

10291

10291

Diagram No. 1215-3

NOAA FORM 76-35A

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

DESCRIPTIVE REPORT

Type of Survey ... Hydrographic.....

Field No. WH-10-6-88

Registry No. H-10291

LOCALITY

State New Jersey.....

General Locality ... Atlantic Ocean

Sublocality Bradley Beach to Sea Grit.....

19 88

CHIEF OF PARTY

CDR D.R. Seidel.....

LIBRARY & ARCHIVES

DATE September 20, 1989

☆U.S. GOV. PRINTING OFFICE: 1985-566-054

GP
 12324 4 E coast ✓
 12293-NC
 12326 ✓
 12300 ✓
 13006
 13003 NC
 CHARTS SIGN
 OFF 200 FM 110
 BRIDE

HYDROGRAPHIC TITLE SHEET

H-10291

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.

WH-10-6-88

State New Jersey

General locality Atlantic Ocean

Locality Bradley Beach to Sea Girt

Scale 1:10,000 Date of survey 16 Nov - 22 Nov 1988

Instructions dated 16 September 1986 Project No. OPR-C147-WH

Vessel NOAA Ship WHITING (Edp# 2930)

Chief of party CDR Dean R. Seidel

Surveyed by Dean R. Seidel, Todd A. Baxter, Samuel P. DeBow, James S. Verlaque
Mark P. Skarbek, Jeffery D. Bear, Peter C. Stauffer

Soundings taken by echo sounder, ~~hand lead, pole~~ DSF-6000N

Graphic record scaled by SPD, JSV, MPS, JDB, PCS, Maxine Fetterly, Felix R. Cruz,
Gale A. Variot, Patricia Wiggins, Debbie Bland, Richard H. Whitfield,
Doug Mason, Frank L. Saunders, Norris Wike

Graphic record checked by SPD, JSV, MPS, JDB, PCS, MF, FRC, GAV, PW, DB, RW, DM, FLS, NW

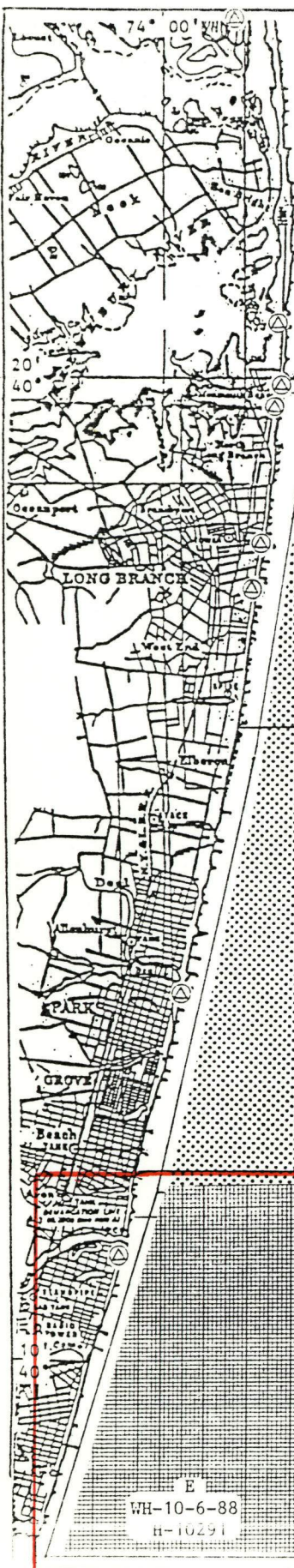
Verification by: B. Olmstead Automated plot by PMC Xynetics Plotter

Evaluation by: A. Luceno

Soundings in ~~fathoms~~ feet at ~~MLW~~ MLLW _____

REMARKS: Marginal notes in black generated during office processing. All separates
are filed with the hydrographic data.

AWOIS/SURF sm&sm 10/11/89



73° 50'

PROJECT PROGRESS SKETCH

OPR-C147-WH
OFFSHORE NEW JERSEY COAST
NEW JERSEY

Oct - Nov 1988

NOAA SHIP WHITING
CDR. DEAN R. SEIDEL
commanding

20'
40'

LEGEND:

	Oct	Nov
LNH Sounding Line	757.9	643.8
SNM Sounding Coverage	25.5	20.6
LNH Side Scan Sonar Line	665.5	574.8
SNM S S Sonar Coverage	25.5	20.6
Control Sta. Set Up	3	0
Tide Sta. Inspected	0	1
TDC Cast	2	2
Nansen Cast	0	1
Bottom Samples	42	22
Surveyed Area		

C
WH-10-2-88
H-10285

D
WH-10-4-88
H-10287

E
WH-10-6-88
H-10291

F
WH-10-5-88
H-10290

10'
40'

DESCRIPTIVE REPORT TO ACCOMPANY
HYDROGRAPHIC SURVEY
OPR-C147-WH
1988
WH-10-6-88
H-10291
NOAA SHIP WHITING
CDR Dean R. Seidel
Commanding Officer

A. PROJECT

1. General

The purpose of project OPR-C147-WH, sheet E, was to accomplish complete side scan sonar coverage with identification of contacts over a large area along the New Jersey coast. Verification of charted wrecks and obstructions had been requested by the New York and New Jersey Sandy Hook Pilots' Associations and masters of vessels calling in New York and Newark Harbors. Because prior basic surveys in this area were conducted in 1934, contemporary survey data are required to update existing charts. ✓

The survey was conducted in accordance with Hydrographic Project Instructions OPR-C147-WH, issued August 22, 1988, and changes No.1 and No.2, issued September 26 and November 22, 1988. Charted wrecks and obstructions will be detected or disproven with 200 ~~or 400~~ percent side scan sonar coverage. The WHITING processed the data to the extent that recommendations were made as to which obstructions warrant further investigations and least depth determinations. A compilation of recommendations for further work has been included in this report. The recommended investigations will be performed by a different field party at a later time (see section 7.1, Project Instructions OPR-C147-WH). The survey data acquired for this project affects charts 12323, 12324, 12326, and 12300. ✓

2. Survey of Methods

In order to accomplish the project WHITING was outfitted with the new Hydrographic Data Acquisition and Processing System (HDAPS) for on-line data collection and post processing. The HDAPS system is a semi-automated data acquisition system whose main advantage lies in its ability to acquire and store vast quantities of sounding and sonar data, utilize multiple lines of position (MLOP) for precise positioning, and combine all data input into an easily workable format. ✓

HDAPS consists of the following system components:
a Hewlett Packard (HP) 9000 Model 310 computer, two HP 35471 Color Monitors, an HP 9153B Disk Drive with a Winchester hard disk storage capacity of 20 Mbytes, a Bruning-Nicolett ZETA 824 plotter, an HP 82906A printer, and a M4 Data Model 9800 Tape Streamer. ✓

The interface between the computer and the hydrographic sensors is with a Navitronic Hyflex 1000 Hydrographic Data Handler. A Navitronic Path Guidance Unit (PGU) functions both as remote steering display for the helm, and as a remote control for the HDAPS. All software programs are written in HP BASIC. ✓

HDAPS determines a hydrographic position by using the Houtenbos algorithm which basically computes a least squares adjustment of the vessel's position. Up to four lines of position, in addition to the vessel acceleration and gyro compass information, are utilized in the algorithm for position computations. Erroneous range data are excluded from the real time position computation by a range editor. FALCON Mini-Ranger ranges which fall below the minimal accepted signal strength are not used in the solution. ✓

The acquisition of MLOP ^{has} have significantly increased data quantity and quality. The quality of data has increased since the positioning algorithm has reduced the number of "flyers" obtained on-line. As a result survey lines need not be rerun due to positional errors. Data quality has increased dramatically since the least squares adjustment of the lines of position allows the hydrographer to ascertain the overall accuracy and precision of each sounding. The accuracy of each line of position determined from the algorithm are presented as "residuals". Residuals are the theoretical corrections to be applied to each LOP in order to make the observations intersect at the least squares position. The overall precision of each position is given as size of the 95% confidence circle. With these tools the hydrographer can readily assess the quality of the survey. ✓

In the data acquisition mode, HDAPS is capable of recording side scan sonar, echo sounder, and positioning data every two seconds. All soundings are corrected, on-line, for predicted tides, velocity corrections, and dynamic draft (static draft plus Settlement and Squat correction). As a result the field hydrographer has, for the first time, the capability of comparing on line "almost" smooth soundings with charted and prior survey soundings. HDAPS also has the capability to accept real time tides, when they are available. Both the High and Low frequency digitized depth are recorded. All LOP are corrected for the baseline calibration correctors entered in the C-0 table. Any one of the following On-line plots can be produced: Depth plot, Trackline plot, or Side Scan Sonar Swath plot. All mainscheme lines were plotted as Swath Plots to ensure that adequate overlap between adjacent swaths was maintained. Depth Plots were used exclusively for crosslines. ✓

Data are archived on 7-inch magnetic tape reels read on the M4 Data Tape Streamer. Data tapes are labeled with a five digit code designating the day, number of tape for that day and a "0" for a raw, or master tape, or a "1" for an edited tape. For example, the second master tape on Day 285 would be coded as 28520. Likewise, the first edited tape of Day 247 would be 24711. ✓

On-line operations were conducted exclusively from WHITING. Twenty-four hour shipboard data acquisition and processing was the mode of operations. In order to ensure that 200% side scan sonar coverage was obtained, sounding lines were run at 80 meter line spacing for the 100 meter range scale, and 130 meter line spacing for the 150 meter range scale. This line spacing ensured that the required effective swath overlap of 2.0 mm at the scale of the survey, per the Provisional Side Scan Sonar Manual, dated April 25, 1986, was maintained. An EG&G model 260 dual channel image correcting side scan sonar unit, towed behind WHITING, was the only unit used for the survey. All significant contacts located were plotted and their height off the bottom determined as shown on figure 1. Items deemed significant enough for further investigation are included in Section Q. ✓

The Project Instructions dictated the inshore limits of the survey to be the 30-foot depth curve. In most cases adequate side scan sonar coverage was not obtainable in less than 35 feet of water. In 30 feet of water (9.1 meters) the minimal height of the sonar fish off the bottom is 8 meters (8% of the 100 meter range scale). This would mean the fish had to be towed 1.1 meters below the water surface. Since WHITING has a draft of 10.6 feet (3.2 meters) cavitation from the screws would degenerate the sonar trace. Consequently, it was found that by varying towing speeds and cable lengths WHITING could adequately obtain sonar coverage in depths 35 feet or greater. The HDAPS on-line swath plot reduces the effective scanning swath whenever the fish is less than 8% of the range scale in use. In areas where the effective swath is plotted as less than 8%, the sonargrams were examined to ensure adequate coverage was maintained. ✓

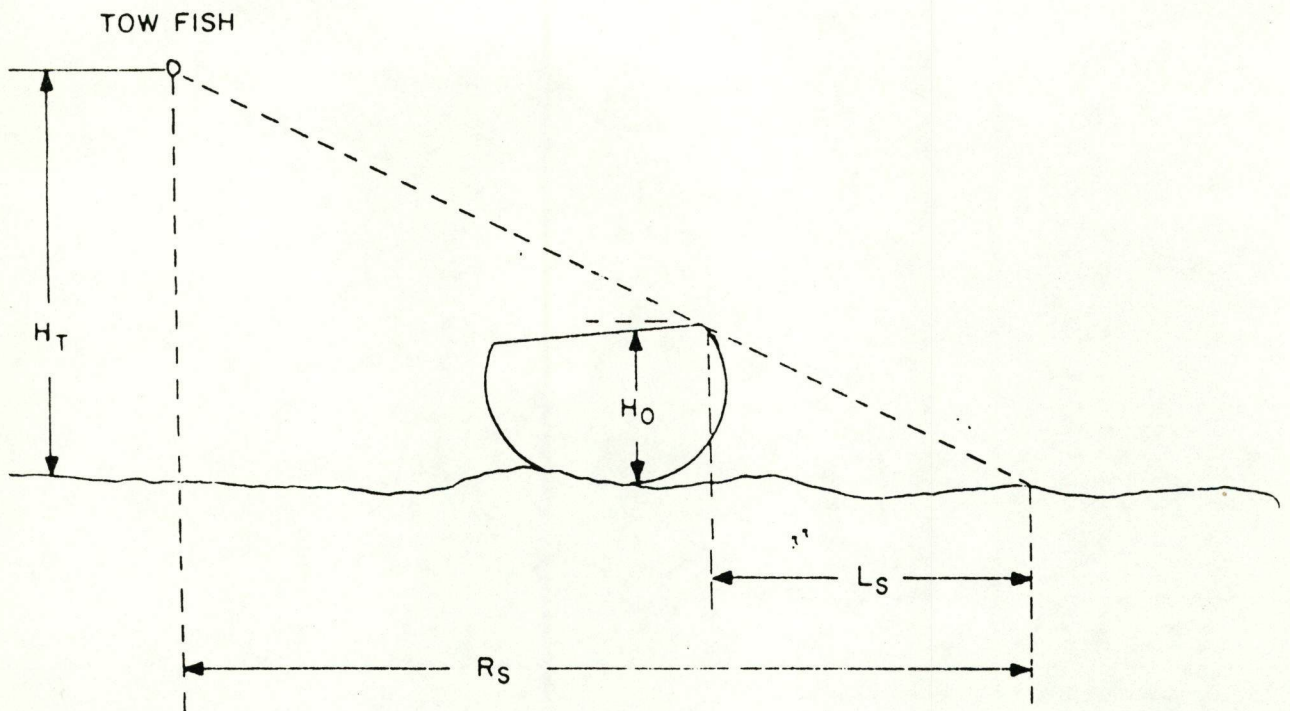
B. AREA SURVEYED

The project area for "E" sheet extends from ⁱⁿoffshore Bradley Beach, New Jersey on the north edge (latitude 40-18-45 N) southward to ~~offshore~~ Sea Girt, New Jersey (latitude 40-07-55 N), and junctions to the east with H-10290 (longitude 73-58-00³ W). The western limit is the minimum effective side scan sonar depth of 35 feet. The survey was run from November 16, 1988 through November 22, 1988. ✓

C. SOUNDING VESSELS

The NOAA Ship WHITING was used as the sounding vessel for this survey.

<u>EDP#</u>	<u>Vessel</u>	<u>Hull No.</u>	<u>Days (1988)</u>
2930	WHITING	S329	321 - 327



$$H_0 = \frac{L_S}{R_S} H_T$$

For example:

If, Shadow length (L_S)	= 15 Meters
Shadow range (R_S)	= 50 Meters
Tow fish height (H_T)	= 20 Meters
Then, Object height (H_0)	= 6 Meters

Figure 1. Object height determination.

D. SOUNDING EQUIPMENT AND CORRECTION TO ECHO SOUNDINGS

1. SOUNDING EQUIPMENT

The ship was equipped with an EG&G model 260 dual channel image correcting side scan sonar unit. A listing of serial numbers and days of use follows:

<u>EDP#</u>	<u>Vessel</u>	<u>Type</u>	<u>S/N</u>	<u>Days (1988)</u>
2930	WHITING S329	EG&G Recorder 260	0012102	321 - 326
		Towfish	0011901	321 - 326

A Raytheon DSF 6000N echo sounder was the only sounding equipment used during the survey. The following is a list of serial numbers, and days of use:

<u>EDP#</u>	<u>Vessel</u>	<u>Type</u>	<u>S/N</u>	<u>Days (1988)</u>
2930	WHITING S329	DSF 6000N	A116N	321 - 321 322 - 327
		DSF 6000N	A105N	321 - 322

In accordance with the Project Instructions, section 6.6.1, the depths recorded with the DSF 6000N echo sounders were measured in feet with a calibrated velocity of sound through water of 1463.04 m/s.

Survey records were scanned by NOAA Commissioned Officers, Survey Technicians, and Cartographic Technicians. Upon scanning the DSF 6000N analog records, any significant peaks or deeps which occurred between soundings, as well as any missed depths on the records, were inserted during Post Processing on the HDAPS system, and any incorrectly digitized soundings were corrected. The effect of sea and swell action on the echograms were also corrected, as per section 4.9.8.2 of the Hydrographic Manual.

Figures 2 and 3 depict the Mini-Ranger antenna positions, the transducer positions, and the layback configuration of the side scan sonar towfish for the WHITING. All of these corrections are incorporated in the "Offset" table for the HDAPS, Supplemental 3E. By HDAPS convention the "Offset" is defined as the left/right displacement of the sensor, positive to the right when facing the bow of the vessel. "Layback" is defined as the fore/aft displacement of the sensor, positive aft. "Height" is the up/down displacement of the sensor from the static waterline, positive down. The location of the high frequency DSF-6000N transducer was used as the starting point (0,0) for the on-board coordinate system.

SIDE SCAN SONAR OFFSET DIAGRAM

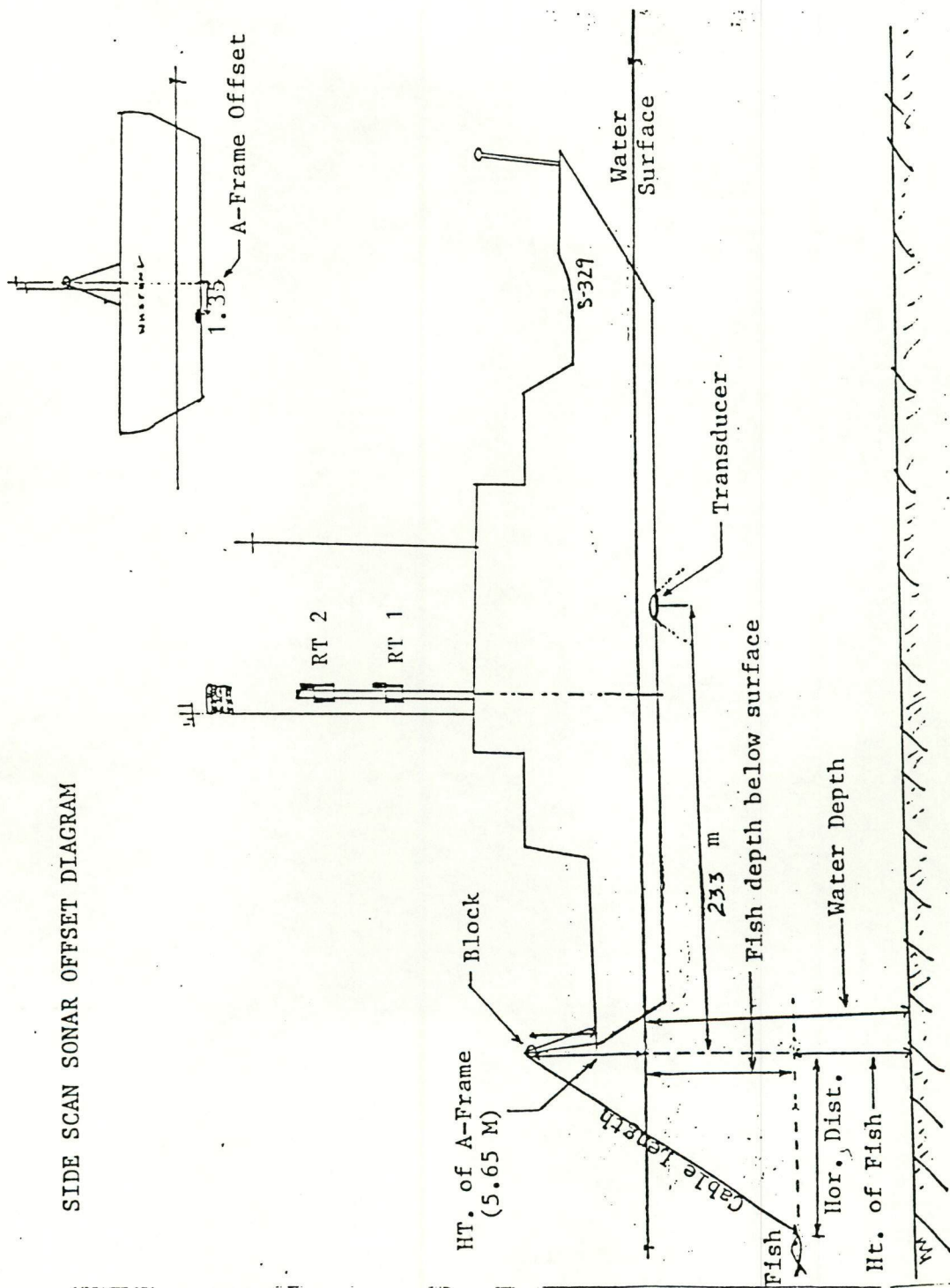


Figure 2

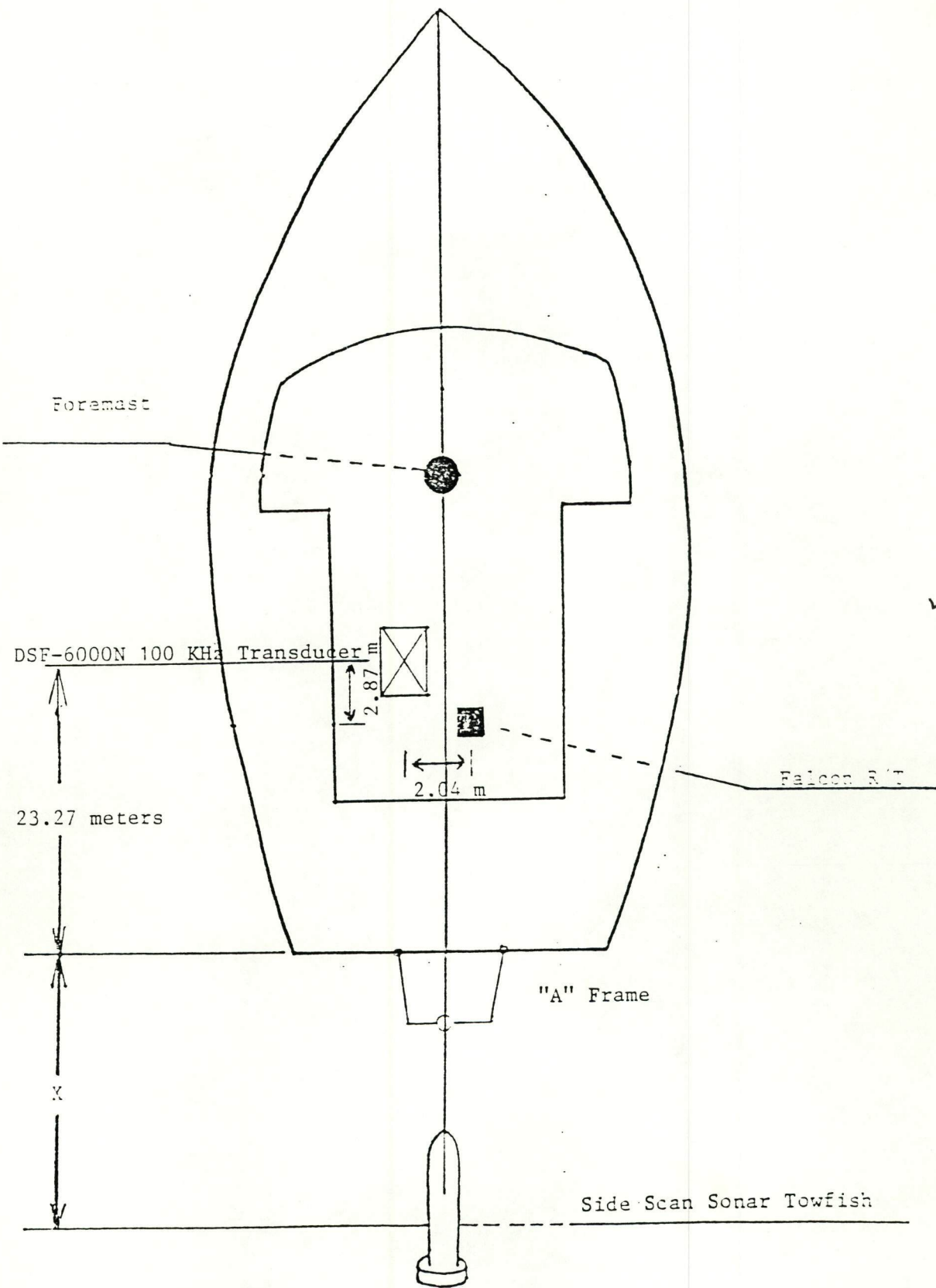


Figure 3

2. SIDE SCAN SONAR

Side scan operations were performed by the ship by fitting a custom made pulley block and A-frame support to the after deck. A heavily armored side scan sonar towing cable was used for this project which reduced the number of times the fish snagged on lobster pot lines, and also allowed for deeper towing depths. ✓

Methods of Investigation

Side Scan Sonar operations were run at a speed of less than 6 knots with the 100 meter range scale, in depths less than 60 feet, and at less than 4 knots with the 150 meter range scale in greater depths. Sonar swath plots were generated on-line to insure the required swath coverage (2 mm at the scale of the survey) was obtained. Off-line swath plots were plotted for each 100% of coverage obtained, one set each on a separate sheet, so that analysis of the data was clearer. ✓

Processing Procedures

Inspection of the sonargrams was the initial step of processing the side scan sonar. Inspection involved checking the records for complete annotation and identifying and numbering each of the significant contacts (contacts with computed heights rising above the bottom at least 10% of the depth in water depths greater than 66 feet and contacts with computed heights of at least 1 meter in less than 66 feet). Other views of the same contact from adjacent lines were determined by hand plotting the significant contact on the Trackline plot, then determining where others views of the same contact should be seen on the sonargrams. All adjacent views were inspected to ensure that they were in fact the same contact. Per section 7.1.1. of the Project Instructions only the most dangerous contact need be investigated if contacts are closer than 3.3 mm apart using the largest scale chart of the area. Since the largest scale chart of the area is 1:40,000, this would mean that if the adjacent views of the same contact fall within 1.3 cm at the survey scale, only the most significant contact needs to be addressed. Adjacent views of the significant contacts were not numbered but roughly compared on the Trackline plot. ✓

Side scan sonar records were inspected by Lt. Sam DeBow, Ens. James Verlaque, and Ens. Peter Stauffer. Upon scanning the records, all significant contacts were "flagged" with an arrow and given a contact name for processing purposes. If the contact is determined by the scanner to be insignificant, the label "No Further Investigation Necessary" (NFIN) or "no significant height" is assigned to the contact. If the contact is determined to be merely bottom texture as evidenced by a large dark region without any shadow, the label "Change in Bottom Texture" (CIBT) is assigned signifying that no further processing is necessary for the contact. If a series of contacts are concentrated within a certain area, as exemplified by a dumpsite or unusually rocky bottom, the label "Hydrographic Development Area" (HDA) is assigned to signify that the entire area is in need of further hydrographic development by reducing line spacing. ✓

Confidence checks ensuring proper functioning of the side scan sonar unit were obtained on line by inspection of the sonargram. When on-line side scan sonargrams are depicting bottom texture, the requirement for confidence checks is being met. Under these circumstances, additional off-line confidence checks are not required. With a properly functioning sonar unit, a series of sand waves or other bottom characteristics will be recorded clearly on the sonargram. A good trace will display the "mackerel" appearance of these sand waves with good resolution and contrast. These features are annotated as "confidence checks" on the sonargram. ✓

After being identified and numbered on the sonargram, only the significant contacts were listed in the Side Scan Sonar Preprocessing Contact List. The list itemizes the day, the contact number, the contact name (relative to the position number of the contact), the time, the offset from the reference line (negative to Port and positive to Starboard), the shadow length, and the item description and adjacent views. All of this information is necessary as entering parameters for the "Contact Utility Program" in the HDAPS Post Processing Program. The program generates the true contact height off the bottom and the contact position. With this information, contacts were incorporated into a HDAPS signal list and plotted on the Side Scan Sonar Contact plot. ✓

Since the purpose of this project was to identify significant side scan sonar contacts for further investigation by another field unit, a Sonar Contact Examination Record was not completed. Instead a form titled "Recommended Sonar Contacts for Further Investigation" was created and can be found in Separate M. This form lists the contact number, contact name, Easting, Northing, Latitude, Longitude, Height, Water Depth, and Recommendations or Remarks for further investigation. ✓

3. VELOCITY CORRECTIONS

Corrections for sound velocity in water were calculated from data obtained from a Martek Mark VII TDC module and sensor assembly, s/n 101. Program "Velocity" was used for velocity correction computations. ✓

The velocity casts were conducted in the same area where hydrographic data was obtained for the period the computed correctors were to be used. The data collected from each velocity cast was used directly to construct the corresponding velocity table. For example, during the period between days 263 and 268, hydrographic data was collected for sheets B and C. Therefore, on day 263, velocity cast #2 was performed on the border between sheets B and C so that velocity correctors could be obtained for both sheets B and C. The temperature and conductivity values given by cast #2 were used in computing velocity table #2. This velocity table was used until day 268, when velocity cast #3 was performed and velocity table #3 computed. Likewise, velocity cast #4 yielded velocity table #4, etc.. No averaging of any values between two different casts occurred or was required. ✓

The general trend of correctors decreasing throughout the project period corresponds to the seasonal cooling of the water column. The most radical shift occurred between days 283 (velocity cast #5) and 300 (velocity cast #6) when the velocity correctors decreased from 2.2 feet in 85 feet of water to 1.6 feet in 85 feet of water. The water column stabilized sometime between day 308 and 325 as evidenced by the near identical velocity correctors obtained by casts #7 and #8. ✓

All velocity tables were applied on-line by the HDAPS system and are found in Supplemental 3B.

<u>Table</u>	<u>Cast</u>	<u>Day</u>	<u>Depth</u>	<u>Time</u>	<u>Location</u>	<u>Days Applied</u>
7	TDC 7	308	24.0m	10:00Z	40-12-06 N 73-52-15 W	308 - 325
8	TDC 8	325	26.0m	20:33Z	40-10-55 W 73-52-21 N	325 - 328
None	Nansen 1	325	20.0m	20:50 Z	40-09-36 W 73-53-06 N	None

Velocity Cast 7 was taken prior to the commencement of hydrographic operations in order to be incorporated as the velocity correction in the HDAPS velocity table. Velocity corrections were applied automatically by the HDAPS system. All on-line soundings were corrected for velocity during the survey. ✓

On day 325, Nansen 1 was conducted simultaneously with TDC 8 for comparison purposes per section 2.1.2.2 of the Field Procedures Manual for Hydrographic Surveying (1988). The resulting correctors of the separate casts agreed within 0.1 feet, ensuring proper functioning of the Martek TDC (s/n 101) for the project period. Since the Nansen Cast served only as a check, the correctors resulting from the cast were not applied to any hydrographic data. ✓

4. BAR CHECKS

No bar checks were taken from the WHITING. Daily echo simulator checks were performed so that the narrow and wide beam returns compared within one-tenth of a foot. ✓

5. VERTICAL CASTS

Shipboard echo sounder/pneumatic depth gauge comparisons were conducted on Day 268, while the ship was at anchor off Sandy Hook, New Jersey. ✓

A pneumatic depth gauge (s/n 545-22HBC) was placed on the bottom directly under the transducers and the depth readings recorded concurrently with the analog readings from the DSF-6000N echo sounder (s/n A116N). Readings from the echo sounder and the pneumatic depth gauge were compared, the results (in feet) are as follows: ✓

Pneumo Depth	Pneumo Corr.	Pneumo Depth + Corr	Draft by Pneumo	Pneumo - Draft	Echo Sounder Depth + 0.4 Vel Corr	DSF 6000 Inst. Error
33.0	+0.2	33.2	10.6	22.6	22.9	-0.3
33.2	+0.2	33.4	10.6	22.8	22.8	+0.0
33.2	+0.2	33.4	10.6	22.8	22.8	+0.0
33.2	+0.2	33.4	10.6	22.8	22.7	+0.1
33.2	+0.2	33.4	10.6	22.8	22.7	+0.1
----	----	----	----	----	----	----
33.2	+0.2	33.4	10.6	22.8	22.8	+0.0

The average instrument error with velocities applied is +0.0 feet. The pneumatic depth gauge was bench calibrated on 8 June, 1988 and field calibrated against a lead line on Day 268 and a corrector of +0.2 feet was applied to all pneumo readings.

6. DRAFT CORRECTION

The depth of the transducers was measured by divers with the pneumatic depth gauge and found to be 10.6 ft., which agrees with historical data. However, a draft corrector of 10.5 ft. was applied to all sounding data for this project. *The TRA table includes settlement & squat corrections whenever applicable.*

7. SETTLEMENT AND SQUAT

Settlement and squat correctors for the WHITING (VESNO 2930) were obtained from historical data determined on 4 April 1985 at Puerto Castilla, Honduras (OPR-303-MI/WH-85). No major ship alterations have been completed that would affect the accuracy of these settlement and squat correctors. A 0.1 foot corrector was determined for all engine speeds between all ahead "2's" and all ahead "5's". A 0.2 foot corrector was determined for all ahead "6's" and a 0.5 foot corrector was determined for all ahead "7's". All data was collected by the ship at speeds between all ahead "2's" and all ahead "7's". This historical settlement and squat data was applied to all soundings obtained by the WHITING. Historical data is included in Supplemental 3A.

8. TIDE CORRECTORS

Predicted tide correctors were applied on-line by HDAPS to all soundings that were acquired with the DSF 6000N, except as noted in the Field Tide Note, Separate B. All echo sounding data plotted on the final field sheet were plotted with predicted tide correctors.

The tidal datum for the project was mean lower low water. The operating tide station at Sandy Hook, New Jersey (853-1680), served as control for datum determination. Third-order levels were run from the tide staff to five bench marks on 6 September, 1988. No secondary tide stations were established. Closing levels were run on November 28, 1988.

Predicted tides were calculated using Sandy Hook, New Jersey, as a reference station. The time and height correctors were given in the Project Instructions, section 5.9, for the project area (a -30 minute time correction, and a 0.94 range ratio, north of latitude 40-10.0 N). Because the transition line was in the middle of the sheet, only the north correctors were used. Correctors south of latitude 40-10.0 N should be applied at the Pacific Marine Center. The predicted tide tables for 1988 have Mean Low Water as the tidal datum rather than Mean Low^{er} Water which was specified in the project instructions. *Recommendation has been applied.* ✓

Smooth tides were requested from Chief, Sea and Lake Levels Branch, N/OMA12, in a letter dated 19 December, 1988. A copy of the letter is included in Separate I. The Field Tide Note is also included in Separate B. ✓

E. HYDROGRAPHIC SHEETS

The assigned survey scale was 1:10,000. All sheets were produced on board the WHITING with the HDAPS system on the Bruning-Nicolett ZETA plotter. Survey records will be submitted to the Hydrographic Surveys Branch, Pacific Marine Center. A list of submitted sheets for H-10291 follows:

<u>Sheet</u>	<u>Scale</u>	<u>Quantity</u>
On Line Swath	1:10,000	2
Raw Trackline	1:10,000	1
Edited Trackline	1:10,000	2
Edited Soundings	1:10,000	3
Edited Swath	1:10,000	2
SSS Contact Plot	1:10,000	1
Final Swath	1:10,000	2
Smooth Soundings	1:10,000	2
Master Overlay	1:10,000	1
Rough (NSP Data)	1:10,000	1

F. CONTROL STATIONS

The horizontal control datum for this project was the North American Datum of 1983. The following stations were used as Falcon Mini-Ranger shore stations during this survey.

<u>No.</u>	<u>Name</u>	<u>Source</u>	<u>Year</u>
001	AMBROSE LIGHT <i>(not in survey area)</i>	AMC	1988
010	IMPERIAL <i>(not in survey area)</i>	AMC	1988
016	BELFISH	AMC	1988
019	GIRTY	AMC	1988
020	MANASQUAN IN N SKEL TWR NE LEG <i>(not in survey area)</i>	AMC	1988

For more information concerning the recovery of the geodetic stations used, refer to the Horizontal Control Report which can be found within Supplemental 7.

G. HYDROGRAPHIC POSITION CONTROL

Hydrographic position control was accomplished using the Mini-Ranger Falcon 484 system which provided accuracy adequate to exceed 1:10,000 scale survey requirements. Only range/range positioning, using 4 stations simultaneously, was used during this project. A survey network was set up to allow four reference stations to be accessed simultaneously by HDAPS. The following MOTOROLA Mini-Ranger equipment was used:

<u>VESNO</u>	<u>Equipment</u>	<u>S/N</u>	<u>Days</u>
2930	RPU*	E0138	321-327
	CDU	F0201	321-327
	R/T	2960	321-327

*RPU - Range Processing Unit
 CDU - Control Display Unit
 R/T - Receiver/Transmitter

1. Remote Reference Stations

<u>Code</u>	<u>S/N</u>	<u>Stations</u>	<u>Days (1988)</u>
2	E2959	001	327
4	G3571	020	321 - 326
5	E2976	019	321 - 327
8	E2890	016	321 - 327
9	E2979	010	321 - 327

2. Critical System Check

A three point sextant fix system calibration was performed using sextant (sn's T2989, T2976, T2990), RT 2960 and codes 8, 5 and 4 on day 312. Comparisons of observed and computed lines of position resulted in residuals of less than 5.0 for all stations. A three point sextant system calibration using RT 2960 and codes 2, 4, 5, 8 and 9 was performed on day 326 with resultant residuals of less than 5.2 meters for all codes.

<u>Date</u>	<u>DoY</u>	<u>Code</u>	<u>Mean Residual</u>
7 November 1988	Day 312	8	-3.8
		5	+3.2
		4	-2.3
21 November 1988	Day 326	2	-3.1
		4	-5.2
		5	+3.2
		8	+0.4
		9	-3.0

3. Non-critical System Check

Non-critical system checks were performed twice daily. Per Attachment A of the Project Instructions, noncritical checks were documented by stopping the vessel and invoking the DUMP GRAPHICS and DUMP ALPHA commands on "Page 3" of the "SURVEY" program. Screen dumps of "Page 3" are included with the on-line printout in the daily records. ✓

4. Mini-Ranger Falcon Calibration

Baseline calibrations were performed to the standards of the AMC OORDER 86 (Falcon 484 Calibration Procedures and Standard Forms) and Attachment A in the Project Instructions. Opening baseline calibrations were performed on 17 & 18 August, 1988 at Fort Monroe, Virginia, and on 29 August & 6 September, 1988 at Sandy Hook, New Jersey. Only the values computed over the Sandy Hook baseline were utilized as correctors in the HDAPS C-0 table. All records of these calibrations are included with the survey records in Supplemental 4. ✓

Per Attachment A of the Project Instructions, a closing baseline calibration was not performed. The critical system checks performed on Days 312 and 326 were within tolerance and MLOP were used 100% of the time on the project. ✓

H. SHORELINE

No shoreline lies within the survey boundaries. Therefore, delineation of shoreline detail was not applicable to this survey. Shoreline was transferred to the field sheets from a 1:10,000 scale enlargement of Chart 12324, 38th Ed. for orientation purposes only. ✓

I. CROSSLINES

A total of 23.7 linear nautical miles of crosslines were run on "E" sheet and amounted to 11.2% of the mainscheme hydrography acquired. Over 80% of the soundings agree to within one foot and all soundings at crossings agreed to within two feet. ✓

J. JUNCTIONS

This sheet junctions with the concurrent surveys H-10287 and H-10290. Junctions with sheets "D" and "F" were compared with this survey and over 98% of the soundings were found to agree within two feet. *(See sect. 5 of Eval. Report)* ✓

K. COMPARISON WITH PRIOR SURVEYS

Soundings from this sheet were compared with the following surveys:

<u>Registry #</u>	<u>Scale</u>	<u>Year Surveyed</u>
H-5300	1:10,000	1933
H-5638	1:10,000	1934
H-6190	1:40,000	1936
H-6463 WD	1:40,000	1939
FE-221 WD	1:40,000	1978-79

Representative soundings from these previous surveys were transferred to an overlay and checked against soundings from this survey. Depths were found to be in agreement within 1-4 ft. This difference in survey depths should not be considered unusual for the following reasons:

1. The surveys were performed when positioning consisted of visual cuts using sextants and soundings were taken by leadline. Modern survey methods are much more accurate.

2. The Northern New Jersey coastline is an area known for constantly shifting shoals and shorelines and sand bottoms, hence, bottom configurations could have easily changed since the surveys were completed.

AWOIS 1504, Barge No. 10, was an assigned item listed as a 65 foot barge that sank in 1965 at Lat. 40-08-29.4, Long 73-58-15.0 W. (NAD 27) It had a required search area of 100 meters with 200% side scan sonar coverage. During the course of the survey the WHITING found a barge-like side scan sonar ^{contact} within the search area. This AWOIS item is located at Lat. 40-08-31.297, Long 73-58-14.176 W. (NAD 27) Least depths and accurate positioning for the depths will have to be determined by a future field unit as the WHITING conducted no diver item investigations. 42 ft.

AWOIS 4282 was an assigned item listed as a 39 foot cabin (NAD 27) cruiser that sank in 1972 at Lat. 40-10-18 N, Long 73-58-30 W. It had a required search area of 3000 meters with 200% side scan sonar coverage. No wreck-like side scan sonar contact was found within the assigned search area.

The hydrographer recommends that this wreck be removed from all of the affected charts. See E.R. section 7 *concur*

AWOIS 4284 was an assigned item listed as a 25 foot vessel that sank in 1980 at Lat. 40-10-36 N, Long 73-58-54 W. (NAD 27) It had a required search area of 3000 meters with 200% side scan sonar coverage. No wreck-like side scan sonar contact was found within the assigned search area.

The hydrographer recommends that this wreck be removed from all of the affected charts. *concur*

In common areas, the soundings from the current survey should be utilized to update the existing charts.

L. COMPARISON WITH THE CHART

Comparison of data from the present survey was made during the course of data acquisition with a 1:10,000 scale enlargement of Chart 12324, 24th edition, dated November 15, 1986, and with Chart 12326, 38th edition, dated February 22, 1986 per section 6.11 of the Project Instructions. All soundings agreed within four feet with the majority of the charted soundings being two or more feet shoaler than the present survey soundings. ✓

There are two 40 foot soundings located at Lat. 40-09-57.0 N, Long. 073-58-12.0 W ^(NAO 27) and Lat. 40-08-16.5 N, Long. 073-58-24.0 W ^(NAO 27) which are at least 10 feet shoaler than the present survey soundings. No indication of shoaling was observed on the side scan sonar in this area. These soundings are labeled on the chart markup as being thought to be from a survey from around 1883. These differences can be attributed to over one hundred years of the ocean washing away at the New Jersey coastline and the fact that modern surveys have much more accurate methods for sounding and positioning. The hydrographer recommends that the present survey soundings supersede the charted soundings in this area. ✓ *concur*

There are two sewer outfalls within the bounds of this survey. Both outfalls were found by side scan sonar and their positions computed from the sonargram using the HDAPS utilities program. They were found to be in the same general location as on the chart but not on the exact position. The hydrographer recommends that these two sewer outfalls be charted in the positions computed from the side scan sonar records found in separate M. *See Eval. Report, sect. 7a.* ✓

Splits of mainscheme lines, holidays and developments were run on days 326 and 327 after and during a period of extremely high winds and seas throughout the project area. While rough plotting it was found that a three to four foot difference was observed between the mainscheme and the development lines. All correctors and systems were checked and found to be normal. A call was placed to Mr. Jim Dixon, Chief Atlantic Operations Group, to determine if a change was observed in the actual tides during this period. He reported that a 4.5 foot drop in the normal tide level was observed throughout the period (refer to figure L-1). Consequently, the development and holiday lines were not smooth plotted in the field but should be plotted when smooth tides are applied to the data. *Discrepancies resolved after application of actual tides.* ✓

It was noticed that during the comparison with the charts that the further offshore on "E" ^(H-18291) sheet the more varying the differences in the soundings. Near shore, the charted soundings agreed much closer to the present survey soundings. ✓

There were no dangers to navigation within the survey area.

M. ADEQUACY OF SURVEY

This survey was conducted in accordance with the Project Instructions, Hydrographic Survey Guidelines, AMC OPERATIONS, and the Hydrographic Manual. This survey is a complete basic hydrographic survey with the exception that contacts identified by 200% side scan coverage have been left for further investigation and least depth determination by a different field unit. ✓

N. AIDS TO NAVIGATION

Visual cuts were taken from the ship's gyroscopic alidade which confirmed that the landmark positions for this sheet are adequately and accurately charted. ✓

Floating Aids to Navigation

The following Floating Aid to Navigation was determined to be adequately charted and it will need to be positioned by a detached position by a future field unit. ✓

Shark River Inlet
Lighted Whistle Buoy SI

1988 Light List No. 37325

Non-Floating Aids to Navigation (

The project instructions stated in CHANGE NO. 1 that, during normal survey operations, the field unit was to take visual cuts on all landmarks and fixed aids to determine charting accuracy and adequacy. The charts used were the latest editions of charts 12323 and 12326. The following landmarks and fixed aids to navigation were found to be accurate and more than adequate in location and quantity:

<u>Name of Light</u>	<u>1988 Light List #</u>
Shark River Inlet:	
North Breakwater Light 2	37330
South Breakwater Light 1	37335
Manasquan Inlet:	
North Breakwater Light 24	37345
South Breakwater Light 23	37350

Name of Landmark

Allenhurst R. TR.	Allenhurst TANK
Asbury Park MICRO TOWER	Asbury Park R. TR. (WJLK)
Bradley Beach TANK	Avon TANK
Shark River R MAST	Shark River STANDPIPE
Belmar STANDPIPE	Belmar GAS TANK
Belmar RADIO TOWER	Spring Lake HOTEL DOME
Spring Lake TANK	Wreck Pond TANK
Manasquan TANK	Brielle TANK
Brielle CUPOLA	Brielle TOWER

O. STATISTICS

No. of Positions	3935 ¹⁹²⁸
No. of Side Scan Positions	1636
No. of Crossline Positions	108
No. of Development Positions	180
No. of Rejected ^{Revised} Positions	115
Linear NM of Sounding Lines	211.1
Linear NM of Side Scan Inv.	187.4
Square NM of Hydrography	7.8
Bottom Samples	7
Detached Positions	0
Omitted Positions	1992
Duplicated Positions	1
Dive Investigations	0

Additional Statistics

TDC Casts	2
Nansen Casts	1
Tide Stations Levelled	1
Days of Production	7

P. MISCELLANEOUS

1. Shipboard Hydrography

24-hour mainscheme operations were advantageous in obtaining the complete coverage of the survey area. However, there were several factors which impeded operations significantly. The area was densely populated with lobster traps ("pots") which occasionally entangled the side scan sonar cable so that operations had to be delayed until the lines entangling the sonar could be cut. The entanglement of the towfish put considerable strain on the side scan connector cable. This resulted in damage to the cable requiring it to be "repped". Heavy traffic within the work area also presented problems. Operations were occasionally delayed due to traffic situations. Finally, several survey lines had to be rerun due to side scan sonar coverage busts.

2. Bottom Samples

Bottom samples were taken for submission to the Smithsonian Institution, as directed in Section 6.7 of the Project Instructions and Section 5 of Change No. 1. Seven Bottom samples were transmitted on November 20, 1988. Due to an HDAPS software deficiency, Detached Positions cannot be digitally recorded on the magnetic tape, so the positions were recorded only on the master printout and plotted on the smooth sheets by hand.

3. Anomalous Currents

No anomalous currents were observed in the survey area, per Section 8.1 of the Project Instructions.

Q. RECOMMENDATIONS

The following side scan sonar contacts are recommended for further investigation: ✓

<u>Contact #</u>	<u>Position #</u>
1	102.0p
19	1349.6p

*See letters dated March 22, 1989
& April 4, 1989.*

Descriptive and positioning information on these contacts can be found in separate M.

R. AUTOMATED DATA PROCESSING

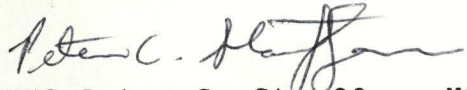
In addition to the HDAPS system, the following non-HDAPS computer program was used: ✓

VELOCITY Velocity Computations (IBM PC)

S. REFERRAL TO REPORTS

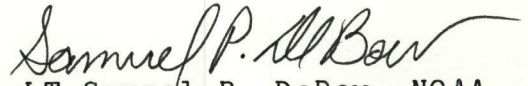
<u>Title</u>	<u>Transmittal Information</u>
Descriptive Report To Accompany Survey	Nautical Chart Branch Pacific Marine Center N/MOP21
H-10287 - WH-OPS-03-89 H-10290 - WH-OPS-02-89	Dated: 17 January 1989 Dated: 17 January 1989
Horizontal Control Report	Photogrammetry Branch Atlantic Marine Center N/MOA22
	Written by: C.M. Middleton Jr. Dated: 30 September 1988
Chart Sales Agent Report	Field Surveys Section, N/MOA222 Mr. Kenneth H. Moyer N/CG33
	Transmittal WH-OPS-63-88 Dated: November 7, 1988
User Evaluation Report	Program Planning & Requirement Atlantic Marine Center N/MOA2x1
	Transmittal WH-OPS-64-88 Dated: November 7, 1988
Chart Inspection Report	Mr. Rudolph D. Sanocki Atlantic Marine Center N/MOA232
	Transmittal WH-OPS-73-88 Dated: December 5, 1988
Coast Pilot Report	Mr. Rudolph D. Sanocki Atlantic Marine Center N/MOA232
	Transmittal WH-OPS-76-88 Dated: December 6, 1988

Submitted By:



ENS Peter C. Stauffer, NOAA

Reviewed By:



LT Samuel P. DeBow, NOAA
Field Operations Officer

Approved By:



CDR Dean R. Seidel, NOAA
Commanding Officer

STATION LIST
 OPR-C147-WH
 1988
 WH-10-6-88
 H-10291

No.	Lat	Long	Cart	H	Code	Frequency
001	040:27:35.263	073:49:49.999	250	45	2	000000
010	040:16:41.197	073:59:01.833	250	56	9	000000
012	040:13:43.310	073:59:53.482	250	81	-	000000
015	040:11:11.116	074:00:26.109	250	13	-	000000
016	040:11:08.351	074:00:34.846	250	9	8	000000
019	040:08:11.868	074:01:38.854	250	15	5	000000
020	040:06:05.908	074:01:52.935	250	9	4	000000
035	040:08:04.575	074:02:26.770	139	36	-	000000

No.	Name	Source	Year
001	AMBROSE LIGHT (ECC)	AMC	1988
010	IMPERIAL	AMC	1988
012	ASBURY T	AMC	1988
015	SHARK RIVER INLET S BKWTR LT 1	AMC	1988
016	BELFISH	AMC	1988
019	GIRTY	AMC	1988
020	MANASQUAN IN N SKEL TWR NE LEG	AMC	1988
035	SEA GIRT WHITE TANK	AMC	1988

✓ GAV



U.S. DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration

Pacific Marine Center
1801 Fairview Avenue East
Seattle, Washington 98102-3767

MAR 22 1989

MOP211C/AL

MEMORANDUM FOR: Captain Christian Andreasen, NOAA
Chief, Nautical Charting Division

FROM: *Sigmund R. Petersen*
Rear Admiral Sigmund R. Petersen, NOAA
Director, Pacific Marine Center

SUBJECT: Review of Survey H-10291 Side Scan Sonar Records

The side scan sonar operation from Bradley Beach to Sea Girt supplementing hydrographic survey H-10291 was executed by NOAA Ship WHITING from November 3 to November 23, 1988. Section 6.14.1 of Project Instructions OPR-C147-WH, Offshore New Jersey Coast, dated August 22, 1988 requires a review and/or supplement of the hydrographer's recommendations on significant contacts. The review consisted of checking the sonargrams for additional significant contacts; checking the contact height and position computations; and correlating the contacts with AWOIS items, charted features and soundings from the field sheet.

The hydrographer listed twenty nine contacts from seven different objects of which two were recommended for additional investigation. No additional significant contacts were identified during the office review of the echogram and the sonargram records. The two contacts discussed below were identified by the hydrographer and verified during office review to be significant.

AWOIS 1504, designated as Item #1 from the hydrographer's contact list, is a sunken barge listed at latitude 40°08'29.4"N, longitude 73°58'15.0"W in the AWOIS listing. This barge is charted as a wreck with a least depth of 46 feet on charts 12324 and 12326. No contact was recorded on the sonargram at this position. However, repeated contacts were recorded on the sonargram from possibly the same barge 61.7 meters NNE from the AWOIS listing at latitude 40°08'31.297"N, longitude 73°58'14.176"W. It is recommended that further investigation by divers or by other means be made for a positive identification of the feature and determination of its least depth.

Contacts recorded on the sonargram listed as item #19 in the hydrographer's contact list are possibly from some scattered rocks extending for a radius of 200 meters from latitude 40°08'32.334"N, longitude 74°00'41.992"W (NAD83). The sonargram indicates that some rocks have a least depth of 44 feet in 47 feet of water. It is recommended that a diver investigation be made for a positive identification of the feature and determination of its least depth.



Information has been received recently regarding a potential error in soundings obtained with the DSF-6000N echosounder. The error apparently originates only with certain echosounders used with the HDAPS and at this time it is not known if the faulty equipment was, in fact, used during this survey. Until the exact nature of this error is identified and quantified, users of the information contained in this report are cautioned that the depths contained in the preceding paragraphs may be at least six percent greater than the actual depths.

A plot of the significant contacts and AWOIS items, a copy of the Side Scan Sonar Data Report, a copy of sonargrams relevant to each contact and applicable excerpts from the Descriptive Report for survey H-10291 will be forwarded to the Commanding Officer, NOAA Ship HECK.

A contact plot at 1:20,000 scale and a contact list have been forwarded under separate cover to the Operations Section, CG241, for use in compiling Project Instructions.

Separate cover

Nautical Chart Branch
7600 Sand Point Way NE
BIN C15700
Seattle, Washington 98115-0070

April 4, 1989

MOP211C/JSG

MEMORANDUM FOR: Commanding Officer
NOAA Ship HECK

Pamela Hill
FROM: Lieutenant Commander Pamela Chelgren-Koterba, NOAA
Chief, Nautical Chart Branch

SUBJECT: Investigation of Side Scan Sonar Contacts for OPR-C147,
Offshore New Jersey Coast

REFERENCE: PMC letter, Review of Survey H-10287 Side Scan Sonar Records,
March 22, 1989
PMC letter, Review of Survey H-10290 Side Scan Sonar Records,
March 22, 1989
PMC letter, Review of Survey H-10291 Side Scan Sonar Records,
March 22, 1989

A data package with items for additional investigation on hydrographic surveys H-10287, H-10290 and H-10291, OPR-C147, Offshore New Jersey Coast, has been forwarded to you previously. N/CG241 has requested that the following items in this package be clarified.

The data package includes a contact plot depicting the side scan sonar contacts and the AWOIS items for each survey. Items requiring additional investigation are symbolized on these contact plots by black squares. These black squares are also shown for AWOIS items that are candidates for disapproval, as additional side scan survey coverage was originally requested. This request for additional side scan coverage was deleted at the last moment and the contact plots were not updated. The only items requiring additional investigation are identified in the referenced letters, copies of which are included in the data package. The black squares on the contact plots for the AWOIS items listed below should be disregarded.

H-10287	AWOIS Items 1516, 1528 and 4286
H-10290	AWOIS Items 1510 and 1511
H-10291	AWOIS Items 4282 and 4284

Additional data, such as a copy of the WHITING's Side Scan Sonar Data Report and copies of sonargrams for all the contacts recommended for additional investigation by the WHITING, are included in the data package. This additional data is for informational purposes only, the only items requiring additional investigation are identified in the letters to Chief, Nautical Charting Division, referenced previously.

cc: N/CG241



UNITED STATES DEPARTMENT OF COMMERCE
 National Oceanic and Atmospheric Administration
 NATIONAL OCEAN SERVICE
 OFFICE OF CHARTING AND GEODETIC SERVICES
 ROCKVILLE, MARYLAND 20852

FEB 23 1989

PACIFIC MARINE CENTER

Action:	Date to MCP
MSP 21	
Orig	CC
MSP 21	MSP 2
MSP 21 ✓	olney 1/6/89
Initial	3/6/89
	Remarks

MEMORANDUM FOR: Rear Admiral Ray E. Moses, NOAA
 Director, Atlantic Marine Center

Rear Admiral Sigmund R. Petersen, NOAA
 Director, Pacific Marine Center

FROM: *Christian Andreasen*
 Captain Christian Andreasen, NOAA
 Chief, Nautical Charting Division

SUBJECT: Showing Estimated Side Scan Sonar Depths on
 Smooth Sheets

This memorandum is in response to a telephone request by the Hydrographic Surveys Branch, Atlantic Marine Center, for a policy with regard to the portrayal on smooth sheets of depths (obstructions) scaled from side scan sonar records where the estimated depths are not further investigated on that survey. This policy is necessitated by the NOAA Ship WHITING's combined hydrographic/side scan sonar surveys accomplished in 1988 off the New Jersey coast using new item investigation procedures. The significant side scan sonar contacts detected on those surveys will be investigated by the NOAA Ship HECK during the 1989 field season.

The following policy is effective immediately:

Each depth that is scaled from a side scan sonar record and not investigated further, when shown on a smooth sheet, shall be accompanied by a note "obstr (A)," drafted in slanted black lettering in proximity to the depth. Also, in a convenient location on the sheet, preferably near the title block, the following note (plural form shown in the example) shall be added in black vertical lettering.

(A) 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.

In the case of the WHITING surveys off New Jersey, and others done under similar authorized investigation procedures, the following sentence shall be added to the above note.

Refer to subsequent field examinations for more definitive information on these features.



If known, the registry number(s) of the subsequent field examination(s) shall be inserted in the above sentence; for example:

Refer to surveys FE-xxx (19xx) SS and FE-xxx (19xx) for more definitive information on these features.

cc:

N/CG2x2 - Armstrong

N/CG22 - Florwick



NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION
NATIONAL OCEAN SERVICE

NOAA Ship WHITING
439 West York Street
Norfolk, Va 23510-1114

November 29, 1988 N/MOAWH:JSV

TO: N/MOA232 - Rudolph D. Sanocki
FROM: N/MOAWH - *Dean R. Seidel* Dean R. Seidel
SUBJECT: Chart Inspection Report, OPR-C147-WH

The purpose of this memorandum is to provide a report on the inspection of charts used by WHITING during hydrographic survey project OPR-C147-WH. Survey operations were conducted from Sandy Hook to Sea Girt, New Jersey between August 29 and November 28, 1988.

The affected charts of the area were NOAA 12324, 12326, and 12300. As per section 4 of the 1987 Coast Pilot Manual, 4th edition, recommended changes and improvements have been noted on the attached largest scale chart of the area, chart 12324, 24th edition, November 15, 1986.

Section 1 of 5:

Third Order Class One positions by traverse methods using the North American Datum of 1983 were acquired for the following landmarks and are recommended for charting:

The Admiralty - Located in Monmouth Beach, this is the northern most highrise on the shoreline at lat 40/19/51.99N, long 73/58/27.12W.

The Shores - Located in Momouth Beach, just south of The Admiralty, this highrise appears as two buildings as it is partitioned by a low midsection at lat 40/19/42.74N, long 73/58/27.91W.

Ocean Cove - Located on the southern end of Long Branch, this is the middle of three highrises on the shoreline at lat 40/16/48.87N, long 73/58/59.99W.

The Imperial House - Located on the southern end of Long Branch, this is the southern most highrise of the three on the shoreline at 40/16/41.20N, 73/59/01.83W.

The position for the radio tower (WNJY) in Long Branch was recomputed as 40/18/15.64N, 73/59/06.40W.



Section 2 of 2:

Positions were not determined for the following landmarks by Third Order Class One methods, but were acquired using NAD 83 from the 1988 DIPFILE:

Sandy Hook Lighthouse - Position confirmed by sextant calibration methods and acquiring a fix with a gyroscopic allidade.

Spermacetti Cove Coast Guard Cupola - Located at Sandy Hook, New Jersey, the position was confirmed by the same method as for Sandy Hook Lighthouse.

Navesink Light - Historically known as Highlands Twin Tower light museum, the position was confirmed by the same method as for Sandy Hook Lighthouse.

Section 3 of 5:

Third Order Class One positions by traverse methods using the North American Datum of 1983 were acquired for the following landmarks and are recommended for charting:

Asbury Towers - Located in Asbury Park, this is the highest condominium along the shoreline from Sandy Hook to Manasquan. Three fixed red aircraft warning lights are located at the top of the building. The center light was positioned for navigation purposes. This highrise is also the most noticeable from seaward as this is the only tall building in the area located at lat 40/13/43.32N, long 73/59/53.52W.

Chart 12324 has a hotel symbol located just south of the survey position for Asbury Towers. It is possible that the symbol on the chart is positioned from an NAD 27 computation. WHITING recommends this hotel symbol be removed and the new position for Asbury Towers be added to the chart.

* The entrance breakwater lights to Shark River inlet located at the eastern end of the north and south jetties were positioned at lat 40/11/14.89N, long 74/00/28.63W and lat 40/23/45.63N, long 73/59/07.69W, respectively. The 1988 Light List only has the position of the north breakwater light listed as lat 40/11/12N, long 74/00/30W.

* Two sewage pipes extending approximately 1/4 mile offshore of Asbury Park were located during the survey on the side scan sonargrams and positioned with a Falcon 404 Mini-Ranger system using multiple lines of position. The sewage pipes both form a "Y" at the

* In survey H-10291 area

seaward ends of each outfall. Positions have been acquired at the northern, central, and southern points of each pipe by entering parameters (day, time, and offset) taken from the side scan sonargrams into the HDAPS contact utility program. The positions for the northern and southern sewage pipes follow and are recommended for charting:

North Sewage Pipe

Northern Point - lat 40/15/18.759N, long 73/58/55.782W
Central Point - lat 40/15/15.922N, long 73/58/57.224W
Southern Point - lat 40/15/13.507N, long 73/58/56.609W.

South Sewage Pipe

Northern Point - lat 40/13/35.091N, long 73/59/26.657W
Central Point - lat 40/13/34.092N, long 73/59/29.118W
Southern Point - lat 40/13/31.725N, long 73/59/27.518W.

Section 4 of 5:

Third Order Class One positions by traverse methods using the North American Datum of 1983 were acquired for the following landmarks and are recommended for charting:

- ★ Manasquan Water Tank - Located inland at the north end of Manasquan, this green tank was recomputed at lat 40/07/13.68N, long 74/03/25.89W.
- ★ Sea Girt White Tank - Located inland in the center of Sea Girt, this northern tank is in close proximity to another tank. The position was at lat 40/08/04.57N, long 73/02/26.77W.

The Essex and Sussex Hotel, located in Spring Lake, was under renovation at the time of the survey. A cupola is present at the top of the hotel and the position on the chart was verified by cutting a fix to the landmark by a gyroscopic alidade.

★ In survey H-10291 area

Section 5 of 5:

Third Order Class One positions by traverse methods using the North American Datum of 1983 were acquired for the following fixed aids to navigation:

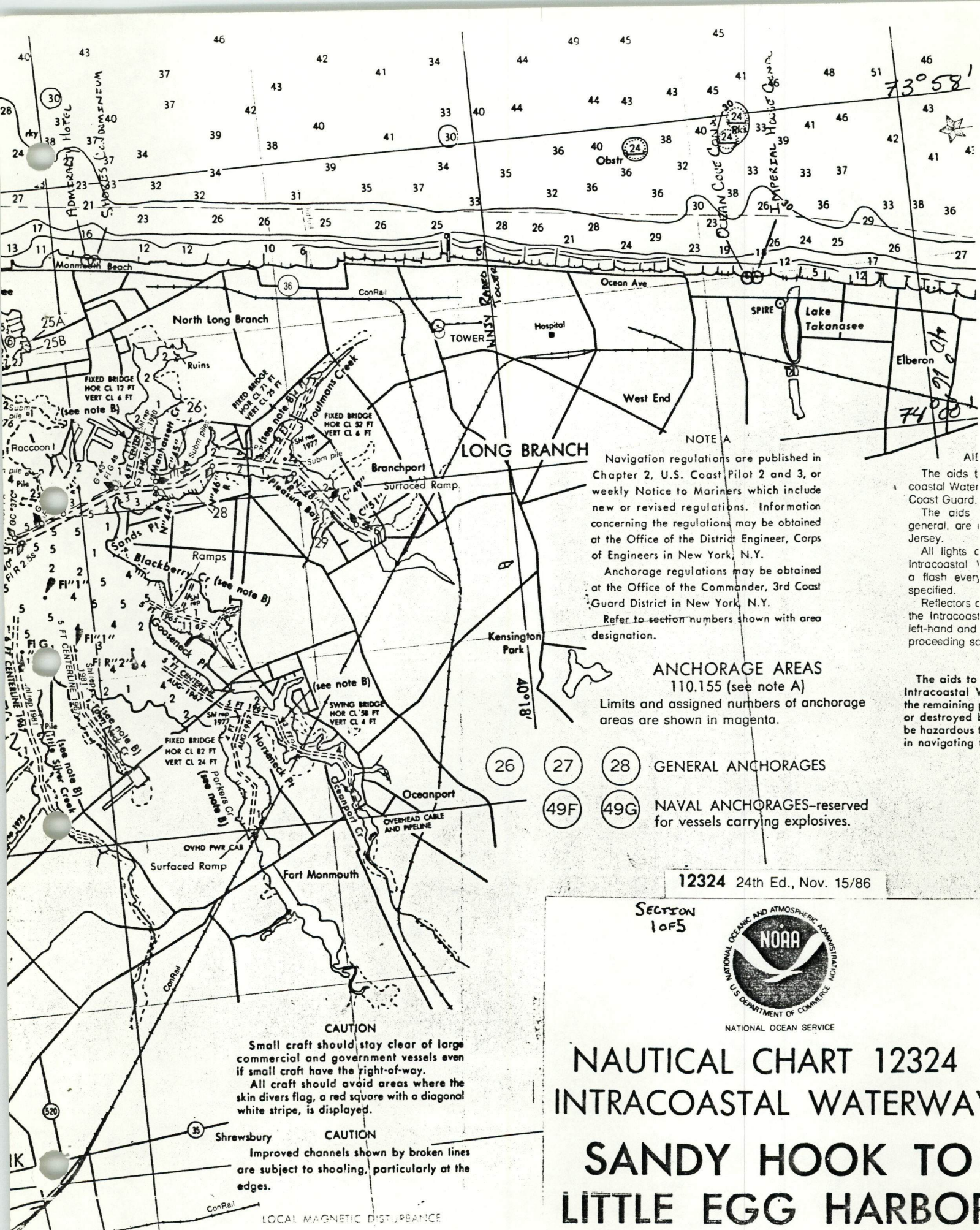
- * Manasquan Inlet North Breakwater Light 4 - The characteristics are FL R 4sec 5M
12.1 meters at
lat 40/11/14.89N,
long 74/00/28.63W.

- * Manasquan Inlet South Breakwater Light 3 - The characteristics are FL 6 sec 15M
13.42 meters at
lat 40/11/11.12N,
long 74/00/26.11W.

The 1988 Light List only gives the position of the south breakwater light listed as lat 40/06/06N, long 74/01/54W.

* In survey # - 10291 area

Attachments



73° 58'

40° 16' 00"
74° 00'

NOTE A

Navigation regulations are published in Chapter 2, U.S. Coast Pilot 2 and 3, or weekly Notice to Mariners which include new or revised regulations. Information concerning the regulations may be obtained at the Office of the District Engineer, Corps of Engineers in New York, N.Y.

Anchorage regulations may be obtained at the Office of the Commander, 3rd Coast Guard District in New York, N.Y.

Refer to section numbers shown with area designation.

ANCHORAGE AREAS
110.155 (see note A)

Limits and assigned numbers of anchorage areas are shown in magenta.

- (26) (27) (28) GENERAL ANCHORAGES
- (49F) (49G) NAVAL ANCHORAGES—reserved for vessels carrying explosives.

12324 24th Ed., Nov. 15/86

SECTION 10F5



**NAUTICAL CHART 12324
INTRACOASTAL WATERWAY
SANDY HOOK TO
LITTLE EGG HARBOR
NEW JERSEY**

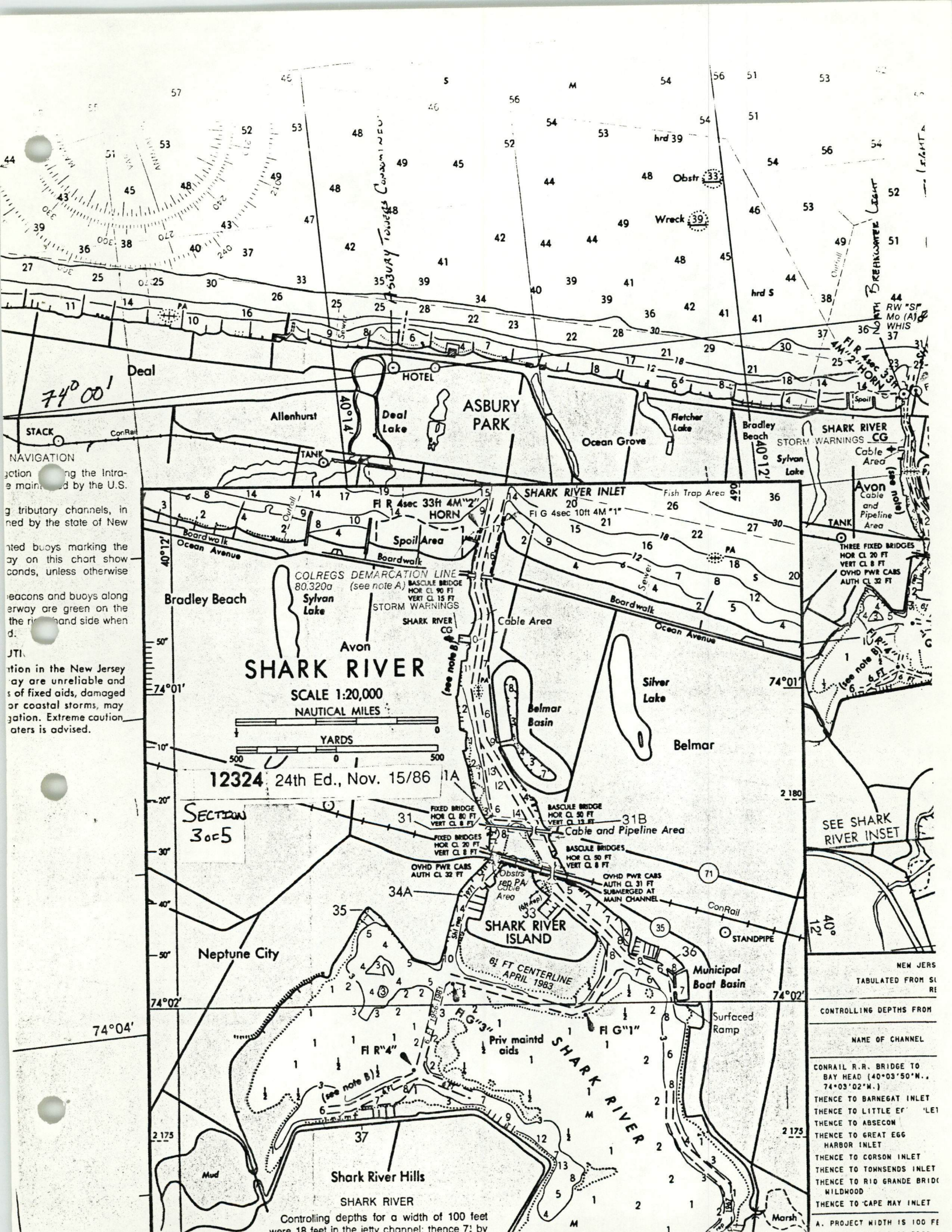
CAUTION

Small craft should stay clear of large commercial and government vessels even if small craft have the right-of-way. All craft should avoid areas where the skin divers flag, a red square with a diagonal white stripe, is displayed.

CAUTION

Improved channels shown by broken lines are subject to shoaling, particularly at the edges.

LOCAL MAGNETIC DISTURBANCE



NAVIGATION
 Section showing the Intra-
 e maintained by the U.S.

g tributary channels, in
 ned by the state of New

ated buoys marking the
 ay on this chart show
 onds, unless otherwise

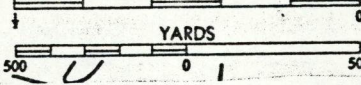
asons and buoys along
 erway are green on the
 the right hand side when

NTI

ation in the New Jersey
 ay are unreliable and
 s of fixed aids, damaged
 or coastal storms, may
 gation. Extreme caution
 aters is advised.

SHARK RIVER

SCALE 1:20,000
 NAUTICAL MILES



12324 24th Ed., Nov. 15/86

SECTION
 30c5

SEE SHARK
 RIVER INSET

NEW JERS
 TABULATED FROM SI
 RE

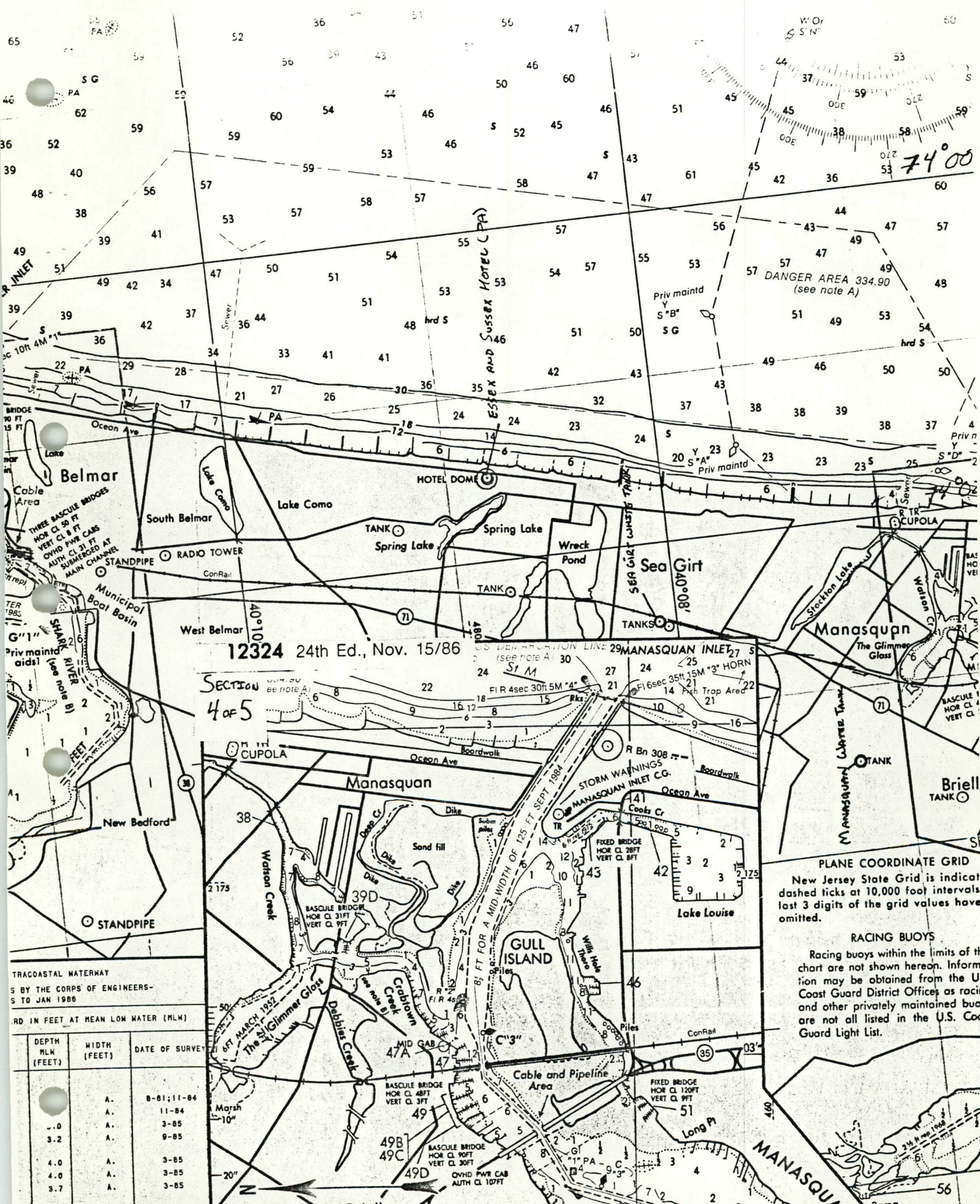
CONTROLLING DEPTHS FROM

NAME OF CHANNEL

- CONRAIL R.R. BRIDGE TO BAY HEAD (40°03'50"N., 74°03'02"W.)
- THENCE TO BARNEGAT INLET
- THENCE TO LITTLE EY' LET
- THENCE TO ABSECON
- THENCE TO GREAT EGG HARBOR INLET
- THENCE TO CORSON INLET
- THENCE TO TOMSENDS INLET
- THENCE TO RIO GRANDE BRIDGE WILDLAND
- THENCE TO CAPE MAY INLET

A. PROJECT WIDTH IS 100 FEET

Controlling depths for a width of 100 feet
 were 18 feet in the jetty channel; thence 7 1/2



74°00'

12324 24th Ed., Nov. 15/86

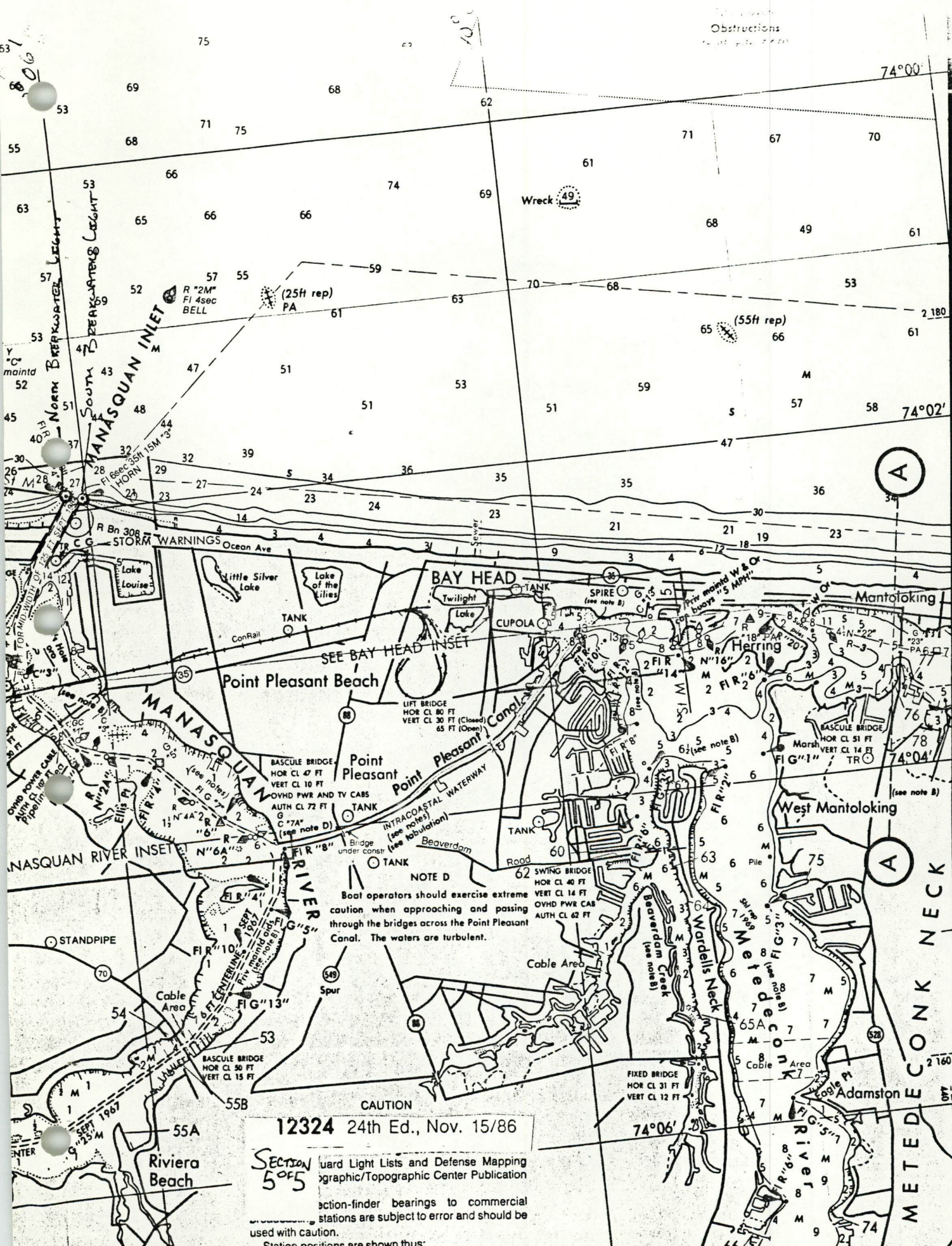
SECTION 4 of 5

TRACOASTAL WATERWAY
 SURVEYED BY THE CORPS OF ENGINEERS -
 FROM 1886 TO JAN 1886
 READ IN FEET AT MEAN LOW WATER (MLW)

DEPTH MLW (FEET)	WIDTH (FEET)	DATE OF SURVEY
0.0	A.	8-81; 11-84
3.2	A.	11-84
4.0	A.	3-85
4.0	A.	9-85
3.7	A.	3-85
5.8	A.	3-85
10.0	A.	3-85
	A.	3-11-85
	A.	9-83; 5-85

PLANE COORDINATE GRID
 New Jersey State Grid is indicated by dashed ticks at 10,000 foot intervals. Last 3 digits of the grid values have been omitted.

RACING BUOYS
 Racing buoys within the limits of this chart are not shown hereon. Information may be obtained from the U.S. Coast Guard District Offices as racing and other privately maintained buoys are not all listed in the U.S. Coast Guard Light List.



Obstructions
to navigation

A

A

12324 24th Ed., Nov. 15/86

SECTION 5055
 Light Lists and Defense Mapping
 Graphic/Topographic Center Publication

action-finder bearings to commercial
 stations are subject to error and should be
 used with caution.

Station positions are shown thus:
 (O) (Accurate location) (o) (Approximate location)

NOTE D
 Boat operators should exercise extreme
 caution when approaching and passing
 through the bridges across the Point Pleasant
 Canal. The waters are turbulent.

CAUTION

METEDECONK NECK

APPROVAL SHEET

HYDROGRAPHIC AND
SIDE SCAN SONAR SURVEY
OPR-C147-WH
1988
WH-10-6-88
H-10291

This combined hydrographic and side scan sonar survey was conducted in accordance with the Project Instructions for OPR-C147-WH, the Hydrographic Manual, the AMC OPORDERS, and the Hydrographic Survey Guidelines. The survey and reports were completed under daily supervision. All boat sheets and final transmitted sheets were reviewed in their entirety and all supporting records were checked as well.

This survey is complete for the intended purpose of identifying items requiring further investigation by a different field unit.



Dean R. Seidel, CDR NOAA
Commanding Officer
NOAA Ship WHITING

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

TIDE NOTE FOR HYDROGRAPHIC SURVEY

DATE: February 22, 1989

MARINE CENTER: Pacific

OPR: C147

HYDROGRAPHIC SHEET: H-10291

LOCALITY: New Jersey, Offshore Bradley Beach to Sea Girt

TIME PERIOD: November 16, 1988 - November 22, 1988

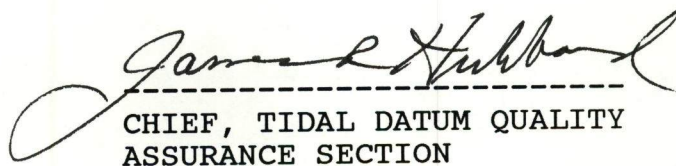
TIDE STATION(S) USED: 853-1680 Sandy Hook, NJ

PLANE OF REFERENCE (MEAN LOWER LOW WATER): 2.27 ft.

HEIGHT OF HIGH WATER ABOVE PLANE OF REFERENCE: 4.9 ft.

REMARKS: RECOMMENDED ZONING

1. Apply a -0 hr 30 minute time correction and a X0.94 range ratio to all heights.



CHIEF, TIDAL DATUM QUALITY
ASSURANCE SECTION

GEOGRAPHIC NAMES

Name on Survey
NEW JERSEY, ATLANTIC OCEAN
BRADLEY BEACH TO SEA GIRT

ON CHART NO. 12324
 A ON PREVIOUS SURVEY
 B NO.
 C ON U.S. QUADRANGLE MAPS
 D FROM LOCAL INFORMATION
 E ON LOCAL MAPS
 F P.O. GUIDE OR MAP
 G GRAND McNALLY ATLAS
 H U.S. LIGHT LIST
 K

	A	B	C	D	E	F	G	H	K
AVON-BY-THE-SEA									1
BELMAR	X								2
BRADLEY BEACH (locale)	X								3
NEW JERSEY (title)	X								4
SEA GIRT	X								5
SHARK RIVER	X								6
SHARK RIVER INLET	X								7
SPRING LAKE (locale)	X								8
									9
									10
									11
									12
									13
									14
									15
						Approved:			16
									17
						<i>Charles E. Harrington</i>			18
						Chief Geographer, -N/C62x5			19
						APR - 5 1989			20
									21
									22
									23
									24
									25

HYDROGRAPHIC SURVEY STATISTICS

RECORDS ACCOMPANYING SURVEY: To be completed when survey is processed.

RECORD DESCRIPTION		AMOUNT	RECORD DESCRIPTION		AMOUNT
SMOOTH SHEET		/	SMOOTH OVERLAYS: POS., ARC, EXCESS		5
DESCRIPTIVE REPORT		/	FIELD SHEETS AND OTHER OVERLAYS		5
DESCRIP-TION	DEPTH/POS RECORDS	HORIZ. CONT. RECORDS	SONAR-GRAMS	HYDROGRAPHIC DATA SEPARATES	ABSTRACTS/SOURCE DOCUMENTS
ACCORDION FILES	2 (includes sonargrams)			1	
ENVELOPES					
VOLUMES					
CAHIERS					
BOXES					

SHORELINE DATA

SHORELINE MAPS (List):

PHOTOBATHYMETRIC MAPS (List):

NOTES TO THE HYDROGRAPHER (List):

SPECIAL REPORTS (List):

NAUTICAL CHARTS (List):

OFFICE PROCESSING ACTIVITIES

The following statistics will be submitted with the cartographer's report on the survey

PROCESSING ACTIVITY	AMOUNTS		
	VERIFICATION	EVALUATION	TOTALS
POSITIONS ON SHEET			1928
POSITIONS REVISED			15
SOUNDINGS REVISED			154
CONTROL STATIONS REVISED			
	TIME-HOURS		
	VERIFICATION	EVALUATION	TOTALS
PRE-PROCESSING EXAMINATION			
VERIFICATION OF CONTROL			
VERIFICATION OF POSITIONS	26		26
VERIFICATION OF SOUNDINGS	48		48
VERIFICATION OF JUNCTIONS			
APPLICATION OF PHOTOBATHYMETRY			
SHORELINE APPLICATION/VERIFICATION			
COMPILATION OF SMOOTH SHEET	26		26
COMPARISON WITH PRIOR SURVEYS AND CHARTS		44	44
EVALUATION OF SIDE SCAN SONAR RECORDS			
EVALUATION OF WIRE DRAGS AND SWEEPS			
EVALUATION REPORT		48	48
GEOGRAPHIC NAMES			
OTHER*			
*USE OTHER SIDE OF FORM FOR REMARKS	TOTALS	100	92
			192

Pre-processing Examination by M. Bradley	Beginning Date	Ending Date 2/13/89
Verification of Field Data by J. Stringham	Time (Hours) 2/9/89	Ending Date 4/11/89
Verification Check by B. Olmstead	Time (Hours) 3/30/89	Ending Date 5/11/89
Evaluation and Analysis by A. Luceno	Time (Hours) 3/16/89	Ending Date 7/31/89
Inspection by D. Hill	Time (Hours) 2	Ending Date 8/22/89

EVALUATION REPORT

H-10291

1. INTRODUCTION

Survey H-10291 is a combined basic hydrographic/side scan sonar survey accomplished by the NOAA Ship WHITING utilizing the Hydrographic Data Acquisition and Processing System (HDAPS) under the following Project Instructions.

OPR-C147-WH, dated August 22, 1988
CHANGE NO. 1, dated September 26, 1988
CHANGE NO. 2, dated November 22, 1988

This survey covers the inshore area of the New Jersey Coast between Bradley Beach and Sea Girt. The surveyed area extends from latitudes $40^{\circ}07'57''\text{N}$ to $40^{\circ}11'48''\text{N}$ (NAD 83) and from 500 meters seaward from the shore to longitude $73^{\circ}58'03''\text{W}$ (NAD 83). The bottom consists of sand and broken shells. Depths range from 25 to 70 feet.

Survey H-10291 is one of the first surveys supplemented by side scan sonar using the automated HDAPS for data acquisition and field processing to be processed at the Pacific Marine Center. The hardware and software for processing of HDAPS data at the marine center is very limited at this time. The capability to edit data using the block edit function or other edit programs to allow changes by selecting different combinations of the recorded LOPs for recomputation of positions with large residuals does not exist at the marine center. Section A of the hydrographer's report provides an overview of the HDAPS.

The additional purpose of this survey to supplement the basic hydrography with a complete 200-percent side scan sonar swath coverage of the bottom within the survey area was accomplished. The side scan sonar was used to search the region between the regular sounding lines for additional indications of dangers and bottom irregularities.

The project instructions specified that further investigation of significant side scan sonar contacts be deferred to a different field unit on a future project. The side scan sonar data was reviewed at the Pacific Marine Center to evaluate reported contacts for significance and to identify additional contacts warranting further investigation. The criteria contained in section 7.1.1 of the project instructions was used. Recommendations for additional investigations were submitted to N/CG241 and to the NOAA Ship HECK (see attached letters, Review of Survey H-10291 Side Scan Sonar Records, March 22, 1989 and

Investigation of Side Scan Sonar Contacts for OPR-C147, Offshore New Jersey Coast, April 4, 1989).

This survey has been processed before the results of the recommended additional investigation are available. Therefore, the approximate depths for the significant contacts that are scaled from the sonargrams are shown on the smooth sheet according to the attached letter, Showing Estimated Side Scan Sonar Depths on Smooth Sheets, dated February 23, 1989.

Predicted tides for Sandy Hook, New Jersey were used for the reduction of soundings during field processing. Approved hourly heights zoned from Sandy Hook, gage 853-1680, were used during office processing.

The field sheet parameters have been revised to center the hydrography on the smooth sheet and to change the projection to polyconic. Corrections to echo soundings are discussed in section D of the hydrographer's report and in the Corrections To Echo Soundings Support Data separates filed with the survey records. The correctors are adequate and required no revision. An accompanying computer printout contains the parameters and the correctors. The electronic correctors are adequate and require no corrections.

A digital file has been generated for this survey as required by N/CG2 Hydrographic Survey Guideline No. 23, Completion of Digital Hydrographic Surveys, September 7, 1983. The file, however, is incomplete. Certain feature descriptive information, all line type data and miscellaneous isolated features are not in the digital record due to the present lack of digitizing resources. The user should refer to the smooth sheet for complete information.

2. CONTROL AND SHORELINE

Sections F and G of the hydrographer's report, the Horizontal Control Report for HC-8804 and the Hydrographic Position Control Report filed with the survey records contain adequate discussions of horizontal control and hydrographic positioning.

Positions of horizontal control stations used during hydrography are 1988 field values based on NAD 83. These values were used during office processing for the computation of positions. The smooth sheet and accompanying overlays are annotated with NAD 27 adjustment ticks based on values determined by N/CG121. Geographic positions based on NAD 27 may be plotted on the smooth sheet using the NAD 83 projection by applying the following corrections:

Latitude:	+0.410 seconds	(+12.6 meters)
Longitude:	-1.502 seconds	(-35.5 meters).

The year of establishment of control stations shown on the smooth sheet originates with the horizontal control report for this survey.

The use of multiple lines of position for electronic control by the HDAPS has significant benefits in improving the accuracy of positions for the survey. However, the availability of multiple information raises questions which require resolution. HDAPS computes ECR (error circle radius) as well as residuals as a measure of position quality. The ECR is a measure of positional accuracy and is a function of lines of position geometry and assumed standard errors. Acceptable positions are those which have small residuals and good geometry between intersecting lines of positions. The ECR's for this survey, which range from 3.0 to 10.0 meters, indicate strong fixes, with positional accuracy of a 95-percent probability that the HDAPS' computed positions lie within a confidence circle with a radius of 15.0 meters (1.5 millimeters at scale of survey, maximum tolerance). Nevertheless, all positions with maximum residuals of 5 meters and greater (0.5 millimeters at scale of survey, maximum tolerance) were flagged during office processing, indicating that systematic error may exist in one or more of the lines of position. HDAPS computes a filtered position using past and current measurements. In the case of a range-range survey such as this one, a residual is defined as the difference between the range from the HDAPS computed filtered position to each control station and the observed range from the station. HDAPS records the maximum residual for a position. The residual is a measure of line of position accuracy. Attachment A to the project instructions specifies that the maximum residual for an HDAPS position for a survey at this scale should not exceed 5 meters consistently for a period of 5 minutes and longer. On DN (Day Number) 326 from 1533 to 1757 hours, position numbers 3712 to 3753, the residuals persistently exceeded this limitation. The positions on the sounding lines with large residuals are on reruns of previous regular sounding lines with residuals within the 5-meter tolerance. Depths on the overlapping sounding lines are in good agreement. Furthermore, the residuals exceeding the 5-meter limitation are for the most part only slightly larger than the limitation (an average of approximately 6 meters), therefore, not affecting the positions significantly. Additional periods of residuals persistently exceeding the tolerance occurred on crosslines on DN 327 from position 3841 to 3874. Depths along the regular sounding lines and the crosslines are in good agreement. The position data from these sounding lines have been accepted for processing.

There are no shoreline maps available for this survey. Shoreline depicted on the smooth sheet originates with chart 12324, 38th edition, and is to be used for orientation only.

3. HYDROGRAPHY

With the information resulting from the subsequent additional work recommended in the letter dated March 22, 1989, hydrography is adequate to:

- a. delineate the bottom configuration, determine least depths, and draw the standard depth curves;
- b. reveal there are no significant discrepancies or anomalies requiring further investigation; and
- c. show the survey was properly controlled and soundings are correctly plotted.

4. CONDITION OF SURVEY

The hydrographic records and reports received for processing are adequate and conform to the requirements of the Hydrographic Manual, 4th Edition, revised through Change No. 3; the Hydrographic Survey Guidelines; the Field Procedures Manual; and the Side Scan Sonar Manual except as follows.

No supporting data for checks made on landmarks for charts mentioned in section N of the hydrographer's report were included in the records received by the processing office. There was no form 76-40 submitted for landmarks that are within the survey area which were located with Third Order Class One accuracy. The pertinent landmarks are listed in the Chart Inspection Report dated November 1988 (copy attached).

Residuals exceeded the limitation contained in Attachment A of the project instructions of 5 meters or greater at the scale of this survey consistently for 5 minutes or longer on DN 326. The residuals exceeded the tolerance for 1 hour and 15 minutes within a period of two hours. Attachment A of the project instructions requires a critical system check before proceeding with the field survey operation when the residuals exceed the specification.

5. JUNCTIONS

Survey H-10291 junctions with the following surveys.

<u>Survey</u>	<u>Year</u>	<u>Scale</u>	<u>Area</u>
H-10287	1988	1:10,000	North
H-10290	1988	1:10,000	East

All junctions are complete. Soundings generally agree within 1 foot between the junction sheets. There are no standard depth curves common between survey H-10287 and the present survey. The standard 60-foot depth curve is common between H-10290 and the present survey. Some soundings from survey H-10290 were

transferred to the smooth sheet to better portray the bottom in the common area.

There are no junctions to the south and the west. Considering the changes in the sand bottom as evidenced by sand wave contacts recorded in the sonargrams and the 1936 survey date of the charting source, there is no conflict between the present survey depths and the charted depths in these areas.

6. COMPARISON WITH PRIOR SURVEYS

H-5300 (1933) 1:10,000
H-5638 (1934) 1:10,000
H-6190 (1936) 1:40,000

There are no AWOIS items originating from these prior surveys that are applicable to the present survey.

Survey H-6190 covers the entire area of the present survey. Survey H-5638 covers a small portion of the western limits of the present survey. Survey H-5300 covers the approaches to the Shark River. These prior surveys also include the area between the shoreline and the 30-foot depth curve which was not covered in the present survey. The present survey depths are 3 feet deeper than depths from the prior surveys on some occasions. These differences in depths were caused mostly by the changing sand bottom as evidenced by sand wave contacts recorded in the sonargrams.

Survey H-10291 is adequate to supersede the prior surveys within the common area.

H-6463WD (1939) 1:40,000

No significant features in this prior survey are within the limits of the present survey.

FE-221WD (1978-79) 1:40,000

The only item on survey FE-221 within the limits of this survey is AWOIS 1504. This feature is a sunken barge listed at latitude 40°08'29.4"N, longitude 73°58'15.0"W(NAD 27). A preliminary least depth of 42 feet from a scaled side scan sonar contact height of 11.4 feet at latitude 40°08'31.3"N, longitude 73°58'14.2"W(NAD83) in an average surrounding depth of 53.5 feet was derived from the HDAPS utility program and plotted on the smooth sheet. Further investigation by divers or by other means for the positive identification and determination of the least depth and a more accurate location of the feature was recommended in the letter, Review of Survey H-10291 Side Scan Sonar Records, dated March 22, 1989. It is recommended that the preliminary 42-foot obstruction shown on the smooth sheet be charted in lieu of the charted 46-foot depth on the wreck pending the result of the additional investigation.

7. COMPARISON WITH CHART

Chart 12324, 24th edition, dated November 15, 1986; scale 1:40,000

Chart 12326, 38th edition, dated February 22, 1986; scale 1:80,000

a. Hydrography

Charted information originates with prior surveys H-5300, H-5638, H-6190, FE-221WD and miscellaneous sources.

Two submerged sewer outfalls are charted on chart 12324. The positions of these features were determined from the side scan sonar contacts recorded on the sonargrams using the HDAPS utilities program. These features are shown on the smooth sheet centered at latitude 40°09'48"N, longitude 74°00'12"W(NAD 83) and at latitude 40°11'30"N, longitude 73°59'30"W(NAD 83). The charted positions of these sewers were found to be displaced 150 meters to the north and 120 meters to the south, respectively, of the present survey's positions. These features should be charted in accordance with the present survey extending the unsurveyed portion straight to the shoreline.

Survey H-10291 is adequate to supersede charted hydrography within the common area.

b. AWOIS

AWOIS 1513 is an uncharted and unassigned item of investigation originating from a miscellaneous source and reported in 1857 as a sunken bark at latitude 40°11'15.0"N, longitude 70°00'00.0"W (NAD 27). The present survey, together with junction survey H-10287 did not reveal the existence of this feature within a radius of 3000 meters except the western portion which was covered to a radius of 200 meters from the listed position. Depths in this area precluded side scan sonar operation because of the limitation in the allowable altitude of the side scan sonar towfish. Considering the reporting date, the absence of the verification of its existence during the subsequent surveys of the area after the initial reporting date and the additional information from the present surveys, the feature should remain uncharted.

AWOIS 4282 and 4284 are adequately discussed in section K of the hydrographer's report.

c. Controlling Depths

There are no charted channels with controlling depths within the area of this survey.

d. Aids to Navigation

The positions of fixed aids Shark River Inlet North Breakwater Light 2, (1988 Light List No.37330) and Shark River Inlet South Breakwater Light 1, (1988 Light List No.37335) were checked and are included in the control file of the hydrographic listing. These aids serve their intended purpose and should remain as charted. The position of the Shark River Inlet Lighted Whistle Buoy (1988 Light List No. 37325) was not checked during the present survey. This floating aid which is not shown on the smooth sheet serves its intended purpose and should remain as charted.

The landmarks discussed in section N of the hydrographer's report should remain as charted.

e. Geographic Names

Names appearing on the smooth sheet and in the survey title have been approved by the Chief Geographer.

f. Dangers to Navigation

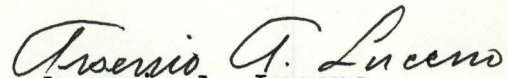
No reports of dangers to navigation were generated during the survey or office processing.

8. COMPLIANCE WITH INSTRUCTIONS

Survey H-10291 adequately complies with the Project Instructions.

9. ADDITIONAL FIELD WORK

This is an excellent basic hydrographic/side scan sonar survey. Additional field examination for more definitive information on the significant side scan sonar contacts contained in the letters, Review of Survey H-10291 Side Scan Sonar Report and in the Investigation of Side Scan Sonar Contacts for OPR-C147, Offshore New Jersey Coast, is recommended for final disposition of the features.


Arsenio A. Luceno
Cartographer

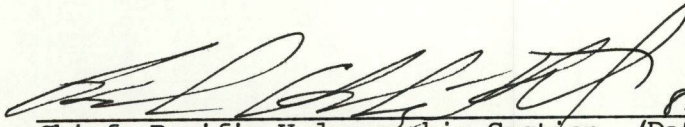
This survey has been examined and it meets Charting and Geodetic Services' standards and requirements for use in nautical charting. Approval is recommended.



Dennis Hill
Chief, Hydrographic Unit

APPROVALS

I have reviewed the smooth sheet, accompanying data, and reports associated with hydrographic survey H-10291. This survey meets or exceeds Charting and Geodetic Services' standards for products in support of nautical charting.


Chief, Pacific Hydrographic Section (Date) 8/24/89

After review of the smooth sheet and accompanying reports, I hereby certify this survey is accurate, complete, and meets appropriate standards.


Director, Pacific Marine Center (Date) 8/31/89

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

Hydrographic Index No. 66 L

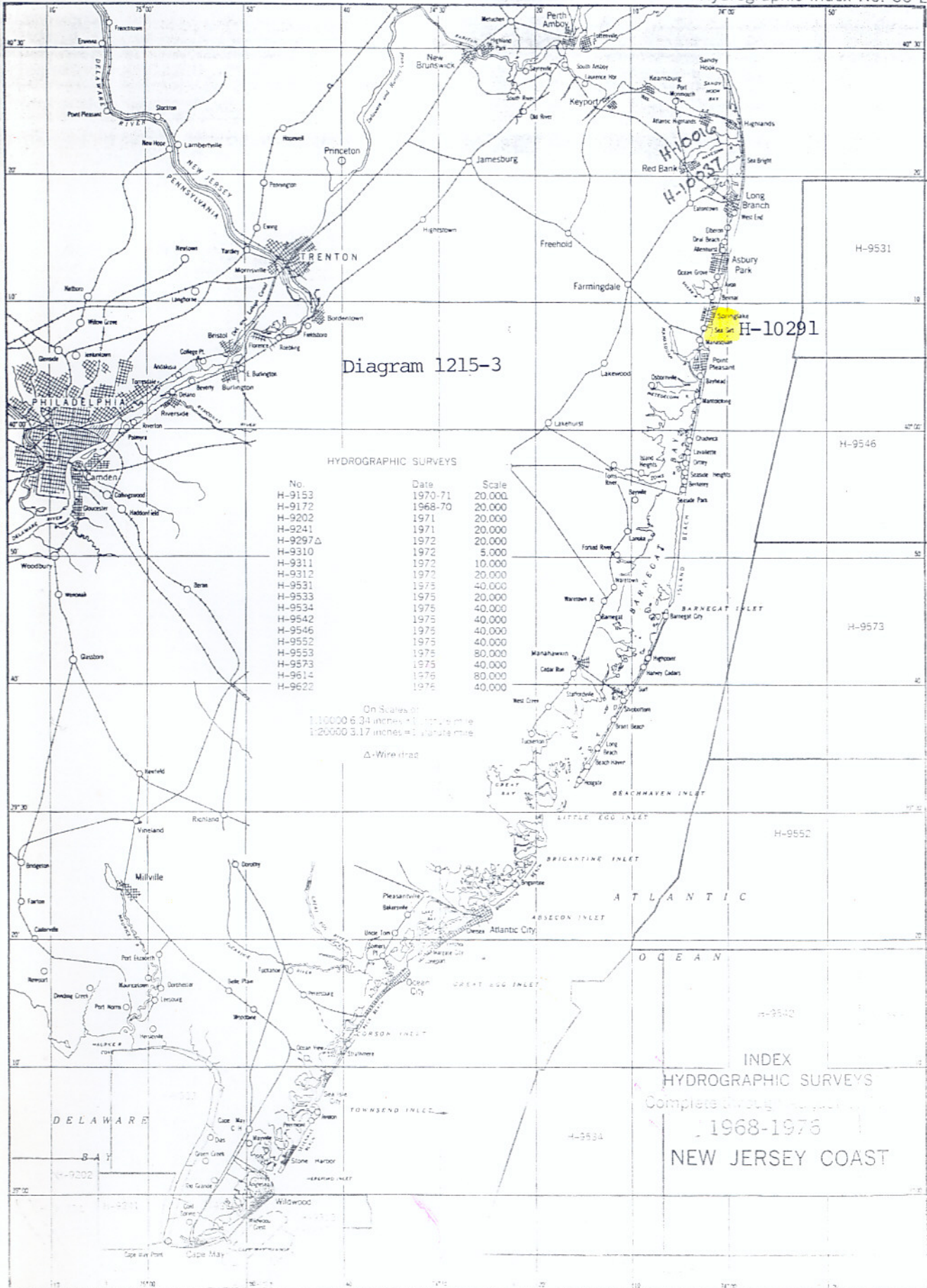


Diagram 1215-3

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-9553	1975	80,000
H-9573	1975	40,000
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

INDEX
HYDROGRAPHIC SURVEYS
Completed during the period
1968-1976
NEW JERSEY COAST

