

H10771

NOAA FORM 76-35A

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

DESCRIPTIVE REPORT

Type of Survey SIDE SCAN SONAR
Field No. RU-10-04-97
Registry No. H10771

LOCALITY

State NEW HAMPSHIRE
General Locality BIGELOW BIGHT
Sublocality MURRAY ROCK TO
..... DUCK ISLAND
.....
..... 19 97

CHIEF OF PARTY

..... LCDR D. A. COLE, NOAA

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DATE JUN 23 1999

HYDROGRAPHIC TITLE SHEET

H-10771

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-10-4-97

State New Hampshire

General locality Bigelow Bight

Locality Murray Rock to Duck Island

Scale 1:10,000

Date of survey 12 August - 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, 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 HP 2500C (office)

Verification by AHB Personnel

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

REMARKS:

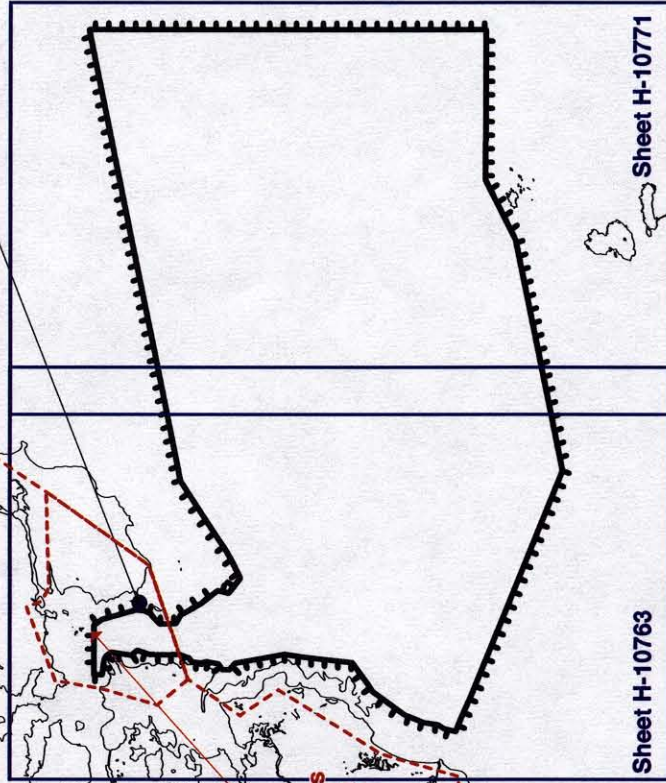
All times recorded in UTC.

Notes in the Descriptive Report were made in red during office proceedings.

AWOS/SURF 6/10/99 MCR

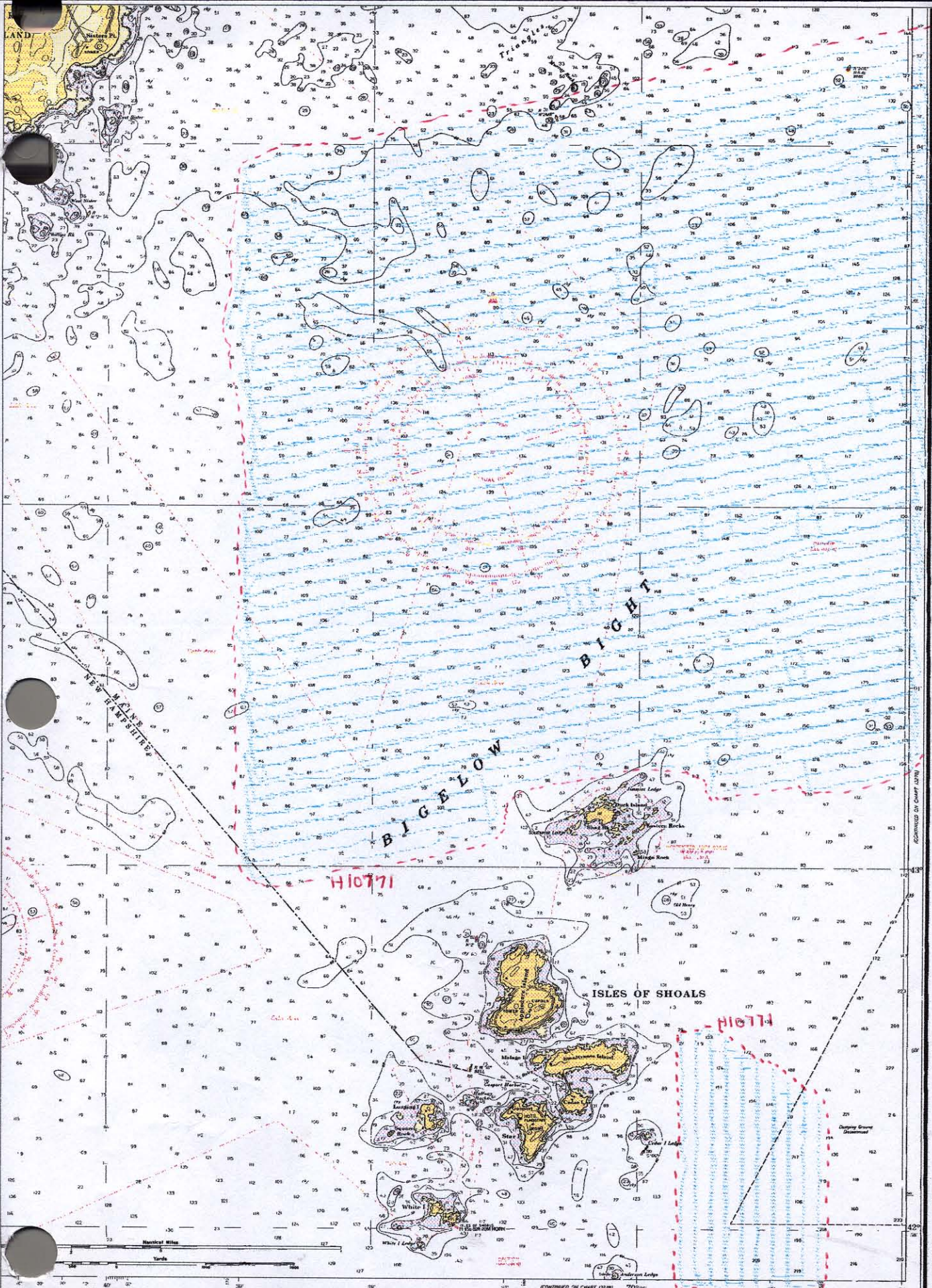
Final Zoning for OPR A315-RU-97 Approaches to Portsmouth, N.H.

8419688 GERRISH ISLAND, KITTERY



Zone NH1
Time Corrector 0 mins
Range Corrector 1.00
Reference 8419688

Zone EC27
Time Corrector -6 mins
Range Corrector 1.00
Reference 8419688



H10771

H10771



Published at Washington, D. C.
 U. S. DEPARTMENT OF COMMERCE
 NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION
 NATIONAL OCEAN SERVICE
 COAST SURVEY

FAHRENHEIT	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
FEET	30	33	36	39	42	45	48	51	54	57	60	63	66	69	72	75	78	81	84	87
METERS	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28

(Cape Neddick Harbor to Isles of Shoals)
 SOUNDINGS IN FEET - SCALE 1:20,000

13283

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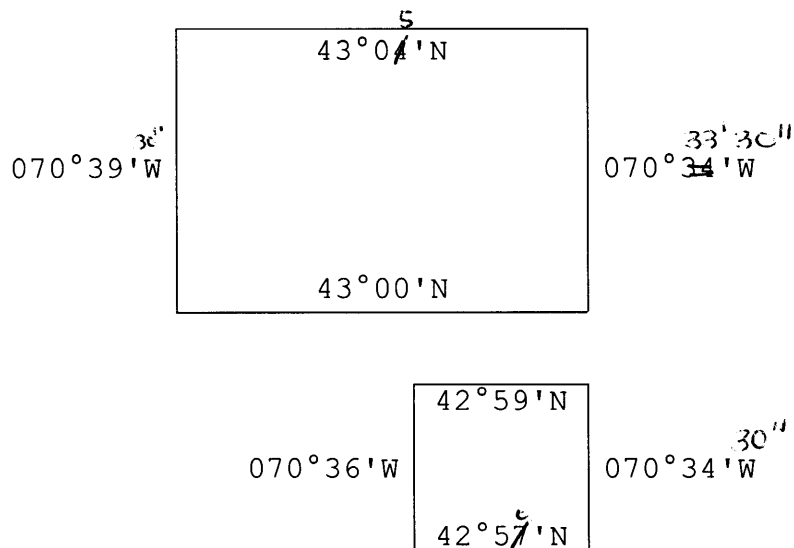
** Data filed with field records.*

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 instructions.
- A.4 This survey is designated registry number H-10771.
- 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 foreign and domestic container ships, bulk carriers, tankers, feeder vessels, barges, cruise liners, and fishing vessels. The maximum draft for large vessels traversing the area is between 30 and 37 feet. The area was last surveyed by the Coast and Geodetic Survey in 1954 and 1955 (near shore areas), and 1851 to 1928 (offshore areas).

B. AREA SURVEYED

- B.1 Survey H-10771 spans approximately 13 square nautical miles (nm) north of the Isles of Shoals, from Duck Island and Bigelow Bight to Murray Rock. A small area, covering approximately one square nm just southeast of the Isles of Shoals, is also included.
- B.2 The survey is comprised of one sheet with the following survey boundaries (approximate and not to scale):



B.3 Data acquisition for survey H-10771 began on August 12, 1997 (DN 224) and ended on October 2, 1997 (DN 275). Over 60 million multibeam soundings were processed during the survey.

C. SURVEY VESSELS

C.1 All H-10771 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 pole mounted on the port side, approximately amidships. The multibeam transducer was rotated into the water only during times of data acquisition.

D. AUTOMATED DATA ACQUISITION AND PROCESSING - See also 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 sound velocity data:

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

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 slant-range correcting side scan sonar recorder. Additionally, all side scan sonar data were recorded digitally using the Triton 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 The 150-meter range scale was used at a line spacing of 160 meters to obtain 100% side scan sonar coverage.
- E.4b Because of the extremely rocky nature of the bottom throughout survey H-10771, easily identifiable bathymetric features were always present near the outermost edges of the side scan sonar records. The hydrographer's confidence in side scan sonar area coverage was continuously verified.
- E.4c One hundred percent side scan sonar coverage was completed for this survey. 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.
- E.6 All significant contacts were developed during the course of one hundred percent 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 No diver investigations were performed for this survey.

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

F.4 SeaBat 9003 (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 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^{actual} 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
1,2	224
3	226
4,5	227
6,7,8	230
9,10,11	231
12,13	232
14,15,16	236
17,18,19	237

Cast #	Day Number
20,21	238
22	239
23,24	240
25,26	246
27,28	247
29,30	248
31,32	250
33	251

Cast #	Day Number
34,35,36	252
37	253, 254
38,39,40	258
41,42,43	266
44,45	267
46,47	268
48	269
49,50	275

Sound velocity and refraction effects were applied to the SeaBat data in HIPS (incorporating the 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.

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 Heading data were acquired with RUDE's Sperry Mark 32 Gyrocompass and were used to determine both multibeam and towfish transducer azimuth and position.

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 IV 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 diver least depth gage was not used for this survey.

G.5 No significant systematic errors were detected. A time-dependent, sensor timing error was observed during the course of multibeam data processing. In general, one hertz navigation data were observed to fluctuate between 0.8 and 1.2 seconds. Data acquired during periods of moderate sea state exhibited roll artifacts on the outer edges of the multibeam swath. Sounding data over all significant bathymetric features degraded by these artifacts were reacquired with near-nadir multibeam swath coverage.

G.6 The vertical reference surface for this survey is Mean Lower Low Water (MLLW).

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 5, 1997. These data will replace the predicted tide data during verification by N/CS33. * Approved tides and zones 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.

H. CONTROL STATIONS - See also 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 USCG reference station beacons were used:

SITE A (Primary): Portsmouth, NH (288 kHz, 100 bps)
SITE B (Check): Brunswick, ME (316 kHz, 100 bps)

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 1E89D-P
Magnavox DGPS Receiver MX50R, s/n 078

System B (Check System, starboard antenna mount):
Ashtech GPS Sensor, s/n 700417B1003, Firmware 1E89D-P
Magnavox DGPS Receiver MX50R, s/n 160

Hardware System A was used exclusively for this survey.

I.4 The GPS Horizontal Dilution of Precision (HDOP) was recorded during survey operations and manually checked via the Detailed Data Abstract in HPS. The calculated 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 (listed in Section I.1) were conducted using program MONITOR. *See Separate III for data records.

- 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 (VCF) 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.6g A-frame position (tow point), cable length, towfish height, and depth of water were applied to navigation data in HPS to compute the position of the towfish.

J. SHORELINE

No shoreline is contained within the boundaries of this survey.

K. CROSS COMPARISONS

- K.1 A total of 23.8 nm of crosslines were acquired for this survey, equating to over 13% of the mainscheme 100% side scan sonar coverage lines and approximately 4% 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 400,000 soundings were compared.

K.2 Processed SeaBat crossline soundings excessed 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 (excessed at 3 meters x 3 meters). Averaged across the statistics computed as a function of beam number ~~(see Separate IV)~~, the mean difference between **SeaBat crossline and SeaBat mainscheme soundings** is approximately +0.24 meters (407,690 comparisons, + means crossline soundings compared deeper--due to shoal-biased DTM surface).

High frequency (100 kHz) DSF digital crossline soundings (see Section F.4) were compared to a 5 meter x 5 meter binned 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 -0.46 meters (4,242 comparisons, DSF shoaler), and the standard deviation is approximately 0.63 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. The bathymetry on survey H-10771 is deep and extremely steep and rocky.

K.3 No anomalous crossline comparisons were noted.

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

L. JUNCTIONS - See also Evaluation Report

L.1 Survey H-10771 junctions with OPR-A315-RU-97 survey H-10763, on the western edge. An area measuring a little less than one square nautical mile is common to the two surveys.

L.2 SeaBat 9003 soundings from the junction of surveys H-10763 and H-10771 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 Evaluation Report

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

N. ITEM INVESTIGATION REPORTS - See also Evaluation Report - Section O.

No AWOIS items were assigned to this survey - mCR, 6/10/99
Survey H-10771 was covered with 100% multibeam. Additional 100% multibeam coverage lines were conducted over shoal areas to obtain least-depth soundings near nadir. The following SeaBat 9003 least depths were submitted as Dangers to Navigation (see Appendix I for report):

Fix #	(m) Depth	(ft)	Latitude (N)	Longitude (W)
76278	7.53.49	24	43°03'45.4"	070°35'58.8"
85942	9.74.89	32	43°03'12.4"	070°36'00.1"
74094	10.63.65	35	43°02'31.9"	070°35'33.7"
76275	10.68.60	35	43°03'08.4"	070°36'02.0"
75870	11.44.33	37	43°02'47.5"	070°38'16.2"
61666	14.01.86	46	43°02'26.3"	070°35'05.3"
73766	15.54.52	51	43°02'18.7"	070°35'09.9"

O. COMPARISON WITH THE CHART - See also Evaluation Report

O.1 Seven charts are affected by this survey:

- Chart 13006, 29th Ed., 22 March 1997 1:675,000 scale
- Chart 13009, 27th Ed., 17 August 1996 1:500,000 scale
- Chart 13260, 37th Ed., 25th January 1997^C 1:378,838 scale
- Chart 13274, 22nd Ed., 15 March 1997 1: 40,000 scale
- Chart 13278, 23rd Ed., 10th June 1995^E 1: 80,000 scale
- Chart 13283, 16th Ed., 23 December 1995 1: 20,000 scale
- Chart 13286, 28th Ed., 20 April 1996 1: 80,000 scale

O.2 Two Danger to Navigation reports containing a total of seven (7) depth changes were submitted for this survey. See Section N for a brief summary listing of the soundings and Appendix I for a copy of each report.

O.3a Over seven hundred charted soundings were contained within the H-10771 survey limits. Approximately 90% of the charted soundings were in reasonable agreement with the surveyed depths, with differences of 3 feet or less.

Approximately 4% of the charted soundings were found to be more than 3 feet deeper than corresponding survey depths, with a mean difference of over 11 feet (stdev \approx 8 feet). In one case, a charted sounding was found to be nearly 40 feet deeper than the surrounding survey depths (see Dangers to Navigation in Section N, fix #73766, 51 feet).

The remaining 6% of the charted soundings were more than 3 feet shoaler than corresponding survey depths, with a mean difference exceeding 35 feet (stdev \approx 21 feet). Maximum differences exceed 70 feet in places.

- O.3b The survey area is geologically stable. The large discrepancies are due exclusively to inaccurate chart soundings obtained from prior surveys dating back to the early 1900's, where horizontal positioning and depth determination were subject to many errors.

P. ADEQUACY OF SURVEY - See also Evaluation Report

Survey H-10771 was completed with 100% multibeam sonar 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 (see Section O).

Q. AIDS TO NAVIGATION - See also Evaluation Report

- Q.1 Detached positions were taken on two (2) floating aids to navigation located near the boundaries of this survey.
- Q.2 A comparison was made between the detached positions and the largest scale chart of the area. Neither floating 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.
- Q.3 Both aids located during the survey were tabulated in the Light List, Vol. 1, 1997.
- 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 No. of Processed Multibeam Soundings	60,155,681
R.1b No. of Multibeam Soundings Transferred to HPS.	47,818
R.1c Lineal Nautical Miles of Sounding Lines.	644
R.2a Square Nautical Miles of Hydrography	14
R.2b Days of Production*.	25
R.2c Detached Positions	2
R.2d Bottom Samples	42
R.2e Tide Stations.	1
R.2f Velocity Casts	50
R.2g SEABAT Item Investigations	N/A

* Several of the survey H-10771 days of production reported above were partial days; OPR-A315-RU daily survey operations were often split between H-10763 and H-10771.

S. MISCELLANEOUS - *See also 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.

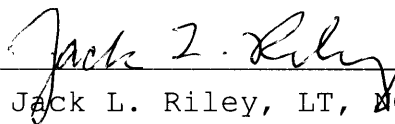
T. RECOMMENDATIONS - *See also Section P. of the Evaluation Report*

- 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

A copy of the Coast Pilot Report will be included in the Separates.

This report and the accompanying field sheets are respectfully submitted.



Jack L. Riley

Jack L. Riley, LT, NOAA
NOAA Ship RUDE

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

APPENDIX VII

APPROVAL SHEET

LETTER OF APPROVAL

REGISTRY NO. H-10771

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 was completed with 100% multibeam sonar coverage and should 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



U.S. DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration
NATIONAL OCEAN SERVICE

TIDE NOTE FOR HYDROGRAPHIC SURVEY

DATE: January 22, 1998

HYDROGRAPHIC BRANCH: Atlantic

HYDROGRAPHIC PROJECT: OPR-A315-RU
HYDROGRAPHIC SHEET: H-10771

LOCALITY: Approaches to Portsmouth Harbor, NH

TIME PERIOD: Aug 12 - Oct 2, 1997

TIDE STATION USED: 841-9688 Gerrish Island, Kittery, Maine
Lat. 43° 4.0'N Lon. 70° 41.7'W

PLANE OF REFERENCE (MEAN LOWER LOW WATER): 0.000 meters

HEIGHT OF HIGH WATER ABOVE PLANE OF REFERENCE: 2.754 meters

REMARKS: RECOMMENDED ZONING EC27

Use zone(s) identified as:

Refer to attachments for zoning information.

Note 1: Provided time series data are tabulated in metric units (Meters), relative to MLLW and on Greenwich Mean Time.



CHIEF, OPERATIONAL ANALYSIS BRANCH



Final tide zone node point locations for OPR A315-RU-97,
 Sheet H-10771.

Format: Longitude in decimal degrees (negative value denotes
 Longitude West),
 Latitude in decimal degrees
 Tide Station (in recommended order of use)
 Average Time Correction (in minutes)
 Range Correction

	Tide Station Order	AVG Time Correction	Range Correction
Zone EC27			
-70.789982 42.944428	841-9688	-6	1.00
-70.591671 42.893315			
-70.507736 43.106484			
-70.644433 43.112283			
-70.67157 43.082302			
-70.688183 43.065167			
-70.713996 43.058649			
-70.722217 43.049966			
-70.716407 43.043614			
-70.731049 43.026401			
-70.736055 43.013842			
-70.740704 43.013159			
-70.745662 43.006563			
-70.752481 42.992002			
-70.75682 42.99314			
-70.789982 42.944428			

GEOGRAPHIC NAMES

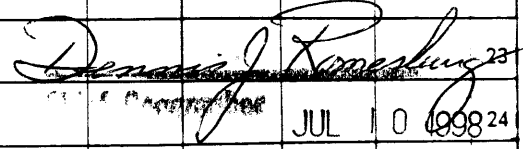
H-10771

Page 1 of 2

Name on Survey

A ON CHART NO. 13283, 13274, 13278, 13286
 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 RANDOMLY
 H ATLAS
 K U.S. LIGHT LIST

Name on Survey	A	B	C	D	E	F	G	H	K
ANDERSON LEDGE	X		X						1
APPLEDORE ISLAND	X		X						2
BIGELOW BIGHT	X		X						3
CEDAR ISLAND	X		X						4
CEDAR ISLAND LEDGE	X		X						5
DUCK ISLAND	X		X						6
EASTERN ROCKS	X		X						7
GOSPORT	X		X						8
GOSPORT HARBOR	X		X						9
HALEY COVE	X		X						10
HALFWAY ROCKS	X		X						11
ISLES OF SHOALS	X		X						12
JIMMIES LEDGE	X		X						13
LUNGING ISLAND	X		X						14
MAINE (title)	X		X						15
MALAGA ISLAND	X		X						16
MINGO ROCK	X		X						17
MURRAY ROCK	X		X						18
NEW HAMPSHIRE (title)	X		X						19
OLD HENRY	X		X						20
SHAG ROCK	X		X						21
SMUTTYNOSE ISLAND	X		X						22
SOUTHWEST LEDGE	X		X						23
SQUARE ROCK	X		X						24
STAR ISLAND	X		X						25


 JUL 10 1998

GEOGRAPHIC NAMES

H-10771

Page 2 of 2

Name on Survey

A ON CHART NO. 13285, 13274, 13278, 13286
 B ON PREVIOUS SURVEY
 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
TRIANGLES	X		X						1
WHITE ISLAND	X		X						2
WHITE ISLAND LEDGE	X		X						3
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Approved:

Dennis J. Rausch
 Chief Geographer JUL 10 1998

N/CS33-45-99

LETTER TRANSMITTING DATA

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

ORDINARY MAIL AIR MAIL

REGISTERED MAIL EXPRESS

GBL (Give number) _____

DATE FORWARDED

JUNE 4, 1999

NUMBER OF PACKAGES

ONE TUBE

TO:

CHIEF, DATA CONTROL GROUP, N/CS3x1
NOAA/NATIONAL OCEAN SERVICE
STATION 6815, SSMC3
1315 EAST-WEST HIGHWAY
SILVER SPRING, MARYLAND 20910-3282

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.

H10771

NEW HAMPSHIRE, BIGELOW BIGHT, MURRAY ROCK TO DUCK ISLAND

(ONE) TUBE CONTAINING THE FOLLOWING:

- 1 SMOOTH SHEET FOR SURVEY H10771
- 1 ORIGINAL DESCRIPTIVE REPORT
- 2 DRAWING HISTORY FORMS (NOAA FORM #76-71) 1 EACH FOR NOS CHARTS 13278 AND 13283
- 1 RECORD OF APPLICATION TO CHART FORM (NOAA FORM #75-96) FOR SURVEY H10771
- 1 H-DRAWING FOR NOS CHART 13278
- 1 H-DRAWING FOR NOS CHART 13283
- 1 COMPOSITE DRAWING FOR NOS CHART 13278
- 1 COMPOSITE DRAWING FOR NOS CHART 13283

FROM: (Signature)

DEBORAH A. BLAND

RECEIVED THE ABOVE

(Name, Division, Date)

Return receipted copy to:

ATLANTIC HYDROGRAPHIC BRANCH
N/CS33
439 WEST YORK STREET
NORFOLK, VA 23510-1114

06/04/99

HYDROGRAPHIC SURVEY STATISTICS
REGISTRY NUMBER: H10771

NUMBER OF CONTROL STATIONS		2
NUMBER OF POSITIONS		47818
NUMBER OF SOUNDINGS		47818
	TIME-HOURS	DATE COMPLETED
PREPROCESSING EXAMINATION	3	03/04/98
VERIFICATION OF FIELD DATA	313	04/26/99
EVALUATION AND ANALYSIS	44	
FINAL INSPECTION	3	10/16/98
COMPILATION	159	05/26/99
TOTAL TIME	522	
ATLANTIC HYDROGRAPHIC BRANCH APPROVAL		04/16/99



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 16, 1997

FAKED
09/16/97

✓ LNM No. 38
17 Sept 1997

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-10771
 State.....New Hampshire and Maine
 General Locality.....Bigelow Bight
 Sublocality.....Murray Rock to Duck Island
 Project Number.....OPR-A315-RU-97
 Surveyed by.....NOAA Ship RUDE

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

CHART NUMBER	CHART EDITION NO.	CHART EDITION DATE	REPORTED DEPTH *	LATITUDE (NAD 83)	LONGITUDE (NAD 83)
13283	16	Dec. 23, 1995	24 ft	43° 03' 45.4" N	070° 35' 58.8" W
13278	23	Jun. 10, 1995			
13286	28	Apr. 20, 1996			

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

Contact either of the following personnel for further information:

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

Chief, Atlantic Hydrographic Branch
 Atlantic Marine Center (804) 441-6746
 439 West York Street
 Norfolk, VA 23510

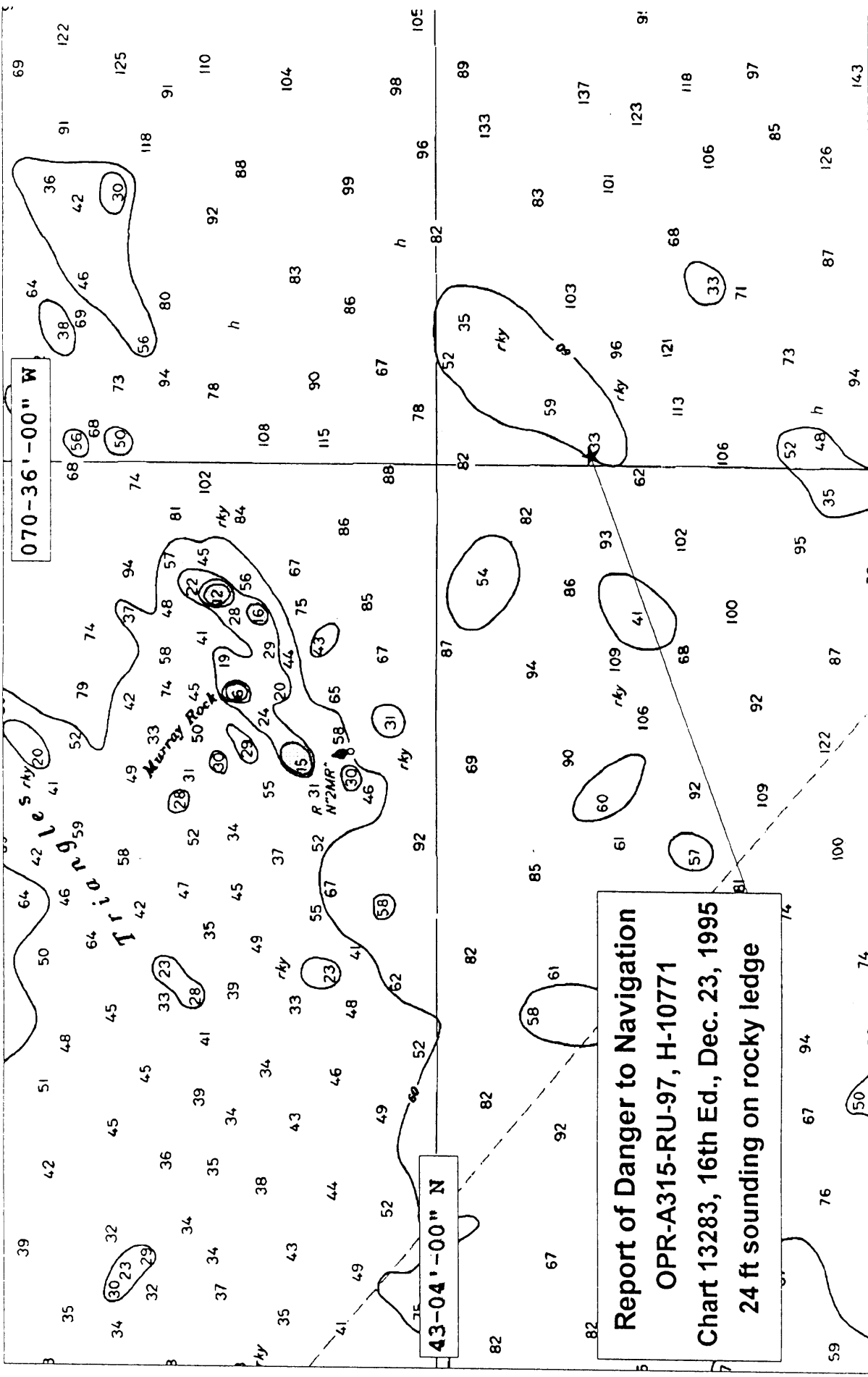
Sincerely,

David A. Cole

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

cc: AHB, NIMA





070-36'-00" W

43-04'-00" N

Report of Danger to Navigation
OPR-A315-RU-97, H-10771
Chart 13283, 16th Ed., Dec. 23, 1995
24 ft sounding on rocky ledge

Murray Rock

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FAXED
 10/1/97
 ✓ LNM No. 42
 15 Oct 1997



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 30, 1997

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-10771
 State.....New Hampshire and Maine
 General Locality.....Bigelow Bight
 Sublocality.....Murray Rock to Duck Island
 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)
32 ft	43° 03' 12.5" N	070° 36' 00.1" W
35 ft	43° 03' 08.4" N	070° 36' 02.0" W
35 ft	43° 02' 31.9" N	070° 35' 33.7" W
37 ft	43° 02' 47.5" N	070° 38' 16.2" W
47.6 ft	43° 02' 26.3" N	070° 35' 05.3" W
51 ft	43° 02' 18.7" N	070° 35' 09.9" 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

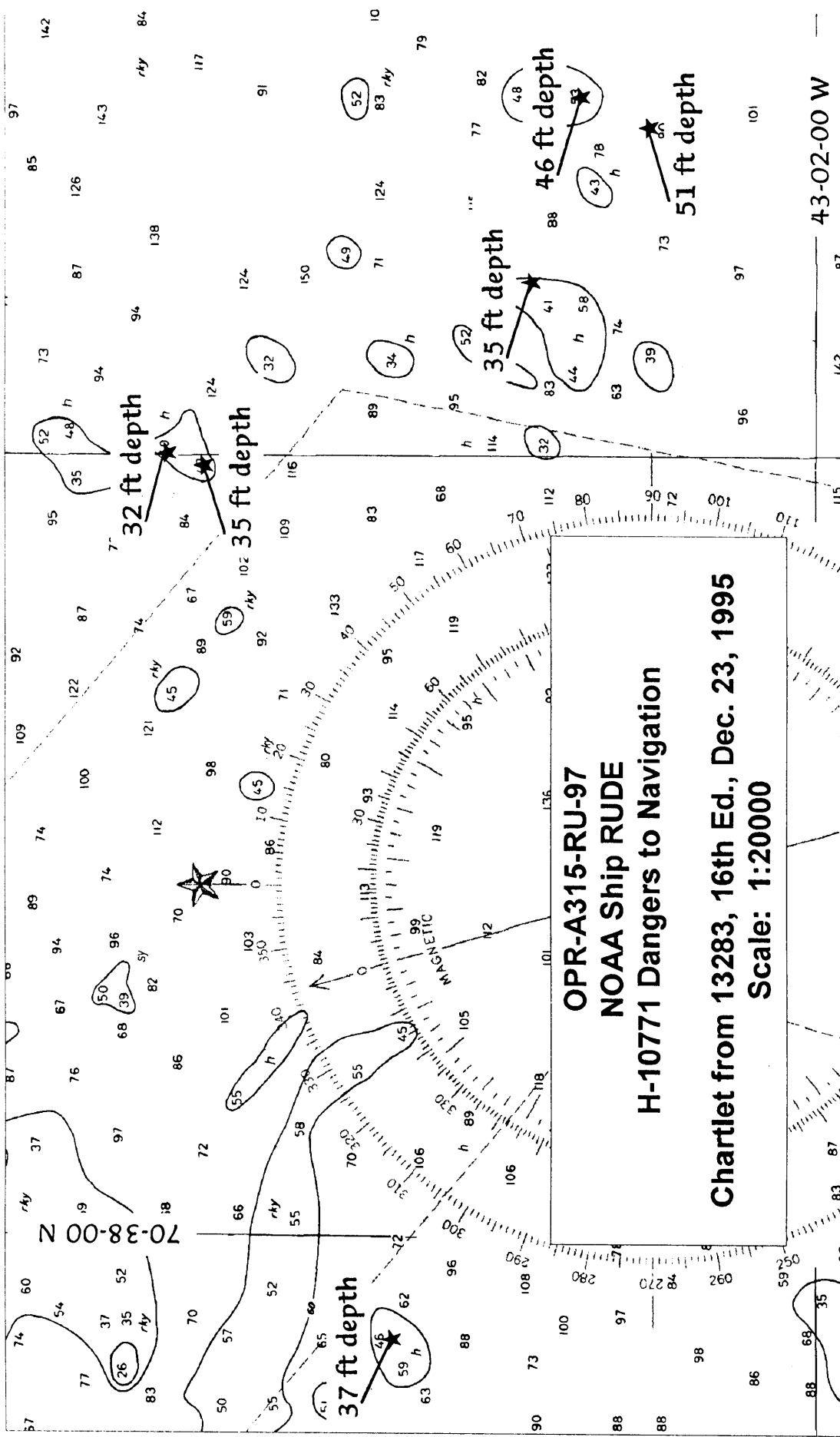
Chief, Atlantic Hydrographic Branch
Atlantic Marine Center (804) 441-6746
439 West York Street
Norfolk, VA 23510

Sincerely,



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

cc: AHB, NIMA



OPR-A315-RU-97
NOAA Ship RUDE
H-10771 Dangers to Navigation
Chartlet from 13283, 16th Ed., Dec. 23, 1995
Scale: 1:20000

43-02-00 W

**ATLANTIC HYDROGRAPHIC BRANCH
EVALUATION REPORT FOR H10771 (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
NADCON, version 2.10
SiteWorks, version 2.01
MicroStation 95, version 5.05
I/RAS B, version 5.01

The smooth sheet was plotted using a Hewlett Packard Design Jet 2500CP 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 survey on the NAD 27 datum, move the projection lines 0.327 seconds (10.096 meters or 1.01 mm at the scale of the survey) north in latitude and 1.821 seconds (41.246 meters or 4.12 mm at the scale of the survey) east in longitude.

L. JUNCTIONS

H10763 (1997) To the West

A standard junction was effected between the present survey and survey H10673 (1997).

There are no contemporary surveys to the north, east, or south, of the present survey.

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 13278 (24th Edition, Mar. 07/98)
13283 (17th Edition, Apr. 11/98)

0.1. Hydrography

The charted hydrography originates with prior surveys and miscellaneous sources. The hydrographer makes adequate comparison in Section O. of the Descriptive Report. The following should be noted:

1. A charted 52 foot depth (15⁹ m) on a rock in Latitude 43°04'22.0"N, Longitude 70°34'29.5"W originates with an unknown source and was found by the present survey in a rocky area in the vicinity of the charted rock. A 49 ft (15¹ m) depth in Latitude 43°04'20.912"N, Longitude 70°34'34.404"W was found by the present survey. It is recommended that the charted 52 foot depth on a rock be removed from the chart and that a 49 foot depth on a rock be charted in the above present survey location.

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

0.2. Danger to Navigation

The hydrographer identified seven (7) dangers to navigation and submitted information for inclusion into the Local Notice to Mariners, to the Commander, First Coast Guard District, Boston, Massachusetts. A copy of the letter was forwarded to Chief, Nautical Data Branch, N/CS26, Silver Spring, Maryland.

The following features and shoal soundings are charted on the latest edition of the charts and originate with the present survey as Danger to Navigation Letters:

<u>FEATURES/SOUNDINGS</u>	<u>LATITUDE (N)</u>	<u>LONGITUDE (W)</u>
24RK	43°03'45.394"	70°35'58.756"
35	43°03'08.367"	70°36'02.029"
35	43°02'31.885"	70°35'33.688"
37Rk	43°02'47.531"	70°38'16.151"
46	43°02'26.297"	70°35'05.282"
51	43°02'18.657"	70°35'09.904"

The 32ft shoal sounding in Latitude 43°03'12.377"N, Longitude 70°36'00.029"W is incorrectly charted on the 24th edition of NOS Chart 13278, dated March 7, 1998. The shoal sounding is charted in Latitude 43°03'18"N,

Longitude 70°36'01"W. The actual position of the 32ft shoal sounding plots on top of the 35ft shoal sounding charted in Latitude 43°03'08.367"N, Longitude 70°36'02.029"W. It is recommended that the 35ft shoal sounding be removed from the chart and that the 32ft shoal sounding be charted in the present survey location.

Other than the above, no changes in charting are recommended.

P. ADEQUACY OF SURVEY

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

Q. AIDS TO NAVIGATION

The hydrographer located two floating aids to navigation within the limits of the present survey. These aids appear adequate to serve their intended purpose.

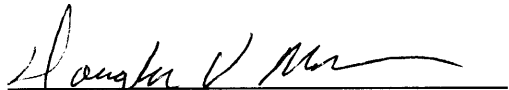
S. MISCELLANEOUS

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

The following NOS charts were used for compilation of the present survey:

13278 (24th Edition, Mar. 07/98) 1:80,000
13283 (17th Edition, Apr, 11/98) 1:20,000

HECK Processing Team



Douglas V. Mason
Cartographic Technician
Verification of Field Data
Evaluation and Analysis

APPROVAL SHEET
H10771

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.

Deborah A. Bland

Date: 7 APR 1999

Deborah A. Bland
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.

Andrew L. Beaver

Date: 4/16/99

Andrew L. Beaver
Lieutenant Commander, NOAA
Chief, Atlantic Hydrographic Branch

Final Approval:

Approved: Samuel P. De Bow

Date: 6/23/99

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

