H10548

NOAA FORM 76-35A

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

DESCRIPTIVE REPORT

Type of Survey HYDROGRAPHIC/ SIDE SCAN SONAR

Field No. RU-10-4-94

Registry No. H-10548

LOCALITY

State MASSACHUSETTS

General Locality VINEYARD SOUND

Sublocality 4.0 NM SSW OF CUTTYHUNK ISLAND

19 94

CHIEF OF PARTY

LCDR D. R. HERLIHY, NOAA

LIBRARY & ARCHIVES

DATE JAN 22 1996

*U.S. GOV. PRINTING OFFICE: 1967---756-980

NOAA FORM 77-28 (11-72)	U.S. DEPARTMENT OF COMMERCE NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION	REGISTER NO.
	HYDROGRAPHIC TITLE SHEET	H-10548
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-10-4-94

State Massachusetts

General locality Vineyard Sound

Locality 4.0 NM SSW of Cuttyhunk Island

Scale 1:10,000 Date of survey 20 June - 13 September 1994

Instructions dated 23 February 1994 Project No. OPR-B616-RU-94

Vessel NOAA Ship RUDE S590

Chief of party LCDR D.R. Herlihy

Surveyed by LCDR D.R. Herlihy, LTJG R.T. Brennan, ENS T.A. Haupt, ENS S.R. Williams & ST E.T. Hardison

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

Graphic record scaled by DRH, RTB, TAH, SRW & ETH

Graphic record checked by DRH, RTB, TAH, SRW & ETH

Protracted by NA Automated plot by ENCAD NOVAJET III PLOTTER

Verification by ATLANTIC HYDROGRAPHIC BRANCH PERSONNEL

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

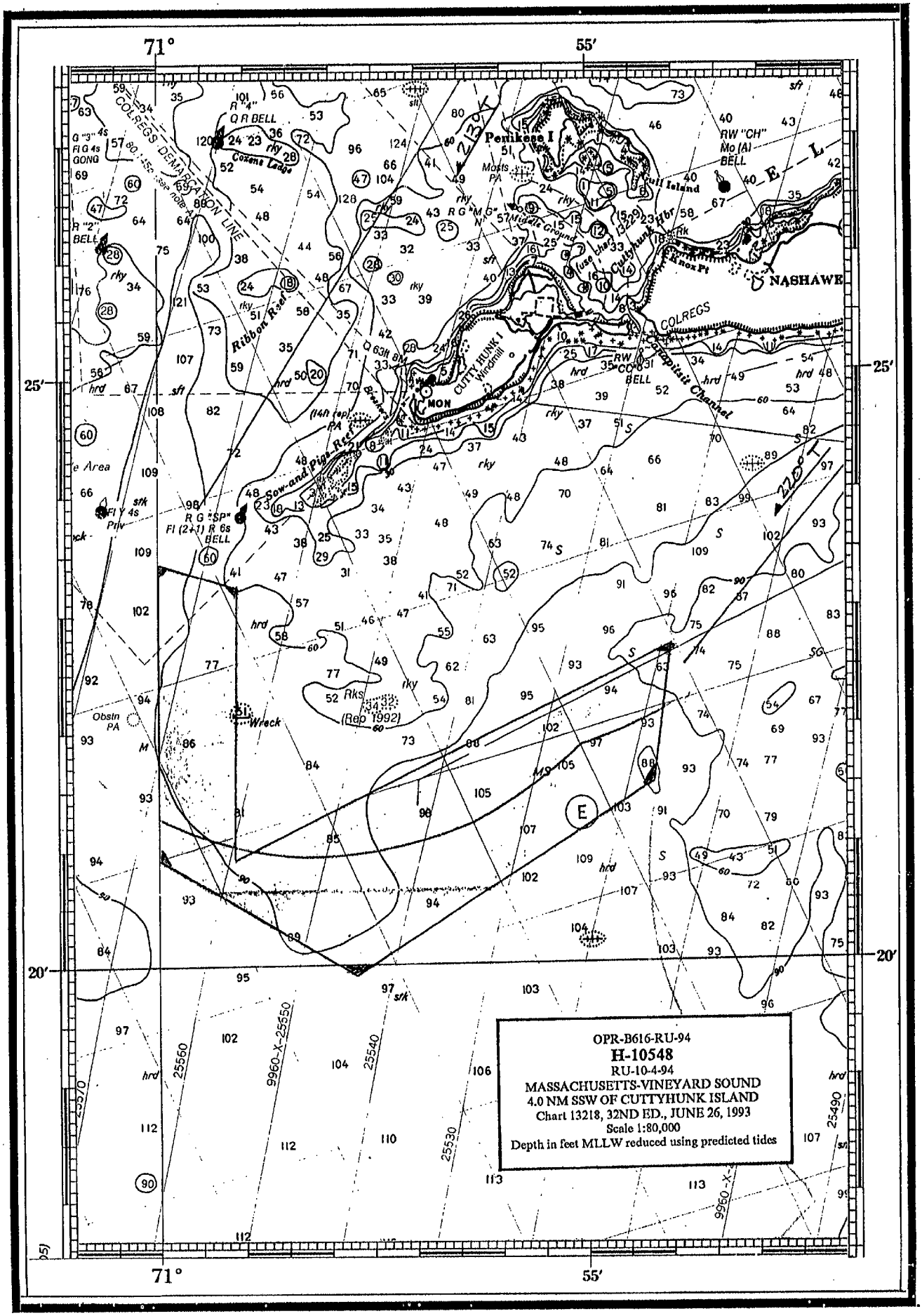
REMARKS: All times recorded in UTC.

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

Notes in the Descriptive Report were made in red ink during office processing

DSC 1-17-96 1-24-96 AWOIS + SURF ✓ RWD 1/24/96

TABLE OF CONTENTS



SOUNDINGS IN FEET

A. PROJECT

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

A.2 The original instructions are dated February 23, 1994.

A.3 There has been one change to these instructions:

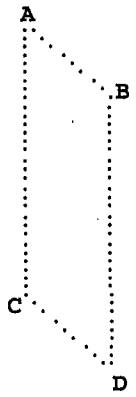
- Change No. 1 dated March ~~15~~ 9, 1994

A.4 This Descriptive Report covers the navigable area survey conducted on sheet "E" of project OPR-B616-RU/WH in Vineyard Sound as specified by the Project Instructions.

A.5 This portion of project OPR-B616-RU/WH responds to requests from the Northeast Marine Pilots to survey areas in Vineyard Sound which are frequented by large cruise ships in the summer months

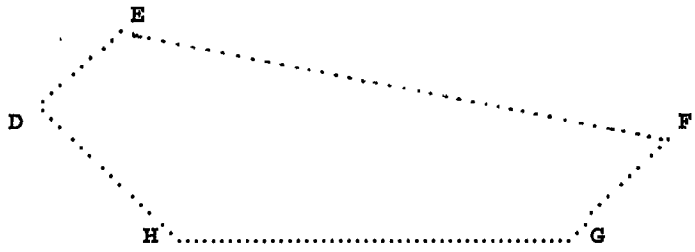
B. AREA SURVEYED

This survey is located at the entrance to Vineyard Sound, MA., approximately 4.0 nautical miles south southwest of the southwest corner of Cuttyhunk Island. The survey encompasses two sheets (Sheet 1 and Sheet 2) which form an irregular V-shaped area, sharing a 0.4 NM common border. The exact boundaries of the two sheets are as follows:



SHEET 1

A - 41°23'24"N, 071°00'00"W
B - 41°23'12"N, 070°59'06"W
C - 41°20'54"N, 071°00'00"W
D - 41°20'30"N, 070°59'06"W



SHEET 2

D - 41°20'30"N, 070°59'06"W
E - 41°20'54"N, 070°59'06"W
F - 41°22'42"N, 070°54'00"W
G - 41°21'30"N, 070°54'12"W
H - 41°19'54"N, 070°57'42"W

Data collection for this survey began on June 20, 1994 (DN 171) and concluded on September 13, 1994 (DN 256).

C. SURVEY VESSELS

C.1 The following was the only vessel used during this survey:

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

C.2 During the ship's January 1994 dry-dock period, RUDE was outfitted with a pivoting armature to carry the transducers for the Reson SEABAT 9001 shallow-water multi-beam sonar system. This armature was mounted on the port side of the ship, approximately midway along the ship's length. The arm was designed to be detachable and ride in a cradle on the boat deck when not in use for extended periods. Since the transducers were not designed for permanent deployment, the arm was typically installed only when the SEABAT system was to be used, and rotated into the down, or operating position, only during times of data acquisition.

D. AUTOMATED DATA ACQUISITION AND PROCESSING

See Also the Evaluation Report

D.1 All HDAPS data acquisition and processing for the entire period (DN 171 - 256) of this survey were accomplished with the following software versions:

Program	Version	Program	Version
BACKUP	2.00	LSTAWOIS	3.07
BLKEDIT	2.02	MAN_DATA	2.01
CARTO	2.13	NEWPOST	6.01
CLASSIFY	1.05	PLOTALL	2.27
CONTACT	2.34	PREDICT	2.01
DAS_SURV	6.71	PRESURV	7.08
DP	2.14	QUICK	2.05
EXCESS	4.21	RAMSAVER	1.02
FILESYS	3.24	REAPPLY	2.10
GRAFEDIT	1.06	ZOOMEDIT	2.24

D.2 Other software includes program **VELOCITY 2.10**, dated March 15, 1994, which generates sound velocity corrector tables for HDAPS data, including the program's **REFRACT** option, which corrects SEABAT multiple slant range depths for sound velocity and position of soundings (cross track distance) for refraction.

D.3 SEABAT multi-beam data were acquired exclusively on the SEABAT 9001 data acquisition 486 personal computer, using the Coastal Oceanographics **HYPACK** software package (Version 1.0, dated March 1, 1994), receiving gyro and predicted tide input from HDAPS and direct heave/roll/pitch data from the Datawell HRP sensor and positioning input from the Ashtech GPS receivers. SEABAT data was processed on one of two personal computers equipped with the NOAA **LSTDRUD** (Version 2.2, dated July 15, 1994) post-processing software. A single least depth was generated for each SEABAT investigation and later entered into HDAPS via the **MANUAL DATA ENTRY** program.

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 (vessel # 9040). The following side scan equipment was utilized on the dates specified:

Equipment Type	Serial Number	Dates Used
Recorder	12106	171 - 193
Towfish	16696	171 - 187
	16700	188 - 193

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

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

E.4 a. Given the average depth of water throughout the navigable area corridor comprising this survey, the 100-meter range scale was used throughout to maximize area coverage and provide optimal contact resolution.

There were isolated areas where the sea floor rose up sharply, causing the side scan 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 over-lap between adjoining swaths. To compensate for this lack of coverage, holiday coverage was run to fill in these gaps. All side scan coverage was ultimately checked with smooth plots to ensure proper overlap between adjoining lines.

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

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

where: RS = range scale

EPE = expected position error

For a 1:10,000-scale survey, a maximum EPE of 15 meters is permitted. Using this value in the equation above, a maximum line spacing of 170 meters for RS = 100 meters is authorized. Data collected with an EPE of 15 or greater was either rejected or smoothed in the post-processing phase of the survey, therefore the maximum line spacing was never exceeded. In addition, in order to maximize surveying efficiency, the actual line spacing for the side scan coverage of this survey was 160 meters. This line spacing was chosen to give an added margin on coverage, and to allow an even number of development lines to be run between each set of mainscheme lines.

Erroneous Expected Position Error (EPE) values in excess of 15 meters may be seen in the raw data printouts, most typically ranging between 408.2 and 409.2. These values were not considered in the line spacing calculations shown above due to their acceptable corresponding Horizontal Dilution of Precision (HDOP) values. These excessive EPE values were investigated in the HDAPS Graphic Sounding Edit program and 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. Features such as sand waves, lobster pots and trawl door scours were commonly used for this purpose.

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

d. Large areas of the bottom on this sheet consisted of soft silt and sand. Due to the inherent characteristics of this bottom composition and the lack of contacts found there, there are segments of data with 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.

During the first day of Sheet 1 data acquisition on DN 171, side scan data quality was periodically affected by thermoclines in the water column, which caused blurring in the outer half of the sonagrams. On this day, the winds were calm and sea state minimal, conditions that favor the formation of thermoclines during this time of year in New England. All sonagrams from this day were carefully reviewed, with all affected data being subsequently rejected and re-run.

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

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

E.5 As authorized by the Project Instructions (6.15.1), a 400-meter grid was developed to overlay this survey. The most significant contacts within each of these 400-meter "cells" were investigated by intensive echo sounder investigation. Tight line spacing, routinely as close as five meters, was used to conduct these investigations. Contacts warranting more precise depth determination were investigated using the SEABAT 9001 multi-beam sonar system. The data for these investigations are summarized in the Development Abstract in Section N of this report.

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

F. SOUNDING EQUIPMENT

F.1 All traditional hydrographic soundings were acquired using a Raytheon Model 6000N Digital Survey Fathometer (DSF-6000N, s/n A107).

F.2 No diver least depth investigations were required for this survey, and none were conducted.

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

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

F.5 As authorized by the Project Instructions, the Reson SEABAT 9001 shallow-water multi-beam sonar system was used to determine precise least depths over significant contacts discovered during routine side scan sonar operations.

The Reson SEABAT 9001 produces sixty 1.5 degree beams per swath, yielding an included swath angle of 90 degrees and a swath width which is approximately twice the surrounding water depth. The system operates at a frequency of 455 kHz and updates at a rate of 7 times per second in 25 meters of water, thus acquiring 420 soundings per second. SEABAT slant ranges and quality factors for each of the 60 beams are acquired through the Coastal Oceanographics **HYPACK** data acquisition system on an IBM-compatible 486 personal computer.

Prior to beginning SEABAT data collection on this survey, a RUDE SEABAT-specific offset table/file was created to define the physical relationship between the various components that comprise the system, including the SEABAT transducer head, Hippy sensor and GPS antenna. In addition, this offset file contains heave, roll and pitch biases determined during a "Patch Test" conducted in Buzzards Bay on July 1, 1994. A copy of the SEABAT offset table is contained in Separate III.*

During post-processing using the **LSTDRUD** software, SEABAT position and Hippy data are first viewed graphically and edited as necessary for data quality. Once this has been accomplished, the software attaches a position to each of the SEABAT data records. The various heading, Hippy and sound velocity refraction correctors are then applied to the SEABAT slant range values to create a data record for each individual SEABAT beam, 60 data records for each SEABAT swath. The 60 records contain computed positions and depths, cross track distances and beam quality codes. After this expanded file is created, the data are viewed graphically in three different perspectives to check the consistency of the sounding data, with the option of editing any erroneous or questionable soundings that may exist.

Once the sounding data has been reviewed and edited as necessary, the LSTDRUD software selects a subset of the approximate 14,000 minimum depths contained within the total data set being processed, following which a file containing the 15 least depths found within the subset of 14,000 minimum depths is generated. It is from this file that the single least depth for each SEABAT investigation was obtained for manual data entry into HDAPS.

A summary of all SEABAT investigations conducted for this survey is contained in the SEABAT 9001 Development Addendum in Section N. Copies of all 15 least depth listings associated with these investigations are included in Separate V.*

* Data filed with original field records

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 meter was operating within tolerance. Velocity casts were conducted weekly with few exceptions.

All data were processed using program **VELOCITY,** version 2.10. Computed velocity correctors were entered into the HDAPS sound velocity table and re-applied during post-processing to both high and low frequency soundings. SEABAT sound velocity and refraction correctors were generated through the **REFRACT** subroutine and applied during post-processing.

Sound velocity correctors applied to this survey were obtained from the following casts:

Cast Number	Date	Latitude	Longitude	HDAPS Table	Applied to Days
14	171	41°21.6'N	070°55.7'W	14	171 - ~~186~~ 178
16	187	41°21.4'N	070°55.6'W	16	186 - 189
17	192	41°23.5'N	071°00.1'W	17	192 - 194
21	206	41°22.0'N	070°59.3'W	21	206 - 207
27	237	41°21.9'N	070°56.2'W	27	237 - 238
29	244	41°23.0'N	071°00.2'W	29	244 - 245
31	250	41°21.6'N	070°55.4'W	31	250 - 252
32	255	41°23.2'N	071°00.0'W	32	255 - 256

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 conducted during special project S-B902 in Long Island Sound:

DN 160 at 41°00'25"N and 070°32'59"W (27 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 from current (approximately 5°), this is excellent agreement and provides an adequate check that the echo sounder was functioning properly. Data from these comparisons can be found in Separate IV.* Data filed with original field records

Two types of lead line were used during the leadline to DSF-6000N comparison. The starboard leadline was a steel surveyor's tape graduated in feet with a fixed 5 lb weight at its end. A leadline corrector of 0.0 was assumed for this leadline. The port leadline was a traditional leadline made of cotton tiller with a stainless steel cable core. This lead line had a corrector of 0.0 up to its 30-foot mark, yielding an average leadline corrector of 0.0 to be applied in the comparison with the DSF-6000N.

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 1994 dry-dock period, an exact vertical measurement was taken from the DSF transducer to a fixed point on the bridge wing. After the ship was re-floated, the height above the waterline was determined for this point. The ship's static draft was thereby calculated to be exactly 2.12 meters (7.0 feet). This draft corrector 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 applied to soundings through the HDAPS offset table.

h. Heave data were acquired by a Datawell heave, roll and pitch sensor (s/n 19128-C), and were applied to HDAPS soundings in real time. Only heave corrections were applied to the plotted soundings. Heave, roll and pitch correctors were collected on line and applied to all SEABAT soundings during post-processing.

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 resulting from weekly velocity casts were re-applied to the HDAPS data acquired that entire week. Section G.1.a. gives the periods during which each set of velocity cast correctors were used.

G.4 Pneumatic gauge depths were not required for this survey as no diver least depth investigations were conducted.

G.5 Generally, sea conditions greater than one meter affected the graphic 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 Woods Hole, MA. (844-7930) served as direct control for datum determination. The operating tide station at Newport, R.I. (845-2660) served as the reference station for predicted tides. Data for predicted tides were provided on floppy disk before the start of the project.

b. Time and height correctors for predicted tides were obtained from section 5.9.2. of the Project Instructions, and applied to the digital tide data using HDAPS software. The following correctors were applied to the Newport, R.I. predicted tides:

Time corrector: +24 minutes
Height Corrector: x 0.82 range ratio

Tidal correctors were applied on line using HDAPS predicted tide tables numbers 6, 7 and 8. Tide table 6 was used for the month of June, 7 for July and so on. Approved Tides and Zonings were applied during office processing

c. Zoning for this project is consistent with the Project Instructions.

A request for smooth tides was mailed on September 15, 1994.

H. CONTROL STATIONS See Also The Evaluation Report

H.1 The horizontal datum for this survey 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. A list of Horizontal Control Stations is appended to this Report

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 as no shore-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 positioning.

I.2 Accuracy requirements were met as specified by the Hydrographic Manual and Field Procedures Manual (FPM). The Horizontal Dilution of Precision (HDOP) and Expected Position Error (EPE) specified by the FPM were monitored during on-line data collection. When these values exceeded the allowable limits (HDOP = 3.35, EPE = 15), survey operations were suspended until the Differential GPS 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:

Differential GPS:

Unit A	Unit B
Ashtech GPS Sensor	Ashtech GPS Sensor
s/n 700417B1083	s/n 700417B1003
Firmware Version 1E11D-P	Firmware Version 1E11D-P
Magnavox MX50R	Magnavox MX50R
DGPS Receiver s/n 078	DGPS Receiver s/n 160

I.4 Correctors were received from both the Montauk, New York and Portsmouth, New Hampshire radio beacons for the entire survey.

I.5 The Differential GPS system requires no calibrations to its equipment from outside sources. However, to check the position 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 "SHIPDIM" 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:

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

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

EPE = Expected Position 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_{max} for a successful performance check.

I.6 No calibration data were required to be applied to the raw positioning data as DGPS was the primary positioning system.

I.7 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 radio beacons, or both, depending on the location of the degraded weather at the time. During such instances, control would be switched to the reference beacon sending the strongest, most interference-free signal. If both the Montauk and Portsmouth beacons were experiencing periods of degraded weather, the survey operations were suspended until such time as service from one or both beacons had resumed.

d. During the periods when local weather affected the DGPS radio beacons 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 which could be continuously monitored. Such weather-related outages could occur often, sometimes every few minutes, making it nearly impossible to begin or complete a survey line. The duration of these outages ranged from half an hour to a couple of hours.

e. No systematic errors were detected which 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. A copy of the HDAPS Offset Table #1 is contained in Separate III.

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. A copy of the HDAPS Offset Table #1 is contained in Separate III.*
* Data filed with the original ~~Fate~~ field records

J. SHORELINE

No shoreline is contained within the boundaries of this survey.

K. CROSSLINES

A combined total of 12.78 nautical miles of crosslines were acquired on the two sheets which comprise this survey, which represents 9.4% of the 81.7 nautical miles of mainscheme sounding lines.

An excessed plot of mainscheme soundings with un-excessed crossline soundings superimposed was used to conduct mainscheme to crossline sounding 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 in all areas. The differences observed between soundings was generally two feet or less.

L. JUNCTIONS See Also Section "L" in the Evaluation Report

L.1 The west side of Sheet 1 for this survey junctions with the east side of contemporary survey H-10458, a 1:20,000-scale survey completed by the RUDE during the 1993 field season.

L.2 A comparison between this survey (H-10548) and survey H-10458 was completed to assess agreement between the two. For this purpose, a chart overlay was plotted with soundings from survey H-10458. All soundings from survey H-10548 within a 50-meter radius of each plotted sounding from survey H-10458 were compared at the junction of the two surveys. Agreement between soundings is excellent. The greatest difference observed between soundings was three feet, with an average agreement of two feet.

L.3 No discrepancies at the junction with survey H-10458 are apparent.

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

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

A comparison 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 7308

Vineyard Sound

Reported Position:
41°22'09.98"N
070°59'03.52"W

Datum: NAD27

Reported Depths: Charted 51-foot wire drag effective depth, supporting 54-foot sounding obtained during survey FE207WD/66 (FE3/67WD); surrounding depths of 61-67 feet.

Feature: Unknown Obstruction

N.2.1 Description and Source of Item

AWOIS 7308 was first documented during survey H6445/39 as a 55-foot least depth in position 41°22'12.0"N and 070°59'00.0"W, believed to be the same area in which the steamer SEACONNET (AWOIS 1881 and/or 7487) sank on May 1, 1923. A preliminary fathometer search for the wreck during survey FE194WD/63 (FE1/64WD) revealed a 54-foot depth in position 41°22'09.6"N and 070°59'05.4"W, and the area was later cleared with a 51-foot effective depth, with no hang obtained.

During investigation of AWOIS 7487, survey H-10458/1993, NOAA Ship RUDE positively identified (side scan, echo sounder and diver verified) the wreck of the SEACONNET in position 41°22'09.59"N and 071°00'22.97"W, with a least depth of 21.6 meters (70.8 feet). AWOIS 7308, therefore, could not be the wreck of the SEACONNET. Concur

N.3.1 Survey Requirements

This item required 200% side scan coverage, echo sounder development and diver investigation.

N.4.1 Method of Investigation

Two hundred percent side scan coverage over the entire AWOIS 7308 200-meter search radius was not necessary, as a 49.5-foot least depth was obtained during mainscheme side scan/echo sounder operations in position 41°22'08.798"N and 070°59'04.421"W, directly adjacent to the charted 51-foot wire drag-cleared depth. Later, the surrounding area was further developed with 10-meter splits, which revealed the original 49.5-foot depth to be the least depth over this item. Based on the results of all echo sounder lines run in this location, it was readily apparent that this item is a rockpile, one of many such features discovered in this area of Vineyard Sound.

N.5.1 Results of Investigation

AWOIS 7308 was discovered during mainscheme side scan/echo sounder operations, and later confirmed by echo sounder development to be a rockpile with a least depth of 49.5-feet in position 41°22'08.798"N and 070°59'04.421"W. Due to its characteristic echo sounder profile, a diver investigation was not deemed necessary on this item.

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

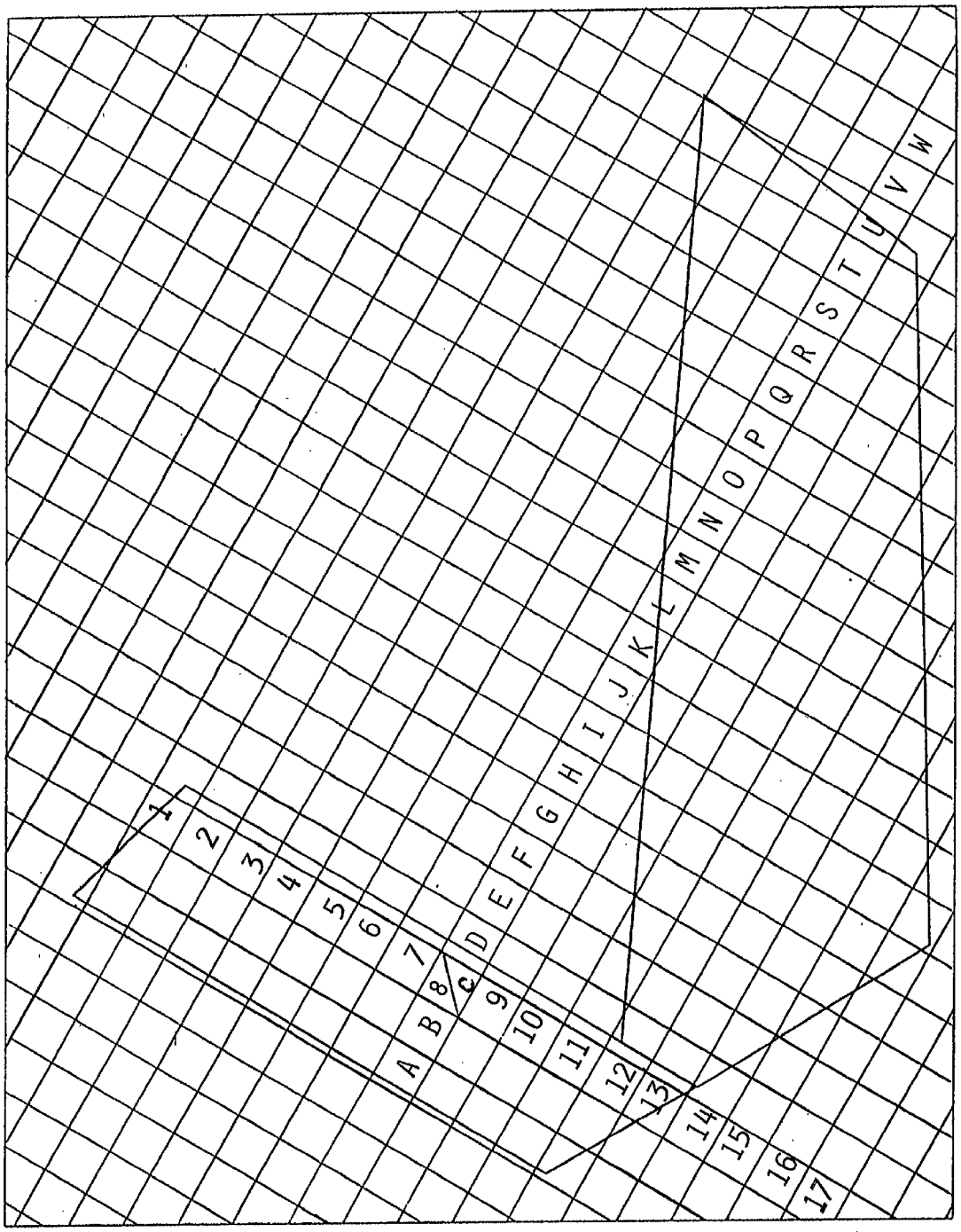
Largest scale chart of the survey area:

Chart 13218
"Block Island to Martha's Vineyard"
32st ed. June 26, 1993
Scale: 1:80,000

AWOIS 7308, a 51-foot wire drag-cleared depth charted in position 41°22'09.98"N and 070°59'03.52"W, was found to be a rockpile with a least depth of ~~49.5~~ 50.2 feet in position 41°22'08.798"N and 070°59'04.421"W.

It is the opinion of the hydrographer that the 51-foot wire drag-cleared depth be removed from the chart and replaced with the ~~49.5~~ 50.2-foot least depth obtained during this survey in position 41°22'08.798"N and 070°59'04.421"W (fix 785.5) Concur
Chart a submerged rock with a depth of 50 feet

Information pertaining to hydrographic development of significant side scan sonar contacts, including SEABAT 9001 multi-beam sonar investigations, is contained in the following Development Abstract and SEABAT Development Addendum.



Survey H-10548 400-Meter Contact Development Grid

DEV	SIDE SCAN CONTACT NUMBER	HYDRO DEV POSITIONS	LEAST DEPTH (M) *	LD POS	GEOGRAPHIC POSITION	REMARKS
1B1	1359.33P	1459-1470	22.~~54~~	1459.2	41°23'13.397"N 70°59'31.407"W	
1B2	1359.16P	1471-1480	21.9	1479.2	41°23'16.940"N 70°59'31.678"W	
1B3	669.56S	1481-1492	24.~~12~~	1485.3	41°23'09.790"N 70°59'35.591"W	
1C1	1355.18P	1493-1502	~~19.9~~ 20.1	1501.5	41°23'18.509"N 70°59'26.818"W	
1C2	1354.38P	1503-1512	~~20.9~~ 21.1	1507.2	41°23'10.105"N 70°59'25.778"W	
1C3	1316.37P	1513-1522	13.~~79~~	1517.4	41°23'14.762"N 70°59'14.499"W	
1C4	1316.46P	1523-1530	13.~~87~~	1529.2	41°23'14.756"N 70°59'14.293"W	
1C5	1354.42P	1531-1542	20.~~78~~	1531.2	41°23'10.000"N 70°59'26.781"W	SEE ALSO SEABAT DEVELOPMENT
1D1	585.17P	1543-1552	15.2	1549.1	41°23'10.954"N 70°59'06.695"W	SEE ALSO SEABAT DEVELOPMENT
1D2	1279.42P	1553-1560	15.4	1558.0	41°23'11.748"N 70°59'02.333"W	
1D3	1316.22S	1561-1570	15.3	1567.5	41°23'11.296"N 70°59'10.432"W	
2A1	714.59S	1571-1580	30.7	157~~1~~.0 3	41°22'55.~~409~~"N 70°59'57.~~423~~"W	.892 .381
2B1	631.31S	1581-1592	21.~~86~~	1583.1	41°23'05.~~178~~"N 70°59'30.~~389~~"W	.438 .411

* Changes due to Smooth Tide.

DEV	SIDE SCAN CONTACT NUMBER	HYDRO DEV POSITIONS	LEAST DEPTH (M) *	LD POS	GEOGRAPHIC POSITION	REMARKS
2C1	1351.57P	1593-1600	19.0	1599.1	41°23'01.074"N 70°59'25.980"W	
2C2	1319.19S	1601-1610	19.4	1607.3	41°22'58.460"N 70°59'19.772"W	SEE ALSO SEABAT DEVELOPMENT
2C3	1315.37P	1611-1618	17.23	1617.1	41°23'07.331"N 70°59'13.100"W	SEE ALSO SEABAT DEVELOPMENT
2C4	1315.01P	1619-1626	16.56	1623.2	41°23'00.998"N 70°59'12.818"W	SEE ALSO SEABAT DEVELOPMENT
2C5	1318.44S	1627-1634	19.35	1633.2	41°23'04.846"N 70°59'19.615"W	SEE ALSO SEABAT DEVELOPMENT
2C6	1318.32P	1635-1640	20.78	1638.0	41°23'05.835"N 70°59'16.875"W	
2D1	582.15S	1641-1648	19.56	1645.2	41°22'55.606"N 70°59'06.828"W	SEE ALSO SEABAT DEVELOPMENT
2D2	1280.23S	1649-1656	19.87	1655.3	41°23'01.570"N 70°59'06.398"W	
3A1	705.30S	1657-1664	25.89	1657.4	41°22'41.231"N 70°59'46.138"W	
3B1	676.34P	1665-1687	25.81	1677.2	41°22'53.292"N 70°59'42.027"W	SEE ALSO SEABAT DEVELOPMENT
3B2	667.59S	1683-1692	~~24.9~~ 25.1	1691.2	41°22'48.118"N 70°59'35.516"W	
3C1	1359.30P	1693-1700	21.13	1694.0	41°22'37.017"N 70°59'27.011"W	
3C2	632.54P	1701-1710	21.56	1701.2	41°22'48.775"N 70°59'26.626"W	SEE ALSO SEABAT DEVELOPMENT

* Changes due to Smooth Tide

DEV	SIDE SCAN CONTACT NUMBER	HYDRO DEV POSITIONS	LEAST DEPTH (M) *	LD POS	GEOGRAPHIC POSITION	REMARKS
3C3	625.46P	1711-1722	19.~~5~~4	1719.3	41°22'53.762"N 70°59'23.100"W	SEE ALSO SEABAT DEVELOPMENT
3D1	1313.04S	1723-1734	19.~~8~~4	1729.2	41°22'45.057"N 70°59'09.613"W	SEE ALSO SEABAT DEVELOPMENT
3D2	1312.47S	1735-1742	~~19.1~~ 18.9	1741.3	41°22'41.659"N 70°59'10.242"W	
4A1	703.39S	1743-1758	24.~~8~~2	1749.3	41°22'28.034"N 70°59'46.595"W	SEE ALSO SEABAT DEVELOPMENT
4A2	1400.15S	1759-1764	25.~~7~~6	1763.2	41°22'30.903"N 70°59'48.707"W	
4B1	1363.01P	1765-1774	20.~~1~~0	1771.2	41°22'34.999"N 70°59'31.172"W	
4B2	678.37P	1775-1782	23.8	1779.3	41°22'33.132"N 70°59'40.553"W	
4B3	1362.54P	1783-1788	20.~~2~~1	1783.3	41°22'34.872"N 70°59'31.292"W	SEE ALSO SEABAT DEVELOPMENT
4B4	1362.28P	1789-1796	22.0	1789.2	41°22'39.922"N 70°59'31.364"W	SEE ALSO SEABAT DEVELOPMENT
4C1	592.51S	1797-1804	20.~~1~~0	1799.3	41°22'28.786"N 70°59'16.125"W	
4C2	1312.08P	1805-1812	20.~~1~~0	1805.2	41°22'36.365"N 70°59'13.006"W	
4D1	1312.09S	1813-1824	17.9	1821.2	41°22'36.940"N 70°59'10.059"W	SEE ALSO SEABAT DEVELOPMENT
5A1	737.03P	1825-1834	25.~~5~~6	1825.2	41°22'25.053"N 70°59'56.787"W	

* Changes due to Smooth Tide

DEV	SIDE SCAN CONTACT NUMBER	HYDRO DEV POSITIONS	LEAST DEPTH (M) *	LD POS	GEOGRAPHIC POSITION	REMARKS
5A2	1400.35P	1835-1842	24.~~89~~	1839.3	41°22'27.546"N 70°59'45.811"W	
5A3	737.44P	1843-1850	24.~~89~~	1847.1	41°22'17.917"N 70°59'57.857"W	
5B1	1387.30S	1851-1858	20.~~89~~	1855.3	41°22'21.572"N 70°59'38.119"W	SEE ALSO SEABAT DEVELOPMENT
5B2	665.06S	1859-1868	21.3	1865.2	41°22'18.549"N 70°59'35.112"W	
5B3	665.20S	1869-1876	19.4	1875.3	41°22'21.088"N 70°59'34.757"W	SEE ALSO SEABAT DEVELOPMENT
5B4	680.19S	1877-1882	23.~~54~~	1881.1	41°22'15.071"N 70°59'44.041"W	
5C1	1346.47S	1883-1890	17.~~21~~	1887.3	41°22'17.944"N 70°59'22.270"W	
5D1	1284.05S	1891-1898	~~18.0~~ 17.9	1893.2	41°22'26.662"N 70°59'06.532"W	SEE ALSO SEABAT DEVELOPMENT
6A1	701.51S	1899-1908	22.~~10~~	1903.3	41°22'13.739"N 70°59'48.660"W	SEE ALSO SEABAT DEVELOPMENT
6A2	1401.52S	1909-1918	22.~~43~~	1913.2	41°22'13.510"N 70°59'47.841"W	SEE ALSO SEABAT DEVELOPMENT
6B1	1385.35P	2108-2113	24.~~10~~	2113.0	41°22'07.350"N 70°59'39.685"W	SEE ALSO SEABAT DEVELOPMENT
6B2	1386.32S	2114-2123	22.5	2120.2	41°22'12.385"N 70°59'38.789"W	
6C1	618.26S	2206-2221	21.5	2220.2	41°22'06.567"N 70°59'19.394"W	SEE ALSO SEABAT DEVELOPMENT

*Changes due to Smooth Tide

DEV	SIDE SCAN CONTACT NUMBER	HYDRO DEV POSITIONS	LEAST DEPTH (M) *	LD POS	GEOGRAPHIC POSITION	REMARKS
6C2	549.47S	2222-2233	19.9	2226.2	41°22'11.806"N 70°59'16.369"W	
6C3	595.17P	2234-2241	21.~~0~~	2237.0	41°22'11.353"N 70°59'13.523"W	
6C4	1314.46S	2242-2255	21.~~8~~5	2254.2	41°22'08.214"N 70°59'23.848"W	
6C5	1323.58P	2256-2265	21.1	2256.2	41°22'09.705"N 70°59'16.824"W	
6C6	755.30P	2266-2275	17.7	2270.2	41°22'13.751"N 70°59'11.773"W	
6D1	1286.04P	2276-2287	17.0	2286.2	41°22'08.174"N 70°59'03.292"W	SEE ALSO SEABAT DEVELOPMENT
6D2	1309.08S	2288-2305	19.8	2294.3	41°22'08.896"N 70°59'08.935"W	
7A1	700.07P	2306-2315	23.1	2310.3	41°21'59.425"N 70°59'50.590"W	SEE ALSO SEABAT DEVELOPMENT
7A2	1418.58P	2316-2325	26.8	2318.2	41°21'50.392"N 70°59'54.242"W	
7B1	1403.34P	2326-2337	22.0	2332.2	41°21'54.611"N 70°59'43.797"W	SEE ALSO SEABAT DEVELOPMENT
7C1	1344.37P	2338-2349	22.8	2344.2	41°21'57.121"N 70°59'26.695"W	SEE ALSO SEABAT DEVELOPMENT
7C2	596.02S	2350-2359	24.6	2356.1	41°22'00.197"N 70°59'17.778"W	
7D1	1306.50S	2562-2571	23.7	2570.2	41°21'49.221"N 70°59'10.584"W	SEE ALSO SEABAT DEVELOPMENT

*Changes due to Smooth Tide

DEV	SIDE SCAN CONTACT NUMBER	HYDRO DEV POSITIONS	LEAST DEPTH (M) *	LD POS	GEOGRAPHIC POSITION	REMARKS
7D2	1286.45P	2572-2581	22.7	2579.0	41°22'03.796"N 70°59'07.361"W	
8A1	698.51S	2582-2591	24.4	2582.2	41°21'47.157"N 70°59'47.819"W	
8C1	750.20S	2592-2603	~~24.9~~ 25.0	2592.2	41°21'36.344"N 70°59'26.021"W	
8C2	1343.31P	2604-2611	24.8 9	2606.2	41°21'46.367"N 70°59'28.102"W	
8D1	1288.06S	2612-2619	23.7 8	2612.2	41°21'48.250"N 70°59'06.908"W	
9C1	615.18P	2620-2629	~~24.9~~ 25.0	2624.2	41°21'35.583"N 70°59'22.943"W	
12C1	868.59P	2630-2635	25.9	2630.2	41°20'50.329"N 70°59'12.322"W	
12D1	568.57S	2636-2641	24.9	2636.2	41°20'49.743"N 70°59'05.146"W	SEE ALSO SEABAT DEVELOPMENT
12D2	868.42S	2642-2647	26.0	2642.2	41°20'53.464"N 70°59'09.731"W	
13C1	1337.30S	2648-2653	27.0	2648.2	41°20'39.088"N 70°59'22.068"W	
AWOIS 7308	51' CHARTED SOUNDING	2654-2675			41°20'"N 70°59'"W	
1D4	UNKNOWN				41°20'"N 70°59'"W	

*Changes due to Smooth Tide

DEV	SIDE SCAN CONTACT NUMBER	HYDRO DEV POSITIONS	LEAST DEPTH (M) *	LD POS	GEOGRAPHIC POSITION	REMARKS
4U1	299.33P	2124-2131	18.6	2126.3	41°22'30.652"N 70°54'05.471"W	
4U2	300.02S	2132-2143	17.7	2138.3	41°22'30.312"N 70°54'11.043"W	SEE ALSO SEABAT DEVELOPMENT
5U1	293.01P	2144-2169	17.4	2150.2	41°22'26.707"N 70°54'05.243"W	SEE ALSO SEABAT DEVELOPMENT
5T1	300.35S	2170-2175	22.0	2170.4	41°22'29.077"N 70°54'15.276"W	
4T1	369.37P	2176-2191	18.7	2178.3	41°22'32.210"N 70°54'18.680"W	SEE ALSO SEABAT DEVELOPMENT
4T2	376.17P	2192-2205	24.5	2192.3	41°22'33.747"N 70°54'27.293"W	SEE ALSO SEABAT DEVELOPMENT
7M1	884.47P	2360-2367	19.69	2362.1	41°21'49.580"N 70°56'27.996"W	
7M2	409.07S	2368-2377	26.45	2369.0	41°21'52.499"N 70°56'22.322"W	
7N1	409.13P	2378-2383	27.5	2378.0	41°21'49.018"N 70°56'19.153"W	
7N2	386.19S	2384-2401	28.5	2394.2	41°21'50.950"N 70°56'11.769"W	
8N1	940.58P	2402-2413	29.87	2410.2	41°21'44.134"N 70°56'10.911"W	SEE ALSO SEABAT DEVELOPMENT
8M1	942.09S	2414-2443	22.1	2432.2	41°21'41.128"N 70°56'28.968"W	
8M2	563.20P	2444-2459	26.21	2454.4	41°21'46.849"N 70°56'18.754"W	

*Changes due to Smooth Tide

DEV	SIDE SCAN CONTACT NUMBER	HYDRO DEV POSITIONS	LEAST DEPTH (M) *	LD POS	GEOGRAPHIC POSITION	REMARKS
8L2	885.59S	2482-2489	22.~~8~~4	2488.3	41°21'45.462"N 70°5642.752'"W	
9L1	558.11S	2490-2501	25.7	2496.3	41°21'35.329"N 70°56'46.348"W	SEE ALSO SEABAT DEVELOPMENT
8L1	389.07S	2460-2481	25.4	2462.1	41°21'35.141"N 70°56'42.601"W	SEE ALSO SEABAT DEVELOPMENT
9L2	389.43P	2507-2513	27.4	2502.2	41°21'32.004"N 70°56'45.022"W	SEE ALSO SEABAT DEVELOPMENT
9J1	878.11P	2514-2529	25.~~8~~3	2526.2	41°21'31.829"N 70°57'26.440"W	SEE ALSO SEABAT DEVELOPMENT
10J1	966.33P	2530-2537	~~27.2~~ 26.9	2530.2	41°21'14.425"N 70°57'11.367"W	
11J1	994.49S	2548-2561	25.~~8~~1	2554.2	41°21'03.037"N 70°57'20.513"W	SEE ALSO SEABAT DEVELOPMENT

*Changes due to Smooth Tide

NOAA SHIP RUDE	SEABAT 9001 DEVELOPMENT ADDENDUM	PAGE 1 OF 2
OPR-B616-RU-94	H-10548	RU-10-4-94

SHEET	CONTACT	FILE	VELCAST	DEV.	FIX #	DN	GMT	RAW DEPTH	TIDE CORR.	LEAST DEPTH *	LATITUDE	LONGITUDE
2	369.37P	2385683M	94237142	4T1	13000	238	160646	19.5	-0.9	18.6	41°22'32.229"N	070°54'18.861"W
2	293.01P	2386221M	94237142	5U1	13001	238	171709	18.4	-0.9	17.56	41°22'26.727"N	070°54'05.429"W
2	300.02S	23862967	94237142	4U2	13002	238	172942	18.7	-0.9	~~17.8~~ 18.0	41°22'30.354"N	070°54'10.941"W
2	878.11P	25066938	94250143	9J1	13003	250	183606	25.5	+0.0	25.54	41°21'31.712"N	070°57'26.333"W
2	994.49S	25073593	94250143	11J1	13004	250	202658	25.4	+0.1	25.54	41°21'03.031"N	070°57'20.729"W
2	376.17P	2514675M	94250143	4T2	13005	251	125933	25.7	-1.0	24.7	41°22'33.683"N	070°54'27.297"W
2	558.11S	25152230	94250143	9L1	13006	251	143048	27.6	-1.2	26.4	41°21'35.352"N	070°56'46.328"W
1	1403.34P	2515436M	94250143	7B1	13007	251	150642	23.2	-1.2	22.01	41°21'54.556"N	070°59'43.806"W
1	665.20S	2515579M	94250143	5B3	13008	251	153516	20.9	-1.1	19.89	41°22'21.052"N	070°59'34.749"W
1	1313.04S	2515774M	94250143	3D1	13009	251	160249	20.9	-1.0	~~19.9~~ 20.0	41°22'45.041"N	070°59'09.803"W
1	625.46P	25160109	94250143	3C3	13010	251	164219	20.2	-0.8	19.46	41°22'53.775"N	070°59'23.079"W
1	1362.54P	25158581	94250143	4B3	13011	251	161648	21.1	-1.0	20.10	41°22'34.834"N	070°59'31.254"W
1	1315.01P	25161046	94250143	2C4	13012	251	165802	17.0	-0.7	16.31	41°23'01.245"N	070°59'12.811"W
1	1319.19S	2516219M	94250143	2C2	13013	251	171655	19.9	-0.6	19.31	41°22'58.512"N	070°59'19.906"W
1	585.17P	2516335M	94250143	1D1	13014	251	174220	15.1	-0.5	14.65	41°23'11.010"N	070°59'06.550"W
1	1354.42P	25577056	94255134	1C5	13015	255	212450	21.3	-0.6	20.78	41°23'09.946"N	070°59'26.648"W
1	1315.37P	25578094	94255134	2C3	13016	255	214149	17.9	-0.5	17.4	41°23'07.566"N	070°59'12.697"W
1	1318.44S	25578643	94255134	2C5	13017	255	215103	19.2	-0.5	18.78	41°23'04.931"N	070°59'19.620"W
1	582.15S	25579021	94255134	2D1	13018	255	215722	19.9	-0.5	19.45	41°22'55.612"N	070°59'06.729"W
1	676.34P	25579868	94255134	3B1	13019	255	221124	26.0	-0.4	25.6	41°22'53.263"N	070°59'42.058"W
1	632.54P	25580306	94255134	3C2	13020	255	221852	22.1	-0.4	21.7	41°22'48.746"N	070°59'26.597"W
1	703.39S	25580854	94255134	4A1	13021	255	222753	24.6	-0.4	24.23	41°22'27.900"N	070°59'46.643"W
1	1362.28S	25581444	94255134	4B4	13022	255	223750	22.3	-0.3	22.0	41°22'39.923"N	070°59'31.223"W
1	1312.09S	25581793	94255134	4D1	13023	255	224336	18.3	-0.3	18.0	41°22'36.808"N	070°59'09.784"W
1	1387.30S	25582215	94255134	5B1	13024	255	225032	21.4	-0.3	21.1	41°22'21.469"N	070°59'38.279"W
1	1346.47S	25582822	94255134	5C1	13025	255	230042	18.2	-0.3	17.9	41°22'17.763"N	070°59'22.176"W
1	1284.05S	25583259	94255134	5D1	13026	255	230759	18.2	-0.2	18.0	41°22'26.634"N	070°59'06.318"W

*Changes due to Smooth Tide

NOAA SHIP RUDE	SEABAT 9001 DEVELOPMENT ADDENDUM	PAGE 2 OF 2
OPR-B616-RU-94	H-10548	RU-10-4-94

SHEET	CONTACT	FILE	VELCAST	DEV.	FIX #	DN	GMT	RAW DEPTH	TIDE CORR.	LEAST DEPTH *	LATITUDE	LONGITUDE
1	701.51S	25583731	94255134	6A1	13027	255	231551	22.7	-0.2	22.5	41°22'13.545"N	070°59'48.587"W
1	1401.52S	25584050	94255134	6A2	13028	255	232117	22.4	-0.2	22.2	41°22'13.546"N	070°59'47.597"W
1	Unknown	25575188	94255134	1D4	13029	255	205321	16.2	-0.9	15.34	41°23'09.484"N	070°59'08.526"W
2	389.07S	25654310	94255134	8L1	13030	256	150527	24.6	-0.4	24.3	41°21'35.453"N	070°56'42.326"W
2	940.58P	25655612	94255134	8N1	13031	256	152715	30.3	-0.4	29.9	41°21'44.137"N	070°56'10.890"W
2	389.43P	25653837	94255134	9L2	13032	256	145737	27.8	-0.2	27.6	41°21'31.949"N	070°56'45.031"W
1	618.26S	25649248	94255134	6C1	13033	256	134109	21.8	-0.2	21.6	41°22'06.778"N	070°59'19.611"W
1	1286.04P	25649639	94255134	6D1	13034	256	134740	17.3	-0.2	17.1	41°22'08.388"N	070°59'03.521"W
1	700.07P	25650471	94255134	7A1	13035	256	140128	23.3	-0.2	23.1	41°21'59.539"N	070°59'50.445"W
1	1344.37P	25650887	94255134	7C1	13036	256	140825	22.9	-0.2	22.7	41°21'57.141"N	070°59'26.601"W
1	1306.50S	25651522	94255134	7D1	13037	256	141901	23.8	-0.2	23.6	41°21'49.188"N	070°59'10.619"W
1	568.57S	25652495	94255134	12D1	13038	256	143510	25.1	-0.3	24.89	41°20'49.714"N	070°59'05.146"W

*Changes due to Smooth Tide

NOTE: ALL DEPTHS ARE IN METERS.

O. COMPARISON WITH THE CHART See Also Section "O" in The Evaluation Report

O.1 There is only one chart affected by this survey:

Chart 13218
"Block Island to Martha's Vineyard"
32st ed. June 26, 1993
Scale: 1:80,000

O.2 On September 19, 1994, a Danger to Navigation Report was sent to the Commander, First Coast Guard District, outlining charting discrepancies found during this survey.

See Appendix I* for a complete copy of the Danger to Navigation Report, the details of which are summarized below:
* Appended to This Report

REPORT OF DANGER TO NAVIGATION **

* THESE UPDATED DEPTHS AFFECT THE FOLLOWING CHART: Chart 13218 (32nd ed. 26 June 1993) Chart Scale: 1:80,000		
** DEPTH (MLLW)	LATITUDE	LONGITUDE
52 ft	41°-23'-04.6"N	070°-59'-10.9"W
58 ft	41°-22'-36.9"N	070°-59'-10.1"W
65ft	41°-22'-340"N, 846	070°-59'-31.2"W, 387
56 ft	41°-22'-17.9"N	070°-59'-22.3"W
62ft	41°-21'-48.7"N	070°-56'-28.6"W

O.3 The overall correlation between charted soundings and survey depths is excellent, with average differences of approximately one foot in flat and slightly sloping areas, and no more than two feet in areas of irregular bottom topography.

O.4 The correlation between charted shoal areas and corresponding depths from this survey is also excellent, with an average difference of two feet or less.

O.5 No recommendations based on the results of this survey.
** See Also Evaluation Report (Section "O") and Memorandum (appended to this Report)

P. ADEQUACY OF SURVEY See Also the Evaluation Report

P.1 All items investigated during this survey are addressed.

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

Q. AIDS TO NAVIGATION

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

Q.2 There are no floating aids to navigation within the boundaries of this survey.

Q.3 There are no aids to navigation within the boundaries of this survey.

Q.4 No bridges, overhead cables or overhead pipelines are located within the boundaries of this survey.

Q.5 No pipelines or designated ferry routes are located within the boundaries of this survey.

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

R. STATISTICS

R.1	**a.** Number of Positions	2698
	b. Lineal Nautical Miles of Sounding Lines	
	- nautical miles of survey with the use of the side scan sonar	176.32
	- nautical miles of survey without the use of the side scan sonar	88.50
R.2	**a.** Square Nautical Miles of Hydrography	6.10
	b. Days of Production	22
	c. Detached Positions	0
	d. Bottom Samples	31
	e. Tide Stations	1
	f. Current Stations	0
	g. Velocity Casts	8
	h. Magnetic Stations	0
	i. 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 Thirty-one bottom samples were obtained during this survey. As directed by the Project Instructions, all bottom samples were inspected and recorder, but none were retained for submission to the Smithsonian Institution.

T. RECOMMENDATIONS

T.1 There are no known inadequacies with this survey and no additional field work is required.

T.2 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.

U. REFERRAL TO REPORTS

No reports have been published which are not contained within 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 geographic positions for the two Differential GPS radio beacons used during this survey are as follows:

Montauk Point, N.Y. (MPRB)	41°04'02.047"N ~~41°01'02.05"N~~ 071°51'38.27"W
Portsmouth, N.H.	15.064 43°04'~~12.00~~"N 070°42'~~30.00~~"W 36.805

APPENDIX II

NON-FLOATING AIDS AND LANDMARKS FOR CHARTS

NOAA Form 76-40 is not submitted as there are no non-floating aids or landmarks within the confines of survey H-10548.

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

September 19, 1994

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

Dear Sir:

During the course of NOAA Ship RUDE's hydrographic survey of an area at the entrance to Vineyard Sound centered approximately 4.0 nautical miles south southwest of Cuttyhunk Island, discrepancies were found on chart 13218 **(32th ed. 26 June 1993)**. It is requested that information concerning these discrepancies be published in the Local Notice to Mariners.

Updated depths are outlined in the attached table. 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 and the updated depths highlighted.

The survey depths were determined during preliminary hydrographic investigation using a Raytheon DSF-6000N 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:

Hydrographic Survey Registry Number.....H-10548
State.....Massachusetts
General Locality.....Vineyard Sound
Locality.....4.0 NM SSW of Cuttyhunk Island
Project Number.....B616-RU-94
Surveyed by.....NOAA Ship RUDE

* THESE UPDATED DEPTHS AFFECT THE FOLLOWING CHART: Chart 13218 (32nd ed. 26 June 1993) Chart Scale: 1:80,000		
** DEPTH (MLLW)	LATITUDE	LONGITUDE
52 ft	41°-23'-04.6"N	070°-59'-10.9"W
58 ft	41°-22'-36.9"N	070°-59'-10.1"W
6~~8~~5 ft	41°-22'-3~~8~~4Ø"N, 846	070°-59'-31.2"W 387
56 ft	41°-22'-17.9"N	070°-59'-22.3"W
62~~8~~ ft	41°-21'-48.7"N	070°-56'-28.6"W

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

** **Depths reduced to MLLW using ~~predicted~~ Approved tides.**

Please contact either of the following personnel for further information:

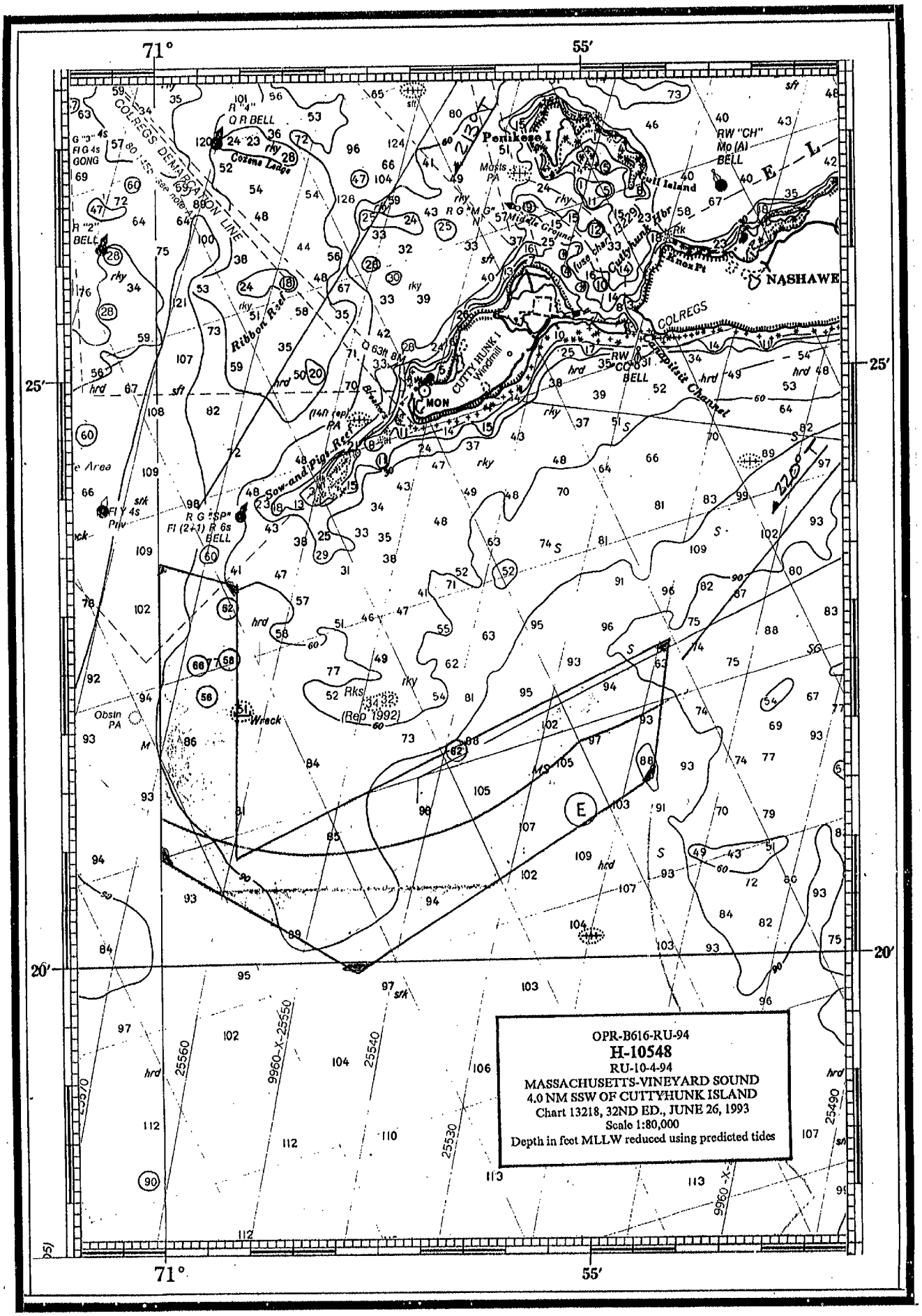
Commanding Officer
NOAA Ship RUDE
16 Sconticut Neck. Rd
#244
Fairhaven, MA. 02719
508-979-0600

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



SOUNDINGS IN FEET

APPENDIX VII

APPROVAL SHEET

LETTER OF APPROVAL

REGISTRY NO. H-10548

This report and the accompanying field sheets are respectfully submitted.

Field operations contributing to the accomplishment of survey H-10548 were conducted under my direct supervision with frequent personal checks of progress and adequacy. This report and field sheets have been closely reviewed and are considered complete and adequate for nautical charting.

Daniel R. Herlihy

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: March 3, 1995

HYDROGRAPHIC SECTION: Atlantic

HYDROGRAPHIC PROJECT: OPR-B616

HYDROGRAPHIC SHEET: H-10548

LOCALITY: Massachusetts, Vineyard Sound 4.0 Nautical Miles SSW of Cuttyhunk Island

TIME PERIOD: June 20 - September 13, 1994

TIDE STATION USED: 844-8725 Menemsha Harbor, Ma.
Lat. 41° 21.3'N Lon. 70° 46.0'W

PLANE OF REFERENCE (MEAN LOWER LOW WATER): 2.05 ft.

HEIGHT OF HIGH WATER ABOVE PLANE OF REFERENCE: 2.9 ft.

REMARKS: RECOMMENDED ZONING

Apply a -18 minute correction for times and a X1.04 range ratio to heights using Menemsha Harbor, Ma. (844-8725).

Note: Times are tabulated on Greenwich Mean Time.

William M. Stevens

CHIEF, DATUMS SECTION

NOAA FORM 76-155
(11-72)

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

GEOGRAPHIC NAMES

SURVEY NUMBER

H-10548

Name on Survey	A ON CHART NO. 13218	B ON PREVIOUS SURVEY NO.	C ON U.S. QUADRANGLE MAPS	D FROM LOCAL INFORMATION	E ON LOCAL MAPS	F P.O. GUIDE OR MAP	G RAND MCNALLY ATLAS	H U.S. LIGHT LIST	K	
CUTTYHUNK ISLAND (title)	X		X							1
MASSACHUSETTS (title)	X		X							2
VINEYARD SOUND (title)	X		X							3
										4
										5
										6
										7
										8
										9
										10
										11
										12
										13
										14
										15
										16
										17
										18
										19
					Approved					20
										21
										22
					Chief Geographer					23
					AUG 15 1995					24
										25

NOAA FORM 76-155 SUPERSEDES C&GS 197

NOAA FORM 61-29 (12-74)

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

LETTER TRANSMITTING DATA

REFERENCE NO.

N/CS33-39-96

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

☐ ORDINARY MAIL ☐ AIR MAIL

☐ REGISTERED MAIL ☒ EXPRESS

☐ GBL *(Give number)* _____

DATE FORWARDED

10 January 1996

NUMBER OF PACKAGES

SIX Tubes

TO:

Chief, Data Control Groupn, N/CS3x1
NOAA/National Ocean Service
Station 6813, SSMC3
1315 East-West Highway
Silver Spring, Maryland

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

TUBE 1	3 paper composite plots for:	Chart 13218 & Surveys H-10520, H-10548
	3 mylar H-drawings	H-10575
TUBE 2	3 paper composite plots for:	Charts 13221, 13228, 13232 & Surveys H-10520
	3 mylar H-drawings	H-10575
TUBE 3	3 paper composite plots for:	Charts 13229, 13218 & Surveys H-10520
	3 mylar H-drawings	H-10563
TUBE 4	3 paper composite plots for:	Charts 13230, 13233 & Surveys H-10520
	3 mylar H-drawings	H-10563
TUBE 5	1 Original Descriptive Report &	1 Smooth sheet for H-10520
	1 Original Descriptive Report &	1 Smooth sheet for H-10548
TUBE 6	1 Original Descriptive Report &	1 Smooth sheet for H-10563
	1 Original Descriptive Report &	1 Smooth sheet for H-10575

FROM: *(Signature)*

Maxine Fetterly

RECEIVED THE ABOVE
(Name, Division, Date)

Return receipted copy to:

Atlantic Hydrographic Branch
N/CS331
439 West York Street
Norfolk, VA 23510-1114

NOAA FORM 61-29 SUPERSEDES FORM C & GS 413 WHICH MAY BE USED. *U.S.GPO:1983-0-664-006/1192

12/15/95

HYDROGRAPHIC SURVEY STATISTICS
REGISTRY NUMBER: H-10548

NUMBER OF CONTROL STATIONS		2
NUMBER OF POSITIONS		2698
NUMBER OF SOUNDINGS		11206
	TIME-HOURS	DATE COMPLETED
PREPROCESSING EXAMINATION	90	02/10/95
VERIFICATION OF FIELD DATA	164.50	11/20/95
QUALITY CONTROL CHECKS	27	
EVALUATION AND ANALYSIS	53	
FINAL INSPECTION	12	11/03/95
COMPILATION	32	12/12/95
TOTAL TIME	~~379~~ 378.5	
ATLANTIC HYDROGRAPHIC BRANCH APPROVAL		12/12/95

ATLANTIC HYDROGRAPHIC BRANCH
EVALUATION REPORT FOR H-10548 (1994)

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

D. AUTOMATED DATA ACQUISITION AND PROCESSING

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

Hydrographic Processing System (HPS)
AutoCAD Release 12
NADCON, Version 2.10
MicroStation
QUICKSURF, Version 5.1

The smooth sheet was plotted using an ENCAD NovaJet III plotter.

H. CONTROL STATIONS

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

To place the smooth plots on the NAD 27 datum, move the projection lines 0.391 seconds (12.073 meters or 1.21 mm at the scale of the survey) north in latitude and 1.875 seconds (43.582 meters or 4.358 mm at the scale of the survey) east in longitude.

L. JUNCTIONS

H-10458 (1993) 1:20,000 to the west

A standard junction was effected between the present survey and survey H-10458 (1993). There are no junctional surveys to the east, north, south, or southwest. Present survey depths are in harmony with the charted hydrography to the east, north, south, and southwest.

M. COMPARISON WITH PRIOR SURVEYS

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

O. COMPARISON WITH CHARTS 13218 (32nd Edition, Jun 26/93)

The charted hydrography originates with prior surveys and miscellaneous sources. An adequate comparison with charted depths is made in sections 0.3 and 0.4, page 30, of the Descriptive Report and needs no further discussion.

Attention is directed to the following:

Information pertaining to charted and uncharted items within the present survey area was forwarded to Nautical Chart Division for application to NOS chart 13218 prior to approval of the present survey. A copy of the memorandum titled, "Updates for Charts 13218, 13230, and 13229", dated July 19, 1995, is appended to this report.

After completion of office processing of this survey, the evaluator concurs with the charting recommendations made in memorandum referenced in the preceding paragraph.

P. ADEQUACY OF SURVEY

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

S. MISCELLANEOUS

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

H-10548

RUDE Processing Team

Richard W. Blevins

Richard W. Blevins
Cartographic Technician
Verification of Field Data
Evaluation and Analysis

UNITED STATES DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration
NATIONAL OCEAN SERVICE
Coast and Geodetic Survey
Norfolk, Virginia 23510-2114

July 19, 1995

MEMORANDUM FOR: Captain Andrew A. Armstrong, III
Chief, Hydrographic Surveys Division

FROM: Commander Nicholas E. Perugini, NOAA
Chief, Atlantic Hydrographic Branch

SUBJECT: Updates for Charts 13218, 13230, and 13229

The Atlantic Hydrographic Branch has recently forwarded several smooth sheets and H-drawings that affect soon-to-be printed charts in Buzzards Bay. Three other surveys have not yet been fully processed; H-10575, H-10520, and H-10548.

Attached are significant data extracted from these surveys which can be applied to the subject charts. While these surveys have not been fully processed, we have identified many changes, deletions, and additions that will be made to the chart. There are several categories of features:

1. Deletions - Hydrographer has disproved the existence of a charted feature.

2. Changes - The hydrographer has located a particular feature and has determined an accurate least depth. On surveys H-10520 and H-10548, approved tides have been applied to the data so the charting depiction will be accurate.

3. Notice to Mariners Features - The RUDE submitted a Dangers to Navigation Report on July 22, 1994. This report affected H-10520. The ship also submitted a second report on September 19, 1994. This report affected survey H-10548. Both of these reports detailed many additions and deletions of depths to the chart. Some of those depths have already appeared on the new edition of chart 13230. We have since applied approved tides to the data and those depths have changed slightly. The updated depths are included with this package.

Please contact me if there are any questions concerning this data.

NOS CHART 13218 UPDATE
Corrections to Chart 13218, 32nd Ed., June 26, 1993
Submitted July 18, 1995

FROM SURVEY H-10548 (1994)

CHANGE THE FOLLOWING CHARTED ITEMS:

A. DELETE THE 51-FOOT WIRE DRAG CLEARANCE DEPTH AND DANGER CURVE ON A WRECK AT LAT 41°22'09.98"N, LON 070°59'03.52"W AND CHART A 50-FOOT SOUNDING ON A ROCK FROM PRESENT SURVEY AT LAT 41°22'08.798"N LON 070°59'04.421"W - **AWOIS ITEM 7308**

CHART THE FOLLOWING SHOAL SOUNDINGS:

Items B. through F. originated with a Danger to Navigation report submitted by NOAA Ship RUDE on SEPTEMBER 19, 1994.

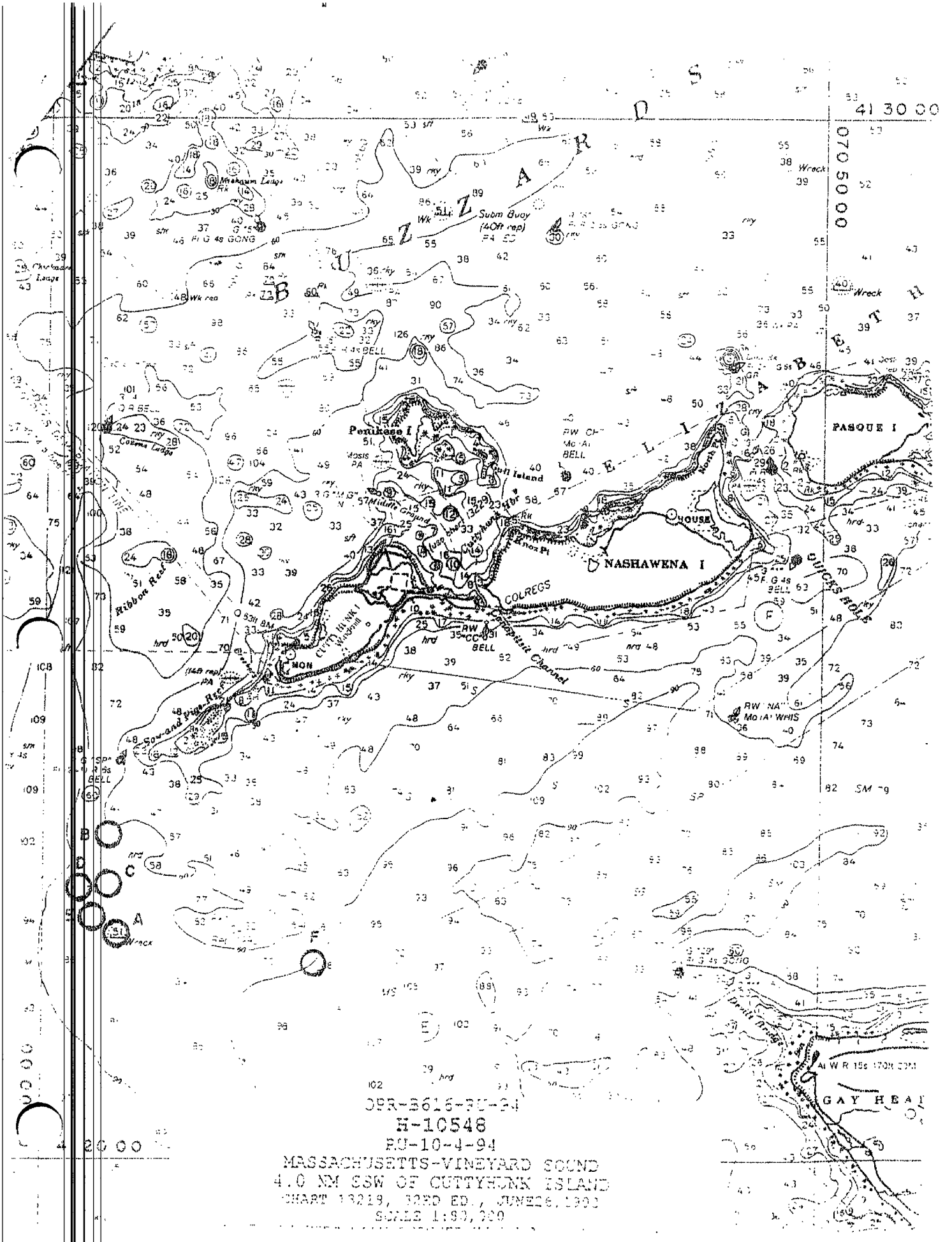
B. 52-FOOT SOUNDING AT LAT 41°23'04.573"N LON 070°59'10.933"W

C. 58-FOOT SOUNDING ON A ROCK AT LAT 41°22'36.940"N LON 070°59'10.059"W

D. 65-FOOT SOUNDING ON A ROCK AT LAT 41°22'34.999"N LON 070°59'31.172"W

E. 56-FOOT SOUNDING ON A ROCK AT LAT 41°22'17.944"N LON 070°59'22.270"W

F. 62-FOOT SOUNDING AT LAT 41°21'51.734"N LON 070°56'29.437"W



OPR-B616-FU-94

H-10548

FU-10-4-94

MASSACHUSETTS-VINEYARD SOUND

4.0 NM SSW OF CUTTYHUNK ISLAND

CHART 13218, 32ND ED., JUNE26,1993

SCALE 1:80,000

APPROVAL SHEET
H-10548

Initial Approvals:

The completed survey has been inspected with regard to survey coverage, delineation of depth curves, development of critical depths, cartographic symbolization, and verification or disproval of charted data. The digital data have been completed and all revisions and additions made to the smooth sheet during survey processing. 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.

Robert R. Hill Jr. Date: 12-12-95

Robert R. Hill Jr.
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: December 12, 1995

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

****

Final Approval:

Approved: Andrew A. Armstrong III Dated: 1-22-96

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

NOAA FORM 75-96
(10-83)

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

MARINE CHART BRANCH

RECORD OF APPLICATION TO CHARTS

FILE WITH DESCRIPTIVE REPORT OF SURVEY NO. H-10548

INSTRUCTIONS

1. A basic hydrographic or topographic survey supersedes all information of like nature on the uncorrected chart.
2. Letter all information.
3. In "Remarks" column cross out words that do not apply.
4. Give reasons for deviations, if any, from recommendations made under "Comparison with Charts" in the Review.

CHART	DATE	CARTOGRAPHER	REMARKS
13218	1-10-96	Robert Yelf	Full ~~Part Before~~ After Marine Center Approval Signed Via
			Drawing No.
13218	2/7/96	Dan Hook	Full ~~Part Before~~ After Marine Center Approval Signed Via
			Drawing No. 70
13200	3/20/96	Dan Hook	Full ~~Part Before~~ After Marine Center Approval Signed Via
			Drawing No. 39 THAN CHT. 13218
12300	3/21/96	Dan Hook	Full ~~Part Before~~ After Marine Center Approval Signed Via
			Drawing No. 58 THAN CHT. & 13218
13009	3/21/96	Dan Hook	Full ~~Part Before~~ After Marine Center Approval Signed Via
			Drawing No. 4 & NO CORR. - SCALE
			Full Part Before After Marine Center Approval Signed Via
			Drawing No.
			Full Part Before After Marine Center Approval Signed Via
			Drawing No.
			Full Part Before After Marine Center Approval Signed Via
			Drawing No.
			Full Part Before After Marine Center Approval Signed Via
			Drawing No.
			Full Part Before After Marine Center Approval Signed Via
			Drawing No.

SUPERSEDES C&GS FORM 8352 WHICH MAY BE USED.