H13824

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

# DESCRIPTIVE REPORT

| | |
|---|---|
| Type of Survey: | Navigable Area |
| Registry Number: | H13824 |

## LOCALITY

| | |
|---|---|
| State(s): | Alaska |
| General Locality: | Offshore of Kodiak Island |
| Sub-locality: | Kodiak Trough |

**2023**

CHIEF OF PARTY
CDR Meghan McGovern

LIBRARY & ARCHIVES

Date:

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

REGISTRY NUMBER:

# HYDROGRAPHIC TITLE SHEET

# H13824

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: | **Offshore of Kodiak Island** |
| Sub-Locality: | **Kodiak Trough** |
| Scale: | **40000** |
| Dates of Survey: | **06/20/2023 to 08/24/2023** |
| Instructions Dated: | **07/26/2023** |
| Project Number: | **OPR-P337-FA-23** |
| Field Unit: | **NOAA Ship *Fairweather*** |
| Chief of Party: | **CDR Meghan McGovern** |
| 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 05N, 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 H13824

Project: OPR-P337-FA-23

Locality: Offshore of Kodiak Island

Sublocality: Kodiak Trough

Scale: 1:40000

June 2023 - August 2023

**NOAA Ship *Fairweather***

Chief of Party: CDR Meghan McGovern

# A. Area Surveyed

The survey area is located offshore of Kodiak Island, Alaska.

## A.1 Survey Limits

Data were acquired within the following survey limits:

| Northwest Limit | Southeast Limit |
|---|---|
| 57° 43' 21.52" N<br>152° 7' 15.46" W | 57° 7' 26.27" N<br>151° 2' 32.63" W |

*Table 1: Survey Limits*

Data were not acquired to the survey limits in accordance with the requirements in the Project Instructions and the 2022 NOS Hydrographic Surveys Specifications and Deliverables (HSSD) due to time and weather constraints. Coverage acquired in H13824 is shown in the figure below.

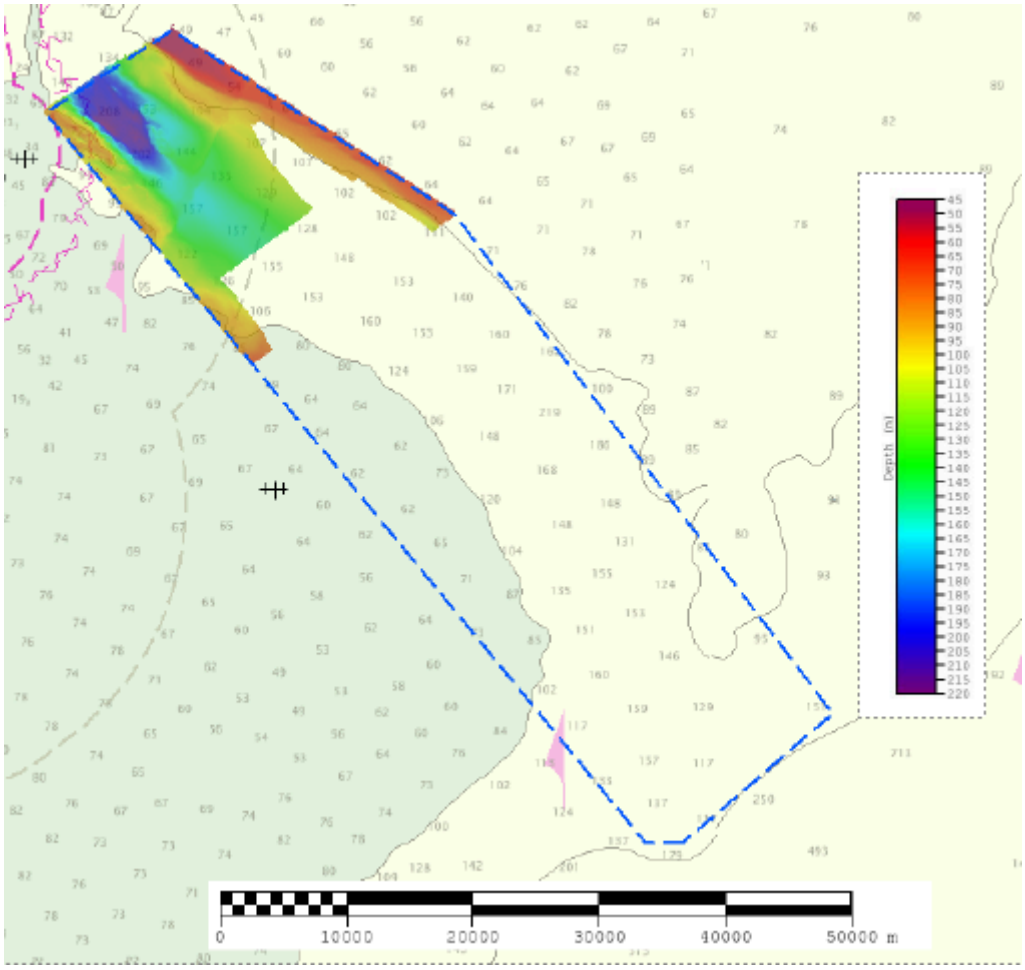



*Figure 1: H13824 survey coverage overlaid with sheet limits onto US2AK20M and ENC US3AK5KM.*

## A.2 Survey Purpose

Kodiak Island, AK is located in the western Gulf of Alaska and its surrounding marine waters are among the most productive in the North Pacific. There are over one hundred species of marine fish in the area and commercial fishing and processing are 55% of the private sector work force. Despite being an economically and ecologically significant area, the previous surveys in this area are from the 1970s or 1930s or not mapped to modern standards. This project is part of a larger regional mapping campaign Seascape Alaska that is a partnership with USGS with the larger goal of mapping ocean waters off Alaska. Other goals of the Seascape Alaska project include understanding the habitat, seafloor, archaeological, biological, chemical, and other oceanic attributes in addition to collecting bathymetric data.

## A.3 Survey Quality

The entire survey is adequate to supersede previous data.

Data acquired in H13824 meet multibeam echo sounder (MBES) coverage requirements for complete coverage, as required by the HSSD. This includes crosslines (see Section B.2.1), NOAA allowable uncertainty (see Section B.2.10), and density requirements (see Section B.2.11).

## 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. | Complete Coverage (Refer to HSSD Section 5.2.2.3) |

*Table 2: Survey Coverage*

Survey coverage was in accordance with the requirements listed above and in the HSSD.

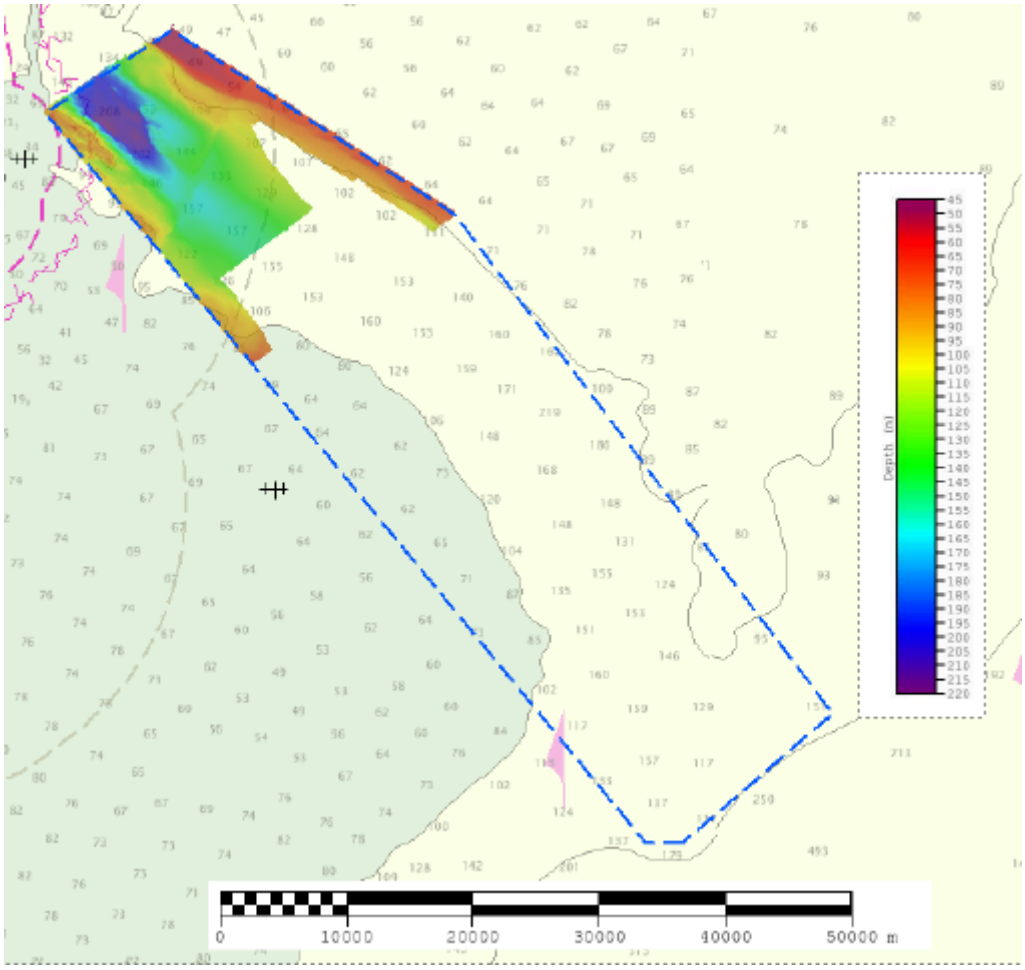



*Figure 2: H13824 surface overlaid onto Charts US2AK20M and US3AK5KM.*

## A.6 Survey Statistics

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

| | HULL ID | *S220* | *2805* | *2806* | *2807* | *2808* | *Total* |
|---|---|---|---|---|---|---|---|
| **LNM** | **SBES Mainscheme** | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| | **MBES Mainscheme** | 0.97 | 157.57 | 50.03 | 134.27 | 210.1 | 581.24 |
| | **Lidar Mainscheme** | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| | **SSS Mainscheme** | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| | **SBES/SSS Mainscheme** | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| | **MBES/SSS Mainscheme** | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| | **SBES/MBES Crosslines** | 13.64 | 5.63 | 0.0 | 0.0 | 9.02 | 28.3 |
| | **Lidar Crosslines** | 0.0 | 0.0 | 0.0 | 0.0 | 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** | | | | | | | 85.06 |

*Table 3: Hydrographic Survey Statistics*

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

| Survey Dates | Day of the Year |
|---|---|
| 06/20/2023 | 171 |
| 06/21/2023 | 172 |
| 06/22/2023 | 173 |
| 06/23/2023 | 174 |
| 06/24/2023 | 175 |
| 08/24/2023 | 236 |

*Table 4: Dates of Hydrography*

# 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 | *S220* | *2805* | *2806* | *2807* | *2808* |
|---|---|---|---|---|---|
| **LOA** | 70.4 meters | 8.6 meters | 8.6 meters | 8.6 meters | 8.6 meters |
| **Draft** | 4.8 meters | 1.1 meters | 1.1 meters | 1.1 meters | 1.1 meters |

*Table 5: Vessels Used*


*Figure 3: S220*

*Figure 4: FA Hydrographic Survey Launches*

### B.1.2 Equipment

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

| Manufacturer | Model | Type |
|---|---|---|
| Kongsberg Maritime | EM 712 | MBES |
| Applanix | POS MV 320 v5 | Positioning and Attitude System |
| AML Oceanographic | MVP200 | Conductivity, Temperature, and Depth Sensor |
| Kongsberg Maritime | EM 2040 | MBES |
| Sea-Bird Scientific | SBE 19plus V2 | Conductivity, Temperature, and Depth Sensor |
| Teledyne RESON | SVP 70 | Sound Speed System |
| Teledyne RESON | SVP 71 | Sound Speed System |

*Table 6: Major Systems Used*

The equipment was installed on the survey platform as follows: S220 utilizes the Kongsberg EM 712MBES, a POS M/V v5 system for position and attitude, SVP 70 surface sound speed sensors, and AML Oceanographic MVP 200 for conductivity, temperature, and depth (CTD) casts. 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.

## 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, 4.87% of crossline to MBES data was acquired. 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 0.02 meters and 95% of nodes falling within 0.61 meters. For the respective depths, the difference surface was compared to the allowable NOAA uncertainty standards. In total, 99.5+% of the depth differences between H13824 mainscheme and crossline data were within allowable NOAA uncertainties.

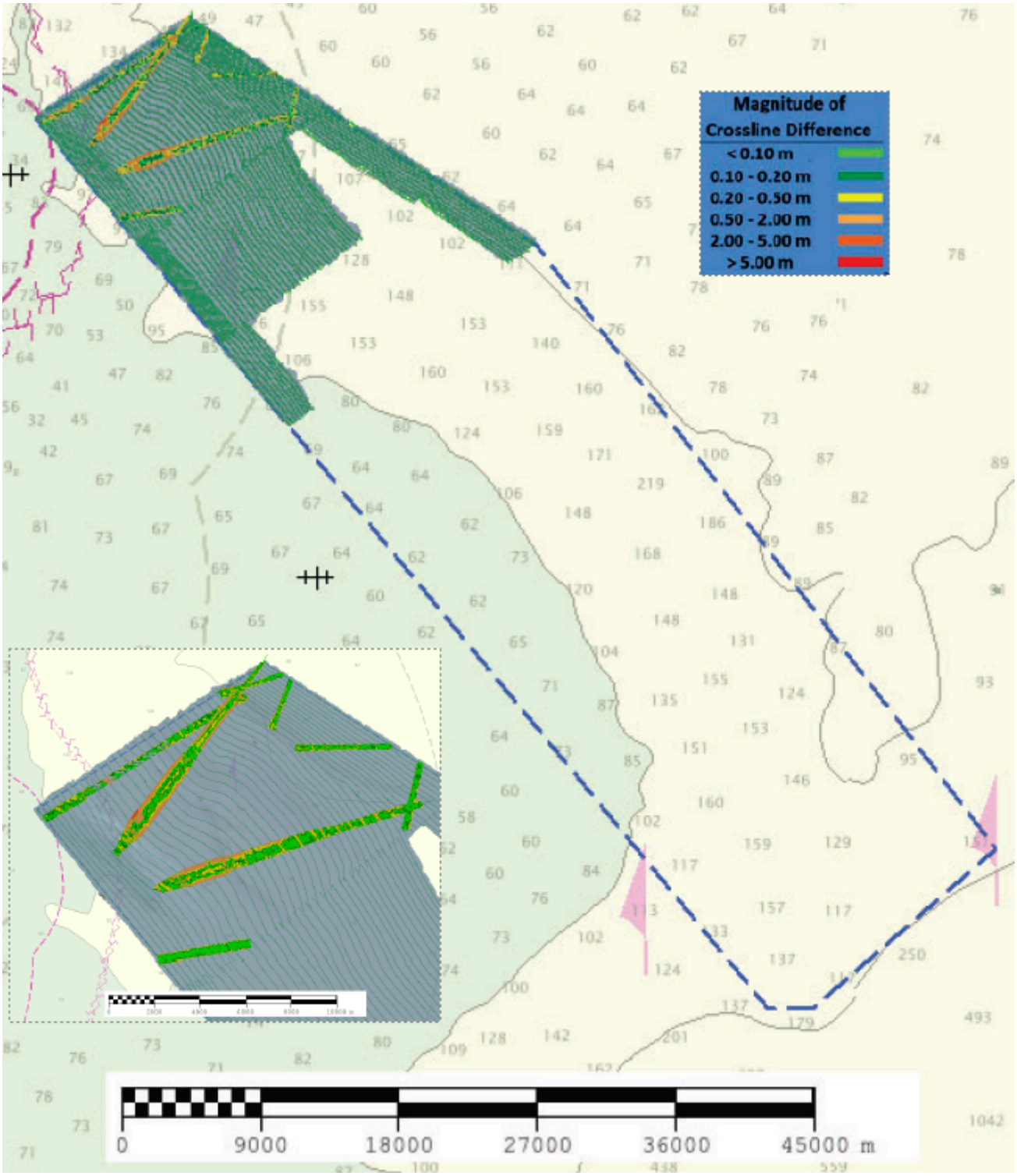
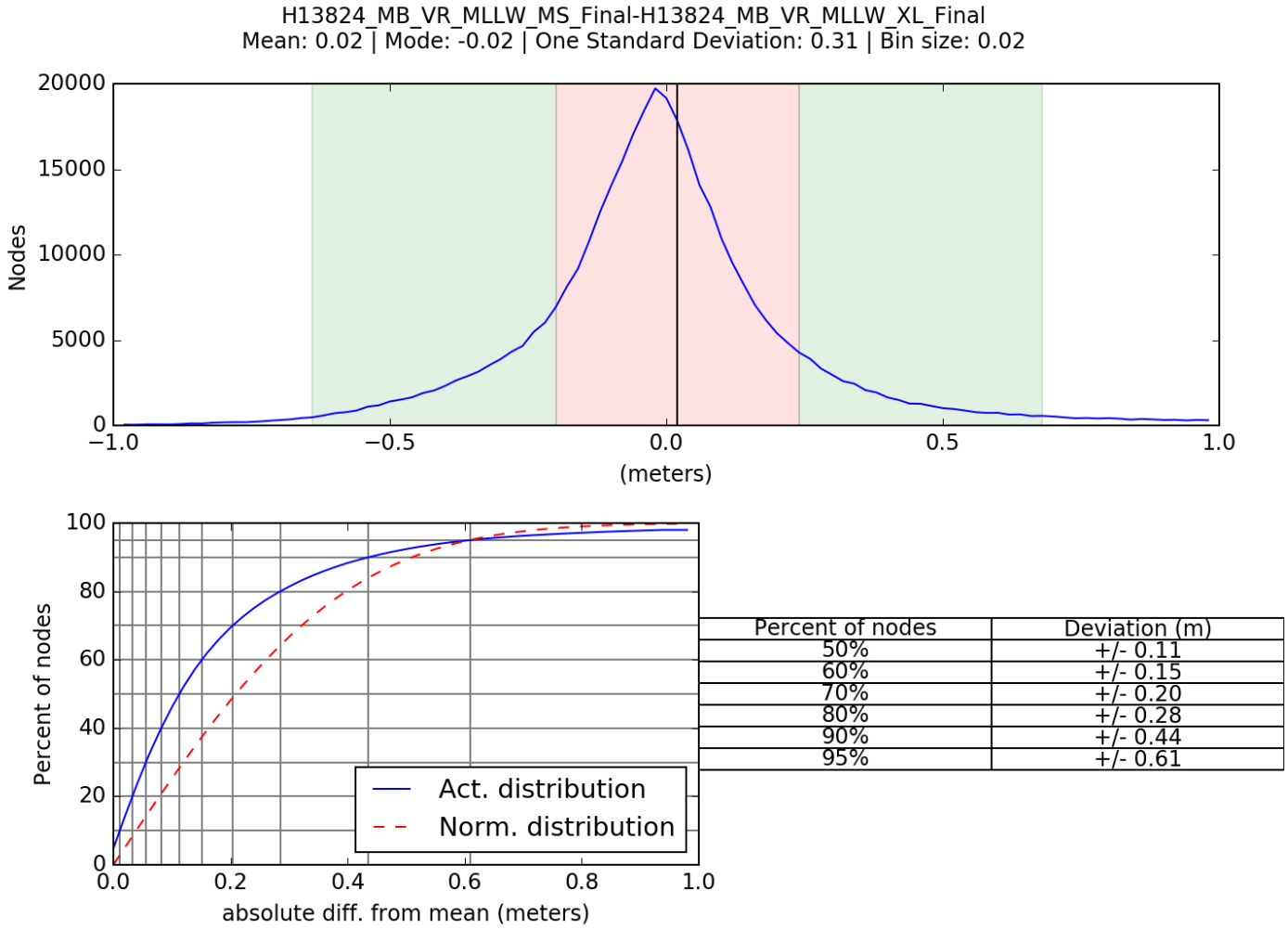



*Figure 5: Overview of H13824 crosslines.*




| Percent of nodes | Deviation (m) |
|---|---|
| 50% | +/- 0.11 |
| 60% | +/- 0.15 |
| 70% | +/- 0.20 |
| 80% | +/- 0.28 |
| 90% | +/- 0.44 |
| 95% | +/- 0.61 |

*Figure 6: H13824 crossline and mainscheme difference statistics.*

### B.2.2 Uncertainty

The following survey specific parameters were used for this survey:

| Method | Measured | Zoning |
|---|---|---|
| ERS via VDATUM | 0.0 meters | 0.16 meters |

*Table 7: Survey Specific Tide TPU Values.*

| Hull ID | Measured - CTD | Measured - MVP | Measured - XBT | Surface |
|---|---|---|---|---|
| S220 | N/A | 1 meters/second | N/A | 0.5 meters/second |
| 280x | 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 via device models for vessel motion and ERTDM/ VDATUM/TCARI, real-time and post-processed uncertainty sources were also incorporated into the depth estimates of survey H13824. Real-time uncertainties were provided via EM 2040 and EM 712 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 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

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: Sound Speed Cast Frequency: CTD casts were conducted at a minimum of one every four hours during launch acquisition. MVP casts on S220 and were conducted at a minimum of one every four hours, guided by observation of the surface sound speed and targeted toward equal distribution of data collection.

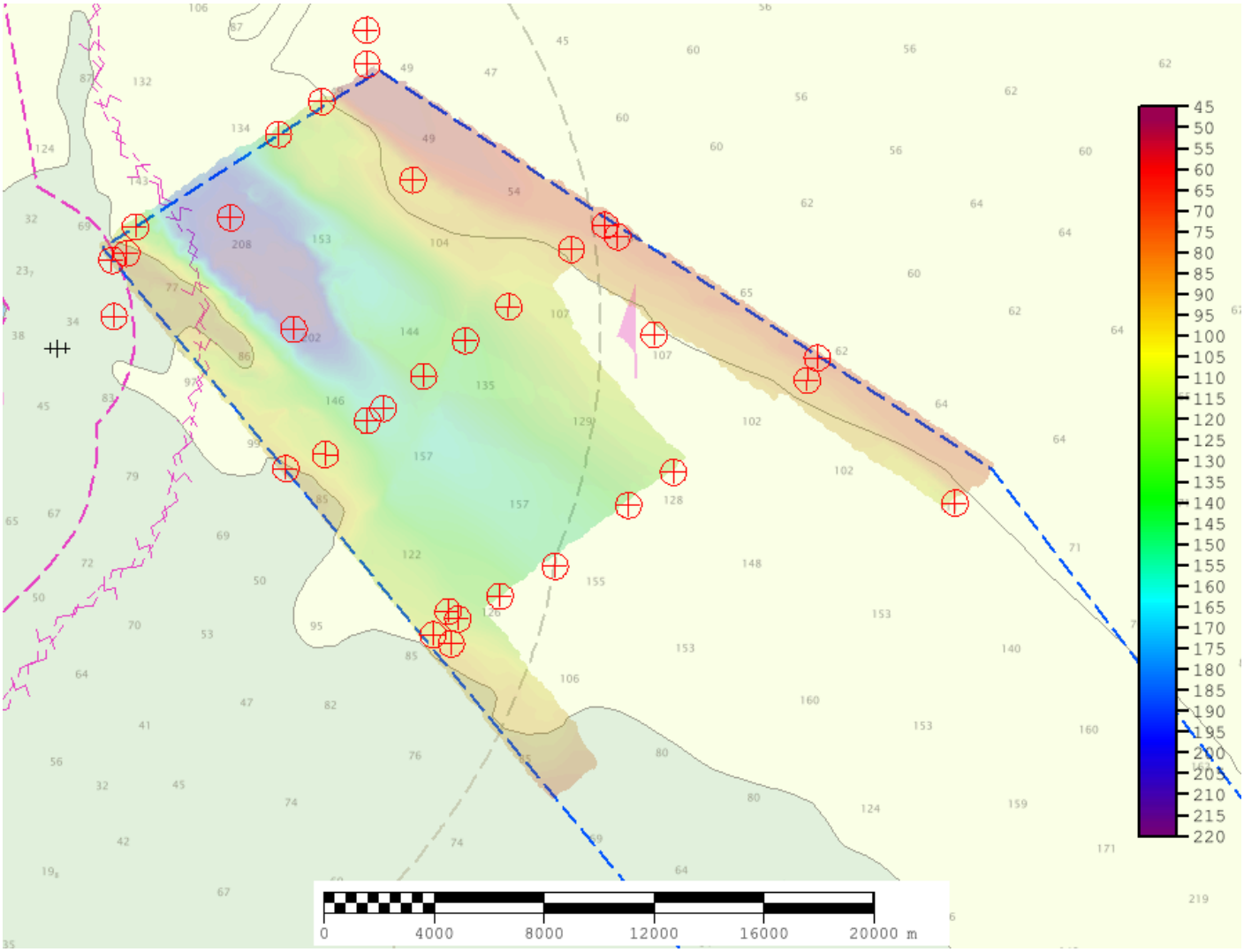



*Figure 7: Cast locations displayed with red crosshairs for H13824.*

### B.2.8 Coverage Equipment and Methods

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

### B.2.9 Holidays

H13824 data were reviewed in CARIS HIPS and SIPS for holidays in accordance with Section 5.2.2.3 of the HSSD. One holiday which meets the definition described in the HSSD for complete coverage 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. Holiday was caused due to gaps in coverage which were unable to be filled due to time constraints.

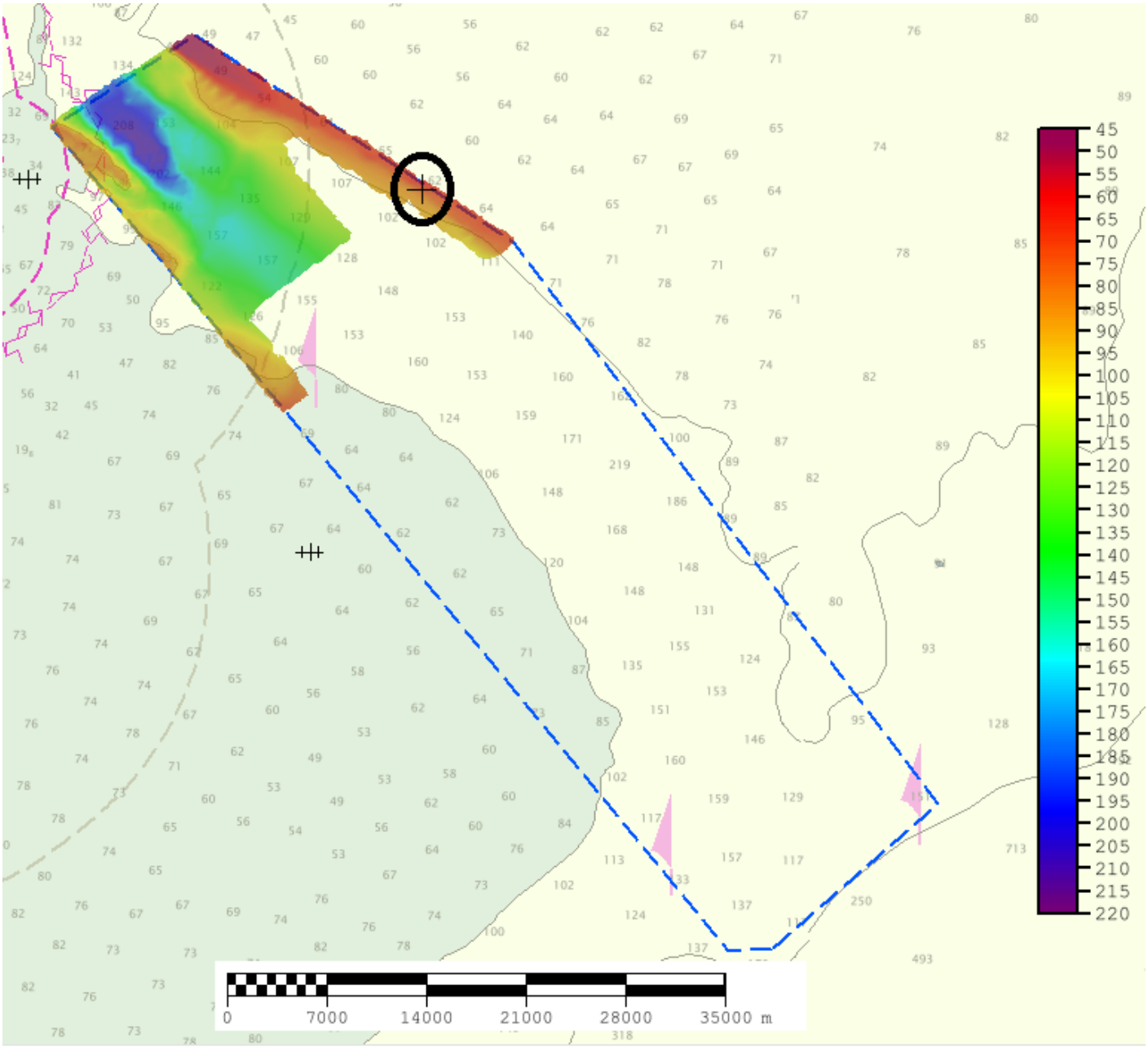



*Figure 8: Holiday in H13824.*

### 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 H13824.

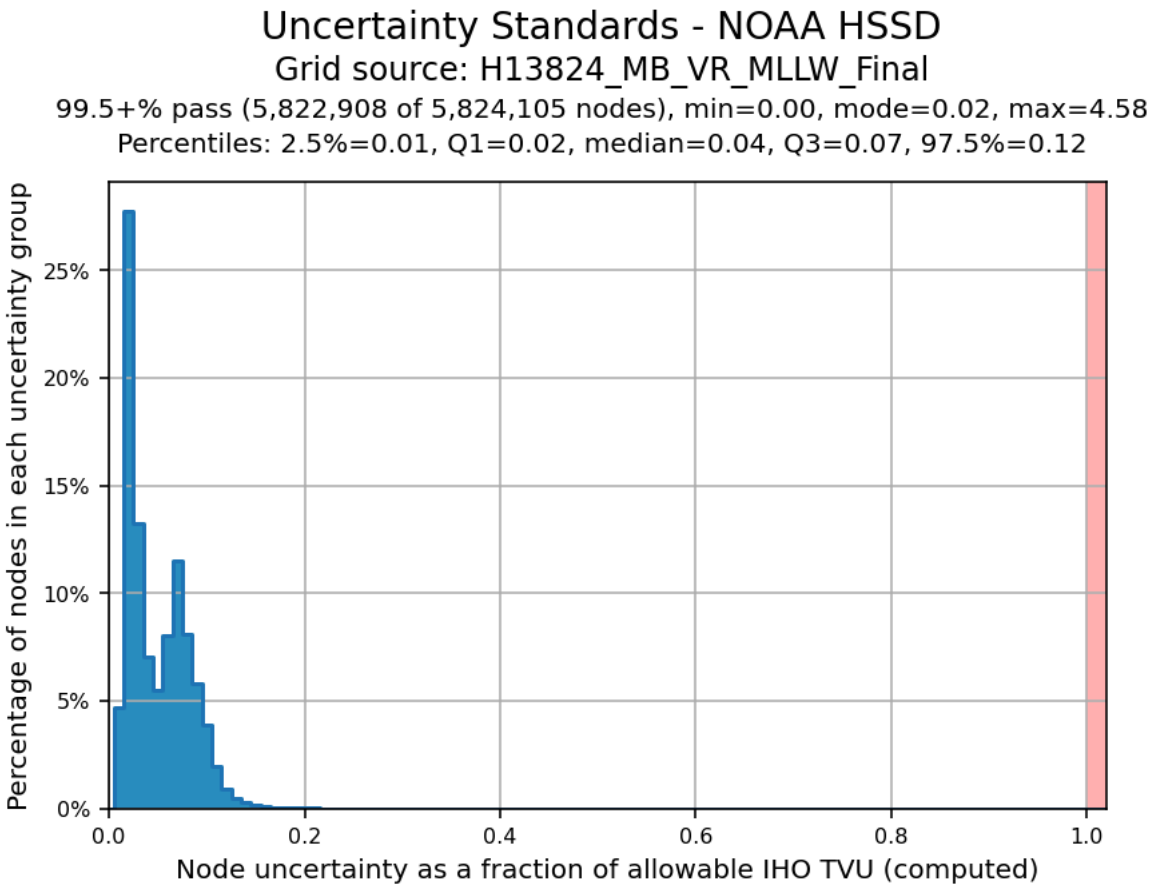



*Figure 9: H13824 allowable uncertainty statistics*

### B.2.11 Density

The surface was analyzed using the HydrOffice QC Tools Grid QA feature to determine compliance with specifications. Density requirements for H13824 were achieved with at least 99.5+% of surface nodes containing five or more soundings as required by HSSD Section 5.2.2.3.

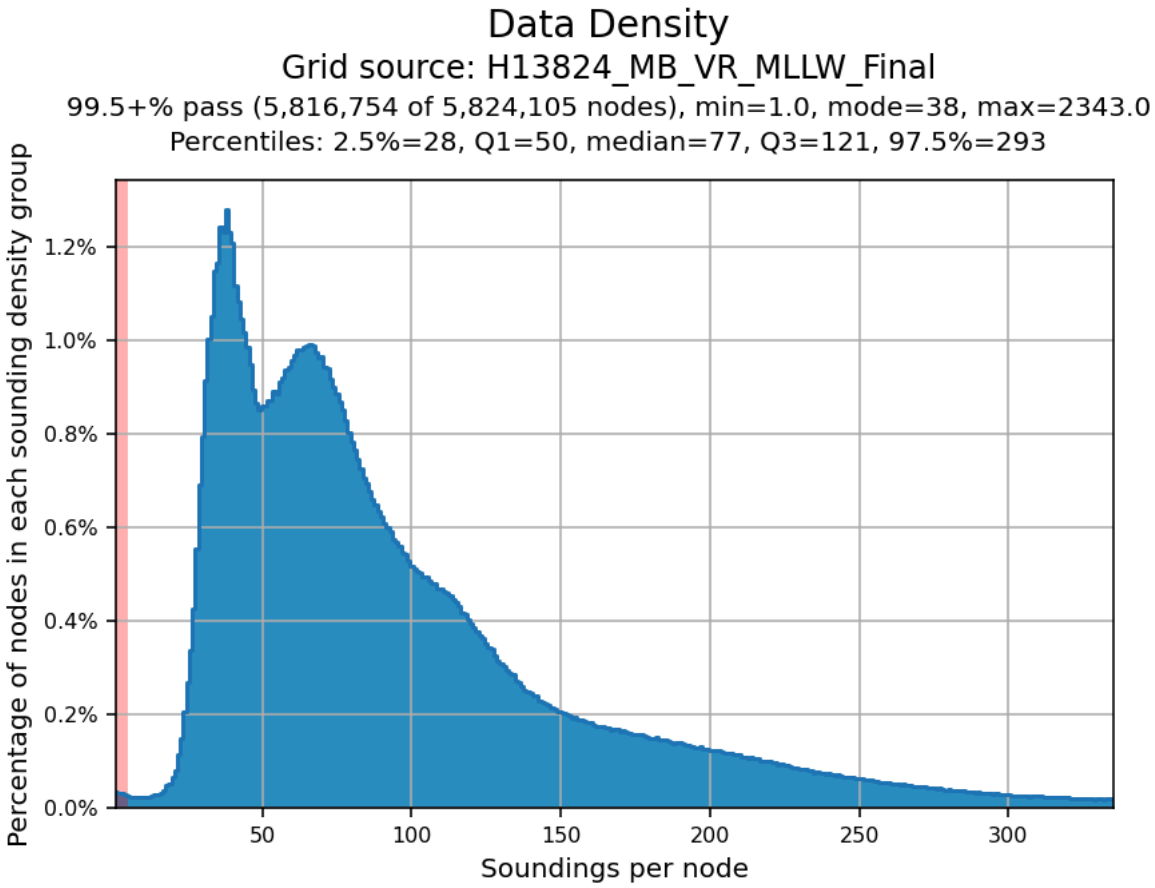



*Figure 10: H13824 data density statistics*

## 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 .kmall and .all files 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. We have four backscatter mosaics created at 2m resolution based on the specifications for a 300kHz system and one backscatter mosaic created at 6m resolution based on the specifications for a 100kHz system. All equipment and survey methods were used as detailed in the DAPR. A relative backscatter calibration was performed by the field unit via a backscatter calibration site in order to bring the survey systems on each of the launches into alignment. See figure below for a table of the calibration values entered into the Processing Settings within FMGT. Approximate inter-calibration corrections for offsets between sonar systems were applied to the mosaic.

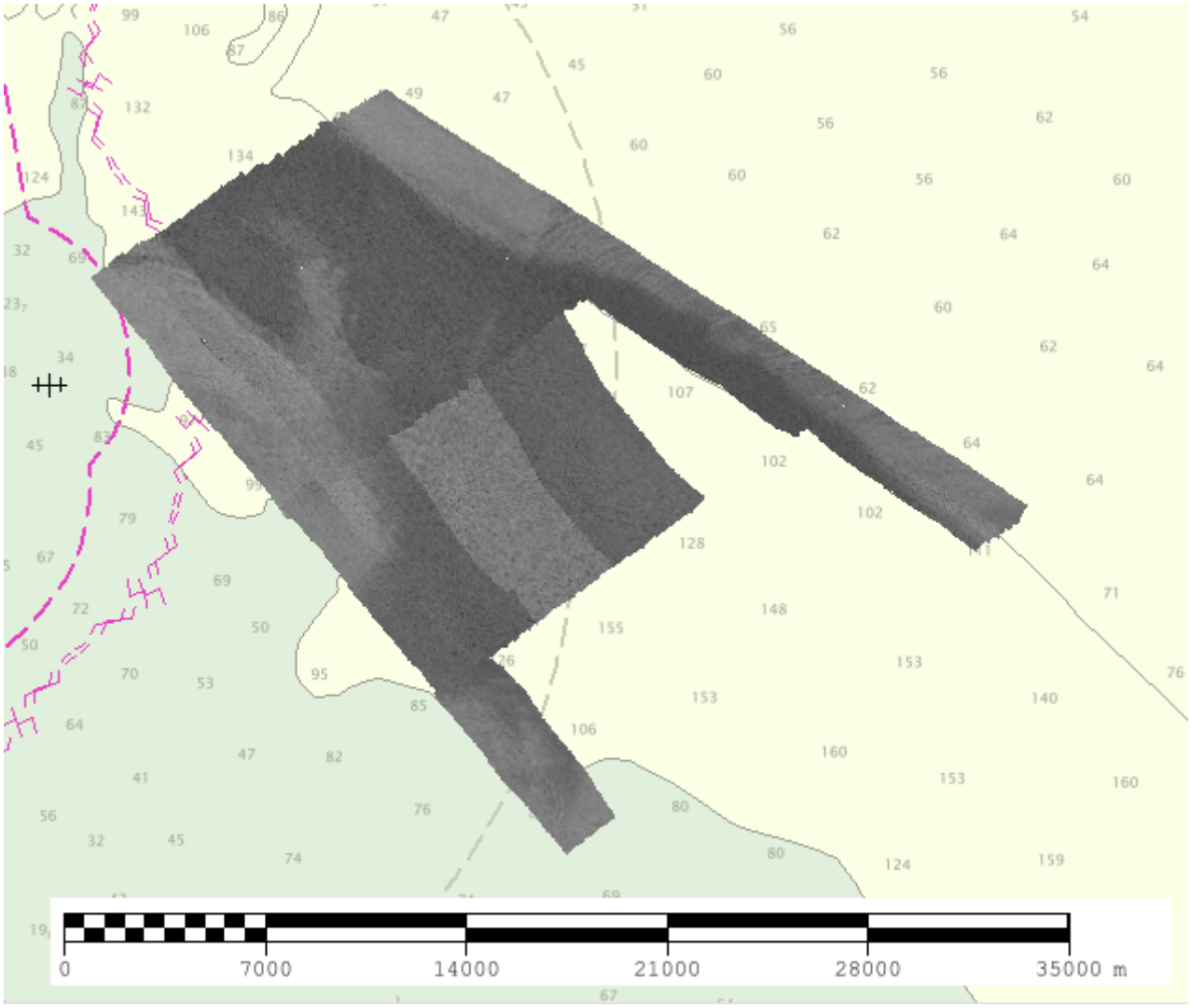



*Figure 11: Backscatter mosaic for all launches and S220 overlaid for H13824.*

## 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 |

*Table 9: Primary bathymetric data processing software*

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

| Manufacturer | Name | Version |
|---|---|---|
| QPS | Fledermaus | 7.10.2 |

*Table 10: Primary imagery 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 |
|---|---|---|---|---|---|
| H13824_MB_VR_MLLW | CARIS VR Surface (CUBE) | | 47.7 meters - 220.0 meters | NOAA_VR | Complete MBES |
| H13824_MB_VR_MLLW_Final | CARIS VR Surface (CUBE) | | 47.7 meters - 220.0 meters | NOAA_VR | Complete MBES |

*Table 11: Submitted Surfaces*

The NOAA CUBE parameters defined in the HSSD were used for the creation of all CUBE surfaces for H13824. 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 75 remaining fliers that have been deemed valid aspects of the surface.

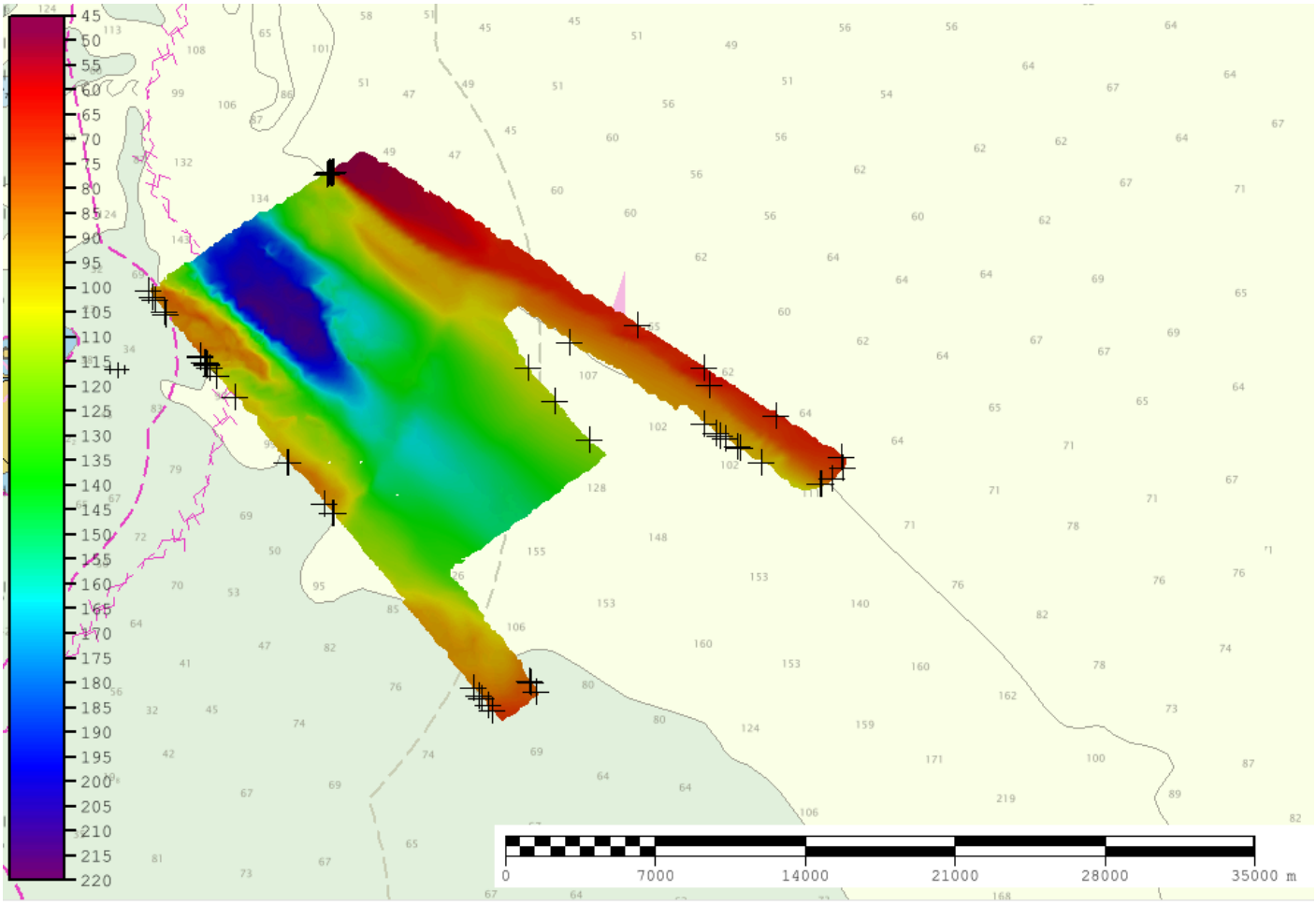



*Figure 12: Remaining 75 flagged targets deemed as valid aspects of the surface*

# 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 | OPR-P377-KR-18_AK_AOI_updated_NAD83_2011-MLLW.csar |

*Table 12: ERS method and SEP file*

ERS methods were used as the final means of reducing H13824 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 5.

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 similar to USCG DGPS stations. WAAS and SBETs were the sole methods of positioning for H13824, as no DGPS stations were available for real-time horizontal control.

# D. Results and Recommendations

## D.1 Chart Comparison

Chart comparison between ENC and soundings from collected data. The soundings from H13824 are generally in agreement with ENC US3AK5KM.

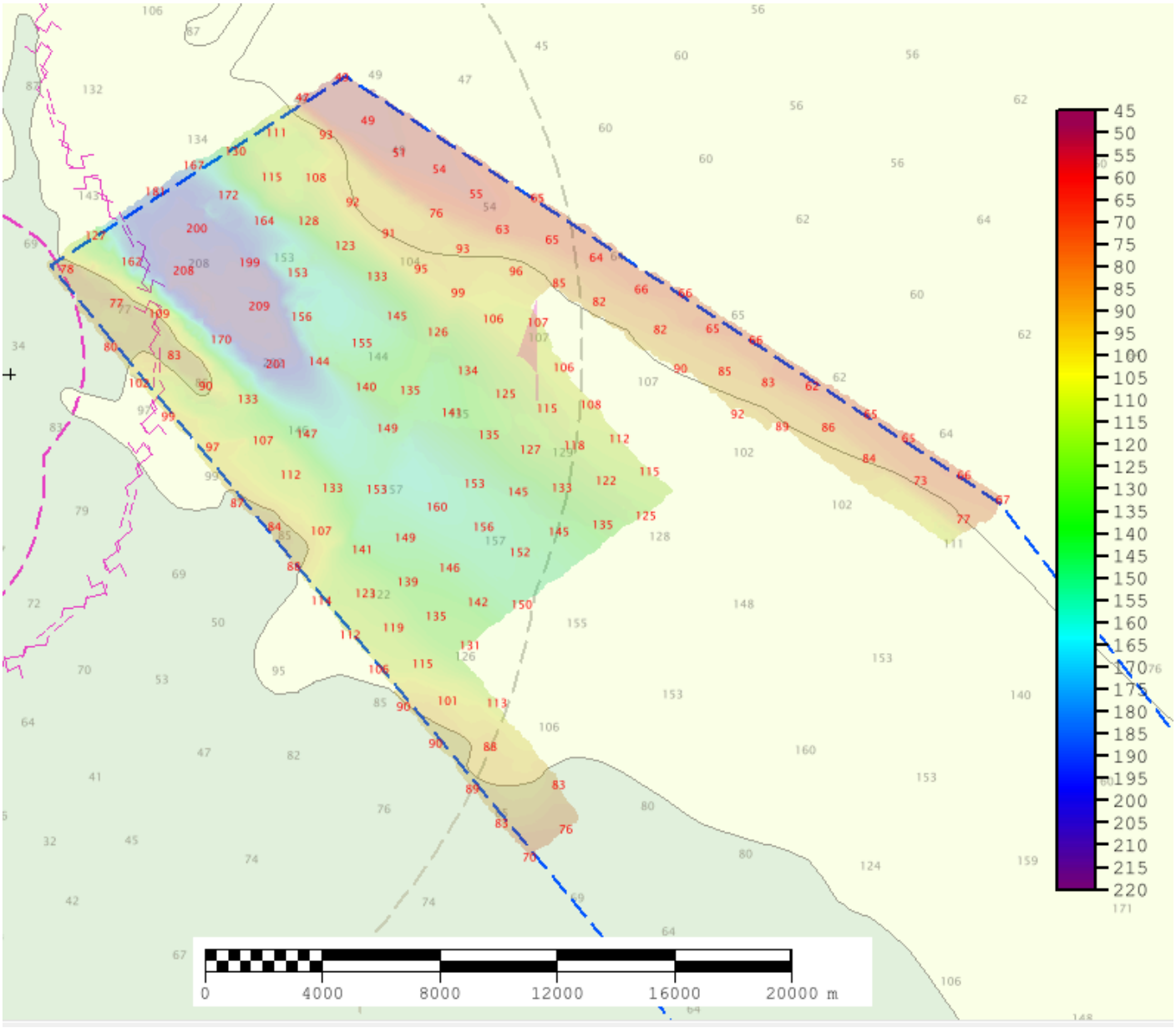



*Figure 13: Survey outline with soundings (in red) overlaid with coverage onto ENC US3AK5KM.*

### 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 |
|---|---|---|---|---|
| US3AK5KM | 1:350000 | 33 | 01/11/2023 | 06/07/2023 |
| US2AK20M | 1:969761 | 14 | 02/07/2023 | 06/07/2023 |

*Table 13: 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

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

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 | Chief of Party | 11/03/2023 | MCGOVERN.MEGHAN.ELIZABETH.1284020495 Digitally signed by MCGOVERN.MEGHAN.ELIZABETH.1284020495 Date: 2023.11.03 06:53:46 -08'00' |
| LT Michael Card | Field Operations Officer | 11/03/2023 | CARD.MICHAEL.DOUGLAS.1011746507 Digitally signed by CARD.MICHAEL.DOUGLAS.1011746507 Date: 2023.11.05 02:55:59 -09'00' |
| HST Benjamin Bryan | Sheet Manager | 11/03/2023 | BRYAN.BENJAMIN.MASON.1619908402 Digitally signed by BRYAN.BENJAMIN.MASON.1619908402 Date: 2023.11.03 06:55:56 -08'00' |
| ENS Robert Sobelsohn | Sheet Manager | 11/03/2023 | SOBELSOHN.ROBERT.W.1607479476 Digitally signed by SOBELSOHN.ROBERT.W.1607479476 Date: 2023.11.03 04:43:36 -08'00' |

# 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 |