H13776

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

DESCRIPTIVE REPORT

Type of Survey:	Basic Hydrographic Survey
Registry Number:	H13776

LOCALITY

State(s):	Alaska
General Locality:	Southeast Alaska
Sub-locality:	Vicinity of Annette Point

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

H13776

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:	**Southeast Alaska**
Sub-Locality:	**Vicinity of Annette Point**
Scale:	**40000**
Dates of Survey:	**04/14/2023 to 11/01/2023**
Instructions Dated:	**03/23/2023**
Project Number:	**OPR-O392-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 9N, 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 H13776

Project: OPR-O392-FA-23

Locality: Southeast Alaska

Sublocality: Vicinity of Annette Point

Scale: 1:40000

April 2023 - November 2023

NOAA Ship *Fairweather*

Chief of Party: CDR Meghan McGovern

A. Area Surveyed

The survey area is located in the vicinity of Annette Point, Alaska.

A.1 Survey Limits

Data were acquired within the following survey limits:

Northwest Limit	Southeast Limit
55° 4' 3.99" N 131° 29' 3.28" W	54° 56' 56.82" N 131° 10' 36.05" W

Table 1: Survey Limits

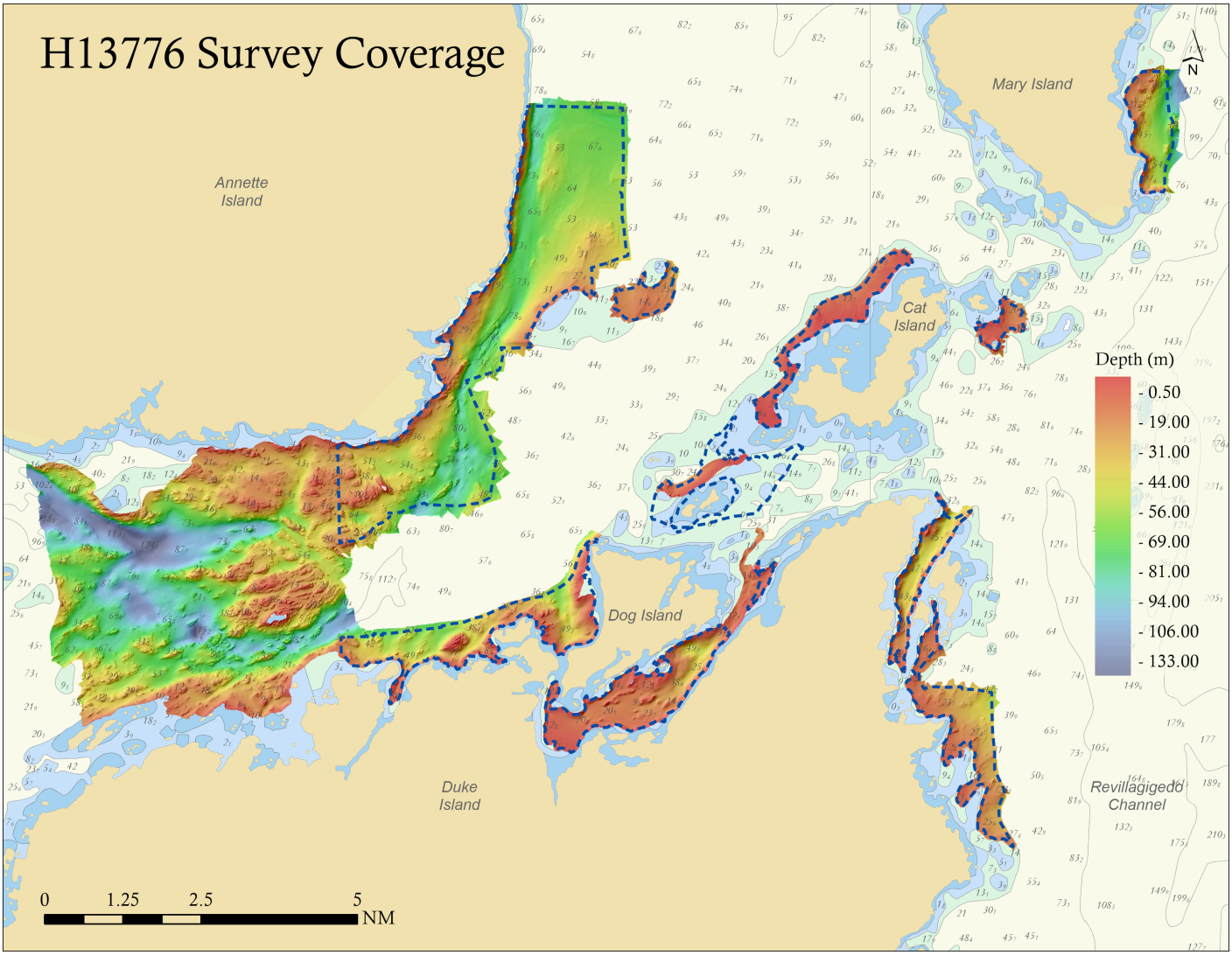


Figure 1: H13776 sheet limits (in blue) overlaid onto charts US4AK4SM and US4AK49m.

Data were not fully 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 constraints. Coverage acquired in H13776 is shown. Additional data in neighboring assigned sheet H13779 were acquired and combined with H13776.

A.2 Survey Purpose

This project is a continuation of the 2020 work to provide modern bathymetric data in the region of the Revillagigedo Channel, Clarence Strait, and Dixon Entrance in Southeast Alaska. The region is heavily trafficked by large cruise ships and other tourism vessels, commercial and recreational fishing vessels, is a part of the Alaska Marine Highway System, and is home to the Metlakatla Indian Community (MIC) on

Annette Island. The MIC, whose economy relies on fishing, seafood processing and tourism, is the only Indian Reserve in the State of Alaska.1 The majority of the region has no modern bathymetry; a quarter of the project area was last surveyed in the 1970s, while the remainder of the area was previously surveyed in the 1880s and 1920s. Conducting a modern bathymetric survey in this area will identify the hazards and changes to the seafloor, improve the Hydrographic Health, and provide critical data for updating National Ocean Service nautical charting products to improve maritime safety.

A.3 Survey Quality

The entire survey is adequate to supersede previous data.

Data acquired in H13776 meet multibeam echo sounder (MBES) coverage requirements for complete coverage, as required by the HSSD. This includes crosslines, NOAA allowable uncertainty (see Section B.2.10), and density requirements (see Section B.2.11) meet HSSD requirements.

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

The entirety of H13776 was acquired with complete coverage, meeting the requirements listed above and in the HSSD.

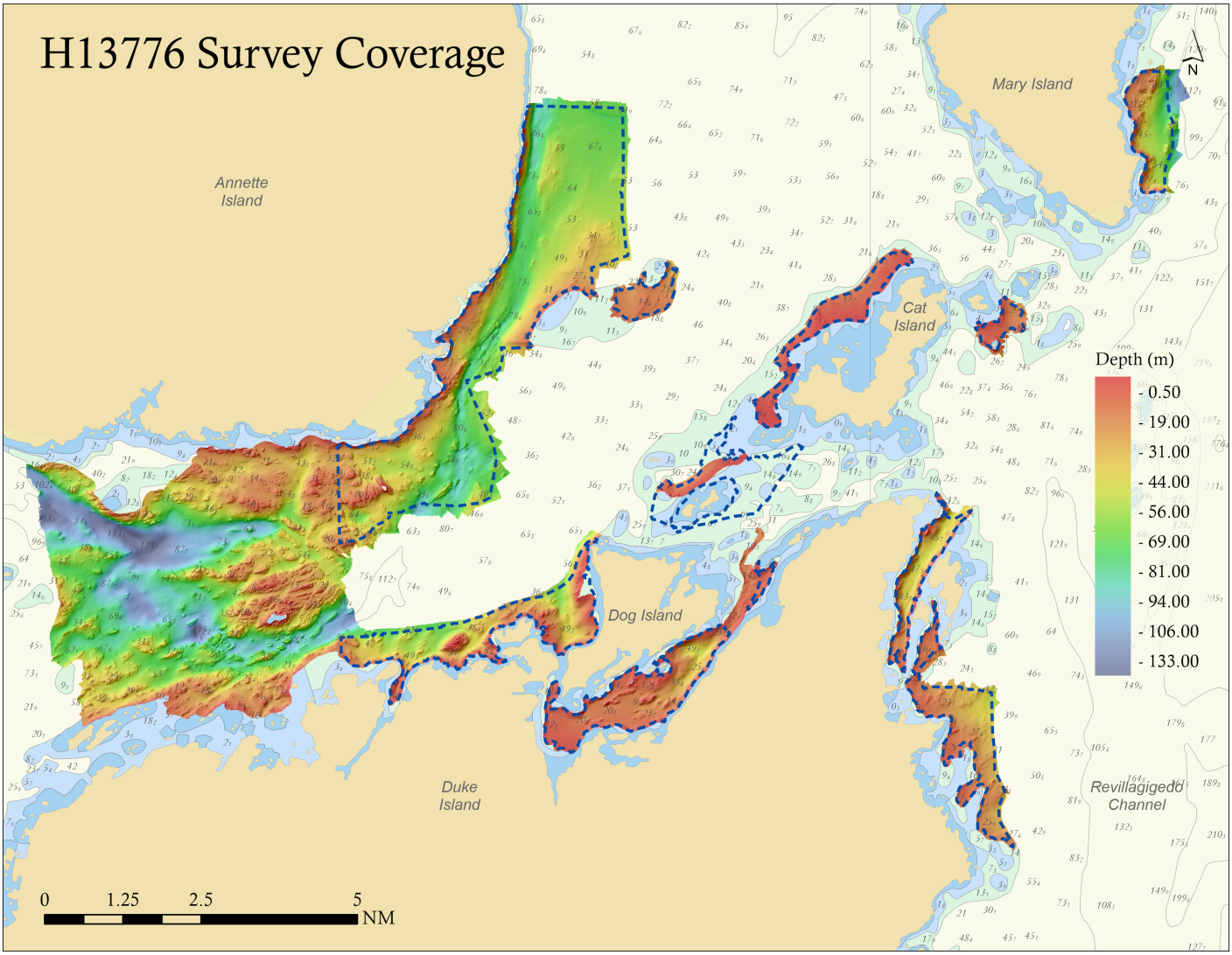


Figure 2: H13776 survey coverage overlaid onto charts US4AK4SM and US4AK49m.

A.6 Survey Statistics

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

	HULL ID	*FA2805*	*FA2806*	*FA2807*	*FA2808*	*Total*
LNM	**SBES Mainscheme**	0.0	0.0	0.0	0.0	0.0
	MBES Mainscheme	166.7	90.3	61.4	14.2	356.9
	Lidar Mainscheme	0.0	0.0	0.0	0.0	0.0
	SSS Mainscheme	0.0	0.0	0.0	0.0	0.0
	SBES/SSS Mainscheme	0.0	0.0	0.0	0.0	0.0
	MBES/SSS Mainscheme	0.0	0.0	0.0	0.0	0.0
	SBES/MBES Crosslines	8.5	15.8	0.0	0.0	24.3
	Lidar Crosslines	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						13.7

Table 3: Hydrographic Survey Statistics

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

Survey Dates	Day of the Year
04/14/2023	104
10/16/2023	289

Survey Dates	Day of the Year
10/19/2023	292
10/27/2023	300
10/28/2023	301
10/29/2023	302
10/30/2023	303
10/31/2023	304
11/01/2023	305

Table 4: Dates of Hydrography

B. Data Acquisition and Processing

B.1 Equipment and Vessels

Refer to the OPR-O392-FA-23 Approaches to Revillagigedo 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	*FA 2805*	*FA 2806*	*FA 2807*	*FA 2808*
LOA	8.6 meters	8.6 meters	8.6 meters	8.6 meters
Draft	1.1 meters	1.1 meters	1.1 meters	1.1 meters

Table 5: Vessels Used

Figure 3: FA Launches.

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

The equipment was installed on the survey platform as follows: 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, 7.3% of crossline to MBES data was acquired. To evaluate the crossline, a surface generated via data strictly from the mainscheme lines and a surface generated via data strictly from the crossline were created. From these two surfaces, a difference surface (mainscheme - crossline = difference surface) was generated. Statistics show the mean difference between the depths derived from the mainsheme data and crossline data was 0.02 meters and 95% of nodes falling within 0.41 meters. For the respective depths, the difference surface was compared to the allowable NOAA uncertainty standards. In total, 99.0% of the depth differences between H13776 mainscheme and crossline data were within allowable NOAA uncertainties.

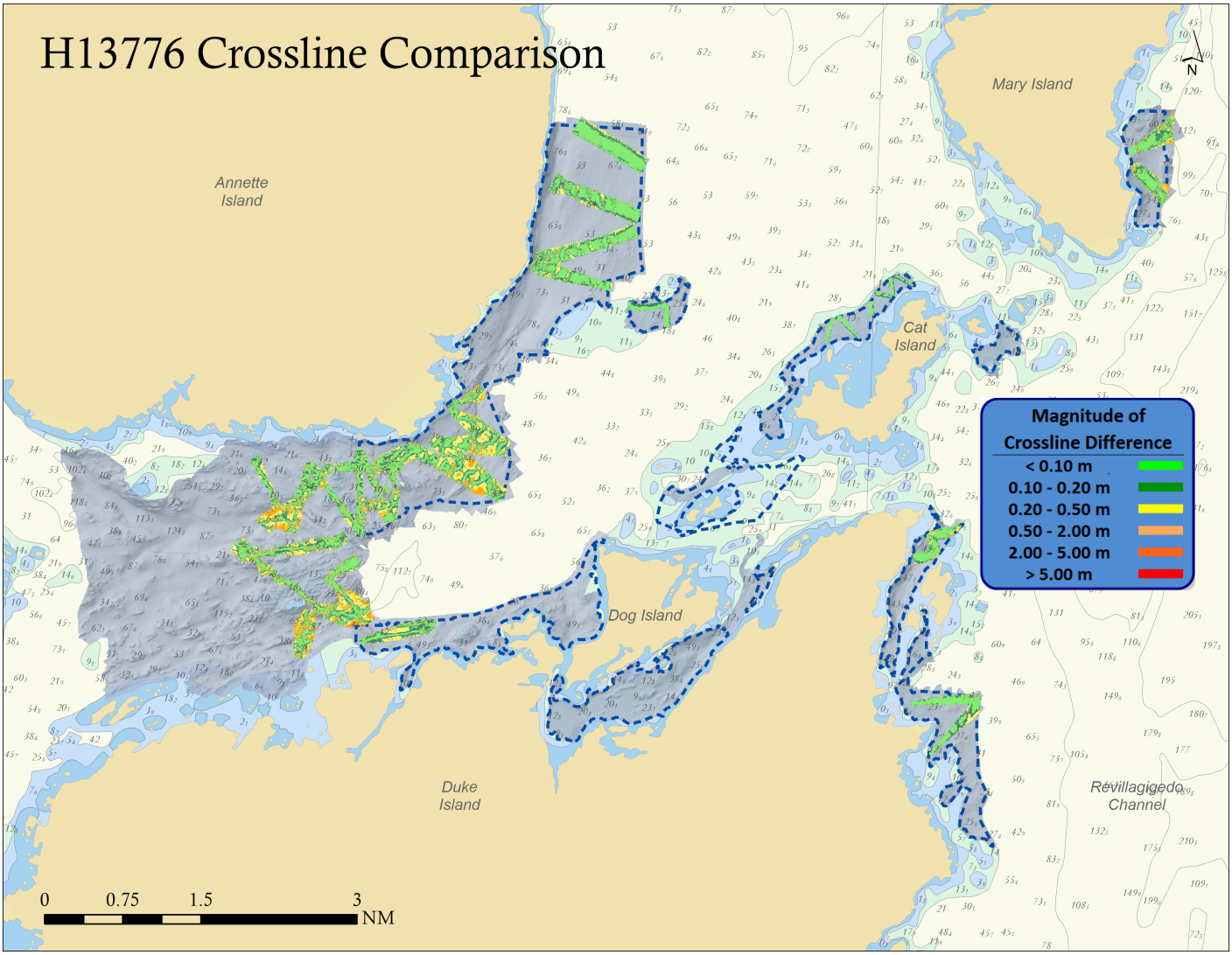


Figure 4: Overview of H13776 crosslines.

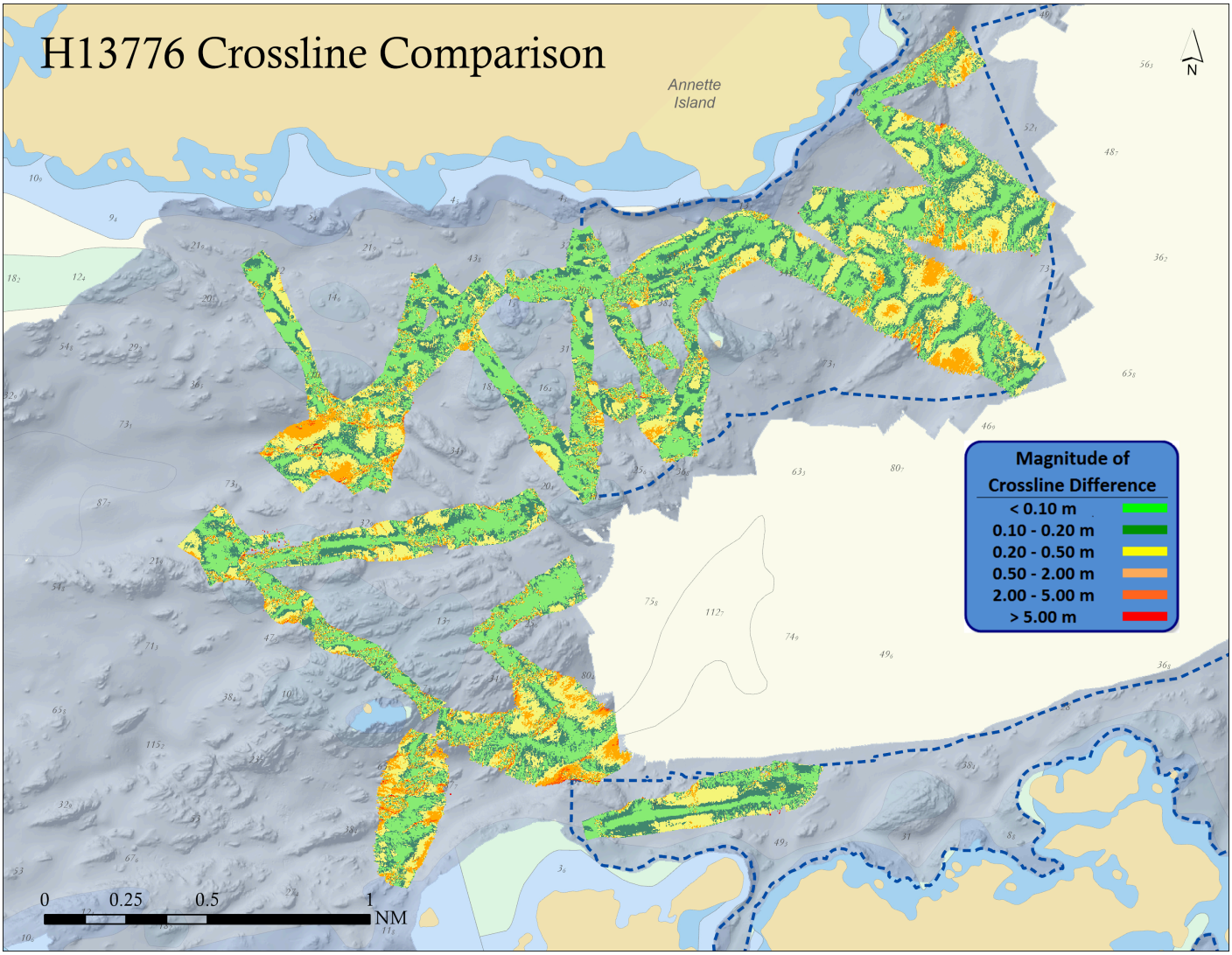


Figure 5: A closer look at H13776 crosslines.

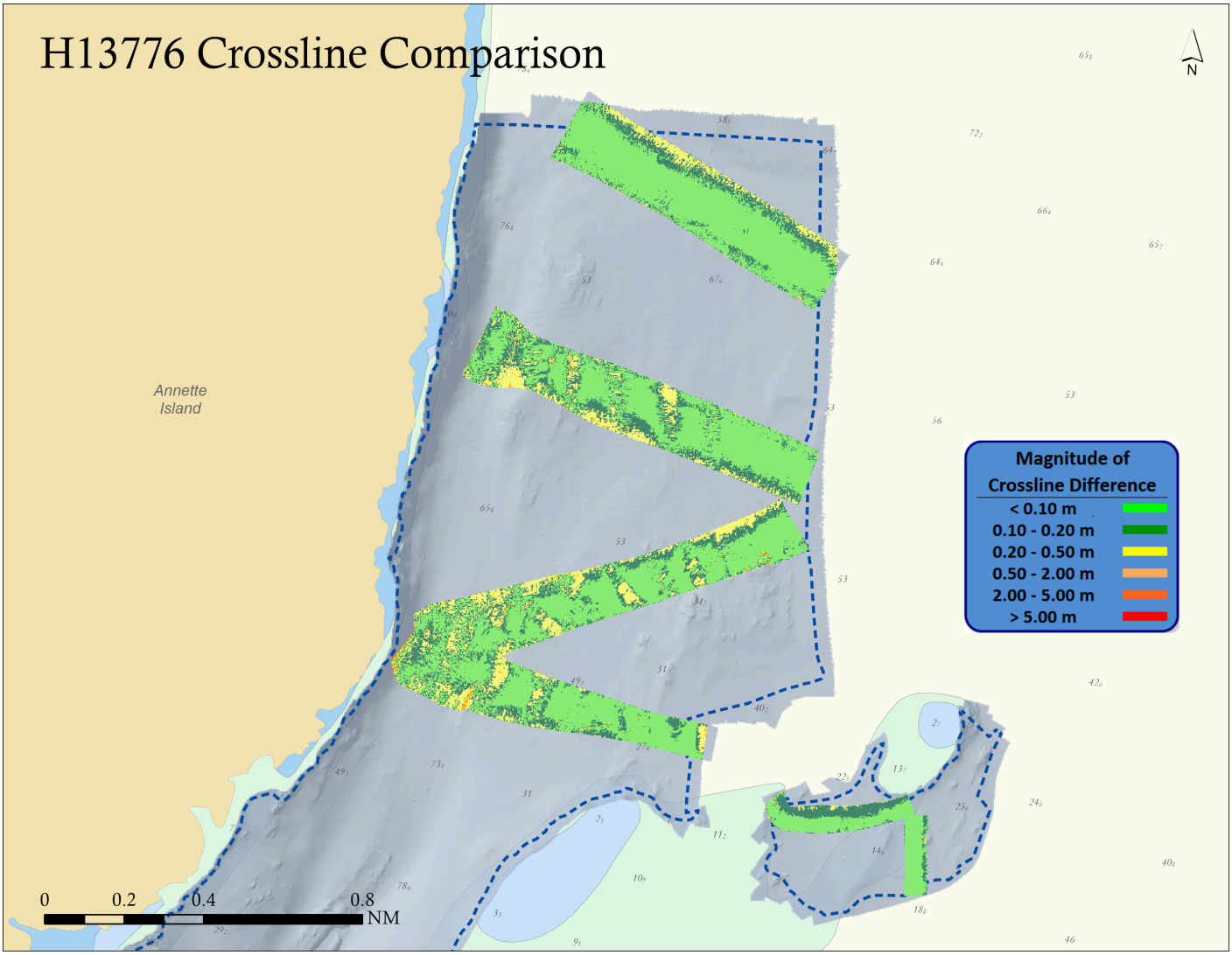


Figure 6: A closer look at H13776 crosslines.

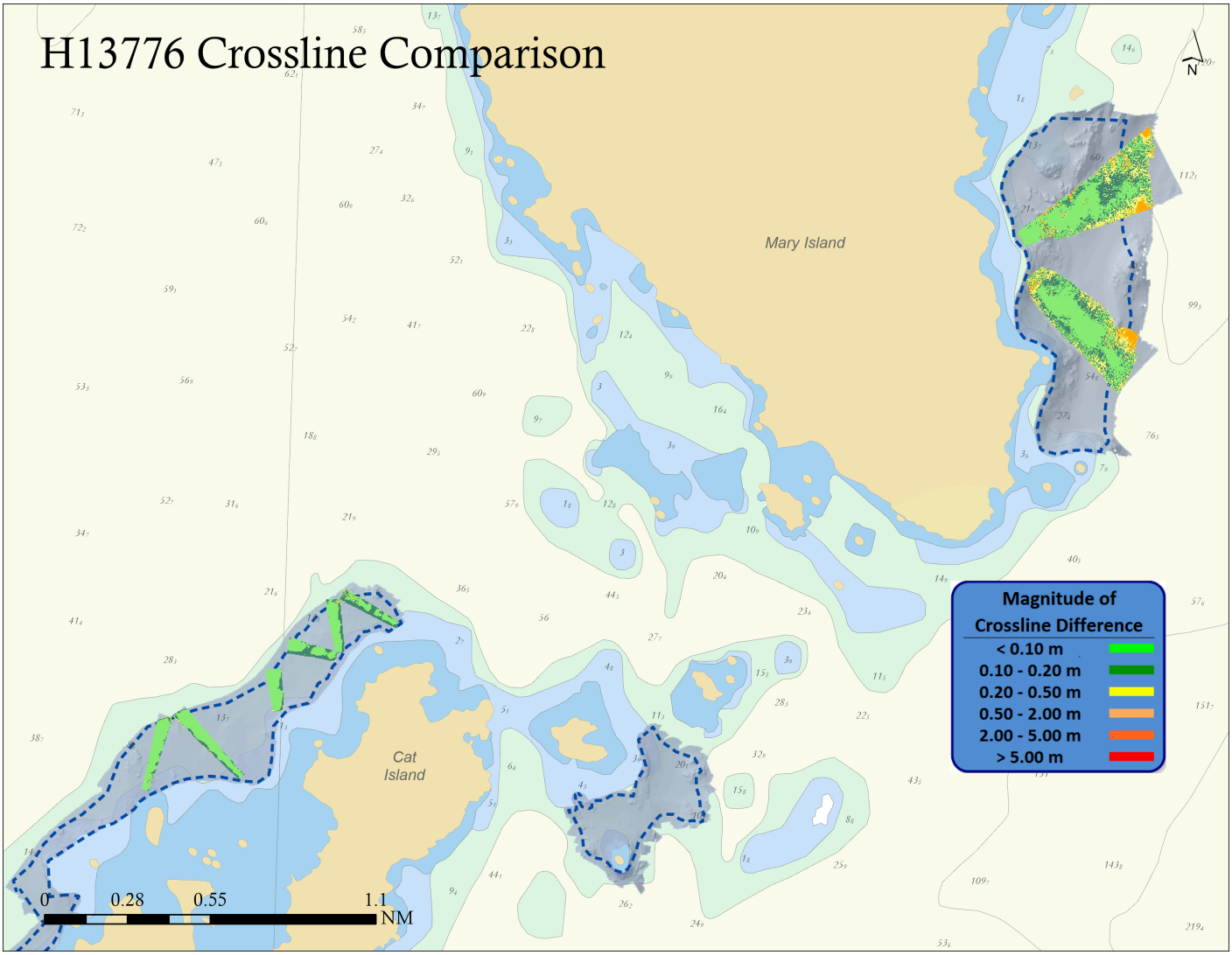


Figure 7: A closer look at H13776 crosslines.

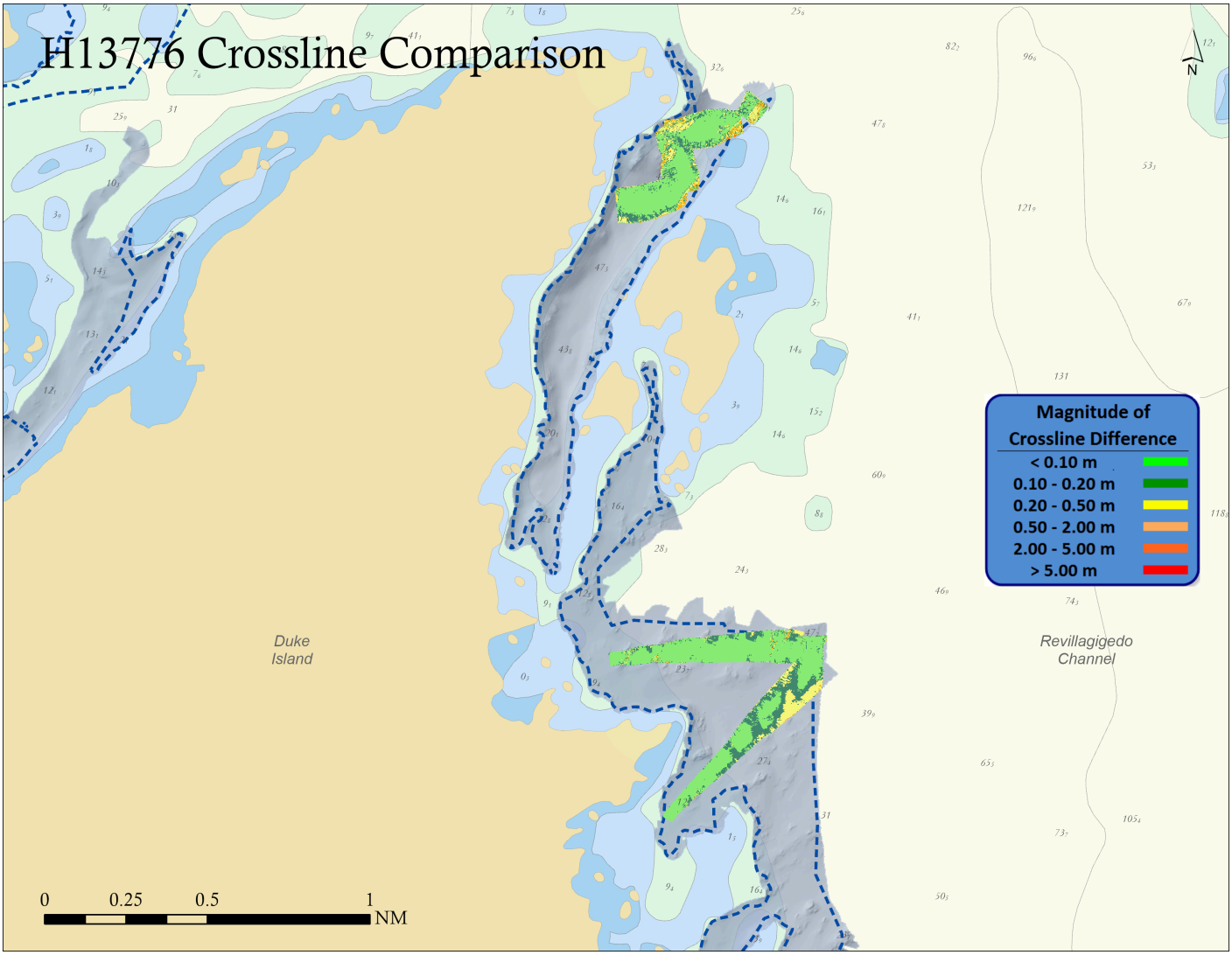
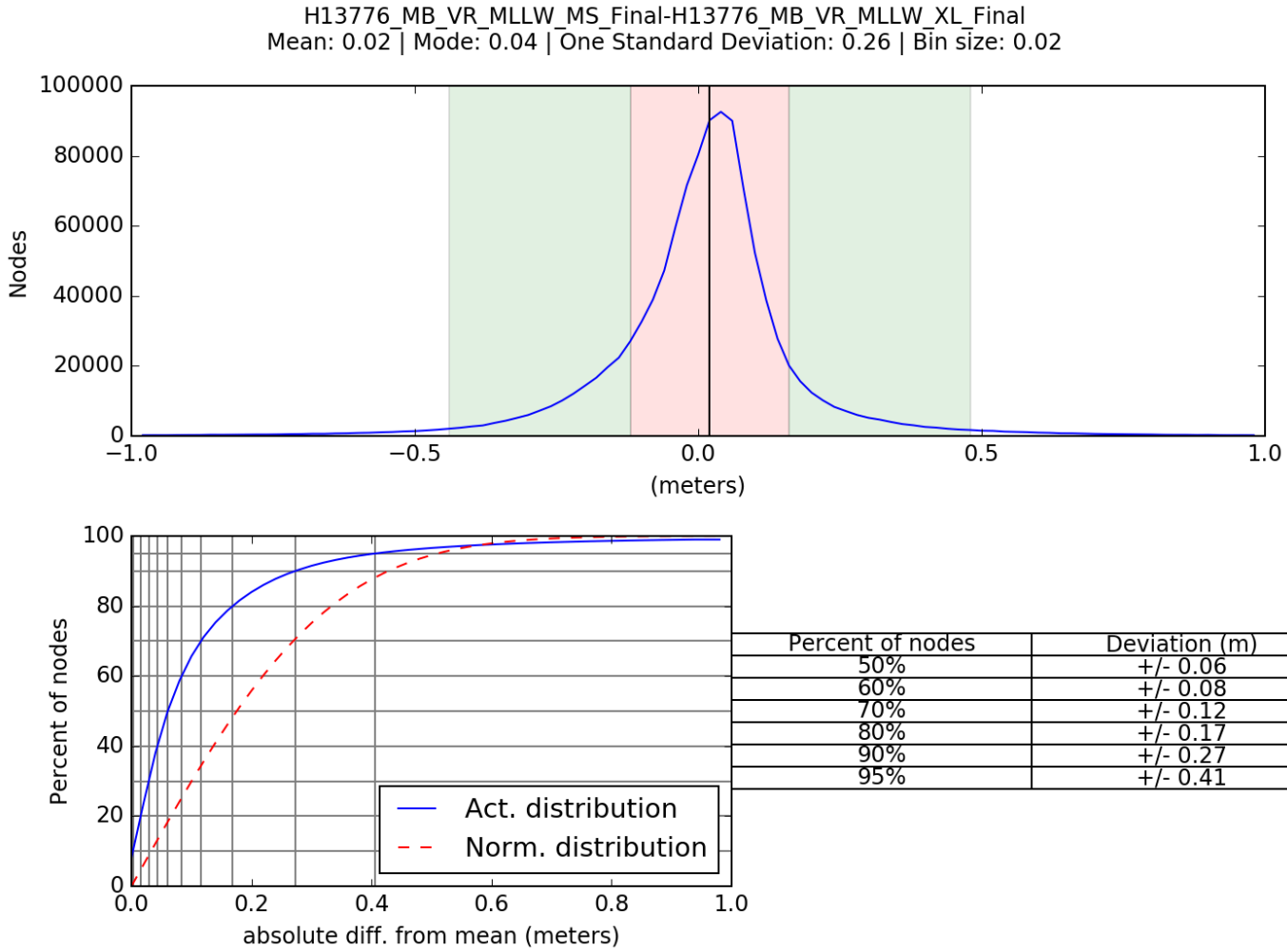


Figure 8: A closer look at H13776 crosslines.



Percent of nodes	Deviation (m)
50%	+/- 0.06
60%	+/- 0.08
70%	+/- 0.12
80%	+/- 0.17
90%	+/- 0.27
95%	+/- 0.41

Figure 9: H13776 crossline and mainscheme diffrence statistics.

B.2.2 Uncertainty

The following survey specific parameters were used for this survey:

Method	Measured	Zoning
ERS via VDATUM	0.0 meters	0.13 meters

Table 7: Survey Specific Tide TPU Values.

Hull ID	Measured - CTD	Measured - MVP	Measured - XBT	Surface
280X (all launches)	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 VDATUM, real-time and post-processed uncertainty sources were also incorporated into the depth estimates of survey H13776. Real-time uncertainties were provided via EM2040 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

H13776 junctions with two adjacent surveys from prior projects, H12178 and H13407 as shown in the figure below. Data overlap between H13776 and each adjacent survey was achieved. The areas of overlap between H13776 and its junctioning surfaces were reviewed in CARIS HIPS and SIPs by surface differencing to assess surface agreement, but the comparisons were not made with surfaces of equal resolutions and the junction surfaces exceed the NOAA allowable uncertainty. For all junctions with H13776, a negative difference indicates H13776 was shoaler and a positive difference indicates H13776 was deeper.

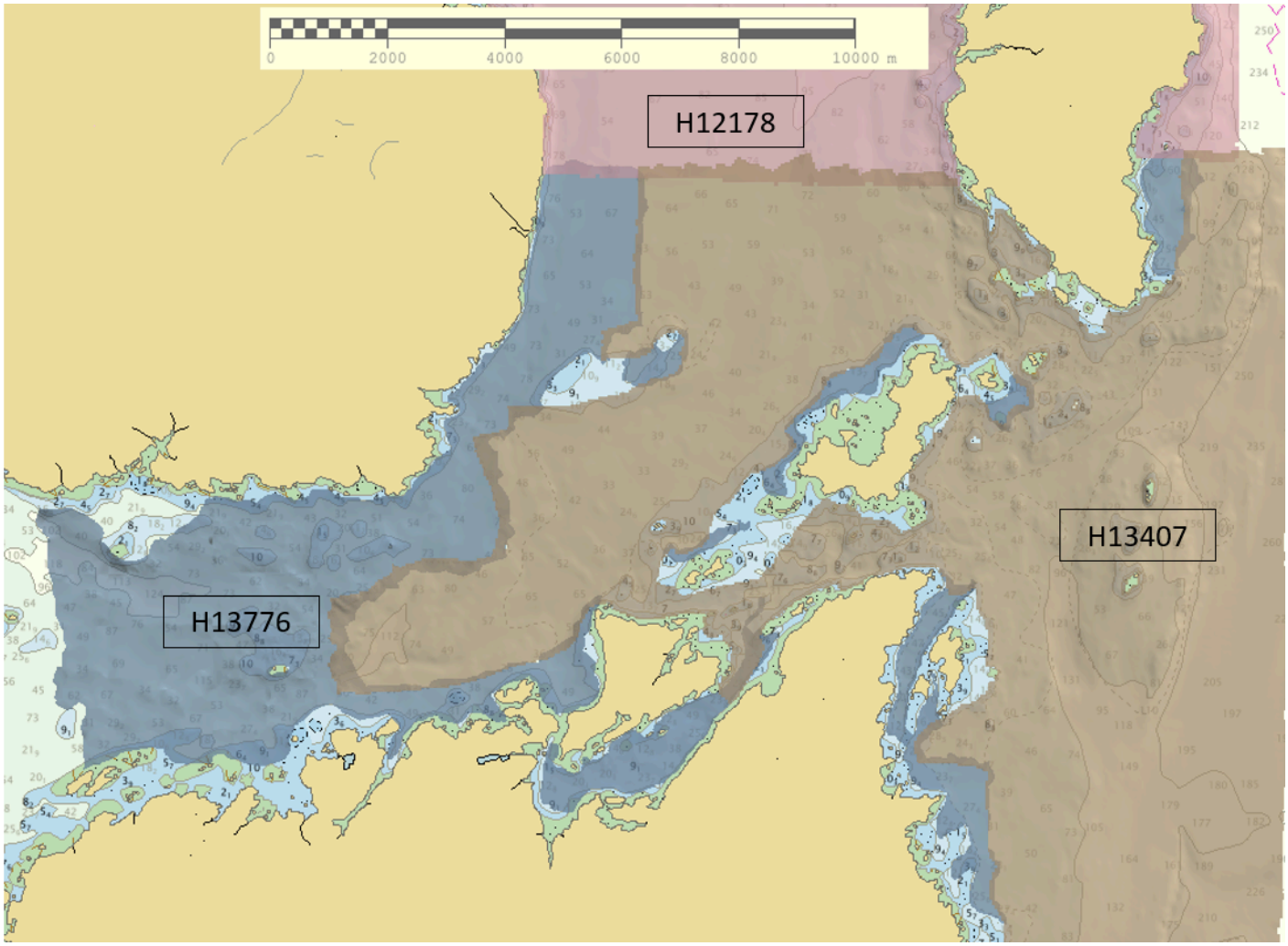


Figure 10: Overview of H13776 junction surveys. H13776 in grey, H12178 in pink, and H13407 in brown.

The following junctions were made with this survey:

Registry Number	Scale	Year	Field Unit	Relative Location
H12178	1:20000	2010	Fairweather, NOAA	N
H13407	1:10000	2020	Rainier, NOAA	E

Table 9: Junctioning Surveys

H12178

Surface differencing in CARIS HIPS and SIPS was used to assess junction agreement between the surface from H13776 and the surface from H12178. The statistical analysis of the difference surface shows a mean

of -0.48 meters with 95% of the nodes having a maximum deviation of +/- 6.69 meters, as seen in the figure below. It was found that 51.0% of nodes are within NOAA allowable uncertainty.

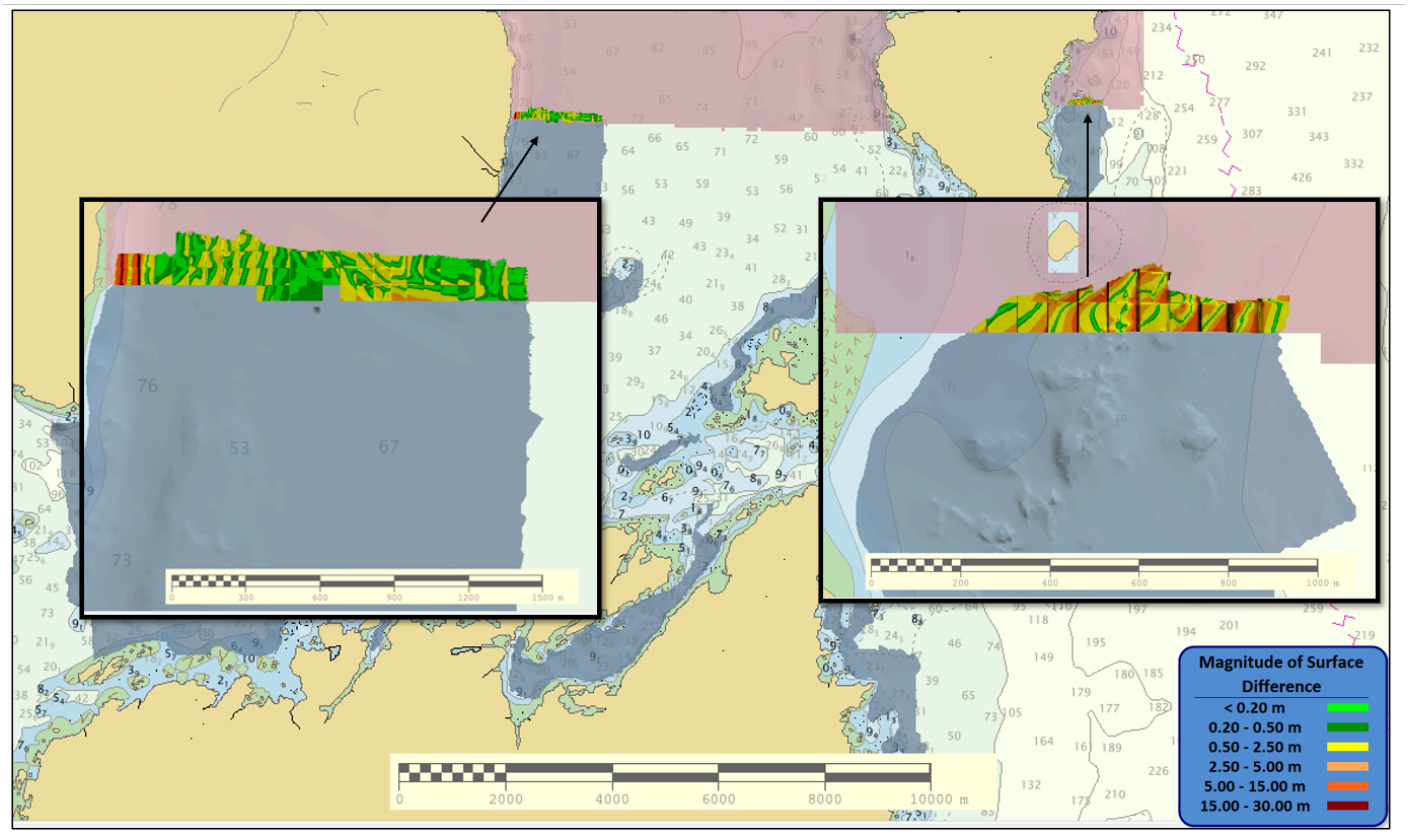
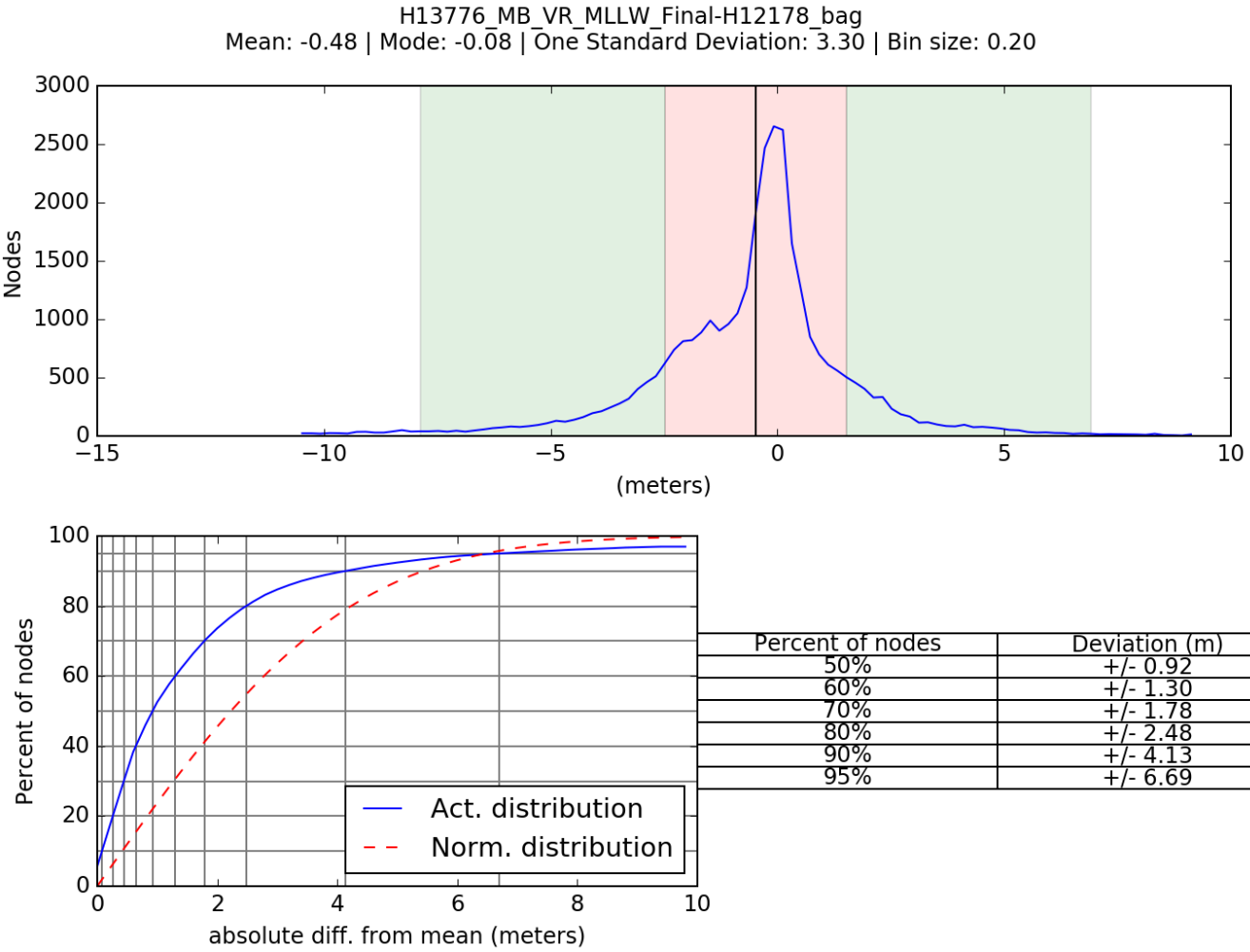


Figure 11: Difference surface between H13776 (grey) and junctioning survey H12178 (pink).



Percent of nodes	Deviation (m)
50%	+/- 0.92
60%	+/- 1.30
70%	+/- 1.78
80%	+/- 2.48
90%	+/- 4.13
95%	+/- 6.69

Figure 12: Difference surface statistics between H13776 and H12178.

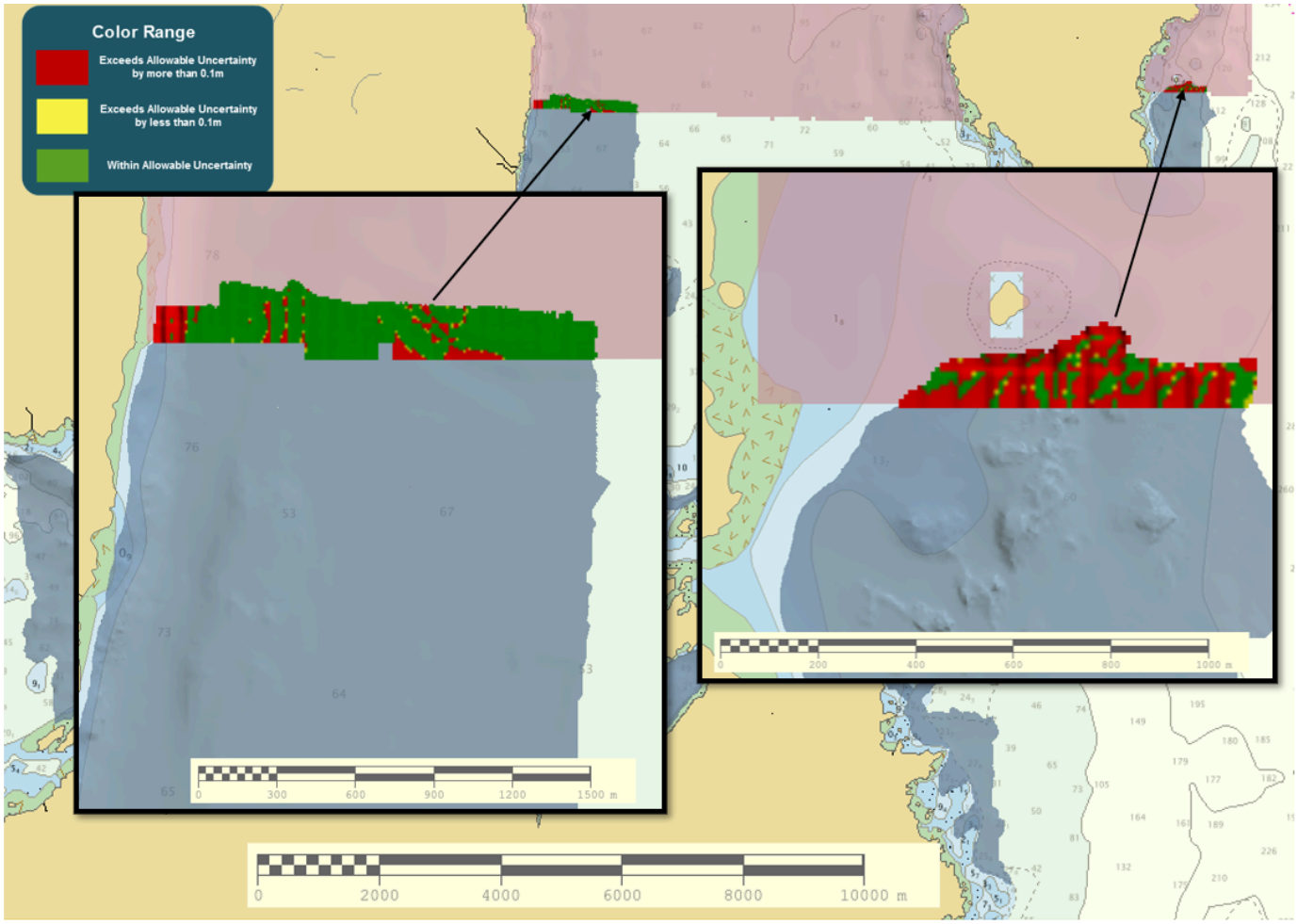


Figure 13: Difference surface compliance with NOAA allowable uncertainty between H13776 (brown) and junctioning survey H12178 (grey).

H13407

Surface differencing in CARIS HIPS and SIPS was used to assess junction agreement between the surface from H13776 and the surface from H13407. The statistical analysis of the difference surface shows a mean of 0.53 meters with 95% of the nodes having a maximum deviation of +/- 2.94 meters, as seen in the figure below. It was found that 65.0% of nodes are within NOAA allowable uncertainty.

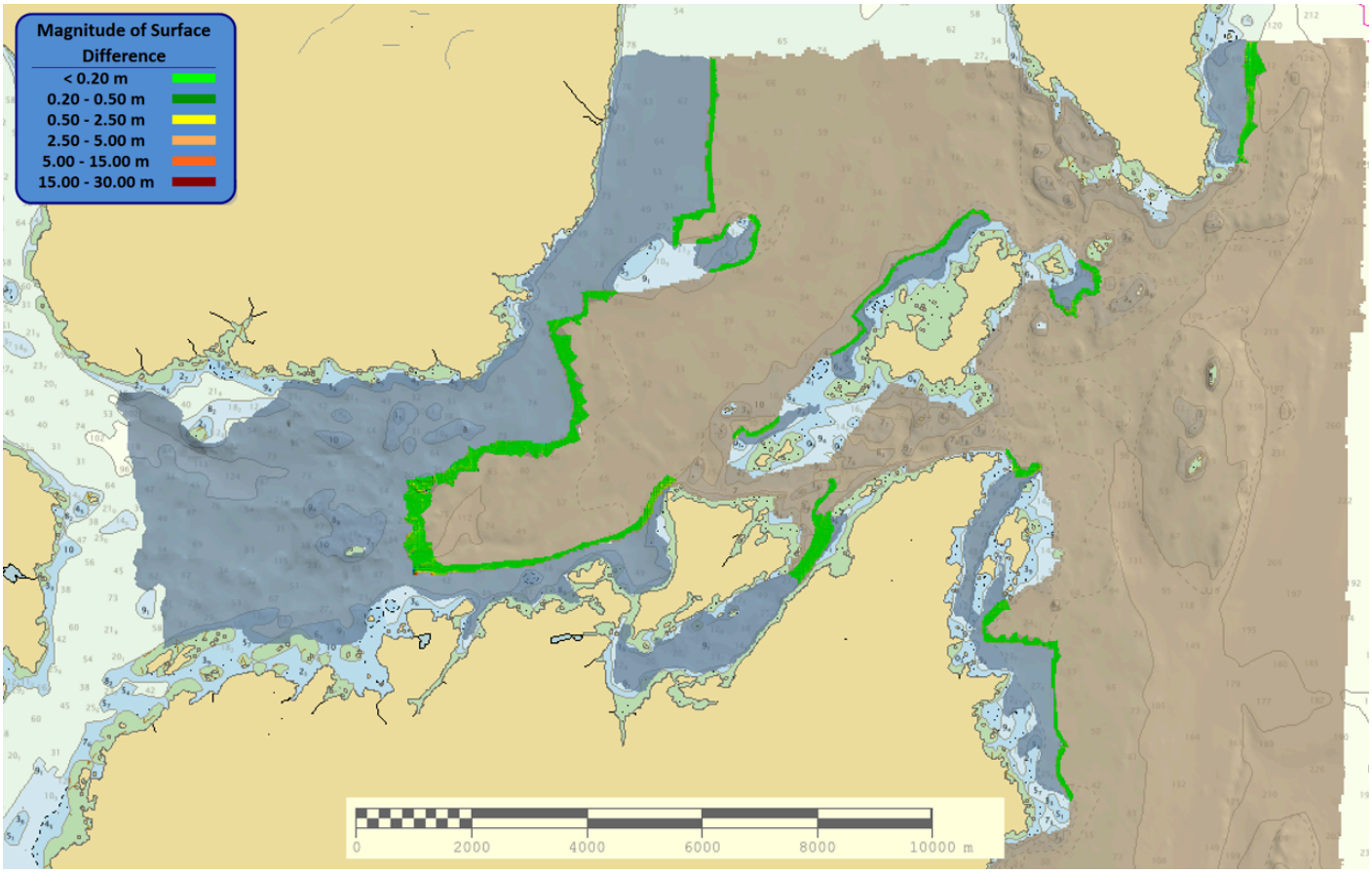


Figure 14: Difference surface between H13776 (grey) and junctioning survey H13407 (brown).

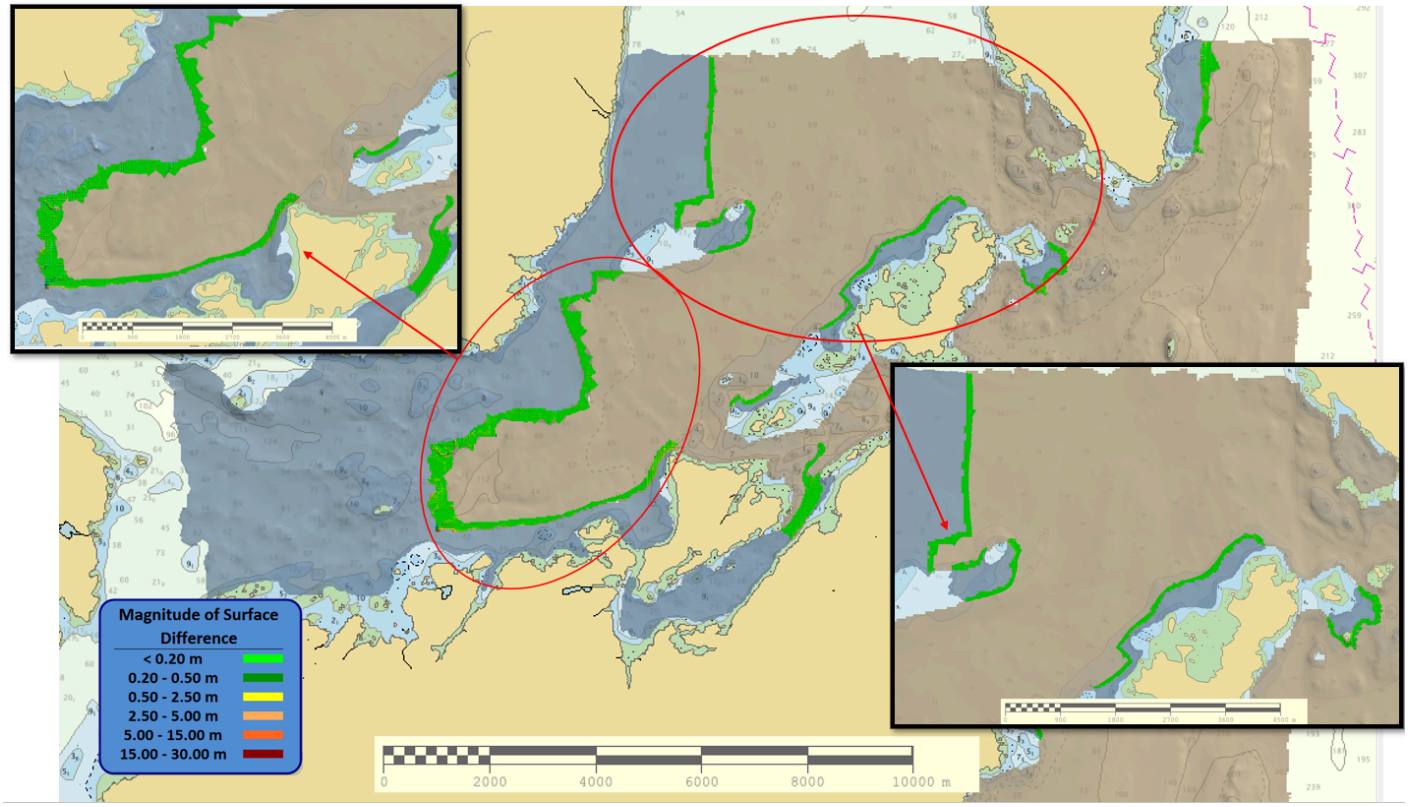


Figure 15: Difference surface between H13776 (grey) and junctioning survey H13407 (brown) continued.

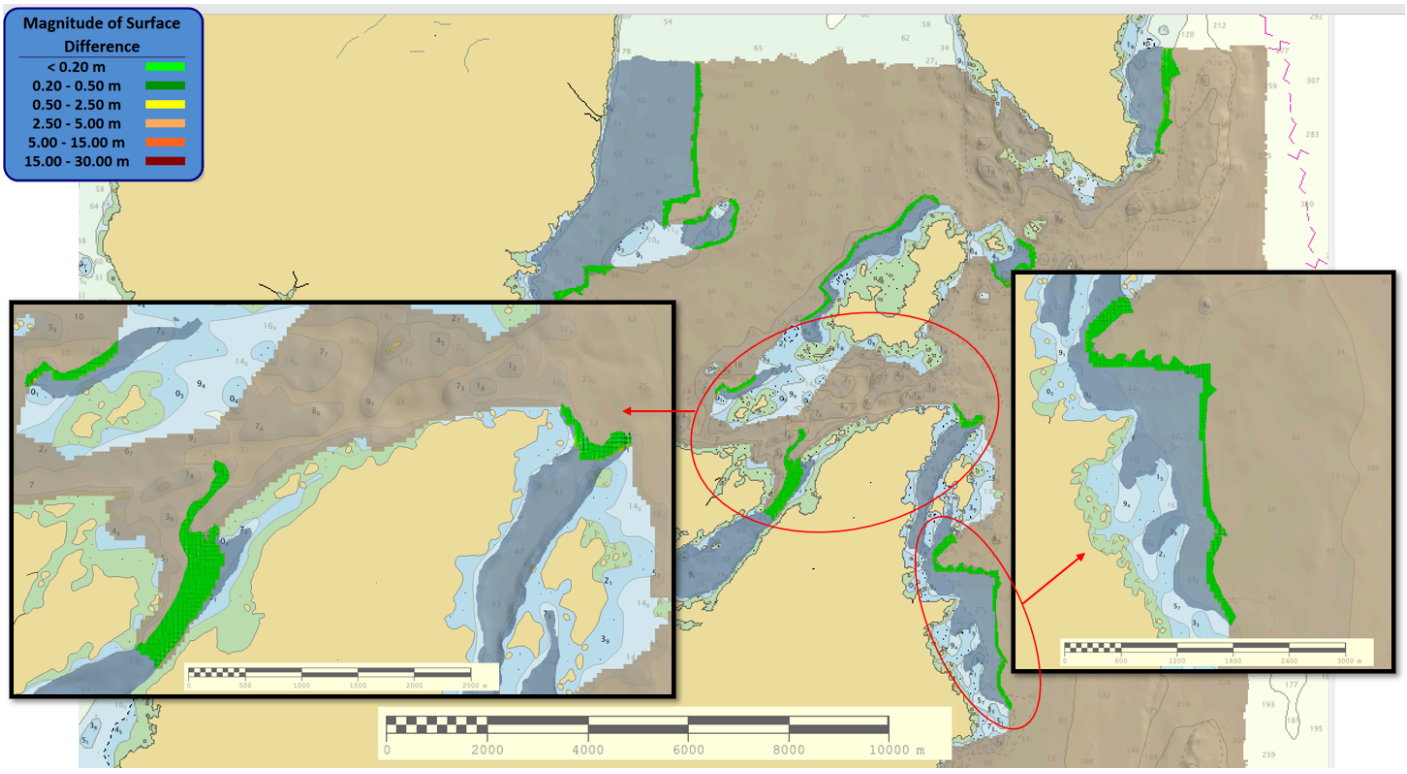
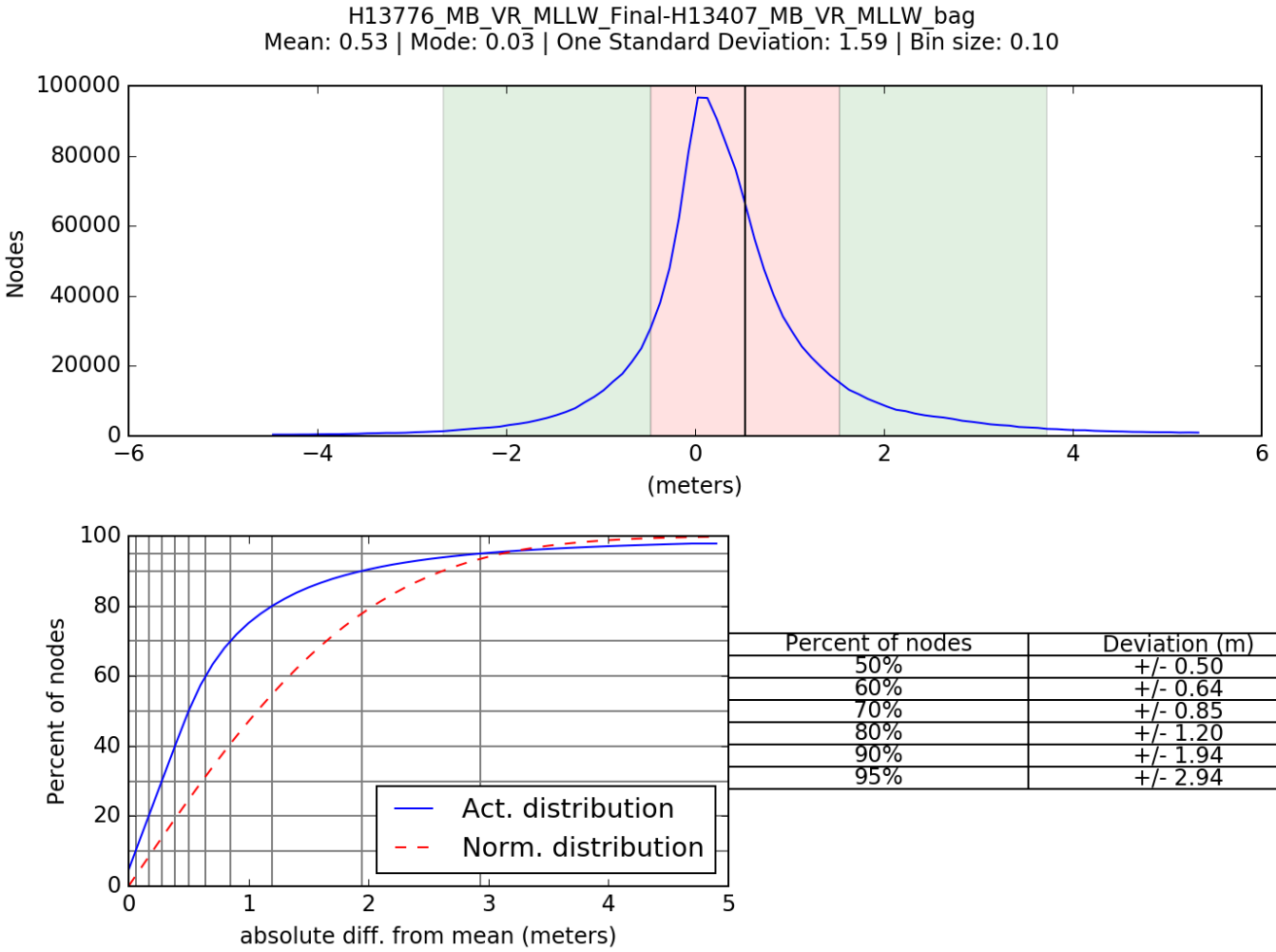


Figure 16: Difference surface between H13776 (grey) and junctioning survey H13407 (brown) continued.



Percent of nodes	Deviation (m)
50%	+/- 0.50
60%	+/- 0.64
70%	+/- 0.85
80%	+/- 1.20
90%	+/- 1.94
95%	+/- 2.94

Figure 17: Difference surface statistics between H13776 and H13407.

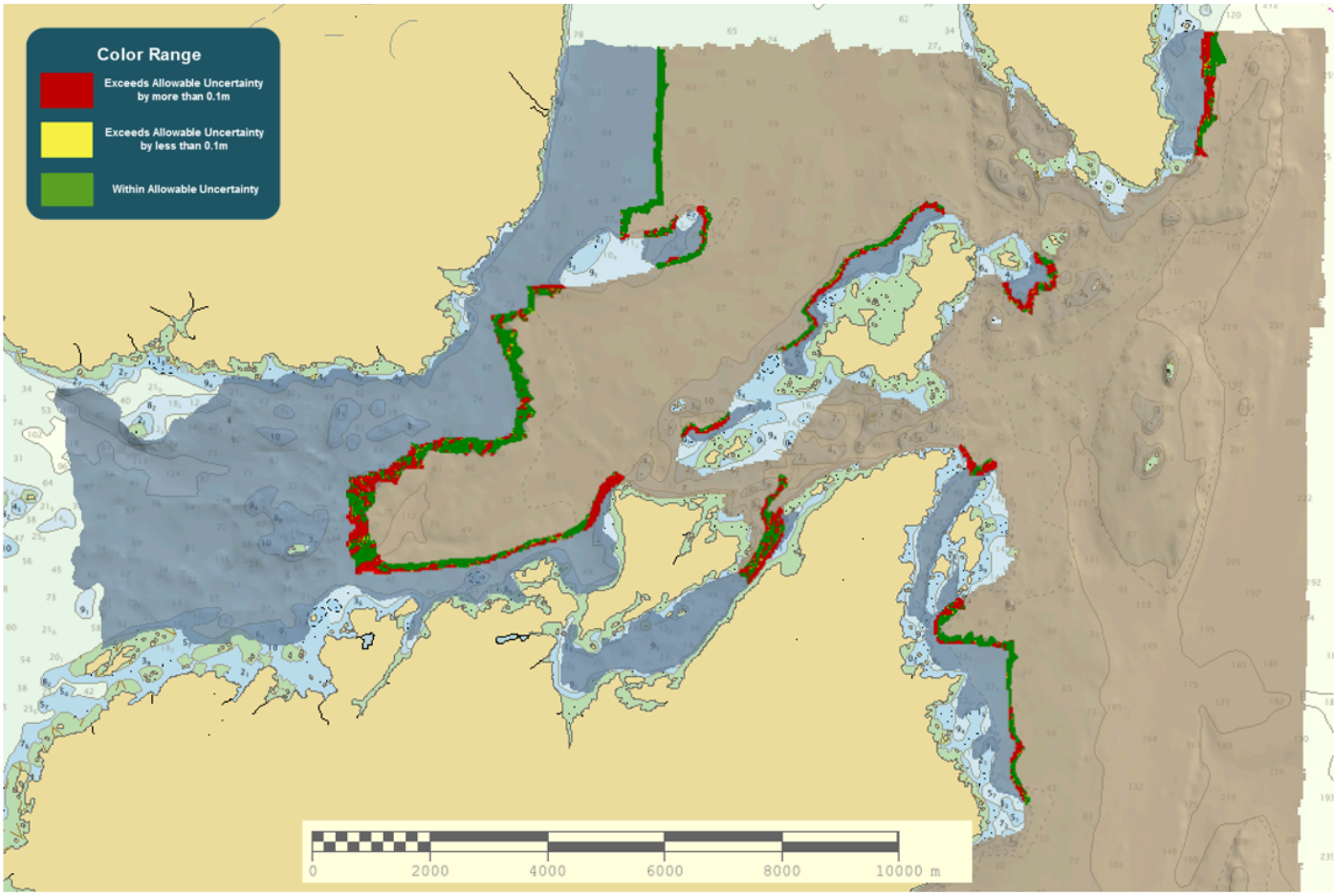


Figure 18: Difference surface compliance with NOAA allowable uncertainty between H13776 (grey) and junctioning survey H13407 (brown).

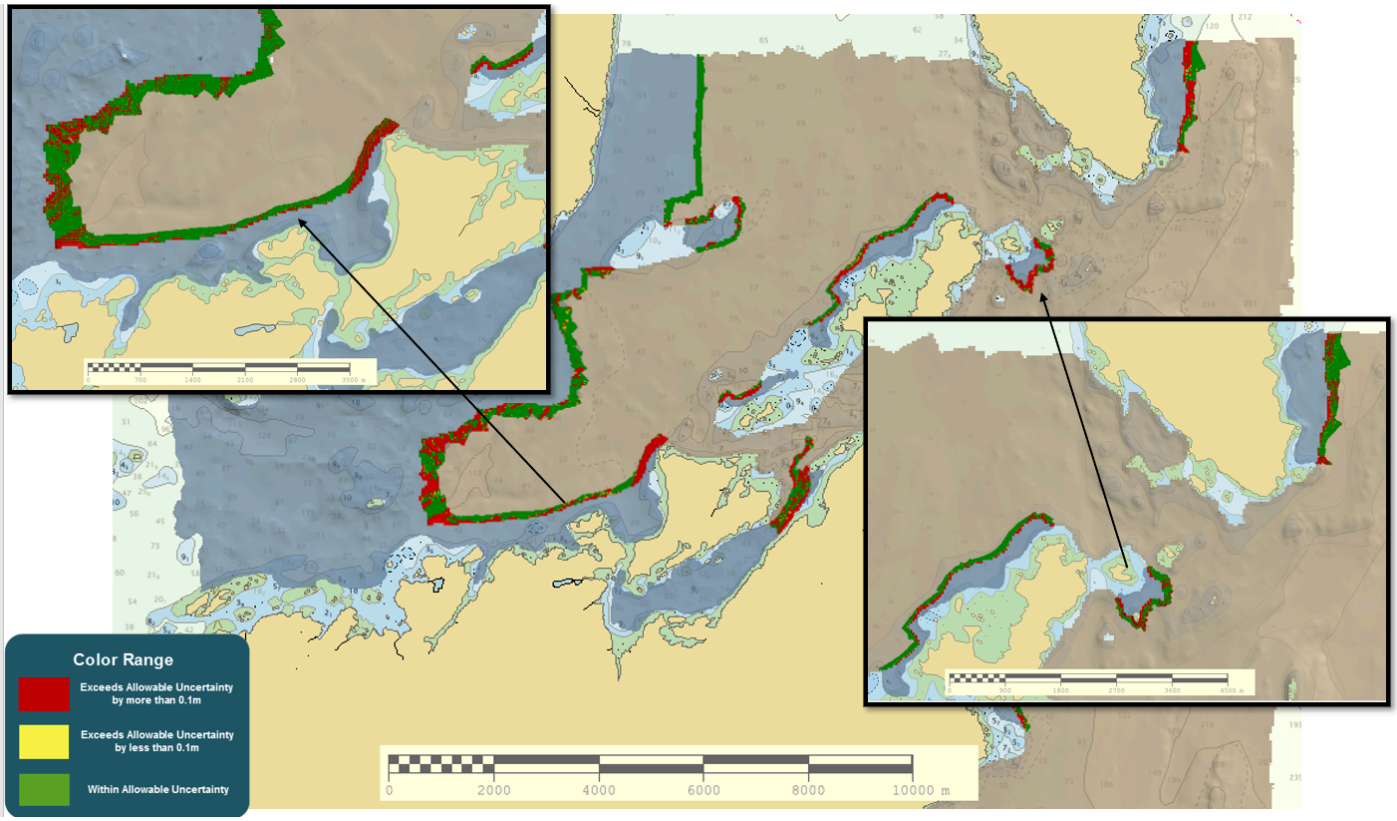


Figure 19: Difference surface compliance with NOAA allowable uncertainty between H13776 (grey) and junctioning survey H13407 (brown) continued.

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 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.

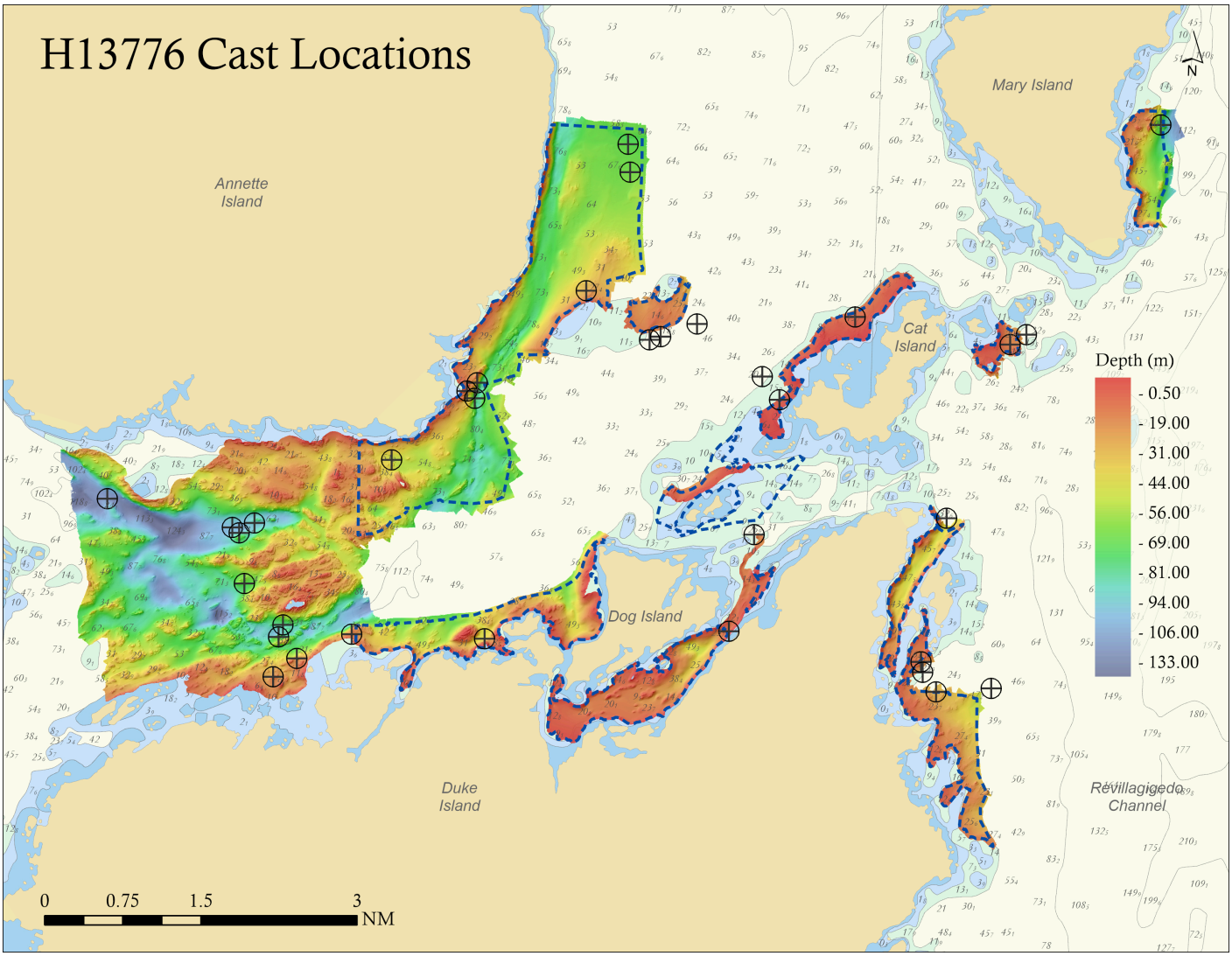


Figure 20: H13776 cast locations.

B.2.8 Coverage Equipment and Methods

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

B.2.9 Density

The surface was analyzed using the HydrOffice QC Tools Grid QA feature to determine compliance with specifications. Density requirements for H13776 were achieved with at least 99.5% of surface nodes containing five or more soundings as required by HSSD Section 5.2.2.3.

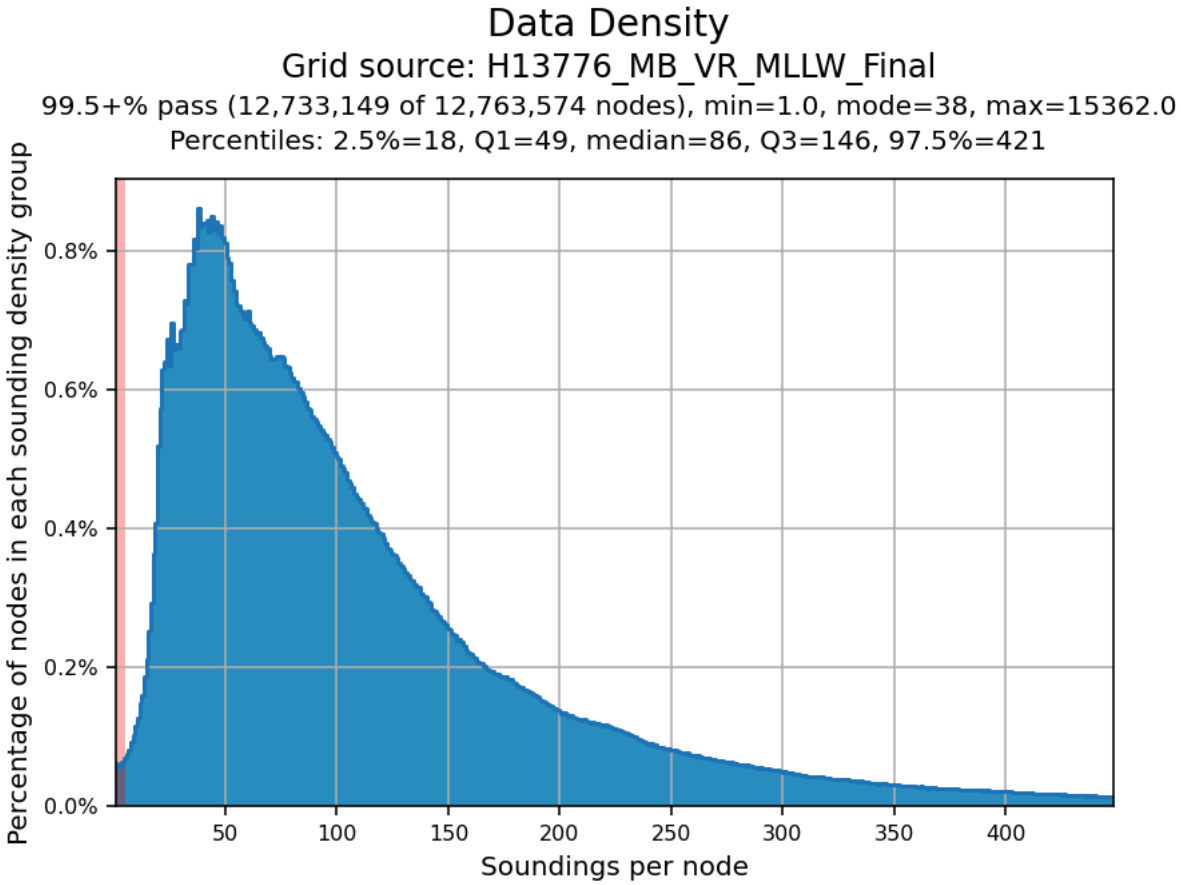


Figure 21: H13776 data density statistics.

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 H13776.

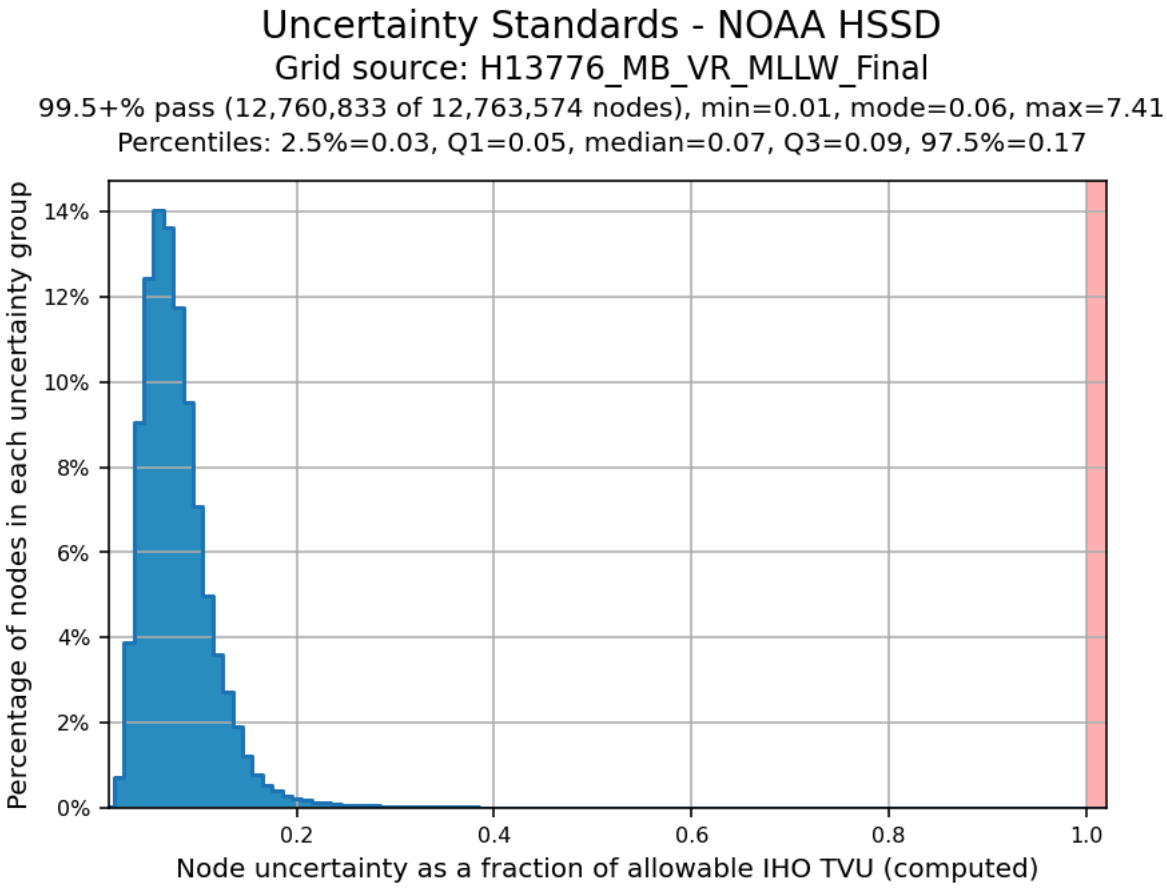


Figure 22: H13776 NOAA allowable uncertainty statistics.

B.2.11 Holidays

H13776 data were reviewed in CARIS HIPS and SIPS for holidays in accordance with Section 5.2.2.3 of the HSSD. There are 11 holidays that 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 inspection in subset editor in CARIS, these holidays are attributed to acoustic shadowing and areas where the NALL was achieved.

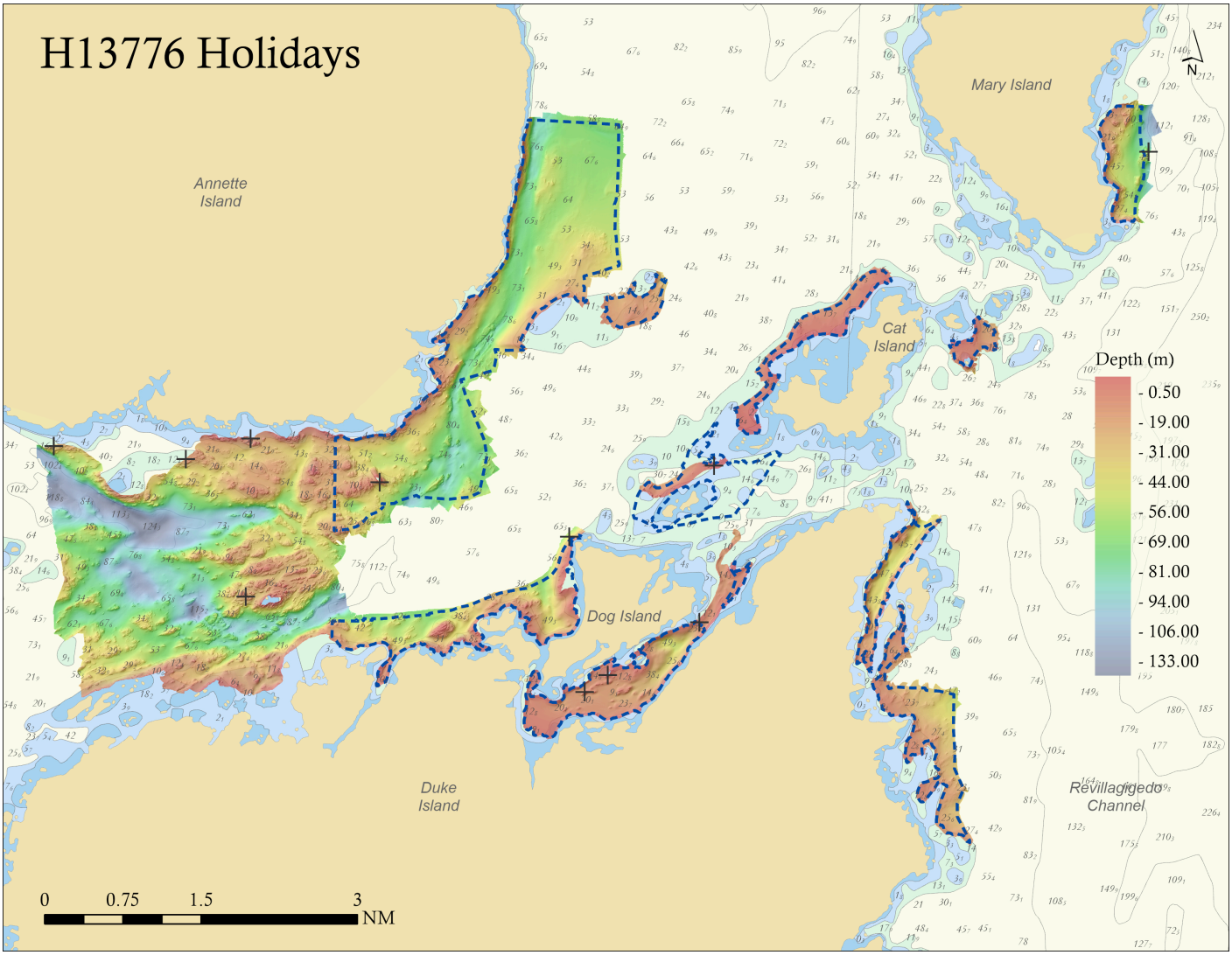


Figure 23: H13776 holidays (11) detected by QC Tools Holiday Finder Tool.

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 the figure below for a greyscale representation of the complete mosaic. Four backscatter mosaics wer created at 2m resolution based on the specifications for a 300kHz system. All equipment and survey methods were used as detailed in the DAPR.

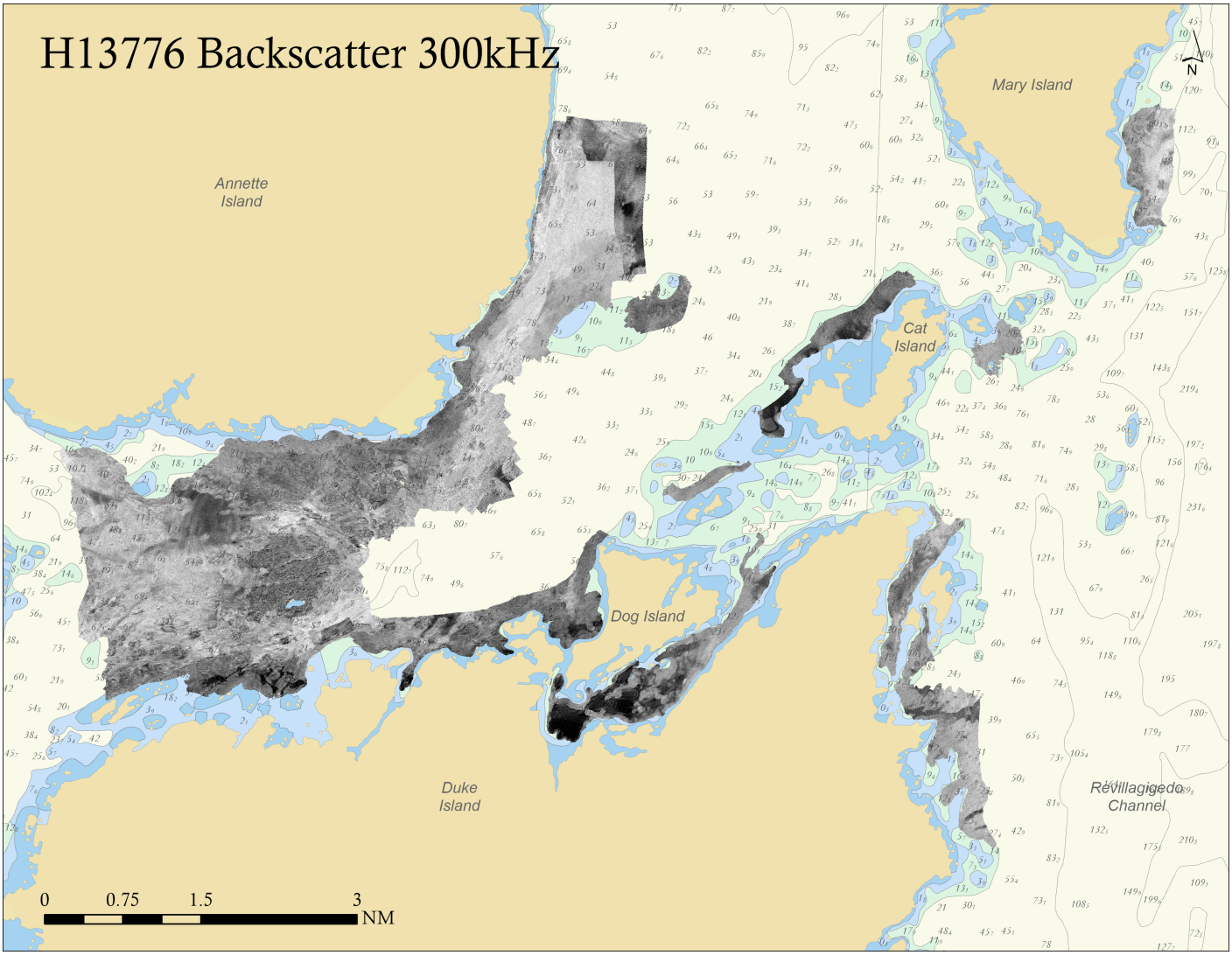


Figure 24: Backscatter mosaics at 300kHz for H13776.

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 10: 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 11: 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
H13776_MB_VR_MLLW	CARIS VR Surface (CUBE)	Variable Resolution	-0.8 meters - 132.7 meters	NOAA_VR	Complete MBES
H13776_MB_VR_MLLW_Final	CARIS VR Surface (CUBE)	Variable Resolution	-0.8 meters - 132.7 meters	NOAA_VR	Complete MBES

Table 12: Submitted Surfaces

The NOAA CUBE parameters defined in the HSSD were used for the creation of all CUBE surfaces for H13776. H13776 data were reviewed in CARIS HIPS and SIPS for flagged areas in accordance with the HSSD. There were 4,064 flagged areas identified via HydrOffice QC Tools Flier Finder tool. This tool automatically scans the surface for fliers as defined in the HSSD and was run in conjunction with a visual inspection of the surface by the hydrographer. These flagged areas were either deemed to be actual representation of the sea floor or flagged due to the stretching of the surface to compensate for shadows created by the dynamic environment of the seabed.

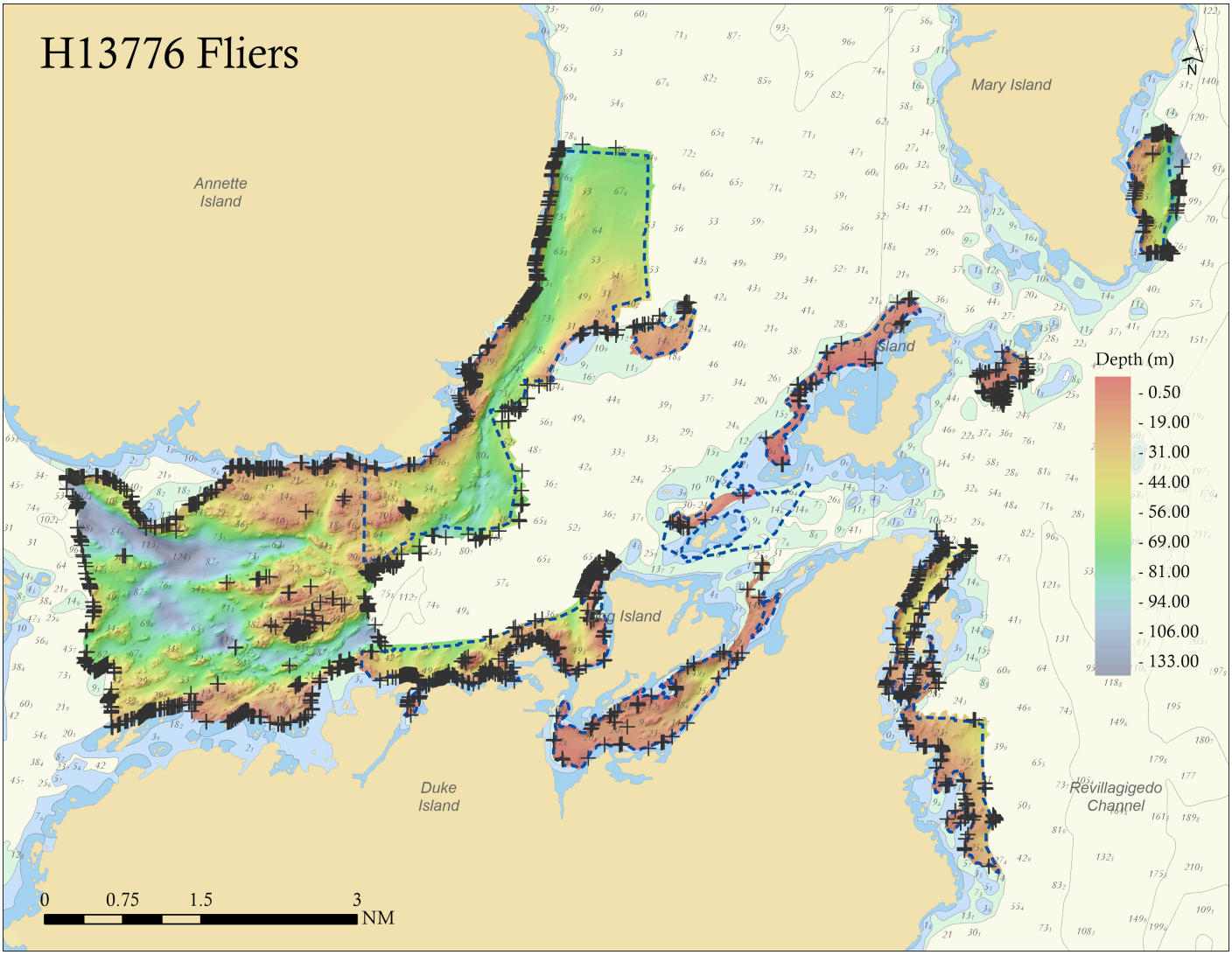


Figure 25: H13776 flagged areas (4,064).

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-O392-FA-23_VDatum_NAD83_2011-MLLW.csar

Table 13: ERS method and SEP file

ERS methods were used as the final means of reducing H13776 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 9.

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 H13776, 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 H13776 (displayed in meters) are generally in agreement with charted soundings from ENC US3AK42M and US4AK49M.

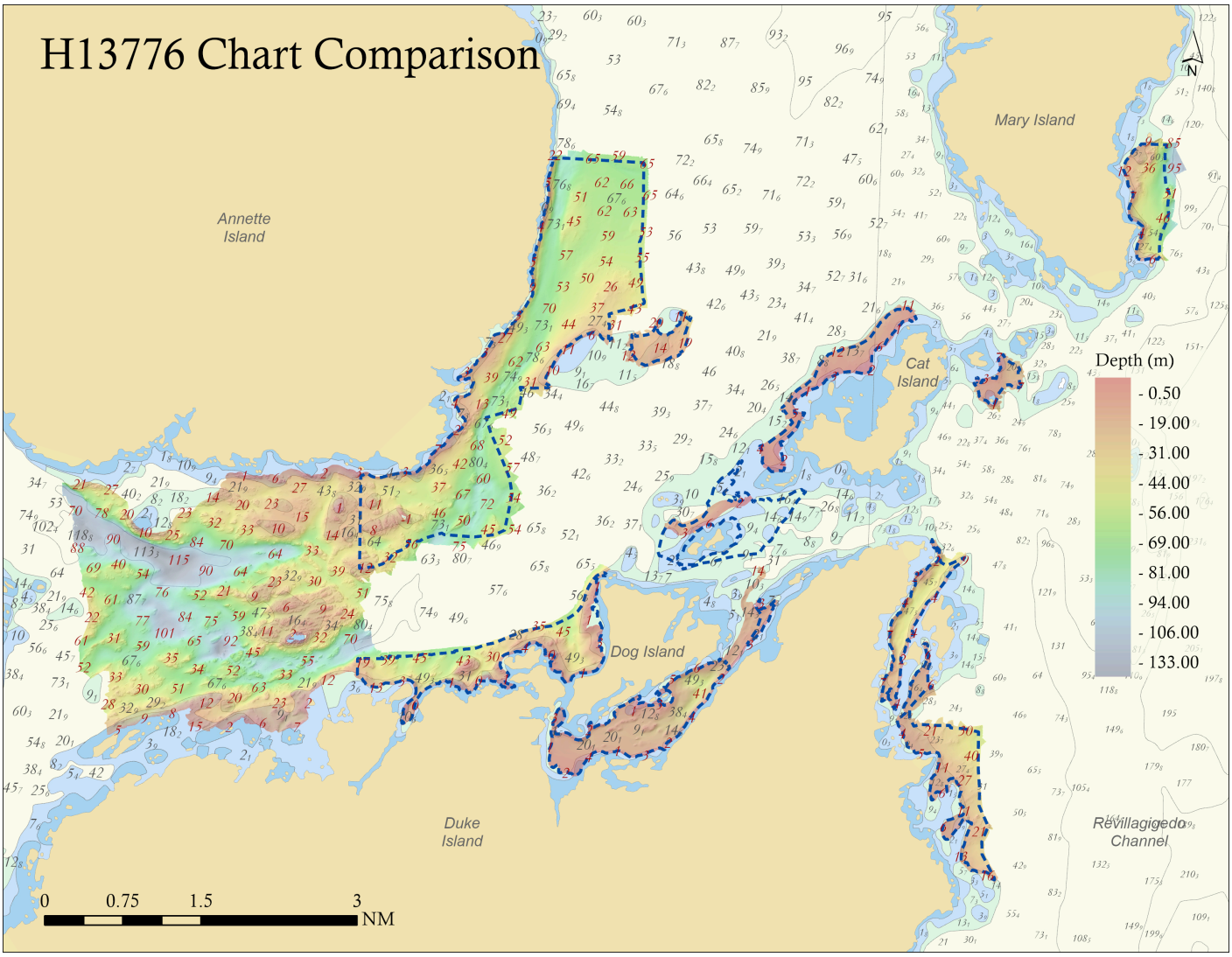


Figure 26: Survey coverage with soundings (in red) overlaid onto ENC US3AK4SM and US4AK49M.

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
US4AK4SM	1:80000	8	11/28/2022	11/28/2022
US4AK49M	1:80000	11	11/28/2022	12/02/2022

Table 14: Largest Scale ENCs

D.1.2 Shoal and Hazardous Features

Two shoals exist for this survey and addressed in the Danger to Navigation Reports submitted. Images of the two shoal areas investigated as DTONs are shown below.

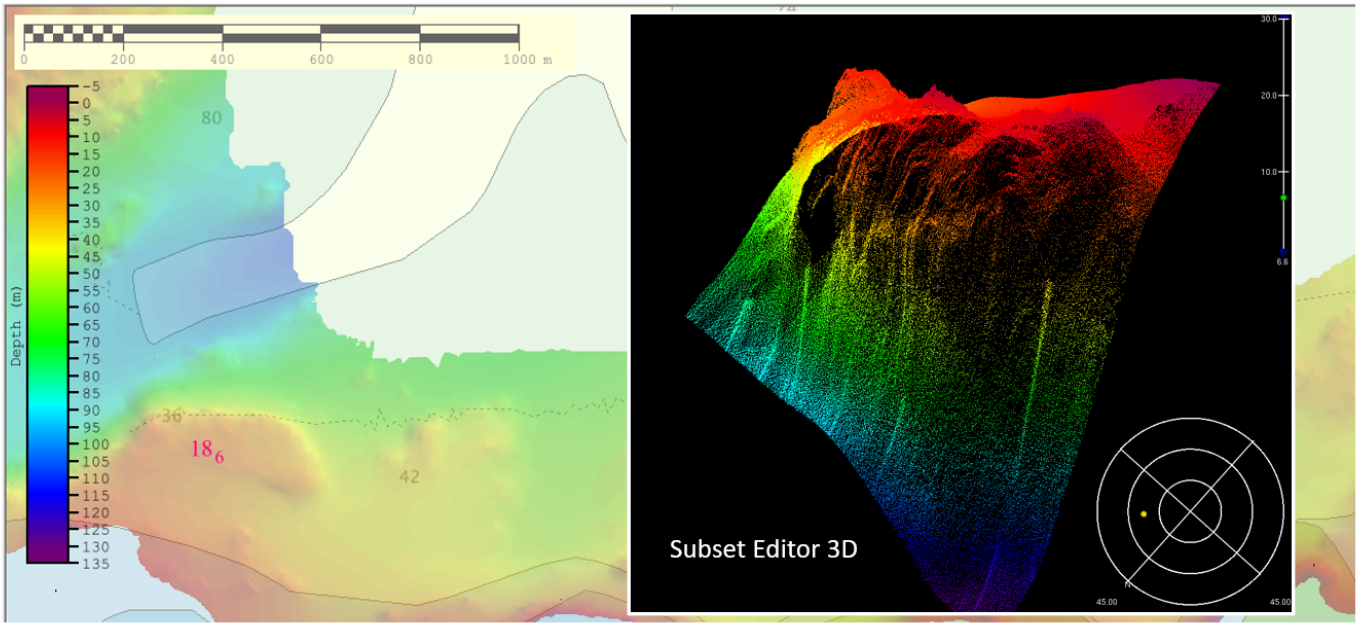


Figure 27: Shoal area submitted as DTON

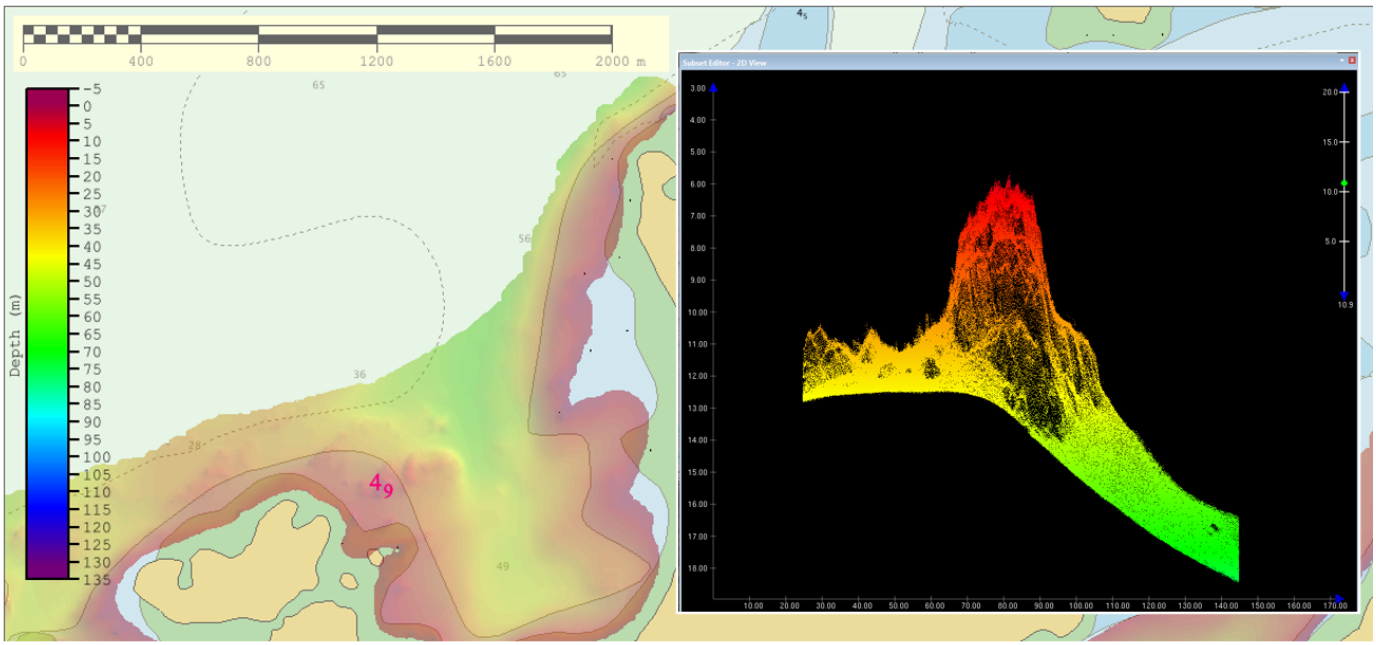


Figure 28: Shoal area submitted as DTON

D.1.3 Charted Features

D.1.4 Uncharted Features

Survey H13776 has 3 new features that are addressed in the H13776 Final Feature File. Of these features, there is one new land area and two new land elevations.

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) were assigned for this survey.

D.2.2 Maritime Boundary Points

No Maritime Boundary Points were assigned for this survey.

D.2.3 Bottom Samples

Bottom samples were assigned for this survey, but were not acquired.

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 14:13:52 -08'00'
LT Michael Card	Operations Officer	11/07/2023	CARD.MICHAEL.DOUGLAS.1011746507 Digitally signed by CARD.MICHAEL.DOUGLAS.1011746507 Date: 2023.11.07 09:47:42 -08'00'
HST Benjamin Bryan	Sheet Manager	11/07/2023	BRYAN.BENJAMIN.MASON.1619908402 Digitally signed by BRYAN.BENJAMIN.MASON.1619908402 Date: 2023.11.07 08:31:31 -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