

NOAA FORM 78-35A

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

## DESCRIPTIVE REPORT

*Type of Survey* . HYDROGRAPHIC/SIDE SCAN SONAR..

*Field No.* ..... RU-10-1-93.....

*Registry No.* ..... H-10461.....

### LOCALITY

*State* ..... MASSACHUSETTS.....

*General Locality*..... BUZZARDS BAY.....

*Sublocality* ..... 3.0 NM. NORTH OF.....

..... NAUSHON ISLAND.....

..... 19 93.....

..... CHIEF OF PARTY.....

..... LCDR. D. R. HERLIHY, NOAA.....

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*DATE* ..... JUL 19 1995.....

# H10461

HYDROGRAPHIC TITLE SHEET

H-10461

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-10-1-93

State Massachusetts

General locality Buzzards Bay

Locality ~~3.0 NM East of Wilkes Ledge~~ 3.0 NM NORTH OF NAUSHON ISLAND

Scale 1:10,000 Date of survey March 24 to August 16, 1993

Instructions dated 3 May 1993 Project No. B616-RU-93

Vessel NOAA Ship RUDE (9040)

Chief of party LCDR Daniel R. Herlihy, NOAA

Surveyed by D. R. Herlihy, T. A. Nichel, R. T. Brennan, T. A. Haupt, D. E. Williams

Soundings taken by echo sounder, ~~hand lead, pole~~ Pneumatic Depth Gauge

Graphic record scaled by TAN, RTB, TAH, DEW

Graphic record checked by TAN, RTB, TAH, DEW

Protracted by N/A Automated plot by N/A ENCAD NOVATER ZII

Verification by N/A ATLANTIC HYDROGRAPHIC BRANCH PERSONNEL

Soundings in ~~fathoms~~ ~~feet~~ ~~at MLLW~~ ~~MLLW~~ <sup>feet</sup> meters at MLLW

REMARKS: All times recorded in UTC

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

SL-14-97 Awoisand SURF - Pnd 8/95

55'

50'

B616-RU-93

H-10461

RU-10-1-93

Massachusetts-Buzzards Bay

3 NM East of Wilkes Ledge

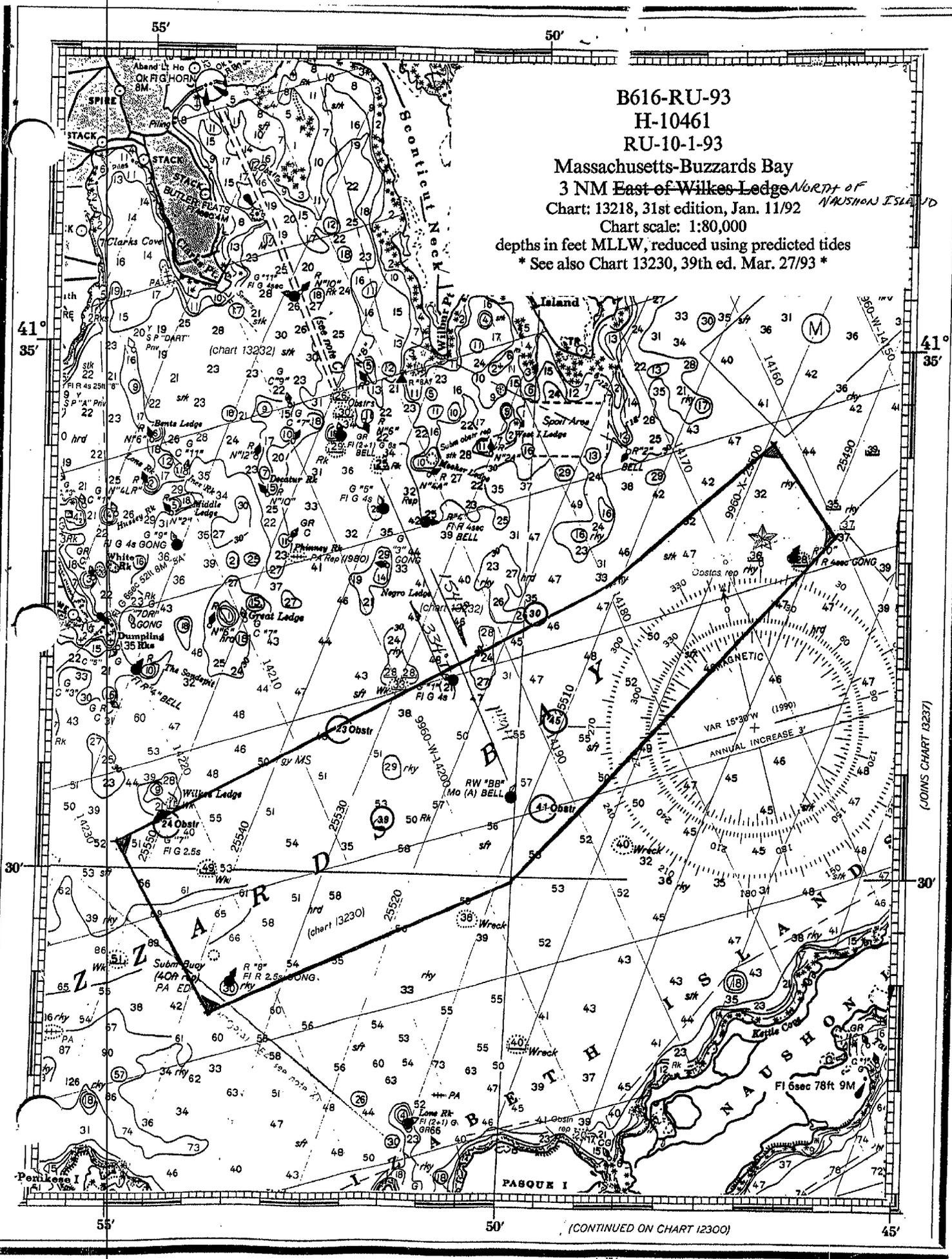
Chart: 13218, 31st edition, Jan. 11/92

Chart scale: 1:80,000

depths in feet MLLW, reduced using predicted tides

\* See also Chart 13230, 39th ed. Mar. 27/93 \*

NORTH OF NAUSHON ISLAND



41° 35'

41° 35'

30'

30'

55'

50'

45'

(CONTINUED ON CHART 12300)

(JOINS CHART 13237)

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**A. PROJECT**

**A.1** This survey was conducted in accordance with Hydrographic Project Instructions OPR-B616-RU, Buzzards Bay, Nantucket and Vineyard Sound, Massachusetts.

**A.2** The original date of the instructions is May 3, 1993.

**A.3** There have been no changes, to date, for this project.

**A.4** This Descriptive Report covers the navigable area survey conducted on sheet "C" of project B616-RU-93 in the Buzzards Bay navigation corridor as specified by the project instructions.

**A.5** Project OPR-B616-RU responds to requests from the U.S. Coast Guard and the Coast and Geodetic Survey's Mapping and Charting Branch to investigate certain reported submerged wrecks and obstructions in Buzzards Bay, and to complete surveys of the four general anchorages in Buzzards Bay.

**B. AREA SURVEYED**

This survey encompasses the area in Buzzards Bay ranging from Wilkes Ledge in the southwest to the red "R 10" buoy in the northeast, and represents the second of four sheets proceeding north from the entrance of the bay. The exact boundaries of this navigable area survey lie between the following coordinates, starting in the northern most corner and proceeding clockwise:

41°34'10"N	070°46'54"W
41°33'21"N	070°46'09"W
41°29'57"N	070°50'00"W
41°28'42"N	070°53'48"W
41°30'15"N	070°55'06"W
41°32'48"N	070°49'00"W

Data collection on this survey began on March 24, 1993 (DN 083) and concluded on August 16, 1993 (DN 228).

**C. SURVEY VESSELS**

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

<b>Vessels</b>	<b>Processing Number</b>	<b>Primary Function</b>
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 following HDAPS software versions:

<b>Program</b>	<b>Version</b>	<b>Dates Used</b>
DAS_SURV	6.33	DN 083-174
	6.38	DN 175-228
POSTSUR	6.00	DN 083-174
	6.01	DN 175-228

**D.2** Additional software includes program **VELOCITY (version 2.00 - December 18, 1992)** used to generate sound velocity corrector tables.

**D.3** No non-standard automated data acquisition or processing methods were used.

**E. SONAR EQUIPMENT**

**E.1** Side scan sonar operations were conducted using an EG&G Model 260 image corrected side scan sonar recorder and a Model 272-T single frequency towfish. All side scan operations were conducted from the RUDE. Equipment serial numbers and corresponding dates used are as follows:

Equipment Type	Serial Number	Dates Used
Recorder	10884	DN 083-228
Towfish	11901	DN 083-228

E.2 The side scan sonar towfish was configured with a 20° beam depression, the normal setting, 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 exclusively for this survey. Given the average depth of water in the survey area, this range scale was used to provide optimum contact resolution. There were isolated areas where the sea floor rose up sharply causing the coverage to narrow. These areas of reduced coverage were easily recognized because the on-line swath plot would "neck down", leaving "holidays" or areas with no overlap. To compensate for this lack of coverage, holiday coverage was run to close these gaps. All side scan coverage was ultimately checked with a smooth plot to insure proper overlap between consecutive lines.

The current Field Procedures Manual (FPM) specification was used to determine maximum line spacing with Differential Global Positioning System (DGPS) positioning:

$$LS_{\max} = 2RS - 2EPE_{\max}$$

where:  $LS_{\max}$  = maximum line spacing

RS = range scale (100 meters)

EPE = estimated positional error

For a 1:10,000 scale survey, a maximum EPE of 15 meters is permitted. Using this value in the above equation yields a maximum line spacing of 170 meters. Data collected with an EPE of 15 or greater was either rejected or smoothed in the post-processing phase of the survey, so the maximum line spacing was never exceeded. In addition, the actual line spacing for the side scan sonar coverage of this survey was 160 meters. This line spacing was chosen to 1) give an added margin on coverage, and 2) to allow an even number of hydro lines to be run in between each main scheme line (i.e. seven lines at 20-meter spacing between two mainscheme lines).

Estimated Positional Error (EPE) values in excess of 15 meters may be seen in the raw data printout, most typically ranging between 408.2 and 409.2. These values were not considered in the line spacing calculations above due to their acceptable corresponding HDOP values. These excessive values were investigated in the HDAPS Graphic Sounding Edit program. The excessive EPE values were consistently found to be erroneous when accompanied by an acceptable HDOP value. The high EPE values appear to be caused by an HDAPS software deficiency.

b) Confidence checks were obtained by noting recognizable bottom characteristics at the edges of the sonar range scale in use. Features such as sand waves, buoy anchors and trawl door scours were commonly used for this purpose.

c) Two hundred percent side scan sonar coverage was completed for this survey.

d) The most representative bottom composition for this survey consisted of soft silt and sand. Due to the inherent characteristics of this type of bottom, with its lack of sonar contacts, there are segments of data with significant gaps between confidence checks. It is the opinion of the hydrographer that this data is acceptable due to confidence checks seen before and after these barren areas.

Except as noted above, all side scan sonar records acquired during this survey were clear with excellent returns. There were several occasions when the side scan sonar towfish became entangled in lobster pot buoy lines, temporarily whitening out the sonargram. On these occasions, the towfish was brought on board and inspected, with all affected data subsequently being rejected.

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

E.5 Significant contacts were grouped into "developments" and were investigated by intensive echosounder investigation. Tight line spacing, at times as close as five meters, was used to conduct these investigations. Some contacts investigated by echosounder justified diver investigations. Twenty diver investigations were conducted during this survey. Dive reports are included in Separate VII. *APPENDED TO THIS REPORT*

E.6 Overlap was checked on line using the real-time plot, with the edited swath plot used to identify holidays.

## **F. SOUNDING EQUIPMENT**

**F.1** All hydrographic soundings were acquired using a Raytheon 6000N Digital Survey Fathometer (DSF). Equipment serial numbers and corresponding dates used are as follows:

<b>Equipment Type</b>	<b>Serial Number</b>	<b>Dates Used</b>
DSF 6000N	A106N	081 - 099
DSF 6000N	C066	099
DSF 6000N	A107	102 - 109 111 - 228
DSF 6000N	B040N	109 - 111

**F.2** When diver investigations were conducted, least depths were measured with a 3-D Instruments, Inc. precision direct drive depth gauge:

0 - 70 fsw (feet salt water)                      S/N 201637 12

This gauge was checked each day it was used by comparing it with a leadline. Depths recorded by the leadline varied with that recorded from the pneumatic depth gauge at times by more than the allowed 0.5 feet. This disparity can be attributed to large wire angles in the leadline (approximately 10°), choppy sea states and significant currents on the day dive operations were conducted. Calibration and check documentation for this equipment is included in Separate IV. *DATA FILED WITH ORIGINAL FIELD RECORDS*

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

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

## **G. CORRECTIONS TO SOUNDINGS**

**G.1 a)** The velocity of sound through water was determined using an Odom Digibar Sound Velocity Probe (S/N 169). A Data Quality Assurance Test was conducted before each velocity cast to ensure the instrument was operating within tolerance. Generally, velocity casts were conducted weekly with few exceptions.

At the beginning of this field season, two #2 velocity casts were conducted on the same day. One was taken within the confines of Sheet C (B616), and the other within the confines of offshore survey H-10458 (B660). The purpose of taking two casts was to determine if there was a difference between the inshore project area (B616) and the offshore project area (B660). The two #2 casts were found to be identical, therefore, only one cast was acquired per week, with the subsequent correctors being applied to both projects.

Casts #10 and #11 were also conducted in a similar manner. Cast #10 was taken within the inshore project (B616) and cast #11 was taken within the offshore project (B660). Upon comparing these two velocity casts, it was apparent that the inshore waters (B616) had become more homogenous with respect to the speed of sound than were the offshore waters (B660). This was visible in the amount of velocity corrections required for a given range of depths. As a result of this second set of comparison casts, it was decided to conduct individual velocity casts for each project from that point on. The velocity data from these casts were generally re-applied to the data acquired during a one week time frame.

All data were processed using program **Velocity**. Computed velocity correctors were entered into HDAPS sound velocity tables and applied on line to both high and low frequency soundings. The sound velocity correctors applied to this survey are based on the casts conducted on the following dates:

Cast Number	Date	Latitude	Longitude	HDAPS Table #	Applied to Days
1	084	41°28.1'N	070°55.9'W	1	083-084
<del>32</del>	090	41°24.0 <sup>8.1</sup> 'N	071°00.1 <sup>70°55.1</sup> 'W	2	090
3	098	41°28.3'N	070°55.3'W	3	096-098
4	104	41°24.5'N	071°00.0'W	4	106-111
5	111	41°30.0'N	070°54.7'W	5	109-111
6	119	41°25.3'N	070°59.5'W	6	116
8	133	41°24.9'N	071°00.2'W	8	130-132
9	140	41°27.7'N	070°55.7'W	9	139-141
10	147	41°27.8'N	070°55.7'W	10	145-152
14	161	41°27.9'N	070°55.5'W	14	158-162

15	167	41°29.3'N	070°54.6'W	15	165-167
17	175	41°28.0'N	070°55.2'W	17	172-176
19	179	41°29.4'N	070°54.6'W	19	179-180
23	202	41°29.4'N	070°54.6'W	23	201-204
25	211	41°29.4'N	070°54.6'W	25	209-211
27	217	41°29.4'N	070°54.7'W	27	215-218
29	225	41°29.4'N	070°54.6'W	29	222-228

**G.1 b)** There was no variation in the DSF-6000N instrument initial.

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

**d)** A dual leadline comparison with the DSF-6000N was made in the project area:

DN 076 at 41° 27.0'N 070° 54.0'W (38 ft depths)

The greatest variation between leadline and DSF soundings was 0.1 meters. Considering the ship's motion and the wire angle in the leadline due to current (approximately 5°), this is excellent agreement and provides an adequate check that the echosounder was functioning properly. **Data from these comparisons are on file at the Atlantic Hydrographic Section in Norfolk, Virginia. DATA FILED WITH ORIGINAL FIELD RECORDS.**

Both of the leadlines used in the leadline to DSF 6000N comparison were calibrated by steel tape prior to the above comparison. An average leadline correction of -0.45 feet was applied in comparisons between the DSF-6000N 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 ship's 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 all 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 3, 1993. 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 the resulting correctors were applied to soundings via 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. *DATA Filed with original field records*

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

**G.3** Generally, sound velocity correctors determined from weekly velocity casts were re-applied to the data acquired during that entire week. Section G.1 a) lists the periods for which each set of velocity cast correctors were used.

**G.4** The ship's two pneumatic depth gauges were calibrated by Instruments East, Inc. of Norfolk, VA on February 11, 1993. On April 22, 1993, gauge #20163712 was re-calibrated and adjusted due to a bent indicator needle. Corrector data from the calibration was not applied to measured depths because it was less than 0.1 meters.

A system check was performed on each day the pneumatic gauge was employed, as a means of ensuring the validity of the gauge's measurements. These system checks are included in Separate IV. Hydrographic Survey Guideline No. 55 mandates that agreement between the leadline and observed gauge readings not exceed 0.5 feet. However, there were occasions during this survey when observed readings did exceed this limit. On these occasions, the observed wire angle of the leadline and pneumatic depth gauge hose was unavoidably excessive and, therefore, the comparison values were viewed with suspicion. As a result, no correctors were applied to measured pneumatic depth gauge values.

**G.5** Generally, sea conditions greater than one meter affected the sounding record, creating a trace of constant peaks and deeps. 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 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	POSITION	TIME		HEIGHT	
			High Water	Low Water	High Water	Low Water
1105	Penikese Island	41° 27'N 70° 55'N	+0 17	+0 16	*0.97	*0.97

Tidal correctors were applied on-line using the HDAPS predicted tide tables numbers 3, 4, 5, 6, 7, and 8. Tide table 3 was used for the month of March, 4 for April and so on. *Approved tides and zoning were applied during office processing.*

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

A request for smooth tides was forwarded on September 6, 1993.

**H. CONTROL STATIONS** *See also 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 exclusively using Differential GPS, which precluded the need for shore based horizontal control stations.

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

**H.4** No horizontal control stations were used or established for this survey.

**H.5** Verification of horizontal control was not necessary since no land based horizontal control stations were used.

**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 exclusively using Differential GPS (DGPS) positioning.

I.2 Accuracy requirements were met as specified by the Hydrographic Manual and Field Procedures Manual (FPM). The Horizontal Dilution of Position (HDOP) and Estimated Position Error (EPE) specified by the FPM were monitored during on-line data collection. When these values exceeded the allowable limits (HDOP = 3.35, EPE = 15), survey operations were suspended until the DGPS improved. If the positioning degraded beyond the acceptable limits while on line, the data were either smoothed or rejected, depending on the extent of the affected data.

### I.3 Control Equipment:

DGPS

#### Unit A:

Ashtech GPS Sensor  
S/N 700417B1083  
Firmware Version: 1E06D-P  
Magnavox MX50R DGPS Receiver S/N 078

#### Unit B:

Ashtech GPS Sensor  
S/N 700417B1012  
Firmware Version: 1E06D-P  
Magnavox MX50R DGPS Receiver S/N 160

Correctors were received from both the Montauk, New York and Portsmouth, New Hampshire radiobeacons for the entire survey.

I.4 The DGPS positioning system requires no calibration from outside sources. However, to check the positional accuracy of the DGPS system, a daily performance check was conducted. The Shipboard Data Integrity Monitor (version 1.2), or SHIPDIM, program was utilized to conduct these performance checks. Section 3.4.5 of the FPM states that a DGPS performance check may be conducted using the SHIPDIM program when "two independent reference beacons are receivable, and two remote receivers are available on the ship. Each remote receives correctors from a different reference, then the computed positions are compared." The computed inverse between the check receiver and the reference receiver must not exceed  $\Delta P_{max}$ , where:

$$\text{delta } P_{\text{max}} = \text{SQRT} [ (\text{EPE})^2 + (\text{ECR})^2 ]$$

delta  $P_{\text{max}}$  = Maximum allowable inverse distance  
between the DGPS and check position

EPE = Expected Positional Error of the DGPS  
position

ECR = Error Circle Radius of the check  
position

SHIPDIM compares four sample positions from both the check and reference receivers. Three of the four checks must be less than the delta  $P_{\text{max}}$  for a successful performance check.

I.5 No calibration data were required to be applied to the raw positioning data because DGPS was the primary positioning system.

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

b) No shipboard DGPS malfunctions were experienced during the times of hydrography for this survey.

c) During times of heavy rains and/or thunderstorms, the ship would experience periods of intermittent service from either the Montauk, New York or the Portsmouth, New Hampshire radiobeacons, depending on which station was experiencing degraded weather at the time. On these occasions, control would be switched to the reference beacon which was sending the strongest, most interference-free signal. If both the Montauk and Portsmouth beacons were experiencing periods of degraded weather, survey operations were suspended until acceptable service from at least one of the beacons had resumed.

d) During those periods when local weather effected the DGPS radiobeacons as described in section I.6.c, the on-line positioning would unexpectedly "drop out". These instantaneous outages were associated only with weather-related beacon interference. During times of poor satellite coverage or geometry, there would be a steady deterioration of the HDOP that could be continuously monitored. Such weather-related outages could occur often, sometimes every few minutes, making it difficult to either begin or complete a survey line. The duration of these outages ranged from half an hour up to several hours.

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 the original field records*

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. Refer to Separate III for a copy of offset table 1. *Data filed with the original field records*

#### **J. SHORELINE**

No shoreline is contained within the boundaries of this survey.

#### **K. CROSSLINES**

A total of 11.56 nautical miles of crosslines were run for this survey, which represents 7.2% of the first 100% side scan mainscheme coverage.

An un-excessed plot of mainscheme soundings with crosslines superimposed was used to conduct mainscheme to crossline comparisons. Soundings at intersections were compared to all other soundings within a 5 mm (50 meter) radius. Based on this procedure, agreement between mainscheme and crossline soundings was found to be excellent, especially in areas of flat or slightly sloping relief. The greatest difference observed between soundings was three feet, with an average agreement of one foot within a 2 mm (20 meter) radius.

#### **L. JUNCTIONS *See the Evaluation Report***

L.1 This survey will junction with contemporary survey H-10496, which is also a 1:10,000-scale survey. Survey H-10496 lies to the west of this survey, between Coxens Ledge and Wilkes Ledge.

L.2 A final statement as to the agreement between these two surveys cannot be made at this time, since work on survey H-10496 has yet to be completed.

L.3 No discrepancies at the junction with survey H-10496 are apparent at this time.

L.4 No recommendations for adjustments to soundings, features or depth curves are appropriate.

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

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

**N. ITEM INVESTIGATION REPORTS**

**N.1.1 Area of Investigation**

**AWOIS 7916**

Massachusetts, Buzzards Bay

Reported Position:

41°29'12.38"N

070°53'46.12"W

Datum: NAD83

Reported depths in area 65-66 feet, however buoy was originally moored 40 feet below the surface.

**N.2.1 Description and Source of Item**

This object was a yellow spherical buoy moored in PA 41°<sup>29</sup>'12"N and 070°53'48"W. It was first reported in Notice to Mariners 15/67 and was to remain on station until March 31, 1968. This item was not found after 90-meter lines were run perpendicular to mainscheme soundings during survey H-9615/76.

**N.3.1 Survey Requirements**

This item required 200% side scan coverage over a 400-meter search radius, echosounder development and a diver investigation. Salvage documentation would be sufficient for disproval.

**N.4.1 Method of Investigation**

Two hundred percent side scan sonar coverage was achieved over the search radius for AWOIS 7916. Both first and second hundred percent side scan coverages were run concurrently (parallel to each other) with base courses of 060° and 240° True. All significant contacts were investigated by echo sounder development, employing line spacing as close as 5 meters.

### **N.5.1 Results of Investigation**

Upon review of both the first and second 100% side scan coverages, there was no indication of a submerged buoy within the 400-meter search radius encircling the geographic position for AWOIS 7916, nor was there any sign of a buoy chain associated with this item. An item was found on the sonargram (contact 1223.14S) further to the northeast which resembled an anchor chain. This item became the object of Dive 183.1 (See Separate VI). However, this object was found to be an abandoned dredge pipe, not a buoy chain. Further review of the sonargram showed the area in which the buoy was originally moored to be a soft, silty bottom (as was encountered on all dives for this survey). Therefore, it is the conclusion of the hydrographer that the buoy and its associated chain have become all or partially buried in this silty bottom, and are thus unrecognizable to side scan sonar and insignificant with respect to the water depth.

### **N.6.1 Comparison with Prior Surveys**

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

### **N.7.1 Comparison with Chart and Charting Recommendations**

Largest scale chart of the survey area:

Chart 13230  
"Buzzards Bay"  
39<sup>th</sup> ed. March 27, 1993  
Scale: 1:40,000

AWOIS 7916, a submerged buoy charted in position 41°29'12.38"N and 070°53'46.12"W has been disproven. No evidence of a submerged buoy was encountered during this investigation within the associated 400-meter search radius, nor was there any indication of this item in other areas of this survey (aside from that addressed in dive 183.1).

It is the opinion of the hydrographer that the danger circle and associated notation "Subm buoy PA, (40 ft rep), ED" be deleted from the chart and soundings found during this survey be applied to that area. X

*Concur*

### **N.1.2 Area of Investigation**

#### **AWOIS 1921**

Massachusetts, Buzzards Bay

Reported Position:

41°30'00.38"N  
070°53'52.12"W

Datum: NAD83

Reported depths: surrounding depths 57-58 feet, wire drag  
cleared to 49 feet during survey FE-194WD/1963.

Feature: wreck

### **N.2.2 Description and Source of Item**

This item was a 185-foot wreck reported in position 41°30'00.38"N and 070°53'52.12"W. During survey FE-194WD/1963, an area 0.5 nm around the geographic position was searched with no groundings or indications of a wreck.

### **N.3.2 Survey Requirements**

This item required 200% side scan coverage over a 3000-meter search radius, with echosounder development or bottom drag. Salvage documentation would be sufficient for disapproval.

### **N.4.2 Method of Investigation**

Two hundred percent side scan sonar coverage was achieved only in those areas of the 3000-meter search radius falling within the boundaries of this survey. Both first and second 100% side scan coverages were run concurrently (parallel to each other) with base courses of 060° and 240° True. All significant contacts were investigated by echo sounder development, with line spacing as close as 5 meters.

### **N.5.2 Results of Investigation**

Review of the first and second 100% side scan coverages revealed no indication of a 185-foot wreck. The immediate area surrounding the geographic position is a flat, sandy bottom which, contrary to a rocky bottom, would readily show signs of wreckage on the sonargram, if any existed. This however was not the case. An area of at least 1000 meters surrounding the geographic position for this item consisted of a flat, sandy and featureless bottom, with no significant side scan contacts. An area of 100 meters around the geographic position for this item was initially investigated with 10-meter hydro splits and then rerun at 5-meter splits with no evidence of a wreck or obstruction with a depth of 49 feet.

**N.6.2 Comparison with Prior Surveys**

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

**N.7.2 Comparison with Chart and Charting Recommendations**

Largest scale chart of the survey area:

Chart 13230  
"Buzzards Bay"  
39<sup>th</sup> ed. March 27, 1993  
Scale: 1:40,000

AWOIS 1921, a 185-foot wreck, cleared with wire drag to 49 feet and charted in position 41°30'00.38"N and 070°53'52.12"W, has been proven not to exist within the confines of survey H-10461. X

It is the opinion of the hydrographer that the danger circle with a wire drag, <sup>clearance</sup> depth of 49 feet and the associated wreck notation be deleted from the chart, and soundings found during this survey be applied to that area.

*CONCUR*

**N.1.3 Area of Investigation**

AWOIS 1925

Massachusetts, Buzzards Bay

Reported Position:

41°30'36.38"N  
070°54'26.12"W

Datum: NAD83

Reported depths: wreck hung at 13 feet cleared by 11 feet,  
actual depth 12 feet (survey FE-207WD/66).

Feature: wreck

**N.2.3 Description and Source of Item**

This item is the wreck of the SHERWOOD, a 1281-ton barge reported in position 41°30'36.38"N and 070°54'26.12"W. The wreck was originally stranded on Wilkes Ledge, with its bow and deck house showing above water. The wreck later shifted, awash only at MLW. The most recent survey, FE-207WD/66, reported the wreck hung at 13 feet with an actual depth of 12 feet.

**N.3.3 Survey Requirements**

This item was not assigned due to the reported shoal depths in the area.

#### **N.4.3 Method of Investigation**

Two hundred percent side scan sonar coverage was achieved over this item. The wreck was immediately recognizable, therefore a diver investigation was conducted, with no further side scan or hydro investigations required. See dive number 222.6 (Separate VI)\* for specific information on the dive investigation.

*\* APPENDED TO THIS REPORT*

#### **N.5.3 Results of Investigation**

AWOIS 1925 was not originally assigned for investigation due to the reported shoal water in its vicinity. However, this item was found 350 meters to the northeast in deeper water during main-scheme side scan coverage and was subsequently re-assigned.

The SHERWOOD was found during the second 100% side scan coverage (contact 1972.27S) in position:

41°30'40.961"N  
070°54'11.862"W

The contact was readily recognizable as a barge on the sonagram by its rectangular shape and the lengthwise striations caused by its stringers. This was later confirmed on August 10, 1993 during dive 222.6. Its size was estimated to be 11 by 27 meters, with a least depth of <sup>(13.7)</sup> meters (corrected with ~~predicted~~ <sup>Approved</sup> tides). The barge was partially buried on its north~~west~~<sup>east</sup> corner and showed signs of shifting down the northeast side of Wilkes Ledge. There was no deck or hull plating remaining.

#### **N.6.3 Comparison with Prior Surveys**

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

#### **N.7.3 Comparison with Chart and Charting Recommendations**

Largest scale chart of the survey area:

Chart 13230  
"Buzzards Bay"  
39<sup>th</sup> ed. March 27, 1993  
Scale: 1:40,000

AWOIS 1925, the wreck of the barge SHERWOOD, has been resolved. Due to shifting, the wreck no longer rests atop Wilkes Ledge, but has gradually slid down the northeast slope of this ledge. The wreck is in stable condition on the slope, however, further movement is not unlikely if the shoal it rests on erodes from beneath it. The least depth of 45 feet for the SHERWOOD lies below the controlling depth of 32 feet for the Cape Cod Canal, and thus poses little or no threat to the deep draft commercial traffic transiting the area. The wreck would, however, pose problems for the local fishing fleet if their nets were to become snagged on its remaining hulk. Evidence of this was present on the wreck in the form of fishing net fragments.

It is the opinion of the hydrographer that the danger circle with a wire drag <sup>clearance</sup> depth of 11 feet and the associated wreck notation be deleted from position 41°30'36.38"N and 070°54'26.2"W, and recharted as a wreck, least depth of <sup>(3.7m)</sup> 45 feet determined by diver investigation at position 41°30'40.961"N and 070°54'11.862"W.

*Concur*

#### **N.1.4 Area of Investigation**

##### AWOIS 1930

Massachusetts, Buzzards Bay

Reported Position:

41°31'48.38"N  
070°51'34.12"W

Datum: NAD83

Reported depths: wreck hung at 35 feet cleared at 33 feet,  
actual depth 36 feet (survey FE-194WD/63).

Feature: wreck

#### **N.2.4 Description and Source of Item**

This item was the wreck of the fishing vessel UNCLE JOHN, a 110-foot wooden vessel which sank on November 13, 1947 in position 41°31'48"N and 070°51'36"W.

#### **N.3.4 Survey Requirements**

This item required 200% side scan coverage over a 300-meter search radius, echo sounder development and diver investigation. Salvage documentation would be sufficient for disapproval.

#### N.4.4 Method of Investigation

Two hundred percent side scan sonar coverage was achieved over the entire 300-meter search radius. Both first and second hundred percent side scan coverage were run concurrently (parallel to each other) with base courses of 060° and 240° True. All significant contacts were investigated by echo sounder development, with line spacing as close as 5 meters. Contacts showing reasonable promise of being the UNCLE JOHN were scheduled for diver investigations.

#### N.5.4 Results of Investigation

Following review of the first and second 100% side scan coverage, no contacts were immediately recognizable as that of a 110-foot wreck. There were, however, some significant contacts in the southeastern half of the AWOIS 1930 search area which held promise as potential wreckage. Developments 38 and 50 addressed these contacts.

Three dives were conducted within the AWOIS 1930 radius on suspicious contacts. The first two dives were conducted on August 10, 1993 and the third was conducted on August 16, 1993 (See dives 222.4, 222.5 and 228.2 in ~~Appendix VI~~ <sup>SEPARATE</sup> for specifics concerning these diver investigations). \* APPENDED TO THIS REPORT.

Dive 222.4 was conducted halfway between a <sup>(8 ft)</sup> 2.4-meter side scan contact, number 1958.35P, and the Loran TDs given for AWOIS 1930. The distance between these two positions was 53 meters. Divers conducted two circle searches around this central position, one at 10 meters and the other at 25 meters. The only item encountered on either of these circle searches was a large round boulder, approximately <sup>(10 ft)</sup> 3 meters tall.

The second dive, number 222.5, was conducted around a 2.3-meter side scan contact, number 1958.42S. The only item discovered during this dive was another boulder, approximately 1.5 meters <sup>(5 ft)</sup> tall. Since this dive did not produce a wreck, no pneumatic depth reading or detached position were acquired. CONCUR

The final dive was on echo sounder insert 5102.1, an item found during additional echo sounder development. Although it fell just outside the AWOIS search radius, this item was scheduled for diver investigation since it was lying at the base of a large, sandy ridge. It was hoped that if this were the wreck, it had shifted down slope from its original position. This was not, however, the case as the diver investigation produced only another large rock, approximately 2.5 meters tall. <sup>(8 ft)</sup>

Two additional items located within this search radius, wire drag hangs found during survey FE-194WD/63 were addressed during hydro investigations on DN 225 (fix 5098 - 5127). This investigation centered around side scan contact numbers 4999.35S, 5006.13P and 5020.57P. Based on a thorough review of the associated side scan records and contact signatures, it is the hydrographer's opinion that the two additional hangs encountered during survey FE-194WD are two large rocks, which, as the diver and echo sounder investigations have shown, are common in this area.

#### N.6.4 Comparison with Prior Surveys

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

#### N.7.4 Comparison with Chart and Charting Recommendations

Largest scale chart of the survey area:

Chart 13230  
"Buzzards Bay"  
39<sup>th</sup> ed. March 27, 1993  
Scale: 1:40,000

AWOIS 1930, the wreck of the fishing vessel UNCLE JOHN, has been disproven. A review of the side scan sonar records, echo sounder trace and diver-supplied information associated with this item indicates there is no conclusive evidence that this wreck exists within the given search radius. A comparison of the side scan information from this item with that of known wrecks indicates that none of the contacts encountered within the 300-meter search radius are that of a wreck. All such contacts display the sonar signature of naturally occurring features such as rocks, compared to the distinctly un-natural return cast by even a highly deteriorated wreck.

It is the opinion of the hydrographer that the danger circle with a wire drag <sup>depth</sup> of 33 feet and the associated wreck symbol be deleted from position 41°31'48.38"N and 070°51'34.12"W, and a rock, with a least depth of 33 feet, replace it in position 41°31'48.676"N and 070°51'35.017"W. In addition the two <sup>deleted</sup> wire drag depths of 28 feet should also be deleted and replaced with soundings acquired during this survey.

*SEE EVALUATION REPORT SECTION N.*

### **N.1.5 Area of Investigation**

#### **AWOIS 7245**

Massachusetts, Buzzards Bay

Reported Position:

41°29'33.98"N  
070°50'34.12"W

Datum: NAD83

Reported depths: wreck cleared to 38 feet during survey

FE-194WD/63

Feature: wreck

### **N.2.5 Description and Source of Item**

This item was the wreck of the fishing vessel FANNY PARNELL, a 60-foot vessel reported sunk in Notice to Mariners 43/49 in position 41°29'29"N and 070°50'40"W, and later recharted in position 41°29'33.6"N and 070°50'36.0"W as a result of survey FE-194WD/63.

### **N.3.5 Survey Requirements**

This item required 200% side scan coverage over a 300-meter search radius, echo sounder development and diver investigation. Salvage documentation would be sufficient for disproval.

### **N.4.5 Method of Investigation**

Two hundred percent side scan sonar coverage was achieved over the entire 300-meter search radius. The second 100% side scan coverage was run perpendicular to the first 100% side scan coverage. The first 100% was run on base courses of 060° and 240° True, while the second 100% was run at 150° and 330° True. All significant contacts were investigated by echo sounder development, with line spacing as close as 5 meters. Upon verifying their significance with the echo sounder, contacts showing the most promise of being the FANNY PARNELL were scheduled for diver investigations.

### **N.5.5 Results of Investigation**

A thorough review of the first and second 100% coverage revealed no contacts immediately recognizable as that of a 60-foot wreck. However, there were several small boulder fields located within the 300-meter search radius of AWOIS 7245 which were investigated for potential wreckage. Developments 59 and 77 are associated with these contacts.

Three dives were conducted within the AWOIS 7245 radius on potential contacts. All three dives were conducted on August 10, 1993 (See dives 222.1, 222.2 and 222.3 in <sup>SEPARATE</sup> Appendix VI \* for specific information concerning the diver investigations).  
\* APPENDED TO THIS REPORT

Dive 222.1 was centered around a 1.6-meter side scan contact, number 1852.40S. Although this was not the most prominent feature in this area, it was the most central and deemed the best to conduct a series of circle searches around. This dive, however, yielded no signs of wreckage. Except for several medium-sized rocks (approximately 0.5 to 1 meter in diameter), the bottom in this area was flat and barren, consisting of brown sand and silt.

Dive 222.2 was centered around a 2.3-meter side scan contact, number 1845.03S. While conducting 10- and 20-meter circle searches around this location, the divers located a large boulder, approximately 2.5 meters tall, but no wreckage was seen. Due to the size of this boulder, a pneumatic depth reading and detached position were obtained.

Dive 222.3 was centered around the Loran TDs given in the AWOIS description for this item. This position was correlated to the side scan coverage in that area and reviewed for potential contacts. Several small rocks appeared to be scattered across the bottom near the Loran position, but there was no indication of wreckage. This dive verified what was apparent from the sonargram, that aside from several small rocks, the bottom in this location was primarily flat and featureless.

#### **N.6.5 Comparison with Prior Surveys**

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

#### **N.7.5 Comparison with Chart and Charting Recommendations**

Largest scale chart of the survey area:

Chart 13230  
"Buzzards Bay"  
39<sup>th</sup> ed. March 27, 1993  
Scale: 1:40,000

AWOIS 7245, the wreck of the fishing vessel FANNY PARNELL, has been disproven. A review of the side scan sonar records, echo sounder trace and diver-supplied information associated with this item gives no indication that this wreck exists within the given search radius. In comparing the side scan information from this item with that of known wrecks, it is apparent that none of the contacts encountered within the 300-meter search radius are that of a wreck. All contacts in this area have the signature of naturally occurring features such as rocks, as opposed to the distinctly un-natural return cast by even a highly deteriorated wreck.

It is the <sup>4. ECHO SOUNDER</sup> opinion of the hydrographer that the danger circle with a wire drag depth of 38 feet and the associated wreck symbol be deleted from position 41°29'33.6"N and 070°50'36.0"W, and soundings acquired during this survey be charted in its place.

CONCUR

#### **N.1.6 Area of Investigation**

✓ AWOIS 7956

Massachusetts, Buzzards Bay

Reported Position:

41°30'33.93"N  
070°51'20.92"W

Datum: NAD83

Reported depths: rock hung at 50 feet, divers leadline sounding of 53 feet

Feature: rock

#### **N.2.6 Description and Source of Item**

This item was a wire drag hang encountered in position 41°<sup>28'17"</sup>17"N and 070°<sup>51'12"</sup>51'12"W during survey FE-207WD/66. The rock was hung at 50 feet. However, divers leadline sounding on a 2-foot rock placed it at 53 feet. Upon review of the surrounding depths for survey H-9615/1976, 56 to 57 foot depths were found to exist in the area, which is inconsistent with a two foot rock with a least depth of 53 feet (charted 50 foot rock).

#### **N.3.6 Survey Requirements**

This item required 200% side scan coverage over a 100-meter search radius, echo sounder development and diver investigation.

#### **N.4.6 Method of Investigation**

Two hundred percent side scan sonar coverage was achieved over the entire 100-meter search radius. Both first and second hundred percent side scan coverages were run concurrently (parallel to each other) with base courses of 060° and 240° True. All significant contacts were investigated by echo sounder development, with line spacing as close as 5 meters.

#### **N.5.6 Results of Investigation**

A review of the side scan records in this area revealed two contacts within the search radius for AWOIS 7956. These two contacts plotted nearly on top of each other, indicating that it was the same item seen in consecutive side scan passes. These two contacts were investigated during development 45, in which a 3.6-meter rock was found having a least depth by echo sounder development of 14.4 meters (47 feet), corrected for ~~predicted~~ APPROVED tides.

This item was not scheduled for diver investigations due to its good correlation with the prior survey depth, and because a substantially shoaler rock with a least depth of 39 feet was found approximately 400 meters to the west. <sup>38 (11.7m)</sup>

#### **N.6.6 Comparison with Prior Surveys**

A comparison with prior surveys will be performed by the Atlantic Hydrographic Section during the office verification process.

#### **N.7.6 Comparison with Chart and Charting Recommendations**

Largest scale chart of the survey area:

Chart 13230  
"Buzzards Bay"  
39<sup>th</sup> ed. March 27, 1993  
Scale: 1:40,000

AWOIS 7956, a charted 50-foot rock, has been resolved. It is the opinion of the hydrographer that the rock investigated during development 45 of this survey was the object of the diver investigation during survey FE-207WD/66. This conclusion is supported by the fact that this was the only significant contact found within the given 100-meter search radius. X

It is the opinion of the hydrographer that the 50-foot depth and associated rock notation in position 41°30'33.38"N and 070°51'22.8"W be deleted from the chart and replaced with a 47-foot rock in position 41°30'30.395"N and 070°51'22.851"W.

(14.4m)

CONCUR

**N.1.7 Area of Investigation**

✓ **AWOIS 7962**

Massachusetts, Buzzards Bay

Reported Position:

41°33'04.38"N  
070°47'05.11"W

Datum: NAD83

Reported depths: hang at 38 feet, cleared 36 feet, with  
46-48 foot depths in the vicinity

Feature: sounding

**N.2.7 Description and Source of Item**

This item was originally discovered during survey H-3391/12 as a wire drag hang at 39 feet, with a cleared depth of 34 feet.

It was again encountered in position 41°33'04.38"N and 070°47'05.11"W during survey FE-161WD/57. The obstruction was hung at 38 feet and cleared at 36 feet.

**N.3.7 Survey Requirements**

This item required 200% side scan coverage over a 100-meter search radius, echo sounder development and diver investigation.

**N.4.7 Method of Investigation**

Two hundred percent side scan sonar coverage was achieved over the entire 100-meter search radius. Both first and second 100% side scan coverages were run concurrently (parallel to each other) with base courses of 060° and 240° True. All significant contacts were investigated by echo sounder development, with line spacing as close as 5 meters.

**N.5.7 Results of Investigation**

Review of the side scan records in this area revealed approximately 5 contacts plotted in a tightly spaced group to the south southwest and just outside the search radius for AWOIS 7962. These contacts were the subject of hydro development 4 and subsequent dive 223.7~~8~~.

During development 4, line spacing of 5 meters and less was used to delineate the least depths for the contacts under investigation. The resulting least depth was found to be a 34 foot sounding (fathogram insert 2257.03), which became the target of dive 223.7~~8~~.

On August 11, 1993, the area surrounding the 34-foot sounding was investigated by divers and found to be a 2-meter tall angular rock resting in a field of smaller rocks approximately 0.1 meter in diameter. A pneumatic gauge least depth of 40 feet was taken on this rock, which replaces the shoaler 34-foot sounding obtained by echo sounder due to the abundance of fish return seen over this contact during hydro development.

#### **N.6.7 Comparison with Prior Surveys**

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

#### **N.7.7 Comparison with Chart and Charting Recommendations**

Largest scale chart of the survey area:

Chart 13230  
"Buzzards Bay"  
39<sup>th</sup> ed. March 27, 1993  
Scale: 1:40,000

AWOIS 7962, a charted 36-foot sounding, has been resolved. It is the opinion of the hydrographer that the rock found during both hydro development 4 and dive 223.7 is the same rock hung during surveys H-3391/12 and FE-161WD/57. The rock found during this survey, although it lies outside the search radius for AWOIS 7962, is the closest and most significant contact encountered, and closely matches the wire drag hang depths from the prior surveys. Therefore, it is the hydrographer's opinion that the <sup>wire drag</sup> 36-foot sounding in position 41°33'04.38"N and 070°47'05.11"W be <sup>39 (12.1 m)</sup> deleted and replaced by a rock with a least depth of 40 feet in position 41°33'00.142"N and 070°47'10.343"W. <sup>Cleared depth of</sup>

#### **N.1.8 Area of Investigation**

##### AWOIS 7963

Massachusetts, Buzzards Bay

Reported Position:

41°33'02.18"N

070°46'34.11"W

Datum: NAD83

Reported depths: hang at 32 feet, cleared 28 feet, with 36 foot depths in the vicinity

Feature: sounding

#### **N.2.8 Description and Source of Item**

This item was originally discovered during survey H-3556/13 as a wire drag hang at 31 feet, scaled in position 41°33'01.8"N and 070°46'36"W. It was again encountered during survey FE-159WD/57 as a 32-foot echo sounding located approximately 40 meters east of the previously charted 31-foot depth. This same item was located two more times during surveys FE-161WD/57 and H-9615/76 in position 41°33'02"N and 070°46'34.8"W.

#### **N.3.8 Survey Requirements**

This item required 200% side scan coverage over a 100-meter search radius, echo sounder development and diver investigation.

#### **N.4.8 Method of Investigation**

Two hundred percent side scan sonar coverage was achieved over the entire 100-meter search radius. Both first and second hundred percent side scan coverages were run concurrently (parallel to each other) with base courses of 060° and 240° True. All significant contacts were investigated by echo sounder development, with line spacing as close as 5 meters.

#### **N.5.8 Results of Investigation**

Following review of the side scan records in this area, it was apparent that AWOIS 7963 was located in the middle of a boulder field, based the dense concentration of contacts in and around the 100-meter search radius. These contacts were grouped together and became the target of hydro development 2 and of subsequent dive 228~~3~~<sup>4</sup> (See Separate VI for specific information concerning this diver investigation). *APPENDED TO THIS REPORT*

During development 2, line spacing of 5 meters and less was used to delineate the least depths for the many of the contacts under investigation. The resulting least depth was found to be a 33-foot sounding (fathogram insert 2135.3), which became the subject of dive 228.3<sup>4</sup>

On August 16, 1993, this item was investigated by divers and found to be a large rock approximately 5 meters tall and shaped like a truncated cone. The rock, measuring approximately 3 meters in diameter at the base and 1 meter in diameter at the top, was resting in a field of smaller rocks ranging between 1 and 2 meters in diameter. A pneumatic gauge least depth of 30 feet was taken on top of the rock. (9.3m)

**N.6.8 Comparison with Prior Surveys**

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

**N.7.8 Comparison with Chart and Charting Recommendations**

Largest scale chart of the survey area:

Chart 13230  
"Buzzards Bay"  
39<sup>th</sup> ed. March 27, 1993  
Scale: 1:40,000

AWOIS 7963, a charted 28-foot sounding, has been resolved. It is the opinion of the hydrographer that the rock found during both hydro development 2 and dive 228. <sup>is</sup> the same rock hung during surveys H-3556/13, FE-159WD/57, FE-161WD/57 and H-9615/76. Therefore, it is the hydrographer's opinion that the 28-foot <sup>wire drag</sup> <sup>clearance depth</sup> sounding in position 41°33'02.18"N and 070°46'34.11"W be deleted and replaced by a rock with a least depth of 30 feet in position 41°33'01.289"N and 070°46'33.311"W. (9.3m)

*CONCUR*

**DEVELOPMENT ABSTRACT**

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NOAA Ship RUDE

Descriptive Report

Survey H-10461

DEVELOPMENT ABSTRACT  
H-10461

NOAA Ship RUDE  
OPR-B616-93

DEV	Side Scan Contact Number(s)	Hydro Dev Positions	Least Depth *(m)	LD Pos	Geographic Position	Remarks
1	790.555P 2059.19P 2063.46S	939-956 2086-2116	9.83	2082.7	41°33'39.479"N 70°47'07.928"W	
2	110.47S 381.565P 461.19S 467.55S	957-980 2117-2211 4312-4362 4457-4462	10.82	2135.3	41°33'01.240"N 70°46'33.372"W	
3	294.09S	2212-2255 2413-2421	12.21	2224.2	41°33'29.939"N 70°46'13.935"W	
4	207.275P 207.29S 287.10S	2256-2299 4366-4442	10.4 12.7	2257.2	41°33'00.194"N 70°47'10.460"W	
5	384.21S	2300-2311	14.1	2300.4	41°32'50.056"N 70°47'14.389"W	
6	459.45P	2312-2321	14.84	2315.0	41°32'54.124"N 70°46'58.633"W	
7	1077.26S, 1077.50S, 1085.35P, 1086.03P, 1115.16P, 1115.41P	2322-2342	12.86	2322.5	41°32'19.276"N 70°47'24.217"W	
8	113.055P, 114.16S, 114.415S, 114.495S, 186.13P, 187.22S, 210.31P, 385.20S	2343-2412	13.70	114.	41°32'44.701"N 70°47'29.848"W	

\* Corrected for approved tide

DEVELOPMENT ABSTRACT  
H-10461

NOAA Ship RUDE  
OPR-B616-93

DEV	Side Scan Contact Number(s)	Hydro Dev Positions	Least Depth * (m)	LD Pos	Geographic Position	Remarks
9	61.085S	2422-2431	11.6 11.5	2422.1	41° 33' 24.056"N 70° 47' 54.123"W	
10	52.35S	2432-2443	11.5	2436.4	41° 33' 22.162"N 70° 47' 58.720"W	
11	300.10P 300.21S 891.03P	2444-2464 2466-2521 4443-4456 4463-4647	10.8 10.7	2491.4 2491.6	41° 33' 10.532"N 70° 47' 49.056"W	
12	912.32P	2527-2577	11.4 11.5	2561.6	41° 33' 12.140"N 70° 48' 01.220"W	
13	33.53P, 34.06P, 783.57P	2578-2603	9.8 9.7	2599.6	41° 32' 51.628"N 70° 48' 58.289"W	
14	904.00P 933.53P	2604-2613	13.0	2610.1	41° 32' 39.739"N 70° 49' 07.642"W	
15	899.59S 906.44S	2614-2626	13.2	2621.4	41° 32' 31.974"N 70° 49' 19.500"W	
16	29.20S, 29.35S, 29.40P, 29.46S, 780.02P, 780.24P, 936.26P	2627-2672	-8.6 10.0	2649.3	41° 32' 30.131"N 70° 49' 44.822"W 498	
17	1068.13S 1095.55S	2673-2692 2695-2708	15.0 14.8	2699.5	41° 31' 28.608"N 70° 49' 31.869"W	
18	1380.16S	2709-2714	16.8 17	1396.4	41° 31' 05.470"N 70° 49' 21.557"W	

\* depths corrected for approved tides

DEVELOPMENT ABSTRACT  
H-10461

NOAA Ship RUDE  
OPR-B616-93

DEV	Side Scan Contact Number(s)	Hydro Dev Positions	Least Depth * (m)	ID Pos	Geographic Position	Remarks
19	1618.35S	2715-2722	13.6 <sup>5</sup> / <sub>5</sub>	2717.2	41°30'39.569"N 70°49'36.433"W	
20	397.21S	2723-2769	11.2 <sup>1</sup> / <sub>1</sub>	2724.1	41°31'42.992"N 70°50'06.768"W	
21	273.445S	2770-2783	10.2 <sup>0</sup> / <sub>0</sub>	2774.2	41°31'44.603"N 70°50'04.119"W	
22	692.51P	2784-2799	10.1 <sup>0</sup> / <sub>0</sub>	2786.2	41°31'52.139"N 70°50'12.656"W	
23	719.43P	2800-2854	12.1 <sup>0</sup> / <sub>0</sub>	2827.4	41°32'03.312"N 70°50'07.454"W	
24	740.565S	2855-2860 2920-2921	12.0 11.8	2859.1	41°32'06.518"N 70°50'14.853"W	
25	760.095S 777.59S	2922-2927	11.7	2922.2	41°32'14.463"N 70°50'12.338"W	
26	360.37P, 360.41P, 694.025S, 694.06S	2928-2943	12.9	2940.5 <sup>5</sup> / <sub>5</sub>	41°31'59.672"N 70°49'50.566"W	
27	693.15P 2042.04S	2944-2949	9.8	2946.1	41°31'53.792"N 70°50'11.867"W	
28	310.33S, 360.09S, 310.365S	2950-2957	15.0	2952.1	41°31'52.716"N 70°50'00.966"W	
29	733.33P 743.02P	2958-2963	9.9	2958.0	41°31'56.040"N 70°50'33.665"W	

\* depths corrected for approved tides

DEVELOPMENT ABSTRACT  
H-10461

NOAA Ship RUDE  
OPR-B616-93

DEV	Side Scan Contact Number(s)	Hydro Dev Positions	Least Depth * (m)	LD Pos	Geographic Position	Remarks
30	700.325S, 700.37S 712.42S, 713.065S	2964-2986	9.8	2970. <del>4</del> <sub>5</sub>	41°31'48.744"N 70°50'28.630"W	
31	723.21S	2987-3010 3014-3056 3057-3075 4145-4194 4197-4200 4205-4230	7. <del>1</del> <sub>0</sub>	4215. <del>4</del> <sub>5</sub>	41°31'46.816"N 70°50'56.854"W	
32	525.58S	3076-3081	16.4	3080. <del>1</del> <sub>0</sub>	41°31'07.123"N 70°50'44.065"W	
33	488.28S	3082-3087	16. <del>1</del> <sub>2</sub>	3085.0	41°31'08.214"N 70°50'52.497"W	
34	400.215S	3088-3093 3098-3099	15. <del>2</del> <sub>3</sub>	3090.2	41°31'20.837"N 70°50'42.855"W	
35	267.49S	3100-3123	13. <del>0</del> <sub>7</sub>	3114.1	41°31'28.941"N 70°50'41.227"W	
36	689.28S	3124-3129	12. <del>2</del> <sub>4</sub>	3128.4	41°31'34.123"N 70°50'51.157"W	
37	702.32S	3130-3135	10. <del>0</del> <sub>2</sub>	3134.2	41°31'38.411"N 70°50'53.664"W	
38	1957.49P	3136-3158 3214-3231	10. <del>0</del> <sub>2</sub>	3147. <del>5</del> <sub>6</sub>	41°31'48. <sup>784</sup> <del>676</del> "N 70°51'35.017"W	

34.793

\* depths corrected for approved tides

DEVELOPMENT ABSTRACT  
H-10461

NOAA Ship RUDE  
OPR-B616-93

DEV	Side Scan Contact Number(s)	Hydro Dev Positions	Least Depth * (m)	LD Pos	Geographic Position	Remarks
39	351.54S 317.385S	3232-3314 3316-3322 3325-3326 3329-3345	9.2 2	3277.2	41°30'59.685"N 70°51'38.771"W <sup>950</sup> .827	
40	134.425S	3346-3357	15.6	3354.0	41°30'53.568"N 70°51'50.559"W	
41	651.36S	3358-3369	15.0 14.9	3368.2 5	41°30'43.197"N 70°51'28.479"W	
42	1058.03S 1125.30S	3370-3375	15.2	3370.2	41°30'35.255"N 70°51'29.916"W	
43	AWOIS #7956	3376-3389	15.2 8	3384.2	41°30'33.305"N 70°51'23.011"W	
44	1404.14S	3390-3397	17.3	1372.0	41°30'25.455"N 70°51'00.318"W	
45	1157.29S 1221.55P	3398-3403	18.0 14.4	3398.3	41°30'30.395"N 70°51'22.851"W	
46	1126.38P 1156.13P	3404-3423 3429-3435	12.2 3	3416.2 5	41°30'30.900"N 70°51'39.453"W <sup>773</sup>	
47	403.025P 438.39P	3436-3469	14.2 6	3465.3	41°31'07.160"N 70°51'15.769"W	
48	316.30S, 353.15S, 353.19S, 726.47P, 1022.17P	3470-3499 3514-3558	12.2 4	3515.1	41°31'19.693"N 70°51'26.823"W	

\* depths corrected for approved tides

DEVELOPMENT ABSTRACT  
H-10461

NOAA Ship RUDE  
OPR-B616-93

DEV	Side Scan Contact Number(s)	Hydro Dev Positions	Least Depth * (m)	ID Pos	Geographic Position	Remarks
49	749.265S	3559-3572	10.9 11.0	3563.4	41° 31' 34.366"N 70° 51' 31.336"W	
50	769.24P	3573-3592 4706-4770	10.8	4270.46	41° 31' 28.921"N 70° 51' 28.949"W	
51	18.16P	3593-3598	14.8 16	3593.3	41° 31' 37.597"N 70° 51' 48.678"W	
52	1921.09S 1954.53S	3599-3604	13.9	3599.2	41° 31' 33.662"N 70° 51' 46.877"W	
53	168.47P 228.09P	3605-3614	14.1 12	3607.2	41° 31' 14.023"N 70° 51' 11.514"W	
54	608.375P	3615-3620	17.1 10	3619.10	41° 31' 13.135"N 70° 50' 14.086"W	
55	520.215S	3621-3626	15.8 3	3625.4	41° 30' 34.736"N 70° 51' 56.510"W	
56	518.51P	3627-3632	16.8 2	3627.3	41° 30' 32.569"N 70° 52' 15.155"W	
57	1153.56S	3633-3712 3716-3733	13.8 6	3705.4	41° 30' 10.495"N 70° 52' 01.495"W	
58	1643.53S	3734-3737 3740-3754 3760-3806 3809-3824 3829-3906 4937-4998	8.1 8	1584.2	41° 28' 53.865"N 70° 53' 42.044"W	

\* depths corrected for apparent tides

DEVELOPMENT ABSTRACT  
H-10461

NOAA Ship RUDE  
OPR-B616-93

DEV	Side Scan Contact Number(s)	Hydro Dev Positions	Least Depth * (m)	LD Pos	Geographic Position	Remarks
59	1844.52S, 1845.03S, 1855.22P, 1847.54P	3825-3828 4104-4115	12.8	4110.4	41° 29' 27.667"N 70° 50' 22.409"W	
60	1694.58P	3907-3910	17.2 <sub>2</sub>	3909.1	41° 29' 01.658"N 70° 53' 08.084"W	
61	1748.32P	3911-3918	17.4	3915.2 <sub>3</sub>	41° 28' 47.875"N 70° 53' 15.754"W	
62	1198.57P	3919-3957	16.4	3938.4	41° 29' 42.548"N 70° 52' 54.109"W	
63	1364.56P 1369.56P	3958-3965	17.2 <sub>2</sub>	3958.2	41° 29' 48.364"N 70° 52' 28.779"W	
64	1365.18P	3966-3975	16.2 <sub>7</sub>	3970.4	41° 29' 53.282"N 70° 52' 27.101"W	
65	1272.15S	3976-3983	17.1 <sub>0</sub>	4097.0	41° 30' 16.249"N 70° 52' 46.731"W	
66	140.53S 165.565S	3984-4003	-14.8 15.0	3986.2	41° 30' 18.289"N 70° 53' 08.374"W	
67	49' CHARTED DEPTH INVESTIGATION	4004-4013 4016-4023 4899-4922 4925-4936	17.1 <sub>3</sub>	4006.5	41° 30' 03.415"N 70° 53' 50.194"W	
68	1940.57P	4024-4031	13.8 <sub>8</sub>	4024.3	41° 30' 20.034"N 70° 54' 42.753"W	
69	2.42P 1976.05P	4032-4045	14.2 <sub>5</sub>	4032.2 <sub>0</sub>	41° 30' 22.253"N 70° 54' 44.273"W	

\* depths corrected for approved tides

NOAA Ship RUDE

Descriptive Report

Survey H-10461

DEVELOPMENT ABSTRACT  
H-10461

NOAA Ship RUDE  
OPR-B616-93

DEV	Side Scan Contact Number(s)	Hydro Dev Positions	Least Depth * (m)	ID Pos	Geographic Position	Remarks
70	161.15S	4046-4051	<del>15.9</del> 16.0	4047.0	41°30'34.504"N 70°52'42.681"W	
71	516.525S	4052-4059	17.1	4053.0	41°30'17.572"N 70°52'37.741"W	
72	655.27P	4060-4077	14.8 <del>7</del>	4072.1	41°30'13.550"N 70°52'18.641"W	
73	1129.49P	4078-4083	12.2 <del>1</del>	4082.2	41°30'13.123"N 70°52'15.243"W	
74	1271.41P 1292.32P	4084-4091	12.9 <del>8</del>	4088.2	41°29'58.643"N 70°52'17.515"W	
75	24.315S, 516.04S, 762.07S, 762.105S 776.09P, 2036.26S	4092-4097	7.4	4676.5	41°32'03.240"N 70°50'31.833"W	
76	1631.32S	4098-4103 4771-4825 4828-4839 4842-4870 4873-4898	<del>12.9</del> 13.0	4880.0	41°30'25.177"N 70°54'20.198"W	
77	1840.16S	4116-4144	13.2 <del>4</del>	4136.4	41°29'31.365"N 70°50'30.165"W	

\* depths corrected for approved tides

**O. COMPARISON WITH THE CHART** *See also the Evaluation Report*

**O.1 Charts effected by this survey are:**

Chart 13230  
"Buzzards Bay"  
39<sup>th</sup> ed. March 27, 1993  
Scale: 1:40,000

Chart 13218  
"Block Island to Martha's Vineyard"  
31<sup>st</sup> ed. 11 January 92)  
Scale: 1:80,000

**O.2** On September 16, 1993, a Danger to Navigation Report was sent to the Commander, First Coast Guard District outlining charting discrepancies found during this survey. The details of this report are outlined below. See Appendix I for a complete copy of this report. *Appended to this report*

REPORT OF DANGER TO NAVIGATION

* THESE UPDATED DEPTHS AFFECT THE FOLLOWING CHARTS:		
Chart 13230 (39 <sup>th</sup> ed. 27 March 93) Chart Scale 1:40,000		
Chart 13218 (31 <sup>st</sup> ed. 11 January 92) Chart Scale 1:80,000		
**DEPTH (MLLW)	LATITUDE	LONGITUDE
<i>38 3/4</i> ft	41°30'30.611"N	070°51'39.181"W
30 ft	41°32'30.394"N	070°49'44.580"W
45 ft	41°31'28.839"N	070°49'31.860"W

X  
X RK  
X RK

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

\*\* Depths reduced to MLLW using *approved* ~~predicted~~ tides.

THESE OBSTRUCTIONS AFFECT THE FOLLOWING CHARTS:

Chart 13230 (39<sup>th</sup> ed. 27 March 93)  
Chart Scale 1:40,000

Chart 13218 (31<sup>st</sup> ed. 11 January 92)  
Chart Scale 1:80,000

	* LEAST DEPTH	LATITUDE	LONGITUDE	
OBSTN <sub>1</sub>	<del>13</del> 24 ft	41°30'31.776"N	070°54'25.483"W	X
OBSTN <sub>2</sub>	23 ft	41°31'22.898"N	070°52'16.167"W	X
OBSTN <sub>3</sub>	<del>40</del> 41 ft	41°30'39.569"N	070°49'36.433"W	X

\* depths corrected for approved tides

OBSTRUCTION DESCRIPTIONS

OBSTN<sub>1</sub>: Chart as an obstruction with a least depth of 23 feet in lat 41°30'31.776"N  
Longitude 70°54'25.483"W

This item is an abandoned navigation buoy anchor. It measures approximately 4 feet square by 2 feet wide. It rests on edge and is located on Wilkes Ledge in Buzzards Bay, near buoy "G 7".

OBSTN<sub>2</sub>: Chart as an obstruction with a least depth of 23 feet in lat 41°31'22.898"N  
Longitude 70°52'16.167"W

This item is an abandoned fishing net anchored to the bottom. Approximately 20 feet of net are suspended in the water column by several plastic floats.

OBSTN<sub>3</sub>: Chart as an obstruction with a least depth of 40 feet in lat 41°30'39.569"N  
Longitude 70°49'36.433"W

This item is an abandoned fishing net anchored to the bottom, with a portion suspended in the water column like OBSTN<sub>2</sub>, however lies in deeper water.

0.3 The overall correlation between charted depths and survey soundings is excellent, with average differences of approximately one foot in flat and slightly sloping areas, and two to three feet in areas of irregular bottom topography.

An area with a radius of approximately 500 meters, centered around position 41°30'06"N and 070°54'00"W, was found to be deeper than the charted depths by 5 to 8 feet. Since this is an area with a sandy/silt bottom, erosion and/or shifting sediments is the most probable cause for the deeper soundings discovered during this survey.

**O.4** The correlation between charted shoal areas and corresponding soundings from this survey is excellent. See section O.2 for discrepancies and additions to the chart.

**O.5** Chart 13230, 39th ed., March 27, 1993 is the main operating chart used by fishing vessels in Buzzards Bay. Since the primary navigation system in the Bay is still Loran, it would be beneficial to have the Loran time delay grid overlaid on this chart. In addition, the latitude and longitude scales in their present format are cumbersome to use, since they are only broken down into whole minutes, rather than tenths of minutes.

**P. ADEQUACY OF SURVEY** *See also the Evaluation Report*

**P.1** This survey is complete and adequate to supersede prior surveys. *Concur*

**P.2** This survey is complete and contains no substandard data. *Concur*

**Q. AIDS TO NAVIGATION**

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

**Q.2** There are five floating aids to navigation within the survey area. In the U.S. Coast Guard Light List Volume 1, Atlantic Coast, these aids are identified as follows:

Light No.	Name	Position
16045	Wilkes Ledge Lighted Buoy 7	41°30.5'N 070°54.6'W
16050	Traffic Lighted Gong Buoy 8	41°29.0'N 070°53.6'W
16055	Buzzards Bay Midchannel Lighted Bell Buoy BB	41°30.8'N 070°50.1'W
16060	Buzzards Bay Lighted Gong Buoy 10	41°33.1'N 070°46.7'W
16710	Approach Lighted Buoy 1	no position given

The observed characteristics of these buoys agreed with their published characteristics. Detached positions were obtained for all buoys to verify their exact positions. Detached positions were determined by maneuvering the ship as close to each buoy as possible, taking several detached positions, and at the same time estimating the distance and bearing from ship's bow to the buoy. The estimated distance was corrected for the location of the transducer and applied to the detached position to compute a "true" position. All computed positions agree well with the published positions: *These aids appear adequate to serve their intended purposes.*

Buoy "7"	41°30.49'N	070°54.54'W	DP 514 <del>2</del> 1
Buoy "8"	41°28.96'N	070°53.56'W	DP 514 <del>0</del> 39
Buoy "BB"	41°30.78'N	070°50.10'W	DP 5138
Buoy "1"	41°31.82'N	070°50.90'W	DP 5129 30
Buoy "10"	41°33.07'N	070°46.65'W	DP 4365

Q.3 There were no aids other than those listed in the Light List found within the boundaries of this survey. *CONCUR*

Q.4 No bridges, overhead cables or overhead pipelines are located within the survey area. *CONCUR*

Q.5 Two ferry routes cross this survey. One ferry, which transits between New Bedford, MA and Martha's Vineyard, MA, runs across the extreme northeastern end of this survey. The other ferry, between New Bedford, MA and Cuttyhunk Island, MA, transits across the extreme southwestern end of this survey.

#### New Bedford to Martha's Vineyard Ferry

<u>Departure Position</u>	<u>Arrival Position</u>
41°36'35"N 070°54'15"W	41°27'20"N 070°36'00"W

#### New Bedford to Cuttyhunk Ferry

<u>Departure Position</u>	<u>Arrival Position</u>
41°38'10"N 070°55'15"W	41°25'28"N 070°55'25"W

Q.6 No ferry terminals are located within the survey area. *CONCUR*

**R. STATISTICS**

<b>R.1</b>	<b>a)</b> Number of positions	5160
	<b>b)</b> Lineal nautical miles of sounding lines	
	- nautical miles of survey with the use of the side scan sonar	221.36
	- nautical miles of survey without the use of the side scan sonar	323.72
<b>R.2</b>	<b>a)</b> square nautical miles of hydrography	17.5
	- per 100% of side scan coverage	
	<b>b)</b> days of production	45
	<b>c)</b> detached positions	75
	- 18 for diver investigations	
	- 5 for floating aids to navigation	
	- 52 for bottom samples	
	<b>d)</b> bottom samples	52
	<b>e)</b> tide stations	1
	<b>f)</b> current stations	0
	<b>g)</b> velocity casts	10
	<b>h)</b> magnetic stations	0
	<b>i)</b> XBT drops	0

**S. MISCELLANEOUS** *See also the Evaluation Report*

- S.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 observations of unusual currents were recorded during this survey.
  - e)** No evidence of magnetic anomalies was found during this survey.

**S.2** Fifty-two bottom samples were obtained during this survey. As directed in the Project Instructions, no bottom samples were submitted to the Smithsonian Institution.

**T. RECOMMENDATIONS**

**T.1** See section 0.2 for dangers to navigation noted during this survey.

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

**T.3** No further investigation of the survey area is recommended, except for those items noted in section 0.2.

**U. REFERRAL TO REPORTS**

No reports have been published which are not part of this Descriptive Report.

APPENDIX III

LIST OF HORIZONTAL CONTROL STATIONS

No horizontal control stations were needed for this survey as Differential GPS was employed exclusively for all positioning control. The following are the geographic positions for the Differential GPS radiobeacons used during this survey:

<i>Montauk, N.Y.</i> <del>Portsmouth, N.H.</del>	41°04'02.047"N	071°51'38.274"W
<del>Montauk, N.Y.</del> <i>Portsmouth, N.H.</i>	43°04'15.064"N	070°42'36.805"W



U.S. DEPARTMENT OF COMMERCE  
National Oceanic and Atmospheric Administration  
Office of NOAA Corps Operations  
NOAA Ship RUDE S-590  
439 W. York Street  
Norfolk, VA 23510-1114

16 September 1993

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

Dear Sir:

Over the course of NOAA Ship RUDE's hydrographic survey of the area between Wilkes Ledge and the red "10" buoy in Buzzards Bay, several discrepancies and obstructions were found on chart 13230 (39<sup>th</sup> ed. 27 March 93). It is requested that information concerning these discrepancies be published in the Local Notice to Mariners.

Updated depths and obstructions are outlined in the tables found in this report. These items should be viewed as preliminary information subject to office review. In addition, there is a chartlet enclosed with the boundaries of the survey outlined.

The survey soundings were determined during preliminary hydro investigation using a Raytheon DSF-6000 survey fathometer. The depths have been reduced to Mean Lower Low Water (MLLW) by applying predicted tide corrections. The horizontal datum is NAD 83.

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

REPORT OF DANGER TO NAVIGATION

Hydrographic Survey Registry Number...H-10461  
State.....Massachusetts  
General Locality.....Buzzards Bay  
Locality.....3 NM East of Wilkes Ledge  
Project Number.....B616-RU-93  
Surveyed by.....NOAA Ship RUDE



\* THESE UPDATED DEPTHS AFFECT THE FOLLOWING CHARTS:

Chart 13230 (39<sup>th</sup> ed. 27 March 93)  
Chart Scale 1:40,000

Chart 13218 (31<sup>st</sup> ed. 11 January 92)  
Chart Scale 1:80,000

** DEPTH (MLLW)	LATITUDE	LONGITUDE
<del>38</del> 39 ft	41°-30'-30.611"N	070°-51'-39.181"W
30 ft	41°-32'-30.394"N	070°-49'-44.580"W
45 ft	41°-31'-28.839"N	070°-49'-31.860"W

\* THESE OBSTRUCTIONS AFFECT THE FOLLOWING CHARTS:

Chart 13230 (39<sup>th</sup> ed. 27 March 93)  
Chart Scale 1:40,000

Chart 13218 (31<sup>st</sup> ed. 11 January 92)  
Chart Scale 1:80,000

	** DEPTH (MLLW)	LATITUDE	LONGITUDE
OBSTN <sub>1</sub>	24 ft	41°-30'-31.776"N	070°-54'-25.483"W
OBSTN <sub>2</sub>	23 ft	41°-31'-22.898"N	070°-52'-16.167"W
OBSTN <sub>3</sub>	41 ft	41°-30'-39.569"N	070°-49'-36.433"W

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

\*\* Depths reduced to MLLW using <sup>approved</sup> predicted tides.

## OBSTRUCTION DESCRIPTIONS

### OBSTN<sub>1</sub>:

This item is an abandoned navigational buoy anchor. It measures approximately 4 feet square by 2 feet wide. It rests on edge on Wilkes Ledge in Buzzards Bay, near buoy G "7".

### OBSTN<sub>2</sub>:

This item is an abandoned fishing net anchored to the bottom. Approximately 20 feet of net are suspended in the water column by several plastic floats.

### OBSTN<sub>3</sub>:

This item is an abandoned fishing net anchored to the bottom, with a portion suspended in the water column like OBSTN<sub>2</sub>, however lies in deeper water.

Contact either of the following personnel for further information.

Commanding Officer  
NOAA Ship RUDE  
16 Sconticut Neck. Rd  
#244  
Fairhaven, MA. 02719  
508-979-0600

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

Sincerely,

*Daniel R. Herlihy*  
Daniel R. Herlihy  
Lieutenant Commander, NOAA  
Commanding Officer, NOAA Ship RUDE

B616-RU-93  
H-10461  
DIVE INVESTIGATION REPORT  
DIVE 183.1

DATE: JULY 2, 1993      DN: 183

PERSONNEL:

DIVEMASTER\TENDER - ENS HAUPT                  DIVERS - LCDR HERLIHY

COXSWAIN\TENDER      - ABS ONEYEAR                  - ENS BRENNAN

VISIBILITY: 15 FEET                                  CURRENT: NEGLIGIBLE

MAXIMUM DEPTH: 19.8 METERS                          BOTTOM TIME: 25 MIN.

METHOD OF POSITION DETERMINATION: SIDE SCAN CONTACT

HDAPS POSITION: 1223.14S (SIDE SCAN CONTACT)

EASTING: 58486.1    NORTHING: 56602.4

LATITUDE: 41°30'34.812"N                                  LONGITUDE: 070°51'05.284W

AVERAGE LEAST DEPTH BY PNEUMATIC DEPTH GAUGE: N/A

TIME OF READING: N/A

PNEUMATIC DEPTH GAUGE CORRECTOR: 0.0

PREDICTED TIDAL ZONE CORRECTOR: N/A

LEAST DEPTH DETERMINED @MLLW N/A

NARRATIVE REPORT: The object of this dive was thought to be AWOIS # 7916, an anchor chain and submerged buoy. This determination was made based on the long slender return and small shadow cast by this object on the side scan sonar record.

A dive buoy with an acoustic pinger was dropped on the contact's position and subsequently checked by the ship with the side scan sonar. The dive buoy was positioned approximately 6 meters from the contact, bearing 150° True. Divers descended the buoy line and conducted a 5-meter circle search. Before going through a quarter of a revolution, a large steel pipe, approximately 0.45 meters in diameter and 25 meters long, was found. The pipe was found to be lying on a soft, silty bottom and had become buried at one end. On average, the pipe rose off the bottom approximately 0.3 meters. The divers least depth on the pipe was 61 feet by hand held diver's depth gauge. No pneumatic depth readings were taken on this object since it rose off the bottom only one foot.

B616-RU-93  
H-10461  
DIVE INVESTIGATION REPORT  
DIVE 183.2

*Obstr #3*

DATE: JULY 2, 1993 DN: 183

PERSONNEL:

DIVEMASTER\TENDER - ENS HAUPT                      DIVERS - LCDR HERLIHY

COXSWAIN\TENDER    - ABS ONEYEAR                      - ENS BRENNAN

VISIBILITY: 15 FEET                                      CURRENT: NEGLIGIBLE

MAXIMUM DEPTH: 17.0 METERS                              BOTTOM TIME: 18 MIN.

METHOD OF POSITION DETERMINATION: ON-LINE HYDRO DEVELOPMENT

HDAPS POSITION: 271<sup>7</sup>2.2 FATHOGRAM INSERT      *Fix 10100*

EASTING: 60546.5    NORTHING: 56749.0

LATITUDE: 41°30'39.569"N                                      LONGITUDE: 070°49'36.433"W

AVERAGE LEAST DEPTH BY PNEUMATIC DEPTH GAUGE: 12.5

TIME OF READING: 1535 UTC

PNEUMATIC DEPTH GAUGE CORRECTOR: 0.0

*Approved*  
~~PREDICTED~~ TIDAL ZONE CORRECTOR: -0.1 METERS

LEAST DEPTH DETERMINED @MLLW 12.4 METERS (*40 ft*)

NARRATIVE REPORT: The object of this dive was a tall slender spike found during hydro developments, which rose approximately 4-5 meters off the bottom based on the fathogram record.

A dive buoy was dropped by the ship at the position of the contact. Divers descended the line to the bottom and conducted a 5-meter circle search. During the first revolution, the item was located and found to be a large pile of fishing net anchored to the bottom and suspended in the water column by a series of floats attached to the net. This pile of nets sat on a flat, silty bottom in approximately 16.8 meters of water. A pneumatic depth reading was taken at the uppermost end of the nets, with a least depth of 12.4 meters (40.68 feet).

Due to the nature of the item and because it returned only a weak echosounder trace, no detached position was obtained. The position given in this report was taken from the hydro development conducted on this item. *See also Section 0.2. of the*

*Descriptive Report*

B616-RU-93  
H-10461  
DIVE INVESTIGATION REPORT  
DIVE 222.1

DATE: AUGUST 10, 1993 DN: 222

PERSONNEL:

DIVEMASTER\TENDER - ENS HAUPT                      DIVERS - LCDR HERLIHY

COXSWAIN\TENDER    - SS BRAWLEY                      - ENS BRENNAN

VISIBILITY: 15 FEET                                      CURRENT: < 0.5 KT

MAXIMUM DEPTH: 14.6 METERS                              BOTTOM TIME: 29 MIN.

NARRATIVE REPORT: This was the first of three dives within the search radius of AWOIS 7245. A review of the side scan records revealed no contacts which were immediately recognizable as the wreck of the FANNY PARNELL, a sixty foot fishing vessel. Therefore, the most probable contacts were targeted for investigation.

This dive centered around side scan contact 1852.40S in position \* E = 59525.9 and N = 54639.2. Circle searches of 10 and 20 meters were conducted around this position. Except for several small boulders measuring less than half a meter tall, the bottom was flat and barren, consisting of fine brown sand and silt. Upon completion of the two circle searches, the divers ascended to the surface, terminating this investigation.

\* Lat 41° 29' 31.181" N  
  Lon 70° 50' 20.439" W

B616-RU-93  
H-10461  
DIVE INVESTIGATION REPORT  
DIVE 222.2

DATE: AUGUST 10, 1993 DN: 222

PERSONNEL:

DIVEMASTER\TENDER - ENS HAUPT                      DIVERS - LCDR HERLIHY

COXSWAIN\TENDER - SS BRAWLEY                      - ENS BRENNAN

VISIBILITY: 15 FEET                      CURRENT: < 0.5 KTS

MAXIMUM DEPTH: 9.1 METERS                      BOTTOM TIME: 27 MIN.

METHOD OF POSITION DETERMINATION: DETACHED POSITION

HDAPS POSITION: 10000

EASTING: 59515.7                      NORTHING: 54570.8

LATITUDE: 41°29'28.<sup>964</sup>946"N                      LONGITUDE: 070°50'20.879W

AVERAGE LEAST DEPTH BY PNEUMATIC DEPTH GAUGE: 13.4 METERS

TIME OF READING: 1407 UTC

PNEUMATIC DEPTH GAUGE CORRECTOR: 0.0

*Approved*  
~~PREDICTED~~ TIDAL ZONE CORRECTOR: -0.<sup>5</sup>/<sub>6</sub> METERS

LEAST DEPTH DETERMINED @MLLW 12.<sup>9</sup>/<sub>8</sub> METERS (42 ft)

NARRATIVE REPORT: This was the second of three dives on AWOIS 7245, the wreck of the 60-foot fishing vessel FANNY PARNELL. This dive was centered around side scan contact 1845.03S in position E = 59525.0 and N = 54571.4. *Lat 41°59'28.983*

*Lon 70°50'20.478*  
Upon descending the buoy line, the divers conducted circle searches of 10 and 20 meters. On each revolution, a large boulder, approximately 2.5 meters tall, 3 meters long and 2 meters wide, was snagged. After completing the second circle search, the dive buoy was moved to this boulder and a pneumofathometer reading was taken. This was the largest of several boulders, with the others measuring less than one meter tall. The bottom in this area consisted of fine sand and silt and was relatively flat. No sign of the FANNY PARNELL was found during this investigation.

B616-RU-93  
H-10461  
DIVE INVESTIGATION REPORT  
DIVE 222.3

DATE: AUGUST 10, 1993 DN: 222

PERSONNEL:

DIVEMASTER\TENDER - ENS HAUPT                      DIVERS - LCDR HERLIHY

COXSWAIN\TENDER        - SS BRAWLEY                      - ENS BRENNAN

VISIBILITY: 15 FEET                                      CURRENT: < 0.5 KTS

MAXIMUM DEPTH: 10.6 METERS                              BOTTOM TIME: 13 MIN.

NARRATIVE REPORT: This was the third of three dives on AWOIS 7245, the wreck of the 60-foot fishing vessel FANNY PARNELL. This dive was centered around the Loran time delays (TD) given in the AWOIS listing. These TDs were entered into the ship's Loran receiver and converted to latitude and longitude. The latitude and longitude were in turn converted to easting and northing in the ship's HDAPS system for use in positioning the dive buoy. The TDs and correlating easting and northing are as follows:

9960-W	14203.0	E = 59332.0	<i>Lat 41° 29' 29.401" N</i>
9960-Y	43953.4	N = 54584.3	<i>Lon 70° 50' 28.798" W</i>

Upon descending the buoy line, the divers conducted circle searches of 10 and 20 meters. The bottom was flat and consisted of fine sand and silt. Several small boulders were found, but no indication of the wreck of the FANNY PARNELL. The divers completed the circle searches and ascended to the surface. No pneumo-fathometer readings or detached positions were obtained.

H-10461  
AWOIS ITEM 1930  
DIVE INVESTIGATION REPORT  
DIVE 222.4

DATE: AUGUST 10, 1993 DN: 222

PERSONNEL:

DIVEMASTER\TENDER - ST WILLIAMS            DIVERS - LT NIICHEL

COXSWAIN\TENDER    - SS BRAWLEY                            - ENS HAUPT

VISIBILITY: 10 FEET    CURRENT: 1.0 KT

MAXIMUM DEPTH: 14.7 METERS                                    BOTTOM TIME: 30 MIN.

METHOD OF POSITION DETERMINATION: DETACHED POSITION

HDAPS POSITION: FIX 10001

EASTING: 57880.9    NORTHING: 58831.9

LATITUDE: 41°31'47.075"N                                        LONGITUDE: 070°51'31.410"W

AVERAGE LEAST DEPTH BY PNEUMATIC DEPTH GAUGE: 11.6 METERS

TIME OF READING: 1720 UTC

PNEUMATIC DEPTH GAUGE CORRECTOR: 0.0

*Approved*  
~~PREDICTED~~-TIDAL ZONE CORRECTOR: -1.0 METERS

LEAST DEPTH DETERMINED @MLLW 10.6 METERS (34 ft)

NARRATIVE REPORT: This dive was centered around a group of contacts which were thought to be wreckage of AWOIS 1930, the wreck of the 110-foot wooden fishing vessel UNCLE JOHN. The dive buoy was dropped half way between the position for side scan contact 1958.35P and the Loran time delays given in the AWOIS listing (position E = 57904.2 and N = 58826.9). *Lat 41°31'46.914" N*  
*Lon 70°51'30.405" W*

Circle searches of 10 and 25 meters were conducted. The only item found during these searches was a round boulder 3 meters in height, located approximately 12 meters east of the buoy drop. No evidence of the wreck UNCLE JOHN was found. The bottom in this area was soft mud. The surrounding depth was 47 feet by diver's depth gauge.

H-10461  
AWOIS ITEM 1930  
DIVE INVESTIGATION REPORT  
DIVE 222.5

DATE: AUGUST 10, 1993 DN: 222

PERSONNEL:

DIVEMASTER\TENDER - ST WILLIAMS            DIVERS - LT NIICHEL

COXSWAIN\TENDER - SS BRAWLEY            - ENS HAUPT

VISIBILITY: 10 FEET                      CURRENT: 1.0 KT

MAXIMUM DEPTH: 15.2 METERS              BOTTOM TIME: 8 MIN.

METHOD OF POSITION DETERMINATION: SSS POSITION 1958.42S

HDAPS POSITION: FIX N/A

EASTING: 57803.1                      NORTHING: 58882.4

LATITUDE: N/A                      LONGITUDE: N/A

AVERAGE LEAST DEPTH BY PNEUMATIC DEPTH GAUGE: N/A

TIME OF READING: N/A

PNEUMATIC DEPTH GAUGE CORRECTOR: N/A

~~PREDICTED~~ TIDAL ZONE CORRECTOR: N/A

LEAST DEPTH DETERMINED @MLLW N/A

NARRATIVE REPORT: The object of this dive was side scan contact number 1958.42S. This contact was believed to be wreckage from AWOIS 1930, the wreck of the 110-foot fishing vessel UNCLE JOHN.

The dive buoy was dropped in position E = 57803.1 and N = 58882.4.\* A 10-meter circle search revealed a 5 foot boulder approximately 12 meters south of the buoy drop. However, no evidence of the UNCLE JOHN was encountered. No detached position or pneumatic least depth was taken for this dive. The bottom in this area consisted of soft mud. The surrounding depth was 50 feet by diver's depth gauge.

\* Lat 41° 31' 48.712" N  
Lon 70° 51' 34.767" W

H-10461  
AWOIS ITEM 1925  
DIVE INVESTIGATION REPORT  
DIVE 222.6

DATE: AUGUST 10, 1993 DN: 222

PERSONNEL:

DIVEMASTER\TENDER - ST WILLIAMS      DIVERS - LT NIICHEL

COXSWAIN\TENDER - SS BRAWLEY      - ENS HAUPT

VISIBILITY: 10 FEET      CURRENT: 1.0 KNOT

MAXIMUM DEPTH: 19.2 METERS      BOTTOM TIME: 29 MIN.

METHOD OF POSITION DETERMINATION: DETACHED POSITION

HDAPS POSITION: FIX 10002

EASTING: 54159.6      NORTHING: 56794.3

LATITUDE: 41°30'40.961"N      LONGITUDE: 070°54'11.862"W

AVERAGE LEAST DEPTH BY PNEUMATIC DEPTH GAUGE: 14.6 METERS

TIME OF READING: 1928 UTC

PNEUMATIC DEPTH GAUGE CORRECTOR: 0.0

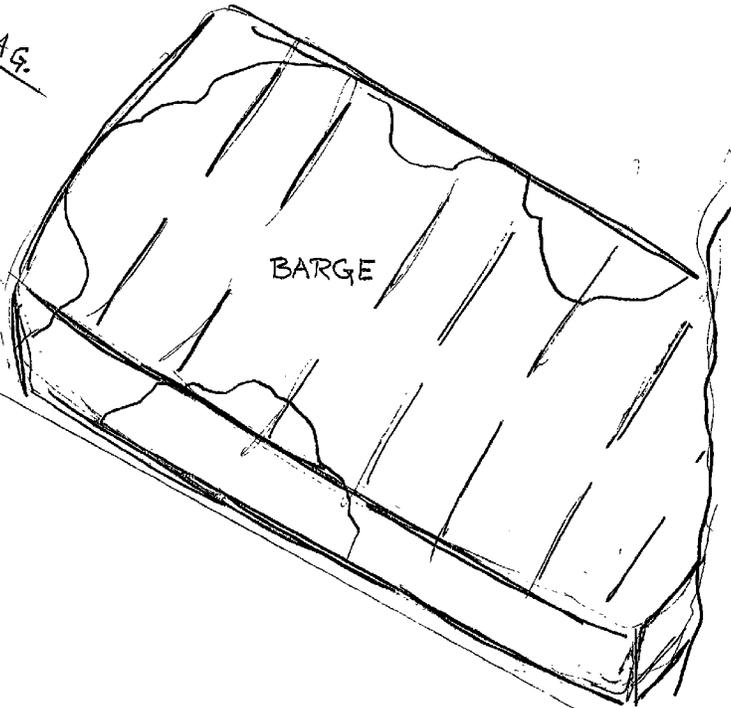
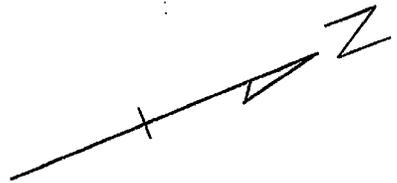
*APPROVED*  
~~PREDICTED~~ TIDAL ZONE CORRECTOR: -0.9 METERS

LEAST DEPTH DETERMINED @MLLW 13.7 METERS (45 ft.)

NARRATIVE REPORT: The dive buoy was dropped in position 41°30'36.38"N and 070°54'26.12"W, taken from side scan contact 1972.27S, believed to be AWOIS 1925, the wreck of the barge SHERWOOD.

The buoy landed on top of the sunken barge. A thorough investigation revealed the barge to be nearly deteriorated, metal in composition and rectangular in shape (approximately 11 meters x 27 meters). The longitudinal axis was aligned in a NE/SW direction by diver's compass. The northwest corner was buried in the surrounding mud bottom, as the barge appeared to be sliding down a shallow, 10-15° sloped embankment. The southeast corner of the barge was the highest point, with a least depth by pneumatic depth gauge of 14.6 meter. A sketch of the barge and its position on the embankment is attached. A number of fish nets were entangled in the remaining frames of the barge. There was no floor or skin discernable on the barge. The surrounding depth was 63 feet by diver's depth gauge.

235° MAG.



BARGE

PORTION  
UNDER  
MUD

10°-15°

B616-RU-93  
H-10461  
DIVE INVESTIGATION REPORT  
DIVE 222.7

*Obstr # 1*

DATE: AUGUST 10, 1993 DN: 222

PERSONNEL:

DIVEMASTER\TENDER - ENS HAUPT                      DIVERS - LCDR HERLIHY

COXSWAIN\TENDER    - SS BRAWLEY                      - ENS BRENNAN

VISIBILITY: 25 FEET                                      CURRENT: < 0.5 KTS

MAXIMUM DEPTH: 9.1 METERS                              BOTTOM TIME: 22 MIN.

METHOD OF POSITION DETERMINATION: DETACHED POSITION

HDAPS POSITION: 10003

EASTING: 53843.5    NORTHING: 56511.2

LATITUDE: 41°30'31.776"N                                  LONGITUDE: 070°54'25.483"W

AVERAGE LEAST DEPTH BY PNEUMATIC DEPTH GAUGE: 7.7 METERS

TIME OF READING: 2126 UTC

PNEUMATIC DEPTH GAUGE CORRECTOR: 0.0

*APPROVED*  
~~PREDICTED~~ TIDAL ZONE CORRECTOR: -0.5 METERS

LEAST DEPTH DETERMINED @MLLW 7.2 METERS (*23 ft*)

NARRATIVE REPORT: The focus of this dive investigation is a 25 foot sounding discovered during mainscheme side scan sonar coverage (position 1997.1). A slender 1.5-meter tall spike was recorded on the fathogram in an area near Wilkes Ledge, which was subsequently found to be the shoalest sounding in this vicinity.

A dive buoy was dropped at the location of position 1997.1 \*(E = 53875.1 and N = 56529.7). Divers descended the buoy line and found the anchor resting at the base of a large rectangular block of concrete, which was determined to be the anchor of a navigational buoy. This block was approximately 1.5 meters square by 0.5 meters wide, and had several links of buoy chain attached to its center.

A pneumo-fathometer reading was taken, with a least depth of 7.2 meters (*23.6* feet reduced to MLLW using *APPROVED* predicted tides). The divers ascended to the surface and a detached position was obtained by the ship. *See also Section 0.2. of the Descriptive Report*

\* Lat 41°30'32.371" N  
Lon 70°54'24.121" W

B616-RU-93  
H-10461  
DIVE INVESTIGATION REPORT  
DIVE 222.8

DATE: AUGUST 10, 1993 DN: 222

PERSONNEL:

DIVEMASTER\TENDER - ENS HAUPT                      DIVERS - LCDR HERLIHY

COXSWAIN\TENDER    - SS BRAWLEY                      - ENS BRENNAN

VISIBILITY: 25 FEET                                      CURRENT: < 0.5 KTS

MAXIMUM DEPTH: 10.0 METERS                              BOTTOM TIME: 12 MIN.

METHOD OF POSITION DETERMINATION: DETACHED POSITION

HDAPS POSITION: 10004

EASTING: 54842.7    NORTHING: 53474.5

LATITUDE: 41°28'53.369"N                                      LONGITUDE: 070°53'42.302"W

AVERAGE LEAST DEPTH BY PNEUMATIC DEPTH GAUGE: 9.4 METERS

TIME OF READING: 2216 UTC

PNEUMATIC DEPTH GAUGE CORRECTOR: 0.0

~~PREDICTED~~ TIDAL ZONE CORRECTOR: -0.<sup>4</sup>/<sub>8</sub> METERS

LEAST DEPTH DETERMINED @MLLW 9.<sup>0</sup>/<sub>8</sub> METERS (29 ft.)

NARRATIVE REPORT: This dive was conducted around the position of the shoalest depth found during hydro developments in the vicinity of buoy "R 8" in Buzzards Bay.

*Lat 41°28'53.865"N Lon 70°53'42.044"W*

A dive buoy was dropped at HDAPS position 1584.2 (E = 54848.7 and N = 53489.8) by the RUDE. Divers descended the buoy line and conducted a 10- and 20-meter circle search. The bottom in this location was rocky and strewn with various sized boulders ranging between 0.5 to 2.5-meters in circumference. The two largest boulders encountered were each approximately 2.5-meters wide by 1.5-meters tall. The one with the shoalest depth by diver's depth gauge was chosen for measurement. The divers moved the dive buoy to the position of this boulder and a pneumo-fathometer least depth of 9.<sup>10</sup>/<sub>8</sub> meters (29.<sup>8</sup>/<sub>8</sub> feet reduced to MLLW using ~~predicted~~ <sup>approved</sup> tides) was obtained. The divers ascended to the surface and a detached position for this boulder was obtained by the ship.

B616-RU-93  
H-10461  
DIVE INVESTIGATION REPORT  
DIVE 223.1

DATE: AUGUST 11, 1993 DN: 223

PERSONNEL:

DIVEMASTER\TENDER - ENS HAUPT                      DIVERS - LCDR HERLIHY

COXSWAIN\TENDER    - SS BRAWLEY                      - ENS BRENNAN

VISIBILITY: 15 FEET                                      CURRENT: < 0.5 KTS

MAXIMUM DEPTH: 13.7 METERS                              BOTTOM TIME: 25 MIN.

METHOD OF POSITION DETERMINATION: DETACHED POSITION

HDAPS POSITION: 10005

EASTING: 57700.0    NORTHING: 56473.0

LATITUDE: 41°30'30.611"N                                  LONGITUDE: 070°51'39.181"W

AVERAGE LEAST DEPTH BY PNEUMATIC DEPTH GAUGE: 12.1 METERS

TIME OF READING: 1249 UTC

PNEUMATIC DEPTH GAUGE CORRECTOR: 0.0

*Approved*  
~~PREDICTED~~ TIDAL ZONE CORRECTOR: -0.<sup>4</sup><sub>3</sub> METERS

LEAST DEPTH DETERMINED @MLLW 11.<sup>7</sup><sub>8</sub> METERS (38 ft)

NARRATIVE REPORT: The object of this dive was a 39-foot sounding discovered during hydro development 46. This sounding fell on the peak of a rocky ridge, as seen on the fathogram.

The RUDE dropped a dive buoy in HDAPS position 3416.4  
\*(E = 57693.7 and N = 56481.9). Divers descended the buoy line and conducted two circle searches, one at 10 meters and another at 20 meters. Several rocks of similar size were encountered over the course of the dive. During the circle searches, rough estimates of each rock's least depth were determined via the diver's depth gauge. A pneumo-fathometer measurement was obtained on the shoalest rock, with a least depth of 11.<sup>7</sup><sub>8</sub> meters (38.<sup>7</sup><sub>7</sub> feet corrected to MLLW using ~~predicted~~ *approved* tides). The divers ascended to the surface and a detached position was acquired by the ship.

\* Lat 41° 30' 30.9" N  
Lon 70° 51' 39.453" W

B616-RU-93  
H-10461  
DIVE INVESTIGATION REPORT  
DIVE 223.2

DATE: AUGUST 11, 1993 DN: 223

PERSONNEL:

DIVEMASTER\TENDER - ENS HAUPT                      DIVERS - LCDR HERLIHY

COXSWAIN\TENDER    - SS BRAWLEY                      - ENS BRENNAN

VISIBILITY: 10 FEET                                      CURRENT: < 0.5 KTS

MAXIMUM DEPTH: 13.7 METERS                              BOTTOM TIME: 9 MIN.

METHOD OF POSITION DETERMINATION: DETACHED POSITION

HDAPS POSITION: 10006

EASTING: 57756.5    NORTHING: 57208.3

LATITUDE: 41°30'54.446"N                                      LONGITUDE: 070°51'36.755"W

AVERAGE LEAST DEPTH BY PNEUMATIC DEPTH GAUGE: 10.2 METERS

TIME OF READING: 1321 UTC

PNEUMATIC DEPTH GAUGE CORRECTOR: 0.0

*Approved*  
PREDICTED TIDAL ZONE CORRECTOR: -0.4 METERS

LEAST DEPTH DETERMINED @MLLW 9.8 METERS (32 ft)

NARRATIVE REPORT: The object of this dive was a 33-foot sounding discovered during hydro development 39. This sounding was a 2.5-meter spike on a rocky shoal as seen on the fathogram.

A dive buoy was dropped in HDAPS position 3291.4\* (E = 57753.4 and N = 57210.8). Divers descended the buoy line and conducted two circle searches, one at 10 meters and another at 20 meters. Several large rocks were encountered over the course of the dive. During the circle searches, rough estimates of each rock's least depth was determined via the diver's depth gauge. A pneumo-fathometer reading was obtained on the shoalest of these rocks, with a least depth of 9.8 meters (32.2 feet corrected to MLLW using *approved* predicted tides). The divers ascended to the surface and a detached position was acquired by the ship.

\* Lat 41° 30' 54.527" N  
Lon 70° 51' 36.888" W

B616-RU-93  
H-10461  
DIVE INVESTIGATION REPORT  
DIVE 223.3

DATE: AUGUST 11, 1993 DN: 223

PERSONNEL:

DIVEMASTER\TENDER - ENS HAUPT                      DIVERS - LCDR HERLIHY

COXSWAIN\TENDER - SS BRAWLEY                      - ENS BRENNAN

VISIBILITY: 10 FEET                                      CURRENT: < 0.5 KTS

MAXIMUM DEPTH: 13.1 METERS                              BOTTOM TIME: 13 MIN.

METHOD OF POSITION DETERMINATION: DETACHED POSITION

HDAPS POSITION: 10007

EASTING: 57679.<sup>2</sup><sub>5</sub>    NORTHING: 57418.2

LATITUDE: 41°31'01.249"N                                      LONGITUDE: 070°51'40.091"W

AVERAGE LEAST DEPTH BY PNEUMATIC DEPTH GAUGE: 9.5 METERS

TIME OF READING: 1346 UTC

PNEUMATIC DEPTH GAUGE CORRECTOR: 0.0

*Approved*  
~~PREDICTED~~ TIDAL ZONE CORRECTOR: -0.<sup>5</sup><sub>4</sub> METERS

LEAST DEPTH DETERMINED @MLLW 9.<sup>0</sup><sub>1</sub> METERS (29 ft.)

NARRATIVE REPORT: The object of this dive was a 30-foot sounding discovered during hydro development 39. This sounding was a 2.5 meter spike on a rocky shoal as seen on the fathogram.

A dive buoy was dropped in HDAPS position 3284.3<sup>\*</sup> (E = 57664.2 and N = 57400.6). Divers descended the buoy line and conducted two circle searches, one at 10 meters and another at 20 meters. During the first circle search, a large rock, approximately 2.5 meters tall, was encountered. The subsequent 20-meter circle search was conducted to ensure that this was the rock seen on the fathogram. The same rock was snagged on the second search. The dive buoy was moved to the position of the rock, and a pneumo-fathometer reading was obtained, with a least depth of 9.<sup>0</sup><sub>1</sub> meters (29.<sup>0</sup><sub>9</sub> feet corrected to MLLW using ~~predicted~~ tides). The divers ascended the line and a detached position was acquired by the ship.

\* LAT 41°31'00.679"N  
    LON 70°51'40.738"W

B616-RU-93  
H-10461  
DIVE INVESTIGATION REPORT  
DIVE 223.4

DATE: AUGUST 11, 1993 DN: 223

PERSONNEL:

DIVEMASTER\TENDER - ENS HAUPT                      DIVERS - LCDR HERLIHY

COXSWAIN\TENDER - SS BRAWLEY                      - ENS BRENNAN

VISIBILITY: 20 FEET                      CURRENT: < 0.5 KTS

MAXIMUM DEPTH: 12.2 METERS                      BOTTOM TIME: 11 MIN.

METHOD OF POSITION DETERMINATION: DETACHED POSITION

HDAPS POSITION: 10008

EASTING: 60357.4                      NORTHING: 60168.0

LATITUDE: 41°32'30.394"N                      LONGITUDE: 070°49'44.580"W

AVERAGE LEAST DEPTH BY PNEUMATIC DEPTH GAUGE: 9.7 METERS

TIME OF READING: 1457 UTC

PNEUMATIC DEPTH GAUGE CORRECTOR: 0.0

*Approved*  
~~PREDICTED~~ TIDAL ZONE CORRECTOR: -0.6 METERS

LEAST DEPTH DETERMINED @MLLW 9.1 METERS (30 ft)

NARRATIVE REPORT: The object of this dive was a 28-foot sounding discovered during hydro development 16. This sounding was a 2.5-meter spike inserted on the fathogram during the investigation of a small ridge in this development.

A dive buoy was dropped in HDAPS position 2649.3.3<sup>\*</sup> (E = 60351.8 N = 60159.9). Divers descended the buoy line and found the anchor resting at the base of a large boulder, approximately 7 meters wide by 3.5 meters tall. The surrounding area consisted of coarse sand and broken shells. The dive buoy was moved to the highest point on the boulder and a pneumatic least depth of 9.1 meters (29.8 feet corrected using ~~predicted~~ *approved* tides) was recorded. The divers ascended to the surface and a detached position was obtained by the ship.

\* LAT 41° 32' 30.131" N  
LON 70° 49' 44.822" W

B616-RU-93  
H-10461  
DIVE INVESTIGATION REPORT  
DIVE 223.5

DATE: AUGUST 11, 1993 DN: 223

PERSONNEL:

DIVEMASTER\TENDER - ST WILLIAMS DIVERS - LT NIICHEL

COXSWAIN\TENDER - SS BRAWLEY - ENS HAUPT

VISIBILITY: 10 FEET CURRENT: 1.0 KT

MAXIMUM DEPTH: 18.3 METERS BOTTOM TIME: 14 MIN.

METHOD OF POSITION DETERMINATION: DETACHED POSITION

HDAPS POSITION: FIX 10009

EASTING: 60652.4 NORTHING: 58269.0

LATITUDE: 41°31'28.839"N LONGITUDE: 070°49'31.860"W

AVERAGE LEAST DEPTH BY PNEUMATIC DEPTH GAUGE: 14.7 METERS

TIME OF READING: 1714 UTC

PNEUMATIC DEPTH GAUGE CORRECTOR: 0.0

*Approved*  
~~PREDICTED~~ TIDAL ZONE CORRECTOR: -0.9 METERS

LEAST DEPTH DETERMINED @MLLW 13.<sup>8</sup>/<sub>10</sub> METERS (45 ft.)

NARRATIVE REPORT: The object of this dive was a 49-foot sounding found during hydro development 17.

The dive buoy was dropped in HDAPS position 2699.5<sup>\*</sup> (E = 57874.6 and N = 58831.9). Two large boulders, approximately 1.5 meters by 1.5 meters by 2.0 meters tall, were discovered during a 5-meter circle search. The boulders were found 5 meters southeast of the buoy anchor, aligned in an east/west orientation and approximately 5 meters apart. A least depth of <sup>12.8</sup>14.7 meters was (45 ft) obtained on the boulder to the east. The bottom in this area consisted of small cobbles and sand. The surrounding depth was 60 feet by diver's depth gauge.

\* 41°31' 47.075" N  
70°51' 31.682" W

B616-RU-93  
H-10461  
DIVE INVESTIGATION REPORT  
DIVE 223.6

DATE: AUGUST 11, 1993 DN: 223

PERSONNEL:

DIVEMASTER\TENDER - ST WILLIAMS      DIVERS - LT NIICHEL

COXSWAIN\TENDER - SS BRAWLEY      - ENS HAUPT

VISIBILITY: 10 FEET      CURRENT: 1.0 KT

MAXIMUM DEPTH: 15.8 METERS      BOTTOM TIME: 14 MIN.

METHOD OF POSITION DETERMINATION: DETACHED POSITION

HDAPS POSITION: FIX #10010

EASTING: 63164.1      NORTHING: 61218.0

LATITUDE: 41°33'04.407"N      LONGITUDE: 070°47'43.467"W

AVERAGE LEAST DEPTH BY PNEUMATIC DEPTH GAUGE: 11.6

TIME OF READING: 1956 UTC

PNEUMATIC DEPTH GAUGE CORRECTOR: 0.0

*Approved*  
PREDICTED TIDAL ZONE CORRECTOR: ~~-0.9~~ METERS

LEAST DEPTH DETERMINED @MLLW 10.7 METERS (34 ft.)

NARRATIVE REPORT: The object of this dive was a spike found on the fathogram at position\*2499.59. The spike proved to be one of two boulders, each approximately 1.5 meters tall. Both boulders were angular in shape, aligned in a NW/SE direction and approximately 3 meters apart. A least depth of ~~11.6~~ meters by pneumatic depth gauge was obtained on the SE boulder. A detached position was taken at a point half way between the two boulders. The bottom in this area was gravel and sand, with a surrounding depth of 52 feet by diver's depth gauge.

\* LAT 41°32'54.443" N  
LON 70°47'35.534" W

B616-RU-93  
H-10461  
DIVE INVESTIGATION REPORT  
DIVE 223.7

DATE: AUGUST 11, 1993 DN: 223

PERSONNEL:

DIVEMASTER\TENDER - ENS HAUPT                      DIVERS - LCDR HERLIHY

COXSWAIN\TENDER        - SS BRAWLEY                      - LTJG BRENNAN

VISIBILITY: 15 FEET                                      CURRENT: < 1.0 KT

MAXIMUM DEPTH: 14.3 METERS                              BOTTOM TIME: 17 MIN.

METHOD OF POSITION DETERMINATION: DETACHED POSITION

HDAPS POSITION: 10011

EASTING: 63931.8                                      NORTHING: 61086.8

LATITUDE: 41°33'00.142"N                              LONGITUDE: 070°47'10.343"W

AVERAGE LEAST DEPTH BY PNEUMATIC DEPTH GAUGE: 12.7

TIME OF READING: 2220 UTC

PNEUMATIC DEPTH GAUGE CORRECTOR: 0.0

*Approved*  
PREDICTED TIDAL ZONE CORRECTOR: -0.<sup>6</sup>/<sub>8</sub> METERS

LEAST DEPTH DETERMINED @MLLW 12.<sup>1</sup>/<sub>2</sub> METERS (39 ft.)

NARRATIVE REPORT: The object of this dive was a 34-foot sounding believed to be that associated with AWOIS 7962, a 36-foot wire drag hang from survey FE-161WD/1957.

A dive buoy was dropped in HDAPS position 2257.03\* (E = 63929.1 and N = 61088.4). Divers descended the buoy line and conducted two circle searches, one of 5 meters and the second of 10 meters. The same large rock was snagged during both circle searches. The dive buoy was moved to the position of this rock and a pneumo-fathometer measurement was obtained, with a least depth of 12.<sup>3</sup>/<sub>8</sub> meters (40.<sup>39</sup>/<sub>10</sub> feet corrected to MLLW using *predicted* tides). The divers ascended the buoy line and a detached position was acquired by the ship.

This rock was approximately 2 meters tall, with a sloping face to the west and a vertical face to the east. The bottom in this area was covered with many smaller rocks measuring less than one meter in diameter.

\* Lat 41° 33' 00.194" N  
Lon 70° 47' 10.460" W

B616-RU-93  
H-10461  
DIVE INVESTIGATION REPORT  
DIVE 228.2

DATE: AUGUST 16, 1993 DN: 228

PERSONNEL:

DIVEMASTER\TENDER - ENS HAUPT                    DIVERS - LT MOORE  
COXSWAIN\TENDER    - SS BRAWLEY                    - LTJG BRENNAN

VISIBILITY: 10 FEET                                CURRENT: 1.0 KT  
MAXIMUM DEPTH: 15.8 METERS                        BOTTOM TIME: 20 MIN.

METHOD OF POSITION DETERMINATION: DETACHED POSITION

HDAPS POSITION: 10012

EASTING: 57575.3                                    NORTHING: 58745.7  
LATITUDE: 41°31'44.278"N                        LONGITUDE: 070°51'44.591"W

AVERAGE LEAST DEPTH BY PNEUMATIC DEPTH GAUGE: 13.5 METERS

TIME OF READING: 1739 UTC

PNEUMATIC DEPTH GAUGE CORRECTOR: 0.0

*Approved*  
~~PREDICTED~~ TIDAL ZONE CORRECTOR: -0.1 METERS

LEAST DEPTH DETERMINED @MLLW 13.4 METERS  
(44.0 FEET)

NARRATIVE REPORT: The object of this dive was side scan contact 4999.35S, an item which fell just outside the AWOIS 1930 search radius, and was thought to be the wreck of the 110-foot fishing vessel UNCLE JOHN.

A dive buoy was dropped, divers descended the buoy line and conducted a 10-meter circle search. During the first revolution, a large boulder was encountered resting on a soft, muddy bottom. This boulder was approximately 2.5 meters tall and 3 meters in diameter at the base. Although this was obviously not part of the UNCLE JOHN, a least depth by pneumo-fathometer and detached position were obtained due to the size of the boulder.

B616-RU-93  
H-10461  
DIVE INVESTIGATION REPORT  
DIVE 228.3

*Obstr #2*

DATE: AUGUST 16, 1993 DN: 228

PERSONNEL:

DIVEMASTER\TENDER - ENS HAUPT                      DIVERS - LT MOORE

COXSWAIN\TENDER - SS BRAWLEY                      - LTJG BRENNAN

VISIBILITY: 20 FEET                                      CURRENT: 1.0 KT

MAXIMUM DEPTH: 14.0 METERS                              BOTTOM TIME: 8 MIN.

METHOD OF POSITION DETERMINATION: DETACHED POSITION

HDAPS POSITION: 10013

EASTING: 56843.0                                      NORTHING: 58086.4

LATITUDE: 41°31'22.898"N                              LONGITUDE: 070°52'16.167"W

AVERAGE LEAST DEPTH BY PNEUMATIC DEPTH GAUGE: 7.2 METERS

TIME OF READING: 1818 UTC

PNEUMATIC DEPTH GAUGE CORRECTOR: 0.0

*Approved*  
~~PREDICTED~~ TIDAL ZONE CORRECTOR: -0.2 METERS

LEAST DEPTH DETERMINED @MLLW                              7.0 METERS  
(~~22.9~~ FEET)  
(*23 ft.*)

NARRATIVE REPORT: The object of this dive was a side scan contact thought to be fishing nets similar to those found during dive 183.2. Fix number 5120.19 from an echosounder investigation was used as the position for this dive.

A dive buoy was dropped in position E = 56843.4 and N = 58084.0. Divers descended the buoy line and immediately found a large column of nets suspended in the water column by a series of floats. The nets were anchored to the bottom by a string of rubberized down wheels and rose off the bottom approximately 20 to 25 feet. A pneumatic least depth of 7.0 meter (~~22.9~~ feet) was obtained at the highest point of the suspended nets. *23*

*See also Section 0.2 of the Descriptive Report*

*Lat 41°31'22.82" N  
Lon 70°52'16.15" W*

B616-RU-93  
H-10461  
DIVE INVESTIGATION REPORT  
DIVE 228.4

DATE: AUGUST 16, 1993 DN: 228

PERSONNEL:

DIVEMASTER\TENDER - LTJG BRENNAN      DIVERS - LCDR HERLIHY

COXSWAIN\TENDER      - SS BRAWLEY      - ENS HAUPT

VISIBILITY: 10 FEET      CURRENT: 1.0 KT

MAXIMUM DEPTH: 14.6 METERS      BOTTOM TIME: 13 MIN.

METHOD OF POSITION DETERMINATION: DETACHED POSITION

HDAPS POSITION: 10014

EASTING: 64790.0      NORTHING: 61122.7

LATITUDE: 41°33'01.289"N      LONGITUDE: 070°46'33.311"W

AVERAGE LEAST DEPTH BY PNEUMATIC DEPTH GAUGE: 9.9 METERS

TIME OF READING: 1953 UTC

PNEUMATIC DEPTH GAUGE CORRECTOR: 0.0

~~PREDICTED~~ TIDAL ZONE CORRECTOR: -0.<sup>6</sup>/<sub>7</sub> METERS

LEAST DEPTH DETERMINED @MLLW 9.<sup>3</sup>/<sub>2</sub> METERS (30 ft)

NARRATIVE REPORT: The object of this dive was a <sup>(0.9m)</sup> 36-foot sounding found near the AWOIS 7963 search radius. AWOIS 7963 was a 31-foot wire drag hang recorded during survey FE-161WD/1957.

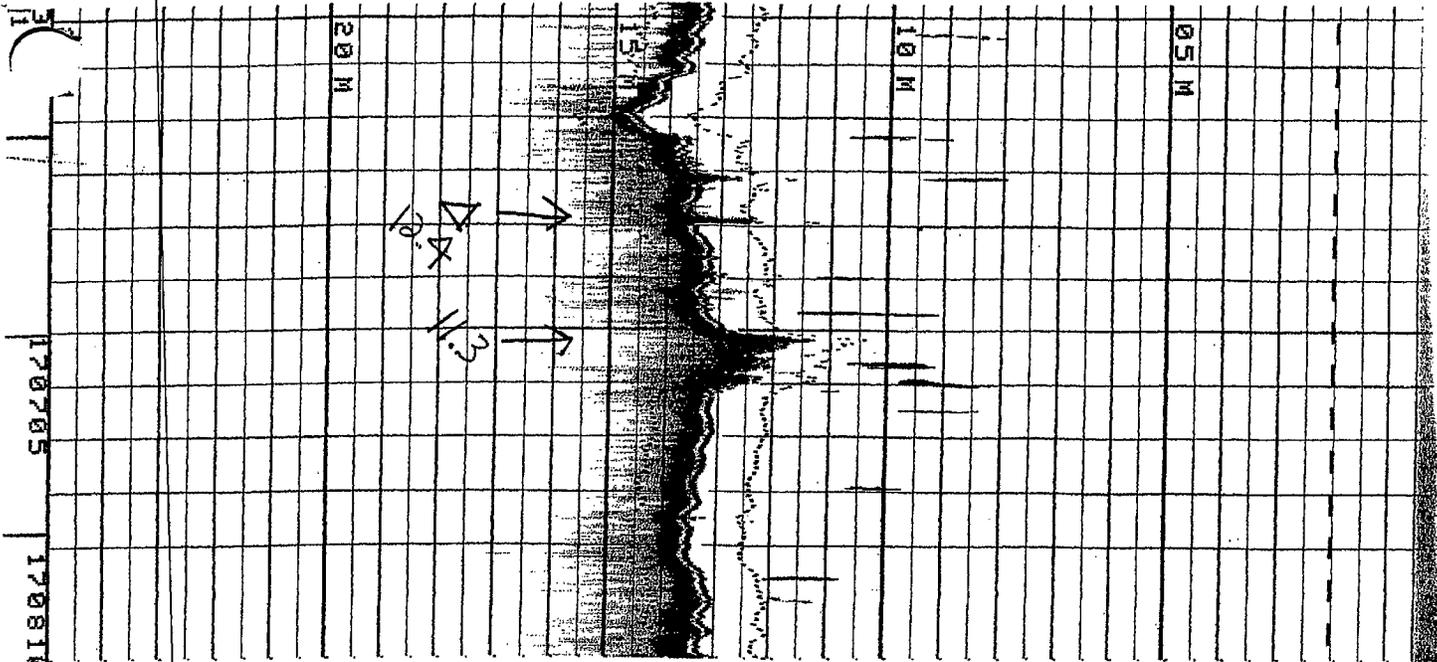
A dive buoy was dropped in position E = 64788.6 and N = 61121.2. Divers descended the buoy line, conducted a 5-meter circle search and discovered a large rock approximately 4 meters to the south. The rock rose 16 feet off the bottom and had a circular base. The base was 10 feet in diameter and narrowed to a flat circular top approximately 4 feet in diameter. A copy of the fathogram trace is attached. The bottom in this area was soft mud and the surrounding depth was 48 feet by diver's depth gauge.

2.1.2

1607

160A

K

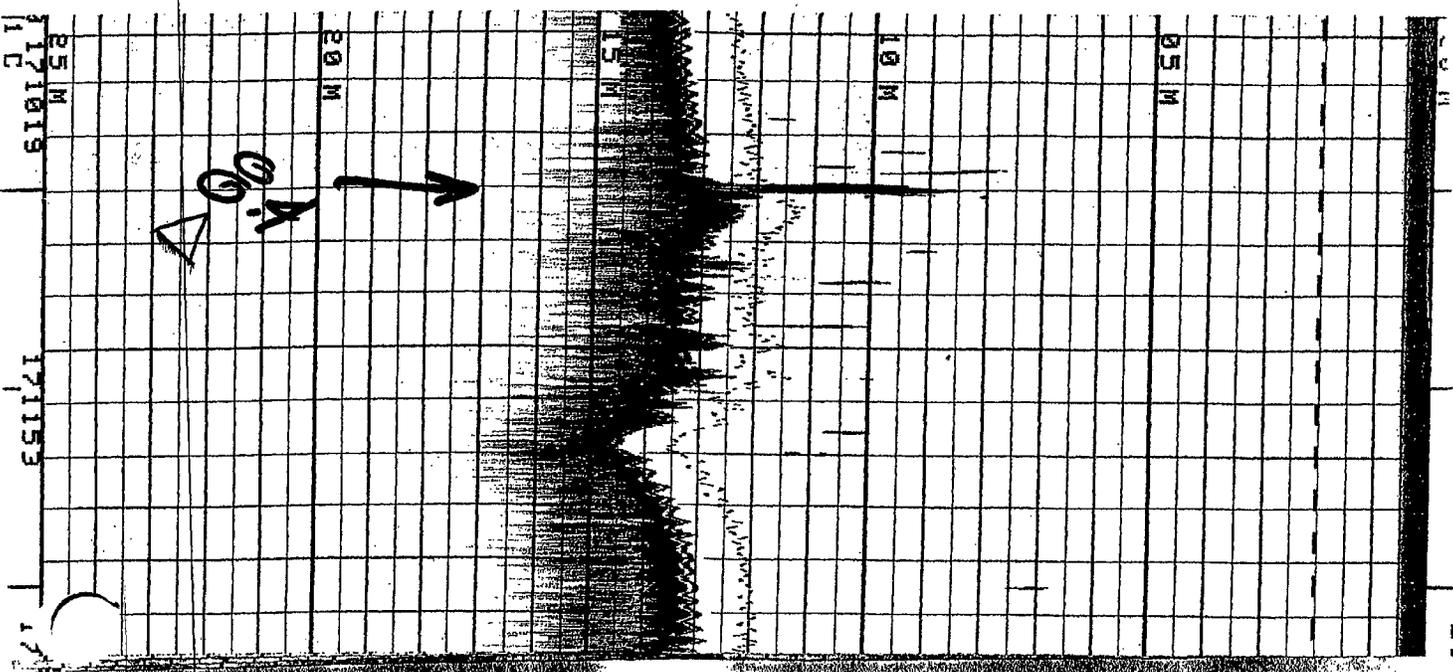


DEV. 2

2407

1970A

LTRA LR



APPENDIX VII

APPROVAL SHEET

LETTER OF APPROVAL

REGISTRY NO. H-10461

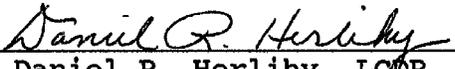
This Descriptive Report and the accompanying field sheets are respectfully submitted.



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Richard T. Brennan, LT(jg), NOAA  
Field Operations Officer  
NOAA Ship RUDE

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



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Daniel R. Herlihy, 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  
Silver Spring, Maryland 20910

TIDE NOTE FOR HYDROGRAPHIC SURVEY

DATE: November 12, 1993

MARINE CENTER: Atlantic

HYDROGRAPHIC PROJECT: OPR-B616

HYDROGRAPHIC SHEET: H-10461

LOCALITY: Massachusetts, Buzzards Bay 3.0 N.M. East of  
Wilkes Ledge

TIME PERIOD: March 24 - August 16, 1993

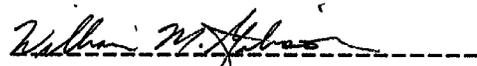
TIDE STATION USED: 844-8248 Penikese Island, Ma.  
Lat.  $41^{\circ} 27.0'N$  Lon.  $70^{\circ} 55.3'W$

PLANE OF REFERENCE (MEAN LOWER LOW WATER): 2.62 ft.  
HEIGHT OF HIGH WATER ABOVE PLANE OF REFERENCE: 3.6 ft.

REMARKS: RECOMMENDED ZONING

1. West of  $70^{\circ} 50.0'W$ , times and heights are direct on Penikese Island, Ma. (844-8248).
2. East of  $70^{\circ} 50.0'W$ , times are direct, and apply a X1.06 range ratio to Penikese Island, Ma. (844-8248).

Note: Times are tabulated in Eastern Standard Time.

  
CHIEF, DAPUMS SECTION



H-10461

GEOGRAPHIC NAMES

Name on Survey	ON CHART NO. 13218 ON PREVIOUS SURVEY No. ON U.S. QUADRANGLE MAPS FROM LOCAL INFORMATION ON LOCAL MAPS P.O. GUIDE OR MAP GRAND MCNALLY ATLAS U.S. LIGHT LIST										
	A	B	C	D	E	F	G	H	K		
BUZZARDS BAY (title)	X										1
MASSACHUSETTS (title)	X										2
NAUSHON ISLAND (title)	X										3
WILKES LEDGE	X										4
											5
											6
											7
											8
											9
											10
											11
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											22
											23
											24
											25

To: Maxine Fetterly@NCG244@noaa  
Cc: Robert G Roberson@NCG244@noaa  
Subject: Curtis Loy@STAFF@NCG2  
re: Survey H-10461  
Date: Wednesday, July 5, 1995 9:38:42 EDT  
Attach:  
Certify: N  
Forwarded by:

---

Maxine -

I recommend the following location for the title for H-10461:

3 NM North of Naushon Island, Buzzards Bay

Curt

07/18/95

HYDROGRAPHIC SURVEY STATISTICS  
REGISTRY NUMBER: H-10461

NUMBER OF CONTROL STATIONS		2
NUMBER OF POSITIONS		5160
NUMBER OF SOUNDINGS		21935
	TIME-HOURS	DATE COMPLETED
PREPROCESSING EXAMINATION	299	12/07/93
VERIFICATION OF FIELD DATA	349	03/30/95
QUALITY CONTROL CHECKS	70	
EVALUATION AND ANALYSIS	172	
FINAL INSPECTION	28	06/27/95
COMPILATION	20	07/14/95
TOTAL TIME	964	
ATLANTIC HYDROGRAPHIC BRANCH APPROVAL		07/17/95

**ATLANTIC HYDROGRAPHIC BRANCH  
EVALUATION REPORT FOR H-10461 (1993)**

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

**H. CONTROL STATIONS**

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 NAD 83 and the North American Datum of 1927 (NAD 27).

To place the smooth plots on the NAD 27, move the projection lines 0.385 seconds (11.869 meters or 1.19 mm at the scale of the survey) north in latitude and 1.879 seconds (43.560 meters or 4.36 mm at the scale of the survey) east in longitude.

**L. JUNCTIONS**

H-10496 (1993) 1:10,000 to the southwest  
H-10520 (1994) 1:10,000 to the northeast  
H-10530 (1994) 1:10,000 to the north northwest

Junctions have been effected between the present survey and the surveys listed above. There are no junctional surveys to the southeast. Present survey depths are in harmony with the charted hydrography to the southeast.

**M. COMPARISON WITH PRIOR SURVEYS**

**M.1. Hydrographic**

H-2320	(1897)	1:20,000
H-2601B	(1903-1907)	1:20,000
H-2601C	(1904)	1:20,000
H-3556	(1913-1915)	1:20,000
<u>H-9615</u>	<u>(1976)</u>	<u>1:20,000</u>

Prior surveys H-2320 (1897), H-2601B (1903-1907),

H-2601C (1904) and H-3556 (1913-1915) were not available for comparison.

Prior survey H-9615 (1976) is common to the present survey area and is in adequate agreement. Prior survey depths are generally 1 foot (0<sup>3</sup> m) deeper than present survey depths with scattered depths up to 3 feet (0<sup>9</sup> m) deeper than present survey depths. The differences between the prior and present survey depths can be attributed to improved hydrographic surveying methods and equipment.

The present survey is adequate to supersede the prior surveys within the common area.

#### M.2. Wire Drag Surveys

FE-161WD	(1957)	1:40,000
FE-194WD	(1963)	1:20,000, 1:40,000
<u>FE-207WD</u>	<u>(1966)</u>	<u>1:40,000</u>

Two charted hangs originate with prior survey FE-161WD (1957). These charted hangs have been assigned as Automated Wreck and Obstruction Information System (AWOIS) Items #7962 and #7963 and are adequately discussed in section N., pages 26-29 of the Descriptive Report.

Five charted hangs originate with prior survey FE-194WD (1963). Three of the hangs have been assigned as AWOIS Items #1921, #1930, and #7245. AWOIS Items #1921 and #7245 are adequately discussed in section N., pages 16-17, and 22-24, respectively, of the Descriptive Report.

One charted hang originates with prior survey FE-207WD (1966). The charted hang has been assigned AWOIS Item #1925 and is adequately discussed in section N., pages 17-19, of the Descriptive Report.

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

**N.7.4. COMPARISON WITH CHART AND CHARTING RECOMMENDATIONS**

AWOIS Item #1930, a charted wreck with a wire drag clearance depth of 33-feet (10.0m), in Latitude 41°31'48.38"N, Longitude 70°51'34.12"W, is considered disproved by present survey. A rock with a least depth of 33-feet (10.0m) was located in Latitude 41°31'48.754"N and Longitude 70°51'34.793"W during the 1993 field season. In 1994, this item was re-investigated by the field unit, survey H-10530, and a rock with a least depth of 32-feet (9.7m), was located in Latitude 41°31'48.757 and Longitude 70°51'34.758. It is recommended that the charted wreck be deleted from the chart. It is also recommended that a rock with a least depth of 32-feet (9.7m) be charted as shown on survey H-10530 (1994).

Two charted 28-ft wire drag clearance depths, in Latitude 41°31'55"N, Longitude 70°51'41"W and Latitude 41°31'55"N, Longitude 70°51'29"W, originate with FE-194WD (1963) and fall within the search radius for AWOIS Item #1930. These two features are considered disproved by the present survey. It is recommended that the charted 28-ft wire drag clearance depths be deleted from the chart, and the area be charted as shown on the present survey.

**O. COMPARISON WITH CHARTS 13218 (31<sup>st</sup> Edition, Jan. 11/92)**  
**13230 (39<sup>th</sup> Edition, Mar. 27/93)**  
**13232 ( 2<sup>nd</sup> Edition, May 15/93)**

The charted hydrography originates with the previously discussed prior surveys and unascertainable sources which need no further consideration. Specific items discussed in section N. of the Descriptive Report have charting recommendations and require no additional comments except as noted in that report.

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

**P. ADEQUACY OF SURVEY**

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

**S. MISCELLANEOUS**

Chart compilation using the present survey data was done by Atlantic Hydrographic Branch personnel in Norfolk, Virginia. Compilation data will be forwarded upon completion of the project.

**RUDE Processing Team**

*Richard W. Blevins*

**Richard W. Blevins**  
Cartographic Technician  
Verification of Field Data

*Maxine Fetterly*

**Maxine Fetterly**  
Cartographic Technician  
Evaluation and Analysis

APPROVAL SHEET  
H-10461

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. A final sounding printout of the survey has been made. The survey records and digital data comply with NOS requirements except where noted in the Evaluation Report.

Richard H. Whitfield Date: 7-17-95  
Richard H. Whitfield  
Cartographer  
Atlantic Hydrographic Branch

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

Nicholas E. Perugini Date: July 17, 1995  
Nicholas E. Perugini, CDR, NOAA  
Chief, Atlantic Hydrographic Branch

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Final Approval:

Approved: Andrew A. Armstrong III Date: 7-19-95  
Andrew A. Armstrong III  
Captain, NOAA  
Chief, Hydrographic Surveys Division

