

**H13380**

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

**DESCRIPTIVE REPORT**

Type of Survey: Basic Hydrographic Survey

Registry Number: H13380

**LOCALITY**

State(s): Alaska

General Locality: North Side Alaska Peninsula

Sub-locality: Wolf Point

**2020**

CHIEF OF PARTY  
David Neff

LIBRARY & ARCHIVES

Date:

**HYDROGRAPHIC TITLE SHEET**

**H13380**

**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: **North Side Alaska Peninsula**

Sub-Locality: **Wolf Point**

Scale: **40000**

Dates of Survey: **06/20/2020 to 08/12/2020**

Instructions Dated: **05/11/2020**

Project Number: **OPR-R355-KR-20**

Field Unit: **eTrac**

Chief of Party: **David Neff**

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:**

All times are UTC. The purpose of this survey is to update existing NOS nautical charts. H13380 covers approximately 41 square nautical miles in Wolf Point, Alaska.

*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

<b>A. Area Surveyed</b> .....	1
A.1 Survey Limits.....	1
A.2 Survey Purpose.....	3
A.3 Survey Quality.....	3
A.4 Survey Coverage.....	4
A.6 Survey Statistics.....	7
<b>B. Data Acquisition and Processing</b> .....	9
B.1 Equipment and Vessels.....	9
B.1.1 Vessels.....	10
B.1.2 Equipment.....	10
B.2 Quality Control.....	11
B.2.1 Crosslines.....	11
B.2.2 Uncertainty.....	12
B.2.3 Junctions.....	16
B.2.4 Sonar QC Checks.....	18
B.2.5 Equipment Effectiveness.....	18
B.2.6 Factors Affecting Soundings.....	18
B.2.7 Sound Speed Methods.....	18
B.2.8 Coverage Equipment and Methods.....	19
B.2.9 Data Density Evaluation.....	19
B.3 Echo Sounding Corrections.....	21
B.3.1 Corrections to Echo Soundings.....	21
B.3.2 Calibrations.....	21
B.4 Backscatter.....	22
B.5 Data Processing.....	22
B.5.1 Primary Data Processing Software.....	22
B.5.2 Surfaces.....	23
<b>C. Vertical and Horizontal Control</b> .....	25
C.1 Vertical Control.....	26
C.2 Horizontal Control.....	26
<b>D. Results and Recommendations</b> .....	27
D.1 Chart Comparison.....	27
D.1.1 Electronic Navigational Charts.....	29
D.1.2 Shoal and Hazardous Features.....	30
D.1.3 Charted Features.....	30
D.1.4 Uncharted Features.....	30
D.1.5 Channels.....	30
D.2 Additional Results.....	30
D.2.1 Aids to Navigation.....	30
D.2.2 Maritime Boundary Points.....	30
D.2.3 Bottom Samples.....	30
D.2.4 Overhead Features.....	31
D.2.5 Submarine Features.....	31

D.2.6 Platforms.....	31
D.2.7 Ferry Routes and Terminals.....	31
D.2.8 Abnormal Seafloor or Environmental Conditions.....	31
D.2.9 Construction and Dredging.....	32
D.2.10 New Survey Recommendations.....	32
D.2.11 ENC Scale Recommendations.....	32
<b>E. Approval Sheet.....</b>	<b>34</b>
<b>F. Table of Acronyms.....</b>	<b>35</b>

## List of Tables

Table 1: Survey Limits.....	1
Table 2: Survey Coverage.....	4
Table 3: Hydrographic Survey Statistics.....	8
Table 4: Dates of Hydrography.....	9
Table 5: Vessels Used.....	10
Table 6: Major Systems Used.....	10
Table 7: Survey Specific Tide TPU Values.....	12
Table 8: Survey Specific Sound Speed TPU Values.....	12
Table 9: Junctioning Surveys.....	17
Table 10: Submitted Surfaces.....	23
Table 11: ERS method and SEP file.....	26
Table 12: Largest Scale ENCs.....	29

## List of Figures

Figure 1: Survey Limits Overview (light blue area).....	2
Figure 2: Survey Limits (black line).....	3
Figure 3: Survey Coverage.....	5
Figure 4: Survey Coverage with 3.5m and 5m NALL displayed.....	6
Figure 5: 1 Holiday found in H13380.....	7
Figure 6: H13380 Crossline Comparison.....	11
Figure 7: H13380 Finalized 1m Complete Coverage MBES TVU Statistics.....	13
Figure 8: H13380 Finalized 2m Complete Coverage MBES TVU Statistics.....	14
Figure 9: H13378 - H13380 Junction Comparison.....	17
Figure 10: H13378 - H13380 Difference Statistics.....	18
Figure 11: H13380 Finalized 1m Complete Coverage MBES Density Distribution.....	20
Figure 12: H13380 Finalized 2m Complete Coverage MBES Density Distribution.....	21
Figure 13: Raw Backscatter from R/V 505 (DN187).....	22
Figure 14: H13380 Finalized 1m CUBE weighted Dynamic Surface Coverage.....	24
Figure 15: H13380 Finalized 2m CUBE weighted Dynamic Surface Coverage.....	25
Figure 16: Generated Soundings used for Chart Comparison.....	28
Figure 17: Generated Soundings Submitted as Dangers (example 1).....	29
Figure 18: Dynamic Sediment Movement.....	32



## Descriptive Report to Accompany Survey H13380

Project: OPR-R355-KR-20

Locality: North Side Alaska Peninsula

Sublocality: Wolf Point

Scale: 1:40000

June 2020 - August 2020

**eTrac**

Chief of Party: David Neff

### A. Area Surveyed

eTrac conducted hydrographic survey operations in the Wolf Point, Alaska. H13380 covers approximately 32 square nautical miles of survey area. 1,538 linear nautical miles were acquired during the survey. H13380 is located in the Wolf Point, Alaska.

Survey was conducted within these limits between June 20, 2020 (DN172) and August 12, 2020 (DN225).

#### A.1 Survey Limits

Data were acquired within the following survey limits:

Northwest Limit	Southeast Limit
56° 6' 41.76" N 160° 52' 1.47" W	56° 0' 47.8" N 160° 33' 57.37" W

*Table 1: Survey Limits*

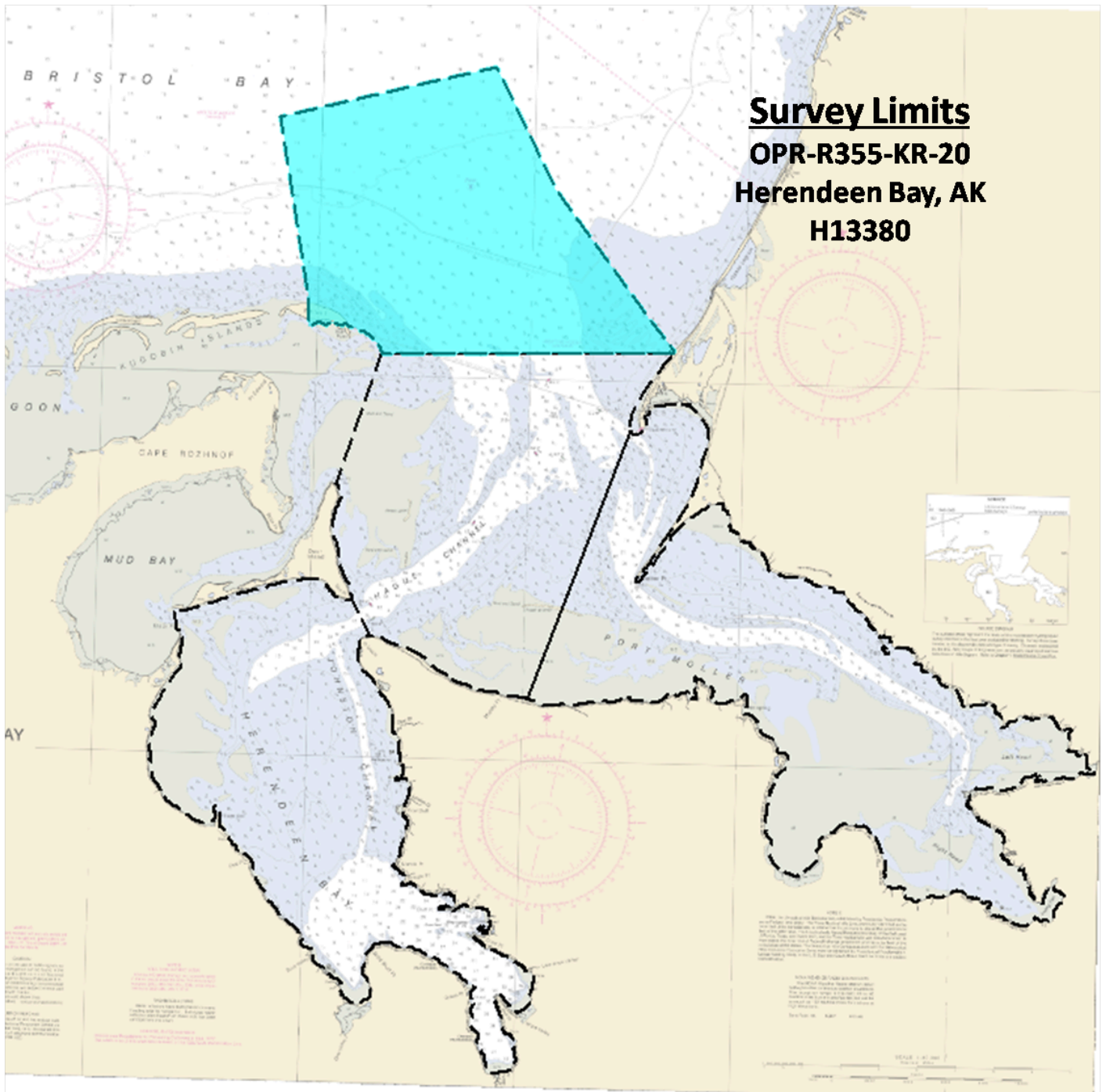
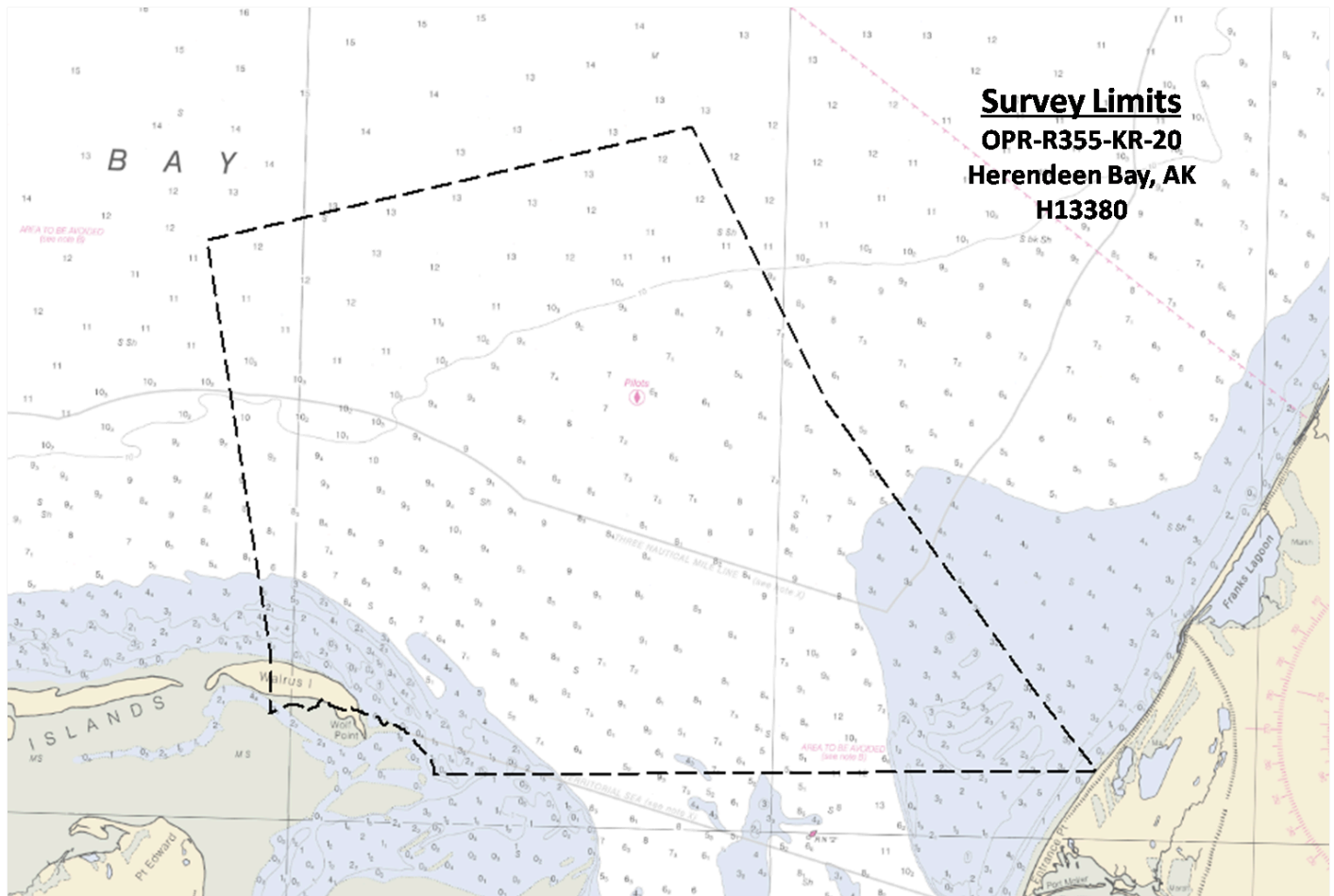


Figure 1: Survey Limits Overview (light blue area)



*Figure 2: Survey Limits (black line)*

All data were acquired in accordance with the requirements in the Project Instructions and specifications set forth in the Hydrographic Survey Specifications and Deliverables 2020 Edition (HSSD 2020).

## **A.2 Survey Purpose**

The purpose of this survey is to update existing National Ocean Service (NOS) nautical charts.

## **A.3 Survey Quality**

The entire survey is adequate to supersede previous data.

Survey H13380 is accurate to International Hydrographic Organization (IHO) Order 1a as required per the HSSD 2020.



## 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 5795 LNM. Transit mileage, system calibration mileage and data which do not meet HSSD specifications shall not count towards the completion of the LNM requirement. Notify the COR/ Project Manager upon nearing completion of LNM requirement. The final survey area shall be squared off and ensure the full investigation of any features within the surveyed extent.
Sheet 1 through Sheet 4 greater than 5 meters water depth	Complete Coverage
Sheet 1 through Sheet 4 shoaler than 5 meters water depth	Set Line Spacing MBES at 400-meter, perpendicular to contours. Complete Coverage on all features.

*Table 2: Survey Coverage*

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

Note: Survey coverage did not extend to the entire assigned survey boundary as the Navigable Area Limit Line (NALL) was reached. In some instances the NALL was not 100% met due to safety.

Note: 1 holiday was found in H13380 after eTrac left the field.

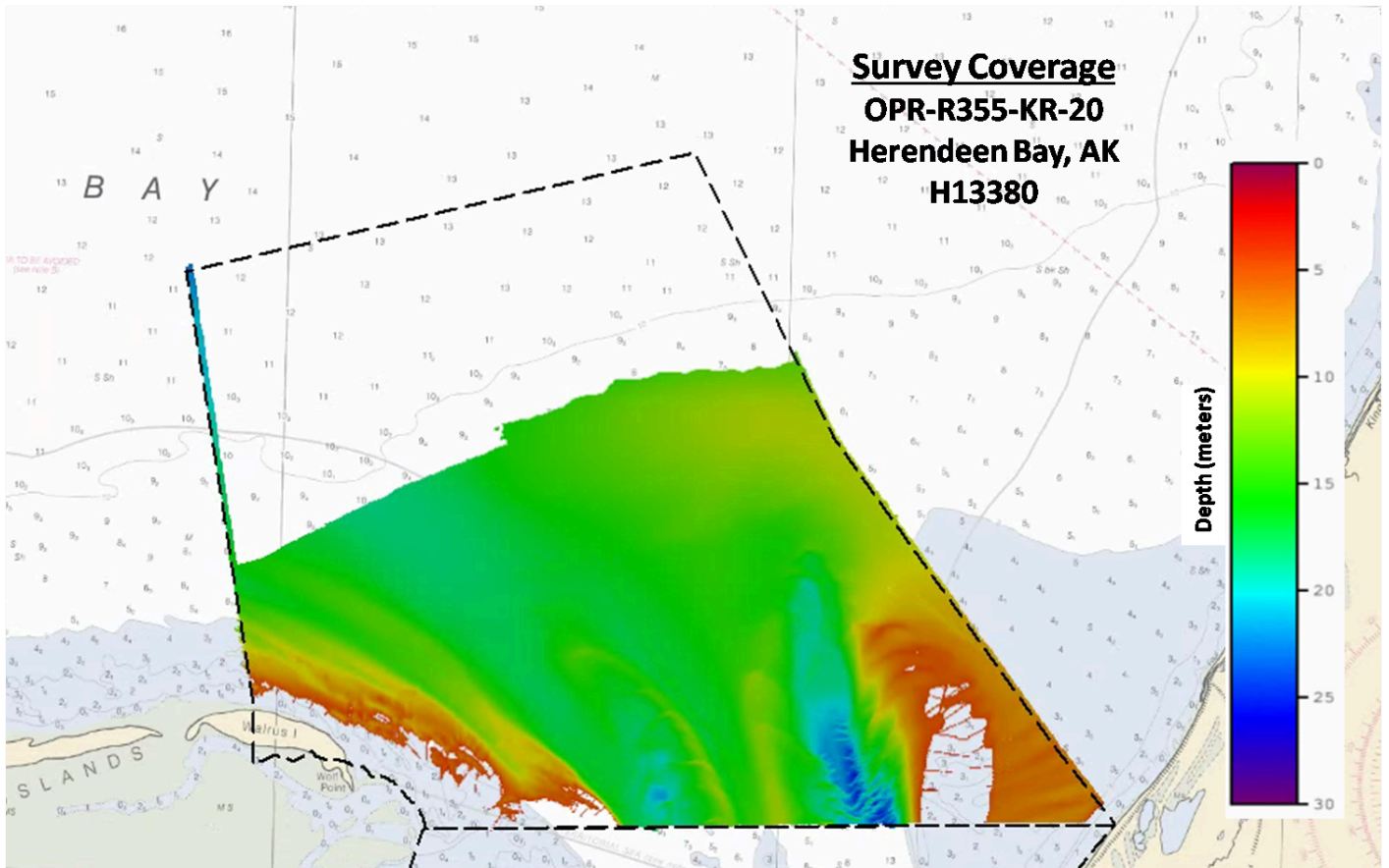
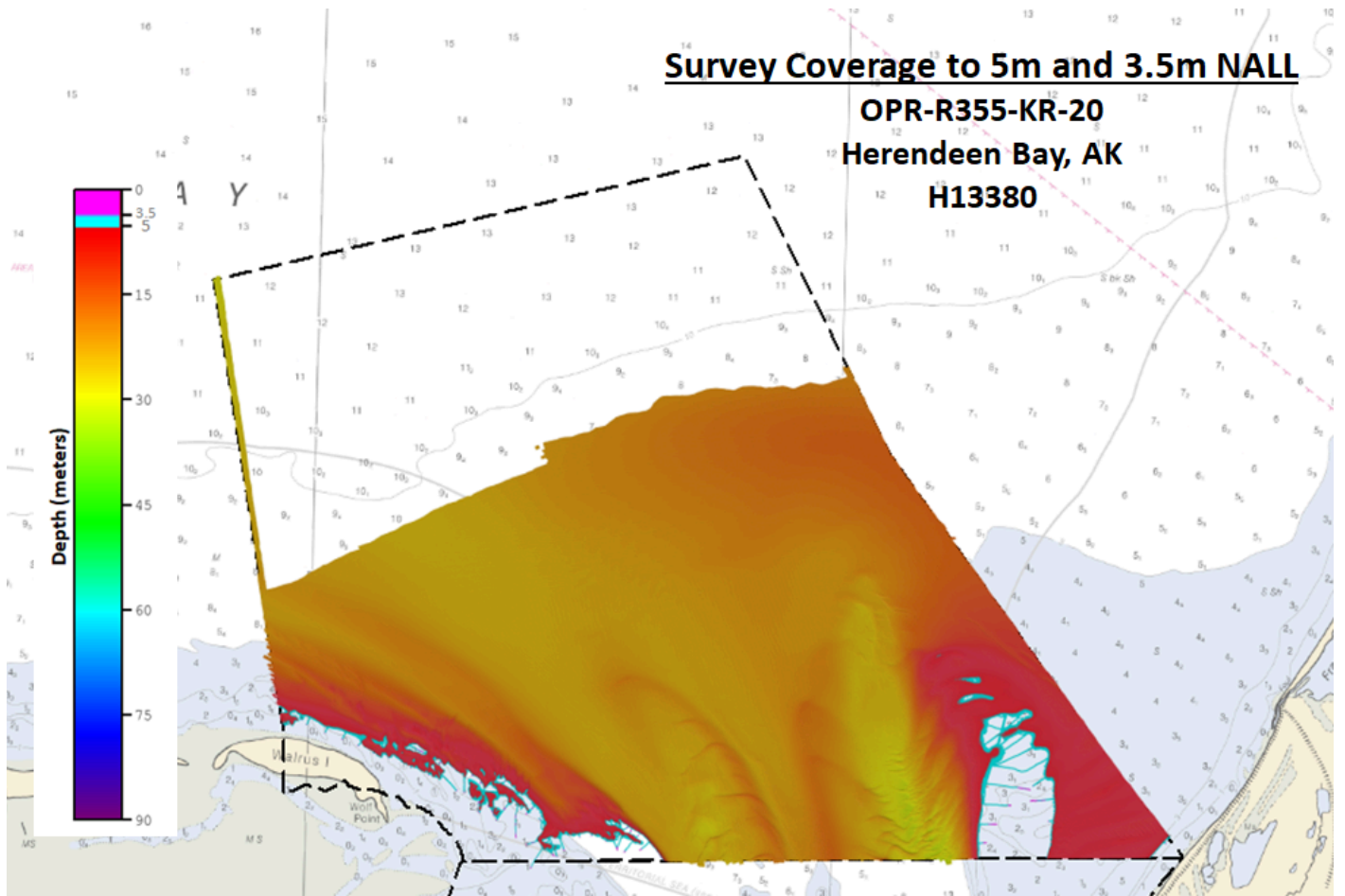


Figure 3: Survey Coverage



*Figure 4: Survey Coverage with 3.5m and 5m NALL displayed*

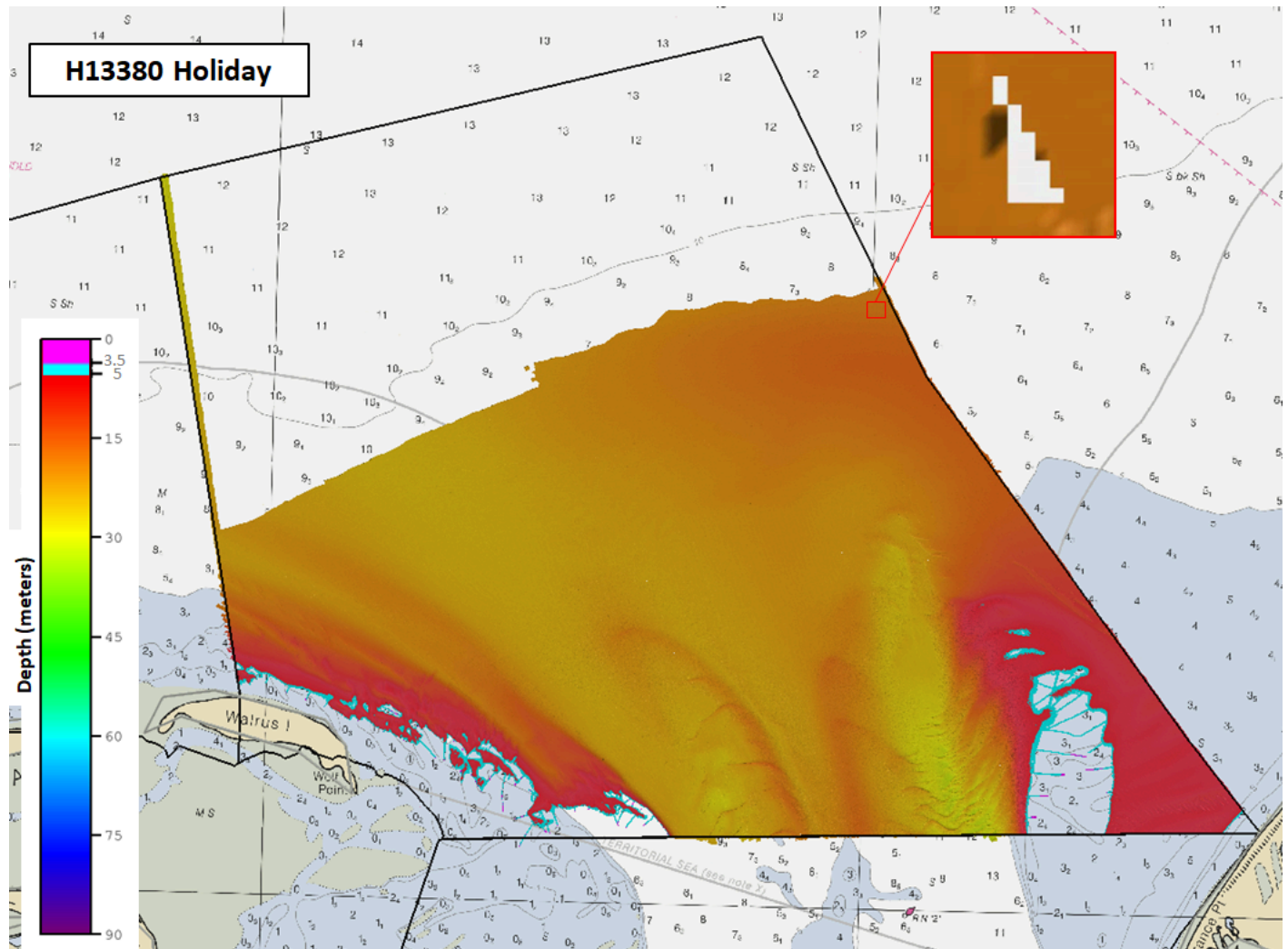


Figure 5: 1 Holiday found in H13380

## A.6 Survey Statistics

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

	<b>HULL ID</b>	<i>R/V 505</i>	<i>R/V Rapid</i>	<i>R/V Spectrum</i>	<i>Total</i>
<b>LNM</b>	<b>SBES Mainscheme</b>	0	0	0	0
	<b>MBES Mainscheme</b>	635.35	550.41	328.89	1464.65
	<b>Lidar Mainscheme</b>	0	0	0	0
	<b>SSS Mainscheme</b>	0	0	0	0
	<b>SBES/SSS Mainscheme</b>	0	0	0	0
	<b>MBES/SSS Mainscheme</b>	0	0	0	0
	<b>SBES/MBES Crosslines</b>	49.22	14.65	9.35	73.22
	<b>Lidar Crosslines</b>	0	0	0	0
<b>Number of Bottom Samples</b>					5
<b>Number Maritime Boundary Points Investigated</b>					0
<b>Number of DPs</b>					0
<b>Number of Items Investigated by Dive Ops</b>					0
<b>Total SNM</b>					41

*Table 3: Hydrographic Survey Statistics*

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

<b>Survey Dates</b>	<b>Day of the Year</b>
06/20/2020	172

<b>Survey Dates</b>	<b>Day of the Year</b>
06/22/2020	174
06/23/2020	175
06/24/2020	176
06/25/2020	177
07/03/2020	185
07/05/2020	187
07/12/2020	194
07/13/2020	195
07/14/2020	196
07/15/2020	197
07/16/2020	198
07/17/2020	199
07/18/2020	200
07/19/2020	201
07/20/2020	202
07/27/2020	209
07/28/2020	210
08/01/2020	214
08/02/2020	215
08/03/2020	216
08/04/2020	217
08/08/2020	221
08/12/2020	225

*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:

<b>Hull ID</b>	<b><i>R/V 505</i></b>	<b><i>R/V Rapid</i></b>	<b><i>R/V Spectrum</i></b>
<b>LOA</b>	10 meters	8.5 meters	6.7 meters
<b>Draft</b>	0.6 meters	0.6 meters	0.6 meters

*Table 5: Vessels Used*

The R/V 505 is a 10 meter aluminum catamaran equipped with a Universal Sonar Mount (USM) starboard multibeam pole mount.

The R/V Rapid is a 8.5 meter aluminum monohull equipped with both a Universal Sonar Mount (USM) starboard and port multibeam pole mount.

The R/V Spectrum is a 6.7 meter aluminum monohull equipped with a Universal Sonar Mount (USM) starboard multibeam pole mount.

### B.1.2 Equipment

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

<b>Manufacturer</b>	<b>Model</b>	<b>Type</b>
R2Sonic	2022	MBES
R2Sonic	2024	MBES
AML Oceanographic	BaseX2	Sound Speed System
AML Oceanographic	MicroX SV	Sound Speed System
AML Oceanographic	SmartX	Sound Speed System
R2Sonic	I2NS	Positioning and Attitude System

*Table 6: Major Systems Used*

Note: R/V 505 utilized a dualhead R2Sonic 2022 multibeam echosounder system, an AML Base.X2 for the sound speed system, an AML Micro.X for the surface sound speed system, an AML Smart.X as a spare for the sound speed system, and a R2Sonic I2NS for the positioning system. R/V Rapid utilized a dualhead R2Sonic 2024 multibeam echosounder system, an AML Base.X2 for the sound speed system, an AML Micro.X for the surface sound speed system, an AML Smart.X as a spare for the sound speed system, and a R2Sonic I2NS for the positioning system. R/V Spectrum utilized a R2Sonic 2024 multibeam echosounder

system, an AML Base.X2 for the sound speed system, an AML Micro.X for the surface sound speed system, and a R2Sonic I2NS for the positioning system.

## B.2 Quality Control

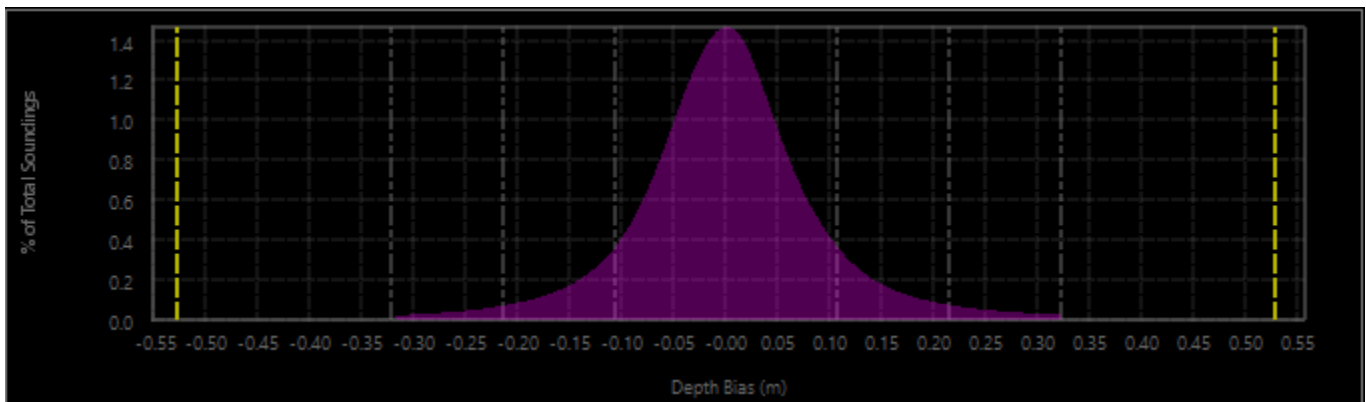
### B.2.1 Crosslines

A beam-to-beam statistical analysis was performed using the Cross Check tool in Qimera. A 1 meter Combined Uncertainty and Bathymetric Estimator (CUBE) weighted dynamic surface was created incorporating only the mainscheme lines and excluded crosslines. The Cross Check tool was used to perform the beam-by-beam comparison of the crossline data to the mainscheme surface. Comparisons showed excellent agreement, well above 95% of the allowable TVU.

Note: This surface was created for QC only and is not submitted as a surface deliverable.

The beam-to-beam crossline comparison report generated through the Qimera Cross Check tool is included in Separates II.

Below is a histogram of the crossline comparison statistics showing IHO Order 1a compliance per beam.



*Figure 6: H13380 Crossline Comparison*



### B.2.2 Uncertainty

The following survey specific parameters were used for this survey:

Method	Measured	Zoning
ERS via ERTDM	0.22 meters	N/A

*Table 7: Survey Specific Tide TPU Values.*

Hull ID	Measured - CTD	Measured - MVP	Measured - XBT	Surface
R/V 505	0.05 meters/second	N/A	N/A	0.2 meters/second
R/V Rapid	0.05 meters/second	N/A	N/A	0.2 meters/second
R/V Spectrum	0.05 meters/second	N/A	N/A	0.2 meters/second

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

Standard deviation and uncertainty layers of the Dynamic Surface were utilized during data processing to search for features, water column noise, and systematic errors.

IHO Order 1a uncertainty specification was met by 100% of the nodes.

The final Bathymetric Attributed Grid (BAG) surface's uncertainty was generated through the NOAA QC Tools and an image of the results is located below.

For H13380 the following percentages represent the results of the TPU calculation:

Complete Coverage MBES (Finalized 1m CUBE weighted Dynamic Surface in NOAA QC Tools) = 99.5+% of nodes are within the allowable TVU.

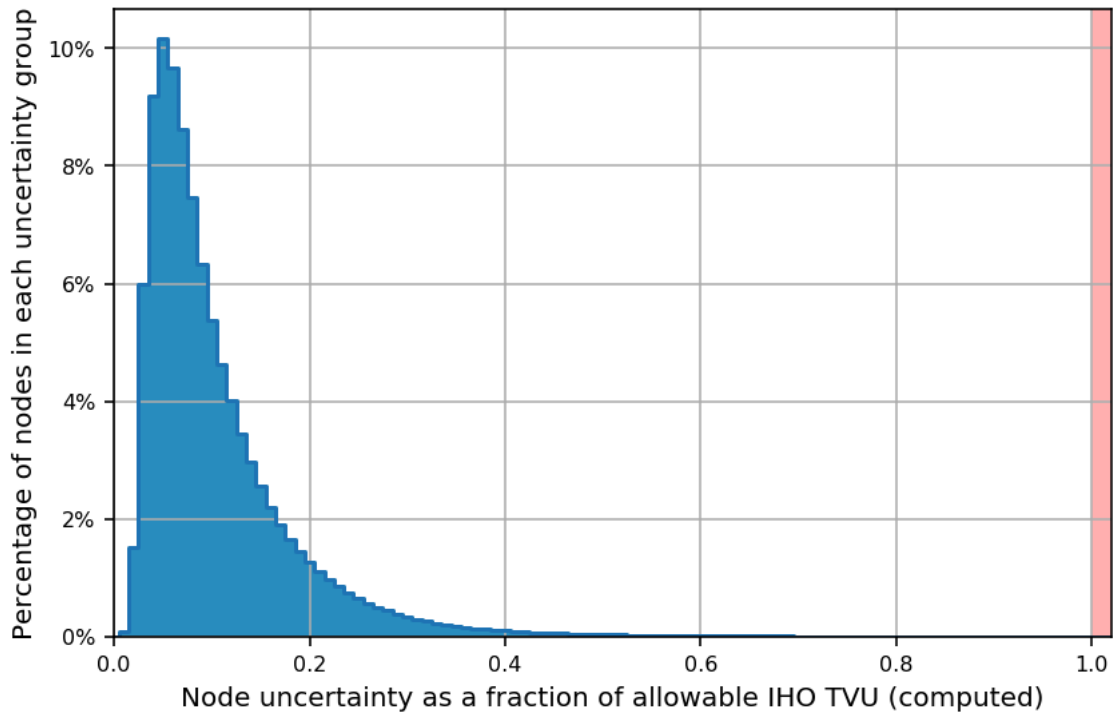
Complete Coverage MBES (Finalized 2m CUBE weighted Dynamic Surface in NOAA QC Tools) = 99.5+% of nodes are within the allowable TVU.

### Uncertainty Standards - NOAA HSSD

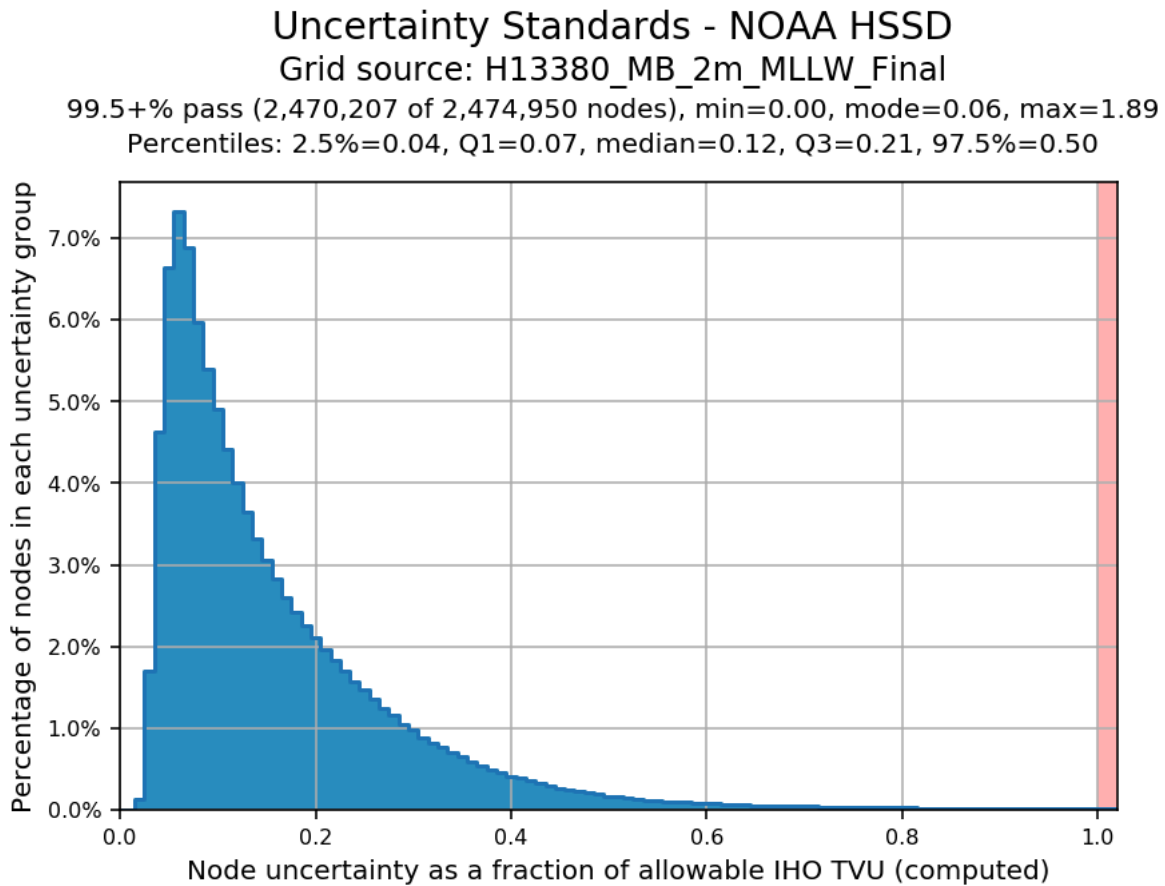
Grid source: H13380\_MB\_1m\_MLLW\_Final

99.5+% pass (104,475,394 of 104,492,779 nodes), min=0.00, mode=0.05, max=3.42

Percentiles: 2.5%=0.03, Q1=0.05, median=0.08, Q3=0.13, 97.5%=0.32



*Figure 7: H13380 Finalized 1m Complete Coverage MBES TVU Statistics*



*Figure 8: H13380 Finalized 2m Complete Coverage MBES TVU Statistics*

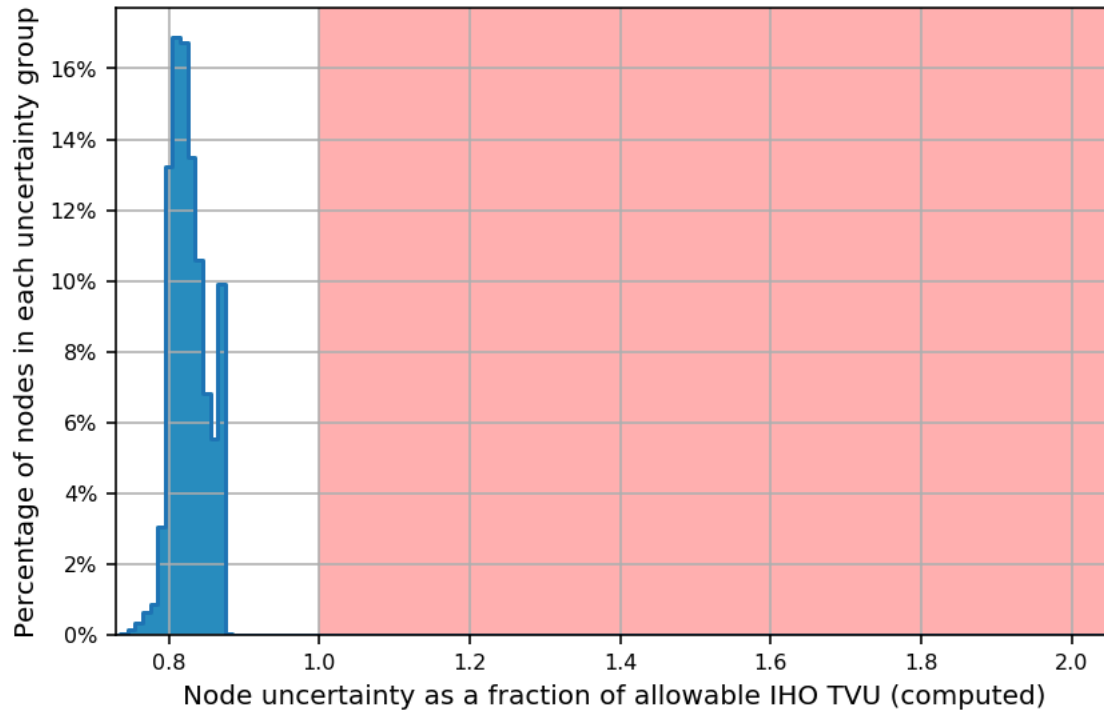
*After office processing, the final grids are both 1m resolution. The 2of2 grid is composed solely of set spacing MBES coverage. The 1of2 TVU has a 98% pass rate and 2of2 has a 90% pass rate, not 99.5+% as shown in the DR figures. The hydrographer's analysis for overall TVU is still valid, as they were submitting grids that conform to their Project Instructions.*

## Uncertainty Standards - NOAA HSSD

Grid source: H13380\_MB\_1m\_MLLW\_Final\_1of2

98% pass (104,126,354 of 105,856,670 nodes), min=0.73, mode=0.81, max=4.01

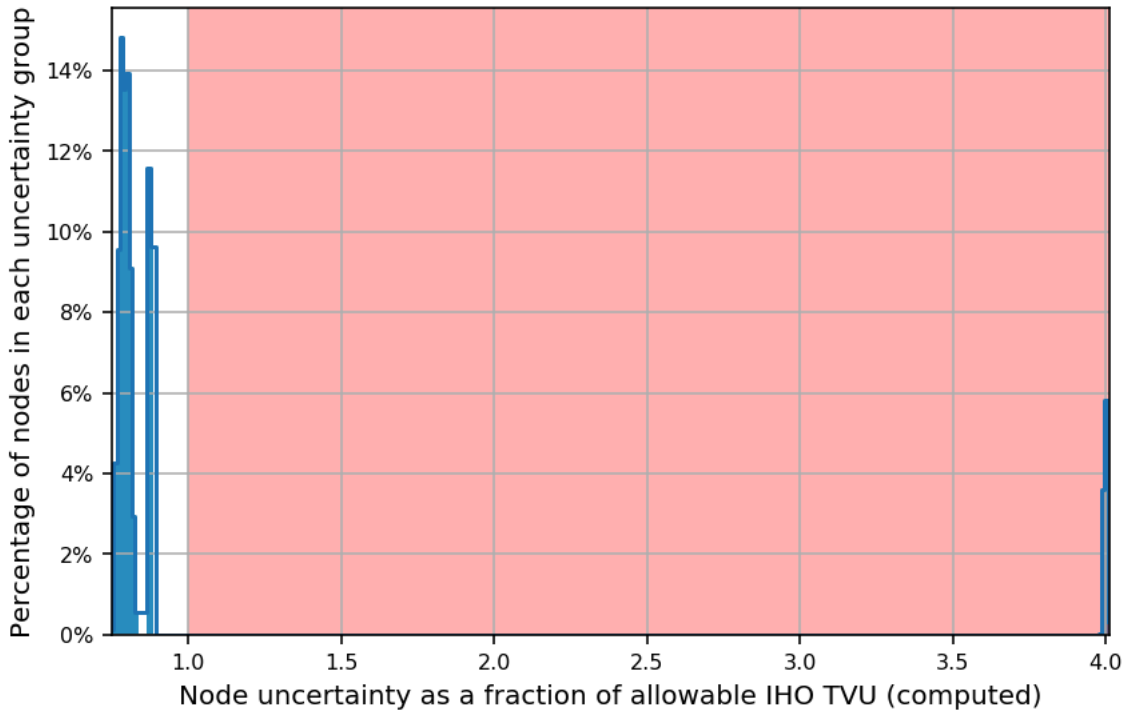
Percentiles: 2.5%=0.79, Q1=0.81, median=0.82, Q3=0.84, 97.5%=0.87



*TVU analysis for grid 1of2, continuous coverage*

### Uncertainty Standards - NOAA HSSD Grid source: H13380\_MB\_1m\_MLLW\_Final\_2of2

90% pass (1,033,328 of 1,147,556 nodes), min=0.75, mode=0.78, max=4.01  
Percentiles: 2.5%=0.76, Q1=0.78, median=0.80, Q3=0.87, 97.5%=4.00



*TVU analysis for grid 2of2, set line spacing*

### B.2.3 Junctions

Depth differences between junctioning surveys were evaluated using the JunctionTrac program, developed in-house by eTrac. For each junction, each CUBE weighted dynamic surface's nodes were exported to an ASCII CSV file where the fields were (Easting, Northing, Depth) for each node. A 1 meter difference surface between the junctioning datasets was also created and exported to an ASCII CSV file where the fields were (Easting, Northing, Diff) for each node. The three ASCII CSV files were then loaded into the JunctionTrac program and junction statistics were computed. A file was also created in this process to locate any nodes from the difference surface that exceed the allowable TVU, which was imported into Qimera and any identified points from JunctionTrac were analyzed. Note: the difference surfaces were created for comparison efforts only and are not submitted as surface deliverables.

The following junctions were made with this survey:

Registry Number	Scale	Year	Field Unit	Relative Location
H13378	1:40000	2020	eTrac	S

Table 9: Junctioning Surveys

H13378

The junction comparison was performed using all overlapping data between H13378 and H13380. Below is a histogram of junction comparison statistics showing the difference between the junctioning surfaces and allowable TVU as well as difference statistics. 98.651% of nodes were within allowable TVU.

Note: Spikes above allowable TVU were caused by sandwave movement.

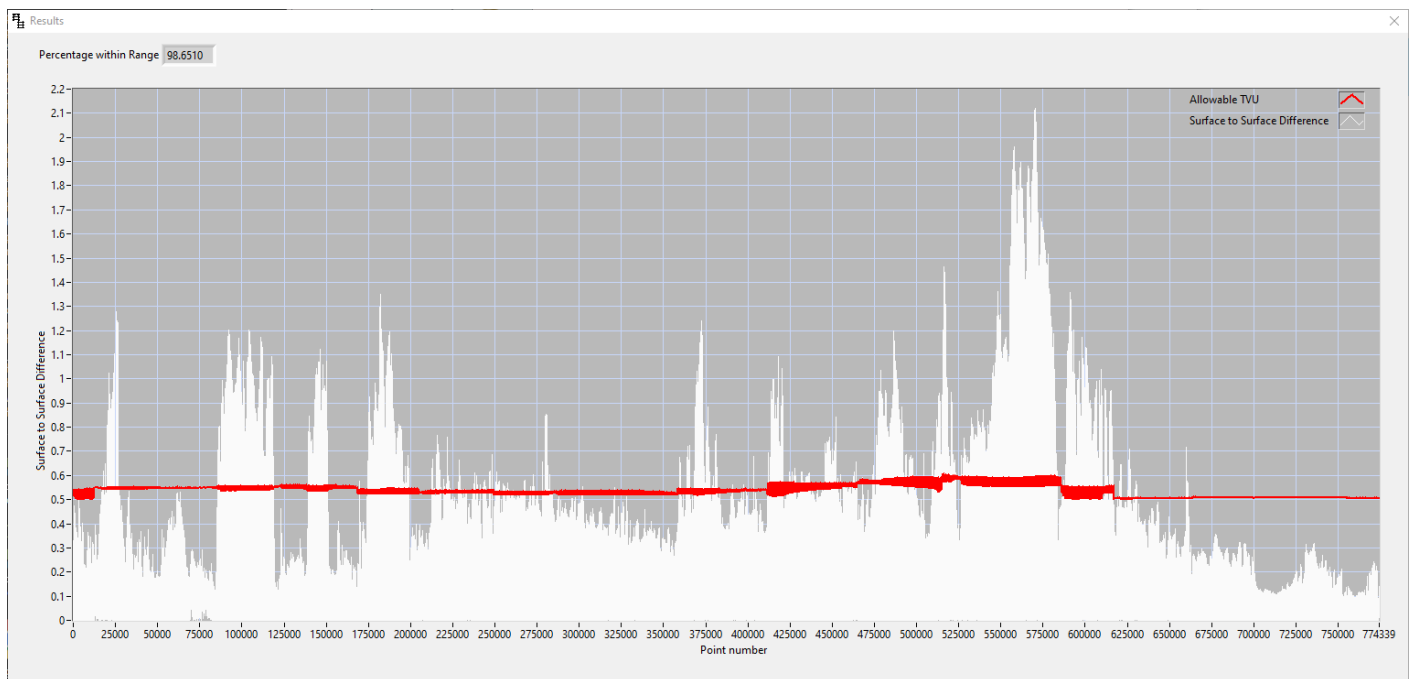


Figure 9: H13378 - H13380 Junction Comparison

<b>Criteria</b>	<b>Number of Nodes</b>	<b>Resulting %</b>
DIFF < 10cm	476318	61.51%
10cm < DIFF < 20cm	179847	23.23%
20cm < DIFF < 30cm	69679	9.00%
DIFF > 30cm	48496	6.26%
<b>Total</b>	<b>774340</b>	<b>100.00%</b>

*Figure 10: H13378 - H13380 Difference Statistics*

#### **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: SVP casts were generally taken every 2 hours. Occasionally casts would exceed a 2 hour frequency, however would never exceed a 4 hour frequency.

On R/V 505, R/V Rapid, and R/V Spectrum casts were applied in QPS Qinsy acquisition software at the time of the cast. Surface SVP measured at 1Hz was compared to surface speed from the current profile in realtime. If the surface velocity comparison was in excess of 2m/s at any time during survey operations, a new cast was taken.

Surface sound speeds were compared in realtime and profile to profile for each cast on the vessel. Additionally, the processor reviewed profiles in Qimera to remove spurious readings within a cast, compare day-to-day casts, and to check distribution over the surveyed area, in order to better understand trends for efficient acquisition planning.

### **B.2.8 Coverage Equipment and Methods**

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

### **B.2.9 Data Density Evaluation**

In order to determine if the density of the data met the specified 5 soundings per node, data density was evaluated using DensityTrac in the AmiTrac program, developed in-house by eTrac. Each finalized CUBE weighted dynamic surface's nodes were exported to a BBH file. The BBH file was then loaded into the DensityTrac program and density statistics were computed.

For H13380 the following percentages represent the results of the density query:

Complete Coverage MBES (Finalized 1m CUBE weighted Dynamic Surface ) = 99.92% of nodes are composed from at least 5 soundings.

Complete Coverage MBES (Finalized 2m CUBE weighted Dynamic Surface ) = 99.95% of nodes are composed from at least 5 soundings.



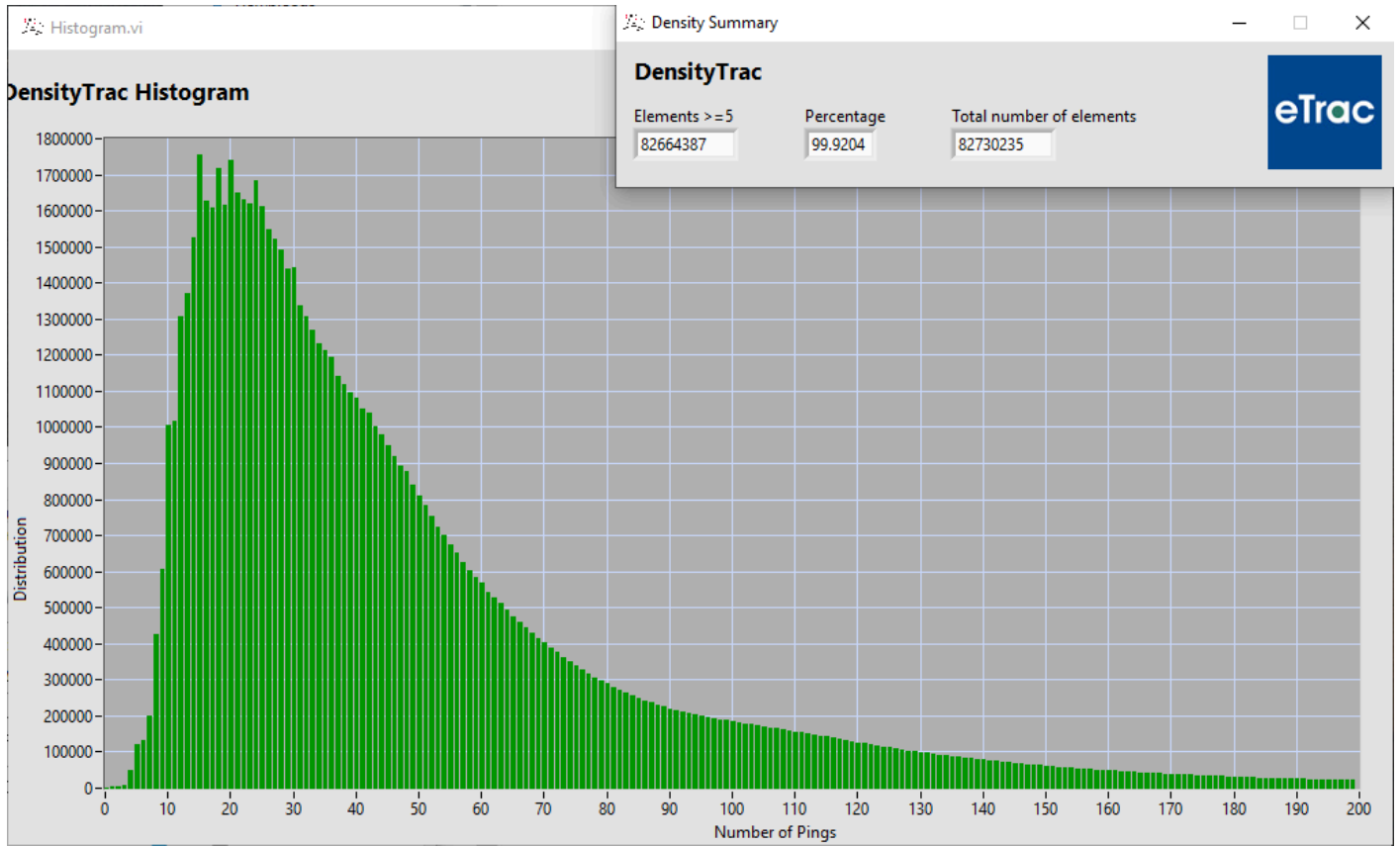


Figure 11: H13380 Finalized 1m Complete Coverage MBES Density Distribution

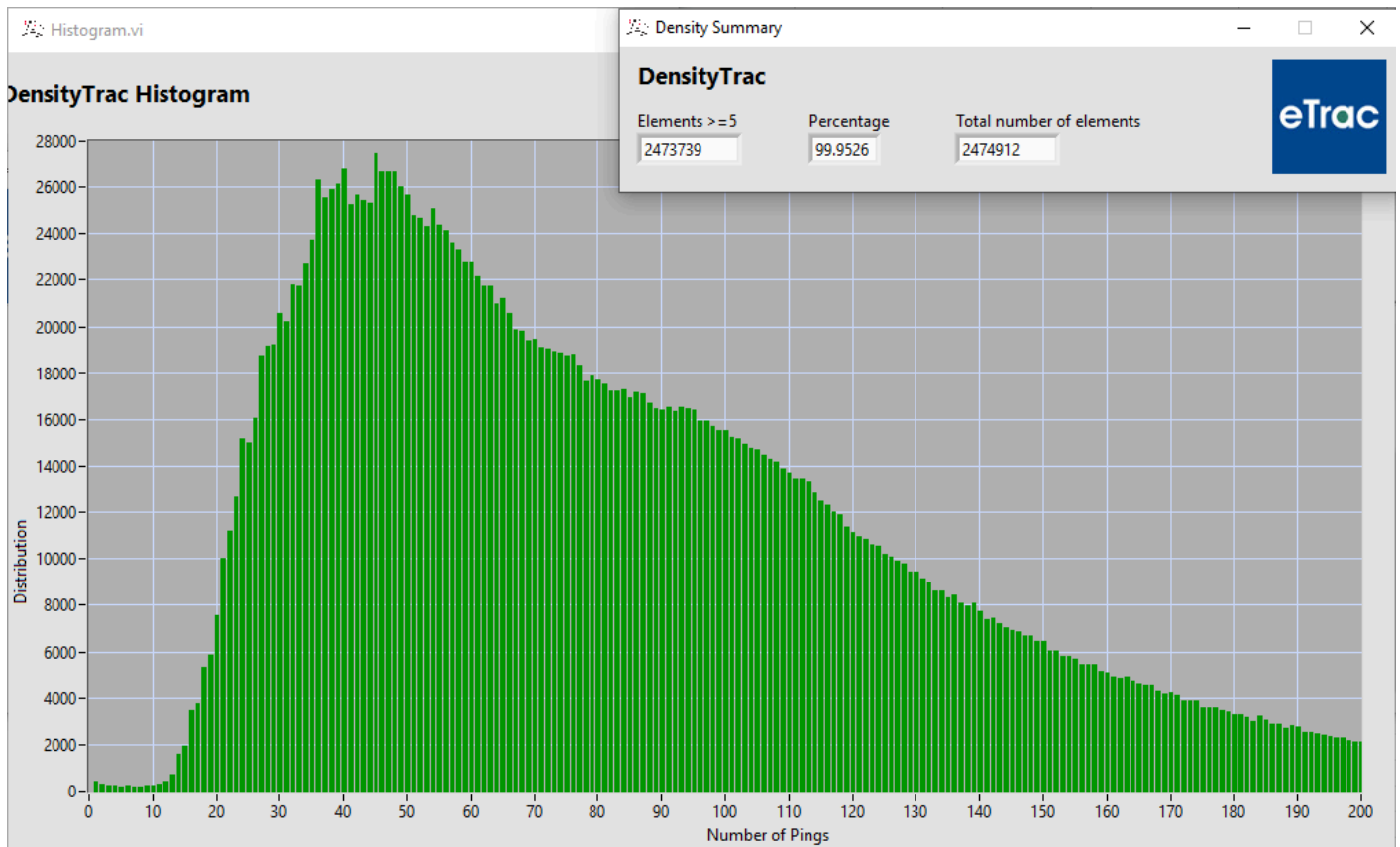


Figure 12: H13380 Finalized 2m Complete Coverage MBES Density Distribution

*After office processing, the final grids are both 1m resolution, and the 2of2 grid is composed solely of set spacing MBES coverage. The density statistics for grids 1of2 and 2of2 still agree with what is reported in the DR.*

## B.3 Echo Sounding Corrections

### B.3.1 Corrections to Echo Soundings

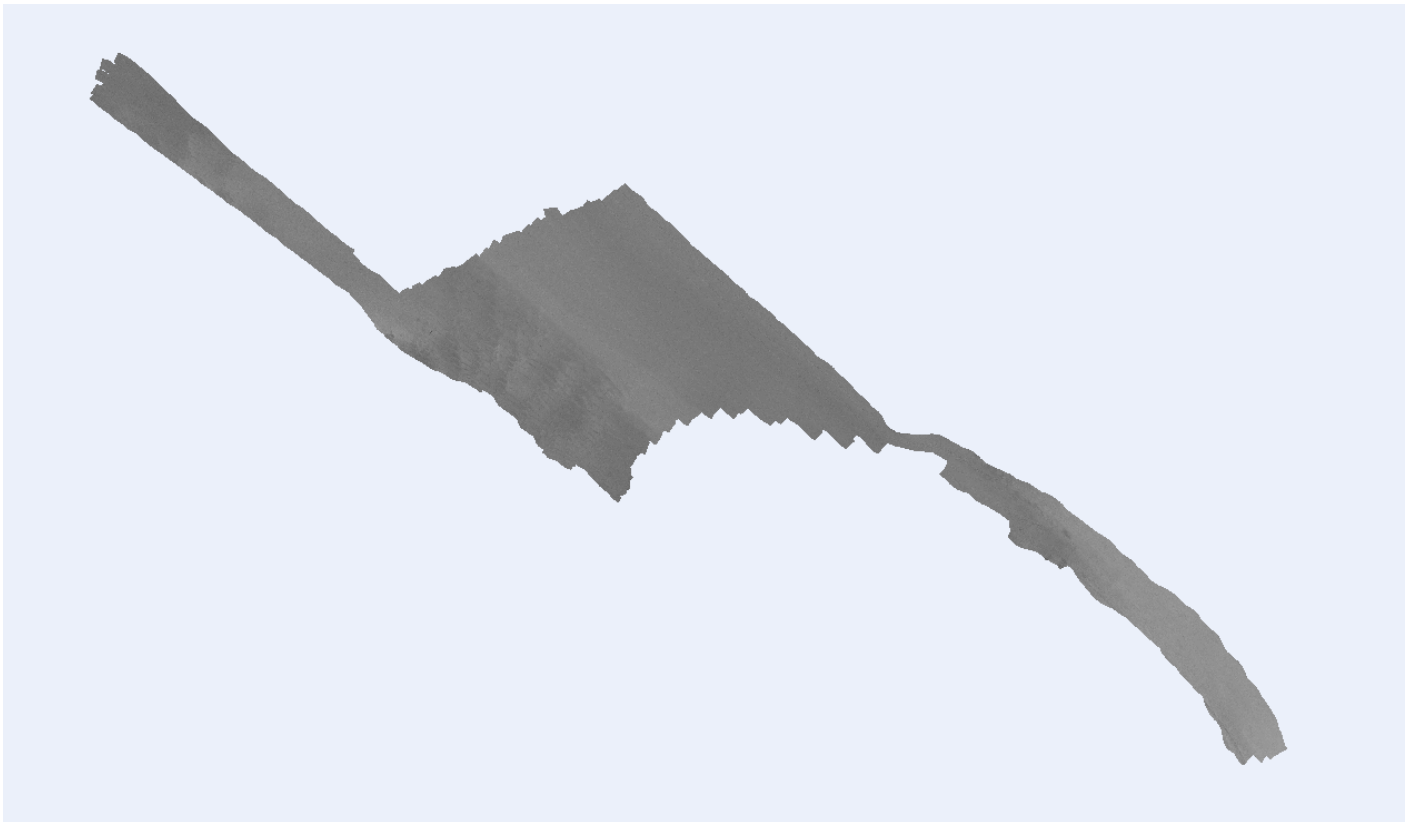
All data reduction procedures conform to those detailed in the DAPR.

### B.3.2 Calibrations

All sounding systems were calibrated as detailed in the DAPR.

## B.4 Backscatter

Backscatter data were collected throughout the survey and are retained in the raw ALL and DB files. Every effort was made in the field to collect quality backscatter data while maintaining the primary mandate of high quality bathymetric data. While no processing or analysis of backscatter was required, eTrac verified coverage and general quality of the backscatter data collected. A beam intensity window was monitored in Qinsy during acquisition to ensure backscatter data collection. Raw backscatter data were viewed in QPS FMGeocoder to further confirm collection criteria had been met. Shown below is an example of the unprocessed backscatter mosaic from H13380 DN187 (R/V 505).



*Figure 13: Raw Backscatter from R/V 505 (DN187)*

## B.5 Data Processing

### B.5.1 Primary Data Processing Software

The following Feature Object Catalog was used: **NOAA Profile Version 2020**

Feature Object Catalog, NOAA Profile Version 2020 was used only in CARIS. Qimera was used as the primary processing software, which included feature management.

### 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
H13380_MB_1m_MLLW_Final	BAG	1 meters	1.75 meters - 20 meters	NOAA_1m	Complete MBES
H13380_MB_2m_MLLW_Final	BAG	2 meters	18 meters - 26.33 meters	NOAA_2m	Complete MBES

*Table 10: Submitted Surfaces*

A 1m and 2m surface are provided meeting complete coverage MBES with backscatter specifications for H13380.

A parent surface of the 1m surface is also provided in the Surfaces\_Mosaics Folder in this delivery drive package.

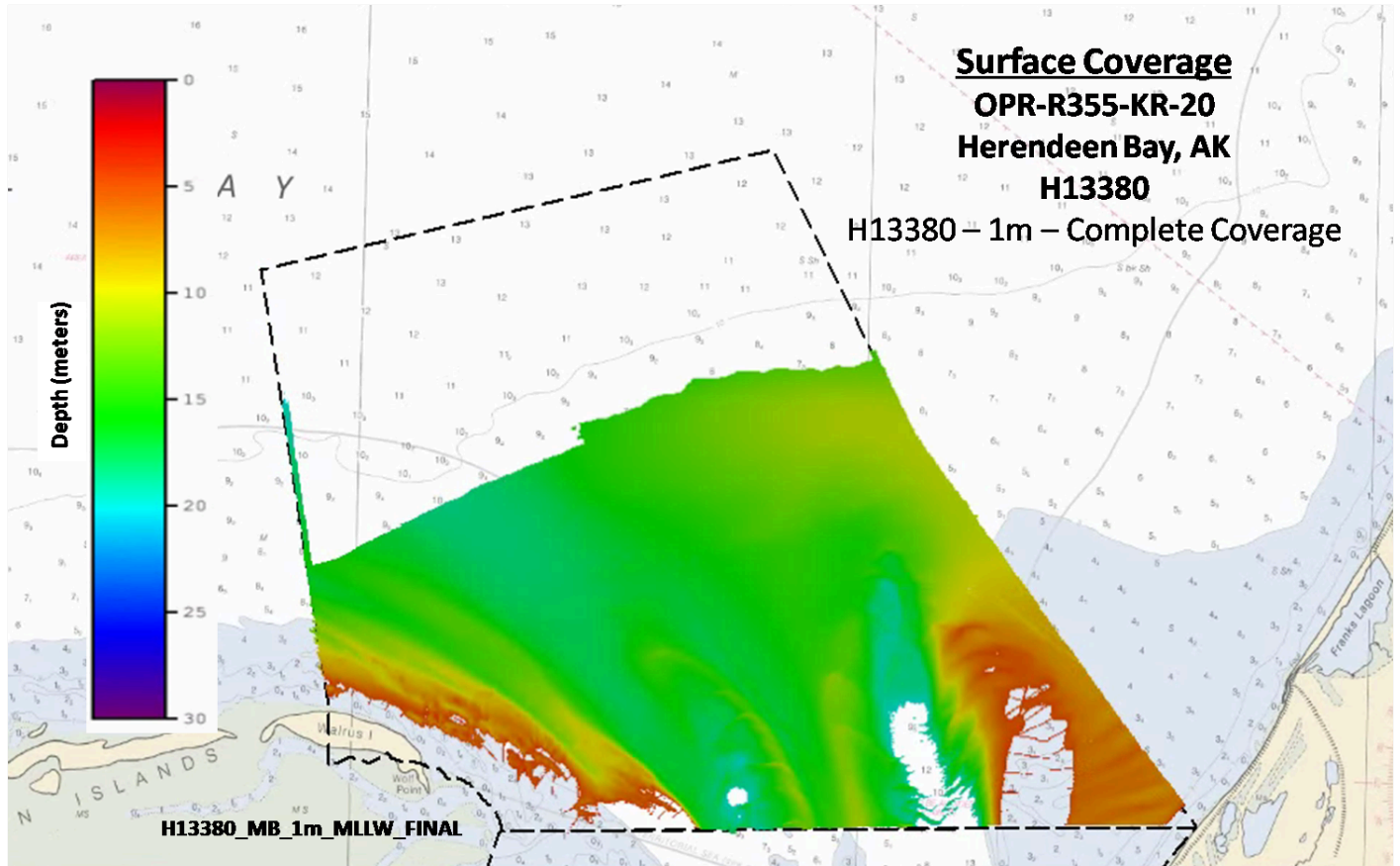


Figure 14: H13380 Finalized 1m CUBE weighted Dynamic Surface Coverage

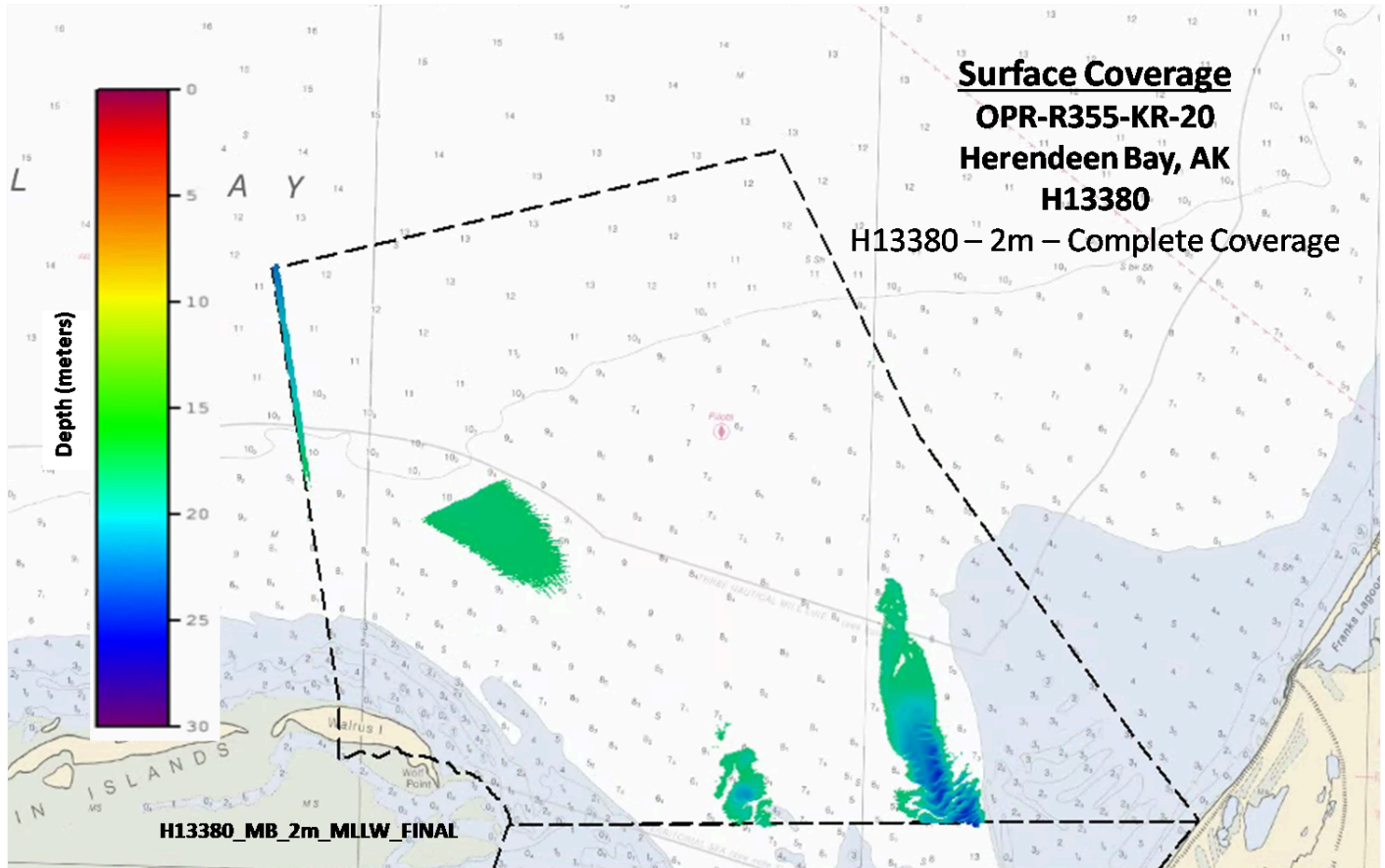


Figure 15: H13380 Finalized 2m CUBE weighted Dynamic Surface Coverage

*After office processing, the final grids are both 1m resolution and the 2of2 grid is composed entirely of set spacing MBES.*

## 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-R355-KR-20_ERTDM_WGS84- MLLW_04142020.qgfvom

*Table 11: ERS method and SEP file*

In order to reference soundings to Mean Low Low Water Datum a VDatum separation model was applied to the Qinsy DB files via a separation file in the acquisition software.

## 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

Applanix PosPac MMS was utilized to post process realtime positioning data utilizing Trimble's PP-RTX implementation of Trimble CenterPoint RTX to create a Smoothed Best Estimate of Trajectory (SBET).

### RTK

GNSS satellite corrections were received on each vessel using the G2+ carrier signal from the Marinestar Global Correction System maintained by Fugro.

## **D. Results and Recommendations**

### **D.1 Chart Comparison**

A chart comparison was conducted for H13380 using Qimera and CARIS HIPS and SIPS. Survey data were compared against the largest scale ENC to accomplish the chart comparison. Details of the ENC used are listed below.

US4AK5GM, scale: 80000, edition: 6.2, update application date: 12/27/2017, issue date: 07/24/2020

The results of the chart comparison are listed below.

**Shoal and Hazardous Features:** Throughout survey operations sounding comparisons between the charted depths and the surveyed depths were analyzed to identify depth discrepancies. Using the 1 meter CUBE weighted Dynamic surface, soundings were generated in CARIS HIPS and SIPS. Soundings were displayed against the charted soundings and a visual comparison was made. An example image of the generated soundings overlaid on the chart is included below. From this methodology, three DtoNs were submitted for this survey. The DtoNs were regions where the surveyed data were significantly shoaler than the charted soundings.

**Charted Features:** For features that were addressed, the surveyed features generally agreed with the charted features. Additional details can be found in the FFF.

**Uncharted Features:** There were no additional uncharted features.

**Channels:** There were no charted maintained channels within the survey boundary.





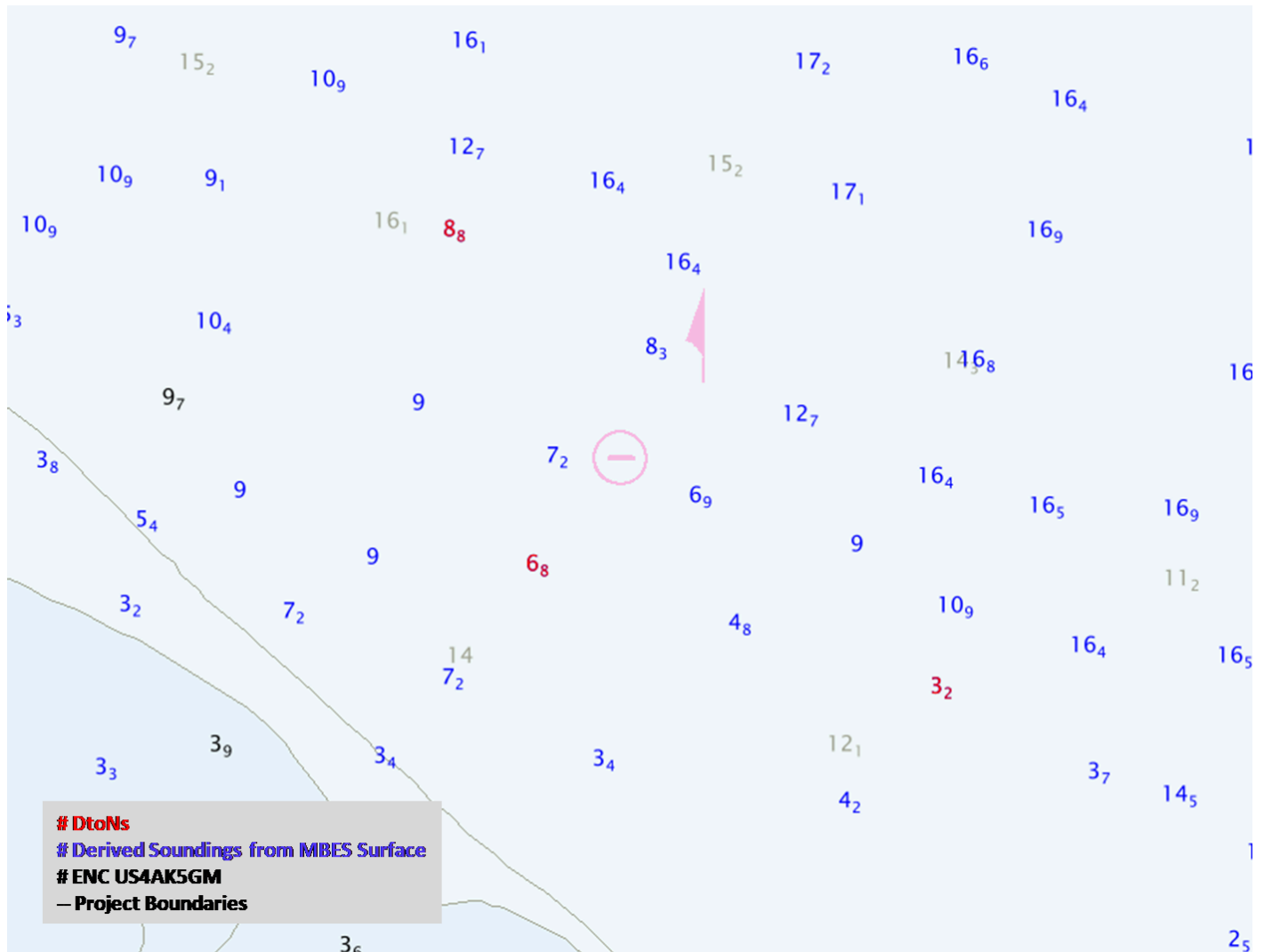


Figure 17: Generated Soundings Submitted as Dangers (example 1)

**Reported DTONs have been applied to the latest ENC**

**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
US4AK5GM	1:80000	6	12/27/2017	07/24/2020

Table 12: Largest Scale ENCs

### **D.1.2 Shoal and Hazardous Features**

There were 3 DtoNs found in H13380 and added to the Final Feature File (FFF). Each feature in the FFF has been given a unique identifier in the "userid" field of the .000 S-57 file (format 80XXX). Refer to the FFF for determinations and recommendations of each feature. The DtoNs were submitted in the following Danger to navigation report: H13380\_DtoN.

### **D.1.3 Charted Features**

No charted features were assigned to H13380.

### **D.1.4 Uncharted Features**

No new features were found in H13380. Note: DtoNs are not included in the number of new features in this section. DtoNs can be found separately in section D.1.2.

### **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**

No AtoNs were assigned in H13380.

### **D.2.2 Maritime Boundary Points**

No Maritime Boundary Points were assigned for this survey.

### **D.2.3 Bottom Samples**

5 bottom samples were obtained in accordance with section 7.1 of the HSSD 2020 in areas designated by the field through discussions with our COR. Detailed information and images of the bottom samples are located in the Final Feature File (FFF). Each bottom sample has been given a unique identifier in the "userid" field of the .000 S-57 file (format DX).

**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**

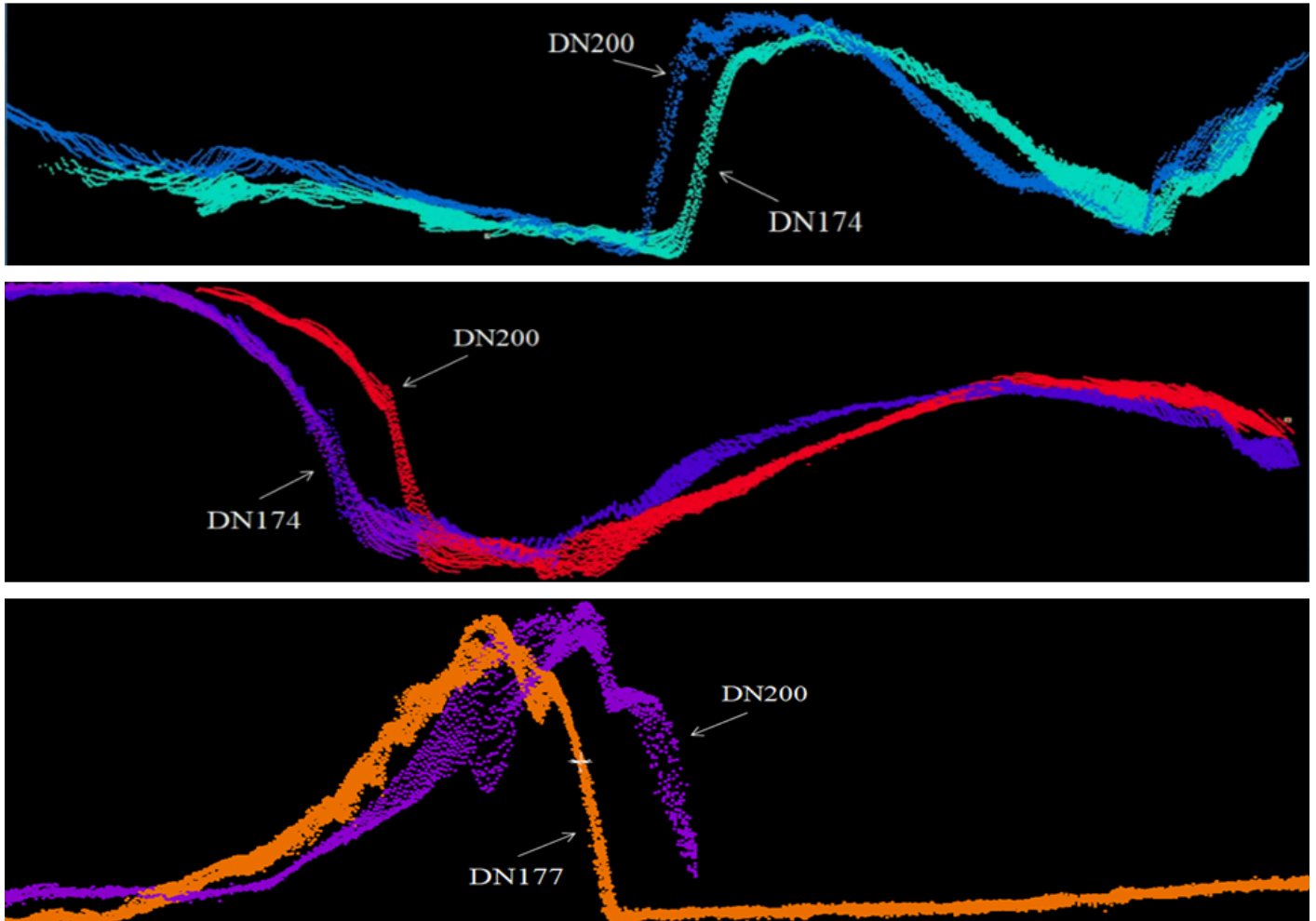
No platforms exist for this survey.

**D.2.7 Ferry Routes and Terminals**

No ferry routes or terminals exist for this survey.

**D.2.8 Abnormal Seafloor or Environmental Conditions**

Dynamic sandwaves and sediment movement was observed in H13380. Examples of the observed movement are shown in the image below. Note: In some instances, flier finder occasionally flags areas where sediment movement was observed.

**H13380 Sediment Movement**

*Figure 18: Dynamic Sediment Movement*

**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
David Neff	Chief of Party	10/20/2020	David Neff  <small>Digitally signed by David Neff DN: C=US, E=david@etracinc.com, O=eTrac Inc., CN=David Neff Date: 2020.10.20 15:07:37-0700'</small>

## F. Table of Acronyms

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

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



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