

H11680

NOAA FORM 76-35A	
U.S. DEPARTMENT OF COMMERCE NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION NATIONAL OCEAN SURVEY	
DESCRIPTIVE REPORT	
Type of Survey:	Navigable Area
Registry Number:	H11680
LOCALITY	
State:	South Carolina
General Locality:	North Atlantic Ocean
Sub-locality:	Blake Plateau
20057	
CHIEF OF PARTY CAPT Raymond C. Slagle NOAA	
DATE	LIBRARY & ARCHIVES

HYDROGRAPHIC TITLE SHEET

H11680

INSTRUCTIONS: The Hydrographic Sheet should be accompanied by this form, filled in as completely as possible, when the sheet is forwarded to the Office.

State: **South Carolina**

General Locality: **North Atlantic Ocean**

Sub-Locality: **Blake Plateau**

Scale: **1:80,000** Date of Survey: **05/23/07 to 05/28/07**

Instructions Dated: **April 12, 2007** Project Number: **M-G900-TJ-07**

Vessel: **NOAA Ship THOMAS JEFFERSON**

Chief of Party: **CAPT Raymond C. Slagle, NOAA**

Surveyed by: **THOMAS JEFFERSON Personnel**

Soundings by: **Kongsberg SIMRAD EM1002 Multibeam Echosounder**

Graphic record scaled by: **N/A**

Graphic record checked by: **N/A**

Protracted by: **N/A** Automated Plot: **N/A**

Verification by: **Atlantic Hydrographic Branch Personnel**

Soundings in: **Meters *Fathoms* at MLLW**

Remarks: ***Red, bold, italic notes in descriptive report were made during office processing.***
1) All Times are in UTC.
2) This is a Navigable Area Hydrographic Survey.
3) Projection is UTM Zone 17.

Descriptive Report to Accompany Hydrographic Survey

Project M-G900-TJ-07
 120 NM Southeast of Charleston, SC
 Blake Plateau, North Atlantic Ocean
 Scale 1:80,000
 May 23-28, 2007
NOAA Ship THOMAS JEFFERSON

A. AREA SURVEYED

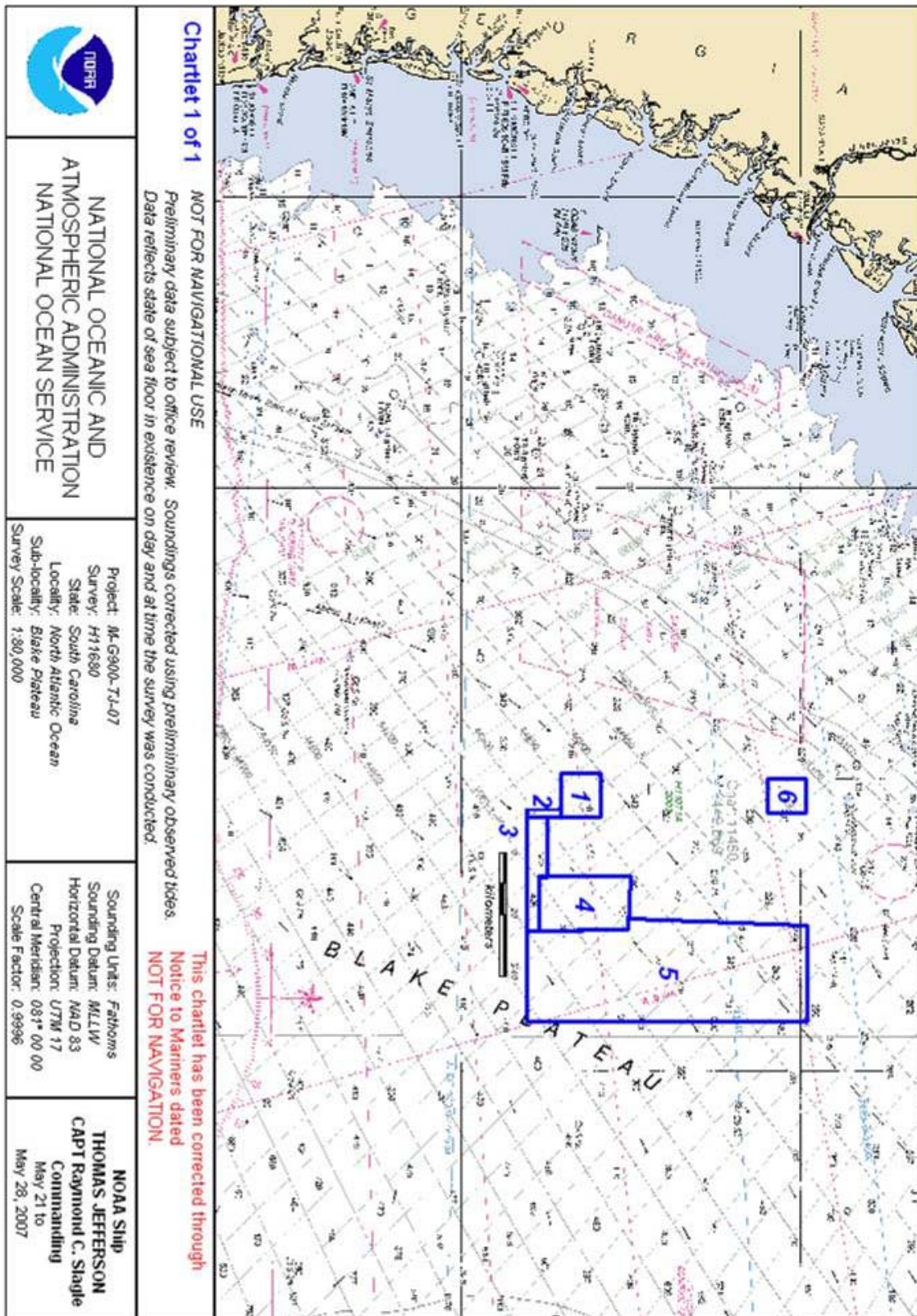
This hydrographic survey was completed as specified by Hydrographic Survey Letter Instructions M-G900-TJ-07, dated April 12, 2007. *Filed with original field records.*

Northern Limit	Southern Limit	Western Limit	Eastern Limit
31° 30' 22.41" N 078° 40' 02.13" W	31° 11' 00.86" N 078° 53' 56.45" W	31° 24' 00.78" N 079° 01' 23.18" W	31° 14' 10.89" N 078° 10' 12.53" W

This project responds to a request for bathymetric data from Dr. George Sedberry of the Marine Resources Research Institute at the South Carolina Department of Natural Resources. The bathymetric data will be used to map fish and coral habitats so management plans can be developed for these species. These areas have been selected for investigation because of their importance as Essential Fish Habitat (EFH) as defined by the Sustainable Fisheries Act, and as important fishing grounds; and their consideration by the South Atlantic Fishery Management Council (SAFMC) as a Habitat Area of Particular Concern (HAPC) for deepwater corals. A bathymetric survey of the area known as the "Charleston Bump" was initiated in 1999 and continued in 2000, 2001 and 2003 by the NOAA Ships WHITING and THOMAS JEFFERSON (formerly LITTLEHALES), and the NOAA Office of Coast Survey. The previously surveyed sites and the areas proposed for survey in 2007 are important bottom and pelagic fishing grounds and are currently subject to seasonal fishery closures. Surveys are needed to determine the habitats of particular concern for fishes and corals and to evaluate management regulations. In addition, bathymetric data from this project will update NOS charts in the area.

Approximate Survey limits of H11680 are shown on the following page.

Lineal Nautical Miles	
Single Beam Only	None
Multibeam Only	613.6
Side Scan Sonar Only	None
Side Scan/Single Beam	None
Crosslines	72.7
Multibeam Developments	N/A
Side Scan Developments	N/A
Shoreline Investigation	N/A
Data acquired from 23-28 May 2007	
No. bottom samples collected	None
No AWOIS items investigated	None



B. DATA ACQUISITION AND PROCESSING *See also the Evaluation Report.*

Refer to the 2007 Data Acquisition and Processing Report (DAPR)* for a complete description of data acquisition and processing systems, survey vessels, quality control procedures and data processing methods. Additional information to supplement sounding and survey data, and any deviations from the DAPR are included in this descriptive report.

B 1. EQUIPMENT AND VESSELS

Data were acquired by NOAA Ship THOMAS JEFFERSON (S-222). THOMAS JEFFERSON is a 208-foot hydrographic survey vessel and acquired SIMRAD EM1002 multibeam echosounder soundings as well as sound velocity profiles. Vessel configurations, equipment operation and data acquisition and processing were consistent with specifications described in the DAPR.

Concur.

B 2. QUALITY CONTROL

B 2.1 System Certification and Calibration

Refer to 2007 NOAA Ship THOMAS JEFFERSON DAPR* and Hydrographic Systems Readiness Report (HSRR) * for a complete description of system integration and calibration results for equipment and sensors used for this survey. *Concur.*

B.2.2 Sounding Coverage

Letter Instructions* for this survey called for Complete MBES coverage. According to the specification, Complete Multibeam coverage requires a maximum surface uncertainty of IHO Order 2 for depths greater than 100 meters. According to the IHO S-44 specification, the maximum depth for an IHO Order 2 survey is 200 meters. The average depth of this survey is 600 meters reduced to MLLW, thus it was conducted to the IHO Order 3 standard. Bathymetry coverage was monitored daily in CARIS HIPS/SIPS. *Concur.*

B 2.3 Crosslines

Multibeam echosounder cross-lines totaling 72 lineal nautical miles, comprising 11.85% of Kongsberg EM1002 main scheme multibeam hydrography, were acquired during the course of the survey. A CARIS QC report was performed to test whether this survey meets IHO Order 3 specifications. The CARIS QC report is contained in Separate II. *Concur.*

B 2.4 Junctions and Prior Surveys

The following contemporary surveys junction with H11680: *Concur.*

Registry #	Scale	Date	Field Party
H11071A	1:80,000	2003	THOMAS JEFFERSON*
H11071	1:80,000	2001	WHITING
H10947	1:80,000	2000	WHITING

**Filed with original field records.*

* THOMAS JEFFERSON had recently been delivered to NOAA and was still named LITTLEHALES at the time of acquisition of survey H11071A.

No junction data was available to THOMAS JEFFERSON for comparison, thus no junction analysis was performed for surveys H11071, H11071A, or H10947.

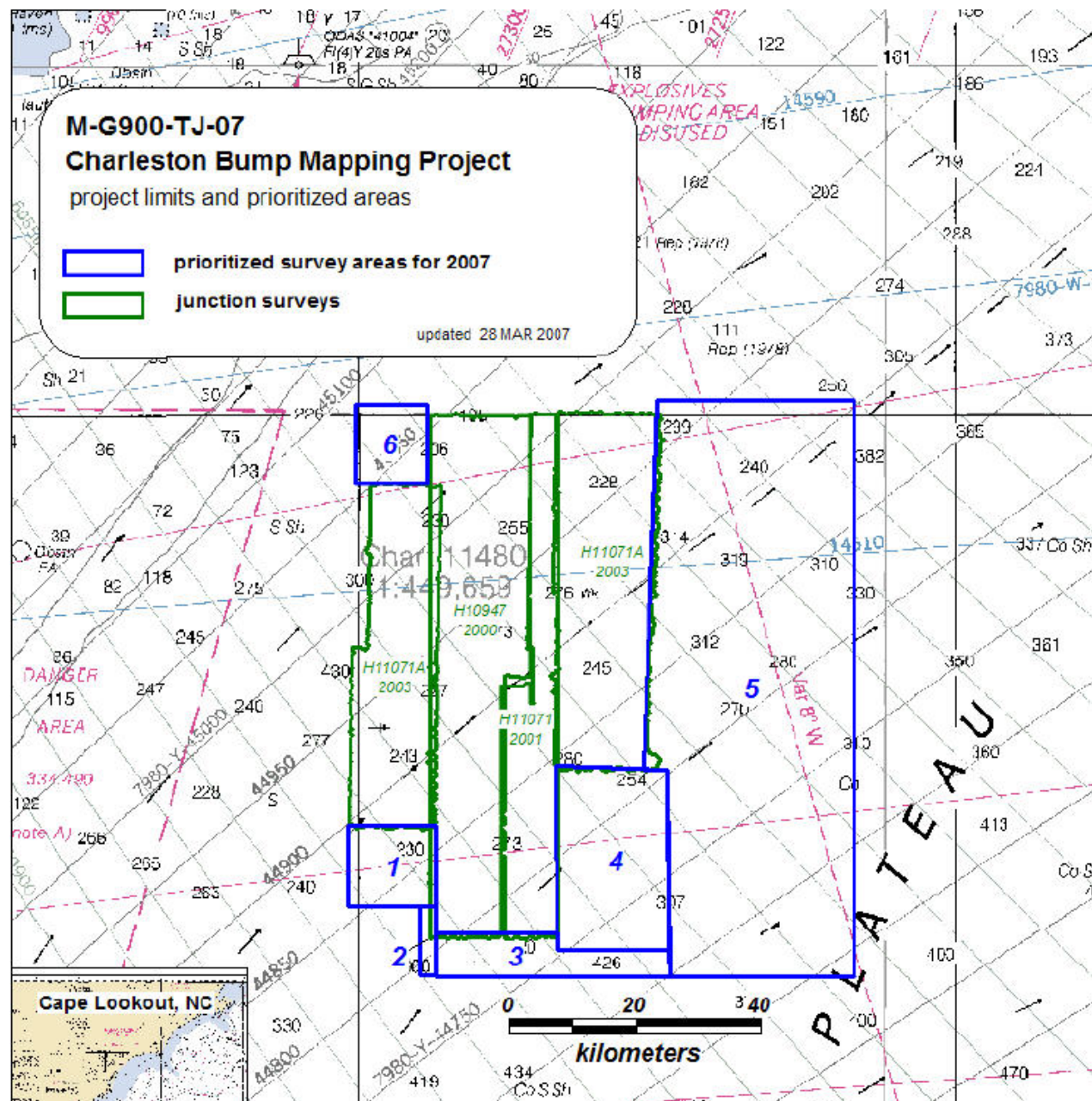


Figure 2. H11680 Junction Surveys.

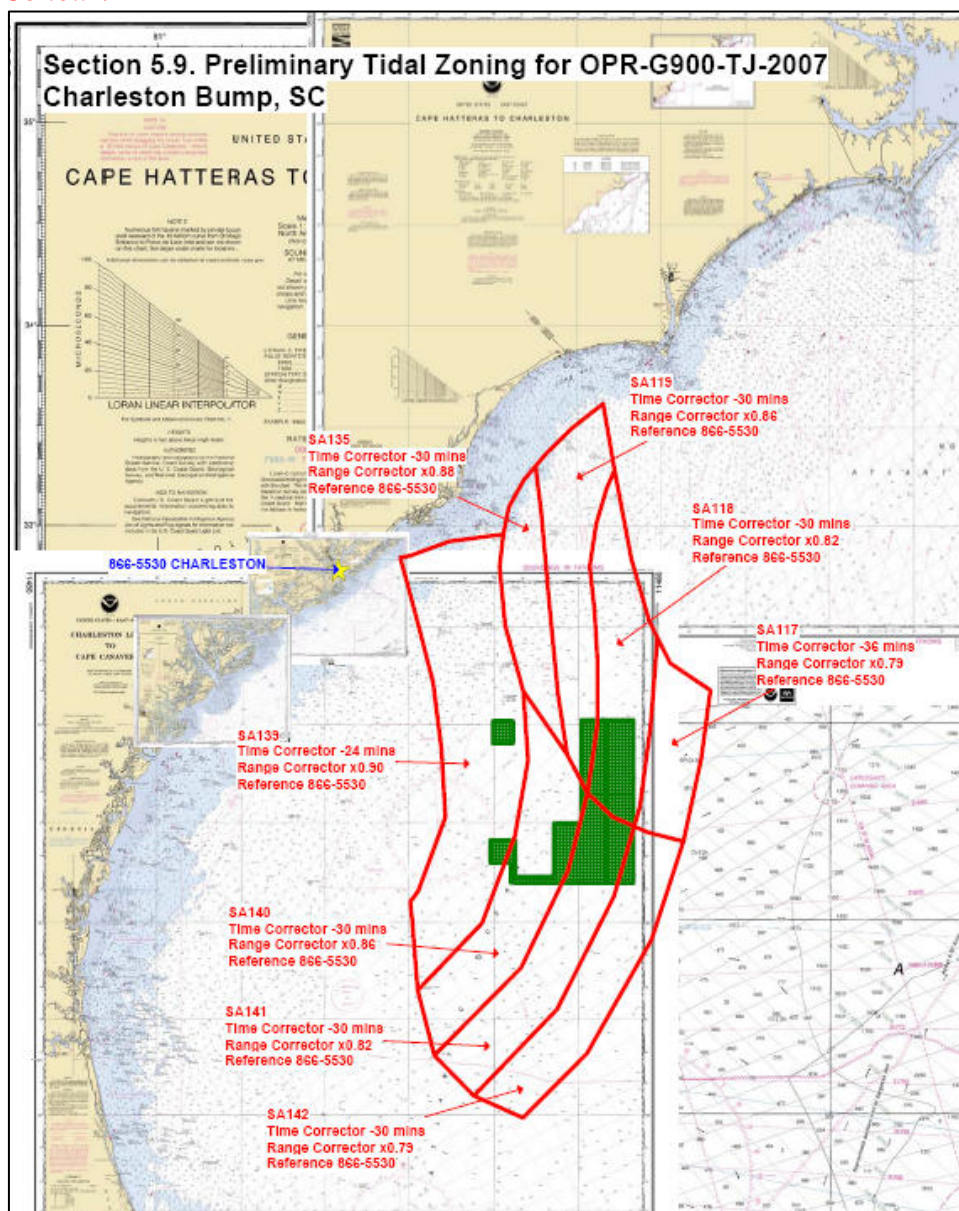
B 2.5 Systematic Errors

Systematic errors due to sound velocity are evident in section 3. This was due to repeated CTD errors on DN 148 wherein a cast was only successfully achieved to a depth of 350 meters rather than the intended 550 meters. This error does not exceed the error budget for IHO Order 3 and will not be corrected. *Concur.*

B 3. CORRECTIONS TO ECHO SOUNDING

HDSCS sounding data were reduced to mean lower-low water (MLLW) using predicted water levels from the primary station at Charleston, South Carolina (866-5530) and preliminary tide zoning. These files were provided by CO-OPS, as specified in the Letter Instructions and illustrated in Figure 2. *Concur.*

Figure 2: Preliminary Tide Zoning



Sound velocity profiles compared well. Due to limited time and the error budget for an IHO Order 3 survey (13.8m, assuming the average depth of the survey is 600m), CTD casts were taken approximately every eight hours. All other methods and instruments used for sound velocity correction were as described in the DAPR. A table detailing all sound velocity casts is located in Separate II of this Descriptive Report.

All other datum reduction procedures conform to those outlined in the DAPR.

B 4. DATA PROCESSING

B 4.1 Total Propagated Error

For the 2007 field season, Total Propagated Error (TPE) parameters for sound speed and tides are calculated separately for each project. The project-specific parameters for M-G900-TJ-07, Survey H11680 are as follows:

Table 2: TPE Parameters

Vessel	Tide Values		Sound Speed Values	
	Measured	Zoning	Measured	Surface
S222	0	0	0.05	0.06

These values were calculated for all MBES data immediately following CARIS Merge. Tide zoning and measurement error values were not provided to the field party by CO-OPS. The estimated tidal zoning error contribution to the total survey error budget in the offshore vicinity of Charleston, SC can not be computed due to a lack of available water level time series data. Tidal zoning error is not expected to exceed the error budget for an IHO Order 3 survey (13.8m, assuming the average depth of the survey is 600m).

B 4.2 BASE Surfaces and Mosaics

The following table describes all BASE Surfaces and Mosaics submitted as part of Survey H11680:

<i>Name of Fieldsheet</i>	<i>Resolution</i>	<i>Type</i>	<i>Purpose</i>
H11680_Section_1	30m	CUBE/Deep	Coverage
H11680_Section_2	30m	CUBE/Deep	Coverage
H11680_Section_3	30m	CUBE/Deep	Coverage
H11680_Section_4	30m	CUBE/Deep	Coverage
H11680_Section_5	30m	CUBE/Deep	Coverage
H11680_50M_Combined	50m	CUBE/Deep	Coverage

This survey was processed using the Combined Uncertainty and Bathymetry Estimator (CUBE) algorithm. The CUBE configuration was set to “Deep” for this entire survey. Refer to the 2007 Data Acquisition and Processing Report, 2007 Field Procedures Manual, and CARIS HIPS/SIPS 6.1 manual for further discussion of CUBE.

C. VERTICAL AND HORIZONTAL CONTROL *See also the Evaluation Report.*

A complete description of vertical and horizontal control for survey H11680 can be found in the M-G900-TJ-07 Horizontal and Vertical Control Report, submitted as an appendix to the DAPR*. A summary of horizontal and vertical control for this survey follows.

C 1.1 Horizontal Control

The horizontal datum for this project is the North American Datum of 1983 (NAD83), zone 17. Differential GPS (DGPS) was the sole method of positioning. Differential corrections from U.S. Coast Guard beacon at Kensington, SC (292.0 kHz), were used during this survey.

No horizontal control stations were established by the field party for this survey. *Concur.*

C 1.2 Vertical Control

The vertical datum for this project is Mean Lower-Low Water (MLLW). The operating National Water Level Observation Network (NWLON) station at Charleston, SC (866-5530) served as datum control for H11680. Predicted tides from station 866-5530 with preliminary tide zoning were applied to all sounding data. TCARI computation was not used. *Concur.*

A request for delivery of final approved (verified) tides for this survey was forwarded to N/OPS1 May 29, 2007 in accordance with the FPM and project letter instructions. *See also the Evaluation Report.*

**Filed with original field records.*

D. RESULTS AND RECOMMENDATIONS

D.1 Chart Comparison

Survey H11680 was compared with chart 11480 (39th Ed.; September 2005), chart 11009 (38th Ed.; December 2006), ENC US2EC02M and US3GA10M. Chart comparisons were performed in CARIS, in Pydro using survey-scale excessed soundings, and in MapInfo using survey-scale and chart-scale excessed soundings exported from Pydro. *Concur.*

D.1.1 Chart 11480 Comparison

Depth soundings from this survey range from 50 fathoms shoaler to 112 fathoms deeper than charted depths. No hazards to navigation were observed. *Concur.*

D.1.2 Chart 11009 Comparison

Depth soundings from this survey range from 107 fathoms shoaler to 59 fathoms deeper than charted soundings. Marks indicating direction of the Gulf Stream current (toward the northeast) correlate with observed current direction. No hazards to navigation were observed. *Concur.*

D.1.3 ENC US2EC02M

This ENC was scanned from paper chart 11480; differences between ENC US2EC02M and this survey are identical to differences between raster chart 11480 and this survey. *Concur.*

D.1.4 ENC US3GA10M

This ENC was scanned from paper chart 11009; differences between ENC US3GA10M and this survey are identical to differences between raster chart 11009 and this survey. *Concur.*

D.2 Additional Results

There were no additional results.

D.2.1 Automated Wreck and Obstruction Information Service (AWOIS) Items

There were no AWOIS items assigned to the field party for this project. *Concur.*

D.2.4 Shoreline

There is no shoreline within the sheet limits of survey H11680. *Concur.*

D.2.5 Charted Features

There are no charted features within the survey limits of H11680. *Concur.*

D.2.6 Charted Pipelines and Cables

There are no charted pipelines or cables in the survey area. *Concur.*

D.2.7 Bridges, Ferry Routes, and Overhead Cables

There are no ferry routes, bridges, or overhead cable crossings within the limits of the survey. *Concur.*

D.3 Dangers to Navigation and Shoals

D 3.1 Dangers to Navigation

There are no Dangers to Navigation for survey H11680. *Concur.*

D 3.2 Shoals

No navigationally significant shoaling was observed for survey H11680. *Concur.*

D.4 Aids to Navigation

There are no Aids to Navigation located within the survey limits of H11680. *Concur.*

D.5 Coast Pilot Information

The Hydrographer has no recommendations for changes or addenda to the Coast Pilot.

D.6 Miscellaneous

Bottom Samples

No bottom samples were acquired for survey H11680. *Concur.*

D.8 Adequacy of Survey

This survey is considered complete and adequate to supersede charted depths within common areas as per requirements specified in the Project Instructions. *Concur.*

Summary and Recommendations for Additional Work

There were no navigationally significant features detected by sonar, and all soundings are consistent with safe shipping depths. Update applicable charts per current survey data. *Concur.*

E. APPROVAL

As Lead Hydrographer, I have ensured that standard field surveying and processing procedures were followed in producing this examination in accordance with the Office of Coast Survey Hydrographic Surveys Division's *Field Procedures Manual*, and NOS *Hydrographic Surveys Specifications and Deliverables*. Field operations for this basic hydrographic survey were conducted under my daily supervision with frequent checks of progress and adequacy.

All field sheets, this Descriptive Report, and all accompanying records and data are approved. All records are forwarded for final review and processing to N/CS33, Atlantic Hydrographic Branch.

Survey H11680 is adequate to supersede charted soundings in their common areas.

Listed below are supplemental reports submitted separately that contain additional information relevant to this survey:

<u>Title</u>	<u>Date Sent</u>	<u>Office</u>
2007 Data Acquisition and Processing Report	15 June 2007	N/CS33
2007 Hydrographic Systems Readiness Report	6 April 2007	
Horizontal and Vertical Control Report for M-G900-TJ-07	<i>Pending</i>	N/CS33
Tides and Water Levels Package for M-G900-TJ-07	<i>Pending</i>	N/OPS1
Coast Pilot Report for M-G900-TJ-07	<i>N/A</i>	N/CS26

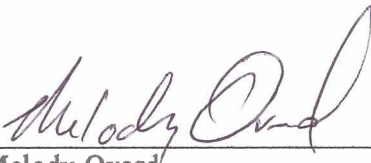
Approved and Forwarded:

LT Christiaan VanWestendorp, NOAA
Field Operations Officer

Captain Raymond C. Slagle, NOAA
Commanding Officer

In addition, the following individuals were also responsible for overseeing data acquisition and processing of this survey:

Survey Manager:



Melody Ovard
Assistant Survey Technician, NOAA

Appendix I

Danger to Navigation

No Dangers to Navigation were located during Survey H11680.

Appendix II

Navigationally Significant Features

No navigationally significant features were located during Survey H11680.

Appendix V

Supplemental Records and Correspondence

Subject: RE: Charleston Bump Survey 2007

From: George Sedberry <SedberryG@dnr.sc.gov>

Date: Wed, 23 May 2007 07:40:17 -0400

To: Christiaan VanWestendorp <Christiaan.VanWestendorp@noaa.gov>, LCDR Todd Haupt <Todd.A.Haupt@noaa.gov>

CC: LCDR James M Crocker <James.M.Crocker@noaa.gov>

LT van Westendorp,

Thank you for the update. When the survey is completed, it would be useful to me to get ArcGIS shapefiles or corner coordinates of the areas that are actually completed. This will help me in planning some additional surveys to be done in June and July aboard the NOAA Ship NANCY FOSTER.

Thanks again,

George

PLEASE NOTE MY ADDRESS WILL CHANGE SOON. MY NEW ADDRESS WILL BE (EFFECTIVE 11 JUNE 2007):

Gray's Reef National Marine Sanctuary
10 Ocean Science Circle
Savannah GA 31411
george.sedberry@noaa.gov

Until then, please use:

George R. Sedberry
Marine Resources Research Institute, SCDNR
P.O. Box 12559
(217 Ft. Johnson Rd.)
Charleston SC 29412

Office: 843-953-9814
Mobile: 843-607-3089
Fax: 843-953-9820

sedberryg@dnr.sc.gov

-----Original Message-----

From: Christiaan VanWestendorp
[<mailto:Christiaan.VanWestendorp@noaa.gov>]
Sent: Tuesday, May 22, 2007 9:33 PM
To: LCDR Todd Haupt; George Sedberry
Cc: LCDR James M Crocker
Subject: Charleston Bump Survey 2007

Dr. Sedberry and LCDR Haupt,

I just wanted to let you know that THOMAS JEFFERSON is currently in transit to the Charleston Bump and plans to commence multibeam acquisition on project M-G900-TJ-07 tomorrow (23 May) afternoon. We currently plan to continue acquisition until the afternoon/early evening of 28 May (Monday) before we transit to a scheduled inport period at Wilmington. If you have any questions or concerns, please let me know.

Thank you,
LT Chris van Westendorp



UNITED STATES DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration
National Ocean Service
Silver Spring, Maryland 20910



AHB PRE-COMPILATION PROCESS

REGISTRY No. [H11680](#)
 PROJECT No. [OPR-G900-TJ-07](#)
 FIELD UNIT [TJ](#)
 PRE-COMPILER [Bridget Williams](#)

Milestones	File Name
<i>Product Surface Creation</i>	PS_H11680_80k_800mrad_200mres
<i>Shifted Surface</i>	Shifted_PS_H11680_80k_800mrad_200mres
<i>Contour Layer</i>	PS_H11680_80k_800mrad_200mres_Contours
<i>Survey Scale Soundings</i>	H11680_80k_800mrad_200mres_SS_Soundings
<i>Chart Scale Soundings</i>	H11680_CU_Soundings
<i>Feature Layer</i>	N/A
<i>Meta-objects Layer</i>	H11680_Metaobjects
<i>Blue notes</i>	H11680_Bluenotes
<i>Content Review</i>	12/13/07 9am

SPECIFICATIONS:

- I. COMBINED SURFACE:
 - a. [H11680 30m Combined](#)
- II. PRODUCT SURFACE:
 - a. Scale: [1:80000](#)
 - b. Radius: [800m](#)
 - c. Resolution: [200m](#)
- III. SHIFTED SURFACE:
 - a. [Single Shift Value: -.229](#)
- IV. CONTOUR LAYER:
 - a. Use a Depth List: NOAA_depth_curves_list, in fathoms (365.760, 548.640, 731.520, 914.400)
 - b. Output Options: Create contour lines: line object: [DEPCNT](#); Value Attribute: [VALDCO](#)
- V. SOUNDING SELECTION:
 - a. Selection Criteria:
 - i. [Radius](#)
 - ii. [Shoal biased](#)
 - iii. Use Single-Defined Radius: [1600 distance on ground \(m\)](#)
 - iv. Filter: [Generalized !=1](#)
 - v. Sounding Rounding Rule: [NOAA Fathoms](#)
- VI. FEATURES:
 - a. [N/A](#)
- VII. META-OBJECTS:
 - a. M_COVR attributes: INFORM: H11680; CATCOV: 1; SORDAT: 20070528; SORIND: US,US,surve,H11680
 - b. M_NSYS attributes: INFORM: H11680; MARSYS: IALA B; SORDAT: 20070528; SORIND: US,US,surve,H11680
 - c. M_QUAL attributes: CATZOC: ZONE OF CONFIDENCE A2; INFORM: H11680; POSACC:10; SORIND: US,US,surve,H11680; SORDAT:20070528; SUREND: 20070528; SURSTA:20070523

ATLANTIC HYDROGRAPHIC BRANCH EVALUATION REPORT FOR H11680 (2007)

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.

B. DATA ACQUISITION AND PROCESSING

B.1 DATA PROCESSING

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

HSTP PYDRO version 7.3 r2239
CARIS HIPS/SIPS version 6.1 SP1 HF 1-6
CARIS Bathy Manager version 2.1 HF 1-3
CARIS HOM ENC version 3.3 SP3 HF 1-7
DKART INSPECTOR, version 5.0 Build 732

B.2 QUALITY CONTROL

B.2.1 H-CELL

The AHB source depth grid for the survey's nautical chart update product entailed using a 30m resolution combined grid model generated from five 30m resolution finalized depth grids. All soundings were extracted from a 200m resolution product surface model generated at a scale of 1:80,000, generalization radius of 800m, 200m cell resolution (PS_H11680_80k_800mrad_200mres). The chart scale soundings were selected from the survey scale selections. Office personnel used the surface model as reference when selecting the chart scale soundings, ensuring that the selected soundings portray the bathymetry within the common area.

The pre-compilation products or components (Stand Alone HOB Files (SAHOB)) are detailed in the Pre-Compile Process Log of this document. The SAHOB files included sounding selections (SOUNDG), Meta objects (M_COVR, M_QUAL, M_NSYS), and cartographic Blue Notes. The individual SAHOB files were imported into the CARIS HOM for H-Cell compilation.

The completed H-Cell was exported as a Base Cell File (ENC.000) in S-57 format with all values in metric units. The metric equivalent ENC.000 file was then converted to NOAA chart units (ENC_CU.000) with all values measured in fathoms following NOAA sounding rounding rules.

Chart compilation was performed by Atlantic Hydrographic Branch personnel in Norfolk, Virginia. Compilation data will be forwarded to Marine Chart Division, Silver Spring, Maryland.

The H11680 CARIS H-Cell final deliverables include the following Base Cell products:

US311680_CU.000	1:449,659 Scale	H11680 H-Cell with Chart 11480 Scale Selected Soundings
US311680_SS.000	1:80,000 Scale	H11680 Survey Scale Soundings
US311680_BlueNotes.000	1:80,000 Scale	H11680 Cartographic Notes and Depth Curves
US311680_Feature.000	Not submitted	No Group 2, Non-Skin-of-the-Earth features. Reference H11680_Features_READ-ME.txt

C. VERTICAL AND HORIZONTAL CONTROL

Final vertical correction processing was completed by the Atlantic Hydrographic Branch using final verified water levels and preliminary as final zoning. The field unit applied verified water levels in conjunction with the preliminary tidal zoning which was accepted and approved by N/OPSI CO-OPS as the final zoning for H11421. Vertical datum for all soundings are reference to Mean Lower Low Water (MLLW).

Horizontal control used for this survey during data acquisition is based upon the North American Datum of 1983 (NAD83), UTM projection zone 17. Office ENC processing of this survey required translating the datum to meet S-57 ENC requirements. The horizontal geodetic datum was translated to Latitude and Longitude (LLDG) World Geodetic System-84 (WGS-84) during CARIS HOM processing. The S-57 H-CELL format serves as the exchange file format submitted to Marine Chart Division.

D. RESULTS AND RECOMMENDATIONS

D.1 CHART COMPARISON **11480 (40th Edition, Mar./07)**
Corrected through NM 10/30/2007
Corrected through LNM 11/02/2007

ENC Comparison **US3GA10M**

D.1.1 Hydrography

The charted hydrography originates with prior surveys and requires no further consideration. The hydrographer makes adequate chart comparisons in section “D” and Appendix 1 of the Descriptive Report. The survey did not reveal or detail Non-Skin-of-the-Earth (Group 2) features during data verification and product generation.

D.2 COMPARISON WITH PRIOR SURVEYS

A comparison with prior surveys was not done during office processing in accordance with section 4 of the memorandum titled "Changes to Hydrographic Survey Processing", dated May 24, 1995.

MISCELLANEOUS

Chart compilation was done by Atlantic Hydrographic Branch personnel, in Norfolk, Virginia. Compilation data will be forwarded to Marine Chart Division, Silver Spring, Maryland. The following NOS charts were used for compilation of the present survey:

11480 (40th Edition, Mar./07) 1: 449,659 Scale
Corrected through NM 10/30/2007
Corrected through LNM 11/02/2007

US3GA10M

D.3 ADEQUACY OF SURVEY

The present survey is adequate to supersede the charted bathymetry within the common area. Any features not specifically addressed either in the H-Cell BASE Cell File or the Blue Notes should be retained as charted. Refer to the Descriptive Report for further survey requirements recommended by the hydrographer.

APPROVAL SHEET
H11680

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. All revisions and additions made to the H-Cell files 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.

Leonard Tyson
Hydrographic Intern,
Atlantic Hydrographic Branch

Bridget E. Williams
Hydrographic Intern,
Atlantic Hydrographic Branch

All final products have undergone a comprehensive review as per the Atlantic Hydrographic Branch Processing Manual and are verified to be accurate and complete except where noted in the Evaluation Report.

Edward A. Owens
Physical Scientist,
Atlantic Hydrographic Branch

I have reviewed the H11680 Base Cell files, accompanying data, and reports. This survey and accompanying Marine Chart Division deliverables meet or exceed NOS requirements and standards for products in support of nautical charting except where noted in the Evaluation Report.

Approved: _____
Shep Smith
Lieutenant Commander, NOAA
Chief, Atlantic Hydrographic Branch