

F00795

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

DESCRIPTIVE REPORT

Type of Survey: Navigable Area

Registry Number: F00795

LOCALITY

State(s): Maryland

General Locality: Chesapeake Bay

Sub-locality: Little Cove Point

2019

CHIEF OF PARTY
Lieutenant Patrick J Debroisse

LIBRARY & ARCHIVES

Date:

HYDROGRAPHIC TITLE SHEET

F00795

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): **Maryland**

General Locality: **Chesapeake Bay**

Sub-Locality: **Little Cove Point**

Scale: **10000**

Dates of Survey: **09/19/2019 to 10/15/2019**

Instructions Dated: **09/11/2019**

Project Number: **S-E937-BH2-19**

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

Chief of Party: **Lieutenant Patrick J Debroisse**

Soundings by: **Kongsberg Maritime EM 2040 (MBES)
 PicoTech PicoMB-120 (MBES)**

Imagery by: **Kongsberg Maritime EM 2040 (MBES Backscatter)**

Verification by: **Pacific 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 18N, 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

A. Area Surveyed

This hydrographic survey was acquired in accordance with the requirements defined in the Project Instruction S-E937-BH2-19.

Data were acquired within the following survey limits:

Northwest Limit	Southeast Limit
38° 21' 58.7" N 76° 22' 33.33" W	38° 21' 38.85" N 76° 21' 59.18" W

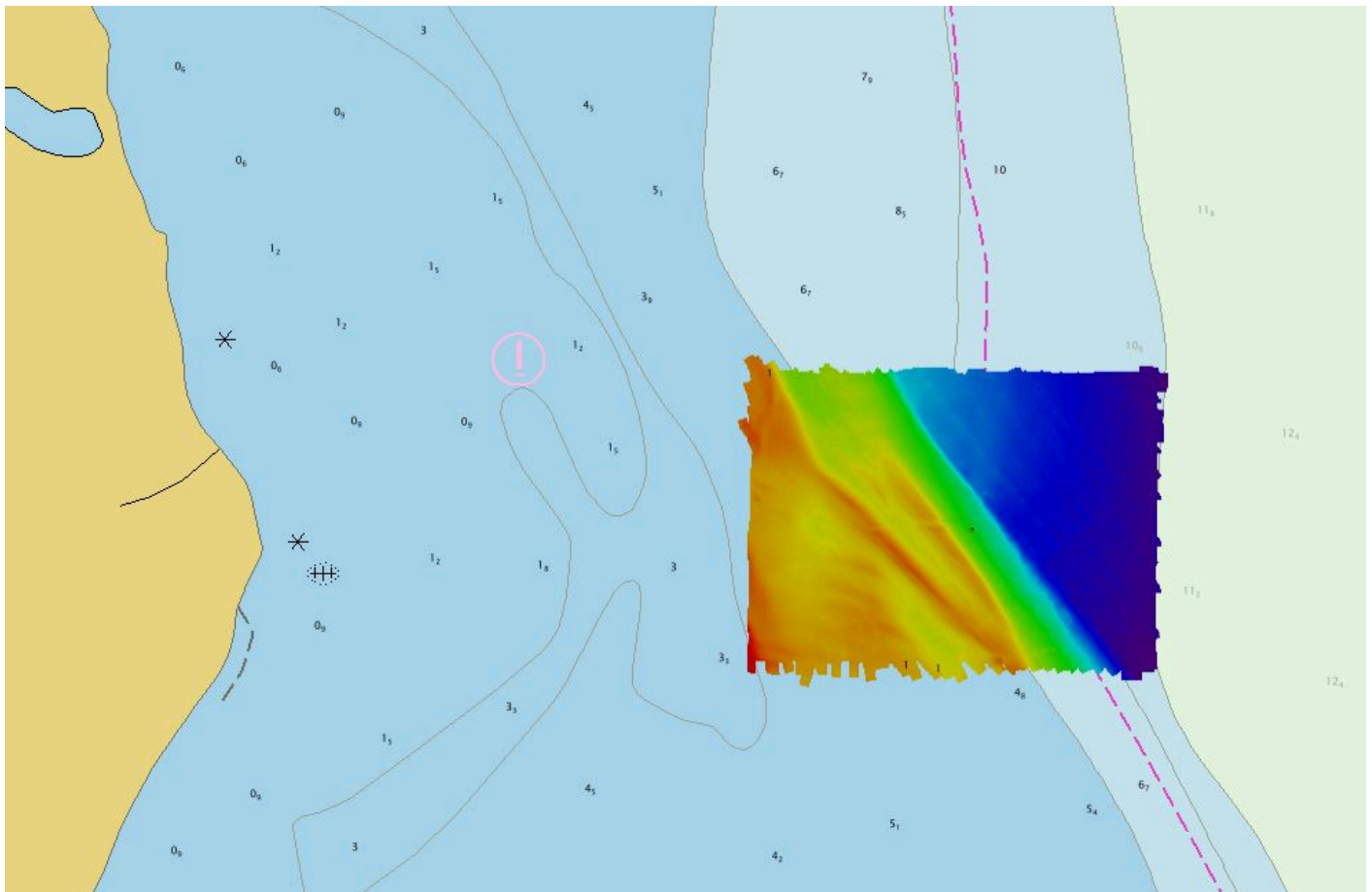


Figure 1: F00795 Coverage overlaid on ENC US5MD21M.

B. Survey Purpose

There are submerged pilings off of Little Cove Point in the approximate position of 38° 21.836'N 076° 22.222'W. The location is in the area of a registered pound net, pound net site 601, which has been removed. It is also reported that a number of poles and net remain submerged within 2 - 3 feet of below the surface. The waterman reported the submerged pilings in positions: 38°21'50.16"-076°22'-13.32' and 38°21'46.5"-076°22'13.26". The USCG reported end points of the registered net are 38°21'48.96 - 076°22'24.96' and 38°21'.96"-076°22'13.44". The Bay Hydro II was assigned to investigate the location of the reported obstructions.

C. Intended Use of Survey

The entire survey is adequate to supersede previous data.

Data acquired in F00795 meet multibeam echo sounder (MBES) coverage requirements for object detection, as required by the HSSD. This includes crosslines, NOAA allowable uncertainty, and density requirements. Additional compliance statistics can be located in Appendix II of this report. Survey data from this project is intended to supersede all prior survey data in the common area.

D. Data Acquisition and Processing

Refer to the S-E937-BH2-19 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 F00795. Real-time uncertainties were provided via EM 2040 and PicoMB 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 Grid QA feature to determine what percentage of each surface meets specifications. Figure 2 shows the statistics for the surface. Overall, 99.5% of nodes meet or exceed NOAA Allowable Uncertainty specifications for F00795. For individual graphs per surface of uncertainty requirements, see the QC Tools Folder located in Appendix II.

Uncertainty Standards

Grid source: F00795_MB_MLLW_50cm

99.5+% pass (1,920,987 of 1,920,988 nodes), min=0.34, mode=0.35, max=1.09

Percentiles: 2.5%=0.34, Q1=0.35, median=0.36, Q3=0.37, 97.5%=0.41

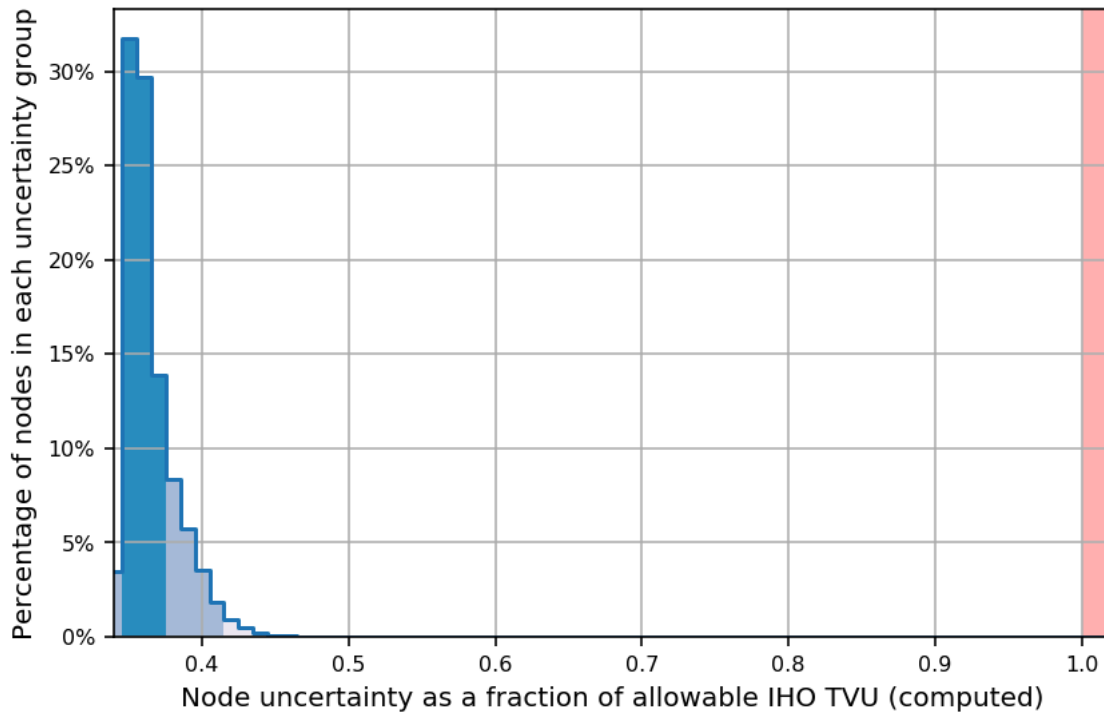


Figure 2: F00795 Uncertainty Statistics

F. Results and Recommendations

The following are the largest scale ENC's, which cover the survey area:

ENC	Scale	Edition	Update Application Date	Issue Date	Preliminary?
US5MD21M	1:40000	25	05/14/2018	09/25/2019	NO

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

Surface Name	Surface Type	Resolution	Depth Range	Surface Parameter	Purpose
F00795_MB_50cm_MLLW.csar	CARIS Raster Surface (CUBE)	0.5 cm	4.0 m - 11.6 m	NOAA_0.5m	Object Detection
F00795_MB_50cm_MLLW_Final.csar	CARIS Raster Surface (CUBE)	0.5 cm	0.3 m - 11.6 m	NOAA_0.5m	Object Detection
F00795_MBAB_50cm_BHII_300kHz.csar	MB Backscatter Mosaic	0.5 m	N/A	NOAA_0.5m	Object Detection

A comparison was performed between survey F00795 and ENC US5MD21M using CARIS HIPS and SIPS sounding and contour layers derived from the 0.5 meter combined surface. The contours and soundings were overlaid on the chart to assess differences between the surveyed soundings and charted depths.

Soundings from F00795 (orange) are in a general agreement with charted depths on ENC US5MD21M (red), with most depths agreeing to 0.3 meters as shown in Figure 3.

Contours from F00795 (red) are in a general disagreement with charted contours on ENC US5MD21M (black) as shown in Figure 4. The largest differences are seen in the 5.4m contour where surveyed contour is much further in shore than the charted contour. The surveyed 9.1m contour is about 35m further inshore than charted over most of the survey area.

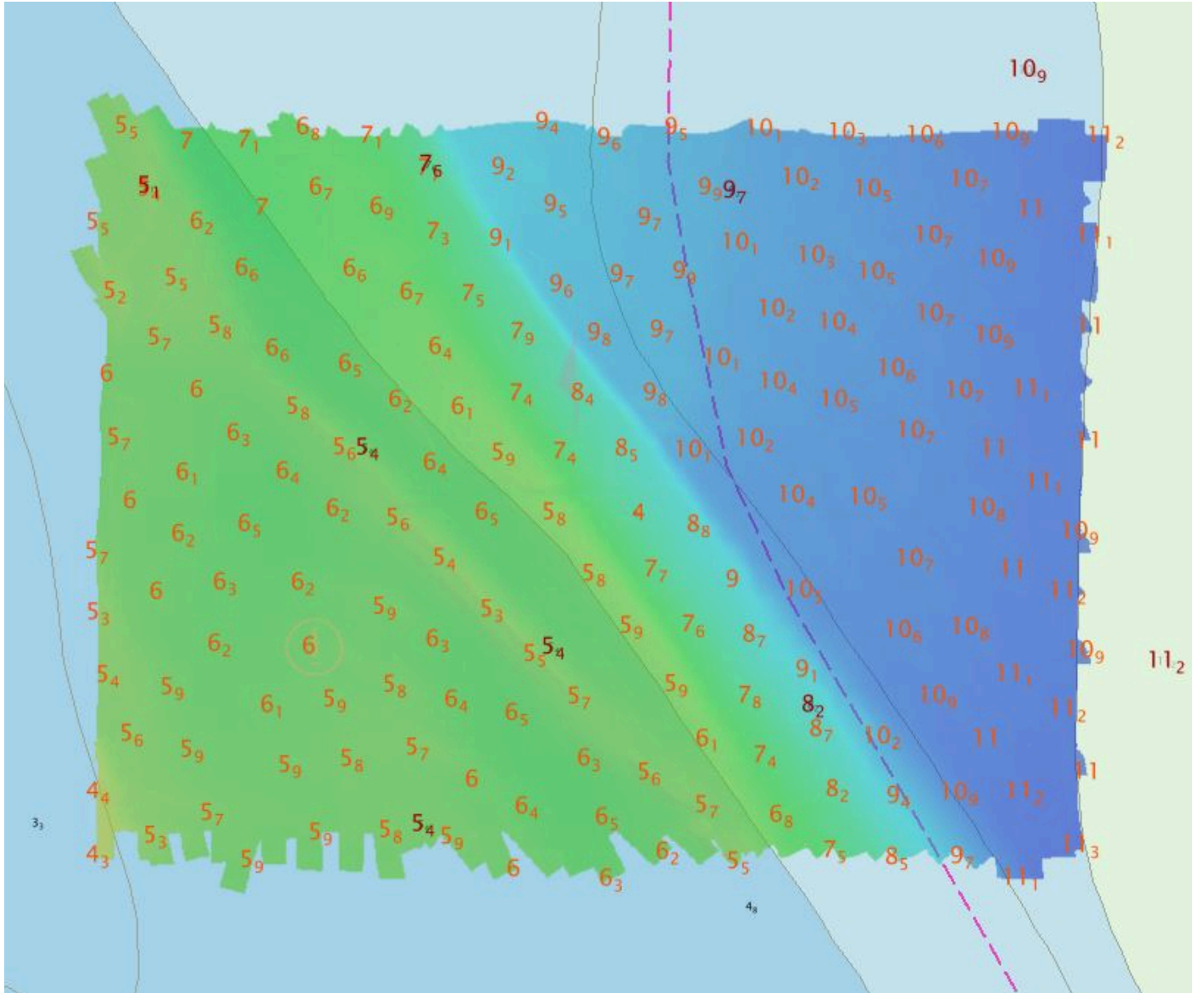


Figure 3: Overview of F00795 soundings (orange) overlaid onto ENC US5MD21M (red).

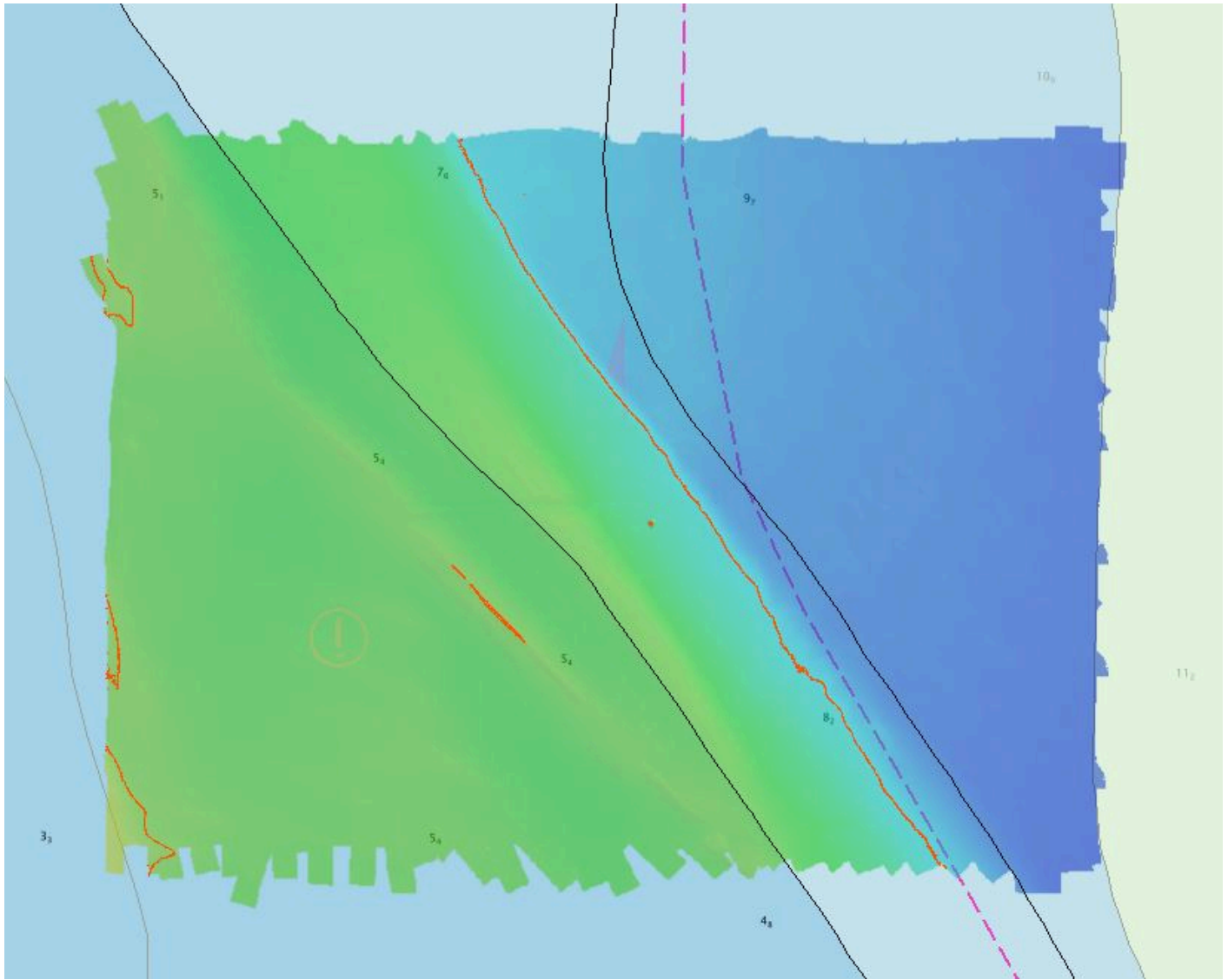


Figure 4: Overview of F00795 contours (orange) overlaid onto ENC US5MD21M (black).

G. Vertical and Horizontal Control

The vertical datum for this project is Mean Lower Low Water. The vertical control method used was VDatum.

ERS methods were used as the final means of reducing F00795 to MLLW for submission. Data were reduced using the VDATUM model S-E937_VDatumLimits_100m_NAD83-MLLW_geoid12b.csar provided by the project manager.

The horizontal datum for this project is North American Datum of 1983 (NAD 83). The projection used for this project is Universal Transverse Mercator (UTM) Zone 18.

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 F00795 POSPAC Processing Logs spreadsheets located in the Separates folder.

During real-time acquisition, ASV008 and Bay Hydro II received correctors from the Wide Area Augmentation System (WAAS) for increased accuracies similar to USCG DGPS stations. WAAS and SBETs were the sole methods of positioning for F00795.

H. Additional Results

Crossline

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 CUBE surface using strictly crosslines were created. From these two surfaces, a difference surface (mainscheme - crosslines = difference surface) was generated using Pydro's Compare Grids tool at a 0.5 meter resolution (Figure 5), and is submitted in the Separates II Digital Data folder. Statistics show the mean difference between the depths derived from mainscheme and crosslines was 0.06 meters with mainscheme being deeper and 95% of nodes falling within 0.12 meters (Figure 6). For the respective depths, the difference surface was compared to the allowable NOAA uncertainty standards using Compare Grids. In total, 99.5% of the depth differences between mainscheme and crossline data were within allowable NOAA uncertainties (Figure 7).

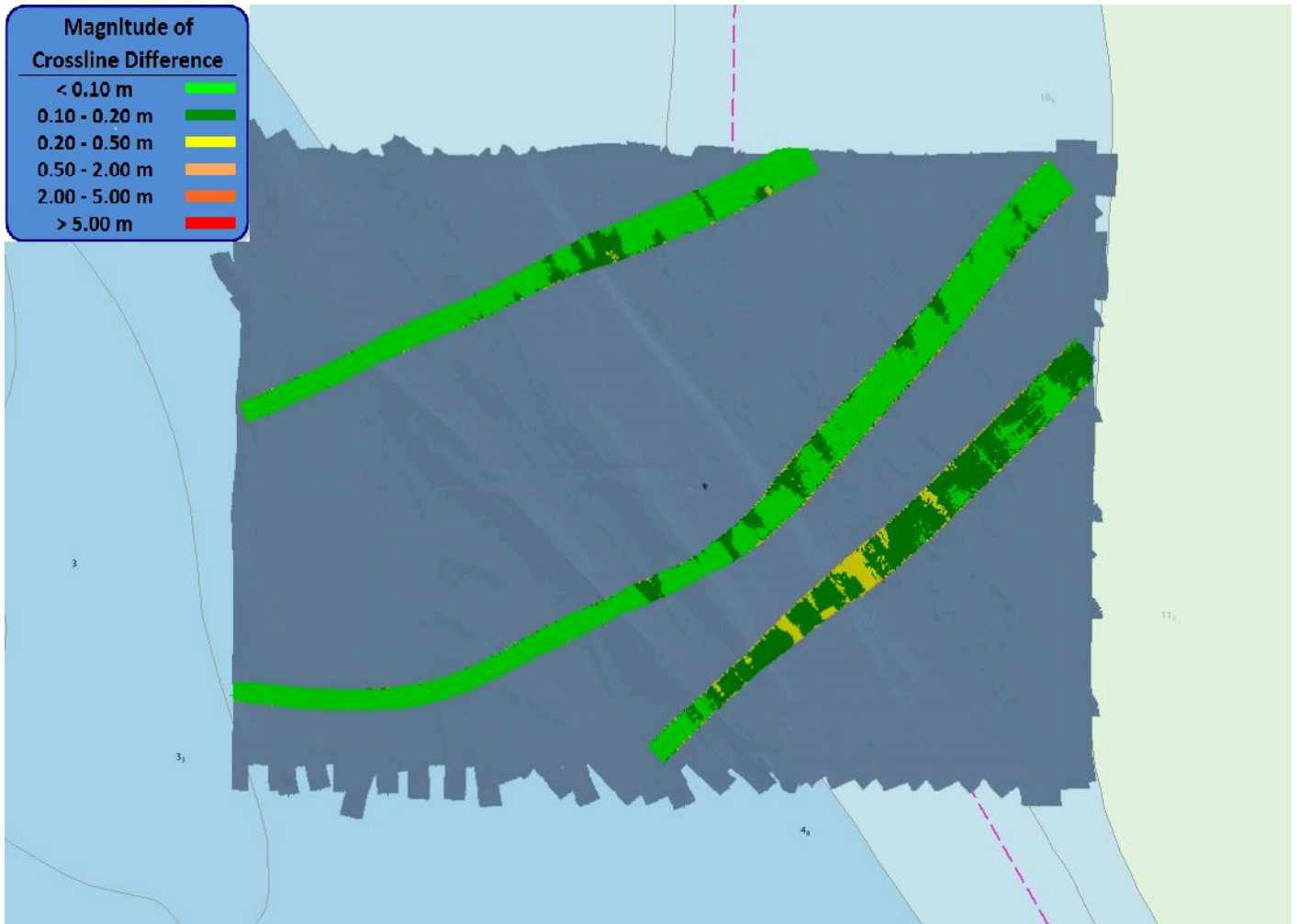


Figure 5: F00795 Crossline Comparison Overview

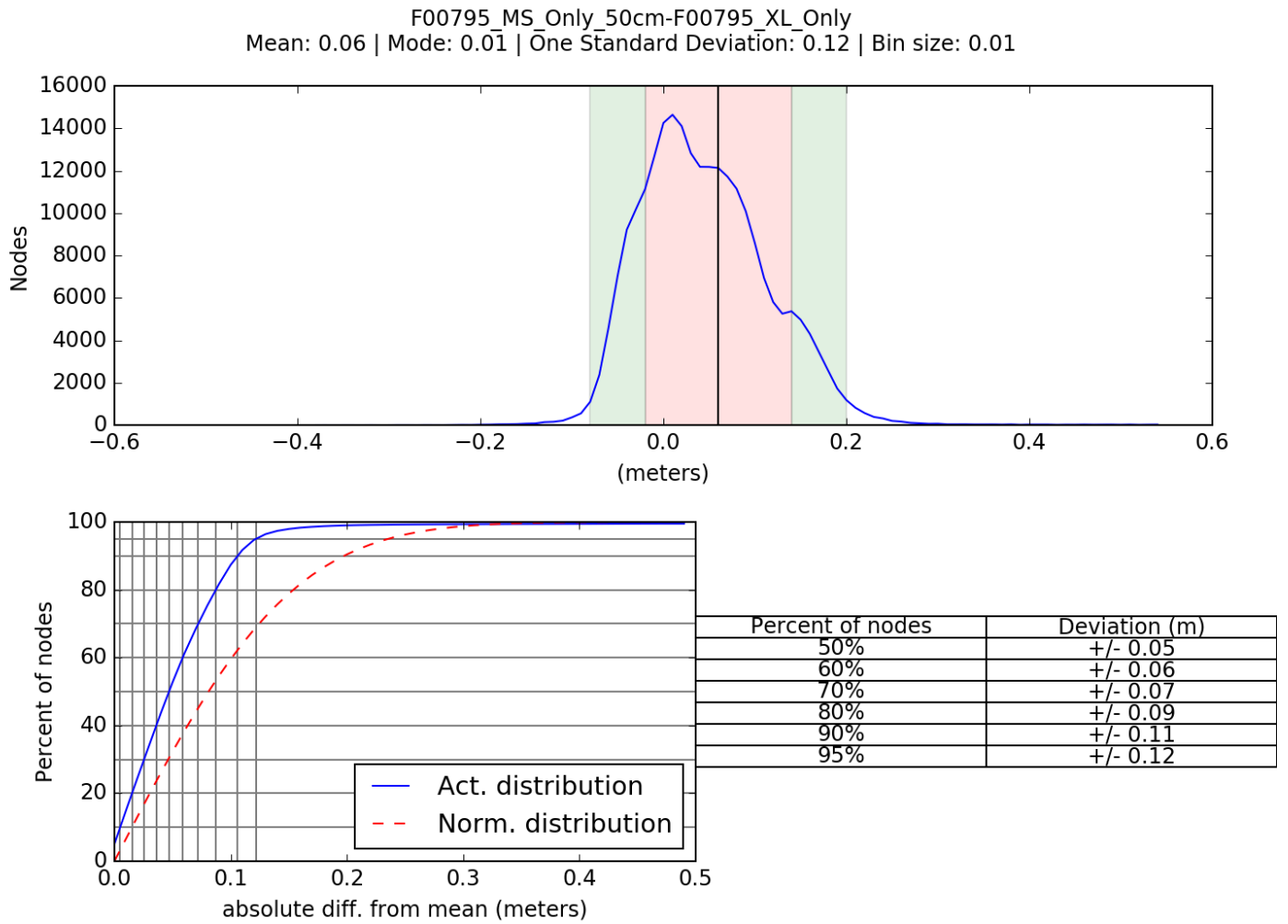


Figure 6: F00795 Crossline Comparison Statistics

Comparison Distribution

Per Grid: F00795_MS_Only_50cm-F00795_XL_Only_fracAllowErr.csar

99.5+% nodes pass (239182), min=0.0, mode=0.1 mean=0.1 max=4.9

Percentiles: 2.5%=0.0, Q1=0.0, median=0.1, Q3=0.1, 97.5%=0.3

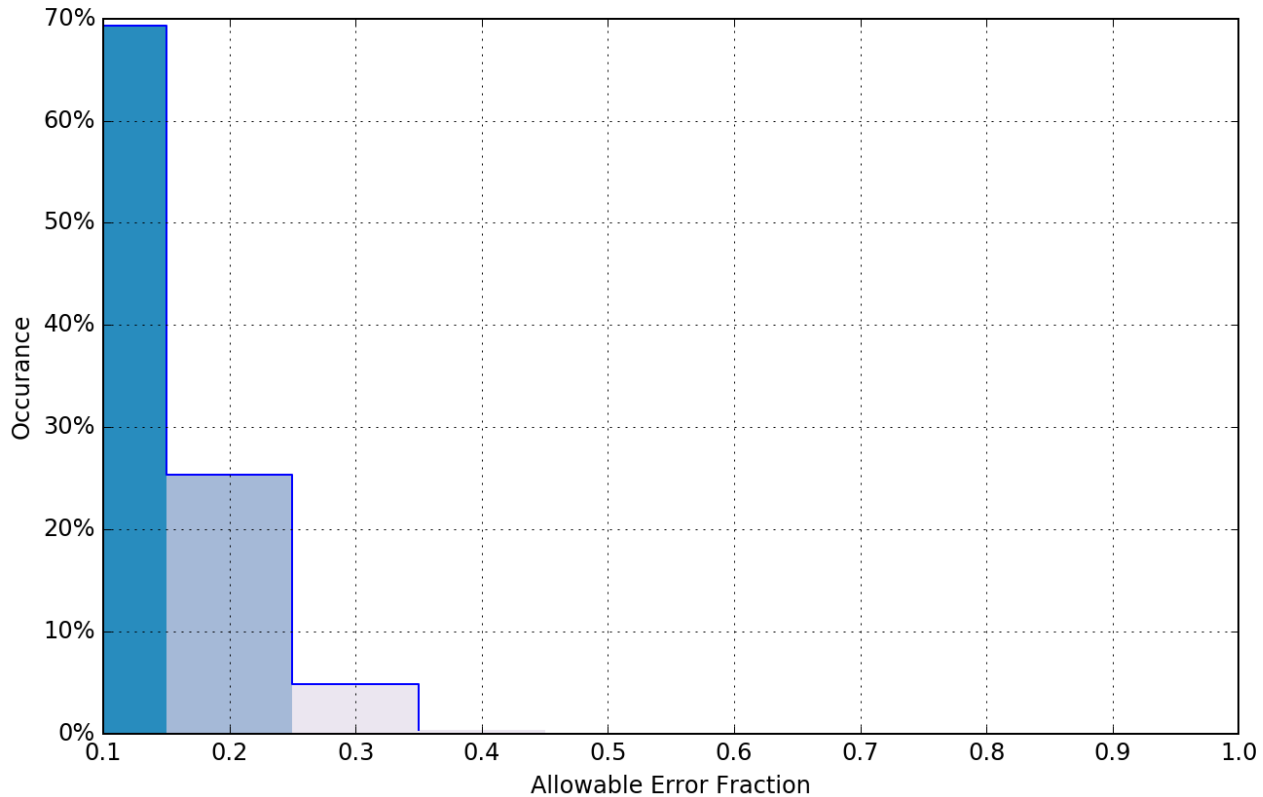


Figure 7: F00795 Crossline Comparison NOAA Allowable Uncertainty Statistics

Data Logs

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 F00795 Data Log spreadsheet. All data logs are submitted digitally in the Processing Logs folder.

Data Density

Finalized surfaces were analyzed using the Pydro QC Tools Grid QA feature and the results are shown in Figure 8 below. Density requirements for F00795 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. The few nodes that did not meet density requirements are due to sparse data in the outer beams. For individual graphs (per surface) of density requirements, see the Grid QA folder located in Appendix II.

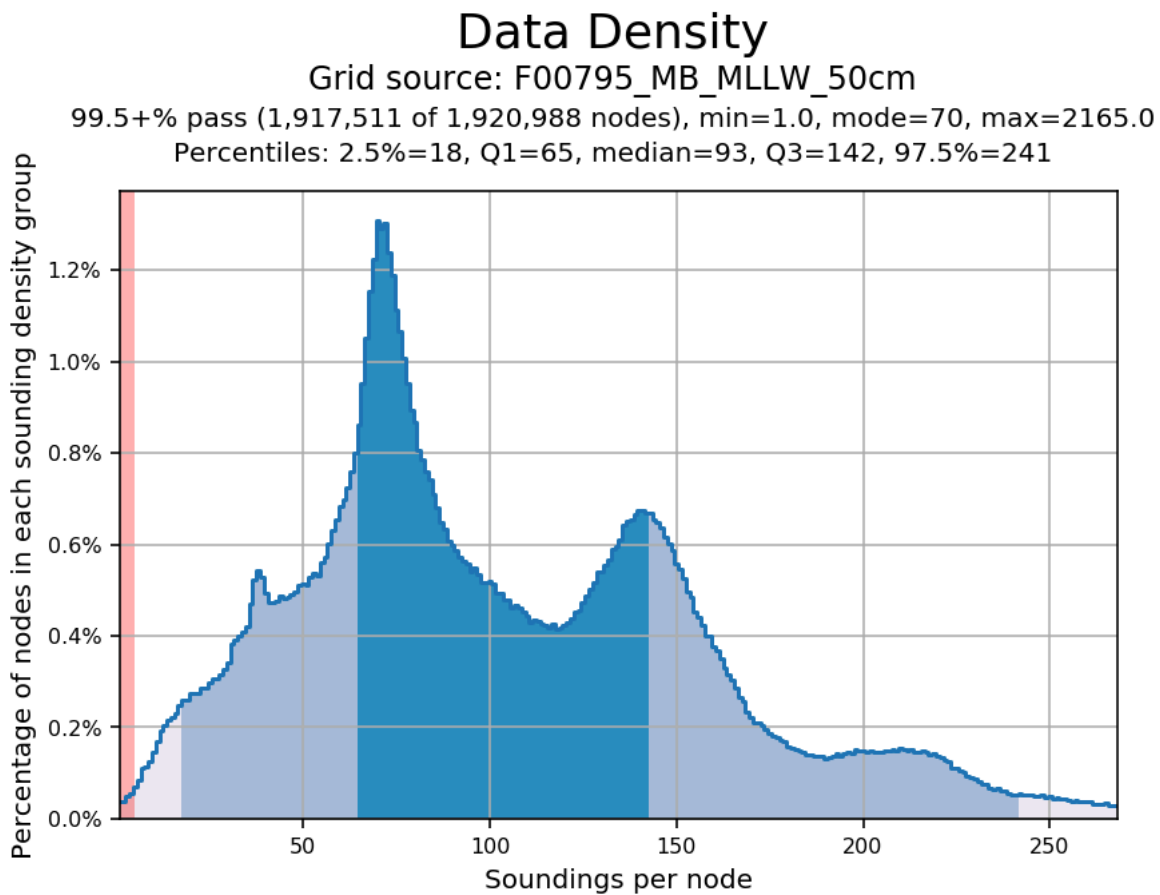


Figure 8: F00795 Surface Density Statistics

Flier Finder

Fliers were analyzed using the Pydro QC Tools Flier Finder tool. Two fliers were flagged. Both of these fliers are located on the obstruction in the area and are thus not considered spurious soundings. For information on the QC Tools settings and the results, see the QC Tools folder located in th Appendix II.

Holidays

F00795 data were reviewed in CARIS HIPS and SIPS for holidays in accordance with Section 5.2.2.3 of the HSSD. Three holidays which meet the 3 by 3 node definition were identified via Pydro QC Tools Holiday Finder tool. This tool automatically scans finalized surfaces for holidays as defined in the HSSD and was run in conjunction with a visual inspection of all surfaces by the hydrographer. These holidays were unfortunately found after the vessel had hauled out for winter repair and could not be obtained. The hydrographer strongly believes there to be no dangers to navigation in these areas based on surrounding data. A F00795_Holidays .hob file showing the location of these holidays is included in appendix II of this report.

Sound Speed

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 had an effect on 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 were used as detailed in the DAPR.

Multibeam data on F00795 contains some evident outer beam spreading (Figure 9) especially in the ASV 008 data. This is caused by sound speed variations in the area, as well as areas of soft mud and silt seafloor. In areas where the beam spreading was obvious, rather than a true seafloor feature, the spurious soundings were rejected and surfaces recomputed. These soundings were rejected manually.

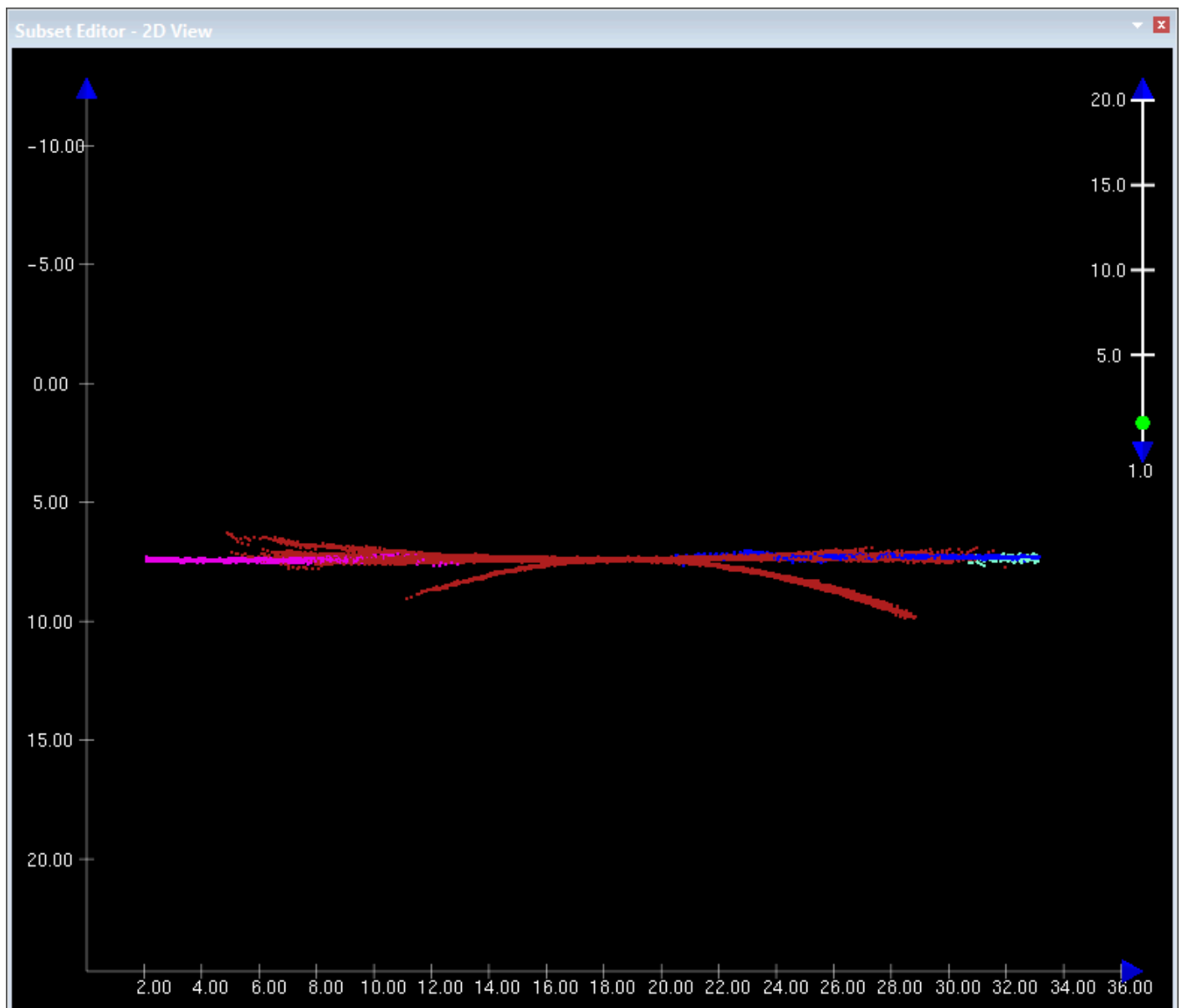


Figure 9: F00795 Sound Velocity Outer Beam Spreading Example

Designated Soundings

F00795 contains one designated sounding in accordance with HSSD Section 5.2.1.2.3. This designated sounding represents a submitted DTON and is included in the FFF.

One DTON report was submitted for this project. The report is included in Appendix II of this report and details the object found and its location. The object is also included in the FFF. Figure 10 shows a 3D sonar image of the object.

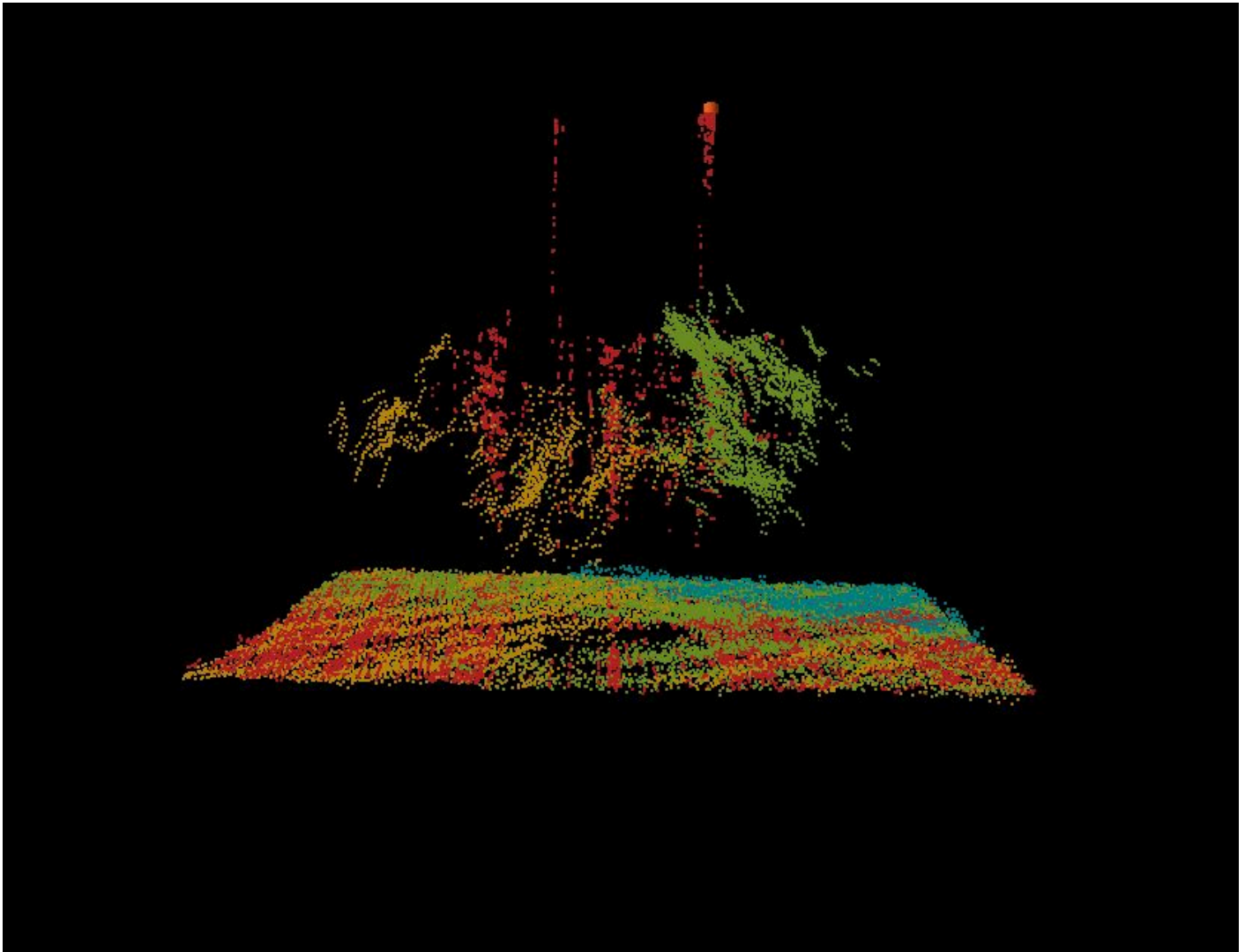


Figure 10: F00795 DTON 3D Image (colored by survey line)

Backscatter

Kongsberg EM2040 stores the backscatter data in the .all file. The data were processed using the Caris SIPS Backscatter tool for data quality assurance (Figure 11). The data were sent to the Pacific Hydrographic Branch for processing. Backscatter data cannot be logged by the Picotech PicoMB and is thus not processed or included in this dataset.

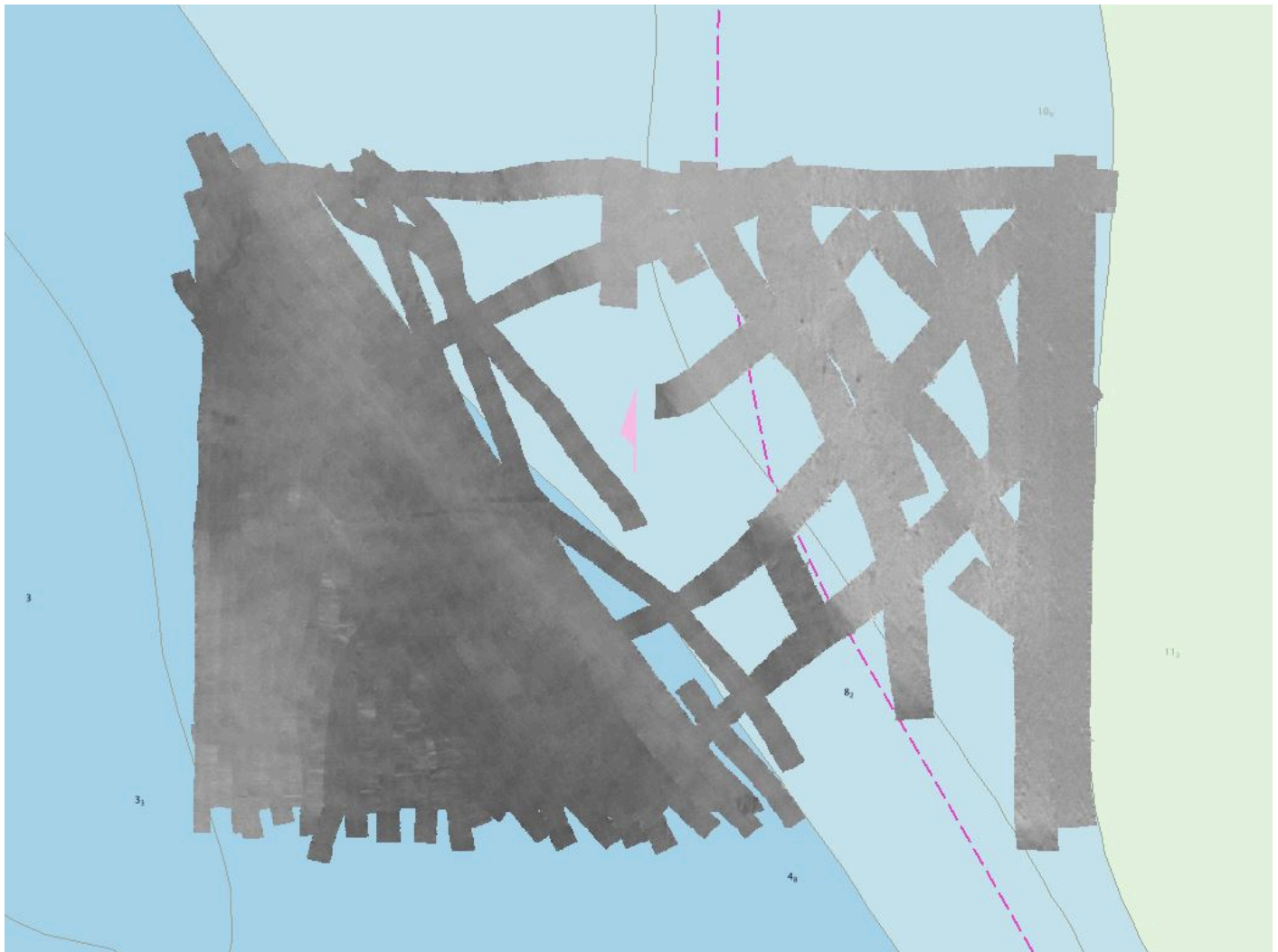


Figure 11: F00795 Kongsberg MBES Backscatter Overview

ASV Navigation Editing



The navigation data for MBES data collected by the ASV was reviewed by the hydrographer. Data was occasionally collected through turns if current or wind forces kept the ASV from hitting the end gates. In order to ensure high quality data, large turns at the ends of track lines were rejected from the navigation data.

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
LT Patrick J Debrousse	Chief of Party	11/15/2019	 DEBROISSE.PATRICK.JOSEP H.1501248670 2019.11.15 14:08:44 -05'00'
LTJG Patrick Lawler	JOIC	11/15/2019	 LAWLER.PATRICK.THOMAS .1523750239 2019.11.15 14:12:12 -05'00'

APPROVAL PAGE

F00795

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: _____

Commander Olivia Hauser, NOAA
Chief, Pacific Hydrographic Branch