F00853

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

DESCRIPTIVE REPORT

Type of Survey:	Navigable Area
Registry Number:	F00853

LOCALITY

State(s):	Maryland
General Locality:	Central Chesapeake Bay
Sub-locality:	Cove Point

2022

CHIEF OF PARTY
LTjg Jane Saunders

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Date:

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

REGISTRY NUMBER:

HYDROGRAPHIC TITLE SHEET

F00853

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:	**Central Chesapeake Bay**
Sub-Locality:	**Cove Point**
Scale:	**20000**
Dates of Survey:	**03/30/2022 to 10/19/2022**
Instructions Dated:	**03/08/2022**
Project Number:	**S-E920-BH2-22**
Field Unit:	**NOAA R/V *Bay Hydro II***
Chief of Party:	**LTjg Jane Saunders**
Soundings by:	**Multibeam Echo Sounder**
Imagery by:	**Multibeam Echo Sounder 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.

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Descriptive Report to Accompany Survey F00853

Project: S-E920-BH2-22

Locality: Central Chesapeake Bay

Sublocality: Cove Point

Scale: 1:20000

March 2022 - October 2022

NOAA R/V *Bay Hydro II*

Chief of Party: LTjg Jane Saunders

A. Area Surveyed

The survey area is located in the Chesapeake Bay with the sub locality being at Cove Point, in and around the Cove Point Liquid Natural Gas (LNG) Terminal restriction zone.

A.1 Survey Limits

Data were acquired within the following survey limits:

Northwest Limit	Southeast Limit
38° 25' 37.74" N 76° 25' 5.79" W	38° 23' 1.87" N 76° 21' 12.86" W

Table 1: Survey Limits

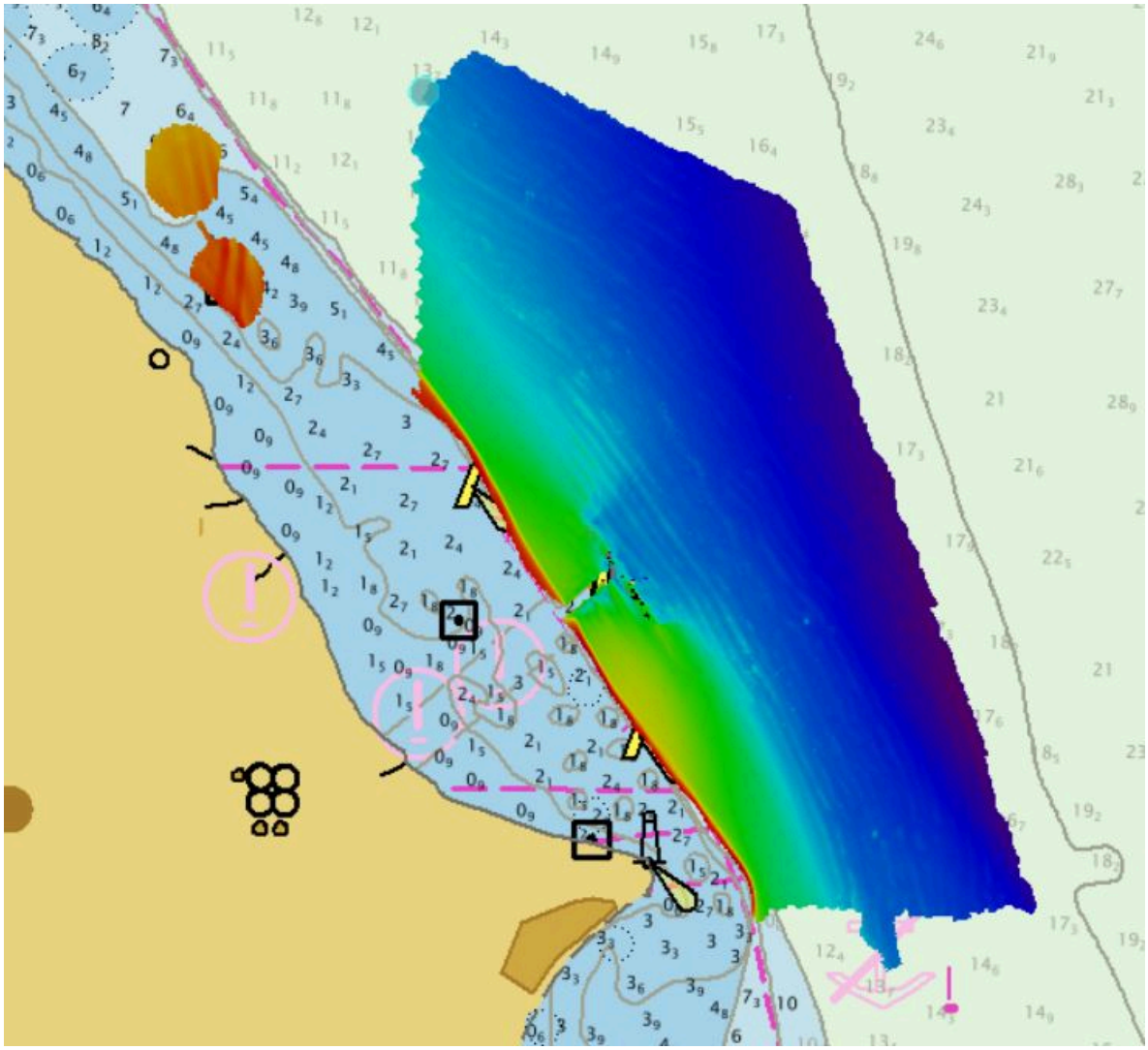


Figure 1: F00853 Surveyed Area

Data were acquired to the survey limits in accordance with the requirements in the Project Instructions (PIs) and the May 2020 NOS Hydrographic Surveys Specifications and Deliverables (HSSD). Sheet limits were not met anywhere along the western edge of the survey area as it approached the western shore of the Chesapeake Bay; nor where they met over the charted ruined offshore platform, again along the western edge of the survey area as it approached the western shore.

The Project Instructions list the NOS Hydrographic Surveys Specifications and Deliverables (HSSD), May 2021 or newer for supporting documentation, and this survey was completed within the time frame for the 2022 edition of the HSSD, which was the version of specification used to validate this survey.

A.2 Survey Purpose

The Maryland Pilot Association requested the approaches to Cove Point LNG Terminal and the mooring area on the east side of the terminal surveyed. Survey data from this project is intended to supersede all prior survey data in the common area.

A.3 Survey Quality

The entire survey is adequate to supersede previous data.

Data acquired in F00853 meet multibeam echo sounder (MBES) coverage requirements for object detection, as required by the HSSD unless otherwise stated in this report. This includes crosslines (see Section B.2.1 of this document), NOAA allowable uncertainty (see Section B.2.2 of this document), and density requirements (see Section B.2.12 of this document). Additional compliance statistics can be found in the Digital Data folder located in Appendix II of this report.

A.4 Survey Coverage

The following table lists the coverage requirements for this survey as assigned in the project instructions:

Water Depth	Coverage Required
All waters in survey area unto the navigable area limit line.	Object Detection Coverage

Table 2: Survey Coverage

Survey coverage was in accordance with the requirements in the PIs and the HSSD with the exception of holidays. In most cases, these holidays were caused by the LNG Terminal prohibiting the MBES from identifying the true seafloor. This interference either obscured the seafloor altogether or resulted in artifacts in the processed data which did not accurately represent the seafloor. Removal of these artifacts in the MBES surface introduced gaps in coverage. In the rest of the cases, these holidays were caused by large schools of fish and/or other marine life prohibiting the MBES from identifying the true seafloor. The number of areas this occurred in was extensive, therefore a Holiday Line file was created and executed. During the re-acquisition of data in some of these areas, more large schools of fish were identified, still resulting in a holiday. These areas were identified in in an associated F00853_Holidays.hob file that is located in the appendices of this report. Each of these gaps in coverage were examined in CARIS HIPS and SIPS, Subset Editor and determined not to degrade the confidence in the quality of the survey. These data gaps do not limit the ability to adequately verify charted depths.

The western edge of the main survey area and charted ruined platform verification radius were not fully ensonified during acquisition. These areas were deemed too unsafe, due to being shallow and too laden with crab pots, for BHII to survey.(see figure 2).

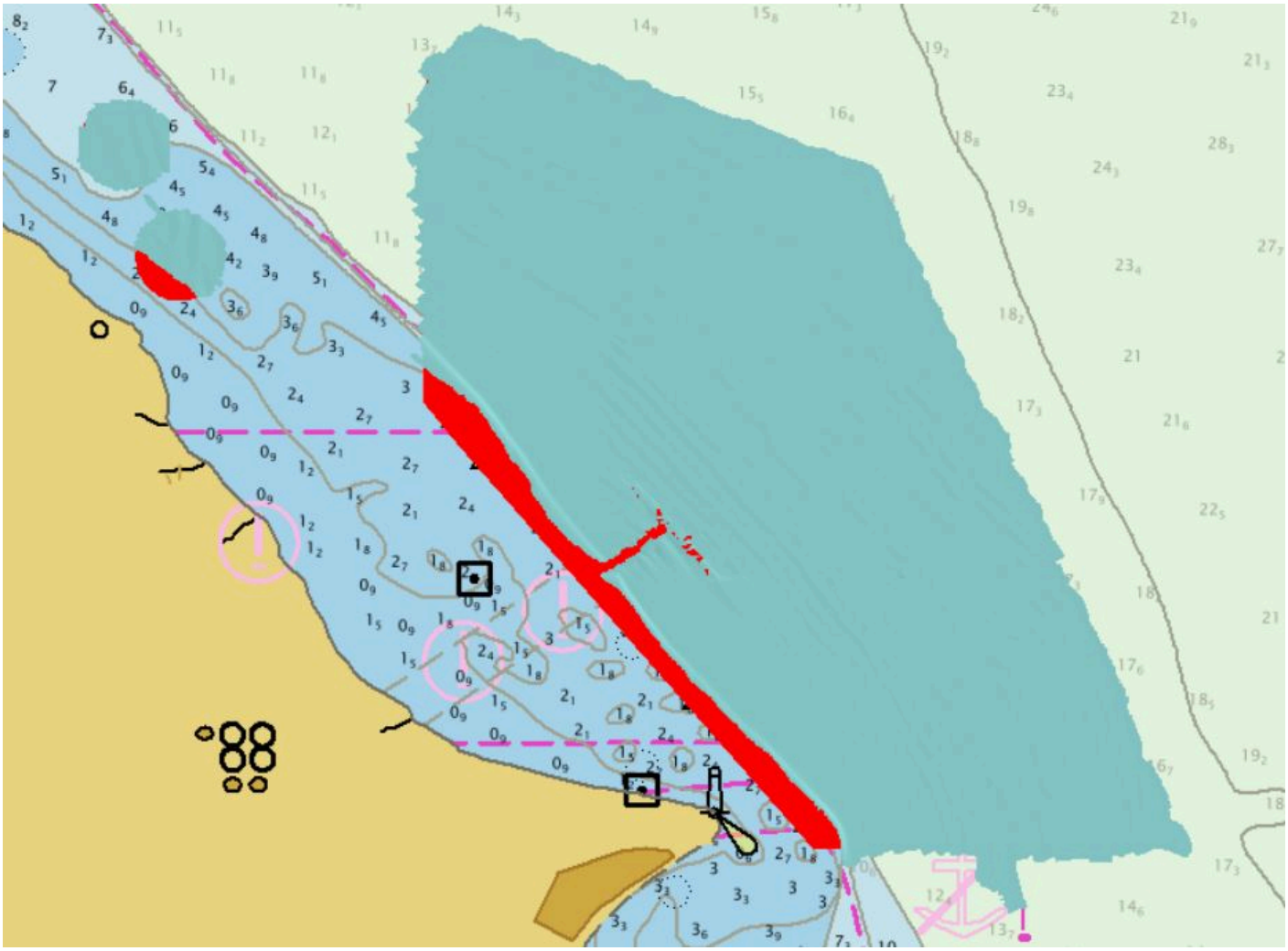


Figure 2: F00853 survey coverage (in green), over laid onto F00853 Sheet Limits (in red), indicating the area BHII deemed too unsafe to meet survey limits.

A.6 Survey Statistics

The following table lists the mainscheme and crossline acquisition mileage for this survey:

	HULL ID	*S5401*	*Total*
LNM	**SBES Mainscheme**	0.0	0.0
	MBES Mainscheme	127.51	127.51
	Lidar Mainscheme	0.0	0.0
	SSS Mainscheme	0.0	0.0
	SBES/SSS Mainscheme	0.0	0.0
	MBES/SSS Mainscheme	0.0	0.0
	SBES/MBES Crosslines	10.77	10.77
	Lidar Crosslines	0.0	0.0
Number of Bottom Samples			0
Number Maritime Boundary Points Investigated			0
Number of DPs			0
Number of Items Investigated by Dive Ops			0
Total SNM			4.52

Table 3: Hydrographic Survey Statistics

The following table lists the specific dates of data acquisition for this survey:

Survey Dates	Day of the Year
03/30/2022	89
09/15/2022	258

Survey Dates	Day of the Year
09/16/2022	259
09/20/2022	263
09/21/2022	264
10/11/2022	284
10/14/2022	287
10/19/2022	292

Table 4: Dates of Hydrography

No multibeam data was acquired between 01March 2022 and 14 September 2022 due to mechanical issues with Bay Hydro II and previously scheduled obligations of the crew.

B. Data Acquisition and Processing

B.1 Equipment and Vessels

Refer to 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. Additional information to supplement sounding and survey data, and any deviations from the DAPR are discussed in the following sections.

B.1.1 Vessels

The following vessels were used for data acquisition during this survey:

Hull ID	***S5401***
LOA	17.3 meters
Draft	1.8 meters

Table 5: Vessels Used

Figure 3: R/V Bay Hydro II, S5401.

B.1.2 Equipment

The following major systems were used for data acquisition during this survey:

Manufacturer	Model	Type
Kongsberg Maritime	EM 2040CD	MBES
Applanix	POS MV 320 v5	Positioning and Attitude System
Valeport	MiniSVS	Sound Speed System
SonTek	CastAway-CTD	Sound Speed System

Table 6: Major Systems Used

B.2 Quality Control

B.2.1 Crosslines

Multibeam crosslines acquired for this survey totaled 10.77% of mainscheme acquisition.

Crosslines were collected, processed, and compared in accordance with Section 5.2.4.2 of the HSSD. To evaluate crosslines, a fifty centimeter Resolution (50CM) CUBE surface using strictly mainscheme lines, and a fifty centimeter (50CM) CUBE surface using strictly crosslines were created. From these two surfaces, a difference surface (mainscheme - crosslines = difference surface) was generated at a fifty centimeter (50CM) (See Figure 4). Statistics show the mean difference between the depths derived from mainscheme and crosslines was -0.00 meters with crosslines being deeper and 95% of nodes falling within +/- 0.22 meters (Figure 5). For the respective depths, the difference surface was compared to the allowable NOAA uncertainty standards using Pydro's Compare Grids tool. In total, 99.5% of the depth differences between F00853 mainscheme and crossline data were within allowable NOAA uncertainties (Figure 6).

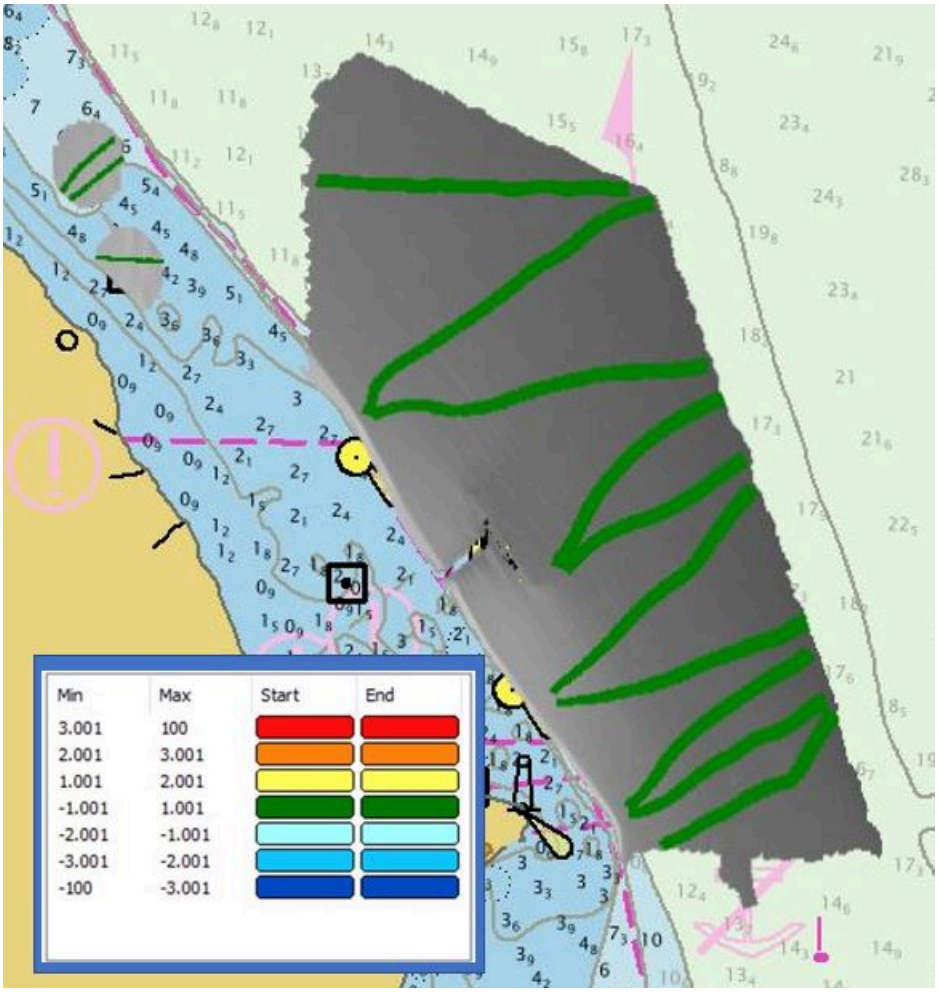
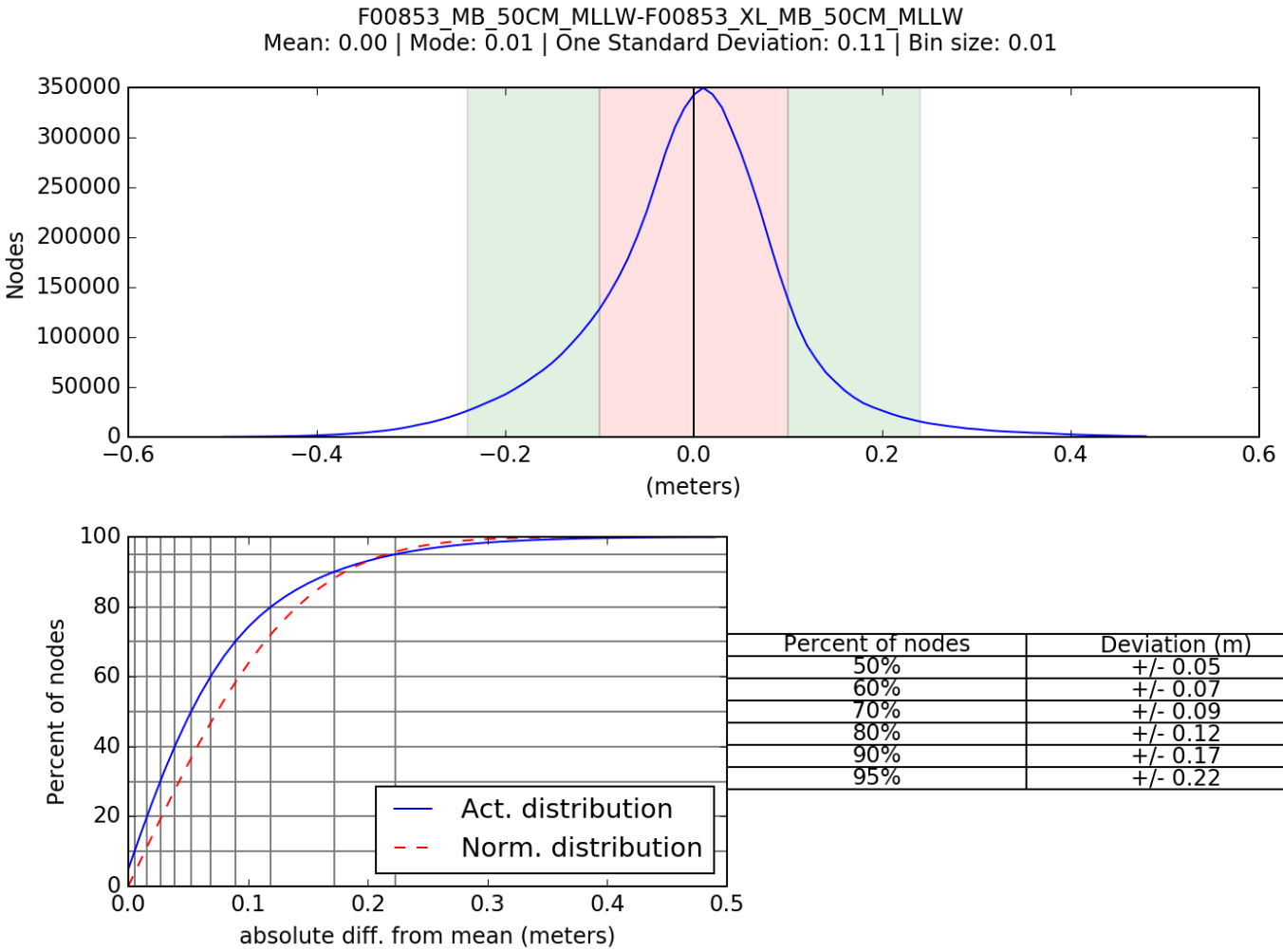


Figure 4: Depth differences between F00853 mainscheme (colored in gray) and F00853 crossline data.



Percent of nodes	Deviation (m)
50%	+/- 0.05
60%	+/- 0.07
70%	+/- 0.09
80%	+/- 0.12
90%	+/- 0.17
95%	+/- 0.22

Figure 5: F00853 maintenance to crossline difference statistics.

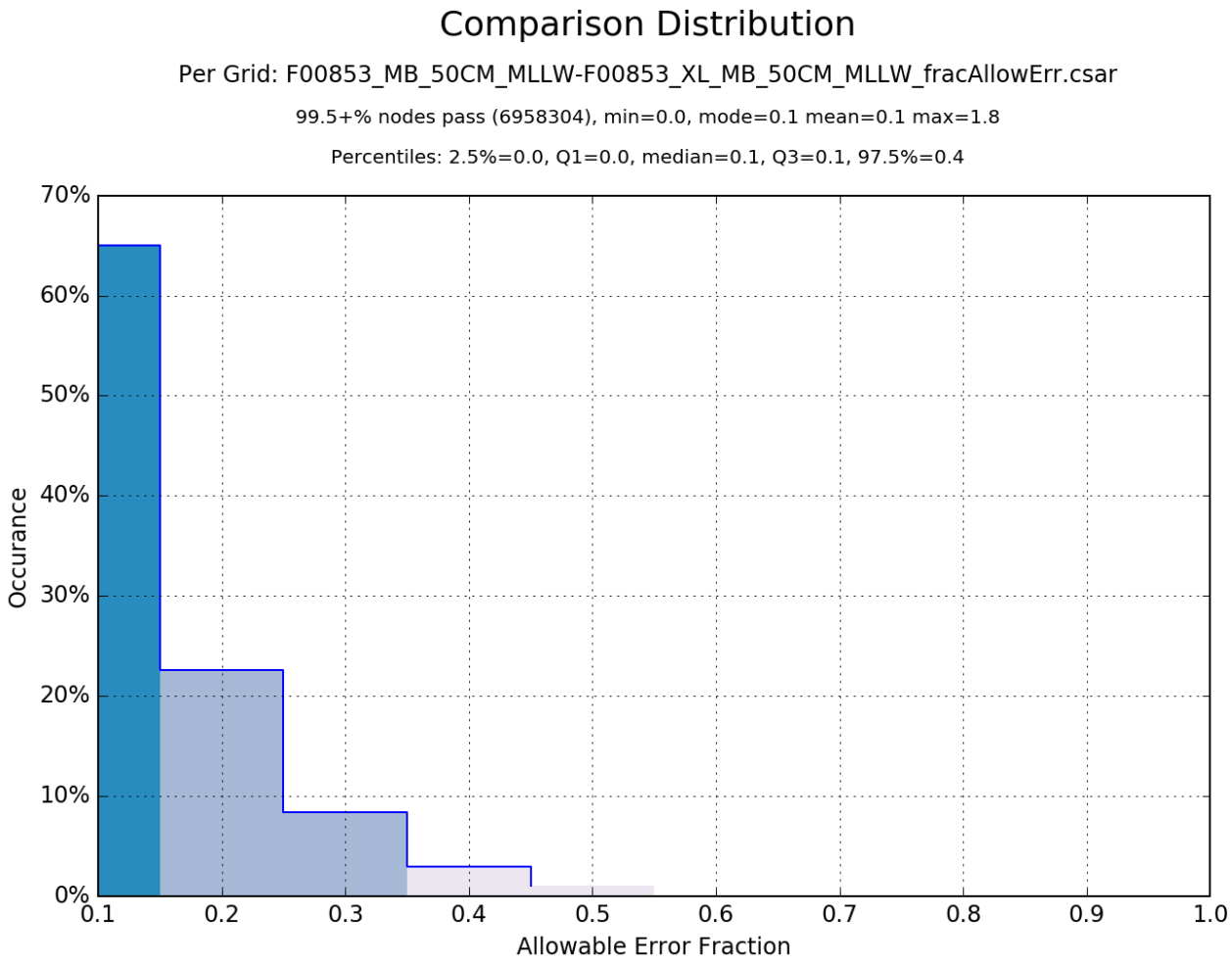


Figure 6: F00853 mainscheme and F00853 crossline NOAA allowable uncertainty statistics.

B.2.2 Uncertainty

The following survey specific parameters were used for this survey:

Method	Measured	Zoning
ERS via VDATUM	0.0 meters	0.09 meters

Table 7: Survey Specific Tide TPU Values.

Hull ID	Measured - CTD	Measured - MVP	Measured - XBT	Surface
S5401	2.0 meters/second	0.0 meters/second	0.0 meters/second	0.5 meters/second

Table 8: Survey Specific Sound Speed TPU Values.

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 F00853. Real-time uncertainties were provided via EM 2040 CH 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.

B.2.3 Junctions

No junctions were assigned to this survey.

There are no contemporary surveys that junction with this survey.

F00853 junctions with survey F00605 from 2012. A depth comparison was made and depths compare well between the two surveys, with a mean difference of only 0.07m

B.2.4 Sonar QC Checks

Sonar system quality control checks were conducted as detailed in the quality control section of the DAPR.

B.2.5 Equipment Effectiveness

There were no conditions or deficiencies that affected equipment operational effectiveness.

B.2.6 Factors Affecting Soundings

There were no other factors that affected corrections to soundings.

B.2.7 Sound Speed Methods

Sound Speed Cast Frequency: Casts were conducted at a minimum of one every four hours during acquisition.

Casts were conducted more frequently in area where tidal shifts caused variations in the make up of the water column or when there was a change in surface sound speed greater than two meters per second. All sound speed methods were used a detailed in the DAPR.

B.2.8 Coverage Equipment and Methods

All equipment and survey methods were used as detailed in the DAPR.

B.2.9 SBET Issues

Multiple days of acquired data encountered SBET issues while processing F00853. On day number 089, 259, and 284, one of the base stations that POSPac MMS tried to use to create the Smartbase SBET was malfunctioning and stopped collecting data (see Figure 7). This could be seen as an height offset range of 0.5M to 1.5M in the MBES surface when these days were combined into surface F00853_MB_50CM_MLLW. This offset error was seen in all lines on these three days, however, on days 258, 263, 264, 287, and 292 this error was only seen in a single to a few lines. Since this offset was seen on all days of the survey, all MBES data was reprocessed using RTX SBET and the height offset was resolved.

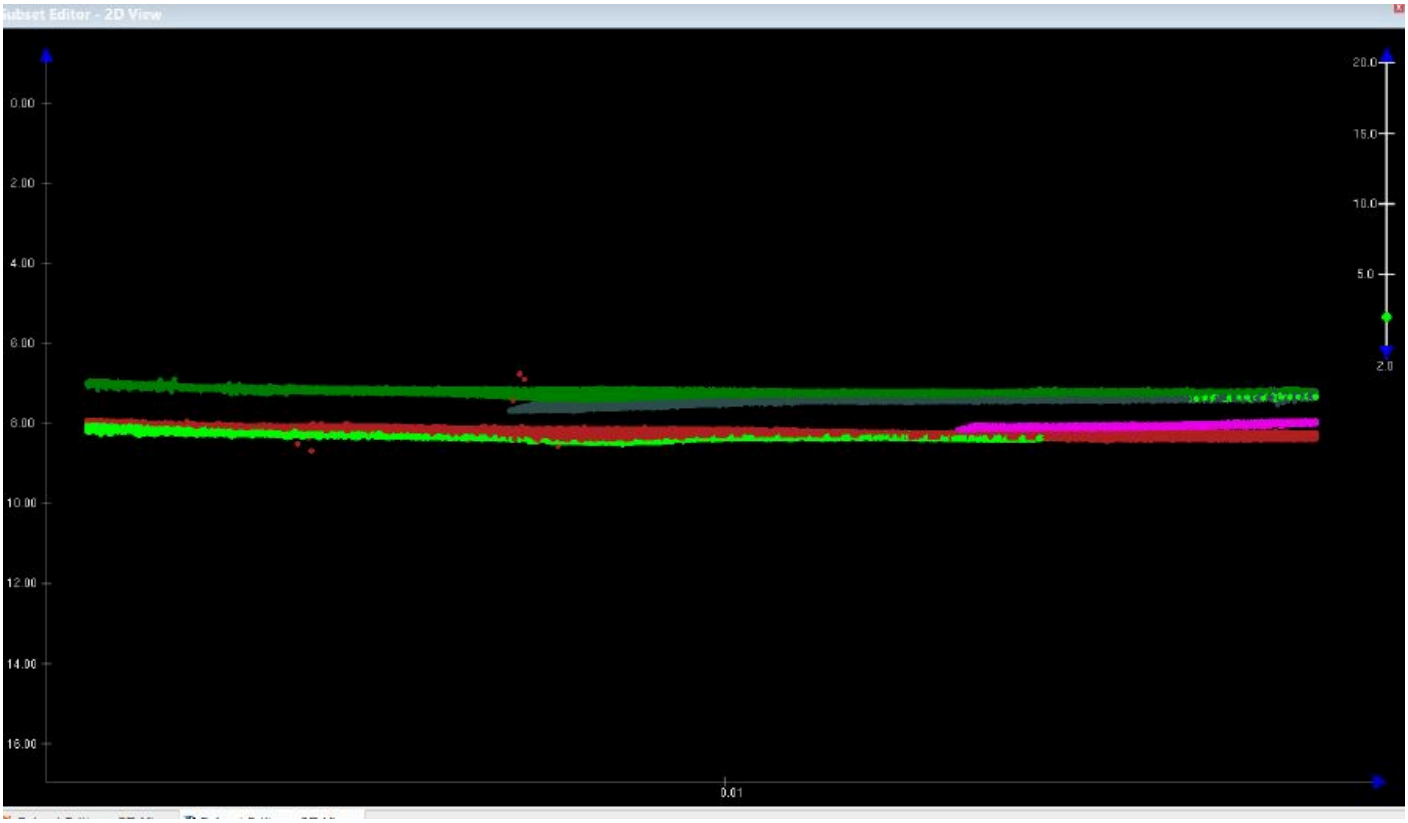


Figure 7: Smartbase SBET issue encountered on multiple days of the survey.

B.2.10 Holidays

On several occasions, a large school of fish and/or other marine life prohibited the MBES from identifying the true seafloor. This interference resulted in artifacts in the processed data which did not accurately represent the seafloor (see Figure 8). In some cases, removal of these artifacts in the MBES surface introduced gaps in coverage. Each of these gaps in coverage were examined in CARIS HIPS and SIPS, Subset Editor and determined not to degrade the confidence in the quality of the survey. These data gaps do not limit the ability of adequately verify charted depths. See the F00853_Holiday.hob file in Appendices- II Supplemental_Records for the location of all of these gaps in coverage.

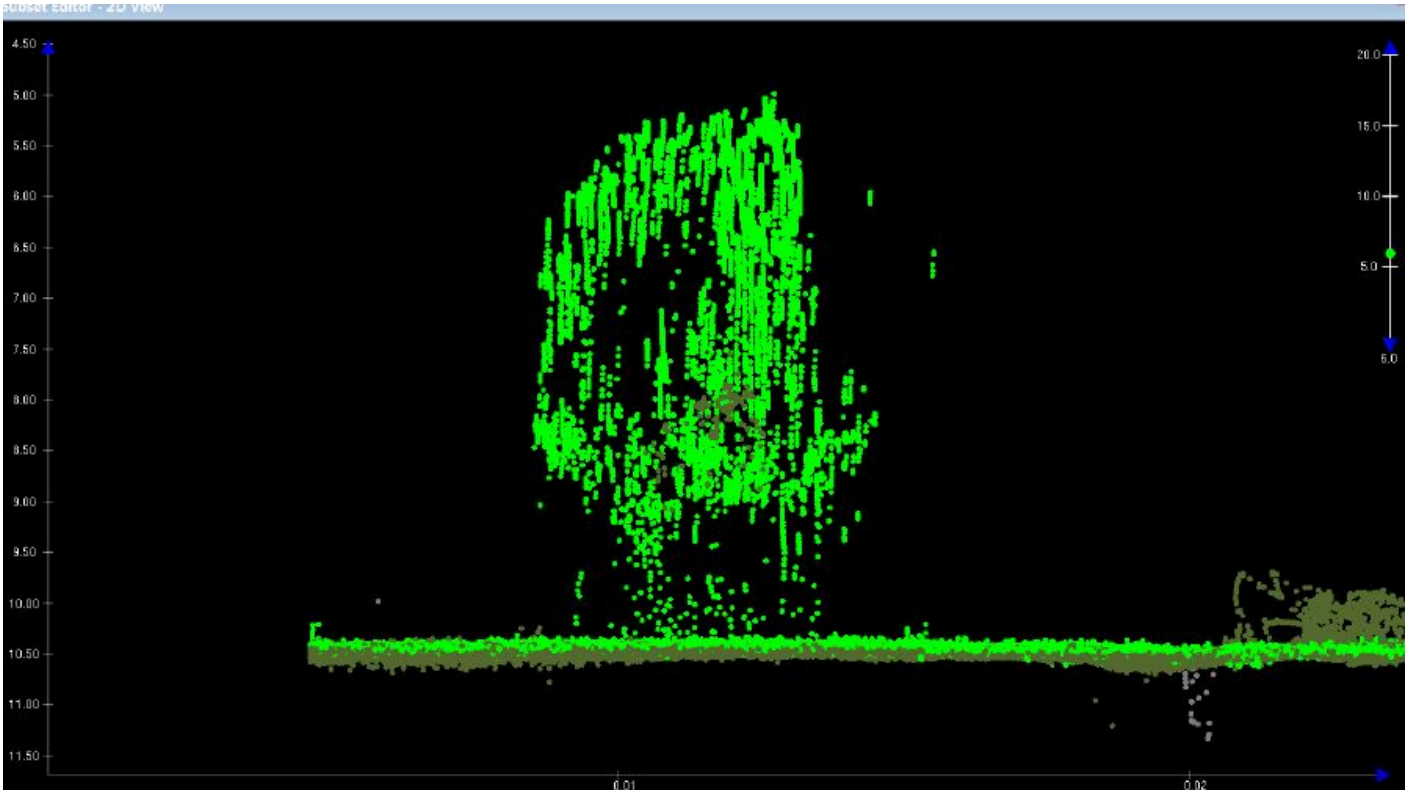


Figure 8: CARIS HIPS and SIPS Subset Editor image of marine life prohibiting the MBES from identifying the true seafloor.

B.2.11 NOAA Allowable Uncertainty

To verify that all data meet the accuracy specifications as stated in HSSD Section 5.1.3, the surface F00853_MB_50CM_MLLW was finalized. The finalized surface was then analyzed using Pydro's QC Tool, Grid QC. Figure 9 shows a graphical overview of the NOAA Allowable Uncertainty layer for the surface and corresponding statistics for the surface. Overall, over 99.5% of nodes from the surface meet or exceed NOAA Allowable Uncertainty specifications for F00853.

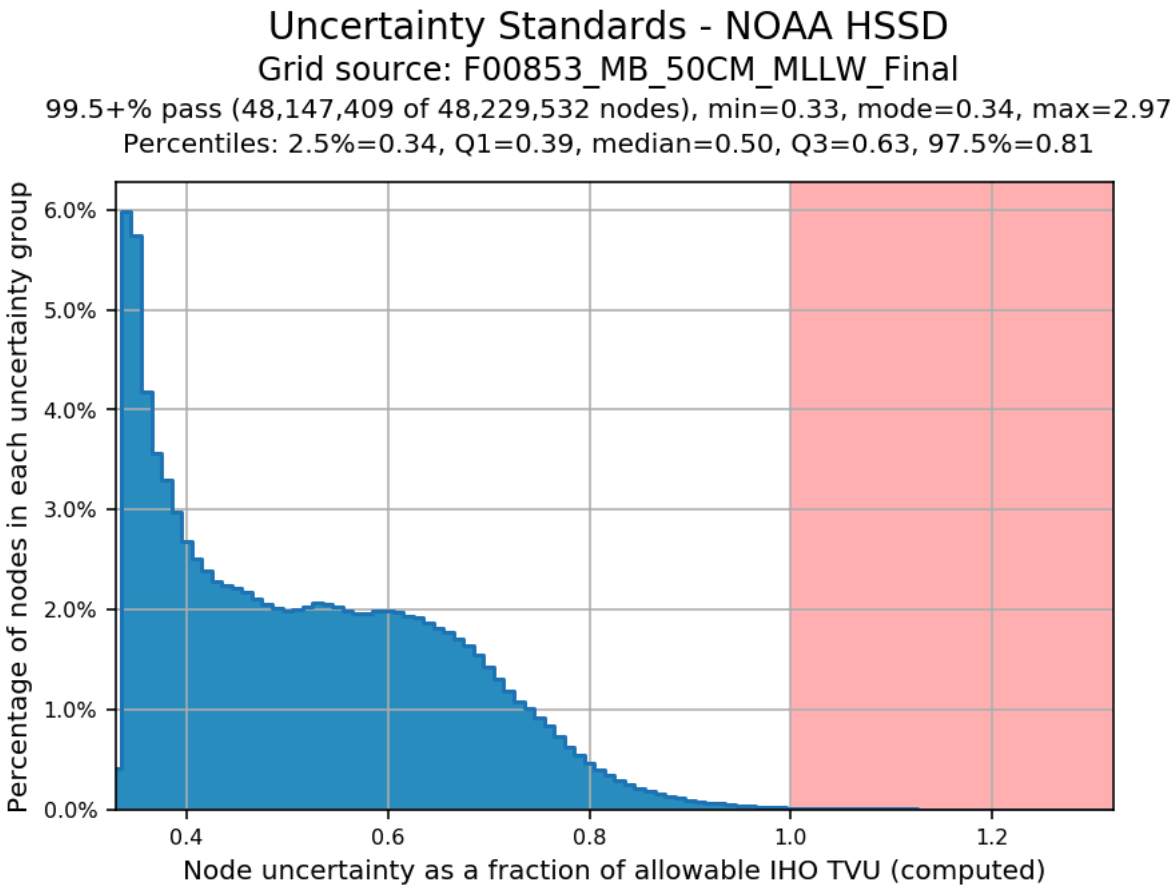


Figure 9: F00853 Allowable Uncertainty graph indicating that over 99.5% of sounding met NOAA Allowable Uncertainty.

B.2.12 Density

The F00853 finalized surface was analyzed using the Pydro QC Tools Grid QC feature and the results are shown in Figure 10. Density requirements for F00853 were achieved with at least 99.5% of finalized surface nodes containing five or more soundings as required by HSSD Section 5.2.2.2. The few nodes that did not meet density requirements are due to sparse data in the outer beams, especially near steep slopes, and at the edges of the survey limits.

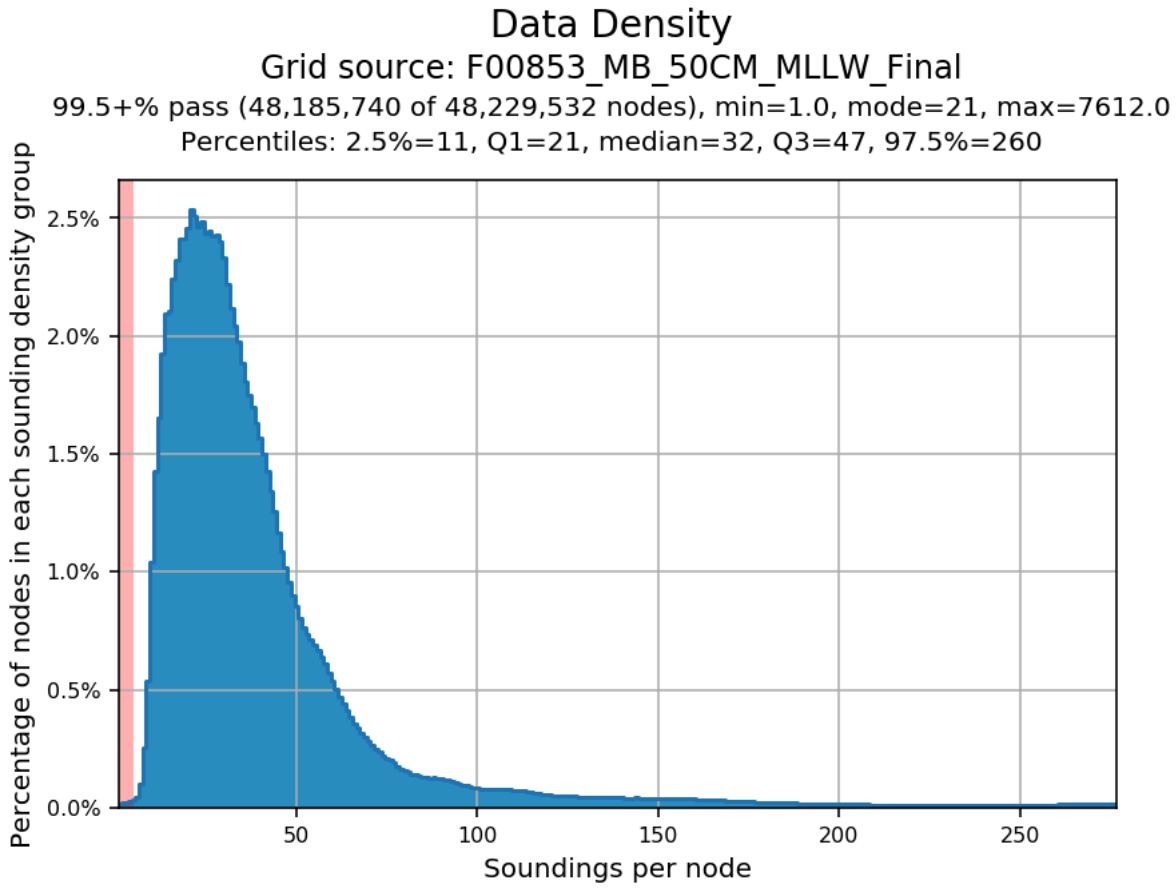


Figure 10: F00853 Density graph indicating that over 99.5% of sounding met NOAA density requirements.

B.3 Echo Sounding Corrections

B.3.1 Corrections to Echo Soundings

All data reduction procedures conform to those detailed in the DAPR.

B.3.2 Calibrations

All sounding systems were calibrated as detailed in the DAPR.

B.4 Backscatter

All equipment and survey methods were used as detailed in the DAPR. Kongsberg EM2040C stores the raw backscatter data in the .all file. All backscatter data were processed to GSF files and a mosaic was created by the field unit via CARIS HIPS and SIPS 11.4.19. Weighted Mean Average (WMA) with Area Based Angle Varying Gain (AVG) was utilized to populate the backscatter mosaic. See Figure 11 for a greyscale representation of the complete backscatter mosaic.

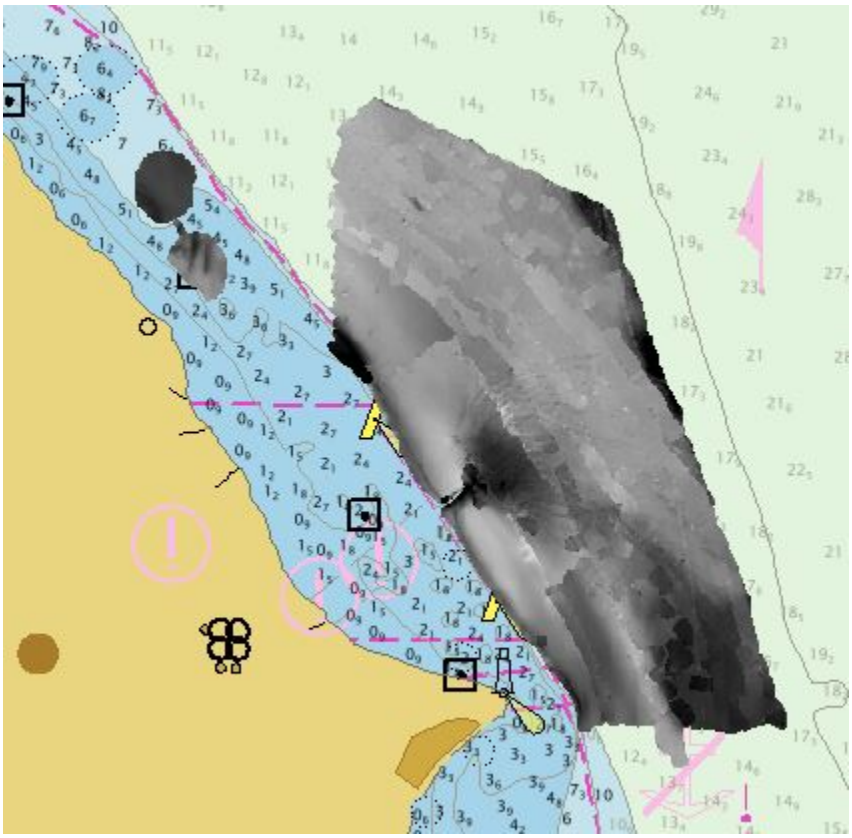


Figure 11: F00853 backscatter mosaic in gray scale.

B.5 Data Processing

B.5.1 Primary Data Processing Software

The following software program was the primary program used for bathymetric data processing:

Manufacturer	Name	Version
CARIS	CARIS HIPS and SIPS	11.3.17
CARIS	CARIS HIPS and SIPS	11.4.19
CARIS	BASE Editor	5.5.14

Table 9: Primary bathymetric data processing software

The following Feature Object Catalog was used: NOAA Profile Version 2022.

B.5.2 Surfaces

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

Surface Name	Surface Type	Resolution	Depth Range	Surface Parameter	Purpose
F00853_MB_50CM_MLLW.csar	CARIS Raster Surface (CUBE)	0.5 meters	2.63 meters - 17.67 meters	NOAA_0.5m	Object Detection
F00853_MB_50CM_MLLW_Final.csar	CARIS Raster Surface (CUBE)	0.5 meters	2.63 meters - 17.67 meters	NOAA_0.5m	Object Detection

Table 10: Submitted Surfaces

The NOAA CUBE parameters defined in the HSSD were used for the creation of all CUBE surfaces in Survey F00853. The surfaces have been reviewed where noisy data, or "fliers," are incorporated into the gridded solutions causing the surface to be shoaler or deeper than the true sea floor. Where these spurious soundings cause the gridded surface to be shoaler or deeper than the reliably measured seabed by greater than the maximum allowable Total Vertical Uncertainty at that depth, the noisy data have been rejected by the hydrographer and the surface recomputed.

Flier Finder v9, part of the QC Tools package within Pydro, was used to assist the search for spurious soundings following gross cleaning. Flier Finder was run multiple times for the surface, reducing the flier height value for each consecutive run. This allowed Flier Finder to accurately and quickly identify gross fliers, but as the flier height was reduced the effectiveness of the tool diminished. With smaller heights, Flier Finder began to incorrectly flag dynamic aspects of the seafloor such as steep drop offs resulting in hundreds of false positives. At this point, the hydrographer ceased using the tool and returned to manual cleaning for these dynamic regions of the seafloor.

C. Vertical and Horizontal Control

Additional information discussing the vertical or horizontal control for this survey can be found in the accompanying HVCR.

C.1 Vertical Control

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

ERS Datum Transformation

The following ellipsoid-to-chart vertical datum transformation was used:

Method	Ellipsoid to Chart Datum Separation File
ERS via VDATUM	S-E920-VDatum Limits_100m_NAD83-MLLW_geoid12b.csar

Table 11: ERS method and SEP file

Following the successful application of SBETs, ERS methods using VDATUM were used for reducing data to MLLW. ERS methods were used as the final means of reducing F00853 to MLLW for submission.

C.2 Horizontal Control

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.

The following PPK methods were used for horizontal control:

- RTX

Vessel kinematic data were post-processed using Applanix POSPac processing software and RTX Positioning methods using Charlene as 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 F00853 POSPAC Processing Logs located in the Separates folder.

WAAS

The Wide Area Augmentation System (WAAS) was used for real-time horizontal control during data acquisition.

D. Results and Recommendations

D.1 Chart Comparison

ENC US5MD21M is the only ENC that covers the area of F00853 and it covers the entirety of the survey area. This ENC was TINed using the TINing tool in CARIS Base Editor 5.5.14, interpolated, and then Warped using the same program's Warping Tool. A difference surface was then created comparing the F00853_MB_50CM_MLLW.csar to the newly created ENC_US5MD21M_Tin_Surface_Warp.csar surface to identify any areas of the survey area that deviate from the the charted ENC soundings, See Figure 12.

All data from F00853 should supersede charted data. In general, surveyed soundings agree with the majority of charted depths. A full discussion of the disagreements follows below.

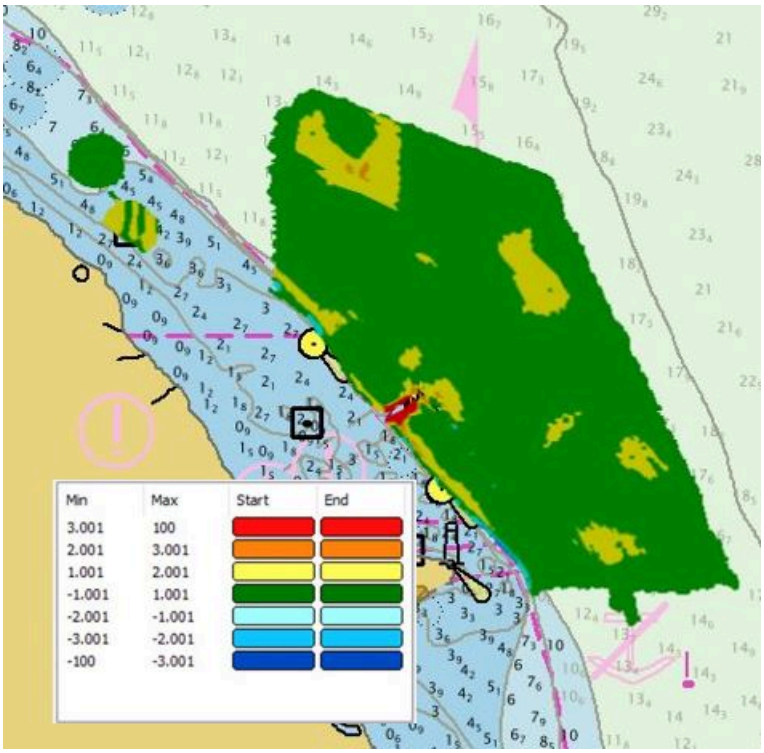


Figure 12: F00853_MB_50CM_MLLW_Final_VS_ENC_US5MD21M_Tin_Surface_Warp difference surface overlaid onto ENC US5MD21M.

Sounding from F00853 are in a general agreement with charted depths on ENC US5MD21M. Most depths agreeing to 1 meter, with the difference being 0.62 meters, with the survey data being shallower than the

charted depths in spots (See Figure 13). The only area that differed more drastically was the area over the charted, unburied tunnel, shore ward of the platform. In this area, F00853 data indicated a divergence from charted depths of three meters or more.

Contours derived from F00853 are in a general agreement with charted contours indicated on ENC US5MD21M. In the north and the south of the survey area, along the western edge, all of the contours are migrating inshore and westward (See Figure 14).

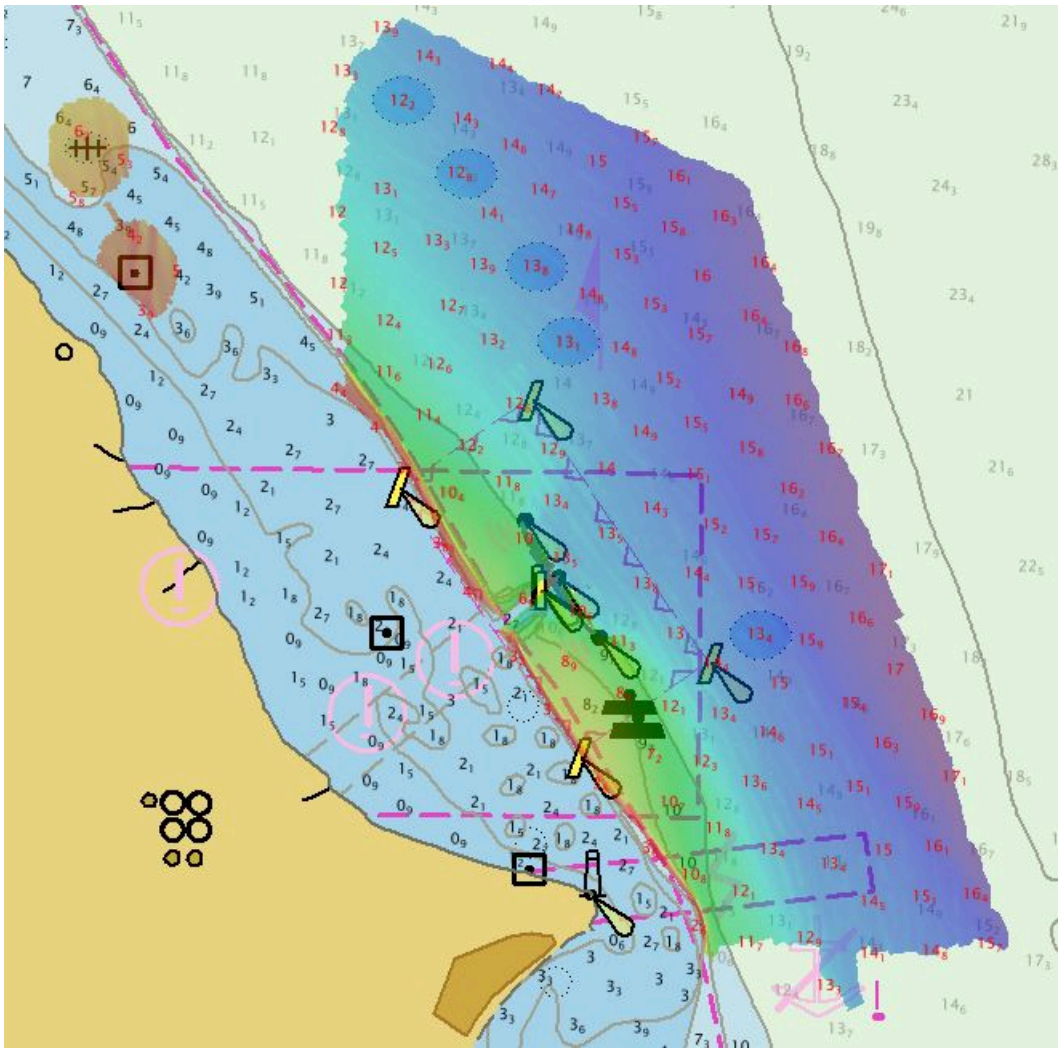


Figure 13: F00853 survey data with soundings in red, overlaid onto ENC US5MD21M soundings in black.

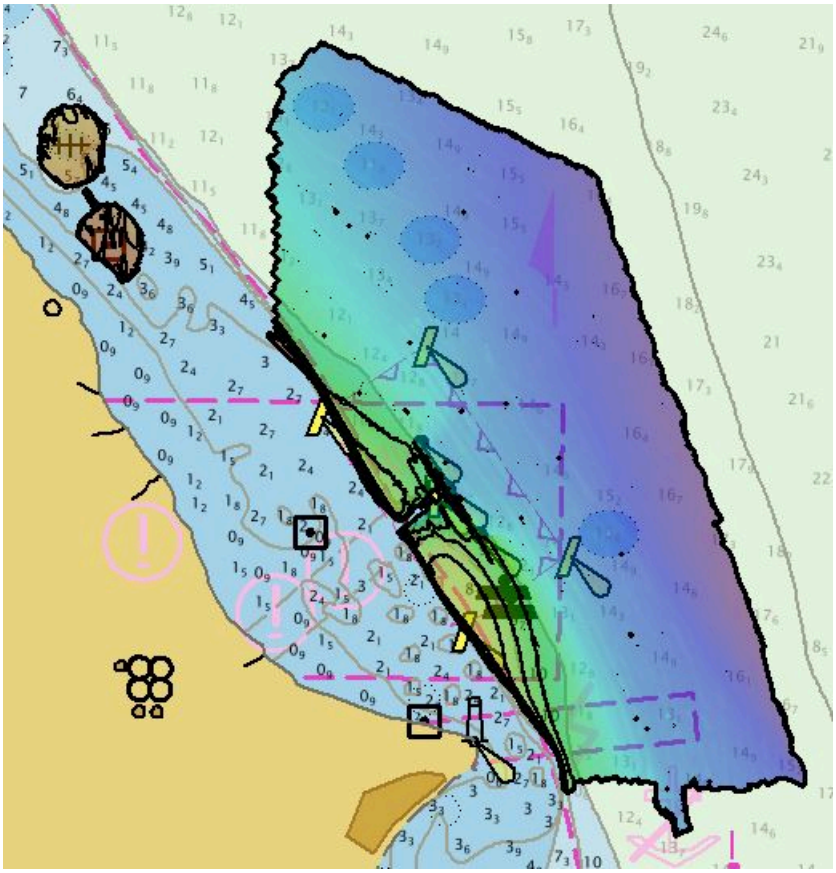


Figure 14: F00853 derived contours in black, overlaid onto ENC US5MD21M.

D.1.1 Electronic Navigational Charts

The following are the largest scale ENCs, which cover the survey area:

ENC	Scale	Edition	Update Application Date	Issue Date
US5MD21M	1:40000	26	10/11/2022	10/11/2022

Table 12: Largest Scale ENCs

D.1.2 Shoal and Hazardous Features

No shoals or potentially hazardous features exist for this survey.

D.1.3 Charted Features

There are multiple features assigned to F00853, see F00853_FFF.000 for descriptions, remarks, and recommendation.

The assigned Unverified Charted Feature (UCF) at potion 38.418614N by 076.41284W can not be considered disproved, due to R/V Bay Hydro II's inability to completely ensonify the assigned search radius for safely reasons. Due to the extensive number of crab pots and the shallowness of the area, the shore ward 135 meters of the search radius was left unsurveyed (See figure 15).

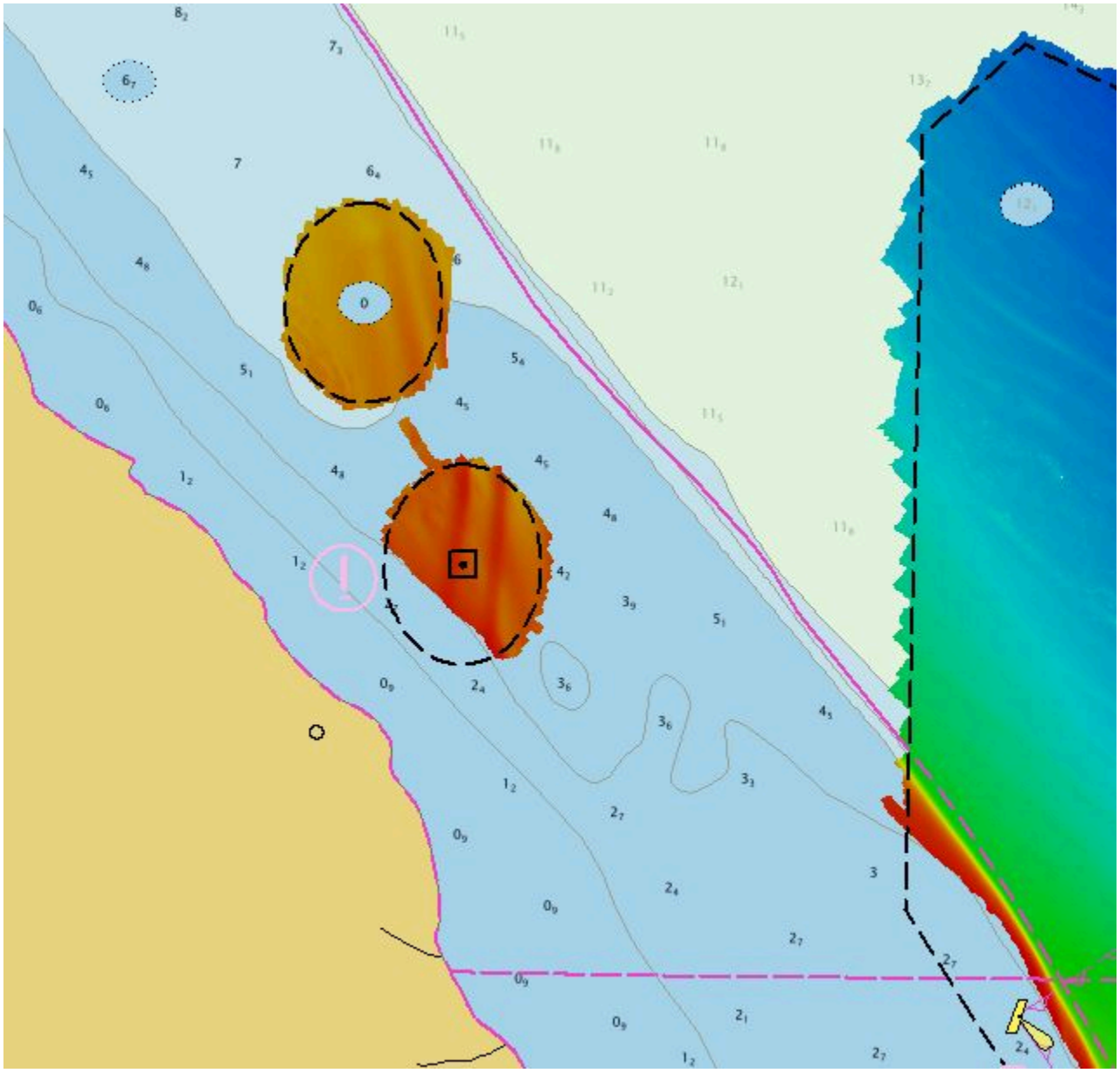


Figure 15: F00853 survey data (in rainbow) overlaid onto the F00853 assigned UCF Search Radius (in black).

D.1.4 Uncharted Features

One uncharted feature was found during this survey. This uncharted feature was found to be a non-dangerous obstruction at position 38.4127N by -076.3722W with a least depth of 14.8 meters (see Image 16). This uncharted feature has been addressed in the Final Feature File, see F00853_FFF.000 for more detail.

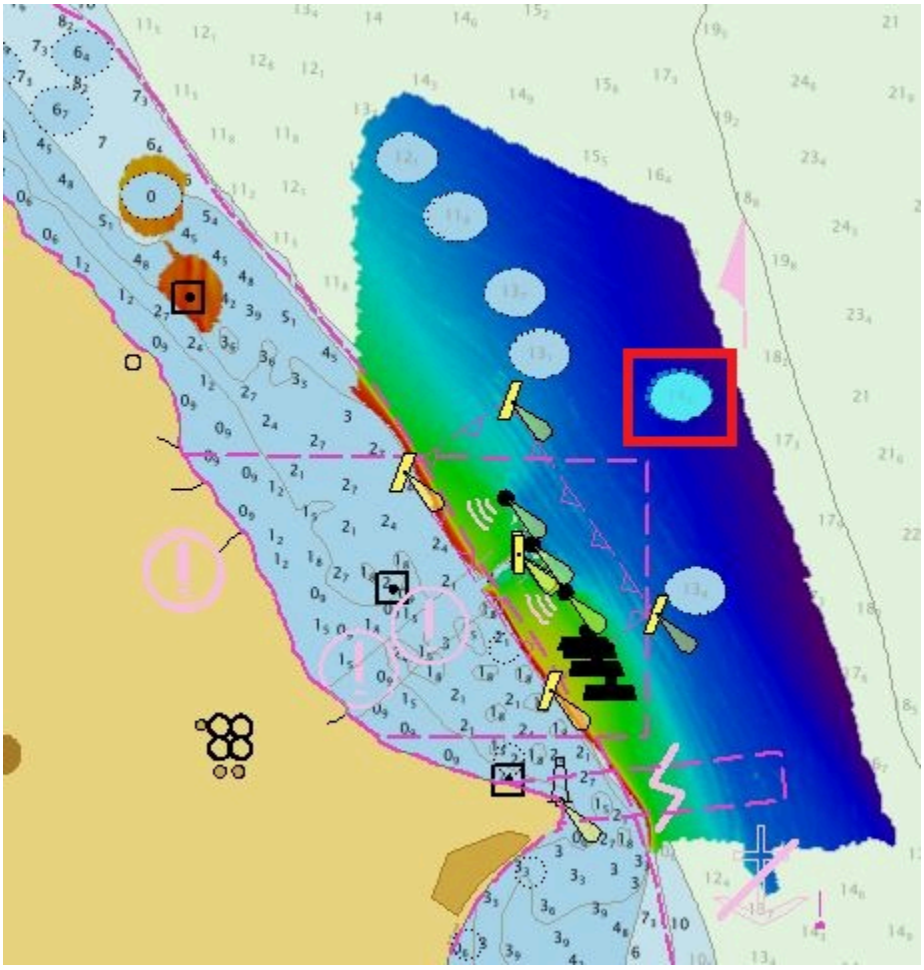


Figure 16: F00853 uncharted obstruction encircled in red.

D.1.5 Channels

No channels exist for this survey. There are no designated anchorages, precautionary areas, safety fairways, traffic separation schemes, pilot boarding areas, or channel and range lines within the survey limits.

D.2 Additional Results

D.2.1 Aids to Navigation

ATONS were investigated to the best of the field unit's ability to determine proper placement and to confirm they are serving their intended purpose, see the Final Feature File (F00853_FFF.000) for more details.

D.2.2 Maritime Boundary Points

No Maritime Boundary Points were assigned for this survey.

D.2.3 Bottom Samples

No bottom samples were required for this survey.

D.2.4 Overhead Features

No overhead features exist for this survey.

D.2.5 Submarine Features

One submarine feature exists in survey F00853, this feature was a set of two tunnels that lay on the seafloor. Due to the shallow draft over the tunnels and R/V Bay Hydro II's concern of causing damage to the tunnels, they were not investigated.

D.2.6 Platforms

One platform feature was assigned to survey F00853, the Cove Point Liquid Natural Gas (LNG) platform (Figure 17). This platform was found to be correctly charted and operational, see the Final Feature File (F00853_FFF.000) for more details

Figure 17: Cove Point LNG Terminal platform.

D.2.7 Ferry Routes and Terminals

No ferry routes or terminals exist for this survey.

D.2.8 Abnormal Seafloor or Environmental Conditions

No abnormal seafloor or environmental conditions exist for this survey.

D.2.9 Construction and Dredging

No present or planned construction or dredging exist within the survey limits.

D.2.10 New Survey Recommendations

No new surveys or further investigations are recommended for this area.

D.2.11 ENC Scale Recommendations

No new ENC scales are recommended for this area.

E. Approval Sheet

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 Descriptive 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, 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 Descriptive Report.

Approver Name	Approver Title	Approval Date	Signature
LTJG Jane Saunders	Chief of Party	02/13/2023	SAUNDERS.JANE.DEVEREAUX.1087825414 Digitally signed by SAUNDERS.JANE.DEVEREAUX.1087825414 Date: 2023.04.04 14:30:50 -04'00'
Robert W. Mowery	Sheet Manager	02/13/2023	MOWERY.ROBERT.WILLIAM.1379754488 Digitally signed by MOWERY.ROBERT.WILLIAM.1379754488 Date: 2023.02.13 12:22:38 -05'00'

F. Table of Acronyms

Acronym	Definition
AHB	Atlantic Hydrographic Branch
AST	Assistant Survey Technician
ATON	Aid to Navigation
AWOIS	Automated Wreck and Obstruction Information System
BAG	Bathymetric Attributed Grid
BASE	Bathymetry Associated with Statistical Error
CO	Commanding Officer
CO-OPS	Center for Operational Products and Services
CORS	Continuously Operating Reference Station
CTD	Conductivity Temperature Depth
CEF	Chart Evaluation File
CSF	Composite Source File
CST	Chief Survey Technician
CUBE	Combined Uncertainty and Bathymetry Estimator
DAPR	Data Acquisition and Processing Report
DGPS	Differential Global Positioning System
DP	Detached Position
DR	Descriptive Report
DTON	Danger to Navigation
ENC	Electronic Navigational Chart
ERS	Ellipsoidal Referenced Survey
ERTDM	Ellipsoidally Referenced Tidal Datum Model
ERZT	Ellipsoidally Referenced Zoned Tides
FFF	Final Feature File
FOO	Field Operations Officer
FPM	Field Procedures Manual
GAMS	GPS Azimuth Measurement Subsystem
GC	Geographic Cell
GPS	Global Positioning System
HIPS	Hydrographic Information Processing System
HSD	Hydrographic Surveys Division

Acronym	Definition
HSSD	Hydrographic Survey Specifications and Deliverables
HSTB	Hydrographic Systems Technology Branch
HSX	Hypack Hysweep File Format
HTD	Hydrographic Surveys Technical Directive
HVCR	Horizontal and Vertical Control Report
HVF	HIPS Vessel File
IHO	International Hydrographic Organization
IMU	Inertial Motion Unit
ITRF	International Terrestrial Reference Frame
LNM	Linear Nautical Miles
MBAB	Multibeam Echosounder Acoustic Backscatter
MCD	Marine Chart Division
MHW	Mean High Water
MLLW	Mean Lower Low Water
NAD 83	North American Datum of 1983
NALL	Navigable Area Limit Line
NTM	Notice to Mariners
NMEA	National Marine Electronics Association
NOAA	National Oceanic and Atmospheric Administration
NOS	National Ocean Service
NRT	Navigation Response Team
NSD	Navigation Services Division
OCS	Office of Coast Survey
OMAO	Office of Marine and Aviation Operations (NOAA)
OPS	Operations Branch
MBES	Multibeam Echosounder
NWLON	National Water Level Observation Network
PDBS	Phase Differencing Bathymetric Sonar
PHB	Pacific Hydrographic Branch
POS/MV	Position and Orientation System for Marine Vessels
PPK	Post Processed Kinematic
PPP	Precise Point Positioning
PPS	Pulse per second

Acronym	Definition
PRF	Project Reference File
PS	Physical Scientist
RNC	Raster Navigational Chart
RTK	Real Time Kinematic
RTX	Real Time Extended
SBES	Singlebeam Echosounder
SBET	Smooth Best Estimate and Trajectory
SNM	Square Nautical Miles
SSS	Side Scan Sonar
SSSAB	Side Scan Sonar Acoustic Backscatter
ST	Survey Technician
SVP	Sound Velocity Profiler
TCARI	Tidal Constituent And Residual Interpolation
TPU	Total Propagated Uncertainty
USACE	United States Army Corps of Engineers
USCG	United States Coast Guard
UTM	Universal Transverse Mercator
XO	Executive Officer
ZDF	Zone Definition File