H10938

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 / Multibeam

Field No. RU-5-3-99

Registry No. H10938

LOCALITY

State New York - New Jersey

General Locality Hudson River

Locality Edgewater to Weehawken

1999

CHIEF OF PARTY
LCDR J. S. Verlaque

NOAA FORM 77-28
(11-72)

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

HYDROGRAPHIC TITLE SHEET

REGISTER NO.

H-10938

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

FIELD NO.

RU-05-03-99

State New York - New Jersey

General locality ~~Lower~~ Hudson River

Locality ~~2 NM South of the George Washington Bridge~~ Edgewater To Weehawken

Scale 1:5,000

Date of survey September ~~10~~ 23 - October ~~15~~ 14, 1999

Instructions dated September 27, 1999

Project No. OPR-B330-RU-99

Vessel NOAA Ship RUDE s590, EDP# 9040

Chief of party Lieutenant Commander James S. Verlaque, NOAA

Surveyed by LCDR J. Verlaque, LT E. Berkowitz, ENS K. Slover, ENS B. Goodwin, PS C. Parker, PS E. Owens, ST S. Rooney, ST M. Chandler

Soundings taken by:(echo sounder,hand lead,pole) Raytheon DSG 6000N Echosounder, Reson SEABAT 9003 SWMB

Graphic record scaled by RUDE Personnel

Graphic record checked by RUDE Personnel

Protracted by N/A

Automated plot by HP 2500CM, HP 750C (Field) HP Design Jet 2500CP (office)

Verification by Atlantic Hydrographic~~s~~ ~~Survey~~s Branch Personnel

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

REMARKS: Time Zone Used, 0 (UTC)

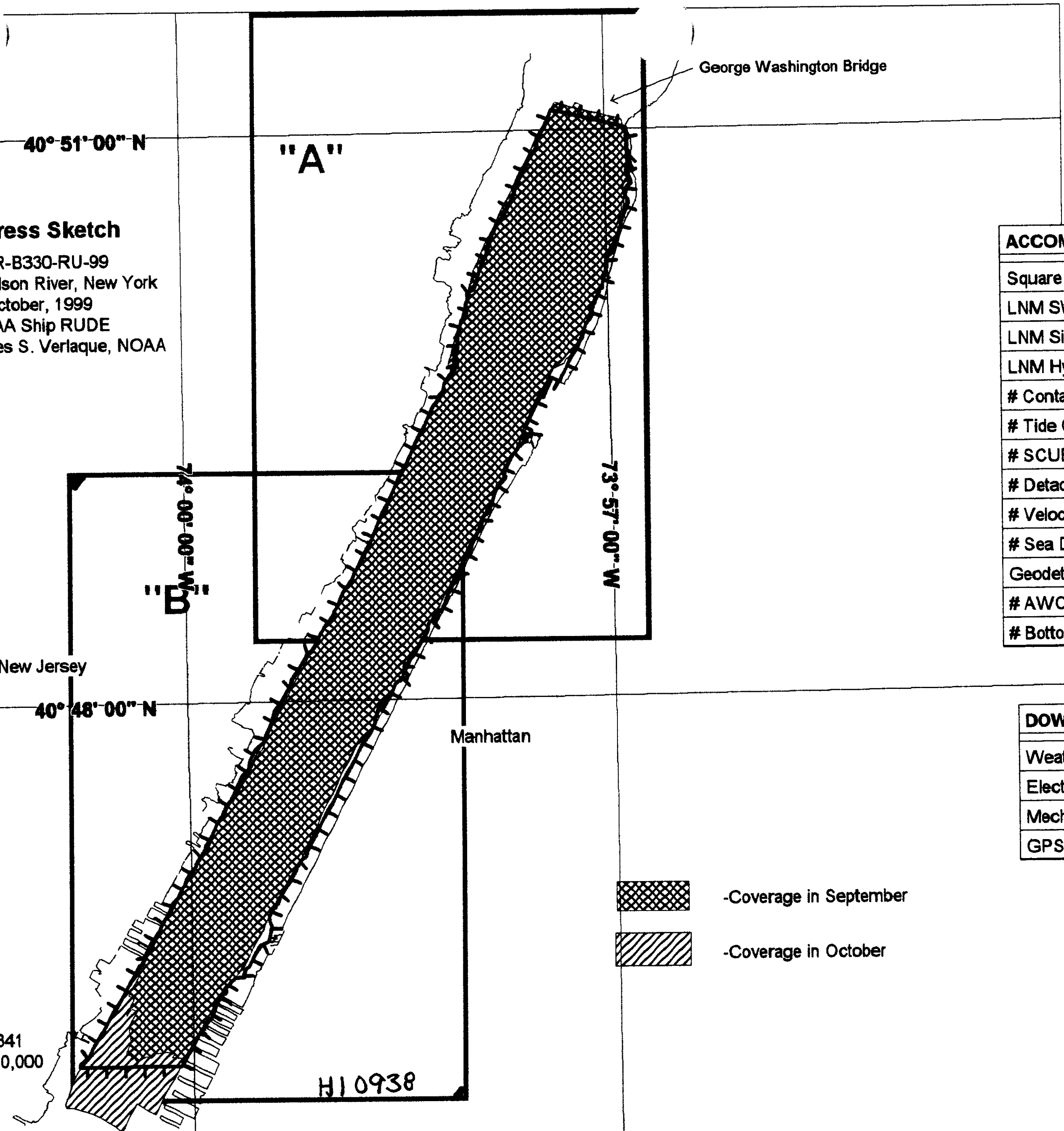
* Handwritten notes in the Descriptive Report were made during office processing

AWOIS/SURF
3/27/00 MCR

INDEX OF SHEETS:

Progress Sketch

OPR-B330-RU-99
Lower Hudson River, New York
October, 1999
NOAA Ship RUDE
LCDR James S. Verlaque, NOAA



ACCOMPLISHMENTS	September	October
Square NM Surveyed	2	1
LNM SWMB	300	48
LNM Side Scan Sonar	49	13
LNM Hydrography	0	0
# Contact Investigations	0	147
# Tide Gauges	0	0
# SCUBA Dives	1	2
# Detached Positions	0	2
# Velocity Casts	27	14
# Sea Days	13	9
Geodetic Control Stations	0	0
# AWOIS Items	0	5
# Bottom Samples	0	26

DOWNTIME_Hrs	September	October
Weather	24	0
Electronics	3	0
Mechanical	0	0
GPS	0	0

REGISTRY_#	Field_#	Sheet	Started	PercentCompleted	Completed
H-10937	RU-5-2-99	A	09/19/1999	100%	10/15/1999
H-10938	RU-5-3-99	B	09/23/1999	100%	10/14/1999

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* Data filed with field records.

A. Project

A.1 This survey was conducted in accordance with Hydrographic Project Instructions OPR-B330-RU-99, Lower Hudson River, New York.

A.2 The original instructions are dated September 27, 1999

A.3 There are no amendments to the instructions.

A.4 This survey is designated as sheet "B", registry number H-10938.

A.5 This project responds to a request from the Department of the Navy, Northeast Region Fleet Support. This project will provide modern hydrography in support of Naval activities during "Opsail 2000" and the International Naval Revue scheduled for July 4, 2000. U.S. and Foreign Naval Ships as well as "tall" sailing ships will be maneuvering and anchoring in the project area. The Port of New York and New Jersey, Harbor Safety, Navigation, and Operations Committee has also requested these surveys in support of the increased number of deep draft vessels transiting these waters. The latest National Ocean Service hydrographic surveys in the project area date from 1939.

B. Area Surveyed

B.1 Survey H-10938 encompasses an~~d~~ area from 128th St to Pier 90, New York City, New York. The survey area covers approximately 5.8 square kilometers or 1.7 square nautical miles.

B.2 The survey is comprised of one sheet with the following survey boundaries (approximate and not to scale):

40°49′11.29 N 074°00′46.88 W	40°49′11.29″ N 073°58′02.19″ W
40°45′53.69 N 074°00′46.88 W	40°45′53.69″ N 073°58′02.19″ W

B.3 Data acquisition for this survey began September ~~19~~ 23, 1999 (DN ~~262~~ 266) and ended October ~~13~~ 14, 1999 (DN ~~288~~ 287).

C. Survey Vessels

C.1 All H-10938 hydrography, side scan, and multibeam investigations were conducted from NOAA Ship RUDE (S-590, EDP #9040). The RUDE acquired 100% side scan and 100% multibeam coverage from the 30-foot contour and deeper. Multibeam sonar was solely used from the 18-foot contour to the 30-foot contour acquiring 100% multibeam sonar coverage.

C.2 The transducer for the multibeam sonar was deployed on a pivoting pole mounted on the port side, approximately amidships. The multibeam transducer was rotated into the water only during times of data acquisition.

D. Automated Data Acquisition and Processing - See also Evaluation Report

D.1 Coastal Oceanographics' Hypack for Windows, Version 7.1a (12/02/97) was used for data acquisition during the survey. Post processing included the use of HP_Tools, Version 9.4.0 (04/22/99), for all Hypack data conversion. Data processing was conducted using Hydrographic Process System (HPS) Version 8.2 (03/02/98) supplied by Atlantic Hydrographic Branch Computer Support Group on the HydroSoft CD, Version 8.9. MapInfo Version 5.0 (08/18/98) was utilized for data display during the evaluation process and completion of the field sheet. All software versions used for data processing are listed in Appendix H.

D.1b Triton Corporations ISIS software Version 4.3.2 (06/01/99) was used to acquire SeaBat multibeam and digital side scan sonar data. SeaBat data was processed on the CARIS-HIPS System, Version 4.2.7 (01/17/97).

D.1c The SEABIRD SBE-19 sound velocity profiler unit was utilized with SEASOFT 3.3M (11/27/99) and SEACAT 3.1 (03/01/99) software. The program VELWIN Version 4.0 (03/01/99) was used to process the acquired data and calculate velocity corrections.

D.2a Multibeam and side scan sonar data (XTF Format) conversion within the CARIS-HIPS System entailed specific conversion selections. Conversion selection for origin of sensor information differs between side scan data and multibeam data. Multibeam data conversion utilized the standard, or default selections. "Ship Nav" from Sensor; "Ship Gyro" from Attitude; "Fish Nav" from Sensor; "Fish Gyro" from Attitude. Data decimation was not selected and image correction was selected during conversion.

Side scan sonar data conversion entailed selecting "Ship Nav" from sensor; "Ship Gyro" from Ship or Attitude; "Fish Nav" from Ship; "Fish Gyro" from Ship or Attitude. Data decimation was not selected and image correction was selected during conversion.

D.2b SeaBat depth data were monitored using ISIS during acquisition and processed utilizing CARIS-HIPS multibeam data cleaning programs. Digital multibeam depth profiles were visually reviewed and fliers were identified and manually flagged as "rejected"; no SEABAT quality flags were used to automatically "reject" data. Vessel navigation data from DGPS and attitude data from heave, pitch, roll, and gyro sensors were displayed and manually cleaned (see Sections G and I).

D.2c After reviewing and cleaning, the depth, navigation, and attitude data were merged with sound velocity, tide, and vessel configuration data to compute the true depth and position of each sonar beam footprint. Multibeam data processing for evaluation during survey operations included importing the multibeam depths into a WorkFile, selecting "extended no key" and "group by beam number". Processed depths were thinned by shoal bias binning with a 3 meter x 3 meter sounding grid determined by selecting the "Line by Line Binning" method. A digital terrain model (DTM) at 5-millimeter resolution was produced within CARIS-HIPS to evaluate multibeam coverage. Multibeam holiday lines were produced and run on gaps observed within the DTM. Soundings were suppressed at 15 meters in order to facilitate the exportation process to HPS (using HP Tools). The exported soundings were then plotted within MapInfo. This yields soundings approximately every 45 meters. The plotted soundings were used for preliminary sounding evaluations.

WorkFile processing for data submission to Atlantic Hydrographic Branch (N/CS33) included binning the same multibeam data set at a grid level of 7.5 meters x 7.5 meters at a scale of 1:1000, yielding one sounding every seven and a half meters. No suppression of the data was accomplished for this data set.

D.2d Sounding evaluation included the use of a text file (.txt) created during the multibeam sounding export process. This text file was used to display the soundings within MapInfo. The data file (.dat) created during the sounding exportation process was later converted into HPS via HP Tools, generating an HPS multibeam only data file for each day of acquisition. The final field sheet only contains soundings that originate from these HPS multibeam only data files.

D.2e Final plots were created in MapInfo, a PC-based GIS package, with assistance from HPS-MI MapInfo tools supplied by Hydrographic Survey Division (HSD). These tools produced depth, track, and swath plots from HPS data and allowed plotting on a HP750C Designjet Plotter and a HP2500CM Inkjet printer. Data could also be overlaid on a raster image of the applicable chart.

D.2f The total number of multibeam soundings used and processed during post processing evaluation does not reflect the total number of multibeam soundings provided to N/CS33. Verification sounding grid size of 3m at survey scale was selected with 15m sounding suppression within HPS. Sounding excessing will be conducted during the verification process using HPS.

E. Sonar Equipment

E.1 All side scan sonar data was acquired using an Edgetech (EG&G) model 272 towfish (S/N 1159) and an Edgetech Model 260-TH slant-range correcting side scan sonar recorder (S/N 12106). Additionally, all side scan sonar data were recorded digitally using the Triton ISIS software and archived in the Extended Triton Format (*.XTF) files.

E.2 The side scan towfish used a 50° vertical beam width tilted down 20° from horizontal.

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

E.4a The 75-meter range scale was used with line spacing of 120 meters, allowing the operators to maintain proper side scan fish altitude. In areas of shallower depths, the 50-meter range scale was utilized with 80-meter line spacing. Swath coverage was checked in MapInfo utilizing the Hps_mi program to ensure 100% side scan sonar coverage.

E.4b Confidence checks were conducted by means of verifying benthic features. Rocks, pipelines, submerged logs, piers, and bulkheads were identifiable within the survey limits and used for confidence checks. These features were identified from inner to outer limits of the range scale. Graphic record annotations indicate the confidence checks. The hydrographer's confidence in side scan sonar area coverage was continuously verified.

E.4c One hundred percent side scan sonar coverage was conducted in depth 30 feet and greater. Holiday coverage was run to fill in any gaps. All coverage was checked with on-screen zoomable coverage displays within MapInfo to ensure overlap between lines.

E.4d The towfish was deployed exclusively from the stern. An electronic cable counter (M/D Totco) was employed to determine the amount of side scan cable deployed.

E.5 Sonar records were monitored on-line and reviewed by two persons during processing to identify contacts. Contact offsets and shadow heights were measured on sonar paper records, checked, and entered into the HPS Contact Table to compute contact heights and positions.

E.6 All side scan contacts with computed heights greater than 10% of the water depth in depths greater than 20 meters, or greater than 1.0 meters off the bottom in depths shoaler than 20 meters, and all contacts which appeared man-made were deemed significant. All significant contacts were further developed with multibeam sonar nadir coverage.

F. Sounding Equipment

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

F.1b SeaBat 9003 (455 kHz) multibeam data were continuously recorded during data acquisition and served as RUDE's primary source of hydrographic digital soundings in the offshore area. Sounding depths ranged from 5 to 78 feet of water, utilizing the 10, 25, and 50-meter range scales. 100% multibeam coverage was based on 10 meter line spacing in water shallower than 30 feet, and 40 meter line spacing for water greater than 30 feet.

F1.c Vessel speed during the mainscheme sounding collection consisted of maintaining standards for side scan operations. Multibeam mainscheme lines included vessels speeds between 4 and 7 knots; item and contact investigation speeds were generally slower (3 to 5 knots), allowing for an increase in the data density along track over the feature.

F.2a Dual-frequency (24 and 100 kHz) vertical beam echo sounding data were acquired with an Odom Echo-Trac echosounder (S/N 9641). The echosounder did not record the low frequency returns.

F.2b Single beam echograms were monitored on-line. Anomalous echogram traces were immediately cross-referenced to the ISIS multibeam acquisition display on-line.

F.2c Single beam edits were not made during survey operations. Single beam vertical correctors were applied to the raw single beam digital soundings (See Section G). The archived HPS fixes from the single beam soundings do not represent the entire character of the seafloor because shoal bias inserts were not selected; graphic records were not scanned for depth edits. Single beam data was not used in any processing during survey operations. **Echo-Trac single beam data should not be included on the final field sheet.**

F.3 Diver investigations were performed during this survey for identification purposes. There were no depth determinations observed with the MODIII Diver Least Depth Gage.

F.4 There were no observed faults in sounding equipment that affected the accuracy or quality of the data.

G. Corrections to Soundings - See also Evaluation Report

G.1a Sounding velocity correctors were computed from a SeaBird SBE19 SEACAT Profiler (S/N 196723-1251). Data quality assurance tests using the CAT programs based on data acquired by the ODOM Digital Pressure Gage-D2000 (S/N 68336). During survey H-10938, the Digital Pressure Gage experienced errors, and was shipped off for repair. The quality assurance tests were then performed using inputted hydrometer and thermometer data. The profiler is calibrated at the beginning and end of each field season. See *Appendix E for data records.

The following velocity casts were used for this survey:

Velocity Cast	Day Number
11	266
12,13	267
14,15	270
16,17,18	271
19,20,21	272
22	273
25,26	277
27,28,29	278
31,32	279
33,34	280
35	281
36	287

*Data filed with field records.

Sound velocities were applied to the SeaBat data in HIPS (incorporating the Nautical Charting Development Lab REFRACT Algorithm). Sound velocity correctors for the vertical beam soundings were computed using VELWIN and applied to the single beam data using HPS.

Tide Station 851-8750, The Battery, New York City, New York			
Zone Station	HR2	HR3	HR4
Time Correctors	+18 mins	+36 mins	+48 mins
Range Corrector	x 0.94	x 0.90	x 0.86
Reference #	851-8750	851-8750	851-8750

Move to G.6.b.

G.1b Single beam leadline comparison was not completed during survey operations as single beam data was not used during any aspect of processing, nor will single beam data be included in the final data set.

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

G.1d Transducer dynamic draft was measured on March 5, 1999 (DN 064) during opening calibration "Patch Test" utilizing Real Time Kinematic on the Fly settlement and squat method. Dynamic draft correctors were stored in the CARIS-HIPS Vessel Configuration File and HPS Offset Table for use in data processing. The HPS Offset Table is Table 01. *See Separate IV for data records.

G.1e Heave, pitch, and roll data were acquired using a Seatex Seapath Motion Reference Unit (MRU-5) (S/N 0544). Heave, pitch, and roll data were applied to SeaBat multibeam data; only heave data were applied to vertical single beam data during post processing.

G.1f Heading data were acquired with Seatex Seapath and applied to determine both multibeam transducer and side scan towfish azimuth and position. Multibeam heave, pitch, roll, and heading sensor data were adjusted using biases as determined during a patch test completed on September 8th, 10th, and 12th, 1999 (DN 251, 253, 255). See the CARIS-HIPS Vessel Configuration File in *Appendix E for data records.

* Data filed with field records.

G.2 No unusual or unique methods or instruments were used to correct for sounding data.

G.3 No velocity zoning was performed during H-10938.

G.4 The divers least depth gauge was not used for this survey.

G.5 No significant systematic errors were detected during this survey.

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

G.6b Tide zoning for this survey is consistent with Project Instructions. During data collection, tide station The Battery, New York (851-8750) was used as the reference station utilizing predicted tides.

Applying time correctors and range correctors to the preliminary unverified tides from the Battery tide gauge developed tide correctors. The conversion was accomplished within CARIS-HIPS, and resulting tide correctors were applied to SeaBat data. Preliminary unverified tides were also computed with HP-Tools and applied in HPS to all singlebeam data.

G.6c Note that multibeam data processing was accomplished using preliminary unverified tide values during data acquisition and post-processing.

Zone station time and height correctors provided by N/CS31, with the project instructions, were applied to all tidal correctors relative to reference station the Battery, New York (851-8750).

G.6d **Do not reapply any correctors to multibeam data in HPS, including verified smooth tides. Note that only preliminary unverified tide values have been applied to H-10938 data. Verified smooth tide values and correctors need to be applied to the entire multibeam set in CARIS-HIPS prior to conversion to HPS.**

H. Hydrographic Position Control – See also Evaluation Report

H.1 The horizontal reference station for this survey is the North American Datum of 1983 (NAD83). No horizontal control stations were established for this survey. Geodesy parameters during data collection entailed the use of Universal Transverse Mercator (UTM) Zone 18, WGS-84, Northern Hemisphere. No horizontal control stations were established for this survey.

H.2 Positioning for this survey was obtained from the NAVSTAR Global Positioning System (GPS) augmented with the U.S. Coast Guard Differential GPS (DGPS) service. The following USCG reference station beacon was used:

USCG DGPS Radio Beacon Broadcast Sites						
Site	Freq	Trans. Rate BPS	Lat (N)	Long (W)	Range (NM)	Beacon ID
Sandy Hook, NJ	286	200	40°28.29′	74°00.71′	100	804

H.3 Accuracy requirements were met as specified by the Hydrographic Manual, section 1.3 and 3.1, and Field Procedures Manual, section 3.4, and National Ocean Service Specifications and Deliverables manual.

H.4 GPS and DGPS signals were acquired with the following hardware equipment:

GPS and DGPS Hardware	SERIAL #
SeaPath 200	0347
StarLink, antenna Model MBA2	4202

H.5a The GPS Horizontal Dilution of Precision (HDOP) was recorded during survey operations. HDOP values were evaluated during data collection. When HDOP values exceeded four, survey operations were halted until values returned to acceptable levels. Any data collected while HDOP values exceeded that maximum allowable limit were rejected, and the affected survey area was reacquired.

H.5b DGPS performance checks were not conducted during H-10938. The necessity for control checks is eliminated when using the Seatex Seapath 200; quality positioning is supported by the continuous calibration routine inherent of Seapath.

H.6 Calibration data are not required for differential GPS.

H.7a There were no unusual methods used to operate the positioning equipment.

H.7b There were no positioning equipment malfunctions during H-10938.

H.7c There were no unusual atmospheric conditions noted which might have affected data quality.

H.7d No significant systematic errors were detected.

H.7e Offsets for the GPS antenna were applied from the CARIS-HIPS Vessel Configuration File to compute the position of the SeaBat transducer. See *Appendix E for Caris-HIPS Vessel Configuration File and HPS Echotrac offset data records.

H.7f A-frame position (tow point), cable length, towfish height, and depth of water were applied to navigation data to compute the position of the towfish. This correction is applied in HPS via offset table and Reapply Sounding Corrections.

I. Shoreline - See also Evaluation Report

Shoreline verification was not performed during H-10938.

J. Crosslines

J.1 A total of four nautical miles of crosslines were acquired for this survey; equating to approximately 5.6% of the total linear miles of hydrography. Crossline spacing was set at 700 meters apart.

J.2 Crossline comparison yields excellent agreement. As H-10938 was a 100% multibeam survey, a Quality Control Report within CARIS-HIPS was utilized to evaluate crossline and mainscheme line agreement. The mean error deviance across all beams is -0.2 and the

* Data filed with field records

standard deviation is equal to 0.2. A copy of the report is contained within *Separate I.

A visual comparison was also conducted, comparing multibeam mainscheme lines and multibeam cross lines. This comparison yields excellent agreement, with depth differences ranging between one to two feet. A three-foot difference was noticed in one instance. This anomaly was due to a highly sloping river floor.

K. Junctions - See also Evaluation Report

K.1 H-10938 junctions with the southern end of H-10937.

K.2 Soundings located in the junction area were in excellent agreement, with sounding of one foot. Two three-foot differences were observed along the shoreline where the river bottom is steep. * Excessive overlap between the two surveys existed.

L. Comparisons with Prior Surveys - See also Evaluation Report

Comparisons with prior surveys are not required when 100% shallow water multibeam sonar is acquired, per Section L of the National Ocean Service Hydrographic Survey Specifications and Deliverables manual.

M. Item Investigation Reports

M.1 Five AWOIS items are within the limits of H-10938. Two dive investigations were also completed during this survey.

*Data filed with field records

M.2a AWOIS NO: 10457

Item Description: Wreck
Source: LNM21/87
AWOIS Position: LAT-40°47′16.00″N, LONG- 073°59′16.00″ W
Required Investigation: SD, S2, SWMB, DI
Charts Affected: 12341

INVESTIGATION
Date(s)/DN(s): September 24 and 27, 1999 / DN 267, 270
Position Numbers:
Investigation Used: S2, SWMB
Position Determined By: Differential GPS

Investigation Summary:
One hundred percent side scan sonar coverage of the area was acquired on DN 267. Initial review of the records within the search radius showed no significant contacts. A second one hundred percent swath of side scan was acquired on DN 270, and again, no significant contacts were seen. Shallow water multibeam records are in agreement as well, showing no sign of the AWOIS item within the search radius. Data from H-10938 does not support the existence of the wreck. Concur

CHARTING RECOMMENDATION

The hydrographer recommends that the charted "dangerous wreck, depth unknown" PA be removed from Chart 12341. Concur

Recommended Position: N/A
Recommended Least Depth: N/A

Compilation Notes

Delete charted

M.2b **AWOIS NO: 10458**

Item Description: Work Barge
Source: LNM3/89
AWOIS Position: LAT-40°46'30.00"N, LONG- 074°00'12.00" W
Required Investigation: SD, S2, SWMB, DI
Charts Affected: 12341

INVESTIGATION
Date(s)/DN(s): 10/5/99 (278); 10/7/99 (280)
Position Numbers: 6744-6749; 7601-7606 · 247323
Investigation Used: SSS200; MB Development
Position Determined By: DGPS

Investigation Summary:
Investigation began on DN ~~278~~ 270. Two hundred percent side scan sonar coverage was acquired, revealing a sunken barge at side scan sonar fix number 1010.0p. On DN 280, multibeam development lines were run over the barge to determine the least depth of the barge. Line number 311 clearly identified AWOIS number 10458. In using subset mode within Swath Editor, length and the least depth were determined. The length was found to be approximately 85 feet (26.1 meters) with a least depth of 21 feet. The barge lies in a north-northeast to south-southwest orientation along the bottom.

CHARTING RECOMMENDATION

The hydrographer recommends removing the charted "dangerous wreck, least depth unknown" PA symbol. Add to the chart "wreck, least depth known by sounding ~~only~~" with the ~~charted~~ present survey position and ~~charted~~ sounding as follows:

Recommended Position: 40°46'37.~~8~~ .766"N, 074°00'14.~~5~~ .479"W
Recommended Least Depth: 21 feet ✓

Compilation Notes · See also p. 24/N.S.F. of this report (same)

Remove (#) PA
Chart (21) wk

M.2c **AWOIS NO: 10459**

Item Description: 45-foot Cabin Cruiser
Source: LNM22/72
AWOIS Position: LAT-40°46'17.00"N, LONG- 073°59'59.00" W
Required Investigation: SD, S2, SWMB, DI
Charts Affected: 12341

- -

INVESTIGATION
Date(s)/DN(s): September 24, October 5, 1999 / DN 267, 278
Position Numbers:
Investigation Used: S2, SWMB
Position Determined By: Differential GPS

Investigation Summary:
One hundred percent side scan sonar coverage was acquired within a 250-meter radius surrounding the AWOIS's approximate position on DN 267. An additional one hundred percent side scan sonar coverage was also acquired on DN 278. One hundred percent multibeam coverage was also acquired within this region during survey operations. Review of the side scan sonar records shows no significant contacts within the area. Data from H-10938 does not support the existence of the wreck.

CHARTING RECOMMENDATION
The hydrographer recommends removing the "dangerous wreck, least depth unknown" PA symbol from the chart. Concur

Recommended Position: N/A
Recommended Least Depth: N/A

Compilation Notes
Delete (+++) PA

M.2d **AWOIS NO: 10462**

Item Description: Obstruction- mooring buoy block
Source: LNM9/72
AWOIS Position: LAT-40°47'34.00"N, LONG- 073°59'12.00" W
Required Investigation: SD, S2, SWMB, DI
Charts Affected: 12341

- -

INVESTIGATION
Date(s)/DN(s): September 24 and 30, 1999, October 4, 1999 / DN 267, 274, 277
Position Numbers:
Investigation Used: S2, SWMB
Position Determined By: Differential GPS

Investigation Summary:
One hundred percent side scan sonar operations were conducted on DN 267, 270, and 271 in the 250-meter search radius surrounding the item. An additional one hundred percent side scan sonar operation was conducted in this area on DN 273, 277, and 278. On DN 267, 273, and 277, contacts were observed within the radius. Contact numbers 603.6s, 5722.3p, and 5759.5p were determined from the record were determined to be man-made or significant contacts to be developed with multibeam sonar. On DN 278, development lines were run nadir over the contacts. Line number 272 was run over 603.6s and line number 273 was run over 5722.3p and 5759.5p. The results of these lines showed no significant heights. All other contacts within this area were determined insignificant, with heights less than one meter. The data from H-10938 does not support the existence of the obstruction.

CHARTING RECOMMENDATION

The hydrographer recommends the removal of the symbol "obstn" at position 40°47'34.00"N, 073°59'12.00" W from Chart 12341. Concur

Recommended Position: N/A
Recommended Least Depth: N/A

Compilation Notes

Delete ( ) Obstn

M.2e AWOIS NO: 10463

Item Description: 18-foot Vessel
Source: N/A
AWOIS Position: LAT-40°46'09.00"N, LONG- 074°00'33.00" W
Required Investigation: SD, S2, SWMB, DI
Charts Affected: 12341, 12335

- -

INVESTIGATION
Date(s)/DN(s): October 5, 1999 / DN 278
Position Numbers: 6452.8s, 6669.1p - 1737.35
Investigation Used: S2, SWMB
Position Determined By: Differential GPS

Investigation Summary:
Both 100% and 200% side scan sonar coverage were acquired within the search radius on DN 278. One hundred percent shallow water multibeam coverage was also acquired on the same day, DN 278. Both side scan sonar records show a wreck in approximately the same location. The location of the wreck shows it next to a debris field within the southwestern section of the survey limits. Several development lines were run in the general vicinity because of the amount of debris in the general location. The depth and position of the wreck were determined within CARIS-HIPS using subset mode in Swath Editor.

CHARTING RECOMMENDATION

The hydrographer recommends removing the symbol "dangerous wreck, depth unknown" PA from Chart 12341. The hydrographer further recommends the addition of the symbol "wreck, least depth known by sounding ~~onl~~y" to Chart 12341 and Chart 12335 with the following specifications: Concur

Recommended Position: 40°46'05.~~9~~.683"N, 073°00'43.~~7~~.869W
Recommended Least Depth: 17 feet

Compilation Notes

Delete (++) PA
Add (17) Wk

See also p. 24-N.5.g. of the Report (same)

M.3 Diver investigations were performed on DN 280 and 281. The purpose of these dives were to investigate unusual scour marks seen in side scan sonar records. The dives were performed to ensure that there were neither uncharted cables nor pipelines. The divers confirmed that the scour marks are neither from an uncharted pipeline nor cable. Brittle pieces of wood found during the dive lead the divers to believe that the scour marks were formed from an old log boom that has since settled and deteriorated. The results of these dives can be seen in*Appendix IV.

N. Comparison with the Chart - See also Evaluation Report

N.1 Two charts are affected by this survey:

- Chart 12341	23rd Ed.	January 03, 1998	1:~~5,000~~ 10,000
- Chart 12335	37th Ed.	January 10, 1998	1:10,000

N.2a Chart 12341 contains 759 soundings within the survey area. Of the charted soundings, 323 agree within one or two feet. This yields a 43% agreement between charted soundings and those found during survey operations. Of the remaining charted depths, 327 charted depths range from two to ten feet shoaler than survey depths. The remaining 109 charted soundings are two to five feet deeper than survey depths. These discrepancies are attributed to sediment transport due to the high currents coupled with the soft bottom found within the river. Concur

N.2b Comparison of the charted 18-foot contour and a cursory interpretation of the data to interpolate the 18-foot contour shows little change in the position of the 18-foot contour on either side of the river. The eastern side of the river shows only a slight migration to the east. An exception to this is apparent in the southeastern portion of the survey area, between Pier 99 and Pier "I" at approximate location 40°46'40.3"N, 073°59'34.2"W. In this area, the contour has significantly migrated westward, posing a danger to navigation. This migration was noted in the Danger to Navigation letter sent to the U.S. Coast Guard 1st District. See*Appendix A for further details. It is the recommendation of the hydrographer to use the soundings found in H-10938 to interpolate the new 18-foot contour on Chart 12341. Concur-
Data appended to this report

* Data filed with field records.

N.2c In contrast to the 18-foot contour, the 30-foot contour shows wide variations on either side of the river. In the northeastern section of the survey limits, a westward migration, towards the Weekhawken-Edgewater Channel can be observed. On the eastern side of the river, a slight eastward migration of this contour can be observed. It is the recommendation of the hydrographer to interpolate the 30-foot contour on Chart 12341 based on the soundings found during H-10938. Concur

N.2d A charted sounding of 18 feet positioned at 40°48′22.0″N, 073°58′18.3″W is not supported by survey data. Line spacing and coverage plots from CARIS-HIPS WorkFile indicates that 100% multibeam coverage was acquired over this charted sounding. The hydrographer recommends removing the 18-foot sounding and revising Chart 12341 with the survey soundings in the common area. Concur

N.2e A charted sounding of 16 feet positioned at 40°48′19.8″N, 073°58′19.4″W is not supported by survey data. Line spacing and coverage plot within CARIS-HIPS WorkFile indicates that 100% multibeam coverage was acquired over this charted sounding. The hydrographer recommends removing the 16-foot sounding and revising Chart 12341 with survey soundings in the common area. Concur w/clarification - Present survey found 17'SND.

N.2f A charted sounding of 14 feet positioned at 40°48′14.7″N, 073°58′23.4″W is not supported by survey data. Line spacing and coverage plots from CARIS-HIPS WorkFile indicates that 100% multibeam coverage was acquired over this charted sounding. The hydrographer recommends removing the 14-foot sounding and revising Chart 12341 with survey soundings in the common area. Concur

N.2g The tabulation of the northern part of the Weekhawken-Edgewater Channel from 85th Street to 40°48′27.1″N, 073°58′49.5″W indicates that depths within this region range from 24.3 feet in the left outside corner to 31.5 feet in the right outside corner. Survey depths do not support these controlling depths. Coverage plots from CARIS-HIPS WorkFile indicates that 100% multibeam coverage was acquired in this region. The hydrographer recommends revising the tabulated depths for the controlled channel with survey soundings. ✗ See section N.2. of the Evaluation Report

N.2h The tabulation of the northern part of the Weekhawken-Edgewater Channel from the Edgewater Oil Terminals to 40°49′30.5″N, 073°58′08.8″W indicate that the controlling depths within this region range from 24.5 feet in the left outside corner to 28.8 feet in the right outside corner. Survey depths do not support these controlling depths. Coverage plots from CARIS-HIPS WorkFile indicates that 100% multibeam coverage was obtained over this region. The hydrographer recommends revising the tabulated depths for this part of the controlled channel with survey soundings. ✗ See Section N.c. of The Evaluation Report

N.2i A charted "dangerous wreck, depth unknown" with position doubtful (PD) is contained within the survey limits of H-10938 at 40°46′26.4″N, 073°59′46.8″W. One hundred percent side scan sonar and 100% multibeam coverage was obtained in this region as well. Side scan sonar line number 100 from DN 267 was run approximately 20 meters west of the charted position, and multibeam line number 303 from DN 272 was located approximately 5 meters off the center of the charted position. The wreck was clearly visible on the side scan sonar record. However, height of the object could not be determined from the record, as there was no visible shadow. The location of the wreck was beyond the swath of the multibeam sonar, so the wreck was not visible within the multibeam data. An additional line was not run closer to the wreck, as vessel safety became a concern with the wreck being located close to the pier. The wreck at 40°46′26.4″N, 073°59′46.8″W is thirteen meters east-northeast of it's charted position. The hydrographer recommends removing the label "PD" and retaining the symbol "dangerous wreck, depth unknown" at position at 40°46′26.4″N, 073°59′46.8″W. Concur - Retain wk at charted position - Remove the P.D. label

N.2j Survey soundings of 9 and 10 feet were found in the vicinity of 40°46'36.8"N, 074°00'21.0W. The position of these soundings place them at the edge of a charted pier, within the 18-foot contour. The hydrographer recommends charting the survey soundings as depicted. Concur w/clarification - Chart present survey depths around ruins - Retain ruins as charted

N.2k ~~Five~~ Isolated present survey soundings in the vicinity of 40°47'50.3N, 073°58'40.9"W range from 10 to 12 feet.

These soundings are contained within the 18-foot contour, and are between charted soundings of 13 and 6 feet. These soundings maybe attributed to a ridge on the river floor. The hydrographer recommends charting the survey soundings. Concur

N.21 An isolated 12 foot present survey sounding is located at 40°48'08.9N 073°58'26.2W. This sounding is located within the charted 18-foot contour, and falls between a charted 13 and 10 foot sounding. The sounding is a may be attributed to a ridge on the river bottom. The hydrographer recommends charting the survey soundings. Concur

N.3a Chart 12335 contains 236 soundings that are contained within the survey limits. Of these soundings, 152 agree to within one or two feet, equating to an agreement of 64.4%. The remaining charted depths are two to four feet shoaler than survey depths, which can be attributed to the sediment transport caused by the high currents within the river.

N.3b A charted 13-foot sounding is ~~charted~~d at 40°46’29.1”N, 074°00’25.9W. The 13-foot sounding is not supported by survey data. Coverage plots created within the CARIS-HIPS WorkFile show that 100% multibeam data was acquired in this area. The hydrographer recommends removing the charted 13-foot sounding and revising Chart 12335 with the survey soundings in common areas. Concur

N.4 Two submarine pipelines are charted within the survey limits of H-10938, parallel to each other ~~both in the same locality~~. The pipelines are charted on the east side at 40°47’~~04~~.1N, ok 073°59’~~10.0~~”W, ok and extend north westward to 40°47’~~04.1~~ 29”N, 073°59’~~10~~ 30'.0”W. Survey operations in this area included 100% side scan sonar and 100% multibeam sonar. There was no evidence of the pipeline in review of the side scan sonar records. However, in looking at the digital terrain model (DTM) exported in the CARIS-HIPS WorkFile, the pipeline can be clearly identified. Depths in the vicinity of these pipelines are deeper than the surrounding depths, suggesting that erosion around the pipelines has caused them to settle. The hydrographer recommends retaining the position of the pipeline on Chart 12341. Concur

N.5a Six dangers to navigation were submitted to U.S. Coast Guard 1st District for this survey. A copy of the report of Dangers to Navigation can be reviewed in *Appendix A. * Data appended to this report

N.5b An uncharted five foot wreck with a least depth of five feet was located at position 40°48'20.7"N, 073°59'01.57"W. Several side scan sonar lines were run to fully develop the wreck and one hundred percent multibeam sonar coverage was acquired within this area. Both multibeam and side scan sonar clearly depict a sunken barge on the end of Pier 1 on the New Jersey side of the river. Least depth and position were determined using multibeam sonar. The hydrographer recommends adding the symbol "dangerous wreck, least depth known by sounding only" to Chart 12341 at position 40°48'20.~~7~~67"N, 073°59'01.5~~7~~2"W with a sounding of five feet. Concur - Chart (5) Wk at present survey location.

N.5c Laying just south of the uncharted wreck in section N.5b, was a submerged tug was found at position 40°48'17.4"N, 073°59'04.7"W. Several lines of side scan sonar were acquired in the vicinity of this wreck, as well as 100% multibeam sonar coverage was acquired. In reviewing the side scan records, the wreck appears to be the tug that accompanied the previously mentioned barge. A least depth could not be determined by multibeam sonar, as the tug's superstructure breaks the surface of the river at low tide. For determination of the height of the superstructure, a manual detached position (DP) was accomplished. The hydrographer assigned fix number 7898 to the manual DP. A least depth of -0.5 meters (visually determined by sounding pole) into the HPS Features Editor. The depth (height) of the tug at survey datum (MLLW) was -1.~~5~~6 feet (1.~~5~~6 feet above MLLW). The hydrographer recommends adding the symbol "wreck showing any portion of the hull or superstructure at level of chart datum" to Chart 12341 at position 40°48'17.~~4~~383"N, 073°59'04.7~~7~~39"W with a ~~sounding~~ height of -~~2~~1' feet (rounded during compilation). Concur w/clarification Chart a visible wreck symbol in the present survey location.

N.5d ~~An~~ Uncharted wrecks with a least depth of eight feet ~~was~~ were located at position 40°47'35.~~3~~388"N, 073°59'36.~~8~~36"W. One hundred percent side scan and 100% multibeam sonar coverage was acquired in this area. Fix number 1049.3p from reference line 107 (DN 270) shows the initial contact of the wreck. Two lines allowed the hydrographer to determine the least depth and position of the wreck~~.~~s The digital side scan image obtained from multibeam sonar shows that the wrecks ~~is~~ are orientated in a south-southeast north-northwest orientation. The hydrographer recommends adding the symbol "danger wreck, least depth known by sounding only" at position 40°47'35.~~8~~"N .288, 073°59'36.8"W 36 with a sounding of eight feet. concur. SSS records indicate more than one wreck. These wrecks are just east of foul area limits. Recommend extending foul limits to include these wks - and add lable Wks.

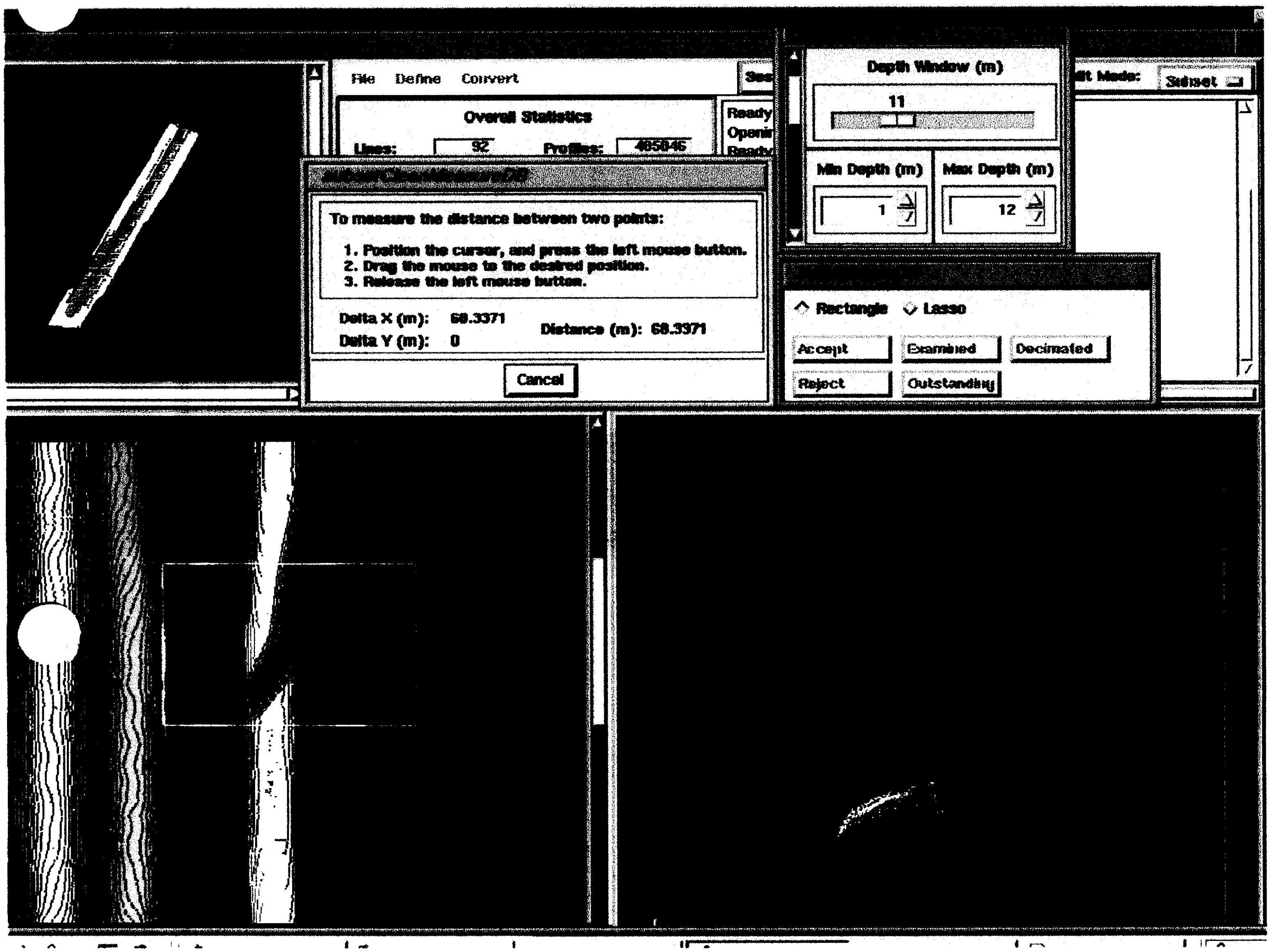
N.5e Submerged pilings in the vicinity of the charted pier ruins on Chart 12341 in position 40°46'46.8"N, 073°59'27.6"W were located using side scan sonar records. Using both side scan contacts and multibeam sonar to identify the positions of these pilings, the limits of the pier ruins could be delineated (see MapInfo chartlet and Multibeam screen display on pages 26 and 27). The hydrographer recommends that the limits of the charted pier ruins be revised using the following coordinates (starting at southwest corner and moving clockwise): 40°46'46.4"N, 073°59'32.0"W; 40°46'46.9'N, 073°59'32.3"W; 40°46'47.3"N, 073°59'31.4"W; 40°46'47.5"N; 073°59'25.4"W; 40°46'46.6"N, 073°59'25.4"W (see page ~~28~~ 27 for MapInfo chartlet). Revise pier ruins using MapInfo Chartlet and coordinates.

N.5f An uncharted wreck with a least depth of 21 feet was located at position 40°46'37.8"N, 074°00'14.5"W. One hundred percent side scan and 100% multibeam sonar coverage was acquired in this area. Both records clearly indicate the presence of the wreck, which was determined to be AWOIS #10458. For further information on this item, see Section M.2b. *The hydrographer recommends adding "dangerous wreck, least depth known by sounding only" to Chart 12341 at position 40°46'37.~~8~~"N .766, 074°00'14.~~5~~"W .479 with a sounding of 21 feet.

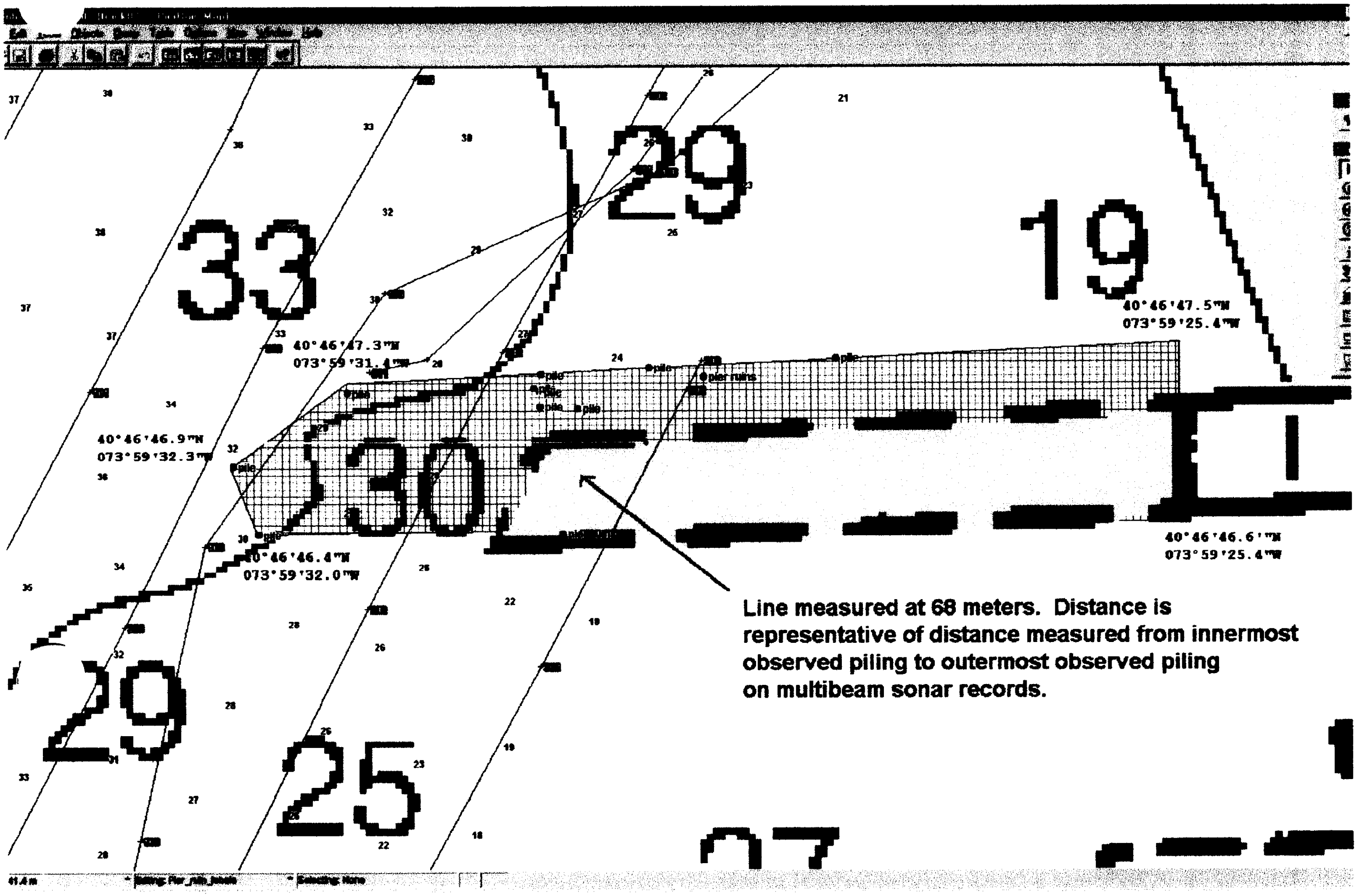
*See p. 15, AWOIS 10458, of this Report for charting recommendations.

N.5g An uncharted wreck with a least depth of 17 feet was located at position 40°46'05.9"N, 074°00'43.7"W. Further investigation of the wreck indicated that the wreck was AWOIS# 10463. Detailed information of this wreck can be seen in Section M.2e. *The hydrographer recommends adding "dangerous wreck, least depth known by sounding only" to Chart 12341 at position 40°46'05.9"N, 074°00'43.7"W with a sounding of 17 feet.

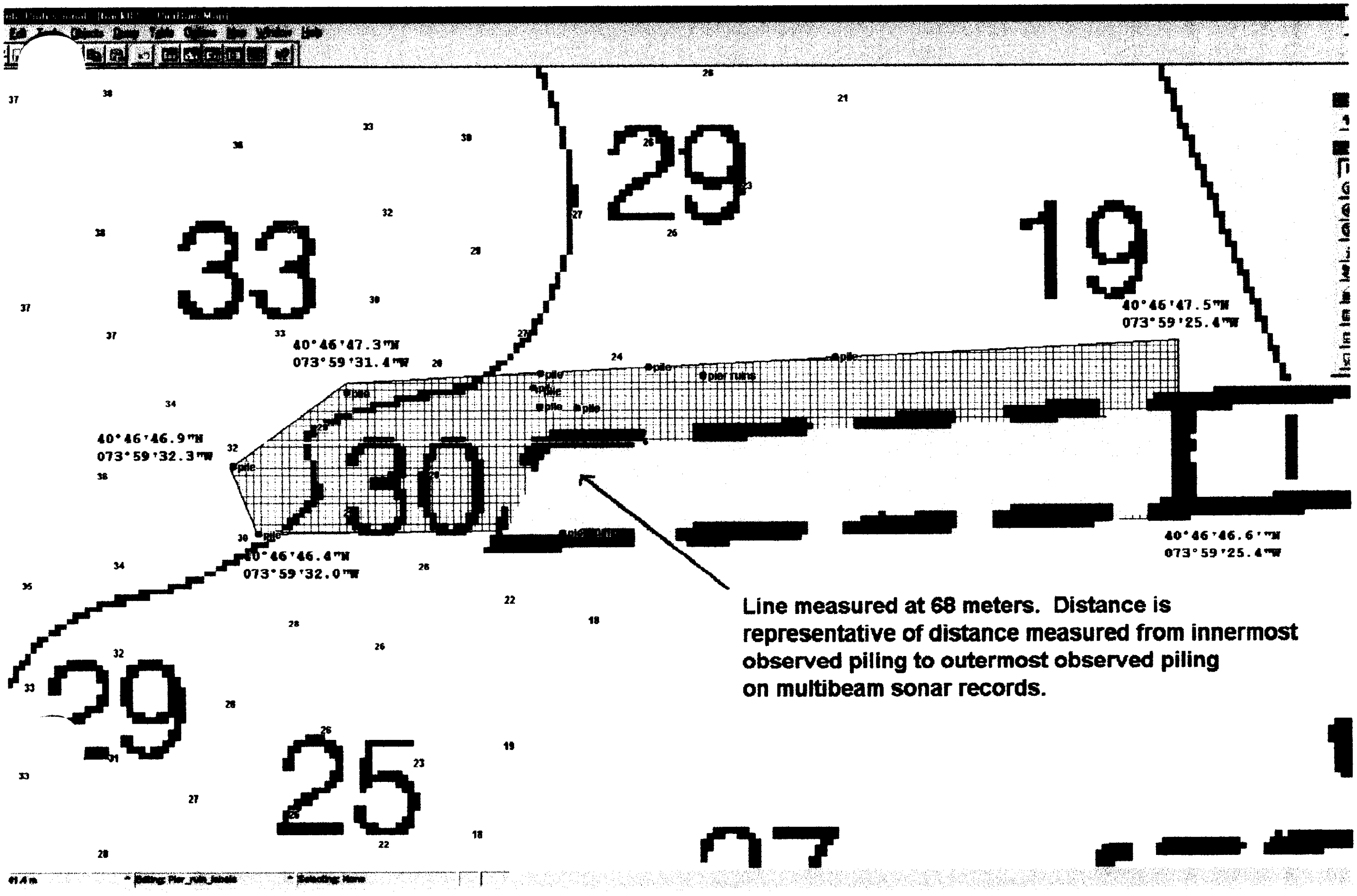
*See p. 18, AWOIS 10463, of this Report for charting recommendations.



Screen of CARIS-HIPS HDCS showing measure from innermost piling to outermost piling. The gray line on lower right image shows distance measured, equal to 68 meters. The lower right image shows the swath coverage of that area.



MapInfo chartlet showing contacts deemed to be pilings. The yellow line shows the distance measured (68 meters) demonstrated in the CARIS-HIPS HDCS screen on page 25. Contacts were observed in side scan sonar records, entered into HPS contact.dbf file and plotted in MapInfo.



MapInfo chartlet showing the hydrographers recommendations for limits of pier ruins. The green shaded area shows the recommended additions to the previously charted pier ruins.

O. Adequacy of Survey - See also Evaluation Report

Survey H-10938 was completed with 100% multibeam mainscheme and multibeam development hydrography in conjunction with 100% side scan sonar. Two hundred percent side scan sonar coverage was acquired over AWOIS items for disproval. It is recommended that H-10938 supercede all prior surveys in common areas.

P. Aids to Navigation

There were no aids to navigation located within the survey limits of H-10938.

Q. Statistics

Q.1a	Nautical miles of sounding lines	121.0
Q.1b	Nautical miles of side scan sonar	70.7
Q.1c	Square nautical miles of sounding lines	2.2
Q.1d	Square nautical miles of side scan sonar	2.1
Q.2a	Days of acquisition	13
Q.2b	Total number of soundings	43,240,000
Q.2c	Number of detached positions	4
Q.2d	Number of bottom samples	18
Q.2e	Number of velocity casts	23
Q.2f	Number of tide stations installed	0

R. Miscellaneous - See also Evaluation Report.

R.1 All relevant information pertaining to this section has been previously discussed.

R.2 Bottom samples were required per project instructions and submitted to the Smithsonian Institution.

S. Recommendations

No additional fieldwork is required.

T. Referral to Reports

A copy of the Coast Pilot Report, User Evaluation, and Chart Inspection Report are included in the Separates.

This report and accompanying field sheets are respectfully submitted.

Ensign Kevin Slover, NOAA
Field Operations Officer
NOAA Ship RUDE

UNITED STATES DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration
Office of NOAA Corps Operations
NOAA Ship RUDE S-590
439 W. York Street
Norfolk, VA 23510-1114
November 4, 1999

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

REPORT OF DANGERS TO NAVIGATION

Dear Sir:

The NOAA Ship RUDE has recently completed a hydrographic survey of the Hudson River, New York City, New York. The survey consisted of 2 sheets (Sheet 01 and Sheet 02), encompassing an area from the George Washington Bridge south to Pier 90:

Hydrographic Survey Registry No.	H-10937
State	New York
General Locality	Hudson River
Sublocality	1NM south of George Washington Bridge
Project Number	OPR-B330-RU-99

Hydrographic Survey Registry No.	H-10938
State	New York
General Locality	Hudson River
Sublocality	2 NM south of George Washington Bridge
Project Number	OPR-B330-RU-99

During the course of multibeam and sidescan sonar operations, ten dangers to navigation were discovered which merit immediate publication in to the Local Notice to Mariners. This information affects the following chart(s):

CHART 12335	1:10,000	9th Ed., July 07, 1990
CHART 12341	1:10,000	23rd Ed., January 03, 1998

Feature	Depth* (Feet)	Latitude (NAD83)	Longitude (NAD 83)	Charts Affected
Obstruction	14	40°50'39.40" N	073°56'49.91" W	12341
Sounding	8	40°50'36.01" N	073°56'50.73" W	12341
Wreck	8	40°50'06.79" N	073°57'03.19" W	12341
Sounding	32	40°49'43.72" N	073°57'21.96" W	12341
Wreck	5	40°48'20.67" N	073°59'01.57" W 2	12341
Wreck	-1	40°48'17.3~~9~~" 83 N	073°59'04.7~~2~~" 29 W	12341
Wreck	8	40°47'35.~~29~~" .288 N	073°59'36.~~84~~" .836 W	12341
Submerged piles	-3	40°46'47.15" N	073°59'29.73" W	12341 · See E+A report
Wreck	21	40°46'37.7~~7~~" 66 N	074°00'14.4~~8~~" 79 W	12341
Wreck	17	40°46'05.~~88~~" .683 N	074°00'43.~~69~~" .869 W	12341, 12335

As shown in the attached chartlets, the 18-foot contour on the western side of the river in H-10937 is migrating westward.

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

Contact either of the following personnel for further information:

Commanding Officer
NOAA Ship RUDE
439 West York Street
Norfolk, VA 23510-1145
(757) 615-6465

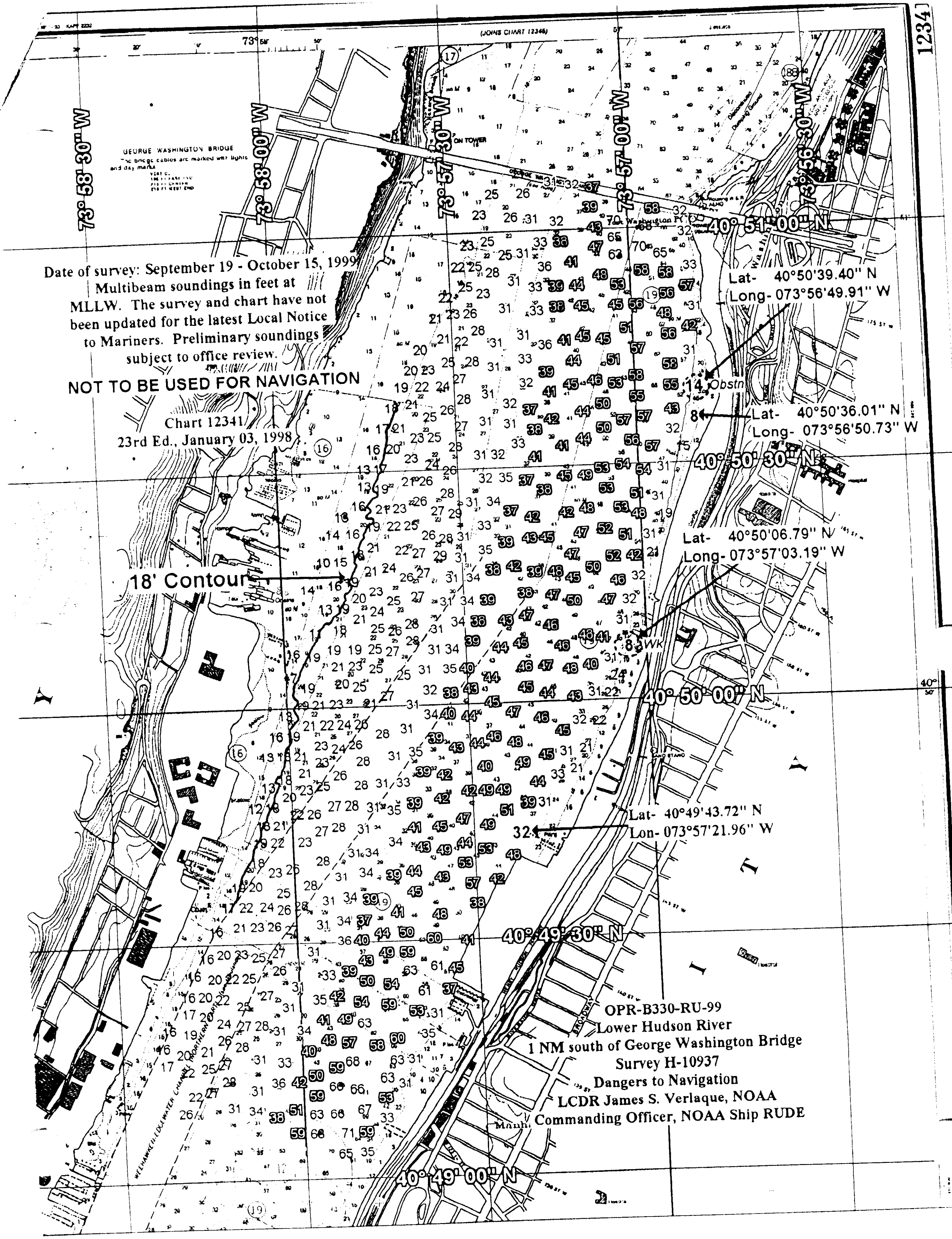
Chief, Atlantic Hydrographic Branch
Atlantic Marine Center
439 W. York Street
Norfolk, VA 23510-115
(757) 441-6746

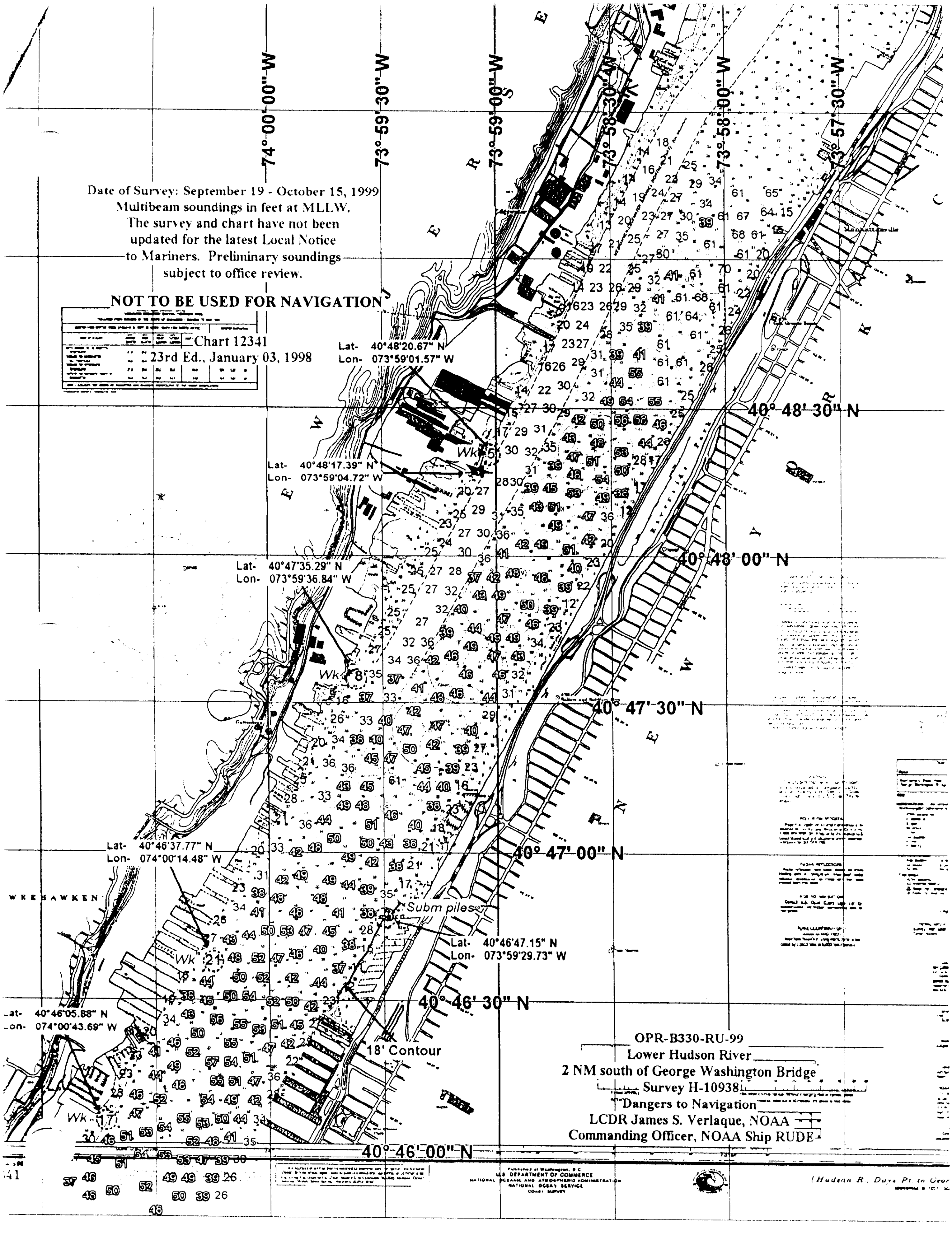
Sincerely,

James S. Verlaque

Lieutenant Commander James S. Verlaque, NOAA
Commanding Officer, NOAA Ship RUDE

Attachment
cc: N/CS, N/CS3, N/CS33, NIMA, Sandy Hook Pilots Association


Date of survey: September 19 - October 15, 1999
Multibeam soundings in feet at
MLLW. The survey and chart have not
been updated for the latest Local Notice
to Mariners. Preliminary soundings
subject to office review.
NOT TO BE USED FOR NAVIGATION
Chart 12341
23rd Ed., January 03, 1998
18' Contour
GEORGE WASHINGTON BRIDGE
73° 58' 30" W
73° 58' 00" W
73° 57' 30" W
73° 57' 00" W
73° 56' 30" W
40° 51' 00" N
40° 50' 30" N
40° 50' 00" N
40° 49' 30" N
40° 49' 00" N
Lat- 40°50'39.40" N
Long- 073°56'49.91" W
14 Obstn
Lat- 40°50'36.01" N
Long- 073°56'50.73" W
Lat- 40°50'06.79" N
Long- 073°57'03.19" W
8 Wk
Lat- 40°49'43.72" N
Lon- 073°57'21.96" W
OPR-B330-RU-99
Lower Hudson River
1 NM south of George Washington Bridge
Survey H-10937
Dangers to Navigation
LCDR James S. Verlaque, NOAA
Commanding Officer, NOAA Ship RUDE
12341



Date of Survey: September 19 - October 15, 1999
Multibeam soundings in feet at MLLW.
The survey and chart have not been
updated for the latest Local Notice
to Mariners. Preliminary soundings
subject to office review.
NOT TO BE USED FOR NAVIGATION
Chart 12341
23rd Ed., January 03, 1998
74°00'00" W
73°59'30" W
73°59'00" W
73°58'30" W
73°58'00" W
73°57'30" W
40°48'30" N
40°48'00" N
40°47'30" N
40°47'00" N
40°46'30" N
40°46'00" N
Lat- 40°48'20.67" N
Lon- 073°59'01.57" W
Lat- 40°48'17.39" N
Lon- 073°59'04.72" W
Wk 5
Lat- 40°47'35.29" N
Lon- 073°59'36.84" W
Wk 8
Lat- 40°46'37.77" N
Lon- 074°00'14.48" W
Wk 21
Subm piles
Lat- 40°46'47.15" N
Lon- 073°59'29.73" W
Lat- 40°46'05.88" N
Lon- 074°00'43.69" W
Wk 17
18' Contour
WEEHAWKEN
OPR-B330-RU-99
Lower Hudson River
2 NM south of George Washington Bridge
Survey H-10938
Dangers to Navigation
LCDR James S. Verlaque, NOAA
Commanding Officer, NOAA Ship RUDE
U.S. DEPARTMENT OF COMMERCE
NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION
NATIONAL OCEAN SERVICE

APPENDIX K

APPROVAL SHEET

LETTER OF APPROVAL

REGISTRY NO. H-10938

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

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

James S. Verlaque

LCDR James S. Verlaque, NOAA
Commanding Officer
NOAA Ship RUDE

UNITED STATES DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration
NATIONAL OCEAN SERVICE
Silver Spring, Maryland 20910

TIDE NOTE FOR HYDROGRAPHIC SURVEY

DATE: February 10, 2000

HYDROGRAPHIC BRANCH: Atlantic
HYDROGRAPHIC PROJECT: OPR-B330-RU-99
HYDROGRAPHIC SHEET: H-10938

LOCALITY: Lower Hudson River- 2 NM south of the George Washington Bridge, NY/NJ
TIME PERIOD: September 23 - October 14, 1999

TIDE STATION USED: 851-8750 The Battery, NY
Lat. 40° 42.0'N Lon. 74° 0.9'W
PLANE OF REFERENCE (MEAN LOWER LOW WATER): 0.000 meters
HEIGHT OF HIGH WATER ABOVE PLANE OF REFERENCE: 1.457 meters

REMARKS: RECOMMENDED ZONING
Use zone(s) identified as: HR2 & HR3.

Refer to attachments for zoning information.

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

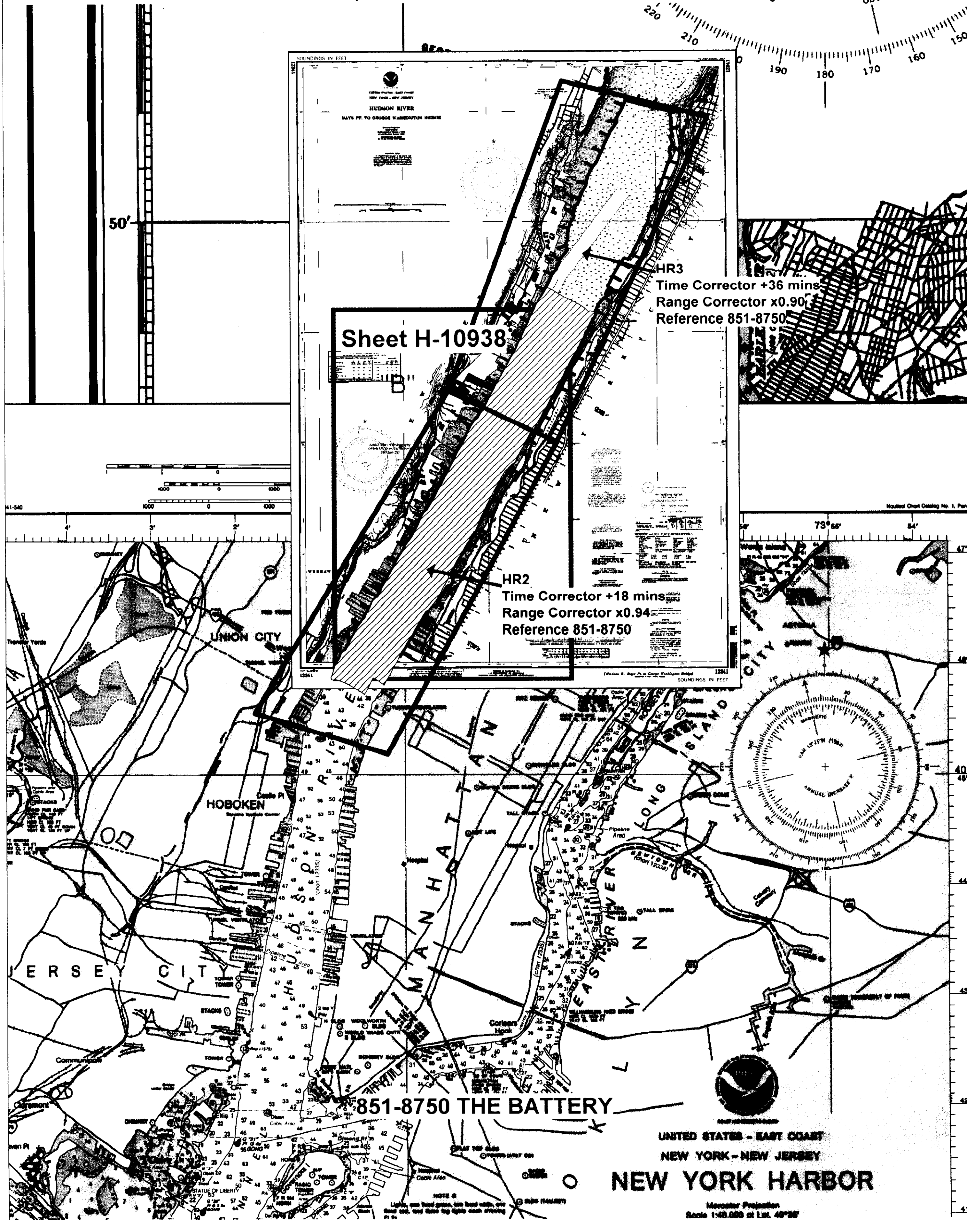
For --
CHIEF, REQUIREMENTS AND DEVELOPMENT DIVISION

Final tide zone node point locations for OPR B330-RU-99,
Sheet H-10938.

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

	Tide Station Order	AVG Time Correction	Range Correction
Zone HR2			
-73.985064 40.778563	851-8750	+18	0.94
-74.003509 40.753182			
-74.029615 40.759375			
-74.007897 40.786878			
-73.991209 40.807877			
-73.969814 40.800172			
-73.985064 40.778563			
Zone HR3			
-73.991209 40.807877	851-8750	+36	0.90
-73.968462 40.854642			
-73.939917 40.849139			
-73.969814 40.800172			
-73.991209 40.807877			

Final Tidal Zoning for OPR-B330-RU-99
Lower Hudson River, NY/NJ Sheet H-10938



NOAA FORM 76-155
(11-72)

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

GEOGRAPHIC NAMES

SURVEY NUMBER

H-10938

Name on Survey	A ON CHART NO. 12335, 12341	B ON PREVIOUS SURVEY NO.	C ON U.S. QUADRANGLE MAPS	D FROM LOCAL INFORMATION	E ON LOCAL MAPS	F P.O. GUIDE OR MAP	G RAND McNALLY ATLAS	H U.S. LIGHT LIST	K	
DAYS POINT			X							1
DE WITT CLINTON PARK	X		X							2
EDGEWATER	X		X							3
GUTTENBERG	X		X							4
MANHATTANVILLE	X		X							5
NEW JERSEY	X		X							6
NEW YORK (title)	X		X							7
NEW YORK CITY	X		X							8
RIVERSIDE PARK	X		X							9
WEEHAWKEN	X		X							10
WEST NEW YORK	X		X							11
										12
										13
										14
										15
										16
										17
										18
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Approved:

Dennis J. Romesburg

JAN 10 2000

NOAA FORM 76-155 SUPERSEDES C&GS 197

NOAA FORM 61-29
(12-71)

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

REFERENCE NO.

N/CS33-15-2000

LETTER TRANSMITTING DATA

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

- [ ] ORDINARY MAIL
- [ ] AIR MAIL
- [ ] REGISTERED MAIL
- [X] EXPRESS
- [ ] GBL (Give number) ____________

TO:

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

DATE FORWARDED

MAR 24, 2000

NUMBER OF PACKAGES

ONE TUBE

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

H10938

NEW YORK - NEW JERSEY, HUDSON RIVER, EDGEWATER TO WEEHAWKEN

(ONE) TUBE CONTAINING THE FOLLOWING:

1 SMOOTH SHEET FOR SURVEY H10938
1 ORIGINAL DESCRIPTIVE REPORT
2 DRAWING HISTORY FORMS (NOAA FORM #76-71) ONE EACH FOR NOS CHARTS 12335 AND 12341
1 RECORD OF APPLICATION TO CHART FORM (NOAA FORM #75-96) FOR SURVEY H10938
2 H-DRAWINGS - ONE EACH FOR NOS CHARTS 12335 AND 12341
3 COMPOSITE DRAWINGS - ONE FOR NOS CHART 12335 AND 2 FOR NOS CHART 12341

FROM: (Signature)

DEBORAH A. BLAND Deborah A. Bland

RECEIVED THE ABOVE
(Name, Division, Date)

Return receipted copy to:

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

03/24/2000

HYDROGRAPHIC SURVEY STATISTICS
REGISTRY NUMBER: H10938

NUMBER OF CONTROL STATIONS	2
NUMBER OF POSITIONS	159112
NUMBER OF SOUNDINGS	159112

	TIME-HOURS	DATE COMPLETED
PREPROCESSING EXAMINATION	48.0	01/12/2000
VERIFICATION OF FIELD DATA	56.0	03/03/2000
QUALITY CONTROL CHECKS	0.0	
EVALUATION AND ANALYSIS	26.0	
FINAL INSPECTION	4.0	03/13/2000
COMPILATION	80.0	03/24/2000
TOTAL TIME	214.0	

ATLANTIC HYDROGRAPHIC BRANCH APPROVAL	03/20/2000

ATLANTIC HYDROGRAPHIC BRANCH
EVALUATION REPORT FOR H10938 (1999)

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

D. AUTOMATED DATA ACQUISITION AND PROCESSING

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

Hydrographic Processing System
NADCON, version 2.10
MicroStation 95, version 5.05
I/RAS B, version 5.01
Caris HIPS/SIPS

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

G. CORRECTIONS TO SOUNDINGS

The data provided for office processing used unverified tide values obtained from the NOAA website. A thorough comparison was made between the values used by the field unit and the approved tide and zoning values supplied by the Requirements and Development Division, Silver Spring, Maryland. There is no difference between these data. No additional office processing was required. Approved tides and zoning were not applied during office processing.

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. The smooth sheet has been annotated with ticks showing the computed mean shift between the NAD 83 and the North American Datum of 1927 (NAD 27).

To place this survey on the NAD 27, move the projection lines 0.364 seconds (11.217 meters or 2.24 mm at the scale of the survey) north in latitude, and 1.499 seconds (35.154 meters or 7.03 mm at the scale of the survey) east in longitude.

I. SHORELINE

Brown shoreline originates with National Ocean Service (NOS) charts 12335 (37^{th} Edition, Jan 10/98) and 12341 (23^{rd} Edition, Jan 3/98) and is for orientation purposes only.

K. JUNCTIONS

H10937 (1999) to the north

A standard junction was effected between the present survey and H10937 (1999). There are no junctional surveys to the south. Present survey depths are in harmony with the charted hydrography to the south.

L. COMPARISON WITH PRIOR SURVEYS

H06427 (1939) 1:5,000
H06428 (1939) 1:5,000

The prior surveys listed above cover the present survey area in its entirety. A comparison with these prior surveys was performed in areas not covered by 100% side scan sonar and 100% multibeam, which all fall within the 18 foot curve. In the areas greater than 18 feet, 100% side scan sonar and 100% multibeam coverage was obtained. No comparisons were done in these areas, in accordance with Section 4. of the memorandum titled "Changes to Hydrographic Survey Processing", dated May 24, 1995. The following should be noted:

1) H06427 (1939) covers the present survey in the area between Latitude 40°45'45"N north to Latitude 40°48'15"N. The present and prior survey are in good general agreement.

2) H06428 (1939) covers the present survey in the area between Latitude 40°48'15"N to the northern limit of the present survey. The present and prior survey are in good general agreement.

Differences between the present and prior surveys may be attributed to natural and cultural change and the modern surveying techniques and equipment.

Except as noted above, the present survey is adequate to supersede the prior surveys within the common area.

N. COMPARISON WITH CHART 12335 (37th Edition, Jan 10/98)
12341 (23rd Edition, Jan 3/98)

a. Hydrography

The charted hydrography originates with the prior surveys and requires no further consideration. The hydrographer makes adequate chart comparisons in Sections N. and O. of the Descriptive Report. The following should be noted:

1) An uncharted obstruction with a depth of 15 feet (4^6 m), in Latitude 40°47'52.70"N, Longitude 73°58'39.46"W, was noted during office processing. This feature was not addressed by the field unit. Surrounding depths range from 19 to 30 feet (5^8 - 9^1 m). It is recommended this feature be charted as shown on the present survey.

2) An uncharted obstruction (debris field) with a depth of 10 feet (3 m), in Latitude 40°46'05.75"N, Longitude 74°00'44.90"W, was located by the field unit. It is recommended that a this feature be charted as shown on the present survey.

3) An uncharted obstruction with a depth of 28 feet (8^5 m), in Latitude 40°48'19.40"N, Longitude 73°58'22.33"W, was not addressed by the field unit. Surrounding depths range from 38 to 42 feet (11^6 - 12^8 m). It is recommended that the feature be charted as shown on the present survey.

4) An uncharted obstruction with a depth of 30 feet (9^1 m), in Latitude 40°48'18.96"N, Longitude 73°58'22.91"W, was not addressed by the field unit. Surrounding depths range from 38 to 42 feet (11^6 - 12^8 m). It is recommended that the feature be charted as shown on the present survey if the scale of the chart permits.

5) Charted ruins, in the vicinity of Latitude 40°47'05, Longitude 73°59'16.3"W, originate with an unknown source and were not addressed by the field unit. During office processing of the survey, multibeam record examination revealed the existence of a unknown feature in the vicinity of the charted ruins. It is recommended that the charted ruins be retained as charted.

6) Charted piles, in the vicinity of Latitude 40°47'02.1"N Longitude 74°00'01.5"W, Latitude 40°46'59.4"N Longitude 74°00'03.5"W originate with an unknown source and were neither verified nor disproved by the field. It is recommended that the charted piles be retained as charted.

b. Dangers to Navigation

One Danger to Navigation Report containing ten items was submitted to Commander (oan), First Coast Guard District, 408 Atlantic Avenue; Boston, Massachusetts for inclusion in the Local Notice to Mariners and to the Marine Chart Division, Silver Spring, Maryland. A copy of the report is appended to the Descriptive Report.

The ten items listed in the Danger to Navigation Report are not presently charted on the latest editions of charts.

c. Controlling Depths

The hydrographer makes controlling depth comparisons in Section N.2 of the Descriptive Report; however, the following should be noted about the charted tabulated controlling depths in the Weehawken-Edgewater Channel (Northern Part) and the depths found on the present survey:

1) There is a conflict between present survey depths and the controlling depth in Latitude 40°47'56.99"N, Longitude 73°59'10.91"W. The charted controlling depth is 29 feet and the present survey depth is 28 feet.

2) In the portion of the channel from 85th Street (Latitude 40°47'35.4"N, Longitude 73°59'33.8"W on the west side of the channel and Latitude 40°47'32.4"N, Longitude 73°59'24.7"W on the east side of the channel) to Latitude 40°48'27.1"N, Longitude 73°58'49.5"W, Right Outside Quarter, there are three 31 foot depths inside this quarter, two of which are in conflict with the 31.5 foot tabulated depth. One conflict is in Latitude 40°48'04.78"N, Longitude 73°59'02.22"W where there is a present survey depth of 31.1 feet and the other is in Latitude 40°48'03.46"N, Longitude 73°59'02.87"W where there is a present survey depth of 31.2 feet.

3) There are conflicts between the controlling depth in the portion of the channel from Latitude 40°48'27.1"N, Longitude 73°58'49.5"W to the Edgewater Oil Terminals (Latitude 40°49'01.7"N, Longitude 73°58'33.4"W on the west side of the channel and Latitude 40°48'57.9"N, Longitude 73°58'24.9"W on the east side of the channel), where the Right Inside Quarter tabulated depth is 25.7 feet. Present survey depths range from 23 to 25 feet in the area from Latitude 40°48'46.5"N, Longitude 73°58'36.9"W continuing north to the Edgewater Oil Terminals (Latitude 40°49'01.7"N, Longitude 73°58'33.4"W on the west side of the channel and Latitude 40°48'57.9"N, Longitude 73°58'24.9"W on the east side of the channel).

4) There are conflicts between the controlling depth and present survey depths in the portion of the channel from Latitude 40°28'27.1"N , Longitude 73°58'49.5"W to the Edgewater Oil Terminals (Latitude 40°49'01.7"N, Longitude 73°58'33.4"W on the west side of the channel and Latitude 40°48'57.9"N, Longitude 73°58'24.9"W on the east side of the channel), where the Right Outside Quarter tabulated depth is 28.8 feet. Present survey depths range from 25 to 28 feet in this area.

5) In the portion of the channel from the Edgewater Oil Terminals (Latitude 40°49'01.7"N, Longitude 73°58'33.4"W on the west side of the channel and Latitude 40°48'57.9"N, Longitude 73°58'24.9"W on the east side of the channel) to the northern limit of the present survey, there are numerous conflicts. Present survey depths range from 2 to 8 feet shoaler than the tabulated depths.

No other conflicts exist. It is recommended that the chart be updated to reflect the present survey findings in these areas

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

O. **ADEQUACY OF SURVEY**

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

R. **MISCELLANEOUS**

Chart compilation was done by Atlantic Hydrographic Branch personnel, in Norfolk, Virginia. Compilation data will be forwarded to Marine Chart Division, Silver Spring, Maryland. The following NOS Charts were used for compilation of the present survey:

12335 (37^{th} Edition, Jan 10/98) 1:10,000
13341 (23^{nd} Edition, Jan 3/98) 1:10,000

H10938

Robert Snow

Robert Snow
Cartographic Technician
Verification of Field Data
Evaluation and Analysis

APPROVAL SHEET
H10938

Initial Approvals:

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

Deborah A. Bland — Date: 20 MAR 2000

Deborah A. Bland
Cartographer,
Atlantic Hydrographic Branch

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

Andrew L. Beaver — Date: 20 MAR 2000

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

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Final Approval:

Approved: Samuel P. De Bow Jr. Date: March 29, 2000

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

NOAA FORM 75-96
(10-83)

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

MARINE CHART BRANCH

RECORD OF APPLICATION TO CHARTS

FILE WITH DESCRIPTIVE REPORT OF SURVEY NO. H10938

INSTRUCTIONS

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

1. Letter all information.
2. In "Remarks" column cross out words that do not apply.
3. Give reasons for deviations, if any, from recommendations made under "Comparison with Charts" in the Review.

CHART	DATE	CARTOGRAPHER	REMARKS
12335	3-22-2000	Deborah A. Bl[illegible]	Full [redacted] After Marine Center Approval Signed Via
			Drawing No.
12341	3-22-2000	Deborah A. Bl[illegible]	Full [redacted] After Marine Center Approval Signed Via
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SUPERSEDES C&GS FORM 8352 WHICH MAY BE USED