

9171

Diag. Cht. Nos. 1000-3 & 1229-2

NOAA FORM 76-35A

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

DESCRIPTIVE REPORT
(HYDROGRAPHIC)

Type of Survey HYDROGRAPHIC
Field No. MI-40-3-70
Office No..... H-9171

LOCALITY

State NORTH CAROLINA
General Locality ATLANTIC OCEAN
Locality OFF KILL DEVIL HILLS

19 70

CHIEF OF PARTY
Edwin K. McCaffrey

LIBRARY & ARCHIVES

DATE August 13, 1973

☆ U.S. GOV. PRINTING OFFICE: 1976-669-441

Area 2 31
CHIT
12205 (129)
12204 (1229)
12200 (1109)
13003

H-9171

PROGRESS SKETCH

OPR-438

North Carolina Marine Charting

Hydrographic Operations

1970

USC&GS Ship MT MITCHELL (MSS-22)

Edwin K. McCaffery, CDR, USESSA, Com'd'g.

Scale of C&GS Chart 1000

	JUL.	AUG.	SEP.	OCT.	NOV.
	152	2613	3027	1990	1167
	320	419	492	431	150
	220	1256	1067	1576	930
	40	56	0	6	29
	1	0	0	0	0
	1	4	5	2	2

MILES, SOUNDING LINE

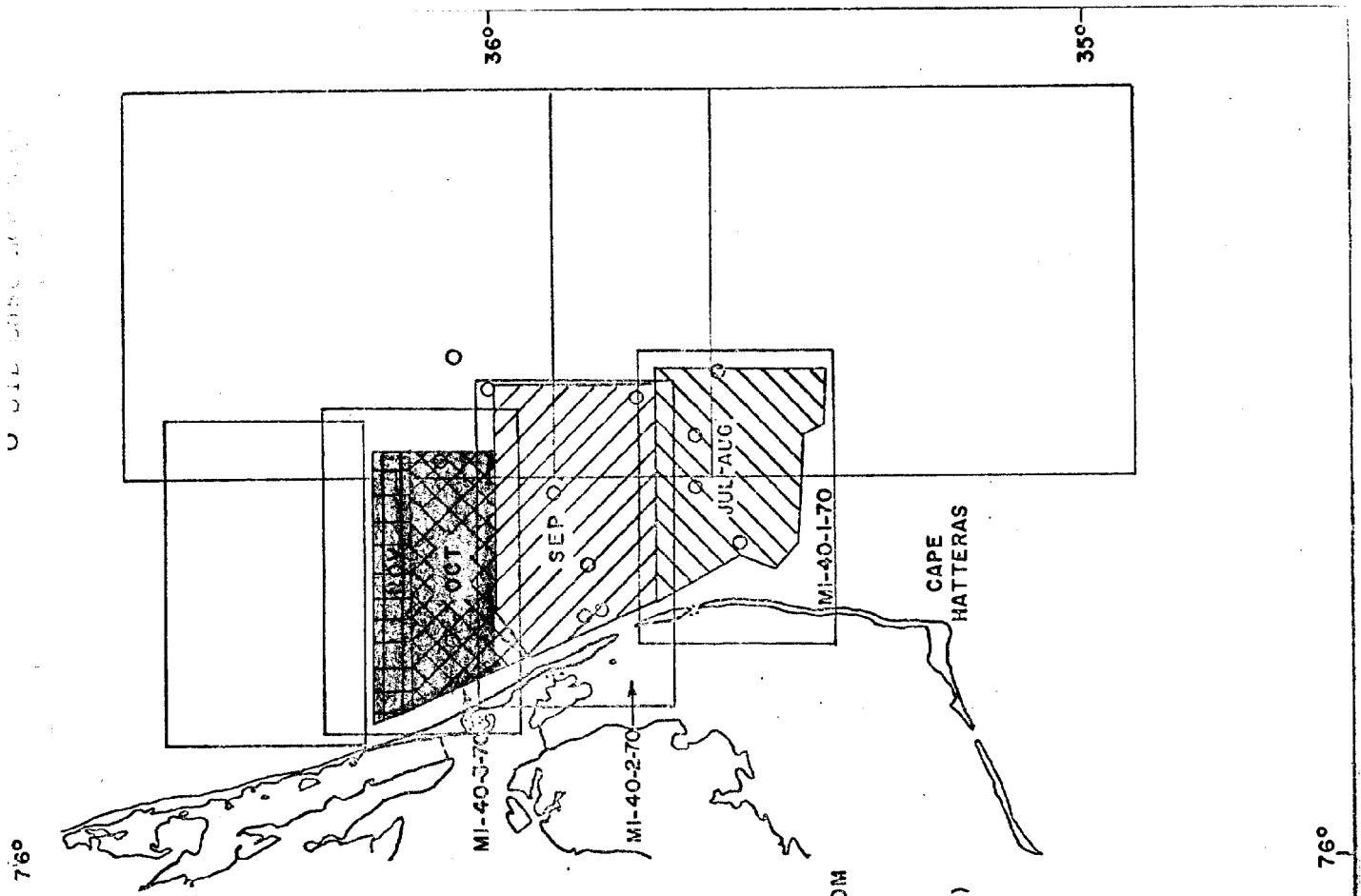
MILES, DISTANCE TO & FROM

MILES, MISCELLANEOUS

BOTTOM SAMPLES (GRAB)

NANSEN CAST

STD CAST



76°

36°

35°

76°

35°

36°

A. PROJECT

This survey was accomplished as part of Project OPR-438, North Carolina Marine Charting, in accordance with the following instructions:

1. Revised Project Instructions dated July 9, 1970
2. Amendment to Instructions dated August 7, 1970
3. Amendment to Instructions dated August 27, 1970

B. AREA SURVEYED

The survey was conducted between October 11, 1970 and November 12, 1970 off the east coast of North Carolina, north of Kill Devil Hills to Duck, North Carolina.

The survey was comprised of 2689 nautical miles of sounding lines covering an area of 291 square nautical miles.

The ^{approximate} western limit of the survey is the 60 foot depth curve adjacent to the shoreline. The northern limit is Latitude 36°12' N, the eastern limit is Longitude 75°10' W and the southern limit is Latitude 36°00' N.

This survey junctions with contemporary survey H-9155 (1970) along the southern edge. The scale of H-9155 is 1:40,000. And H-9243 (1971) to the east, 1:80,000.

C. SOUNDING VESSEL

All hydrography on this survey was accomplished by NOAA Ship MT MITCHELL (MSS-22).

D. SOUNDING EQUIPMENT

All soundings obtained were recorded in feet (to the nearest foot) using a Raytheon Survey Fathometer Model DE-723B, Serial Number 1280.

Velocity corrections were determined from Salinity/Temperature/Depth/Velocity (STDV) casts made using a Bissett-Berman Model 9040-4C STDV, Serial Number 5633.

A total of fourteen STDV casts were made (see sketch) to determine seasonal and area variation throughout the project area. Four of these casts were made in the vicinity of this sheet. Layer corrections for each cast deviated from the average of all fourteen by less than 0.1 foot. In every case, therefore, the values

from all casts were averaged and plotted to obtain the final velocity corrector, A copy of the velocity tape printout is included in this report. The required graphs and abstracts are to be included in the report "Corrections to Echo Soundings" for the project. ✓

A thermistor was towed throughout the survey to determine any areas requiring separate velocity correctors. A Rustrak recorder was used in conjunction with the thermistor and it was placed where it was under constant watch. However, no substantial temperature changes were encountered during the survey. ✓

Attention is invited to Commanding Officer's, NOAA Ship MT MITCHELL memorandum to Director, Atlantic Marine Center, dated July 29, 1970. (~~A copy is included in this report.~~) The memorandum concerns a cold water layer within the limits of this survey. This layer seems to be common knowledge and shows in the publication "The Gulf Stream" issued by NODC, Washington, each month. ✓

Settlement and squat correctors were obtained from data gathered on October 8, 1969 for Standard Speed (175 R.P.M. 10' Pitch) and Half Speed (105 R.P.M. 10' Pitch). Since the variation between the two speeds amounts to a difference in correctors of only 0.7 of a foot, linear interpolation between the two values was used to determine correctors for intermediate speeds. ✓

A zero draft corrector was applied throughout the survey since the fathogram initial was set and maintained at 14 feet to compensate for draft. Several observations during the course of the work indicated that the draft aft (where the transducer is mounted) remained constant as fuel and supplies were consumed from the forward section. ✓

Several apparent corrections indicated on the fathograms for phase, initial, stylus length, etc., proved to be non-existent when subsequent evaluation noted these deviations were caused by poor quality of arcs and depth lines printed on the graphic record. Also, some problems with incorrectly punched paper feed holes were encountered. This resulted in marginal A-F Scale checks, shifting initial, and stylus arm misalignment on the graphic record. In some cases, constant realignment of the paper was needed. By maintaining frequent checks for initial ✓

setting, A-F Scale comparison checks, stylus arm alignment, and speed count it was found that no additional instrument corrections were necessary.

At one point stylus arm speed fell to 80 R.P.M. The data affected by this problem was rejected and the hydrography was re-run. At other periods during the survey the stylus arm had a slight pause causing a spike-like trace. During these periods the speed count remained at it's required rate and soundings were accepted, while the spikes were ignored.

E. SMOOTH SHEET

All fathograms were scanned and a Smooth Raw Data punch tape was made with annotated printout. The Smooth Raw Data records contain all corrected regular and inserted soundings. The Smooth Raw Data printout was proof-read.

The smooth sheet is scheduled to be computer plotted at the Atlantic Marine Center using field data which has been encoded on paper punch tapes. These Raw Data tapes were compiled aboard ship during the operation and included information on time, depth, day number, position number and Hi-Fix readings. All data was recorded using ASCII code, (Model 33ASR teletype), single indicator format. These parameters were recorded using a manual hydrographic data logger and depth module. All necessary corrector tapes, with printouts, were prepared.

F. CONTROL

Hi-Fix, operation at a frequency of 1618.650 KHz, was used for position control during all operations. The range-range system (type A, 40 watts) with slave stations located at two shore sites was used. The two stations used were "SHIP" (Lat. 36°01' 27.592" N Long. 75° 39' 45.789" W Pattern 1; R1 for logging purposes) and "WHITE" (Lat. 36° 13' 19.285" N Long. 75° 46' 10.490" W Pattern 2; R2 for logging purposes). These station sites were located by Atlantic Marine Center personnel.

Hi-Fix was calibrated at the start of each ten day cruise and when the partial lane correctors were in doubt. Calibration was accomplished by observing a sextant angle while running a range. The observed angle was used as an argument when referring to a table compiled to display Hi-Fix position values for a given sextant angle (range distance angle) on the specified range. The table provided the computed lane values for each whole degree of the range distance angle between 45° and 110°.

The table was compiled by Atlantic Marine Center personnel. The calibration objects were: ✓

Rear object of range: Wright Monument, (1933)
Lat. 36° 00' 50.80" N Long. 75° 05.81" W

Front object of range: Croatan Shores Microwave Tower
Lat. 36° 01' 23.19" N Long. 75° 39' 51.66" W

Range distance angle object: Kitty Hawk Microwave Tower
Lat. 36° 03' 49.67" N Long. 75° 41' 57.18" W

The calculated values obtained from the table were used to either set or check the Hi-Fix dial settings or establish partial lane correctors. The micro-wave towers used as front range object and distance angle object were located by Atlantic Marine Center personnel. ✓

When lane count was in doubt; (i.e after numerous gains and losses or after Hi-Fix failure), but calibration was considered reliable, the lane count was checked at either Currituck Lighted Bell Buoy R"6" or Bodie Island Bell Buoy R"8". Lane count values were established for these buoys prior to starting hydrography by running directly from a calibration to the buoy. The circling method was used for these lane checks. ✓

For further detail concerning control see, "Report on Calibration of HI-FIX, PROJECT 438, 1970 FIELD SEASON" ✓

G. SHORELINE

There is no shoreline to be considered in this survey. ✓

H. CROSSLINES

Crosslines amounted to 5.5% of the total miles of sounding lines. In some areas of more than 90 foot depths the bottom was quite flat and there was good crossline and hydrography comparisons. In depths of 90 feet and less, the bottom was much rougher and some discrepancies of three to six feet were noticed. Most of these discrepancies are due to rough bottom and the balance will be resolved during smooth plotting. For example: positions 3253 thru 3313 were plotted with a one lane error in pattern 1. This error causes a southerly displacement of two complete crosslines and about half of a third. Due to the closeness of inked soundings on the boatsheet these lines were not erased. A pencil plot of the correct track of the ship is shown. When these positions are correctly plotted, several depth contours will change. An example of this can be seen at Lat. 36°07,3' N Long. 75° 25.5' W.

I. JUNCTIONS

Junction was made with contemporary survey H-9155 ✓
(MT MITCHELL, 1970) scale 1:40,000, along the southern
edge of the survey. The junction of the two surveys
was in good agreement in depths greater than 90 feet.
The agreement in water less than 90 feet deep was fair,
with some 3 foot differences. These discrepancies are
likely due to predicted tides and rough bottom. This survey also junctions
with H-9243 (1971) on the east. There was good agreement with both junctional surveys.

Special note should be taken of the fact that all sound- ✓
ing on H-9155 were plotted on the boatsheet with pre-
dicted tides for a tide zone which had a time corrector
which differed from sheet H-9171 by thirty minutes.

J. COMPARISONS WITH PRIOR SURVEYS

The prior surveys covering the area of the survey are:

H- 965 1:40,000 Lat. 35°58' to 36°06' ✓
Long. 75°23' to 75°48'

H-1053 1:40,000 Lat. 35°35' to 36°05' ✓
Long. 75°12' to 75°41'

H-1721 1:200,000 Lat. 35°00' to 37°10' ✓
Long. 74°30' to 76°00'

Prior survey H-965 (1868) agrees in general with this ✓
survey. The prior survey used visual control in sight
of land and dead reckoning out of sight of land. Sound-
ings were recorded to the nearest $\frac{1}{4}$ fathom. A random
sample of two hundred soundings indicated nearly ninety
percent of the soundings compared within plus or minus
one fathom. It is felt that many of the discrepancies,
especially those greater than one fathom, are due to
weak control on the prior survey.

Prior survey H-1053 (1870) was surveyed using visual ✓
control within sight of land and dead reckoning out of
sight of land. Soundings were plotted to the nearest
 $\frac{1}{4}$ fathom. The soundings on sheet H-1053 were generally
one to two fathoms deeper than those on the new survey.
The bottom in the area covered by both sheets is rather
rough and could account for most of the discrepancies
when coupled with the differences in control.

Prior survey H-1721 (1886) was surveyed using a combin- ✓
ation of visual and dead reckoning for control.

Nine soundings from this survey cover the area of the new survey. Of the nine soundings, six are in perfect agreement and the other three vary by being one fathom too deep. This is considered good agreement.

Presurvey Review Item #3:

13) The sunken wreck PA (position approximate) charted in Lat. $36^{\circ}12'N$. Long. $75^{\circ}39'W$. was investigated by running a matrix of 200 meter line spacing in addition to the regular lines of hydrography, (development #4 on development overlay). Possible indications of the wreck were found at position number 2680, day 311 and position number 2859, day 312. The development failed to produce any further indication of this wreck. The least depth in the reported area of the wreck is 62 feet based on predicted tides and 62.8 feet from smooth tides. There are several 60 foot soundings (predicted tides) nearby which appears to be due to bottom configuration. The presence of this wreck was not proven or disproven. Retain on chart

CONCUR
SEE REVIEW

Presurvey Review Item #4:

12) The 63 foot sounding charted in Lat. $36^{\circ}03.6'N$. Long. $75^{\circ}24.3'W$. was investigated at 90 meter line spacing. A shoal sounding of 60 feet based on predicted tides, 60.3 feet after smooth tides, was found 1.2 NM on an azimuth of $173^{\circ}T$. from the charted position. There are several shoal soundings of 60 feet in an area about one nautical mile wide along Longitude $75^{\circ}24'W$. between Latitude $36^{\circ}00'N$. and $36^{\circ}03'N$. which should be charted.

57' to the south
with smooth tides
Lat $36^{\circ}01'36''$ and
Long $75^{\circ}24'00''$
also several 61'
soundings in
this area.

11) The circled 48 foot sounding ^{charted} plotted at Lat. $36^{\circ}02.7'N$. Long. $75^{\circ}33.2'W$. was investigated at a line spacing of 90 meters (see development #1 on the development overlay) and were found to be in an area of depths of 48 to 52 feet. The extent of the feature is obvious from the boat sheet. There is a 41' sounding located at $36^{\circ}01'35''$ Long $75^{\circ}33'00''$.

shoal area
approximately
 $\frac{1}{2}$ N.M. wide
E3 Area

10) The circled 60 foot sounding plotted at Lat. $36^{\circ}02.5'N$. Long. $75^{\circ}27.1'W$. was investigated at a line spacing of 90 meters. A least depth of 61 feet based on predicted tides, 60.8 feet from smooth tides, was found 0.1 NM bearing $045^{\circ}T$. from the plotted position. No distinct shoal feature is indicated here, but a rough bottom is found in the area.

recommend
charting of
62' sounding

- 7 The circled 66 foot sounding plotted at Lat. $36^{\circ}03.8'N$. recommend charting of 67' spacing, (see development #3 on the development overlay) sounding at new position. Long. $75^{\circ}26.1'W$. was investigated at 90 meters line. A least depth of 68 feet based on predicted tides, ~~69.2~~ 67.0 feet from smooth tides, was found 0.2 NM bearing $185^{\circ}T$. from the plotted position. The only feature indicated is a rough bottom. ✓
- 8 The circled 72 foot sounding plotted at Lat. $36^{\circ}09.5'N$. recommend charting of least depth Long. $75^{\circ}31.6'W$. was found in an area of general depths ranging from 63 to 85 feet. This area is characterized by rough bottom. ✓
- 9 The circled 72 foot sounding plotted at Lat. $36^{\circ}08.9'N$. recommend charting of least depth Long. $75^{\circ}31.9'W$ was found to be in an area of rough bottom with depths ranging from ~~70~~ ^{63 63 81} to 80 feet. ✓
- 10 The crescent shaped area outlined at Lat. $36^{\circ}06.0'N$. recommend charting of least depth Long. $75^{\circ}27.0'W$. does not appear to be a distinct feature. Depths in this area range from 64 to 95 feet. ✓
- 11 The circled 66 foot sounding plotted at Lat. $36^{\circ}03.1'N$. recommend charting of 68 62' sounding Long. $75^{\circ}28.5'W$. is found in general depths of ~~62~~ ² to ~~80~~ ² feet. ✓
- 12 The enclosed 60 foot sounding plotted at Lat. $36^{\circ}01.0'N$. concurs Long. $75^{\circ}28.5'W$. was found to be within an area of 59 foot soundings. This is a small feature in an area of 65 to 70 foot depths. The feature is obvious on the boat sheet. ✓
- 13 The 58 foot sounding plotted at Lat. $36^{\circ}02.1'N$. Long. $75^{\circ}31.9'W$. is part of a shoal feature which is obvious on the boat sheet. 58 ft sounding located in this vicinity E-3 Area ✓
- 14 The 58 foot sounding plotted at Lat. $36^{\circ}01.4'N$. Long. $75^{\circ}31.9'W$. is part of a shoal feature which is obvious on the boat sheet. 57 and 58' soundings found in this area E-3 Area ✓
- 15 The 65 foot sounding plotted at Lat. $36^{\circ}01.1'N$. Long. $75^{\circ}27.6'W$. is found in an area of depths ranging from ~~65~~ ⁶⁶ feet to ~~76~~ ⁶⁶ feet based on predicted tides and a least depths of ~~62~~ ⁶⁶ feet from smooth tides. ~~0.3 N.W. N.E.~~ Chart present using new position survey depths ✓

K. COMPARISON WITH THE CHART

The largest scale charts of the area covered by this boat sheet are chart 1229, scale 1:80,000, and chart 1109 scale 1:416,944. ✓

Note should be made that the comparisons with the charts is done based on predicted tides. Several shoals appear to be 3 to 4 feet shoaler on the chart than in this survey. Application of smooth tides and velocity corrections may change some of the following comparisons. ✓

Chart 1229, Ed., Dec.20,1969 and corrected thru Notice to Mariners 51/69 was compared to the new survey. The sunken wreck marked PA at Lat. 36° 12'N, Long. 75° 39'W is discussed in section J. The inshore 60 foot contour is in general agreement with the new survey. The 60 foot shoal plotted between Lat. 36° 09'N and Lat. 36° 10'N and at Long.75° 37'W was not found in the new survey. The feature should be removed from the chart. The shoal area at Lat. 36° 07'N and Long. 75° 39'W was not found in the new survey. This feature should be removed from the chart. All other shoals marked on the chart were found in the new survey. In general, chart 1229 compares favorably with this survey.

Chart 1109, Ed. June 9,1969 was compared to the new survey. There are two wrecks and 12 soundings on this chart which are within the survey area not covered by a larger scale chart. No indication of the wrecks were found during the regular line of hydrography. No special developments were done to investigate these wrecks. The 12 soundings were in good agreement with the new survey. *see review*
Retain wrecks as presently charted.

Due to the detail of the new survey, many new features are obvious on the boat sheet which do not appear on the charts. These items will be obvious during processing and are recommended for charting. ✓

L. SURVEY ADEQUACY

This survey is adequate to supersede all prior surveys. ✓

M. AIDS TO NAVIGATION

There are no aids to navigation to be considered in this survey. ✓

N. STATISTICS

3644 Positions

2689 Nautical miles of sounding lines

150 Nautical miles of crosslines

35 Bottom samples

296 Square miles surveyed

O. MISCELLANEOUS

Tide reducers were derived from the Hampton Roads standard tide gage (Lat. 36° 57'N, Long. 76° 20'W)

The mylar boat sheet constructed by the Atlantic Marine Center is unsatisfactory. Plastic inks are needed for permanent soundings and position entries. Regular India inks will not stand the constant usage which the sheets get during survey operations. The data rubs off where the plotter rests his arm or where an Odessey protractor is used. Also India inks will not adhere to places where the sheet graining has been polished by handling or where the oils from the plotter's hands has adhered to the sheet.

The ship obtained Acetograph pens and plastic inks designed to work on mylar surfaces. These inks will do an adequate job only if the plotter keeps the ink flowing by constantly writing. A short pause and the ink will dry up in the pen. Consequently, the plotter spends more time cleaning pens than in entering the soundings on the sheet. It was also noted that plastic inks will not adhere to the sheet when used to write over pencil markings.

The great majority of the sounding on this boat sheet were done using a BIC Accounting Fine Point ball point pen. The major problem in using ball point is whether or not the soundings will be distinct enough for good reproduction of the boat sheet. Current experience using a blue line process indicates that it is not.

The bottom samples were obtained using a 150 pound Shipek grap sampler (Model 60). The samples were split in half and one half was air mailed to Dr. J.W. Pierce at Smithsonian Institution as per project instructions. The remaining half was forwarded to Mr. Stephen G. Conrad, Division of Mineral Resources, Department of Conservation and Development, Raleigh, North Carolina. The samples were double-bagged in plastic bags. A sample label was completed and placed between the two plastic bags. Copies of C&GS Form 733M "Log sheet M" were completed and forwarded with the samples along with a copy of the "Abbreviations and Symbols" page from the new Nautical Chart Manual.

It should be noted that the transducer is displaced with respect to the Hi-Fix receiving antenna. All soundings are actually taken 115 feet aft of the plotted position. Notice should be taken that this displacement is dependent on the ship's heading. Of special interest is the case where a feature is being investigated from opposite directions. In this case the soundings for identical positions will differ by twice the displacement or 230 feet.

P. RECOMMENDATIONS

1. It is suggested that the use of mylar boat sheets be discontinued until a proven inking system is devised. *Ship now has a drum plotter*
2. It is recommended that standardization of teletype models issued to ships for recording survey data be attempted. Teletype troubles are amplified by the many small differences in the models on hand. At one time the ship had six teletypes on board. Three of these were different enough to require extensive study of maintenance instructions by the electronics personnel prior to starting repair work. It is further recommended that teletype machines have cog-feed paper advance systems. Those without cog-feed require constant alignment of the paper and in case of performed pages or fan fold paper, the perforated edge frequently hangs up on the paper depressor and jams the teletype. These paper feed troubles constantly harass the operator and require a constant watch to see that the printout is readable.

3. It is strongly suggested that the ship be permitted to send electronic personnel to a teletype maintenance school. Unless on-board repairs are made, the ship will require 100% back-up in teletype machines. The problem with keeping a large number of back-up machines is the tendency to cannibalize one machine to keep others working.
 4. The National Ocean Survey has invested over \$30,000 in a STDV system for this ship. For most effective use of this investment it is suggested that some of the survey technicians be sent to the Coast Guard School at Governors Island, New York City, N.Y. during the lay-up period to learn how to efficiently use the STDV system.
 5. The Hi-Fix brush recorder trace should be submitted with the survey records. This record can be used to substantiate or refute poor spacing or crooked lines on the boat sheet. Position number 3155 is a good example of where the brush recorder trace is valuable. The plot appears to be in error by one lane, but after checking the trace, it is clear that the ship's track was correct as plotted.
 6. Lane spacing was too tight. In the future a survey scale should be chosen which will allow more room for soundings and fix numbers to be written clearly. A suggested scale along this coast would be 1:20,000 from the 60 foot curve to the 90 foot curve.
-

Respectfully Submitted:

Andrew Lonnie Sikes

Andrew Lonnie Sikes
ENS, NOAA

Approved and Forwarded:

Edwin K. McCaffrey

Edwin K. McCaffrey
CDR, NOAA
Commanding Officer

APPROVAL SHEET

Field Number MI-40-3-70

Registry Number H-9171

The field work and processing of data from this hydro-
graphic survey was under my immediate daily supervision.
The boatsheet and all records have been reviewed and are
approved by me. This survey is complete and adequate to
supersede all prior surveys of the area.

Edwin K. McCaffrey
CDR, NOAA
Commanding Officer

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

TIDE NOTE FOR HYDROGRAPHIC SHEET 3/2/73

Processing Division: Atlantic Marine Center

Hourly heights are approved for .

Tide Station Used (NOAA form 77-12): Hampton Roads, Va.

Period: July 19-Nov 12, 1970

HYDROGRAPHIC SHEET: H-9171, H-9155, H-9137

OPR: 438

Locality: Coast of North Carolina

Plane of reference (mean ~~lower~~ low water): 3.9 ft.

Height of Mean High Water above Plane of Reference is 2.5 ft.

Remarks: Zoning: Apply time and height corrections recommended in project instructions to Hampton Roads hourly heights.

R. H. R. Cummings

Chief Tide Branch

FIELD PARTY TIDE NOTE

OPR-438 North Carolina Marine Charting

The control station for the project was the standard tide gage at Hampton Roads (Sewells Point), Virginia, Latitude $36^{\circ}57'$ N. Longitude $76^{\circ}20'$ W. This station operates on 75° West (+5) time, and the height datum is 3.9 feet below Mean Low Water.

Hourly heights for this project were furnished by the Washington office and were logged on data tapes with printouts. These tapes and printouts were forwarded to Atlantic Marine Center. Attn: CFN3, for final compilation of tide data in accordance with CFN3 memorandum File Number D-2-3-2, Serial Number 70-32 (copy of the memorandum included in this report).

The following corrections to the hourly heights were furnished by Washington in order to zone the boatsheets:

<u>Zone</u>	<u>Time</u>	<u>Diff.</u>	<u>Range</u>	<u>Ratio</u>
Latitude $34^{\circ}00'$ - $36^{\circ}00'$	-2	Hours		1.4
Latitude $3\frac{1}{6}^{\circ}00'$ - $37^{\circ}00'$	$-1\frac{1}{2}$	Hours		1.4

The ship MT MITCHELL operated on local 60° West (+4) time from the start of hydrography on July 19, 1970 until October 30, 1970. The ship's time was then changed to conform with 75° West (+5) time zone.

Submitted by:

Gregory R. Bass
Gregory R. Bass
ENS, NOAA



U.S. DEPARTMENT OF COMMERCE
Environmental Science Services Administration
COAST AND GEODETTIC SURVEY

Date: October 5, 1970

File No: D2-3-2
Ser. No: 70-32

Reply to
Attn of: CFN3

Subject: Smooth Tides

To: Commanding Officers,
AMC Based Ships

Officer in Charge,
ECFP 742
HSL 1257

The following procedures supersede Sections 8-4 and 9-4 in the Instruction Manual for Automated Hydrographic Surveys and will be observed by all AMC vessels and field parties conducting hydrographic/bathymetric surveys which will be smooth plotted at AMC.

1. Hourly heights shall be scanned from merigrams and logged directly on punched paper tape (tide tape format). See enclosure.

2. Hourly height tapes and printouts will be sent to AMC along with the survey. A field party tide note is required in the Descriptive Report (paragraph 7-6, Hydrographic Manual).

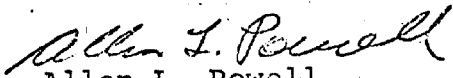
3. Merigrams will be sent to the Chief, Tides Section (C3312), Rockville, with a cover letter (copy to CFN3), requesting the following information be furnished to AMC Processing Division (CFN3):

- a. Datum: Value of MLLW on merigram.
- b. Time and height relationship between gages operated in the area surveyed.
- c. Recommended zoning for tide correctors (if any).

4. Where tide correctors are to be determined from standard gage records, the vessel will request the Tide Section to send a listing of hourly heights to the vessel for preparation of the tape.

2

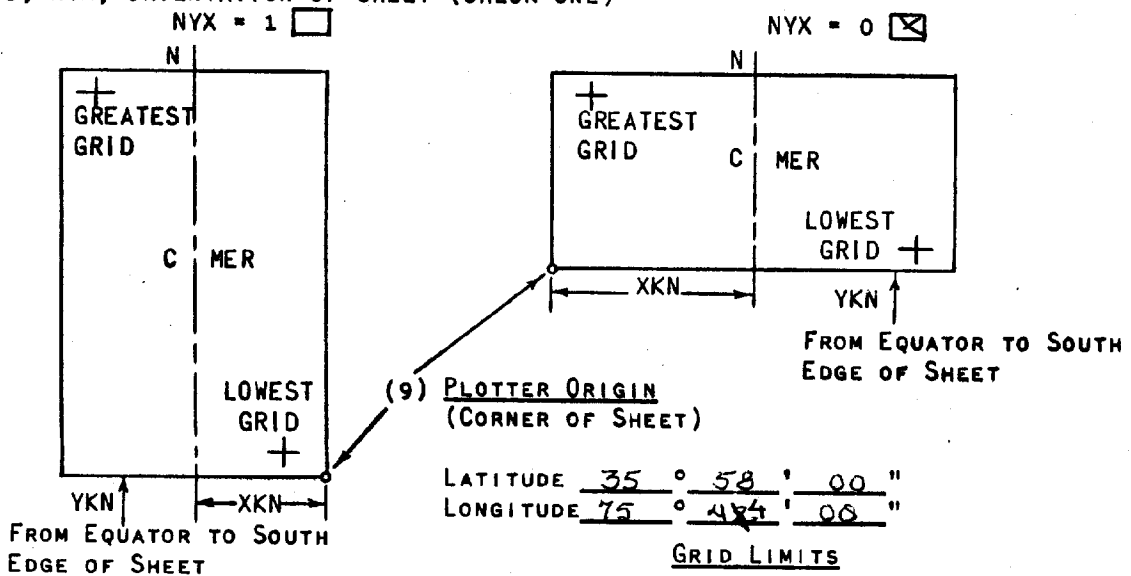
5. Descriptive Reports submitted by the field will not contain Form 712, but must contain a field party tide note designating the gage or gages controlling tide correctors. AMC will obtain Rockville approval of the computer-generated tide corrections and insert the approved 712 in Descriptive Reports. A copy will be sent to the field unit for insertion in their copy of the Descriptive Report.



Allen L. Powell
RADM, USESSA
Director, Atlantic Marine Center

PARAMETERS FOR DIGITAL COMPUTING
POLYCONIC PROJECTION

- (1) PROJECT No. OPR-438
- (2) H No. H-9171
- (3) FIELD No. MI-40-3-70
- (4) REQUESTED BY ATLANTIC MARINE CENTER
- (5) SHIP OR OFFICE SHIP MT MITCHELL
- (6) DATE REQUIRED A.S.B.P.
- (7) VISUAL
- (8) ELECTRONIC (FILL OUT FORM #3)
- (10) XKN (SP 5) DISTANCE FROM CMER TO EAST EDGE (NYX = 1) OR WEST EDGE (NYX = 0). 24,054.720 METERS
- (11) YKN (SP 241) DISTANCE FROM EQUATOR TO SOUTH EDGE OF SHEET. 3,955,754.464 METERS
- (12) CENTRAL MERIDIAN 75° 26' 00"
- (13) SURVEY SCALE 1: 40,000
- (14) SIZE OF SHEET (CHECK ONE) 36X54 42X60 OTHER
- (15) NYX, ORIENTATION OF SHEET (CHECK ONE) NYX = 1 NYX = 0



LIST G.P. OF ALL STATIONS TO BE PLOTTED ON THIS PROJECTION ON THE BACK OF THIS FORM. (DEG., MIN., SEC.)

- (16) GREATEST LATITUDE 36° 16' 00" (PROJECTION LINE
- (17) LOWEST LATITUDE 35° 58' 00" INTERVAL, PAGE 4
- (18) DIFFERENCE 0° 18' 00" HYDRO MANUAL)
- (19) 2' 00"
- (20) 10 YSN
- (21) GREATEST LONGITUDE 75° 42' 00"
- (22) LOWEST LONGITUDE 75° 06' 00"
- (23) DIFFERENCE 0° 36' 00"
- (24) 2' 00"
- (25) 19 XSN

ELECTRONIC CONTROL PARAMETERS

1. Project # OPR- 438 2. Reg. # H-9171 3. Field # MI-40-3-70

4. Type of Control: Hi-Fix (Hi-Fix, Raydist, EPI, etc.)

5. Frequency 1618.650 kc. (for conversion of electronic lanes to meters)

6. Mode of Operation (check one):

Range-Range

Range-Visual

Range One (R₁)
 Station I.D. SHIP
 Range Two (R₂)
 Station I.D. WHITE

Lat. 36° 01' 27.592"
 Long. 75° 39' 45.789"
 Lat. 36° 13' 19.285"
 Long. 75° 46' 10.490"

Hyperbolic (3-station)

Hyper-Visual

Slave One
 Station I.D. _____
 Master
 Station I.D. _____
 Slave Two
 Station I.D. _____

Lat. _____° _____' _____"
 Long. _____° _____' _____"
 Lat. _____° _____' _____"
 Long. _____° _____' _____"
 Lat. _____° _____' _____"
 Long. _____° _____' _____"

7. Location of Survey:

Range-Range Imagine an observer is standing at R₁ Station and looking directly at R₂ (check one):

Survey area is to observer's Right A=0

Survey area is to observer's Left A=1

Hyperbolic Looking from survey area toward Master Station:

Slave One must be to observer's Left;

Slave Two must be to observer's Right.

8. This form is submitted as an aid in preparing a boat sheet.

This form applies to all data on this survey.

This form applies to part of the data on this survey.

Vessel EDP #	From		To		Position Numbers (inclusive)
	Time	Day	Time	Day	
_____	_____	_____	_____	_____	_____ to _____
_____	_____	_____	_____	_____	_____ to _____
_____	_____	_____	_____	_____	_____ to _____

9. Remarks: _____

GEOGRAPHIC NAMES

9171

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												1
Kill Devil Hills												2
												3
												4
												5
												6
												7
												8
												9
												10
												11
												12
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												20
												21
												22
												23
												24
												25

Approved by
C. E. [Signature]
127-1974
Staff Geographer

FORM CGCS-946
(REV. 11-65)
(PRESC. BY
HYDROGRAPHIC
MANUAL 20-2,
8-94, 7-13)

U.S. DEPARTMENT OF COMMERCE
ENVIRONMENTAL SCIENCE SERVICES ADMINISTRATION
COAST AND GEODETIC SURVEY
NAUTICAL CHART DIVISION

HYDROGRAPHIC SURVEY STATISTICS
HYDROGRAPHIC SURVEY NO. H-9171 (MT-40-3-70)

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

RECORD DESCRIPTION	AMOUNT	RECORD DESCRIPTION	AMOUNT
SMOOTH SHEET & PNO	1	BOAT SHEETS	1
DESCRIPTIVE REPORT	1	OVERLAYS	7

DESCRIPTION	DEPTH RECORDS	HORIZ. CONT. RECORDS	PRINTOUTS	TAPE ROLLS	PUNCHED CARDS	ABSTRACTS / SOURCE DOCUMENTS
ENVELOPES	X					
CAHIERS	1		X			1
VOLUMES						
BOXES			7			

T-SHEET PRINTS (List)

SPECIAL REPORTS (List)

~~Report on Calibration of Hi-Fix~~

OFFICE PROCESSING ACTIVITIES

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

PROCESSING ACTIVITY	AMOUNTS			
	PRE-VERIFICATION	VERIFICATION	REVIEW	TOTALS
POSITIONS ON SHEET				3644
POSITIONS CHECKED		400 +	300	
POSITIONS REVISED		22	0	
DEPTH SOUNDINGS REVISED		50 +	36	
DEPTH SOUNDINGS ERRONEOUSLY SPACED				
SIGNALS ERRONEOUSLY PLOTTED OR TRANSFERRED				
	TIME (MANHOURS)			
TOPOGRAPHIC DETAILS			0	
JUNCTIONS		8	10	
VERIFICATION OF SOUNDINGS FROM GRAPHIC RECORDS		40	50	
SPECIAL ADJUSTMENTS			0	
ALL OTHER WORK		199		
TOTALS		247	59	

PRE-VERIFICATION BY	BEGINNING DATE	ENDING DATE
VERIFICATION BY G.F. Trefethen,	1/15/73	7/19/73
B.J. Stephenson & B.T. Davis		
REVIEW BY L. Quinlan 104 hrs	BEGINNING DATE 3/28/78	ENDING DATE 4/29/78
insp. R.W. Wellman 32 hrs		5/26/78
C. Stephens 8 hrs		7/5/78

ATLANTIC MARINE CENTER
APPROVAL SHEET
FOR
AUTOMATED SURVEY H-9171

- A. All revisions and additions made on the smooth sheet during verification have been entered in the magnetic tape records for this survey. A new final position printout has/~~XXXXXX~~ been made. A new final sounding printout has/~~XXXXXX~~ been made.

Date: August 6, 1973

Signed: *Greg R Bass*
Title: Acting
Chief, Verification Branch

- B. The verified smooth sheet has been inspected, is complete, and meets the requirements of the Hydrographic and AMC Manuals. Exceptions are listed in the verifier's report.

Date: August 6, 1973

Signed: *William L Jones*
Title: Acting
Chief, Processing Division

Reg. No. A-9171

The Computer and Excess Sounding Cards for this survey have not been corrected to reflect the changes made to the Computer Card and Excess Card Printouts at this time of the review.

When the cards have been updated to reflect the final results of the survey the following shall be completed:

CARDS CORRECTED

DATE _____ TIME REQ'D _____ INITIALS _____

REMARKS:

Reg. No. _____

The magnetic tape containing the data for this survey has not been corrected to reflect the changes made during evaluation and review.

When the magnetic tape has been updated to reflect the final results of the survey, the following shall be completed:

MAGNETIC TAPE CORRECTED

DATE _____ TIME REQ'D _____ INITIALS _____

REMARKS:

OFFICE OF MARINE SURVEYS AND MAPS
MARINE SURVEYS DIVISION
MODIFIED HYDROGRAPHIC SURVEY REVIEW

REGISTRY NO. H-9171

FIELD NO. MI-40-3-70

North Carolina, Atlantic Ocean, Kill Devil Hills

SURVEYED: October 11 - November 12, 1970

SCALE: 1:40,000

PROJECT NO.: OPR-438

SOUNDINGS: Raytheon Digital Depth Recorder,
DE-723B

CONTROL: Hi-Fix (Range-Range)

Chief of Party	E. K. McCaffrey
Surveyed by	T. E. Gerish
.....	T. Gryniewicz
.....	A. L. Sikes
.....	S. C. Schwartz
.....	S. McGee
.....	G. R. Bass
.....	G. L. Sundin
.....	G. M. Adair
Automated Plot by	Cal Comp Plotter (AMC)
Verified by	G. F. Trefethen, B. J. Stephenson, and B. T. Davis
Reviewed by	L. Quinlan
	Date: April 29, 1978
Cursory inspection made--survey	Kenneth W. Wellman
processing considered complete	May 26, 1978

1. Control and Shoreline

The origin of the control is adequately covered in part F of the Descriptive Report.

There is no shoreline within the limits of this survey.

2. Hydrography

a. Depths at crossings are in adequate agreement. Slight differences of 1 to 2 feet are attributed to sea conditions and sand ridges that exist throughout the area.

b. The usual depth curves are adequately delineated. A few brown curves were added to further delineate significant isolated bottom features.

c. The development of the bottom configuration and the investigations of least depths are considered adequate.

3. Condition of Survey

The sounding records, smooth plotting, and Descriptive Report are complete and conform to the requirements of the Hydrographic Manual supplemented by the Instruction Manual - Automated Hydrographic Surveys.

Attention is directed to the following:

a. It was necessary to erase many sections of the grid which partially obliterated various soundings.

b. In several cases, fathograms were misinterpolated resulting in sounding errors of as much as 20 feet.

4. Junctions

The junctions with H-9155 (1970) on the south and H-9243 (1971) on the east are discussed in their respective Review Reports and require no further consideration. There are no contemporary surveys on the west or north. The curves in these areas were inked to the limits of the present survey.

5. Comparison with Prior Surveys

a.	H-237	(1849-50)	1:400,000
	H-674	(1859)	1:200,000
	H-767	(1860)	1:500,000
	H-1498a	(1880-83)	1:200,000
	H-1721	(1886)	1:200,000

These small-scale surveys lack sufficient reliable information for a comparison of any cartographic value and are considered to be superseded by the present survey within the common area.

b.	H-965	(1868)	1:40,000
	H-1053	(1870)	1:40,000 TRACKLINE

These two prior surveys cover the western half of the area of the present survey. A comparison between the present and prior surveys reveals general depth differences of ± 6 feet with scattered indications of present depths differing within a range of from as much as 9 feet deeper to 19 feet shallower. These differences are attributed to shifting sand bottom sediments and to the less detailed and less accurate methods employed on the prior surveys. The present survey is adequate to supersede the prior surveys within the common area.

c. FE No. 16 (1957) WD 1:40,000

A comparison between the present and the various cleared wire dragged areas reveals no conflicts between present survey depths and cleared depths on FE No. 16. Least depths on two wrecks and two soundings were carried forward to supplement the present survey.

A comparison between the present survey and the hydrographic development on sheet C of the Field Examination revealed variable depth differences of ± 8 feet intermingled with areas of good general agreement. The noted depth differences are attributed to natural causes. The hydrographic development on sheet C of the Field Examination is superseded by the present survey within the common area.

6. Comparison with Chart 12200 (formerly 1109) 29th Ed., April 9, 1977
12204 (formerly 1229) 23rd Ed., February 18, 1978a. Hydrography

The charted hydrography originates with the previously discussed prior surveys which require no further consideration, the U.S. Navy Wreck List of 1957, and with information from the boat sheet of the present survey.

The present survey is adequate to supersede the charted hydrography within the common area. The wreck information should be retained as charted.

b. Aids to Navigation

There are no aids to navigation within the survey limits.


7. Compliance with Instructions

The survey adequately complies with the project instructions.

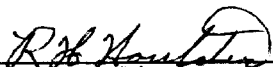
8. Additional Field Work

This survey is considered to be an adequate basic survey and no additional field work is recommended.

Examined and Approved:



Chief
Marine Surveys Division



Associate Director
Office of Marine Surveys
and Maps

RECORD OF APPLICATION TO CHARTS

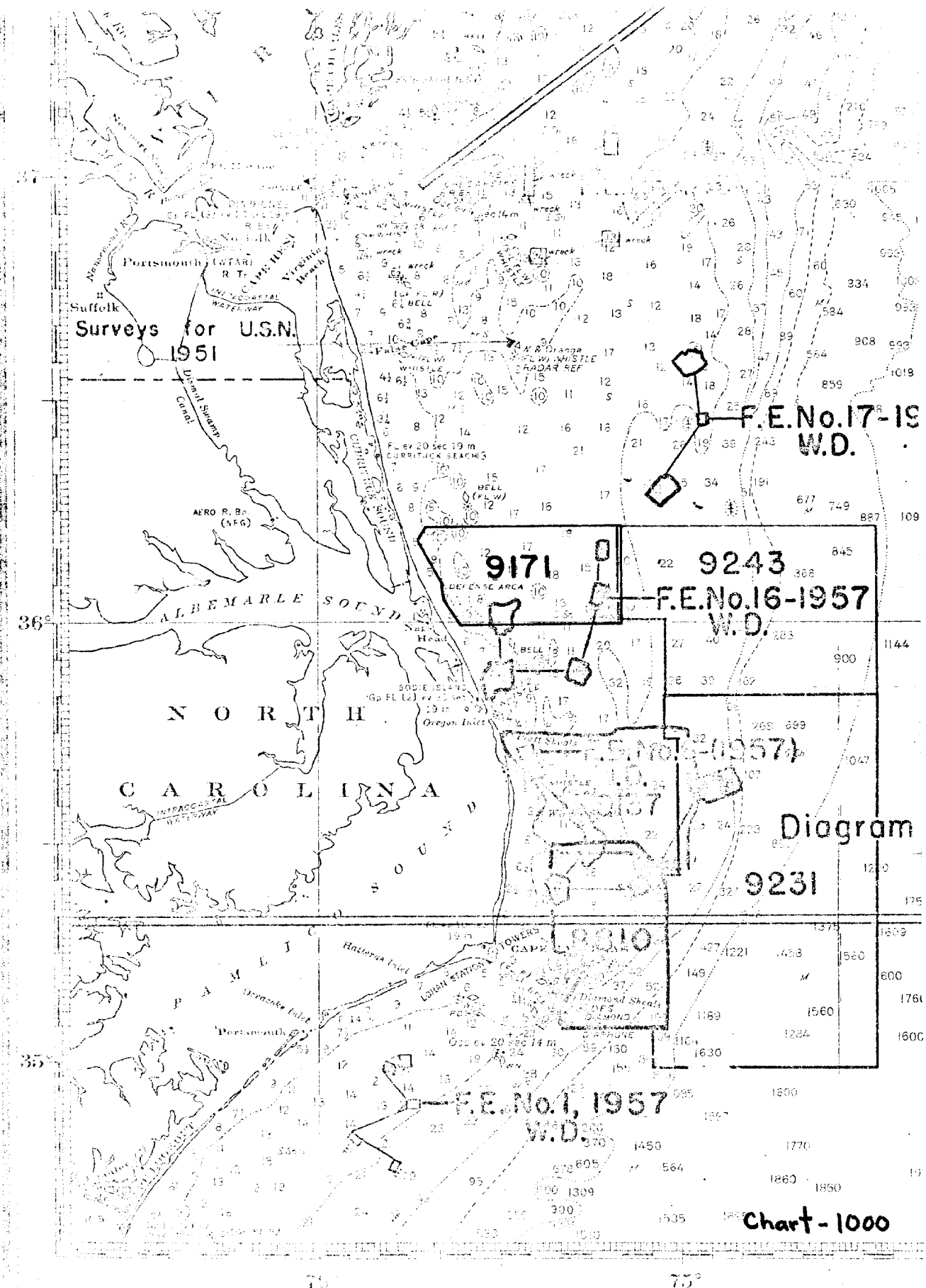
FILE WITH DESCRIPTIVE REPORT OF SURVEY NO. H-9171

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
1000	9-26-73	H. Rodden	Full Part Before ^{before} After Verification, Review Inspection Signed Via Drawing No. 50 Exam for critical corr No corr
1295C	10-23-73	H.O. LARSON	Full Part Before After Verification Review Inspection Signed Via
1295C	12/12/74	J.A. GRAMHAM	Drawing No. 7 EXAM for critical corr - No corr
1109	12/5/73	B. Fernanders	Full Part Before ^{Before} After Verification Review Inspection Signed Via Drawing No. No critical corr
1229	12/9/74	D. Haysine	Full Part Before After Verification Review Inspection Signed Via Drawing No. REVISED GOFF CURVE and MISC Exam for critical corr - No corr and g's
12205 (1295C)	10 26-78	Richard L. Hogan	Full Part Before After Verification Review Inspection Signed Via Drawing No. 13
12204 (1229)	11-1-78	Richard L. Hogan	Full Part Before After Verification Review Inspection Signed Via Drawing No. 39-X CRIT CORR
12204 (1229)	4/12/79	Bill Wambler	Full Part Before After Verification Review Inspection Signed Via Drawing No. 40
12200 (109)	7/17/79	Bill Wambler FIT	Full Part Before After Verification Review Inspection Signed Via Drawing No. 415 Fully applied in overlap area with cht 12204 New # 40
13003 (1000)	7/23/80	Barbara Jones	Full Part Before After Verification Review Inspection Signed Via Drawing No. #57 Applied thru reduction of cht. 12200 #45
12200	5/3/94	John Barber	Full Part Before After Verification Review Inspection Signed Via Drawing No. 55 Fully APP'd.



Surveys for U.S.N.
1951

F.E.No.17-18
W.D.

9171
9243
F.E.No.16-1957
W.D.

9230 (1957)

Diagram

9231

F.E.No.1, 1957
W.D.

Chart-1000

Descriptive Report
To Accompany
Hydrographic Survey Sheet
MI-40-3-70 (H-9171)

Project OPR-438
1970 Field Season
Scale 1:40,000

USC&GS Ship MT MITCHELL (MSS-22) Edwin K. McCaffrey
CDR, USESSA
Commanding Officer

H - 9171

HYDROGRAPHIC TITLE SHEET

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.

MI-40-3-70

State North Carolina

General locality Atlantic Ocean

Locality Off Kill Devil Hills to Duck N.C.

Scale 1:40,000 Date of survey Oct. 11 to Nov. 12, 1970

Instructions dated Rev. Inst. dated Jul. 9, 1970
Amend. dated Aug. 7, 1970 Project No. OPR-438

Vessel Amend. dated Aug. 27, 1970
NOAA Ship MT MITCHELL (MSS-22)

Chief of party Edwin K. McCaffrey, CDR, USNOAA, Commanding Officer

Surveyed by Thomas e. Gerish, LT, Tom Gryniewicz, LTJG, Andrew L. Sikes,
Stephen C. Schwartz, ENS, Steward McGee, ENS, Gregory R. Bass,
ENS, Gary L. Sundin, ENS, Gary M. Adair, ENS

Soundings taken by echo sounder, hand lead, pole DE-723B No. 1280

Graphic record scaled by Ship Personnel

Graphic record checked by Ship Personnel

Protracted by CalComp Plotter Automated plot by Atlantic Marine Center

Soundings penciled by CalComp Plotter

Soundings in ~~fathoms~~ feet at MLW ~~MLW~~

REMARKS: Ship personnel scanned the graphic records and entered
corrected and insert soundings on the Raw Data printout.
The corrected Raw Data printout was used to construct
a Smooth Raw Data tape and printout. The smooth Raw Data
printout was proof-read. All records (mylar boatsheet,
fathograms, Hi-Fix Brush recorder trace, raw data tapes
and printouts, smooth raw data tapes and printouts,
plotting abstracts, corrector tapes and printouts and
tidal data) were forwarded to Atlantic Marine Center,
Attn: CFN3