H10844

NOAA FORM 76-35A

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

DESCRIPTIVE REPORT

Type of Survey Hydrographic/ Side Scan Sonar

Field No. WH-10-14-98

Registry No. H10844

LOCALITY

State North Carolina

General Locality North Atlantic Ocean

Locality Approaches to Morehead City

1998

CHIEF OF PARTY
LCDR J. W. Humphrey

NOAA FORM 77-28
(11-72)

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

REGISTRY NUMBER:

H10844

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 NUMBER: WH-10-14-98

State: North Carolina

General locality: North Atlantic Ocean

Locality: Approaches to Morehead City

Scale: 1: 10,000 Date of survey: September 16,1998 to October 30,1998

Instructions dated: February 20, 1998 Project Number: OPR-F344-WH

Vessel: NOAA Ship WHITING & launch 2932

Chief of Party: LCDR John W. Humphery

Surveyed by: LCDR John W. Humphery, LT T.A. Haupt, LT(jg) L. Krepp, M.J. Annis, C. Clemens, R. Corson, F.R. Cruz, U.L. Gardner, P.G. Lewit

Soundings taken by echo sounder, hand lead-line, or pole: DSF 6000N fathometer

Graphic record scaled by: WHITING Personnel

Graphic record checked by: WHITING Personnel

Protracted by: N/A Automated plot by: ~~HP 750~~ H P DesignJet 2500 CP Plotter

Verification by: ~~Hydrographic Surveys Branch~~ Atlantic Hydrographic Branch Personnel

Soundings in: Feet: X ~~Fathoms:~~ ~~Meters: (*)~~ ~~at MLW~~ MLLW: (*):

Remarks: **Time Zone Used, 0 (UTC)**

Basic Hydrographic and 200% Side Scan Sonar

Notes in the original Descriptive Report were made in red during office processing

AWOIS v # SURF v 7/12/99 by MBH

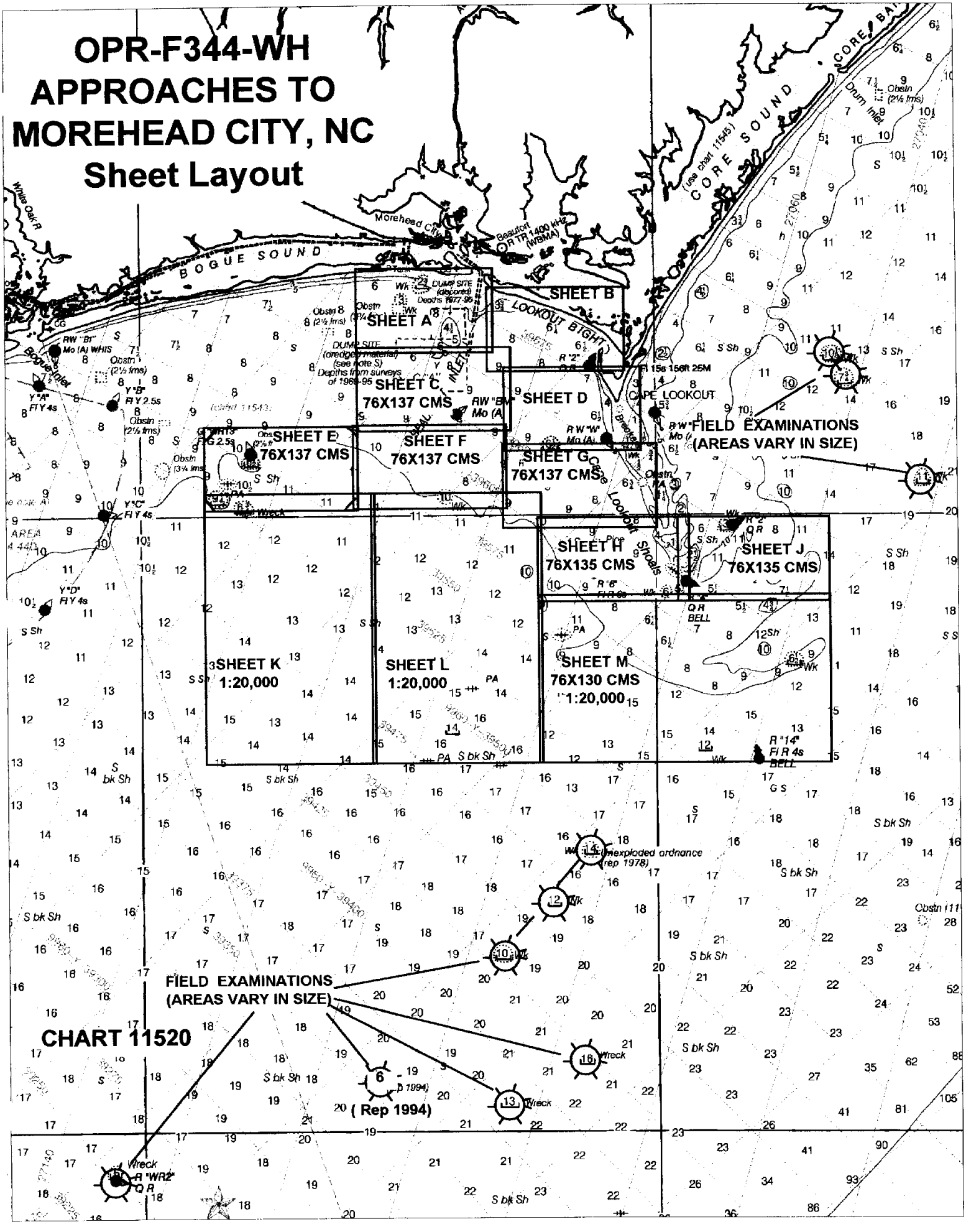

OPR-F344-WH
APPROACHES TO
MOREHEAD CITY, NC
Sheet Layout
SHEET A
SHEET B
SHEET C
76X137 CMS
SHEET D
SHEET E
76X137 CMS
SHEET F
76X137 CMS
SHEET G
76X137 CMS
SHEET H
76X135 CMS
SHEET J
76X135 CMS
SHEET K
1:20,000
SHEET L
1:20,000
SHEET M
76X130 CMS
1:20,000
FIELD EXAMINATIONS
(AREAS VARY IN SIZE)
FIELD EXAMINATIONS
(AREAS VARY IN SIZE)
CHART 11520
(Rep 1994)
BOGUE SOUND
CORE SOUND
LOOKOUT BIGHT
CAPE LOOKOUT
Morehead City
Beaufort
Drum Inlet
Bogue Inlet
Lookout Shoals

TABLE OF CONTENTS

A. PROJECT

A.1 This survey was conducted in accordance with Hydrographic Project Instructions OPR-F344-WH, basic hydrographic survey, Atlantic Ocean, Approaches to Morehead City, North Carolina.

A.2 The original instructions are dated February 20, 1998.

A.3 There have been two changes to the original project instructions dated June 30, 1998 and ~~September 2,~~ August 14 1998.

A.4 This Descriptive Report covers H10844 (sheet "E") of OPR-F344-WH. H10844 lies 13.3 nautical miles southwest of Fort Macon, North Carolina. See section B.2 for exact survey boundaries.

A.5 Project OPR-F344-WH responds to a request from the Fifth U.S. Coast Guard District. The USCG is conducting a Port Access Route Study for Morehead City, North Carolina. The study will determine the need for fairways and/or traffic separation schemes for the area. The port of Morehead City is the primary embarkation point for the 2nd Division, U.S. Marine Corps. The area is also host to commercial vessels transporting hazardous cargoes such as petroleum products and fertilizers.

B. AREA SURVEYED

B.1 This survey covers the navigable area of the Approaches to Morehead City, North Carolina.

B.2 The survey comprises one sheet with the following boundaries, starting at the NW corner and proceeding clockwise:

Sheet "E":

1. 34°34'23"N 076°56'22"W
2. 34°34'~~23~~34"N 076°47'~~25~~"W
3. 34°30'~~25~~"N 076°47'25"W
4. 34°30'2~~5~~"N 076°56'2~~2~~"W

B.3 Data collection for this survey began on September 16, 1998 (DN 259). Data collection ended on October 30, 1998 (DN 303).

C. SURVEY VESSELS

C.1 The following vessels were used during this survey:

Vessel	EDP Number	Primary Function
NOAA Ship WHITING	2930 (WTEW)	Hydrography and Side Scan Operations
NOAA Launch WH-2	2932 (1014)	Diving Operations
NOAA Launch WH-1	2931 (1015)	Hydrography and Side Scan Operations

C.2 No unusual vessel configurations were used during this survey.

D. AUTOMATED DATA ACQUISITION AND PROCESSING

See also the Evaluation Report

D.1 All software used for data acquisition and processing are contained on the **HYDROSOFT 8.2 (plus updates as of 4/22/98)** compact disc provided by Atlantic Hydrographic Branch (N/CS33). The following is a list of software used from this disc:

HYPACK for Windows version 7.1a
HSD Utilities
Hydrographic Processing System
HPTools

D.2 The SEABIRD SBE-19 CTD unit was utilized with **SEASOFT 3.3M** and **SEACAT 2.0** software. The program **VELOCITY** (Version 3.1, February 1998) was used to process the collected data and calculate velocity corrections.

E. SONAR EQUIPMENT

E.1 The WHITING and its launches conducted all side scan sonar operations using an EG&G Model 260 image-corrected side scan sonar recorder and a 100 kHz Model 272-T towfish.

E.2 The towfish was configured with a 20° beam depression, which is the normal setting and yields the optimum beam correction.

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

E.4 a. During survey preparation, it was determined that the depth of water in the survey area would require 80 meter line spacing to accommodate a 100 meter side scan sonar range scale. This line spacing and range scale combination was used to obtain complete (200%) area coverage and provided optimal contact resolution. The line spacing is in accordance with the value specified in section 7.3.2.1 Field Procedures Manual (FPM) (March 1994). Data collected with an EPE of ~~30~~ 15 or greater was rejected or smoothed during post-processing, so the maximum line spacing was never exceeded.

E.4 b. Confidence checks were obtained during passes by bottom features such as sand waves, scours, substrate density changes and buoy anchors. These features were annotated on the sonargram.

E.4 c. Any holidays with a length of 200 meters or less not covered with 200% side scan sonar were covered with 100% side scan sonar. In all other areas, two hundred percent side scan coverage was completed. All side scan coverage was checked with swath plots to ensure proper overlap between adjoining lines.

E.4 d. There were no degraded data returns collected during this survey.

E.4 e. On NOAA Ship WHITING, the SSS towfish was deployed from a Reuland winch using one of two armored cables in conjunction with an A-frame on the stern. The armored cable was connected to the SSS recorder by a slip-ring assembly. On WHITING launches 1014 and 1015, the SSS towfish was deployed using a Superwinch in conjunction with an adjustable davit arm on the stern. The SSS towfish was towed with a vinyl-coated Kevlar cable and was connected to the recorder by a slip-ring assembly.

E.5 Singlebeam echosounder was utilized for development of significant contacts not addressed by diver investigations. Development survey lines were routinely run with line spacing of 10 meters. Detailed descriptions of all AWOIS items and investigated contacts falling within the Navigable Area are addressed in the ITEM INVESTIGATION REPORTS found in section N.

E.6 All overlap was checked and holidays identified during post processing using **HPS_MI**, a MapBasic program provided by Hydrographic Surveys Division (N/CS32) to accompany **MapInfo** software **version 4.5**.

F. SOUNDING EQUIPMENT

F.1 All hydrographic depths were acquired using a Raytheon Model 6000N Digital Survey Echosounder.

F.2 No other sounding equipment was used.

F.3 There were no faults in sounding equipment that affected the accuracy or quality of the data.

F.4 Both high (100 kHz) and low (24 kHz) frequency sounding data were recorded during data acquisition. Only high frequency soundings were plotted.

G. CORRECTIONS TO SOUNDINGS

G.1 a. Sound Velocity Correctors

The velocity of sound through water was calculated using measurements taken from a Sea-Bird SBE 19 Seacat Profiler (CTD) unit (s/n 196093-1060). Seacat Data Quality Assurance Tests were conducted after each respective velocity cast to ensure that the unit was operating within tolerance.

All sound velocity data were processed using program **VELOCITY**. Computed velocity correctors were entered into the HPS sound velocity table and re-applied during post-processing to both high and low frequency soundings.

The following is a list of sound velocity casts performed for H10844:

Cast Number	Day Number	Vessel Covered	Position of Cast		Days Covered
			Latitude	Longitude	
36	261	WHITING	34°38'30"N 2 15	76°48'09"N	259-~~272~~ 266
37		Launches			
42	273	WHITING	34°38'30"N 0 24	76°47'18"N	27~~3~~-280 2
43		Launches			
46	287	WHITING	34°38'30"N 0 24	76°47'24"N	287-292
47		Launches			
48 dive	287	Launches	34°33'30"N	76°50'54"N	287
54 dive and dev	303	Launches	34°33'38"N	76°51'23"N	303

c. The **DAILYDQA** program used in conjunction with the ship's barometer was used to assure that the MOD III Diver Least Depth Gauge was working properly. Daily results fell within specified operating ranges. CTD casts were used in the **SMLGAUGE** program (v3.1) to calculate least depth measurements.

d. Leadline Comparison

Dual leadline comparisons with the DSF-6000N were conducted for WHITING during OPR-F344-WH (H10844) on:

DN 286 at 34°35'18"N and 076°36'54"W (51 ft depths)

A leadline comparison was performed for WHITING launches on:

DN 286 at 34°35'5~~8~~4"N and 076°33'~~12~~05"W (~~36~~42 ft depths)
DN 286 at 34°35'58"N and 076°33'02"W (2~~4~~9 ft depths)

Weather and sea conditions were fair and proved satisfactory for performing the leadline comparisons. No corrections to soundings were needed. Copies of the leadline check data and calibration forms are included in the Separates, section IV. *

f. Static Draft

The static draft correction for launch 1015 is 0.55 meters, and was measured on July 28, 1993. The corrector was entered into HPS Offset Table 1. The correction for static draft for WHITING is 3.2 meters, a historical value which WHITING divers confirmed with a MOD III Diver Least Depth Gauge on May 11, 1995. The corrector was entered into Offset Table 9. Static draft correctors were applied during data processing for each survey platform.

g. Dynamic Draft (Settlement and Squat Correctors)

Settlement and squat values for WHITING were determined on March 26, 1996, and were entered into HPS Offset Table 9. Settlement and squat values for launch 1014 were determined on March 16, 1998, and were entered into HPS Offset Table 2. Settlement and squat values for launch 1015 were determined on March 16, 1998, and were entered into HPS Offset Table 1. The settlement and squat correctors were applied to the sounding data in real time for each survey platform. Refer to Separate IV for data records.

* Data filed with the original field records

h. Heave, Roll, and Pitch Correctors

Heave correctors for data acquired by WHITING and its launches were determined by TSS Dynamic Motion Sensors (DMS-05). Heave correctors were collected during data acquisition and applied to raw data during the **HPTools** conversion process. Serial numbers for these sensors were as follows:

Vessel	Serial Number
2930	2066
2931	2062
2932	2068

G.2 WHITING and its launches employed no unusual or unique methods or instruments to correct echo soundings.

G.6 Tide Correctors

a. The tidal datums for this project are Mean Lower Low Water (MLLW) and Mean High Water(MHW). Soundings are referenced to MLLW. Heights of bridges and cables are referenced to MHW. The operating tide station at Duke Marine Laboratory, Beaufort, North Carolina (865-6483) served as control for datum determination.

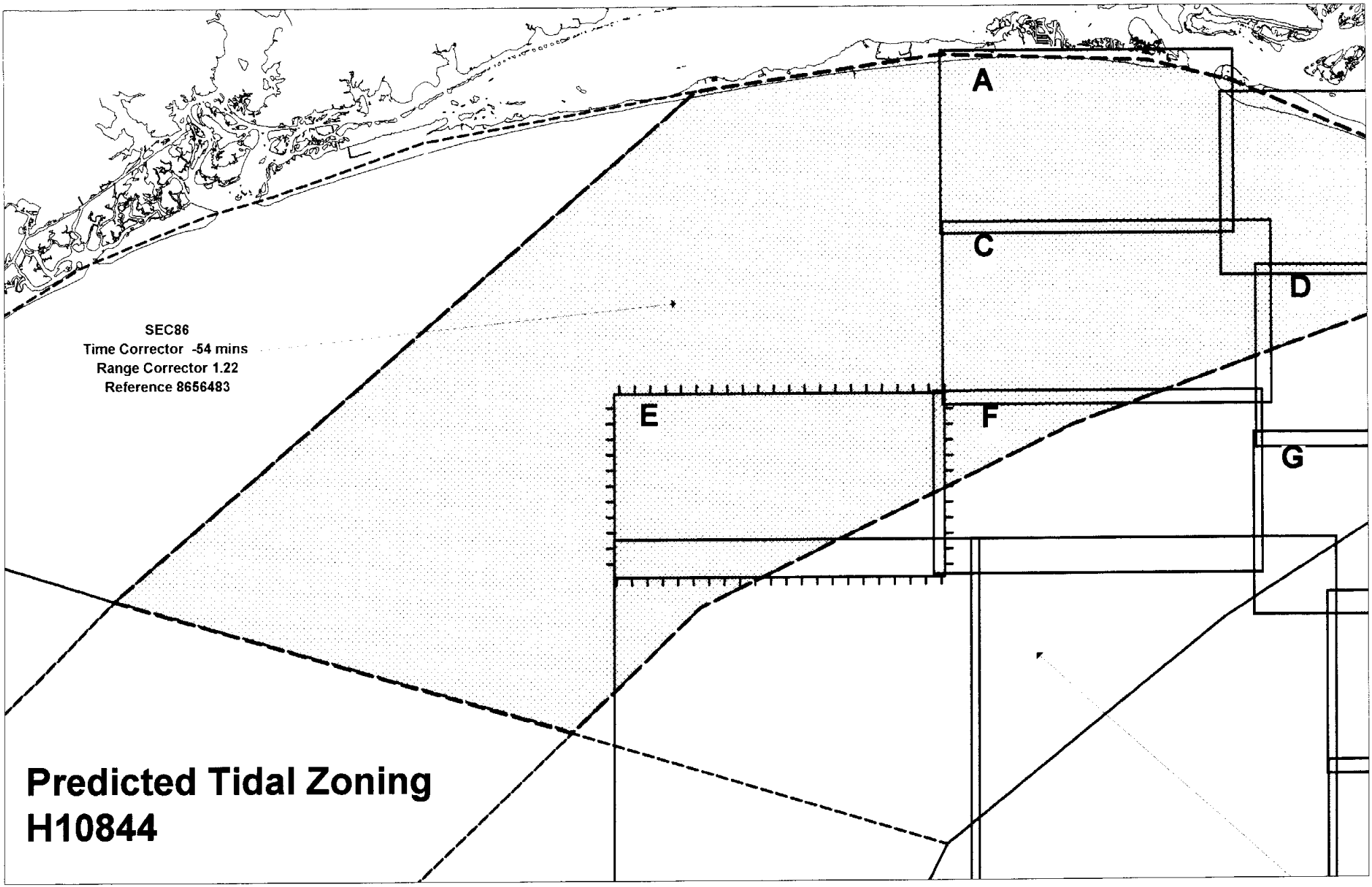
b. Tidal zones are controlled by Duke Marine Laboratory guage, (865-6483). Due to the limitations of HPS and for ease of data processing, zone SEC86 correctors were applied to all H10844 data using unverified actual tides provided by the Atlantic Hydrographic Branch and entered using the DPAS tide utilities in HPS. All proper zones will be applied through HPS upon receipt of smooth tides from N/OES234. See following page for location of zone SEC86.

Smooth tides for H10844 were requested from N/OES234 in a letter mailed and dated November 1, 1998

All sounding correctors were applied to both the narrow (100 kHz) and wide (24 kHz) DSF-6000N beams. Zoning for this project is consistent with the project instructions.

H. CONTROL STATIONS See Also Evaluation Report

The horizontal datum for this survey is the North American Datum of 1983 (NAD 83). No horizontal control stations were established for this survey.



Predicted Tidal Zoning
H10844

I. HYDROGRAPHIC POSITION CONTROL

I.1 This survey was conducted using the Global Positioning System (GPS) corrected by the U.S. Coast Guard (USCG) Differential GPS reference station network. WHITING and its launches used Ashtech Sensor GPS receivers with CSI MBX1 beacon receivers supplying USCG correctors for DGPS navigation. Ashtech receivers were automatically initialized by HSDutils and the CSI MBX1 units were preset to the appropriate station and frequency.

I.2 Accuracy requirements were met as specified by the Hydrographic Manual and Field Procedures Manual (FPM). The Horizontal Dilution of Precision (HDOP) and Expected Position Error (EPE) specified by the FPM were monitored during on-line data collection. If the positioning degraded beyond the acceptable limits while on-line, the data were either smoothed or rejected.

I.3 Differential GPS Equipment:

The serial numbers of the Ashtech Sensor and CSI MBX1 receivers on the data acquisition platforms are as follows:

Vessel	Device	Serial Number
2930 (WTEW)	Ashtech Sensor	700417B1203 (system A) 700417B1191 (system B)
	CSI MBX1	X-1318 (system A) X-1081 (system B)
2931 (1015)	Ashtech Sensor	700417B1194
	CSI MBX1	X-1088
2932 (1016)	Ashtech Sensor	700417B1055
	CSI MBX1	X-1079

I.4 Correctors were received from the Fort Macon, NC and Charleston, SC radiobeacons.

I.5 a. DGPS performance checks on NOAA Ship WHITING and its launches were determined by using the "**P-Check**" program from the Hydrosoft disk. DGPS positions from WHITING, launch 1014 and launch 1015 were taken while secured in their davits using correctors from the Fort Macon, NC DGPS beacon. Simultaneous HYPACK positions were compared with WHITING. An offset in distance and azimuth was then calculated between the ship and launch system. A summary of the DGPS performance checks is included in the* Separates, section III. All DGPS performance checks confirmed that the equipment was working properly.

* Data filed with the original field records

I.7 a. There were no unusual methods used to operate or calibrate electronic positioning equipment.

I.7 b. There were no equipment malfunctions.

I.7 c. No unusual atmospheric conditions affected data quality.

I.7 d. No systematic errors were detected which required adjustments.

I.7 e. The maximum allowed HDOP value of 4.0 was never exceeded.

I.8 f. DGPS antenna offsets were measured on March 19, 1993, for WHITING. Offsets and laybacks were measured using the high frequency echosounder transducer as the reference. Correctors were entered into Offset Table 9. The DGPS antennae was installed on launch 1015 on April 2, 1996, directly over the echosounder transducer. Antenna height was also measured on the same respective dates shown above, using the water line as the reference. Correctors were entered into Offset Table 1 for launch 1015. A minimum of four satellites were used during survey H10825 providing altitude unconstrained positioning.

I.9.g. Offset, layback and height corrections for the launch's aft towing boom was measured on July 28, 1993, verified on April 5, 1994, and applied by HPS during post processing. Correctors were entered into Offset Table 1 for launch 1015. Offset, layback and height for WHITING's A-frame was measured on March 18, 1998, using the forward high frequency transducer as the reference. Correctors were entered into Offset Table 9.

These offsets, along with the cable length, towfish height, and depth of water, were used by the HPS system to compute the position of the towfish. Copies of HPS Offset Tables 1 and 9 are contained in* Separate III.

J. SHORELINE

No shoreline is contained within the boundaries of this survey.

K. CROSSLINES

A combined total of 46.46 linear nautical miles of crosslines were acquired for this survey representing 8.77% of the 530 computed linear nautical miles of mainscheme hydrography.

* Data filed with original field records

A plot of all main scheme soundings in feet, superimposed with cross lines, was used to conduct main scheme-to-cross line comparisons. Depths at intersections were compared to all other depths within a 5-mm (50-meter) radius. Based on this procedure, agreement between main scheme and cross line depths was found to be excellent. The majority of compared depths fell within 1 foot of each other.

L. JUNCTIONS See Also Evaluation Report

L.1 On its eastern edge, survey H10844 junctions with survey H10826, sheet "F". H10826 is a 1:10,000 scale sheet, contained within project OPR-F344-WH. A comparison of data collected on H10826 to that on H10844 proved no significant differences between soundings exist. Generally agreement was excellent, with occasional 1 to 2 foot differences observed.

M. COMPARISON WITH PRIOR SURVEYS See Also Evaluation Report

A comparison with prior surveys is not required for this survey, due to completion of 200% side scan sonar coverage over the entire area.

N. ITEM INVESTIGATION REPORTS See Also Evaluation Report

AWOIS #: 598

Item Description: Wreck "Suloide"

Source: F00052WD, CL684/55, NM42/55, F00143WD, H9060

AWOIS Position: lat. 34°32'48.59"N long. 076°53'40.78"W

Required Investigation: ES,MB,S2,BD,DI,SD **Radius:** 200m

Charts Affected: 11520, 11543

INVESTIGATION

Date(s): 14 October 1998 (DN 287)

Position Numbers: 1

Investigation Used: S2, DI

Surveyed Position: lat. 34°32'41.943"N long. 076°53'42.253"W

Position Determined By: Differential GPS

Investigation Summary: 200% side scan sonar coverage was completed over the assigned 200 meter search radius. Contact 45025.2p was found. During a diver investigation, a badly deteroirated wreck was found, sitting upright on the sandy bottom. A least depth, corrected with ~~predicted~~ Approved tides, of 15.74 meters (51.5 feet) was taken on a steel skin fragment near the bow.

CHARTING RECOMMENDATION

Recommendation: Based on the results of this survey, the hydrographer recommends retaining "wreck, least depth known" and updating charted depth, corrected with predicted tides, to 51.5 feet. Also, recommend removal of wire drag symbol associated with the charted wreck. Concur

Delete 39

Chart 50 WK

AWOIS #: 9951

Item Description: Sounding

Source: F00152WD, H9044

AWOIS Position: 34°31'00.59"N Lon. 076°55'28.78"W

Required Investigation: ES,MB,S2,BD,DI **Radius:** 1500

Charts Affected: 11520, 11543

INVESTIGATION

Date(s): Various

Position Numbers: None

Investigation Used: S2

Surveyed Position:

Position Determined By: Differential GPS

Investigation Summary: During mainscheme hydrography, AWOIS #9951 was covered with 200% side scan sonar. No significant contacts were found.

CHARTING RECOMMENDATION

Recommendation: Based on the results of this survey, the hydrographer recommends no charting change and disproval of AWOIS #9951. Concur

AWOIS #: 9952

Item Description: "Lookout Diver"

Source: LNM28/92

AWOIS Position: Lat. 34°31'24.00"N Lon. 076°54'48.00"W

Required Investigation: ES,MB,S2,BD,DI,SD **Radius:** 750

Charts Affected: 11009, 11520, 11543

INVESTIGATION

Date(s): Various

Position Numbers: None

Investigation Used: S2

Surveyed Position:

Position Determined By: Differential GPS

Investigation Summary: During mainscheme hydrography, AWOIS #9952 was covered with 200% side scan sonar. No significant contacts were found.

CHARTING RECOMMENDATION

Recommendation: Based on the results of this survey, the hydrographer recommends no charting change and disproval of AWOIS #9952. Concur w/ Clarification

Delete ~~it~~: PA

Contact #: 20319.2p

Item Description: Wreck "Indra"

Source: North Carolina Artifical Reef Guide

AWOIS Position: N/A

Required Investigation: None **Radius:** None

Charts Affected: 11520, 11543

INVESTIGATION

Date(s): 14 October 1998 (DN 287)

Position Numbers: 4

Investigation Used: S2, DI

Surveyed Position: Lat. 34°33'43.330"N Lon. 076°51'06.415"W

Position Determined By: Differential GPS

Investigation Summary: During mainscheme hydrography, contact 20319.2p was found. During an investigation, divers found a large intact wreck sitting upright, 320 feet in length. Most of the above deck structures were intact. A least depth, corrected with ~~predicted~~ tides, of ~~10.1~~ 9.5 meters (~~33~~ 31.1 feet) was taken near the stern. Approved

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CHARTING RECOMMENDATION

Recommendation: Based on the results of this survey, the hydrographer recommends charting an "Wreck, least depth known" with a least depth, corrected with ~~predicted~~ tides, of ~~33.1~~ ~~33~~ 31.1 feet at the surveyed position. Approved Concur

✓ Chart 31: WK

Contact #: 20345.0p See Also Evaluation Report Section N.I.

Item Description: C-130 Aircraft

Source: North Carolina Artificial Reef Guide

AWOIS Position: N/A

Required Investigation: None **Radius:** None

Charts Affected: 11520, 11543

INVESTIGATION

Date(s): 30 October 1998 (DN 303)

Position Numbers: 146

Investigation Used: S2, DI

Surveyed Position: Lat. 34°33'38.363"N Lon. 076°51'23.125"W

Position Determined By: Differential GPS

Investigation Summary: During mainscheme hydrography, contact 23045.0p was found. During an investigation, divers found a C-130 aircraft fuselage, resting upside down on the sandy bottom. A least depth, corrected with ~~predicted~~ Approved tides, of 16.~~4~~0 meters (~~53.8~~ 52.5 feet) was taken on the deployed front landing gear.

CHARTING RECOMMENDATION

Recommendation: Due to the proximity to contact #20375.4p, no charting change is recommended. Do not Concur

✓ Chart .52 Obstn

Contact #: 20375.4p See Also Evaluation Report - Section M.2.

Item Description: F-4 Aircraft

Source: North Carolina Artificial Reef Guide

AWOIS Position: N/A

Required Investigation: None **Radius:** None

Charts Affected: 11520, 11543

INVESTIGATION

Date(s): 14 October 1998 (DN 287)

Position Numbers: 7

Investigation Used: S2, DI

Surveyed Position: Lat. 34°33'38.199"N Lon. 076°51'23.616"W

Position Determined By: Differential GPS

Investigation Summary: During mainscheme hydrography, contact 23075.4p was found. During an investigation, divers found an F-4 aircraft, 35-40 feet in length. A least depth, corrected with ~~predicted~~ Approved tides, of ~~15.8~~ 16.3 meters (~~51.8~~ 53.5 feet) was taken on the tail structure.

CHARTING RECOMMENDATION

Recommendation: Based on the results of this survey, the hydrographer recommends charting an "Obstruction, least depth known" with a least depth, corrected with predicted tides, of 51.8 feet at the surveyed position. Do not Concur

Contact #: 20438.3p

Item Description: Railroad Boxcars

Source: North Carolina Artificial Reef Guide

AWOIS Position: N/A

Required Investigation: None **Radius:** None

Charts Affected: 11520, 11543

INVESTIGATION

Date(s): 14 October 1998 (DN 287)

Position Numbers: 5

Investigation Used: S2, DI

Surveyed Position: Lat. 34°33'30.773"N Lon. 076°51'15.286"W

Position Determined By: Differential GPS

Investigation Summary: During mainscheme hydrography, contact 20438.3p was found. During an investigation, divers found three severely deteriorated railroad boxcars, sitting upright on the sandy bottom. The sides of the cars were completely gone, leaving only the ends rising off the bottom. A least depth, corrected with ~~predicted~~ Approved tides, of ~~16.6~~ 15.3 meters (~~54.5~~ 50.8 feet) was taken on top of one of the boxcar ends.

CHARTING RECOMMENDATION

Recommendation: Based on the results of this survey, the hydrographer recommends charting an "Obstruction, least depth known" with a least depth, corrected with ~~predicted~~ Approved tides, of ~~54.5~~ 50.8 feet at the surveyed position. Concur

/ Chart '51 Obstn

O. COMPARISON WITH THE CHART

O.1 Three charts are affected by this survey (H10844):

Chart 11009
"Cape Hatteras to Straits of Florida"
34th Ed. 23 January 1993
Scale: 1:1,200,000

Chart 11520
"Cape Hatteras to Charleston"
37th Ed. 20 Dec 1997
Scale: 1:432,720

Chart 11543
"Cape Lookout to New River"
21st ~~20th~~ Ed. ~~11 July 1992~~ 15 Aug. 1998
Scale: 1:80,000

O.3 Overall, the depths collected for this survey correlated well with charted soundings. Survey depths were converted from meters to feet and overlaid on the largest scale chart of the area using MapInfo software. Depending on geographic area, depths generally showed minor shoaling and deepening when compared to charted soundings. Occasional differences of 1 to 2 feet were found within the survey area.

P. ADEQUACY OF SURVEY See Also Evaluation Report

This survey is complete and fully adequate to supersede prior survey data within common areas.

Q. AIDS TO NAVIGATION

Q.2 There are two floating aids to navigation within the survey limits of H10844.

Detached Positions				
Nav. Aid	**Light List**	**Description**	**Difference Between Charted and Survey Positions**	**DP Fix Number**
G WR "13"	No	Green lighted wreck buoy	180 meters	2
AR "330"	No	Yellow unlighted artificial reef buoy	Not Charted	8

R. STATISTICS

R.1	a. Number of Non-Rejected Positions	26338
	b. Linear Nautical Miles of Sounding Lines:	
	Nautical Miles of Side Scan Sonar	669.83
	Nautical Miles Hydrography	46.46
R.2	a. Square Nautical Miles of Hydrography	29.00
	b. Days of Production	19
	c. Detached Positions	7
	d. Bottom Samples	28
	e. Tide Stations.	1
	g. Velocity Casts	5

S. MISCELLANEOUS See Also Evaluation Report

S.1 Bottom samples were taken at 2000-meter intervals. Samples were examined for composition and consistency, then stored in plastic bags and sent to the Smithsonian Institution.

T. RECOMMENDATIONS

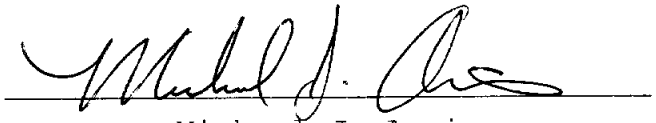
T.1 No further survey work is recommended.

T.2 The hydrographer recommends charting the uncharted artificial reef buoy AR "330" at the surveyed position listed in section Q of this report.

U. REFERRAL TO REPORTS

No reports or data are referred to in this Descriptive Report that are not included with this survey.

This report and the accompanying field sheets are respectfully submitted.



Michael J. Annis
Physical Scientist
Atlantic Hydrographic Branch

APPENDIX I

DANGER TO NAVIGATION REPORTS

Their were no danger to navigation reports issued as a result of this survey.

APPENDIX II

NON-FLOATING AIDS AND LANDMARKS FOR CHARTS

No non-floating aids or landmarks exist within the confines of survey H10844.

APPENDIX III

LIST OF HORIZONTAL CONTROL STATIONS

No horizontal control stations were needed for this survey since differential GPS employed exclusively for all positioning control. The geographic positions for the two differential GPS radio beacons used during this survey are as follows:

Fort Macon, NC	Lat. 34° 41.8 N
294 KHz	Long. 076° 41.0 W
Charleston, SC	Lat. 32° 45.5 N
298 KHz	Long. 079° 50.6 W

APPENDIX VII

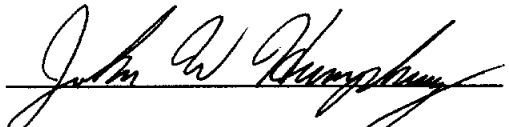
APPROVAL SHEET

LETTER OF APPROVAL

REGISTRY NO. H10844

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

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



John W. Humphrey, LCDR, NOAA
Commanding Officer
NOAA Ship WHITING

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

TIDE NOTE FOR HYDROGRAPHIC SURVEY

DATE: January 21, 1999

HYDROGRAPHIC BRANCH: Atlantic

HYDROGRAPHIC PROJECT: OPR-F344-WH
HYDROGRAPHIC SHEET: H-10844

LOCALITY: North Carolina, Atlantic Ocean Approaches
To Morehead City

TIME PERIOD: September 16, 1998 - October 30, 1998

TIDE STATION USED: 865-6590 Atlantic Beach, Triple "S" Pier, NC
Lat. 34° 41.9'N Lon. 76° 42.7'W
PLANE OF REFERENCE (MEAN LOWER LOW WATER): 0.000 meters
HEIGHT OF HIGH WATER ABOVE PLANE OF REFERENCE: 1.207 meters

TIDE STATION USED: 865-6483 Duke Marine Lab, Beaufort Inlet, NC
Lat. 34° 43.2'N Lon. 76° 40.2'W
PLANE OF REFERENCE (MEAN LOWER LOW WATER): 0.000 meters
HEIGHT OF HIGH WATER ABOVE PLANE OF REFERENCE: 0.966 meters

REMARKS: RECOMMENDED ZONING
Use zone(s) identified as: SEC 85 & SEC86.

Refer to attachments for zoning information.

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

Note 2: Use tide data from the appropriate station with applicable zoning correctors for each zone according to the order in which they are listed in the Tidezone corrector files. For example, tide station one (TS1) would be the first choice for an applicable zone followed by TS2, etc. when data are not available.

Note 3: Atlantic Beach, Triple "S" Pier (865-6590) is the preferred tide data set for hydrography offshore, Atlantic Ocean Approaches to Morehead City. Unfortunately, a significant portion of the collected data was declared invalid do to unresolved gauge problems. Data collected at this station starting October 28, 1998 are valid based on data analyses. However, due

to pier construction, vertical stability verification through SOP differential leveling could not be conducted either at the maintenance activity or at the end of data collection for this project. As a result, uncertainty still exists, however, the accuracy is within the requirement for NOS hydrographic surveying operations. Therefore data from the Atlantic Beach station (TS1) should be used when available. The second choice station for this project is Duke Marine Lab 865-6483 (TS2).

Thomas N. Mero 1/21/99

CHIEF, REQUIREMENTS AND ENGINEERING BRANCH

U.S. DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration
NATIONAL OCEAN SERVICE

April 15, 1999

MEMORANDUM FOR: For The Record

FROM: William M. Gibson, NOS/CO-OPS/RDD

SUBJECT: Tide Data Quality Upgrade For Hydrographic Survey Project "Approaches To Morehead City" OPR-F344-WH-1998

Data collected at Atlantic Beach, Triple "S" Pier (865-6590) and Duke Marine Lab (865-6483) were used for tide reducers for the 1998 Hydrographic Survey Project "Approaches To Morehead City" (OPR-F344-WH). Due to construction on the Pier at the time the project was completed, vertical stability verification leveling could not be conducted. Therefore, data were disseminated with the following caveat added on the tide notes.

> ***Atlantic Beach, Triple "S" Pier (865-6590) is the preferred tide data set for hydrography offshore, Atlantic Ocean Approaches to Morehead City. Unfortunately, a significant portion of the collected data was declared invalid do to unresolved gauge problems. Data collected at this station starting October 28, 1998 are valid based on data analyses. However, due to pier construction, vertical stability verification through SOP differential leveling could not be conducted either at the maintenance activity or at the end of data collection for this project. As a result, uncertainty still exists, however, the accuracy is within the requirement for NOS hydrographic surveying operations. Therefore, data from the Atlantic Beach station (TS1) should be used when available. The second choice station for this project is Duke Marine Lab 865-6483 (TS2).***

Since that time, CO-OPS Field Operations Division conducted vertical stability verification differential leveling for Atlantic Beach Triple "S" Pier (865-6590) and Duke Marine Lab (865-6483). These levels were processed by the Requirements and Development Division and closure was determined to be within tolerances required for hydrographic survey operations, thereby, upgrading their status from preliminary to verified and "accepted".

The above note in italics is superseded by this memorandum which should accompany the following tide notes: H-10824, H-10825, H-10826, H-10827, H-10832, H-10844, H-10845 and F00447.

Distribution:
Thomas Mero, CO-OPS N/OPS1
William Stoney, CO-OPS N/OPS3
Lt. Commander Andrew Beaver CS/HSD/AHB N/CS33

NOAA FORM 76-155
(11-72)

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

GEOGRAPHIC NAMES

SURVEY NUMBER

H-10844

Name on Survey	A ON CHART NO. 11520, 11543	B ON PREVIOUS SURVEY NO.	C ON U.S. QUADRANGLE MAPS	D FROM LOCAL INFORMATION	E ON LOCAL MAPS	F P.O. GUIDE OR MAP	G RAND MCNALLY ATLAS	H U.S. LIGHT LIST	K	
MOREHEAD CITY (title)	X		X							1
NORTH ATLANTIC OCEAN	X		X							2
NORTH CAROLINA (title)	X		X							3
										4
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Approved:

Chief Cartographer

FEB 11 1999

NOAA FORM 76-155 SUPERSEDES C&GS 197

07/06/99

HYDROGRAPHIC SURVEY STATISTICS
REGISTRY NUMBER: H10844

NUMBER OF CONTROL STATIONS	2
NUMBER OF POSITIONS	26338
NUMBER OF SOUNDINGS	26338

	TIME-HOURS	DATE COMPLETED
PREPROCESSING EXAMINATION	37.0	11/21/98
VERIFICATION OF FIELD DATA	179.0	04/13/99
QUALITY CONTROL CHECKS	0.0	
EVALUATION AND ANALYSIS	1.0	
FINAL INSPECTION	11.0	06/22/99
COMPILATION	53.0	07/02/99
TOTAL TIME	281.0	

ATLANTIC HYDROGRAPHIC BRANCH APPROVAL 06/25/99

NOAA FORM 61-29
(12-71)

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

REFERENCE NO.

N/CS33-55-99

LETTER TRANSMITTING DATA

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

☐ ORDINARY MAIL ☐ AIR MAIL

☐ REGISTERED MAIL ☒ EXPRESS

☐ GBL *(Give number)* _____

TO:

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

DATE FORWARDED

JULY 6, 1999

NUMBER OF PACKAGES

ONE TUBE

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

H10844

NORTH CAROLINA, NORTH ATLANTIC OCEAN, APPROACHES TO MOREHEAD CITY

(ONE) TUBE CONTAINING THE FOLLOWING:

1 SMOOTH SHEET FOR SURVEY H10844
1 ORIGINAL DESCRIPTIVE REPORT
1 H-DRAWING FOR NOS CHART 11543
2 COMPOSITE DRAWING FOR NOS CHART 11543

FROM: *(Signature)*

ROBERT R. HILL Robert R. Hill

RECEIVED THE ABOVE
(Name, Division, Date)

Return receipted copy to:

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

NOAA FORM 61-29 SUPERSEDES FORM C & GS 413 WHICH MAY BE USED. *U.S.GPO:1983-0-664-006/1192

ATLANTIC HYDROGRAPHIC BRANCH
EVALUATION REPORT FOR H10844 (1998)

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

D. AUTOMATED DATA ACQUISITION AND PROCESSING

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

Hydrographic Processing System
NADCON, version 2.10
SiteWorks, version 2.1
MicroStation 95, version 5.05
I/RAS B, version 5.01

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

H. CONTROL STATIONS

Horizontal control used for this survey during data acquisition is based upon the North American Datum of 1983 (NAD 83). The smooth sheet has been annotated with ticks showing the computed mean shift between the North American Datum of 1983 (NAD 83) and the North American Datum of 1927 (NAD 27).

To place the survey on the NAD 27 datum, move the projection lines 0.591 seconds (18.205 meters or 1.82 mm at the scale of the survey) north in latitude and 1.224 seconds (31.21 meters or 3.12 mm at the scale of the survey) east in longitude.

L. JUNCTIONS

H10825 (1998) to the northeast
H10826 (1998) to the east

A standard junction was effected between the present survey and survey H10825 (1998).

A standard junction could not be effected between the present survey and H-10826 (1998). The junctional survey is archived at National Ocean Service (NOS) headquarters, Silver Spring, Maryland. In this case, the note "ADJOINS" is shown on the present survey. Any adjustments to the depth curves will have to be made during chart compilation.

There are no contemporary surveys to the north, south, or west. Present survey depths are in harmony with the charted hydrography to the north, south, and west.

M. COMPARISON WITH PRIOR SURVEYS

A comparison with prior surveys was not performed. This is in accordance with section 4. of the memorandum titled, "Changes to Hydrographic Survey Processing", dated May 24, 1995.

N. ITEM INVESTIGATION REPORTS

1. An obstruction with a least depth of 52 feet (16 m), in Latitude 34°33'38.36"N, Longitude 76°51'23.13"W, was located by the hydrographer. It is recommended that this obstruction be charted as shown on the present survey.

2. An obstruction with a least depth of 53 feet (16^3 m), in Latitude 34°33'38.20"N, Longitude 76°51'23.62"W, was located by the hydrographer. It is recommended that this obstruction not be charted due to its close proximity to another obstruction with a least depth of 52 feet (15^8 m) in Latitude 34°33'38.36"N, Longitude 076°51'23.13"W.

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

O. COMPARISON WITH CHARTS 11009 (34th Edition, Jan 23/93) 11520 (37th Edition, Dec 20/97) 11543 (21st Edition, Aug 15/98)

Hydrography

The charted hydrography originates with prior surveys and miscellaneous sources. The hydrographer makes adequate comparisons in section O. of the Descriptive Report. Attention is directed to the following:

A charted obstruction fish haven with an authorized minimum depth of 15 feet, in Latitude 34°33'55"N, Longitude 76°51'20"W, originates with an unknown source. No change in charting is recommended.

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

P. ADEQUACY OF SURVEY

This is an adequate hydrographic/side scan sonar survey; no additional work is recommended.

S. MISCELLANEOUS

Chart compilation using the present survey data was done by Atlantic Hydrographic Branch personnel in Norfolk, Virginia. Compiled data will be forwarded to the Marine Chart Division, Silver Spring, Maryland upon completion of the project.

The following NOS chart was used for compilation of the present survey:

11543 (21st Edition, Aug 15/98).

Richard W. Blevins

Richard W. Blevins
Cartographer
Verification of Field Data
Evaluation and Analysis

APPROVAL SHEET
H10844

Initial Approvals:

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

Robert R. Hill Date: 6/25/99

Robert R. Hill Jr.
Cartographer
Atlantic Hydrographic Branch

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

Robert G Robertson Date: 6/25/99

for Andrew L. Beaver
LCDR, NOAA
Chief, Atlantic Hydrographic Branch

****

Final Approval:

Approved: Samuel P. DeBow, Jr. Dated: 7/26/99

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

NOAA FORM 75-96
(10-83)

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

MARINE CHART BRANCH

RECORD OF APPLICATION TO CHARTS

FILE WITH DESCRIPTIVE REPORT OF SURVEY NO. H10844

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
11543	7/1/99	Robert Hill	Full ~~Part Before~~ After Marine Center Approval Signed Via
			Drawing No.
11543	8/3/99	Mark Hetrick	Full ~~Part Before~~ After Marine Center Approval Signed Via
		PS 8-5-99	Drawing No. 33 (EDITION 22 WILL SHOW H-10844 REVISIONS)
11520	8/9/99	Mark Hetrick	Full ~~Part Before~~ After Marine Center Approval Signed Via
		PS 8-11-99	~~Drawing No.~~ Edition #39 WILL SHOW H-10844 REVISIONS
			Full Part Before After Marine Center Approval Signed Via
			Drawing No.
			Full Part Before After Marine Center Approval Signed Via
			Drawing No.
			Full Part Before After Marine Center Approval Signed Via
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			Full Part Before After Marine Center Approval Signed Via
			Drawing No.
			Full Part Before After Marine Center Approval Signed Via
			Drawing No.

SUPERSEDES C&GS FORM 8352 WHICH MAY BE USED