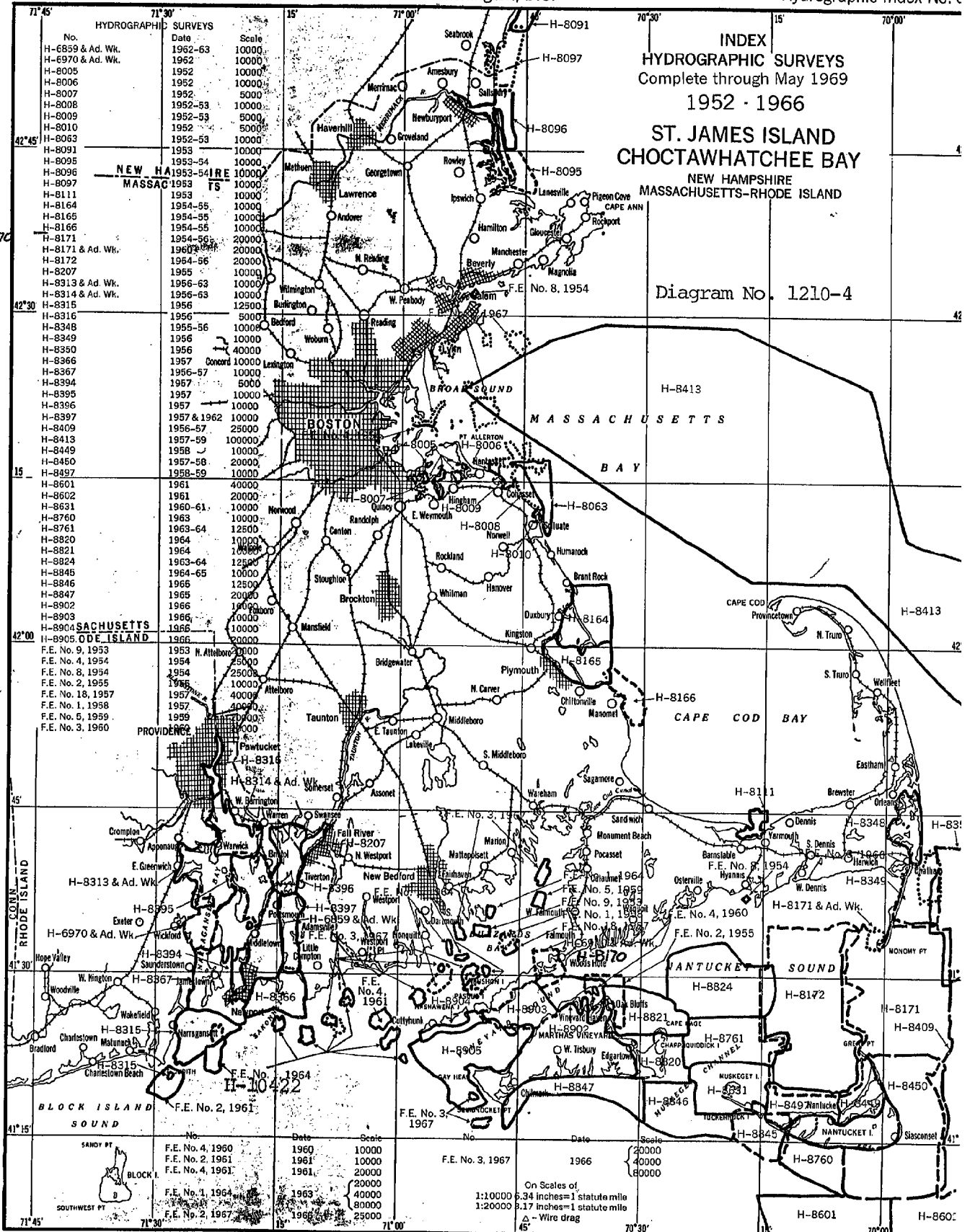
Final Approval:

Approved: James W. Yeager
for J Austin Yeager
Rear Admiral, NOAA
Director, Coast and Geodetic Survey

Date: 12/8/94

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

Hydrographic Index No. 6



MARINE CHART BRANCH
RECORD OF APPLICATION TO CHARTS

FILE WITH DESCRIPTIVE REPORT OF SURVEY NO. H-10422

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
13218	12-23-92	Roy Diamond	Full Part Before After Marine Center Approval Signed Via Roy Diamond Drawing No. 69
12300	1/11/93	John Barber	Full Part Before After Marine Center Approval Signed Via Drawing No. 52 thru chrt 13218
13221 (extension)	2/16/95	John Barber	Full Part Before After Marine Center Approval Signed Via Drawing No. 62 Fully APP'd to extension
			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.
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