NOAA FORM 76-35A

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

DESCRIPTIVE REPORT
(HYDROGRAPHIC)

<table>
<thead>
<tr>
<th>Type of Survey</th>
<th>HYDROGRAPHIC</th>
</tr>
</thead>
<tbody>
<tr>
<td>Field No.</td>
<td>AHP: 05-1-74</td>
</tr>
<tr>
<td>Office No.</td>
<td>H-9431</td>
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</table>

LOCALITY

<table>
<thead>
<tr>
<th>State</th>
<th>NORTH CAROLINA</th>
</tr>
</thead>
<tbody>
<tr>
<td>General Locality</td>
<td>BEAUFORT INLET</td>
</tr>
<tr>
<td>Locality</td>
<td>BEAUFORT AND MOREHEAD CITY CHANNELS</td>
</tr>
</tbody>
</table>

1974
CHIEF OF PARTY
F. T. SMITH

LIBRARY & ARCHIVES

DATE .............. 4/4/75

©U.S. GOVERNMENT PRINTING OFFICE: 1974-763-098
Hydrographic Title Sheet

State: North Carolina

General Locality: Beaufort Inlet

Locality: Beaufort and Morehead City Channels

Scale: 1:5,000

Date of Survey: 11 Sept. - 6 Oct. 1974

Instructions Dated: 31 January 1974

Project No.: OPR-513

Chief of Party: F. T. Smith

Surveyed by: F. Kleinschmidt, W. Hill, D. Bryant, R. Lewis

Soundings Taken: By Echo Sounder, Hand Lead, Pole

Graphic Record Scaled by: Launch Personnel

Graphic Record Checked by: Launch Personnel

Protracted by: N/A

Automated Plot by: TBD-51A

Verification by: TBD

Soundings in feet at MLW: 1

Remarks:

The survey of a portion of this area was made June 1974 is filed as BP 9 (1971: L-6678). Records have been retained with H-9431

Applied to site 5/19/75

Use Chart 1934

C.D.
DESCRIPTIVE REPORT
TO ACCOMPANY
HYDROGRAPHIC SURVEY H-9431
AHP-05-1-74, SCALE 1:5,000
OPR-513
BEAUFORT INLET, NORTH CAROLINA

A. Project

OPR-513 is a cooperative agreement between NOS and the U.S. Army Corps of Engineers to provide a new data base for computer studies of the Beaufort Inlet. The survey was accomplished in accordance with Project Instructions OPR-513-AHP-74, Beaufort Inlet, North Carolina, dated 31 January 1974, and Chapter 3 of the Atlantic Marine Center Manual.

B. Area Surveyed

The area encompassed by sheet H-9431 is an inshore section extending from the northwest tip of Shackleford Banks, Lat. 34° 41' 30"N, Long. 76° 39' 45"W; up the Morehead City Channel to the Highway 70 R.R. Bridge thence westward to Long. 76° 39' 45"W; up the Beaufort Channel to the Town of Beaufort.

Junctions were made with contemporary Surveys H-9432(AHP-05-2-74) scale 1:5,000; and H-9433(AHP-05-3-74) scale 1:5,000.

Detailed prior surveys of the area are H-7963, 1:12,500 scale 1952; and H-8565, 1:5,000 scale 1960. All field work was accomplished during 11 September 1974 to 6 October 1974.

A 1:5,000 scale overlay of the Morehead City and Beaufort Channels is included for plotting clarity.

C. Sounding Vessel

Launch 1277 was used to obtain all hydrography with the exception of 2 short hydro lines run by Skiff No. 1. Skiff No. 1 was used exclusively for all wire drag investigations, bottom samples, and least depth determinations.

D. Sounding Equipment

A Raytheon Fathometer, Model DE-723D, Serial No. 1279 was used in Launch 1277. A to F checks were taken periodically to check stylus arm length. A major problem encountered with the fathometer was its inability to digitize consistently in depths less than 7 feet thus making it necessary to scale soundings from the analog fathomgram. These corrections in addition to those normally experienced made the corrector tapes unusually long.

(3)
A leadline and sounding pole were used exclusively on Skiff No. 1 to obtain all soundings, least depths, and bottom samples.

Refer to Velocity and Fathometer Corrector Report OPR-513, Beaufort Inlet, North Carolina.

**E. Smooth Sheet**

Raw master tapes were logged and data plotted on the boatsheet by Launch's PDF 8/e hydroplot system. Edited master tapes, corrector tapes, velocity tapes, and TC/TI tapes were logged by launch personnel. Visual hydro accomplished by Skiff No. 1 was logged and submitted in logger format.

The smooth sheet will be plotted by Processing Division, Atlantic Marine Center.

**F. Control**

Control for Del-Norte Hydro was established utilizing 4 remote transponders, 3 located over 3rd order traverse stations; Beaufort Inlet Channel Range Rear Light, Bogue Banks "A", and Station B"1"; the other located over an existing triangulation station BAT 1927.

Refer to enclosed Del-Norte Note for station locations and discussion of problems encountered.

Skiff No. 1 was controlled by 3 point sextant fixes on existing control objects.

**G. Shoreline**

Shoreline detail was taken from Class-I (incomplete) manuscripts TP-00517, TP-00518, TP-00519 and TP-00520.

A "hydro-shoreline" in the vicinity of the southwest tip of Bird Shoal and the northwest tip of Shackleford Banks shows a discrepancy in the manuscript shoreline. The shoreline is shown in pencil on the boatsheet in these areas pending recompilation of the HWL by Photogrammetric Division. Numerous notes pertaining to distance to the HWL are indicated on the printouts as an aid to the verifier.

A sounding line run 1 to 2 meters off from the south face of the State Port Terminal Wharf has a few soundings which appear to be displaced by 2 to 3 meters, between positions 1064 and 1066, this is believed to be due to reflections from the metal warehouse rather than a shoreline discrepancy. The Del Norte rates were not changed on these positions also pending final recompilation of shoreline. The corrector tape takes these errors into account, applying the correction to the "RL rate" - Fort Macon.
H. Crosslines

Crosslines were run at approximately 12% of the regular system of hydro. The agreement with main scheme hydrography was good and all soundings agree to the nearest foot.

I. Junctions

Junctions with contemporary Surveys H-9432(AHP-05-2-74) and H-9433(AHP-05-3-74) scale 1:5,000 were very good and all soundings agreed to the nearest foot. All depth curves can be drawn continuously with no displacement between adjoining surveys. A buff junction was effected with H-9432 (1974) on the south, which is superseded by H-9431 (1974) in the common area.

J. Comparison with Prior Surveys

Comparison with H-7963, scale 1:12,500 dated 1952 and H-8565, scale 1:5,000 dated 1960 shows considerable disagreement. The contemporary survey shows extensive shoaling in the vicinity of Lat. 34° 42' 00" to 34° 42' 10" and Long. 076° 39' 45" to 076° 40' 15". Spring field investigation work, filed as Bp-9192 (1974) shall be regarded as the latest prior survey. This area is subject to extensive changes and all prior survey of the inlet should be considered only for historical purposes.

K. Comparison with the Chart

Comparison with Chart No. 423, 15th Edition, 8 December 1973 supports the disagreement mentioned in section J. Another area of disagreement is immediately south of Sugar Loaf Island where depths may disagree by as much as 8 feet and shoals shifting up to 200 meters.

In most of the remaining areas the agreement is reasonable. In Morehead City Harbor the agreement is good and the area in the vicinity of Lat. 34° 42' 30", Long. 76° 42' 45", which is probably the most stable area on the survey, the agreement is very good.

Following is a discussion of Pre-Survey Review Items:

<table>
<thead>
<tr>
<th>Charted Feature</th>
<th>Charted Position</th>
<th>Remarks</th>
</tr>
</thead>
<tbody>
<tr>
<td>Subm</td>
<td>34° 43.15'</td>
<td>This feature was located by wire drag 30 meters east of its charted position - Vol. 1, pg. 13, Posit. 7016. Originates from Chart Letter No. 1572 of 1971.</td>
</tr>
<tr>
<td>Pile</td>
<td>76° 42.42'</td>
<td></td>
</tr>
<tr>
<td>PSI #1</td>
<td>2ft @ MLW</td>
<td></td>
</tr>
<tr>
<td>Mooring</td>
<td>30° 43.15'</td>
<td>This buoy was located near its charted position - Vol. 1, pg. 40, Posit. 7076. It originates with 1954 Corps of Engineers survey (Bp 52356).</td>
</tr>
<tr>
<td>buoyy</td>
<td>76° 41.66'</td>
<td></td>
</tr>
<tr>
<td>PSI #2</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Dangerous</td>
<td>34° 43.1'</td>
<td>Wreck was located by wire drag at its charted position - Vol. 1, pg. 40, Position 7077. Originates from Notice to Mariners No. 33 of 1945.</td>
</tr>
<tr>
<td>Sunken wreck</td>
<td>76° 41.5'</td>
<td></td>
</tr>
<tr>
<td>PSI #3</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>4ft final least depth over wreck (leadline)</td>
</tr>
<tr>
<td>Subm</td>
<td>34° 43.17'</td>
<td>A wire drag investigation in this vicinity located the subm pile near its charted position. The subm pile was removed a few minutes later and should be deleted from the chart - Vol. 1 page 45. It originates from Chart Letter No. 1572 of 1971.</td>
</tr>
<tr>
<td>Pile</td>
<td>76° 41.27'</td>
<td></td>
</tr>
<tr>
<td>PSI #4 (concur)</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Pier ruins
PSI #5
34° 43.06'
76° 41.4'
34° 43.03'
76° 41.43'

T-Shaped
Pier ruins
PSI #6
34° 43.02'
76° 41.45'

Piling PA
PSI #7
34° 42.82'
76° 40.42'

Submerged groin
PSI #8
34° 42.3'
76° 40.76'

Dangerous Sunken Wreck PA
PSI #9
34° 40.5'
76° 42.02'

These pier ruins were investigated visually with no remains in evidence. Field Edit also shows no ruins - delete from chart. (Concur) It originates from 1954 Air Photography. These pier ruins were searched for visually with nothing found. Field Edit shows no ruins - delete feature from chart. (Concur) It originates from 1953 Air Photography, Chart from TP-0519. This piling is shown on manuscript TP-00519 and was verified on a hydroline 50 meters west of its charted position. Feature is a 15" pile, bare 3 feet MHW. (Concur) It originates with Chart Letter No. 1372 of 1971.

This groin is still in existence and is shown on H-9431 and Manuscript TP-00519. The groin is comprised of rock and is completely submerged at MHW and partially submerged at MLW. A position taken at the northernmost end of the groin indicates it extends 150 meters beyond Lt. "5" as is presently shown on Chart. (Vol. 1, pg. 38, posit. 2068) Possibly the terminology of the northern half of this feature should be bulkhead rather than groin. (Concur) It originates from T-12795 (1965).

This wreck was searched for utilizing a modified wire drag on 920 day (Vol. 1, pgs. 57, 58, 59) Covering an area of 200 meters radius from the charted position. There was no indication of the wreck in this vicinity - recommend this feature be deleted from chart. (Concur) It originates with Local Notice to Mariners No. 44 of 1973 Extensive change in area. A wire drag investigation in this vicinity snagged a piece of wreckage 75 meters southwest of the charted position. The wreckage was an outboard motor and small piece of transom which was towed ashore. A continuation of dragging operations revealed no further wreckage - recommend feature be deleted from chart. (Concur) It originates with Local Notice to Mariners No. 39 of 1973 Extensive shearing in this area.
A small snag was located by wire 76°.40.37' drag, protruding 6' above bottom, 20.48 meters NE of charted position. (Vol. 1, pg. 52, posit. 8003) - recommend charting symbol be changed to snag. (Concur)

Delete sub. pile.

A subm. pile was located by wire drag 20 meters SE of charted position. (Vol. 1, pg. 53, posit. 8004) - recommend symbol be changed to subm. pile. (Concur) Source originated with Chart Letter No. 1972 (1971). Delete charted subm. pile. This area was completely investigated by wire drag with the only object found being a subm. pile 100 meters NE of charted position. (Vol. 1, pg. 27, posit. 7033) - recommend new location be charted. (Concur)

Delete charted subm. piles & pipe.

A wire drag investigation at this location showed no indication of this feature at its charted position. A subm. pile was located during the same investigation 150 meters north. (Vol. 1, pg. 25, posit. 7032) - recommend new posit. be charted. (Concur) Originated with Chart Letter No. 531 (1967).

These piling were located by sextant (Vol. 1, pg. 4, 7, 11) as channel markers leading into the "Triple ESS" Marina. They are 8' piling with red or green reflectors depending upon which side of the channel they are located. - Recommend charting symbol be changed from pile to MARKER. (Concur)

This sign was located by sextant (Vol. 1, pg. 4, posit. 7001) as a billboard type, 8' high - 12' wide, advertising the facilities of the "Triple ESS" Marina. (Concur)

Return on chart.

The symbol charted at this position, with no description, is the beginning of the small moorings in the Marina. (Concur) Return on chart.

No visible evidence of sign-remains- this feature was searched for with wire drag. A short length of steel cable was located 10 meters NW, lying flush on bottom. (Vol. 1, pg. 12, posit. 7012) - recommend this feature be deleted. The cable is insignificant although it might be charted as a snag. Recommend feature be charted as snag.
Note: The small islet charted 100 meters south of this feature no longer exists and should also be deleted from chart. (Concur) This is in agreement with TP-00519 (1974).

The pile charted at this position is one of a number of piles comprising the various small boat moorings in this vicinity. (Concur) Retain as charted, but pile bears no description in chart. Change to pipe. The symbols charted at this location with no description are in fact mooring dolphins at the Aviation Fuel Terminal. - Recommend charting as Dols. (Concur)

These features comprise the Navy landing facilities with the following changes to be noted: The platform with Pl. R. Lt., at the SW corner of the group; did not have a light in evidence at the time of this survey. The 2 southerly dolphins charted in the most westerly row no longer exist. The center dolphin of the center row is gone. The remaining dolphins and platform were found as charted (Vol. 1, pgs. 15, 16, 17) (Concur).

This feature is a group of piles at this position - bare 4 to 5' MHW - chart as Piles (Vol. 1, pg. 38).

This pile is near the HWL therefore a visual search was made. The only feature in the vicinity was a newly constructed dredging range. - Recommend pile symbol be deleted. (Concur) This is in agreement with TP-00519 (1973-74).

These pipes lie next to the bulkhead at the Duke Marine Lab near their charted positions. Pipes are 2½" diameter - bare 6 ft. MHW and pose no danger to navigation. (Concur)

The 2 "Pile symbols", charted with no description, at this location are piles used for mooring small boats at the Duke Marine Laboratory. - Chart as Piles - See Manuscript TP-00519. (Concur)

This is a 2½" pipe that bares 4 ft. MHW and lies at the HWL - Retain as charted. (Concur)

This is a 2" iron pipe - bare 2 ft. MHW - located by sextant. Vol. 1, pg. 37, posits. 7063 - Retain as charted. (concur).

A visual search found this pipe at the HWL. Pipe is 2½" diameter - bares 2 ft. MHW. Retain as charted. (concur). Position was not determined by sextant fixes.

This area was completely investigated by wire drag with the only objects found being 2 submerged piles, 100 meters north of charted position. Vol. 1, pgs. 27, 28, posits. 7034, 7035. Chart as Subm Piles at new posits. (concur).

However a dredging range marked on TP-00519 should be charted in L1-3.4496 long. 76° 40.54

These markers are U.S. Corps of Engineers dredging ranges - constructed of steel with temporary lights being deployed during nighttime dredging operations. - Retain as charted. (concur).

These are mooring dolphins at the Fort Macon C.G. Base - Retain as charted. (concur).

The positions were verified by sextant fixes on Sp-91921.

I. Adequacy of Survey

This survey is complete and adequate and should supersede all prior surveys for charting purposes.

M. Aids to Navigation

A comparison between this survey, Chart No. 423, 15th Edition, December 8, 1973 and Light List Volume 1 Atlantic Coast 1974 indicates there are 26 fixed and 9 floating aids to navigation. The only change to be noted at the time of hydrography is - Morehead City Harbor Channel Junction Light - MC (LL 4738) has been replaced by a floating aid - junction buoy - Fl. R. The buoy is positioned 60 meters west of the light's charted position. Vol. 1, pg. 41, pos. 7080. The aids are adequate to serve the purpose for which they were established. See bp. 91921 for positions of Morehead City Channel buoys.

N. Statistics

<table>
<thead>
<tr>
<th>Vessel</th>
<th>Naut. Mi.</th>
<th>Sq. Naut.</th>
<th>Number of Bottom Samples</th>
<th>Number of Positions</th>
</tr>
</thead>
<tbody>
<tr>
<td>Launch 1277</td>
<td>152.5</td>
<td>3.0</td>
<td>0</td>
<td>2137</td>
</tr>
<tr>
<td>Skiff No. 1</td>
<td>0.2</td>
<td>0</td>
<td>15</td>
<td>107</td>
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<tr>
<td>Totals</td>
<td>152.7</td>
<td>3.0</td>
<td>15</td>
<td>2244</td>
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</table>
0. Miscellaneous

Wire drag investigations were accomplished by two methods. One was to tow a 150 ft. section of chain and nylon line between two shrimp trawl boards-setting the boards to drag on the bottom with the estimated distance between the boards exceeding 30 meters. A cartwheel type pattern was usually run while using this method.

The other method was to anchor one end of a 100 meter cable and line, attach the other end to the right trawl board and tow in a counter-clockwise direction with the board set on the bottom. A position was taken on the buoy and the radius was estimated. After a complete circular sweep had been made, the anchor was moved to a new location that would provide an overlap of sweep coverage. The process was repeated until a reasonable area had been completely covered or the object located.

P. Recommendations

It is recommended - the extensive shoal area mentioned in section J, and the 10 ft. shoal at the SW corner of the State Port Terminal Wharf be applied immediately to C&GS Chart No. 423.

Q. References to Reports


Respectfully Submitted

Robert A. Lewis

Robert A. Lewis
Asst. Chief, AHP
The hydrographic records transmitted with this report are complete and adequate.

F. T. Smith
Lt. Cdr., NOAA
Chief, AHP
Del Norte electronic positioning equipment, which operates in a range-range mode, was used to control hydrography on this survey with the exception of the wire drag investigations, bottom samples and numerous D.P.'s positioned by sextant fixes. Five networks were used on this sheet, with the shore stations located over established third order traverse stations. Calibration was established twice daily by positioning the boat at a known third order traverse station. Del Norte ranges were compared to ranges computed by the PDP-8/e using program AM407.

Daily correctors were determined by averaging calibrations taken at the beginning and end of the work day. Performance of the Del Norte System was good with the only problems encountered being interference from Navy radar and U.S. Army Corps of Engineers "Mini Ranger".

The expected problem of reflected signals from metal buildings and fuel tanks, while operating in the vicinity of the State Port Terminal and Aviation Fuel Terminal, was experienced causing erroneous data to be recorded on several occasions. Appropriate correctors were applied to correct the data during these occurrences.
Abstract of Equipment Utilization

Shore Station Locations

I. Unit S/N 249, Omni antenna, on 10' guyed pipe.
   Location: Bogue Banks Station "A" (Fort Macon)
   034° 41' 39.911", 076° 40' 56.95"

II. Unit S/N 181, Directional antenna, on 65' Light Tower.
    Location: Beaufort Inlet Channel Range Rear Light
    034° 42' 52.980", 076° 39' 46.373"

III. Unit S/N 252, Directional antenna, on 20' guyed pipe.
     Location: BAT 1927
     034° 42' 07.81", 076° 43' 14.79"

IV. Unit S/N 188, Directional antenna - 20db attenuator-on Tripod.
    Location: "Bl" (Port Terminal)
    034° 42' 56.73, 076° 41' 42.72"

Mobile Transponder

S/N 162

DMU

S/N 179
Electronic Corrector Abstract

Vessel: 1277
Sheet: H-9431
Sheet: AHP-05-1-74

<table>
<thead>
<tr>
<th>Time</th>
<th>Day</th>
<th>Pattern 1</th>
<th>Pattern 2</th>
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<tbody>
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<td>123622</td>
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<td>-00001</td>
</tr>
</tbody>
</table>

(14)
### Signal List

**OPR-513**

**Beaufort Inlet, N.C.**

| **L1**  | 34 42 5341  | 476 41 4131  | Bogue Sound Light 4  |
| **L2**  | 34 42 6448  | 476 41 4143  | Fort Macon Creek Light 2  |
| **L3**  | 34 42 4524  | 476 41 4774  | Morehead City Channel Light 23  |
| **L4**  | 34 41 5763  | 476 39 5734  | Beaufort Inlet Ch. Range Frnt Lt.  |
| **L5**  | 34 41 1373  | 476 39 5499  | Morehead Ch. Range Rear Light  |
| **L6**  | 34 42 5293  | 476 39 4637  | Beaufort Inlet Ch. Range Rear Lt.  |
| **L14** | 34 41 3991  | 476 40 5635  | Bogue Banks Station A  |
| **L15** | 34 41 3384  | 476 41 1234  | Bogue Banks Station Al  |
| **L36** | 34 43 1475  | 476 42 3841  | *Morehead City T&T Micro Twr (1962)*  |
| **L51** | 34 43 1637  | 476 42 3226  | *Morehead City Standpipe (1913)*  |
| **L32** | 34 42 5140  | 476 41 1149  | *Morehead City Radio Wmb (1962)*  |
| **L33** | 34 43 1323  | 476 39 4912  | *Beaufort Muni Water Tank (1927)*  |
| **L35** | 34 42 1618  | 476 41 4256  | Beaufort Harbor Channel Light 1  |
| **L75** | 34 43 1251  | 476 41 5262  | Morehead Port Terminal Tank  |
| **L76** | 34 42 3262  | 476 33 5194  | WBMA Radio Tower  |
| **L77** | 34 42 5673  | 476 41 4272  | "B1" SE Corner Port Terminal Wharf  |

**To location**

- Third Order Traverse
- Third Order Triangulation

(15)
4. Type of Control Del Norte (Hi-Fix, Raydist, EPI, etc.)
5. Frequency 1498.35 (for conversion of electronic lanes to meters)
6. Mode of Operation (check one):
   Range-Rage [X] Range-Visual [ ]
   Range One (R₁)
      Beaufort Inlet Channel
      Station I.D. Range Rear Light
      Lat. 034°  42'  52.98"
      Long. 076°  39'  46.37"
   Range Two (R₂)
      (Fort Macon)
      Station I.D. Bogue Banks Sta. A
      Lat. 034°  41'  39.11"
      Long. 076°  40'  56.95"
   Hyperbolic (3-station) [ ] Hyper-Visual [ ]
      Slave One
      Station I.D. ____________
      Lat. ______° ______' ______"
      Long. ______° ______' ______"
      Master
      Station I.D. ____________
      Lat. ______° ______' ______"
      Long. ______° ______' ______"
      Slave Two
      Station I.D. ____________
      Lat. ______° ______' ______"
      Long. ______° ______' ______"
7. Location of Survey:
   Range-Rage [X] Imagine an observer is standing at R₁ Station and looking directly at R₂ (check one):
      Survey area is to observer's Right [X] 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.
   [X] This form applies to part of the data on this survey.

   Vessel EDP # From Time Day To Time Day Position Numbers (inclusive)
   1277  143104  262  160216  263  1841 to 2055
   1277  123622  279  135554  279  2665 to 2732
9. Remarks: ________________________________

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

5. Frequency 1498.35 (for conversion of electronic lanes to meters)

6. Mode of Operation (check one):

   Range-Range [X]

   Range One (R₁)
   Station I.D. (Fort Macon)
   Range Two (R₂)
   Station I.D. (Rogue Banks Sta. A)

   Range Rear Light

   Hyperbolic (3-station) [ ]

   Slave One
   Station I.D. _______________________________

   Master
   Station I.D. _______________________________

   Slave Two
   Station I.D. _______________________________

   Range-Visual [ ]

   Lat. 034° 41' 3911"
   Long. 076° 40' 5695"

   Lat. 034° 42' 5298"
   Long. 076° 39' 4637"

   Hyper-Visual [ ]

   Lat. ______° ______' ______"
   Long. ______° ______' ______"

7. Location of Survey:

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

   Survey area is to observer's Right [X] 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.

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

   Vessel EDP # From To Position Numbers (inclusive)

   1277 1442 35 268 174527 269 2056 to 2349

   1277 1240 37 270 153007 270 2484 to 2664

9. Remarks: ____________________________
4. Type of Control Del Norte (Hi-Fix, Raydist, EPI, etc.)
5. Frequency 1498.35 (for conversion of electronic lanes to meters)
6. Mode of Operation (check one):
   - Range-Range [X]
   - Range One (R₁)  Station I.D. Bogue Banks Station A
   - Range Two (R₂)  Station I.D. Bat 1927
   - Latitude 034° 41' 3991"
   - Longitude 076° 40' 5695"
   - Hyperbolic (3-station) [ ]
   - Lat. 034° 42' 0781"
   - Long. 076° 43' 1479"
   - Hyper-Visual [ ]
   - Slave One Station I.D. ______________________
   - Master Station I.D. ______________________
   - Slave Two Station I.D. ______________________
   - Lat. __________
   - Long. __________
   - Lat. __________
   - Long. __________
7. Location of Survey:
   - Range-Range [X] Imagine an observer is standing at R₁ Station and looking directly at R₂ (check one):
   - Survey area is to observer's Right [X] 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.
   [X] This form applies to part of the data on this survey.
   Vessel EDP # From Time Day  To Time Day  Position Numbers (inclusive)
   1277 13 27 19  254  1423 13  262  596 to 1843
   1277 195 001  269  2025 12  269  2435 to 2467
9. Remarks: ______________________
1. Project # OPR-513  
2. Reg. # H-9431  
3. Field # AHP-05-1-74  

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

5. Frequency 1498.35 (for conversion of electronic lanes to meters)  

6. Mode of Operation (check one):  

   Range-Range  [X]  
   Range-Visual  
   Range One (R₁)  
   Station I.D.  
   Range Two (R₂)  
   Station I.D.  
   Beaufort Inlet Channel  
   Range Rear light  

   Hyperbolic (3-station)  

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

7. Location of Survey:  

   Range-Range  [X]  
   Imagine an observer is standing at R₁ Station and looking directly at R₂ (check one):  
   A=0  
   Survey area is to observer's Right  [X]  
   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 # 1277  
From 180609  
To 181227  
Position Numbers (inclusive) 2352 to 2360  

9. Remarks:  

(19)
ATLANTIC MARINE CENTER
ELECTRONIC CONTROL PARAMETERS


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

5. Frequency 1498.35 (for conversion of electronic lanes to meters)

6. Mode of Operation (check one):

<table>
<thead>
<tr>
<th>Range-Range</th>
<th>Range-Visual</th>
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<tbody>
<tr>
<td>×</td>
<td></td>
</tr>
</tbody>
</table>

Range One (R₁)

- Station I.D.: Beaufort Inlet Channel
- Lat.: 034° 42' 5298"
- Long.: 076° 39' 4637"

Range Two (R₂)

- Station I.D.: B-1 (Port Terminal)
- Lat.: 024° 42' 5673"
- Long.: 076° 41' 4272"

Hyperbolic (3-station) Hyper-Visual

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.

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

<table>
<thead>
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9. Remarks:
1. Project No. OPR-513  
2. Reg. No. H-9431  
3. Field No. ANP 5-1-74  
4. Requested By Verification Branch  
5. Ship or Office AMC  
6. Date Required ASAP  
7. Polyconic [X] Modified Transverse Mercator [ ]  
8. Central Meridian of Projection 76° 40' 00"  
9. Survey Scale: 1: 5,000  
10. Size of Sheet (check one):  
    36 x 54 [ ] 36 x 60 [X] Other [ ] Specify [ ]  
11. Sheet Orientation (check one):  
    NYX = 1 [ ] NYX = 0 [X]  
12. Plotter Origin: S.W. Corner of Sheet (not necessarily a grid intersection)  
    Latitude 34° 41' 05"  
    Longitude 76° 42' 15"  
13. G.P.'s of triangulation and/or signals attached [ ]  
    Smooth Sheet [X] Other [ ] Specify [ ]  
15. Remarks: [ ]
VELOCITY TUBE NO. 2

STATION 0-0 - BALIFORT 11.5 MB H.G.

A-0431 - A-11:28-1-74

L.H.O.E. 1372

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(22)
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<td>1</td>
</tr>
<tr>
<td>11/16/74</td>
<td>1</td>
</tr>
</tbody>
</table>
A. Equipment

A Raytheon Fathometer, Model DE-723, serial no. 1279 was used on Launch 1277. Frequent A to F checks were taken to check stylus arm length. A major problem encountered with the fathometer was its inability to digitize consistently in depths less than 7 feet. This made it necessary to scale soundings from the analog fathogram and enter them on the corrector tape. A long corrector tape is not only time consuming to log but makes the offline plot considerably longer.

B. Velocity and Instrument Error Correctors

Bar checks were taken on a daily basis, weather permitting. All correctors for each depth covered by the bar check averaged less than 0.4 foot from the mean therefore one curve was used for this survey.

C. Settlement and Squat Correctors

Settlement and squat correctors were obtained as outlined in Section 5-108 of the Hydrographic Manual. An abstract of corrector values are included with this report.
31. **DELINEATION**

The manuscript was compiled using 1:7,500 scale color transparencies in the Wild B-8 stereo-plotter. Tandem color infrared ratio prints (black and white) were supplied to help in locating the low water line. However, because of the gradual slope of the shore and a stage of tide 1.2 feet above MLW, they proved to be of no help in determining the mean low water line.

Distortion curves drawn for B-8 #1893 were used to correct the vertical control for distortions introduced by the camera lens, stereo-plotter optics and earth curvature.

The compilation was first performed on worksheets with control transferred from manuscripts plotted on the Calcomp by the Rockville office. Completed compilation was transferred to the final manuscript and inked.

32. **CONTROL**


The location of bridge points often caused difficulty in setting models. Many points were located far into the corners of the overlap area where they were in poor position for use in leveling the models.

The problems resulting were further complicated by poor resolution and underexposure.

33. **SUPPLEMENTAL DATA**

None

34. **CONTOURS AND DRAINAGE**

The six foot contour in the area of Morehead City passed
through many buildings. Its position in these areas was interpolated based upon the behavior of the surrounding terrain.

35. SHORELINE AND ALONGSHORE DETAILS

The elevations of the MHW line and the MLW line with respect to the NGVD were furnished for each tide zone. These elevations traced as contours determined their delineation.

The mean low water line around Sugarloaf Island did not appear to relate properly to the tidal data supplied. Tidal observation placed MLWL 1.2 feet under water, whereas in stereo models it often appeared to be located well above the apparent water surface. The mean low water line was delineated with a refraction correction for the 1.2 feet of water indicated by the tide data.

The mean high water line and the two foot contour differed in elevation by 0.1 to 0.4 feet. As a result the mean high water line and two foot contour are very nearly coincident and are identified by the mean high water line where coincidence occurs.

36. OFFSHORE DETAILS

No statement.

37. LANDMARKS AND AIDS

All landmarks and non-floating aids to navigation identifiable on the photography were located and labeled in accordance with amendment I to the general instructions. No form 76-40 was required or prepared.

38. CONTROL FOR FUTURE SURVEYS

None

39. JUNCTIONS

See Form 76-36b, item #5.

40. HORIZONTAL AND VERTICAL ACCURACY

No data, other than outdated published maps, available for evaluation.

41. PHOTOBATHYMETRY

Around Sugarloaf Island, the apparent water level, where
discernable was one foot below the geodetic datum rather than the one tenth foot indicated by the tidal observations. As noted in item #35 the MLWL appeared to be above the water surface in these areas. The photobathymetry was compiled using the 1.2 foot tide level stage as determined by the Tides Division.

Depth curves were limited to the two and four foot contours and in many areas only to the two foot contours because of suspended sediments in the water. Isolated readings deeper than four feet were made when prominent bottom features could be identified.

46. **COMPARISON WITH EXISTING MAPS**

Comparison has been made with the following topographic quadrangle:


47. **COMPARISON WITH NAUTICAL CHARTS**

Comparison has been made with the following nautical chart:

C&GS 423, scale 1:12,000, Dec. 8, 1973, 15th ED.

Note that vast, continuing changes in shore and bottom features preclude the drawing of any conclusions as to accuracy.

**ITEMS TO BE APPLIED TO NAUTICAL CHARTS IMMEDIATELY**

None

**ITEMS TO BE CARRIED FORWARD**

None
Submitted by:

Gary R. Vanderhaven
Sept. 4, 1974

Approved for forwarding:

J.W. Vonasek
Chief, Special Projects Section, AMC

Approved:

V.E. Serena
Chief, Photogrammetric Branch, AMC
31. **DELINEATION**

The area was compiled in accordance with the project instructions from 1:7,500 scale color photographs using the Wild B-8 stereo-plotter. Tandem 1:4,300 scale color infrared photography was flown and supplied to this office in both contact and ratio form to aid in the identification of the water level and the placement of the MLWL. It was discovered, however, that this photography recorded varying degrees of penetration and therefore, could not be relied on to give an accurate picture of the water level or the MLWL. They were used very cautiously. No photos were at MLW stage of tide.

Model Distortion curves for B-8 instrument #2109 were prepared by the Rockville Office. This curve corrected for distortions due to earth curvature, the instrument and the camera lens. They were applied whenever control elevations were read during model setting procedures.

All model work was performed on worksheets, the control for which was transferred from the manuscripts plotted and supplied by the Rockville Office.

32. **CONTROL**

See the "Photogrammetric Plot Report," submitted with this report. Notable in the report are the residual errors of points from the tide related infrared photography which range from +1.1 feet to -0.48 feet within the limits of this survey. It is felt that this was the result of incorrect water cutoff processing of the color infrared film.

All control points were drilled with the PUG. In cases where these were isolated objects in otherwise featureless areas, corresponding elevations could not be accurately read. All
vertical control points were read to the nearest tenth of a foot with due consideration being given to model deformation diagram values.

33. SUPPLEMENTAL DATA

None

34. CONTOURS

All contours were drawn directly from the models. Except for smoothing and shaping, their positions are final. Featureless, sandy spoil banks and areas of dense vegetation, were difficult to compile and were referred to the field editor for confirmation (see discrepancy print).

In accordance with the instructions, only the two (2), four (4) and six (6) foot contours were delineated within the boundaries of this manuscript. Spot elevations were read and recorded on the worksheets to the nearest tenth of a foot. These were rounded off to the nearest foot when applied to the manuscript.

35. SHORELINE AND ALONGSHORE AREAS

All shoreline and alongshore features were delineated in accordance with the specifications and symbolization prescribed in "Topographic Manual, Part II," as amended.

The elevations of the MHW line and the MLW line, with respect to the NGVD, were furnished for each tide zone. These elevations traced as contours determined their delineation.

The difference in elevation between the 2 ft. contour and the MHWL ranges from 0.1 to 0.3 feet. In many areas the two lines are coincident.

Refer to the vertical control sketch in the photogrammetric plot report. In the area of the point with a +1.1 residual, the MLW line, as derived in the model from the bridge elevations, plotted further offshore than would have been expected from photo interpretive experience.

36. OFFSHORE DETAILS

All offshore details were delineated in accordance with the specifications set forth in "Topographic Manual, Part II," as amended. Special attention was given to charted features not visible in the models. These were called to the hydrographers attention.

See par. #41.
37. **LANDMARKS AND AIDS**

All charted landmarks and aids in the project area were positioned from the models and appropriately labeled. No form 76-40 was prepared. (Refer to instructions "Amendment I."

38. **CONTROL FOR FUTURE SURVEYS**

None

39. **JUNCTIONS**

See Form 76-36b, item #5, submitted with this Descriptive Report.

40. **HORIZONTAL AND VERTICAL ACCURACY**

No statement.

41. **PHOTOBATHYMETRY**

The elevation of features below the water surface was obtained by first noting the reading on the glass scale below the NGVD reference plane and subtracting the distance to the water level. The remainder was then multiplied by the refraction correction read from the curves oriented under the worksheet. This varied from 1.42 to 1.84 depending on the relative position of the point in the model. The stage of tide was then subtracted yielding the depth of the image below mean low water.

To determine the glass scale reading of depth curves, the curve depth plus the height of water above MLW was divided by the two media refraction correction and the result was added to the distance of the water level from the NGVD.

Photobathymetry was limited to the very shallow areas. The four (4) foot curve was the deepest one attempted. When areas became very flat or featureless, the curve was drawn graphically using the spot depths read from the B-8 model. Some spot depth readings were reliably acquired in areas deeper than four (4) feet below mean low water; however, these were limited in number and not dense enough to facilitate the delineation of a six (6) or eight (8) foot depth curve. The delineation of photobathymetric details was severely hampered by water turbidity, characteristic of the project area.

It is significant to note that there are no underwater points which can be reliably transferred between bridge strips seven,
flown 7 November 1973, and five, flown 12 November 1973. Only those bridge points drilled above the surface are common to both strips, indicating that the bridging section was not able to transfer or identify common points. During compilation the B-8 operator made exhaustive attempts to identify common points and was unable to do so. The conclusion therefore, is that the shifting of the shoal areas is continuous and very rapid.

No photobathymetry could be accomplished in the large shoal area just north of Shackleford Point despite the fact that it is covered by strips 4, 5 and 7. An attempt was made to set every model covering this area. In only one of these was a satisfactory level and parallax solution obtainable (model 73-C(c)-5579-80 of Strip #7). Four (4) different experienced operators, Mr. Shands, Mr. Vanderhaven, Mr. Byrd and Mr. Hancock have all concluded that, due to featureless bottom and suspended sediments present at the time of photography, it is not possible to accurately identify and measure bottom images from these models. The hydrographers were directed to provide hydrographic data for this area.

46. **COMPARISON WITH EXISTING MAPS**

A comparison was made with U.S.G.S. Quadrangle Beaufort, North Carolina, scaled 1:24,000 and dated 1949, and photo-revised in 1971.

47. **COMPARISON WITH NAUTICAL CHARTS**

A satisfactory comparison was made with chart 423, 15th edition dated December 8, 1973 and scaled 1:12,500.

**ITEMS TO BE APPLIED TO NAUTICAL CHARTS IMMEDIATELY**

None.

**ITEMS TO BE CARRIED FORWARD**

None.
Submitted by:

A.L. Shands  
Cartographer. Sept. 4, 1974

Approved by:

Joseph M. Vonasek  
Chief, Special Projects Section

Approved:

Victor E. Serena  
Chief, Photogrammetric Branch, AMC
FIELD EDIT APPLICATION
TP-00519

As requested, the field editor established and identified on the field ratio prints several vertical control points. Because of changes since photography and the restricted placement of the points requested they were not all of good quality. They were sufficient in number and distribution to allow the models covering the Bird Shoal area to be reset independently of the bridge elevations. Because the southern shore of Bird Shoal is described as being very unstable, all points established there by the field editor were ignored in the final vertical solution of the models.

The entire area was recomplied using the new vertical solutions. Significant differences in elevation of details were noticed in the area of Bulkhead Shoal and Town Marsh. Where these differences exceeded tolerance the original compilation was changed to agree. However the new vertical solution did not allow the compiler to redraw the MHWL inside the Bird Shoal area to agree with the description given by the field editor. While differences were noted, it was apparent in the models that the MHWL on the south shore could not be drawn along "the white sandy area of the photographs". The MHWL and the MLWL were not compiled by interpreting an image on the photographs. Rather the position of these features was determined their elevation as furnished for each tide zone.
Aerial photography dated December 4, 1974 reveals that the position of the sand spit had moved northward during the 10 month interval between the original photography and field edit. The hydrographic survey of September 1974 shows soundings positioned inside the shoreline as mapped. In order to provide a contemporary shoreline for the smooth sheet, a shoreline correction was compiled graphically on a copy of this survey using the recent photos.

Considering that the hydrographic survey is already completed it was deemed not necessary to reset models just to revise the photobathymetry. A small area in the southeast corner that did not join in the new models was removed from the manuscript.

The marsh grass along the northern shore of Bird Shoal is very thick making it difficult to compile the contours. Following the field editor's description of the terrain and the height of grass, contours were redrawn.

The field editor's designation of some areas as "mud" is interpreted to mean that these features are not to be shown as "grass in water" as was done in other areas. They are not considered to be important to the compilation and are not shown.

Though the two concrete mooring anchors in Ft. Macon Creek are potentially portable, it is considered that they constitute a hazard and they are being treated as map features.
COMPILATION REPORT
TP-00520

31. **DELINEATION**

All details were compiled on the Wild B-8 stereo-plotter using 1:7,500 scale color photography. On the ocean side of Shackleford Banks, where the mean low water line was obscured by wave or surf action or glare, it was completed graphically using the black and white ratios of the color infrared photos supplied for that purpose.

It was observed that strip 10 revealed more of the offshore bottom features than any other flight. Because it covered only a very narrow strip of land along one edge, it could not be bridged and no attempt was made to set any of these models.

Distortion curves correcting for earth curvature and errors built into the camera lens and B-8 instrument were drawn up in Rockville for B-8 2109. These corrections were applied whenever control elevations were read.

All model work was performed on worksheets, the control for which was transferred from manuscripts plotted and supplied by the Rockville office.

32. **CONTROL**

See "Photogrammetric Plot Report," dated May, 1974. In the NE corner of this survey the elevation of bridge point 405320 (bridge elev. - 4.1 ft) was -0.2 ft. in the models. This point appeared only on strip 5. Strip 7 points 615310 and 614330 bracketing that point were held.

33. **SUPPLEMENTAL DATA**

None

34. **CONTOURS**

The terrain in this area is very rough with many small hills or sand dunes clustered throughout the area. As prescribed in
the project instructions the two, four, six and eight and ten foot curves were drawn from the models and their positions are considered final.

Frequent spot elevations were dropped to show the height of the sand dunes above the ten foot curve.

35. **SHORELINE AND ALONGSHORE DETAILS**

The mean high water line and all alongshore details were compiled in accordance with the specifications and symbolizations prescribed in the Topographic Manual, Part II, as amended.

The elevation of the MHW line and MLW line with respect to NGVD were furnished for each tide zone. These elevations traced as contours determined their delineation. The B & W ratios of the color infrared were used to complete the delineation of the low water line.

36. **OFFSHORE DETAILS**

None

37. **LANDMARKS AND AIDS**

In accordance with the project instructions no forms 76-40 were prepared. The positions of the two charted lights were dropped during compilation and labeled.

Refer to instructions amendment No. 1.

38. **CONTROL FOR FUTURE SURVEYS**

None

39. **JUNCTIONS**

See Form 76-36b, item #5.

40. **HORIZONTAL AND VERTICAL ACCURACY**

No statement.

41. **PHOTOBATHYMETRY**

No photobathymetry could be accomplished on the Atlantic Ocean side of Shackleford Banks. This was attributed to a gen-
eral lack of water clarity and surf conditions. Only a few spot depths were read on the inlet side of Shackleford Point. These were too sparse to allow the delineation of any depth curves other than the mean low water line. The same is true for the Bogue Bank area.

The Inlet currents are very strong and carry varying amounts of sediments at all stages of tide. It was determined from the models that nearly all of the imagery recorded in the inlet is floating sediments and not stationary bottom features.

46. **COMPARISON WITH EXISTING MAPS**

A comparison was made with U.S.G.S. Quadrangle Beaufort, North Carolina, scaled 1:24,000 and dated 1949, photo-revised, 1971.

47. **COMPARISON WITH NAUTICAL CHARTS**

A comparison was made with Chart 423, 15th edition, dated December 8, 1973 and scale 1:12,500.

**ITEMS TO BE APPLIED TO NAUTICAL CHARTS IMMEDIATELY**

None

**ITEMS TO BE CARRIED FORWARD**

None

Submitted by:

A.L. Shands
Cartographer, Sept. 4, 1974

Approved for forwarding:

Joseph W. Vonasek
Chief, Special Project Section

Approved:

Victor E. Serena
Chief, Photogrammetric Branch, AMC
FIELD EDIT APPLICATION

TP-00520

Very complete field edit performed.

The spot elevations established West of Fort Macon do not warrant changing the surrounding contours.

Because the hydrographic survey already covers the area, it was deemed not necessary to reset models just to change the photobathymetry. Bathymetry in the northeast corner of this survey that did not join the new work in Map No. TP-00520 was recalculated.

The hydrographic survey of September, 1974, was positioned inside the shoreline on the north side of Shackleford Point. In order to provide a more contemporary shoreline for the smooth sheet a shoreline correction was compiled graphically on a copy of this survey using aerial photographs dated December 4, 1974.
COMPILATION REPORT
TP-00521

31. **DELINEATION**

All details were delineated with the Wild B-8 stereo-plotter, 1:7,500 scale color photography was used. 1:4,300 scale color infrared photography was supplied to aid in the identification of the water level and placement of the mean low water line. In an area southeast of Horse Island, there is a disagreement between the mean low water line as compiled from the model and what was recorded on the color infrared photography which shows the above water area of the shoal to be much larger.

Distortion curves correcting for the combined affects of earth curvature, instrument errors and camera lens distortion were supplied by the Rockville office. These were applied whenever control elevations were read.

All model work was compiled on worksheets. The control was obtained from manuscripts plotted and supplied by the Rockville Office.

32. **CONTROL**

See the "Photogrammetric Plot Report," dated May, 1974. Notable are the rather large residuals of the water surface points in the area covered by this manuscript. It is felt that this is the result of the penetration recorded on the color infrared photographs not being filtered out during processing and thus causing those points to be misinterpreted during bridging.

Point 614310 was not drilled in model 73C(C)-6368 and 6370; however, its position was positively identified from bridging photo-73C(C)-5575 on which it was drilled. The elevation of this point from the bridge readout is +3.8 ft. The elevation read on the point in model 73C(C)-6368 -70 was +1.5 ft. The compiler has no explanation for this except that the point is on the very edge of three (3) photos in strip 7 which resulted in a weak determination.

33. **SUPPLEMENTAL DATA**

None
34. **CONTOURS**

All contours were drawn directly from the models. Except for shaping and smoothing, their positions are considered final. Featureless spoil banks and areas of dense vegetation were difficult to compile. These areas were called to the attention of the field editor on the field edit ozalid.

In accordance with the project instructions only the two, four, and six foot curves were delineated within the limits of this manuscript. Spot elevations were read and recorded on the worksheets in tenths of feet. They were rounded off to the nearest foot when applied to the manuscript.

35. **SHORELINE AND ALONGSHORE DETAILS**

All alongshore features were delineated from office interpretation of the compilation photographs. All features were portrayed with the standard symbolization prescribed in the "Topographic Manual, Part II," as amended. The elevation of the MHW line and the MLW line with respect to NGVD was furnished. These elevations traced as contours determined their delineation.

The mean high water line is 1.9 ft. above the National Geodetic Vertical Datum and in many instances the mean high water line and the two foot contour coincide on the manuscript.

The mean low water line was positioned much higher on the mud flats than the image on the color infrared photos would indicate. This is in the area of a bridge point having a -0.6 ft. residual. (Refer to the vertical control sketch in the photogrammetric plot report)

36. **OFFSHORE DETAILS**

See par. #41.

37. **LANDMARKS AND AIDS**

None

38. **CONTROL FOR FUTURE SURVEYS**

None

39. **JUNCTIONS**

See Form 76-36b, item #5 of this Descriptive Report.
40. **HORIZONTAL AND VERTICAL ACCURACY**

No statement.

41. **PHOTOBATHYMETRY**

Photobathymetry was limited to the very shallow areas due to opaque character of the water. Tidal currents in the area carry large amounts of sedimentary materials thus creating an almost daily change in the configuration of bottom details. This change was observed when a comparison was made of the photos in bridge strip #5, dated 12 Nov., 1973 and those of bridge strip #4, dated 7 Nov., 1973. The compiler was not able to identify any common bottom points between these two flights.

The four foot depth curve was the deepest one attempted in the models. When areas became flat or featureless, no continuous curve could be drawn in the model. These were completed graphically using the spot depths which were read in the models. Spot depths were read 50 mm apart or as often as the water clarity and density of bottom features would allow.

46. **COMPARISON WITH EXISTING MAPS**

A satisfactory comparison was made with U.S.G.S. Quadrangle Beaufort, North Carolina, scaled 1:24,000 and dated 1949, Photo-revised 1971.

47. **COMPARISON WITH NAUTICAL CHARTS**

A satisfactory comparison was made with chart 420, 42nd edition dated February 16, 1974, scale 1:40,000.

**ITEMS TO BE APPLIED TO NAUTICAL CHARTS IMMEDIATELY**

None

**ITEMS TO BE CARRIED FORWARD**

None
Submitted by:

A.L. Shands
Cartographer, 3 Sept., 1974

Approved for forwarding:

J.W. Vonasek
Chief, Special Projects Section

Approved:

V.E. Serena
Chief, Photogrammetric Branch, AMC
31. **DELINEATION**

The manuscript was compiled using 1:7,500 scale color transparencies in the Wild B-8 stereo-plotter. Tandem tide controlled color infrared photography (black & white ratios) were used to supplement the compilation photography in determining the mean low water line.

Distortion curves drawn for B-8 #1893 were used to correct the vertical control for distortions introduced by the camera lens, stereo-plotter optics, and earth curvature.

Depth correction curves for water refraction were used in determining true depths. Curves based on 60% overlap supplied by the Rockville Office were used along with curves based on 80% overlap calculated locally.

The compilation was first performed on worksheets with control transferred from manuscripts plotted by the Rockville Office. Completed compilation was transferred to the final manuscript and inked.

32. **CONTROL**


The location of bridge points often caused difficulty in setting models. Many points were located far into the corners and along the edges of the overlap area where they were in poor position for use in leveling the model. Several were located beyond the upper fiducials leaving critical voids in vertical control. In model 73c(c) 5501, 5503 points 808310, 908310, 611330 were all beyond the limits of the tracing stand motions. This left the top 25% of the model without vertical control. In model 73c(c) 5574, 5576 point 614310 was also unusable because of its location beyond the upper fiducials. Additional control from strip five, point 404320, had to be identified in the model before it could be leveled.
33. **SUPPLEMENTAL DATA**

None

34. **CONTOURS**

Contours were delineated up to the ten foot contour. The project boundary provided the contour limit where no 10 ft. contour was reached.

35. **SHORELINE AND ALONGSHORE DETAILS**

The elevations of the MHW and the MLW with respect to NGVD were furnished for each tide zone. These elevations traced as contours determined the delineation in the models.

The combination of surf, turbid water, and glare made continuous identification of the MLWL along the Atlantic Coast of Shackleford Banks impossible with the compilation photography. Black and white ratios of the color infrared photography were used to complete the delineation. On the estuarine side of Shackleford Banks the MLWL was delineated entirely from the compilation photography.

36. **OFFSHORE DETAILS**

Offshore delineation was limited to photobathymetry on the estuarine side of Shackleford Banks.

37. **LANDMARKS AND AIDS**

None located.

38. **CONTROL FOR FUTURE SURVEYS**

None

39. **JUNCTIONS**

See form 76-36b, item #5

40. **HORIZONTAL AND VERTICAL ACCURACY**

No statement.

41. **PHOTOBATHYMETRY**

Photobathymetry was limited to the estuarine side of Shackleford Banks. Glare, wave action, and turbidity prevented penetra-
tion of the water surface along the Atlantic Coast.

The sandy bottom of the estuarine side of Shackleford Banks made depth readings generally difficult to obtain. The bottom had few images which appeared on both photos of a model. Setting the floating marks on the bottom could not be done with any degree of certainty. One portion of the sandbar along Shackleford Slough was not carried forward to the final manuscript. The disparity in depth readings was so great between successive models that a resolution of them was not possible.

46. COMPARISON WITH EXISTING MAPS

Comparison has been made with the following topographic quadrangles:

BEAUFORT, NC, scale 1:24,000, dated 1949, photo-revised 1971
HARKERS ISLAND, NC, scale 1:24,000, dated 1951, photo-revised 1971.

47. COMPARISON WITH NAUTICAL CHARTS

Comparison has been made with the following nautical charts:

C&GS 420, scale 1:40,000, dated Feb. 16, 1974, 42nd Ed.

ITEMS TO BE APPLIED TO NAUTICAL CHARTS IMMEDIATELY

None

ITEMS TO BE CARRIED FORWARD

None
Submitted by:

G.R. Vanderhaven
Sept. 4, 1974

Approved for forwarding:

J.W. Vonasek
Chief, Special Projects Section, AMC

Approved:

V.E. Serena
Chief, Photogrammetric Branch, AMC
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 been made. A new final sounding printout has been made.

Date: 17 March 1978
Signed: [Signature]
Title: 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: 17 March 1978
Signed: [Signature]
Title: Chief, Processing Division
Atlantic Marine Center
Verification of Smooth Tides

Survey H-9431

Plane of Reference

Time Meridian
Height Datum on Staffs

MLW or MLLW

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Tide Stations

Position

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<td>Y 76° 40'</td>
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2.

Y

3.

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Hourly Heights

From Rockville Office
From Field Marigrams
Verified by: Rockville

Tide Zoning

Not Applicable

By Computer

From Two or More Gages

Limits and Description of Zoning Methods

Zone #1. Approx. 76° 40.8', 76° 42.3' Ratio 1.07 time diff. 24 min.
2.     "    76° 40.8' , 76° 39.6' Ratio 1.07 time diff. 30 min.
3. North of 34° 42.7' to Duke Marine Lab, East of Radio Island - Direct.
4. Approx. 76° 42.3', 76° 43.0' in Tar Landing Bay, Ratio 0.93 time diff. 12 min.

Tide Corrections Compiled

By Computer

Verified by: BJS

Manually

Verified by: 

Height of MHW Above Plane of Reference

3.0

Tide Corrections Verified on Sounding Printout

By: BJS

Date of Verification

1/24/75

*Or Ratio

Examined & Approved
TIDE NOTE FOR HYDROGRAPHIC SHEET

Processing Division: Atlantic Marine Center:

Hourly heights are approved for Form 362

Tide Station Used (NOAA Form 77-12): Beaufort (Duke Marina Lab)

Period: August 31 - November 16, 1974

HYDROGRAPHIC SHEET: H9431

OPR: 513

Locality: Beaufort Inlet

Plane of reference (mean lower low water): 1.6 ft.

Height of Mean High Water above Plane of Reference is 3.0 ft.

Remarks: Recommended Zoning:

1. Approx. 76°40'.8 - 76°42'.3
   Apply x1.07 Mn Ratio
   Time corrections
   -24 min.

2. Approx. 76°40'.8 - 76°39'.6
   Apply x1.07 Mn Ratio
   -30 min.

3. North of 34°42'.7 to
   Duke Marine Lab, East of
   Radio Island
   Direct on Duke Marine
   Lab.

4. Approx. 76°42'.3 - 76°43'.0
   in Tar Landing Bay
   Apply x0.93 Mn Ratio
   -12 min.

Jane R. Hubbard
Chief, Tides Branch
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<th>B</th>
<th>C</th>
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HYDROGRAPHIC SURVEY STATISTICS
HYDROGRAPHIC SURVEY NO. H-9431 (Field Investigation)

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

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T-SHEET PRINTS (List):
TP-00517, 00518, 00519, 00520

SPECIAL REPORTS (List):

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

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<td>SIGNALS ERRONEOUSLY PLOTTED OR TRANSFERRED</td>
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TIME (MANHOURS)

| TOPOGRAPHIC DETAILS | 24    | 24    |
| JUNCTIONS          | 2     | 2     |
| VERIFICATION OF SOUNDINGS FROM GRAPHIC RECORDS | - | 30 |
| SPECIAL ADJUSTMENTS | -     | 12    |
| ALL OTHER WORK     | 195   | 24    |
| TOTALS             | 221   | 92    |

PRE-VERIFICATION BY
J. T. Murphy, H. R. Smith, B. J. Stephenson
BEGINNING DATE 7/31/74, ENDING DATE 2/7/75

VERIFICATION BY
B. J. Stephenson
BEGINNING DATE 3/04/75, ENDING DATE 3/12/75

REVIEW BY
Mark J. Fries
BEGINNING DATE 9/18/75, ENDING DATE 10/18/75

*U.S. C.P.O. 1972-768-566/439 REG. #6
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:
H-9431

Items for Future Presurvey Review

The existence of two pilings, charted in latitude 34°42.2', longitude 76°39.7', should be verified on future surveys.

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<tr>
<th>Position</th>
<th>Index</th>
<th>Bottom Change Index</th>
<th>Use Index</th>
<th>Resurvey Cycle (Years)</th>
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OFFICE OF MARINE SURVEYS AND MAPS  
MARINE CHART DIVISION  
MODIFIED HYDROGRAPHIC SURVEY REVIEW

REGISTRY NO. H-9431  
FIELD NO. AHP-05-1-74  

North Carolina, Beaufort Inlet, Beaufort and Morehead City Channels

SURVEYED: September 11 - October 6, 1974

SCALE: 1:5,000  
PROJECT NO.: OPR-513

SOUNDINGS: Raytheon DE-723D Depth Recorder, Leadline, Pole Soundings

CONTROL: Del Norte (Range-Range), Sextant Fixes on Shore Signals

Chief of Party ......................... F. T. Smith
Surveyed by ......................... D. Byrant
........................................ W. Hill
........................................ F. Kleinschmidt
........................................ R. Lewis

Automated Plot by ..................... Calcomp 618 (AMC)
Verified by ........................... B. J. Stephenson
Reviewed by ........................... M. J. Friese
........................................ Date: October 15, 1975
Cursory inspection made--survey ..... G. K. Myers
processing considered complete ...... Date: February 3, 1976

1. Control and Shoreline

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

The shoreline originates with class I photogrammetric bathymetry and topographic manuscripts TP-00517 (1973-74), TP-00518 (1973-74), TP-00519 (1973-74), and TP-00520 (1973-74). The mean high water line is shown for guidance only and, except for revisions in red determined by an office interpretation of photographs flown in December 1974, the true position is shown on the aforementioned surveys.

2. Hydrography

   A. Depths at crossings are in good agreement.

   B. The usual depth curves are adequately delineated. The 3-foot depth curve was added to more adequately delineate the bottom configuration. Depth curves were added in pencil at 2-foot intervals to supplement the standard depth curves.
C. The development of the bottom configuration and the investigation of least depths are considered adequate.

3. Condition of Survey

The field work, sounding records, smooth plotting, sounding printouts, and Descriptive Report conform to the requirements of the Hydrographic Manual supplemented by the Instruction Manual - Automated Hydrographic Surveys. However, many piles, pipes, and dolphins were added to the smooth sheet from the sounding records during review.

4. Junctions

Adequate junctions were effected with H-9433 (1974) on the east. A partial butt junction was effected with H-9432 (1974) on the south because of the highly changeable bottom in this area.

Soundings in red were determined by photobathymetric methods using photographs of November 1973. These soundings were transferred from surveys TP-00517, TP-00518, TP-00519, and TP-00520, and provide supplemental information for unsurveyed areas and areas not adequately surveyed by hydrographic methods.

5. Comparison with Prior Surveys

A.  
<p>| | | | |</p>
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<tr>
<td>H-246</td>
<td>1850</td>
<td>1:10,000</td>
<td>H-789</td>
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<td>H-259</td>
<td>1850</td>
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<td>H-856</td>
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<td>1854</td>
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<td>1857</td>
<td>1:10,000</td>
<td>H-3436</td>
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These early surveys fall in the area of the present survey but are not discussed in the present review.

B.  
<p>| | | |</p>
<table>
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<tr>
<td>H-7963</td>
<td>1952-53</td>
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<td>H-8565</td>
<td>1960</td>
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<tr>
<td>Field Investigation</td>
<td>1974</td>
<td>1:5,000 (Bp 91921)</td>
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These prior surveys, taken together, cover the entire area of the present survey. A comparison between the prior and present surveys reveals considerable change in most of the area. Since the prior surveys, alterations from dredging and spoiling created by maintenance of Federal projects and harbor improvement construction are in evidence.

The bottom configuration in the western approaches to Back Sound has changed significantly. Here, variable differences
of as much as 10-15 feet are found in present depths of less than 20 feet. The deep natural channel in the northern portion of the sound has shifted approximately 350-450 meters north-westward. The shoreline in this area is considered unstable. Changes in this area are attributed primarily to the natural shifting of sediments due to storms and current activity.

Construction of a jetty in the eastern end of Bogue Banks has caused a 150-meter seaward migration of the shoreline in this area. Shoaling of the bottom has prevailed in close proximity to the jetty, while a general deepening in the area seaward of the 6-foot depth curve is evident.

A comparison between prior and present depths reveals that the area west of longitude 76°42' has a relatively stable bottom, and only minor differences of 1-3 feet are found. Most changeable depths lie in the areas of oyster beds.

Extensive changes in the shoreline have occurred throughout the entire area of the present survey.

A detached sounding, pilings, markers, and bottom characteristics were brought forward from the prior surveys. With the addition of these items, the present survey is adequate to supersede the prior surveys in the common area.

6. Comparison with Chart Drawing 423 (October 6, 1975)

A. Hydrography

The charted hydrography originates with the previously discussed prior surveys which require no further consideration, supplemented by the partial application of the verified smooth sheet of the present survey, prior and subsequent information from the Corps of Engineers, and other sources. Specific mention is made of the following:

(1) The pipes, piles, and dolphins charted in the following locations originate with Chart Letter 1397/74 (U.S. Power Squadrons) and were not mentioned by the hydrographer at the time of the survey. These items should be retained on the chart.

<table>
<thead>
<tr>
<th>Feature</th>
<th>Latitude</th>
<th>Longitude</th>
</tr>
</thead>
<tbody>
<tr>
<td>a. 6 piles (PA)</td>
<td>34°41.50'</td>
<td>76°39.84'</td>
</tr>
<tr>
<td>b. 3 dolphins</td>
<td>34°41.92'</td>
<td>76°40.95'</td>
</tr>
<tr>
<td>c. 6 pipes (PA)</td>
<td>34°42.35'</td>
<td>76°40.74'</td>
</tr>
</tbody>
</table>
d. 2 submerged pipes (PA) 34°42.72' 76°40.80'
e. 3 piles (PA) 34°43.04' 76°41.45'
f. 3 piles (PA) 34°42.96' 76°41.5'
g. 5 submerged piles 34°43.20' 76°41.25'
h. 1 pipe 34°43.01' 76°40.25'
i. 1 pile 34°42.88' 76°41.47'

Note the positions of the above items a. through g. are located in the immediate vicinities of the features indicated.

(2) The shoal reported 1975 charted in latitude 34°42.19', longitude 76°42.8' originates with Chart Letter 910/75 (U.S. Power Squadrons), which is subsequent to the present survey and should be retained on the chart.

(3) The rock awash charted in latitude 34°41.84', longitude 76°40.65' originates with 1962 air photo revisions. This feature was not verified or disproved on the present survey and should be retained on the chart.

(4) The two pipes charted in latitude 34°42.90', longitude 76°40.39' and latitude 34°42.93', longitude 76°40.31' originate with a 1973 Corps of Engineers condition survey (Bp 85774). These pipes were not mentioned by the hydrographer and should be retained on the chart.

(5) The submerged jetty charted in the immediate vicinity of latitude 34°42.28', longitude 76°40.70' was not verified on the present survey and should be retained on the chart.

Attention is directed to the discussion of presurvey review items mentioned in section K of the Descriptive Report.

Except for items noted above and in the Descriptive Report, the present survey supersedes the charted information in the common area.

B. Controlling Depths

(1) The table of controlling depths is based on Corps of Engineers data subsequent to the present survey and supersedes the present survey information.

(2) The charted controlling depth note - 7 FT SEPT 1973 - in the project turning basin at latitude 34°43.1', longitude 76°42.85' from prior Corps of Engineers survey information is in agreement with the present survey and should be retained on the chart.
(3) The charted controlling depth note - 9 FT FOR MID-WIDTH OF 80 FT SEPT 1973 - in the Federal project channel at latitude 34°43.1', longitude 76°42.4' from prior Corps of Engineers survey information is in agreement with the present survey and should be retained on the chart.

(4) The charted controlling depth note - 6 FT FOR MID-WIDTH OF 60 FT SEPT 1973 - in the Federal project channel at latitude 34°43.07', longitude 76°43.0' from prior Corps of Engineers information is in agreement with the present survey and should be retained on the chart.

(5) The charted controlling depth note - 12 FT REP at latitude 34°42.77', longitude 76°41.42' from prior Corps of Engineers information is in agreement with the present survey and should be retained on the chart.

(6) In the charted controlling depth area at Fort Macon Creek, present depths are as much as 10 feet shoaler than prior Corps of Engineers information (Chart Letter 980/71). The present survey better defines the bottom configuration.

(7) The tabulated controlling depth of the Intra-coastal Waterway from Notice to Mariners No. 32 of 1975 is based on data furnished by the Corps of Engineers subsequent to the date of the present survey information.

(8) The charted controlling depth note - 17 FT REP 1974 - at latitude 34°42.25', longitude 76°40.85' from the boat sheet of the field investigation (Bp 89132) is superseded by the present survey.

(9) The charted controlling depth note - 10½ FT JULY 1974 - in the Beaufort Harbor turning basin from prior Corps of Engineers information is in agreement with the present survey and should be retained on the chart.

C. Aids to Navigation

The charted aids to navigation adequately serve the purpose and mark the features intended within the common area of the present survey. **Buys in Morehead City Channel were not located on the present survey. Their location had been determined on Bp. 91921.**

7. Compliance with Project Instructions

This survey adequately complies with the Project Instructions.
8. Additional Field Work

This is a very good basic survey and no additional field work is recommended.

Examined and Approved:

Chief
Marine Chart Division

Associate Director
Office of Marine Surveys and Maps
**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.

<table>
<thead>
<tr>
<th>CHART</th>
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<th>CARTOGRAPHER</th>
<th>REMARKS</th>
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<td>D. Logue</td>
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**FORM C&GS-8352 SUPERSEDES ALL EDITIONS OF FORM C&GS-975.**