

9013

Diag. Cht. No. 1107, 1207-2 & 1208-2

NOAA FORM 76-35A

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

DESCRIPTIVE REPORT (HYDROGRAPHIC)

Type of Survey ... Hydrographic

Field No. PE-40-1-68

Office No. H-9013

LOCALITY

State : Massachusetts

General Locality ... Massachusetts Bay

Locality .. Vicinity of Provincetown, Tip of

..... Cape Cod

1968

CHIEF OF PARTY

J. A. Yeager

LIBRARY & ARCHIVES

DATE 11/17/69

9013

HYDROGRAPHIC TITLE SHEET

H - 9013

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.

PE-40-1-68

State MASSACHUSETTS

General locality MASSACHUSETTS BAY

Locality VICINITY OF PROVINCETOWN, TIP OF CAPE COD

Scale 1 ; 40,000 Date of survey 7 Sept - 18 Oct, 1968
~~September, October 1968~~

Instructions dated 3 September, 1968 Project No. OPR 473

Vessel USCGC PEIRCE

Chief of party LCDR J. AUSTIN YEAGER

Surveyed by LT. Austin, LT. Sheehan, Ens. Snooks, Ens. Sigley, Ens. Mostue

Soundings taken by echo sounder, hand lead, pole Echo Sounder

Graphic record scaled by Ship Personnel

Graphic record checked by Ship Personnel

Protracted by ~~Ship Personnel~~ Gerber Digital Plotter, PMC

Soundings penciled by ~~Ship Personnel~~ Gerber Digital Plotter, PMC

Soundings in ~~fathoms~~ feet at MLW MLLW Feet at MLW

REMARKS: Amended Project Instructions dated 3 September, 1968 supersede
all previous instructions.

Instructions dated 27 March 1967 and Amended
Instructions dated 26 March 1968 remain in effect
except where modified by Amended Instructions
of 3 September 1968.

X.W.W. 11/1/91

AHS
JW

SHEET LAYOUT
OPR-473

No Contemporary Survey

PE-40-1-68
H-9013

PE-40-2-68
H-9011

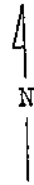
H-9225 (1971)
H-9224 (1971)

42° 00'

H-6563 (1940)

70° 30'

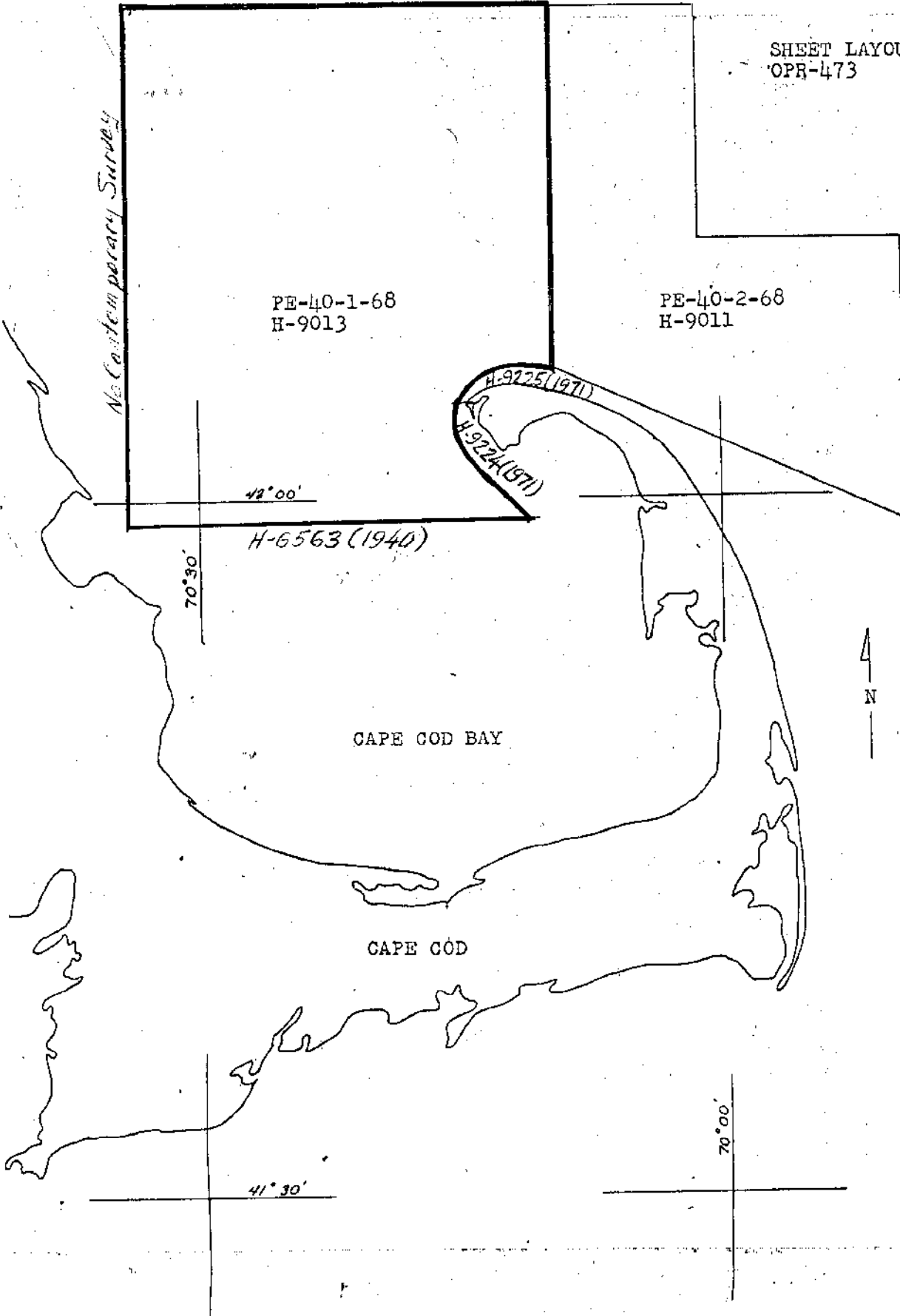
CAPE COD BAY



CAPE COD

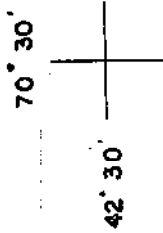
41° 30'


70° 00'




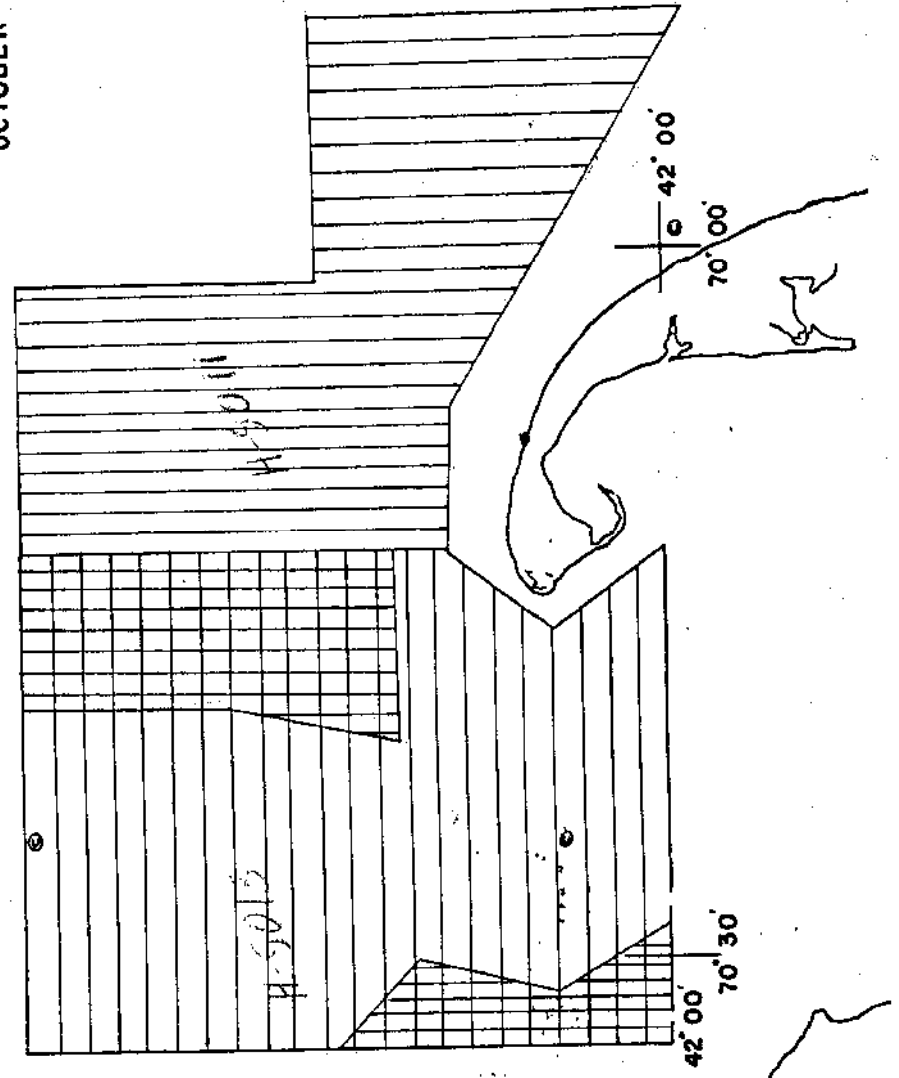
COAST & GEODETIC SURVEY, DON A. JONES · DIRECTOR
 MONTHLY PROGRESS SKETCH - OPR 473
 USCBGS SHIP PEIRCE, LCDR J.A. YEAGER
 1968 FIELD SEASON - CAPE COD & VICINITY

CHART 1107



SEPTMBER 

OCTOBER 



DESCRIPTIVE REPORT
TO ACCOMPANY
HYDROGRAPHIC SURVEY PE 40-1-68
1968 FIELD SEASON

USC&GS Ship PEIRCE

SCALE 1:40,000

J. Austin Yeager, LCDR USESSA

Chief of Party

A. PROJECT:

This survey was accomplished under Project OPR-473, Cape Ann to Cape Cod, Massachusetts. ~~Revised Instructions dated 3 September 1968 supersede all previous instructions.~~ *Instructions dated 27 March 1967 and Amended Instructions dated 26 Mar. 1968*

B. AREA SURVEYED: *remain in effect except where modified by the Amended Instructions of 3 Sept. 1968.*

The area covered by this survey is the southern portion of Massachusetts Bay between Race Point on Cape Cod and the Duxbury outer harbor on the mainland. The west edge of hydrography is juxtaposed to the east coast of Massachusetts Bay at Longitude $70^{\circ}34.0'W$. The eastern limit junctions with contemporary survey PE 40-2-68(H-9011) at Longitude $70^{\circ}11.0'W$. The south edge joins with prior survey H-6563 at Latitude $42^{\circ}00.0'N$. The north edge joins with ~~preir~~ *prior* survey H-8938 at Latitude $42^{\circ}20.0'N$. *(1967)*

Hydrography commenced in this area on 7~~8~~ September 1968 and was completed on 18 October 1968.

C. SOUNDING VESSEL:

All hydrography on this sheet was performed by the Ship PEIRCE. Position numbers are denoted in violet color.

D. SOUNDING EQUIPMENT:

Two Raytheon (type 723) fathometers were used in this survey. Fathometer number 259 was used until it failed mechanically on 4 October 1968 at 1300 hours. Fathometer number 246 was then installed as a replacement. Echo soundings were obtained in depths up to ~~325~~ ³⁴⁷ feet.

The velocity corrections for the ship were obtained by taking Nansen cast oceanographic stations. Depth and temperature data were recorded in the field. Salinity data was determined from measurements of the specific gravity of the water samples with a hydrometer. Results from the oceanographic observations were used in determining layer velocities for sound. These values were then graphed and velocity corrector values picked off in 0.5 foot increments.

The initial was held at 9.0 feet for soundings observed in feet and at 1-1/2 fathoms for sounding in fathoms. Included in the initial is a reduction of one foot from the draft of the vessel transducers as per instructions in a memorandum from the Chief, Instrument Division dated October 1, 1962. (Although soundings were observed both in units of feet and fathoms, all depths have been recorded in units of feet.)

A draft corrector of +0.0 feet was calculated for the ship. Derivation of this figure is discussed in Appendix D.

There was no phase correction necessary as the fathometers were carefully maintained as per instructions in a correspondence from the Chief, Engineering Division dated December 22, 1966.

E. SMOOTH SHEET:

The smooth sheet will be plotted automatically at the Pacific Marine Center, Seattle, Washington by the Gerber Plotter. Field records were encoded on punched tapes designed for computer use. This "Raw Data Tape" was made during the field operations and contained position information including time, depth, day number, and the two HI-FIX readings. Corrector tapes were also logged which provide calibration corrections to HI-FIX readings as well as all other data (smooth tides, transducer corrections, etc.), necessary to reduce the depths to final, correct values. The tapes will be integrated by computer to obtain data for the Gerber plotter.

F. CONTROL:

HI-FIX was used for positioning the ship during hydrographic operations. Shore stations established at "Eastern Point" near Gloucester, Mass. and at "Strawberry Point" in Massachusetts generated the electronic signals required.

HI-FIX calibration was accomplished through three-point sextant fixes. Prior to operations the ship was brought close enough to shore so as to be able to obtain a good three-point fix. There a series of fixes were taken by sextants (a fix consisted of a three-point fix taken by two sextant men and a check angle taken by a third sextant man). The fixes were then plotted by a three arm protractor on the calibration sheet for HI-FIX scaled 1:10,000 of the area. With the sextant fixes plotted on the calibration sheet, corresponding HI-FIX values were read from the sheet. Simultaneously with the fixes, HI-FIX values were read from the HI-FIX console. The difference between the values corresponding to the sextant fixes and the values from the HI-FIX console for the fixes were meaned, and this mean value was recorded as the error for the HI-FIX system for the particular day's calibration.

Upon return of the ship to Norfolk, all calibration was run through the computer on board the USC&GSS WHITING for comparison to field results. Two separate passes with the data were made, the first using the basic right and left angles, and the second substituting the check angle for the right angle. Results for each of these passes were then compared to those derived in the field in the manner described above. Values which did not agree within a range of 0.05 lane were rejected. Values which agreed within this range were then averaged and these correctors used for smooth processing. A discussion of these corrector compilations is also found in Appendix C.

G. SHORELINE:

There was no shoreline to be considered on this sheet.

H. CROSSLINES:

Crosslines were run at 9.1% of total mileage on the boat sheet. All crosslines were in good agreement. Numerous splits run after original sounding lines agreed closely and therefore tend to verify the original work.

I. JUNCTIONS:

Junction with contemporary survey PE 40-2-68 was in excellent agreement on the eastern edge of the sheet. The western edge of the sheet will be junctioned with in later work on OPR-473. *H-9011(1968) See review*

J. COMPARISON WITH PRIOR SURVEYS:

Comparison and junction were established with prior surveys H-6563 and H-8938. Agreement with the EXPLORER'S work on H-8938 was very close. All depths in this northern region of the sheet agreed with a foot or two. Comparison with H-6563 at the southern limit showed depths derived by the Ship PEIRCE that were generally three to four feet shoaler than those obtained on the earlier survey. However, when velocity corrections are applied to the ship's soundings, these depths should agree within a foot. *retain as charted*

The 58-ft sounding wreck charted in lat. 42°09.32', long. 70°33.80'
~~No Pre-Survey Review Items required the hydrographer's attention on this sheet. (Item #1, Pre-Survey Review) was required to be investigated to relocate the wk. and obtain its present least depth.~~

Several questionable soundings were investigated. The 79 foot sounding (Lat. 42°19.3'N, Long. 70°18.0'W) was searched for but not found. The shoalest depth discovered in the area was an 86 89 foot sounding. The 156 foot sounding (Lat. 42°14.5'N, Long. 70°28.4'W) could not be confirmed. Development was run over two *deleted*

likely shoal spots in the vicinity but the shoalest depth revealed was 176⁷ feet. The 198 foot sounding at Lat. 42°19.2'N, Long. 70°27.9'W, was discovered on a shoal approximately one nautical mile east of the above indicated position.

Other questionable soundings included a 69 foot and a 72 foot sounding in Lat. 42°07.9'N, Long. 70°32.6'W. While these specific depths were not found, a 68² foot sounding was discovered just to the west of the position. As this area is apparently very rocky, other shoal soundings may exist. See Section F for recommendations concerning this area.

The 70 foot sounding (Lat. 42°11.4'N, Long. 70°17.8'W) was investigated and a shoalest depth of 76³ feet recorded. The general shoal in position Lat. 42°09'N, Long. 70°19'W was developed using an overlay. The shoalest depth recorded in the vicinity was 68¹ feet. (on shoal 2 miles to SW)

K. COMPARISON WITH THE CHART:

Comparison was made with charts C&GS 1207 and 1208, corrected through Notice to Mariners #36, September 7, 1968. The comparison indicated that the survey was in good agreement with existing charts with the exceptions of the changes noted in Section J. In general there were only minor shifts in the shape and positions of the depth contours.

49 ft. sndg. here from present survey charted
On chart 1208, a fifty foot sounding was found (Lat. 42°02.2'N, Long. 70°32.3'W). Also, a 45⁷ foot shoal was developed in the following position: (Lat. 42°00.5'N, Long. 70°33.3'W). *47 ft charted*

L. ADEQUACY OF SURVEY:

This survey is complete and adequate to super^sede prior surveys of the area with the exception of the southwest corner of the sheet. The status of this region is discussed under Section P. Recommendations.

M. AIDS TO NAVIGATION:

A total of eight navigational aids, all buoys, were located on this survey. Two sets of three buoys (one lighted and two unlighted, orange and white striped) mark sets of hydrophones maintained by the U. S. Navy. The lighted buoy in each case is a channel buoy type and an unlighted consists of one nun buoy and one can buoy. Positions were fixed for each buoy and are indicated on the boat sheet in the following positions: *vicinities*

Lat. 42°06.3'N - Long. 70°14.2'W

Lat. 42°05.4'N - Long. 70°15.0'W

The two sets of 3 buoys mentioned above are not charted. (see 1968 L.L. p. 7)

A black and white bell buoy "RP", flashing Mo(A) was located in position, Lat. $42^{\circ}04.8'N$, Long. $70^{\circ}16.8'W$. *This buoy charted*

A black and white whistle buoy "H", flashing Mo(A) was fixed in position, Lat. $42^{\circ}09.8'N$, Long. $70^{\circ}33.0'W$. *This buoy charted*

N. STATISTICS:

	<u>NO. POS.</u>	<u>NAUT. MI. SDG. LINE</u>	<u>BOTTOM SAMPLES</u>	<u>AREA SURVEYED</u>
Ship PEIRCE	2759	2313.1	56	316 sq. mi.

O. MISCELLANEOUS:

Oceanographic Station #2 was taken on September 7, 1968 at Lat. $42^{\circ}07.2'N$, Long. $70^{\circ}18.6'W$.

Oceanographic Station #3 was taken on September 24, 1968 at Lat. $42^{\circ}19.5'N$, Long. $70^{\circ}23.5'W$.

Current Stations #34 and #37 were observed by Geodyne Current Meter. Data was accumulated for a full 15 day period for #34 and for 13 days at #37. The position for #34 was Lat. $42^{\circ}03.5'N$, Long. $70^{\circ}25.0'W$; for #37 - Lat. $42^{\circ}20.0'N$, Long. $70^{\circ}25.0'W$. Exposed film records from these stations were forwarded to Chief, Tides and Currents Branch for processing.

P. RECOMMENDATIONS:

As the area in the southwest corner of the boat sheet has an extreme amount of relief, it should be surveyed on a larger scale to assure development of the shoal depths. It is recommended that this area be included as a part of the next adjacent survey. The area in question is bounded by the limits of: East - Long. $70^{\circ}32.0'W$; West - Long. $70^{\circ}34.0'W$; North - $42^{\circ}10.0'N$, and South - Lat. $42^{\circ}00.0'N$. It is generally the area inshore of the 120 foot contour.

Q. REFERENCES TO REPORTS:

Report on Landmarks for Charts and Fixed Aids to Navigation, USC&GS Ship PEIRCE, 1968 Field Season.

Coast Pilot Report, USC&GS Ship PEIRCE, 1968 Field Season.

Season's Report, USC&GS Ship PEIRCE, 1968 Field Season.

Respectfully submitted,

A. Brian Mostue

A. Brian Mostue
ENS. USESSA


APPROVED/FORWARDED

J. Austin Yeager
J. Austin Yeager
LCDR USESSA, C. O. PEIRCE

APPROVAL SHEET

FIELD NUMBER PE 40-1-68

The field work and processing of data from this hydrographic survey was under my immediate, daily supervision. The boat sheet and all records have been reviewed and are approved by me. It is believed this survey is complete and adequate with the exception noted in Section P - RECOMMENDATIONS.


J. Austin Yeager
LCDR USESSA
Commanding Officer
USC&GSS PEIRCE

Memorandum

TO : Chief, Processing Division
Pacific Marine Center

DATE: February 5, 1969
In reply refer to:

FROM : Commanding Officer
USC&GSS PEIRCE

SUBJECT: Geographic Positions for HiFix Stations

Adjusted Geographic Positions have been derived for HI FIX stations Strawberry Point and Eastern Point. These stations were used for control purposes by the Ship PEIRCE during the 1968 field season on sheets PE-40-1-68 (H-9013) and PE-40-2-68 (H-9011).

The previously submitted values of Latitude and Longitude for Range One (Strawberry Point) are correct.

$\lambda 42^{\circ} 15' 12.0478''$ *outside limits of H-9013*
 $\phi 70^{\circ} 46' 07.2209''$

Adjusted values for Range Two (Eastern Point) are as follows:

$\lambda 42^{\circ} 34' 49.9137''$ *outside limits of H-9013*
 $\phi 70^{\circ} 39' 48.1897''$

These Range Two values replace the former values which were

$\lambda 42^{\circ} 34' 49.909''$ *outside limits of H-9013*
 $\phi 70^{\circ} 39' 48.191''$

J. Austin Yeager
J. Austin Yeager
LCDR, USESSA



ADJUSTED HORIZONTAL CONTROL DATA

NAME OF STATION: EASTERN HI-FIX

STATE: MASSACHUSETTS YEAR: 1968

THIRD - ORDER

LOCALITY: EASTERN HI-FIX

SOURCE: G-11332

FIELD SKETCH:

GEODETIC LATITUDE:	42 34 49.9137	<i>not on</i>	ELEVATION:	METERS
GEODETIC LONGITUDE:	70 39 48.1897	<i>H-9013</i>		FEET

STATE COORDINATES (Fm)				
STATE & ZONE	CODE	X	Y	β (OR Δ or) ANGLE
MASS. MNLND.	2001	825,329.00	577,054.26	+ 0 33 43

TO STATION OR OBJECT	GEODETIC AZIMUTH (From scrib)	PLANE AZIMUTH (From scrib)	CODE
EASTERN POINT LIGHTHOUSE	72 12 22.2	71 38 39	2001

40.

FORM # 3

FIG. 7

COMPUTER PARAMETERS FOR ELECTRONICALLY CONTROLLED SURVEYS

(RANGE - RANGE)

(1) PROJECT No. OPR 473 (2) H- No. 9013 (3) FIELD No. PE-40-1-68

(4) TYPE OF CONTROL: SHORAN, RAYDIST, HI-FIX, RADAR
FREQUENCY (FOR CONVERSION OF RAYDIST OR HI-FIX LANES TO METERS) 1718.59 KC

(5) RANGE ONE (R1) 42 0 15 " 12.0478 " *outside limits*
STATION NAME STRAWBERRY POINT LONGITUDE 70 0 46 " 07.2209 " *H-9013*

(6) RANGE TWO (R2) 42 0 34 " 49.909 " *outside limits*
STATION NAME EASTERN POINT LONGITUDE 70 0 39 " 48.191 " *H-9013*

(7) AZIMUTH FROM R1 TO R2 193 0 22 " 84.304 "
(8) BASELINE LENGTH IN METERS 37,362.47 M.

(9) LOCATION OF SURVEY WITH RESPECT TO ELECTRONIC BASELINE: CHECK ONE
(TO DETERMINE: IMAGINE AN OBSERVER STANDING AT R1 AND LOOKING DIRECTLY AT R2 --- IF THE SURVEY AREA IS TO THE OBSERVER'S LEFT THEN A IS NEGATIVE; IF THE SURVEY AREA IS TO THE OBSERVER'S RIGHT THEN A IS POSITIVE.)

 -A (MINUS) +A (PLUS)

(10) IF SHORAN CORRECTIONS ARE APPLIED BY THE EQUATION, $K(X) \cdot C = D$, WHERE X IS SHORAN DISTANCE AND D IS TRUE DISTANCE, ENTER THE CONSTANT COEFFICIENTS OF THE EQUATIONS HERE:

K(R1) , C(R1) , K(R2) , C(R2)

(11) NUMBER OF VELOCITY TABLES TO BE USED:
 NONE, ONE, MORE THAN ONE.

(12) THIS FORM IS SUBMITTED ONLY AS AN AID IN PREPARING A BOAT SHEET PROJECTION.

THIS FORM APPLIES TO ALL DATA ON THIS SURVEY.

THIS FORM APPLIES TO PART OF THE DATA ON THIS SURVEY -

TIME AND DATE LIMITATIONS: FROM TO

POSITION NUMBER LIMITATIONS: FROM TO

THIS IS FORM #3 SHEET # 1 OF 1 SHEETS FOR THIS SURVEY.

(13) OTHER REMARKS:

G.P.S OF HI-FIX STATIONS ARE UNADJUSTED POSITIONS.

SEPARATES FOLLOWING TEXT:

APPENDIX A. TIDAL NOTE

- B. ABSTRACT OF CORRECTIONS TO ECHO SOUNDINGS
- C. ABSTRACT OF CORRECTIONS TO DISTANCE MEASUREMENTS
- * D. ABSTRACT OF TRA CORRECTIONS
- X E. ABSTRACT OF DAILY CONSECUTIVE POSITION NUMBERS
- F. ABSTRACT OF STANDARD FORMAT COLUMN HEADINGS
- G. ABSTRACT OF HYDROGRAPHIC DATA LOCATED ON THE SURVEY

*Items D and E filed with Field Records, also
Abstract of Hi Fix correctors.*

TIDAL NOTE

Tidal heights for this survey were obtained by one corrector zone based upon the Boston Massachusetts Tide Station. This Corrector zone and the hourly heights from the Boston Tide Station were supplied by the Tides and Currents Branch.

This corrector zone is described as follows:

Zone one includes all waters in this survey.

There is no time difference and a height ratio of 0.95 on the Boston Tides.

All times used in this survey are on the 60° west time meridian. This was so done because of national observance of Daylight Saving Time. Boston, Massachusetts Tide Station did not use Daylight Saving Time and thus remained on the 75° west time meridian. In order for all times to be in the same time zone, we applied a plus (+) 1 hr. 00 m. correction to all times given us for the Boston, Massachusetts Tide Station. Tidal heights were included on special tide tapes because of the large range in tides.

Abstract of Tides follows as a copy of the Tide Tape
Printout because of the length of the document.

It is printed according to the standard Tide Tape
format as detailed in Appendix F - Standard Format
Column Headings

ABSTRACT OF CORRECTIONS TO ECHO SOUNDINGS

Velocity corrections for this survey were obtained by taking Nansen cast oceanographic stations. Temperature and depth data was obtained in the field. Salinity was determined at a later date. There were a total of 3 Nansen casts taken. The results were then plotted on C&GS Form 117. Because of the dates of the surveys, the dates of the casts, and the depths involved, it was decided that casts numbered 2 and 3 would be averaged together for PE 40-1-68 and cast number 4 would be used for PE 40-2-68. (Nansen cast number 1 had nothing to do with these surveys). Results were picked off in 0.5 foot increments for PE 40-1-68 and in 1.0 foot increments for PE 40-2-68, the difference in increments being because of the difference of the least depths in the two surveys. Below are given the results of the casts in graph form.

Latitude and longitude of the three Nansen cast oceanographic stations are as follows:

Station # 2	ϕ 42° 07.2'N	λ 70° 18.6'W
Station # 3	ϕ 42° 19.5'N	λ 70° 23.5'W
Station # 4	ϕ 42° 09.9'N	λ 69° 52.5'W

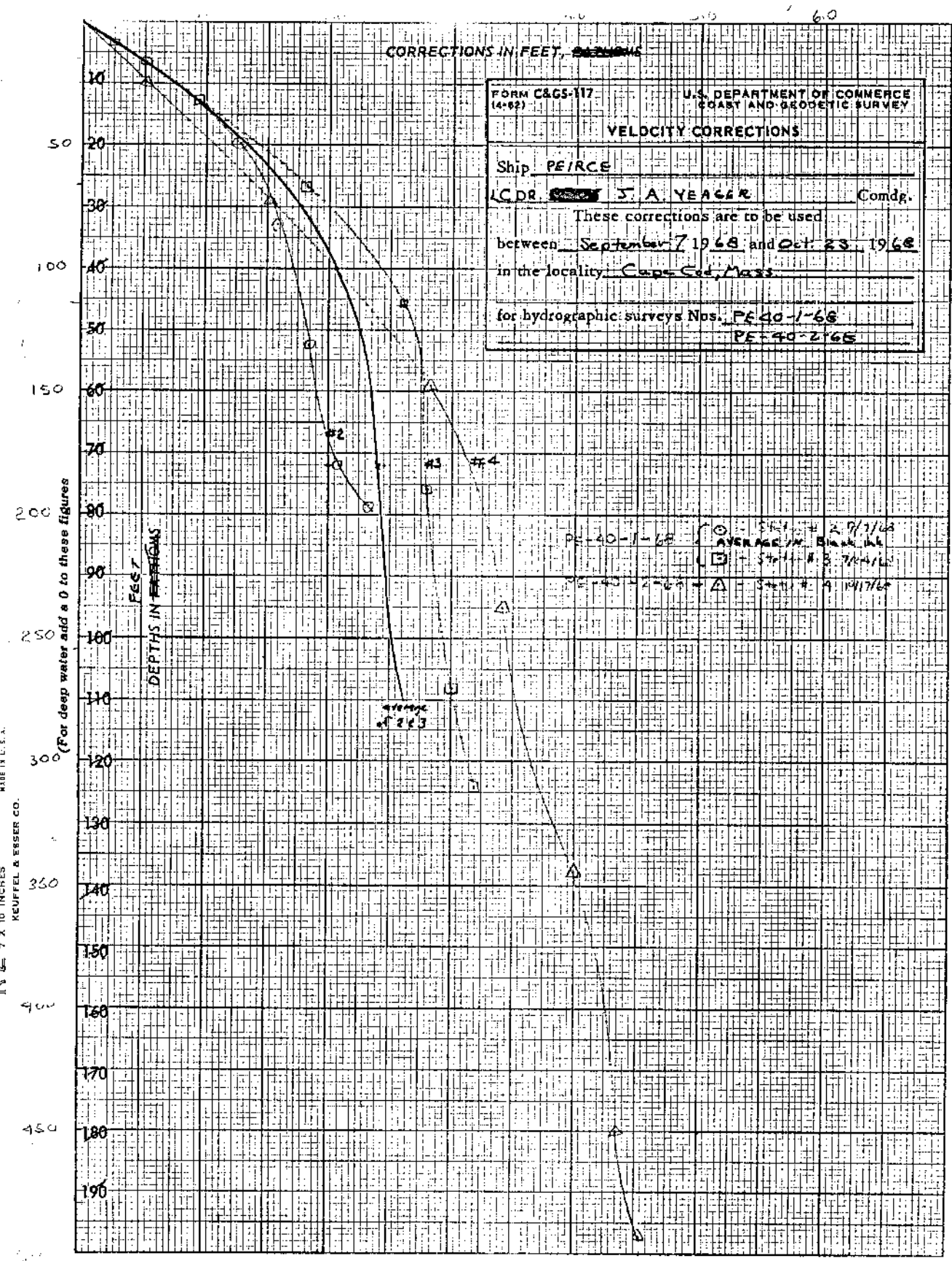
Two Raytheon (type 723) fathometers were used in the survey. The USC&GSS PEIRCE used fathometer #259 until Day 228 (Oct. 4) at 1300 and fathometer #246 for all work after that date and time. Echo soundings for PE 40-1-68 were as deep as 325 feet and for PE 40-2-68 echo soundings were as deep as 657 feet. It became necessary at certain depths to change our soundings taken to fathoms instead of feet. The reason for this was that as the depths became such that the fathometer scales were being repeated (Scale AA) the initial blocked out the reading in feet. For this scale, then, it became necessary to change the fathometer to fathoms and then convert the fathom readings to feet. Accuracy within 3 feet was still maintained.

Even though there were two different fathometers used during this survey, we need to have only one velocity correction table for both fathometers because of careful maintenance and the depths of water involved.

VELOCITY CORRECTIONS FOR PE 40-1-68

<u>To depth</u>	<u>Correction</u>	<u>To depth</u>	<u>Correction</u>
25.0	+0.5	125.0	+2.0
46.0	+1.0	999.0	+2.5
73.0	+ 1.5		

20 X 20 TO THE INCH 46 1240
 KEUFFEL & ESSER CO.
 MADE IN U.S.A.



ABSTRACT OF CORRECTIONS TO DISTANCE MEASUREMENTS

Hi-Fix was used for position control of all ship hydrography. Hi-Fix stations STRAWBERRY POINT (PATTERN 1) and EASTERN POINT (PATTERN 2) were used from September 7, 1968 to October 18, 1968. It became necessary to change receivers on October 3, 1968 at 0800. Thus, there is a change of correctors at this time as noted in the table below.

Correctors were determined in the field by noting the difference (with the proper Algebraic sign) between scaled values from plots of three point fixes and Hi-Fix console readings at the moment of the fix. All observations were recorded in a calibration volume which is forwarded as part of the permanent records of the survey.

Final smooth correctors were determined by comparing field results with computed values generated by placing three point fix information into proper programs of the USC&GSS WHITING'S computer. Two computed values arose - one from the basic two angles recorded and the second from a fix substituting the check angle for the right angle. These two values and the field scaled value were compared and if they varied more than 0.05 lane, they were rejected. If the agreement was within this tolerance, as approximately 50% of the observations were, the values were averaged, subtracted from the console reading, and a single corrector determined for that fix. All the correctors from fixes in an individual calibration were then averaged to give a final corrector for that calibration.

If the correctors thus determined changed from calibration to calibration, as they did early in the project, the smooth correctors reflect only individual calibrations for the period they were judged applicable. Later in the project, calibrations seemed to stabilize and vary only over + 0.1 lanes. If the variance was within these limits, the correctors were averaged together and applied over a longer period of hydrography.

Unknown factors, most probably atmospheric, caused the Hi-Fix dials to run or spin very frequently throughout the project, giving rise to gains or losses of lanes. Where these gains and losses could be resolved from the sawtooth recorder print-outs, corrections were applied in the form of calibration corrections. If the gain or loss became uncertain, the ship returned to a lane count buoy to re-establish control and any work in doubt was rejected.

An abstract of the correctors applied follows:

APPENDIX G

ABSTRACT OF HYDROGRAPHIC DATA LOCATED ON SURVEY

<u>POSITION NUMBER</u>	<u>DESCRIPTION</u>
2752	Lighted Bell Buoy, BW"RF", Mo(A) <i>charted</i> 1207
2753	Lighted Bell Buoy, WOr"A "
2754	Can Buoy, WOr, "C"
2755	Nun Buoy, WOr, "E"
2756	Nun Buoy, WOr, "F"
2757	Can Buoy, WOr, "D"
2758	Lighted Bell Buoy, WOr, "B"
9036	" <i>whistle</i> " BW"H", Mo(A) <i>charted</i> 1207
9001	fne gy S, sh
9002	stky gy M
9003	gy M
9004	gy M
9006	fne br S
9007	gy M
9008	crs br S
9009	fne br S
9010	gy M
9011	gy M
9012	gy M
9013	gy M
9014	gy M
9015	gy M
9016	gy M
9017	gy M

*not
charted*

APPENDIX G (continued)

<u>POSITION NUMBER</u>	<u>DESCRIPTION</u>
9018	gy M
9019	gy M
9020	gy M
9021	gy M
9022	gy M
9023	gy M
9024	gy M
9025	br M
9026	br M
9027	br M
9028	br M
9029	br M
9030	br M
9031	gy M
9032	gy M
9033	gy M
9034	Rk γ
9035	S, Gr
9036	Lighted Whistle Buoy, BW" H" Mo(A)
9037	br M
9038	br M
9039	Rk γ
9040	Rk γ

APPENDIX G (continued)

<u>POSITION NUMBER</u>	<u>DESCRIPTION</u>
9041	br M
9042	crs br S
9043	crs br S
9044	brk Sh
9045	crs br S
9046	Rk
9047	fne br Sh
9048	fne br S
9049	gy M
9050	sm Rk <i>st</i>
9051	sm Rk <i>st</i>
9052	crs br S
9053	crs br S
9054	sm Rk <i>st</i>
9055	crs br S
9056	Crs br S

GEOGRAPHIC NAMES

Survey No. H - 9013

Name on Survey	Source											
	A	B	C	D	E	F	G	H	K			
Massachusetts Bay												1
Stellwagen Bank												2
Race Point												3
Cape Cod Bay												4
												5
												6
												7
												8
												9
												10
												11
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												27

PREPARED BY

Frank W. [Signature]
CARTOGRAPHIC TECHNICIAN

APPROVED BY

A. J. Wroughton
CHIEF GEOGRAPHER

NORFOLK HYDROGRAPHIC PROCESSING BRANCH

VERIFICATION NOTES

H-9013

GENERAL

This appears to be an excellent basic survey. Soundings are in good agreement at crossings and depth curves follow normal configurations in a fairly irregular bottom.

On Julian Day 279, positions 2581 thru 2623 were obviously displaced. A review of the calibration data and an inspection of -? the Brush Recorder tapes showed that a +2.0 lane correction was needed on R-2. This correction was applied and soundings on these positions are now in good agreement with surrounding hydrography.

*No error
+2.0 correction
unnecessary
GLM.*


Hugh L. Proffitt
Chief, Hydro Branch, AMC

Norfolk, Va.
Oct. 3, 1969

FORM CAGS-946
 (REV. 11-65)
 (PREP. BY
 HYDROGRAPHIC
 MANUAL 20-2,
 6-74, 7-13)

U.S. DEPARTMENT OF COMMERCE
 ENVIRONMENTAL SCIENCE SERVICES ADMINISTRATION
 COAST AND GEODETIC SURVEY
 NAUTICAL CHART DIVISION

HYDROGRAPHIC SURVEY STATISTICS
 HYDROGRAPHIC SURVEY NO. H-9013 (PE-40-1-68)

RECORDS ACCOMPANYING SURVEY: To be completed when survey is registered.

RECORD DESCRIPTION	AMOUNT	RECORD DESCRIPTION	AMOUNT			
SMOOTH SHEET	1	BOAT SHEETS				
DESCRIPTIVE REPORT	1	OVERLAYS	4-Misc Overlays 1-Position (My)			
DESCRIPTION	DEPTH RECORDS	HORIZ. CONT. RECORDS	PRINTOUTS	TAPE ROLLS	PUNCHED CARDS	ABSTRACTS/SOURCE DOCUMENTS
ENVELOPES	1					
CANISERS	2		1			1-Brush Rec. Tapes
VOLUMES		1-Calibration				
BOXES						

T-SHEET PRINTS (LINE)

NONE

SPECIAL REPORTS (LINE)

OFFICE PROCESSING ACTIVITIES

The following statistics will be submitted with the cartographer's report on the survey

PROCESSING ACTIVITY	AMOUNTS			
	PRE-VERIFICATION	VERIFICATION	REVIEW	TOTALS
POSITIONS ON SHEET				2759
POSITIONS CHECKED		268	150	
POSITIONS REVISED		78	30	
DEPTH SOUNDINGS REVISED			10	
DEPTH SOUNDINGS ERRONEOUSLY SPACED			5	
SIGNALS ERRONEOUSLY PLOTTED OR TRANSFERRED				
	TIME (MANHOURS)			
TOPOGRAPHIC DETAILS		1		
JUNCTIONS		4	5	
VERIFICATION OF SOUNDINGS FROM GRAPHIC RECORDS		39	15	
SPECIAL ADJUSTMENTS			25	
ALL OTHER WORK		173	75	
TOTALS		217	180 + 25 hrs by Gallahan	

PRE-VERIFICATION BY <u>Inspection</u>	BEGINNING DATE <u>2/18/77</u>	ENDING DATE <u>2-9-77</u>
VERIFICATION BY <u>A.K. Schugeld & W.L. Jonns</u>	BEGINNING DATE <u>2/18/69</u>	ENDING DATE <u>9/24/69</u>
REVIEW BY <u>George R. Meyers</u>	BEGINNING DATE <u>8-11-70</u>	ENDING DATE <u>8-31-70</u>

Reg. No. H-9013

The Computer and Excess Sounding Cards for this survey have not been corrected to reflect the changes made to the Computer Card and Excess Card Printouts at this time of the review.

When the cards have been updated to reflect the final results of the survey, the following shall be completed:

CARDS CORRECTED

DATE _____ TIME REQ'D _____ INITIALS _____

REMARKS:

H-9013

Items for Future Presurvey Reviews

This is a good basic offshore survey of the southern part of Massachusetts Bay. The bottom is considered adequately developed except for the following items for future investigation.

1. The 58 Wreck charted at latitude 42°09.32', longitude 70°33.80' originates with Notice to Mariners 26 of 1930 and is the former steamer PINTHIS. This wreck is fully discussed under item 7A.
2. The sunken wreck charted as dangerous to navigation at latitude 42°00.64', longitude 70°32.02' is the former tug JUNE K. which originates with Chart Letter 866 of 1959.
3. Any future survey should include a more extensive development in the area of the 47-foot shoal at latitude 42°00.6', longitude 70°33.2'.

<u>Position Index</u>		<u>Bottom Change Index</u>	<u>Use Index</u>	<u>Resurvey Cycle</u>
<u>Lat.</u>	<u>Long.</u>			
420	0702	3	6	25 years
420	0703	0	6	50 years
420	0704	2	6	25 years
421	0702	2	6	25 years
421	0703	0	6	50 years
421	0704	1	6	50 years

OFFICE OF MARINE SURVEYS AND MAPS

MARINE SURVEYS DIVISION

HYDROGRAPHIC SURVEY REVIEW

REGISTRY NO. H-9013

FIELD NO. PE-40-1-68

Massachusetts, Massachusetts Bay, Vicinity of Provincetown, Tip of
Cape Cod

SURVEYED: September 8 - October 18, 1968

SCALE: 1:40,000

PROJECT NO.: OPR-473

SOUNDINGS: DE-723 Depth Recorder

CONTROL: Hi-Fix (Range-Range)

Chief of Party	J. A. Yeager
Surveyed by	N. C. Austin
.....	R. T. Sheahan
.....	K. W. Sigley
.....	A. B. Mostue
.....	J. H. Snooks
Automated Plot by	Gerber Digital Plotter
Verified by	A. K. Schugeld, W. L. Jonns
Reviewed by	G. K. Myers
.....	Date: August 31, 1970
Inspected by	J. T. Gallahan

1. Description of the Area

This offshore survey covers a generally rectangular area of the southern part of Massachusetts Bay. Survey limits extend north from latitude 42°00' to latitude 42°20' and west from longitude 70°12' to 70°34'. Surveys depths range from 47 feet to 347 feet with the majority of depths exceeding 66 feet. Stellwagen Bank, the predominant submarine feature in the area, lies in a general north-south direction in the northeast quadrant of the survey.

The major bottom characteristics of the area are mud, sand, and shell with evidences of rock in lesser depths on the west side of the survey.

2. Control and Shoreline

The origin of control is adequately covered in part F of the Descriptive Report.

There is no shoreline within the limits of this survey.

3. Hydrography

Depths at crossings are considered in good agreement and the usual depth curves were adequately delineated.

The development of bottom configuration and the investigation of least depths are considered good.

4. Condition of Survey

The sounding records, smooth plotting, Descriptive Report, and printouts are adequate and conform to the requirements of the Hydrographic Manual and the Instruction Manual - Automated Hydrographic Surveys, except as follows:

A. Simultaneous comparisons were not made by the hydrographer. Vertical casts should have been made in validating the lack of instrumental corrections.

B. The bottom characteristics of "rks" was improperly shown on the survey for "rky." This was revised by the reviewer.

C. The plus 2 lane corrections on Julian day 279, positions 2581-2623, was unnecessarily applied to the R-2 arc.

D. An inspection of the fathogram on Julian day 266, positions 1556-1567, revealed an inaccurate trace from which depths were smooth plotted. This crossline was rejected during review.

5. Junctions

Adequate junctions were made with H-8938 (1967) on the north, H-9011 (1968) on the east, H-6563 (1940) on the south, and H-9224 (1971) and H-9225 (1971) on the southeast. No contemporary survey junctions with the present survey on the west; however, charted and present survey depths are in agreement.

6. Comparison with Prior Surveys

A.	H-516	(1854-56)	1:80,000
	<u>H-519</u>	<u>(1855-56)</u>	<u>1:40,000</u>

These early prior surveys taken together cover the area of the present survey. A comparison of depths between the present and early surveys

ranges from general agreement to differences as great as 20 feet. Differences may be attributed to scale, to inadequate control, and to the less accurate survey methods used on the early surveys.

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

B. H-3413 (1912) 1:20,000
H-5400 (1933) 1:20,000

These early prior surveys with few soundings within the common area of the present survey are of little value for comparative purposes. However, soundings are found to be in good agreement with the present survey.

C. H-3775 W.D. (1915) 1:25,000
H-3776 W.D. (1915-16) 1:30,000

These wire-drag surveys cover the southern portion of the present survey. Shoal depths of 48 and 53 feet were transferred to the present survey from H-3776 W.D. (1915-16) in the vicinity of latitude 42°02', longitude 70°32'. No conflict exists between the present depths and the effective drag depths.

D. H-8413 (1957-59) 1:100,000

This small-scale unverified survey covers the upper half of the present survey. A comparison of depths between the prior and the present survey indicates general agreement except in isolated areas where shoaling and deepening have occurred and depths may vary as much as 15 feet.

The present survey supersedes this prior survey within the common area.

7. Comparison with Chart 13249 (580) latest print date January 17, 1976
 13267 (1207) latest print date November 16, 1974
13246 (1208) latest print date November 1, 1975

A. Hydrography

Most of the charted hydrography originates with the present survey after review, supplemented by depths from prior surveys and junctional survey H-6563 (1940) which require no further consideration.

Attention is directed to the following:

(1) The 58 Wreck charted at latitude 42°09.32', longitude 70°33.80' originates with Notice to Mariners 26 of 1930 and Chart

Letter 325 of 1930. This Presurvey Review item, falling in the western limits near a 78-foot depth, was not discredited; therefore, the 58 Wreck should be retained as charted.

(2) The Unexploded depth charge Rep. 1956 charted at latitude $42^{\circ}14.91'$, longitude $70^{\circ}13.41'$ originates with Notice to Mariners 42 of 1956. This Presurvey Review item, which did not require hydrographic investigation, falls in depths of 105 feet on the present survey and should be retained as charted.

(3) The charted sunken wreck, dangerous to surface navigation, at latitude $42^{\circ}00.64'$, longitude $70^{\circ}32.02'$ originates with Chart Letter 866 of 1959. This wreck, falling in depths of 104-110 feet, was not disproved on the present survey and should be retained as charted.

With the exceptions noted above, the present survey supersedes the charted hydrography within the common area.

B. Aids to Navigation

Lighted Bell buoy, BW"RP"Mo(A), and lighted Whistle buoy, BW"H"Mo(A), agree with the present survey positions and adequately mark the features. Six special purpose buoys located on the present survey north of Race Pt. Lighthouse are not charted.

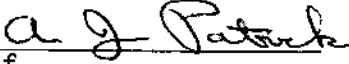
8. Compliance with Instructions

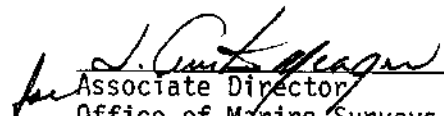
This survey adequately complies with the project instructions.

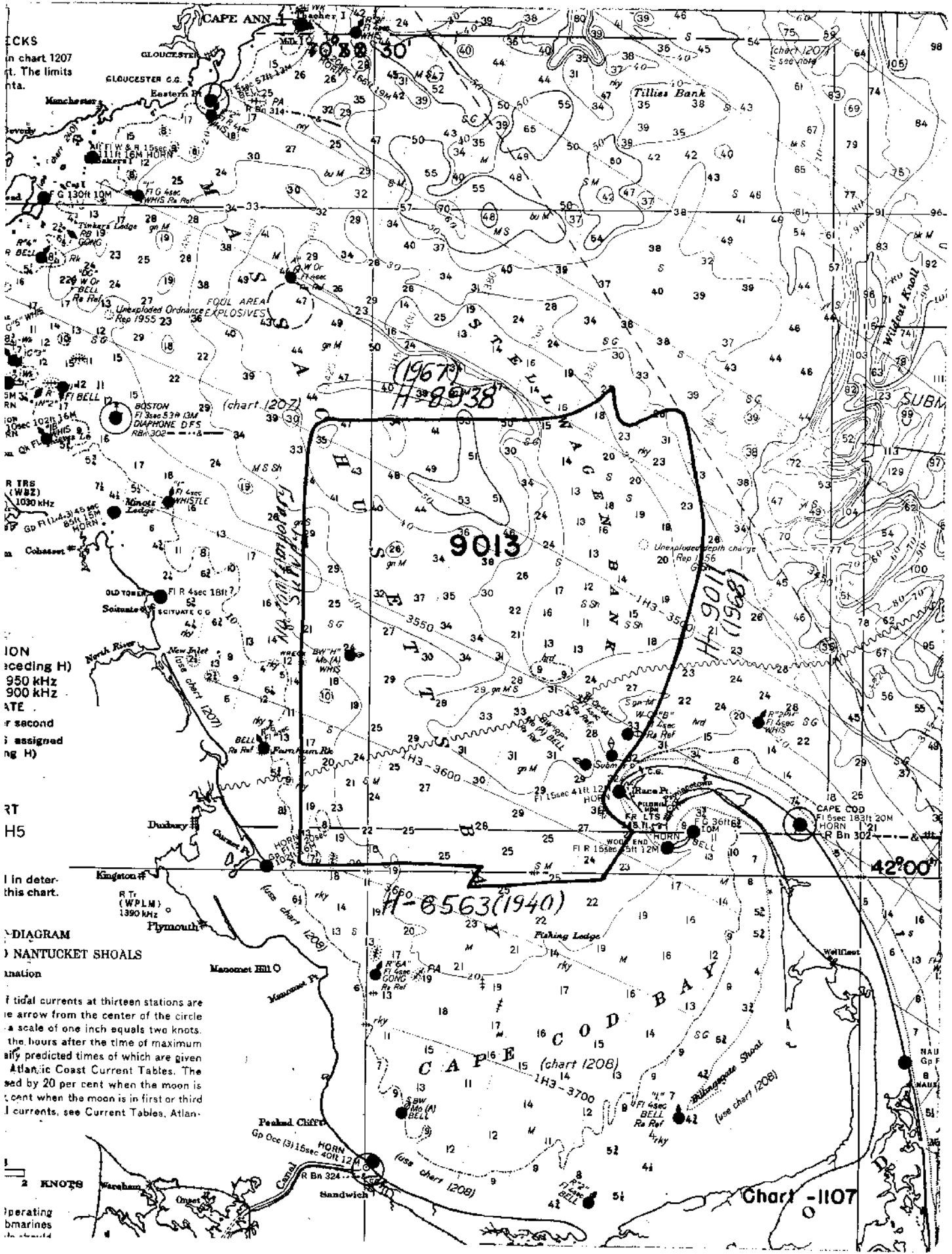
9. Additional Field Work

This is a good basic survey and no additional field work is recommended.

Examined and Approved:


Chief
Marine Surveys Division


Associate Director
Office of Marine Surveys
and Maps



CHARTS
in chart 1207
The limits
of the chart.

UNEXPLODED ORDNANCE
Explosives

FOUL AREA
Explosives

ION
preceding H)
950 kHz
900 kHz

RT
H5

DIAGRAM
NANTUCKET SHOALS

tidal currents at thirteen stations are
indicated by the center of the circle
and a scale of one inch equals two knots.
The hours after the time of maximum
predicted times of which are given
in the Atlantic Coast Current Tables. The
speed by 20 per cent when the moon is
in the first or third quarter. For
tidal currents, see Current Tables, Atlan-

Operating
buoys
and
lights

2 KNOTS

Chart - 1107

42°00'

NAU
Go F
B
MAUS

RECORD OF APPLICATION TO CHARTS

FILE WITH DESCRIPTIVE REPORT OF SURVEY NO. H-701?

INSTRUCTIONS

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

CHART	DATE	CARTOGRAPHER	REMARKS <i>Before</i>
1000	6-13-72	J. Bailey	Full Part Before After Verification Review Inspection Signed Via Drawing No. <i>No critical corrs. Exam thru</i>
			<i>DRWG. 70 # 36</i>
580	5-3-77	H. Rudder	Full Part Before After Verification Review Inspection Signed Via Drawing No. <i>18 Added five soundings and deleted three soundings</i>
1208	5-9-77	R. Winkfield	Full Part Before After Verification Review Inspection Signed Via Drawing No. <i>36 Applied Soundings</i>
			Full Part Before After Verification Review Inspection Signed Via
1207	5-12-77	R. J. Winkfield	Drawing No. <i>37 Applied Soundings</i>
1000	7-20-77	R. J. Winkfield	Full Part Before After Verification Review Inspection Signed Via
			Drawing No. <i>54 Applied Soundings</i>
1106	6-2-78	R. J. Winkfield	Full Part Before After Verification Review Inspection Signed Via Drawing No. <i>X-DRWG #33 Applied soundings thru chs. 1207 & 1208</i>
1107	6-2-78	R. J. Winkfield	Full Part Before After Verification Review Inspection Signed Via Drawing No. <i>Applied soundings thru chs. 1106</i>
71	6-2-78	R. J. Winkfield	Full Part Before After Verification Review Inspection Signed Via Drawing No. <i># 32 Applied soundings thru chs. 1107</i>
70	6-8-78	R. J. Winkfield	Full Part Before After Verification Review Inspection Signed Via Drawing No. <i># 42 Applied soundings thru chart 71</i>
1000	6-8-78	R. J. Winkfield	Full Part Before After Verification Review Inspection Signed Via Drawing No. <i>55 Applied soundings thru chs. 70</i>
13006	2-23-70	Russell Kennedy	<i>Adequately Appd drg 47</i>

RECORD OF APPLICATION TO CHARTS

FILE WITH DESCRIPTIVE REPORT OF SURVEY NO. H-9013

INSTRUCTIONS

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

1. Letter all information.

2. In "Remarks" column cross out words that do not apply.

3. Give reasons for deviations, if any, from recommendations made under "Comparison with Charts" in the Review.

CHART	DATE	CARTOGRAPHER	REMARKS
1106	3-12-70	Jeffrey S. Stuart Pioneer DRK	Full Part Before After Verification ^{before} Review Inspection Signed Via Drawing No. Survey checked for critical edges Added 5 sdgs. Revised 2 and Deleted 3
1207	4-16-70	Eric Fry	Full Part Before After Verification Review Inspection Signed Via Drawing No. Added & revised 11 edge after critical exam only
1000	4/29/70	O. Svendsen	Full Part Before After Verification ^{before} Review Inspection Signed Via Drawing No. 47. Applied 32 fm sdg. critically filling bare area on present chart. (Thru Chart 1106 Drg #25)
71	5-5-70	Eric Fry	Full Part Before After Verification Review Inspection Signed Via Drawing No. 24 critical corrections only revised 4 soundings.
1107	6/12/70	O. Svendsen	Full Part Before After Verification ^{before} Review Inspection Signed Via Drawing No. 23 Exam. No critical corr. thru Ch 1106 Drg #25
1208	7/21/70	O. Svendsen	Full Part Before After Verification Review Inspection Signed Via Drawing No. 29 - thru Ch 1207 Drg #30 (Fry 4/16/70)
70	7/23/70	J. Stuart	Full Part Before After Verification ^{before} Review Inspection Signed Via Drawing No.
580	12/17/70	Oscar Chapman	Full Part Before After Verification ^{before} Review Inspection Signed Via Drawing No. 14 - (proof)
1207	1/11/71	J.W. Maloney	Full Part Before After Verification ^{before} Review Inspection Signed Via Drawing No. Dwg # 31
1106	2/11/71	Oscar Chapman	Full Part Before After Verification ^{before} Review Inspection Signed Via Drawing No. Applied thru 1207 Dwg # 30
1208	2/26/71	J. Esterreich	Full After Verification Review before Inspection Applied part thru chart 1207 dwg # 31 to chart 1208 Dwg # 30. Applied part thru chart 580 dwg # 14 Applied part direct
1107	3/71	S. McKellar	fully applied after verification and review but before inspection thru 1208. (Dwg. #24)
71	Apr 71	P. B. Sanacki	Part applied after verification, review and before inspection thru chrt. 1107 dwg # 24 to dwg # 25/71
70	7-30-71	KIRBY GEAR	PART AFTER VER & REVIEW BEFORE INSP THRU CHART 71 DWG 25

Reg. No. H-9013

The Computer and Excess Sounding Cards for this survey have not been corrected to reflect the changes made to the Computer Card and Excess Card Printouts at this time of the review.

When the cards have been updated to reflect the final results of the survey, the following shall be completed:

CARDS CORRECTED

DATE _____ TIME REQ'D _____ INITIALS _____

REMARKS: