

H10763

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-10-3-97

Registry No. H10763

LOCALITY

State
New Hampshire

General Locality Bigelow Bight

Locality Approaches to Portsmouth Harbor

97

CHIEF OF PARTY
LCDR D. A. Cole

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NOAA FORM 77-28
(11-72)

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

REGISTER NO.

H-10763

HYDROGRAPHIC TITLE SHEET

INSTRUCTIONS - The Hydrographic Sheet should be accompanied by this form, filled in as completely as possible, when the sheet is forwarded to the Office.

FIELD NO.

RU-10-3-97

State New Hampshire

General locality Bigelow Bight

Locality Approaches to Portsmouth Harbor

Scale 1:10,000

Date of survey 10 July - 02 October 1997

Instructions dated 07 July 1997

Project No. OPR-A315-RU-97

Vessel NOAA Ship RUDE, EDP 9040

Chief of party Lieutenant Commander David A. Cole, NOAA

Surveyed by LCDR DA Cole; LTs JM Klay, JG Evjen, JL Riley, DO Neander, LTJG EJ Sipos

Soundings taken by: (echo sounder, hand lead, pole) Raytheon DSF-6000N echo sounder, SEABAT 9003

Graphic record scaled by Officers (listed above,) ST MT Lathrop

Graphic record checked by Officers (listed above,) MTL

Protracted by _____

Automated plot by _____

*HEWLETT PACKARD
DESIGNATED 2500 C/P PLOTTER
(AHB)*

Verification by ATLANTIC HYDROGRAPHIC BRANCH PERSONNEL

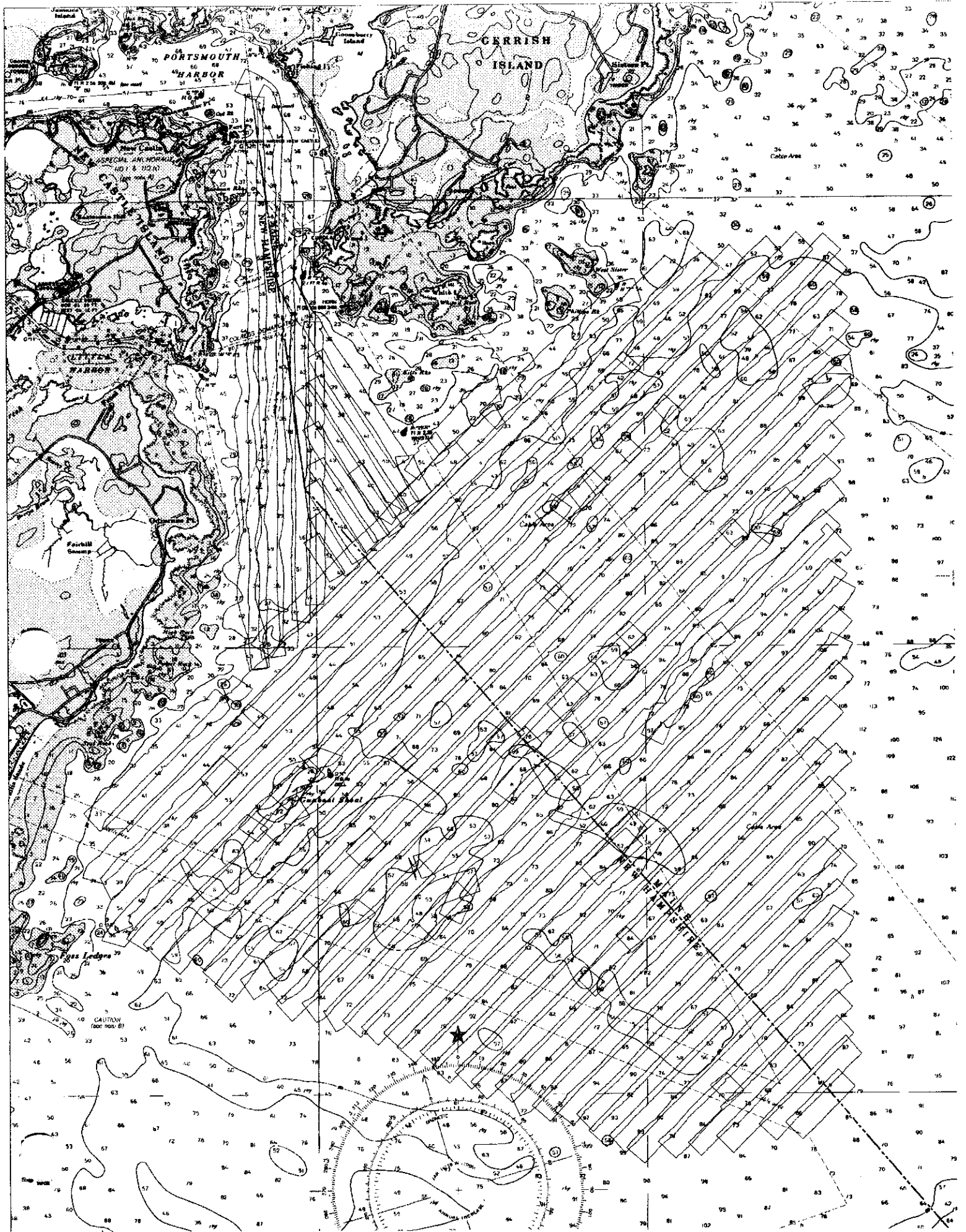
Soundings in (fathoms feet or meters at MLW or MLLW) meters at MLLW

REMARKS:

All times recorded in UTC.

NOTES IN RED WERE MADE DURING OFFICE PROCESSING

AWOL/SURE 4/28/99
MCR



NOAA Ship RUDE: July - December 1997 Data Flowchart

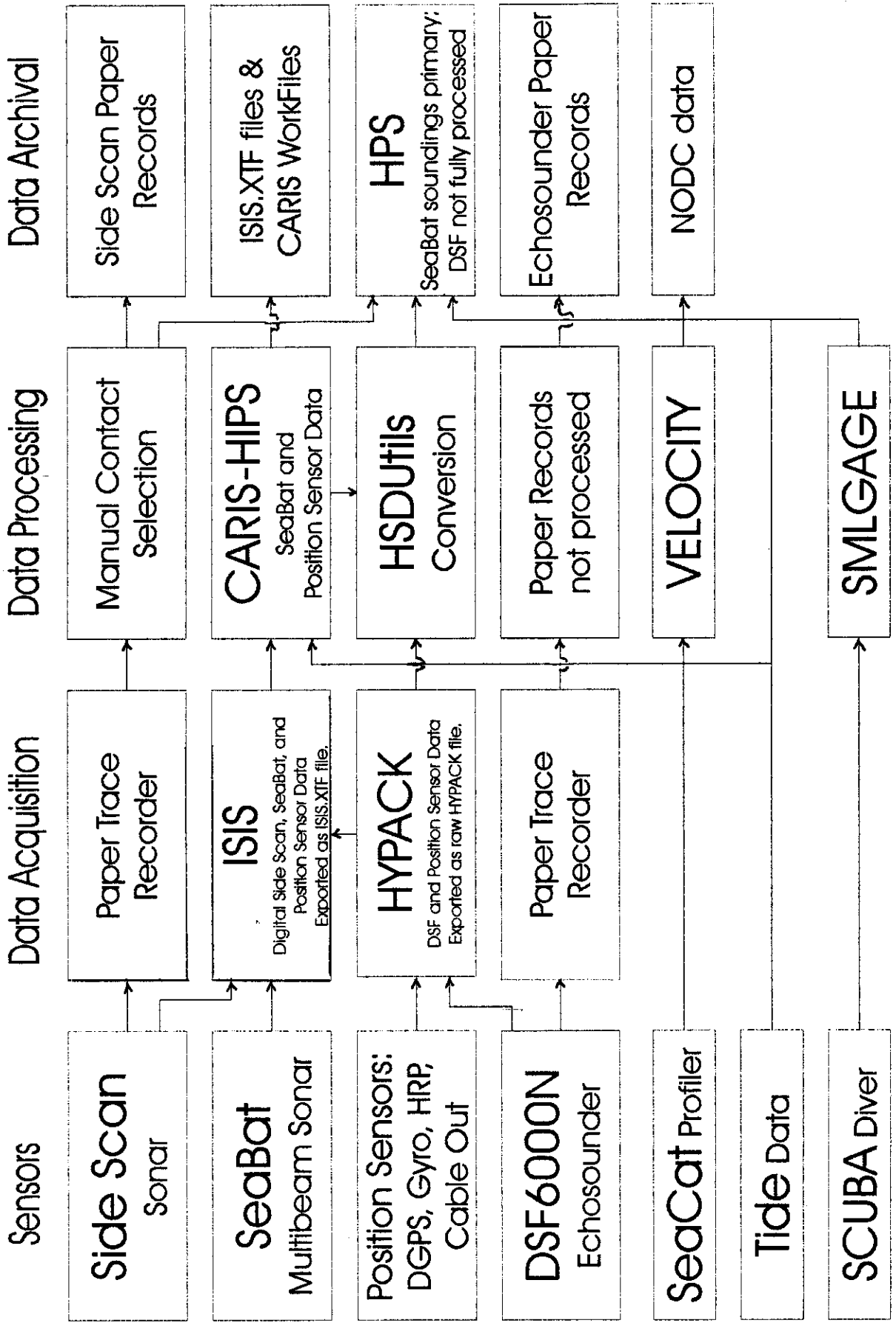


TABLE OF CONTENTS

A. PROJECT.....	2
B. AREA SURVEYED.....	2
C. SURVEY VESSELS.....	2
D. AUTOMATED DATA ACQUISITION AND PROCESSING.....	3
E. SIDE SCAN SONAR EQUIPMENT.....	3
F. SOUNDING EQUIPMENT.....	4
G. CORRECTIONS TO SOUNDINGS.....	6
H. CONTROL STATIONS.....	8
I. HYDROGRAPHIC POSITION CONTROL.....	8
J. SHORELINE.....	9
K. CROSS COMPARISONS.....	9
L. JUNCTIONS.....	10
M. COMPARISON WITH PRIOR SURVEYS.....	10
N. ITEM INVESTIGATION REPORTS.....	10
O. COMPARISON WITH THE CHART.....	14
P. ADEQUACY OF SURVEY.....	14
Q. AIDS TO NAVIGATION.....	15
R. STATISTICS.....	15
S. MISCELLANEOUS.....	15
T. RECOMMENDATIONS.....	16
U. REFERRAL TO REPORTS.....	16

APPENDICES *

APPROVAL SHEET

SEPARATES *

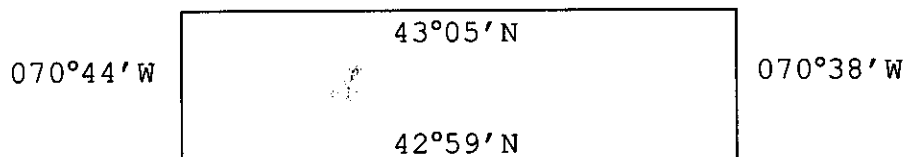
* FILED WITH THE ORIGINAL FIELD RECORDS

A. PROJECT

- A.1 This survey was conducted in accordance with Hydrographic Project Instructions OPR-A315-RU, Approaches to Portsmouth, New Hampshire and Maine.
- A.2 The original instructions are dated June 24, 1997.
- A.3 There are no amendments to the original instructions.
- A.4 This survey is designated H-10763.
- A.5 This survey responds to requests from the New Hampshire State Port Authority, the Portsmouth Pilots, and the First District of the United States Coast Guard. The project area is traversed by container ships, bulk carriers, tankers, feeder vessels, barges, cruise liners, and fishing vessels; the average draft of large vessels is approximately 35 feet. The area was last surveyed by the U.S. Coast and Geodetic Survey in 1955.

B. AREA SURVEYED

- B.1 The area surveyed is a 9.7 square nautical mile (nm) region from Fort Point south to Foss Ledges and east to three nm offshore.
- B.2 The survey is comprised of one sheet with the following approximate boundaries:



- B.3 Data acquisition for this survey began on July 10, 1997 (DN 191) and ended on October 02, 1997 (DN 275). Over 80 million multibeam soundings were processed for the survey.

C. SURVEY VESSELS

- C.1 All hydrography, side scan, and multibeam investigations were conducted from NOAA Ship RUDE, S-590, EDP# 9040.
- C.2 The transducer for the multibeam sonar was deployed on a pivoting arm mounted on the port side, approximately amidships. The arm was rotated into the operating position only during times of data acquisition.

D. AUTOMATED DATA ACQUISITION AND PROCESSING *SEE ALSO THE EVALUATION REPORT.*

D.1 The following programs were used to acquire and process the sounding data and the side scan sonar contact data:

Program	Version	Date	Program	Version	Date
CARIS-HIPS	4.2.7	01/17/97	HYPACK	6.4B	04/17/97
" HDCS	4.2.7	05/09/97	ISIS	2.35	03/25/97
" HDCSMERG	4.2.7	05/09/97	HSDUTILS	3.51	05/28/97
" HIPSCVRT	4.2.7	03/18/97	HPS	none	04/14/97
" VCFEDIT	4.2.7	03/17/97	MAPINFO	4.00	11/15/95
" SWATHEDIT	4.2.7	01/17/97	HPS-MI	--	05/06/97

D.2 The following programs were used to acquire and process the sound velocity data and diver least depths:

Program	Version	Date	Program	Version	Date
CAT	3.00	02/26/97	SEACON	3.3M	11/27/89
VELOCITY	3.00	02/26/97	SMLGAGE	3.00	02/26/97

D.3 The following programs were used for data quality assurance:

Program	Version	Date	Program	Version	Date
MAPINFO	4.00	11/15/95	SHIPDIM	2.1	04/17/95
HPS-MI	--	05/06/97	MONITOR	3.0	03/13/95
DAILYDQA	3.00	02/26/97			

E. SIDE SCAN SONAR EQUIPMENT

- E.1 All side scan sonar data were acquired with an Edgetech (EG&G) Model 272 towfish and an Edgetech Model 260-TH image-correcting side scan sonar recorder. All side scan data were also recorded digitally using ISIS software and archived in the Extended Triton Format (*.XTF) files.
- E.2 The side scan towfish used a 50° vertical beam width tilted down 20° from horizontal.
- E.3 The 100 kHz frequency was used throughout the survey.
- E.4a In the entrance waters between Fort Point and Odiornes Point, the 75-meter range scale was used with 120 meter line spacing to obtain 100% area coverage. In offshore areas, the 100-meter range scale was used with 160 and 80 meter line spacings to obtain 100% and 200% area coverage.
- E.4b Frequent confidence checks were obtained, whenever common features such as rocks or sand waves were encountered.

- E.4c One hundred percent side scan coverage was completed in the entrance waters between Fort Point and Odiornes Point, and in the shoal region east of Kitts Rocks. Two hundred percent coverage was completed in offshore areas. Holiday coverage was run to fill in any gaps. All coverage was checked with on-screen zoomable coverage displays in MapInfo to ensure proper overlap between lines.
- E.4d Any data degraded by towfish instability, thermocline, prop wash, etc., were rejected and reacquired.
- E.4e The towfish was deployed exclusively from the stern.
- E.5 Sonar records were monitored on-line and reviewed by two persons during processing to identify contacts. Contact offsets and shadow heights were measured on sonar paper records, checked, and entered into the HPS Contact Table to compute contact heights and positions. The entrance waters between Fort Point and Odiornes Point and areas of rock outcrop (where individual contacts were difficult to define) were delineated as 100% multibeam cells using the HPS-MI swath coverage tool in MapInfo.
- E.6 All side scan contacts with computed heights greater than 10% of depth, or greater than 1 meter in depths shoaler than 20 meters, and all contacts which appeared manmade were deemed significant. All significant contacts were developed with multibeam sonar coverage. All coverage was checked with on-screen zoomable coverage displays in CARIS-HIPS and MapInfo, and holiday lines were run to fill in any gaps.

F. SOUNDING EQUIPMENT

- F.1 Single-frequency (455 kHz) multibeam data were acquired with a Reson SeaBat 9003 (SN 10496-447020) shallow-water sonar system. The 9003's combined transmit and receive beams yield forty (40) soundings per ping, each formed from a 3° crosstrack x 1.5° alongtrack bottom footprint. During multibeam data processing, the outermost two beams on each side of the swath (beam numbers 1, 2, 39, and 40) were not processed, reducing the effective swath width to 108° (3° x 36 beams). Proper overlap between multibeam sonar coverage lines was verified using a conservative swath width assumption of 100°.

Dual-frequency (24 and 100 kHz) vertical beam echo sounding data were acquired with a Raytheon DSF-6000N Digital Survey Echosounder (SN A107).

- F.2 The diver least depth was acquired with a NOAA MOD3 pressure gage (s/n 68336). The least depth was computed using SMLGAGE and entered into HPS as a detached position.
- F.3 There were no observed faults in sounding equipment that affected the accuracy or quality of the data.
- F.4 SeaBat (455 kHz) multibeam data were continuously recorded during data acquisition and served as the primary source for hydrographic digital soundings.

SeaBat depth data were monitored using ISIS during acquisition and processed using CARIS-HIPS multibeam data cleaning programs. Digital multibeam depth profiles were visually reviewed and fliers were identified and manually flagged as "rejected"; no SeaBat quality flags were used to automatically "reject" data. Vessel navigation data from DGPS and attitude data from heave, pitch, roll, and gyro sensors were also displayed and manually cleaned (see Sections G and I).

After hydrographer review and cleaning, the depth, navigation, and attitude data were merged with sound velocity, tide, and vessel configuration data to compute the true depth and position of each sonar beam footprint. All of the processed data were excessed by selecting shoal soundings at a nominal density of 3 meters x 3 meters. These excessed field sheet soundings were used in CARIS Workfile Processing for cross-data comparisons (see Section K.2). Finally, the CARIS Workfile Processing soundings were shoal-bias excessed at 15 meters x 15 meters and transferred into HPS (using HSDUtils) and MapInfo databases. **Note that excessing was accomplished using predicted tide values. Shoal soundings selected through CARIS may be incorrect due to anomalous predicted tides. Large differences between predicted and verified tides may justify reapplication of tides to the entire CARIS-HIPS dataset to ensure correct selection of least depths for transfer to HPS.**

Both high (100 kHz) and low (24 kHz) frequency vertical beam DSF data were recorded during data acquisition. DSF echograms were monitored on-line. Anomalous DSF echogram traces were immediately cross-referenced to the ISIS multibeam acquisition display online.

No manual edits were made to the DSF data. Vertical correctors were applied to only the raw DSF digital soundings (see Section G); the corrected high frequency (100 kHz) DSF soundings were compared to the SeaBat soundings (see Section K). The archived HPS fixes of DSF soundings do not represent the entire character of the seafloor because shoal bias inserts were not selected.

G. CORRECTIONS TO SOUNDINGS

G.1a Sound velocity and refraction correctors were computed from conductivity, temperature, and depth measurements acquired with a SeaBird SBE19 SEACAT Profiler (s/n 196723-1251). Data quality assurance tests using the CAT program were performed for each cast. The profiler is calibrated at the beginning and end of each field season. See Separate IV* for data records.

The following velocity casts were used for this survey:

Cast #	Day Number
1	191, 192
2,3	192
4,5	194
6,7,8	195
9,10	196
11,12,13	197
14,15,16	198
17,18	199
19,20	201
21,22	202
23,24	203
25,26	204
27,28	205

Cast #	Day Number
29,30	208
31,32	209
33,34,35	211
36,37,38	212
39,40	213
41	216
42	217
43,44	218
45,46	219
47,48,49	220
50,51,52	222
53,54,55	223
56	224

Cast #	Day Number
57	225
58	226
59	245, 254
60,61,62	259
63,64	260
65,66	261
67,68	262
69	264
70,71	265
72	269
73	273
74,75	275

Sound velocity and refraction effects were applied to the SeaBat data using CARIS-HIPS (incorporating the NOAA Nautical Charting Development Lab REFRACT algorithm). Sound velocity correctors for the vertical beam soundings were computed using VELOCITY and applied to the DSF data using HPS.

G.1b A DSF-leadline direct comparison was conducted on June 05, 1997. DSF and leadline soundings compared satisfactorily. See Separate IV* for data records. DSF and SeaBat soundings also compared satisfactorily (see Section K.2).

G.1c Sensor offsets and transducer static drafts were measured during the December 1996 dry-dock period. Sensor offsets were stored in the CARIS-HIPS Vessel Configuration File and HPS Offset Table for use in data processing. See Separate IV* for data records.

G.1d Transducer dynamic draft was measured on February 20, 1997. Dynamic draft correctors were stored in the CARIS-HIPS Vessel Configuration File and HPS Offset Table for use in data processing. See Separate IV* for data records.

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- G.1e Heave, pitch, and roll data were acquired with a TSS Model 335B Motion Sensor (s/n 542). A preseason checkout of the sensor was successfully conducted in accordance with the TSS-335B Operating Manual. Heave, pitch, and roll data were applied to SeaBat multibeam data. Heave data were applied to DSF vertical beam data.
- G.1f Vessel heading data were acquired with a Sperry Mark 32 Gyrocompass (s/n 224). Heading data were used to compute multibeam transducer azimuth and position.
- G.1g Multibeam heave, pitch, roll, and heading sensor data were adjusted using biases as determined during a patch test completed on April 02, 1997. See the CARIS-HIPS Vessel Configuration File in Separate III* for data records.
- G.2 No unusual or unique methods or instruments were used to correct sounding data.
- G.3 Tide zoning for this survey is consistent with the Project Instructions. Tide correctors were developed by applying a +0 minute time correction and a x0.95 range ratio to the predicted tides at Portland, Maine (Station 841-8150). Predicted tides were computed in CARIS-HIPS and HPS and applied to SeaBat and DSF data.
- G.4 The MOD3 pressure gage was calibrated on November 15, 1996. See Separate IV* for data records.
- G.5 The DSF transducer position offset was not corrected. See Section I.6e.
- G.6 The vertical reference surface for this survey is Mean Lower Low Water.

Tide data were acquired at Portland and at Gerrish Island, Maine (Station 841-9688) by N/OES231. Verified tides were unavailable during field processing. A request for verified tides was mailed on October 05, 1997. These data will replace the predicted tide data during verification by N/CS33. *APPROVED TIDES AND ZONING WERE APPLIED DURING OFFICE PROCESSING*

In HPS, only tide reapplication processing is permissible on multibeam data. If necessary, all other vertical correctors and horizontal offsets should be reapplied to multibeam data using CARIS software. However, if tide reapplication is necessary, it should be done to the entire CARIS multibeam dataset to ensure the correct least depths are identified for transfer to HPS.

** FILED WITH THE ORIGINAL FIELD RECORDS*

H. CONTROL STATIONS *SEE ALSO THE EVALUATION REPORT*

The horizontal reference surface for this survey is the North American Datum of 1983 (NAD 83). No horizontal control stations were established for this survey.

I. HYDROGRAPHIC POSITION CONTROL

I.1 Positioning for this survey was obtained from the NAVSTAR Global Positioning System (GPS) augmented with the U.S. Coast Guard Differential GPS (DGPS) service. The following differential beacons were used:

SITE A (Primary):	Portsmouth, NH	43°04'N	070°43'W
SITE B (Check):	Brunswick, ME	43°53'W	069°57'W

I.2 Accuracy requirements were met as specified by the Hydrographic Manual, sections 1.3 and 3.1, and Field Procedures Manual, section 3.4.

I.3 GPS and DGPS signals were acquired with the following hardware equipment:

System A (Primary System, Port antenna mount):

Ashtech GPS Sensor, s/n 700417B1083, Firmware Version 1E89D-P
Magnavox DGPS Receiver MX50R, s/n 078

System B (Check System, Starboard antenna mount):

Ashtech GPS Sensor, s/n 700417B1003, Firmware Version 1E89D-P
Magnavox DGPS Receiver MX50R, s/n 160

Hardware system A was used exclusively during this survey.

I.4 The GPS Horizontal Dilution of Precision (HDOP) was recorded during data acquisition and manually checked via the Detailed Data Abstract in HPS. The computed maximum allowable HDOP value of 3.3 was rarely exceeded.

Anomalous position data were either manually smoothed or flagged "rejected", depending on the extent of the affected data. Instantaneous vessel speed was checked with a 2.5 knot speed jump detector in CARIS-HIPS to aid in the manual cleaning of multibeam navigation data.

DGPS performance checks were conducted using program SHIPDIM. Two 12-hour monitors of the DGPS beacons were conducted using program MONITOR. See Separate III for data records. *FILED WITH THE ORIGINAL FIELD REPORTS*

I.5 Calibration data are not required for differential GPS.

- I.6a There were no unusual methods used to operate the positioning equipment.
- I.6b There were no positioning equipment malfunctions.
- I.6c There were no unusual atmospheric conditions noted which might have affected data quality.
- I.6d No significant systematic errors were detected.
- I.6e Offsets for the GPS antenna were applied from the CARIS-HIPS Vessel Configuration File to compute the position of the SeaBat transducer. See Separate III for data records.

Horizontal positions of the DSF vertical beam echo sounding data were not corrected for GPS antenna offsets during field processing. The horizontal inverse distance between the DSF transducer and the GPS antenna is approximately 2.3 meters.

- I.6f Offsets for the A-frame, cable length, course made good, towfish height, and depth of water were applied from HPS Offset and Contact Tables to compute the towfish position.

J. SHORELINE *SEE ALSO TIDE EVALUATION REPORT.*

No shoreline exists within the boundaries of this survey.

K. CROSS COMPARISONS

- K.1 A total of 17.75 nm of crosslines were acquired for this survey, equating to over 14% of the mainscheme 100% side scan sonar coverage lines and approximately 3% of the mainscheme 100% multibeam sonar coverage lines. Although the total linear nm of crosslines is less than 5% of the total linear nm of mainscheme multibeam lines, over 169,000 crossline multibeam soundings were compared.
- K.2 Processed SeaBat crossline soundings exceeded at 3 meters x 3 meters (see Section F.4) were compared to a 5 meter x 5 meter binned digital terrain model (DTM) surface in CARIS Workfile Processing. The DTM surface was built from processed SeaBat mainscheme soundings, exceeded at 3 meters x 3 meters. The mean difference between **SeaBat crossline and SeaBat mainscheme soundings** is approximately +0.16 meters (169,337 comparisons, crossline soundings compared deeper, due to shoal-biased DTM surface, see Separate IV for records). *FILED WITH THE ORIGINAL FIELD RECORDS*

High frequency (100 kHz) DSF digital crossline soundings (see Section F.4) were compared to a 5 meter x 5 meter binned multibeam DTM surface built from contemporaneous SeaBat multibeam crossline soundings (processed beams 3 through 38, excessed at 3 meters x 3 meters). The mean difference between **SeaBat crossline and DSF crossline soundings** is approximately -0.22 meters (5,422 comparisons, DSF shoaler), and the standard deviation is approximately 0.41 meters. Because of the horizontal uncertainty in the positions of DSF soundings relative to SeaBat soundings, as well as a wide DSF beam footprint, DSF-to-SeaBat comparisons are more favorable in flatter and/or shoaler areas.

K.3 No anomalous cross comparisons were noted.

K.4 The mainscheme and crossline data were collected with the same suite of survey equipment.

L. JUNCTIONS *SEE ALSO THE EVALUATION REPORT.*

L.1 This survey junctions with OPR-A315-RU-97 survey H-10771, on the eastern edge. An area measuring a little less than one square nautical mile is common to the two surveys.

L.2 SeaBat soundings from the junction of the two surveys were cross-compared. Each survey's processed SeaBat soundings excessed at 3 meters x 3 meters (see section F.4) were compared to a 5 meter x 5 meter DTM surface built from the opposite (junctioning) survey's excessed data. As expected, the statistics from the two comparisons are nearly identical. The mean depth difference is approximately 0.08 meters, with H-10771 soundings being deeper. The standard deviation of the depth differences is 0.22 meters.

M. COMPARISON WITH PRIOR SURVEYS *SEE ALSO THE EVALUATION REPORT.*

A comparison with prior surveys will be performed by N/CS33.

N. ITEM INVESTIGATION REPORTS

Three significant items were investigated during this survey. Results of these investigations are summarized below:

Shoal Near Navigation Range at Fort Point

INVESTIGATION CONDUCTED:

- 100% side scan sonar coverage
- 100% SeaBat multibeam sonar coverage

INVESTIGATION RESULTS:

A shoal ridge was discovered as charted, extending from Fort Point east towards the navigation range. From surrounding depths of 35 to 40 feet, the ridge rises above a surveyed least depth of 28 feet, found at the western limit of survey coverage. This least depth is located approximately 150 meters offshore, and 85 meters west from the navigation range. From this point, the top of the ridge continues east to a 29 foot sounding located only 30 meters west from the range.

Least Depths	Fix #	(m)	Depth (ft)	Latitude (N)	Longitude (W)
SeaBat*	74605	8.5	28 7	43°04'18.427"	070°42'24.855"
SeaBat	61732	9.1	29 30	43°04'19.072"	070°42'22.494"
Side Scan	5518.1S	--	--	43°04'17.352"	070°42'19.374"

* Reported as Danger to Navigation; see Appendix 1. *APPENDED TO THIS REPORT*

CHARTING RECOMMENDATION:

Chart representative depths from this survey. *CONCUR. THE DEPTH IS 27-FT AFTER APPLICATION OF APPROVED TIDES. SEE ALSO SECTION C.2 OF THE EVALUATION REPORT*

***** COMPILATION NOTES *****

*REVISE CHARTED 28-FT
CHART A 27-FT SOUNDING
TO*

Rocky area between Stielman Rocks and Jaffrey Point

INVESTIGATION CONDUCTED:

- 100% side scan sonar coverage
- 100% SeaBat multibeam sonar coverage

key
↓

INVESTIGATION RESULTS:

A rocky area was found as charted. The shoal rises from 30 to 40 foot surrounding depths to a least depth of 26 feet. This least depth is located approximately 230 meters west from the navigation range.

Least Depths	Fix #	(m)	Depth (ft)	Latitude (N)	Longitude (W)
SeaBat*	75679	8.1	26 27	43°03'43.841"	070°42'24.767"
Side Scan	5498.2P	--	--	43°03'44.171"	070°42'24.776"
Side Scan	21016.8S	--	--	43°03'44.298"	070°42'25.001"

* Reported as Danger to Navigation; see Appendix 1, APPENDED TO THIS REPORT.

CHARTING RECOMMENDATION:

Chart representative depths from this survey. *CONCUR. THE DEPTH IS 27 FEET AFTER APPLICATION OF SMOOTH TIDES. SEE ALSO SECTION 0.1 OF THE EVALUATION REPORT*

***** COMPILATION NOTES *****

REVISE CHARTED 26 FT ^{TO} CHART A 27-FT DEPTH.

Large rock located 3 miles east from Foss Ledges

INVESTIGATION CONDUCTED:

- 200% side scan sonar coverage
- 100% SeaBat multibeam sonar coverage
- SCUBA diver investigation

INVESTIGATION RESULTS:

Investigation by SCUBA divers revealed a large rectangular rock, 11 feet by 19 feet wide and 12 feet tall, with a least depth of 51 feet. Surrounding depths in the area are approximately 60 feet, and the charted depth is 64 feet. This item is typical of the many significant, isolated features found on this survey, using 100% coverage techniques, which were not found on prior surveys.

Least Depths	Fix #	(m)	Depth (ft)	Latitude (N)	Longitude (W)
SCUBA Diver*	500	15.56	51 ⁰	43°00'05.027"	070°39'24.459"
SeaBat**	49048	15.6	51	43°00'05.015"	070°39'24.688"
Side Scan	6015.8P	--	--	43°00'05.293"	070°39'24.653"
Side Scan	7803.4S	--	--	43°00'05.251"	070°39'24.653"

* See Dive Investigation Report in Separate VI for information.

** Reported as Danger to Navigation; see Appendix 1. APPENDED TO THIS REPORT.

CHARTING RECOMMENDATION:

Chart representative depths from this survey. *CONCUR. THE DEPTH IS 50 FEET AFTER APPLICATION OF APPROVED TIDES*

SEE ALSO SECTION C. 2. OF THE EVALUATION REPORT.

***** COMPILATION NOTES *****

CHART A (50) R.
DELETE 51 FT DEPTH AND CURVE

O. COMPARISON WITH THE CHART *SEE ALSO THE EVALUATION REPORT*

0.1 Seven charts are affected by this survey:

CHART AFFECTED	EDITION	DATE	CHART SCALE
Chart 13006	29 ed	22 Mar 1997	1: 675,000
Chart 13009	27 ed	17 Aug 1996	1: 500,000
Chart 13260	35 ed	25 Jan 1997	1: 378,838
Chart 13274	22 ed	15 Mar 1997	1: 40,000
Chart 13278	23 ed	10 Jun 1995	1: 80,000
Chart 13283	16 ed	23 Dec 1995	1: 20,000
Chart 13286	28 ed	20 Apr 1996	1: 80,000

0.2 One Danger to Navigation report containing a total of seven depth changes was submitted for this survey. See Appendix 1 for a copy of the report. *APPENDED TO TIRAS SEE ALSO SECTION O.3. OF THE EVALUATION REPORT.*

0.3a Over eight hundred charted soundings are contained within the survey limits. Only 50% of the charted soundings compare within three feet of the surveyed depths. Approximately 6% of the charted soundings are over five feet deeper than the surrounding survey depths. A charted 40-foot sounding in position 43°00'52.5"N, 070°41'24.2"W, is more than 20 feet shoaler than the surrounding survey depths, in an area of 100% multibeam coverage. These discrepancies are due to inaccurate chart soundings obtained from prior surveys dating back to the early 1900's, when depth determination and horizontal positioning were subject to many errors.

0.3b No shoaling or deepening trends were found in the survey area.

P. ADEQUACY OF SURVEY

All areas of this survey were completed with either 200% side scan sonar coverage and multibeam developments or 100% side scan sonar and 100% multibeam coverage and should supersede ALL prior surveys in common areas. The large magnitude and number of chart comparison discrepancies warrants a COMPLETE RECOMPILATION OF THE AFFECTED NAUTICAL CHARTS.

Q. AIDS TO NAVIGATION

- Q.1 Detached positions were taken on seven floating aids to navigation located in or near the survey area.
- Q.2 A comparison was made between the detached positions and the largest scale chart of the area. No aid was found to deviate from its charted position by more than a few meters. Each aid adequately serves the apparent purpose for which it was established. *Conceded.*
- Q.3 All aids are properly identified in the Light List.
- Q.4 There were no submarine or overhead pipelines, cables, tunnels, bridges, or ferry routes found in the survey area. The charted "Cable Area" notations should be investigated for current relevance and possible removal.

R. STATISTICS

R.1a # of Multibeam Soundings Processed	82,715,249
R.1b # of Multibeam Soundings Transferred to HPS	33,599
R.1c Number of HPS Positions	56,190
R.1d Lineal Nautical Miles of Sounding Lines	579.14
R.2a Square Nautical Miles of Hydrography	9.7
R.2b Days of Production	39
R.2c Hours on line	94.5
R.2d Detached Positions	8
R.2e Bottom Samples	40
R.2f Tide Stations	1
R.2g Velocity Casts	75
R.2j SeaBat Item Investigations	0

S. MISCELLANEOUS *SEE ALSO THE EVALUATION REPORT*

- S.1 No evidence of silting, unusual submarine features, anomalous tide or tidal current conditions, or magnetic anomalies were detected during this survey.
- S.2 Bottom samples were inspected and recorded but not submitted to the Smithsonian Institution.

T. RECOMMENDATIONS

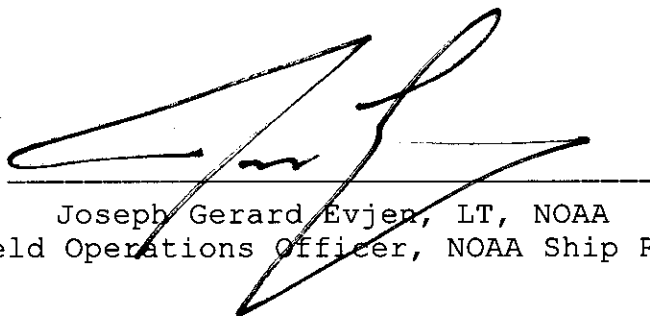
T.1 No additional fieldwork is required.

T.2 The charted "Cable Area" notations should be investigated for current relevance and possible removal.

U. REFERRAL TO REPORTS

None.

This report and the accompanying field sheets are respectfully submitted.



Joseph Gerard Evjen, LT, NOAA
Field Operations Officer, NOAA Ship RUDE



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
 October 1, 1997

FAXED 10/3/97

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

REPORT OF DANGER TO NAVIGATION

Dear Sir:

The NOAA Ship RUDE is currently conducting a hydrographic survey of the approaches to Portsmouth, New Hampshire and Maine:

Hydrographic Survey Registry No....H-10763
 State.....New Hampshire and Maine
 General Locality.....Bigelow Bight
 Sublocality.....Approaches to Portsmouth Harbor
 Project Number.....OPR-A315-RU-97
 Surveyed by.....NOAA Ship RUDE

During the course of multibeam sonar operations, several rocky ledges were discovered to have least depths shoaler than the depths currently shown on the charts of the area. This new depth information merits immediate publication in the Local Notice to Mariners. The updated depths affect the following charts:

CHART NUMBER	CHART EDITION	
	NO.	DATE
13283	16	Dec. 23, 1995
13278	23	Jun. 10, 1995
13286	28	Apr. 20, 1996

REPORTED DEPTH *	LATITUDE (NAD 83)	LONGITUDE (NAD 83)
2726 ft	43° 03' 43.8" N	070° 42' 24.8" W
2728 ft	43° 04' 18.4" N	070° 42' 24.9" W
44 ft	43° 01' 10.5" N	070° 40' 12.7" W
47 ft	43° 00' 12.8" N	070° 39' 43.7" W
49 ft	43° 01' 53.3" N	070° 40' 00.1" W
49 ft	43° 03' 17.6" N	070° 38' 50.2" W
50.81 ft	43° 00' 05.0" N	070° 39' 24.7" W

* Updated depths are reduced to feet at MLLW using predicted tides and should be viewed as preliminary information, subject to office review.

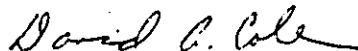


Please contact either of the following personnel for any additional information:

Commanding Officer
NOAA Ship RUDE (917) 833-4279
439 West York Street
Norfolk, VA 23510

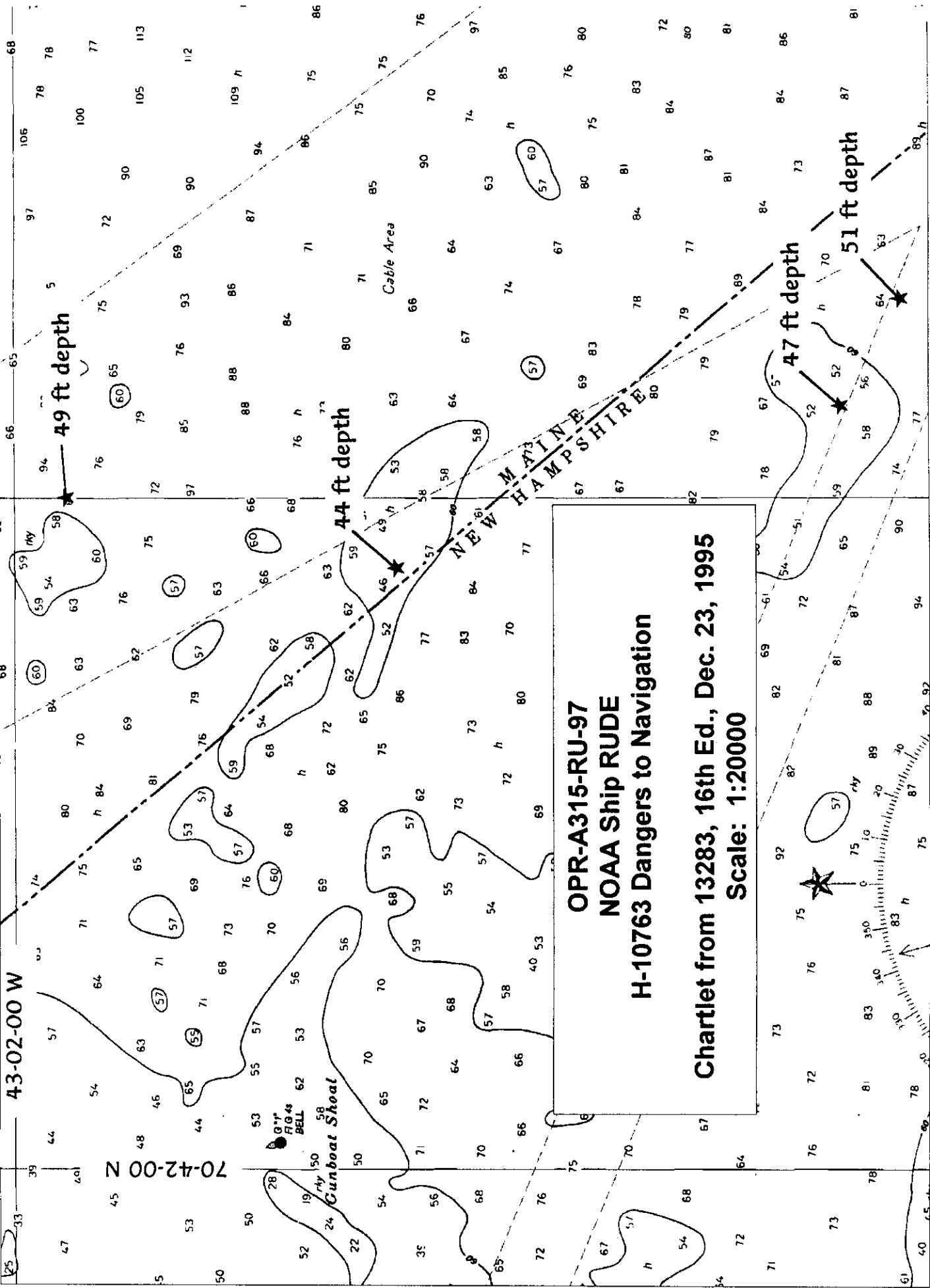
Chief, Atlantic Hydrographic Branch
Atlantic Marine Center (757) 441-6746
439 West York Street
Norfolk, VA 23510

Sincerely,

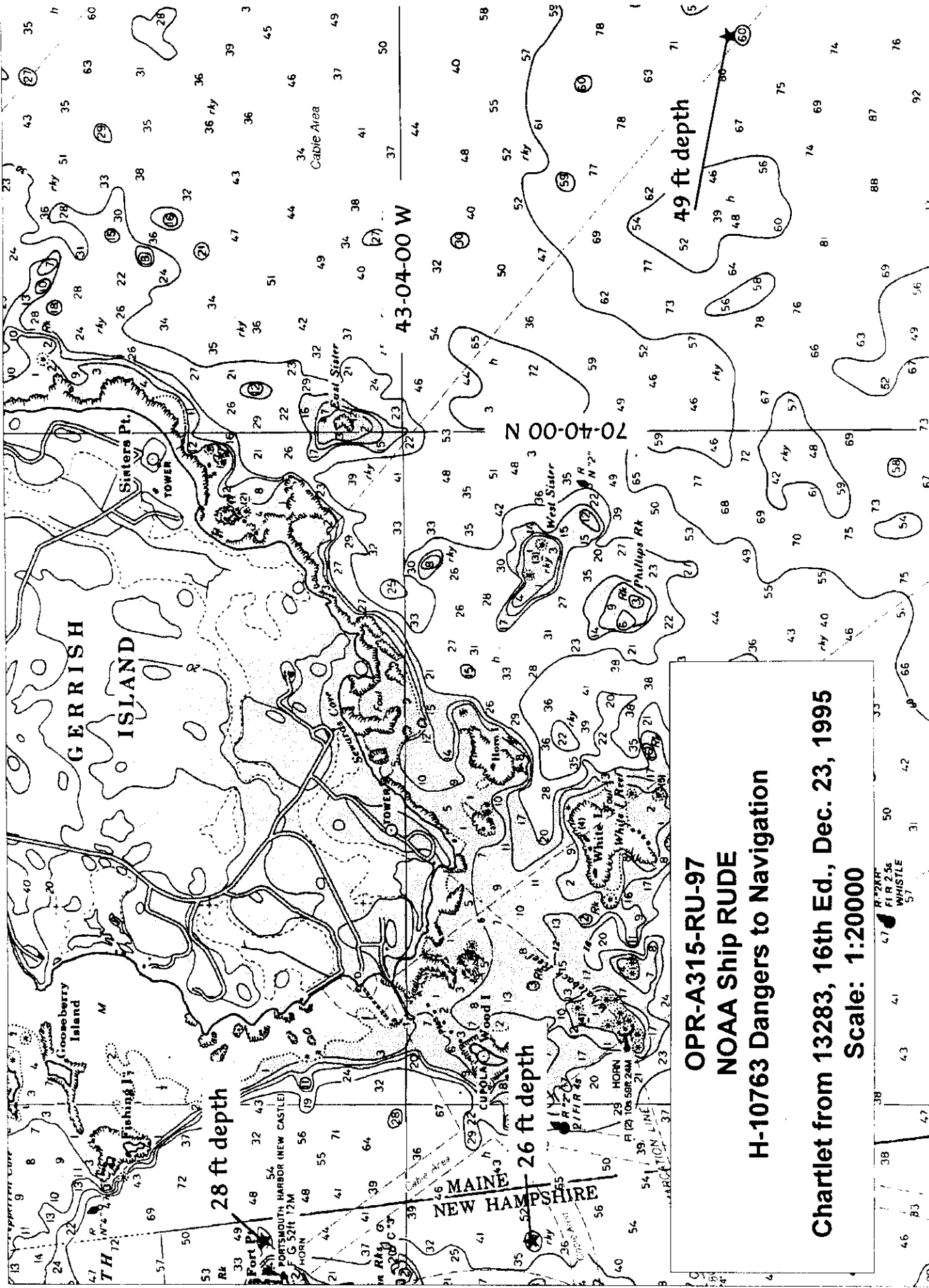


David A. Cole, LCDR, NOAA
Commanding Officer,
NOAA Ship RUDE

cc: AHB, NIMA



OPR-A315-RU-97
NOAA Ship RUDE
H-10763 Dangers to Navigation
Chartlet from 13283, 16th Ed., Dec. 23, 1995
Scale: 1:20000



OPR-A315-RU-97
NOAA Ship RUDE
H-10763 Dangers to Navigation
Chartlet from 13283, 16th Ed., Dec. 23, 1995
Scale: 1:20000



APPENDIX III

LIST OF HORIZONTAL CONTROL STATIONS

Differential GPS was employed for all positioning. The following differential beacons were used:

SITE A (Primary): Portsmouth, NH 43°04'N, 070°43'W
SITE B (Check): Brunswick, ME 43°53'N, 069°57'W

FOO —
Please File



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

May 23, 1997

Commander, First Coast Guard District
Local Notice to Mariners
408 Atlantic Avenue
Boston, MA 02220-3350

Dear Sir:

NOAA ship RUDE will be conducting hydrographic surveys in the Portsmouth harbor area from July through September, 1997. The purpose of these surveys is to update the existing nautical charts of the region. The survey area extends from Salamander Point in Portsmouth Harbor to Foss Ledges, Duck Island, and the Triangles offshore.

RUDE is a 90-foot, white-hulled vessel with a blue NOAA logo on the bow. When conducting survey operations the ship tows a side scan sonar approximately 30 yards astern. Mariners are requested to give RUDE a wide berth as the ship often makes erratic maneuvers during survey operations. RUDE monitors VHF channels 13 and 16.

Anyone with information or comments concerning nautical charts in the area should contact RUDE at the following address:

Commanding Officer
NOAA Ship RUDE
439 West York ST
Norfolk, VA 23510-1145

Additional information may be found on the RUDE web site at www.pmc.noaa.gov/ru/

A previous Notice to Mariners is enclosed as an example.

Thank you for your attention to this matter.

Sincerely,

David A. Cole, LCDR, NOAA
Commanding Officer
NOAA Ship RUDE

enclosure
LOCALNM.doc





UNITED STATES 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

November 24, 1997

Mr. Thomas Orfe, Director
New Hampshire State Port Authority
555 Market Street, Box 506
Portsmouth, New Hampshire 03802

Dear Mr. Orfe:

Your request for information on the cable crossings at the Portsmouth Harbor entrance has been forwarded to our Marine Charting Division. They should be able to research the original source information for these chart notations, and determine if any cable areas are still active and valid. In my final field reports for the Portsmouth Harbor surveys I will recommend that all inactive cable areas be removed from the next edition of charts 13283, 13278, and 13286.

During our recent side scan and multibeam echosounder surveys no obvious trace of cables on the seafloor were noted. If cables still exist, they may be buried, or inactive and deteriorated.

Thank you for your interest and support during our recent survey operations. RUDE's survey work on the Portsmouth project was both personally and professionally rewarding for me. Please feel free to contact me anytime (757-441-6386) for any further assistance.

Sincerely,

David A. Cole, LCDR, NOAA
Commanding Officer, NOAA Ship RUDE

cc: Portsmouth Pilots
Chief, Atlantic Hydrographic Branch
Chief, Marine Charting Division





Sam,

As you can see, there is a great deal of interest in getting these old WWII cable annotations removed from the chart. I don't think any are active. Please pass along to the appropriate charting folks to start the research for ultimate removal.

October 21, 1997

Thanks,

Dave

Lt. Commander David Cole
439 West York Street
Norfolk, Virginia 23510

RE: CABLE CROSSINGS, ENTRANCE PORTSMOUTH, N.H. HARBOR

Dear Lt. Commander Cole:

As you are aware, at the entrance to Portsmouth Harbor (Piscataqua River), there are several cable crossings that we believe are obsolete and are serving no legitimate purpose.

We request information on these cables, such as ownership and purpose, with the intent to remove them for navigation purposes.

Please contact me for further details if necessary. Thank you for your continued participation in the safe navigation of Portsmouth Harbor.

Sincerely,

Thomas Orfe, Director
NHPA

TO;pcb

LTCMDRCOLE

555 Market Street, Box 506
Portsmouth, New Hampshire 03802
Phone # 603-436-8500
FAX # 603-436-2780



PORTSMOUTH PILOTS

P.O. Box 72
Portsmouth, N. H. 03801

Tel. 436-1209
436-1097
436-7317

October 9, 1997

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

Dear Sir:

The NOAA ship Rude recently finished a hydrographic survey of Portsmouth, NH harbor and approaches. The project number is OPR-A315-RU-97 and hydrographic survey registry number H-10771.

This new survey will update charts #13283, #13278, and #13286. We are requesting an updated survey or investigation of cable areas shown on the above charts to determine actual existence. All large, deep draft vessels anchor south of the harbor entrance while awaiting tides, near many of the cable areas.

When revised issues of above charts are printed, it makes sense to complete their validity.

If we may answer any questions or help, please call Portsmouth Pilots at 603-436-1209.

Yours truly,


Richard C. Holt

APPENDIX VII

APPROVAL SHEET

LETTER OF APPROVAL

REGISTRY NO. H-10763

Field operations contributing to the accomplishment of this Navigable Area survey were conducted under my direct supervision with frequent personal checks of progress and adequacy. All field sheets and reports were reviewed in their entirety and all supporting records were checked as well.

This survey is more than adequate to supersede all prior surveys in common areas. The survey is considered complete and adequate for nautical charting.



David A. Cole, LCDR, NOAA
Commanding Officer
NOAA Ship RUDE

GEOGRAPHIC NAMES

H-10763

Name on Survey

Page 1 of 2

A CHART NO. 13274
13285
B ON PREVIOUS SURVEY
NO.
C ON U.S. QUADRANGLE
D FROM LOCAL
INFORMATION
E ON LOCAL MAPS
F P.O. GUIDE OR MAP
G RAND McNALLY
H U.S. LIGHT LIST
K

Name on Survey	A	B	C	D	E	F	G	H	K
BIGELOW BIGHT	X		X						1
CONCORD POINT	X		X						2
FISHING ISLAND	X		X						3
FORT POINT	X		X						4
FOSS LEDGES	X								5
FROST POINT	X		X						6
GERRISH ISLAND	X		X						7
GOOSEBERRY ISLAND	X		X						8
GUNBOAT SHOAL	X								9
HIGH ROCK	X		X						10
JAFFREY POINT	X		X						11
KITTS ROCKS	X		X						12
MAINE (title)	X		X						13
NEW CASTLE ISLAND	X		X						14
NEW HAMPSHIRE (title)	X		X						15
ODIORNES POINT	X		X						16
PHILLIPS ROCK	X		X						17
PORTSMOUTH HARBOR	X		X						18
PULPIT ROCK	X		X						19
SALAMANDER POINT	X		X						20
SEAL ROCKS	X		X						21
STIELMAN ROCKS	X								22
WEST SISTER	X		X						23
WHALEBACK REEF	X		X						24
WHITE ISLAND	X		X						25

Dennis J. Rasmussen
AUG 17 1984

GEOGRAPHIC NAMES

H-10763

Name on Survey

Page 2 of 2

A ON CHART NO. 13287, 13274
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

Name on Survey	A	B	C	D	E	F	G	H	K
WHITE ISLAND REEF	X		X						1
WOOD ISLAND	X		X						2
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Dennis J. Roesch
Chief Geographer AUG 17 1998

REFERENCE NO.

N/CS33-28-99

LETTER TRANSMITTING DATA

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

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

TO:

NOAA/National Ocean Service
 Chief, Data Control Group, N/CS3x1
 SSMC3, Station 6815
 1315 East-West Highway
 Silver Spring, MD 20910-3282

DATE FORWARDED

April 14, 1999

NUMBER OF PACKAGES

1 Box, 1 Tube

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

H10763

New Hampshire, Bigelow Bight, Approaches to Portsmouth Harbor

1 Box Containing:

- 1 Original Descriptive Report for H10763
- 1 HISTORY OF CARTOGRAPHIC WORK (NOAA form 76-71) for H10763 for chart 13283

1 Tube Containing:

- 1 Original Smooth Sheet for H10763
- 1 Paper Composite plot of survey H10763 for chart 13283
- 1 Paper Composite plot of survey H10763 for chart 13283 (inset)
- 1 Mylar H-Drawing of H10763 for chart 13283
- 1 Mylar H-Drawing of H10763 for chart 13283 (inset)

FROM: (Signature)


 Richard H. Whitfield

RECEIVED THE ABOVE
(Name, Division, Date)

Return receipted copy to:

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

04/07/99

HYDROGRAPHIC SURVEY STATISTICS
REGISTRY NUMBER: H10763

NUMBER OF CONTROL STATIONS		2
NUMBER OF POSITIONS		33599
NUMBER OF SOUNDINGS		33599
	TIME-HOURS	DATE COMPLETED
PREPROCESSING EXAMINATION	45	04/29/98
VERIFICATION OF FIELD DATA	298.50	03/02/99
EVALUATION AND ANALYSIS	48	
FINAL INSPECTION	20	01/11/99
COMPILATION	137	04/06/99
TOTAL TIME	549	
ATLANTIC HYDROGRAPHIC BRANCH APPROVAL		03/16/99

**ATLANTIC HYDROGRAPHIC BRANCH
EVALUATION REPORT FOR H10763 (1997)**

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)
SiteWorks, version 2.1
MicroStation, version 5.0
NADCON, version 2.10
I/RAS B, version 5.01

The smooth sheet was plotted using a Hewlett Packard DesignJet 2500CP plotter.

H. CONTROL

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

To place this survey on the NAD 27, move the projection lines 0.324 seconds (9.99 meters or .99 mm at the scale of the survey) north in latitude, and 1.816 seconds (41.10 meters or 4.11 mm at the scale of the survey) east in longitude.

J. SHORELINE

Brown shoreline originates with National Ocean Service (NOS) chart 13283 (16th Ed., Dec.23/95) and is for orientation purposes only.

L. JUNCTIONS

H10771 (1997) to the east

A standard junction was effected between the present survey and survey H10771 (1997).

M. COMPARISON WITH PRIOR SURVEYS

A comparison of prior surveys was not done during office processing. This is in accordance with section 4. of the memorandum titled *Changes to Hydrographic Survey Processing*, dated May 24, 1995. This also applies to 100% Side Scan

coverage with 100% Multibeam coverage.

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

O. COMPARISON WITH CHART 13283 (16th Edition Dec 23/95)

Hydrography

The charted hydrography originates with prior surveys and needs no further discussion. The hydrographer makes an adequate chart comparison in section O. of the Descriptive Report.

O.2. One Danger to Navigation Report containing seven items was submitted to Commander (oan), First Coast Guard District, Boston, Massachusetts for inclusion in the Local Notice to Mariners, and to the Marine Chart Division, Silver Spring, Maryland. A copy of the report is appended to the Descriptive Report.

The seven items listed in the Danger to Navigation Report are presently charted on the latest edition of NOS Chart 13283 (17th ED., Apr 11/98).

One item submitted is charted as a depth of 28 feet in Latitude 43°04'18.427"N, Longitude 70°42'24.844"W. The depth of 28 feet was computed with predicted tides. During office processing approved tides were applied to the present survey. It is recommended that the charted 28-ft depth be revised to a depth of 27-ft as shown on the present survey.

One item submitted is charted as a depth of 26 feet in Latitude 43°03'43.841"N, Longitude 70°42'24.767"W. The depth of 26 feet was computed with predicted tides. During office processing approved tides were applied to the present survey. It is recommended that the charted 26-ft depth be revised to a depth of 27-ft as shown on the present survey.

One item submitted is a charted depth of 51 feet in Latitude 43°00'05.027"N, Longitude 70°39'24.459"W. The depth of 51 feet was computed with predicted tides, and is also described as a rock in section N., page 13, of the Descriptive Report. During office processing approved tides were applied to the present survey. It is recommended that the charted 51-ft depth be revised to a dangerous submerged rock with a depth of 50 feet (50Rk) as shown on the present survey.

One item in the danger to navigation report was submitted

as a depth of 49 feet in Latitude 43°01'53.3"N, Longitude 70°40'00.1"W. This item was not described as a rock by the hydrographer at the time of the survey. This item is presently charted on the latest edition of chart 13283 as a 49 Rk. It is recommended that the notation Rk be deleted from the chart unless other information indicates otherwise.

The following three dangers to navigation submitted by the hydrographer are presently charted.

<u>Depth</u>	<u>Latitude(N)</u>	<u>Longitude(W)</u>
44-ft	43°01'10.5"	70°40'12.7"
47-ft	43°00'12.8"	70°39'43.7"
49-ft	43°03'17.6"	70°38'50.2"

No change in charting is recommended for these depths.

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

P. ADEQUACY OF SURVEY

This is an adequate hydrographic survey. No additional work is recommended.

S. MISCELLANEOUS

Chart compilation using the present survey was done by Atlantic Hydrographic Branch personnel in Norfolk, Virginia. Compilation data will be forwarded to Marine Chart Division, Silver Spring, Maryland.

National Ocean Service Chart 13283 (17th Ed., Apr.11/98) was used for compilation of the present survey.



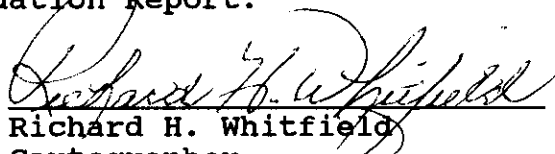
Reginald L. Keene Sr.

Reginald L. Keene Sr.
Cartographic Technician
Verification and Evaluation and Analysis

APPROVAL SHEET
H-10763

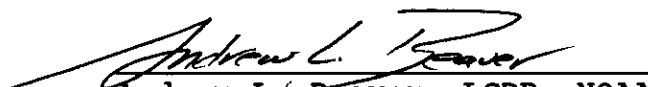
Initial Approvals:

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


Richard H. Whitfield
Cartographer
Atlantic Hydrographic Branch

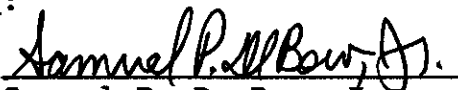
Date: MARCH 16, 1999

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.


Andrew L. Beaver, LCDR, NOAA
Chief, Atlantic Hydrographic Branch

Date: 3/16/99

Final Approval:

Approved: 
Samuel P. De Bow, Jr.
Commander, NOAA
Chief, Hydrographic Surveys Division

Date: May 26, 1999

