

F00715

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: F00715

LOCALITY

State: Maryland

General Locality: Chesapeake Bay

Sub-locality: Vicinity of the Chesapeake Bay Bridge

2018

CHIEF OF PARTY
LTJG Sarah L. Chappel

LIBRARY & ARCHIVES

Date:

HYDROGRAPHIC TITLE SHEET

F00715

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: **Maryland**

General Locality: **Chesapeake Bay**

Sub-Locality: **Vicinity of the Chesapeake Bay Bridge**

Scale: **1:10000**

Dates of Survey: **04/23/2018**

Instructions Dated: **08/08/2018**

Project Number: **S-E920-BH2-18**

Field Unit: **NOAA R/V Bay Hydro II**

Project Manager: **LTJG Sarah L. Chappel**

Soundings by: **Multibeam Echosounder**

Imagery by: **Multibeam Echosounder Acoustic Backscatter**

Verification by: **Pacific Hydrographic Branch**

Soundings Acquired in: **Meters at Mean Lower Low Water**

Remarks:

The purpose of this survey is to provide contemporary surveys to update National Ocean Service (NOS) nautical charts. All separates are filed with the hydrographic data. Any revisions to the Descriptive Report (DR) generated during office processing are shown in bold red italic text. The processing branch maintains the DR as a field unit product, therefore, all information and recommendations within the body of the DR are considered preliminary unless otherwise noted. The final disposition of surveyed features is represented in the OCS nautical chart update products. All pertinent records for this survey, including the DR, are archived at the National Centers for Environmental Information (NCEI) and can be retrieved via <http://www.ncei.noaa.gov/>.

Descriptive Report Summary F00715	
Project	S-E920-BH2-18
Survey	F00715
State	Maryland
Locality	Chesapeake Bay
Sub Locality	Vicinity of the Chesapeake Bay Bridge
Scale of Survey	1:10000
Sonars Used	Kongsberg Maritime EM 2040 (MBES)
Horizontal Datum	North American Datum 1983
Vertical Datum	Mean Lower Low Water
Vertical Datum Correction	VDatum
Projection	Projected UTM 18
Field Unit	NOAA R/V <i>Bay Hydro II</i>
Survey Dates	04/23/2018 - 08/08/2018
Chief of Party	LTJG Sarah L. Chappel

A. Area Surveyed

This hydrographic survey was acquired in accordance with the requirements defined in the Project Instruction and the April 2018 NOS Hydrographic Surveys Specifications and Deliverables (HSSD) as shown in Figure 1.

Data were acquired within the following survey limits:

Northwest Limit	Southeast Limit
39° 1' 7.81" N 76° 22' 45.5" W	38° 55' 37.5" N 76° 23' 11.78" W

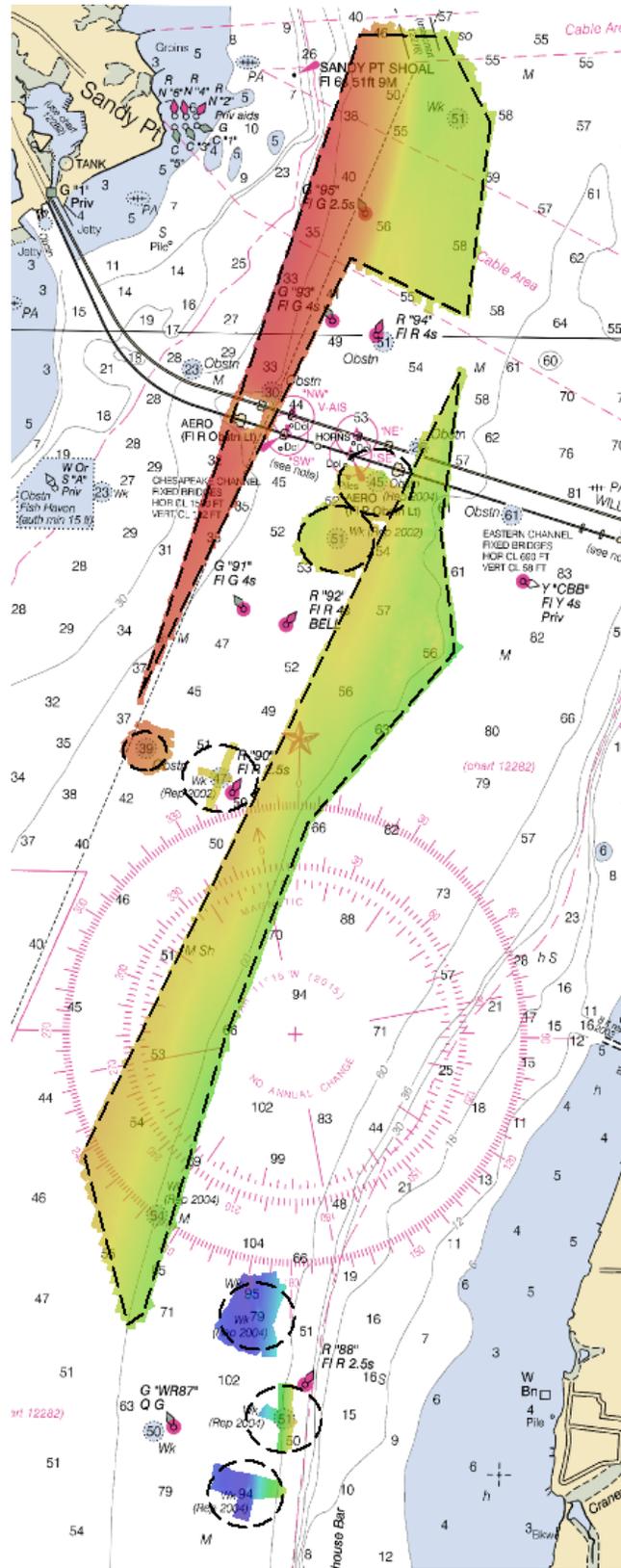


Figure 1: F00715 Sheet limits and coverage overlaid onto Chart 12270.

B. Survey Purpose

The Maryland Pilots have concerns that they are seeing areas of shoaling up to and above the 50 foot depth in the area where vessels are transiting to reach the Craighill Entrance Channel. The Craighill Entrance Channel has a project depth of 50 feet and vessels with a draft of 50 feet are transiting in this area. Survey data from this project is intended to supersede all prior survey data in the common area.

C. Intended Use of Survey

The entire survey is adequate to supersede previous data.

Data acquired in F00715 meet multibeam echo sounder (MBES) coverage requirements for object detection coverage, as required by the HSSD. This includes crosslines, NOAA allowable uncertainty, and density requirements. Additional compliance statistics can be found in Appendix II of this report.

D. Data Acquisition and Processing

Refer to the S-E920-BH2-18 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 discussed in the following sections.

E. Uncertainty

In addition to the usual a priori estimates of uncertainty provided via device models for vessel motion and VDATUM, real-time and post-processed uncertainty sources were also incorporated into the depth estimates of survey F00715. Real-time uncertainties were provided via EM 2040 MBES data and Applanix Delayed Heave RMS. Following post-processing of the real-time vessel motion, recomputed uncertainties of vessel roll, pitch, gyro, and navigation were applied in CARIS HIPS and SIPS via a Smoothed Best Estimate of Trajectory (SBET) RMS file generated in Applanix POSPac.

To verify that all data meets the accuracy specifications as stated in HSSD Section 5.1.3, a child layer titled NOAA_Allowed_1 was created for the 50cm surface using the equations stated in Section 5.1.3 of the HSSD. These surfaces were then analyzed using the Pydro QC Tools QA feature to determine what percentage of each surface meets specifications. Figure 2 shows an overview of the NOAA Allowable Uncertainty layer for the surface. Figure 3 shows the corresponding statistics for the surface. Overall, 99.5+% of nodes with all surfaces meet or exceed NOAA Allowable Uncertainty specifications for F00715. For individual graphs per surface of uncertainty requirements, see Appendix II.



Figure 2: F00715 NOAA Allowable Uncertainty Overview

Uncertainty Standards

Grid source: F00715_MB_50cm_MLLW_Final
 99.5+% pass (27,994,754 of 27,994,977 nodes), min=0.39, mode=0.46, max=1.77
 Percentiles: 2.5%=0.45, Q1=0.46, median=0.48, Q3=0.50, 97.5%=0.53

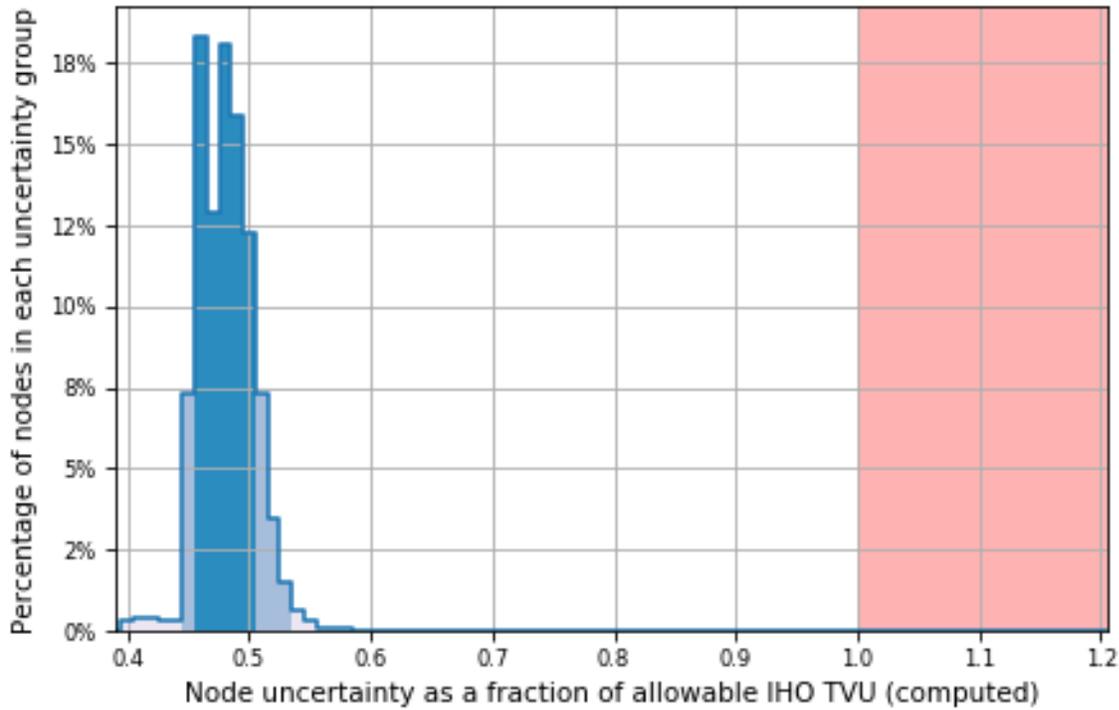


Figure 3: F00715 Total Propagated Uncertainty Statistics

F. Results and Recommendations

The following are the largest scale RNC and ENC, which cover the survey area:

ENC	Scale	Edition	Update Application Date	Issue Date	Preliminary?
US5MD22M	1:25000	11	06/12/2018	06/12/2018	NO
US5MD13M	1:40000	26	06/13/2018	06/13/2018	NO

Soundings from F00715 are in a general agreement with charted depths on ENC US5MD22M, with most depths agreeing to 0.3 meters as shown in Figure 4. The largest differences are seen in the northern part of the western survey area, where differences range to 0.6 meters as seen in Figure 4.

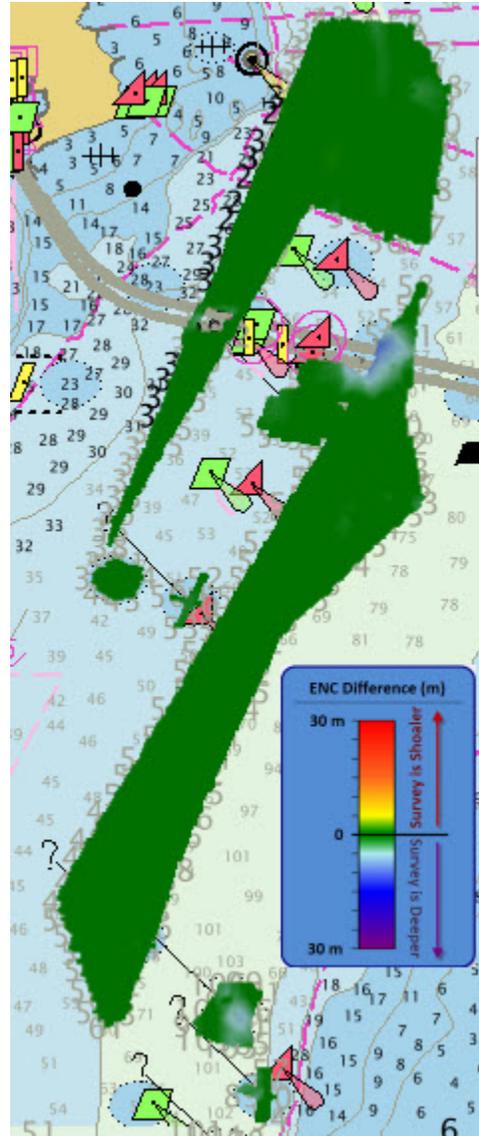


Figure 5: Difference surface between F00715 and interpolated TIN surface from ENC US5MD22M and ENC US5MD13M.

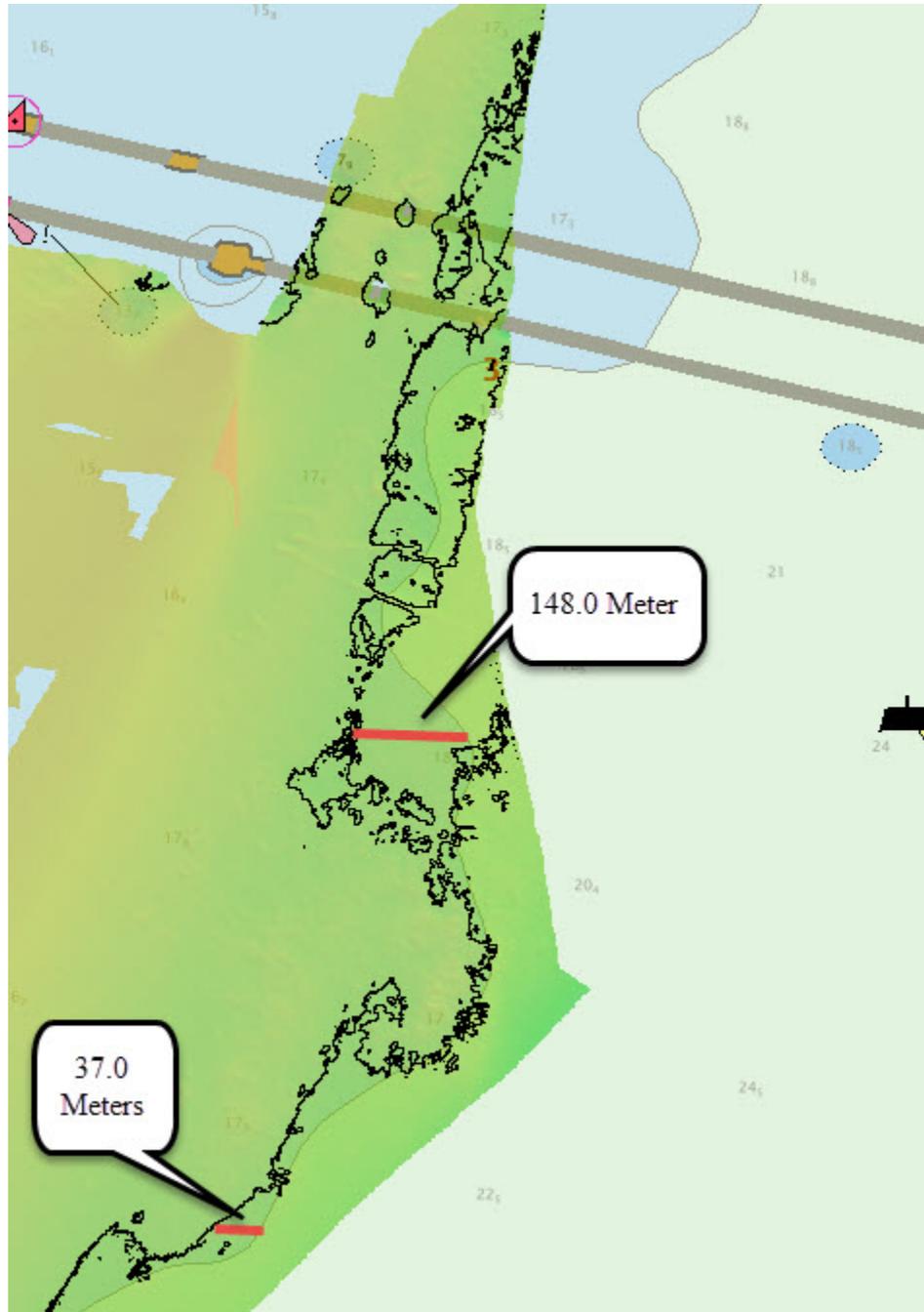


Figure 7: Largest contour difference between F00715 and ENC US5MD22M and ENC US5MD13M.

The following surfaces and/or BAGs were submitted to the Processing Branch:

Surface Name	Surface Type	Resolution	Depth Range	Surface Parameter	Purpose
F00715_MB_50cm_MLLW	CUBE	0.5 m	7.7 m - 35.2 m	NOAA_0.5m	Base Surface

Surface Name	Surface Type	Resolution	Depth Range	Surface Parameter	Purpose
F00715_MB_50cm_MLLW_Final	Cube	0.5 m	0 m - 36 m	NOAA 0.5m	Finalized Surface

The final base surface contains water depths from 7.7 meter to 35.2 meters.

G. Vertical and Horizontal Control

The vertical datum for this project is Mean Lower Low Water.

The vertical control method used for this survey was VDatum.

The following National Water Level Observation Network (NWLON) stations served as datum control for this survey:

Station Name	Station ID
--------------	------------

ERS methods were used as the final means of reducing F00715 to MLLW for submission. Data were reduced using the VDATUM model S-E920-BH2-18-Limits_xyNAD83-MLLW_geoid12b.csar provided by the project manager.

The horizontal datum for this project is North American Datum 1983. The projection used for this survey is Projected UTM 18.

The following DGPS Stations were used for horizontal control:

DGPS Stations

Vessel kinematic data were post-processed using Applanix POSPac processing software and Single Base Positioning methods described in the DAPR. Smoothed Best Estimate of Trajectory (SBET) and associated error (RMS) data were applied to all MBES data in CARIS HIPS and SIPS. For further details regarding the processing and quality control checks performed, see the F00715 POSPAC Processing Logs spreadsheet located in the Separates folder.

During real-time acquisition, S5401 correctors from the Wide Area Augmentation System (WAAS) were applied to the data for increased accuracies, similar to USCG DGPS stations. WAAS and SBETs were the sole methods of positioning for F00715.

H. Additional Results

Crosslines were collected, processed, and compared in accordance with Section 5.2.4.3 of the HSSD. To evaluate crosslines, a 0.5 meter CUBE surface using strictly mainscheme lines, and a 0.5 meter CUBES surface using strictly crosslines were created. From these two surfaces, a difference surface (mainscheme - crosslines = difference surface)

was generated using Pydro's Compare Surfaces tool at a 0.5 meter resolution (Figure 8), and is submitted in the Separates II Digital Data folder. Statistics show the mean difference between the depths derived from mainscheme and crosslines was meters with mainscheme being and 95% of nodes falling within 0.10meters (Figure 9). For the respective depths, the difference surface was compared to the allowable NOAA uncertainty standards using Compare Surfaces. In total, 99.5% of the depth differences between F00715 mainscheme and crossline data were within allowable NOAA uncertainties (Figure 10)

The finalized surface was analyzed using the Pydro QC Tools Grid QA feature and the results are show in Figures 11 and 12 below. Density requirements for F00715 were achieved with at least 99.5% of finalized surface nodes containing five or more soundings as required by HSSD Section 5.2.2.3. For individual graphs (per surface), see Appendix II, QC Tools.

Casts were conducted at a minimum of one every 4 hours during acquisition. Casts were conducted more frequently in areas where the influx of freshwater affected the speed of sound in the water column and when there was a change in surface sound speed greater than two meters per second. All sound speed methods used are detailed in the DAPR.

Data acquisition and processing notes are included in the acquisition and processing logs, and additional processing such as final tide and sound speed application are noted in the F00715 Data Log spreadsheet. All data logs are submitted digitally in the Separates I folder.

F00715 contains 11 designated soundings in accordance with HSSD Section 5.2.1.2.3. All 11 of the designated soundings are included in the FFF, as they are anthropogenic or associated with new or assigned features. Soundings from anthropogenic features, such as piers, seawalls, and bridge pilings were rejected to a point where the natural sea floor was not effected. In some cases, Flier Finder identified fliers in these areas, however, they were deemed to be on valid data surrounding the anthropogenic features.

No bottom samples were assigned to F00715.

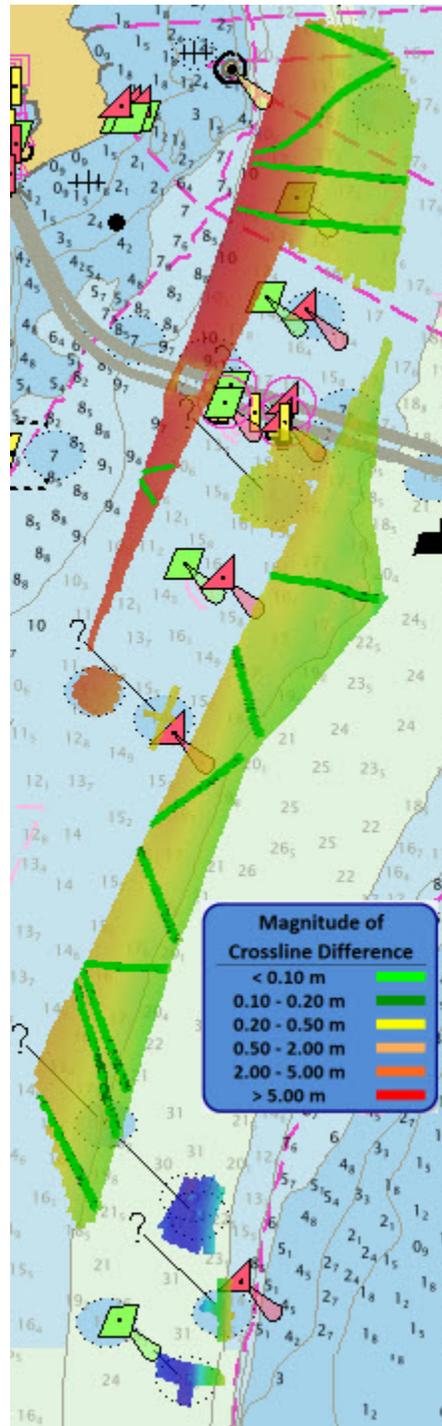


Figure 8: F00715 Crossline Overview

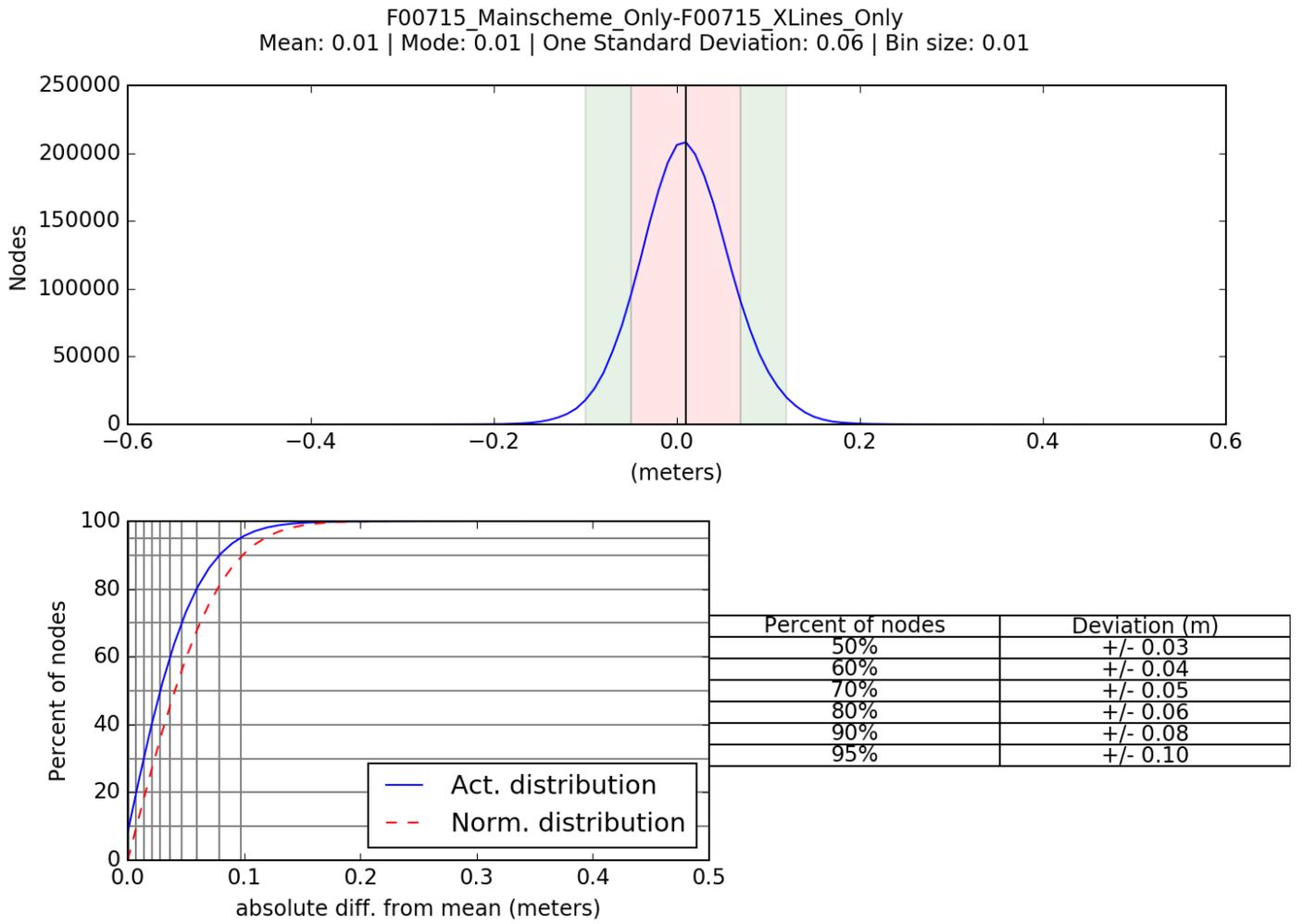


Figure 9: F00715 Crossline Statistics

Comparison Distribution

Per Grid: F00715_Mainscheme_Only-F00715_XLines_Only_fracAllowErr.csar

99.5+% nodes pass (2521903), min=0.0, mode=0.1 mean=0.1 max=8.7

Percentiles: 2.5%=0.0, Q1=0.0, median=0.0, Q3=0.1, 97.5%=0.2

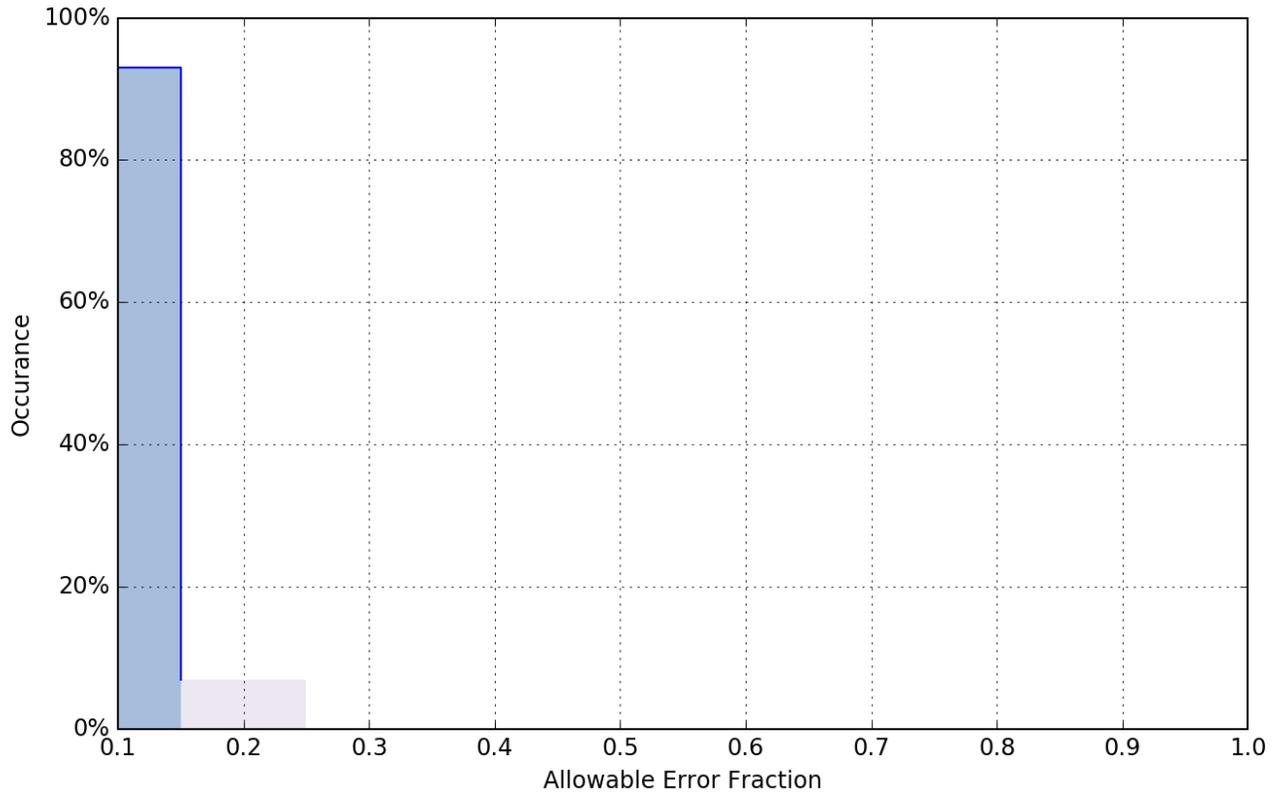


Figure 10: F00715 crossline and mainscheme NOAA allowable uncertainty statistics

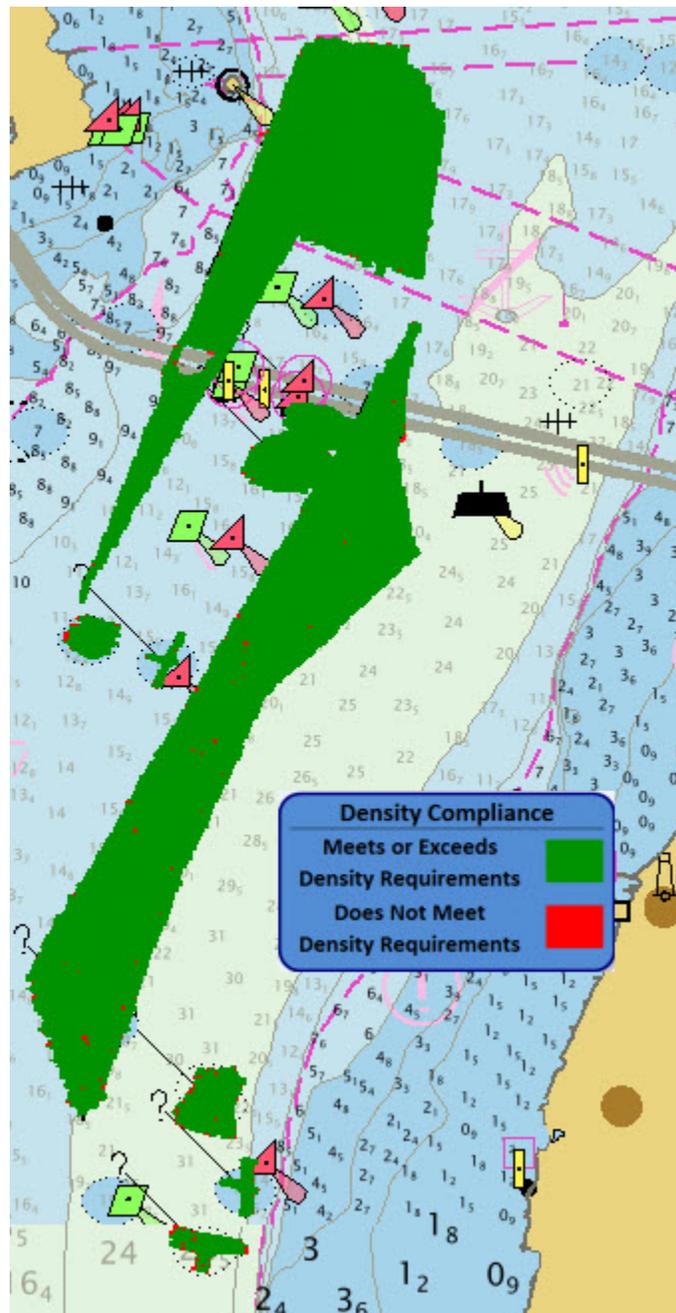


Figure 11: F00715 Density Overview

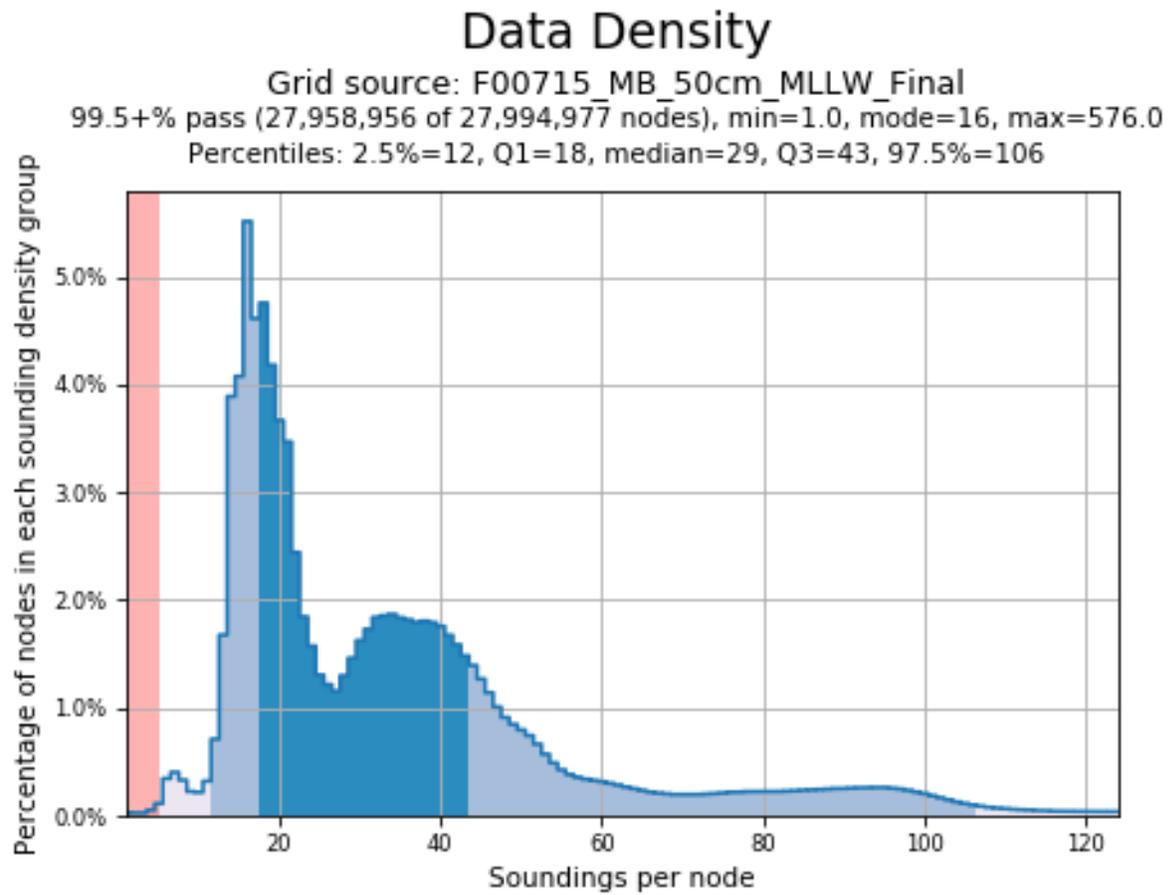


Figure 12: F00715 Density Statistics

I. Approval

As Chief of Party, field operations for this hydrographic survey were conducted under my direct supervision, with frequent personal checks of progress and adequacy. I have reviewed the attached survey data and reports.

All field sheets, this Survey Summary Report, and all accompanying records and data are approved. All records are forwarded for final review and processing to the Processing Branch.

The survey data meets or exceeds requirements as set forth in the NOS Hydrographic Surveys and Specifications Deliverables, Field Procedures Manual, Standing and Letter Instructions, and all HSD Technical Directives. These data are adequate to supersede charted data in their common areas. This survey is complete and no additional work is required with the exception of deficiencies noted in the Survey Summary Report.

Approver Name	Title	Date	Signature
LTjg Sarah Chappel	Chief of Party	08/10/2018	 CHAPPEL.SARAH.LYNN. 1472631272 2018.08.10 10:43:21 -04'00'



BHII F00715 Surface Waiver Request

2 messages

Officer in Charge - BHII <ocs.bhii@noaa.gov>
To: Christopher Hare <christopher.hare@noaa.gov>

Tue, Jun 19, 2018 at 8:47 AM

Good morning, Chris -

Given that only ~5% of the depths acquired on F00715 were found to be deeper than those covered by the standard 50cm final depth range threshold, **BHII would like to request a waiver to extend the depth threshold of the 50 cm finalized surface from 0-20m to 0-36m.**

BHII shall ensure that all data meet the data density requirements for a 50cm surface. If it does not, then the field unit shall use the mandated thresholds for the 50cm surface and create a 1m finalized surface as described in the HSSD.

Thank you.

V/r,

LTJG Sarah Chappel

--

Officer in Charge
R/V Bay Hydro II
14485 Dowell Road
PO Box 157
Solomons, MD 20688
Work cell: [240.638.6637](tel:240.638.6637)
OCS.BHII@noaa.gov

Christopher Hare - NOAA Federal <christopher.hare@noaa.gov>
To: Officer in Charge - BHII <ocs.bhii@noaa.gov>

Tue, Jun 19, 2018 at 9:15 AM

NRB has granted the waiver.

Best Regards,
Chris Hare

[Quoted text hidden]

--

Chris Hare
Project Manager
Navigation Response Branch
NOAA's Office of Coast Survey
240-533-0065

APPROVAL PAGE

F00715

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

The following products will be sent to NCEI for archive

- Descriptive Report
- Collection of Bathymetric Attributed Grids (BAGs)
- Collection of backscatter mosaics
- Processed survey data and records
- GeoPDF of survey products

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

Approved: _____

CDR Olivia Hauser, NOAA
Chief, Pacific Hydrographic Branch