

# 10439

# 10439

Diagram No. 1219-3

NOAA FORM 78-35A

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

## DESCRIPTIVE REPORT

Type of Survey . . . Side Scan Sonar  
Field No. . . . . WH-20-1-92  
Registry No. . . . . H-10439

### LOCALITY

State . . . . . New Jersey  
General Locality . . . Atlantic Ocean  
Sublocality . . . . . 15NM ESE of Cape May

1992

CHIEF OF PARTY  
CDR A.A. Armstrong

### LIBRARY & ARCHIVES

DATE . . . . . June 15, 1993

★U.S. GOV. PRINTING OFFICE: 1987-756-980

12214  
12200  
12300  
13003

HYDROGRAPHIC TITLE SHEET

H-10439

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-20-1-92

State NEW JERSEY

General locality ~~APPROACHES TO DELAWARE BAY~~ ATLANTIC OCEAN

Locality 15 <sup>NM</sup> NAUTICAL MILES <sup>ESE</sup> EAST-SOUTHEAST OF CAPE MAY, NEW JERSEY

Scale 1:20,000 Date of Survey Aug. 19 - Oct. 28, 1992

Instructions dated JULY 16, 1992 Project No. OPR-D168-WH-92

Vessel NOAA Ship WHITING S-329 EDP # 2930

Chief of party Commander Andrew A. Armsrong III

Suveyed by A. Armstrong, B. Greenawalt, N. Crews, J. Verlaque, R. Fletcher, D. Bixby, L. Henn, J. Seitz, F. Cruz, A. Myers, R. Harris

Soundings taken by echo sounder DSF 6000N

Graphic record scaled by WHITING survey personnel

Graphic record checked by WHITING survey personnel

Protracted by N/A Automated plot by HP 7959B, Bruning (FIELD)

Verification by Atlantic Hydrographic Section Personnel

Soundings in MLLW Meters

REMARKS: Surveyed by 1:20,000-scale standards, plotted at 1:10,000

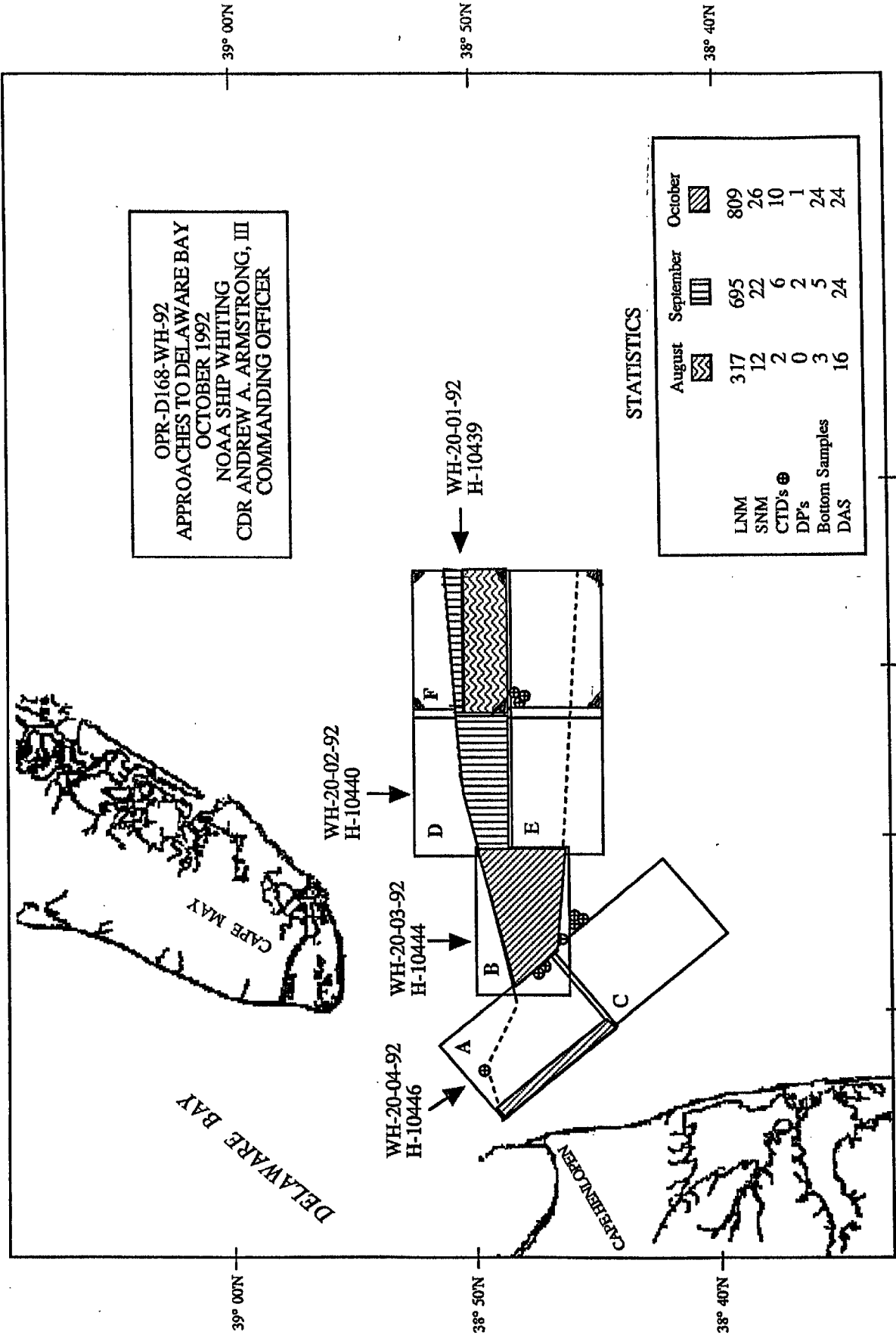
Junctions with H-10440 (1992)

200% side scan sonar coverage

Notes in the Descriptive Report were made in red during off-ice processing

AWOIS/SURF 6/22/93 SJS

# NOAA SHIP WHITING PROGRESS SKETCH



OPR-D168-WH-92  
 APPROACHES TO DELAWARE BAY  
 OCTOBER 1992  
 NOAA SHIP WHITING  
 CDR ANDREW A. ARMSTRONG, III  
 COMMANDING OFFICER

### STATISTICS

	August	September	October
LNm	317	695	809
SNM	12	22	26
CTD's	2	6	10
DP's	0	2	1
Bottom Samples	3	5	24
DAS	16	24	24

DESCRIPTIVE REPORT TO ACCOMPANY  
HYDROGRAPHIC SURVEY  
OPR-D168-WH  
1992  
WH-20-1-92  
H-10439  
NOAA SHIP WHITING  
CDR Andrew A. Armstrong, III, NOAA  
Commanding Officer

A. PROJECT

Project OPR-D168-WH is a basic hydrographic survey with side scan sonar (SSS) bottom coverage of the approaches to Delaware Bay.

The purpose of this project is to update the existing nautical charts and to locate any wrecks and obstructions in or near the approaches to Delaware Bay. Specifically, this project is in response to a request by the Fifth Coast Guard District to survey the approaches to the Delaware Bay in order to realign the eastern approach to the traffic separation scheme.

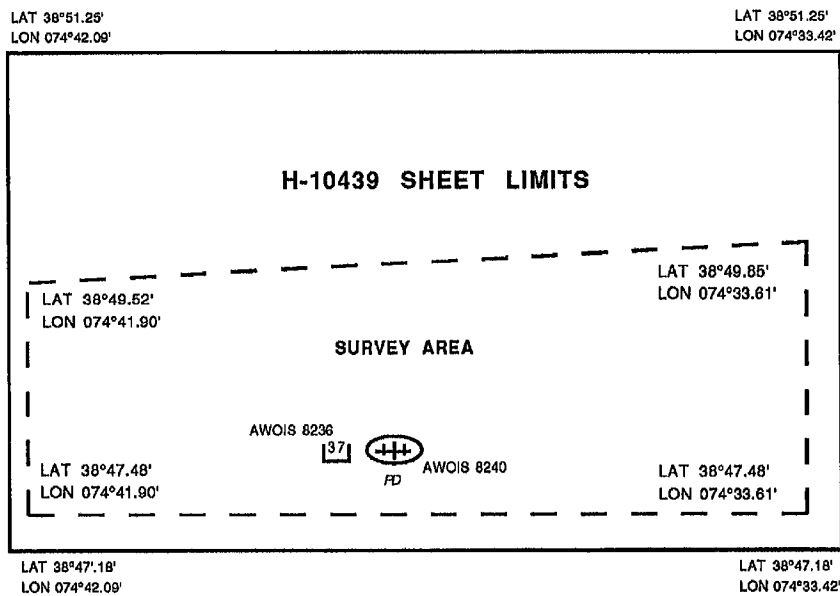
Survey operations were conducted in accordance with Hydrographic Project Instructions OPR-D168-WH dated July 16, 1992. No changes to the project instructions were issued. A change to the Automated Wreck and Obstruction Information System (AWOIS) listing dated August 5, 1992 was issued on October 5, 1992.

Project OPR-D168-WH was divided into seven survey sheets. The survey described in this report was designated "F" Sheet, and assigned field sheet number WH-20-1-92 with registry number H-10439.

B. AREA SURVEYED

Hydrographic survey H-10439 is 15 nautical miles east southeast of Cape May, New Jersey at the eastern approaches to Delaware Bay. The survey covers a portion of the southern edge of Five Fathom Bank to the Cape Henlopen traffic lane and separation zone.

The area surveyed is shown below:



Survey operations began on August 19, 1992 (DOY 232) and ended on October 28, 1992 (DOY 302). Data were acquired on the following days:

<u>DOY</u>	<u>Date</u>
232-233	August 19-20
238-241	August 25-28
245-247	September 1-3
253-254	September 9-10
272-273	September 28-29
295	October 21
298	October 24
300-302	October 26-28

C. SURVEY VESSEL

NOAA Ship WHITING, vessel identification number 2930, was used for all data acquisition during survey H-10439.

No unusual vessel configurations were used nor were any problems encountered.

#### D. AUTOMATED DATA ACQUISITION AND PROCESSING

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

<u>PROGRAM NAME</u>	<u>VERSION</u>	<u>VERSION DATE</u>
MAINMENU	1.00	10-Jul-92
PRESURVEY	7.00	not listed
NEWPOST	6.00	not listed
DIAGNOSTIC	3.01	21-May-92
CARTO	2.02	21-May-92
CONTACT	2.00	18-Jun-92
PREDICT	1.12	21-May-92
BIGABST	2.02	5-Mar-92
SCANNER	1.00	10-Jul-92
RAMSAVER	1.01	21-May-92
PRINTOUT	4.00	18-May-92
INVERSE	2.00	10-Jul-92
CONVERT	3.50	14-Jul-92
BASELINE	1.13	23-Mar-92
LOADNEW	2.00	22-Jul-92
LISTAWOIS	3.00	10-Jul-92
INSTALL	4.00	9-Jul-92
DISC_UTIL	1.00	3-Aug-92
BACKUP	2.00	27-Dec-90
FILESYS	3.00	1-Aug-92
GRAPHEDIT	1.00	3-Aug-92
LIST_DATA	1.00	3-Aug-92
QUICK	2.00	13-Aug-92
BLOCKEDIT	2.00	15-Jun-92
REAPPLY	2.00	10-Jul-92
PLOTALL	2.05	19-Aug-92
POINT	2.10	10-Jun-92
DP	2.11	11-Jun-92
HPRAZ	1.26	22-May-92
EXCESS	4.00	7-Jul-92
ZOOMEDIT	2.00	10-Jul-92
RECOMP	2.02	3-Aug-92
COPRINTOUT	2.01	3-Aug-92
HIPSTICK	1.01	3-Aug-92

NADCON (version 1.01 for IBM compatible computer) was used to calculate the datum shift from the North American Datum of 1983 (NAD 83) to NAD 27 for comparisons with prior surveys.

NAVUTL (version 6.00 for the MicroVAX computer) was used to compute inverses for DGPS performance checks.

Sound velocity corrections were determined using version 1.00 of program CAT and version 1.11 of VELOCITY.

#### E. SIDE SCAN SONAR EQUIPMENT

Side scan sonar (SSS) operations were conducted using one of two EG&G model 260 slant-range corrected SSS recorders and one of two 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 for optimum coverage. Armored towing cable was used. The following sonar equipment was used throughout the survey:

<u>Type</u>	<u>S/N</u>
Towfish	11904
Towfish	10823
260 Recorder	10884
260 Recorder	12102

The towfish was deployed from a slip-ring winch at the stern of WHITING and was generally maintained at a height between 8 and 20 meters off the bottom. Side scan sonar operations were limited to a speed of 5 knots or slower.

Offsets and laybacks for the A-frame used to tow the SSS towfish were measured on July 27, 1992 using the 100 kHz (high frequency) transducer as the reference. The A-frame height was measured from the waterline on the same date. All offset, layback and height data were applied as defined by the HDAPS Manual. This Data is on file at the Atlantic Hydrographic Section (AHS). *Filed with the original field records.*

In order to acquire the required 200% SSS coverage, main-scheme lines were run at a spacing of 75 meters with the 100-meter range scale. These lines were split in all areas where 200% coverage was questionable due to refraction, noise, or inadequate swath overlap. *Concor*

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 taken on buoys when convenient. SSS data gathered at the northern edge of the sheet (days 245-247) displayed severe refraction in the outer 25-30 meters of each channel. The refraction corresponded to an unusual velocity profile recorded on the velocity cast of DOY 247. Where refraction was evident on the sonargram, the line spacing was reduced to 37 meters, ensuring 200% SSS coverage. Adequate coverage was determined by producing an 'A' and 'B' swath plot and ensuring 100% coverage on each plot. Some propeller wash is evident in the sonargram trace when WHITING ran over areas where the depth was less than 15 meters. However, the trace is legible to depict contacts. For an AWOIS item disapproval requiring 400% coverage, additional lines spaced at 75-meters were run normal to the main-scheme lines.

The HDAPS Contact Utility Program was used to compute the location and approximate height of contacts. Contacts with measurable height and those with a distinct shape were considered significant and were listed in the HDAPS contact table. Final determination of "significant" contacts will be made by the Atlantic Hydrographic Section.

In accordance with the project instructions section 1.3, WHITING did not develop or investigate contacts discovered during this survey. This work is scheduled for a later date. *Concor.*

#### F. SOUNDING EQUIPMENT

A Raytheon Digital Survey Fathometer (DSF) 6000N echo sounder was the only sounding equipment used to determine water depth 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 as shown on the sounding plots. DSF6000N fathometers, s/n A111N and A122N, were used during this survey.

Echograms were carefully reviewed for significant features along the track line. Electronic technicians performed daily accuracy checks and preventive maintenance of the DSF 6000N.

#### 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 profiler was calibrated on January 29, 1992 during WHITING's winter inport period. Calibration coefficients were applied via program VELOCITY. A copy of the calibration report may be found in the supplemental data cahier submitted with this survey.

The CTD, mounted on a rosette, 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 corrector table was then manually entered into an HDAPS velocity table. All corrections were applied to soundings on line. Velocity profile data can be found in the supplemental data cahier submitted with this survey.

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



surface values, and confirmed that the velocity probe was working properly. Depth comparisons of the CTD with a leadline and DSF6000N confirmed the depth sensor was operating within acceptable tolerances.

A summary of sound velocity casts follows:

<u>DOY</u>	<u>Vel.Table#</u>	<u>Latitude</u>	<u>Longitude</u>	<u>Depth</u>
229	1	38°50'25" N	74°33'12" W	23.3 m
238	2	38°47'18" N	74°32'48" W	20.8 m
245	3	38°47'11" N	74°32'51" W	24.1 m
272	7	38°46'54" N	74°40'53" W	29.9 m
298	14	38°47'06" N	74°40'54" W	26.2 m
301	15	38°46'00" N	74°56'45" W	36.4 m
302*	16	38°47'00" N	74°40'57" W	24.5 m

\*Included for reference, not applied on line.

Settlement and squat determination was conducted on August 5, 1991. Correctors based on this determination were applied in real time throughout the survey. During work on survey H-10439 settlement and squat correctors were recomputed based on the August 5, 1991 determination. The new correctors were applied to data acquired on or after DOY 295. Differences between correctors applied before DOY 295 and those applied after are insignificant. Settlement and squat correctors are on file at the Atlantic Hydrographic Section (AHS). *Filed with the original field records.*

Heave correctors were applied by HDAPS. The HDAPS data acquisition computer logged heave data from a Heave, Roll, and Pitch sensor (HIPPY, s/n 19109-C) while on line.

The tidal datum for this project was Mean Lower Low Water. The operating tide station at Breakwater Harbor (Lewes), Delaware (855-7380) served as direct control for datum determination. Mr. Larry Nieson, Atlantic Operations Group, N/OES213, confirmed the proper operation of the tide station during the survey. This station also 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:	-1 hr 00 min	x0.94
Low Water:	-1 hr 00 min	x0.94

Tidal data used during data acquisition were from table 2 of the East Coast of North & South America Tidal predictions, and were applied on line to the digital data using HDAPS software. The tidal data, in digital form, were received on floppy disk from Hydrographic Surveys Branch N/CG24. Request for smooth tides was

submitted to Sea and Lake Levels Branch N/OMA12 on October 30, 1992. *Approved Tides were applied during office processing*

The correction for WHITING's static draft was 3.2 meters, a historical value that WHITING divers confirmed by pneumatic depth gauge on October 28, 1991. The Transducer Depth Determination Report is on file at AHS. *Filed with the original field records*

All sounding corrections were applied to both the narrow (100kHz) and wide (24kHz) DSF6000N beams.

A leadline comparison with the DSF6000N was performed on September 27, 1992 (DOY 271). The difference in the high frequency reading was 0.1 meter and the difference in the low frequency reading was -.06 meter. This difference is attributable to the swell action at the time the comparison was performed. No correction for this difference was applied to the survey soundings.

#### H. CONTROL STATIONS *See section 2.a. of the Evaluation Report*

The horizontal datum for this project is the North American Datum of 1983 (NAD83). Two B-order horizontal control stations were used as DGPS reference stations for this survey; one at Cape Henlopen and one at Cape Henry. The adjusted NAD83 positions, computed by GPS methods, were provided by Lieutenant Jeffrey Ferguson of the Hydrographic Surveys Branch, N/CG24 on April 3, 1992. The positions are as follows:

	<u>Latitude</u>	<u>Longitude</u>
Cape Henry	36°55' 37.580"N	076°00' 23.884"W
Cape Henlopen	38°46' 36.421"N	075°05' 15.667"W

Computations for these stations are on file at the Atlantic Hydrographic Section. *Filed with original field records*

#### I. HYDROGRAPHIC POSITION CONTROL *See also section 2.a. of the Evaluation Report*

A Differential Global Positioning System (DGPS) was used as the primary navigation system for this survey. WHITING monitored two U.S. Coast Guard DGPS beacons; Cape Henlopen, Delaware and Cape Henry, Virginia. Two Magnavox MX4200 DGPS satellite receivers were used to compute geographic positions and two MX50R beacon receivers were used to monitor the differential correctors.

The primary DGPS receiver system was initialized by HDAPS to monitor the Cape Henlopen beacon (298 kHz) and the second DGPS receiver system was initialized by the Magnavox-supplied control display program, "4200" (version 2.21, dated March 11, 1992) on a

Gateway 2000 386/33c microcomputer (S/N 402208) to monitor Cape Henry (289kHz). Neither receiver was operated in altitude constrain mode, although an altitude of 22.1 meters (antenna height above sea level) was entered in case only four satellites were in view and HDAPS defaulted into the 2-DGPS mode.

The serial numbers of the Magnavox MX4200 and MX50R receivers were as follows:

<u>Item</u>	<u>Part Number</u>	<u>Serial Number</u>
Primary System:		
Magnavox MX4200D	707361-803	537
Magnavox MX50R	627188-1	060

<u>Item</u>	<u>Part Number</u>	<u>Serial Number</u>
Secondary System:		
Magnavox MX4200D	707361-803	681
Magnavox MX50R	627188-1	036

Magnavox MX4200D firmware was upgraded on March 25, 1992. The firmware revision was A1 REV\_E/H D030/B030.

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 the Cape Henlopen and Cape Henry beacons were 7.4 and 6.2, respectively. No data were acquired at HDOP values exceeding these thresholds.

DGPS positioning was accomplished in accordance with the Field Procedures Manual, section 3.4. Cape Henlopen was used as the primary station throughout the project. Cape Henry was used as a back-up when the Cape Henlopen signal was intermittent or erratic. When the beacon signal was lost for more than 45 seconds, the survey line was broken and the line was rerun where control had been unacceptable.

Performance checks were conducted during the survey using the two reference station method (FPM section 3.4.5). These performance checks used Cape Henlopen as the primary reference station and Cape Henry as the check station. By simultaneously printing the HDAPS screen (Cape Henlopen) and the Gateway 2000 screen (Cape Henry), a minimum of three simultaneous positions were recorded and inverse computations made using program NAVUTL. All DGPS performance checks confirmed that the DGPS positioning systems were operating properly and accurately. A summary of the DGPS performance checks may be found in the supplemental data cahier submitted with this survey.

DGPS antenna offsets and laybacks were measured on July 27, 1992 using the 100 kHz (high frequency) transducer as the reference. Antenna heights were measured from the waterline on the same date. Offsets and laybacks were applied by HDAPS on line. All offset, layback and height data is on file at the Atlantic Hydrographic Section (AHS). *Filed with the original field records*

J. SHORELINE *See also section 3. b. of the Evaluation Report*

There was no shoreline in this survey area.

K. CROSSLINES *See also section 3. a. of the Evaluation Report.*

A total of 10.4 nautical miles of crosslines were run on H-10439. This amounted to 5% of the total linear nautical miles of mainscheme lines. Although survey H-10439 required 200% SSS coverage, the crossline percentage requirement is based on 100% SSS coverage.

Crossline and mainscheme agreement was excellent. The maximum difference between mainscheme and cross-line soundings was 0.4 meters.

L. JUNCTIONS *See also section 5. of the Evaluation Report.*

The western edge of survey H-10439 junctioned with WHITING's contemporary survey H-10440 (WH-20-2-92). Agreement between contours at the junction was good. The maximum difference between survey and junction soundings was 0.4 meters. At the completion of survey H-10439, there were no other contemporary junction surveys.

M. COMPARISONS WITH PRIOR SURVEYS *See also section 6. of the Evaluation Report.*

Survey H-10439 soundings were compared with prior surveys H-9700, H-9723, and H-9294<sup>WD</sup>. All prior surveys were referenced to NAD 27. For comparison purposes, a datum shift was applied to H-10439 in accordance with the Field Procedures Manual for Hydrographic Surveying.

Survey H-9700, scale 1:20,000, was completed in 1977 with Mean Low Water being the tidal datum. H-9700 encompassed most of the area surveyed on H-10439. A 1:20,000 scale, NAD 27, sounding plot of this survey was compared with H-9700. Depth contours showed excellent agreement indicating that the general position and shape of the shoal in the center of the sheet has remained unchanged since the prior survey. The

shallowest depth on survey H-9700 was 11.6 meters (38 feet) while the shallowest depth found in the current survey was 12.2 meters (40 feet). The 11.6 meter (38 feet) depth was disproved by running closely spaced sounding lines\* *CONCERN*. The position of the shallowest depth found in this survey was 12.2 M (40 Ft) approximately 200 meters southeast of the shallowest depth on survey H-9700. *Prior Survey soundings show a general trend of varying +/- 0.3 to 0.6 M (1-2 Ft) deeper than present soundings*. A small portion of this survey coincided with the 1:20,000 scale survey H-9723 completed in 1977. Soundings compared between these surveys agreed within 0.5 meters. *Prior soundings are generally 1 foot (0.3 M) deeper than the present survey.*

Survey H-9294<sup>40</sup> a 1:20,000 scale wire-drag survey, was completed in 1978 with Mean Low Water used as the tidal datum. H-9294<sup>40</sup> shows a 46-foot hang that cleared at 37 feet. This was listed as AWOIS item 8236 at NAD-83 position 38°48'03.40"N, 074°38'41.57"W. The depth from survey H-10439 at the position was 13.8 meters (45 feet). WHITING acquired 400% SSS coverage over the 200-meter search radius to disprove the item. No significant contacts were found. WHITING recommends deleting this cleared depth from the chart, and charting depths from H-10439. *see section 6.b. of the Evaluation Report.*

The bottom in the area surveyed was generally smooth with a shoal running through the central portion of the sheet. SSS records showed a variety of bottom textures in the survey area. Sand waves were evident along the eastern edge of the survey.

WHITING recommends survey H-10439 supersede all hydrography from prior surveys in the common area. *CONCERN*

#### N. COMPARISON WITH THE CHART *see also section 7.a. of the Evaluation Report*

This survey was compared with chart 12211, 37th ed., June 27/92; scale 1:80,000. No Notices to Mariners had been issued for the survey area. All charted soundings in the area covered by this survey were compared and agreement was good. The maximum difference was 1.3 meters. Surveyed soundings were generally one meter deeper than charted soundings. WHITING recommends that depths from H-10439 supersede all charted soundings in the common area.

A CHARTED DANGEROUS SUNKEN WRECK, RD  
AWOIS item 8240 is an 83-foot boat reported to have sunk in position 38°48'06.40"N, 074°38'04.57" by USCG Notice to Mariner #45 of 1956. 200% SSS coverage was required over a 1000 meter search radius to disprove this item. Coverage for disproof was reduced from 400% to 200% in a change to the AWOIS listing issued on October 5, 1992. No significant contacts were found within the search radius. WHITING

recommends deleting the wreck<sup>70</sup> from the chart. *Concur*

Based on the preliminary shipboard review, there were no dangers to navigation found in the survey area. *Concur*

O. ADEQUACY OF SURVEY *See also Section 9. of the Evaluation Report*

This survey is a complete basic hydrographic survey, adequate to supersede all prior surveys of the common area. No part of this survey is considered to be substandard. Final determination of sonar contacts requiring further investigation will be made during post-survey processing at AHS. Any required investigation will be scheduled as a separate FE survey.

P. AIDS TO NAVIGATION *See also Section 7.c. of the Evaluation Report*

Buoy "4FB" was the only aid to navigation within the survey limits. The charted position and characteristics of this buoy were verified on DOY 261. WHITING positioned the buoy by making close passes on the north, south, east and west sides of the buoy and recording the DGPS position as the buoy was abeam. Buoy 4FB, marking the northern limit of the traffic lane and the southeastern limit of Five Fathom Bank, adequately serves the purpose for which it was intended.

Q. STATISTICS

Number of Positions.....	2955
Nautical Miles of Main-scheme Sounding Lines.....	208
Nautical Miles of Cross-lines .....	10.4
Square Nautical Miles Surveyed.....	14.3
Days of Production.....	18
Detached Positions.....	3
Bottom Samples.....	8
Tide Stations Installed.....	0
Current Stations.....	0
Number of CTD Casts.....	6
Magnetic Stations.....	0

R. MISCELLANEOUS

Adequate bottom samples were collected during a prior survey in 1977. Eight bottom samples, taken during this survey, confirmed that the bottom type has not changed since the prior survey. The oceanographic log sheet is included in the supplemental cahier submitted with this survey. Bottom

samples were not submitted to the Smithsonian Institution.

WHITING suspended side scan operations twice daily to run the engines under full load. This time was used to run crosslines, service equipment, or transit between survey areas.

S. RECOMMENDATIONS *see section 9. of the Evaluation Report*

None.

T. REFERRAL TO OTHER REPORTS

The following reports will be submitted to N/CG244 and forwarded to N/CG243 as part of OPR-D168-WH-92:

Coast Pilot Report  
Chart Agent Visit Report  
Chart Inspection Report  
User Evaluation Report

Submitted By:

*David E. Bixby*

David E. Bixby  
Lieutenant junior grade, NOAA

Reviewed By:

*James S. Verlaque*

James S. Verlaque  
Lieutenant, NOAA  
Operations Officer




APPROVAL SHEET

HYDROGRAPHIC AND  
SIDE SCAN SONAR SURVEY  
OPR-D168-WH  
1992  
WH-20-1-92  
H-10439

The data for this survey were acquired and checked under my daily 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. The survey is complete and adequate for the intended purpose of delineating bottom topography and determining depths and identifying (but not fully investigating) all potential dangers to navigation. No final field sheets were prepared for this survey. The survey data and accompanying records are complete and adequate for the preparation of the smooth sheet.

In accordance with section 6.14.1 of the Project Instructions, this survey is being processed under a partnership program with the Atlantic Hydrographic Section. The final designation of significant side scan sonar contacts that may represent dangers to navigation will be made by the Atlantic Hydrographic Section. The investigation of any significant contacts will be assigned as a separate survey.

Approved By:

  
Andrew A. Armstrong III  
Commander, NOAA  
Commanding Officer



UNITED STATES DEPARTMENT OF COMMERCE  
National Oceanic and Atmospheric Administration  
NATIONAL OCEAN SERVICE  
Coast and Geodetic Survey  
Rockville, Maryland 20852

APR 3 1992

TO: Mike McKinney  
FROM: Lieutenant *Jeffrey Ferguson* Ferguson, NOAA  
Operations Section  
Hydrographic Surveys Branch

SUBJECT: Cape Henlopen DGPS reference position

The position of the GPS antenna mount at the Cape Henlopen beacon site is:

38° 46' 36.42091" N  
75° 05' 15.66618" W  
Ellipsoidal Height = -6.01 meters.

The position was determined by observing the vector between station GPS S 5 and the antenna mount with two Trimble 400SST GPS receivers. As a data quality check, vectors were also observed between station GPS S 5 A and the antenna mount, and between station GPS S 5 and station GPS S 5 A. The three vectors formed a 7.9 km loop that closed to 0.027 meters.

GPS S 5 and GPS S 5 A were existing stations in the NGS data base, descriptions and positions of these stations are attached.

The manufacturer of the survey poles I used is,  
Hixon Mfg. and Supply Company  
1400 Webster Ave  
Fort Collins, CO 80524  
(303) 482-0111

They call the item the "Constant Height Global Positioning System Survey Pole".

If any additional information is needed please call me at  
301-443-8752.





UNITED STATES DEPARTMENT OF COMMERCE  
National Oceanic and Atmospheric Administration  
NATIONAL OCEAN SERVICE  
Coast and Geodetic Survey  
Rockville, Maryland 20852

NOV 25 1992

MEMORANDUM FOR: The Record  
FROM: Lieutenant Jeffrey Ferguson, NOAA  
Operations Section  
Hydrographic Surveys Branch  
SUBJECT: Cape Henry DGPS Reference Station

On June 9 and June 10, 1992, Lieutenant Commander David Minkel and Lieutenant Jeffrey Ferguson of the Nautical Charting Division positioned the reference station at the Cape Henry beacon. The final NAD83 position for the reference station follows:

Cape Henry, Virginia  
36° 55' 37.580" N  
76° 00' 23.884" W  
Ellipsoidal Height = -17.2 Meters

The survey was conducted using two Ashtech M-XII geodetic receivers. A total of three vectors were observed. One second order horizontal control station (NORF), a B order horizontal control station (HENRY) and the Cape Henry antenna mount (CAPE) were occupied.

All vectors were reduced using Ashtech post processing software LINECOMP version 4.0.01. Fixed integer solutions were obtained in all cases.

As a data quality check, program SHOOTER was used to compute a loop closure. The loop (NORF-HENRY-CAPE-NORF) had a length of 20 km and a closure of 1.6 ppm.

Program FILLNET version 2.0 was used to perform a 3-D least squares adjustment and compute a final position for the antenna mount. The horizontal and vertical constraints were station NORF.





UNITED STATES DEPARTMENT OF COMMERCE  
National Oceanic and Atmospheric Administration  
NATIONAL OCEAN SERVICE  
Office of Ocean and Earth Sciences  
Rockville, Maryland 20852

**TIDE NOTE FOR HYDROGRAPHIC SURVEY**

**DATE:** December 29, 1992

**MARINE CENTER:** Atlantic

**HYDROGRAPHIC PROJECT:** OPR-D168-WH

**HYDROGRAPHIC SHEET:** H-10439

**LOCALITY:** New Jersey, Atlantic Ocean, 15 NM ESE of Cape May

**TIME PERIOD:** August 19 - October 28, 1992

**TIDE STATION USED:** 855-7380 Lewes (Ft. Miles), Breakwater Harbor,  
Delaware Lat.  $38^{\circ} 46.9'N$  Lon.  $75^{\circ} 07.2'W$

**PLANE OF REFERENCE (MEAN LOWER LOW WATER):** 2.51 ft.

**HEIGHT OF HIGH WATER ABOVE PLANE OF REFERENCE:** 4.3 ft.

**REMARKS:** RECOMMENDED ZONING

Apply a -1 hr 00 min time correction and a x0.94 range ratio  
to Lewes Breakwater Harbor, Delaware (855-7380).

Note: Times are tabulated in Eastern Standard Time.

*for Brian L. Lewis*  
-----  
CHIEF, DATUMS SECTION  
*a*



GEOGRAPHIC NAMES

H-10439

Name on Survey	Source of Name										
	A	B	C	D	E	F	G	H	K		
	ON CHART NO.	ON PREVIOUS SURVEY NO.	ON U.S. QUADRANGLE MAPS	FROM LOCAL INFORMATION	ON LOCAL MAPS	P.O. GUIDE OR MAP	GRAND McNALLY ATLAS	U.S. LIGHT LIST			
ATLANTIC OCEAN (title)											1
CAPE MAY (title)											2
NEW JERSEY (title)											3
											4
											5
											6
											7
											8
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											25

Approved:

*Charles E. Harrington*  
Chief Geographer - N/CG 2x5

NOV - 5 1992

N/CG244-67-93

## LETTER TRANSMITTING DATA

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

- ORDINARY MAIL       AIR MAIL
- REGISTERED MAIL       EXPRESS
- GBL (Give number) \_\_\_\_\_

TO:

NOAA/National Ocean Service  
Chief, Data Control Branch  
N/CG243, Station 6813, SSMC3  
1315 East-West Highway  
Silver Spring, MD 20910

DATE FORWARDED

7 June 1993

NUMBER OF PACKAGES

1 tube, 3 boxes

**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.

H-10439

New Jersey, Atlantic Ocean, 15 NM ESE of Cape May1 Tube containing:

- 1 Original Descriptive Report for H-10439
- 1 Original Smooth Sheet for H-10439
- 1 Smooth Position Overlay
- 2 Excess Sounding Overlays

Box 1 of 3 containing:

- 1 Cahier with Position Printout and Control File
- 2 Accordion Files with fathograms, side scan sonargrams and field printouts for JD's: 232, 233, 238, 239, and 240

Box 2 of 3 containing:

- 1 Cahier with Sounding Printout and Line File
- 2 Accordion Files with fathograms, side scan sonargrams and field printouts for JD's: 240, 241, 245, 246, 253, 254, 272, and 273

Box 3 of 3 containing:

- 1 Envelope with Appendices and Separates removed from original Descriptive Report
- 1 Envelope with miscellaneous data removed from Printouts
- 1 Envelope with Velocity Tables
- 1 Envelope with HDAPS Printouts
- 2 Accordion Files with fathograms, side scan sonargrams and field printouts for JD's: 240, 241, 246, 247, 261, 267, 272, 273, 295, 298, 300, 301, 302

FROM: (Signature)

  
Richard H. Whiffield

RECEIVED THE ABOVE

(Name, Division, Date)

Return receipted copy to:

Atlantic Hydrographic Section, N/CG244  
439 W. York Street  
Norfolk, VA 23510-1114



JUN 15 1993

05/14/93

HYDROGRAPHIC SURVEY STATISTICS  
REGISTRY NUMBER: H-10439

NUMBER OF CONTROL STATIONS		2
NUMBER OF POSITIONS		2831
NUMBER OF SOUNDINGS		22615
	TIME-HOURS	DATE COMPLETED
PREPROCESSING EXAMINATION	310	12/02/92
VERIFICATION OF FIELD DATA	126	04/07/93
ELECTRONIC DATA PROCESSING	70	
QUALITY CONTROL CHECKS	60	
EVALUATION AND ANALYSIS	20	04/09/93
FINAL INSPECTION	14	05/13/93
TOTAL TIME	600	
ATLANTIC HYROGRAPHIC SECTION APPROVAL		05/13/93

**COAST AND GEODETIC SURVEY  
ATLANTIC HYDROGRAPHIC SECTION  
EVALUATION REPORT**

**SURVEY NO.:** H-10439

**FIELD NO.:** WH-20-1-92

New Jersey, Atlantic Ocean, 15 NM ESE of Cape May

**SURVEYED:** 19 August through 28 October 1992

**SCALE:** 1:20,000

**PROJECT NO.:** OPR-D168-WH-92

**SOUNDINGS:** RAYTHEON DSF-6000N Fathometer and EG&G Model 260  
Side Scan Sonar

**CONTROL:** MAGNAVOX MX4200 Satellite Receiver/MAGNAVOX MX50R  
Beacon Receiver (Differential Global Positioning  
System)

Chief of Party.....A. A. Armstrong III

Surveyed by.....C. B. Greenawalt  
.....N. L. Crews  
.....J. S. Verlaque  
.....R. A. Fletcher  
.....D. E. Bixby  
.....L. P. Henn  
.....J. A. Seitz  
.....F. R. Cruz  
.....R. L. Harris  
.....A. A. Myers  
.....J. L. Riley

Automated Plot by.....XYNETICS 1201 Plotter (AHS)

**1. INTRODUCTION**

a. This is a combined basic hydrographic/side scan sonar survey. Side scan sonar was operated simultaneously with the fathometer during survey operations. Side scan sonar contacts located by the present survey during hydrographic operations were not investigated by the present survey. In cases where the side scan sonar was used to determine the estimated depth of a feature, the item is shown on the present survey with the upper case letter 'A' in parenthesis. This note is shown on the present survey smooth sheet in proximity to the title block. See also memorandum titled "Showing Estimated Side Scan Sonar Depths on Smooth Sheets", dated 23 February 1989, for an explanation of the note shown on the survey smooth sheet. Depths on these obstructions were estimated by scaling heights off the bottom from side scan sonar records. Positions were determined by computing offsets from the vessel's track.



b. No unusual problems were encountered during office processing.

c. Notes in the Descriptive Report were made in red during office processing.

## 2. CONTROL AND SHORELINE

a. Control is adequately discussed in sections H. and I. of the Descriptive Report.

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

To place this survey on the NAD 27 move the projection lines 0.409 seconds (12.6 meters or 0.63 mm at the scale of the survey) north in latitude, and 1.427 seconds (34.4 meters or 1.72 mm at the scale of the survey) east in longitude.

b. There is no shoreline within the limits of the present survey.

## 3. HYDROGRAPHY

a. Soundings at crossings are in excellent agreement and comply with the criteria found in sections 4.6.1 and 6.3.4.3. of the HYDROGRAPHIC MANUAL.

b. The standard depth curves were drawn in their entirety. Brown curves were also drawn to better delineate bottom relief.

c. The development of the bottom configuration and determination of least depths is considered adequate.

## 4. CONDITION OF SURVEY

The smooth sheet and accompanying overlays, hydrographic records and reports conform to the requirements of the HYDROGRAPHIC MANUAL, SIDE SCAN SONAR MANUAL, and the FIELD PROCEDURES MANUAL with the following exception:

The field unit verified but did not adequately locate two floating aids to navigation as required by section 4.2.1. of the Project Instructions.

**5. JUNCTIONS****H-10440 (1992) to the west**

A standard junction was effected between the present survey and survey H-10440 (1992). Present survey depths are in harmony with the charted hydrography to the north, south, and east.

**6. COMPARISON WITH PRIOR SURVEYS****a. Hydrographic**

H-9700 (1977) 1:20,000  
H-9723 (1977) 1:20,000

The prior surveys listed above cover the present survey area in its entirety. These prior surveys are adequately discussed in section M., pages 10 and 11, of the Descriptive Report and need no further discussion.

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

**b. Wire Drag**

H-9294WD (1970) 1:20,000

Comparison with the prior survey shows one hang that falls within the common area of the present survey. This hang is AWOIS item #8236.

Automated Wreck and Obstruction Information System (AWOIS) item #8236, a charted wire drag clearance depth of 37-ft (11<sup>2</sup> m), in Latitude 38°48'03.40"N, Longitude 74°38'41.57"W, originates with the prior survey as a bottom hang at 46 feet (14 m). The item was investigated with negative results. Present survey depths range from 13<sup>7</sup> to 14 meters (45 to 46 ft). It is recommended that the charted wire drag clearance depth of 37-ft (11<sup>2</sup> m) be deleted and the area charted as shown on present survey.

There are no conflicts between prior survey effective clearance depths and the present survey depths.

**7. COMPARISON WITH CHART 12214, (37<sup>th</sup> Ed., Jun 27/92)****a. Hydrography**

The charted hydrography originates with the previously discussed prior surveys and requires no further consideration. An adequate discussion and charting recommendation for AWOIS item #8240 is in section M. page 10, of the Descriptive Report. The following should be noted:

1) A portion of the search radius for AWOIS item #1138 falls within the limits of the present survey. The AWOIS item is outside the limits of the present survey and was not assigned to this survey. A significant side scan sonar contact was noted inside the search radius limits during office processing and is shown on the present survey as an obstruction with an estimated depth of 17<sup>3</sup> meters (56 ft) in Latitude 38°47'49.61"N, Longitude 74°35'07.63"W. The position and height of the contact was scaled from the side scan sonograms. It is recommended that this obstruction be charted in accordance with Cartographic Order 004/89, dated 3 July 1989. This obstruction has been recommended for additional work during the 1993 field season. Because a complete investigation of this item was not conducted, no change in the charting status for AWOIS #1138 is recommended.

2) An uncharted obstruction with an estimated depth of 17<sup>6</sup> meters (57 ft), in Latitude 38°48'08.39"N, Longitude 74°35'48.65"W, noted during office processing, is considered significant. The position and height of the contact was scaled from the side scan sonograms. It is recommended that this obstruction be charted in accordance with Cartographic Order 004/89, dated 3 July 1989. This obstruction has been recommended for additional work during the 1993 field season.

Except as noted above the present survey is adequate to supersede the charted hydrography within the common area.

**b. Dangers to Navigation**

There were no Dangers to Navigation submitted by the field unit. No dangers were noted during office processing.

**c. Aids to Navigation**

There are two floating aids to navigation shown on the present survey. These aids appear adequate to serve their intended purpose.

**8. COMPLIANCE WITH INSTRUCTIONS**

This survey complies with the Project Instructions except as noted in section 4. of this report.

**9. ADDITIONAL FIELD WORK**

This is an adequate basic hydrographic/side scan sonar survey. Additional work is recommended for items discussed in sections 7.a.1) and 2) of this report.

WHITING Processing Team  
Verification and Evaluation and Analysis

*Franklin L. Saunders*

---

Franklin L. Saunders  
Cartographic Technician

*Norris A. Wike*

---

Norris A. Wike  
Cartographer

APPROVAL SHEET  
H-10439

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 magnetic tape record for this survey. Final control, position, and sounding printouts of the survey have been made. The survey records and digital data comply with NOS requirements except where noted in the Evaluation Report.

Richard H. Whitfield Date: 13 May 1993  
Richard H. Whitfield  
Cartographer, Evaluation and Analysis Team  
Atlantic Hydrographic Section

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.

Christopher B. Lawrence Date: 13 May 1993  
Christopher B. Lawrence, CDR, NOAA  
Chief, Atlantic Hydrographic Section

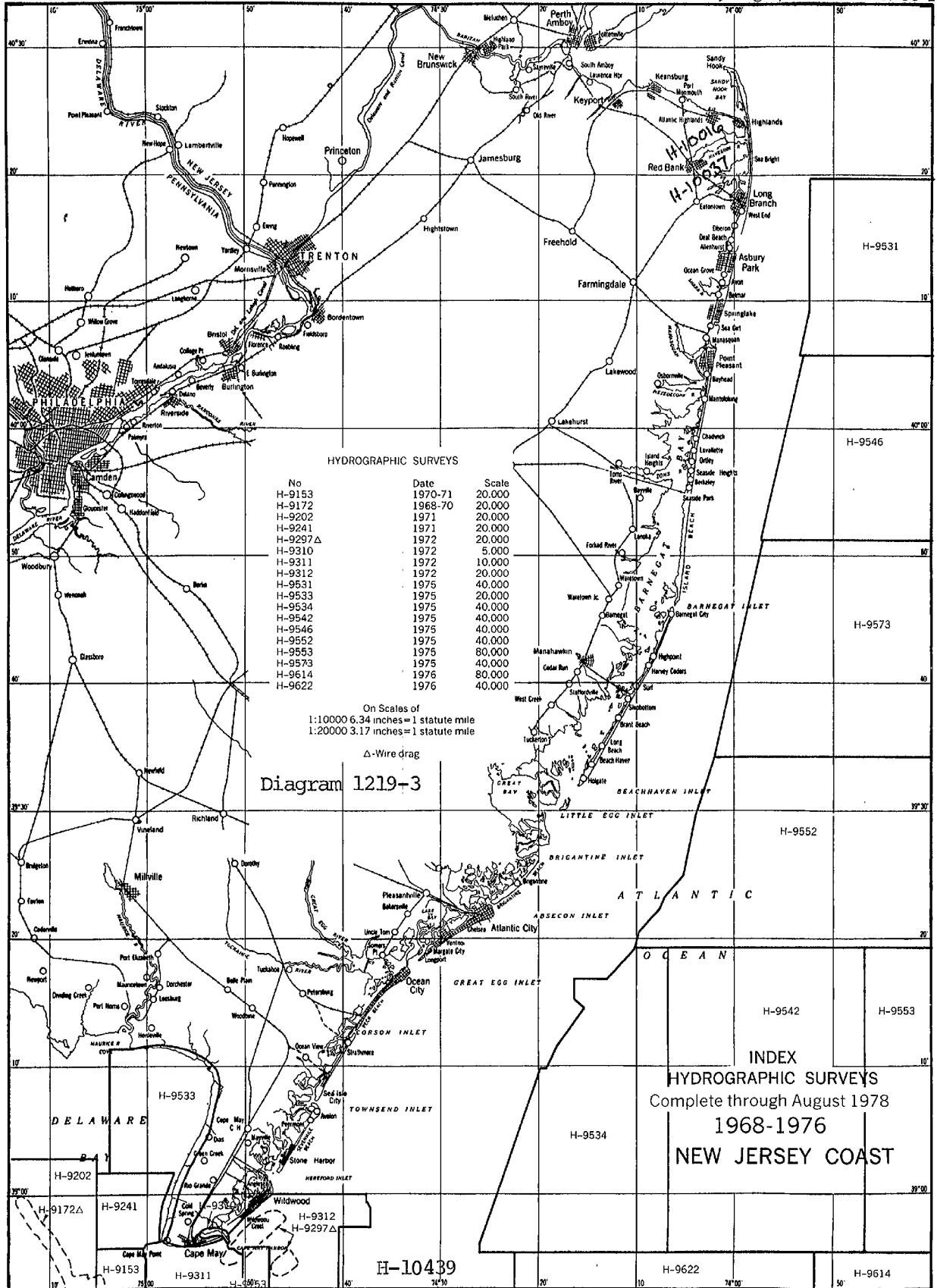
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Final Approval:

Approved: J. Austin Yeager Date: 12/8/94  
J. Austin Yeager  
Rear Admiral, NOAA  
Director, Coast and Geodetic Survey

DEPARTMENT OF COMMERCE  
 National Oceanic and Atmospheric Administration  
 National Ocean Survey  
 Rockville, Maryland

Hydrographic Index No. 66 L



HYDROGRAPHIC SURVEYS

No.	Date	Scale
H-9153	1970-71	20,000
H-9172	1968-70	20,000
H-9202	1971	20,000
H-9241	1971	20,000
H-9297Δ	1972	20,000
H-9310	1972	5,000
H-9311	1972	10,000
H-9312	1972	20,000
H-9531	1975	40,000
H-9533	1975	20,000
H-9534	1975	40,000
H-9542	1975	40,000
H-9546	1975	40,000
H-9552	1975	40,000
H-9573	1975	80,000
H-9614	1976	80,000
H-9622	1976	40,000

On Scales of  
 1:10000 6.34 inches=1 statute mile  
 1:20000 3.17 inches=1 statute mile

Δ-Wire drag

Diagram 1219-3

INDEX  
 HYDROGRAPHIC SURVEYS  
 Complete through August 1978  
 1968-1976  
 NEW JERSEY COAST

MARINE CHART BRANCH  
**RECORD OF APPLICATION TO CHARTS**

FILE WITH DESCRIPTIVE REPORT OF SURVEY NO. H-10439

**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
12214	9/28/93	<i>Don Slack</i>	<del>Full Part Before</del> After Marine Center Approval Signed Via Drawing No. <i>50 CRIT. APPLIC.</i>
12200	9/28/93	<i>Don Slack</i>	<del>Full Part Before</del> After Marine Center Approval Signed Via Drawing No. <i>55 CRIT. APPLIC.</i>
12214	2-17-94	<i>Ralph B. Pass</i>	<del>Full Part Before</del> After Marine Center Approval Signed Via Drawing No. <i>50 appl in full</i>
13003	4-16-95	<i>B. Stannard</i>	<del>Full Part Before</del> After Marine Center Approval Signed Via Drawing No. <i>64 appl in full</i>
			Full Part Before After Marine Center Approval Signed Via Drawing No.
			Full Part Before After Marine Center Approval Signed Via Drawing No.
			Full Part Before After Marine Center Approval Signed Via Drawing No.
			Full Part Before After Marine Center Approval Signed Via Drawing No.
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