

D00159 FH

NOAA FORM 76-35A

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

DESCRIPTIVE REPORT

Type of Survey: Hurricane Response
Registry Number: D00159

LOCALITY

State: Virginia
General Locality: Cape Henry
Sub-locality: Hampton Roads and Southern Chesapeake Bay

2011

CHIEF OF PARTY
LCDR Benjamin, K. Evans
NOAA

LIBRARY & ARCHIVES
DATE

NOAA FORM 77-28 (11-72)		U.S. DEPARTMENT OF COMMERCE NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION		REGISTRY NUMBER: D00159	
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.					
State:	Virginia				
General Locality:	Cape Henry				
Sub-Locality:	Hampton Roads and Southern Chesapeake Bay				
Scale:	1:10,000	Date of Survey: 29 August to 30 August 2011			
Instructions Dated:	2 September 2011	Project Number: S-E915-OCS-11			
Vessel:	NOAA Ship <i>Ferdinand R. Hassler</i>				
Chief of Party:	LCDR Benjamin K. Evans, NOAA				
Surveyed by:	<i>Ferdinand R. Hassler</i> Personnel				
Soundings by:	Reson 7125 multibeam echosounder				
Graphic record scaled by:	N/A				
Graphic record checked by:	N/A				
Protracted by:	N/A	Automated Plot: N/A			
Verification by:					
Soundings in:	Meters at MLLW				
Remarks:	<p>1) All Times are in UTC.</p> <p>2) This is a Hurricane Response Survey.</p> <p>3) Projection is NAD83, UTM Zone 18.</p>				

The purpose of this survey is to provide contemporary surveys to update National Ocean Service (NOS) nautical charts. Revisions and Rednotes were generated during office processing. The processing branch concurs with all information and recommendations in the DR unless otherwise noted. Page numbering may be interrupted or non-sequential. All pertinent records for this survey, including the Descriptive Report, are archived at the National Geophysical Data Center (NGDC) and can be retrieved via <http://www.ngdc.noaa.gov/>.

Descriptive Report to Accompany Hydrographic Survey D00159

Project S-E915-OCS-11
 Cape Henry
 Hampton Roads and Southern Chesapeake Bay
 Scale 1:10,000
 29 – 30 August 2011
NOAA Ship *Ferdinand R. Hassler*

A. AREA SURVEYED

This hurricane response survey was completed as specified by Hydrographic Survey Letter Instructions S-E915-OCS-11, dated 2 September, 2011.

Northern Limit	Southern Limit	Western Limit	Eastern Limit
37° 18' 05" N	36° 48' 51" N	075° 45' 13" W	076° 08' 41" W

Data acquisition was conducted from 29-30 August 2011

This survey was in response to a U.S. Coast Guard (USCG) request to NOAA's Office of Coast Survey (OCS). The USCG requested assistance to determine the existence of any hazards to the navigation channels as a result of Hurricane Irene. *Ferdinand R. Hassler* worked in cooperation with *NRT2* and *Bay Hydro II* to re-open the channels and identify obstructions and shoaling that could impede traffic in the shipping lanes. With the exception of delivering to AHB the raw side scan sonar data, standard deliverables and requirements for hydrographic surveys were not required by the project instruction.

Though the project instructions and registry number are shared by *NRT2* and *Bay Hydro II*, this submission includes only data acquired by *Ferdinand R. Hassler*.

	Linear Nautical Miles
Lineal nautical miles of any combination of the above techniques (SSS 200%, MBES)	148
Development lines non mainscheme	56

Table 1: Hydrographic Survey Statistics

Survey limits of D00159 (Figure 1) are shown below.

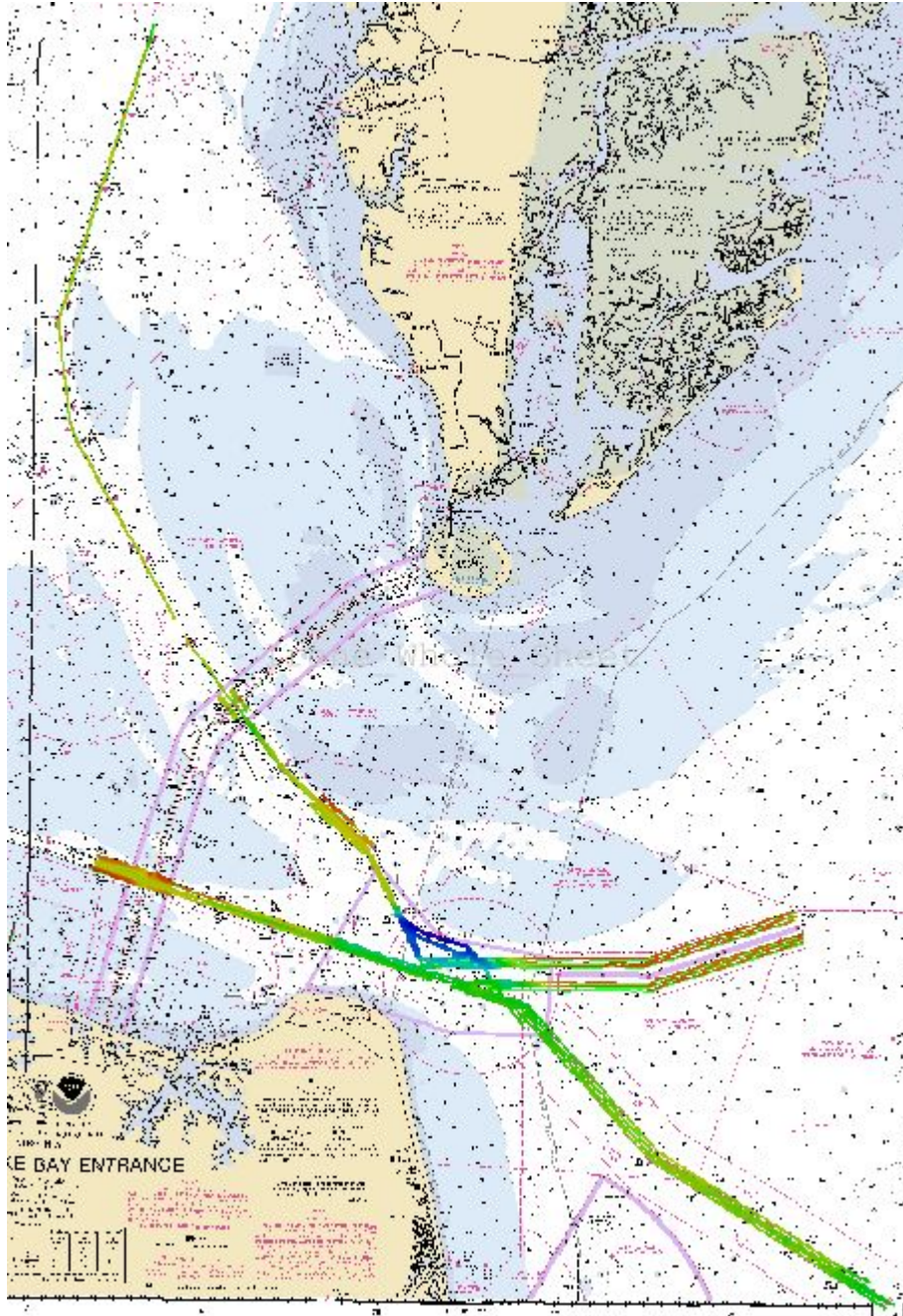


Figure 1: Survey Limits over-plotted on NOAA Chart 12221

Calendar Date	Julian Day
29 August 2011	241
30 August 2011	242

Table 2: Dates of Acquisition in Calendar and Julian Day

B. DATA ACQUISITION AND PROCESSING

All data were acquired by the NOAA Ship *Ferdinand R. Hassler*. This ship is of small water plane twin hull (SWATH) design. Each hull of the ship is outfitted with a 400kHz Reson 7125 multibeam echosounder system. For this project, all multibeam data were acquired using Hysweep software from Hypack, Inc. The echosounders were operated exclusively in 512 beam, equi-distant, dual head mode. In this mode, the heads alternate pings, but the swath data is combined into one record of 1024 beams. Beams 1-512 are from the port head; beams 513-1024 are from the starboard head.

One hundred percent side scan data were also acquired along with the main scheme hydrography with the exception of Cape York Channel. A Klein 5000 side scan sonar was towed from a sheave attached to the a-frame of the stern of the vessel. All side scan data was recorded in .sdf format using SonarPro acquisition software. Side scan records were scanned and check scanned for contacts by independent, experienced hydrographers. All contacts were imported into Pydro software and evaluated for navigational significance in the context of this survey and all contacts of potential significance were developed with multibeam.

All positioning was accomplished with an Applanix POS MV v.4 with applied differential correctors. The ship is equipped with two independent POS MV systems with one IMU in each hull. The starboard POS MV system was used to position all multibeam data. The port system was used to position the side scan sonar.

Multibeam and side scan data was processed in Caris processing software.

Raw GNSS observables were logged during data acquisition with the exception of portions of the latter half of DN241. Where logged data was available, Applanix PosPac software was used to post process the position and attitude data. The post-processed position, attitude, and error data was applied in Caris.

B 2.3 Crosslines

No crosslines were acquired.

B 2.4 Junctions and Prior Surveys

No comparison of this survey data to either junction or prior surveys was performed.

B 2.5 Systematic Errors

From approximately 1250 on DN 241 to 0850 on DN 242, data from the port side 7125 sonar exhibited a timing induced error. This error was rectified by creating a new hydrographic vessel file (HVF) with a 1 second time offset in swath 1 (the port swath) for the lines so effected. Line 2011S_2420840 seemed to begin with the time offset error but end without. This line was

converted using the time delayed HVF, and all port side data with resulting motion artifacts (those east of 075-55-44W) was flagged as rejected.

An example of the uncorrected error is shown in Figure 2.

The root cause of this apparent timing error is unknown.



Figure 2. Port sonar timing error rejected

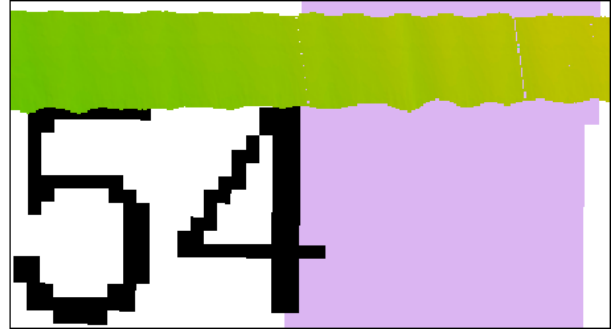


Figure 3. Data with timing error

B 3. CORRECTIONS TO ECHO SOUNDING

HDSC sounding data were reduced to mean lower-low water (MLLW) using verified water levels from Chesapeake Bay Bridge Tunnel, VA (8638863), Duck, NC (8651370), and Yorktown, VA (8637689) and applied using preliminary discrete zoning (HamptonRoadsCORP.zdf) provided by CO-OPS on 29 August. This zone file is illustrated in figure 4.

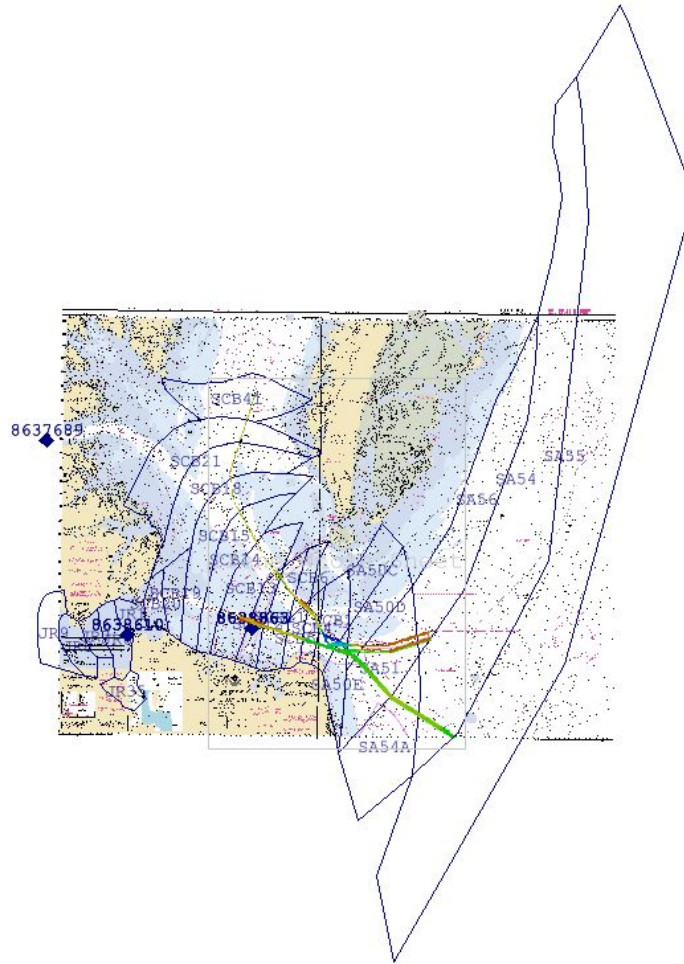


Figure 4: Final Tide Zoning

B 4. DATA PROCESSING

SVP casts were applied to HDCS data using the nearest in distance within time (5 hours) hours option in CARIS.

B 4.1 Total Propagated Error

The TPE values in Table 4 below were applied to Survey D00159:

Vessel	Tide Values		Sound Speed Values		
	Measured	Zoning	Measured	Surface	
S250	0.1m	0.1m	1m/s	2m/s	MVP

Table 4: TPE Parameters

These values were used as inputs to the TPE calculation for all MBES data. TPE was calculated using PosPac generated vessel data when available.

B 4.2 BASE Surfaces and Mosaics

The following table describes all BASE Surfaces submitted as part of Survey D00159:

Name of Surfaces and /or Mosaics	Resolution	Type	Purpose
FH_Irene_1m	1m	CUBE	Complete Coverage
HurricaneIreneResponse_FH_1m	1m	SSS Mosaic	100% Side Scan Coverage

Table 5: Field Sheets

This survey was processed using the Combined Uncertainty and Bathymetry Estimator (CUBE) algorithm. The CUBE configurations were set to NOAA_1m.

B 4.3 Data Cleaning

The survey data were cleaned using the swath and subset editor tools in CARIS. Gross fliers were manually rejected. All areas of the BASE surface have been examined.

C. HORIZONTAL AND VERTICAL CONTROL

As per FPM section 5.2.3.2.3 a HVCR report was not filed as no horizontal or vertical control stations were established by the field party for this survey. 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). Differential GPS (DGPS) was the sole method of positioning. Differential corrections from U.S. Coast Guard beacon at Driver, VA (289 kHz), were used during this survey.

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

C 1.2 Vertical Control

The vertical datum for this project is Mean Lower-Low Water (MLLW).

D. RESULTS AND RECOMMENDATIONS

D.1 Chart Comparison

Survey D00159 was compared to Charts 12208 (14th Ed., August, 2011 1:50,000), 12222 (52nd Ed., September 2009, 1:40,000), and 12224 (25th Ed., April 2011, 1:40,000). No comparison was performed with ENC's.

D 1.1 Charts 12208, 12222, and 12224 Comparison

In general the soundings agree within 1 to 3 feet. Mostly surveyed data was found to be deeper than charted data. In some non-navigationally significant regions surveyed depths were 1 foot shallower than charted soundings.

All survey data were found to be in agreement with and for the most part deeper than tabulated depths in channels.

D.2 Additional Results

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

No AWOIS items were assigned to D00159.

D.2.3 Charted Features

A number of charted aids to navigation (ATON) were observed to be off station during survey operations. These ATONS were reported to the USCG and a USCG buoy tender was repositioning ATONS at the conclusion of this survey, accordingly, they are not reported in this report.

All charted features were found to be charted accurately with the exception of one feature. A least depth of 55 feet was acquired over a charted 56 foot obstruction at 36-56-06.4N, 075-57-18.0W. The new least depth on the obstruction is not considered navigationally significant and will be left to the discretion of the Atlantic Hydrographic Branch (AHB) if MCD should be contacted to update this feature.

All survey features from D00159 have been processed and are available in the pydro data set D00159.pss. With the exception of the obstruction mentioned above, no charting action is advised for any of the features.

D.3 Dangers to Navigation and Shoals

D 3.1 Dangers to Navigation

No dangers to navigation were found.

D.4 Adequacy of Survey

This survey is considered complete and adequate to ensure that no new obstructions or shoaling resultant from hurricane Irene are impeding maritime traffic in area of survey coverage.

Summary and Recommendations for Additional Work


No additional work is needed to complete this survey.

E . APPROVAL

As Lead Hydrographer, I have ensured that standard field surveying and processing procedures were followed to the extent practicable. 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.

Approved and Forwarded:

 Digitally signed by
Samuel Greenaway
Date: 2011.10.11
14:14:07 Z

LT Samuel Greenaway, NOAA
Field Operations Officer

 Digitally signed by Benjamin K.
Evans
Date: 2011.10.03 16:06:24 -04'00'

LCDR Benjamin Evans, NOAA
Commanding Officer

APPROVAL PAGE

D00159

Data meet or exceed current specifications as certified by the OCS survey acceptance review process. Descriptive Report and survey data where noted in the chart letter are adequate to supersede prior surveys and nautical charts in the common area.

The following products will be sent to NGDC for archive

- D00159_DR.pdf
- D00159_ChartLetter.pdf

The survey evaluation and verification has been conducted according current OCS Specifications, and the survey has been approved for usage of updating NOAA's suite of nautical charts.

Approved: _____

LT Abigail Higgins
Chief, Atlantic Hydrographic Branch