

H10498

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. **WH-10-1-93**
Registry No. **H-10498**

LOCALITY

State **MASSACHUSETTS**
General Locality **NANTUCKET SOUND**
Sublocality **NORTH CHANNEL**

19 93-94

CHIEF OF PARTY

CDR. A. A. ARMSTRONG, III, NOAA

LIBRARY & ARCHIVES

DATE **MAY 7 1996**

HYDROGRAPHIC TITLE SHEET

H-10498

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

FIELD NO.

WH-10-1-93

State Massachusetts

General locality Nantucket Sound

Locality ~~Approaches to Hyannis Harbor~~ NORTH CHANNEL

Scale 1:10,000 Date of Survey MAY 25 - AUG 4 1993
AUG 29 - NOV 22, 1993

Instructions dated May 6, 1993 Project No. OPR-B616-RU/WH-93

Vessel NOAA Ship WHITING (2930), Launch 1015 (2931), Launch 1014 (2930)

Chief of party Commander Andrew A. Armstrong III

Suveyed by A.A. Armstrong III, S.R. Barnum, J.S. Verlaque, J.G. Clayton, J.L. Riley,
E.W. Berkowitz, N.O. Silverman, M.P. Zipperer, J.A. Seitz, F.R. Cruz,
S.R. Parker, P.R. White, J.S. Gaskin

Soundings taken by echo sounder DSF-6000

Graphic record scaled by WHITING Survey Personnel

Graphic record checked by WHITING Survey Personnel

Protracted by N/A Automated plot by ENCAD NOVASET III PLOTTER (AHS)
HP 7959B, Bruning (FIELD)

Verification by ATLANTIC HYDROGRAPHIC BRANCH PERSONNEL

Soundings in MLLW Meters FEET

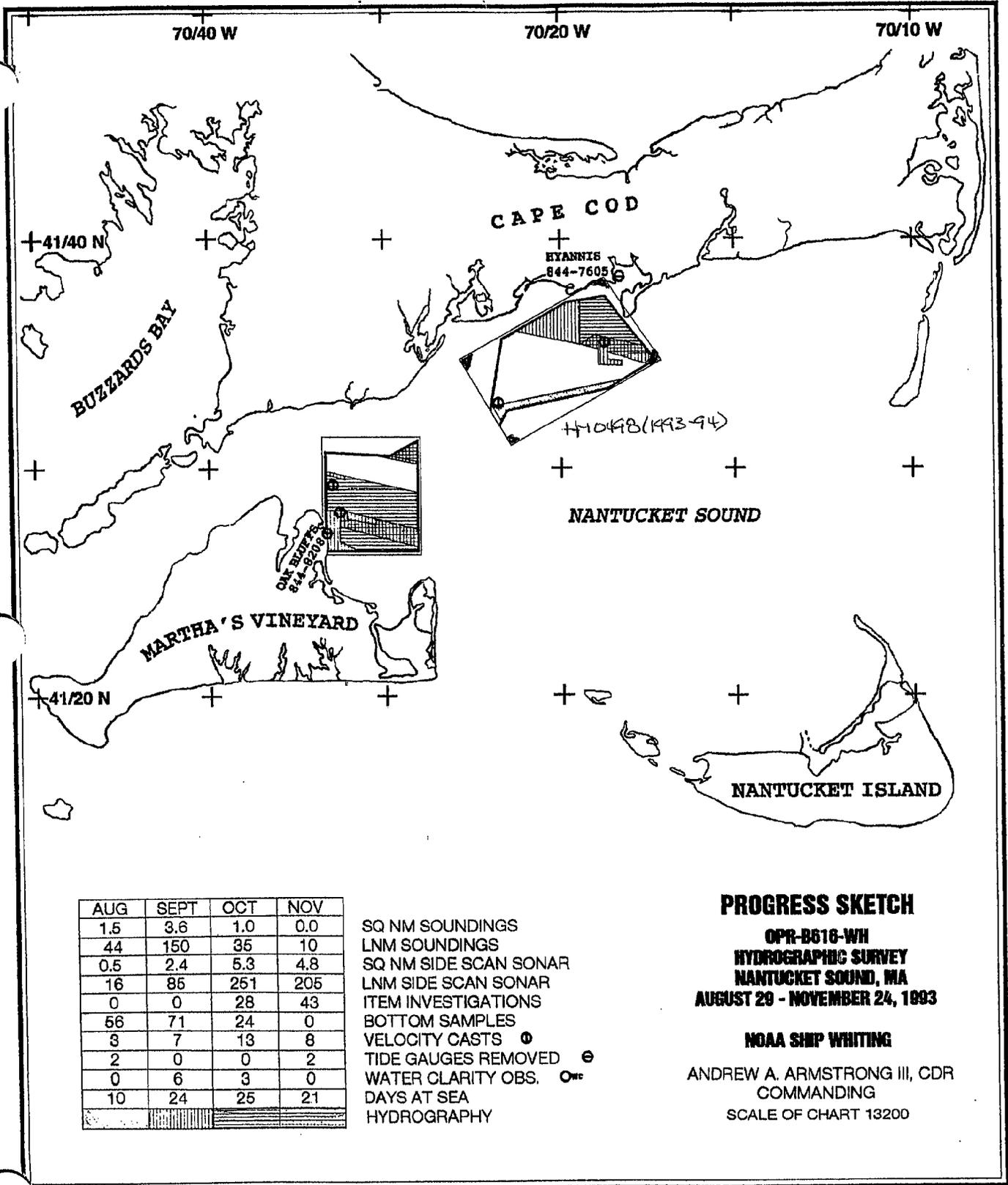
REMARKS: Time Zone Used, 0 (UTC)

200% Side Scan Sonar Coverage

NOTES IN THE ORIGINAL DESCRIPTIVE REPORT WERE MADE IN RED
DURING OFFICE PROCESSING.

MAY 7 1996

AWARDS and SURF ✓ 5/96 RWD



AUG	SEPT	OCT	NOV
1.5	3.6	1.0	0.0
44	150	35	10
0.5	2.4	5.3	4.8
16	85	251	205
0	0	28	43
56	71	24	0
3	7	13	8
2	0	0	2
0	6	3	0
10	24	25	21

- SQ NM SOUNDINGS
- LNM SOUNDINGS
- SQ NM SIDE SCAN SONAR
- LNM SIDE SCAN SONAR
- ITEM INVESTIGATIONS
- BOTTOM SAMPLES
- VELOCITY CASTS ○
- TIDE GAUGES REMOVED ⊕
- WATER CLARITY OBS. ○
- DAYS AT SEA
- HYDROGRAPHY

PROGRESS SKETCH

OPR-D516-WH
HYDROGRAPHIC SURVEY
NANTUCKET SOUND, MA
AUGUST 29 - NOVEMBER 24, 1993

NOAA SHIP WHITING

ANDREW A. ARMSTRONG III, CDR
COMMANDING
SCALE OF CHART 13200

DESCRIPTIVE REPORT TO ACCOMPANY
HYDROGRAPHIC SURVEY
OPR-B616-RU/WH
1993
WH-10-1-93
H-10498

NOAA SHIP WHITING
CDR Andrew A. Armstrong, III, NOAA
Commanding Officer

A. PROJECT

Project OPR-B616-RU/WH is a multiyear project encompassing Buzzards Bay and Nantucket Sound, including Nantucket Shoals and Vineyard Sound, Massachusetts. WHITING is conducting basic hydrographic surveys with 200-percent side scan sonar (SSS) bottom coverage to the five-meter depth curve with continued echosounder coverage to the two-meter depth curve.

The purpose of this survey is to update the existing nautical charts and to locate uncharted obstructions in the approaches to Hyannis Harbor, Oak Bluffs Harbor and the channel between Martha's Vineyard and Hyannis Harbor. Specifically, this project is in response to a request for a survey of the area by the Woods's Hole, Martha's Vineyard and Nantucket Steamship Authority.

Survey operations were conducted in accordance with Hydrographic Project Instructions OPR-B616-RU/WH, Buzzards Bay, Nantucket and Vineyard Sounds, Massachusetts, dated May 3, 1993, Change No. 1, dated July 23, 1993, and Change No. 2 dated October 13, 1993. This survey is registered as a 1:10,000 scale and all data acquired meet the accuracy requirements for a 1:10,000 scale survey.

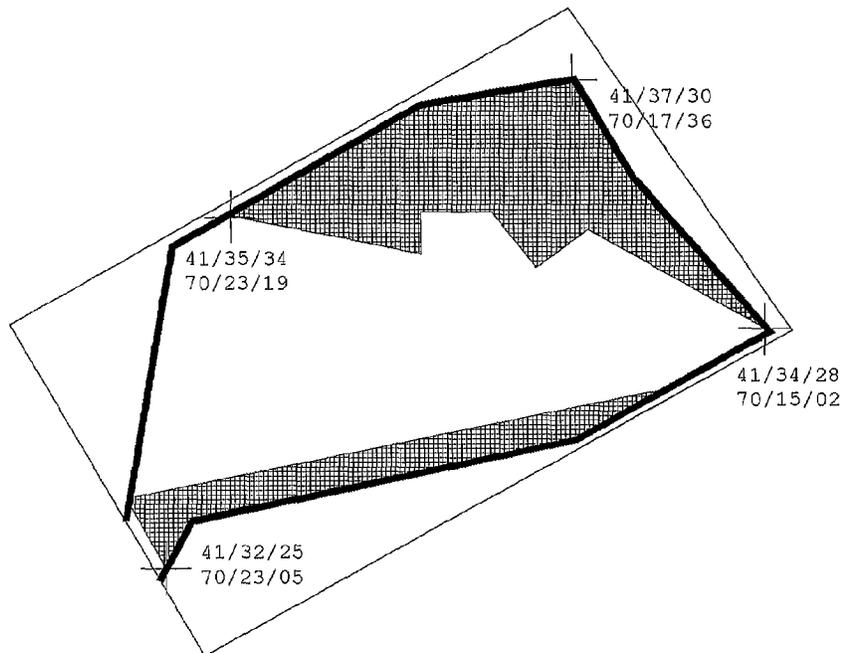
Project OPR-B616-RU/WH is divided into thirteen survey sheets. The survey described in this report is designated "K" Sheet, and assigned field sheet number WH-10-1-93 and registry number H-10498.

B. AREA SURVEYED

Hydrographic survey H-10498 is three nautical miles south of Hyannis Port, Massachusetts. This survey covers a portion of North Channel and the approaches to Hyannis Harbor. The entire survey area is bounded by the following limits:

<u>Latitude</u>	<u>Longitude</u>
41°32'24.9"N	070°23'04.7" W
41°33'22.6"N	070°17'37.2" W
41°34'27.7"N	070°15'01.9" W
41°36'24.8"N	070°16'53.8" W
41°37'29.6"N	070°16'36.3" W
41°37'11.7"N	070°19'42.3" W
41°35'34.2"N	070°23'19.0" W
41°32'55.4"N	070°24'06.6" W

The shaded area shown below is the survey area completed:



Survey operations began on August 29, 1993 (DOY 241) and ended on November 22, 1993 (DOY 326). Data were acquired on the following days:

<u>DOY</u>	<u>Date</u>
241-242	29-30 August
251-252	8-9 September
254-255	11-12 September
267-268	24-25 September
278-279	5-6 October
284	11 October
287	14 October
292-293	19-20 October
312-313	8-9 November
320-322	16-17 November
326	22 November

C. SURVEY VESSEL

NOAA launch 1014, vessel identification number 2932, and launch 1015, vessel identification number 2931 were used for side scan sonar and sounding-data acquisition.

Launch 1014 was primarily used for collecting sounding data and providing support for dive operations. After the 2 and 5-meter depth curves were delineated, launch 1014 began acquiring SSS data.

Launch 1015 was primarily used for collecting SSS data. In addition to the normal stern mounted davit and winch, the launch was fitted with a bow mounted boom for towing the SSS fish in shallow water.

No other unusual vessel configurations were used nor were any problems encountered with the current vessel configuration.

D. AUTOMATED DATA ACQUISITION AND PROCESSING - SEE ALSO EVALUATION REPORT.

Survey data acquisition and processing were accomplished using the HDAPS system with the following software:

<u>Program</u>	<u>Version</u>	<u>Date</u>
AUTOST	3.01	17-Jun-93
BACKUP	2.00	17-Jun-93
BASELINE	1.14	17-Jun-93
BIGABST	2.05	17-Jun-93
BLKEDIT	2.02	17-Jun-93
CARTO	2.08	15-Jul-93
CLASSIFY	1.00	15-Jul-93
CONTACT	2.09	15-Jul-93
CONVERT	3.54	17-Jun-93
DAS_SURV	6.42	15-Jul-93
DIAGNOSE	3.03	17-Jun-93
DISC_UTIL	1.00	17-Jun-93
DP	2.14	17-Jun-93
EXCESS	4.11	17-Jun-93
FILESYS	3.10	15-Jul-93
GRAFEDIT	1.04	17-Jun-93
HIPSTICK	1.01	17-Jun-93
HPRAZ	1.26	17-Jun-93
INSTALL	4.02	17-Jun-93
INVERSE	2.01	17-Jun-93
LISTDATA	1.02	17-Jun-93
LOADNEW	2.05	15-Jul-93
LSTAWOIS	3.04	17-Jun-93
MAINMENU	1.10	15-Jul-93
MAN_DATA	2.01	17-Jun-93
NEWPOST	6.01	17-Jun-93

<u>Program</u>	<u>Version</u>	<u>Date</u>
ONETIME	1.00	15-Jul-93
PLOTALL	2.12	17-Jun-93
POINT	2.10	17-Jun-93
PREDICT	2.01	17-Jun-93
PRESURV	7.04	15-Jul-93
PRINTOUT	4.03	17-Jun-93
QUICK	2.04	15-Jul-93
RAMSAVER	1.02	17-Jun-93
REAPPLY	2.03	17-Jun-93
RECOMP	2.02	17-Jun-93
SCANNER	1.00	17-Jun-93
SELPRINT	2.03	17-Jun-93
SHEETSPPLIT	1.03	17-Jun-93
SYMBOL	2.00	17-Jun-93
ZOOMEDIT	2.12	17-Jun-93

Correctors for settlement and squat and sound velocity were applied during postprocessing. Sound velocity corrections were determined using version 2.00 of program CAT and version 2.00 of program VELOCITY.

All field sheets were made on board WHITING, launch 1014, and launch 1015 with automated Bruning 936 plotters driven by the HDAPS system. No final field sheets were prepared. All on-line plots, field records and supporting data were sent to AHS per the Processing Partnership Agreement.

There were no irregularities in projection or scale during post-processing of this survey.

E. SIDE SCAN SONAR EQUIPMENT

Side scan sonar (SSS) operations were conducted using an EG&G model 260 slant-range corrected SSS recorder and an EG&G 272-T dual-channel, single-frequency towfish. The towfish was operated on the 100-kHz frequency and was configured with a 20° beam depression. The sonar equipment used throughout the survey is listed below:

<u>Type</u>		<u>S/N</u>
Towfish	(1014)	016835
	(1015)	011902
260 Recorder	(1014)	016670
	(1015)	016671

On launch 1014 and 1015, the towfish was deployed from a Superwinch Winch Model W115 from an adjustable davit arm on the

stern of the launch. In shallow water, the towfish on launch 1015 was deployed using the Superwinch Model W115 in conjunction with a bow-mounted towing boom. The SSS towfish was towed with a vinyl-coated Kevlar cable which was connected to the recorder cabling from the Superwinch via a slip-ring assembly.

The SSS towfish was maintained at a height off the bottom between 8 to 20 percent of the SSS range scale, when conditions permitted. In depths less than 8 meters, the towfish height ranged from 3 to 8 percent of the SSS range scale. SSS operations were limited to a speed-over-ground of 4.5 knots or slower on the 50-meter range scale, 6 knots or slower on the 75-meter range scale and 5 knots or slower on the 100-meter range scale.

Offsets, laybacks, and heights for the stern-mounted davit arm used to tow the SSS towfish from launches 1014 and 1015 were measured on July 28, 1993 using the 100 kHz (high frequency) transducer as the reference. Offset, layback, and height measurements for launch 1015's bow mounted towing boom were measured on October 10, 1993 using the 100 kHz transducer as the reference.

The engine on launch 1014 was replaced on September 19, 1993 (DOY 262), requiring a new offset table for different settlement and squat correctors; offset table 4 correctors were applied to all data acquired on launch 1014 after DOY 262. Offset table 2 correctors were applied to all data acquired on launch 1014 prior to DOY 262. Offset table 3 correctors were applied to all data acquired with launch 1015 utilizing the bow mount towing arrangement; offset table 1 correctors were applied to all other data acquired by launch 1015. All offset, layback and height data were applied as required by the HDAPS manual. These data are on file at AHS. *DATA FILED WITH FIELD RECORDS.*

All side scan sonar data were collected using 50, 75 and 100-meter range scales and 100-Khz frequency. In order to acquire the required 200% SSS coverage, main-scheme lines were run at a spacing of 40 meters when using the 50-meter range scale and at a spacing of 60 meters when using the 75 and 100-meter range scale. The 100-meter range scale was used when the water became relatively deep (greater than 20 to 25 meters). In deep water areas, insufficient SSS cable length prevented maintaining the fish height at the allowed 8 to 20 percent of the range scale. During these instances, the lines were split or re-run. Lines were also re-run or split in areas where 200% coverage was questionable due to a degraded sonargram. Degraded sonargrams were caused by pitching or rolling of the survey launches and surface noise.

Adequate coverage was determined by producing an 'A' and 'B' swath plot and ensuring 100% coverage on each plot.

Confidence checks were performed on a routine basis, primarily by noting changes in bottom texture on the outer edges of the sonagram. Significant SSS contacts were investigated using divers.

F. SOUNDING EQUIPMENT

A RAYTHEON Digital Survey Fathometer (DSF) 6000N echosounders were the only echo-sounding equipment used to measure water depths during the survey. The DSF-6000N produced a graphic record of the high frequency (100-kHz) and low frequency (24-kHz) depth. The high- and low-frequency digital depths were recorded by the HDAPS acquisition system. The high-frequency depths were selected as the primary depths for sounding plot purposes. The following is a list of DSF-6000N fathometers used during this survey:

<u>Vessel</u>	<u>S/N</u>
Launch 1014	B053N (DN 241-278), B042N (DN 279-326)
Launch 1015	A106N (DN 241-293), A105N (DN 312-321) B053N (DN 322)

Echograms were carefully reviewed for significant features along the track line. Any features on the graphic record that were not selected as primary soundings were manually selected. Electronic technicians performed daily accuracy checks and preventive maintenance on the DSF-6000N. Bar checks were performed on a weekly basis in accordance with the FPM.

Diver-determined least depths were measured with a leadline and a prototype Diver Least Depth Gauge Module (MOD 3). New leadlines were made at the beginning of the field season and measured on April 26, 1993. The MOD 3 Gauge was used in accordance with the documentation sent by the Nautical Charting Research and Development Laboratory on September 9, 1993. This documentation is on file at AHS.* The MOD 3 gauge was calibrated before and after the period of hydrography. The calibration showed that no changes had occurred over the period. Calibrations are on file at AHS.*

The paper take-up motor for the echosounder (A105N) aboard launch 1015 failed on November 17, 1993 during survey operations. Launch 1015 was conducting SSS splits to acquire sonar coverage of the area. As adequate sounding data had been collected for this area, launch 1015 continued collecting sonar data to acquire the 200% SSS coverage. Electronic technicians replaced the paper take-up motor the following morning.

* DATA FILED WITH FIELD RECORDS.

G. CORRECTIONS TO SOUNDINGS

Sound velocity profiles of the water column were determined using Seacat Conductivity, Temperature and Depth (CTD) profilers (model SBE 19, S/N 286 and S/N 1060). The profilers were calibrated on December 16, 1992 during WHITING's winter inport period. Copies of the calibration reports are on file at AHS.*

The CTD, mounted in a cage, was lowered through the water column to obtain data for sound velocity corrections. Programs CAT and VELOCITY were used to process the data, select significant data points, and create a corrector table. The velocity correctors were manually entered into an HDAPS velocity table. The correctors were applied to both high- and low-frequency beams during acquisition. Velocity profile data can be found in the separates submitted with this survey. The depth data acquired were corrected after acquisition using the proper casts. Velocity casts one and two were performed for reference only and were not applied to any data acquired.

Data Quality Assurance (DQA) for the Seacat was performed by using a hydrometer and a thermometer to measure the density and temperature of a surface water sample taken during the CTD cast. The program CAT compared these values to the CTD surface values, and confirmed that the velocity probe was working properly.

A summary of sound velocity casts follows:

<u>DOY</u>	<u>Vel.Table#</u>	<u>Latitude</u>	<u>Longitude</u>	<u>Depth</u>
242	03	41°32'32"N	070°28'10"W	36.2
251	04	41°32'32"N	070°28'10"W	35.5
254	05	41°32'29"N	070°23'03"W	35.3
267	08	41°32'24"N	070°22'54"W	32.5
279	12	41°32'33"N	070°23'09"W	37.7
287	16	41°32'37"N	070°23'06"W	37.5
292	17	41°32'36"N	070°23'00"W	36.1
313	28	41°32'30"N	070°22'22"W	32.7
320	30	41°32'44"N	070°22'37"W	20.8

The static draft for launches 1014 and 1015 is 0.55 meters which was measured on July 28, 1993. A Transducer Depth Determination Report is on file at AHS.*

Settlement and squat measurements were conducted and correctors determined on August 15, 1993 for launch 1014 and on August 23, 1993 for launch 1015. The main engine on launch 1014 was replaced on September 19; settlement and squat observations were re-measured on September 20 for the launch. These correctors were applied during data acquisition and are on file at AHS.*

* DATA FILED WITH FIELD RECORDS.

The operating tide station at Nantucket, Massachusetts (844-9130) served as the reference station for predicted tides. Time and height correctors applied for this project were as follows:

	<u>Time Correction</u>	<u>Height Ratio</u>
High Water:	-0 hr 07 min	x0.91
Low Water:	-0 hr 07 min	x0.91

Tidal data used during data acquisition were taken from table 2 of the East Coast of North and South America Tide Tables and were applied on-line to the digital data using HDAPS software. The tidal data, in digital form, were received on floppy disk from N/CG24, Hydrographic Surveys Branch.

The tidal datum for this project was Mean Lower Low Water. WHITING installed and leveled two ADR tide gauges for datum control. One at the Hyannis Port Pier, Hyannis Port, MA (844-7605) and one at the Steamship Authority Pier Oak Bluffs, MA (844-8208). Gauge operation was checked throughout the project duration to ensure proper operation by WHITING. Contract observers for each station were hired by WHITING to make tide observations.

Opening levels were run on the tide stations at Hyannis Port and Oak Bluffs on August 25 and 26, 1993, respectively. Levels were re-run when next generation (NEXGEN) gauges were installed at the Hyannis and Oak Bluffs gauges on October 1, 1993 and September 29, 1993, respectively. These level runs tied in the NEXGEN sensors with the corresponding tide staffs. Closing levels were run on November 12 and 19, 1993 for Hyannis Port and Oak Bluffs, respectively. The levels confirmed that the tide staff and marks were undisturbed. The tide note is on file at AHS. DATA FILED WITH FIELD RECORDS.

A request for smooth tides was submitted to Product and Services Branch, Datums Section, N/OES231, on November 29, 1993. APPROVED TIDES AND ZONING WERE APPLIED DURING OFFICE PROCESSING.

All sounding corrections were applied on-line to both the narrow (100 kHz) and wide (24 kHz) DSF-6000N beams. The echosounder data from launches 1014 and 1015 are uncorrected for heave.

H. CONTROL STATIONS- SEE ALSO EVALUATION REPORT.

The horizontal datum for this project is the North American Datum of 1983 (NAD 83). Two B-order horizontal control stations were used as DGPS reference stations for this survey; Montauk Point, New York and Portsmouth Harbor, New Hampshire. The adjusted NAD 83 positions, computed by GPS methods, were provided by Lieutenant Commander John Wilder of the Hydrographic Surveys Branch, N/CG24, on August 23, 1993. The positions are as follows:

	<u>Latitude</u>	<u>Longitude</u>	<u>Frequency</u>
Montauk Point	41°04'02.088"N	071°51'38.484"W	293 kHz
Portsmouth Harbor	43°04'15.066"N	070°42'36.804"W	288 kHz

I. HYDROGRAPHIC POSITION CONTROL

A Differential Global Positioning System (DGPS) was used as the navigation system for this survey. Survey H-10498 operations utilized two U.S. Coast Guard DGPS beacons: Montauk Point, New York and Portsmouth Harbor, New Hampshire. Launch 1014 and 1015 each were equipped with one Ashtech Sensor GPS receiver and one Magnavox MX50R differential radio receiver to supply correctors to the Ashtech receiver. WHITING's DGPS system was not used for collecting survey data, however, the positioning system aboard WHITING was used to conduct performance checks for each launch by the reference station method. WHITING used two Ashtech Sensor GPS receivers for GPS navigation with two Magnavox MX50R receivers supplying differential correctors to the Ashtech receivers. The MX50R and Ashtech receivers were initialized using HDAPS, with only the primary receiver sending navigational output to HDAPS.

The serial numbers of the Ashtech Sensor and MX50R receivers were as follows and can be found in the headers of the on-line data printouts:

	<u>Device</u>	<u>Serial Number</u>
(Primary) WHITING	Ashtech Sensor	700417B1055
	Magnavox MX50R	168
(Secondary) WHITING	Ashtech Sensor	700417B1129
	Magnavox MX50R	169
Launch 1014	Ashtech Sensor	700417B1203
	Magnavox MX50R	036
Launch 1015	Ashtech Sensor	700417B1191
	Magnavox MX50R	219

An Ashtech Sensor Receiver with a Magnavox MX50R differential radio receiver linked to HDAPS was used for obtaining the positioning. Performance checks for each launch's positioning systems were done with the launches aboard in the davits. Instantaneous HDAPS positions of each launch were compared with WHITING's HDAPS position. From these positions, offsets in distance and azimuths were calculated relative to the ship. Performance checks for WHITING were conducted using program SHIPDIM. SHIPDIM used the two reference station method described in the FPM, section 3.4.5. All performance checks used the Montauk Point beacon as the primary reference station and the Portsmouth Harbor beacon as the check station. Performance checks were conducted on a weekly basis. All DGPS performance

checks confirmed the DGPS systems were operating properly and accurately. A summary of performance checks for launch 1014 and 1015 are on file at AHS.*

Satellite coverage during this survey period allowed launch 1014 and 1015 to operate in the non-altitude constrain mode continuously. The DGPS receiver system was used for all data acquisition.

Horizontal Dilution of Precision (HDOP) limits were computed for each station as required in section 3.4.2 of the Field Procedures Manual (FPM) for Hydrographic Surveying. The HDOP limit for a 1:10,000-scale survey for the Montauk and Portsmouth beacons were 3.4 and 2.6, respectively. No data were acquired at HDOP values exceeding the 1:10,000 thresholds.

DGPS positioning was accomplished in accordance with the FPM, section 3.4. When the beacon signal was lost for more than 30 seconds, the survey line was broken and the line was rerun where control had been unacceptable.

DGPS antenna offsets, laybacks and heights for launches 1014 and 1015 were measured on July 28, 1993 using the 100 kHz (high frequency) echosounder transducer as the reference. All offset, layback and height data were applied as required by the HDAPS manual. This data is on file at AHS.*

J. SHORELINE

WHITING surveyed to the 2-meter depth curve. The shoreline was not examined.

K. CROSSLINES

A total of 24.7 nautical miles of crosslines were run on H-10498. This amounted to 12.0 percent of the total linear nautical miles of main-scheme lines needed for 100% coverage.

Crosslines and main-scheme agreement was adequate. The average difference showed crossline soundings generally 0.2 to 0.4 meters deeper than main-scheme soundings. The maximum difference between main-scheme and crossline soundings was 1.6 meters in an area with significant sand waves. This difference can be attributed to the irregular bottom and does not reflect a sounding or positioning problem.

L. JUNCTIONS - SEE ALSO EVALUATION REPORT.

There were no contemporary surveys that junctioned with H-10498.

M. COMPARISONS WITH PRIOR SURVEYS - SEE ALSO EVALUATION REPORT.

As depicted on the prior surveys, the bottom in the area surveyed is dynamic; echosounder and SSS records showed significant sand waves and large areas with rocks and boulders. Survey H-10498 soundings were compared with prior surveys H-6533 (1939, scale 1:20,000) and H-6470 (1939, scale 1:10,000). Both prior surveys were referenced to NAD 27. For comparison purposes, a datum shift was applied to H-10498 in accordance with section 7.4 of the FPM (NADCON, version 1.01, January 9, 1989). Comparisons were made between survey H-10498 soundings plotted at predicted MLLW and both prior survey sounding sheets plotted at MLW.

The southern section of the survey area was covered by survey H-6533. Sounding comparisons between present survey depths and H-6533 agreed very well. Two shoal areas on the western edge of the survey area were developed with echosounding. The soundings from this survey averaged 0.3 meters deeper than the prior survey. Two shoal areas in the southeastern section of the survey area were also developed with echosounding. The soundings on these shoals averaged 0.6 meters deeper than the prior survey. These areas will be further developed with side scan sonar during WHITING's 1994 field season. Bottom samples acquired in these shoal areas revealed a sand bottom. Deeper present survey depths may be attributable to strong currents shifting the sand bottom. *CONCUR*

The northern section of the survey area was covered by prior survey H-6470. Sounding comparisons between present survey depths and H-6470 agreed very well. Present survey depths in a rocky area near the vicinity of 41°36'40"N, 070°19'15"W were 0.6 meters deeper than prior survey depths. The depth curves depicted on H-10498 agree very well with H-6470 except in the vicinity of 41°37'08"N, 070°18'25"W, where the 12-foot (3.7 meter) depth curve does not extend as previously shown. *CONCUR*

The following rocks originating from prior survey H-6470 have not yet been examined and require investigation during WHITING's 1994 field season:*

H-6740 Depth Feet (Meters)	H-10498 Depth Feet (Meters)	Approximate Latitude	Position Longitude
5 (1.5)	57 (2.1) 1.5	41°36'09"N	070°19'46"W
5 (1.5)	68 (2.5) 2.4	41°36'06"N	070°20'15"W
4 (1.2)	46 (1.8) 1.4	41°35'49"N	070°20'04"W
5 (1.5)	89 (2.7) 2.4	41°36'53"N	070°20'17"W
7 (2.1)	810 (3.0) 2.4	41°36'43"N	070°19'33"W
5 (1.5)	411 (3.4) 1.4	41°37'23"N	070°18'24"W
*	312 (3.7) 4.9	41°36'58"N	070°17'07"W
5 (1.5)	614 (4.3) 1.9	41°36'12"N	070°15'45"W
5 (1.5)	517 (5.2) 1.7	41°35'26"N	070°18'59"W

*ITEM WERE INVESTIGATED DURING 1993 OR 1994 FIELD SEASON. SEE APPROPRIATE SECTIONS OF 1994 DESCRIPTIVE REPORT OR EVALUATION REPORT FOR CHARTING RECOMMENDATIONS.

H-6740 Depth Feet (Meters)	H-10498 Depth Feet (Meters)	Approximate Position	
		Latitude	Longitude
8 (2.4)	7.17 (5.2) 2.2	41°35'25"N	070°18'46"W
3 (0.9)	4.9 (2.7) 1.2	41°36'51"N	070°19'27"W
5 (1.5)	5.9 (2.7) 1.7	41°36'48"N	070°19'24"W
4 (1.2)	4.9 (2.7) 1.2	41°36'40"N	070°19'14"W
3 (0.9)	4.10 (3.0) 1.3	41°36'31"N	070°19'11"W
2 (0.6)	2.9 (2.7) 0.8	41°36'27"N	070°18'57"W

SEE APPROPRIATE N. SECTIONS OF 1994 DESCRIPTIVE REPORT OR EVALUATION REPORT FOR CHARTING RECOMMENDATIONS.
N. ITEM INVESTIGATIONS

WHITING investigated contacts located by echosounder and side scan sonar lines throughout the sheet to determine contact characteristics and least depths using divers. In addition to the contacts located by WHITING, AWOIS item 7888 was investigated using divers. The following is a list of items investigated by WHITING.

<u>CONTACT NO.</u>	<u>SECTION</u>
39.35 (E/S)	N1
38.35 (E/S)	N2
839.20 (E/S)	N3
132.45 (E/S)	N4
701.00 (DP)	N5
690.30 (E/S)	N6
921.30 (E/S)	N7
965.20 (E/S)	N8
81.10 (E/S)	N9
6920.29S	N10
6977.10P	N11
7004.50P	N12
6906.25S	N13
1287.00 (E/S)	N14
6301.47P/S	N15
6705.01P	N16
7513.09S	N17
7496.36P	N18
7501.34P	N19
1231.10	N20
7490.46S	N21
1001.10 (E/S)	N22
961.00 (E/S)	N23
AWOIS Item 7888	N24

N1. Contact# 39.35 (E/S)

Contact# 39.35 (E/S) was found on an echosounder main scheme line. The characteristics of the contact were undetermined from the echosounder trace, and a diver investigation was conducted.

The contact was investigated and echosounding was used to pinpoint the divers drop position. Once the item was located, a position and least depth (fix# 1177, DN 279) were determined during dive operations. ⁸

Divers located a rock 2.0 meters long by 1.5 meters wide at latitude 41°36'18.29" N, longitude 070°16'22.17" W with a leadline least depth of 4.4^φ meters (corrected to ^{APPROVED} predicted MLLW). The rock projects 1.5 meters off the bottom.

WHITING recommends that the rock with a known least depth of 4.4^φ meters be charted at latitude 41°36'18.29" N, longitude 070°16'22.17" W.* ✓ *Do not chart*

N2. Contact# 38.35 (E/S)

Contact# 38.38 (E/S) was found by an echosounder main scheme line. The characteristics of the contact were undetermined from the echosounder trace, and a diver investigation was conducted.

The contact was investigated and echosounding was used to pinpoint the divers drop position. Once the item was located, a position and least depth (fix# 1178, DN 279) were determined during dive operations. ⁸

Divers located a rock 1.5 meters long by 1.2 meters wide at latitude 41°36'26.56" N, longitude 070°16'22.36" W with a leadline least depth of 4.5^φ meters (corrected to ^{APPROVED} predicted MLLW). The rock projects 0.6 to 0.9 meters off the bottom.

WHITING recommends that the rock with a known least depth of 4.5^φ meters be charted at latitude 41°36'26.56" N, longitude 070°16'22.36" W.* ✓

N3. Contact# 839.20 (E/S)

Contact# 839.20 (E/S) was found by an echosounder main scheme line. The characteristics of the contact were undetermined from the echosounder trace, and a diver investigation was conducted.

The contact was investigated and echosounding was used to pinpoint the divers drop position. Once the item was located, a position and least depth (fix# 1704, DN 287) were determined during dive operations.

Divers located a 0.6 meter diameter rock at latitude 41°36'27.32" N, longitude 070°20'41.03" W with a least depth of 3.5^φ meters (MOD 3, corrected to ^{APPROVED} predicted MLLW). The rock projects 0.6 meters off the bottom.

* DO NOT CONCUR - DO NOT CHART - SIMILAR FEATURES OR SOUNDINGS IN VICINITY

WHITING recommends that the rock with a known least depth of 3.5⁴ meters be charted at latitude 41°36'27.32" N, longitude 070°20'41.03" W. *CONCUR CHART IDRK*

N4. Contact# 132.45 (E/S)

Contact# 132.45 (E/S) was found by an echosounding main scheme line. The characteristics of the contact were undetermined from the echosounder trace, and a diver investigation was conducted.

A buoy was dropped at the contact's position. Divers conducted a 10 meter circle search and found no contact. The area consisted of patches of kelp standing 0.3 meters off the bottom (fix# 1179, DN 279).
8

The echosounder trace is attributed to kelp. No obstruction exists, general survey depths should be charted in this area. *CONCUR*

N5. Contact# 701.00 (DP)

Contact# 701.00 (DP) was originally found by an echosounding main scheme line. Detached positions were taken to pinpoint the item and further determine its characteristics (fix#'s 701, 702 and 703). The characteristics of the contact were undetermined from the echosounder traces, and a diver investigation was conducted.

A buoy was dropped at the contact's echosounder position. Divers conducted a 10 meter circle search and found no contact in the area. The area consisted of patches of kelp attached to shells standing 0.3 meters off the bottom (fix# 1180, DN 279).
8

The echosounder trace is attributed to kelp. No obstruction exists, general survey depths should be charted in this area. *CONCUR*

N6. Contact# 690.30 (E/S)

Contact# 690.30 (E/S) was found by an echosounder main scheme line. The characteristics of the contact were undetermined from the echosounder trace, and a diver investigation was conducted.

A buoy was dropped at the contact's position. Divers conducted a 20 meter circle search and found no contact in the area. Divers observed seaweed attached to shells adrift in the search area (fix# 1703, DN 287).

The echosounder trace is attributed to kelp. No obstruction exists, general survey depths should be charted in this area. *CONCUR*

N7. Contact# 921.30 (E/S)

Contact# 921.30 (E/S) was found by an echosounder main scheme line. The characteristics of the contact were undetermined from the echosounder trace, and a diver investigation was conducted.

A buoy was dropped at the contact's echosounder position. Divers conducted a 20 meter circle search and found no contact in the area. Divers observed seaweed attached to shells standing 0.6 meters high adrift in the area (fix# 1705, DN 287).

The echosounder trace is attributed to kelp. No obstruction exists, general survey depths should be charted in this area. CONCUR —

N8. Contact# 965.20 (E/S)

Contact# 965.20 (E/S) was found on an echosounder main scheme line. The characteristics of the contact were undetermined from the echosounder trace, and a diver investigation was conducted.

A buoy was dropped at the contact's echosounder position. Divers conducted a 20 meter circle search and found no contact in the area. Divers observed seaweed adrift in the search area (fix# 1707, DN 287).

The echosounder trace is attributed to kelp. No obstruction exists, general survey depths should be charted in this area. CONCUR —

N9. Contact# 81.10 (E/S)

Contact# 81.10 (E/S) was found on an echosounder main scheme line. The characteristics of the contact were undetermined from the echosounder trace, and a diver investigation was conducted.

A buoy was dropped at the contact's position. Divers conducted a 15 meter circle search and found no contacts in the area. The area consisted of patches of kelp standing 0.6 to 0.9 meters off the bottom (fix# 2052, DN 320).

The echosounder trace is attributed to kelp. No obstruction exists, general survey depths should be charted in this area. CONCUR —

N10. Contact# 6920.29S

Contact# 6920.29S was found by side scan sonar during the 200 percent main scheme survey of H-10498. The contact height measured from side scan sonar was computed to be significant and a diver investigation was conducted.

The contact was investigated and echosounding was used to pinpoint the divers drop position. Once the item was located, a

position and least depth were determined (fix# 2054, DN 320) during dive operations.

Divers located a rock 1.8 meters long by 1.8 meters wide at latitude 41°36'07.21" N, longitude 070°17'34.28" W with a least depth of 5.7 meters (MOD 3, corrected to ^{APPROVED} predicted MLLW). The rock projected 1.2 meters off the bottom. Divers noted kelp growing on top of the rock approximately 0.3 meters high. The surrounding area consisted of patches of kelp standing 0.3 meters off the bottom.

WHITING recommends that rocks with a known least depth of 5.7 meters ^(8 FT) be charted at latitude 41°36'07.21" N, longitude 070°17'34.28" W. CONCUR CHART 18 RK -

N11. Contact# 6977.10P

Contact# 6977.10P was found by side scan sonar during the 200 percent main scheme survey of H-10498. The contact height measured from side scan sonar was computed to be significant and a diver investigation was conducted.

The contact was investigated and echosounding was used to pinpoint the divers drop position. Once the item was located, a position and least depth (fix# 2056, DN 320) were determined during diving operations.

Divers located a rock 2.4 meters long by 2.4 meters wide at latitude 41°36'03.72" N, 070°17'37.00" W with a least depth of 5.5 meters (MOD 3, corrected to ^{APPROVED} predicted MLLW). The rock projects 2.4 meters off the bottom. Divers found another rock 4.6 meters to the south southwest approximately 0.2 to 0.3 meters high. Another rock, 1.8 meters long by 0.9 meters wide by 0.9 meters high was found approximately 9 to 12 meters to the west of the least depth item. The surrounding area consisted of patches of kelp standing 0.3 to 0.6 meters off the bottom.

WHITING recommends that the rock with a known least depth of 5.5 meters be charted at latitude 41°36'03.72" N, longitude 070°17'37.00" W. DO NOT CONCUR - DO NOT CHART - SIMILAR FEATURES OR SOUNDINGS IN VICINITY

N12. Contact# 7004.50P

Contact# 7004.50P was found by side scan sonar during the 200 percent main scheme survey. The contact height measured from side scan sonar was computed to be significant and a diver investigation was conducted.

The contact was investigated and echosounding was used to pinpoint the divers drop position. Once the item was located, a position and least depth (fix# 2057, DN 320) were determined during diving operations.

Divers located a wedge-shaped rock 1.8 meters long by 2.4 wide at latitude 41°36'54.18" N, longitude 070°18'20.62" W with a least depth of 5.6 meters (MOD 3, corrected to ^{APPROVED} predicted MLLW). The rock projects 0.6 meters off the bottom and had kelp 0.3 meters high growing on top. The surrounding area consisted of patches of kelp standing 0.3 meters off the bottom.

WHITING recommends that the rock with a known least depth of 5.6 meters be charted at latitude 41°36'54.18" N, longitude 070°18'20.62" W.* *Do not chart*

N13. Contact# 6906.35S

Contact# 6906.35S was found by side scan sonar during the 200 percent main scheme survey. The contact height measured from side scan sonar was computed to be significant and a diver investigation was conducted.

The contact was investigated and echosounding was used to pinpoint the divers drop position. Once the item was located, a position and least depth (fix# 2059, DN 320) were determined during diving operations.

Divers located a rock 1.2 meters long by 2.1 meters wide at latitude 41°36'57.58" N, longitude 070°18'19.90" W with a least depth of 5.0 meters (MOD 3, corrected to ^{APPROVED} predicted MLLW). Divers noted kelp 0.3 meters high growing on top of the rock. The surrounding area consisted of patches of kelp standing 0.3 meters off the bottom. Divers conducted a 5 meter circle search and located no other items.

WHITING recommends that the rock with a known least depth of 5.0 meters be charted at latitude 41°36'57.58" N, longitude 070°18'19.90" W.*

N14. Contact# 1287.0 (E/S)

Contact# 1287.0 (E/S) was found on an echosounder main scheme line. The characteristics of the contact were undetermined from the echosounder trace, and a diver investigation was conducted.

The contact was investigated and echosounding was used to pinpoint the divers drop position. Once the item was located, a position and least depth (fix# 2061, DN 320) were determined during diving operations.

Divers located a rock 3.6 meters long by 4.6 meters wide at latitude 41°37'10.34" N, longitude 070°18'14.65" W with a least depth of 1.9 meters (MOD 3, corrected to ^{APPROVED} predicted MLLW). Kelp, 0.3 meters high was growing on top of the rock. The rock projects 3.0 meters off the bottom. Approximately 1.5 to 3.0 meters from the least depth item divers located small rocks

approximately 0.3 meters high. The surrounding area consisted of patches of kelp standing 0.3 meters off the bottom.

WHITING recommends that the rock with a known least depth of 1.9 meters be charted at latitude 41°37'10.34" N, longitude 070°18'14.65" W. ~~DO NOT CONCUR - DO NOT CHART - SHOALER FEATURES OR SOUNDINGS IN VICINITY~~

N15. Contact# 6301.47P/S

Contact# 6301.47P/S was found by side scan sonar during the 200 percent main scheme. The contact height measured from side scan sonar was computed to be significant and a diver investigation was conducted.

The contact was investigated and echosounding was used to pinpoint the divers drop position. Once the item was located, a position and least depth (fix# 2065, DN 320) were determined during diving operations.

Divers located a rock 3.0 meters long by 3.0 meters wide at latitude 41°33'09.50" N, longitude 070°20'16.45" W with a least depth of 11.4 meters (MOD 3, corrected to ~~predicted~~ ^{APPROVED} MLLW). The rock projects 3.3 meters off the bottom.

WHITING recommends that the rock with a known least depth of 11.4 meters ^(51ft) be charted at latitude 41°33'09.50" N, longitude 070°20'16.45" W. ~~CONCUR~~ CHART 37RK ✓

N16. Contact# 6705.01P

Contact# 6705.01P was found by side scan sonar during the 200 percent main scheme survey. The contact height measured from side scan sonar was computed to be significant and a diver investigation was conducted.

The contact was investigated and echosounding was used to pinpoint the divers drop position. Once the item was located, a position and least depth (fix# 2067, DN 320) were determined during diving operations.

Divers located a rock 3.0 meters long by 3.0 meters wide at latitude 41°33'18.22" N, longitude 070°21'05.75" W with a least depth of 10.7 meters (MOD 3, corrected to ~~predicted~~ ^{APPROVED} MLLW). The rock projects 3.3 meters off the bottom.

WHITING recommends that the rock with a known least depth of 10.7 meters ^(35ft) be charted at latitude 41°33'18.22" N, longitude 070°21'05.75" W. ~~CONCUR~~ CHART 35RK ✓

N17. Contact# 7513.09S

Contact# 7513.09S was found by side scan sonar during the 200 percent main scheme survey. The contact height measured from side scan sonar was computed to be significant and a diver investigation was conducted.

The contact was investigated and echosounding was used to pinpoint the divers drop position. Once the item was located, a position and least depth (fix# 2150, DN 322) were determined during diving operations.

Divers located a rock 1.8 meters long by 1.8 meters wide at latitude 41°36'30.26" N, longitude 070°16'33.02" W with a least depth of 3.2¹ meters (MOD 3, corrected to ~~predicted~~^{APPROVED} MLLW). The rock projects 1.5 meters off the bottom and has kelp standing 0.2 meters high on top. The surrounding area consisted of patches of kelp standing 0.3 meters off the bottom. Divers conducted a 5 meter circle search and found no other items in the area.

WHITING recommends that the rock with a known least depth of 3.2¹ meters^(0.5) be charted at latitude 41°36'30.26" N, longitude 070°16'33.02" W. ~~CONCUR~~ ~~CHART~~ ~~10RK~~

N18. Contact# 7496.36P

Contact# 7496.36P was found by a side scan sonar during the 200 percent main scheme survey. The contact height measured from side scan sonar was computed to be significant and a diver investigation was conducted.

The contact was investigated and echosounding was used to pinpoint the divers drop position. Once the item was located, a position and least depth (fix# 2152, DN 322) were determined during diving operations.

Divers located a rock 6.1 meters long by 2.4 meters wide at latitude 41°36'19.77" N, longitude 070°16'21.04" W with a least depth of 3.1^φ meters (MOD 3, corrected to MLLW). The rock projects 2.4 meters off the bottom and has kelp standing 0.2 meters high on top. The surrounding area consisted of patches of kelp standing 0.2 off the bottom. To the east of the least depth item, approximately 3 to 6 meters, divers located two small rock 0.6 to 0.9 meters high. On a bearing of 120° magnetic, divers located a two rocks 0.9 meters high. No other significant items were found in the area.

WHITING recommends that the rock with a known least depth of 3.1^φ meters^(0.5) be charted at latitude 41°36'19.77" N, longitude 070°16'21.04" W. ~~CONCUR~~ ~~CHART~~ ~~10RK~~ Do not chart

N19. Contact# 7501.34P

Contact# 7501.34P was found by side scan sonar during the 200 percent main scheme survey. The contact height measured from side scan sonar was computed to be significant and a diver investigation was conducted.

The contact was investigated and echosounding was used to pinpoint the divers drop position. Once the item was located, a position and least depth (fix# 2153, DN 322) were determined during diving operations.

Divers located a rock 2.4 meters long by 2.1 meters wide at latitude 41°36'20.76" N, longitude 070°16'10.05"W with a least depth of 3.2^φ meters (MOD 3, corrected to MLLW). The rock projects 2.4 meters off the bottom and has kelp standing 0.2 meters high on top. The surrounding area consisted of patches of kelp standing 0.2 meters off the bottom. On a bearing of 120° magnetic and approximately 2 meters from the least depth item, divers located a smaller rock 2.1 meters high. Smaller rocks approximately 0.9 meters high were found on the same bearing approximately 6 meters from the least depth item. No other significant items were found in the area.

WHITING recommends that rocks with a known least depth of 3.2^φ meters be charted at latitude 41°36'20.76" N, longitude 070°16'10.05" W. CONCUR CHART 10 ~~724~~ ~~24~~

N20. Contact# 1231.10 (E/S)

Contact# 1231.10 (E/S) was found by an echosounding main-scheme line during this survey. The characteristics of the contact were undetermined from the echosounder trace, and a diver investigation was conducted.

A buoy was dropped at the contact's echosounder position. Divers conducted a 10 meter circle search and found no significant items in the area. Divers noted kelp approximately 0.3 to 0.6 meters high attached to small rocks in the area and large amounts of kelp drifting in the water column (fix# 2155, DN 322).

The echosounder trace is attributed to kelp. No obstruction exists, general survey depths should be charted in this area. CONCUR

N21. Contact# 7490.46S

Contact# 7490.46S was found by side scan sonar during the 200 percent main scheme survey. The contact height measured from side scan sonar was computed to be significant and a diver investigation was conducted.

The contact was investigated and echosounding was used to pinpoint the divers drop position. Once the item was located, a position and least depth (fix# 2157, DN 322) were determined during diving operations.

Divers located a rock 1.8 meters long by 1.8 meters wide at latitude 41°36'28.57" N, longitude 070°16'29.29" W with a least depth of 3.0 meters (MOD 3, corrected to ^{APPROVED} predicted MLLW). The rock projects 2.0 meters off the bottom. On a bearing of 060° magnetic and 7 to 9 meters from the least depth item, divers located a rock 1.8 meters long and 1.2 meters high. No other significant items were found in the area.

WHITING recommends that the rock with a known least depth of 3.0 meters be charted at latitude 41°36'28.57" N, longitude 070°16'29.29" W. DO NOT CONCUR - DO NOT CHART - SHOALER FEATURES OR SOUNDINGS IN VICINITY

N22. Contact# 1002.10 (E/S)

Contact# 1002.10 (E/S) was found by an echosounding main scheme line during this survey. The characteristics of the contact were undetermined from the echosounder trace, and a diver investigation was conducted.

The contact was investigated and echosounding was used to pinpoint the divers drop position. Once the item was located, a position and least depth (fix# 2159, DN 322) were determined during diving operations.

Divers located a rock 3.6 meters long by 1.5 meters wide at latitude 41°35'48.53" N, longitude 070°19'28.72" W with a least depth of 3.0 meters (MOD 3, corrected to MLLW). The rock projects 2.4 meters off the bottom. To the west of the least depth item a smaller rock approximately 1.8 meters high was found. No other significant items were found in the area.

WHITING recommends that rocks with a known least depth of 3.0 meters ^(OFF) be charted at latitude 41°35'48.53" N, longitude 070°19'28.72" W. CONCUR CHART 102K

N23. Contact# 961.00 (E/S)

Contacts# 1231.10 (E/S) was found by an echosounding main-scheme line during this survey. The characteristics of the contact were undetermined from the echosounder trace, and a diver investigation was conducted.

A buoy was dropped at the contact's echosounder position. Divers conducted a 15 meter circle search and found no significant items in the area. The area consisted of patches of kelp standing 0.4 to 0.8 meters high attached to small rocks (fix # 2160, DN 322).

The echosounder trace is attributed to kelp. No obstruction exists, general survey depths should be charted in this area. *CONCUR*

N24. AWOIS Item 7888

Reported Latitude: 41°37'48.0" N
Reported Longitude: 070°17'30.0" W
Source: Local Notice to Mariners 42/89, 10/18/89
Datum: NAD 83
Depth: Exposed mast reported

AWOIS item 7888 is marked by a lighted wreck buoy in Hyannis Harbor. Divers descended the buoy position and located the item. Once the item was located, a position and least depth were determined during diving operations (fix# 2149, DN 322).

Divers located a submerged wooden wreck 4.6 meters north of the buoy anchor position. The wreckage was approximately 2.4 meters wide by 2.4 meters high at the least depth site. The least depth of 1.2 meters (MOD 3, corrected to ^{APPROX} predicted MLLW) was taken on the south end of the wreckage on the west side at latitude 41°37'50.70" N, longitude 070°17'27.14" W.

The item is currently charted as "PA Masts". WHITING recommends that the present symbol be ~~deleted~~ from the chart, and wreck with a known least depth of 1.2 meters ^(SHR) be charted at latitude 41°37'50.70" N, longitude 070°17'27.14" W. *CONCUR CHART SWK*

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

<u>Chart#</u>	<u>Scale</u>	<u>Edition #</u>	<u>Date</u>
13229	1:40,000	25	March 27, 1993
13237	1:80,000	34	October 26, 1991

There is good agreement between survey H-10498 soundings and the charted soundings, contours and features.

Shoals in the center of the survey area were developed with 50-meter line spacing. Present survey depths were 1 meter deeper than charted sounding depths. These areas will be investigated with side scan sonar and echosounding in 1994. Survey soundings in the southern sheet area were 0.6 meters deeper than charted soundings. In the southwestern area of the survey in greater depths of water, survey soundings are 1 meter shoaler than charted soundings. All present survey depth curves agree well with charted depth curves except in the vicinity of 41°36'00"N, 070°19'40"W, where the present survey depth curves do not extend to where previously charted.

There were no previously unknown dangers to navigation warranting a Notice to Mariners located during this survey.

P. ADEQUACY OF SURVEY - SEE ALSO EVALUATION REPORT

This survey is not complete. Survey data obtained is adequate for updating presently charted information. This survey is scheduled for completion in 1994.

Q. AIDS TO NAVIGATION

There are 13 charted floating aids to navigation in the survey area. A detached position was taken by launch 1014 for each aid. These positions were compared to charted positions from Chart 13229, 25th Ed., Mar. 27/93. Four fixed aids to navigation lie in or very near the survey limits and were also positioned by launch 1014. ~~THESE AIDS TO NAVIGATION APPEAR ADEQUATE TO SERVE THEIR INTENDED PURPOSES.~~

The physical characteristics for each aid was observed and compared to the Light List Vol. II Atlantic Coast 1993 description. Light characteristics were observed from WHITING on clear nights as the ship was anchored near the working grounds. The light characteristics for each non-floating and floating aid were compared to the light list characteristics. No discrepancies were found in the light characteristics.

Three privately maintained buoys (Light List #'s 14533, 14534 and 14535) described as "EDDIE WOODS ROCK FISH TRAP NORTH, CENTER, AND SOUTH LIGHT" did not exist when survey H-10498 was being conducted. A charted "FL Y 6 SEC" light in the position of Light List # 14535, Eddie Woods Rock Fish Trap South Light" also did not exist during H-10498 survey operations.

The following is a table of the charted and surveyed positions for each of the aids to navigation within the survey area.

Light List	Charted Position	Surveyed GP
14510	41° 36.1' 070° 15.8'	41° 36.1' 070° 15.8'
14515	41° 36.0' 070° 17.4'	41° 36.0' 070° 17.4'
14520	41° 36.9' 070° 16.8'	41° 36.9' 070° 16.9'
14525	41° 37.1' 070° 17.4'	41° 37.1' 070° 17.4'

14530	41° 37.0' 070° 17.2'	41° 37.0' 070° 17.1'
14685	41° 35.7' 070° 21.1'	41° 35.7' 070° 21.1'
14675	41° 35.4' 070° 19.0'	41° 35.4' 070° 19.0'
14765	41° 33.1' 070° 20.8'	41° 33.1' 070° 19.0' 20.8'
14770	41° 32.3' 070° 23.1'	41° 32.2' 070° 23.1'
14490	41° 34.5' 070° 15.0'	41° 34.5' 070° 15.0'
14500	41° 34.5' 070° 16.0'	41° 34.5' 070° 16.0'
14680	41° 35.8' 070° 20.0'	41° 35.8' 070° 20.0'
14705	41° 36.2' 070° 19.8'	41° 36.2' 070° 19.8'
14540	41° 37.4' 070° 17.5'	41° 37.4' 070° 17.5'
14720	41° 36.9' 070° 20.3'	41° 36.9' 070° 20.3'
14710	41° 36.1' 070° 20.2'	41° 36.1' 070° 20.2'
14715	41° 36.1 ² 070° 20.2	41° 36.1 ² 070° 20.2

19.φ

19.φ

Light List #	Description/Name Characteristics	Observed Characteristics
14510	Gazelle Rock Lighted Red Nun Buoy 2 Fl R 2.5	Lighted Red Nun Buoy Numbered - "2" Fl R 2.5 ^s
14515	Approach Lighted Bell Buoy HH Mo (A) W Red and white stripes with red spherical topmark.	Bell and Light Lettering - "HH" Red and white stripes with red spherical topmark. Mo(A) W

14520	Halftide Rock Buoy HR White can with orange bands.	Can buoy with white and orange bands. Lettered - "HR"
14525	Lighted Buoy 4 Fl R 2.5 ^s Red	Red Structure Buoy with red light. Numbered - "4" Fl R 2.5 ^s
14530	Great Rock Daybeacon 4A On edge of Flats TR on spindle.	Fixed Dayshape Numbered - "4A" Attached to exposed rock.
14685	Collier Ledge Lighted Buoy. Red with Green bands. Fl (2+1) R 6 ^s	Red and Green Structure Buoy with red light. Fl (2+1) R 6 ^s
14675	Hodges Rock Buoy 2 Red Nun.	Red Nun Buoy Numbered - "2"
14765	Nantucket Sound North Side Lighted Bell Buoy 5 Green Fl G 2.5 ^s	Green Structure Buoy with green light and bell. Numbered - "5" Fl G 2.5 ^s
14770	Horseshoe shoal Buoy 7. At northwest part of shoal. Green Can	Green Can Buoy Numbered - "7"
14490	Daybeacon NR on slatted structure	Red and White Daybeacon
14500	South Approach Buoy 4 Red Nun Fl R 4 ^s	Red Nun Buoy Numbered - "4" Fl R 4 ^s
14680	Gallatin Rock Buoy 3 South of rock. Green Can.	Green Can Buoy Numbered - "3"
14705	Bearse Rock Buoy 4 West of Rock. Red Nun.	Red Nun Buoy Numbered "4"
14540	BREAKWATER LIGHT 5 SG on black skeleton tower, seaward side worded HYANNIS. Fl G 6 ^s	Fixed green dayshape on tower with green light. Lettered - "Hyannis" Fl G 6 ^s

14720	Gannet Ledge Buoy 6 Red nun.	Red nun buoy. Numbered - "6"
14710	Channel Rock Buoy Southwest of rock. Green can with red bands.	Green can buoy with red bands.
14715	Southwest Rock Buoy 2SR Red nun.	Red nun buoy. Lettering was worn off.

R. STATISTICS

Number of Positions.....3736
 Main-scheme Sounding Lines (Nautical Miles).....412.9
 Crosslines (Nautical Miles).....24.7
 Square Nautical Miles Surveyed.....10.6
 Days of Production.....20
 Detached Positions.....57
 Bottom Samples.....81
 Tide Stations Installed.....2
 Current Stations.....None
 Number of CTD Casts.....13
 Magnetic Stations.....None

S. MISCELLANEOUS - SEE ALSO EVALUATION REPORT

A total of eighty one bottom samples were taken during survey H-10498 as required in the Project Instructions. The bottom samples were taken on an approximate grid spacing of 1000 meters in accordance with the Project Instructions. The oceanographic log sheets are included in the separates submitted with the survey. Bottom samples were not submitted to the Smithsonian Institution.

No anomalies in either tide or current and/or unusual magnetic variations were encountered in the survey area.

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

Because of the large number of rocks strewn on the bottom in the survey area, a modified approach to determine significance. Based on the nature of the sea bed and the likelihood that vessels with not enter the area with a draft greater than 9 meters, contacts were deemed significant in 10 to 12 meters of water if the calculated height is at least 10 percent of the water depth. Contacts in less than 10 meters of water were chosen as significant if the calculated height is 1.0 meters or

The following side scan sonar contacts are deemed significant and are recommended for further investigation:

<u>Contact#</u>	<u>Table, Item</u>	<u>#Contact#</u>	<u>Table, Item#</u>
*6161.12P	1, 14	*7501.51S	23, 29
6216.22P	1, 23 ✓	*7567.33P	23, 30
6301.32S	3, 10 ✓	7573.22S	25, 2 ✓
6727.02S	11, 1 ✓	7591.43S	25, 4 ✓
*6767.42P	11, 18	*7576.19P	25, 5
*6793.29P	13, 12	*7577.06P	25, 7
6793.55P	13, 13 ✓	*7583.59P	25, 10
*6794.19P	13, 14	*7584.07S	25, 11
6838.17P	13, 15 ✓	*7585.42P	25, 14
*6838.35P	13, 16	7586.37S	25, 15 ✓
6848.21P	13, 17 ✓	*7593.50P	25, 17
6873.56P	17, 1 ✓	*7483.26S	25, 18
*6876.22S	17, 2		
*6906.35S	17, 5		
*6920.29S	17, 6		
*6966.27P	17, 11		
*6999.17S	17, 17		
*6999.37P	17, 18		
7029.29P	17, 23 ✓		
*7099.39S	17, 29		
*7112.31P	17, 30		
*7188.27P	19, 6		
*7338.02S	19, 13		
*7463.28S	19, 15		
7463.47S	19, 17 ✓		
7387.58P	19, 25 ✓		
*7379.36P	19, 30		
7383.17S	21, 4 ✓		
7381.20S	21, 7 ✓		
*7383.47P	21, 8		
*7387.16P	21, 9		
*7388.12P	21, 15		
*7394.21P	21, 17		
*7417.58P	21, 20		
*7417.06S	21, 22		
*7417.48S	21, 24		
*7483.15P	21, 27		
*7490.46S	21, 29		
*7513.09S	23, 4		
*7491.57P	23, 7		
*7519.30S	23, 10		
7495.19P	23, 12 ✓		
*7496.48P	23, 17		
*7585.15S	23, 20		
7501.34P	23, 21 ✓		
*7567.58P	23, 24		
*7519.00S	23, 26		
7566.51P	23, 27 ✓		

* ITEMS DETERMINE INSIGNIFICANT DURING OFFICE PROCESSING

✓ SEE SECTION N. OF 1994 DESCRIPTIVE REPORT FOR CHARTING RECOMMENDATION.

Recommendations concerning specific items are located in section N of this report. The data meets the 1:10,000 scale accuracy requirements and can be used on charts requiring that accuracy.

U. REFERRAL TO OTHER REPORTS

The following reports have been submitted to N/CG244 and will be forwarded to N/CG243 as part of OPR-D368-WH-93:

Coast Pilot Report
Chart Inspection Report
User Evaluation Report
Diver Least Depth Module (MOD 3) Documentation

Submitted By:


Eric W. Berkowitz
Ensign, NOAA

DESCRIPTIVE REPORT TO ACCOMPANY
HYDROGRAPHIC SURVEY
OPR-B616-RU/WH
WH-10-1-93
1994
H-10498

NOAA SHIP WHITING
CDR John D. Wilder, NOAA
Commanding Officer

A. PROJECT

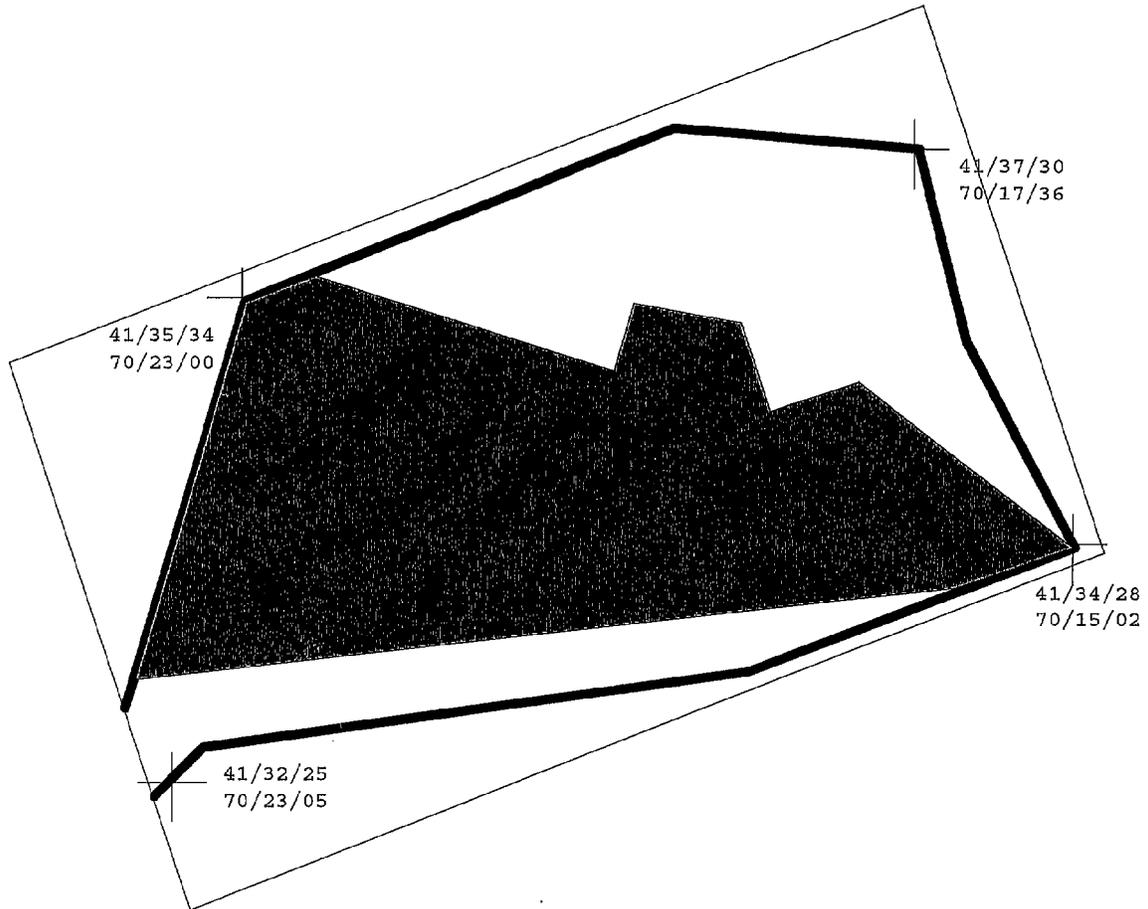
Project OPR-B616-RU/WH is a multi-year project encompassing Buzzards Bay Nantucket Sound, and Vineyard Sound, Massachusetts. WHITING is conducting basic hydrographic surveys along a corridor in Nantucket and Vineyard Sounds, with 200 percent side scan sonar (SSS) bottom coverage to the five-meter depth curve and continued echosounder coverage to the two-meter depth curve.

Project OPR-B616-RU/WH is divided into thirteen survey sheets. The survey described in this report was designated "K" Sheet, Approaches to Hyannis Harbor, and assigned field sheet number WH-10-1-93 and registry number H-10498. This survey was initiated in the fall of 1993. A separate Descriptive Report was completed for the area surveyed during 1993. DATA COMBINED WITH THIS REPORT.

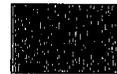
Survey operations were conducted in accordance with Hydrographic Project Instructions OPR-B616-RU/WH, Buzzards Bay, Nantucket and Vineyard Sounds, Massachusetts, dated February 23, 1994, Change NO. 1 dated March 9, 1994. Survey H-10498 is registered as a 1:10,000 scale and all data acquired meet the accuracy requirements for a 1:10,000 scale survey.

B. AREA SURVEYED

Hydrographic survey H-10498 covers a portion of North Channel and the Approaches to Hyannis Harbor. The area surveyed within field sheet WH-10-1-93 during 1994 is pictured on the top of the next page. This area constitutes the remainder of the sheet unsurveyed during 1993.



WH-10-1-93 (1994)



Survey operations began on May 20, 1994 (DN 140) and ended on August 4, 1994 (DN 216). Data were acquired on the following days:

<u>DN</u>	<u>Date</u>
140-144	May 20-24, 1994
155-156	June 4-5, 1994
159-161	June 8-10, 1994
168-171	June 17-20, 1994
173-175	June 22-24, 1994
187-194	July 6-13, 1994
200-202	July 19-21, 1994
207-208	July 26-27, 1994
215-216	August 3-4, 1994

C. SURVEY VESSEL

NOAA launch 1014 (VESNO 2932), launch 1015 (VESNO 2931), and NOAA Ship WHITING (VESNO 2930) were used for side scan sonar and sounding-data acquisition.

Launch 1015 was equipped with a custom-built bowsprit to tow the SSS towfish in shallow water. No other unusual vessel configurations were used.

D. AUTOMATED DATA ACQUISITION AND PROCESSING - SEE ALSO EVALUATION REPORT

Survey data acquisition and processing were accomplished using the HDAPS system with the software listed on the next page:

<u>Program</u>	<u>Version</u>	<u>HDAPS Date</u>
BACKUP	2.00	27-Oct-93
BASELINE	1.14	07-Apr-93
BIGABST	2.07	01-Oct-93
BIGAUTOST	3.01	01-Feb-93
BLKEDIT	2.02	11-Mar-93
CARTO	2.13	29-Mar-94
CLASSIFY	1.05	22-Nov-93
CONTACT	2.34	29-Mar-94
CONVERT	3.62	09-Dec-93
DAS SURV	6.70	01-Apr-94
DIAGNOSE	3.04	16-Mar-94
DISC_UTIL	1.00	01-Feb-93
DP	2.14	07-Apr-93
DPCONVERT	1.01	07-Jun-94
EXCESS	4.21	03-Feb-94
FILESYS	3.24	01-Apr-94
GRAFEDIT	1.06	16-Nov-93
HIPSTIC	1.01	28-Jul-93
HPRAZ	1.26	22-May-93
INVERSE	2.01	07-Apr-93
LISTDATA	1.02	19-Apr-93
LOADNEW	2.10	18-Feb-94
LSTAWOIS	3.07	29-Mar-94
MAINMENU	1.20	02-Nov-93
MAN DATA	2.01	07-Apr-93
NEWPOST	6.01	07-Apr-93
PLOTTALL	2.27	29-Mar-94
POINT	2.10	24-Sep-93
PREDICT	2.01	07-Apr-93
PRESURV	7.08	29-Mar-94
PRINTOUT	4.03	19-Apr-93
QUICK	2.05	01-Apr-94
RAMSAVER	1.02	07-Apr-93
REAPPLY	2.10	12-Oct-93

<u>Program</u>	<u>Version</u>	<u>HDAPS Date</u>
RECOMP	1.02	01-Feb-93
SCANNER	1.00	10-Jul-93
SEL.PRINT	2.04	12-Oct-93
SYMBOLS		01-Feb-93
VERSIONS	1.00	24-Nov-93
ZOOMEDIT	2.24	04-Apr-94

Program SHIPDIM (version 1.2) was used for DGPS performance checks. Sound velocity corrections were determined using programs CAT (version 2.00) and VELOCITY (version 2.10).

There were no nonstandard automated acquisition or processing methods used.

E. SIDE SCAN SONAR EQUIPMENT

Side scan sonar (SSS) operations were conducted using an EG&G model 260 slant-range corrected SSS recorder and an EG&G 272-T dual-channel, single-frequency towfish. The towfish was operated on the 100-kHz frequency and was configured with a 20° beam depression. Serial numbers (S/N) for the side scan sonar equipment used throughout the survey are listed below:

<u>Vessel</u>	<u>SSS Towfish S/N</u>	<u>260 Recorder S/N</u>
WHITING (2930)	016699	016670
Launch 1014 (2932)	016630	016671
Launch 1015 (2931)	016835	016942

On WHITING, the SSS towfish was deployed from a Reuland winch (model number 8377-XF5461A, S/N 814861A-1) using armored cabling in conjunction with an A-frame on the stern. The armored cable was connected to the SSS recorder via a slip-ring assembly.

On launches 1014 and 1015, the SSS towfish was deployed using a Superwinch Model W115 in conjunction with an adjustable davit arm on the stern of each launch. In shallow water, the towfish was deployed from launch 1015 using the Superwinch Model W115 in conjunction with a custom-built bowsprit. The SSS towfish was towed with vinyl-coated Kevlar cable and was connected to the recorder via a slip ring assembly.

Side scan sonar data were collected utilizing the 50 and 75-meter range scales. In order to acquire the required 200% SSS coverage, main-scheme lines were run at a spacing of 40 and 60-meters. Adequate coverage was determined by producing an 'A' and 'B' swath plot and ensuring 100% coverage on each plot. Main scheme lines were split or re-run in all areas where 200%

coverage was questionable due to a degraded sonargram. Degraded sonargrams were usually caused by surface noise or propeller wash in shallow water areas.

The SSS towfish was maintained at a height off the bottom of 8 to 20 percent of the range scale in use. SSS operations were limited to a speed-over-ground of 4.5 knots on the 50-meter and 5.5 knots on the 75-meter range scales.

Confidence checks were performed on a routine basis, primarily by noting changes in bottom texture on the outer edges of the sonargram. Confidence checks were also taken on buoys or contacts when convenient.

All significant contacts were measured off the sonargrams and entered into an HDAPS contact table. WHITING hydrographers determined contact heights, positions, and cross-reference correlations using the HDAPS Contact Utility Program. The items were then further examined by diver or echosounder investigation. Refer to Section N. and Separate V for more information. DATA FILES WITH FIELD RECORDS

F. SOUNDING EQUIPMENT

Raytheon Digital Survey Fathometer (DSF) 6000N echo sounders were used to measure bottom depths during the survey. The DSF 6000N produced a graphic record of the high frequency (100 kHz) and low frequency (24 kHz) bottom depths. Digital depths from the high frequency and low frequency beams were recorded by the HDAPS acquisition system. High frequency depths were selected as the primary depths and are shown on the sounding plots. Echograms were carefully reviewed for significant features along the track line. Any features on the graphic record that were not selected as primary soundings were manually inserted.

Electronic technicians performed accuracy checks and preventive maintenance on all of the DSF-6000N echosounders used. As a result, the echosounder on WHITING (S/N A112N), launch 1014 (S/N C076), and launch 1015 (S/N A105N) operated throughout the survey period without any major problems.

Diver determined least depths were measured with a pneumatic depth gauge (S/N 138921-30). The annual calibration for pneumatic gauge 138921-30 was performed on November 29, 1993. The pneumogauge was used in accordance with Hydrographic Guideline No. 55 and a system check was performed on each dive day to ensure the gauge was working properly.

G. CORRECTIONS TO SOUNDINGS

Sound velocity profiles of the water column were determined using a Seacat Conductivity, Temperature and Depth (CTD) profiler (model SBE-19, S/N 286). The CTD's annual calibration was performed on December 17, 1993.

A Data Quality Assurance (DQA) test was performed during each CTD cast by using a hydrometer and a thermometer to measure the density and temperature of a surface water sample. Program CAT compared these values to the Seacat's surface values to confirm that the velocity probe was working properly. There were no variations in instrument initials.

After each CTD cast, programs CAT (version 2.00) and VELOCITY (version 2.10) were used to process the data, to select significant data points, and to create a corrector table for each vessel. The velocity correctors were manually entered into each HDAPS velocity table. Velocity profile data are in the Separates submitted with this survey. Nine velocity casts were conducted for H-10498 in 1994:

<u>DN</u>	<u>Vel.Table#</u>	<u>Latitude</u>	<u>Longitude</u>	<u>Depth</u>
140	1	41°32'29"N	070°22'36"W	23.0 m
156	6,7	41°32'33"N	070°23'11"W	30.3 m
165	10,11	41°30'45"N	070°29'06"W	23.2 m
174	14,15	41°32'30"N	070°23'12"W	31.7 m
187	16,17	41°32'07"N	070°23'30"W	33.2 m
192	18,19	41°32'06"N	070°23'48"W	31.8 m
200	22,23	41°32'06"N	070°23'48"W	28.5 m
206	26,27	41°32'20"N	070°23'40"W	31.5 m
215	28,29	41°31'59"N	070°23'49"W	26.4 m

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

Bar checks were performed on launch 1014 and launch 1015 in accordance with the requirements stated in the Field Procedures Manual (FPM). No corrections to soundings were applied based on bar check data.

Leadlines were made on April 10, 1993. Calibrations were performed on March 17, 1994 and the leadline error was negligible. A leadline/DSF-6000N comparison was performed on WHITING on May 11, 1994 (DN 131) and on June 18, 1994 (DN 169). On average, the leadline reading was less than 0.1 meters deeper than the high frequency digitized reading and less than 0.2 meters shoaler than the low frequency digitized reading. No corrections for the differences were applied to the survey data. All leadline/DSF-6000N comparisons performed during H-10498 are on file at AHS. DATA FILED WITH FIELD RECORDS.

The correction for the static draft for launches 1014 and 1015 is 0.55 meters, as measured on July 28, 1993. The correction for WHITING's static draft is 3.2 meters, a historical value that WHITING divers confirmed by pneumatic depth gauge on May 20, 1993.

Settlement and squat measurements for launch 1014 (Offset Table 2) and launch 1015 (Offset Tables 1 & 3) were conducted and correctors determined on April 4, 1994. The correctors were applied in real time throughout the survey. Settlement and squat measurements for WHITING (Offset Table 9) were conducted and correctors determined on November 10, 1993. The settlement and squat correctors were applied to the sounding data in real time on each survey platform. Settlement and squat corrector tables are in Separate IV.*

For data acquired by WHITING, the HDAPS data acquisition computer logged heave data from a Datawell b/v heave, roll, and pitch sensor (HIPPY, S/N 19109-C). Heave correctors were applied in post-processing. Heave correctors were applied during post processing for launches 1014 and 1015 by manually scanning the echograms.

The tidal datum for this project is Mean Lower Low Water. The operating tide station at Nantucket, Massachusetts (844-9130) served as the reference station for predicted tides. Time and height correctors for the project were as follows:

	<u>Time Correction</u>	<u>Height Ratio</u>
High Water:	-0 hr 07 min	x0.91
Low Water:	-0 hr 07 min	x0.91

Tidal data used during data acquisition were taken from Table 2 of the East Coast of North and South America Tide Tables and were applied to the digital data during acquisition by HDAPS. Digital tidal data were received on floppy disk from N/CG24, Hydrographic Surveys Branch.

WHITING installed and leveled two ADR tide gauges for datum control on H-10498: one at the Hyannis Port Pier, Hyannis Port, MA (844-7605) and one at the Steamship Authority Pier, Oak Bluffs, MA (844-8208). Opening levels were run on the tide station at Hyannis Port on May 17, 1994. Opening levels were run on the tide station at Oak Bluffs on May 19, 1994. These level runs also tied in the NEXGEN sensors with the corresponding tide staffs. The tide note is on file at AHS.* The request for smooth tides was submitted to the Product and Services Branch, N/OES231, Datums Section, on August 24, 1994. APPROVED TIDES AND ZONING WERE APPLIED DURING OFFICE PROCESSING.

H. CONTROL STATIONS-SEE ALSO EVALUATION REPORT.

The horizontal datum for this project is the North American Datum of 1983 (NAD 83). Two B-order horizontal control stations were used as DGPS reference stations for this survey: Montauk Point, New York and Portsmouth Harbor, New Hampshire. The adjusted NAD 83 positions, computed by GPS methods are as follows:

	<u>Latitude</u>	<u>Longitude</u>	<u>Frequency</u>
Montauk Point	41°04'02.088"N	071°51'38.484"W	293 kHz
Portsmouth Harbor	43°04'15.066"N	070°42'36.804"W	288 kHz

I. HYDROGRAPHIC POSITION CONTROL

A Differential Global Positioning System (DGPS) was used as the navigation system for this survey. WHITING used two Ashtech Sensor GPS receivers with two Communications Systems International, Inc. (CSI) model MBX1 differential radio receivers supplying correctors for DGPS navigation. Launches 1014 and 1015 used a similar system, but with only one Ashtech/CSI set each. Ashtech receivers were initialized by HDAPS and CSI receivers were initialized with CSI firmware via controls on the front of each unit. On board WHITING, only one DGPS receiver drawer sent navigational output to HDAPS; the secondary drawer was used in conjunction with the primary drawer for DGPS performance checks.

DGPS positioning was accomplished in accordance with the FPM, section 3.4. Horizontal Dilution of Precision (HDOP) limits were computed as required in section 3.4.2 of the FPM. The HDOP limits for a 1:10,000 scale survey for the Montauk Point and Portsmouth Harbor beacons were 3.4 and 2.6, respectively.

The serial numbers of the Ashtech Sensor and MBX1 receivers used are as follows:

	<u>Device</u>	<u>Serial Number</u>
WHITING (Primary)	Ashtech Sensor CSI MBX1	700417B1193 1081
WHITING (Secondary)	Ashtech Sensor CSI MBX1	700417B1194 1079
Launch 1014	Ashtech Sensor CSI MBX1	700417B1203 1078
Launch 1015	Ashtech Sensor CSI MBX1	700417B1191 1080

DGPS performance checks for WHITING were conducted using the program SHIPDIM. SHIPDIM uses the two reference station method

as described in the FPM, section 3.4.5. All DGPS performance checks confirmed that WHITING's DGPS positioning systems were operating properly. Performance checks for each launch's DGPS positioning system were conducted with each launch securely housed in WHITING's davits. Simultaneous HDAPS positions were compared between WHITING and each launch; an offset in distance and azimuth was then calculated between the ship and each launch system. A summary of the DGPS performance checks is in Separate III. *

DGPS antenna offsets and laybacks were measured on March 19, 1993 for WHITING, and on July 28, 1993 for launches 1014 and 1015. Offsets and laybacks were measured using the 100 kHz (high frequency) echosounder transducer as the reference. Antenna heights were also measured on the same respective dates shown above, using the water line as the reference. The offsets and laybacks were applied by HDAPS on-line. A minimum of four satellites were used during survey H-10498 (1:10,000), providing altitude unconstrained positioning.

Offsets and laybacks for WHITING's SSS towfish A-frame were measured on July 27, 1992 using the forward 100 kHz (high frequency) transducer as the reference. The A-frame height was measured from the water line on the same date.

Offset, layback, and height corrections for each launch's SSS aft towing boom were measured on July 28, 1993, and verified on April 5, 1994. The corrections for launch 1015's SSS bowsprit were measured on June 18, 1994.

All offset, layback, and height data were applied by HDAPS on-line. These data are on file at AHS.* Correctors from offset table 1 were applied to all data acquired from launch 1015's stern mount. Correctors from offset table 2 were applied to all data acquired from launch 1014's stern mount. Correctors from offset table 3 were applied to all data acquired from launch 1015's bow mount. Correctors from offset table 9 were applied to all data acquired from WHITING.

J. SHORELINE

The area was surveyed to the 2-meter depth curve. The shoreline was not examined.

K. CROSSLINES

Twenty-four nautical miles of the crosslines run on H-10498 during survey operations in 1993 cover the area surveyed in 1994. This amounted to 17 percent of the total linear nautical miles of main-scheme lines needed for 100 percent coverage during 1994.

Crosslines and main-scheme agreement, with predicted tides applied, was good. Most soundings agreed to within 0.2 meters with no errors greater than 0.4 meters.

L. JUNCTIONS - SEE ALSO EVALUATION REPORT

Survey H-10498 (WH-10-1-93) junctions with the areas surveyed on the field sheet during 1993 on the north and south. The junction agreement between the field sections surveyed in 1993 and 1994 was excellent. The agreement between field sheets is within 0.1 meters.

Survey H-10498 also junctions with current survey H-10547 (WH-10-5-94) at the Southwest corner of survey H-10498. The agreement between field sheets is within 0.2 meters.

M. COMPARISONS WITH PRIOR SURVEYS - SEE ALSO EVALUATION REPORT

As depicted on the prior surveys, the bottom in the area surveyed is irregular; echosounder and SSS records showed significant sand waves and large areas with rocks and boulders. Survey H-10498 soundings were compared with prior surveys H-6533 (1939, scale 1:20,000) and H-6470 (1939, scale 1:10,000). Both prior surveys were referenced to NAD 27. For comparison purposes, a datum shift was applied to H-10498 in accordance with section 7.4 of the FPM (NADCON, version 1.01, January 9, 1989). Comparisons were made between survey H-10498 soundings plotted at predicted MLLW and both prior survey sounding sheets plotted at MLW.

Comparison with prior surveys showed a systematic difference, whereby the area has become deeper over the years.

The southern section of the survey area was covered by survey H-6533. Sounding comparisons between present survey depths and H-6533 agreed well. Present survey soundings average 0.7 meters deeper than the prior survey soundings.

The northern section of the survey area was covered by prior survey H-6470. Present survey soundings average 0.4 meters deeper than the prior survey soundings.

WHITING developed 5 areas where depths were 1 meter or more shoaler than current survey depths. These developments revealed no shoaler depths than previously acquired mainscheme soundings. WHITING recommends that the soundings from survey H-10498 supersede all hydrography from prior surveys H-6533 and H-6470. CONCUR

Deeper present survey depths may be attributable to strong currents shifting the sand bottom within the survey area.

Rocks originating from prior survey H-6470 were investigated by WHITING and are discussed in section N. (N.138 - N.149).

N. ITEM INVESTIGATIONS

AWOIS 2971

The 1500-meter search radius for AWOIS 2971 lies within the 200% SSS survey area of H-10498. The AWOIS listing describes the wreck as a 40-foot cabin cruiser sunk in 28 feet of water. SSS records within the search radius revealed no contacts which appeared to be a wreck. All significant contacts within this search radius were investigated by WHITING divers or echosounder and some were recommended for charting (see below).

WHITING recommends the wreck charted at 41° 34' 35.40" N, 070° 20' 17.18" W be deleted from all affected charts. *CONCUR*

Items N.1 through N.37 are further investigation (FIN) contacts assigned by the Atlantic Hydrographic Section after reviewing all of the contacts located by WHITING during the 1993 H-10498 survey operations (see DESCRIPTIVE REPORT TO ACCOMPANY H-10498, 1993, Section N., for additional item investigations on WH-10-1-93).

<u>SECTION</u>	<u>NAME</u>	<u>STATUS</u>
N.1	7405.48S	Diver least depth acquired
N.2	7495.19P	Diver least depth acquired
N.3	7029.29P	Diver least depth acquired
N.4	7573.22S	Diver least depth acquired
N.5	7566.51P	Diver least depth acquired
N.6	7501.51S	Diver least depth acquired
N.7	7586.37S	Diver least depth acquired
N.8	7591.43S	Diver least depth acquired
N.9	7387.58P	Diver least depth acquired
N.10	2031.27S	Diver least depth acquired
N.11	7381.20S	Echosounder least depth acquired
N.12	7383.17S	Echosounder least depth acquired
N.13	7463.47S	Echosounder least depth acquired
N.14	6873.56P	Echosounder least depth acquired
N.15	7452.41S	Echosounder least depth acquired
N.16	6727.02S	Echosounder least depth acquired
N.17	6649.01S	Echosounder least depth acquired
N.18	6315.28S	Echosounder least depth acquired
N.19	6706.14P	Echosounder least depth acquired
N.20	6412.03P	Echosounder least depth acquired
N.21	6838.17P	Echosounder least depth acquired
N.22	6770.22S	Echosounder least depth acquired
N.23	6793.55P	Echosounder least depth acquired
N.24	6337.31S	Echosounder least depth acquired
N.25	6171.12P	Echosounder least depth acquired

<u>SECTION</u>	<u>NAME</u>	<u>STATUS</u> (continued)
N.26	6264.27S	Echosounder least depth acquired
N.27	6301.32S	Echosounder least depth acquired
N.28	6848.21P	Echosounder least depth acquired
N.29	6115.45P	Echosounder least depth acquired
N.30	6386.37S	Echosounder least depth acquired
N.31	6216.22P	Echosounder least depth acquired
N.32	6334.52S	Echosounder least depth acquired
N.33	6790.45P	Echosounder least depth acquired
N.34	6304.39S	Echosounder least depth acquired
N.35	2069.12S	Echosounder least depth acquired
N.36	6771.41P	Echosounder development
N.37	6379.41P	Item not investigated

Items N.38 through N.137 are contacts located during the 1994 H-10498 survey operations. These SSS contacts represent the most significant item found within a 200-meter grid overlay of the survey area and were further investigated by WHITING:

N.38	3578.09S	Echosounder least depth acquired
N.39	3320.22S	Echosounder least depth acquired
N.40	3415.14S	Echosounder least depth acquired
N.41	3580.30S	Echosounder least depth acquired
N.42	3518.15P	Echosounder least depth acquired
N.43	8234.04P	Echosounder least depth acquired
N.44	8957.36S	Echosounder least depth acquired
N.45	8744.56S	Echosounder least depth acquired
N.46	8959.43P	Echosounder least depth acquired
N.47	3417.27S	Echosounder least depth acquired
N.48	8714.31P	Echosounder least depth acquired
N.49	8749.45P	Echosounder least depth acquired
N.50	8949.49P	Echosounder least depth acquired
N.51	3128.54S	Echosounder least depth acquired
N.52	3327.21S	Echosounder least depth acquired
N.53	3263.08P	Echosounder least depth acquired
N.54	3171.27P	Echosounder least depth acquired
N.55	3120.09S	Echosounder least depth acquired
N.56	3265.48P	Echosounder least depth acquired
N.57	9124.06P	Echosounder least depth acquired
N.58	9093.31S	Echosounder least depth acquired
N.59	2223.15P	Echosounder least depth acquired
N.60	2242.26P	Echosounder least depth acquired
N.61	2347.45S	Echosounder least depth acquired
N.62	2225.06P	Echosounder least depth acquired
N.63	2255.51S	Echosounder least depth acquired
N.64	2194.39S	Echosounder least depth acquired
N.65	2207.28P	Echosounder least depth acquired
N.66	2272.13P	Echosounder least depth acquired
N.67	2296.40P	Echosounder least depth acquired
N.68	2179.11S	Echosounder least depth acquired
N.69	2178.05S	Echosounder least depth acquired

<u>SECTION</u>	<u>NAME</u>	<u>STATUS</u> (continued)
N. 70	2236.05P	Echosounder least depth acquired
N. 71	2356.17S	Echosounder least depth acquired
N. 72	4149.05S	Echosounder least depth acquired
N. 73	3119.27P	Echosounder least depth acquired
N. 74	3082.47S	Echosounder least depth acquired
N. 75	251.16P	Echosounder least depth acquired
N. 76	4961.48P	Echosounder least depth acquired
N. 77	4932.50S	Echosounder least depth acquired
N. 78	4857.37P	Echosounder least depth acquired
N. 79	178.12P	Echosounder least depth acquired
N. 80	150.00P	Echosounder least depth acquired
N. 81	149.18S	Echosounder least depth acquired
N. 82	67.14S	Echosounder least depth acquired
N. 83	63.29S	Echosounder least depth acquired
N. 84	9909.27S	Echosounder least depth acquired
N. 85	9828.38S	Echosounder least depth acquired
N. 86	9678.12S	Echosounder least depth acquired
N. 87	264.34P	Echosounder least depth acquired
N. 88	142.23S	Echosounder least depth acquired
N. 89	9055.35S	Echosounder least depth acquired
N. 90	9063.14S	Echosounder least depth acquired
N. 91	9117.02P	Echosounder least depth acquired
N. 92	9188.24S	Echosounder least depth acquired
N. 93	4704.28S	Echosounder least depth acquired
N. 94	9635.30S	Echosounder least depth acquired
N. 95	3150.26P	Diver least depth acquired
N. 96	3242.29P	Diver least depth acquired
N. 97	3355.16S	Diver least depth acquired
N. 98	3349.33S	Diver least depth acquired
N. 99	3245.35P	Diver least depth acquired
N. 100	3149.34S	Diver least depth acquired
N. 101	3142.02P	Diver least depth acquired
N. 102	3060.19S	Diver least depth acquired
N. 103	8147.42S	Diver least depth acquired
N. 104	8765.13S	Diver least depth acquired
N. 105	8962.18P	Diver least depth acquired
N. 106	8742.19P	Diver least depth acquired
N. 107	8790.44S	Diver least depth acquired
N. 108	8838.11S	Diver least depth acquired
N. 109	8964.20P	Diver least depth acquired
N. 110	8795.32S	Diver least depth acquired
N. 111	8148.46S	Diver least depth acquired
N. 112	8842.21P	Diver least depth acquired
N. 113	8311.48S	Diver least depth acquired
N. 114	8840.57P	Diver least depth acquired
N. 115	8854.00P	Diver least depth acquired
N. 116	8388.01S	Diver least depth acquired
N. 117	8514.00S	Diver least depth acquired
N. 118	8895.40S	Diver least depth acquired
N. 119	8758.22S	Diver least depth acquired
N. 120	8779.36P	Diver least depth acquired

N.121	8388.40S	Diver least depth acquired
N.122	195.35P	Diver least depth acquired
N.123	9682.28P	Diver least depth acquired
N.124	9683.26S	Diver least depth acquired
N.125	3210.47S	Diver least depth acquired
N.126	219.55P	Diver least depth acquired
N.127	261.46S	Diver least depth acquired
N.128	3121.55P	Diver least depth acquired
N.129	3078.57P	Diver least depth acquired
N.130	9040.14P	Diver least depth acquired
N.131	9161.08P	Diver least depth acquired
N.132	9127.30P	Diver least depth acquired
N.133	9636.38S	Diver least depth acquired
N.134	4277.29S	Diver least depth acquired
N.135	9703.39P	Diver least depth acquired
N.136	218.07S	Diver investigation
N.137	4793.02S	Diver disapproval

Items N139. through N150. are rocks which originated from prior survey H-6470 and were not investigated during 1993 field work:

<u>SECTION</u>	<u>NAME</u>	<u>STATUS</u>
N.138	N/A	Sounding pole least depth
N.139	N/A	Sounding pole least depth
N.140	N/A	Leadline least depth
N.141	N/A	Sounding pole least depth
N.142	N/A	Sounding pole least depth
N.143	N/A	Sounding pole least depth
N.144	N/A	Sounding pole least depth
N.145	N/A	Sounding pole least depth
N.146	N/A	Sounding pole least depth
N.147	N/A	Sounding pole least depth
N.148	N/A	Echosounder development
N.149	N/A	Echosounder development

N1. - N10.

Items N1. through N10. were investigated by divers. Echosounding was used to pinpoint divers drop position on each item. A pneumatic depth gauge (S/N 138921 30) was used to measure the least depth.

N1. Contact #7405.48S (1993)

Latitude: 41° 36' 56.523" N
Longitude: 070° 17' 15.506" W * ✓
Cross Reference: 7387.16P (1993)
Description: Rk: 15ft long, 10ft wide, 6ft high
Position #: 8621, DN 155
Least depth: ~~4.2-2.8~~ meters (predicted tides) (14 FT) APPROVED
Depth of water: 5.0 meters (predicted tides)
Recommendation: Chart as rock with known least depth

Do not chart

N2. Contact #7495.19P (1993)

Latitude: 41° 36' 24.504" N
Longitude: 070° 16' 36.834" W
Cross Reference: 7583.35S (1993), 7577.46S (1993)
Description: 'L' shaped group of rocks 15ft x 25ft x 2.5ft high (4ft high at least depth point)
Position #: 8620, DN 155
Least depth: 4.1 meters (predicted tides) (13 FT) APPROVED
Depth of water: 5.5 meters (predicted tides)
Recommendation: Chart as rock with known least depth CONCUR

CHART IS Rk -

N3. Contact #7029.29P (1993)

Latitude: 41° 36' 10.681" N
Longitude: 070° 17' 30.463" W * ✓
Cross Reference: 6937.53S (1993)
Description: Rk: 5ft long, 5ft wide, 4ft high
Position #: 8619, DN 155
Least depth: 5.7 meters (predicted tides) (18 FT) APPROVED
Depth of water: 6.8 meters (predicted tides)
Recommendation: Chart as rock with known least depth

N4. Contact #7573.22S (1993) Gazelle Rock

Latitude: 41° 36' 08.376" N
Longitude: 070° 15' 42.144" W
Cross Reference: No cross reference
Description: Rk: 20ft diameter, 10ft high
Position #: 8672, DN 155
Least depth: ~~1.9-2.0~~ meters (predicted tides) (6 FT) APPROVED
Depth of water: 4.0 meters (predicted tides)
Recommendation: Chart as rock with known least depth CONCUR

CHART GRK -

* DO NOT CONCUR - DO NOT CHART - SHOALER FEATURES AND/OR SOUNDINGS IN VICINITY

N5. Contact #7566.51P (1993)

Latitude: 41° 36' 23.806" N
Longitude: 070° 16' 23.501" W
Cross Reference: 7502.34P (1993)
Description: Rk: 12ft diameter, 10ft high
Position #: 8678, DN 155 APPROVED
Least depth: 2.5⁴ meters (predicted tides) (8 FT)
Depth of water: 5.0 meters (predicted tides)
Recommendation: Chart as rock with known least depth CONCUR
CHART 8 RK ✓

N6. Contact #7501.51S (1993)

Latitude: 41° 36' 22.533" N
Longitude: 070° 16' 13.117" W
Cross Reference: No cross reference
Description: Rk: 6ft diameter, 4ft high
Position #: 8676, DN 155 APPROVED
Least depth: 3.6⁵ meters (predicted tides) (11 FT)
Depth of water: 4.9 meters (predicted tides)
Recommendation: Chart as rock with known least depth DO NOT CONCUR
DO NOT CHART - SHOALER FEATURES AND/OR SOUNDINGS IN VICINITY

N7. Contact #7586.37S (1993)

Latitude: 41° 36' 14.842" N
Longitude: 070° 15' 58.898" W
Cross Reference: 7498.18P (1993)
Description: Rk: 12ft diameter, 10ft high
Position #: 8675, DN 155 APPROVED
Least depth: 2.4³ meters (predicted tides) (7 FT)
Depth of water: 4.5 meters (predicted tides)
Recommendation: Chart as rock with known least depth CONCUR
CHART 7 RK - ✓

N8. Contact #7591.43S (1993)

Latitude: 41° 36' 11.858" N
Longitude: 070° 15' 58.600" W
Cross Reference: 7574.28P (1993)
Description: Rk: 15ft long, 10ft wide, 8ft high
Position #: 8673, DN 155 APPROVED
Least depth: 3.5⁴ meters (predicted tides) (11 FT)
Depth of water: 5.5 meters (predicted tides)
Recommendation: Not recommended for charting - CONCUR
Chart 11 RK

N9. Contact #7387.58P (1993)

Latitude: 41° 37' 02.941" N
Longitude: 070° 17' 21.062" W
Cross Reference: 7377.29S (1993), 7406.33S (1993)
Description: Rk: 20ft long, 10ft wide, 4 ft high
Position #: 8623, DN 155
Least depth: 3.6¹meters (~~predicted tides~~) (11 FT)
Depth of water: 5.0 meters (~~predicted tides~~)
Recommendation: Chart as rock with known least depth CONCUR
CHART 112K ✓

N10. Contact #2031.27S (1993)

Latitude: 41° 36' 12.521" N
Longitude: 070° 21' 25.473" W
Cross Reference: 1851.28S (1993), 2029.21P (1993)
Description: Rk: 10ft long, 8 ft wide, 6 ft high
Position #: 8624, DN 155
Least depth: 3.1⁰meters (~~predicted tides~~) (10 FT)
Depth of water: 4.6 meters (~~predicted tides~~)
Recommendation: Chart as rock with known least depth DO NOT CONCUR
DO NOT CHART - SHOALER FEATURES AND/OR SOUNDING IN VICINITY ✓

N.11 - N.35

Items N.11 through N.35 (1993 contacts) were further investigated by running echosounder investigation lines centered over each contact's average SSS position. WHITING believes that all of these contacts are rocks. The lines were run at a speed of 2.5 knots or slower, often times with the launch at idle, adrift over the rock. Below is a summary of the results of these investigations. Least depths are corrected for ~~predicted tides~~ APPROVED. Contacts marked with an * are not recommended for charting by WHITING because shoaler depths exist near the contact. All other contacts should be charted as a rock at the position listed.

N11. Contact #7381.20S (1993)

Latitude: 41° 36' 45.220" N
Longitude: 070° 17' 00.080" W
Cross Reference: No cross reference
Position #: 3001, DN 140
Least depth: 4.3²meters (~~predicted tides~~) (14 FT)
Depth of water: 5.0 meters (~~predicted tides~~)
CHART 142K ✓

N12. Contact #7383.17S (1993) ✕

Latitude: 41° 36' 56.615" N
Longitude: 070° 17' 10.495" W
Cross Reference: 7379.49P (1993)
Position #: 3004, 140 DN
Least depth: 3.4³ meters (predicted tides) (11 FT)
Depth of water: 4.5 meters (predicted tides)

N13. Contact #7463.47S (1993) ✕

Latitude: 41° 37' 01.027" N
Longitude: 070° 17' 35.757" W
Cross Reference: 7475.22P (1993)
Position #: 3013, DN 140
Least depth: 4.7 meters (predicted tides) (15 FT)
Depth of water: 5.4 meters (predicted tides)

N14. Contact #6873.56P (1993)

Latitude: 41° 37' 05.844" N
Longitude: 070° 18' 19.947" W
Cross Reference: 6876.43P (1993)
Position #: 3021, DN 140
Least depth: 3.2⁰ meters (predicted tides) (10 FT)
Depth of water: 4.0 meters (predicted tides)

CHART 102K ~

N15. Contact #7452.41S (1993) ✕

Latitude: 41° 36' 55.984" N
Longitude: 070° 17' 36.422" W
Cross Reference: 7338.02S (1993)
Position #: 3019, DN 140
Least depth: 4.8⁶ meters (predicted tides) (15 FT)
Depth of water: 5.4 meters (predicted tides)

N16. Contact #6727.02S (1993)

Latitude: 41° 33' 10.950" N
Longitude: 070° 22' 02.954" W
Cross Reference: 6709.08S (1993)
Position #: 8019, 141 DN
Least depth: 12.5³ meters (predicted tides) (40 FT)
Depth of water: 13.5 meters (predicted tides)

CHART 402E

* DO NOT CON LUT - DO NOT CHART - SHOALER SOUNDINGS AND/OR FEATURES IN
VIZ-BN-ITJ

N17.*Contact #6649.01S (1993)

Latitude: 41° 33' 02.449" N
Longitude: 070° 22' 18.521" W
Cross Reference: 6578.37P (1993)
Position #: 8013, DN 141
Least depth: ~~15.9-16.1~~ meters (~~predicted tides~~) (52 FT) APPROVED
Depth of water: 16.7 meters (~~predicted tides~~) CONCUR -

N18.*Contact #6315.28S (1993)

Latitude: 41° 32' 52.538" N
Longitude: 070° 22' 01.935" W
Cross Reference: 6330.09S (1993)
Position #: 8011, DN 141
Least depth: 20.3 meters (~~predicted tides~~) (66 FT) APPROVED
Depth of water: 20.7 meters (~~predicted tides~~) CONCUR

N19. Contact #6706.14P (1993)

Latitude: 41° 33' 15.813" N
Longitude: 070° 21' 22.575" W
Cross Reference: 6768.56S (1993)
Position #: 3029, DN 141
Least depth: 14.2 meters (~~predicted tides~~) (46 FT) APPROVED
Depth of water: 15.0 meters (~~predicted tides~~) CONCUR
CHART 46RK Do not Chart

N20.*Contact #6412.03P (1993)

Latitude: 41° 33' 05.903" N
Longitude: 070° 21' 18.926" W
Cross Reference: 6493.36S (1993)
Position #: 3027, DN 141
Least depth: 17.9 meters (~~predicted tides~~) (58 FT) APPROVED
Depth of water: 18.6 meters (~~predicted tides~~) CONCUR

N21.*Contact #6838.17P (1993)

Latitude: 41° 33' 37.686" N
Longitude: 070° 18' 47.809" W
Cross Reference: 6595.45P (1993)
Position #: 3022, DN 141
Least depth: 11.9 meters (~~predicted tides~~) (38 FT) APPROVED
Depth of water: 12.5 meters (~~predicted tides~~) CONCUR

N22.*Contact #6770.22S (1993)

Latitude: 41° 33' 12.514" N
Longitude: 070° 21' 37.975" W
Cross Reference: 6707.25P (1993)
Position #: 3037, DN 141 APPROVED
Least depth: 16.2 meters (~~predicted tides~~) (52 FT) ✓
Depth of water: 17.0 meters (~~predicted tides~~) CONCUR

N23.*Contact #6793.55P (1993)

Latitude: 41° 33' 24.737" N
Longitude: 070° 20' 55.599" W
Cross Reference: 6732.12P (1993)
Position #: 3039, DN 141 APPROVED
Least depth: 12.5 meters (~~predicted tides~~) (41 FT) ✓
Depth of water: 14.0 meters (~~predicted tides~~) CONCUR

N24.*Contact #6337.31S (1993)

Latitude: 41° 33' 12.514" N
Longitude: 070° 21' 39.501" W
Cross Reference: 6303.00S (1993)
Position #: 3042, DN 141 APPROVED
Least depth: 15.3 meters (~~predicted tides~~) (50 FT) ✓
Depth of water: 16.0 meters (~~predicted tides~~) CONCUR ✓

N25.*Contact #6171.12P (1993)

Latitude: 41° 33' 03.179" N
Longitude: 070° 20' 19.731" W
Cross Reference: 6173.16P (1993), 6215.24P (1993)
Position #: 3044, DN 141 APPROVED
Least depth: 14.1 meters (~~predicted tides~~) (46 FT) ✓
Depth of water: 15.0 meters (~~predicted tides~~) CONCUR

N26.*Contact 6264.27S# (1993)

Latitude: 41° 33' 05.277" N
Longitude: 070° 20' 21.500" W
Cross Reference: 6215.30S (1993)
Position #: 3045, DN 141 APPROVED
Least depth: 13.9 meters (~~predicted tides~~) (45 FT) ✓
Depth of water: 14.5 meters (~~predicted tides~~) CONCUR

N27.*Contact #6301.32S (1993)

Latitude: 41° 33' 10.433" N
Longitude: 070° 20' 13.713" W
Cross Reference: 6338.49S (1993)
Position #: 3046, DN 141 APPROVED
Least depth: 12.7 meters (~~predicted tides~~) (42 FT) ✓
Depth of water: 14.0 meters (~~predicted tides~~) CONCUR

N28.*Contact #6848.21P (1993)

Latitude: 41° 33' 30.638" N
Longitude: 070° 19' 44.346" W
Cross Reference: 6699.10P (1993)
Position #: 3054, DN 141 APPROVED
Least depth: 11.5³ meters (~~predicted tides~~) (37 FT)
Depth of water: 12.0 meters (~~predicted tides~~) CONCUR ✓

N29.*Contact #6115.45P (1993)

Latitude: 41° 33' 09.343" N
Longitude: 070° 19' 18.150" W
Cross Reference: 6136.40P (1993)
Position #: 3055, DN 141 APPROVED
Least depth: 11.6⁴ meters (~~predicted tides~~) (37 FT)
Depth of water: 12.2 meters (~~predicted tides~~) CONCUR

N30.*Contact #6386.37S (1993)

Latitude: 41° 33' 00.355" N
Longitude: 070° 21' 39.501" W
Cross Reference: 6410.21S (1993)
Position #: 3830, DN 159 APPROVED
Least depth: 17.2¹ meters (~~predicted tides~~) (56 FT)
Depth of water: 18.6 meters (~~predicted tides~~) CONCUR

N31.*Contact #6216.22P (1993)

Latitude: 41° 33' 02.525" N
Longitude: 070° 20' 30.309" W
Cross Reference: 6170.50P (1993)
Position #: 3968, DN 161 APPROVED
Least depth: 16.5⁴ meters (~~predicted tides~~) (54 FT)
Depth of water: 16.8 meters (~~predicted tides~~) CONCUR

N32.*Contact #6334.52S (1993)

Latitude: 41° 33' 01.813" N
Longitude: 070° 21' 03.935" W
Cross Reference: 6306.04S (1993)
Position #: 3971, DN 161
Least depth: 17.7⁶ meters (APPROVED ~~predicted~~ tides) (57 FT)
Depth of water: 18.5 meters (APPROVED ~~predicted~~ tides) CONCUR

N33.*Contact #6790.45P

Latitude: 41° 33' 18.863" N
Longitude: 070° 21' 39.516" W
Cross Reference: 2180.43S (1994)
Position #: 5269, DN 201
Least depth: 14.7⁸ meters (APPROVED ~~predicted~~ tides) (48 FT)
Depth of water: 16.0 meters (APPROVED ~~predicted~~ tides) CONCUR

N34.*Contact #6304.39S

Latitude: 41° 33' 04.959"
Longitude: 070° 20' 48.580"
Cross Reference: 6336.08S
Position #: 3965, DN 161
Least depth: 16.7 meters (APPROVED ~~predicted~~ tides) (55 FT)
Depth of water: 17.5 meters (APPROVED ~~predicted~~ tides) CONCUR

N35 *Contact #2069.12S

Latitude: 41° 35' 43.672"
Longitude: 070° 21' 12.316"
Cross Reference: No cross reference
Position #: 4007, DN 151
Least Depth: 6.6 meters (APPROVED ~~predicted~~ tides) (21 FT)
Depth of Water: 7.5 meters (APPROVED ~~predicted~~ tides) CONCUR

N36 *Contact #6771.41P (1993)

Latitude: 41° 33' 08.755" N (SSS)
Longitude: 070° 21' 52.365" W (SSS)
Cross Reference: 6651.33P (1993)
Position #: 3979, DN 161
Least depth: 15.5 meters (APPROVED ~~predicted~~ tides) (51 FT)
Depth of water: 15.7 meters (APPROVED ~~predicted~~ tides) CONCUR

An echosounder development was run in the area of this contact. The least depth was selected from these lines. WHITING does not recommend this contact be charted.

N37. Contact # 6379.41P (1993)

Latitude: 41° 33' 12.494" (SSS)
Longitude: 070° 20' 18.516" (SSS)
Cross Reference: 6338.29P (1993), 6417.00S (1993)

Contact #6379.41P was not investigated by WHITING during 1994 survey operations. Contact #6379.41P is less than 200 meters from contact #6301.32S (1993). This contact was investigated by WHITING during 1994 survey operations (Position # 3046) and determined to have a least depth of 12.17 meters (APPROVED predicted tides). WHITING determined contact #6301.32S to be the more significant of the two contacts and therefore did not investigate 6379.41P. NO CHANGE IN CHARTING.

N.38 - N.92

Items N.38 through N.92 (1994 contacts) were further investigated by running echosounder investigation lines centered over each contact's average SSS position. WHITING believes that all of these contacts are rocks. The lines were run at a speed of 2.5 knots or slower, often times with the launch at idle, adrift over the rock. The table below summarizes the results of these investigations. Contacts marked with an * are not recommended for charting by WHITING because shoaler depths exist near the contact. All other contacts should be charted as a rock at the position listed.

N38. Contact #3578.09S

Latitude: 41° 34' 19.106" N
Longitude: 070° 20' 06.126" W
Cross Reference: 3523.30S
Position #: ~~199308~~, DN 193 APPROVED
Least depth: 8.9⁸ meters (predicted tides) (29 FT)
Depth of water: 10.5 meters (predicted tides) CONCUR
CHART 2972K -

N39. Contact #3320.22S

Latitude: 41° 34' 28.414 N
Longitude: 070° 20' 03.740 W
Cross Reference: 3378.32S
Position #: ~~199306~~, DN 193 APPROVED
Least depth: 8.2¹ meters (predicted tides) (26 FT)
Depth of water: 10.5 meters (predicted tides) CONCUR
CHART 2622K -

N40.* Contact #3415.14S

Latitude: 41° 34' 20.953" N
Longitude: 070° 20' 26.964" W
Cross Reference: 3486.17S
Position #: ~~1994304~~, DN 193 APPROVED
Least depth: 8.9⁸ meters (predicted tides) (29 FT) ✓
Depth of water: 10.5 meters (predicted tides) CONCUR

* Not recommended for charting 23

N41.*Contact #3580.30S

Latitude: 41° 34' 14.610" N
Longitude: 070° 20' 35.261" W
Cross Reference: 3520.53S
Position #: ~~190-302~~, DN 193 APPROVED
Least depth: 9.76 meters (predicted tides) (31 FT)
Depth of water: 10.3 meters (predicted tides) CONCUR

N42. Contact #3518.15P

Latitude: 41° 34' 11.654" N
Longitude: 070° 21' 04.837" W
Cross Reference: 3488.56P
Position #: ~~190-301~~, DN 193 APPROVED
Least depth: 8.65 meters (predicted tides) (28 FT) ✓
Depth of water: 10.3 meters (predicted tides) CONCUR
CHART 28 RK ✓

N43. Contact #8234.04P

Latitude: 41° 35' 38.441" N
Longitude: 070° 16' 17.204" W
Cross Reference: 8717.37P, 8700.13S
Position #: ~~189-297~~, 193 APPROVED
Least depth: ~~7.8-8.0~~ meters (predicted tides) (25 FT)
Depth of water: 9.8 meters (predicted tides) CONCUR
CHART 25 RK ✓

N44.*Contact #8957.36S

Latitude: 41° 35' 56.644" N
Longitude: 070° 16' 07.197" W
Cross Reference: 8745.51S
Position #: ~~189-293~~, DN 193 APPROVED
Least depth: 6.64 meters (predicted tides) (21 FT)
Depth of water: 7.7 meters (predicted tides) CONCUR

N45. Contact #8744.56s

Latitude: 41° 35' 53.473" N
Longitude: 070° 15' 56.049" W
Cross Reference: ~~189-292~~ 8958.43S
Position #: ~~292~~, DN 193 APPROVED
Least depth: ~~5.76-0~~ meters (predicted tides) (18 FT)
Depth of water: 7.5 meters (predicted tides) CONCUR
CHART 18 RK Do not chart ✓

N46.*Contact #8959.43P

Latitude: 41° 35' 51.927" N
Longitude: 070° 15' 45.630" W
Cross Reference: 9150.45P
Position #: ~~189-290~~, DN 193 APPROVED
Least depth: ~~5.96-1~~ meters (predicted tides) (19 FT) ✓
Depth of water: 7.0 meters (predicted tides) CONCUR

N47.*Contact #3417.27S

Latitude: 41° 34' 24.543" N
Longitude: 070° 20' 03.682" W
Cross Reference: 3474.08S
Position #: 5251, DN 194 APPROVED
Least depth: 9.4³meters (predicted tides) 30FT
Depth of water: 10.5 meters (predicted tides) CONCUR

N48.*Contact #8714.31P

Latitude: 41° 35' 48.679" N
Longitude: 070° 16' 49.139" W
Cross Reference: 8697.11S
Position #: 5249, DN 194 APPROVED
Least depth: 7.3²meters (predicted tides) (23 FT)
Depth of water: 8.7 meters (predicted tides) CONCUR
Chart 23 ft

N49. Contact #8749.45P

Latitude: 41° 36' 07.859" N
Longitude: 070° 16' 53.853" W
Cross Reference: 8828.36S
Position #: 5242, DN 194 APPROVED
Least depth: 6.6⁵meters (predicted tides) (21 FT)
Depth of water: 7.6 meters (predicted tides) CONCUR
CHART 21 RK RK -

N50.*Contact # 8949.49P

Latitude: 41° 35' 58.217" N
Longitude: 070° 17' 42.154" W
Cross Reference: 8928.03S, 8974.59S
Position #: 5240, DN 194 APPROVED
Least depth: 6.6⁵meters (predicted tides) (21 FT)
Depth of water: 7.2 meters (predicted tides) CONCUR

N51. Contact #3128.54S

Latitude: 41° 34' 53.986" N
Longitude: 070° 18' 10.213" W
Cross Reference: 3163.38S, 3480.58S
Position #: 5237, DN 194 APPROVED
Least depth: 5.7⁶meters (predicted tides) 18 FT
Depth of water: 6.7 meters (predicted tides) CONCUR
~~CHART 18 RK~~ Do not chart

N52. Contact #3327.21S

Latitude: 41° 34' 39.295" N
Longitude: 070° 19' 00.001" W
Cross Reference: 3372.08S
Position #: 5232, DN 194 APPROVED
Least depth: 6.2⁶meters (predicted tides) (19 FT)
Depth of water: 7.4 meters (predicted tides) CONCUR
CHART 19 RK -

N53.*Contact #3263.08P

Latitude: 41° 34' 37.572" N
Longitude: 070° 19' 20.118" W
Cross Reference: 3325.50P
Position #: 5230, DN 194 APPROVED
Least depth: 7.4³ meters (~~predicted tides~~) (24 FT)
Depth of water: 8.4 meters (~~predicted tides~~) CONCUR
Chart 24 ft

N54.*Contact #3171.27P

Latitude: 41° 34' 37.512" N
Longitude: 070° 19' 46.235" W
Cross Reference: 3213.06P
Position #: 5229, DN 194 APPROVED
Least depth: 7.6⁴ meters (~~predicted tides~~) (24 FT)
Depth of water: 9.0 meters (~~predicted tides~~) CONCUR ✓

N55. Contact #3120.09S

Latitude: 41° 34' 36.922" N
Longitude: 070° 19' 59.869" W
Cross Reference: 3172.30S
Position #: 5227, DN 194 APPROVED
Least depth: 7.4² meters (~~predicted tides~~) (23 FT)
Depth of water: 9.3 meters (~~predicted tides~~) CONCUR
CHART 23 FT ✓

N56.*Contact #3265.48P

Latitude: 41° 34' 32.263" N
Longitude: 070° 19' 54.725" W
Cross Reference: 3321.09P
Position #: 5223, DN 194 APPROVED
Least depth: 9.2¹ meters (~~predicted tides~~) (30 FT)
Depth of water: 9.5 meters (~~predicted tides~~) CONCUR

N57.*Contact #9124.06P

Latitude: 41° 35' 46.069" N
Longitude: 070° 15' 17.027" W
Cross Reference: 9153.15P
Position #: 5256, DN 200 APPROVED
Least depth: 4.7⁶ meters (~~predicted tides~~) (15 FT)
Depth of water: 6.0 meters (~~predicted tides~~) CONCUR

N58. Contact #9093.31S

Latitude: 41° 35' 51.153" N
Longitude: 070° 15' 20.132" W
Cross Reference: 9207.42S
Position #: 5254, DN 200 APPROVED
Least depth: 4.3² meters (~~predicted tides~~) (14 FT)
Depth of water: 5.5 meters (~~predicted tides~~) CONCUR
CHART 14 FT

** Not recommended for charting 26

N59.*Contact #2223.15P

Latitude: 41° 33' 09.871" N
Longitude: 070° 22' 40.934" W
Cross Reference: 2191.35s
Position #: 5262, DN 201 APPROVED
Least depth: 17.9 meters (~~predicted tides~~) (58 FT)
Depth of water: 18.5 meters (~~predicted tides~~) CONCUR

N60.*Contact #2242.26P

Latitude: 41° 33' 20.448" N
Longitude: 070° 22' 27.616" W
Cross Reference: 2290.39P
Position #: 5259, DN 201 APPROVED
Least depth: 18.1² meters (~~predicted tides~~) (59 FT)
Depth of water: 19.0 meters (~~predicted tides~~) CONCUR

N61.*Contact #2347.45S

Latitude: 41° 33' 37.762" N
Longitude: 070° 22' 18.589" W
Cross Reference: 2311.54S
Position #: 5263, DN 201 APPROVED
Least depth: 16.2 meters (~~predicted tides~~) (53 FT)
Depth of water: 16.9 meters (~~predicted tides~~) CONCUR

N62.*Contact #2225.06P

Latitude: 41° 33' 15.059" N
Longitude: 070° 22' 14.137" W
Cross Reference: 2193.23S
Position #: 5264, DN 201 APPROVED
Least depth: 17.3⁴ meters (~~predicted tides~~) (57 FT)
Depth of water: 18.0 meters (~~predicted tides~~) CONCUR

N63.*Contact #2255.51S

Latitude: 41° 33' 18.420" N
Longitude: 070° 22' 09.439" W
Cross Reference: 2193.42P, 2209.21S
Position #: 5265, DN 201 APPROVED
Least depth: 15.0^{14.9} meters (~~predicted tides~~) (49 FT)
Depth of water: 15.0 meters (~~predicted tides~~) CONCUR

N64.*Contact #2194.39S

Latitude: 41° 33' 17.373" N
Longitude: 070° 21' 55.032" W
Cross Reference: 2226.22P
Position #: 5266, DN 201 APPROVED
Least depth: 15.2 meters (~~predicted tides~~) (50 FT)
Depth of water: 15.8 meters (~~predicted tides~~) CONCUR

N65. Contact #2207.28P

Latitude: 41° 33' 21.107" N
Longitude: 070° 21' 41.384" W
Cross Reference: 2195.36P, 2227.18P
Position #: 5267, DN 201 APPROVED
Least depth: 13.6 meters (~~predicted tides~~) (44FT)
Depth of water: 15.5 meters (~~predicted tides~~) CONCUR
CHART 44RK Do not chart

N66. Contact #2272.13P

Latitude: 41° 33' 33.184" N
Longitude: 070° 21' 24.893" W
Cross Reference: 2238.12S
Position #: 5272, DN 201 APPROVED
Least depth: 12.0 meters (~~predicted tides~~) (39FT) ✓
Depth of water: 13.8 meters (~~predicted tides~~) CONCUR
CHART 39RK Do not chart

- N67.*Contact #2296.40P

Latitude: 41° 33' 32.214" N
Longitude: 070° 21' 12.793" W
Cross Reference: 2237.26P
Position #: 5274, DN 201 APPROVED
Least depth: 11.7 meters (~~predicted tides~~) (38FT)
Depth of water: 13.0 meters (~~predicted tides~~) DO NOT CONCUR -
CHART 38RK Do not chart

N68. Contact #2179.11S

Latitude: 41° 33' 21.772" N
Longitude: 070° 21' 17.673" W
Cross Reference: 2228.51S
Position #: 5276, DN 201 APPROVED
Least depth: 12.5 meters (~~predicted tides~~) (40FT)
Depth of water: 14.0 meters (~~predicted tides~~) CONCUR -
CHART 40RK

N69. Contact #2178.05S

Latitude: 41° 33' 23.751" N
Longitude: 070° 21' 02.868" W
Cross Reference: 2229.54S
Position #: 5278, DN 201 APPROVED
Least depth: 12.8 meters (~~predicted tides~~) (42FT)
Depth of water: 14.0 meters (~~predicted tides~~) CONCUR
CHART 42RK Do not Chart

N70.*Contact #2236.05P

Latitude: 41° 33' 36.079" N
Longitude: 070° 20' 52.949" W
Cross Reference: 2298.18P
Position #: 5281, DN 201 APPROVED
Least depth: 11.5 meters (~~predicted tides~~) (37FT)
Depth of water: 12.0 meters (~~predicted tides~~) CONCUR

* Not recommended for charting 28

N71.*Contact #2356.17S

Latitude: 41° 33' 44.942" N
Longitude: 070° 20' 39.781" W
Cross Reference: 2305.01S, 2321.19P
Position #: 5282, DN 201
Least depth: 10.5⁴ meters (^{APPROVED} predicted tides) (34 FT)
Depth of water: 11.0 meters (^{APPROVED} predicted tides) CONCUR ✓

N72. Contact #4149.05S

Latitude: 41° 33' 53.449" N
Longitude: 070° 20' 38.990" W
Cross Reference: 4072.27S
Position #: 5284, DN 201
Least depth: 8.9⁸ meters (^{APPROVED} predicted tides) (29 FT)
Depth of water: 10.0 meters (^{APPROVED} predicted tides) CONCUR ✓
CHART 29R -

N73.*Contact #3119.27P

Latitude: 41° 34' 37.132" N
Longitude: 070° 20' 08.906" W
Cross Reference: 3080.32P
Position #: 5287, DN 201
Least depth: 7.9⁸ meters (^{APPROVED} predicted tides) (25 FT)
Depth of water: 9.5 meters (^{APPROVED} predicted tides) CONCUR ✓
Chart 25ft

N74. Contact #3082.47S

Latitude: 41° 34' 33.975" N
Longitude: 070° 20' 38.258" W
Cross Reference: No cross reference
Position #: 5289, 201
Least depth: 8.7⁶ meters (^{APPROVED} predicted tides) (28 FT)
Depth of water: 9.7 meters (^{APPROVED} predicted tides) CONCUR ✓
CHART 28R

N75.*Contact #251.16P

Latitude: 41° 34' 48.498" N
Longitude: 070° 19' 35.499" W
Cross Reference: 242.09S, 255.46P
Position #: 5292, DN 201
Least depth: 5.4³ meters (^{APPROVED} predicted tides) (17 FT)
Depth of water: 8.0 meters (^{APPROVED} predicted tides) CONCUR ✓

N76. Contact #4961.48P

Latitude: 41° 34' 43.651" N
Longitude: 070° 20' 36.587" W
Cross Reference: 4898.33P
Position #: 5294, DN 201
Least depth: ~~7.98.0~~ meters (~~predicted tides~~) (26 FT) APPROVED
Depth of water: 9.3 meters (~~predicted tides~~) CONCUR
CHART 26 RK

N77. *Contact #4932.50P

Latitude: 41° 34' 48.161" N
Longitude: 070° 20' 13.682" W
Cross Reference: 4892.10S
Position #: 5296, DN 201
Least depth: 7.65 meters (~~predicted tides~~) (24 FT) APPROVED
Depth of water: 8.5 meters (~~predicted tides~~) CONCUR ✓

N78. Contact #4857.37P

Latitude: 41° 34' 52.076" N
Longitude: 070° 20' 03.698" W
Cross Reference: 4928.44S
Position #: 5297, DN 201
Least depth: 7.1 meters (~~predicted tides~~) (23 FT) APPROVED
Depth of water: 8.2 meters (~~predicted tides~~) CONCUR
CHART 23 RK -

N79. Contact #178.12P

Latitude: 41° 34' 59.025" N
Longitude: 070° 20' 05.348" W
Cross Reference: 180.08P
Position #: 5299, DN 201
Least depth: 6.98 meters (~~predicted tides~~) (22 FT) APPROVED
Depth of water: 8.0 meters (~~predicted tides~~) CONCUR ✓
CHART 22 RK

N80. Contact #150.00P

Latitude: 41° 35' 01.485" N
Longitude: 070° 19' 50.022" W
Cross Reference: 154.48P
Position #: 5300, DN 201
Least depth: 5.8 meters (~~predicted tides~~) (18 FT) APPROVED
Depth of water: 7.4 meters (~~predicted tides~~) CONCUR
CHART 18 RK

N81. Contact #149.18S

Latitude: 41° 35' 02.412" N
Longitude: 070° 19' 40.285" W
Cross Reference: 129.14S
Position #: 5302, DN 201 APPROVED
Least depth: ~~5.86~~ 7.1 meters (predicted tides) (19FT)
Depth of water: 7.1 meters (predicted tides) CONCUR
CHART 19RK

N82. Contact #67.14S

Latitude: 41° 35' 06.159" N
Longitude: 070° 19' 29.401" W
Cross Reference: 93.57P
Position #: 5303, DN 201 APPROVED
Least depth: 6.2 meters (predicted tides) (19FT)
Depth of water: 7.0 meters (predicted tides) CONCUR
CHART 19RK

N83.*Contact #63.29S

Latitude: 41° 35' 06.399" N
Longitude: 070° 20' 11.876" W
Cross Reference: 89.18P, 9517.06P
Position #: 5304, DN 201 APPROVED
Least depth: 7.4³ meters (predicted tides) (24FT)
Depth of water: 8.0 meters (predicted tides) CONCUR

N84. Contact #9909.27S

Latitude: 41° 35' 13.147" N
Longitude: 070° 20' 09.020" W
Cross Reference: 9948.05S
Position #: 5307, DN 201 APPROVED
Least depth: 6.2 meters (predicted tides) (20FT)
Depth of water: 7.5 meters (predicted tides) CONCUR
CHART 20RK

N85. Contact #9828.38S

Latitude: 41° 35' 17.707" N
Longitude: 070° 19' 51.469" W
Cross Reference: 9863.09S
Position #: 5308, DN 201 APPROVED
Least depth: 5.8¹ meters (predicted tides) (18FT)
Depth of water: 6.8 meters (predicted tides) CONCUR
CHART 18RK

N86. Contact #9678.12S

Latitude: 41° 35' 26.085" N
Longitude: 070° 19' 52.857" W
Cross Reference: 9721.38S
Position #: 5310, DN 201 APPROVED
Least depth: ~~4.8~~ 5.0 meters (predicted tides) (15 FT)
Depth of water: 6.3 meters (predicted tides) CONCUR ✓
CHART 15 RK

N87.*Contact #264.34P

Latitude: 41° 35' 17.010" N
Longitude: 070° 18' 29.669" W
Cross Reference: 9834.23S
Position #: 5311, DN 201 APPROVED
Least depth: 5.9 meters (predicted tides) (18 FT)
Depth of water: 6.3 meters (predicted tides) CONCUR ✓

N88.*Contact #142.23S

Latitude: 41° 35' 01.974" N
Longitude: 070° 18' 07.725" W
Cross Reference: 136.27S
Position #: 5312, DN 201 APPROVED
Least depth: 5.9 meters (predicted tides) (18 FT)
Depth of water: 6.7 meters (predicted tides) CONCUR ✓

N89.*Contact #9055.35S

Latitude: 41° 36' 19.423" N
Longitude: 070° 16' 28.985" W
Cross Reference: No cross reference
Position #: 5313, DN 201 APPROVED
Least depth: 5.6 meters (predicted tides) (18 FT)
Depth of water: 6.0 meters (predicted tides) CONCUR ✓

N90. Contact #9063.14S

Latitude: 41° 36' 10.720" N
Longitude: 070° 16' 10.990" W
Cross Reference: 9195.07S
Position #: 5319, DN 201 APPROVED
Least depth: 4.5 meters (predicted tides) (14 FT)
Depth of water: 6.3 meters (predicted tides) CONCUR ✓
CHART 14 RK
RK

N91. Contact #9117.02P

Latitude: 41° 36' 04.462" N
Longitude: 070° 15' 41.296" W
Cross Reference: 9204.02S
Position #: 5321, DN 201 APPROVED
Least depth: 3.9 meters (predicted tides) (13 FT)
Depth of water: 6.0 meters (predicted tides) CONCUR
CHART 13 ~~RR~~ do not chart

N92. Contact #9188.24S

Latitude: 41° 36' 00.273" N
Longitude: 070° 15' 36.240" W
Cross Reference: 9066.35S
Position #: 5326, DN 201 APPROVED
Least depth: 3.8 meters (predicted tides) (12 FT)
Depth of water: 6.6 meters (predicted tides) CONCUR

CHART 12 ~~RR~~ -

N93.*Contact #4704.28S

Latitude: 41° 34' 31.538" N
Longitude: 070° 15' 03.011" W
Cross Reference: 4692.06S
Position #: 5352, DN 202 APPROVED
Least depth: 3.2 meters (predicted tides) (10 FT)
Depth of water: 6.5 meters (predicted tides)

DO NOT CONCUR - CHART 10 ~~RR~~

N94.*Contact #9635.30S

Latitude: 41° 35' 26.885" N
Longitude: 070° 15' 49.778" W
Cross Reference: 9646.18S
Position #: 5355, DN 207 APPROVED
Least depth: 7.5 meters (predicted tides) (24 FT)
Depth of water: 8.2 meters (predicted tides) CONCUR

N95. - N 135.

Items N95. through N135. were investigated by divers. Echosounding was used to pinpoint divers drop position on each item. A pneumatic depth gauge (S/N 138921 30) was used to measure the least depth.

N95. Contact #3150.26P

Latitude: 41° 35' 20.316" N
Longitude: 070° 15' 26.284" W
Cross Reference: 3239.30P
Description: Rk: 12ft long, 6ft wide, 5ft high
Position #: 4023, DN 169 APPROVED
Least depth: 5.5³ meters (predicted tides) (17 FT) *Don't Chart*
Depth of water: 8.0 meters (predicted tides)
Recommendation: Not recommended for charting CONCUR ✓

N96. Contact #3242.29P

Latitude: 41° 35' 25.603" N
Longitude: 070° 14' 54.626" W
Cross Reference: No cross reference
Description: Rk: 11 ft long, 10ft wide, 5ft high
Position #: 4022, DN 169 APPROVED
Least depth: 4.7-5.8 meters (predicted tides) (15 FT)
Depth of water: 7.0 meters (predicted tides)
Recommendation: Chart as rock with known least depth CONCUR ✓
CHART 15 Rk ✓

N97. Contact #3355.16S

Latitude: 41° 35' 13.895" N
Longitude: 070° 15' 26.826" W
Cross Reference: 3348.56S
Description: Rk: 20ft long, 20ft wide, 7ft high
Position #: 4020, DN 169 APPROVED
Least depth: 5.8¹ meters (predicted tides) (16 FT)
Depth of water: 8.2 meters (predicted tides)
Recommendation: Chart as rock with known least depth CONCUR ✓
CHART 16 Rk ✓

N98. Contact #3349.33S

Latitude: 41° 35' 15.571" N
Longitude: 070° 15' 20.421" W
Cross Reference: 3354.45S
Description: Rk: 10ft long, 10ft wide, 5ft high
Position #: 4019, DN 169 APPROVED
Least depth: 5.4-6.3 meters (predicted tides) (17 FT)
Depth of water: 7.8 meters (predicted tides)
Recommendation: Not recommended for charting CONCUR ✓

N99. Contact #3245.35P

Latitude: 41° 35' 16.620" N
Longitude: 070° 15' 18.811" W
Cross Reference: 3349.45P
Description: Rk: 15ft long, 6ft wide, 5ft high
Position #: 4018, DN 169
Least depth: ~~5.0-6.1~~ meters (^{APPROVED} ~~predicted~~ tides)(16FT)
Depth of water: 8.2 meters (~~predicted~~ tides)
Recommendation: Chart as rock with known least depth CONCUR
CHART 16 RK

N100. Contact #3149.34S

Latitude: 41° 35' 24.304" N
Longitude: 070° 15' 16.713" W
Cross Reference: 3142.54S
Description: Rk: 11ft long, 10ft wide, 6ft high
Position #: 4017, DN 169
Least depth: ~~4.2-5.3~~ meters (^{APPROVED} ~~predicted~~ tides)(14FT)
Depth of water: 7.6 meters (~~predicted~~ tides)
Recommendation: Chart as rock with known least depth CONCUR
CHART 14 RK

N101. Contact #3142.02P

Latitude: 41° 35' 23.676" N
Longitude: 070° 15' 28.011" W
Cross Reference: 3059.07P
Description: Rk: 20ft long, 10ft wide, 11ft high
Position #: 4016, DN 169
Least depth: 3.7⁹ meters (^{APPROVED} ~~predicted~~ tides)(13FT)
Depth of water: 7.0 meters (~~predicted~~ tides)
Recommendation: Chart as rock with known least depth CONCUR
CHART 13 RK

N102. Contact #3060.19S

Latitude: 41° 35' 23.035" N
Longitude: 070° 15' 44.956" W
Cross Reference: No cross reference
Description: Rk: 14ft long, 4ft wide, 4ft high
Position #: 4014, DN 169
Least depth: 6.5¹ meters (^{APPROVED} ~~predicted~~ tides)(20FT)
Depth of water: 8.0 meters (~~predicted~~ tides)
Recommendation: Chart as rock with known least depth CONCUR
CHART 20 RK

N103.Contact #8147.42S

Latitude: 41° 35' 36.380" N
Longitude: 070° 15' 41.079" W
Cross Reference: 8300.15P
Description: Rk: 16ft long, 8ft wide, 3ft high
Position #: 4013, DN 169 APPROVED
Least depth: ~~5.163~~ meters (predicted tides)(18 FT)
Depth of water: 7.3 meters (predicted tides)
Recommendation: Chart as rock with known least depth CONCUR
CHART 18 Rk - Do not chart

N104.Contact #8765.13S

Latitude: 41° 35' 42.015" N
Longitude: 070° 15' 18.595" W
Cross Reference: 8741.39P
Description: Rk: 22ft long, 17ft wide, 6ft high
Position #: 4012, DN 169 APPROVED
Least depth: ~~3.944~~ meters (predicted tides)(13 FT)
Depth of water: 5.8 meters (predicted tides)
Recommendation: Not recommended for charting CONCUR ✓

N105.Contact #8962.18P

Latitude: 41° 35' 44.540" N
Longitude: 070° 15' 17.719" W
Cross Reference: 8741.43S
Description: Rk: 8ft long, 12ft wide, 5ft high
Position #: 4011, DN 169 APPROVED
Least depth: 3.8⁴ meters (predicted tides)(11 FT)
Depth of water: 6.0 meters (predicted tides)
Recommendation: Chart as rock with known least depth CONCUR ✓
CHART 11 Rk

N106.Contact #8742.19P

Latitude: 41° 35' 42.906" N
Longitude: 070° 15' 26.870" W
Cross Reference: 8765.52S
Description: Rk: 15ft long, 8ft wide, 7ft high
Position #: 4010, DN 169 APPROVED
Least depth: 3.1⁰ meters (predicted tides)(10 FT)
Depth of water: 6.0 meters (predicted tides)
Recommendation: Chart as rock with known least depth CONCUR
CHART 10 Rk
Rk

N107.Contact #8790.44S

Latitude: 41° 35' 44.753" N
Longitude: 070° 15' 51.021" W
Cross Reference: 8796.47S
Description: Rk: 17ft long, 12ft wide, 6ft high
Position #: 4008, DN 169 ^{APPROVED}
Least depth: 5.3 meters (~~predicted~~ tides) (17 FT)
Depth of water: 7.5 meters (~~predicted~~ tides)
Recommendation: Chart as rock with known least depth CONCUR -
CHART AS 17RK RK

N108.Contact #8838.11S

Latitude: 41° 35' 31.758" N
Longitude: 070° 15' 01.328" W
Cross Reference: 8309.12P
Description: Rk: 8ft long, 6ft wide, 5ft high
Position #: 9022, DN 168 ^{APPROVED}
Least depth: 4.8 meters (~~predicted~~ tides) (15 FT)
Depth of water: 6.7 meters (~~predicted~~ tides)
Recommendation: Chart as rock with known least depth CONCUR -
CHART 15RK Do not chart

N109.Contact #8964.20P

Latitude: 41° 35' 37.508" N
Longitude: 070° 14' 56.437" W
Cross Reference: No cross reference
Description: Rk: 10ft long, 8ft wide, 5ft high
Position #: 9019, DN 168 ^{APPROVED}
Least depth: 4.8 meters (~~predicted~~ tides) (15 FT)
Depth of water: 6.7 meters (~~predicted~~ tides)
Recommendation: Chart as rock with known least depth CONCUR
CHART AS 15RK
RK

N110.Contact #8795.32S

Latitude: 41° 35' 39.464" N
Longitude: 070° 15' 36.345" W
Cross Reference: 8833.02P
Description: Rk: 20ft long, 15ft wide, 10ft high
Position #: 9037, DN 168 ^{APPROVED}
Least depth: 3.5³ meters (~~predicted~~ tides) (11 FT)
Depth of water: 6.0 meters (~~predicted~~ tides)
Recommendation: Chart as rock with known least depth CONCUR -
CHART AS 11RK

N111. Contact #8148.46S

Latitude: 41° 35' 35.883" N
Longitude: 070° 15' 28.062" W
Cross Reference: 8304.54P
Description: Rk: 10ft long, 6ft wide, 8ft high
Position #: 9034, DN 168 APPROVED
Least depth: 4.3² meters (predicted tides) (14 FT)
Depth of water: 7.0 meters (predicted tides)
Recommendation: Chart as rock with known least depth CONCUR
CHART 14 ~~RE~~ ~~RE~~

N112. Contact #8842.21P

Latitude: 41° 35' 30.732" N
Longitude: 070° 15' 45.761" W
Cross Reference: 8856.11S
Description: Rk: 40ft long, 15ft wide, 10ft high
Position #: 9033, DN 168 APPROVED
Least depth: 5.2 meters (predicted tides) (17 FT)
Depth of water: 8.0 meters (predicted tides)
Recommendation: Chart as rock with known least depth CONCUR
CHART 17 ~~RE~~

N113. Contact #8311.48S

Latitude: 41° 35' 33.085" N
Longitude: 070° 15' 32.339" W
Cross Reference: 8155.45P
Description: Rk: 20ft long, 10ft wide, 6ft high
Position #: 9028, DN 168 APPROVED
Least depth: 4.9⁵ meters (predicted tides) (16 FT)
Depth of water: 7.5 meters (predicted tides)
Recommendation: Chart as rock with known least depth CONCUR
CHART 16 ~~RE~~ Do not Chart

N114. Contact #8840.57P

Latitude: 41° 35' 30.436" N
Longitude: 070° 15' 30.773" W
Cross Reference: 8854.47S
Description: Rk: 12ft long, 6ft wide, 3ft high
Position #: 9025, DN 168 APPROVED
Least depth: 6.1 meters (predicted tides) (20 FT)
Depth of water: 7.5 meters (predicted tides)
Recommendation: Chart as rock with known least depth DO NOT CONCUR
DO NOT CHART - SHOALER FEATURES AND/OR SOUNDINGS IN VICINITY

N115.Contact #8854.00P

* Latitude: 41° 35' 29.333" N
Longitude: 070° 15' 22.327" W
Cross Reference: 9277.03S
Description: Rk: 12ft long, 8ft wide, 5ft high
Position #: 9023, DN 168
Least depth: 5.7⁶ meters (~~predicted tides~~) (18 FT) APPROVED
Depth of water: 7.5 meters (~~predicted tides~~)
Recommendation: Chart as rock with known least depth ✓

~~Chart 10 RK~~

N116.Contact #8388.01S

Latitude: 41° 35' 30.407" N
Longitude: 070° 18' 46.059" W
Cross Reference: 9291.14S
Description: Rk: 12ft long, 10 t wide, 5ft high
Position #: 9010, DN 168
Least depth: 3.3 meters (~~predicted tides~~) (11 FT) APPROVED
Depth of water: 5.4 meters (~~predicted tides~~)
Recommendation: Chart as rock with known least depth CONCUR ✓

CHART 11 RK Do not Chart

N117.Contact #8514.00S

Latitude: 41° 35' 49.731" N
Longitude: 070° 19' 00.781" W
Cross Reference: 8572.00S
Description: Rk: 30ft long, 15ft wide, 8ft high
Position #: 9008, DN 168
Least depth: 3.4³ meters (~~predicted tides~~) (11 FT) APPROVED
Depth of water: 6.2 meters (~~predicted tides~~)
Recommendation: Chart as rock with known least depth CONCUR ✓

CHART 11 RK ✓

N118.Contact #8895.40S

* Latitude: 41° 35' 48.550" N
Longitude: 070° 19' 28.447" W
Cross Reference: 8516.13P
Description: Rk: 12ft long, 10ft wide, 8ft high
Position #: 9004, DN 168
Least depth: 3.1⁰ meters (~~predicted tides~~) (10 FT) APPROVED
Depth of water: 5.5 meters (~~predicted tides~~)
Recommendation: Chart as rock with known least depth

Chart 10 RK ✓

* DO NOT CONCUR - DO NOT CHART - SHOALER FEATURES AND/OR SOUNDINGS
IN VICINITY

N119.Contact #8758.22S

Latitude: 41° 35' 49.266" N
Longitude: 070° 16' 00.546" W
Cross Reference: 8789.51P
Description: Rk: 8ft long, 6ft wide, 6ft high
Position #: 9015, DN 168 APPROVED
Least depth: 5.4 meters (~~predicted tides~~)(17 FT)
Depth of water: 7.4 meters (~~predicted tides~~)
Recommendation: Chart as rock with known least depth CONCUR
CHART 17 RK ~~RK~~

N120.Contact #8779.36P

Latitude: 41° 35' 53.343" N
Longitude: 070° 16' 37.488" W
Cross Reference: 8732.02P
Description: Rk: 30ft long, 15ft wide, 3ft high
(group of rocks)
Position #: 9014, DN 168 APPROVED
Least depth: 8.7 meters (~~predicted tides~~)(28 FT)
Depth of water: 10.6 meters (~~predicted tides~~)
Recommendation: Chart as rock with known least depth CONCUR
CHART 28 RK ~~RK~~

N121.Contact #8388.40S

Latitude: 41° 35' 30.014" N
Longitude: 070° 18' 38.542" W
Cross Reference: No cross reference
Description: Rk: 14ft long, 10ft wide, 6ft high
Position #: 9012, DN 168 APPROVED
Least depth: 3.1 meters (~~predicted tides~~)(10 FT)
Depth of water: 5.4 meters (~~predicted tides~~)
Recommendation: Chart as rock with known least depth CONCUR
CHART 10 RK ~~RK~~

N122.Contact #195.35P

Latitude: 41° 34' 56.168" N
Longitude: 070° 19' 05.638" W
Cross Reference: 184.57S, 206.57P
Description: Rk: 30ft long, 20ft wide, 9ft high (at
least depth, group of rocks)
Position #: 5350, DN 202 APPROVED
Least depth: 4.7 meters (~~predicted tides~~)(15 FT)
Depth of water: 7.0 meters (~~predicted tides~~)
Recommendation: Chart as rock with known least depth CONCUR
CHART 15 RK ~~RK~~

N123.Contact #9682.28p

Latitude: 41° 35' 26.166" N
Longitude: 070° 18' 56.468" W
Cross Reference: 9665.33P
Description: Rk: 11ft high rock
Position #: 5349, DN 202 APPROVED
Least depth: 1.9 meters (predicted tides) (5 FT)
Depth of water: 5.5 meters (predicted tides)
Recommendation: Chart as rock with known least depth CONCUR ✓
CHART 5RK ✓

N124.Contact #9683.26S

Latitude: 41° 35' 25.648" N
Longitude: 070° 18' 43.836" W
Cross Reference: 9717.21S
Description: Rk: 10ft long, 8ft wide, 10ft high
Position #: 5347, DN 202 APPROVED
Least depth: 2.4 meters (predicted tides) (7 FT)
Depth of water: 5.5 meters (predicted tides)
Recommendation: Chart as rock with known least depth CONCUR ✓
CHART 7RK ✓

N125.Contact #3210.47s

Latitude: 41° 34' 30.669" N
Longitude: 070° 20' 17.828" W
Cross Reference: 3174.03P
Description: Rk: 10ft diameter, 6ft high
Position #: 5344, DN 202 APPROVED
Least depth: 8.8 meters (predicted tides) (28 FT)
Depth of water: 10.0 meters (predicted tides)
Recommendation: Chart as rock with known least depth CONCUR ✓
CHART 28RK ✓

N126.Contact #219.55P

Latitude: 41° 34' 53.761" N
Longitude: 070° 19' 50.095" W
Cross Reference: 203.12S
Description: Rk: 8ft high
Position #: 5340, DN 202 APPROVED
Least depth: 8.0 meters (predicted tides) (19 FT)
Depth of water: 8.1 meters (predicted tides)
Recommendation: Chart as rock with known least depth CONCUR ✓
CHART 19RK ✓

N127.Contact #261.46S

Latitude: 41° 34' 45.444" N
Longitude: 070° 19' 39.587"W
Cross Reference: 5215.40S
Description: Rk: 15ft long, 12ft wide, 12ft high
Position #: 5338, DN 202 APPROVED
Least depth: 5.3 meters (~~predicted tides~~) (16 FT)
Depth of water: 7.6 meters (~~predicted tides~~)
Recommendation: Chart as rock with known least depth CONCUR —
CHART 16 RK —

N128.Contact #3121.55P

* Latitude: 41° 34' 41.976" N
Longitude: 070° 19' 37.593" W
Cross Reference: 3078.04P
Description: Rk: 12ft long, 10ft wide, 4ft high
Position #: 5336, DN 202 APPROVED
Least depth: 6.9 meters (~~predicted tides~~) (22 FT)
Depth of water: 8.0 meters (~~predicted tides~~)
Recommendation: Chart as rock with known least depth

N129.Contact #3078.57P

Latitude: 41° 34' 40.724" N
Longitude: 070° 19' 48.347" W
Cross Reference: 3121.05P
Description: Rk: 12ft diameter, 8ft high
Position #: 5334, DN 202 APPROVED
Least depth: 6.2 meters (~~predicted tides~~) (20 FT)
Depth of water: 8.5 meters (~~predicted tides~~)
Recommendation: Chart as rock with known least depth CONCUR —
CHART 20 RK —

N130.Contact #9040.14P

* Latitude: 41° 36' 16.940" N
Longitude: 070° 16' 19.374" W
Cross Reference: No cross reference
Description: Rk: 8ft long, 6ft wide, 3ft high
Position #: 5362, DN 207 APPROVED
Least depth: 4.9 meters (~~predicted tides~~) (15 FT)
Depth of water: 6.0 meters (~~predicted tides~~)
Recommendation: Chart as rock with known least depth

* DO NOT CONCUR - DO NOT CHART - SHOALER FEATURES AND/OR SOUNDING IN VICINITY

N131.Contact #9161.08P

Latitude: 41° 35' 56.711" N
Longitude: 070° 15' 46.110" W
Cross Reference: 9101.29S
Description: Rk: 8ft long, 6ft wide, 6ft high
Position #: 5356, DN 207
Least depth: ~~4.5~~ 5.0 meters (predicted tides) (5 FT) APPROVED
Depth of water: 7.2 meters (predicted tides)
Recommendation: Chart as rock with known least depth CONCUR
CHART 15 ~~RK~~ RK

N132.Contact #9127.30P

Latitude: 41° 35' 51.415" N
Longitude: 070° 15' 37.290" W
Cross Reference: 9151.26P
Description: Rk: 9ft long, 7ft wide, 5ft high
Position #: 5357, DN 207
Least depth: 4.9 meters (predicted tides) (5 FT) APPROVED
Depth of water: 6.6 meters (predicted tides)
Recommendation: Chart as rock with known least depth CONCUR
CHART 15 ~~RK~~ RK

N133.Contact #9636.38S

Latitude: 41° 35' 27.124" N
Longitude: 070° 15' 36.213" W
Cross Reference: 9644.55S
Description: Rk: 15ft diameter, 4ft high (at least depth, group of rocks)
Position #: 5358, DN 207
Least depth: 6.3 meters (predicted tides) (20 FT) APPROVED
Depth of water: 7.6 meters (predicted tides)
Recommendation: Chart as rock with known least depth CONCUR
CHART 20 ~~RK~~ Do not chart

N134.Contact #4277.29S

Latitude: 41° 33' 51.053" N
Longitude: 070° 20' 27.810" W
Cross Reference: 2320.18S, 2359.18P, 4303.49S
Description: Rk: 15ft long, 12 ft wide, 4 ft high
Position #: 5367, DN 207
Least depth: 8.9 ~~9.0~~ meters (predicted tides) (29 FT) APPROVED
Depth of water: 10.0 meters (predicted tides)
Recommendation: Chart as rock with known least depth CONCUR
CHART 29 ~~RK~~ Do not chart

N135.Contact #9703.39P (AWOIS 8283)

Reported Latitude: 41° 35' 18.00" N
Reported Longitude: 070° 15' 42.00" W
Source: LNM36/90 (9/6/90) 1st CGD
Datum: NAD 83
Reported Depth: Dangerous Wk

AWOIS 8283 is described (14 February 1994 AWOIS list) as a 21 ft Bayliner that sank in 17 ft of water.

WHITING covered the 300 meter search radius for AWOIS 8283 with 200 percent SSS and found no contacts which appeared to be a wreck. Contact 9703.39P is 550 meters WNW of the reported position for AWOIS 8283. This contact was investigated by WHITING divers.

Echosounding was used to pinpoint a drop position for WHITING divers. Divers located an aluminum hulled wreck with a fiberglass superstructure laying on its starboard side. The wreck is 24 ft long with a 9 ft beam and stood 4 feet off the bottom. A 7.6-meter least depth was taken near the center of the wreck (DP #5351, DN 202).

WHITING recommends that the wreck charted at 41° 35' 18.00" N, 070° 15' 42.00" W be deleted from all affected charts. A wreck with least depth known by diver of 7.6 meters ^(25 ft) should be charted at latitude 41° 35' 22.370", longitude 070° 16' 05.106" on charts 13237 and 13229. *CONCUR* *CHART 25 WK*

N136. Contact #218.07S

Latitude: 41° 34' 53.9" N
Longitude: 070° 19' 27.7" W
Cross Reference: 205.05S
Position #: 5345, DN 202

Echosounding was used to pinpoint a drop position for WHITING divers. Divers located an 18-inch diameter steel pipe, 285 ft long. The pipe stands approximately 1 ft off the bottom.

WHITING does not recommend this item for charting. *DO NOT CONCUR*
CHART 20 OBSTR IN LATITUDE 41° 34' 54.796" N, LONGITUDE 70° 19' 26.992" W.

N137. Contact #4793.02S

Latitude: 41° 34' 11.166" N
Longitude: 070° 16' 42.227" W
Cross Reference: 4724.07S
Position #: 5253, DN 202

WHITING dropped a buoy at the average SSS position for contact 4793.02S. Divers conducted a 20-meter circle search at this position and found no contact in the area. WHITING recommends no further investigation of this contact. *CONCUR*

N138. - N149.

Items **N138.** through **N149.** are located in depths of water less than 5-meters. No SSS data was acquired in these areas as per Project instructions. Positions for these items were scaled from

the prior survey and converted to NAD 83. The positions were converted to Easting and Northing and entered into HDAPS as targets. WHITING personnel visually searched for rocks in the vicinity of each target. When a rock was found, a leadline or sounding pole least depth was taken on the rock. If a rock was not visually located, an echosounder development was run in the area to search for the item (N148. and N149.). The systematic difference between the prior survey and current least depths indicate depths have gotten deeper over the years.

N138.

Charted Latitude: 41° 36' 06.76" N
Charted Longitude: 070° 20' 16.02" W
Charted Depth: 1.5 meters
Surveyed Latitude: 41° 36' 06.501" N
Surveyed Longitude: 070° 20' 14.678" W
Position #: DP# 5372, DN 208
Least Depth: 2.2⁶ meters (6 FT)
Recommendation: Chart as rock with least depth known CONCUR —
CHART 6 RK —

N139.

Charted Latitude: 41° 36' 09.10" N
Charted Longitude: 070° 19' 45.18" W
Charted Depth: 1.5 meters
Surveyed Latitude: 41° 36' 09.010" N
Surveyed Longitude: 070° 20' 45.701" W
Position #: DP# 5407, DN 215
Least Depth: 1.75 meters (5 FT)
Recommendation: Chart as rock with least depth known CONCUR —
CHART 5 RK —

N140.

Charted Latitude: 41° 36' 51.46" N
Charted Longitude: 070° 19' 25.32" W
Charted Depth: 0.9 meters
Surveyed Latitude: 41° 36' 51.458" N
Surveyed Longitude: 070° 19' 25.572" W
Position #: DP# 5442, DN 216
Least Depth: 1.42 meters (4 FT)
Recommendation: Chart as rock with least depth known CONCUR —
CHART 4 RK —

N141.

Charted Latitude: 41° 36' 49.12" N
Charted Longitude: 070° 19' 22.08" W
Charted Depth: 1.5 meters
Surveyed Latitude: 41° 36' 49.127" N
Surveyed Longitude: 070° 19' 22.288" W
Position #: DP# 5441, DN 216
Least Depth: 1.8¹ meters (5 FT)
Recommendation: Chart as rock with least depth known CONCUR
CHART 5 RKN ✓

N142.

Charted Latitude: 41° 36' 40.24" N
Charted Longitude: 070° 19' 13.80" W
Charted Depth: 1.2 meters
Surveyed Latitude: 41° 36' 40.295" N
Surveyed Longitude: 070° 19' 14.915" W
Position #: DP# 5437, DN 216
Least Depth: 1.5² meters (4 FT)
Recommendation: Chart as rock with least depth known CONCUR
CHART 4 RKN ✓

N143.

Charted Latitude: 41° 36' 40.06" N
Charted Longitude: 070° 19' 12.96" W
Charted Depth: 1.2 meters
Surveyed Latitude: 41° 36' 39.959" N
Surveyed Longitude: 070° 19' 12.392" W
Position #: DP# 5433, DN 215
Least Depth: 1.5⁴ meters (4 FT) ✓
Recommendation: Chart as rock with least depth known DO NOT CONCUR
DO NOT CHART - SHOALER FEATURES AND/OR SOUNDING IN VICINITY

N144.

Charted Latitude: 41° 36' 31.60" N
Charted Longitude: 070° 19' 08.94" W
Charted Depth: 0.9 meters
Surveyed Latitude: 41° 36' 31.157" N
Surveyed Longitude: 070° 19' 09.503" W
Position #: DP# 5430, DN 215
Least Depth: 1.3 meters (4 FT)
Recommendation: Chart as rock with least depth known CONCUR
CHART 4 RKN ✓

N145.

Charted Latitude: 41° 36' 27.40" N
Charted Longitude: 070° 18' 55.44" W
Charted Depth: 0.6 meters
Surveyed Latitude: 41° 36' 27.120" N
Surveyed Longitude: 070° 18' 55.471" W
Position #: DP# 5427, DN 215
Least Depth: ϕ 1.0 meters (2 FT)
Recommendation: Chart as rock with least depth known CONCUR —
CHART ZRK —

N146.

Charted Latitude: 41° 37' 10.24" N
Charted Longitude: 070° 18' 14.88" W
Charted Depth: 1.5 meters
Surveyed Latitude: 41° 37' 10.307" N
Surveyed Longitude: 070° 18' 14.611" W
Position #: DP# 5425, DN 215
Least Depth: 1.5⁴meters (4 FT)
Recommendation: Chart as rock with least depth known CONCUR —
CHART 4RK —

N147.

Charted Latitude: 41° 36' 58.48" N
Charted Longitude: 070° 17' 05.76" W
Charted Depth: * (awash) ⁵⁰⁸
Surveyed Latitude: 41° 36' 58.228" N
Surveyed Longitude: 070° 17' 05.850⁵²⁸" W
Position #: ~~DP# 5422, DN 215~~ (DP# 5452, DN 216,
Check)
Least Depth: ϕ 1.0 meters (2 FT)
Recommendation: Chart as rock with least depth known CONCUR —
CHART ZRK —

Items N148. and N149. were developed with echosounder. No isolated rocks were found on the trace in the areas developed.

N148.

Charted Latitude: 41° 36' 53.32" N
Charted Longitude: 070° 20' 17.52" W
Charted Depth: 1.5 meters
Surveyed Latitude: 41° 36' 53.420" N
Surveyed Longitude: 070° 20' 16.833" W
Position #: Fix 5382 + 2
Least Depth: 2.5⁴meters (8 FT)
Recommendation: Chart depth of 2.5⁴meters CONCUR —
CHART 8 FT SOUNDING —

N149.

Charted Latitude: 41° 36' 43.00" N
Charted Longitude: 070° 19' 30.90" W
Charted Depth: 2.1 meters ^{42,84φ}
Surveyed Latitude: 41° 36' 09.010" N
Surveyed Longitude: 070° 20' 45.701" W
Position #: Fix 5445 + 5 ^{19'27.97φ}
Least Depth: 2.6 meters (8 FT)
Recommendation: Chart depth of 2.6 meters *CONCUR*
CHART 8 FT SOUNDING

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

<u>Chart#</u>	<u>Scale</u>	<u>Edition #</u>	<u>Date</u>
13229	1:40,000	25	March 27 June 1993
13237	1:80,000	34	October 26, 1991

There is good agreement between survey H-10498 soundings and the charted soundings, contours, and features. Charted soundings originate from the prior surveys, discussed in Section M. Of the soundings compared, 87% agreed within 1 meter, with the current survey being deeper than the prior survey. No other changes were affected by the Notice to Mariners.

P. ADEQUACY OF SURVEY - *SEE ALSO EVALUATION REPORT*

This survey completes H-10498, which commenced in the fall of 1993. A separate Descriptive Report was completed for the areas surveyed during 1993. This survey is considered complete, and the data acquired are adequate to supersede all prior surveys of the common area.

Q. AIDS TO NAVIGATION

The aids to navigation located within survey area H-10498 were observed during survey operations in 1993. All charted aids agree well with the surveyed observations. *THESE AIDS APPEAR ADEQUATE TO SERVE THEIR INTENDED PURPOSES.*

R. STATISTICS

Number of Positions.....	4492
Main-scheme Sounding Lines (Nautical Miles).....	573
Crosslines (Nautical Miles).....	0 (Ran in 1993)
Square Nautical Miles Surveyed.....	14
Days of Production.....	32
Detached Positions.....	154
Bottom Samples.....	0
Tide Stations Installed.....	2
Current Stations.....	0
Number of CTD Casts.....	9
Magnetic Stations.....	0

S. MISCELLANEOUS-SEE ALSO EVALUATION REPORT

Bottom samples for the survey area were acquired during 1993. As specified in the Project Instructions, the samples were taken on an approximate grid spacing of 1000 meters square. Oceanographic

log sheets for H-10498 are on file at AHS. Bottom samples were not submitted to the Smithsonian Institution.

No anomalies in either tide or current and/or unusual magnetic variations were encountered in the survey area.

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

Recommendations concerning specific items are located in section N of this report.

U. REFERRAL TO OTHER REPORTS

A separate Descriptive Report was completed for the H-10498 areas surveyed during 1993. Additionally, the following reports will be submitted to N/CG244 and forwarded to N/CG243 as part of OPR-B616-WH-94:

Coast Pilot Report
Chart Inspection Report
User Evaluation Report

Submitted By:



Eric W. Berkowitz
Lieutenant (Junior Grade), NOAA



U.S. DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration
Office of NOAA Corps Operations
NOAA Ship WHITING S-329
439 W. York Street
Norfolk, VA 23510-1114
August 23, 1994

**ADVANCE
INFORMATION**

Commander, First Coast Guard District
Attention: OAN
408 Atlantic Avenue
Boston, MA 02110

Dear Sir:

While conducting hydrographic survey operations in Nantucket Sound, the NOAA ship WHITING discovered 13 uncharted rocks which could pose a hazard to surface navigation. Enclosed are reports on these rocks and a chartlet indicating their locations. The following table is a summary of our findings:

<u>Feature</u>	<u>Latitude</u>	<u>Longitude</u>	<u>Depth (ft)</u>
Rk	41° 36' 24.504" N	070° 16' 36.834" W	13
Rk	41° 36' 23.806" N	070° 16' 23.501" W	8
Rk	41° 35' 33.085" N	070° 15' 32.339" W	16
Rk	41° 35' 35.883" N	070° 15' 28.062" W	14
Rk	41° 35' 39.464" N	070° 15' 36.345" W	11
Rk	41° 35' 42.906" N	070° 15' 26.870" W	10
Rk	41° 35' 23.676" N	070° 15' 28.011" W	12
Rk	41° 35' 24.304" N	070° 15' 16.713" W	17
Rk	41° 35' 51.153" N	070° 15' 20.132" W	14
Rk	41° 36' 10.720" N	070° 16' 10.990" W	14
Rk	41° 36' 00.273" N	070° 15' 36.240" W	12
Rk	41° 35' 56.711" N	070° 15' 46.110" W	16
Rk	41° 35' 51.415" N	070° 15' 37.290" W	16

Differential GPS was used to determine items' positions. Positions are referenced to NAD 83. All depths are referenced to MLLW using predicted tides. Chart 13229 is the largest scale chart affected.

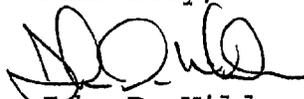


A copy of this letter and attachments have been forwarded to the following offices:

Chief, Nautical Charting Division, NOAA
Chief, AMC Operations Division, NOAA
Chief, Atlantic Hydrographic Section
Director, Defense Mapping Agency
Hydrographic/Topographic Center

**ADVANCE
INFORMATION**

Sincerely,



John D. Wilder
Commander, NOAA
Commanding Officer

Enclosures

cc: AMC1
N/CG2
N/CG244
DMAHTC

REPORT OF UNCHARTED SUBMERGED FEATURE

Hydrographic Survey Registry Number: H-10498

State: Massachusetts

General Locality: Nantucket Sound

Sublocality: Approaches to Hyannis Harbor

Project Number: OPR-B616-RU/WH

The following item was found during hydrographic survey operations by the NOAA Ship WHITING:

Object Discovered:

An uncharted rock was found with side scan sonar and further investigated with divers. Divers located a group of rocks in 5.5 meters (18ft) of water.

Covers:

Divers used a pneumatic depth gauge to determine the least depth. Their findings indicate a least depth of 4.1 meters (13ft) corrected to MLLW with predicted tide correctors. WHITING recommends charting a rock with least depth known.

Affected Nautical Charts:

<u>Chart Number</u>	<u>Edition No.</u>	<u>Date</u>	<u>Reported Depth</u>	<u>Chart Datum</u>	<u>Geographic Location</u>	
					<u>Latitude</u>	<u>Longitude</u>
13229	25	6/93	13ft	NAD83	41°36'24.504"N	070°16'36.834"W
13237	34	10/26/91	same	same		

Questions concerning this report should be directed to the Atlantic Hydrographic Section in Norfolk, Virginia, at (804) 441-6746.

REPORT OF UNCHARTED SUBMERGED FEATURE

Hydrographic Survey Registry Number: H-10498

State: Massachusetts

General Locality: Nantucket Sound

Sublocality: Approaches to Hyannis Harbor

Project Number: OPR-B616-RU/WH

The following item was found during hydrographic survey operations by the NOAA Ship WHITING:

Object Discovered:

An uncharted rock was found with side scan sonar and further investigated with divers. Divers located a rock in 5.0 meters (16ft) of water.

Covers:

Divers used a pneumatic depth gauge to determine the least depth. Their findings indicate a least depth of 2.5 meters (8ft) corrected to MLLW with predicted tide correctors. WHITING recommends charting a rock with least depth known.

Affected Nautical Charts:

<u>Chart Number</u>	<u>Edition No.</u>	<u>Date</u>	<u>Reported Depth</u>	<u>Chart Datum</u>	<u>Geographic Location</u>	
					<u>Latitude</u>	<u>Longitude</u>
13229	25	6/93	8ft	NAD 83	41°36'23.806"N	070°16'23.501"W
13237	34	10/26/91	same	same	same	same

Questions concerning this report should be directed to the Atlantic Hydrographic Section in Norfolk, Virginia, at (804) 441-6746.

REPORT OF UNCHARTED SUBMERGED FEATURE

Hydrographic Survey Registry Number: H-10498

State: Massachusetts

General Locality: Nantucket Sound

Sublocality: Approaches to Hyannis Harbor

Project Number: OPR-B616-RU/WH

The following item was found during hydrographic survey operations by the NOAA Ship WHITING:

Object Discovered:

An uncharted rock was found with side scan sonar and further investigated with divers. Divers located a rock in 7.5 meters (24ft) water.

Covers:

Divers used a pneumatic depth gauge to determine the least depth. Their findings indicate a least depth of 5.0 meters (16ft) corrected to MLLW with predicted tide correctors. WHITING recommends charting a rock with least depth known.

Affected Nautical Charts:

<u>Chart Number</u>	<u>Edition No.</u>	<u>Date</u>	<u>Reported Depth</u>	<u>Chart Datum</u>	<u>Geographic Location</u>	
					<u>Latitude</u>	<u>Longitude</u>
13229	25	6/93	16ft	NAD 83	41°35'33.085"N	070°15'32.339"W
13237	34	10/26/91	same	same	same	same

Questions concerning this report should be directed to the Atlantic Hydrographic Section in Norfolk, Virginia, at (804) 441-6746.

REPORT OF UNCHARTED SUBMERGED FEATURE

Hydrographic Survey Registry Number: H-10498

State: Massachusetts

General Locality: Nantucket Sound

Sublocality: Approaches to Hyannis Harbor

Project Number: OPR-B616-RU/WH

The following item was found during hydrographic survey operations by the NOAA Ship WHITING:

Object Discovered:

An uncharted rock was found with side scan sonar and further investigated with divers. Divers located a rock in 7.0 meters of (23ft) water.

Covers:

Divers used a pneumatic depth gauge to determine the least depth. Their findings indicate a least depth of 4.3 meters (14ft) corrected to MLLW with predicted tide correctors. WHITING recommends charting a rock with least depth known.

Affected Nautical Charts:

<u>Chart Number</u>	<u>Edition No.</u>	<u>Date</u>	<u>Reported Depth</u>	<u>Chart Datum</u>	<u>Geographic Location</u>	
					<u>Latitude</u>	<u>Longitude</u>
13229	25	6/93	14ft	NAD83	41°35'35.883"N	070°15'28.062"W
13237	34	10/26/91	same	same	same	same

Questions concerning this report should be directed to the Atlantic Hydrographic Section in Norfolk, Virginia, at (804) 441-6746.

REPORT OF UNCHARTED SUBMERGED FEATURE

Hydrographic Survey Registry Number: H-10498

State: Massachusetts

General Locality: Nantucket Sound

Sublocality: Approaches to Hyannis Harbor

Project Number: OPR-B616-RU/WH

The following item was found during hydrographic survey operations by the NOAA Ship WHITING:

Object Discovered:

An uncharted rock was found with side scan sonar and further investigated with divers. Divers located a rock in 6.0 meters (20ft) of water.

Covers:

Divers used a pneumatic depth gauge to determine the least depth. Their findings indicate a least depth of 3.5 meters (11ft) corrected to MLLW with predicted tide correctors. WHITING recommends charting a rock with least depth known.

Affected Nautical Charts:

<u>Chart Number</u>	<u>Edition No.</u>	<u>Date</u>	<u>Reported Depth</u>	<u>Chart Datum</u>	<u>Geographic Location</u>	
					<u>Latitude</u>	<u>Longitude</u>
13229	25	6/93	11ft	NAD83	41°35'39.464"N	070°15'36.345"W
13237	34	10/26/91	same	same	same	same

Questions concerning this report should be directed to the Atlantic Hydrographic Section in Norfolk, Virginia, at (804) 441-6746.

REPORT OF UNCHARTED SUBMERGED FEATURE

Hydrographic Survey Registry Number: H-10498

State: Massachusetts

General Locality: Nantucket Sound

Sublocality: Approaches to Hyannis Harbor

Project Number: OPR-B616-RU/WH

The following item was found during hydrographic survey operations by the NOAA Ship WHITING:

Object Discovered:

An uncharted rock was found with side scan sonar and further investigated with divers. Divers located a rock in 6.0 meters (19ft) of water.

Covers:

Divers used a pneumatic depth gauge to determine the least depth. Their findings indicate a least depth of 3.1 meters (10 feet) corrected to MLLW with predicted tide correctors. WHITING recommends charting a rock with least depth known.

Affected Nautical Charts:

<u>Chart Number</u>	<u>Edition No.</u>	<u>Date</u>	<u>Reported Depth</u>	<u>Chart Datum</u>	<u>Geographic Location</u>	
					<u>Latitude</u>	<u>Longitude</u>
13229	25	6/93	10ft	NAD83	41°35'42.906"N	070°15'26.870"W
13237	34	10/26/91	same	same	same	same

Questions concerning this report should be directed to the Atlantic Hydrographic Section in Norfolk, Virginia, at (804) 441-6746.

REPORT OF UNCHARTED SUBMERGED FEATURE

Hydrographic Survey Registry Number: H-10498

State: Massachusetts

General Locality: Nantucket Sound

Sublocality: Approaches to Hyannis Harbor

Project Number: OPR-B616-RU/WH

The following item was found during hydrographic survey operations by the NOAA Ship WHITING:

Object Discovered:

An uncharted rock was found with side scan sonar and further investigated with divers. Divers located a rock in 7.0 meters (23ft) of water.

Covers:

Divers used a pneumatic depth gauge to determine the least depth. Their findings indicate a least depth of 3.7 meters (12ft) corrected to MLLW with predicted tide correctors. WHITING recommends charting a rock with least depth known.

Affected Nautical Charts:

<u>Chart Number</u>	<u>Edition No.</u>	<u>Date</u>	<u>Reported Depth</u>	<u>Chart Datum</u>	<u>Geographic Location</u>	
					<u>Latitude</u>	<u>Longitude</u>
13229	25	6/93	12ft	NAD 83	41°35'23.676"N	070°15'28.011"W
13237	34	10/26/91	same	same	same	same

Questions concerning this report should be directed to the Atlantic Hydrographic Section in Norfolk, Virginia, at (804) 441-6746.

REPORT OF UNCHARTED SUBMERGED FEATURE

Hydrographic Survey Registry Number: H-10498

State: Massachusetts

General Locality: Nantucket Sound

Sublocality: Approaches to Hyannis Harbor

Project Number: OPR-B616-RU/WH

The following item was found during hydrographic survey operations by the NOAA Ship WHITING:

Object Discovered:

An uncharted rock was found with side scan sonar and further investigated with divers. Divers located a rock in 7.6 meters (25ft) of water.

Covers:

Divers used a pneumatic depth gauge to determine the least depth. Their findings indicate a least depth of 5.3 meters (17ft) corrected to MLLW with predicted tide correctors. WHITING recommends charting a rock with least depth known.

Affected Nautical Charts:

<u>Chart Number</u>	<u>Edition No.</u>	<u>Date</u>	<u>Reported Depth</u>	<u>Chart Datum</u>	<u>Geographic Location</u>	
					<u>Latitude</u>	<u>Longitude</u>
13229	25	6/93	17ft	NAD83	41°35'24.304"N	070°15'16.713"W
13237	34	10/26/91	same	same	same	same

Questions concerning this report should be directed to the Atlantic Hydrographic Section in Norfolk, Virginia, at (804) 441-6746.

REPORT OF UNCHARTED SUBMERGED FEATURE

Hydrographic Survey Registry Number: H-10498

State: Massachusetts

General Locality: Nantucket Sound

Sublocality: Approaches to Hyannis Harbor

Project Number: OPR-B616-RU/WH

The following item was found during hydrographic survey operations by the NOAA Ship WHITING:

Object Discovered:

An uncharted rock was found with side scan sonar and further investigated with divers. Divers located a rock in 5.5 meters (18ft) of water.

Covers:

Divers used a pneumatic depth gauge to determine the least depth. Their findings indicate a least depth of 4.3 meters (14 ft) corrected to MLLW with predicted tide correctors. WHITING recommends charting a rock with least depth known.

Affected Nautical Charts:

<u>Chart Number</u>	<u>Edition No.</u>	<u>Date</u>	<u>Reported Depth</u>	<u>Chart Datum</u>	<u>Geographic Location</u>	
					<u>Latitude</u>	<u>Longitude</u>
13229	25	6/93	14ft	NAD83	41°35'51.153"N	070°15'20.132"W
13237	34	10/26/91	same	same	same	same

Questions concerning this report should be directed to the Atlantic Hydrographic Section in Norfolk, Virginia, at (804) 441-6746.

REPORT OF UNCHARTED SUBMERGED FEATURE

Hydrographic Survey Registry Number: H-10498

State: Massachusetts

General Locality: Nantucket Sound

Sublocality: Approaches to Hyannis Harbor

Project Number: OPR-B616-RU/WH

The following item was found during hydrographic survey operations by the NOAA Ship WHITING:

Object Discovered:

An uncharted rock was found with side scan sonar and further investigated with divers. Divers located a rock in 6.3 meters (20ft) of water.

Covers:

Divers used a pneumatic depth gauge to determine the least depth. Their findings indicate a least depth of 4.5 meters (14 feet) corrected to MLLW with predicted tide correctors. WHITING recommends charting a rock with least depth known.

Affected Nautical Charts:

<u>Chart Number</u>	<u>Edition No.</u>	<u>Date</u>	<u>Reported Depth</u>	<u>Chart Datum</u>	<u>Geographic Location</u>	
					<u>Latitude</u>	<u>Longitude</u>
13229	25	6/93	14ft	NAD 83	41°36'10.720"N	070°16'10.990"W
13237	34	10/26/91	same	same	same	same

Questions concerning this report should be directed to the Atlantic Hydrographic Section in Norfolk, Virginia, at (804) 441-6746.

REPORT OF UNCHARTED SUBMERGED FEATURE

Hydrographic Survey Registry Number: H-10498

State: Massachusetts

General Locality: Nantucket Sound

Sublocality: Approaches to Hyannis Harbor

Project Number: OPR-B616-RU/WH

The following item was found during hydrographic survey operations by the NOAA Ship WHITING:

Object Discovered:

An uncharted rock was found with side scan sonar and further investigated with divers. Divers located a rock in 6.6 meters (21ft) of water.

Covers:

Divers used a pneumatic depth gauge to determine the least depth. Their findings indicate a least depth of 3.8 meters (12ft) corrected to MLLW with predicted tide correctors. WHITING recommends charting a rock with least depth known.

Affected Nautical Charts:

<u>Chart Number</u>	<u>Edition No.</u>	<u>Date</u>	<u>Reported Depth</u>	<u>Chart Datum</u>	<u>Geographic Location</u>	
					<u>Latitude</u>	<u>Longitude</u>
13229	25	6/93	12ft	NAD83	41°36'00.273"N	070°15'36.240"W
13237	34	10/26/91	same	same	same	same

Questions concerning this report should be directed to the Atlantic Hydrographic Section in Norfolk, Virginia, at (804) 441-6746.

REPORT OF UNCHARTED SUBMERGED FEATURE

Hydrographic Survey Registry Number: H-10498

State: Massachusetts

General Locality: Nantucket Sound

Sublocality: Approaches to Hyannis Harbor

Project Number: OPR-B616-RU/WH

The following item was found during hydrographic survey operations by the NOAA Ship WHITING:

Object Discovered:

An uncharted rock was found with side scan sonar and further investigated with divers. Divers located a rock in 7.2 meters of (23ft) water.

Covers:

Divers used a pneumatic depth gauge to determine the least depth. Their findings indicate a least depth of 5.0 meters (16ft) corrected to MLLW with predicted tide correctors. WHITING recommends charting a rock with least depth known.

Affected Nautical Charts:

<u>Chart Number</u>	<u>Edition No.</u>	<u>Date</u>	<u>Reported Depth</u>	<u>Chart Datum</u>	<u>Geographic Location</u>	
					<u>Latitude</u>	<u>Longitude</u>
13229	25	6/93	16ft	NAD83	41°35'56.711"N	070°15'46.110"W
13237	34	10/26/91	same	same	same	same

Questions concerning this report should be directed to the Atlantic Hydrographic Section in Norfolk, Virginia, at (804) 441-6746.

REPORT OF UNCHARTED SUBMERGED FEATURE

Hydrographic Survey Registry Number: H-10498

State: Massachusetts

General Locality: Nantucket Sound

Sublocality: Approaches to Hyannis Harbor

Project Number: OPR-B616-RU/WH

The following item was found during hydrographic survey operations by the NOAA Ship WHITING:

Object Discovered:

An uncharted rock was found with side scan sonar and further investigated with divers. Divers located a rock in 6.6 meters (21ft) of water.

Covers:

Divers used a pneumatic depth gauge to determine the least depth. Their findings indicate a least depth of 4.9 meters (16 feet) corrected to MLLW with predicted tide correctors. WHITING recommends charting a rock with least depth known.

Affected Nautical Charts:

<u>Chart Number</u>	<u>Edition No.</u>	<u>Date</u>	<u>Reported Depth</u>	<u>Chart Datum</u>	<u>Geographic Location</u>	
					<u>Latitude</u>	<u>Longitude</u>
13229	25	6/93	16ft	NAD 83	41°35'51.415"N	070°15'37.290"W
13237	34	10/26/91	same	same	same	same

Questions concerning this report should be directed to the Atlantic Hydrographic Section in Norfolk, Virginia, at (804) 441-6746.

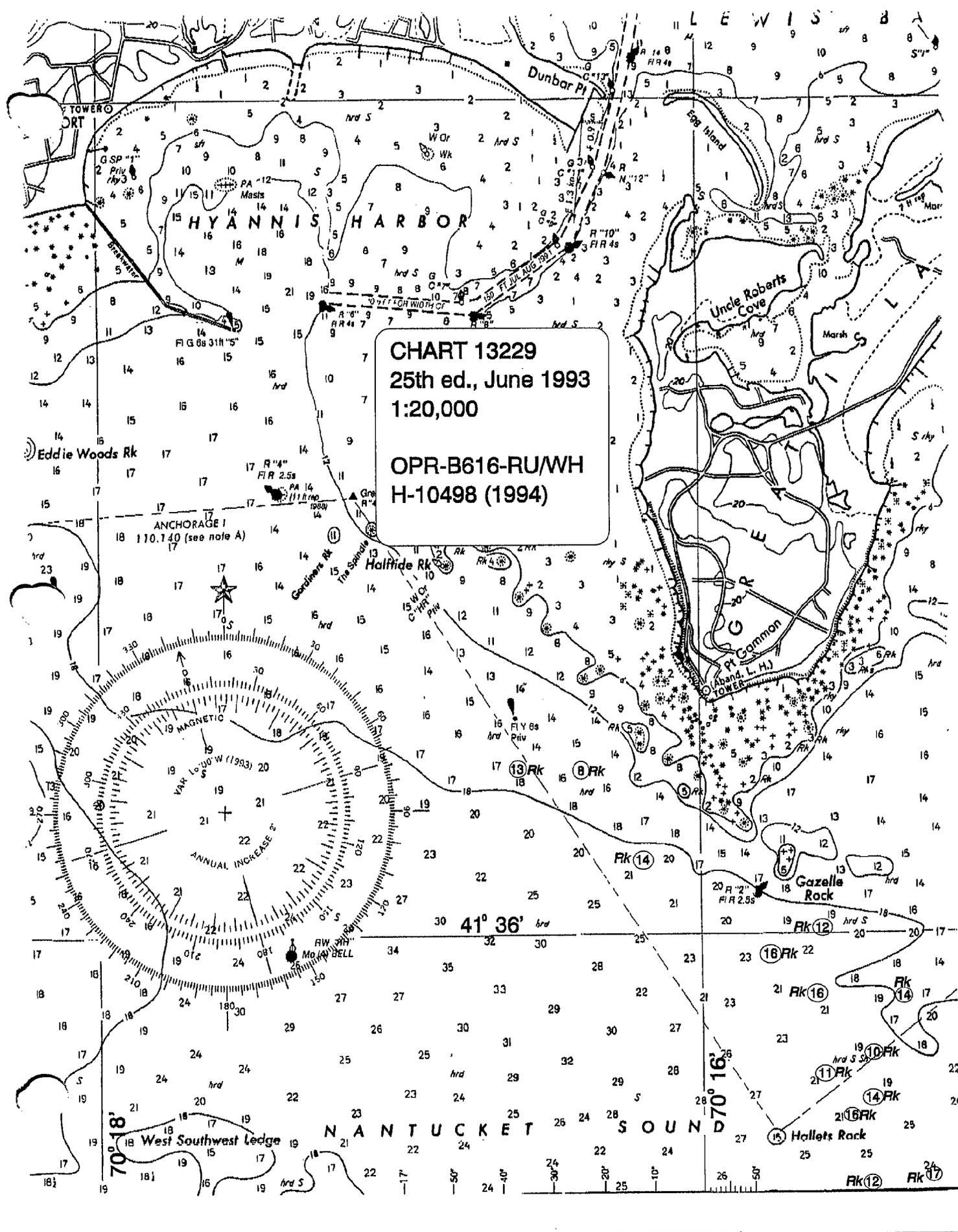
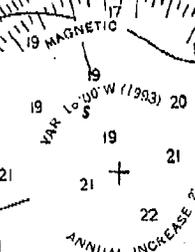


CHART 13229
25th ed., June 1993
1:20,000

OPR-B616-RU/WH
H-10498 (1994)

ANCHORAGE I
110.140 (see note A)



41° 36'

70° 16'

NANTUCKET SOUND

70° 16'

Rk(12) Rk(17)

APPROVAL SHEET
FIELD EXAMINATION SURVEY
OPR-B616-RU/WH
1993
WH-10-1-93
H-10498

The data for this survey were acquired and checked frequently under my direct supervision. Position and sounding accuracy meet the requirements specified in the Hydrographic Manual, the Hydrographic Survey Guidelines, and the Field Procedures Manual for Hydrographic Surveying. This survey is complete and adequate, in the area surveyed, for the intended purpose of delineating bottom topography and determining depths and identifying (but not fully investigating) all potential dangers to navigation. Significant portions of this survey remain incomplete.

Approved By:



Andrew A. Armstrong, IPI
Commander, NOAA
Commanding Officer

NOAA FORM 76-155 (11-72)		U.S. DEPARTMENT OF COMMERCE NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION		SURVEY NUMBER														
GEOGRAPHIC NAMES				H-10498														
Name on Survey	A ON-SHORE 15229, 15237		B ON PREVIOUS SURVEY NO.		C ON U.S. QUADRANGLE MAPS		D FROM LOCAL INFORMATION		E ON LOCAL MAPS		F P.O. GUIDE OR MAP		G GRAND McNALLY ATLAS		H U.S. LIGHT LIST		K	
	BEARSE ROCK	X		X														
BISHOP AND CLERKS (bar)	X		X															2
CHANNEL ROCK	X		X															3
COLLIER LEDGE	X		X															4
EDDIE WOODS ROCK	X		X															5
GALLATIN ROCK	X		X															6
GAMMON, POINT	X		X															7
GANNET LEDGE	X		X															8
GANNET ROCKS	X		X															9
GARDINERS ROCK	X		X															10
GREAT ROCK	X		X															11
HALFTIDE ROCK	X		X															12
HALLETS ROCK	X																	13
HODGES ROCK	X		X															14
HYANNIS HARBOR	X		X															15
HYANNIS POINT	X		X															16
MASSACHUSETTS (title)	X		X															17
NANTUCKET SOUND	X		X															18
NORTH CHANNEL	X		X															19
SOUTH WEST ROCK	X		X															20
WEST SOUTH WEST LEDGE	X		X															21
																		22
																		23
																		24
																		25

Approved

 Chief Geographer
 MAY 29 1996



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: April 18, 1994

MARINE CENTER: Atlantic

HYDROGRAPHIC PROJECT: OPR-B616

HYDROGRAPHIC SHEET: H-10498

LOCALITY: Massachusetts, Nantucket Sound, North Channel

TIME PERIOD: August 29 - November 22, 1993

TIDE STATION USED: 844-7605 Hyannisport, Ma.
Lat. $41^{\circ} 37.7'N$ Lon. $70^{\circ} 18.0'W$

PLANE OF REFERENCE (MEAN LOWER LOW WATER): 12.07 ft.
HEIGHT OF HIGH WATER ABOVE PLANE OF REFERENCE: 3.5 ft.

REMARKS: RECOMMENDED ZONING

1. East of $70^{\circ} 22.0'W$, times and heights are direct on Hyannisport, Ma. (844-7605).
2. West of $70^{\circ} 22.0'W$, times are direct and apply a X0.87 range ratio to all heights using Hyannisport, Ma. (844-7605).

Note: Times are tabulated in Eastern Standard Time.

William M. Gibson

CHIEF, DATUMS SECTION





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

TIDE NOTE FOR HYDROGRAPHIC SURVEY

DATE: March 3, 1995

HYDROGRAPHIC SECTION: Atlantic

HYDROGRAPHIC PROJECT: OPR-B616

HYDROGRAPHIC SHEET: H-10498

LOCALITY: Nantucket Sound, Approaches to Hyannis Harbor, Ma.

TIME PERIOD: May 20 - July 27, 1994

TIDE STATION USED: 844-7605 Hyannisport, Ma.
Lat. $41^{\circ} 37.7'N$ Lon. $70^{\circ} 18.0'W$

PLANE OF REFERENCE (MEAN LOWER LOW WATER): 12.14 ft.
HEIGHT OF HIGH WATER ABOVE PLANE OF REFERENCE: 3.5 ft.

REMARKS: RECOMMENDED ZONING

1. East of $70^{\circ} 20.0'W$, times and heights are direct on Hyannisport, Ma. (844-7605).
2. West of $70^{\circ} 20.0'W$ and east of $70^{\circ} 23.0'W$, times are direct and apply a X0.93 range ratio to heights using Hyannisport, Ma. (844-7605).
3. West of $70^{\circ} 23.0'W$, times are direct and apply a X0.78 range ratio to heights using Hyannisport, Ma. (844-7605).

Note: Times are tabulated in Greenwich Mean Time.


CHIEF, DATUMS SECTION



.4

**ATLANTIC HYDROGRAPHIC BRANCH
EVALUATION REPORT FOR H-10498 (1993-94)**

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:

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

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). Office processing of this survey is based on these values.

To place this survey on the NAD 27, move the projection lines 0.404 seconds (12.455 meters or 1.25 mm at the scale of the survey) north in latitude, and 1.920 seconds (44.484 meters or 4.45 mm at the scale of the survey) east in longitude.

L. JUNCTIONS

H-10547 (1994) to the southwest

A standard junction was effected between the present survey and survey H-10547 (1994).

There are no junctional surveys to the northwest, north, south, or east. Present survey depths are in harmony with the charted hydrography to the northwest, north, south and east.

M. COMPARISON WITH PRIOR SURVEYS

A comparison with prior surveys was not done during office processing in accordance with section 4. of the memorandum titled "Changes to Hydrographic Survey Processing", dated May 24, 1995; however, a comparison with prior survey H-6470 (1939) was done because side scan sonar operations were not conducted in the common area.

Prior survey H-6470 (1939) covers the present survey to the north. Prior survey depths compare favorably and show a general trend of being 1 to 2 ft (0³ 0⁶ m) shoaler than the present survey depths. The following should be noted:

The following charted dangerous submerged rocks originating with the prior survey were located during present survey operations:

<u>CHARTED (ft)</u>	<u>LOCATED (ft)</u>	<u>LATITUDE (N)</u>	<u>LONGITUDE (W)</u>
5		41°36'12"	70°15'45"
	6	41°36'08.38"	70°15'42.14"
5		41°35'26"	70°18'59"
	5	41°35'26.17"	70°18'56.47"
4		41°35'49"	70°20'04"
	4	41°35'48.70"	70°20'04.42"

It is recommended that the charted dangerous submerged rocks be revised and charted as shown on the present survey.

The following charted rocks, originating with the prior survey were neither verified nor disproved by the present survey:

<u>DEPTH (ft)</u>	<u>LATITUDE (N)</u>	<u>LONGITUDE (W)</u>
5	41°37'23"	70°18'24"
bares 2 ft	41°37'15"	70°18'45"
bares 1 ft	41°37'08"	70°19'35"

No change in charting status is recommended.

An uncharted rock with a depth of 8 feet (2⁴ m), in Latitude 41°35'26.8"N, Longitude 70°18'43.4"W, originating with the prior survey was verified by the field unit. A rock with a depth of 7 feet (2¹ m) was located in Latitude 41°35'25.65"N, Longitude 70°18'43.84. The rock shown on the present survey is in the vicinity of shoaler features or soundings. No change in charting status is recommended.

The differences between the prior survey and the present survey are attributed to natural and cultural changes, and/or improved hydrographic surveying methods and equipment.

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

- O. COMPARISON WITH CHARTS 13229 (25th Edition, Mar 27/93)
13233 (14th Edition, Nov 28/92)
13237 (34th Edition, Oct 26/91)

Hydrography

The hydrographer makes adequate chart comparisons in sections N. and O. of the Descriptive Report. The following should be noted:

1) The following uncharted dangerous submerged rocks were located during present survey operations, but were not discussed in the Descriptive Report:

<u>DEPTH (ft)</u>	<u>LATITUDE (N)</u>	<u>LONGITUDE (W)</u>
16	41°35'31.87"	70°19'56.66"
10	41°35'53.86"	70°19'49.64"
10	41°35'35.60"	70°19'46.55"
15	41°35'38.74"	70°19'02.60"

It is recommended that the dangerous submerged rocks be charted as shown on the present survey.

2) A charted submerged rock, with notations Rk (11ft) and 11 ft rep, in the vicinity of Latitude 41°37'04"N, Longitude 70°17'20"W, was located by the present survey as a rock with a known depth of 11 ft in Latitude 41°37'02.94"N, Longitude 70°17'21.06. It is recommended that the charted submerged rock, with notations Rk (11ft) and 11 ft rep be deleted, and a rock with a known depth be charted in Latitude 41°37'02.94"N, Longitude 70°17'21.06"W.

3) A charted light, Fl Y 6s, "Priv", in Latitude 41°36'31"N, Longitude 70°16'36"W was not located by the field unit. It is recommended that the Source Data Section ascertain the appropriate charting disposition for this aid.

4) An uncharted "priv marker" was located during present survey operations in Latitude 41°36'26.74"N, Longitude 70°19'11.01"W. It is recommended that the Source Data Section ascertain the appropriate charting disposition for this aid.

The present survey is adequate to supersede the charted hydrography within the common area, *except the 3-foot sdg. charted at lat. 41°36'27"N long. 70°19'10."w from an unascertainable source which first appeared on chart 258, dated Dec. 1942.*

Danger to Navigation

One Danger to Navigation report was submitted to Commander (oan), First Coast Guard District, Boston, Massachusetts for inclusion in the Local Notice to Mariners, and to the Marine Chart Division, N/CS3x1, Silver Spring, Maryland. A copy of the report is appended to this report.

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. Compilation data will be forwarded to the Marine Chart Division, Silver Spring, Maryland.

WHITING Processing Team



Robert Snow
Cartographic Technician

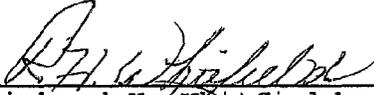


Norris A. Wike
Cartographer

APPROVAL SHEET
H-10498

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.



Richard H. Whitfield
Cartographer
Atlantic Hydrographic Branch

Date: JANUARY 2, 1996

I have reviewed the smooth sheet, accompanying data, and reports. This survey and accompanying digital data meet or exceed NOS requirements and standards for products in support of nautical charting except where noted in the Evaluation Report.



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

Date: JANUARY 2, 1996

Final Approval:

Approved: 

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

Date: JUNE 10, 1996

