H13783

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

# DESCRIPTIVE REPORT

| | |
|---|---|
| Type of Survey: | Navigable Area |
| Registry Number: | H13783 |

## LOCALITY

| | |
|---|---|
| State(s): | Alaska |
| General Locality: | Togiak Bay and Approaches |
| Sub-locality: | 2NM NE of Black Rock to Anchor Point |

**2023**

CHIEF OF PARTY
CDR Meghan McGovern, NOAA

LIBRARY & ARCHIVES

Date:

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

REGISTRY NUMBER:

# HYDROGRAPHIC TITLE SHEET

**H13783**

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): | **Alaska** |
| General Locality: | **Togiak Bay and Approaches** |
| Sub-Locality: | **2NM NE of Black Rock to Anchor Point** |
| Scale: | **40000** |
| Dates of Survey: | **05/24/2023 to 06/02/2023** |
| Instructions Dated: | **04/05/2023** |
| Project Number: | **OPR-R331-FA-23** |
| Field Unit: | **NOAA Ship *Fairweather*** |
| Chief of Party: | **CDR Meghan McGovern, NOAA** |
| Soundings by: | **Multibeam Echo Sounder** |
| Imagery by: | **Multibeam Echo Sounder Bakscatter** |
| 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 4N, MLLW. All references to other horizontal or vertical datums in this report are applicable to the processed hydrographic data provided by the field unit.***

# Table of Contents

# List of Tables



# List of Figures

# Descriptive Report to Accompany Survey H13783

Project: OPR-R331-FA-23

Locality: Togiak Bay and Approaches

Sublocality: 2NM NE of Black Rock to Anchor Point

Scale: 1:40000

May 2023 - June 2023

**NOAA Ship *Fairweather***

Chief of Party: CDR Meghan McGovern, NOAA

# A. Area Surveyed

2 NM NE of Black Rock to Anchor Point, Alaska

## A.1 Survey Limits

Data were acquired within the following survey limits:

| Northwest Limit | Southeast Limit |
|---|---|
| 58° 57' 15" N<br>160° 30' 2.61" W | 58° 43' 35.58" N<br>160° 2' 35.43" W |

*Table 1: Survey Limits*

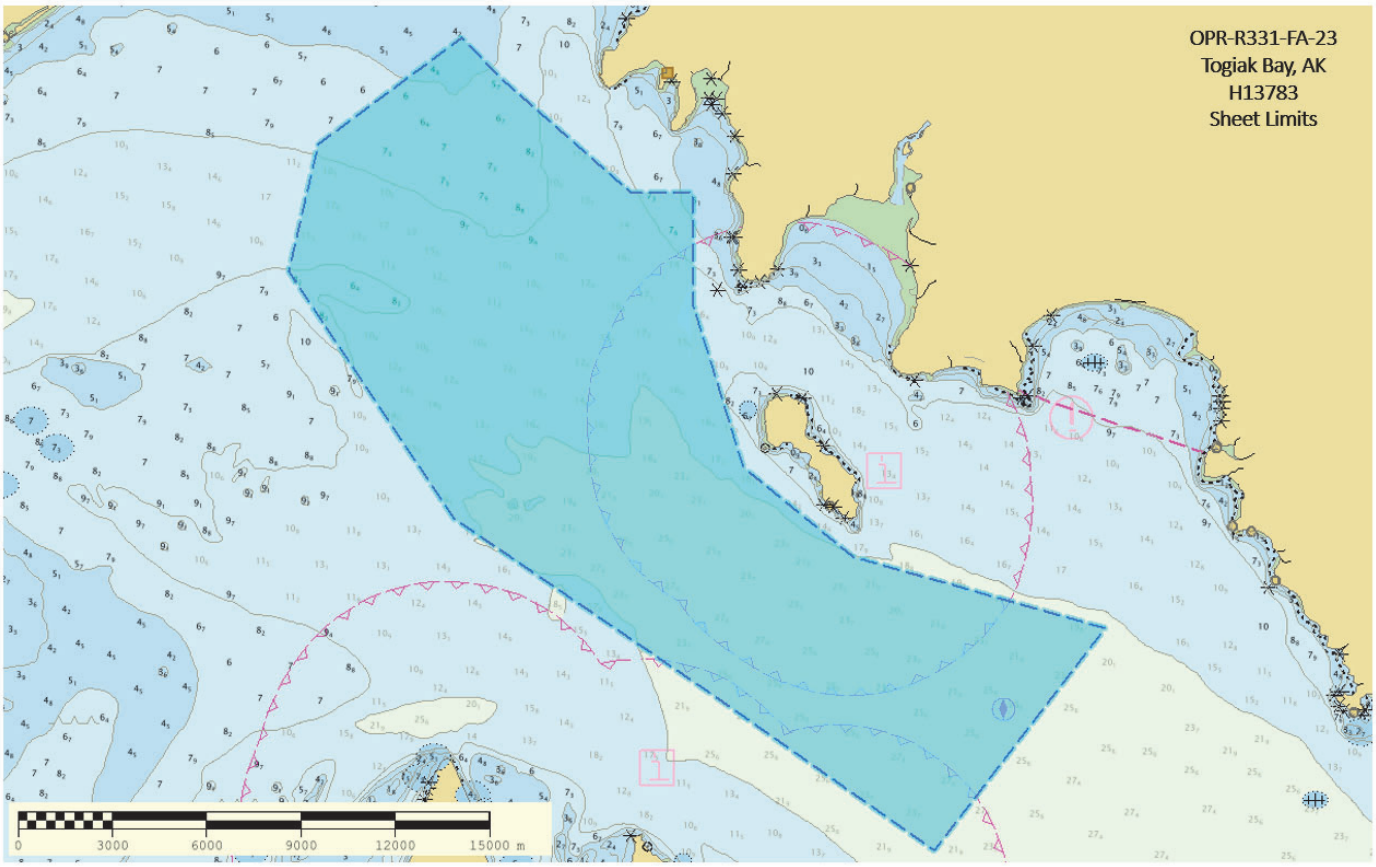



*Figure 1: H13783 sheet limits (in blue) overlaid onto Chart US4AK87M*

Data were acquired to the survey limits in accordance with the requirements in the Project Instructions and the 2022 NOS Hydrographic Surveys Specifications and Deliverables (HSSD). Coverage acquired in H13783 is shown in Figure 1.

## A.2 Survey Purpose

Togiak Bay is well known for its striking landscapes and unique variety of wildlife and fish. The Togiak National Wildlife Refuge's rivers are home to all five species of Pacific Salmon, Rainbow Trout, Arctic Grayling, Dolly Varden, and Arctic Char. The rivers contribute a large part of Togiak's fisheries production of nearly 3 million salmon annually and as the primary subsistence resource for local villages including Togiak and Twin Hills. Archaeological evidence indicates the occupation of this area by Alaska Native Peoples for over 4,000 years.

This hydrographic survey project will be a continuation of NOAA's mapping campaign in Bristol Bay, with sister projects surveying from the Nushagak Peninsula area to Kvichak Bay and Southern Cape Newenham. Portions of Togiak Bay were last surveyed in the early 1990s with offshore areas having never been surveyed. Higher priority areas have been identified for updated bathymetry by the Alaska Marine

Pilots and the West Alaska Lightering Group. This project will provide modern bathymetric data in an area of high hydrographic risk, improve maritime safety, and support the Seabed 2030 global mapping initiative.

## A.3 Survey Quality

The entire survey is adequate to supersede previous data.

Data acquired in H13783 meet multibeam echo sounder (MBES) coverage requirements for set line spacing, as required by the HSSD. This includes NOAA allowable uncertainty (see Section B.2.10) and density requirements (see Section B.2.11). This does not include crosslines as less than 8% were acquired (see section B.2.1).

## 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 | Set Line Spacing MBES at 200m |

*Table 2: Survey Coverage*

The entirety of H13783 was acquired with set line spacing, meeting the requirements listed above and in the HSSD (see section 5.2.2.4).

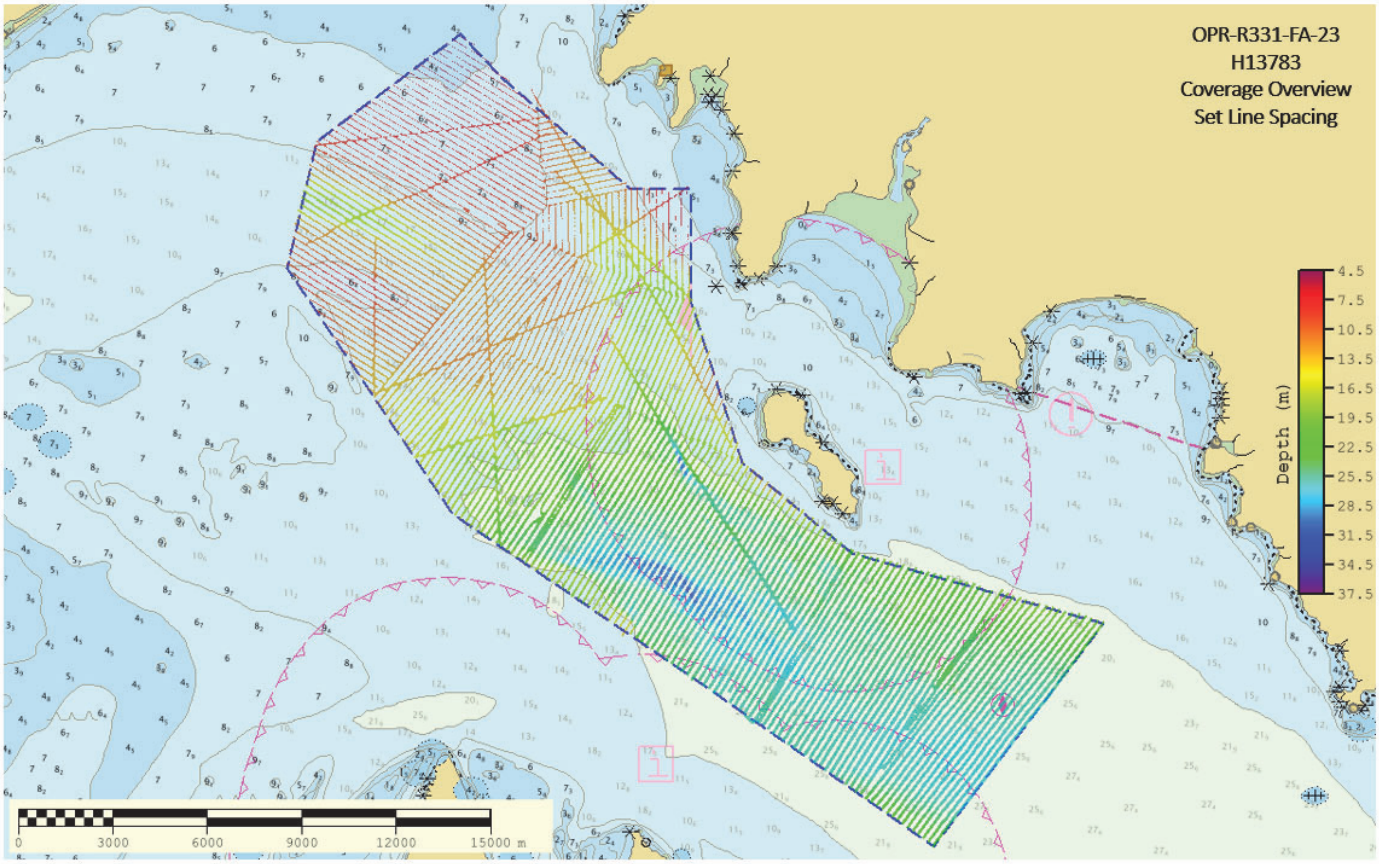



*Figure 2: H13783 survey coverage overlaid onto Chart US4AK87M*

## A.6 Survey Statistics

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

| | HULL ID | *2805* | *2806* | *2808* | *Total* |
|---|---|---|---|---|---|
| **LNM** | **SBES Mainscheme** | 0.0 | 0.0 | 0.0 | 0.0 |
| | **MBES Mainscheme** | 31.39 | 246.67 | 374.39 | 692.46 |
| | **Lidar Mainscheme** | 0.0 | 0.0 | 0.0 | 0.0 |
| | **SSS Mainscheme** | 0.0 | 0.0 | 0.0 | 0.0 |
| | **SBES/SSS Mainscheme** | 0.0 | 0.0 | 0.0 | 0.0 |
| | **MBES/SSS Mainscheme** | 0.0 | 0.0 | 0.0 | 0.0 |
| | **SBES/MBES Crosslines** | 6.13 | 20.64 | 13.06 | 39.83 |
| | **Lidar Crosslines** | 0.0 | 0.0 | 0.0 | 0.0 |
| **Number of Bottom Samples** | | | | | 6 |
| **Number Maritime Boundary Points Investigated** | | | | | 0 |
| **Number of DPs** | | | | | 0 |
| **Number of Items Investigated by Dive Ops** | | | | | 0 |
| **Total SNM** | | | | | 26.68 |

*Table 3: Hydrographic Survey Statistics*

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

| Survey Dates | Day of the Year |
|---|---|
| 05/24/2023 | 144 |
| 05/25/2023 | 145 |

| Survey Dates | Day of the Year |
|---|---|
| 05/26/2023 | 146 |
| 05/27/2023 | 147 |
| 05/28/2023 | 148 |
| 05/29/2023 | 149 |
| 05/30/2023 | 150 |
| 05/31/2023 | 151 |
| 06/01/2023 | 152 |
| 06/02/2023 | 153 |

*Table 4: Dates of Hydrography*

# B. Data Acquisition and Processing

## B.1 Equipment and Vessels

Refer to the OPR-R331-FA-23 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** | ***2805*** | ***2806*** | ***2808*** |
|---|---|---|---|
| **LOA** | 8.6 meters | 8.6 meters | 8.6 meters |
| **Draft** | 1.1 meters | 1.1 meters | 1.1 meters |

*Table 5: Vessels Used*

*Figure 3: Image of HSL used during survey (2805, 2806, and 2808)*

### B.1.2 Equipment

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

| Manufacturer | Model | Type |
|---|---|---|
| Kongsberg Maritime | EM 2040 | MBES |
| Sea-Bird Scientific | SBE 19plus V2 | Conductivity, Temperature, and Depth Sensor |
| Applanix | POS MV 320 v5 | Positioning and Attitude System |
| Teledyne RESON | SVP 71 | Sound Speed System |

*Table 6: Major Systems Used*

All launches utilize the Kongsberg EM 2040 MBES, a POS M/V v5 system for position and attitude, SVP 71 surface sound speed sensors, and Sea-Bird SBE 19plus v2 CTDs for conductivity, temperature, and depth casts. Launches 2806 and 2808 are equipped with the Velodyne VLP-16 Lidar for shoreline feature acquisition.

## B.2 Quality Control

### B.2.1 Crosslines

Crosslines were collected, processed and compared in accordance with Section 5.2.4.2 of the HSSD. For adequate comparison, 5.75% of crossline to MBES data was acquired. The HSSD specifies 8% for set line spacing. We were not able to acquire 8%. To evaluate crosslines, a surface generated via data strictly from mainscheme lines and a surface generated via data strictly from crosslines were created. From these two surfaces, a difference surface (mainscheme - crosslines = difference surface) was generated. Statistics show the mean difference between the depths derived from mainscheme data and crossline data was -0.01 meters and 95% of nodes falling within +/- 0.16 meters. For the respective depths, the difference surface was compared to the allowable NOAA uncertainty standards. In total, 100.00% of the depth differences between H13783 mainscheme and crossline data were within allowable NOAA uncertainties.

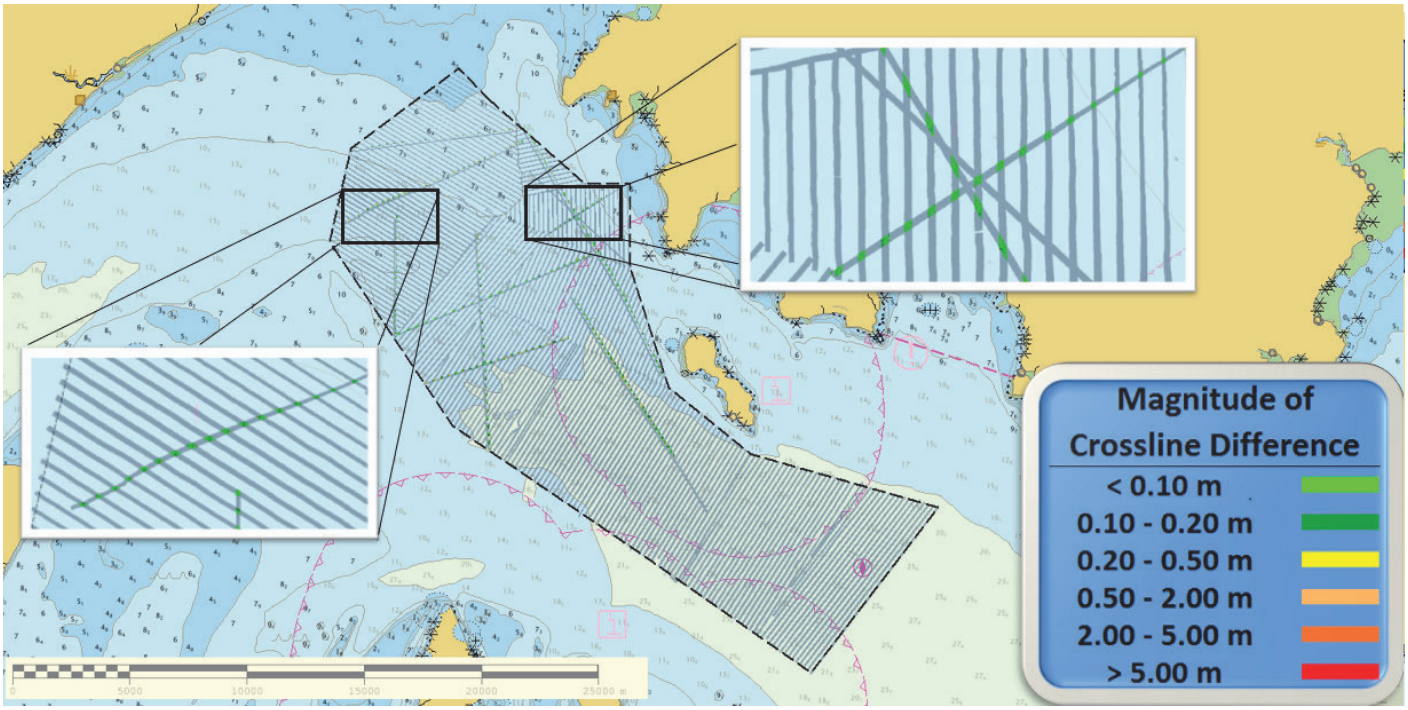
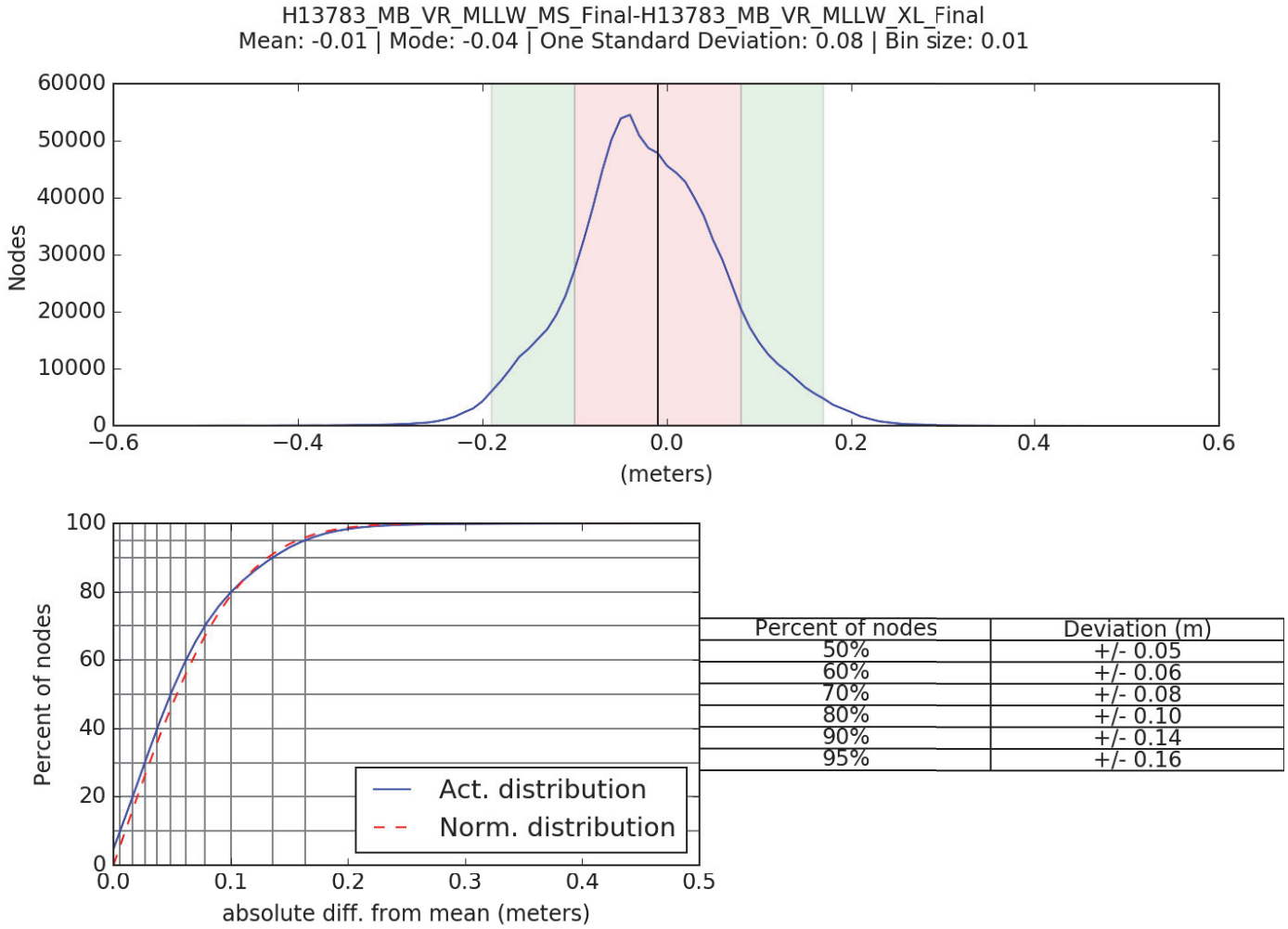



*Figure 4: Overview of H13783 crosslines*




| Percent of nodes | Deviation (m) |
|---|---|
| 50% | +/- 0.05 |
| 60% | +/- 0.06 |
| 70% | +/- 0.08 |
| 80% | +/- 0.10 |
| 90% | +/- 0.14 |
| 95% | +/- 0.16 |

*Figure 5: Difference surface statistics between H13783 MS and H13783 XL (VR surface)*

### B.2.2 Uncertainty

The following survey specific parameters were used for this survey:

| Method | Measured | Zoning |
|---|---|---|
| ERS via ERTDM | N/A | 0.17 meters |

*Table 7: Survey Specific Tide TPU Values.*

| Hull ID | Measured - CTD | Measured - MVP | Measured - XBT | Surface |
|---|---|---|---|---|
| 2805 | 2 meters/second | N/A | N/A | 0.5 meters/second |
| 2806 | 2 meters/second | N/A | N/A | 0.5 meters/second |
| 2808 | 2 meters/second | N/A | N/A | 0.5 meters/second |

*Table 8: Survey Specific Sound Speed TPU Values*.

In addition to the usual a priori estimates of uncertainty, real-time and post-processed uncertainty sources were also incorporated into the depth estimates of this survey. Real-time uncertainties for position, navigation, attitude, and vessel motion data from Applanix POS MV were applied during acquisition and initially in post-processing. We later applied POSPac SBET and RMS files in CARIS HIPS to supercede POS MV uncertainties associated with GPS height and position.

### B.2.3 Junctions

No junctions exist for this survey

There are no contemporary surveys that junction with this survey.

### 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

MBES subbottom return near nadir

A subbottom return was observed in the near-nadir region of HSL MBES data. This return was present in the majority of lines collected with HSL 2805, 2806, and 2808 and does not appear to effect the surface. Subset Editor was used to reject this data. It could be that a subbottom was observed due to a combination of high frequency (400kHz) and the mud nature of the seafloor resulting in pings extending past the surface.

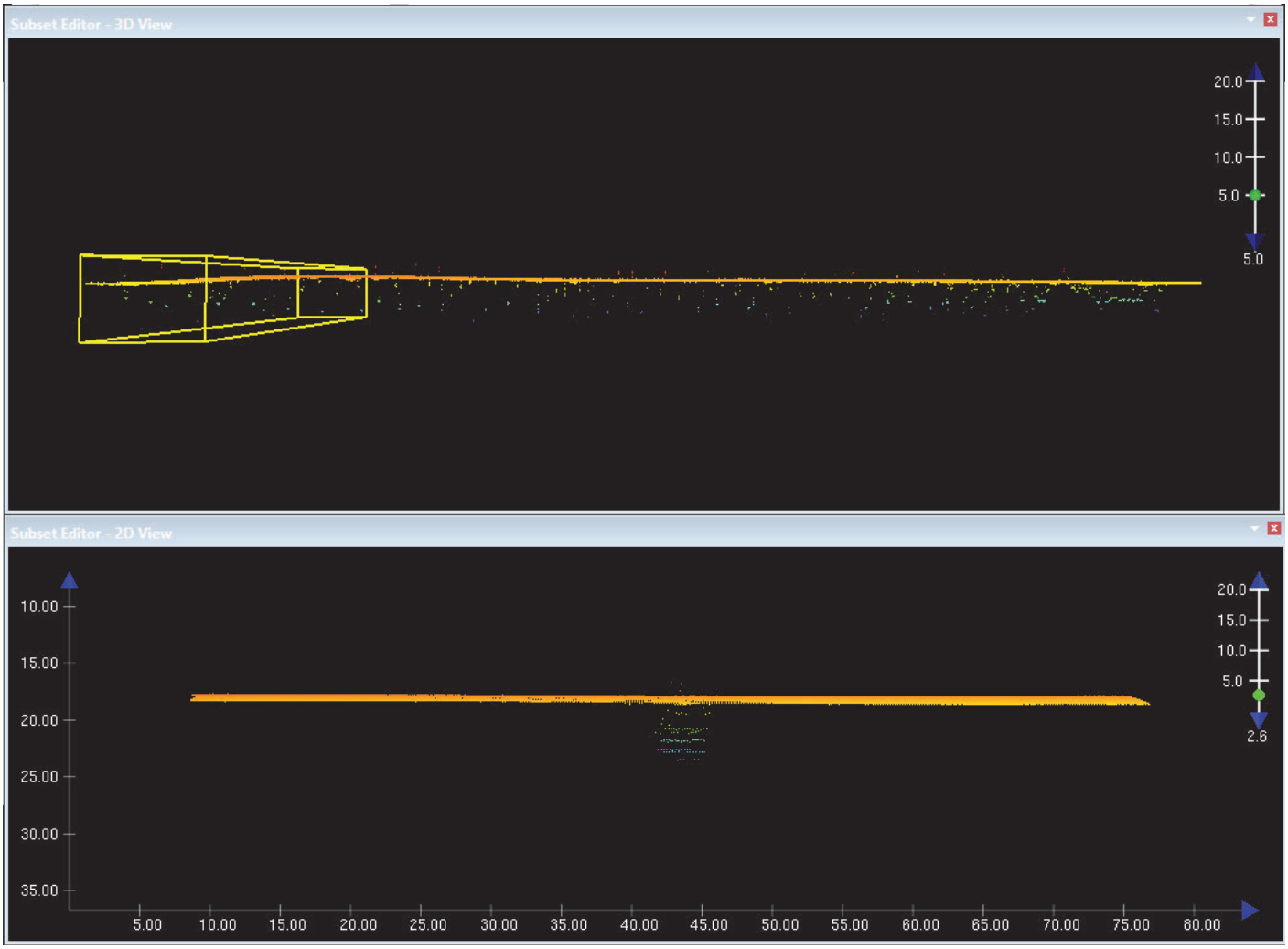



*Figure 6: Example of subbottom return in near-nadir region of HSL MBES data as seen in Subset Editor.*

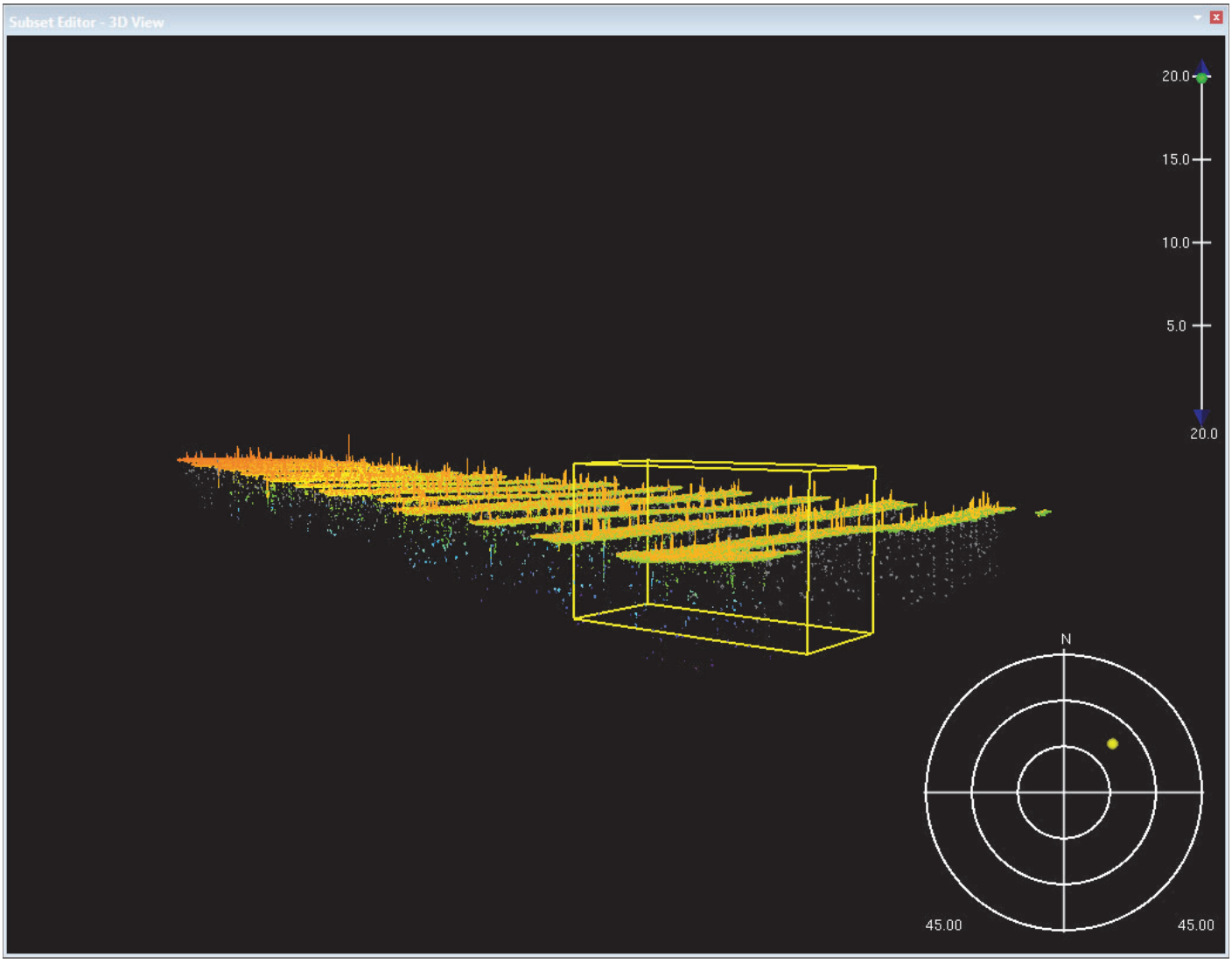



*Figure 7: Example of subbottom return in near-nadir region of HSL MBES data as seen in Subset Editor.*

### 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: Minimum of one every four hours

Casts were conducted at a minimum of one every four hours during launch 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.

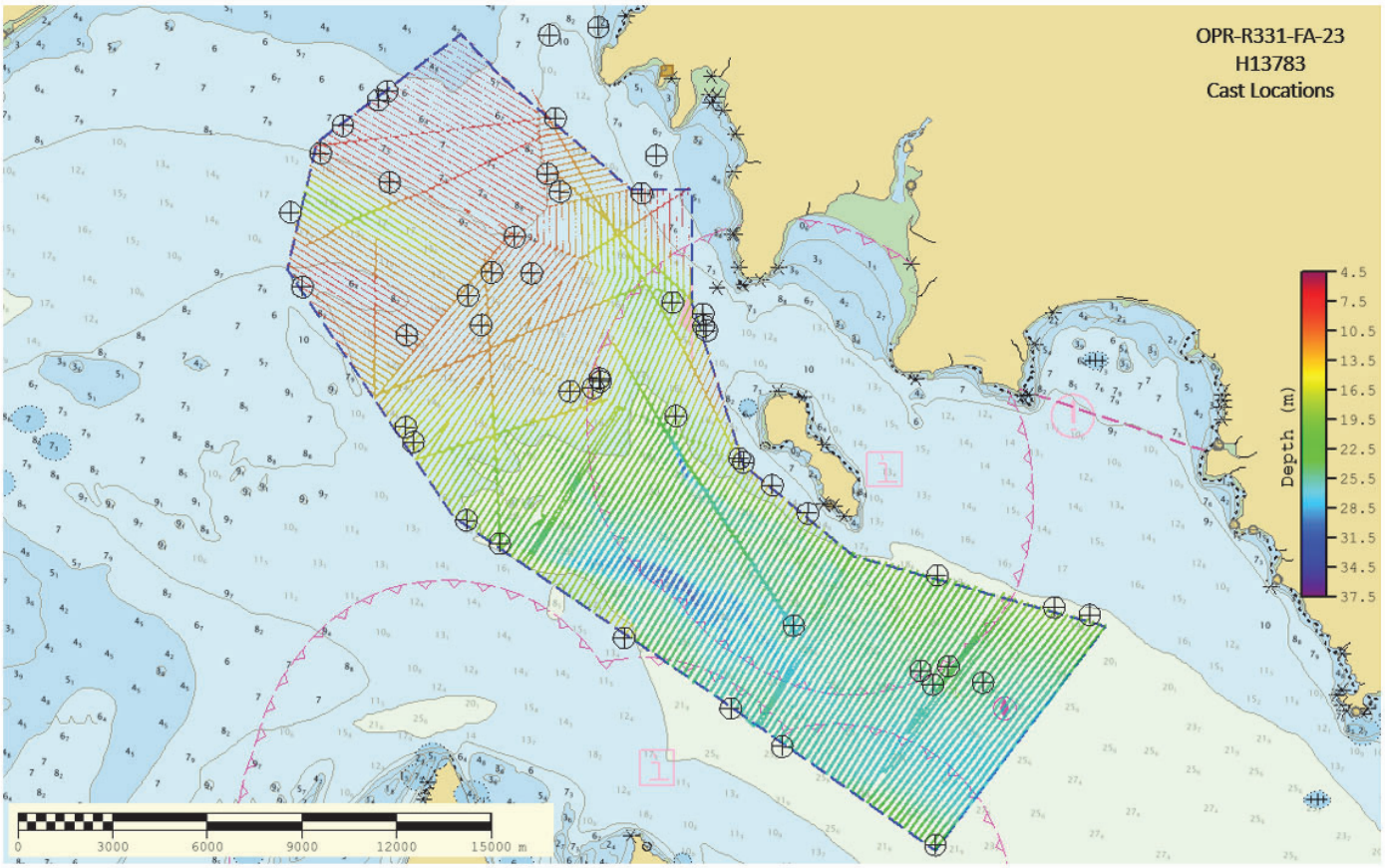



*Figure 8: Cast locations for H13783*

### B.2.8 Coverage Equipment and Methods

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

### B.2.9 Holidays

H13783 data were reviewed in CARIS HIPS and SIPS for holidays in accordance with Section 5.2.2.3 of the HSSD. Twenty seven holidays which meet the definition described in the HSSD for set line spacing were identified via HydrOffice QC Tools Holiday Finder tool. This tool automatically scans the surface for holidays as defined in the HSSD and was run in conjunction with a visual inspection of the surface by the hydrographer. After careful inspection in CARIS using subset editor, 24 of these holidays were identified at the instersection of crosslines set lines and were deemed to be fully covered. Three were identified to be

caused by "blow outs" when a boat hit the trough of a wave hard causing bubbles to interrupt the sonar and lose bottom. All holidays are represented in Figure 9 below.

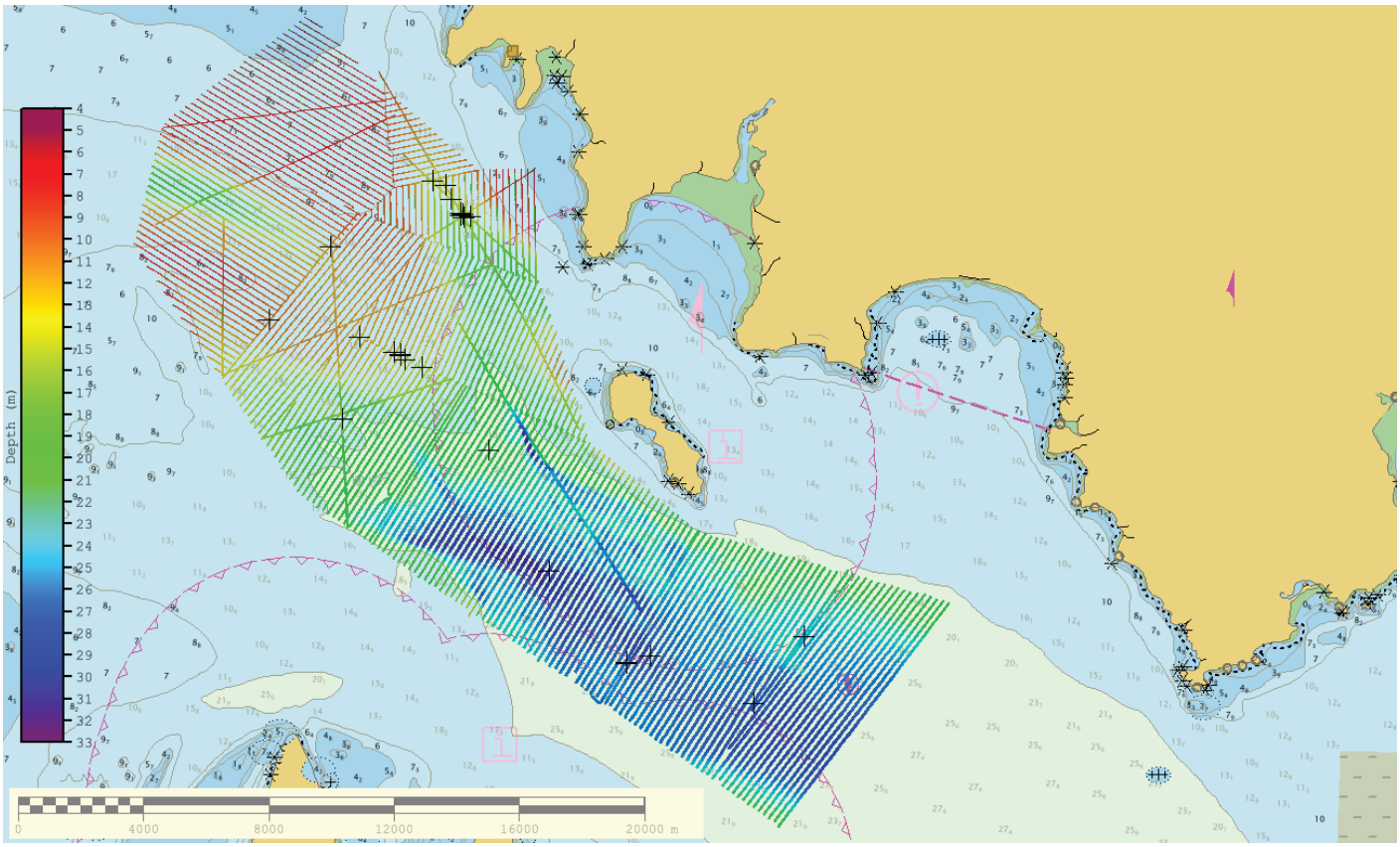



*Figure 9: H13783 Holidays plotted over survey coverage with charts US4AK87M*

### B.2.10 NOAA Allowable Uncertainty

The surface was analyzed using the HydrOffice QC Tools Grid QA feature to determine compliance with specifications. Overall, 99.5% of nodes within the surface meet NOAA Allowable Uncertainty specifications for H13783.

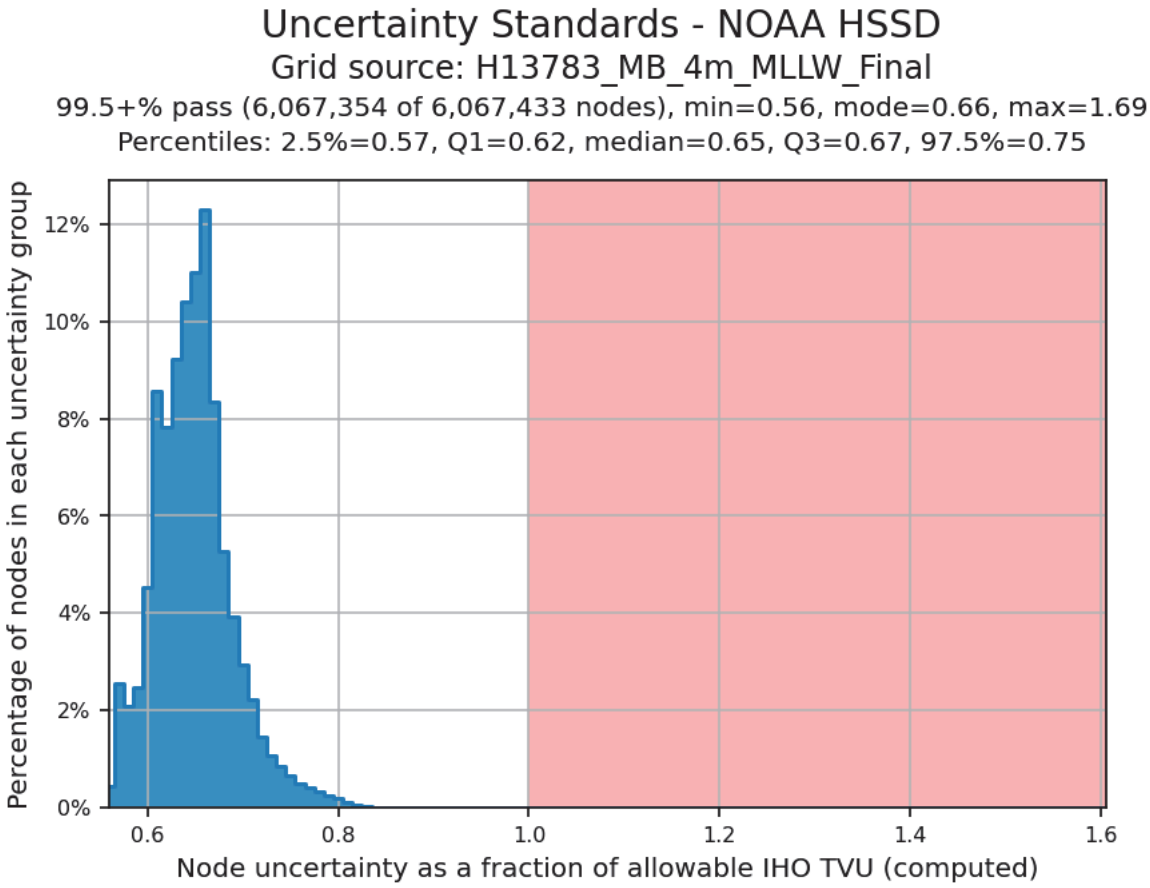



*Figure 10: H13783 allowable uncertainty statistics*

### B.2.11 Density

The surface was analyzed using the HydrOffice QC Tools Grid QA feature to determine compliance with specifications. Density requirements for H13783 were achieved with at least 99.5% of surface nodes containing five or more soundings as required by HSSD Section 5.2.2.3.

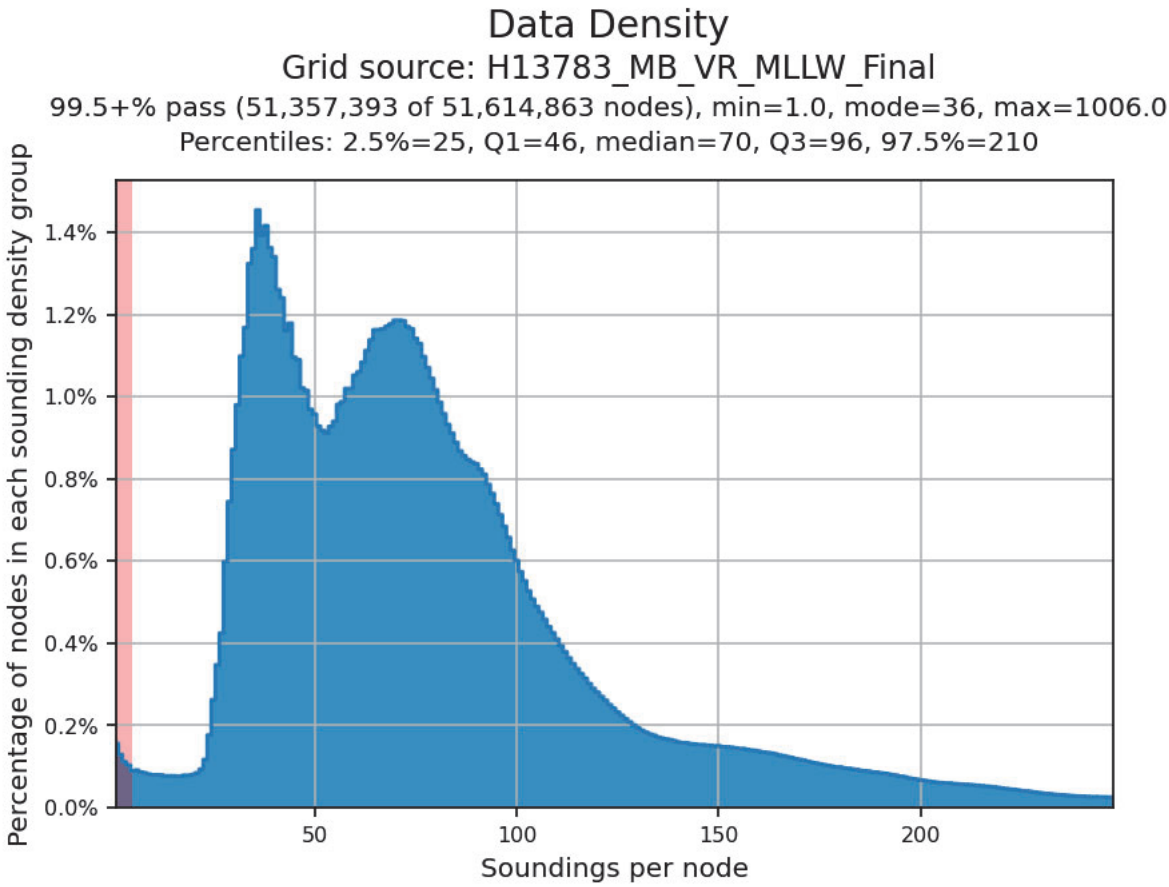



*Figure 11: H13783 data density statistics*

## 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

Raw backscatter data were stored in the .all file for Kongsberg systems. All backscatter were processed to GSF files and a floating point mosaic was created by the field unit via Fledermaus FMGT 7.10.2. See Figure below for a greyscale representation of the complete mosaic. A single backscatter mosaic was created at 2m resolution based on the specifications for a 400kHz system. All equipment and survey methods were used as detailed in the DAPR.

Upon processing an artifact appeared across the mosaic. Evidence of this is not present in the log or in the GSF files. The cause is unknown and it does not appear to effect the data from the backscatter mosaic.

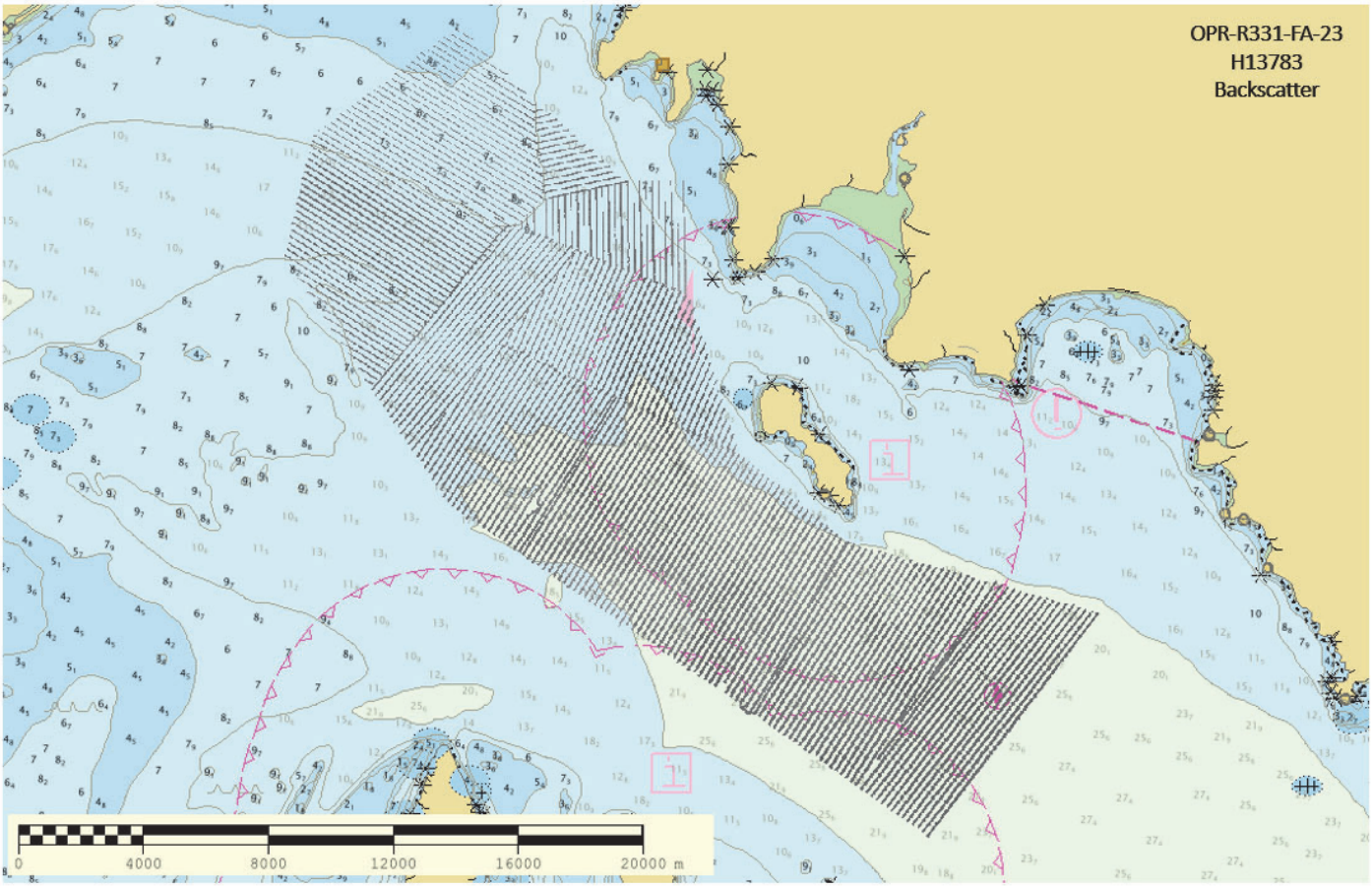



*Figure 12: Combined backscatter mosaic for H13783*

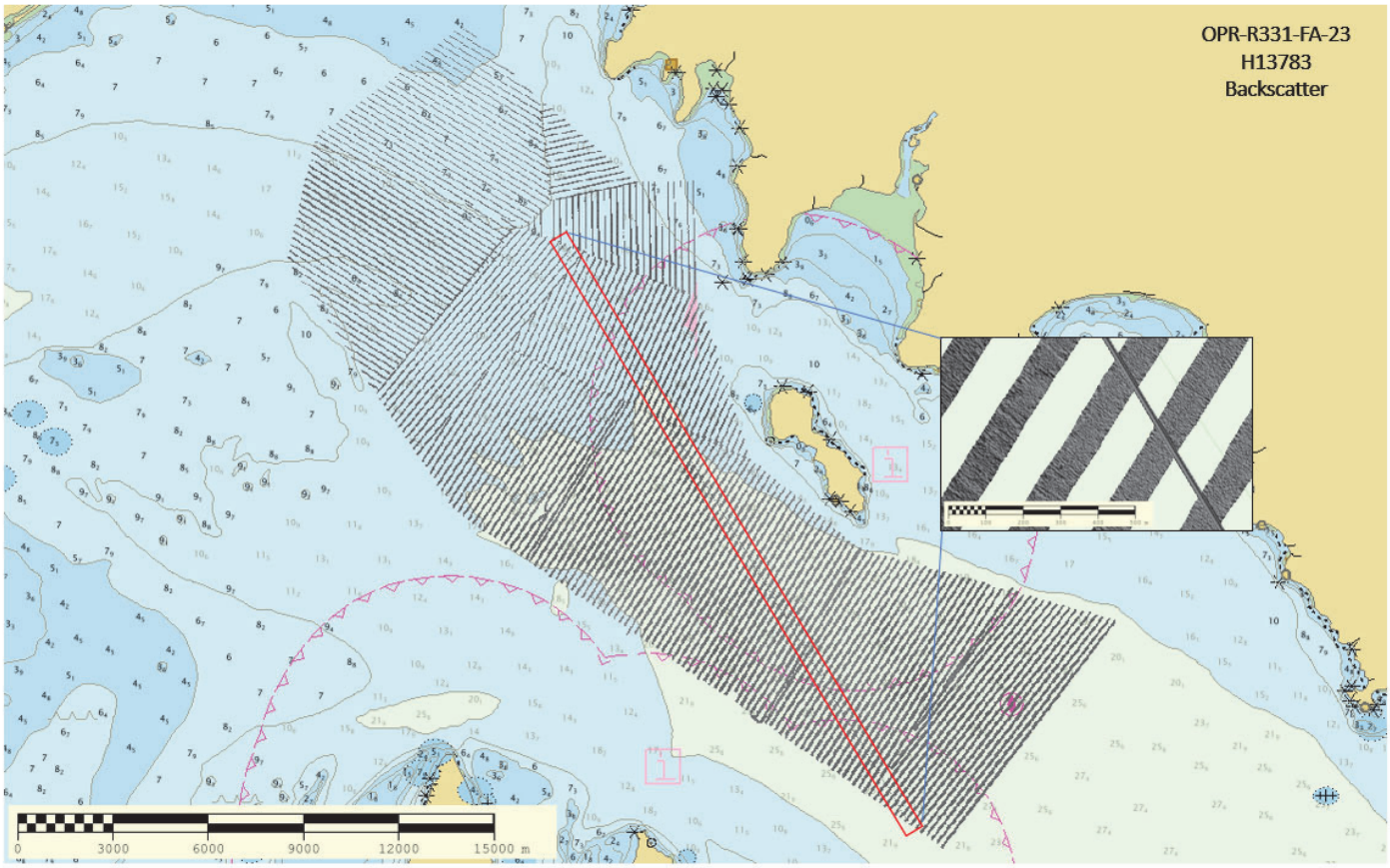



*Figure 13: Detail of backscatter mosaic artifiact for H13783*

## 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 | HIPS and SIPS | 11.4 |
| QPS | Fledermaus | 7.10.2 |

*Table 9: Primary bathymetric data processing software*

The following Feature Object Catalog was used: NOAA Profile Version 2023.

### 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 |
|---|---|---|---|---|---|
| H13783_MB_4m_MLLW | CARIS Raster Surface (CUBE) | 4 meters | 4.8 meters - 32.8 meters | NOAA_4m | MBES Set Line Spacing |
| H13783_MB_4m_MLLW_Final | CARIS Raster Surface (CUBE) | 4 meters | 4.8 meters - 32.8 meters | NOAA_4m | MBES Set Line Spacing |

*Table 10: Submitted Surfaces*

The NOAA CUBE parameters defined in the HSSD were used for the creation of all CUBE surfaces for H13783. 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 vary from 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, part of the QC Tools package within HydrOffice, was used to assist the search for spurious soundings following gross cleaning. Flier Finder was run iteratively until there were 160 areas flagged as fliers deemed as valid aspects of the surface. A large number of edge fliers are to be expected given the nature of the set line spacing.

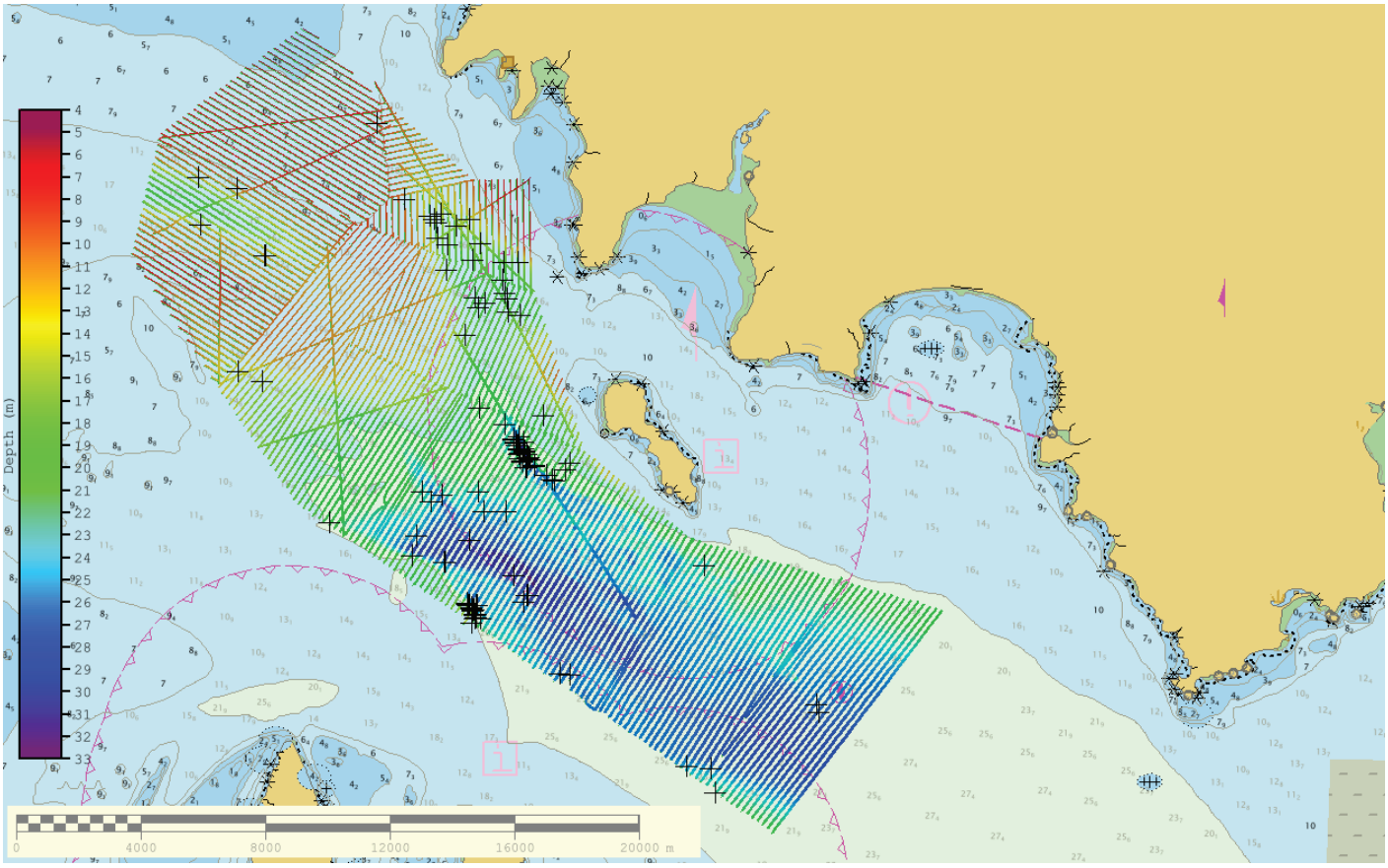



*Figure 14: Remaining 160 areas flagged as fliers deemed as valid aspects of the surface*

# C. Vertical and Horizontal Control

Per Section 5.2.2.1.3 of the 2022 Field Procedures Manual no Horizontal and Vertical Control Report has been generated for H13783.

## 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 ERTDM | OPR-R331-FA-23_AK_ERTDM_2023_NAD83-MLLW |

*Table 11: ERS method and SEP file*

ERS methods were used as the final means of reducing H13783 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 4.

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 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.

WAAS

During real-time acquisition, all platforms received correctors from the Wide Area Augmentation System (WAAS) for increased accuracies.

# D. Results and Recommendations

## D.1 Chart Comparison

Chart comparison between ENC and soundings from collected data. The soundings from H13783 are generally in agreement ENC US4AK87M.

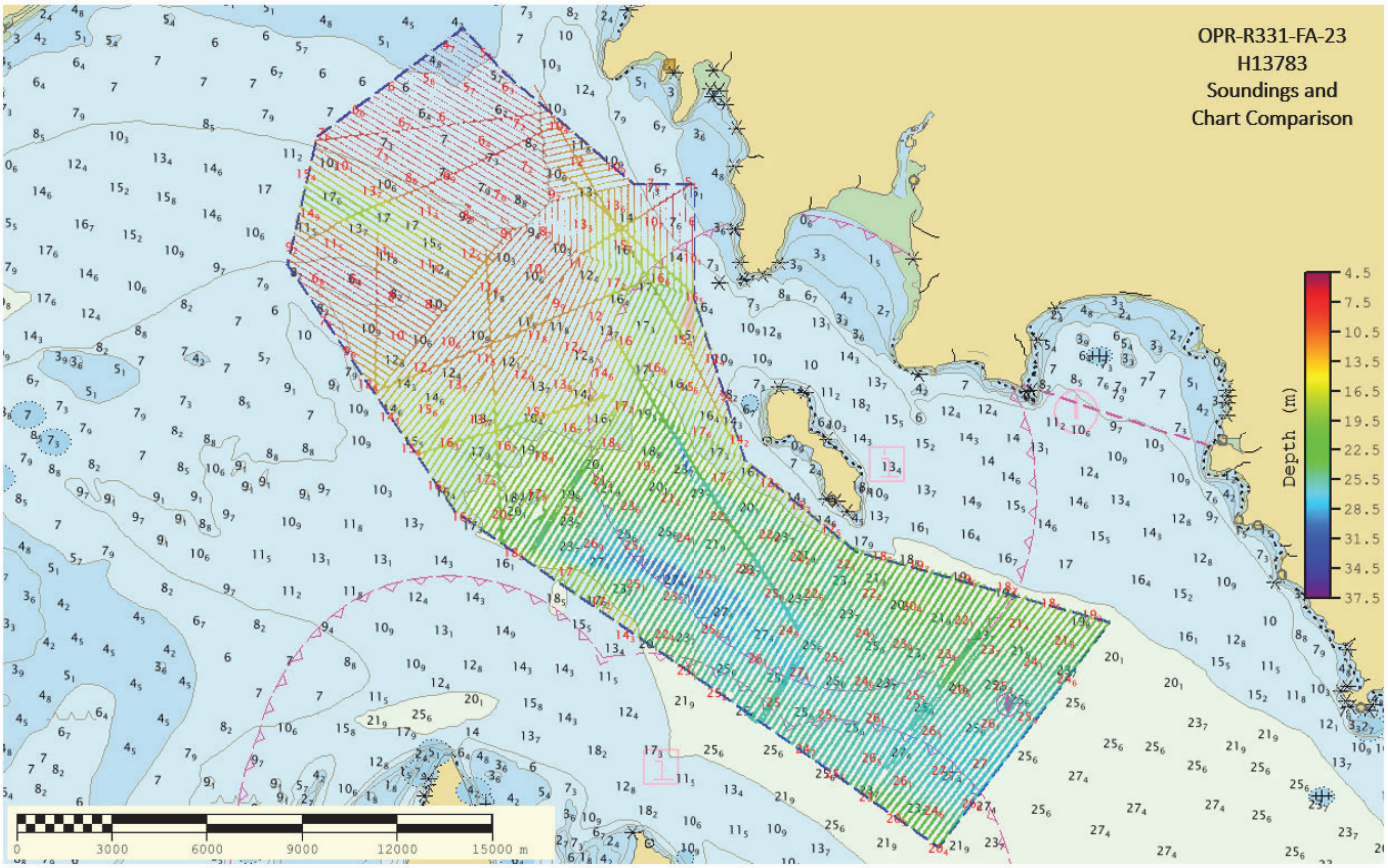



*Figure 15: Survey coverage with soundings (in red) overlaid onto ENC US4AK87M*

### 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 |
|---|---|---|---|---|
| US4AK87M | 1:100000 | 5 | 09/15/2022 | 01/24/2023 |

*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

No charted features exist for this survey.

### D.1.4 Uncharted Features

No uncharted features exist for this survey.

### D.1.5 Channels

No channels exist within the survey limits.

## D.2 Additional Results

### D.2.1 Aids to Navigation

No Aids to navigation (ATONs) exist for this survey.

### D.2.2 Maritime Boundary Points

No Maritime Boundary Points were assigned for this survey.

### D.2.3 Bottom Samples

Six bottom samples were acquired in accordance with the Project Instructions for survey H13783. All bottom samples were entered in the H13783 Final Feature File. See Figure for a graphical overview of sample locations.

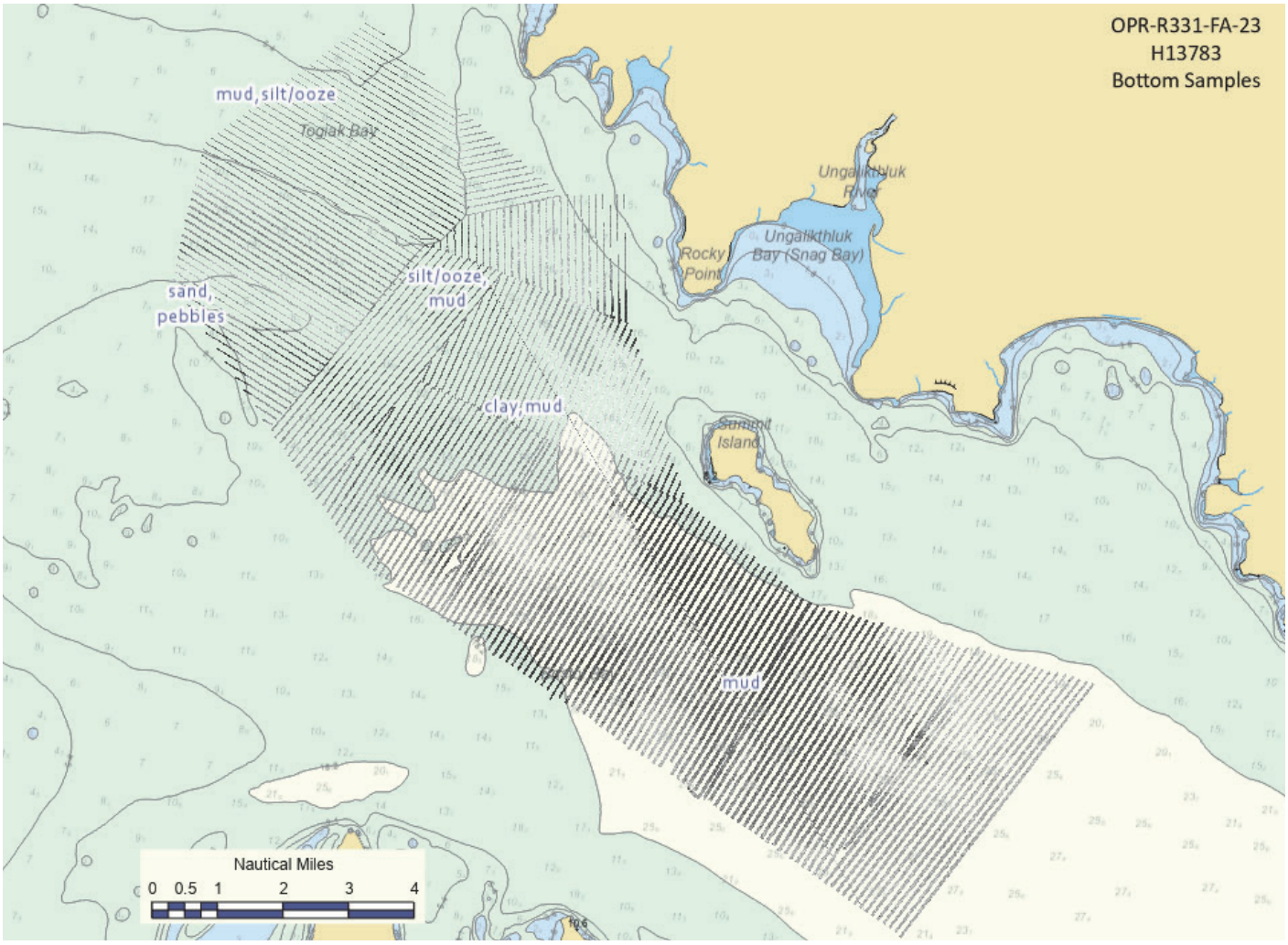



*Figure 16: H13783 Bottom Samples overlaid onto Chart US4AK87M (ArcGIS)*

### D.2.4 Overhead Features

No overhead features exist for this survey.

### D.2.5 Submarine Features

No submarine features exist for this survey.

### D.2.6 Platforms

No platforms exist for this survey.

### 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 |
|---|---|---|---|
| CDR Meghan McGovern | Commanding Officer | 11/07/2023 | MCGOVERN.MEGHAN.ELIZABETH.1284020495 Digitally signed by MCGOVERN.MEGHAN.ELIZABETH.1284020495 Date: 2023.11.07 14:12:51 -08'00' |
| LT Taylor Krabiel | Operations Officer | 11/07/2023 | Digitally signed by KRABIEL.TAYLOR.ALAN.1539169935 Date: 2023.12.01 16:14:35 -05'00' |
| HST Finnegan Sougioultzoglou | Sheet Manager | 07/28/2023 | |
| HST Michael Lauzon | Sheet Manager | 11/07/2023 | |

# 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 |