F00758

U.S. Department of Commerce
National Oceanic and Atmospheric Administration
National Ocean Survey

DESCRIPTIVE REPORT

Type of Survey: Navigable Area

Registry Number: F00758

LOCALITY

State(s): Puerto Rico

General Locality: San Juan and Ponce and Vicinities

Sub-locality: Culebra

2018

CHIEF OF PARTY
Christiaan van Westendorp

LIBRARY & ARCHIVES

Date:

U.S. DEPARTMENT OF COMMERCE NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION	REGISTRY NUMBER:
HYDROGRAPHIC TITLE SHEET	**F00758**

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(s):	**Puerto Rico**
General Locality:	**San Juan and Ponce and Vicinities**
Sub-Locality:	**Culebra**
Scale:	**5000**
Dates of Survey:	**10/30/2018 to 10/30/2018**
Project Number:	**OPR-I369-TJ-18**
Chief of Party:	**Christiaan van Westendorp**
Soundings by:	**Multibeam Echo Sounder**
Imagery by:	**Multibeam Echo Sounder Backscatter**
Verification by:	**Atlantic Hydrographic Branch**
Soundings Acquired in:	**Meters at Mean Lower Low Water**

Remarks:

Any revisions to the Descriptive Report (DR) applied during office processing are shown in red italic text. The DR is maintained as a field unit product, therefore all information and recommendations within this report are considered preliminary unless otherwise noted. The final disposition of survey data is represented in the NOAA nautical chart products. All pertinent records for this survey are archived at the National Centers for Environmental Information (NCEI) and can be retrieved via https://www.ncei.noaa.gov/. Products created during office processing were generated in NAD83 UTM 20N, MLLW All references to other horizontal or vertical datums in this report are applicable to the processed hydrographic data provided by the field unit.

Descriptive Report Summary F00758	
Project	OPR-I369-TJ-18
Survey	F00758
State	Puerto Rico
Locality	San Juan and Ponce and Vicinities, Puerto Rico
Sub Locality	Culebra
Scale of Survey	1:5000
Sonars Used	Kongsberg Maritime EM 2040 (MBES)
Horizontal Datum	~~World Geodetic System (WGS) 1984~~ ***NAD 83***
Vertical Datum	Mean Lower Low Water
Vertical Datum Correction	VDatum
Projection	UTM 20N
Field Unit	NOAA Ship *Thomas Jefferson*
Survey Dates	10/30/2018
Chief of Party	CAPT Christiaan Van Westendorp

A. Area Surveyed

F00758 is a survey of two areas around the Isla de Culebra, PR: the Culebra ferry terminal approach in the Bahia de Sardinas on the west coast of the island; and the narrow entrance into the Ensenada Honda (Figures 1, 2 and 3). The survey was conducted in accordance with requests from local stakeholders and directions from the Project Manager.

Data were acquired within the following survey limits (Table 1):

Table 1: Survey limits

Northwest Limit	Southeast Limit
18° 18' 3.29" N 65° 18' 29.2" W	18° 17' 19.74" N 65° 16' 15.14" W

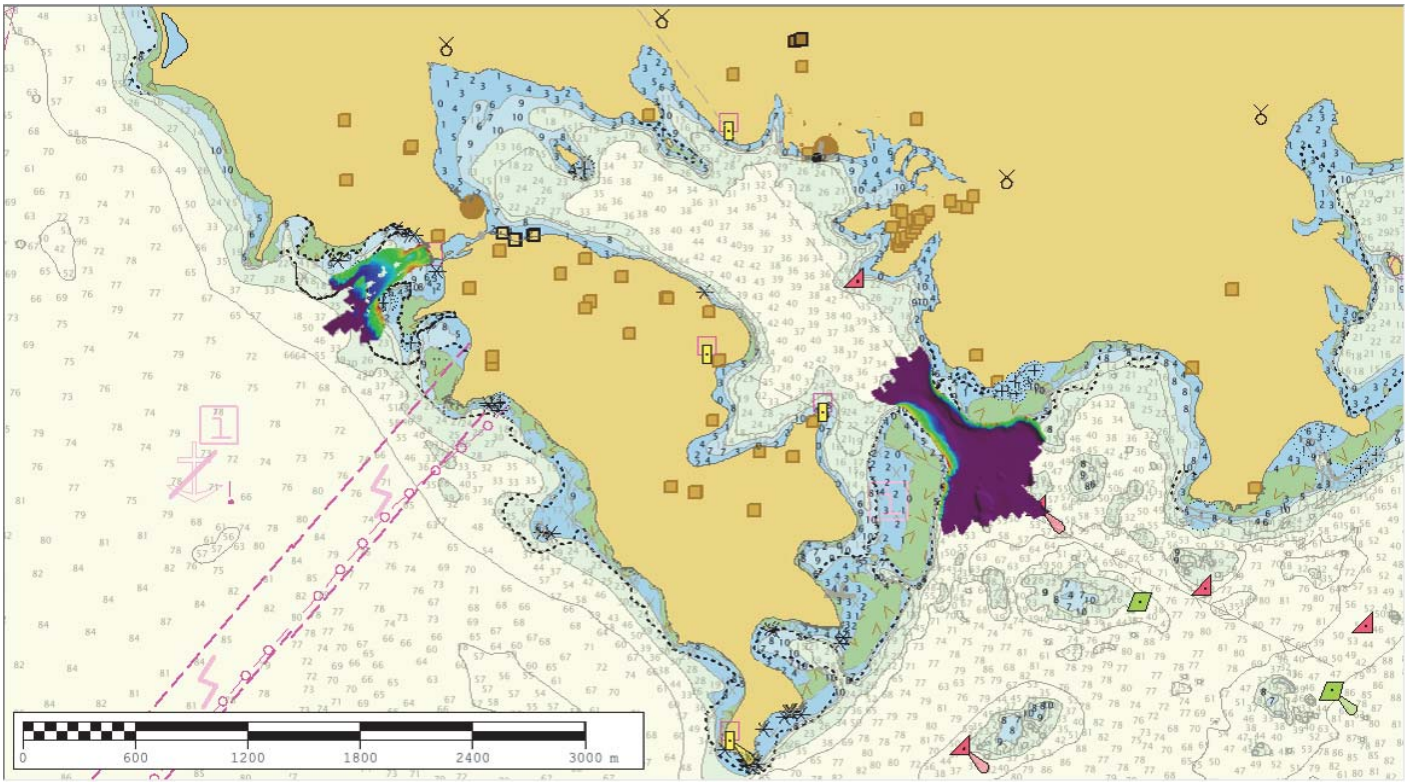


Figure 1: F00758 - Overview of survey areas on ENCs US5PR52M and US5PR53M

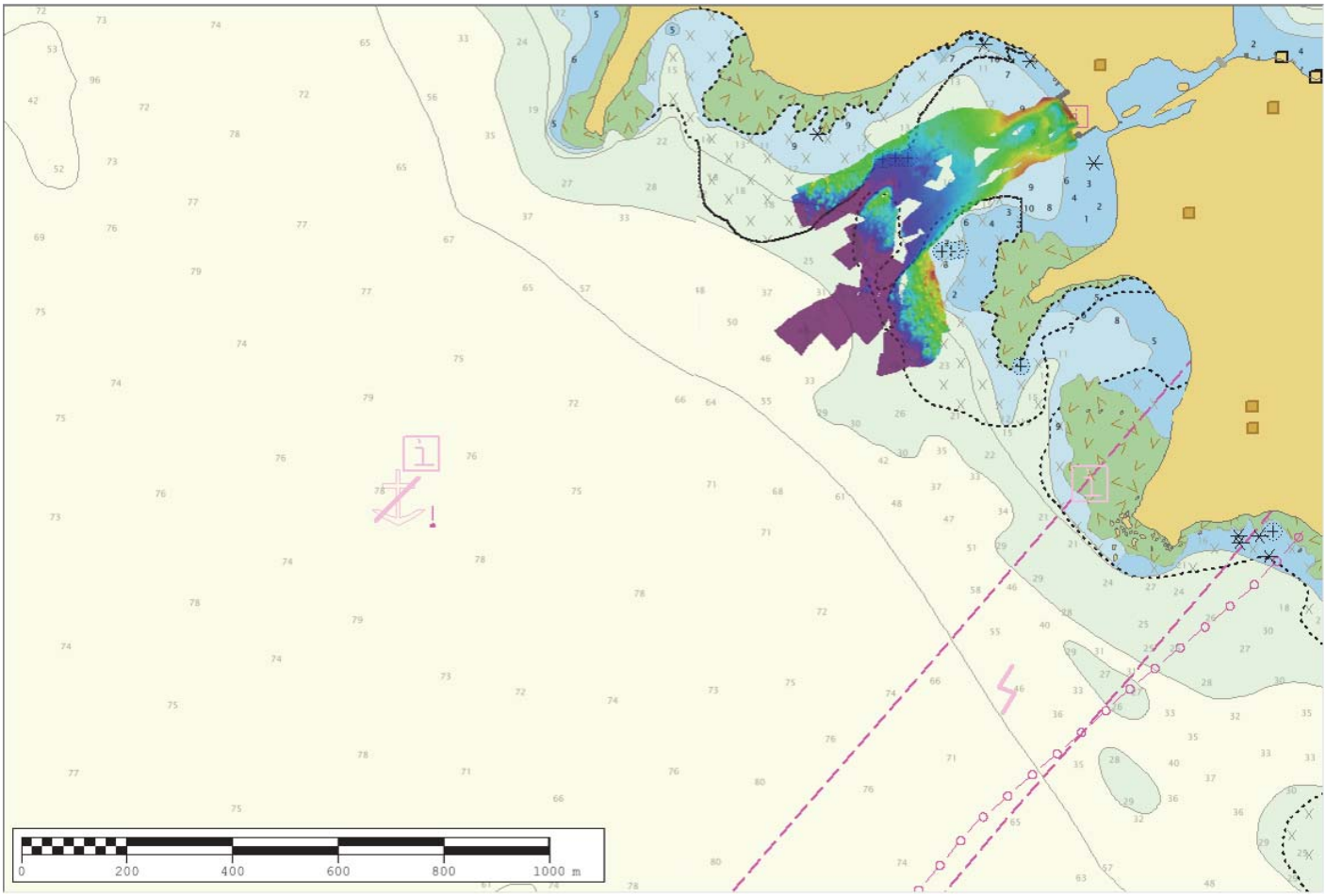


Figure 2: F00758 - Bahia de Sardinas survey area on ENCs US5PR52M and US5PR53M

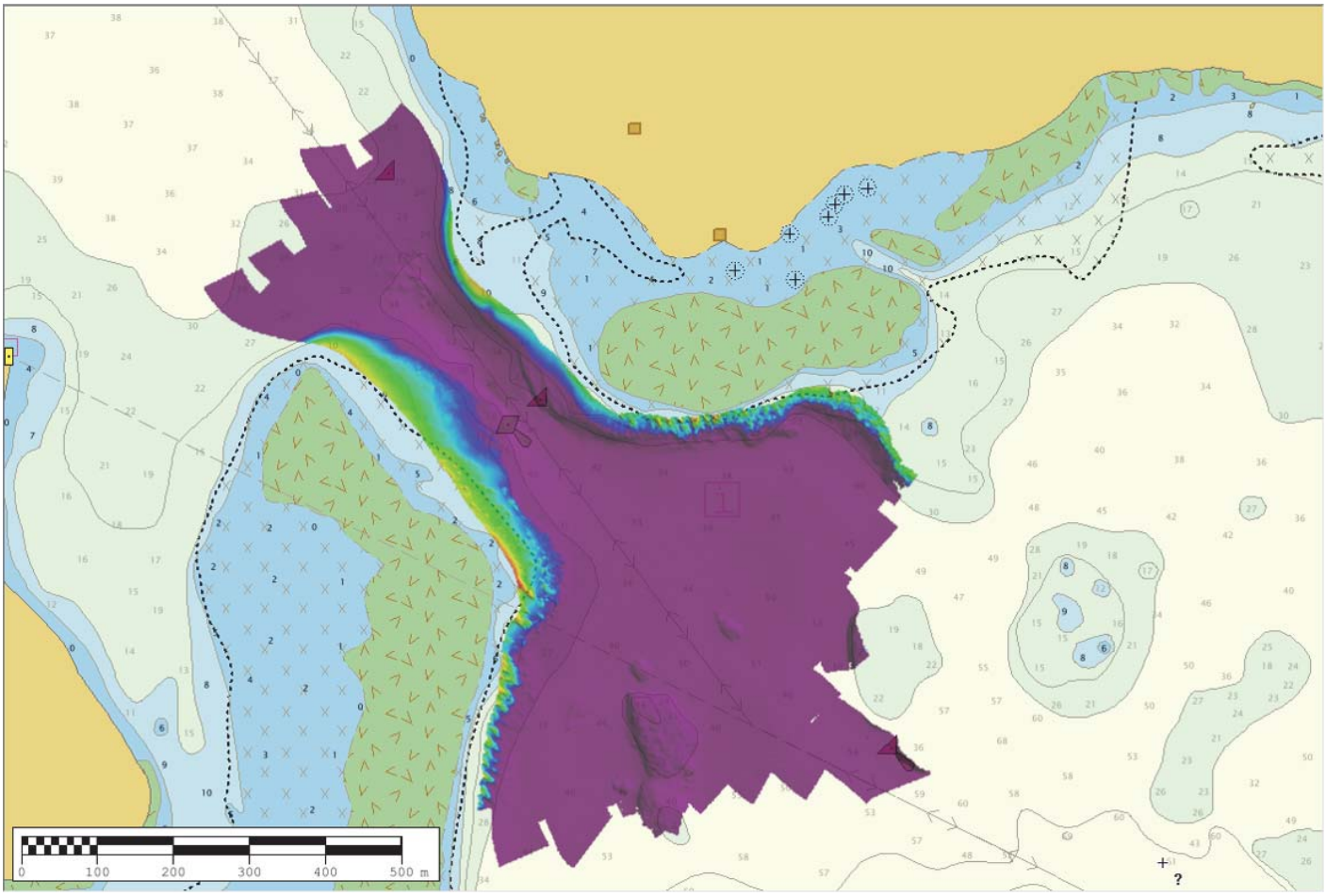


Figure 3: F00758 - Approach into Ensenada Honda survey area on ENC US5PR52M

B. Survey Purpose

The NOAA Ship *Thomas Jefferson* (TJ) surveyed the approach to the Isla de Culebra ferry terminal in 2017 following Hurricane Maria; Survey F00758 complements and validates the 2017 survey data (Figure 4). Survey F00758 supports requests from local stakeholders to provide updated survey data in support of local marine supply vessels.

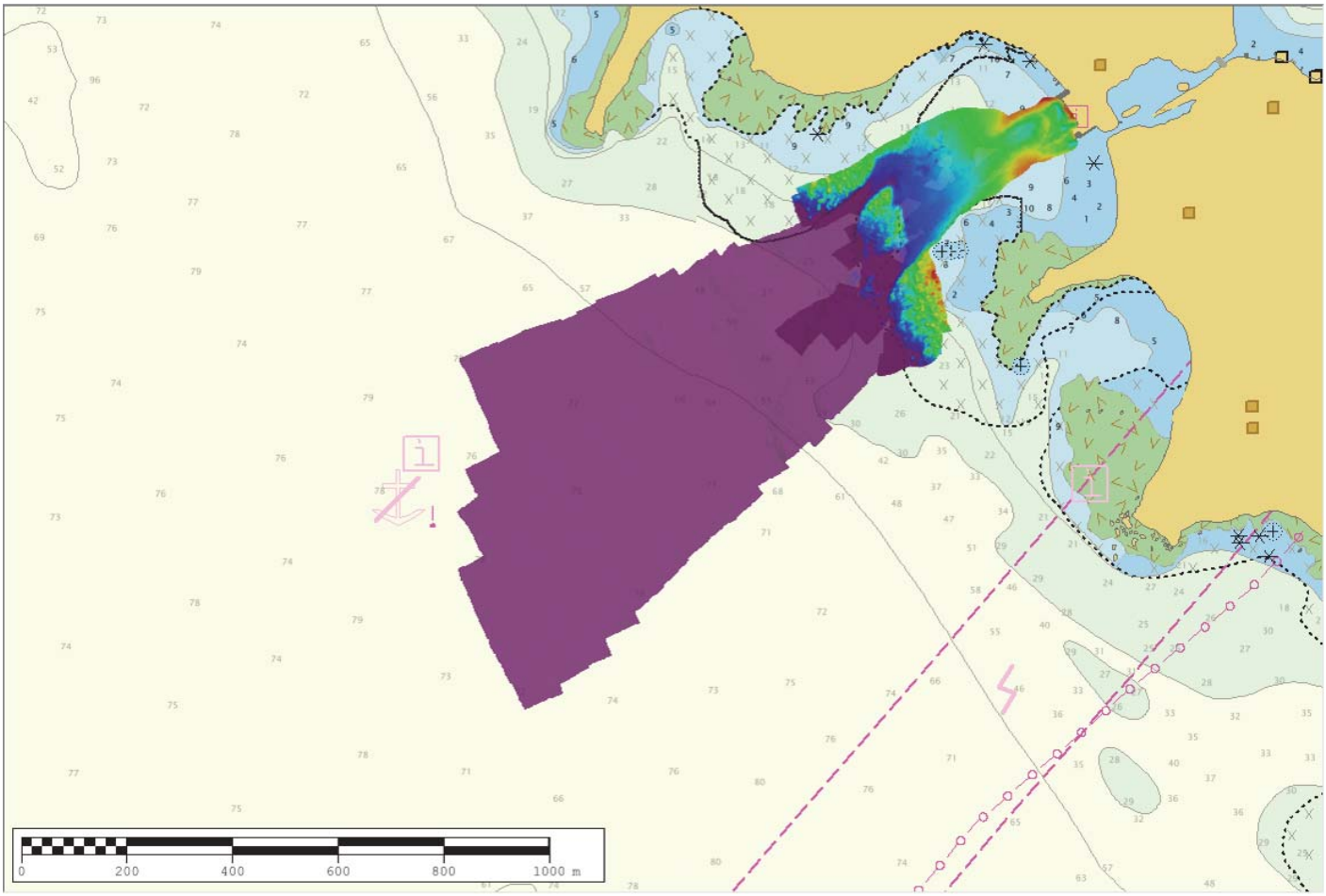


Figure 4: F00758 and F00707 - Combined 2017-2018 MBES coverage in Bahia de Sardinas

C. Intended Use of Survey

The entire survey is adequate to supersede previous data.

Survey F00758 is adequate to use for charting purposes.

D. Data Acquisition and Processing

Reference the 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.

Survey operations and planning for F00758 were designed to complement and validate F00707 (NOAA Ship *Thomas Jefferson,* 2017) survey coverage in accordance with instructions from the Project Manager. Object Detection MBES data was acquired in all areas not covered by MBES data from F00707 in the approach to the Bahia de Sardinas ferry terminal. One MBES surface holiday exists within the F00758 sheet limits (Figure 5).

Data were collected and processed in accordance with Object Detection MBES standards. A Variable Resolution (VR) Combined Uncertainty and Bathymetric Estimator (CUBE) bathymetric grid was generated for the entire survey area and all depth ranges.

Two sound speed casts were taken during the course of the survey; one cast was taken in vicinity of Bahia de Sardinas and the other in the vicinity of the Ensenada Honda (Figure 6). The Bahia de Sardinas cast was taken 65m outside of assigned sheet limits; however, the cast location was deemed to be representative of the survey area.

8.0 linear nautical miles mainscheme data and 0.9 linear nautical miles of crossline data were collected. Crossline mileage amounted to 11.6 % of mainscheme mileage.

F00758 Holiday	
LAT	18.299419 N
LON	065.307218 W
REMARKS	A holiday exists in the bathymetric surfaces (both F00758 only surface and the combined 2017-2018 surface) within the sheet limits for the Bahia de Sardinas survey areas; the holiday is located in a rocky reef area outside and adjacent to the main approach to the local ferry terminal.

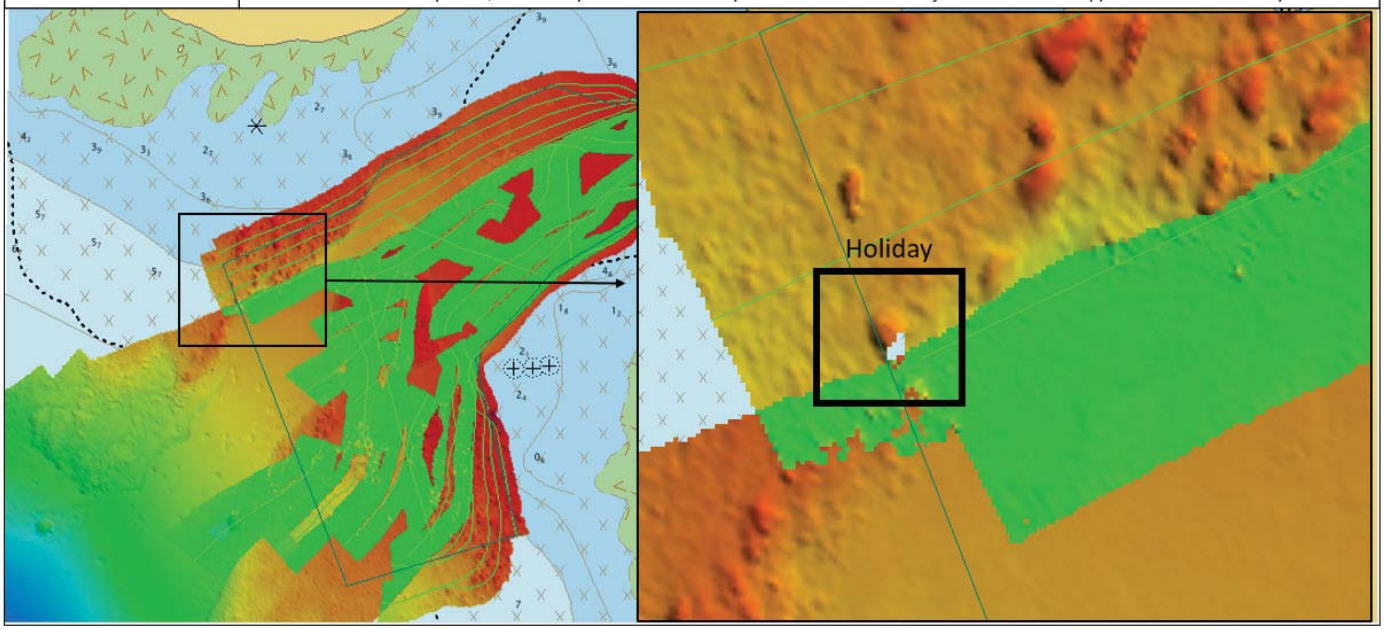


Figure 5: Holiday within the sheet limits for F00758 and combined with F00707 MBES data.

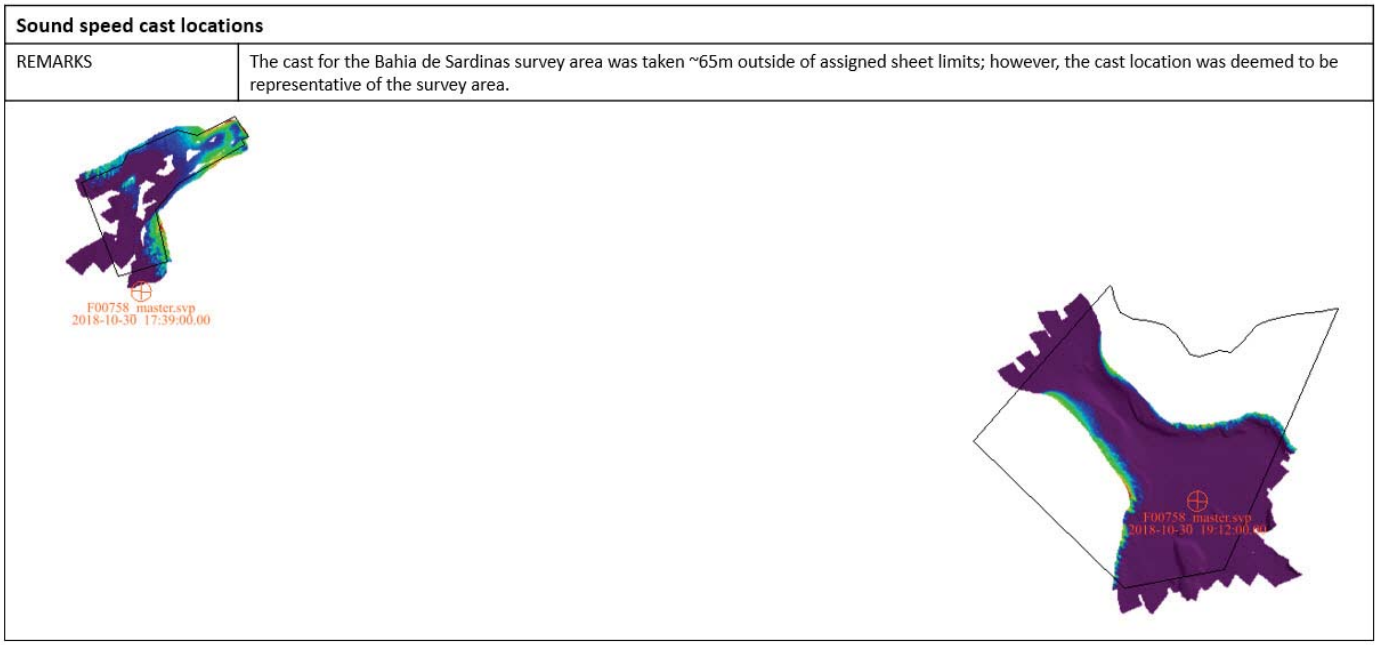


Figure 6: Sound speed cast locations for F00758.

E. Uncertainty

F00758 data were reduced to Mean Lower Low Water (MLLW) using Vertical Datum (VDatum) methods.

The values used to calculate Total Propagated Uncertainty (TPU) are listed below.

- Ellipsoidal Referenced Survey (ERS) separation model uncertainty (via VDatum): 0.12 m

- Sound speed measured: 4.000 m/s

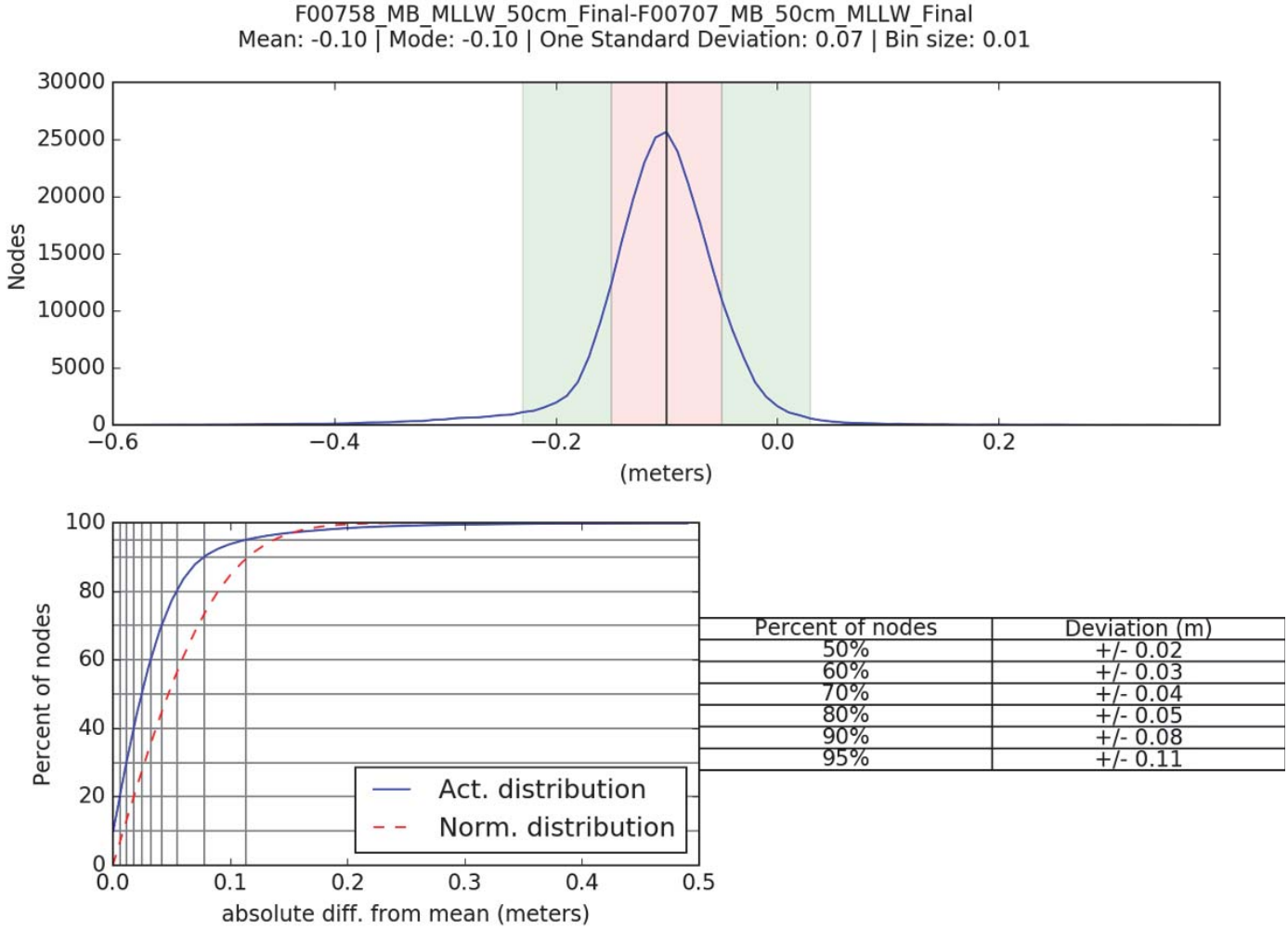
- Sound speed surface: 0.200 m/s

The single resolution 50cm CUBE surface from Survey F00758 was compared with the single resolution 50cm CUBE surface from Survey F00707; the two surveys are in general agreement. A difference surface analysis resulted in a mean difference of -0.10m with a standard deviation of 0.07m (Figure 7). More than 99.5% of nodes passed expected uncertainty standards (Figure 8).

Crosslines were acquired and a Mainscheme-Crossline comparison was conducted in accordance with procedures outlines in the DAPR. A difference surface analysis resulted in a mean difference of 0.00m with a standard deviation of 0.08m (Figure 9). More than 99.5% of nodes passed expected uncertainty standards (Figure 10).

The final bathymetric surface for F00758 is compliant with HSSD 2018 uncertainty and density standards (Figures 11 and 12).

Refer to the DAPR for more information about the methods used to assess uncertainty.



Percent of nodes	Deviation (m)
50%	+/- 0.02
60%	+/- 0.03
70%	+/- 0.04
80%	+/- 0.05
90%	+/- 0.08
95%	+/- 0.11

Figure 7: F00758 less F00707 difference surface statistics – summary statistics and distribution

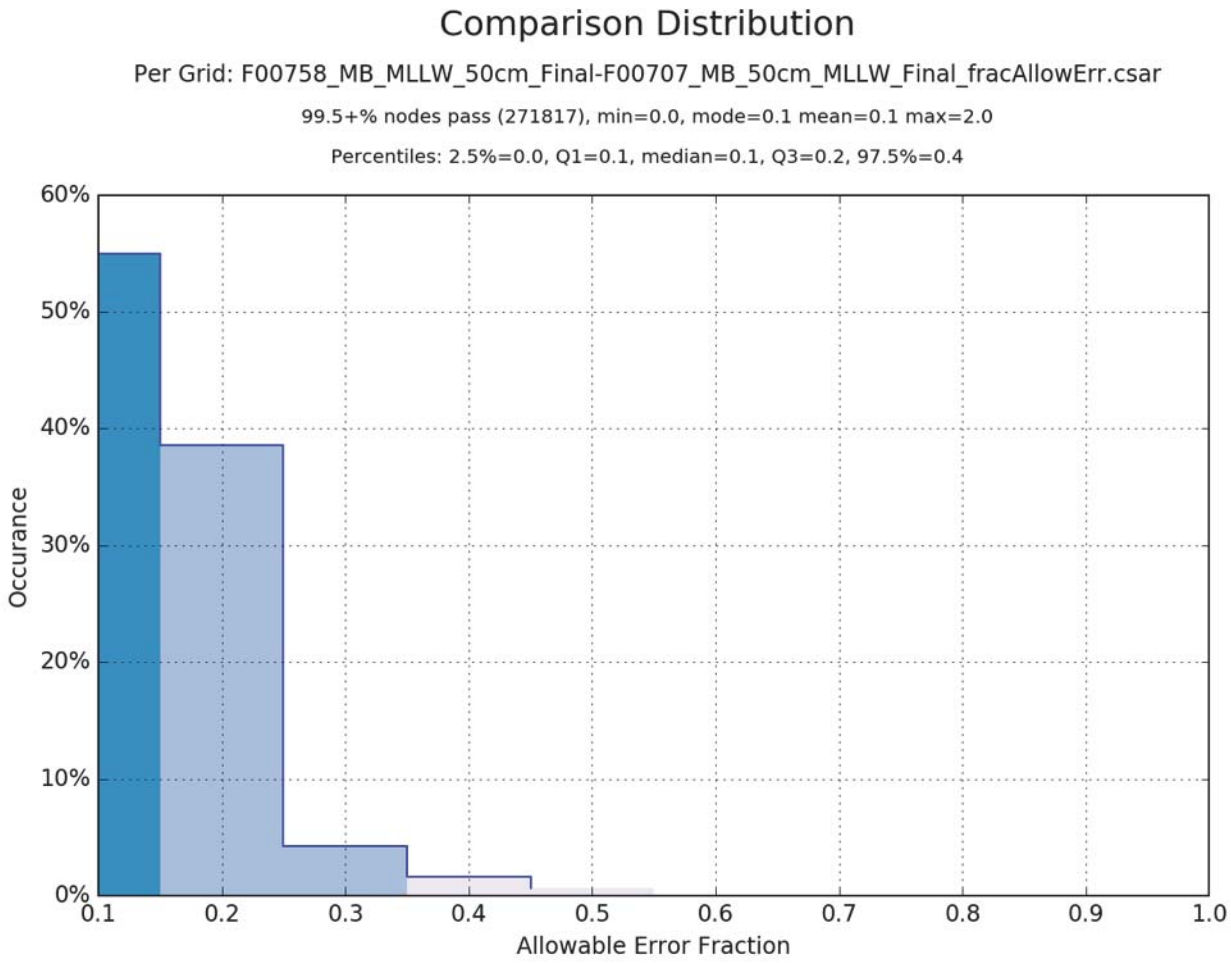
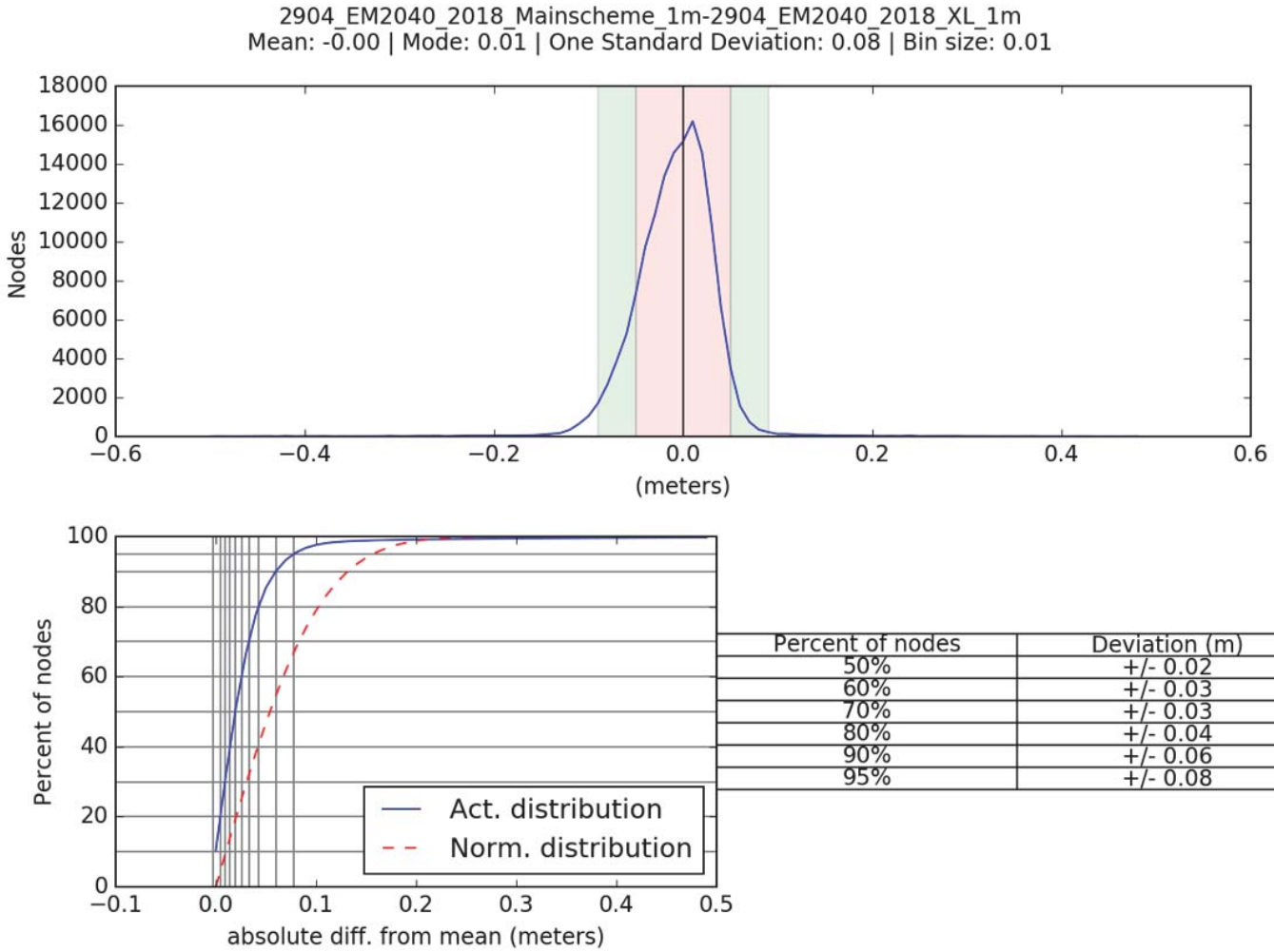


Figure 8: F00758 less F00707 difference surface statistics – observed difference values as a fraction of expected allowable difference values



Percent of nodes	Deviation (m)
50%	+/- 0.02
60%	+/- 0.03
70%	+/- 0.03
80%	+/- 0.04
90%	+/- 0.06
95%	+/- 0.08

Figure 9: F00758 Mainscheme vs. F00758 Crossline difference surface statistics – summary statistics and distribution

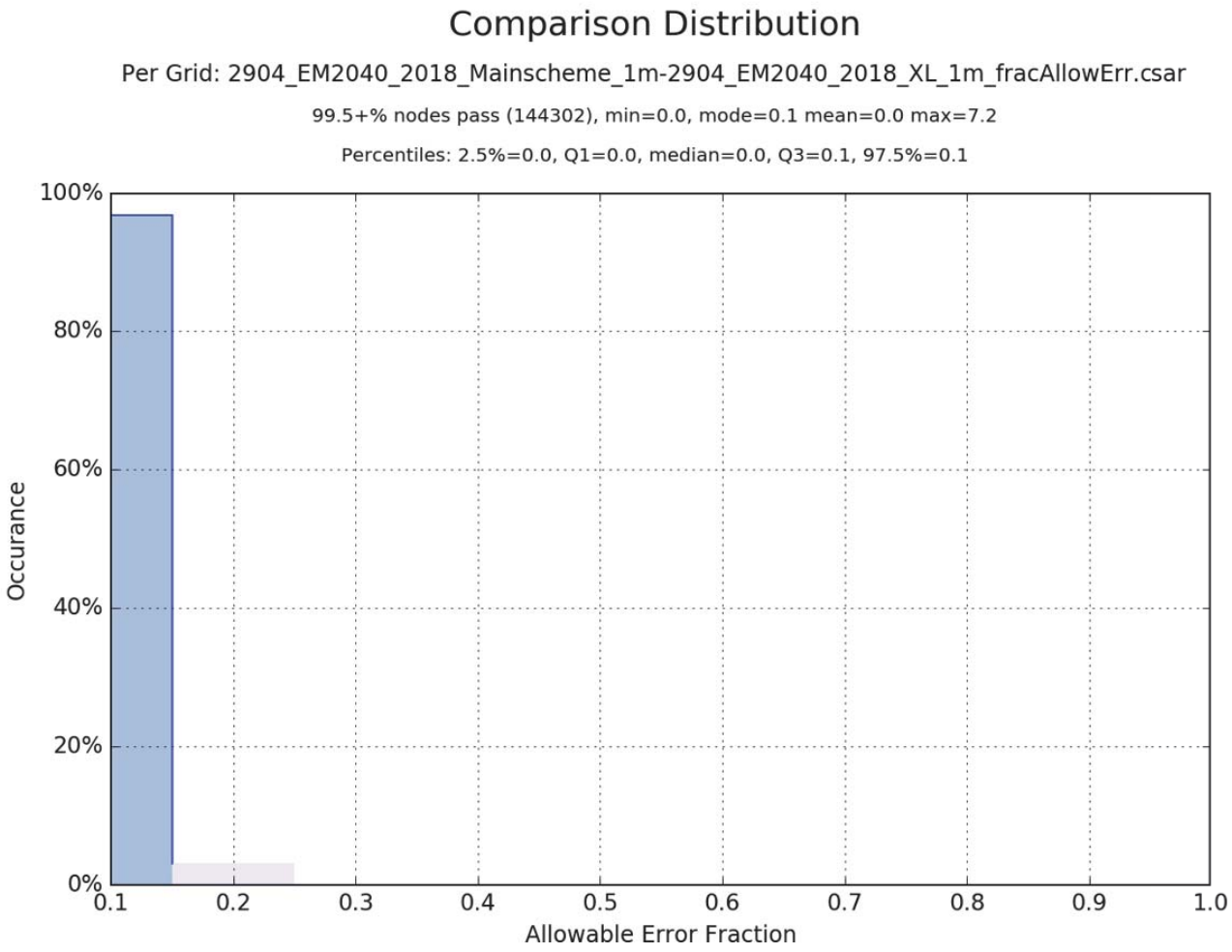


Figure 10: F00758 Mainscheme vs. F00758 Crossline difference surface statistics - observed difference values as a fraction of expected allowable difference values

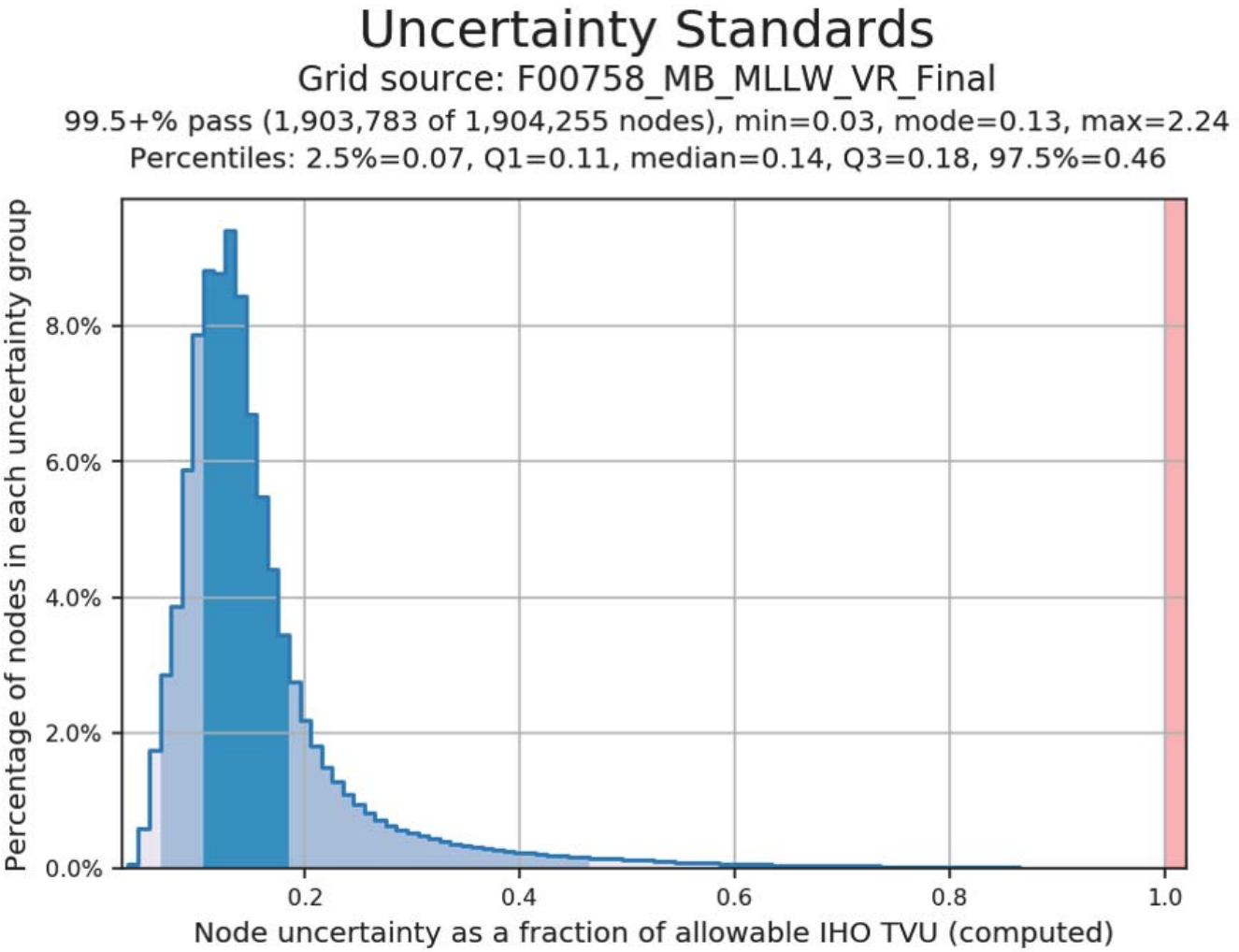


Figure 11: F00758 total vertical uncertainty (TVU) analysis

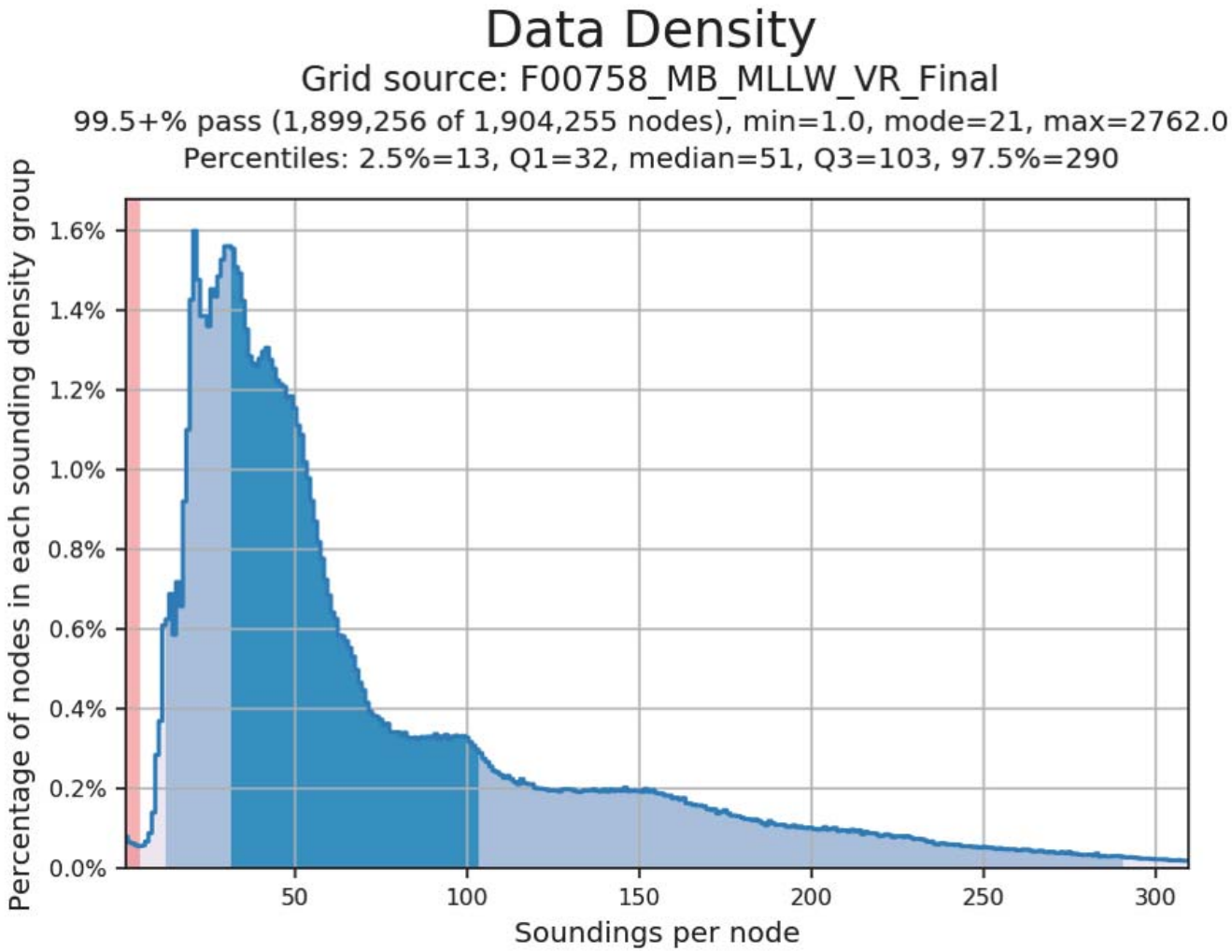


Figure 12: F00758 surface density analysis

F. Results and Recommendations

The following is the largest scale ENC that covers the survey area (Table 2):

Table 2: List of ENCs

ENC	Scale	Edition	Update Application Date	Issue Date	Preliminary?
US5PR52M	1:6500	8	12/15/2014	12/15/2014	NO

A comparison was made between F00758 survey data and Electronic Navigation Chart (ENC) US5PR52M in accordance with methods outlined in the DAPR. A comparison using F00758 survey data only (without F00707) for

the Bahia de Sardinas area is not useful; a comparison using combined 2017-2018 data is provided in the Additional Section of this document.

No significant discrepancies were observed in the vicinity of the approach in to Ensenada Honda and only minor updates to charted soundings are recommended.

The following surfaces and/or BAGs were submitted to the Processing Branch (Table 3):

Table 3: List of surfaces

Surface Name	Surface Type	Resolution	Depth Range	Surface Parameter	Purpose
F00758_MB_VR_MLLW	CARIS VR Surface (CUBE)	VR m	2.62 m - 24.38 m	NOAA_VR	Object Detection MBES
F00758_MB_VR_MLLW_Final	CARIS VR Surface (CUBE)	VR m	2.62 m - 24.38 m	NOAA_VR	Object Detection
F00758_MBAB_1m_2904_300kHz_1of1	MB Backscatter Mosaic Geotiff	1 m	-	N/A	Object Detection

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.

All F00758 survey data were reduced to MLLW using VDatum methods. The ellipsoid to chart datum separation file used is VDatum_Outline_ACHARE_Polygon_xyWGS84-MLLW_geoid12b.csar.

The horizontal datum for this project is World Geodetic System (WGS) 1984.* The projection used for this survey is UTM 20N.

Horizontal and vertical positioning was achieved in accordance with practices outlined in the DAPR. Processing and products for Survey F00758 were conducted and completed in WGS84.

The Field Unit conducted the survey project referencing WGS84 for the horizontal datum. AHB revised the products to horizontal datum of NAD83 and UTM 20N projection to meet HSSD product specification.

H. Additional Results

Chart comparison conducted using combined 2017-2018 survey data:

A comparison was made between the combined 2017-2018 survey data and Electronic Navigation Chart (ENC) US5PR52M in accordance with methods outlined in the DAPR. Numerous discrepancies between ENC US5PR52M and the combined 2017-2018 surveys were observed in the vicinity of Bahia de Sardinas (Figure 13):

- Area A: Three charted underwater rocks with least depths unknown were not observed in the data and are recommended for removal from the chart (Figure 14).

- Area B: The charted foul areas do not reflect areas dangerous to local marine traffic; the foul areas should be replaced with updated soundings and contours (Figure 15).

- Area C: A 4.9m sounding was observed near a charted 6.4m sounding. The discrepancy is not considered a danger to navigation due to the close proximity of shoaler soundings (Figure 16).

- Area D: A 5.2m sounding was observed near a charted 6.4m sounding. The discrepancy is not considered a danger to navigation due to the close proximity of shoaler soundings (Figure 17).

General revisions to charted soundings, depth contours, and area features are recommended.

Differences observed between F00758 and F00707 data:

Two significant differences between data from F00758 (2018) and F00707 (2017) were observed near the ferry terminal in Bahia de Sardinas over two localized depressions in the seafloor (Figure 18). The depressions were observed in both 2017 and 2018 data sets; however, the depressions were 1 to 1.25 meters deeper in the 2017 data. Neither depression is significant for charting purposes.

The mean difference between bathymetric surface nodes of F00758 and F00707 is 0.3 with a standard deviation of 0.1m.

High quality LIDAR data from a joint 2018 USACE/FEMA project can be found on NOAA's Digital Coast website at: https://coast.noaa.gov/htdata/raster2/elevation/USACE_PR_Topobathy_DEM_2018_8571/

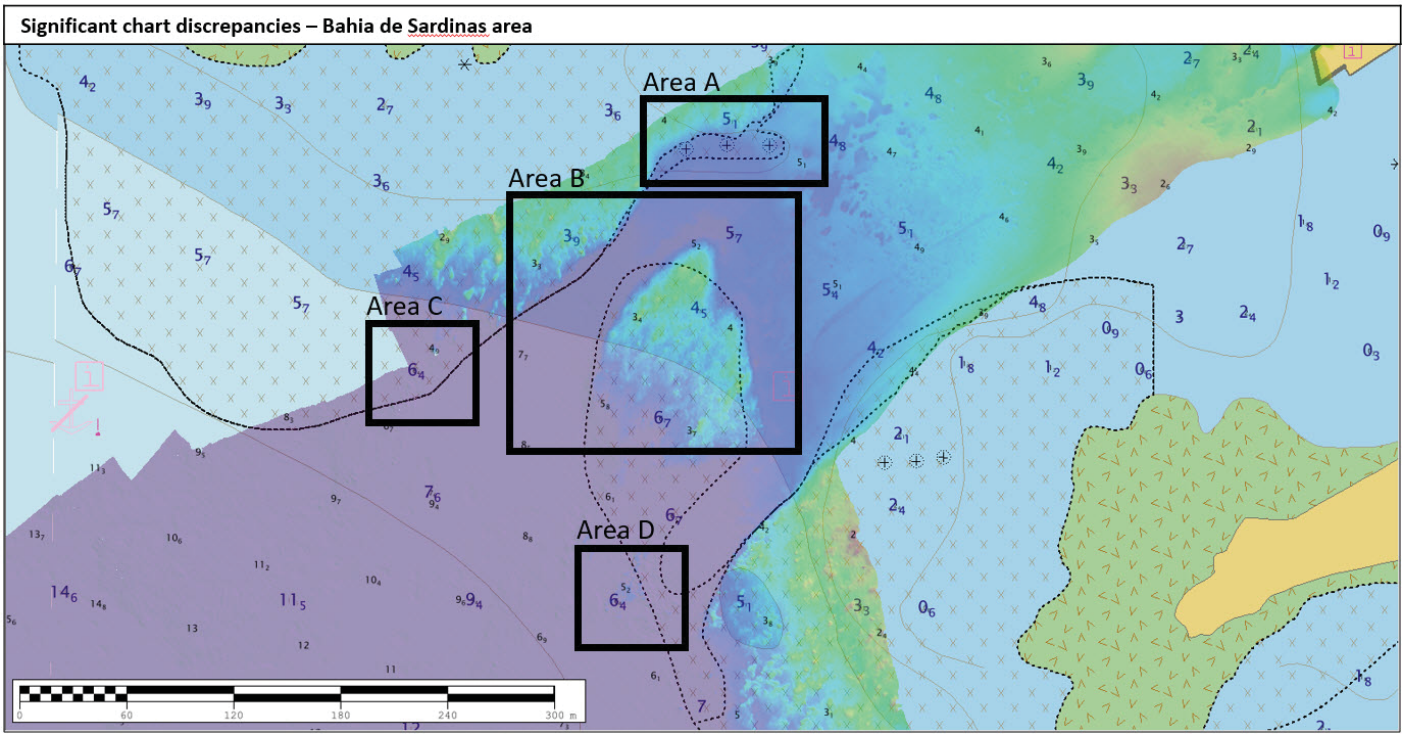
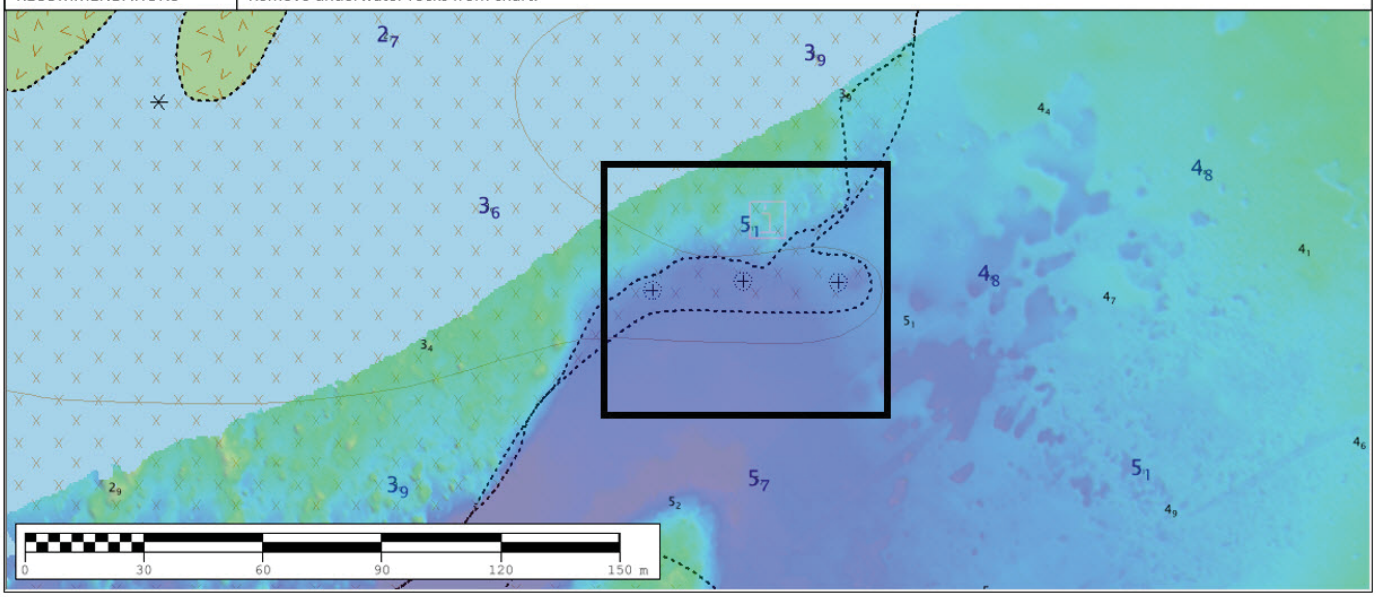


Figure 13: Overview of discrepancies between ENC US5PR52M and Survey F00758. Larger soundings = charted ENC depths / Smaller soundings = F00758

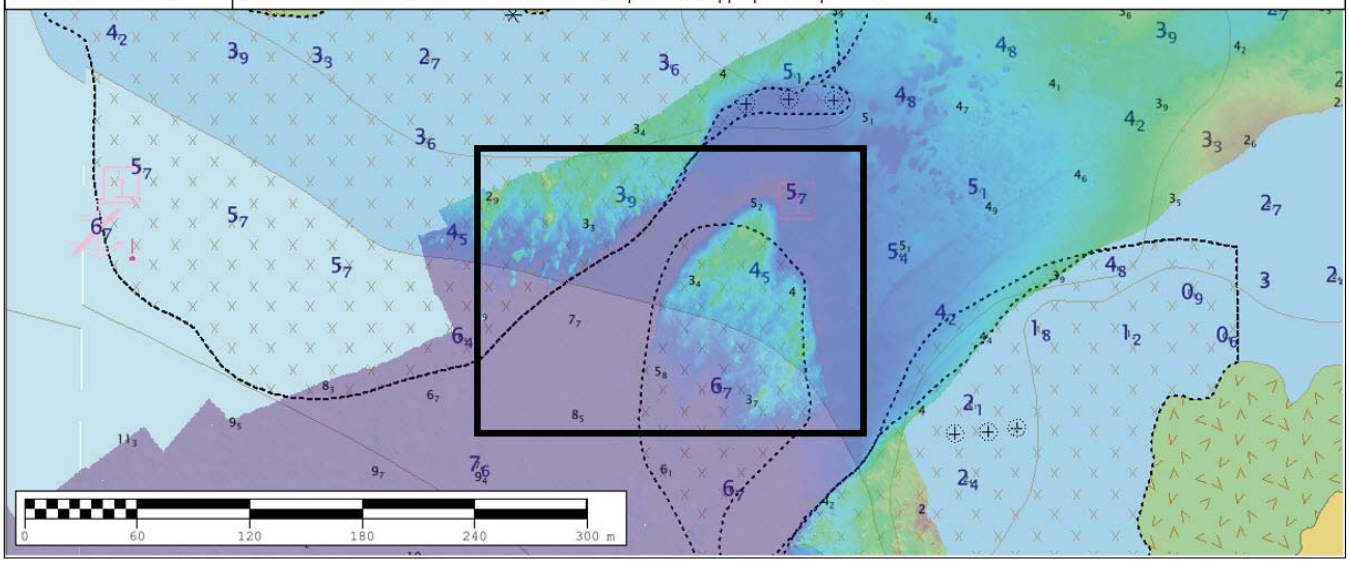
AREA A	
LAT	18.300491 N
LON	065.305690 W
REMARKS	Charted underwater rocks with depths unknown were unobserved in MBES data.
RECOMMENDATIONS	Remove underwater rocks from chart.



* Larger soundings = charted ENC depths / Smaller sounding = F00758 soundings

Figure 14: Chart discrepancy - Area A

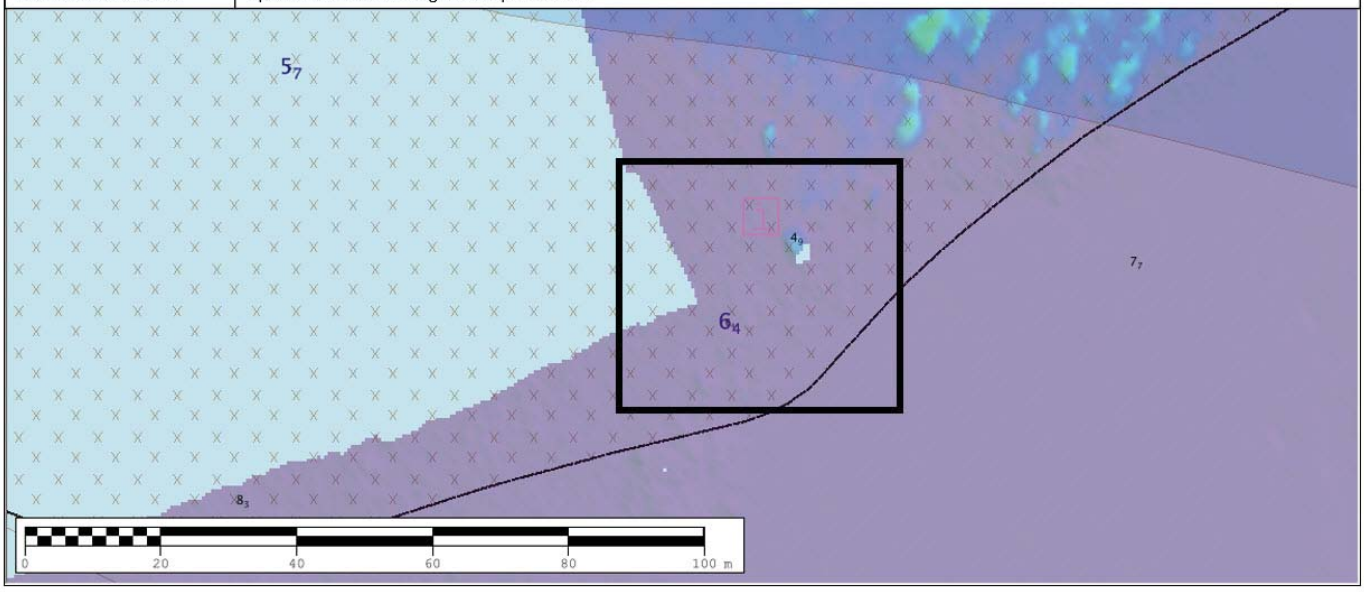
AREA B	
LAT	18.299355 N
LON	065.305960 W
REMARKS	Charted foul area over an area frequently trafficked by local marine traffic and ferry service; area is not dangerous to navigate and foul area should be removed from chart.
RECOMMENDATIONS	Remove foul area from this area of the chart and replace with appropriate depth area.



* Larger soundings = charted ENC depths / Smaller sounding = F00758 soundings

Figure 15: Chart discrepancy - Area B

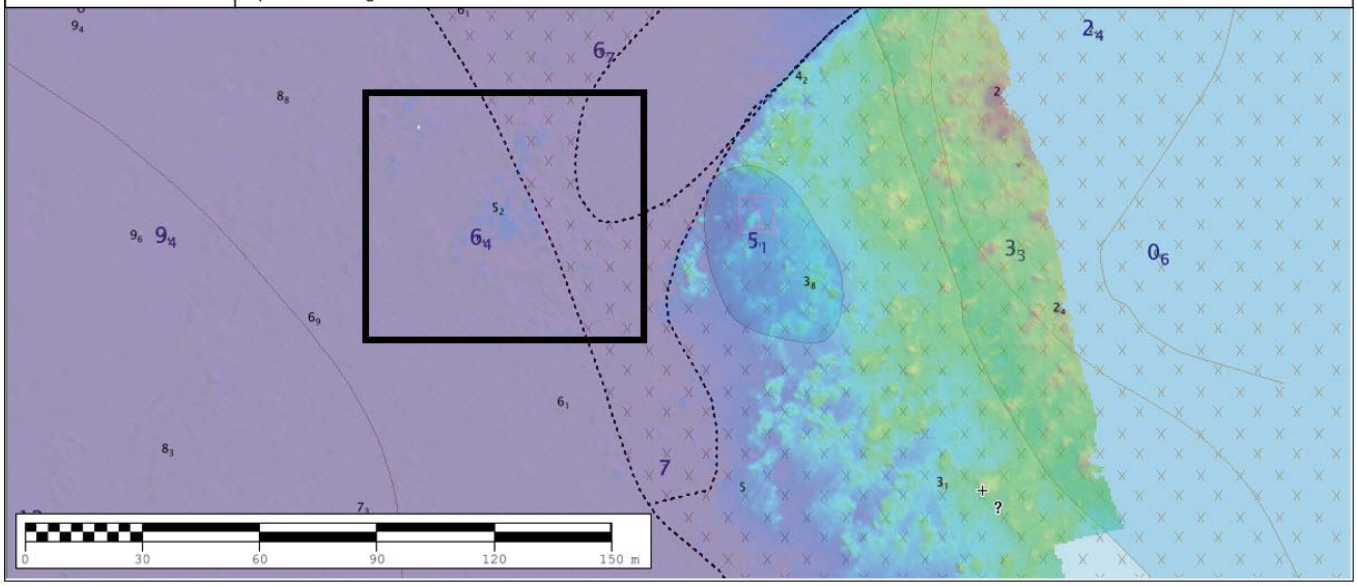
AREA C	
LAT	18.299441 N
LON	065.307299 W
REMARKS	Charted soundings and depth contour do not reflect observed sounding.
RECOMMENDATIONS	Update charted soundings and depth contour.



* Larger soundings = charted ENC depths / Smaller sounding = F00758 soundings

Figure 16: Chart discrepancy - Area C

AREA D	
LAT	18.298248 N
LON	065.306197 W
REMARKS	Charted sounding is 1.2 m deeper than observed sounding.
RECOMMENDATIONS	Update sounding.



* Larger soundings = charted ENC depths / Smaller sounding = F00758 soundings

Figure 17: Chart discrepancy - Area D

Differences between 2018 and 2017 data	
LAT	18.300910 N
LON	065.302928 W
REMARKS	Two significant differences between data from F00707 (2017) and F00758 (2018) were observed near the ferry terminal in Bahia de Sardinas. Depressions were observed in 2017 and 2018 data sets; however, the depressions were 1 to 1.25 meters deeper in the 2017 data. Neither depression is significant for charting purposes.

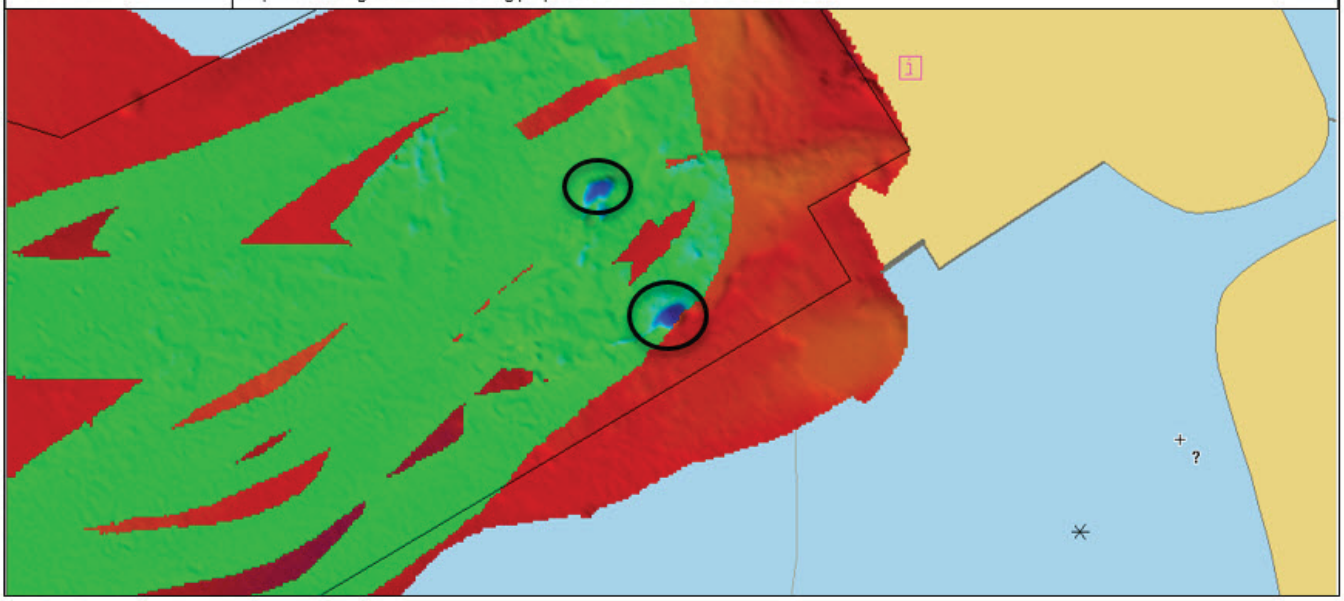


Figure 18: Differences between F00758 and F00707 data. Areas circled in black are the two areas of significant difference

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 Specifications and 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
CAPT Christiaan van Westendorp, NOAA	Commanding Officer / Chief of Party	04/01/2019	VAN WESTENDORP.CHRISTIAAN.HENRY.1012828175 c=US, o=U.S. Government, ou=DoD, ou=PKI, ou=NOAA, cn=VAN WESTENDORP.CHRISTIAAN.HENRY.1012828175 2019.04.03 09:04:52 -04'00'
LT Charles J. Wisotzkey, NOAA	Operations Officer	04/01/2019	Digitally signed by WISOTZKEY.CHARLES.JUSTIN.1300819660 Date: 2019.04.08 08:28:55 -04'00'
Joshua Hiteshew	Chief Hydrographic Survey Technician	04/01/2019	HITESHEW.JOSHUA.TAYLOR.1537939652 Digitally signed by HITESHEW.JOSHUA.TAYLOR.1537939652 Date: 2019.04.03 20:02:30 Z

Charles Wisotzkey - NOAA Federal <charles.j.wisotzkey@noaa.gov>

Coast Pilot Review Report for OPR-I369-TJ-18 Puerto Rico Ports

1 message

Charles Wisotzkey - NOAA Federal <charles.j.wisotzkey@noaa.gov> Fri, Apr 12, 2019 at 10:54 AM
To: OCS NDB - NOAA Service Account <ocs.ndb@noaa.gov>, _NOS OCS NSD Coast Pilot <coast.pilot@noaa.gov>
Cc: Christina Belton - NOAA Federal <christina.belton@noaa.gov>, _OMAO MOA OPS Thomas Jefferson <ops.thomas.jefferson@noaa.gov>, _OMAO MOA ChiefST Thomas Jefferson <chiefst.thomas.jefferson@noaa.gov>

All,

Please see attached Coast Pilot Review Notes (OPR-I369-TJ-18_Coast Pilot Review Report.pdf).

The only suggested edits concern the entry for the port of Las Mareas and are in Paragraph 508.

Entries referencing depths should be updated in accordance with submitted bathy grids.

--

LT Charles J. Wisotzkey, NOAA
NOAA Ship Thomas Jefferson (S-222)

2 attachments

OPR-I369-TJ-18CoastPilotReport_original.pdf
2311K

OPR-I369-TJ-18_Coast Pilot Review Report.pdf
2264K

ChiefST.Thomas Jefferson - NOAA Service Account <chiefst.thomas.jefferson@noaa.gov>

Survey Outlines for project OPR_I369_TJ_18

1 message

Charles Wisotzkey - NOAA Federal <charles.j.wisotzkey@noaa.gov> Wed, Nov 7, 2018 at 7:30 PM
To: survey.outlines@noaa.gov
Cc: Christina Belton - NOAA Federal <christina.belton@noaa.gov>, _OMAO MOA OPS Thomas Jefferson <ops.thomas.jefferson@noaa.gov>, _OMAO MOA ChiefST Thomas Jefferson <chiefst.thomas.jefferson@noaa.gov>, michael hewlett - NOAA Federal <michael.hewlett@noaa.gov>, Joshua Hiteshew - NOAA Federal <joshua.hiteshew@noaa.gov>, Kevin Brown - NOAA Federal <kevin.w.brown@noaa.gov>, Sydney Catoire - NOAA Federal <sydney.catoire@noaa.gov>, Jacquelyn Putnam - NOAA Federal <jacquelyn.putnam@noaa.gov>

All concerned,

Survey outlines for all surveys conducted by TJ on project OPR_I369_TJ_18 attached; the files can also be downloaded from the following link:

https://drive.google.com/open?id=1QDb9YsXRQvIXX8y6o0ct2bMhJjQ-uhfm

- Charles

--

LT Charles J. Wisotzkey, NOAA
NOAA Ship Thomas Jefferson (S-222)

OPR_I369_TJ_18_Survey_Outlines_20181107.zip
8471K

Charles Wisotzkey - NOAA Federal <charles.j.wisotzkey@noaa.gov>

OPR-I369-TJ-18 NCEI Data

2 messages

Calandria DeCastro <calandria.m.decastro@noaa.gov> Thu, Mar 21, 2019 at 1:43 PM
To: _NODC Submissions <nodc.submissions@noaa.gov>
Cc: ops.thomas.jefferson@noaa.gov, Christina Belton - NOAA Federal <christina.belton@noaa.gov>

Good afternoon,

Attached is the NCEI Sound Speed Data for Project OPR-I369-TJ-18.

V/r,

--
LT Calandria DeCastro, NOAA
OPS in Training, NOAA Ship *Thomas Jefferson*
Ship Land Line: 757-441-6322
Ship Cell: 757-647-0187
Ship Iridium: 808-434-2706

OPR-I369_TJ-18_20190321.zip
1582K

Charles Wisotzkey - NOAA Federal <charles.j.wisotzkey@noaa.gov> Fri, Apr 5, 2019 at 10:58 AM
To: _OMAO MOA ChiefST Thomas Jefferson <chiefst.thomas.jefferson@noaa.gov>

[Quoted text hidden]
--

LT Charles J. Wisotzkey, NOAA
NOAA Ship Thomas Jefferson (S-222)

OPR-I369_TJ-18_20190321.zip
1582K

UNITED STATES DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration
Office of Marine and Aviation Operations,
Marine Operation Center-Atlantic, NOAA Ship Thomas Jefferson
Norfolk, Virginia 23510

April 16, 2018

MEMORANDUM FOR: Jay Nunenkamp
Environmental Compliance Coordinator, NOAA Office of Coast Survey

FROM: ENS Jacquelyn Putnam, NOAA
Junior Officer, NOAA Ship *Thomas Jefferson*

SUBJECT: Recipients of Marine Species Awareness Training

The following personnel of NOAA Ship *Thomas Jefferson* completed the required Marine Species Awareness Training (MSAT) on April 4, 2018:

- LCDR Meghan McGovern
- LT Anthony Klemm
- LT Charles Wisotzkey
- ENS Dale Gump
- ENS Sydney Catoire
- ENS Garrison Grant
- ENS Jacquelyn Putnam
- ENS Taylor Krabiel
- JUE Sharon Gilliam
- EU Andy Medina
- WP Michael Wilson
- ET Thomas Loftin
- ET Richard Conway
- CHST Allison Stone
- HST Kim Glomb
- HST Joshua Hiteshew
- HST Tracey McMillan
- HAST Kevin Brown
- CB Bernard Pooser
- BGL Robert Bayliss
- SS Francine Grains
- SS James Brzostek

- AB Patrick Osborn
- AB Tom Bascom
- AB Stephen Lovett
- GVA Joshua Thompson
- CC Ace Burke
- 2C Patrick Fennel
- 2C Nester Poblete

UNITED STATES DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration
Office of Marine and Aviation Operations
NOAA Ship *Thomas Jefferson* (S222)
439 West York St, Norfolk, VA 23510

3/29/2018

MEMORANDUM FOR: Corey Allen
Acting Chief, Operations Branch
Hydrographic Surveys Division

VAN WESTENDORP.CHRISTIAAN.HENRY.1012828175
c=US, o=U.S. Government, ou=DoD, ou=PKI, ou=NOAA, cn=VAN WESTENDORP.CHRISTIAAN.HENRY.1012828175
2018.03.30 09:57:32 -04'00'

FROM: Commander Christiaan van Westendorp, NOAA
Commanding Officer, NOAA Ship *Thomas Jefferson*

SUBJECT: Waiver request – WGS84 Datum, CY2018 Projects

Thomas Jefferson requests a waiver of the HSSD 2017 and HSSD 2018 Section 2.2 Horizontal Datum requirement to acquire and submit survey data in WGS84 rather than NAD83 for all projects in calendar year 2018.

Justification

Retaining the current procedure and configurations will reduce the possibility of errors.

Decision

Waiver is: Granted _____ Denied _____

cc: OPS, *Thomas Jefferson*
HCST, *Thomas Jefferson*

APPROVAL PAGE

F00758

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
- Data Acquisition and Processing Report
- Collection of Bathymetric Attributed Grids (BAGs)
- Processed survey data and records
- GeoPDF of survey products
- Collection of Backscatter mosaics

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: Meghan Mcgovern 2020.10.29 13:57:40 -04'00'

Commander Meghan McGovern, NOAA
Chief, Atlantic Hydrographic Branch