

H10575

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-10-6-94**
Registry No. **H-10575**

LOCALITY

State **RHODE ISLAND**
General Locality **RHODE ISLAND SOUND**
Sublocality **5 NM SE OF
SAKONNET POINT**

19 94-95

CHIEF OF PARTY
LCDR D. R. HERLIHY, NOAA

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DATE **JAN 22 1996**

NOAA FORM 77-28
(11-72)

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

REGISTER NO.

HYDROGRAPHIC TITLE SHEET

H-10575

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-10-6-94

State Rhode Island

General locality Rhode Island Sound

Locality 5.0 NM SE of Sakonnet Point

Scale 1:10,000

Date of survey 3 Oct - 4 Nov 94; 27 Mar - 8 May 95

Instructions dated February 16, 1995

Project No. OPR-B302-RU-94/95

Vessel NOAA Ship RUDE S590

(VESNO 9040)

Chief of party LCDR D.R. Herlihy

Surveyed by LCDR D.R. Herlihy, LT C.L. Callahan, ENS T.A. Haupt, ENS J.J. Walker, ST M.T. Lathrop

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

Graphic record scaled by DRH, CLC, TAH, JJW, & MTL

Graphic record checked by DRH, CLC, TAH, JJW, & MTL

Protracted by _____ Automated plot by ENCAD NOVAJET III (AHD)

Verification by ATLANTIC HYDROGRAPHIC BRANCH PERSONNEL

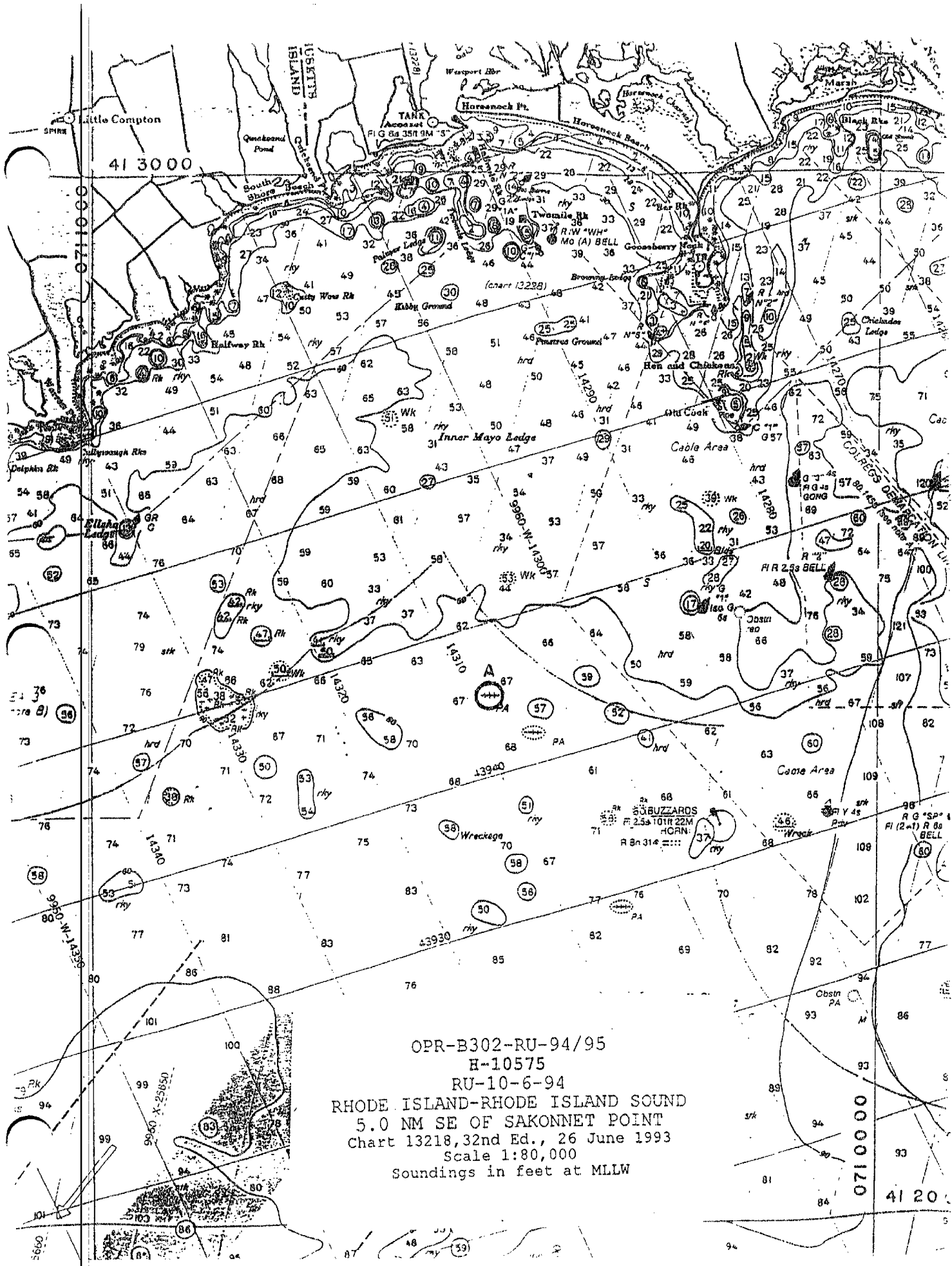
Soundings in (fathoms, feet, or meters at MLW or MLLW) _____ Meters at MLLW

REMARKS: All times recorded in UTC.

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

AWOIS and Surf 2/7/96 mcr
NOTES IN THE DESCRIPTIVE REPORT WERE MADE IN RED
DURING OFFICE PROCESSING.

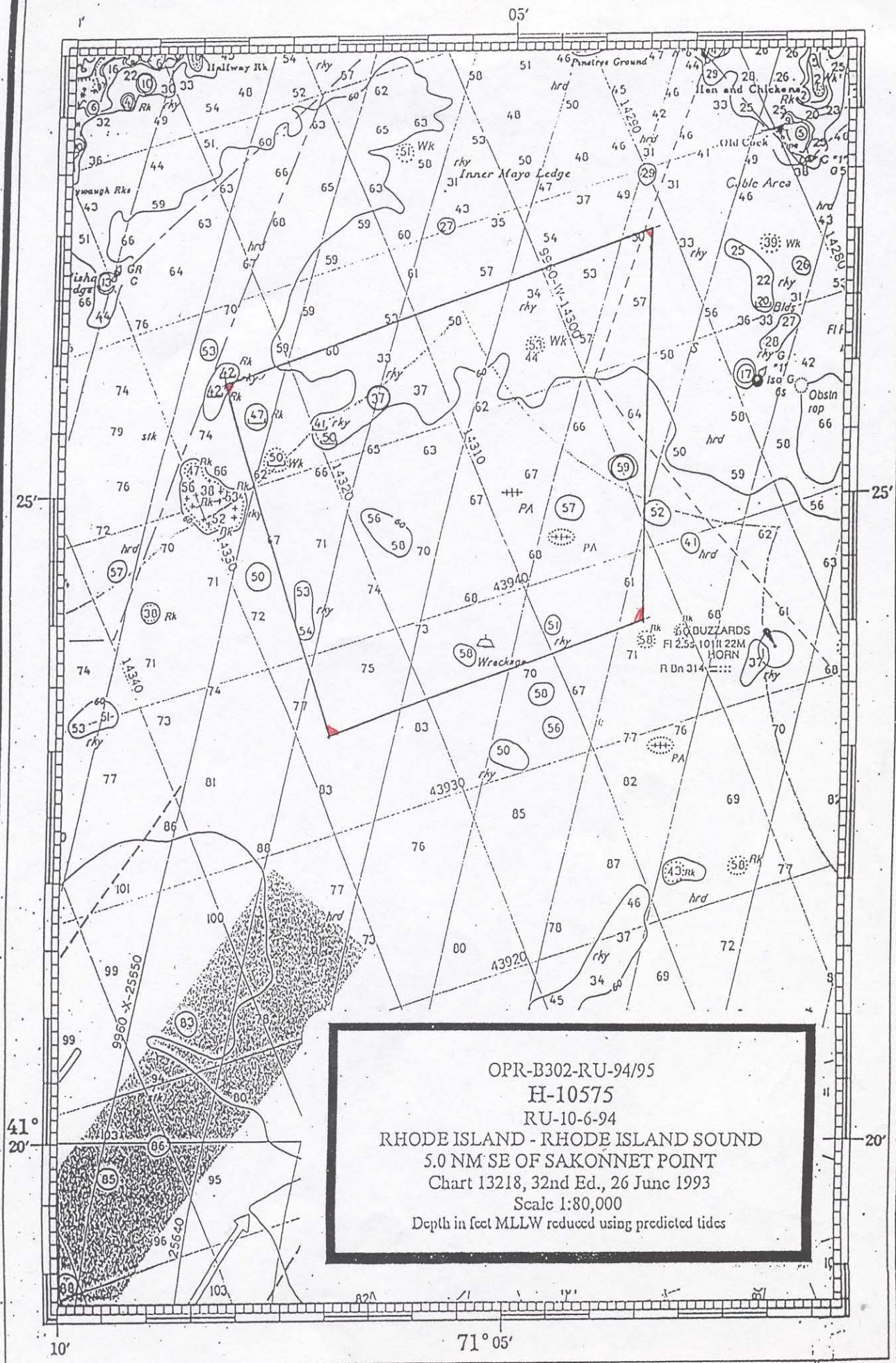
DEC 1-22-96



OPR-B302-RU-94/95
 H-10575
 RU-10-6-94

RHODE ISLAND-RHODE ISLAND SOUND
 5.0 NM SE OF SAKONNET POINT
 Chart 13218, 32nd Ed., 26 June 1993
 Scale 1:80,000
 Soundings in feet at MLLW

0710000
 41 20



05'

25'

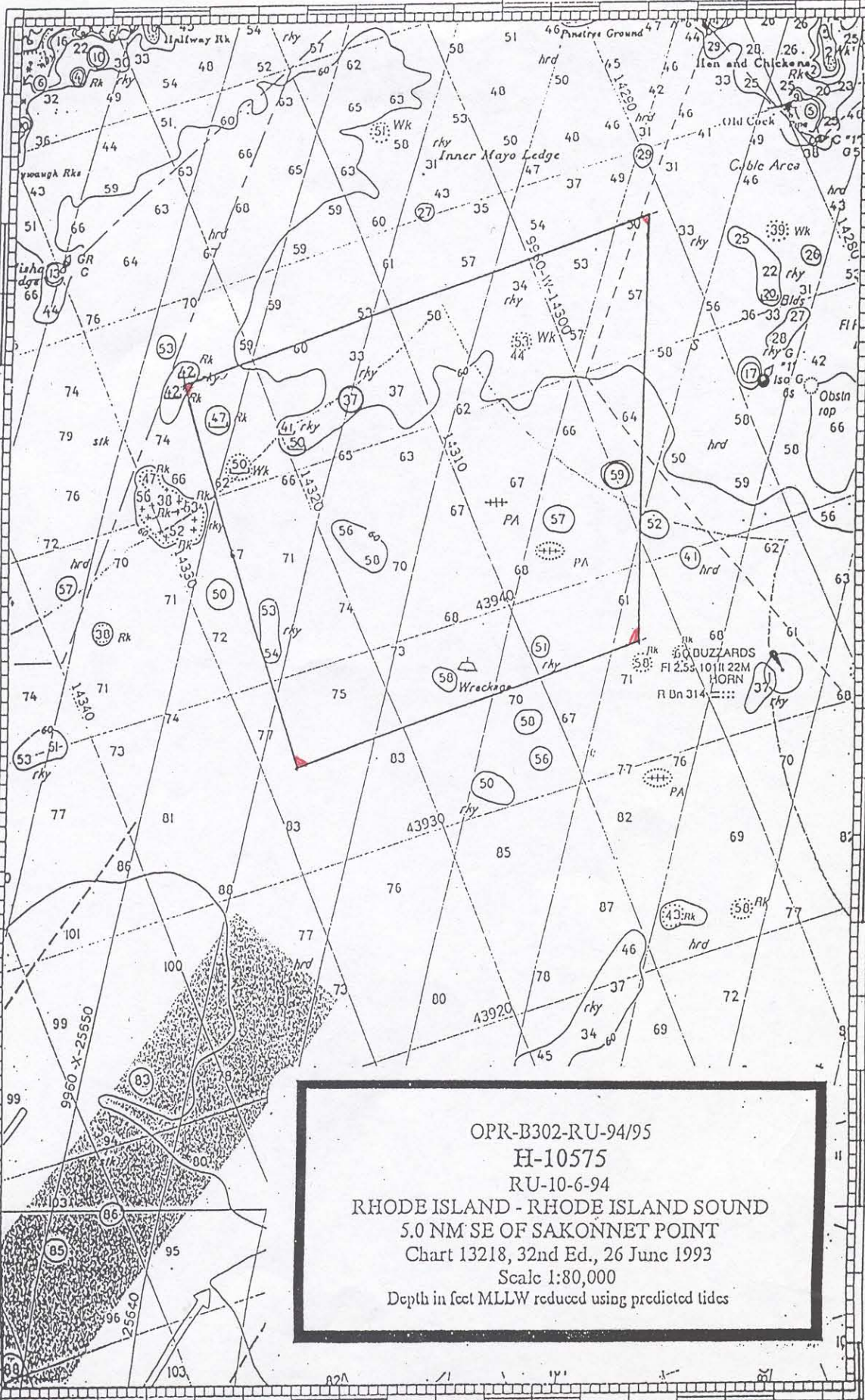
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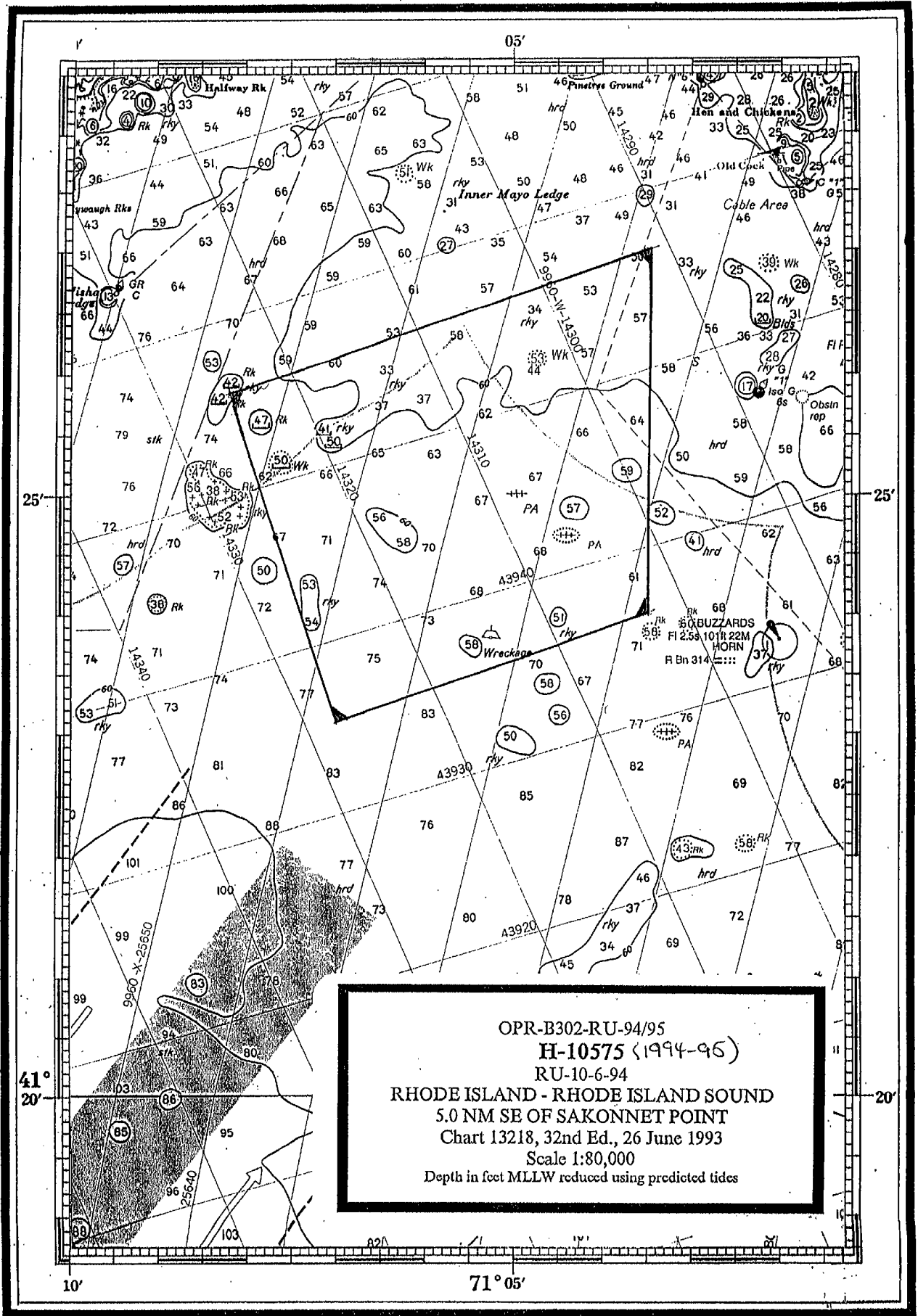
41°
20'

20'

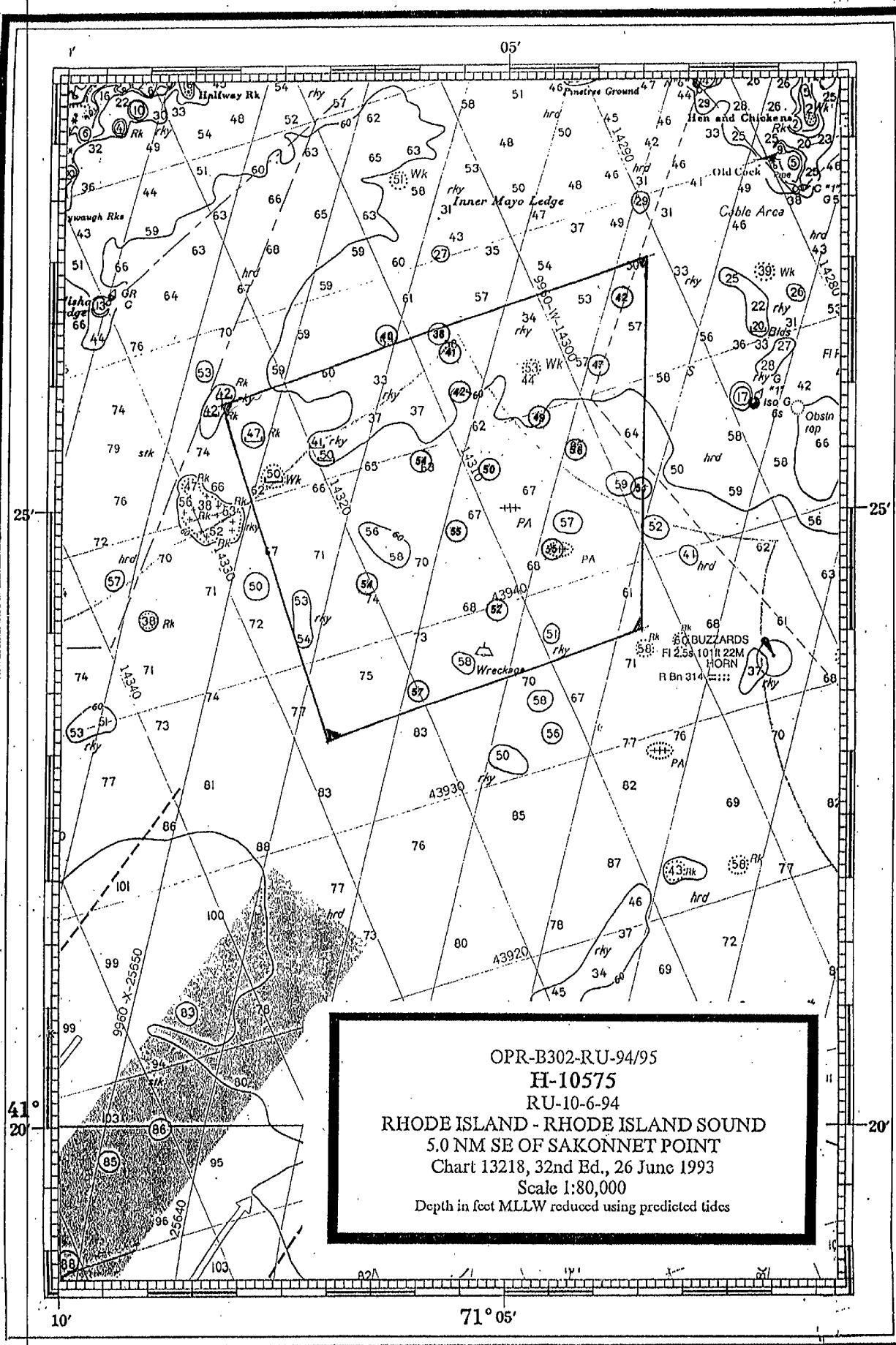
10'

71° 05'





OPR-B302-RU-94/95
 H-10575 (1994-95)
 RU-10-6-94
 RHODE ISLAND - RHODE ISLAND SOUND
 5.0 NM SE OF SAKONNET POINT
 Chart 13218, 32nd Ed., 26 June 1993
 Scale 1:80,000
 Depth in feet MLLW reduced using predicted tides



OPR-B302-RU-94/95
 H-10575
 RU-10-6-94
 RHODE ISLAND - RHODE ISLAND SOUND
 5.0 NM SE OF SAKONNET POINT
 Chart 13218, 32nd Ed., 26 June 1993
 Scale 1:80,000
 Depth in feet MLLW reduced using predicted tides

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A. PROJECT

A.1 This survey was conducted in accordance with Hydrographic Project Instructions OPR-B302-RU, Rhode Island Sound Corridor, Rhode Island and Massachusetts.

A.2 Although this survey was started in October at the end of the 1994 field season, Project Instructions were not received until just prior to the beginning of the 1995 field season. The original instructions are dated February 16, 1995.

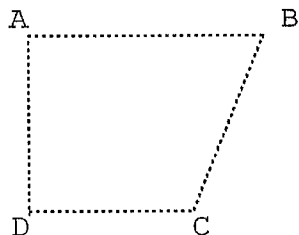
A.3 There have been no changes to the original instructions.

A.4 This Descriptive Report covers the navigable area survey conducted on sheet "A" of project OPR-B302-RU in Rhode Island Sound Corridor as specified in the Project Instructions.

A.5 This portion of project OPR-B302-RU responds to requests from the Northeast Marine Pilots to survey areas in Rhode Island Sound. The Corridor is heavily used by a variety of commercial and pleasure craft with maximum drafts of up to 40 feet. The area was last surveyed by the Coast and Geodetic Survey between 1939 and the mid-1950's.

B. AREA SURVEYED

This survey covers an offshore area located at the entrance to Buzzards Bay approximately 5.0 NM southeast of Sakonnet Point, R.I. The survey is comprised of one sheet, forming a polygon with the following exact boundaries:



- A - 41°^{26 01}25'52"N, 071°08'12"W
- B - 41°27'03"N, 071°03'³⁷30"W
- C - 41°23'57"N, 071°03'¹⁰30"W
- D - 41°23'03"N, 071°06'^{07 10}58"W

Data collection for this survey was conducted during two separate time frames. Data collection began on October 3, 1994 (DN 276) and continued until November 4, 1994 (DN 308), resumed again on March 27, 1995 (DN 086) and was completed on May 8, 1995 (DN 128).

C. SURVEY VESSELS

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

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

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

D. AUTOMATED DATA ACQUISITION AND PROCESSING

*SEE also the
Evaluation Report*

D.1 All HDAPS data acquisition and processing for this survey during the 1994 field season (October 3 - November 4) was accomplished using the following software versions:

Program	Version	Program	Version
BACKUP	2.00	LSTAWOIS	3.07
BLKEDIT	2.02	MAINMENU	1.20
CARTO	2.13	MAN DATA	2.01
CLASSIFY	1.05	NEWPOST	6.01
CONTACT	2.34	PLOTALL	2.27
CONVERT	3.54	PREDICT	2.01
DAS_SURV	6.70	PRESURV	7.08
DP	2.14	QUICK	2.05
EXCESS	4.21	RAMSAVER	1.02
FILESYS	3.24	REAPPLY	2.10
GRAFEDIT	1.06	ZOOMEDIT	2.24

During the 1995 field season (March 03 - May 08), the following HDAPS software versions were used:

Program	Version	Program	Version
BACKUP	2.00	MAINMENU	1.20
BLKEDIT	2.02	MAN_DATA	3.03
CARTO	2.17	MOD III	2.2
CLASSIFY	2.12	NEWPOST	6.13
CONTACT	2.48	PLOTALL	2.32
CONVERT	3.65	PREDICT	2.01
DAS_SURV	6.80	PRESURV	7.11
DP	2.18	QUICK	2.07
EXCESS	4.32	RAMSAVER	1.02
FILESYS	3.31	REAPPLY	2.12
GRAFEDIT	1.06	SEACAT	2.0
INVERSE	2.02	SEASOFT	3.3M
LSTAWOIS	3.10	ZOOMEDIT	2.33

D.2 Other software used during the 1994 field season includes the program **VELOCITY 2.10**, dated March 15, 1994, which generates sound velocity corrector tables for HDAPS data. **VELOCITY 2.11**, dated September 21, 1994, was used during the 1995 field season. Both versions included the **REFRACT** subroutine, which corrects SEABAT multiple slant range depths for sound velocity and corrects position of soundings (cross track distance) for refraction. Commencing April 3, 1995, the SEABIRD SBE-19 sound velocity profile unit was utilized in conjunction with the following software: **SEASOFT 3.3M**, **SEACAT 2.0**, and **VELOCITY 2.11**.

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

E. SONAR EQUIPMENT

E.1 Side scan sonar operations were conducted using an EG&G Model 260 image corrected side scan sonar recorder and a Model 272-T single frequency towfish. All side scan operations were conducted from the RUDE (vessel # 9040). The following side scan equipment was utilized on the dates specified:

Equipment Type	Serial Number	Dates Used (1994)
Recorder	12106	276 - 300
Towfish	16696	276 - 300
		Dates Used (1995)
Recorder	12106	125
Towfish	16696	125

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

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

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

Areas of reduced coverage occasionally occurred when the ship was forced to avoid buoys or lobster pots. These areas were easily recognized because the swath plot clearly showed the lack of overlap between adjoining swaths. Holiday coverage was run to fill in these gaps, and all side scan coverage was ultimately checked with smooth plots to ensure proper overlap between adjoining lines.

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

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

where: RS = Range Scale

EPE = Expected Position Error

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

b. The abundance of contacts due to the extremely rocky terrain eliminated the need for traditional confidence checks using features such as sand waves or buoy anchors.

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

d. There were occasions when the side scan sonar towfish became entangled in lobster trap buoy lines, temporarily whiting out the sonagram. On these occasions, the towfish was brought on board, inspected, and serviced as necessary. All affected data were subsequently rejected and re-run.

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

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

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

F. SOUNDING EQUIPMENT

F.1 All standard hydrographic soundings were acquired using a Raytheon Model 6000N Digital Survey Fathometer (DSF-6000N) with the following serial numbers and dates:

Serial Number	Dates Used
A107	10/3/94 - 11/4/94
	3/16/95 - 3/29/95
B040	3/29/95 - 3/30/95
A118	3/30/95 - 4/02/95
B040	4/02/95 - 4/11/95
A118	4/11/95 - 5/08/95

F.2 No diver investigations were conducted for this survey since the SEABAT 9001 system was used to obtain precise least depths over all potentially hazardous bottom features.

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

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

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

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

Prior to beginning SEABAT data collection on this survey, the RUDE SEABAT-specific offset table/file was updated to define the physical relationship between the various components that comprise the system, including the SEABAT transducer head, Hippo sensor, and GPS antenna. In addition, this offset file

contains heave, roll, and pitch biases determined during a "Patch Test" conducted in Buzzards Bay on March 24, 1995. A copy of the SEABAT offset table is contained in Separate III. ✕

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

Once the sounding data have been reviewed and edited as necessary, the LSTRUD software selects a subset of the approximate 14,000 minimum depths contained within the total data set being processed. A file containing the 15 least depths found within that subset is then generated. The single least depth for each SEABAT investigation was obtained from this file and manually entered into HDAPS.

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

G. CORRECTIONS TO SOUNDINGS

G.1 a. The velocity of sound through water was determined using an Odom Digibar Sound Velocity Probe (s/n 169) and a Sea-Bird SBE 19 Seacat Profiler (s/n 1448). The Digibar was used during the entire 1994 field season and from March 27 to April 24, 1995. From April 3 to April 24, four comparisons were conducted with the Seacat and the Digibar to verify the accuracy of the Seacat prior to discontinuing use of the Digibar. After April 24, the Seacat was used exclusively to determine sound velocity correctors. Digibar and Seacat Data Quality Assurance Tests were conducted before each respective velocity cast to ensure that the units were operating within tolerance. Velocity casts were conducted weekly without exception.

** DATA FILED WITH ORIGINAL Field Records.*

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

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

Cast Number	DN/Year	Latitude	Longitude	HDAPS Table	Applied to Days
36	276/94	41°23.13'N	071°05.89'W	36	276-280
37	284/94	41°22.94'N	071°06.76'W	37	284-287 6
38	290/94	41°22.10'N	071°06.60'W	38	290-294 3
39	297/94	41°23.23'N	071°06.44'W	39	297-301
40	304/94	41°23.0 0 ³ 'N	071°05.90'W	40	304-308
04	086/95	41°22.16'N	071°07.69'W	04	086-090
05	093/95	41°22.72'N	071°07.33'W	05	093-097
06	100/95	41°22.28'N	071°07.76'W	06	100-104 2
07	107/95	41°21.90'N	071°06.86'W	07	107-111
08	114/95	41°22.53'N	071°07.20'W	08	114-118
09	123/95	41°23.13'N	071°06.62'W	09	122-12 88

- b. There was no variation in the DSF-6000N instrument initial.
- c. No instrument correctors to the DSF-6000N were required.
- d. A dual leadline comparison with the DSF-6000N was conducted during special project S-B900-RU-95 on:

DN 82 at 41°21.53'N and 070°46.91'W (41 ft depths)

The greatest variation between leadline and DSF soundings was 0.16 meters. Considering the ship's motion and the wire angle (approximately 5°) in the leadline from the current, this was an excellent value agreement and provided an adequate check that the echo sounder was functioning properly. Data from these comparisons can be found in **Separate IV.* DATA FILED WITH ORIGINAL FIELD RECORDS.*

Two types of leadline were used during the leadline-to-DSF-6000N comparison. The starboard leadline was a steel surveyor's tape graduated in feet with a fixed 5 lb weight at its end. A leadline corrector of 0.0 meters was assumed for this leadline. The port leadline was a traditional leadline made of cotton tiller with a stainless steel cable core. This leadline had a corrector of 0.25 feet up to the 45 foot mark and 0.26 feet for depths greater than 45 feet.

e. All sounding correctors were applied to both the narrow (100 kHz) and wide (24 kHz) DSF-6000N beams.

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

g. Settlement and squat correctors for the RUDE were determined on the Elizabeth River, Norfolk, Virginia on January 25, 1995. An observer, stationed with a level on a pier, measured changes in relative height by sighting to a staff held at the longitudinal position of the ship's transducer. The ship steamed directly toward and then away from the observer. The values obtained from the toward and away runs were averaged and applied to soundings through the HDAPS Offset Table #1.

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

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

G.3 Generally, sound velocity correctors resulting from weekly velocity casts were re-applied to the HDAPS data acquired that entire week. Section G.1.a. gives the periods during which each set of velocity cast correctors was used.

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

* DATA FILED WITH ORIGINAL Field Records

G.5 Generally, sea conditions greater than one meter affected the graphic sounding record by creating a trace of constant peaks and deeps. Application of heave correctors to raw echo soundings appeared to represent true depths accurately.

G.6 a. The tidal datum for this project is Mean Lower Low Water. The operating tide station at Newport, R.I. (845-2660) served as both direct control for datum determination and as the reference station for predicted tides. Data for predicted tides were provided on floppy disk before the start of the project.

b. Tidal data used during data acquisition were obtained from Table 2 of the East Coast of North and South America Tide Predictions and applied to the digital tide data using HDAPS software. The subordinate station for predicted tides was:

NO.	PLACE	POSITION	TIME		HEIGHT	
			High Water	Low Water	High Water	Low Water
845-0768	Sakonnet Point	41°27.9'N 71°11.6'W	direct		*0.85	*0.85

Tidal correctors were applied on line using HDAPS predicted tide tables numbers 10, 11, 3, 4, and 5. Tide table 10 was used for the month of October 1994 and table 11 was used for November 1994. Tables 3, 4 and 5 were used for the corresponding months in 1995.

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

A request for smooth tides was mailed on May 19, 1995.
Approved Tides and Zoning were applied during office processing

H. CONTROL STATIONS *See also the Evaluation Report*

H.1 The horizontal datum for this survey is the North American Datum of 1983 (NAD 83).

H.2 This survey was conducted exclusively using Differential GPS, which precluded the need for shore-based horizontal control stations.

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

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

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

H.6 There are no photogrammetric problems, positioning problems or unconventional survey methods pertinent to this survey.

I. HYDROGRAPHIC POSITION CONTROL

I.1 This survey was conducted exclusively using Differential GPS positioning.

I.2 Accuracy requirements were met as specified by the Hydrographic Manual and Field Procedures Manual (FPM). The Horizontal Dilution of Precision (HDOP) and Expected Position Error (EPE) specified by the FPM were monitored during on-line data collection. The allowable HDOP limit for the Portsmouth, N.H. radio beacon is 3.28, and 3.35 for the closer Montauk Point, N.Y. radio beacon. It was standard practice on the RUDE to use the more conservative HDOP limit of 3.28 for both beacons during this survey. When the allowable limits (HDOP = 3.28, EPE = 15) were exceeded, survey operations were suspended until the Differential GPS improved. If the positioning degraded beyond the acceptable limits while on line, the data were either smoothed or rejected, depending on the extent of the affected data.

I.3 Control Equipment:

Differential GPS:

<u>Unit A</u>	<u>Unit B</u>
Ashtech GPS Sensor	Ashtech GPS Sensor
s/n 700417B1083	s/n 700417B1003
Firmware Version 1E89D-P	Firmware Version 1E89D-P
Magnavox MX50R	Magnavox MX50R
DGPS Receiver s/n 078	DGPS Receiver s/n 160

I.4 Correctors were received from both the Montauk, N.Y. and Portsmouth, N.H. radio beacons for the entire survey.

I.5 The Differential GPS system requires no calibrations to its equipment from outside sources. However, a daily performance check was conducted whenever both radio beacons were operational. The Shipboard Data Integrity Monitor (version 1.2), or "SHIPDIM", program was utilized to conduct these performance checks. See SHIPDIM PERFORMANCE CHECKS in Separate III for weekly system checks.* There were many days on which a performance check was not performed due to the absence of differential correctors from the Portsmouth, N.H. beacon.

For a DGPS performance check, section 3.4.5 of the FPM states that a DGPS performance check may be conducted using "SHIPDIM" when "...two independent reference beacons are receivable, and two remote receivers are available on the ship. Each remote receives correctors from a different reference, then the computed positions are compared." The computed inverse between the check receiver and the reference receiver must not exceed ΔP_{max} , where:

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

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

EPE = Expected Position Error of the DGPS
position

ECR = Error Circle Radius of the check position

"SHIPDIM" compares four sample positions from both the check and reference receivers. Three of the four checks must be less than the ΔP_{max} for a successful performance check.

The program **MONITOR** (Ver 3.0) was used on April 4, 1995 to test the differential reference station at Montauk, N.Y. MONITOR calculates the inverse distance between the known position and every position record received from the GPS receiver. Data were collected for a continuous period of 24 hours. The final statistics showed an excellent correspondence between the received signal and the actual position. The results of this test are contained in Separate III.*

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

**Data Filed with Field Records.*

I.7 a. There were no unusual methods used to calibrate or operate the electronic positioning equipment.

b. During times of hydrography for this survey, correctors from the Portsmouth, N.H. beacon were received only intermittently. The removal and replacement of the corresponding shipboard Ashtech receiver failed to improve signal reception. All other shipboard DGPS hardware and firmware were inspected and tested for existing malfunctions. A possible explanation for the sporadic reception is the change in broadcast signal strength or type from the beacon itself, combined with the beacon's physical distance from the ship.

c. During times of heavy rains and/or thunderstorms, the ship would also experience periods of intermittent service from the Montauk, N.Y. beacon. During such instances, survey operations were suspended until such time as service from the beacon resumed.

d. During times of poor satellite coverage or geometry, there was a steady deterioration of the HDOP which could be continuously monitored. When local weather affected the DGPS radio beacons as described in section I.6.c., however, the on-line positioning would unexpectedly "drop out" for periods ranging from a couple of minutes to half an hour. The outages were separated by only a few minutes of strong signal reception, making it nearly impossible to begin or complete a survey line. These periods of sporadic positioning difficulties occurred infrequently and were associated only with weather-related beacon interference.

e. No systematic errors were detected which required adjustments.

f. Antenna positions were corrected for offset and layback, and referenced to the position of the DSF-6000N fathometer transducer. These correctors are located in HDAPS Offset Table #1, and were applied on line to the positioning algorithm. A copy of Offset Table #1 is contained in Separate III.*

g. Offset and layback distances for the A-frame (tow point) are located in HDAPS Offset Table #1 and were applied on line. These offsets, along with the cable length, towfish height, and depth of water, were used by the HDAPS system to compute the position of the towfish. A copy of Offset Table #1 is contained in Separate III.*

** DATA FILED WITH ORIGINAL FIELD RECORDS.*

J. SHORELINE

No shoreline is contained within the boundaries of this survey.

K. CROSSLINES

A combined total of 13.5 nautical miles of crosslines was acquired for this survey, which represents 11.0% of the 123.2 nautical miles of the first 100% side scan mainscheme coverage.

An un-excessed plot of mainscheme soundings with crosslines superimposed was used to conduct mainscheme to crossline comparisons. Soundings at intersections were compared to all other soundings within a 5 m (50 meter) radius. Based on this procedure, agreement between mainscheme and crossline soundings was found to be excellent, especially in areas of flat or slightly sloping relief. The majority of compared soundings fell within one foot of each other, with only an occasional difference of three feet noted. Most often these larger differences were observed in steeply rising shoal areas characterized by an irregular bottom consisting of large boulders.

L. JUNCTIONS *SEE ALSO THE EVALUATION REPORT*

L.1 Survey H-10575 junctions with ^{Four} three previously completed surveys. Survey H-10434, a 1:10,000-scale survey completed by the RUDE during the 1992 field season, junctions along the eastern boundary of H-10575. Survey FE-378, a 1:20,000-scale survey also completed by the RUDE during the 1992 field season, junctions along its southeastern boundary. The third junction, along the southern boundary of H-10575, is with survey H-10458, a 1:20,000-scale survey completed by the RUDE during the 1993 field season.

L.2 Agreement at the junction of surveys H-10434, H-10458, and FE-378 with H-10575 is excellent. Agreement between soundings was typically within one foot when compared to other soundings within a 30 to 40-meter radius, and only occasionally differed by three feet within a similar radius of investigation.

L.3 There were no significant junction discrepancies to be reconciled.

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

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

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

N. ITEM INVESTIGATION REPORTS

N.1.1 Area of Investigation

AWOIS 1898

Rhode Island Sound

Reported Position:

41°25'00.38"N

071°04'58.14"W

Datum: NAD83

Reported Depths: N/A

Feature: Wreck

N.2.1 Description and Source of Item

AWOIS 1898 was first documented in Local Notice to Mariners 51/1969 as the 27-foot cabin cruiser Seven Seas. Notice to Mariners 03/1979 listed the item at position 41°25'N and 071°05'W. This position has been converted from datum NAD27 to NAD83. During survey FE-241, 100% side scan sonar investigation failed to locate the item. A wire drag investigation was unsuccessful due to lobster pots and irregular bottom terrain.

This item is considered to be neither disproved nor a hazard to navigation. Field units recommended the replacement of the charted dangerous wreck symbol with a non-dangerous wreck symbol. On March 24, 1983, knowledgeable source Mr. M. Hickson reported that the wreck was less of a hazard to navigation than the surrounding boulders.

N.3.1 Survey Requirements

This item required 200% side scan coverage, echo sounder development and diver investigation. Salvage documentation would be sufficient for disproval.

N.4.1 Method of Investigation

Two hundred percent side scan coverage was achieved over the entire AWOIS 1898 1000-meter search radius. Many significant contacts were logged within the search radius. Significant contacts were then prioritized according to the authorized 400-meter grid system and developed with echosounder using 5 meter line spacing. SEABAT was used passively during all echosounder developments to assist the hydrographer in least depth determination. Several of these contacts were further developed through active SEABAT data collection.

N.5.1 Results of Investigation

A review of all side scan sonar, echosounder and SEABAT data revealed no obvious signs of a wreck. Seventeen (17) significant contacts were investigated within the 1000-meter search radius (see Development Abstract for contacts investigated within AWOIS 1898). All contacts investigated were clearly natural rock formations similar to the multitude of other boulder fields in the area.

N.6.1 Comparison with Prior Surveys

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

N.7.1 Comparison with Chart and Charting Recommendations

Largest scale chart of this portion of the survey area:

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

AWOIS 1898, the 27-foot long cabin cruiser Seven Seas reported in position 41°25'00.38"N and 071°04'58.14"W, was not found.

It is the opinion of the hydrographer that any remains of AWOIS 1898 that may exist are not a hazard to navigation and do not warrant charting.

It is the recommendation of the hydrographer that the non-dangerous wreck symbol and associated PA charted in position 41°25'00.38"N and 071°04'58.14"W be deleted. See the Report of Danger to Navigation in Section 0.2 of this report for any charting recommendations located within the AWOIS 1898 1000-meter search radius. ✓
Concur

N.1.2 Area of Investigation

AWOIS 1905

Rhode Island Sound

Reported Position:

41°25'17.57"N

071°07'35.35"W

Datum: NAD83

Reported Depths: 50-foot depths exist in the vicinity.

Feature: Wreck

N.2.2 Description and Source of Item

AWOIS 1905 is identified as the 120-foot long, 30-foot wide wreck of ARCO Barge No. 7, which sank on June 2, 1952 by marine casualty in position 41°25'30"N and 071°07'24"W. This position has been converted from datum NAD27 to NAD83. During survey FE-194, the area was wire dragged to 50 feet without locating the wreck. A later wire drag survey (FE-207) also failed to find the barge, though there were three hangs in the area. According to the reviewer, the searches conducted during the two surveys are sufficient to recommend the deletion of the charted sunken dangerous wreck symbol.

N.3.2 Survey Requirements

This item required 200% side scan coverage, echo sounder development and diver investigation. Salvage documentation would be sufficient for disproval.

N.4.2 Method of Investigation

Two hundred percent side scan sonar coverage was achieved over the entire AWOIS 1905 200-meter search radius. Due to the absence of any indication on side scan sonar of a wreck or any other unnaturally occurring contacts, no further hydro splits were run within the AWOIS search radius. Nevertheless, three significant contacts were logged within the search radius: 690.13S, 689.51S and 1113.52P. Contact 1113.52P was determined to be a smaller side scan return of the same item as contact 689.51S. Both 690.13S and 689.51S were investigated as developments 9C1 and 8C1, respectively, using echosounder with a 5-meter line spacing. SEABAT was operated passively during both echosounder developments to assist the hydrographer in least depth determination.

N.5.2 Results of Investigation

AWOIS 1905, the wreck of the barge ARCO NO.7 charted in position 41°25'17.57"N and 071°07'35.35"W, was not found. A review of all side scan sonar and echosounder data revealed no obvious signs of a wreck. The two least depths within the search radius result from echosounder developments 9C1 and 8C1. Development 9C1 yielded a ^{approved} predicted tide corrected least depth of 17.7⁹ meters (58.4⁰ feet) in position 41°25'15.198"N and 71°07'38.523"W (fix 3815.2). Development 8C1 yielded a ^{approved} predicted tide corrected least depth of 17.2³ meters (56.4⁷ feet) in position 41°25'16.766"N and 71°07'33.651"W (fix 3770.4). The least depth from echosounder development 8C1 is the least depth within the entire AWOIS 1905 search radius. Both contacts investigated were clearly natural rock formations resembling the abundance of other boulder fields in the area.

N.6.2 Comparison with Prior Surveys

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

N.7.2 Comparison with Chart and Charting Recommendations

Largest scale chart of this portion of the survey area:

Chart 13221
"Narragansett Bay"
49th ed. July 26, 1993
Scale: 1:40,000

AWOIS 1905, the wreck of the barge ARCO NO.7 charted in position 41°25'17.57"N and 071°07'35.35"W, was not found. However, a single rock feature with a ^{approved} predicted tide corrected echo sounder least depth of 17.23 meters (56.47 feet) was discovered during development 8C1 within the stated AWOIS 1905 search radius.

It is the opinion of the hydrographer that any existing remains of AWOIS 1905 are not a hazard to navigation and do not warrant charting.

It is the recommendation of the hydrographer that the charted dangerous wreck symbol and associated 50-foot cleared wire drag sounding charted in position 41°25'17.57"N and 071°07'35.35"W be deleted and the 56-foot least depth from development 8C1 (fix 3770.4) be charted in position 41°25'16.766"N and 71°07'33.651"W. *CONCUR CHART AS 56RK ✓*

A dangerous wreck depth unknown symbol is charted in position 41°25'30"N and 71°07'23"W on chart 13221 only. NOAA's Hydrographic Survey Branch notified the field unit that this position is outdated and has since been revised in the current AWOIS listing. The wreck charted in the above position is due to a chart compiler's mistake and will be deleted from the next edition of chart 13221.

N.1.3 Area of Investigation

AWOIS 9288

Rhode Island Sound

Reported Position:

41°25'25.00"N

071°07'00.00"W

Datum: NAD83

Reported Depths: Charted 50-foot wire drag clearance.

Feature: Obstruction

N.2.3 Description and Source of Item

AWOIS 9288 is located on the western end of a large shoal area. AWOIS 9288 was encountered during survey FE194WD/1963 as a wire drag hang, with a clearance depth of 50 feet in position 41°25'25.00"N and 071°07'00.00"W.

N.3.3 Survey Requirements

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

N.4.3 Method of Investigation

Two hundred percent side scan sonar coverage was achieved over the entire AWOIS 9288 100-meter search radius. The entire search radius was further developed using 40-meter hydro splits as part of a surrounding shoal development. Many significant contacts were logged within and close to the east side of the AWOIS 9288 search radius. Five significant contacts were logged within the search radius, all of which were developed using echosounder at a 5-meter line spacing. SEABAT was used passively during all echosounder developments to assist the hydrographer in least depth determination and later used actively, if warranted. Development 8E1, centered on contact 1111.15S, yielded the least depth in the search radius. This contact was fully delineated with SEABAT, and therefore no diver investigation was conducted.

N.5.3 Results of Investigation

AWOIS 9288, an obstruction charted by a wire drag symbol with a clearance depth of 50 feet, was located in the northern portion of the 100-meter search radius. Echosounder development 8E1, centered on contact 1111.15S, yielded the ^{approved} predicted tide corrected least depth within the search radius of 15.46 meters (^{51.2}~~50.5~~ feet), in position 41°25'27.578"N and 071°06'59.569"W (fix 3412.3). The SEABAT investigation of the same contact yielded a ^{approved} predicted tide corrected least depth of 15.89 meters (^{51.8}~~51.2~~ feet) in position 41°25'27.546"N and 71°06'59.⁴⁰⁵~~395~~"W (fix 13040).

N.6.3 Comparison with Prior Surveys

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

N.7.3 Comparison with Chart and Charting Recommendations

Largest scale chart of this portion of the survey area:

Chart 13221
"Narragansett Bay"
49th ed. July 26, 1993
Scale: 1:40,000

AWOIS 9288, an obstruction charted by a wire drag symbol with a 50-foot clearance depth, was located as a single rock feature during echosounder development 8E1.

It is the recommendation of the hydrographer that the wire drag symbol with a clearance depth of 50 feet charted in position 41°25'25.00"N and 071°07'00.00"W be deleted and replaced with a ^{approved} predicted tide corrected depth of ⁵¹ 50 feet in position 41°25'27.578"N and 071°06'59.569"W (fix 3412.3), obtained from echosounder development 8E1, centered on contact 1111.15S.

CHART AS ~~ST~~ 45

N.1.4 Area of Investigation

AWOIS 9289

Rhode Island Sound

Reported Position:

41°25'32.00"N

071°07'06.00"W

Datum: NAD83

Reported Depths: Charted 41-foot wire drag clearance.

Feature: Obstruction

*Do not CONCUR
Chart 4541 IN
Lat 41° 25' 27.7" N ✓
Long 71° 07' 06.1" W*

N.2.4 Description and Source of Item

AWOIS 9289 is located on the western end of a large shoal area. AWOIS 9289 was encountered during survey FE194WD/1963 as a wire drag hang with a clearance depth of 41 feet in position 41°25'32"N and 071°07'06"W.

N.3.4 Survey Requirements

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

N.4.4 Method of Investigation

Two hundred percent side scan sonar coverage was achieved over the entire AWOIS 9289 100-meter search radius. The entire search radius was further developed as part of a surrounding shoal development using 40-meter hydro splits. Many significant contacts were logged within and close to the east of the AWOIS 9289 search radius. Seven significant contacts were logged within the search radius, all of which were developed with echosounder using 5-meter line spacing. SEABAT was used passively during all echosounder developments to assist the hydrographer in least depth determination and later used actively, if warranted. Two of the seven contacts were further developed with SEABAT. The two least depths within the search radius were obtained as a result of echosounder developments 7E7 and 7E2, centered on contacts 735.42P and 698.45P respectively. Development 7E2 was further developed with SEABAT. Since none of these developments yielded depths close to that reported for AWOIS 9289, nearby contacts outside of the search radius were investigated as possible AWOIS 9289 items. The least depth of the surrounding shoal area is a result of echosounder development 7E1, centered on contact 735.01P, which was logged on side scan sonar close to the east of AWOIS 9289 search radius.

N.5.4 Results of Investigation

AWOIS 9289, an obstruction charted by a wire drag symbol with a clearance depth of 41 feet, has been proven not to exist. The two least depths within the search radius were obtained as a result of echosounder developments 7E7 and 7E2. Development 7E7 yielded a ~~predicted~~ ^{approved} tide corrected least depth of 15.76 meters (50.8 feet) in position 41°25'32.731"N and 71°07'03.920"W (fix 3374.6). Development 7E2 yielded a ~~predicted~~ ^{approved} tide corrected least depth of 15.87 meters (51.25 feet) in position 41°25'29.631"N and 71°07'04.384"W (fix 3364.3). The further SEABAT development of 7E2 yielded a ~~predicted~~ ^{approved} tide corrected least depth of 15.9 meters (52.1 feet). However, the least depth of the surrounding shoal area is a result of echosounder development 7E1, centered on contact 735.01P, which was logged on side scan sonar close to the east of the AWOIS 9289 search radius. This development yielded a ~~predicted~~ ^{approved} tide corrected least depth of 14.46 meters (47.29 feet) in position 41°25'35.317"N and 71°06'57.691"W (fix 3394.3).

N.6.4 Comparison with Prior Surveys

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

N.7.4 Comparison with Chart and Charted Recommendations

Largest scale chart of this portion of the survey area:

Chart 13221
"Narragansett Bay"
49th ed. July 26, 1993
Scale: 1:40,000

AWOIS 9289, an obstruction charted by a wire drag symbol with a clearance depth of 41 feet, has been proven not to exist. However, a single rock feature with a ^{approved} predicted tide corrected echosounder depth of 14.16 meters (47.2 ^{47.2} feet), which is the least depth of the surrounding shoal area, was located close to the east in position 41°25'35.317"N and 71°06'57.691"W, as a result of echosounder development 7E1.

It is the recommendation of the hydrographer that the wire drag symbol with a clearance depth of 41 feet charted in position 41°25'32.00"N and 071°07'06.00"W, be deleted and a ^{approved} predicted tide corrected depth of 47 ⁴⁷ feet be charted to the east in position 41°25'35.317"N and 071°06'57.691"W (fix 3394.3), obtained from echosounder development 7E1 centered on contact 735.01P *CHART AS 48 ~~RE~~ ✓ in a shoal area identified as rky CONCUR*

N.1.5 Area of Investigation

AWOIS 9290

Rhode Island Sound

Reported Position:

41°25'37.57"N

071°07'48.55"W

Datum: NAD83

Reported Depths: 47-foot wire drag clearance.

Feature: Obstruction

N.2.5 Description and Source of Item

AWOIS 9290 was encountered during survey FE207WD/1966 as a wire drag hang on a rock at 51 feet. The actual depth of 47 feet was established at position 41°25.62'N and 071°07.84'W (NAD27). This position has been converted from datum NAD27 to NAD83.

N.3.5 Survey Requirements

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

N.4.5 Method of Investigation

Two hundred percent side scan sonar coverage was achieved over the entire AWOIS 9290 100-meter search radius. The entire search radius was further developed as part of a surrounding shoal development using 40-meter hydro splits. No contacts were logged within the search radius. Several significant contacts were logged in the surrounding area, all of which were developed with echosounder using 5-meter line spacing. SEABAT was used passively during all echosounder developments to assist the hydrographer in least depth determination and later used actively, if warranted.

N.5.5 Results of Investigation

A review of all side scan sonar data revealed no signs of an obstruction. AWOIS 9290, an obstruction charted by a wire drag symbol with a clearance depth of 47 feet, has therefore been proved not to exist. However, the least depth of the surrounding area is a result of echosounder development 7C1, centered on contact 744.19P, which was logged on side scan sonar close to the southeast of AWOIS 9290 search radius. This development yielded a ^{approved} ~~predicted~~ tide corrected least depth of 16.3 meters (53.5 feet) in position 41°25'32.224"N and 71°07'39.168"W (fix 1786.2).

N.6.5 Comparison with Prior Surveys

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

N.7.5 Comparison with Chart and Charting Recommendations

Largest scale chart of this portion of the survey area:

Chart 13221
"Narragansett Bay"
49th ed. July 26, 1993
Scale: 1:40,000

AWOIS 9290, an obstruction charted by a wire drag symbol with a clearance depth of 47 feet has been proven not to exist. However, a single rock feature on a small nearby shoal with a ^{approved} predicted tide corrected echo sounder depth of 16.3 meters (53.5 feet) was located close to the southeast in position 41°25'32.224"N and 71°07'39.168"W as a result of echosounder development 7C1.

It is the recommendation of the hydrographer that the wire drag symbol with a clearance depth of 47 feet charted in position 41°25'37.57"N and 071°07'48.55"W, be deleted and a ^{approved} predicted tide corrected depth of 53 feet be charted to the southeast in position 41°25'32.224"N and 71°07'39.168"W (fix 17⁸⁶8.2), which was obtained from echosounder development 7C1 centered on contact 744.19P.

CHART AS 53 RK ✓
CONCUR
in a shoal area identified as rky

N.1.6 Area of Investigation

AWOIS 9374

Rhode Island Sound

Reported Position:

41°25'47.17"N
071°08'20.35"W

Datum: NAD83

Reported Depths: 42-foot wire drag clearance.

Feature: Obstruction

N.2.6 Description and Source of Item

AWOIS 9374 is located approximately 230 meters west of the eastern limit of hydrography. AWOIS 9374 was encountered during survey FE207WD/1966 as a wire drag hang on a rock in position 41°25.78'N and 071°08.37'W. This position has been converted from datum NAD27 to NAD83.

N.3.6 Survey Requirements

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

N.4.6 Method of Investigation

AWOIS 9374 was not originally to be included as part of this survey, but rather as part of survey H-10605, which adjoins survey H-10575 to the west. However, during the development of significant contacts discovered on a survey line extended beyond the western boundary of survey H-10575 and into the AWOIS 9374 search radius, a least depth was obtained which closely matched the reported obstruction least depth for this item. As a result, the decision was made to include this item as part of survey H-10575.

The first 100% side scan coverage was achieved over only the eastern half of the 100-meter search radius, and a second 100% percent coverage was required over only the eastern quarter of the search radius to verify the location of this obstruction. Two significant contacts were logged within the search radius: 883.43P and 934.49S. Contact 934.49S was considered to be a smaller side scan return of the same item as contact 883.43P, and was the center of investigation of echosounder development 6A2. This contact was developed with echosounder using 5-meter line spacing and further delineated with SEABAT.

N.5.6 Results of Investigation

AWOIS 9374, an obstruction charted by a wire drag symbol with a clearance depth of 42 feet, was found. Echosounder development 6A2 yielded a ^{approved} predicted tide corrected least depth of 13.72 meters (43.63 feet) in position 41°25'47.347"N and 71°08'18.538"W (fix 5124.2). The SEABAT investigation of the same development yielded a predicted tide corrected least depth of 13.26 meters (43.53 feet) in position 41°25'47.282"N and 071°08'18.437"W (fix 13082).
.447

N.6.6 Comparison with Prior Surveys

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

N.7.6 Comparison with Chart and Charting Recommendations

Largest scale chart of this portion of the survey area:

Chart 13221
"Narragansett Bay"
49th ed. July 26, 1993
Scale: 1:40,000

AWOIS 9374, an obstruction charted by a wire drag symbol with a clearance depth of 42 feet, was located as a rock feature on top of a shoal during both echosounder development and SEABAT investigation of development 6A2. The SEABAT least depth is the shoaler of the two developments.

It is the recommendation of the hydrographer that the wire drag symbol with a clearance depth of 42 feet charted in position 41°25'47.17"N and 071°08'20.35"W be deleted, and replaced with a ^{APPROVED} predicted tide corrected depth of 43 feet charted in position 41°25'47.³⁴⁷282"N and 071°08'18.⁵³⁸437"W (fix ^{5124.2}13082), obtained from the SEABAT investigation of development 7C1, centered on contact 883.43P. *CHART AS 43XK ✓*

N.1.7 Area of Investigation

*in a shoal area
identified as rky CONCUR*

AWOIS 9375

Rhode Island Sound

Reported Position:

41°25'55.57"N
071°08'10.75"W

Datum: NAD83

Reported Depths: 42 foot wire drag clearance.

Feature: Obstruction

N.2.7 Description and Source of Item

AWOIS 9375 was first encountered during survey FE207WD/1966 as a hang on a rock at position 41°25.92'N and 071°08.21'W (NAD27). This position has been converted from datum NAD27 to NAD83.

N.3.7 Survey Requirements

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

N.4.7 Method of Investigation

Two hundred percent side scan coverage was achieved over the entire AWOIS 9375 100-meter search radius. The entire search radius was further developed using 20-meter hydro splits. Many significant contacts were logged within and nearby the AWOIS 9375 search radius. All significant contacts were developed with echosounder using 5-meter line spacing. Five echosounder developments were run targeting AWOIS 9375: 5A, 5A1, 5A4, 6A and 6A4. SEABAT was used passively during all echosounder developments to assist the hydrographer in least depth determination and later used actively, if warranted. Development 5A yielded the least depth of the five developments. This contact was fully delineated with SEABAT, and therefore no diver investigation was conducted.

N.5.7 Results of Investigation

AWOIS 9375, an obstruction charted by a wire drag symbol with a clearance depth of 42 feet, has been proven not to exist. The least depth of the surrounding area is a result of echosounder development 5A, centered on the least depth position from the 20-meter hydro splits run over the entire AWOIS 9375 search radius. This development yielded a ^{approved} predicted tide corrected least depth of 14.76 meters (47.69 feet) in position 41°25' 55.473"N and 71°08' 13.554"W (fix 3490.3).

N.6.7 Comparison with Prior Surveys

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

N.7.7 Comparison with Chart and Charting Recommendations

Largest scale chart of this portion of the survey area:

Chart 13228
"Westport River and Approaches"
9th ed. June 13, 1992
Scale: 1:20,000

AWOIS 9375, an obstruction charted by a wire drag symbol with a clearance depth of 42 feet, has been proven not to exist. The least depth within the search radius is from a single rock feature on top of a shoal and was obtained from echosounder development 5A.

It is the recommendation of the hydrographer that the wire drag symbol with a clearance depth of 42 feet, charted in position 41°25'55.57"N and 071°08'10.75"W, be deleted and a ^{approved} predicted tide corrected depth of 47~~8~~ feet be charted in position 41°25'55.473"N and 71°08'13.554"W (fix 3490.3). *CONCUR*

CHART AS 48 ~~RE~~ ✓ in a shoal area identified as rky

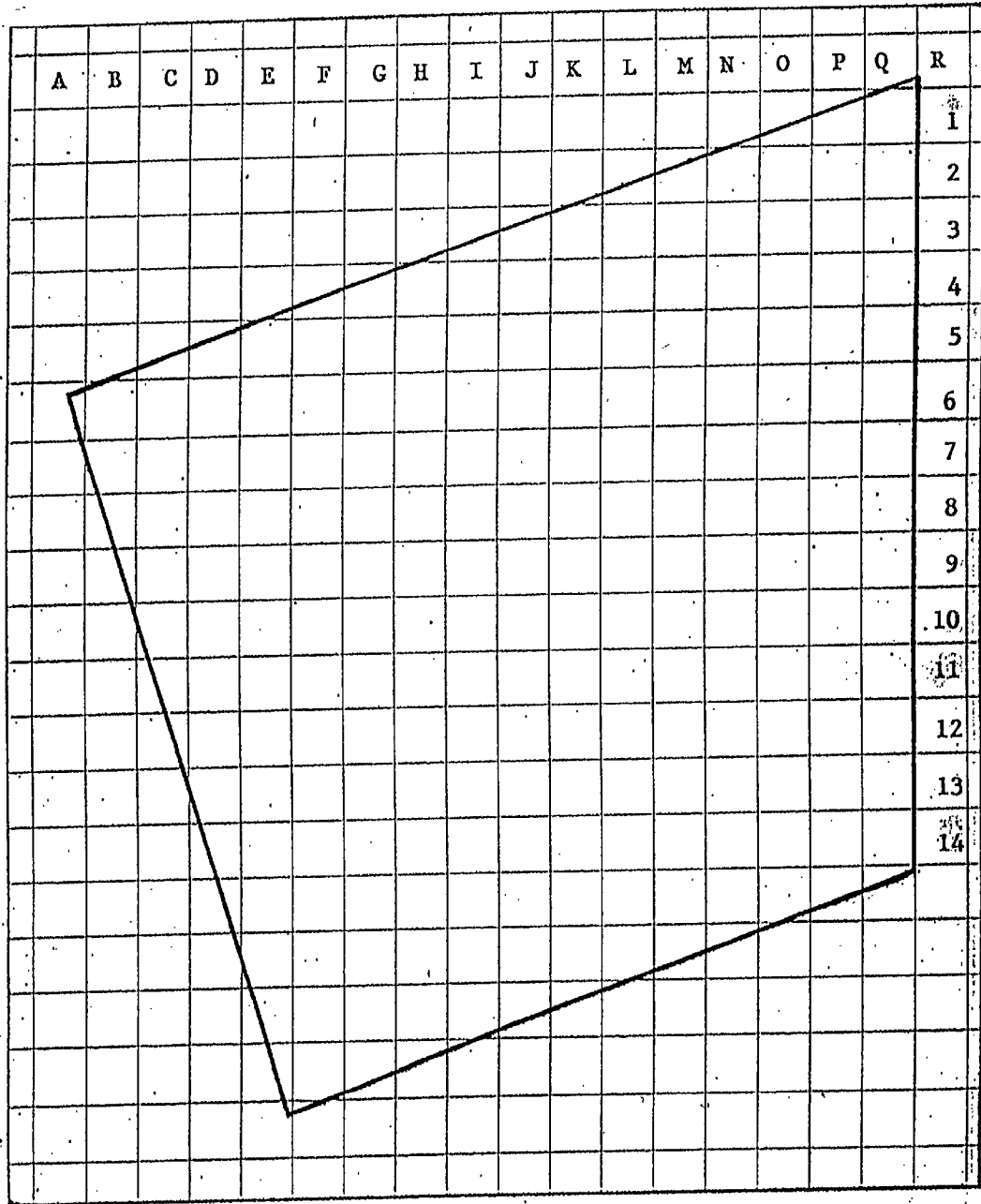
N.1.8

AWOIS 1886, wreckage of unknown origin, was disproved as a result of survey FE-376 (1991), and therefore not assigned as part of this project. However, data collected during this survey near the reported position of AWOIS 1886 yielded three ^{approved} predicted tide corrected depths of 57 feet, one foot less than the reported 58-foot depth associated with AWOIS 1886. These three depths resulted from echosounder developments 15K1, 15K2 and SEABAT development 17I1. All three developments reveal naturally occurring boulders. See the Development Abstract for exact positions and depths.

It is the opinion of the hydrographer that none of the three 57-foot depths are not associated with AWOIS 1886. *CONCUR ✓*

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

Note: Development 5J2, centered on contact 1050.57P, has a least depth of 13.0 meters at fix # 728.4. This depth is taken from a mainscheme side scan sonar line which was run during the 1994 field season. A thorough echosounder development (fixes 5222-5229) was conducted on the same contact during the 1995 field season. The resulting least depth of 13.3 meters occurred at a position only 1 - 2 meters away. The 0.3 meter depth difference is believed to be the result of a discrepancy in predicted tides.



Survey H-10575 400-Meter Contact Development Grid

DEV	Side Scan Contact Number	Hydro Dev Positions	Least Depth (m)	ID Pos	Geographic Position	Remarks
1Q1	905.43P	1830-1839	14.72	1832.2	41°26'59.251"N 71°03'45.783"W	
1R1	956.54S	1812-1819	15.86	1817.0	41°26'50.846"N 71°03'27.590"W	
1R2	813.02S	1820-1829	14.3	1824.2	41°26'51.281"N 71°03'25.338"W	
2L1	868.21P	1872-1881	15.86	1876.2	41°26'35.335"N 71°04'59.075"W	
2L2	918.42S	1882-1895	15.4	1888.2	41°26'37.523"N 71°05'00.414"W	
2L3	899.32P	1896-1905	15.9 16.0	1898.2	41°26'39.334"N 71°05'07.008"W	
2M1	866.53P	1840-1849	13.89	1844.2	41°26'41.173"N 71°04'40.676"W	SEABAT - HDAPS FIX# 13004
2M2	867.38P	5009-5012	15.21	5011.2	41°26'38.570"N 71°04'50.157"W	SEABAT - HDAPS FIX# 13045
2M3	852.53S	1858-1871	13.0	1870.1	41°26'38.546"N 71°04'45.743"W	SEABAT - HDAPS FIX# 13005
3H1	894.15S	5019-5046	13.85	5037.3	41°26'21.816"N 71°06'18.551"W	SEABAT - HDAPS FIX# 13047
3H2	894.11P	1924-1941	12.87	1938.2	41°26'22.335"N 71°06'19.858"W	
3H3	864.07P	1942-1953	12.78	1948.3	41°26'22.286"N 71°06'19.767"W	SEABAT - HDAPS FIX# 13006
3I1	922.45S	2146-2157	12.82	2146.2	41°26'23.506"N 71°05'48.740"W	
3I2	872.11P	2158-2165	12.1	2162.1	41°26'23.590"N 71°05'48.969"W	SEABAT - HDAPS FIX# 13007
3J1	922.14S	2124-2133	16.21	2128.2	41°26'25.183"N 71°05'42.445"W	
3J2	871.56S	2134-2145	16.21	2140.3	41°26'27.242"N 71°05'45.244"W	
3K1	921.07S	2106-2113	16.85	2110.3	41°26'28.430"N 71°05'28.591"W	

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DEV	Side Scan Contact Number	Hydro Dev Positions	Least Depth (m)	LD Pos	Geographic Position	Remarks
3K2	919.54S	2114-2123	16.6	2116.5	41°26'33.792"N 71°05'13.991"W	SEABAT - HDAPS FIX# 13008
3L1	804.26P	2076-2087	11.25	2076.5	41°26'23.082"N 71°04'54.363"W	
3L2	820.25S	2088-2095	14.24	2089.0	41°26'26.981"N 71°04'59.529"W	
3L3	966.58P	2096-2105	10.78	2096.5	41°26'24.641"N 71°04'56.199"W	
3M1	804.37P	2044-2055	11.23	2052.4	41°26'23.404"N 71°04'52.200"W	SEABAT - HDAPS FIX# 13010
3M2	951.07P	2056-2067	11.9 12.0	2058.1	41°26'33.258"N 71°04'46.600"W	
3M3	966.39P	2068-2075	13.27	2070.4	41°26'25.002"N 71°04'52.414"W	
3M4	951.18S	3223-3234	10.23	3225.3	41°26'31.655"N 71°04'45.965"W	SEABAT - HDAPS FIX# 13009
3P1	768.50S	2014-2023	14.01	2020.2	41°26'32.391"N 71°03'57.608"W	
3P2	1042.58S	2024-2031	15.5	2028.4	41°26'27.174"N 71°03'45.235"W	
3P3	1036.43P	2032-2043	15.24	2034.2	41°26'29.760"N 71°03'53.808"W	
3Q1	716.26P	1978-1985	15.28	1978.2	41°26'22.120"N 71°03'30.816"W	
3Q2	720.11S	1986-1995	15.25	1988.3	41°26'25.534"N 71°03'40.546"W	
3Q3	1037.27S	1996-2013	13.5 16.9	1996.2	41°26'30.517"N, 379 71°03'42.932"W, 683	SEABAT - HDAPS FIX# 13011
3R1	719.15P	1954-1967	14.7 15.0	1958.3	41°26'26.937"N 71°03'27.176"W	
3R2	1093.15P	1968-1977	14.09	1974.5	41°26'25.563"N 71°03'28.618"W	SEABAT - HDAPS FIX# 13021
4G1	926.22S	2302-2311	15.0 14.9	2304.2	41°26'12.697"N 71°06'33.972"W	SEABAT - HDAPS FIX# 13016

DEV	Side Scan Contact Number	Hydro Dev Positions	Least Depth (m)	LD Pos	Geographic Position	Remarks
4H1	944.28P	2292-2301	12.86	2294.3	41°26'10.034"N 71°06'22.305"W	SEABAT - HDAPS FIX# 13015
4I1	971.29S	2284-2291	13.98	2286.2	41°26'12.977"N 71°05'50.278"W	SEABAT - HDAPS FIX# 13014
4J1	823.15P	2248-2283	12.7	2258.3	41°26'14.649"N 71°05'38.108"W	SEABAT - HDAPS FIX# 13013
4K1	997.34P	2242-2247	15.8	2242.2	41°26'15.380"N 71°05'16.922"W	
4M1	1047.19S	2236-2241	18.0	2236.2	41°26'12.334"N 71°04'45.280"W	
4N1	1085.31S	2214-2225	16.8	2222.5	41°26'06.964"N 71°04'37.076"W	
4N2	723.18S	2226-2235	15.6	2226.2	41°26'14.689"N 71°04'21.408"W	
4P1	671.30S	2198-2213	14.76	2200.2	41°26'09.769"N 71°04'00.615"W	SEABAT - HDAPS FIX# 13012
4P2	1043.38P	5230-5237	13.97	5236.2	41°26'20.755"N 71°03'55.309"W	SEABAT - HDAPS FIX# 13084
4Q1	669.39S	2166-2175	17.1	2168.2	41°26'15.778"N 71°03'34.956"W	
4Q2	1140.42P	2188-2197	16.43	2190.2	41°26'14.049"N 71°03'30.599"W	
4Q3	1143.51S	2176-2187	18.0	2184.0	41°26'10.481"N 71°03'26.943"W	
5A	--	3486-3495	14.86	3490.3	41°25'55.473"N 71°08'13.554"W	AWOIS 9375
5A1	5069.39S	5126-5141	15.45	5140.2	41°25'55.132"N 71°08'11.459"W	AWOIS 9375
5A2	5069.22P	5142-5155	15.8	5150.2	41°25'51.835"N 71°08'14.075"W	
5A4	5075.27P	5156-5159	17.0	5158.3	41°25'56.832"N 71°08'08.331"W	AWOIS 9375
5B1	5073.15S	5170-5177	14.97	5176.4	41°25'57.561"N 71°08'02.236"W	

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DEV	Side Scan Contact Number	Hydro Dev Positions	Least Depth (m)	LD Pos	Geographic Position	Remarks
5F1	942.11P	2434-2439	17.88	2436.3	41°26'02.904"N 71°06'53.882"W	
5G1	974.39S	2422-2433	10.87	2424.2	41°26'03.075"N 71°06'27.548"W	SEABAT - HDAPS FIX# 13017
5H1	826.17P	5047-5050	14.82	5047.3	41°26'06.463"N 71°06'19.309"W	SEABAT - HDAPS FIX# 13048
5H2	1017.55P	2406-2417	12.84	2408.4	41°25'56.673"N 71°06'10.960"W	SEABAT - HDAPS FIX# 13018
5H3	973.49S	2418-2421	15.86	2418.3	41°26'05.445"N 71°06'17.595"W	
5I1	778.31S	2386-2397	13.85	2396.3	41°26'00.993"N 71°06'03.113"W	SEABAT - HDAPS FIX# 13019
5J1	1051.02P	2368-2385	14.76	2378.3	41°25'58.993"N 71°05'33.544"W	SEABAT - HDAPS FIX# 13020
5J2	1050.57P	719-740* 5222-5229	13.82	728.4	41°25'56.774"N 71°05'32.721"W	SEABAT - HDAPS FIX# 13083 *Least depth from mainscheme hydro
5L1	1102.47S	2348-2353	19.4 20.6	2350.2	41°25'56.594"N 71°05'08.635"W	
5L2	1082.22S	2354-2361	16.82	2358.3	41°25'59.578"N 71°05'05.123"W	
5L3	708.28S	2362-2367	17.84	2362.2	41°25'55.936"N 71°05'04.510"W	
5M1	1134.11P	2338-2341	14.76	2340.5	41°25'56.241"N 71°04'40.012"W	
5M2	675.18S	2342-2343	16.1	2342.0	41°25'57.882"N 71°04'46.053"W	
5M3	1101.12P	2344-2347	14.83	2346.1	41°25'59.899"N 71°04'40.827"W	
5N1	1135.00P	5017-5018	13.83	5017.2	41°25'55.599"N 71°04'35.634"W	SEABAT - HDAPS FIX# 13046
5N2	1135.31S	2336-2337	14.2	2336.2	41°25'57.776"N 71°04'29.909"W	
5O1	673.01P	2320-2325	16.84	2324.3	41°26'02.651"N 71°04'19.482"W	

DEV	Side Scan Contact Number	Hydro Dev Positions	Least Depth (m)	LD Pos	Geographic Position	Remarks
5P1	1138.40S	2312-2319	16.97	2314.2	41°26'06.327"N 71°03'53.819"W	
6A	885.30P	3464-3469	14.9 15.1	3465.0	41°25'52.720"N 71°08'16.358"W	AWOIS 9375
6A1	934.21S	1712-1723	16.9	1720.2	41°25'47.846"N 71°08'12.338"W	
6A2	883.43P	5120-5125	13.82	5124.2	41°25'47.347"N 71°08'18.538"W	AWOIS 9374 SEABAT - HDAPS FIX# 13082
6A4	882.44S	5160-5169	14.9	5162.3	41°25'53.085"N 71°08'06.948"W	AWOIS 9375
6B1	937.59S	1730-1735	19.43	1734.0	41°25'47.292"N 71°07'46.153"W	
6B2	888.19S	1736-1743	16.85	1736.0	41°25'52.459"N 71°08'04.710"W	
6C1	980.24S	3496-3499	16.8	3496.3	41°25'47.425"N 71°07'35.787"W	
6G	--	5178-5197	13.86	5196.2	41°25'44.844"N 71°06'29.504"W	37-foot Charted Sounding
6G1	992.01S	2578-2585	13.0 12.9	2582.2	41°25'53.890"N 71°06'33.935"W	
6G2	732.26P	2586-2591	15.70	2586.3	41°25'43.514"N 71°06'23.042"W	
6G3	1054.37P	2592-2599	13.71	2594.3	41°25'46.401"N 71°06'22.021"W	
6H1	1053.49S	2552-2557	15.01	2552.2	41°25'50.791"N 71°06'12.098"W	
6H2	1054.33S	2558-2571	13.0	2568.2	41°25'47.972"N 71°06'22.307"W	SEABAT - HDAPS FIX# 13026
6H3	1017.24S	2572-2577	15.3	2572.2	41°25'52.550"N 71°06'13.755"W	
6I	--	5198-5221	13.1 12.9	5202.2	41°25'46.530"N 71°06'00.159"W	37-foot Charted Sounding
6I1	703.38S	2526-2535	13.7	2526.2	41°25'42.852"N 71°06'04.016"W	SEABAT - HDAPS FIX# 13025

DEV	Side Scan Contact Number	Hydro Dev Positions	Least Depth (m)	LD Pos	Geographic Position	Remarks
6I2	703.46P	2536-2545	13.87	2536.2	41°25'42.988"N 71°06'04.004"W	
6I3	704.49P	2546-2551	16.2	2548.3	41°25'47.724"N 71°05'49.879"W	
6J1	678.39S	2522-2525	17.23	2524.3	41°25'47.168"N 71°05'33.325"W	
6L1	1150.55P	2506-2513	17.1	2508.3	41°25'44.246"N 71°05'03.500"W	
6L2	676.11S	2514-2521	17.24	2516.2	41°25'54.556"N 71°05'01.102"W	
6M1	1149.37P	2486-2491	15.9	2486.3	41°25'49.107"N 71°04'44.714"W	
6M2	1133.21P	2492-2499	19.0 18.4	2494.2	41°25'52.940"N 71°04'55.695"W	
6M3	1149.31S	2500-2505	16.0	2502.2	41°25'50.277"N 71°04'45.877"W	
6N1	1148.37P	2470-2475	14.3	2470.3	41°25'51.023"N 71°04'33.777"W	SEABAT - HDAPS FIX# 13024
6N2	618.49P	2476-2485	15.0	2478.3	41°25'43.548"N 71°04'38.500"W	SEABAT - HDAPS FIX# 13023
6O1	1194.05P	2458-2463	16.6	2460.2	41°25'43.710"N 71°04'19.740"W	SEABAT - HDAPS FIX# 13022
6O2	1231.50P	2464-2469	17.4	2464.2	41°25'42.608"N 71°04'08.925"W	
6P1	457.39S	2452-2457	17.2	2454.3	41°25'42.922"N 71°03'57.647"W	
6Q1	1238.48S	2440-2451	17.9	2446.3	41°25'43.360"N 71°03'47.858"W	
7A1	936.36S	1744-1749	18.4	1746.2	41°25'39.824"N 71°08'08.252"W	
7A2	936.02S	1750-1755	20.1	1750.2	41°25'39.178"N 71°08'16.032"W	
7B1	790.02P	1756-1765	17.4	1762.2	41°25'38.530"N 71°07'58.672"W	

DEV	Side Scan Contact Number	Hydro Dev Positions	Least Depth (m)	ID Pos	Geographic Position	Remarks
7B2	1007.59P	1766-1777	17.0	1768.1	41°25'30.379"N 71°08'01.904"W	
7C1	744.19P	1780-1789	16.3	1786.2	41°25'32.224"N 71°07'39.168"W	
7C2	1008.58S	1790-1803	17.5	1798.2	41°25'28.980"N 71°07'47.689"W	
7C3	987.16S	1804-1811	16.8	1804.2	41°25'36.660"N 71°07'39.580"W	
7E1	735.01P	3392-3399	14.4	3394.3	41°25'35.347"N 576 71°06'57.691"W 223	AWOIS 9289
7E2	698.45P	3354-3369	15.8	3364.3 3356.3	41°25'29.631"N 71°07'04.384"W	AWOIS 9289 SEABAT - HDAPS FIX# 13027
7E3	1072.19P	3400-3405	16.4	3402.1	41°25'33.091"N 71°07'02.276"W	AWOIS 9289
7E4	1057.58P	3384-3391	16.9 17.0	3386.3	41°25'33.707"N 71°07'06.241"W	AWOIS 9289 SEABAT - HDAPS FIX# 13028
7E5	1071.50S	3368-3369	15.9 16.0	3368.3	41°25'29.692"N 71°07'04.329"W	AWOIS 9289
7E6	735.46P	3376-3383	16.7	3376.2	41°25'31.318"N 71°07'06.235"W	AWOIS 9289
7E7	735.42P	3370-3375	15.8	3374.6	41°25'32.731"N 71°07'03.920"W	AWOIS 9289
7F1	1110.48S	3452-3459	16.8	3452.2	41°25'28.857"N 71°06'53.614"W	AWOIS 9289 SEABAT - HDAPS FIX# 13029
7F2	700.23S	3500-3507	16.4	3500.3	41°25'32.745"N 71°06'43.532"W	
7F3	1109.55S	3508-3513	17.3	3512.4	41°25'32.205"N 71°06'41.501"W	
7G1	1124.52P	3514-3521	15.4	3514.3	41°25'28.961"N 71°06'30.677"W	SEABAT - HDAPS FIX# 13030
7G2	733.08P	5051-5054	13.8	5053.3	41°25'41.407"N 71°06'32.500"W	SEABAT - HDAPS FIX# 13049
7H1	1107.11S	3528-3533	13.4	3530.4	41°25'41.258"N 71°06'05.133"W	SEABAT - HDAPS FIX# 13031

DEV	Side Scan Contact Number	Hydro Dev Positions	Least Depth (m)	ID Pos	Geographic Position	Remarks
7H2	683.08S	3540-3547	15.7	3542.4	41°25'37.797"N 71°06'07.389"W	SEABAT - HDAPS FIX# 13032
7H3	703.04P	3548-3549	14.56	3548.4	41°25'41.574"N 71°06'08.464"W	
7H4	--	3534-3539	12.4	3536.3	41°25'40.498"N 71°06'05.660"W	
7I1	1127.54P	3550-3561	14.9 15.0	3560.2	41°25'37.500"N 71°05'58.253"W	SEABAT - HDAPS FIX# 13034
7I2	1127.40S	3562-3567	13.9 14.0	3562.3	41°25'35.417"N 71°05'59.252"W	SEABAT - HDAPS FIX# 13033
7J1	1177.00S	3568-3573	17.0	3568.3	41°25'29.367"N 71°05'38.581"W	
7J2	635.59S	3574-3577	17.78	3576.3	41°25'35.134"N 71°05'35.736"W	
7K1	1198.14S	3578-3583	17.78	3580.4	41°25'32.702"N 71°05'15.541"W	
7L1	633.42P	3584-3589	16.72	3584.2	41°25'40.599"N 71°05'03.392"W	
7M1	492.07S	3590-3595	16.89	3590.3	41°25'34.666"N 71°04'40.203"W	SEABAT - HDAPS FIX# 13035
7N1	1230.32S	3346-3353	18.96	3350.2	41°25'37.158"N 71°04'23.273"W	
7N2	1229.44P	3596-3601	17.07	3600.2	41°25'36.660"N 71°04'33.707"W	
7N3	1230.14P	3602-3607	18.34	3602.3	41°25'38.329"N 71°04'27.713"W	
7O1	1230.59P	3328-3337	16.07	3332.2	41°25'40.137"N 71°04'18.779"W	SEABAT - HDAPS FIX# 13036
7O2	1276.29P	3338-3345	17.2	3340.4	41°25'30.073"N 71°04'15.284"W	SEABAT - HDAPS FIX# 13037
7P1	1277.53P	3303-3311	17.45	3308.3	41°25'34.312"N 71°03'58.322"W	
7P2	1239.59S	3312-3319	18.72	3312.2	41°25'39.020"N 71°04'02.207"W	

DEV	Side Scan Contact Number	Hydro Dev Positions	Least Depth (m)	LD Pos	Geographic Position	Remarks
7P3	1277.49P	3320-3327	18.76	3322.2	41°25'34.863"N 71°03'59.577"W	
7Q1	405.18S	3235-3244	18.0 17.9	3241.4	41°25'29.173"N 71°03'39.436"W	
7Q2	1283.15P	3245-3256	17.73	3253.3	41°25'31.170"N 71°03'39.056"W	
8A1	1007.01P	3786-3791	18.74	3786.2	41°25'26.638"N 71°08'12.106"W	
8B1	1063.18S	3774-3779	17.76	3776.3	41°25'27.738"N 71°07'51.766"W	
8B2	742.43S	3780-3785	17.9 18.1	3780.3	41°25'24.788"N 71°07'58.092"W	
8C1	689.51S	3768-3773	17.73	3770.4	41°25'16.766"N 71°07'33.651"W	AWOIS 1905
8E1	1111.15S	3406-3417	15.76	3412.3	41°25'27.578"N 71°06'59.569"W	AWOIS 9288 SEABAT - HDAPS FIX# 13040
8E2	698.37S	3418-3427	14.87	3420.2	41°25'27.642"N 71°07'05.086"W	AWOIS 9288 SEABAT - HDAPS FIX# 13038
8E3	1122.23S	3438-3445	16.75	3438.4	41°25'19.810"N 71°06'57.563"W	AWOIS 9288 SEABAT - HDAPS FIX# 13039
8E4	687.01S	3428-3435	17.72	3434.1	41°25'26.019"N 71°06'55.406"W	AWOIS 9288
8E5	686.52S	3446-3451	16.79	3450.2	41°25'27.103"N 71°06'56.139"W	AWOIS 9288
8E6	1122.12P	3436-3437	18.77	3436.2	41°25'23.597"N 71°37'00.977"W	AWOIS 9288
8F1	1122.46S	3460-3463	17.74	3460.3	41°25'22.348"N 71°06'53.543"W	AWOIS 9288
8F2	685.51P	3752-3759	17.1	3758.3	41°25'27.559"N 71°06'41.994"W	
8F3	686.35P	3760-3767	16.6	3762.4	41°25'25.542"N 71°06'51.541"W	
8G1	1124.31P	3734-3739	16.8	3738.2	41°25'28.365"N 71°06'34.495"W	

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DEV	Side Scan Contact Number	Hydro Dev Positions	Least Depth (m)	ID Pos	Geographic Position	Remarks
8G2	1158.04S	3740-3745	16.4 /	3744.4	41°25'23.405"N 71°06'35.805"W	SEABAT - HDAPS FIX# 13041
8G3	1124.10P	3746-3751	16.2 /	3746.3	41°25'27.603"N 71°06'38.742"W	SEABAT - HDAPS FIX# 13042
8H1	1156.51P	3728-3733	16.6 /	3728.3	41°25'24.925"N 71°06'19.670"W	
8I1	1175.44P	3706-3713	17.3 /	3710.1	41°25'26.376"N 71°05'58.022"W	
8I2	1175.20P	3714-3721	16.8 /	3716.3	41°25'25.544"N 71°06'00.448"W	
8I3	613.19P	3722-3727	16.6 /	3724.4	41°25'24.131"N 71°05'57.681"W	
8J1	1223.28P	3700-3705	16.98	3704.3	41°25'18.468"N 71°05'47.801"W	
8K1	1246.21S	3688-3693	18.2 /	3690.3	41°25'18.239"N 71°05'27.047"W	AWOIS 1898
8K2	1226.06S	3694-3699	17.6 /	3698.3	41°25'23.368"N 71°05'14.987"W	AWOIS 1898
8L1	444.11P	3682-3687	15.2 /	3684.3	41°25'19.946"N 71°05'12.916"W	AWOIS 1898 SEABAT - HDAPS FIX# 13053
8M1	1243.09S	3676-3681	18.97	3676.3	41°25'29.030"N 71°04'44.182"W	AWOIS 1898
8N1	1275.43S	3658-3665	18.98	3664.2	41°25'26.074"N 71°04'24.171"W	
8N2	1286.59S	3666-3669	19.97	3666.3	41°25'22.585"N 71°04'24.636"W	
8N3	1287.56S	3670-3675	17.76	3670.3	41°25'16.350"N 71°04'34.755"W	AWOIS 1898
8O1	1286.25P	3642-3645	20.34	3642.3	41°25'23.906"N 71°04'13.061"W	
8O2	1285.46S	3646-3651	17.9 /	3650.2	41°25'25.812"N 71°04'09.601"W	
8O3	1323.57S	3652-3657	18.8 /	3652.3	41°25'17.100"N 71°04'15.663"W	

DEV	Side Scan Contact Number	Hydro Dev Positions	Least Depth (m)	LD Pos	Geographic Position	Remarks
8P1	1325.37P	3640-3641	19.3 /	3640.3	41°25'25.392"N 71°03'57.778"W	
8Q1	365.53S	3628-3633	17.89	3630.2	41°25'25.311"N 71°03'41.219"W	
8Q2	1373.50P	3634-3639	17.72	3636.3	41°25'18.508"N 71°03'34.447"W	
8R1	1374.14S	3608-3617	17.9 18.1	3608.5	41°25'18.126"N 71°03'29.376"W	
8R2	1374.42S	3618-3627	18.56	3622.1	41°25'20.210"N 71°03'21.020"W	
9B1	1117.36P	3792-3814	17.56	3813.4	41°25'08.077"N 71°07'58.437"W	
9C1	690.13S	3815-3820	17.79	3815.2	41°25'15.198"N 71°07'38.523"W	AWOIS 1905
9E1	641.52S	3821-3826	18.46	3821.2	41°25'15.611"N 71°06'56.584"W	
9E2	1206.59S	3827-3828	20.87	3828.0	41°25'02.941"N 71°07'15.886"W	
9F1	1218.24P	3829-3832	18.9 19.1	3831.2	41°25'03.778"N 71°06'48.059"W	
9F2	482.18P	3833-3838	18.24	3833.3	41°25'08.219"N 71°06'47.781"W	
9F3	609.49P	3839-3842	18.88	3841.3	41°25'13.456"N 71°06'47.088"W	
9G1	1219.29P	3843-3848	19.8 /	3845.2	41°25'06.389"N 71°06'35.345"W	
9H1	1220.36P	3849-3852	19.82	3849.4	41°25'09.725"N 71°06'24.124"W	
9J1	1247.12S	3853-3858	17.8 /	3853.2	41°25'15.716"N 71°05'37.583"W	AWOIS 1898
9K1	1294.07P	3859-3864	17.73	3859.4	41°25'05.382"N 71°05'24.985"W	
9K2	1271.06S	3865-3868	18.9 19.0	3865.2	41°25'12.456"N 71°05'19.936"W	AWOIS 1898

DEV	Side Scan Contact Number	Hydro Dev Positions	Least Depth (m)	LD Pos	Geographic Position	Remarks
9L1	1319.25P	3869-3874	18.78	3869.2	41°25'06.339"N 71°05'11.299"W	AWOIS 1898
9L2	1320.32P	3875-3878	18.7	3877.3	41°25'09.393"N 71°04'57.677"W	AWOIS 1898
9O1	1334.03S	3879-3880	19.6	3879.3	41°25'14.347"N 71°04'16.062"W	
9P1	1378.07P	3881-3886	17.43	3883.3	41°25'07.639"N 71°03'49.343"W	
9P2	1378.44S	3887-3890	18.32	3889.3	41°25'07.590"N 71°03'57.792"W	
9Q1	1377.42S	5090-5095	17.0 16.8	5090.2	41°25'10.178"N 71°03'44.137"W	SEABAT - HDAPS FIX# 13075
9R1	315.33P	3897-3899.3	16.9	3899.2	41°25'11.978"N 71°03'25.428"W	
9R4	--	5096-5101	16.43	5100.2	41°25'10.745"N 71°03'29.364"W	SEABAT - HDAPS FIX# 13076
10D1	1214.59P	3993-4000	18.9	3997.2	41°24'51.307"N 71°07'28.964"W	
10D2	1214.58S	4001-4008	18.76	4005.2	41°24'50.477"N 71°07'28.744"W	
10E1	480.41P	3987-3992	19.1	3991.3	41°25'02.663"N 71°07'07.587"W	
10F1	470.53S	3971-3978	18.87	3971.2	41°25'00.357"N 71°06'49.947"W	
10F2	1263.35P	3979-3986	18.87	3983.2	41°24'53.142"N 71°06'52.173"W	
10G1	1299.28S	5055-5060	16.7	5059.2	41°24'51.194"N 71°06'30.832"W	SEABAT - HDAPS FIX# 13050
10G2	1251.19P	3951-3958	18.8	3951.3	41°25'00.729"N 71°06'31.140"W	
10G3	1265.12P	3959-3962	17.8	3961.1	41°24'55.755"N 71°06'35.313"W	
10G4	437.10S	3963-3970	17.7	3967.3	41°24'56.184"N 71°06'35.564"W	

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DEV	Side Scan Contact Number	Hydro Dev Positions	Least Depth (m)	LD Pos	Geographic Position	Remarks
10H1	1297.33S	3941-3942	19.4	3941.2	41°24'57.763"N 71°06'07.848"W	Rej
10I1	394.26S	3935-3940	17.46	3935.3	41°24'55.657"N 71°05'47.980"W	
10J1	1340.27P	3923-3928	18.45	3927.2	41°24'52.896"N 71°05'34.681"W	AWOIS 1898
10J2	1363.02P	3929-3934	17.5	3931.4	41°24'50.057"N 71°05'35.836"W	AWOIS 1898
10O1	279.36S	3917-3922	17.24	3917.2	41°24'53.204"N 71°04'19.740"W	AWOIS 1898
10Q1	1441.21S	3913-3916	19.8	3913.1	41°24'57.079"N 71°03'42.558"W	
10R1	1445.29S	3909-3912	18.6	3911.2	41°24'59.560"N 71°03'25.583"W	
11D1	1303.00S	4009-4014	21.7	4014.0	41°24'40.437"N 71°07'17.901"W	
11F1	1300.01S	5061-5062	17.87	5061.2	41°24'49.172"N 71°06'39.672"W	SEABAT - HDAPS FIX# 13051
11G1	345.29P	4107-4114	18.4	4109.4	41°24'41.199"N 71°06'28.422"W	
11G2	1312.42S	5063-5068	17.32	5067.2	41°24'42.420"N 71°06'31.553"W	SEABAT - HDAPS FIX# 13052
11H1	1343.34P	4087-4092	17.78	4089.4	41°24'42.867"N 71°06'12.562"W	
11H2	1359.06S	4093-4096	17.46	4093.3	41°24'37.918"N 71°06'16.589"W	
11H3	1313.51S	4097-4106	18.37	4099.5	41°24'45.038"N 71°06'17.157"W	
11I1	1341.46S	4079-4086	17.33	4079.3	41°24'49.591"N 71°05'51.293"W	SEABAT - HDAPS FIX# 13043
11J1	349.45S	4067-4078	16.9	4069.2	41°24'49.666"N 71°05'34.099"W	AWOIS 1898 SEABAT - HDAPS FIX# 13044
11M1	1451.58S	4053-4060	17.34	4053.3	41°24'40.377"N 71°04'38.604"W	AWOIS 1898

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DEV	Side Scan Contact Number	Hydro Dev Positions	Least Depth (m)	LD Pos	Geographic Position	Remarks
11N1	1511.07S	5102-5105	17.0 16.9	5104.3	41°24'40.872"N 71°04'31.316"W	AWOIS 1898 SEABAT - HDAPS FIX# 13077
11N2	1150.56S	4023-4028	17.9	4025.2	41°24'43.585"N 71°04'26.887"W	AWOIS 1898 SEABAT - HDAPS FIX# 13054
11O1	1473.25P	4061-4066	18.87	4061.3	41°24'37.804"N 71°04'21.143"W	AWOIS 1898
11Q1	1511.07S	4035-4040	17.85	4037.3	41°24'44.117"N 71°03'30.891"W	
11Q2	1470.08P	4041-4046	20.1	4043.1	41°24'47.612"N 71°03'43.412"W	
11Q3	1514.10S	4047-4052	18.1	4047.3	41°24'40.624"N 71°03'33.295"N	
11R1	192.23S	4029-4034	15.71	4031.3	41°24'38.227"N 71°03'27.542"W	SEABAT - HDAPS FIX# 13001
12C1	1350.14S	4279-4286	19.71	4281.2	41°24'25.048"N 71°07'35.184"W	
12C2	1307.20P	4287-4294	20.0 19.9	4293.3	41°24'29.177"N 71°07'39.013"W	
12C3	1307.44P	4295-4296	19.87	4295.2	41°24'31.021"N 71°07'34.388"W	
12D1	1353.47P	4273-4278	19.84	4273.3	41°24'24.516"N 71°07'18.562"W	
12E1	1354.55S	4267-4272	19.88	4269.3	41°24'23.645"N 71°07'05.250"W	
12F1	344.31P	4249-4254	19.70	4253.2	41°24'36.153"N 71°06'40.448"W	
12F2	300.12P	4255-4258	19.87	4257.2	41°24'25.102"N 71°06'40.526"W	
12F3	1356.09S	4259-4266	20.70	4261.2	41°24'27.019"N 71°06'49.270"W	
12G1	330.55P	4231-4236	17.0	4231.2	41°24'32.331"N 71°06'24.367"W	
12G2	331.11P	4237-4242	19.2	4237.3	41°24'31.270"N 71°06'27.291"W	

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12G3	331.30P	4243-4248	18.88	4245.2	41°24'30.103"N 71°06'31.609"W	
12H1	302.31S	4203-4206	18.81	4203.2	41°24'30.174"N 71°06'09.577"W	
12H2	1389.49P	4207-4212	18.79	4209.3	41°24'31.761"N 71°06'14.565"W	
12H3	330.20P	4213-4220	17.71	4217.3	41°24'33.941"N 71°06'16.275"W	
12H4	--	4221-4230	16.89	4227.2	41°24'36.934"N 71°06'16.077"W	
12I1	303.23S	4197-4202	18.74	4199.2	41°24'32.776"N 71°05'58.734"W	
12J1	1409.01S	4185-4188	19.61	4187.2	41°24'35.971"N 71°05'35.436"W	
12J2	286.20P	4191-4196	20.74	4193.3	41°24'30.392"N 71°05'44.050"W	
12K1	1433.36P	4179-4184	18.72	4179.2	41°24'35.841"N 71°05'21.149"W	AWOIS 1898
12M1	225.09P	4161-4166	18.88	4161.2	41°24'29.428"N 71°04'50.662"W	AWOIS 1898
12M2	1505.12P	4167-4172	19.74	4167.2	41°24'28.409"N 71°04'44.905"W	AWOIS 1898
12M4	1504.46P	5106-5107	18.70	5106.1	41°24'28.658"N 71°04'51.236"W	AWOIS 1898 SEABAT - HDAPS FIX# 13078
12N1	1505.54S	4139-4146	17.89	4143.4	41°24'29.284"N 71°04'35.970"W	
12N2	1520.38S	4147-4154	17.81 18.0	4153.2	41°24'24.820"N 71°04'37.827"W	
12N3	1506.29S	4155-4160	18.75	4155.2	41°24'31.235"N 71°04'28.585"W	
12Q1	1559.14S	4127-4132	17.46	4129.3	41°24'26.769"N 71°03'43.507"W	
12Q2	1555.08P	4133-4138	18.91	4135.2	41°24'35.473"N 71°03'31.852"W	

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DEV	Side Scan Contact Number	Hydro Dev Positions	Least Depth (m)	LD Pos	Geographic Position	Remarks
13C1	1350.18P	4297-4302	18.84	4301.2	41°24'23.174"N 71°07'35.081"W	SEABAT - HDAPS FIX# 13072
13C2	1352.10S	4303-4310	17.71	4305.2	41°24'16.936"N 71°07'35.561"W	
13D1	335.02S	4313-4318	17.9	4317.3	41°24'19.301"N 71°07'19.474"W	
13D2	335.46P	4333-4338	18.2	4337.2	41°24'16.530"N 71°07'25.971"W	
13D3	1353.18S	4325-4332	17.9	4329.2	41°24'20.256"N 71°07'22.517"W	
13D4	--	4319-4324	19.01	4319.2	41°24'19.834"N 71°07'16.608"W	
13E1	1400.41P	4339-4344	17.71	4342.0	41°24'15.396"N 71°07'08.611"W	
13E2	1400.13S	4345-4350	17.76	4345.3	41°24'12.060"N 71°07'10.344"W	
13F1	1403.11P	4351-4354 4361-4362	19.72	4361.2	41°24'22.615"N 71°06'39.456"W	
13F2	1393.05S	4355-4360	19.70	4359.2	41°24'23.886"N 71°06'55.461"W	
13G1	1403.36P	4363-4368	16.6	4365.2	41°24'23.392"N 71°06'34.581"W	SEABAT - HDAPS FIX# 13074
13H1	1428.39S	4369-4374	19.0	4371.4	41°24'18.403"N 71°06'22.600"W	
13H2	1460.30S	4375-4382	20.0	4379.2	41°24'16.867"N 71°06'17.052"W	
13H3	1460.58P	4383-4394	19.72	4387.2	41°24'13.415"N 71°06'20.982"W	
13J1	1480.35S	4395-4396	21.07	4395.2	41°24'18.571"N 71°05'40.748"W	
13J2	1500.21P	4397-4404	21.2	4399.2	41°24'13.658"N 71°05'44.637"W	
13J3	243.48P	4405-4406	20.05	4405.2	41°24'19.399"N 71°05'41.849"W	

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DEV	Side Scan Contact Number	Hydro Dev Positions	Least Depth (m)	ID Pos	Geographic Position	Remarks
13L1	1548.07P	4407-4418	15.8	4413.2	41°24'11.535"N 71°05'06.829"W	SEABAT - HDAPS FIX# 13002
13M1	1565.48S	4449-4456	16.12	4453.2	41°24'12.208"N 71°04'50.988"W	SEABAT - HDAPS FIX# 13003
13Q1	1600.20S	4429-4434	18.78	4433.2	41°24'23.488"N 71°03'30.902"W	
13Q2	109.40P	4435-4440	18.23	4437.2	41°24'15.546"N 71°03'37.324"W	
13Q3	1600.14S	4441-4448	19.12	4447.2	41°24'22.728"N 71°03'31.588"W	
13R1	74.35S	4419-4428	18.34	4423.3	41°24'12.297"N 71°03'28.168"W	SEABAT - HDAPS FIX# 13057
14C1	1398.10S	4657-4668	18.87	4659.3	41°24'06.918"N 71°07'32.537"W	
14D1	1398.28P	4645-4650	19.12	4647.3	41°24'09.193"N 71°07'30.101"W	
14D2	250.26S	5116-5119	17.86	5118.3	41°23'59.522"N 71°07'15.399"W	SEABAT - HDAPS FIX# 13081
14E1	1464.37P	4623-4628	19.4	4627.2	41°24'03.684"N 71°07'03.777"W	
14E2	1425.11P	4629-4638	17.3	4633.2	41°24'10.148"N 71°07'05.041"W	
14E3	254.15P	4639-4644	17.1	4641.4	41°24'06.327"N 71°07'11.262"W	
14F1	1462.49S	4607-4614	20.78	4613.3	41°24'10.420"N 71°06'43.916"W	
14F2	1485.46S	4617-4618	21.2	4617.2	41°24'06.063"N 71°06'40.036"W	
14F3	1487.10P	4619-4622	22.45	4621.2	41°23'59.558"N 71°06'54.438"W	
14G1	1484.38S	4599-4602	21.54	4601.2	41°24'08.253"N 71°06'26.828"W	
14G2	1496.34S	4603-4604	21.5	4603.4	41°24'00.612"N 71°06'29.840"W	

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DEV	Side Scan Contact Number	Hydro Dev Positions	Least Depth (m)	LD Pos	Geographic Position	Remarks
14G3	1496.15P	4605-4606	21.9 ✓	4605.3	41°24'01.509"N 71°06'34.338"W	
14H1	205.38S	4583-4590	19.5 ✓	4589.2	41°24'05.168"N 71°06'07.524"W	
14H2	1529.24P	4591-4594	21.7 ✓	4593.2	41°24'00.895"N 71°06'07.459"W	
14H3	1530.02P	4595-4598	21.7 ✓	4595.2	41°23'59.810"N 71°06'14.175"W	
14I1	1498.56P	4573-4578	20.2 ✓	4573.2	41°24'09.006"N 71°06'01.642"W	
14I2	1528.23S	4579-4582	20.6 ✓	4581.1	41°24'07.228"N 71°05'58.233"W	
14J1	1546.23P	4555-4570	19.4 ✓	4567.2	41°24'05.669"N 71°05'29.830"W	
14J2	180.53S	4571-4572	19.9 ✓	4571.2	41°24'05.792"N 71°05'29.706"W	
14K1	1568.22P	4533-4540	18.8 ✓	4537.2	41°24'02.959"N 71°05'15.057"W	
14K2	161.49P	4541-4546	19.1 ✓	4543.4	41°24'05.084"N 71°05'23.301"W	
14K3	1546.41S	4547-4554	17.9 ✓	4553.1	41°24'08.331"N 71°05'27.821"W	SEABAT - HDAPS FIX# 13056
14L1	1593.21P	5108-5111	17.7 ✓	5110.2	41°24'03.022"N 71°04'56.950"W	SEABAT - HDAPS FIX# 13079
14M1	1593.41P	4517-4524	18.8 ✓	4519.3	41°24'04.961"N 71°04'53.677"W	SEABAT - HDAPS FIX# 13055
14N1	1608.40P	4497-4504	19.0 ✓	4499.4	41°24'00.853"N 71°04'31.443"W	
14N2	105.30S	4505-4512	17.8 ✓	4509.3	41°23'59.586"N 71°04'31.236"W	
14N3	1637.56P	4513-4516	19.0 ✓ 18.9	4513.5	41°23'56.848"N 71°04'33.568"W	
14N4	1638.35P	4733-4738	19.4 ✓	4737.2	41°24'00.750"N 71°04'27.624"W	

DEV	Side Scan Contact Number	Hydro Dev Positions	Least Depth (m)	LD Pos	Geographic Position	Remarks
14O1	1639.30P	4489-4496	16.4	4493.3	41°24'03.425"N 71°04'16.729"W	
14P1	1647.06S	4479-4488	19.1	4487.2	41°24'04.948"N 71°03'46.586"W	
14Q1	1646.06P	4467-4472	17.5	4469.2	41°24'05.586"N 71°03'35.119"W	SEABAT - HDAPS FIX# 13058
14Q2	1646.48S	4473-4478	18.89	4473.2	41°24'04.854"N 71°03'43.228"W	
14R1	1685.46S	4457-4464	20.56	4459.2	41°24'02.199"N 71°03'26.842"W	
15D1	1488.58S	4669-4676	18.45	4675.3	41°23'57.863"N 71°07'15.366"W	SEABAT - HDAPS FIX# 13071
15E1	1534.19S	4677-4678	21.5	4677.2	41°23'49.349"N 71°07'00.077"W	
15E2	1493.07S	4679-4684	20.23	4679.3	41°23'49.782"N 71°17'11.250"W	SEABAT - HDAPS FIX# 13070
15F1	1495.17S	4685-4692	19.9	4691.2	41°23'56.879"N 71°06'45.683"W	SEABAT - HDAPS FIX# 13069
15H1	137.57P	4693-4698	21.1	4697.2	41°23'50.835"N 71°06'05.489"W	
15H2	1530.29P	4809-4812	21.31	4811.2	41°23'57.078"N 71°06'18.219"W	
15H3	1573.28P	4813-4814	22.86	4813.1	41°23'50.581"N 71°06'07.395"W	
15I1	1588.33P	4795-4798	21.70	4795.2	41°23'48.820"N 71°05'56.703"W	
15I2	1588.07S	4799-4802	21.88	4801.2	41°23'46.189"N 71°06'01.600"W	
15I3	1572.18P	4803-4808	21.1 28.9	4807.2	41°23'51.851"N 71°05'55.015"W	
15J1	1615.11S	4781-4786	18.78	4785.2	41°23'46.770"N 71°05'41.839"W	SEABAT - HDAPS FIX# 13063
15J2	1615.07P	4787-4792	19.3	4791.2	41°23'45.716"N 71°05'40.500"W	

DEV	Side Scan Contact Number	Hydro Dev Positions	Least Depth (m)	ID Pos	Geographic Position	Remarks
15J3	140.34S	4793-4794	19.4	4793.3	41°23'56.195"N 71°05'30.834"W	
15K1	1612.40S	4763-4768	17.45	4765.4	41°23'53.360"N 71°05'15.502"W	SEABAT - HDAPS FIX# 13061
15K2	121.03S	4769-4774	18.7	4769.2	41°23'56.587"N 71°05'13.289"W	
15K3	122.01S	4775-4780	17.43	4777.2	41°23'53.951"N 71°05'25.328"W	SEABAT - HDAPS FIX# 13060
15L1	1611.17S	4749-4752	20.44	4749.2	41°23'57.021"N 71°05'00.393"W	
15L2	1611.37S	4753-4756	20.3	4753.2	41°23'56.303"N 71°05'04.109"W	
15L3	1611.40P	4757-4762	20.40	4759.2	41°23'53.539"N 71°05'03.742"W	
15M1	1652.46S	4739-4742	19.65	4739.3	41°23'49.926"N 71°04'49.281"W	
15M2	65.53P	4743-4748	19.3	4743.4	41°23'45.864"N 71°04'45.068"W	
15N1	1637.50P	4727-4732	16.43	4729.2	41°23'58.042"N 71°04'36.327"W	SEABAT - HDAPS FIX# 13059
15O1	1649.08S	4723-4726	17.9 18.0	4725.2	41°23'55.780"N 71°04'07.979"W	
15P1	1683.54P	4711-4716	18.6	4713.2	41°23'58.191"N 71°03'49.089"W	
15P2	18.05S	4717-4722	18.5	4719.2	41°23'48.437"N 71°03'50.600"W	
15Q1	19.10S	4705-4710	18.6	4709.2	41°23'50.725"N 71°03'36.462"W	
15R1	1688.16P	4699-4704	19.76	4701.2	41°23'56.306"N 71°03'26.864"W	
16D1	1538.35P	4815-4816	22.86	4815.2	41°23'40.794"N 71°07'15.020"W	
16F1	1584.42S	4817-4822	21.44	4821.2	41°23'35.587"N 71°06'43.530"W	

DEVELOPMENT ABSTRACT
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NOAA Ship RUDE
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DEV	Side Scan Contact Number	Hydro Dev Positions	Least Depth (m)	ID Pos	Geographic Position	Remarks
16F2	1621.00S	4823-4824	22.71	4823.2	41°23'33.112"N 71°06'44.643"W	
16G1	1576.30P	4825-4828	22.42	4827.3	41°23'42.751"N 71°06'38.206"W	
16H1	1630.08S	4829-4834	20.73	4833.2	41°23'32.378"N 71°06'09.584"W	
16I1	1631.58S	4835-4840	20.74	4839.2	41°23'38.562"N 71°05'47.686"W	
16I2	1631.32S	4841-4844	22.65	4843.2	41°23'36.995"N 71°05'52.488"W	
16J1	1632.14S	4845-4850	18.8	4847.3	41°23'38.305"N 71°05'43.802"W	SEABAT - HDAPS FIX# 13062
16K1	1633.25S	5112-5113	18.43	5112.2	41°23'42.713"N 71°05'29.412"W	SEABAT - HDAPS FIX# 13080
16L1	12.58P	4857-4862	18.5	4861.2	41°23'33.810"N 71°04'56.727"W	
16L2	1696.04S	4863-4866	19.9	4863.3	41°23'34.936"N 71°05'08.069"W	
16M1	1678.36S	4867-4868	19.6	4867.2	41°23'41.737"N 71°14'51.428"W	
16M2	1678.50S	4869-4872	18.76	4869.2	41°23'41.507"N 71°04'48.263"W	
16N1	1680.06S	4877-4882	19.0 18.8	4879.3	41°23'44.370"N 71°14'32.815"W	
16N2	1693.45S	4883-4890	18.75	4889.2	41°23'41.322"N 71°04'37.724"W	
16O1	1692.24S	4873-4876	20.1 19.9	4875.2	41°23'45.184"N 71°04'20.283"W	
17E1	1626.04P	4955-4960	23.73	4959.2	41°23'22.405"N 71°07'01.729"W	
17E2	129.43S	4961-4962	24.71	4961.1	41°23'32.777"N 71°07'03.552"W	
17F1	129.12P	4951-4954	19.65	4953.2	41°23'29.767"N 71°06'55.179"W	SEABAT - HDAPS FIX# 13073

DEV	Side Scan Contact Number	Hydro Dev Positions	Least Depth (m)	ID Pos	Geographic Position	Remarks
17G1	1671.05P	4943-4950	21.0 20.8	4949.2	41°23'20.700"N 71°06'21.622"W	SEABAT - HDAPS FIX# 13068
17H1	1671.12S	4931-4932	22.3	4931.2	41°23'19.963"N 71°06'19.334"W	
17H2	1672.29P	4933-4936	22.0 21.9	4933.5	41°23'28.083"N 71°06'05.722"W	
17H3	1659.53P	4937-4942	21.86	4937.2	41°23'28.372"N 71°06'05.181"W	
17I1	1672.43P	4913-4918	20.7	4917.2	41°23'25.602"N 71°06'02.002"W	SEABAT - HDAPS FIX# 13064
17I2	1659.23P	4919-4930	17.84	4929.2	41°23'29.940"N 71°06'00.190"W	SEABAT - HDAPS FIX# 13065
17J1	1698.20P	4907-4912	20.95	4911.2	41°23'25.616"N 71°05'35.848"W	
17K1	1697.26P	4899-4904	20.97	4901.2	41°23'29.194"N 71°05'24.869"W	
17K2	1696.38P	4905-4906	21.97	4905.3	41°23'29.352"N 71°05'13.359"W	
17L1	1696.26P	4891-4898	19.70	4893.2	41°23'30.802"N 71°05'11.221"W	
18E1	1668.14P	4963-4966	23.73	4963.2	41°23'12.160"N 71°06'56.141"W	
18G1	1702.35S	4967-4970	24.1 23.9	4969.2	41°23'13.495"N 71°06'30.592"W	
18G2	1702.14S	4971-4974	24.0 23.8	4973.2	41°23'14.939"N 71°06'26.135"W	
18H1	1700.41S	4975-4982	22.33	4977.3	41°23'19.106"N 71°06'05.940"W	
18H2	1701.26S	4983-4990	22.4 23.0	4983.2	41°23'16.717"N 71°06'15.644"W	SEABAT - HDAPS FIX# 13067
18H3	7.17P	4991-4998	21.1 20.8	4993.2	41°23'17.131"N 71°06'10.756"W	SEABAT - HDAPS FIX# 13066
18I1	1699.57P	4999-5008	22.1 21.8	5005.2	41°23'18.184"N 71°05'55.317"W	

FIX #	CONTACT	DEV.	AWOIS	FILE	VELCAST	DN	GMT	RAW DEPTH	TIDE CORR.	LEAST DEPTH	LATITUDE	LONGITUDE
13001	192.23S	11R1		11057139	95107143	110	155249	16.2	-0.9	15.3	41°24'38.214"N	71°03'27.542"W
13002	1548.07P	13L1		11482017	96114141	114	224712	16.7	-0.8	15.9	41°24'11.572"N	71°05'06.749"W
13003	1565.48S	13M1		1154555M	95114141	115	124414	16.9	-0.43	16.56	41°24'12.127"N	71°04'51.016"W
13004	866.53P	2M1		11649576	95114141	116	134641	14.1	-0.42	13.89	41°26'41.188"N	71°04'40.753"W
13005	852.53S	2M3		11650061	95114141	116	135440	13.6	-0.41	13.45	41°26'34.645"N	71°04'45.745"W
13006	894.07P	3H3		11651656	95114141	116	142118	13.1	-0.41	12.915.0	41°26'22.508"N	71°06'19.683"W
13007	872.11P	3I2		11652143	95114141	116	142918	12.0	-0.41	11.89	41°26'23.746"N	71°05'48.993"W
13008	804.26P	3L1		11652715	95114141	116	143856	11.6	-0.40	11.56	41°26'23.098"N	71°04'54.382"W
13009	951.18S	3M4		11654279	95114141	116	150459	10.6	-0.40	10.46	41°26'31.566"N	71°04'46.083"W
13010	804.37P	3M1		11654670	95114141	116	151130	11.2	-0.40	11.12	41°26'23.346"N	71°04'54.288"W
13011	1037.27S	3Q3		11658214	95114141	116	153710	13.2	0.0	13.2	41°26'30.664"N	71°03'44.623"W
13012	671.30S	4P1		11657108	95114141	116	155209	14.5	0.0	14.5	41°26'09.641"N	71°04'00.699"W
13013	823.15P	4J1		11657975	95114141	116	160634	12.9	0.0	12.9	41°26'14.613"N	71°05'38.134"W
13014	971.29S	4I1		11658260	95114141	116	161116	13.9	0.0	13.9	41°26'13.054"N	71°05'50.045"W
13015	944.28P	4H1		11658672	95114141	116	161812	12.7	0.0	12.7	41°26'10.095"N	71°06'22.308"W
13016	926.22S	4G1		11658999	95114141	116	162341	15.2	0.0	15.2	41°26'12.697"N	71°06'33.977"W
13017	974.39S	5G1		11659409	95114141	116	163030	10.9	0.0	10.9	41°26'03.092"N	71°06'27.585"W
13018	1017.55P	5H2		11660149	95114141	116	164251	12.7	0.0	12.7	41°25'56.739"N	71°06'11.142"W
13019	778.31S	5I1		11660413	95114141	116	164702	13.6	0.0	13.6	41°26'04.070"N	71°06'03.279"W
13020	1051.02P.	5J1		11660781	95114141	116	165318	14.6	-0.41	14.45	41°25'58.854"N	71°05'33.526"W
13021	1093.15P	3R2		11662088	95114141	116	171507	14.5	-0.1	14.4	41°26'25.750"N	71°03'28.685"W
13022	1194.05P	6O1		11662678	95114141	116	172501	16.6	-0.1	16.5	41°25'43.745"N	71°04'19.700"W
13023	618.49P	6N2		11662995	95114141	116	173016	15.3	-0.1	15.2	41°25'43.542"N	71°04'38.568"W
13024	1148.37P	6N1		11663364	95114141	116	173625	14.5	-0.1	14.4	41°25'51.078"N	71°04'33.842"W
13025	703.38S	6I1		11664039	95114141	116	174737	14.0	-0.2	13.8	41°25'42.911"N	71°06'03.944"W
13026	1054.33S	6H2		1166455M	95114141	116	175614	13.1	-0.2	12.9	41°25'48.026"N	71°06'22.397"W
13027	698.45P	7E2	9289	11666504	95114141	116	182847	16.2	-0.3	15.9	41°25'29.563"N	71°07'04.288"W
13028	1057.58P	7E4	9289	11667098	95114141	116	183837	17.6	-0.3	17.3	41°25'33.700"N	71°07'06.336"W
13029	1110.48S	7F1		11667401	95114141	116	184344	16.8	-0.43	16.45	41°25'29.077"N	71°06'53.625"W
13030	1124.52P	7G1		11668134	95114141	116	185553	16.0	-0.4	15.6	41°25'28.971"N	71°06'30.657"W
13031	1107.11S	7H1		11668494	95114141	116	190148	14.1	-0.4	13.7	41°25'41.286"N	71°06'04.968"W

FLX #	CONTACT	DEV.	AWOIS	FILE	VELCAST	DN	GMT	RAW DEPTH	TIDE CORR.	LEAST DEPTH	LATITUDE	LONGITUDE
13030	1124.52P	7G1		11668134	95114141	116	185553	16.0	-0.4	15.6'	41°25'28.971"N	71°06'30.657"W
13031	1107.11S	7H1		11668494	95114141	116	190148	14.1	-0.4	13.7'	41°25'41.286"N	71°06'04.962"W
13032	683.08S	7H2		11668797	95114141	116	190652	16.4	-0.34	15-916.0	41°25'37.778"N	71°06'07.350"W
13033	1127.40S	7I2		11669456	95114141	116	191751	14.3	-0.34	13.89'	41°25'35.486"N	71°05'59.172"W
13034	1127.54P	7I1		11669745	95114141	116	192242	14.8	-0.5	14.3'	41°25'37.662"N	71°05'58.369"W
13035	492.07S	7M1		11670376	95114141	116	193311	17.6	-0.35	17.0'	41°25'34.606"N	71°04'40.427"W
13036	1230.59P	7O1		11670708	95114141	116	193842	16.8	-0.35	16.23'	41°25'40.030"N	71°04'18.764"W
13037	1276.29P	7O2		11671333	95114141	116	194908	17.9	-0.36	17.23'	41°25'29.956"N	71°04'15.259"W
13038	698.37S	8E2	9288	11672622	95114141	116	201034	14.6	-0.7	13.9'	41°25'27.733"N	71°07'05.696"W
13039	1122.23S	8E3	9288	11672395	95114141	116	201653	17.3	-0.87	16.26'	41°25'19.802"N	71°06'57.424"W
13040	1111.15S	8E1	9288	11673280	95114141	116	202128	16.6	-0.87	15.89'	41°25'27.546"N	71°06'59.555"W
13041	1158.04S	8G2		11673900	95114141	116	203156	17.0	-0.87	16.23'	41°25'23.393"N	71°06'36.053"W
13042	1124.10P	8G3		11674204	95114141	116	203703	17.1	-0.98	16.23'	41°25'27.622"N	71°06'38.652"W
13043	1341.46S	11I1		11675828	95114141	116	210410	17.7	-0.9	16.8'	41°24'49.551"N	71°05'51.186"W
13044	349.45S	11J1		11676214	95114141	116	211038	17.8	-1.0	16.8'	41°24'49.665"N	71°05'34.240"W
13045	867.38P	2M2		12447086	95123140	124	130504	15.8	-0.67	15.21'	41°26'38.660"N	71°04'50.056"W
13046	1135.00S	5N1		12448943	95123140	124	133554	14.3	-0.68	13.75'	41°25'55.596"N	71°04'35.682"W
13047	894.15S	3H1		12452294	95123140	124	152155	14.7	-0.89	13.98'	41°26'21.754"N	71°06'18.364"W
13048	826.17P	5H1		12459036	95123140	124	162412	14.9	-0.78	14.21'	41°26'06.465"N	71°06'19.466"W
13049	733.08P	7G2		12459863	95123140	124	163759	14.6	-0.78	13.88'	41°25'41.425"N	71°06'32.466"W
13050	1299.28S	10G1		12460801	95123140	124	185341	17.9	-0.78	17.21'	41°24'51.167"N	71°06'30.866"W
13051	1300.01S	11F1		12461829	95123140	124	171047	18.7	-0.67	18.10'	41°24'49.148"N	71°06'39.666"W
13052	1312.42S	11G2		12462268	95123140	124	171805	18.0	-0.67	17.23'	41°24'42.312"N	71°06'31.623"W
13053	444.11P	8L1		12464031	95123140	124	174725	15.8	-0.56	15.23'	41°25'19.968"N	71°05'12.927"W
13054	1150.56S	11N2	1898	12466595	95123140	124	183011	18.1	-0.35	17.76'	41°24'43.866"N	71°04'27.001"W
13055	1593.41P	14M1		12467847	95123140	124	185103	19.0	-0.34	18.76'	41°24'04.327"N	71°04'53.646"W
13056	1546.41S	14K3		12468295	95123140	124	185831	18.6	-0.34	18.20'	41°24'08.273"N	71°05'27.905"W
13057	74.35S	13R1		12469626	95123140	124	192037	18.6	-0.23	18.23'	41°24'12.233"N	71°03'28.054"W
13058	1646.00P	14Q1		12469945	95123140	124	192552	18.0	-0.23	17.87'	41°24'05.632"N	71°03'35.115"W

FILE #	CONTACT	DEV.	AWOIS	FILE	VELCAST	DN	GMT	RAW DEPTH	TIDE CORR.	LEAST DEPTH	LATITUDE	LONGITUDE
13059	1637.50P	15N1		12470544	95123140	124	193554	16.5	-0.43	16.72	41°23'57.934"N	71°04'36.320"W
13060	122.01S	15K3		12471502	95123140	124	195154	17.7	-0.43	17.54	41°23'53.932"N	71°05'25.348"W
13061	1612.40S	15K1		12472190	95123140	124	200321	17.8	-0.43	17.75	41°23'53.267"N	71°05'15.332"W
13062	1632.14S	16J1		12472881	95123140	124	201454	19.0	-0.43	18.97	41°23'38.389"N	71°05'43.622"W
13063	1615.11S	15J1		12473161	95123140	124	201937	19.0	-0.43	18.97	41°23'46.668"N	71°05'41.739"W
13064	1672.43P	17I1		12473563	95123140	124	202615	20.5	-0.43	20.42	41°23'25.518"N	71°06'01.951"W
13065	1659.23P	17I2		12473819	95123140	124	203038	17.9	-0.43	17.86	41°23'29.972"N	71°05'59.991"W
13066	1699.57P	18I1		12474198	95123140	124	203655	22.0	-0.43	21.97	41°23'18.259"N	71°05'55.399"W
13067	7.17P	18H3		12474655	95123140	124	204421	21.5	-0.42	21.43	41°23'17.069"N	71°06'10.745"W
13068	1671.05P	17G1		12475121	95123140	124	205221	20.8	-0.42	20.76	41°23'20.654"N	71°06'21.823"W
13069	1495.17S	15F1		12476407	95123140	124	211344	20.2	-0.43	20.74	41°23'56.933"N	71°06'45.718"W
13070	1493.07S	15E2		12476910	95123140	124	212207	20.6	-0.43	20.73	41°23'49.828"N	71°07'11.322"W
13071	1488.58S	15D1		1247727M	95123140	124	212808	18.8	-0.43	18.75	41°23'57.788"N	71°07'15.312"W
13072	1352.10S	13C2		12478083	95123140	124	214140	17.5	-0.43	17.42	41°24'16.946"N	71°07'35.708"W
13073	129.12P	17F1		12475876	95123140	124	210452	19.7	-0.43	19.94	41°23'29.745"N	71°06'55.391"W
13074	1403.36P	13G1		12479061	95123140	124	215800	17.1	-0.43	16.98	41°24'23.321"N	71°06'34.584"W
13075	1377.42S	9Q1		12558501	95123140	125	161519	17.8	-0.49	17.71	41°25'10.227"N	71°03'44.205"W
13076	9R4	9R4		12559705	95123140	125	163516	17.5	-0.8	16.7	41°25'10.910"N	71°03'29.642"W
13077	1511.07S	11N1	1898	12561783	95123140	125	170956	17.8	-0.48	17.40	41°24'40.906"N	71°04'31.228"W
13078	1504.46P	12M4		12562493	95123140	125	172147	18.8	-0.48	18.40	41°24'28.670"N	71°04'51.264"W
13079	1593.21P	14L1		12563243	95123140	125	173421	18.8	-0.48	18.40	41°24'03.008"N	71°04'57.031"W
13080	1633.25S	16K1		12564528	95123140	125	175540	19.0	-0.67	18.43	41°23'42.676"N	71°05'29.378"W
13081	250.26S	14D2		12566129	95123140	125	182220	18.5	-0.67	17.98	41°23'59.648"N	71°07'15.358"W
13082	883.43P	6A2	9374	12567207	95123140	125	184018	13.8	-0.5	13.3	41°25'47.282"N	71°08'18.427"W
13083	1050.57P	5J2		12874670	95123140	128	204457	14.0	-0.49	13.71	41°25'56.935"N	71°05'32.572"W
13084	1043.38P	4P2		1287674M	95123140	128	211936	14.4	-0.68	13.86	41°26'20.810"N	71°03'55.169"W

NOTE: ALL DEPTHS ARE IN METERS.

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

O.1 Charts affected by this survey are as follows:

Chart 13218

"Block Island to Martha's Vineyard"

32nd ed. 26 June 1993

Scale: 1:80,000

Chart 13221

"Narragansett Bay"

49th ed. 17 July 1993

Scale: 1:40,000

Chart 13228

"Westport River and Approaches"

9th ed. 13 June 1992

Scale: 1:20,000

O.2 On May 8, 1995, a Danger to Navigation Report was sent to the Commander, First Coast Guard District, outlining charting discrepancies found during this survey.

See Appendix I for a complete copy of the Danger to Navigation Report, the details of which are summarized in the following tables:

DATA APPENDED TO THIS REPORT

REPORT OF DANGER TO NAVIGATION

* THESE UPDATED DEPTHS AFFECT THE FOLLOWING CHARTS:

Chart 13218 (32nd edition 26 June 93)
Chart Scale: 1:80,000

Chart 13221 (49th edition 17 July 93)
Chart Scale: 1:40,000

Chart 13228 (9th edition 13 June 92)
Chart Scale: 1:20,000

**DEPTH (MLLW)	LATITUDE	LONGITUDE	HDAPS FIX #
41 40.7 ft	41°-26'-22.34"N	071°-06'-19.86"W	1938.2
39 38.7 ft	41°-26'-23.75"N	071°-05'-49.00"W	13007
✓ 41.6 ft	41°-26'-14.65"N	071°-05'-38.11"W	2258.3
43 42.6 ft	41°-26'-31.08"N	071°-03'-44.62"W	2008.4
43 42.6 ft	41°-25'-56.77"N	071°-05'-32.72"W	728.4
✓ 47.6 ft	41°-26'-09.64"N	071°-04'-00.78"W	13012
54.45 ft	41°-25'-24.13"N	071°-05'-57.68"W	3724.4
✓ 49.2 ft	41°-25'-43.55"N	071°-04'-38.50"W	2478.3
✓ 56.4 ft	41°-25'-30.07"N	071°-04'-15.28"W	3340.4
50 ✓ 50.2 ft	41°-25'-19.95"N	071°-05'-12.92"W	3684.3
55.74 ft	41°-24'-49.67"N	071°-05'-34.24"W	13044
54.4 ft	41°-24'-23.39"N	071°-06'-34.58"W	4365.2
53.85 ft	41°-25'-10.74"N	071°-03'-29.36"W	5100.2
55.75 ft	41°-24'-40.87"N	071°-04'-31.32"W	5104.3
52 51.8 ft	41°-24'-11.54"N	071°-05'-06.83"W	4413.2
57.71 ft	41°-23'-29.94"N	071°-06'-00.19"W	4929.2

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

** Depths reduced to MLLW using ^{Approved} predicted tides.

DEPTHS TO BE DELETED FROM THE FOLLOWING CHARTS:

Chart 13218 (32nd ed 26 June 93)
Chart Scale 1:80,000

Chart 13221 (49th ed. 17 July 93)
Chart Scale 1:40,000

DEPTH (MLLW)	LATITUDE	LONGITUDE
59 ft	41°-25'-12.0"N	071°-03'-43.0"W
37 ft	41°-25'-44.0"N	071°-06'-30.0"W

O.3 As indicated in the Danger to Navigation report, two charted soundings (59 feet and 37 feet) have been recommended for deletion from charts 13218 and 13221. The 57-foot charted sounding was recommended for deletion because it is in close proximity to a least depth of 53.8 feet. The 37-foot charted sounding was recommended for deletion because it does not accurately reflect the least depth in the area. The RUDE conducted a thorough hydrographic development over a 100-meter search radius centered on the charted 37-foot position, using line spacing as tight as 5 meters. The resulting least depths differed from the charted sounding by 5 feet or more.

Other than these two exceptions, the overall correlation between charted soundings and survey depths is good to excellent, with average differences of approximately one foot in flat and slightly sloping areas and no more than two to three feet in areas with irregular bottoms.

O.4 The correlation between charted shoal areas and corresponding soundings from this survey is excellent. See Section 0.2 for discrepancies and additions to the chart.

O.5 Chart 13218 (32nd ed. 26 June 1993) is the main operating chart used in this section of Rhode Island Sound. Since the primary navigation system in this area is still LORAN-C, it would be beneficial to have the LORAN-C time delay grid overlaid on this chart.

P. ADEQUACY OF SURVEY *SEE ALSO EVALUATION REPORT*

P.1 All items investigated during this survey have been addressed.

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

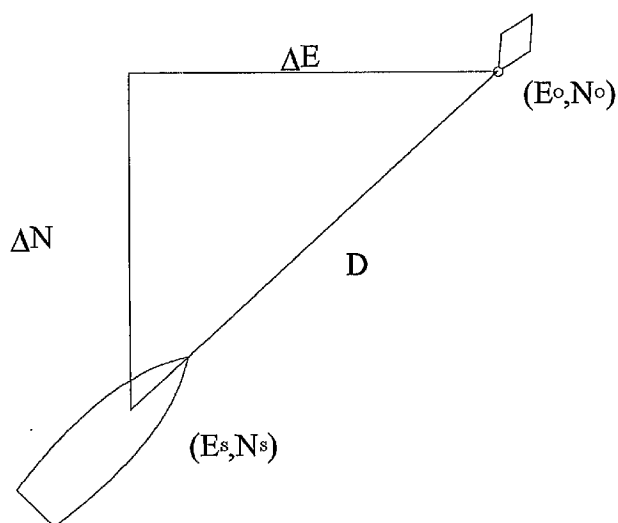
Q. AIDS TO NAVIGATION

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

Q.2 There is one floating aid located within the boundaries of this survey, a large weather observation buoy reported in the Notice to Mariners in position 41°23'48"N and 071°05'04"W.

Since the most recent edition of the Light List (1994) was printed before this aid was established, no comparison can be made between the position observed during this survey and a position from the Light List.

Q.3 This aid is the Coast Guard marine and weather conditions reporting buoy for the Buzzards Bay area. A detached position was obtained for this buoy by maneuvering the RUDE as close as possible to the buoy and then taking several detached positions from different headings. At the same time, the distance and bearing of the ship's bow to the aid was estimated. This distance was corrected for the position of the transducer and applied to the detached position to compute a "true" position of 41°23'44.296"N and 071°05'01.011"W.



ΔE = The difference between the easting of the ship and easting of the object.

ΔN = The difference between the northing of the ship and northing of the object.

D = The distance from the bow of the ship to the object plus 10.13M (10.13M is the distance from the GPS antennae to the bow.)

(E_S, N_S) = The easting and northing of the ship.

(E_O, N_O) = The easting and northing of the object.

Θ = The angle measured from the ship's position (North or South, 0° - 90°) to the position of the object.

$$E_O = \Delta E + E_S \\ = D \sin \Theta + E_S$$

$$N_O = \Delta N + N_S \\ = D \cos \Theta + N_S$$

This aid is a "superbuoy", with a circular base approximately 30 feet in radius, rising approximately 20 feet above the water's surface, first reported in Notice to Mariners 41/94 (October 1, 1994). It is red in color and labeled "BB", and displays the following characteristics:

F1 4s HORN, Racon (-•••)

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

Q.5 No pipelines or designated ferry routes are located within the survey area.

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

R. STATISTICS

R.1 a. Number of Positions 5161

b. Lineal Nautical Miles of Sounding Lines:

Nautical Miles of Survey With the Use
of Side Scan Sonar 242.73

Nautical Miles of Survey Without the Use
of Side Scan Sonar 221.05

R.2 a. Square Nautical Miles of Hydrography
per 100% of Coverage 9.50

b. Days of Production 44

c. Detached Positions 37

- 1 for Floating Aids to Navigation

- 37 for Bottom Samples

d. Bottom Samples 37

e. Tide Stations 1

f. Current Stations 0

g. Velocity Casts 11

h. Magnetic Stations 0

i. XBT Drops 0

j. SEABAT Item Investigations 84

S. MISCELLANEOUS - SEE ALSO EVALUATION REPORT

S.1.a. No evidence of silting was found during this survey.

b. No evidence of unusual submarine features was found during this survey.

c. No evidence of anomalous tidal conditions was found during this survey.

d. No observations of unusual currents were recorded during this survey.

e. No evidence of magnetic anomalies was found during this survey.

S.2 Thirty-seven (37) bottom samples were obtained during this survey. As directed by the Project Instructions, all bottom samples were inspected and recorded, but none were submitted to the Smithsonian Institution.

T. RECOMMENDATIONS *SEE ALSO SECTION P. OF THE EVALUATION REPORT*

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

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

T.3 No further investigation of the survey area is recommended.

U. REFERRAL TO REPORTS

No reports have been published which are not contained within this Descriptive Report.

APPENDIX III

LIST OF HORIZONTAL CONTROL STATIONS

No horizontal control stations were needed for this survey since Differential GPS was employed exclusively for all positioning control. The geographic positions for the two Differential GPS radio beacons used during this survey are as follows:

Montauk Point, N.Y.	41°04'02.05"N
	071°51'38.27"W

Portsmouth, N.H.	43°04'15.06"N
	070°42'36.80"W

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

FROM SURVEY H-10575 (94/95)

DELETE the following charted items

- A. NON-DANGEROUS WRECK SYMBOL LABELED PA CHARTED AT
LAT 41°25'00.38"N LON 071°04'58.14"W - AWOIS ITEM 1898

* THESE DEPTHS AFFECT THE FOLLOWING CHARTS:

Chart 13218 (32nd ed. 26 June 93)
Chart Scale 1:80,000

Chart 13221 (49th ed. 17 July 93)
Chart Scale 1:40,000

Chart 13228 (9th ed. 13 June 92)
Chart Scale 1:20,000

** DEPTH (MLLW)	LATITUDE	LONGITUDE
41 40.7 ft	41°26'22.34"N	071°06'19.86"W
39 38.7 ft	41°26'23.75"N	071°05'49.00"W
41.6 ft	41°26'14.65"N	071°05'38.11"W
43 42.6 ft	41°26'31.08"N	071°03'44.62"W
43 42.6 ft	41°25'56.77"N	071°05'32.72"W
47.6 ft	41°26'09.64"N	071°04'00.70"W
54.46 ft	41°25'24.13"N	071°05'57.68"W
49.2 ft	41°25'43.55"N	071°04'38.50"W
56.4 ft	41°25'30.07"N	071°04'15.28"W
50.2 ft	41°25'19.95"N	071°05'12.92"W
55.1 ft	41°24'49.67"N	071°05'34.24"W
54.4 ft	41°24'23.39"N	071°06'34.58"W
53 53.86 ft	41°25'10.74"N	071°03'29.36"W
55.76 ft	41°24'40.87"N	071°04'31.32"W
52 51.8 ft	41°24'11.54"N	071°05'06.83"W
57.71 ft	41°23'29.94"N	071°06'00.19"W

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

** Depth reduced to MLLW using predicted tides.

DEPTHS TO BE DELETED FROM THE FOLLOWING CHARTS:

Chart 13218 (32nd ed. 26 June 93)
Chart Scale 1:80,000

Chart 13221 (49th ed. 17 July 93)
Chart Scale 1:40,000

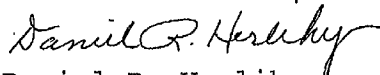
DEPTH (MLLW)	LATITUDE	LONGITUDE
59 ft	41°25'12.0"N	071°03'43.0"W
37 ft	41°25'44.0"N	071°06'30.0"W

Contact either of the following personnel for further information:

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

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

Sincerely,



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

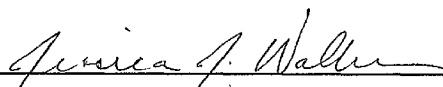
APPENDIX VII

APPROVAL SHEET

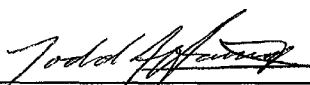
LETTER OF APPROVAL

REGISTRY NO. H-10575

This report and the accompanying field sheets are respectfully submitted.

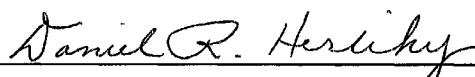


Jessica J. Walker, ENS, NOAA



Todd A. Haupt, ENS, NOAA
Field Operations Officer
NOAA Ship RUDE

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



Daniel R. Herlihy, LCDR, NOAA
Commanding Officer
NOAA Ship RUDE



UNITED STATES DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration
NATIONAL OCEAN SERVICE
Office of Ocean and Earth Sciences
Silver Spring, Maryland 20910

TIDE NOTE FOR HYDROGRAPHIC SURVEY

DATE: September 27, 1995

HYDROGRAPHIC BRANCH: Atlantic

HYDROGRAPHIC PROJECT: OPR-B302-RU

HYDROGRAPHIC SHEET: H-10575

LOCALITY: Rhode Island, Rhode Island Sound 5.0 Nautical Miles SE of Sakonnet Point

TIME PERIOD: October 3 - November 4, 1994; March 27 - May 8, 1995

TIDE STATION USED: 845-0768 Sakonnet Yacht Club, R.I.
Lat. $41^{\circ} 27.9'N$ Lon. $71^{\circ} 11.6'W$

PLANE OF REFERENCE (MEAN LOWER LOW WATER): 2.60 ft.

HEIGHT OF HIGH WATER ABOVE PLANE OF REFERENCE: 3.4 ft.

REMARKS: RECOMMENDED ZONING

Times are direct, and apply a X0.92 range ratio to heights using Sakonnet Yacht Club, R.I. (845-0768).

- Notes:**
1. Times are tabulated in Greenwich Mean Time.
 2. Data for Sakonnet Yacht Club, R.I. (845-0768), are temporarily stored in file #645-0768.

William M. Hylan
CHIEF, DATUMS SECTION



GEOGRAPHIC NAMES

H-10575

Name on Survey	A ON CHART NO. 13218 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 GRAND McNALLY ATLAS H U.S. LIGHT LIST K										
	A	B	C	D	E	F	G	H	K		
MASSACHUSETTS (title)	X		X								1
RHODE ISLAND (title)	X		X								2
RHODE ISLAND SOUND	X		X								3
SAKONNET POINT (title)	X		X								4
											5
											6
											7
											8
											9
											10
											11
											12
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											19
											20
											21
											22
											23
											24
											25

Approved

Chris C. Coy
Chief Geographer

NOV 20 1995

12/14/95

HYDROGRAPHIC SURVEY STATISTICS
REGISTRY NUMBER: H-10575

NUMBER OF CONTROL STATIONS 2

NUMBER OF POSITIONS 5161

NUMBER OF SOUNDINGS 21899

	TIME-HOURS	DATE COMPLETED
PREPROCESSING EXAMINATION	11	06/01/95
VERIFICATION OF FIELD DATA	203.50	12/13/95
QUALITY CONTROL CHECKS	1	
EVALUATION AND ANALYSIS	46.50	
FINAL INSPECTION	16	12/08/95
COMPILATION	0	/ /
TOTAL TIME	278	
ATLANTIC HYDROGRAPHIC BRANCH APPROVAL		12/14/95

NOAA FORM 61-29
(12-71)

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

REFERENCE NO.

N/CS33-39-96

LETTER TRANSMITTING DATA

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

ORDINARY MAIL AIR MAIL

REGISTERED MAIL EXPRESS

GBL (Give number) _____

TO:

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

DATE FORWARDED

10 January 1996

NUMBER OF PACKAGES

SIX Tubes

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

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

FROM: (Signature)

Maxine Fetterly

RECEIVED THE ABOVE

(Name, Division, Date)

Return receipted copy to:

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



**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 15, 1995

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

Dear Sir:

During the course of NOAA Ship RUDE's recently completed hydrographic survey centered approximately 5.0 nautical miles southeast of Sakonnet Point, Rhode Island Sound, Rhode Island, several discrepancies were found on chart 13218 (32nd ed. 26 June 1993). It is requested that these discrepancies be published in the Local Notice to Mariners.

Updated depths are outlined in the attached tables. These items should be viewed as preliminary information subject to office review. In addition, two chartlets are enclosed with the boundaries of the survey. The first chartlet highlights the depths to be added to the chart and the second highlights the charted soundings to be deleted.

These survey depths were determined during preliminary hydro investigation using a Raytheon DSF-6000N survey fathometer, and verified with the Reson SEABAT 9001 shallow-water multibeam sonar system. All depths have been reduced to Mean Lower Low Water (MLLW) by applying predicted tide corrections. The horizontal datum is NAD 83.

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

REPORT OF DANGER TO NAVIGATION

Hydrographic Survey Registry No.....H-10575
State.....Rhode Island
General Locality.....Rhode Island Sound
Locality.....5.0 NM SE of Sakonnet Point
Project Number.....B302-RU-94/95
Surveyed by.....NOAA Ship RUDE





UNITED STATES DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration
Office of Hydrography
Hydrographic Survey
July 19, 1995

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

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

SUBJECT: Updates for Charts 13218, 13230, and 13229

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

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

1. Deletions - Hydrographer has disproved the existence of a charted feature.
2. Changes - The hydrographer has located a particular feature and has determined an accurate least depth. On surveys H-10520 and H-10548, approved tides have been applied to the data so the charting depiction will be accurate.
3. Notice to Mariners Features - The RUDE submitted a Dangers to Navigation Report on July 22, 1994. This report affected H-10520. The ship also submitted a second report on September 19, 1994. This report affected survey H-10548. Both of these reports detailed many additions and deletions of depths to the chart. Some of those depths have already appeared on the new edition of chart 13230. We have since applied approved tides to the data and those depths have changed slightly. The updated depths are included with this package.

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



**ATLANTIC HYDROGRAPHIC BRANCH
EVALUATION REPORT FOR H-10575 (1994)**

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

D. AUTOMATED DATA ACQUISITION AND PROCESSING

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

Hydrographic Processing System
AutoCAD, Release 12
QUICKSURF, version 5.1
NADCON, version 2.10
MicroStation, version 5.0

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

H. CONTROL STATIONS

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

To place this survey on the NAD 27 datum, move the projection lines 0.380 seconds (11.719 meters or 1.17 mm at the scale of the survey) north in latitude and 1.853 seconds (43.035 meters or 4.30 mm at the scale of the survey) east in longitude.

L. JUNCTIONS

FE-378SS (1992)	1:20,000	to the south
H-10434 (1992-93)	1:10,000	to the east
H-10458 (1993)	1:20,000	to the south
H-10605 (1995)	1:10,000	to the west

A standard junction could not be effected between the

present survey and FE-378SS (1992), H-10434 (1992-93) and H-10458 (1993). The junctional surveys are archived at National Ocean Service (NOS) headquarters, Silver Spring, Maryland. Any adjustments to the depth curves will have to be made during chart compilation.

A standard junction was effected between H-10605 (1995) and the present survey.

There are no junctional surveys to the north. Present survey depths are in harmony with the charted hydrography to the north.

M. COMPARISON WITH PRIOR SURVEYS

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

**O. COMPARISON WITH CHARTS 13218 (32nd Edition, June 26/93)
13221 (49th Edition, July 26/93)
13228 (9th Edition, June 13/92)**

The charted hydrography originates with prior surveys and other miscellaneous sources and requires no further consideration. The hydrographer makes adequate chart comparisons in sections N. and O. of the Descriptive Report. Attention is directed to the following:

A charted dangerous sunken wreck with a least depth of 53 feet (16² m), in Latitude 41°26'06.20"N, Longitude 71°04'45.53"W, originates with FE-375SS (1992). This wreck is currently shown as described on chart 13218; however, it is currently shown on the 9th edition of chart 13228 as a dangerous sunken wreck, PA. Additionally, a charted 44-ft (13⁶ m) depth, in Latitude 41°27'02.12"N, Longitude 71°04'47.95"W, originates with the same prior survey. This depth is shown on chart 13218; however it is not shown on the 9th edition of chart 13228. These two features have been brought forward from the prior survey to supplement the

present survey. No change in charting status is recommended for chart 13218. It is recommended that the wreck and depth be charted as shown on the next edition of chart 13228.

P. ADEQUACY OF SURVEY

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

S. MISCELLANEOUS

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

RUDE Processing Team

Richard W. Blevins

Richard W. Blevins
Cartographic Technician
Verification of Field Data

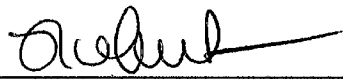
Maxine Fetterly

Maxine Fetterly
Cartographic Technician
Evaluation and Analysis

APPROVAL SHEET
H-10575

Initial Approvals:

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



Date: 12/14/95

Norris A. Wike
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.



Date: 12-14-95

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

Final Approval:

Approved:  Date: 1-22-96

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

MARINE CHART BRANCH
RECORD OF APPLICATION TO CHARTS

FILE WITH DESCRIPTIVE REPORT OF SURVEY NO. H-10575

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
13228	12/27/95	Robert Hill	Full Part Before After Marine Center Approval Signed Via Drawing No.
13221	12/29/95	Robert Hill	Full Part Before After Marine Center Approval Signed Via Drawing No.
13218	1/3/96	Robert Hill	Full Part Before After Marine Center Approval Signed Via Drawing No.
13228	1/27/96 2/7/96	Dan Black ✓	Full Part Before After Marine Center Approval Signed Via Drawing No. 20
13221	1/24/96 2/7/96	Dan Black ✓	Full Part Before After Marine Center Approval Signed Via Drawing No. 63 PLY THRU 13228
13218	2/7/96	Dan Black ✓	Full Part Before After Marine Center Approval Signed Via Drawing No. 70 PLY THRU 13228 + 13221
13200 ↓	3/21/96 ↓	Dan Black ✓ ↓	Full Part Before After Marine Center Approval Signed Via Drawing No. 58 THRU CHART 13218
			Full Part Before After Marine Center Approval Signed Via Drawing No.
			Full Part Before After Marine Center Approval Signed Via Drawing No.
			Full Part Before After Marine Center Approval Signed Via Drawing No.
			Full Part Before After Marine Center Approval Signed Via Drawing No.