H13422

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

DESCRIPTIVE REPORT

Type of Survey:	Navigable Area
Registry Number:	H13422

LOCALITY

State(s):	Alaska
General Locality:	Prince William Sound, AK
Sub-locality:	Odiak Channel

2021

CHIEF OF PARTY
CAPT John Lomnicky

LIBRARY & ARCHIVES

Date:

U.S. DEPARTMENT OF COMMERCE NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION	REGISTRY NUMBER:
HYDROGRAPHIC TITLE SHEET	**H13422**

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:	**Prince William Sound, AK**
Sub-Locality:	**Odiak Channel**
Scale:	**10000**
Dates of Survey:	**04/02/2021 to 08/11/2021**
Instructions Dated:	**02/24/2021**
Project Number:	**OPR-P358-FA-21**
Field Unit:	**NOAA Ship *Fairweather***
Chief of Party:	**CAPT John Lomnicky**
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 6N, 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 H13422

Project: OPR-P358-FA-21

Locality: Prince William Sound, AK

Sublocality: Odiak Channel

Scale: 1:10000

April 2021 - August 2021

NOAA Ship *Fairweather*

Chief of Party: CAPT John Lomnicky

A. Area Surveyed

The survey area is located in Odiak Channel, AK.

A.1 Survey Limits

Data were acquired within the following survey limits:

Northwest Limit	Southeast Limit
60° 37' 50.74" N 145° 47' 24.04" W	60° 32' 26.34" N 145° 41' 43.47" W

Table 1: Survey Limits

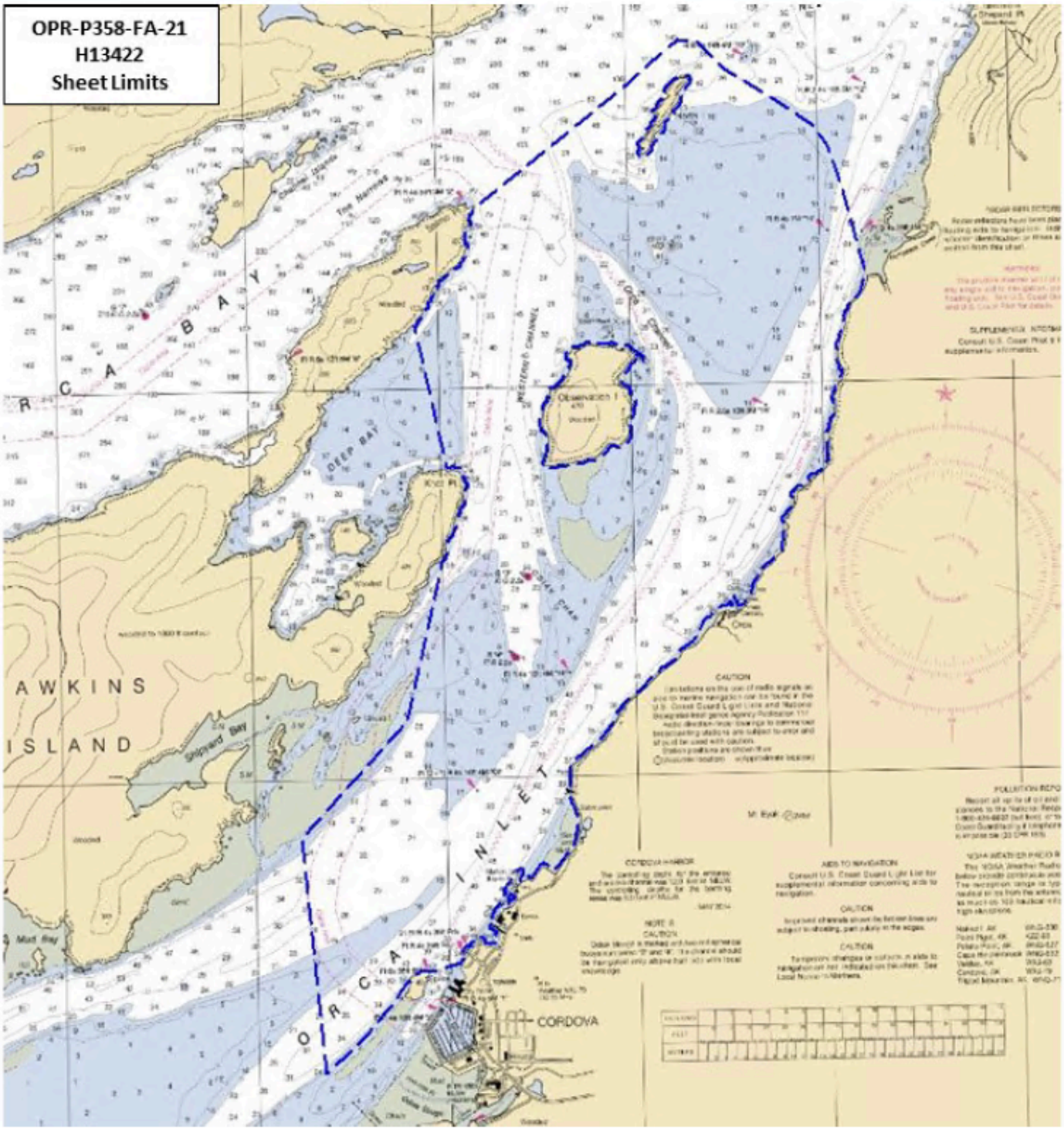


Figure 1: H13422 sheet limits (in blue) overlaid onto Chart 16710

Data were acquired to the survey limits in accordance with the requirements in the Project Instructions and the 2021 NOS Hydrographic Surveys Specifications and Deliverables (HSSD). Coverage acquired in H13422 is shown in Figure 3. In the area where the 3.5 meter depth contour was not met, the Navigable

Area Limit Line (NALL) was defined as the inshore limit of bathymetry due to the risks of maneuvering the survey vessel in close proximity to the rocky shoreline. An example of such an area is shown in Figure 2.

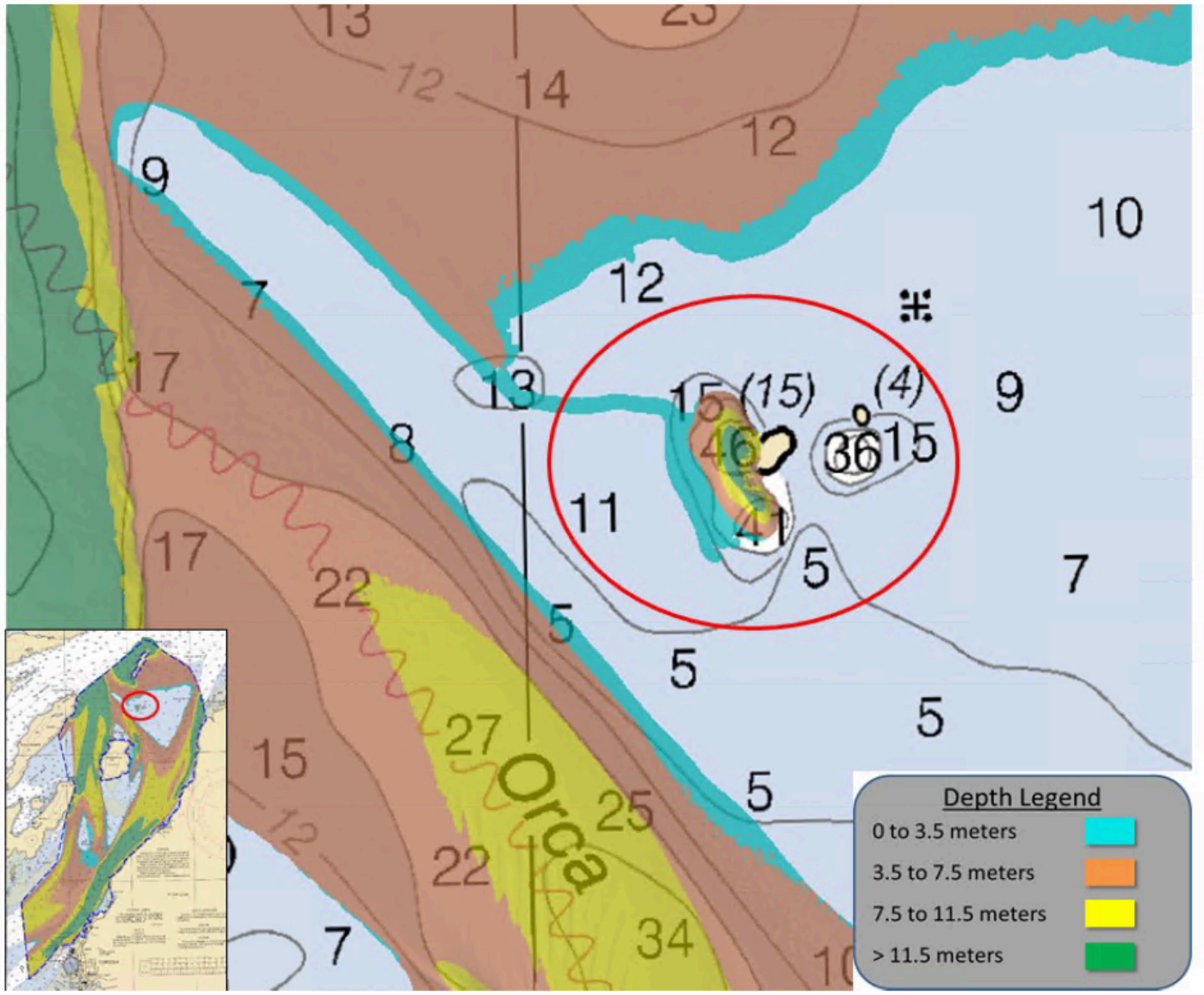


Figure 2: Area where NALL was defined by unsafe navigation

A.2 Survey Purpose

Prince William Sound has 3,800 miles of coastline, supporting the fishing, oil, and tourism industries. This project will provide modern bathymetric data to the Prince William Sound region, which has experienced increased tour boat and cruise ship traffic in recent years. In 2019, the Port of Valdez estimated almost 20,000 passengers aboard cruise ships with the numbers expected to increase.

As the area is becoming more popular, there is greater vessel traffic transiting through the approaches to the port of Cordova. Conducting a modern bathymetric survey in this area will address Seabed 2030 data gaps, identify hazards and changes to the sea floor, provide critical data for updating National Ocean Service (NOS) nautical charting products and improve maritime safety. Survey data from this project is intended to supersede all prior survey data in the common area.

A.3 Survey Quality

The entire survey is adequate to supersede previous data.

Data acquired in H13422 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

Table 2: Survey Coverage

The entirety of H13422 was acquired with complete coverage, meeting the requirements listed above and in the HSSD. See Figure 3 for an overview of coverage.

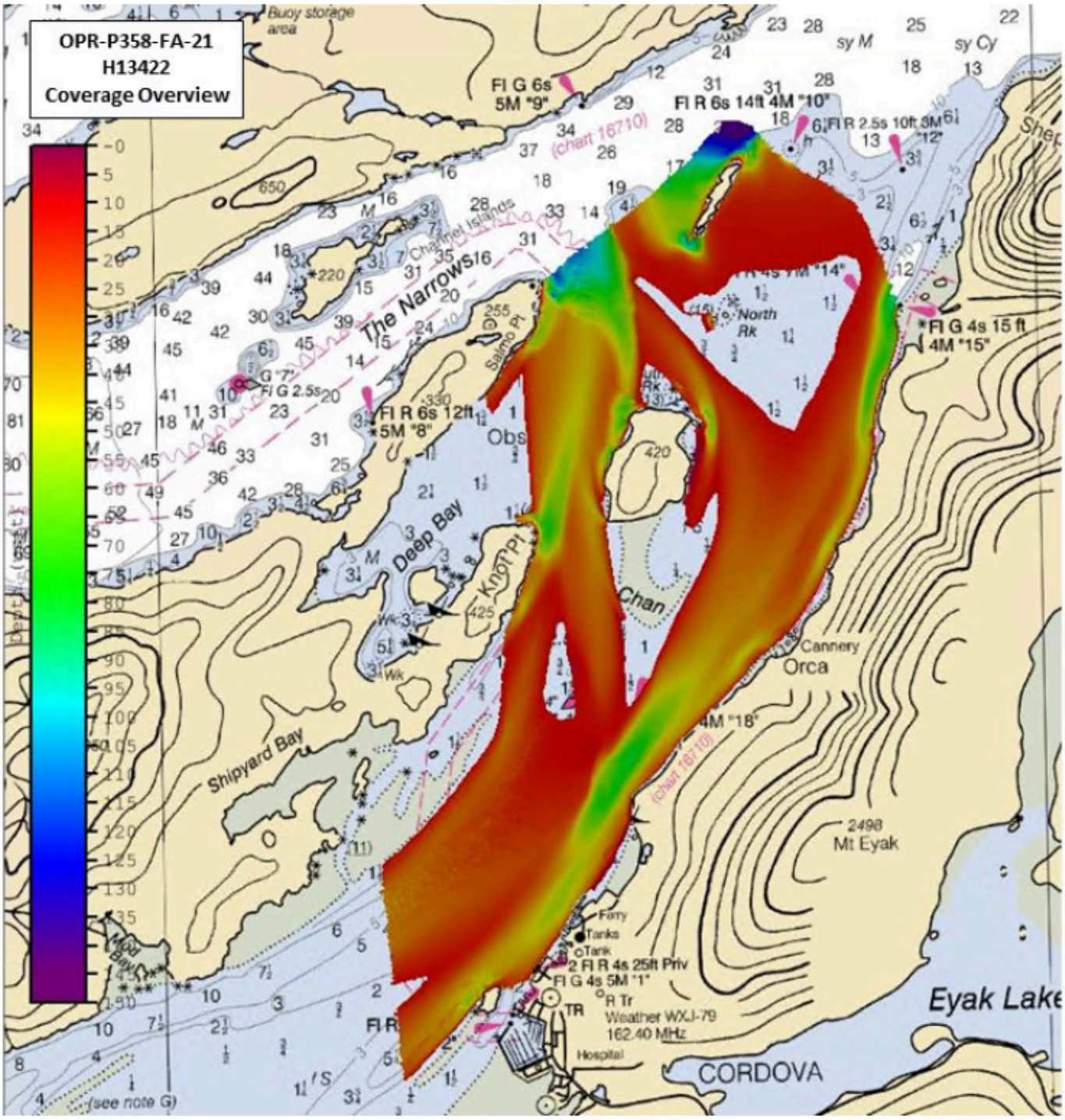


Figure 3: H13422 survey coverage overlaid onto Chart 16709

A.6 Survey Statistics

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

	HULL ID	*FA 2805*	*FA 2806*	*FA 2807*	*FA 2808*	*Total*
LNM	**SBES Mainscheme**	0	0	0	0	0
	MBES Mainscheme	55.79	102.34	206.95	151.62	516.70
	Lidar Mainscheme	0	0	0	0	0
	SSS Mainscheme	0	0	0	0	0
	SBES/SSS Mainscheme	0	0	0	0	0
	MBES/SSS Mainscheme	0	0	0	0	0
	SBES/MBES Crosslines	7.56	0	0	15.95	23.51
	Lidar Crosslines	0	0	0	0	0
Number of Bottom Samples						6
Number Maritime Boundary Points Investigated						0
Number of DPs						0
Number of Items Investigated by Dive Ops						0
Total SNM						5.87

Table 3: Hydrographic Survey Statistics

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

Survey Dates	Day of the Year
04/02/2021	92

Survey Dates	Day of the Year
04/03/2021	93
04/04/2021	94
04/08/2021	98
04/09/2021	99
07/29/2021	210
07/30/2021	211
07/31/2021	212
08/10/2021	222
08/11/2021	223

Table 4: Dates of Hydrography

B. Data Acquisition and Processing

B.1 Equipment and Vessels

Refer to the OPR-P358-FA-21 Data Acquisition and Processing Report (DAPR) for a complete description of data acquisition and processing systems, survey vessels, quality control procedures and data processing methods. Additional information to supplement sounding and survey data, and any deviations from the DAPR are discussed in the following sections.

B.1.1 Vessels

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

Hull ID	*2805*	*2806*	*2807*	*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

The following values HVFs for Vessels 2805 and 2808 differ from what is reported in the DAPR: Vessel 2805: Waterline: -0.622m; Vessel 2806: Draft Uncertainty: 0.011m, Waterline: -0.624; Vessel 2807: Draft Uncertainty: 0.010; Vessel 2808: Draft Uncertainty: 0.014, Waterline: -0.631 HVF.

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
Teledyne RESON	SVP 71	Sound Speed System
Applanix	POS MV 320 v5	Positioning and Attitude System

Table 6: Major Systems Used

All launches utilize the Kongsberg EM 2040 MBES, a POS M/V v5 system for position and attitude, SVP 71 surface sound speed sensors, and Sea-Bird SBE 19plus v2 CTDs for conductivity, temperature, and depth casts.

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. 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 (Figure 4). Statistics show the mean difference between the depths derived from mainscheme data and crossline data was 0.00 meters and 95% of nodes falling within +/- 0.11 meters (Figure 5). For the respective depths, the difference surface was compared to the allowable NOAA uncertainty standards. In total, 99.43% of the depth differences between H13422 mainscheme and crossline data were within allowable NOAA uncertainties.

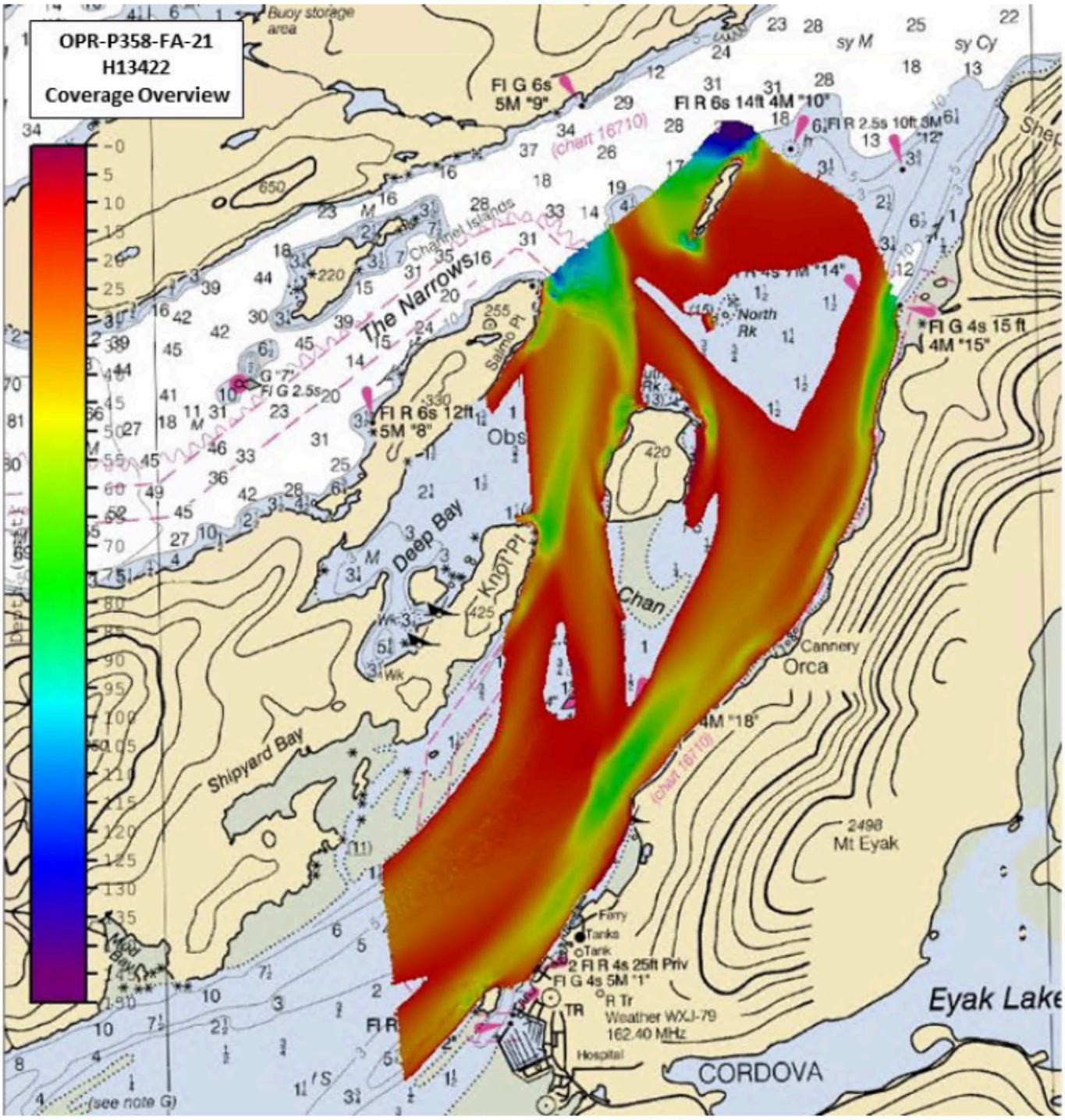
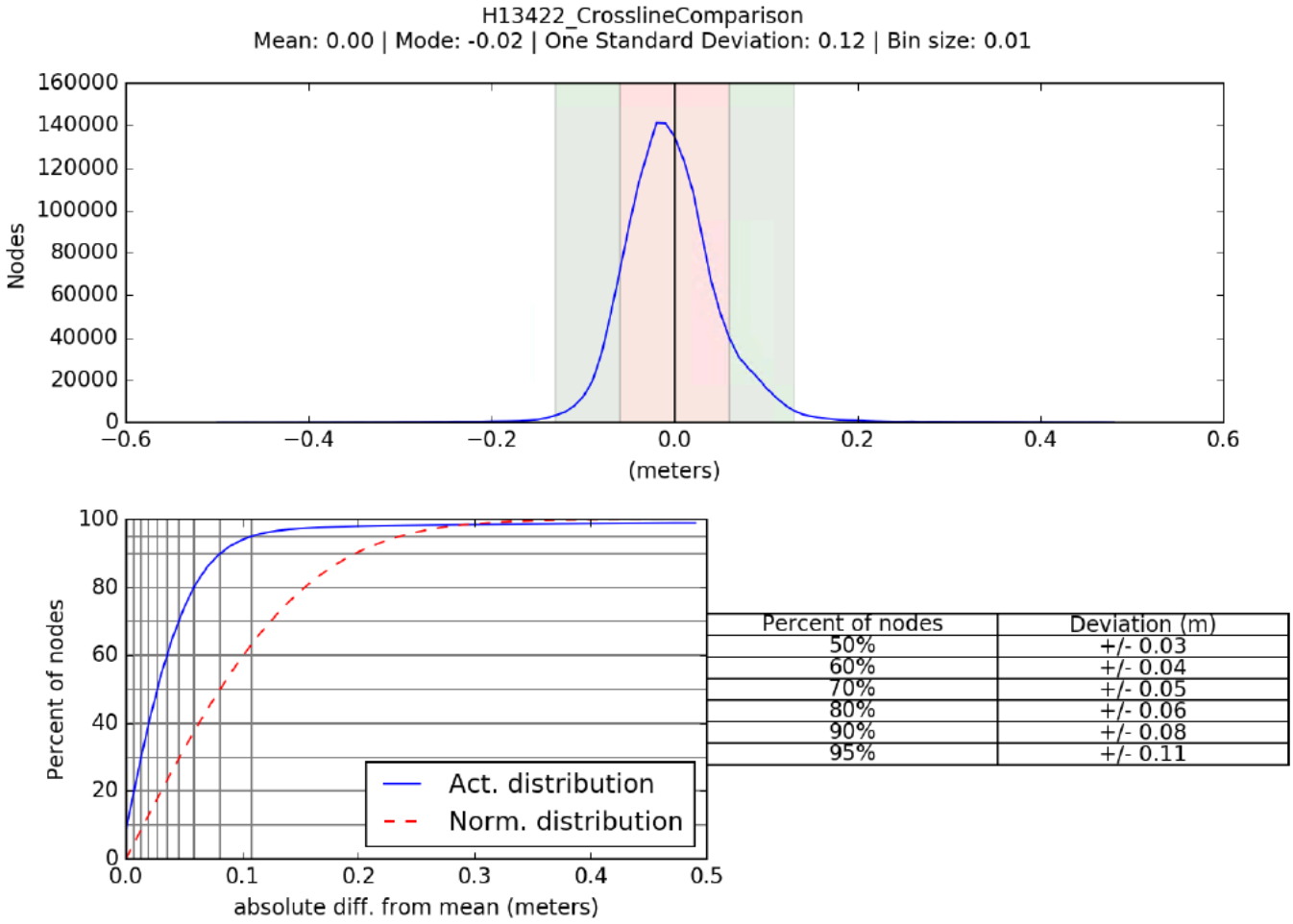


Figure 4: Overview of H13422 crosslines



Percent of nodes	Deviation (m)
50%	+/- 0.03
60%	+/- 0.04
70%	+/- 0.05
80%	+/- 0.06
90%	+/- 0.08
95%	+/- 0.11

Figure 5: H13422 crossline and mainscheme difference statistics

B.2.2 Uncertainty

The following survey specific parameters were used for this survey:

Method	Measured	Zoning
ERS via ERTDM	N/A	0.13 meters

Table 7: Survey Specific Tide TPU Values.

Hull ID	Measured - CTD	Measured - MVP	Measured - XBT	Surface
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, real-time and post-processed uncertainty sources were also incorporated into the depth estimates of survey H13422. Real-time uncertainties were provided via EM 2040 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

H13422 junctions with 2 surveys from prior projects, H11496 and H11497 as shown in Figure 6. Data overlap between H13422 and each adjacent survey was achieved. These areas of overlap between surveys were reviewed in CARIS HIPS and SIPS by surface differencing (at equal resolutions) to assess surface agreement. The multibeam data were also examined in CARIS Subset Editor for consistency and agreement. The junctions with H13422 generally exceed the NOAA allowable uncertainty in their areas of overlap. For all junctions with H13422, a negative difference indicates H13422 was shoaler and a positive difference indicates H13422 was deeper.

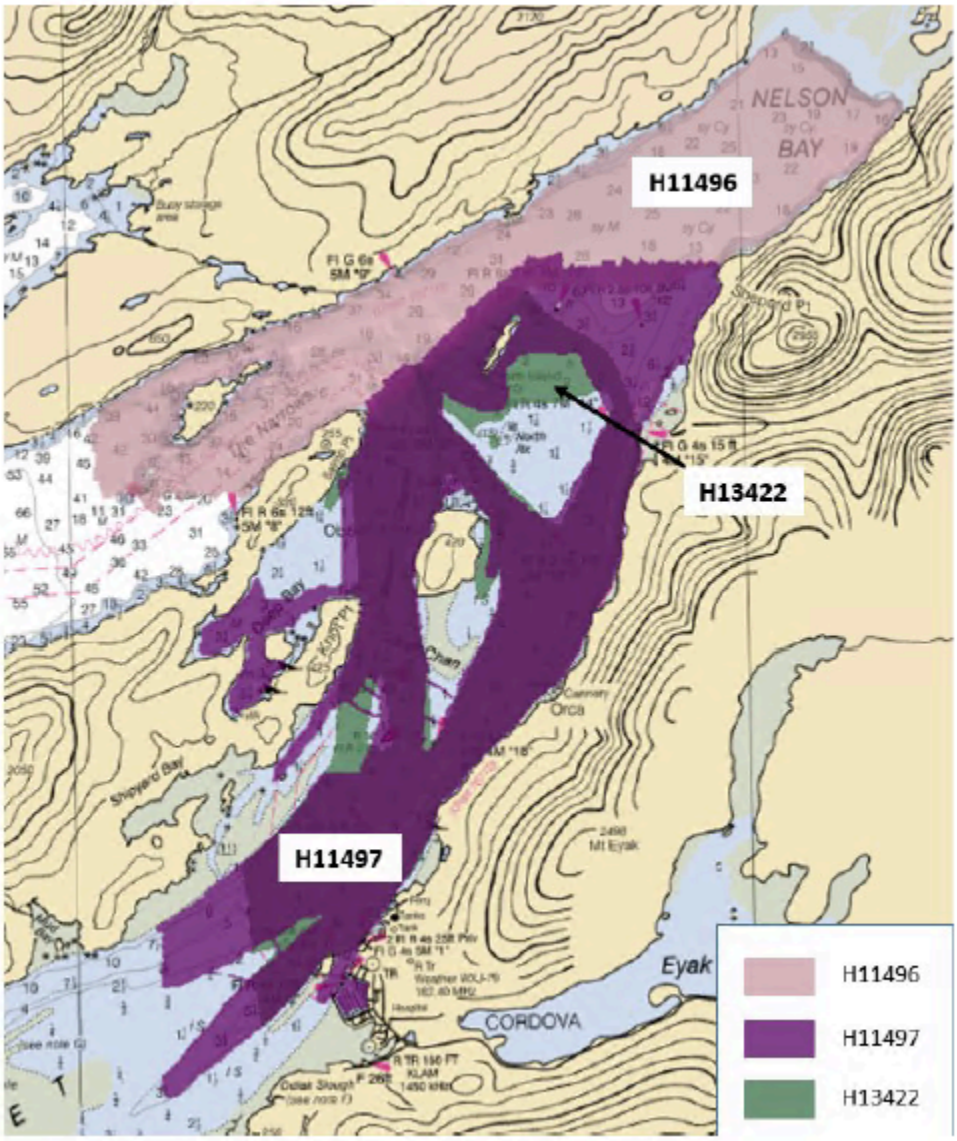


Figure 6: Overview of H13422 junction surveys

The following junctions were made with this survey:

Registry Number	Scale	Year	Field Unit	Relative Location
H11496	1:10000	2005	Fairweather	N
H11497	1:10000	2005	Fairweather	S

Table 9: Junctioning Surveys

H11496

Surface differencing in CARIS HIPS and SIPS was used to assess junction agreement between the surface from H13422 and the surface from H11496 (Figure 7). The statistical analysis of the difference surface shows a mean of 0.27 meters with 95% of the nodes having a maximum deviation of +/- 1.35 meters, as seen in Figure 8. It was found that 85.80% of nodes are within NOAA allowable uncertainty.

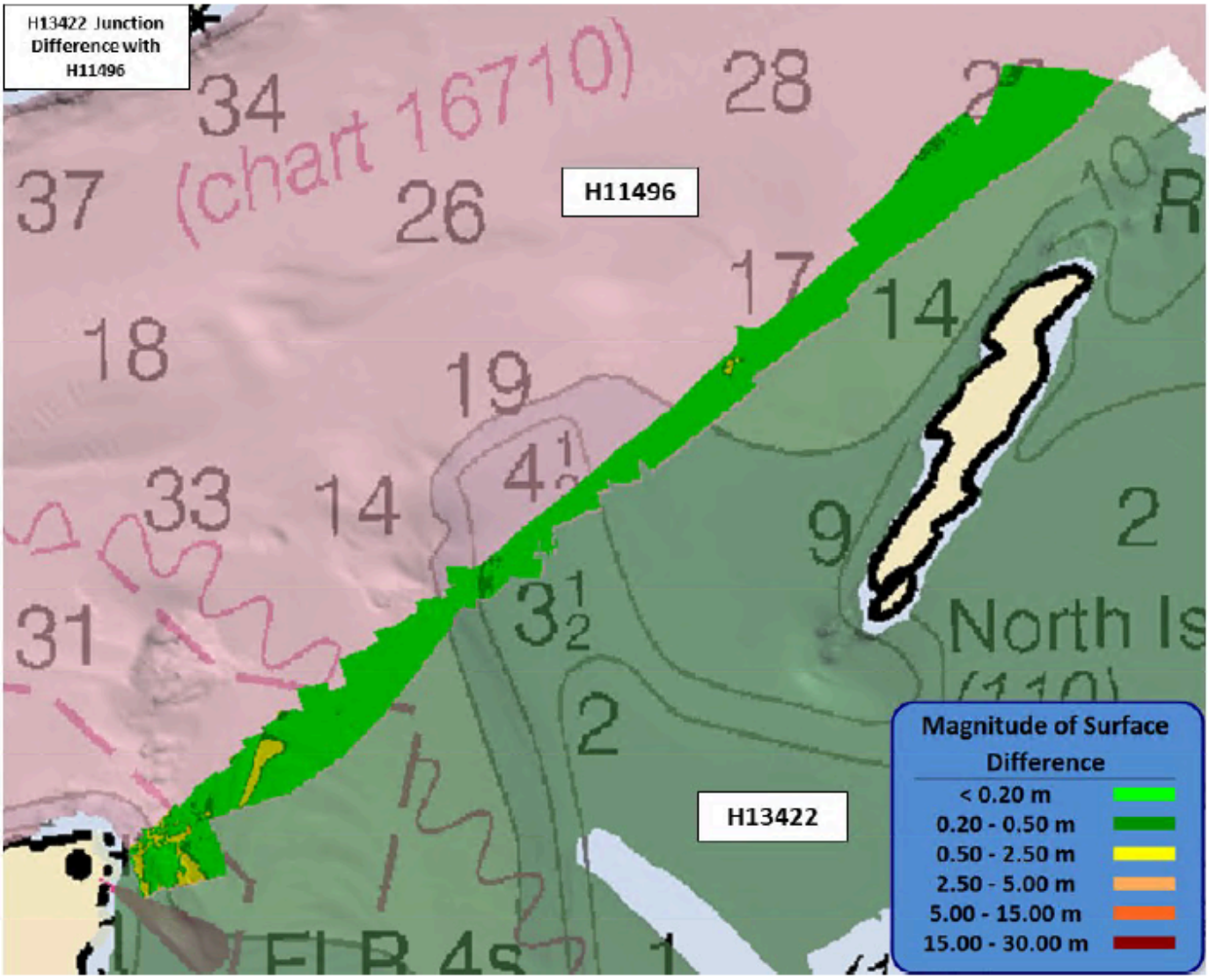
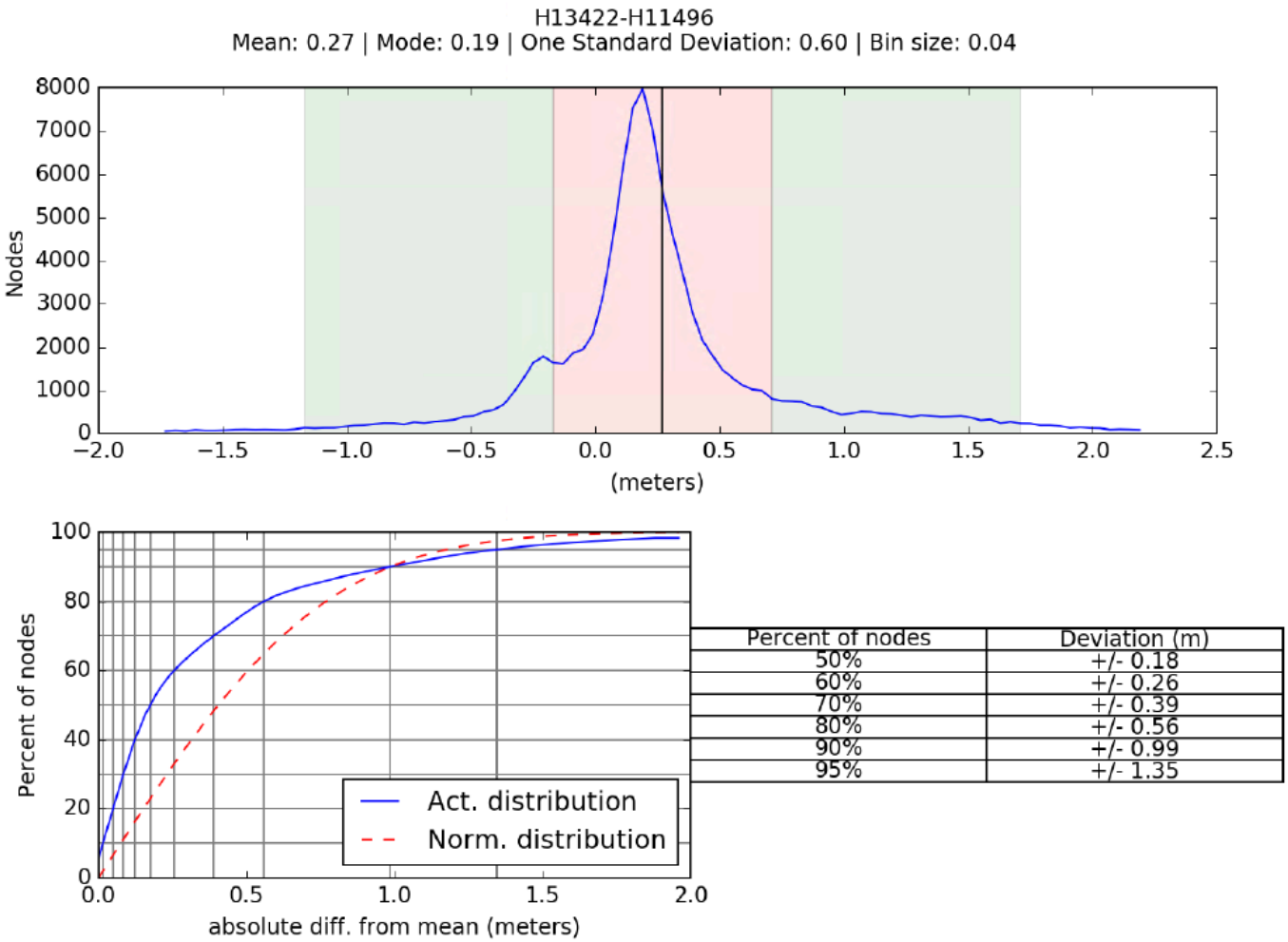


Figure 7: Difference surface between H13422 (green) and junctioning survey H11496 (pink)



Percent of nodes	Deviation (m)
50%	+/- 0.18
60%	+/- 0.26
70%	+/- 0.39
80%	+/- 0.56
90%	+/- 0.99
95%	+/- 1.35

Figure 8: Difference surface statistics between H13422 and H11496 (VR surface)

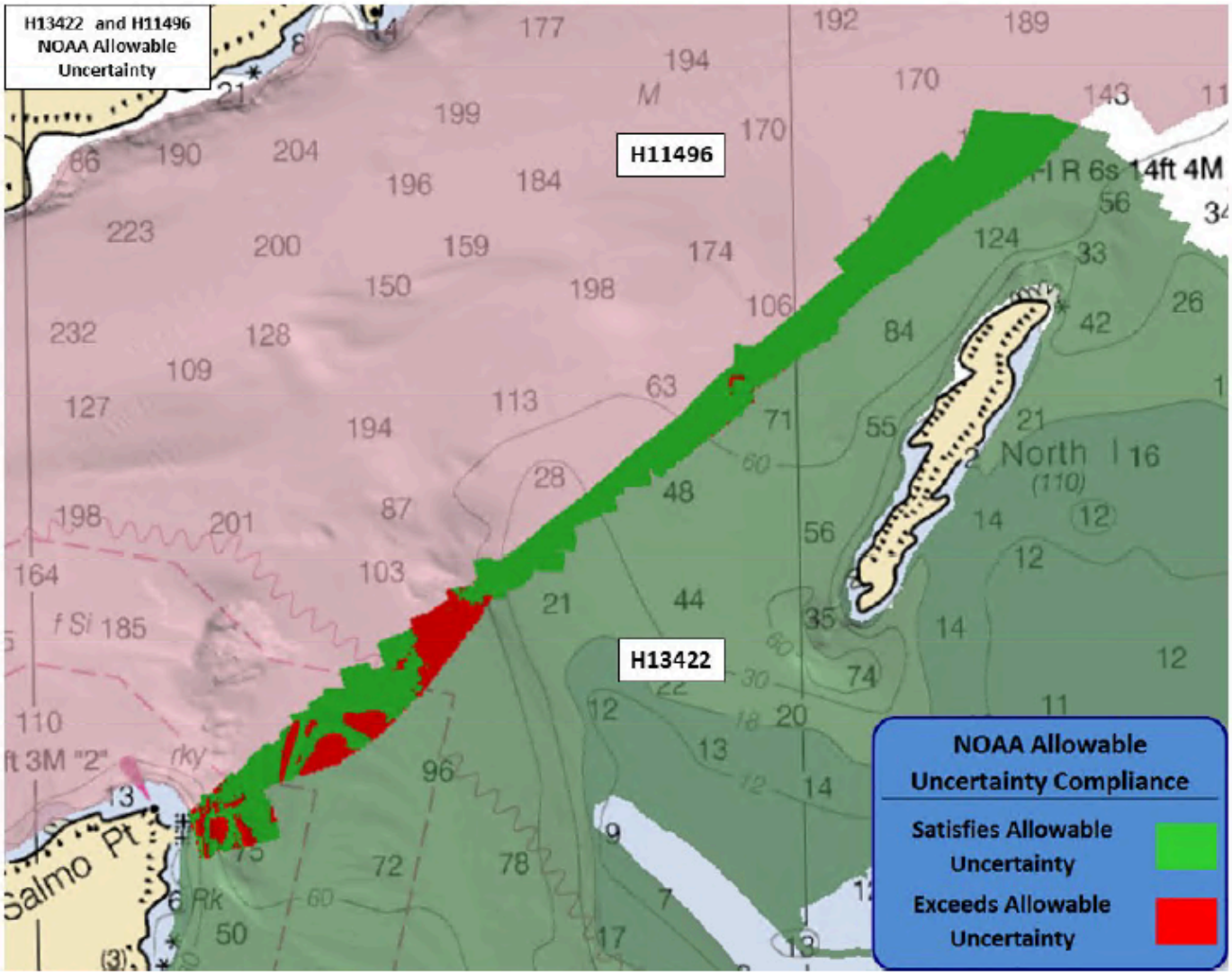


Figure 9: Difference surface compliance with NOAA allowable uncertainty between H13422 (green) and junctioning survey H11496 (pink)

H13422 NOAA Allowable Uncertainty

Variable Resolution Surface	
Total Nodes	99,912
Total Nodes Pass	85,725
Total Percent Pass	85.80%

Figure 10: Difference surface statistics between H13422 and H11496 showing percentage of nodes meeting NOAA allowable uncertainty

H11497

Surface differencing in CARIS HIPS and SIPS was used to assess junction agreement between the surface from H13422 and the surface from H11497 (Figure 11). The statistical analysis of the difference surface shows a mean of 0.08 meters with 95% of the nodes having a maximum deviation of +/- 2.18 meters, as seen in Figure 12. It was found that 76.87% of nodes are within NOAA allowable uncertainty. The sea floor in the survey area consists of dynamic sand waves, which could explain the large uncertainty values.

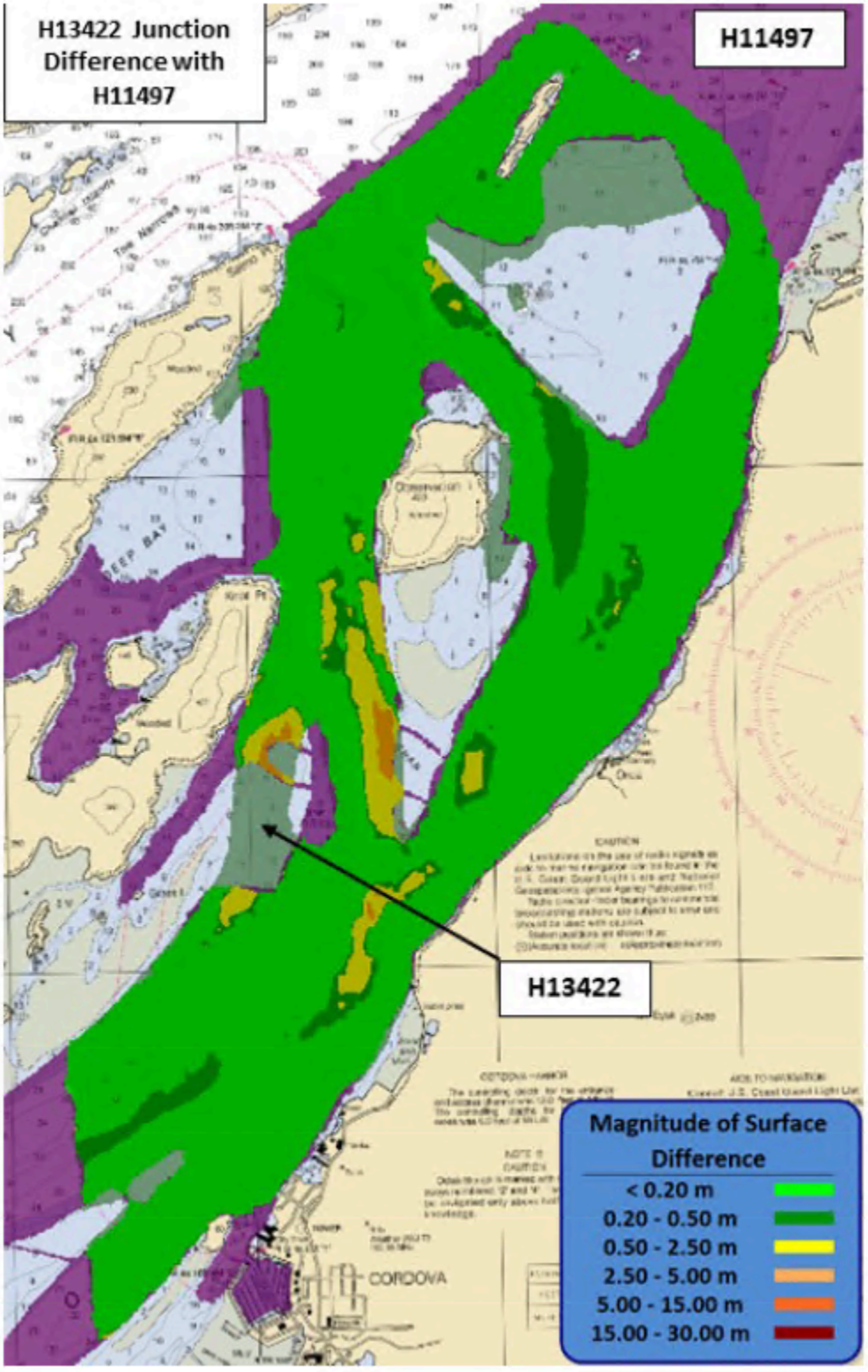
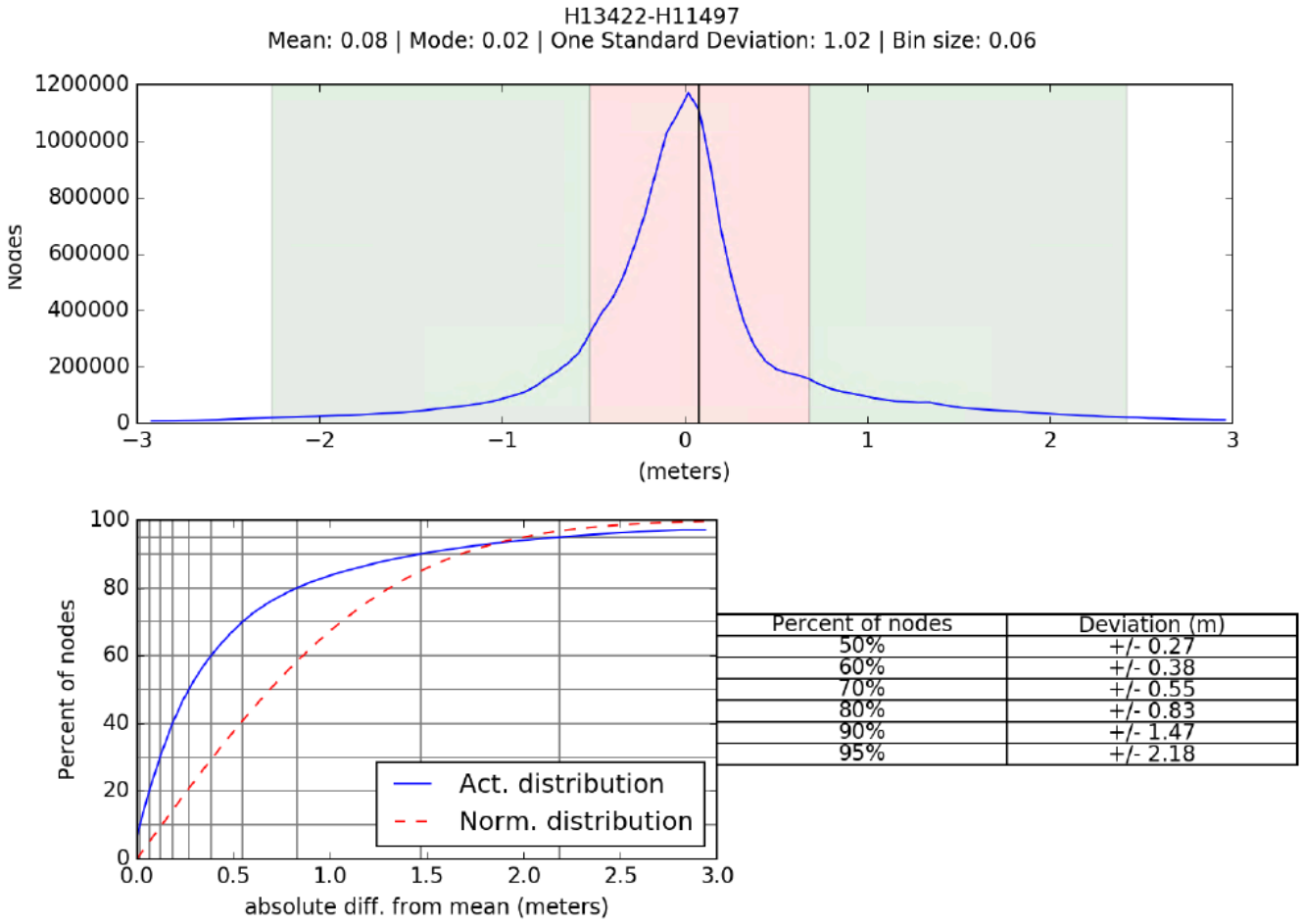


Figure 11: Difference surface between H13422 (green) and junctioning survey H11497 (purple)



Percent of nodes	Deviation (m)
50%	+/- 0.27
60%	+/- 0.38
70%	+/- 0.55
80%	+/- 0.83
90%	+/- 1.47
95%	+/- 2.18

Figure 12: Difference surface statistics between H13422 and H11497 (VR surface)

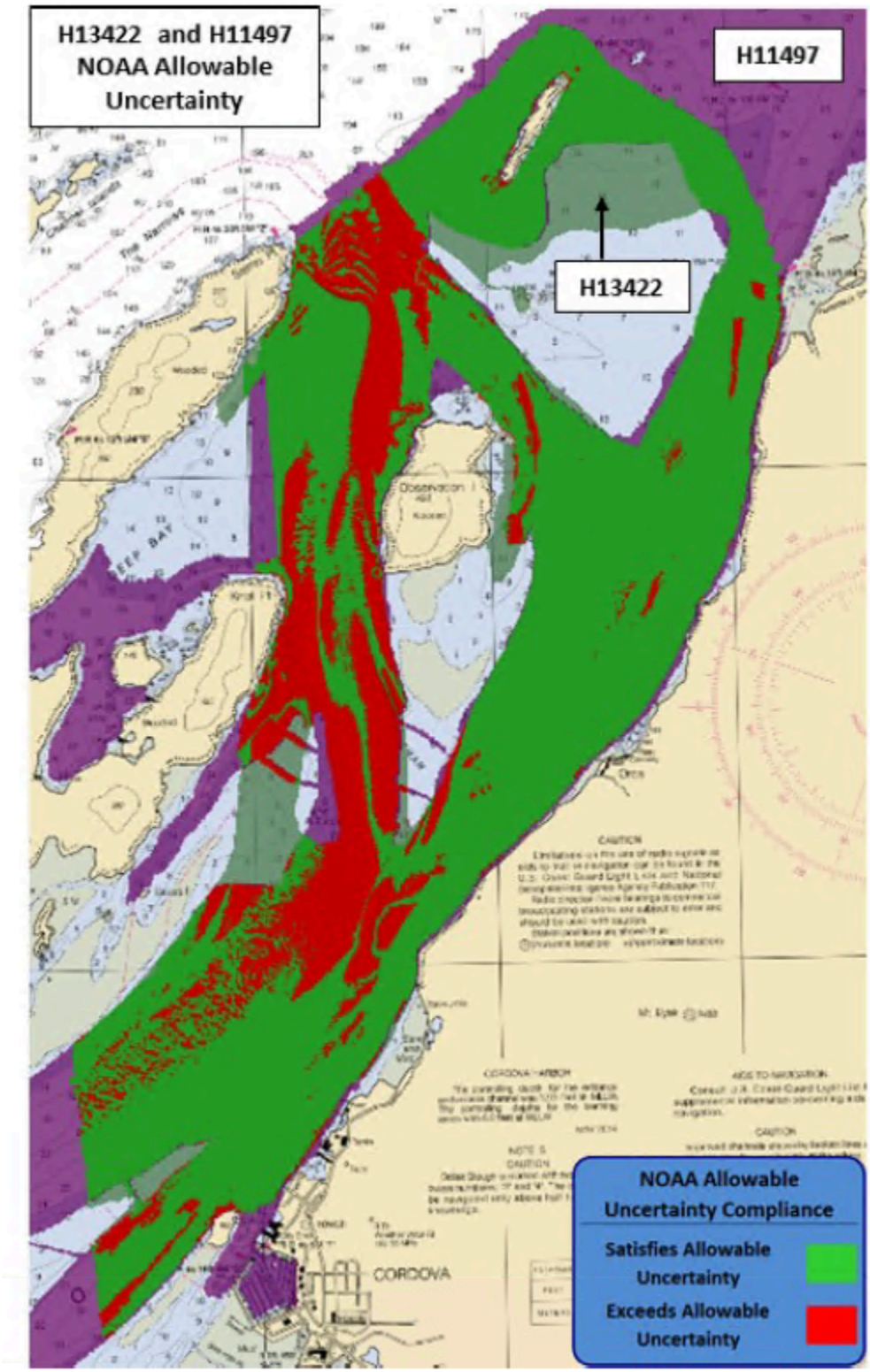
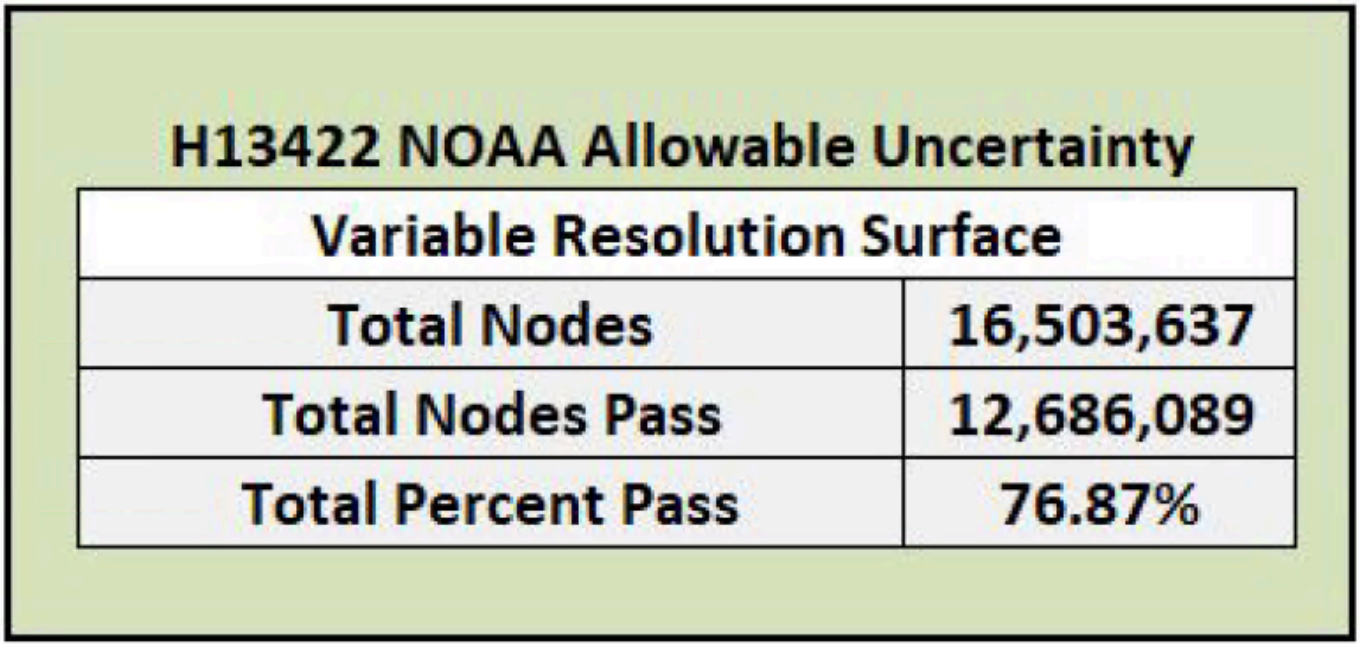


Figure 13: Difference surface compliance with NOAA allowable uncertainty between H13422 (green) and junctioning survey H11497 (purple)



H13422 NOAA Allowable Uncertainty

Variable Resolution Surface	
Total Nodes	16,503,637
Total Nodes Pass	12,686,089
Total Percent Pass	76.87%

Figure 14: Difference surface statistics between H13422 and H11497 showing percentage of nodes meeting NOAA allowable uncertainty

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. All sound speed methods were used as detailed in the DAPR.

B.2.8 Coverage Equipment and Methods

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

B.2.9 Holidays

H13422 data were reviewed in CARIS HIPS and SIPS for holidays in accordance with Section 5.2.2.3 of the HSSD. No holidays which meet 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.

B.2.10 NOAA Allowable Uncertaintly

The surface was analyzed using the HydroOffice QC Tools Grid QA feature to determine compliance with specifications. Overall, 99.5% of nodes within the surface meet NOAA Allowable Uncertainty specifications for H13422 (Figure 16).

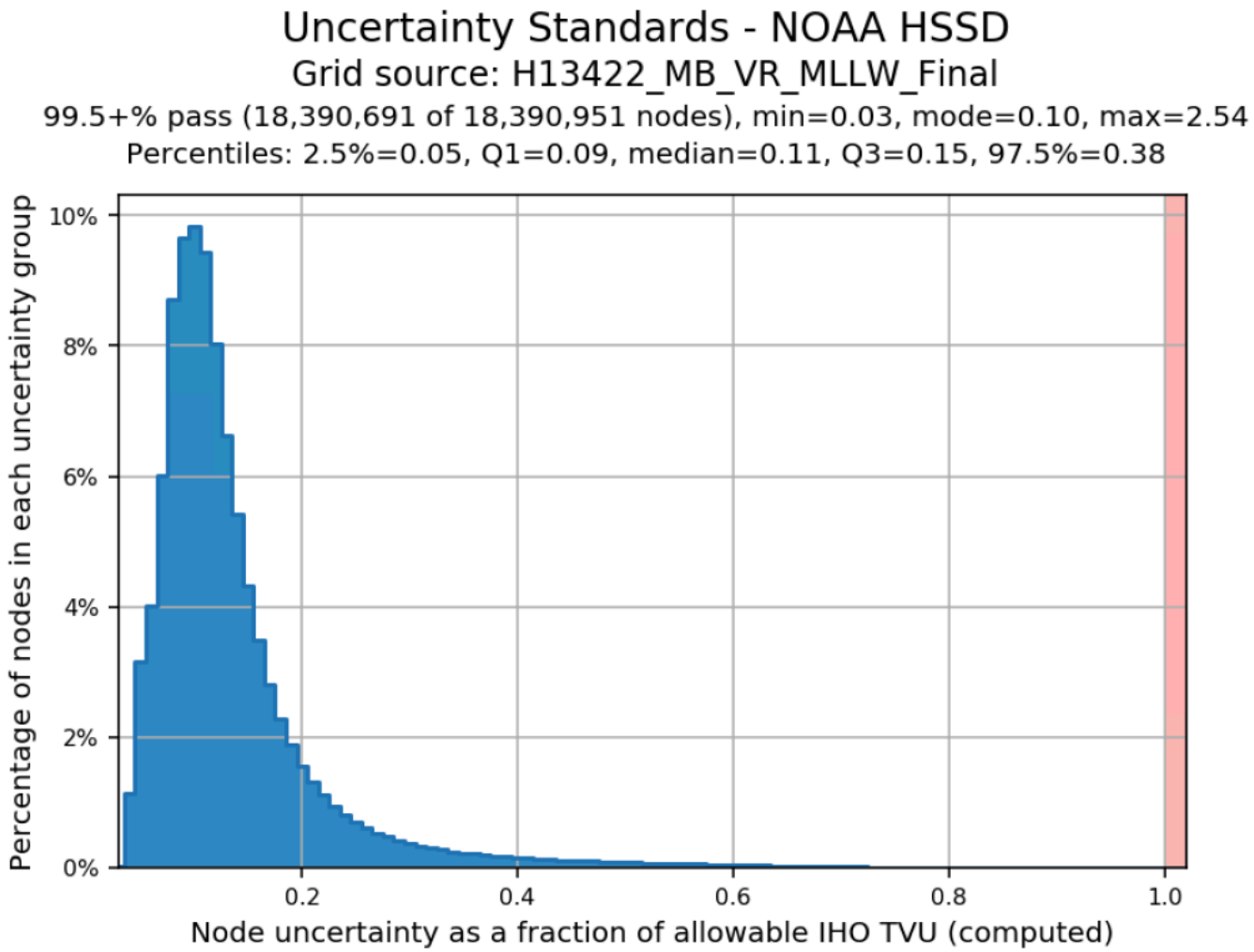


Figure 15: H13422 allowable uncertainty statistics

B.2.11 Density

The surface was analyzed using the HydrOffice QC Tools Grid QA feature to determine compliance with specifications. Density requirements for H13422 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 17).

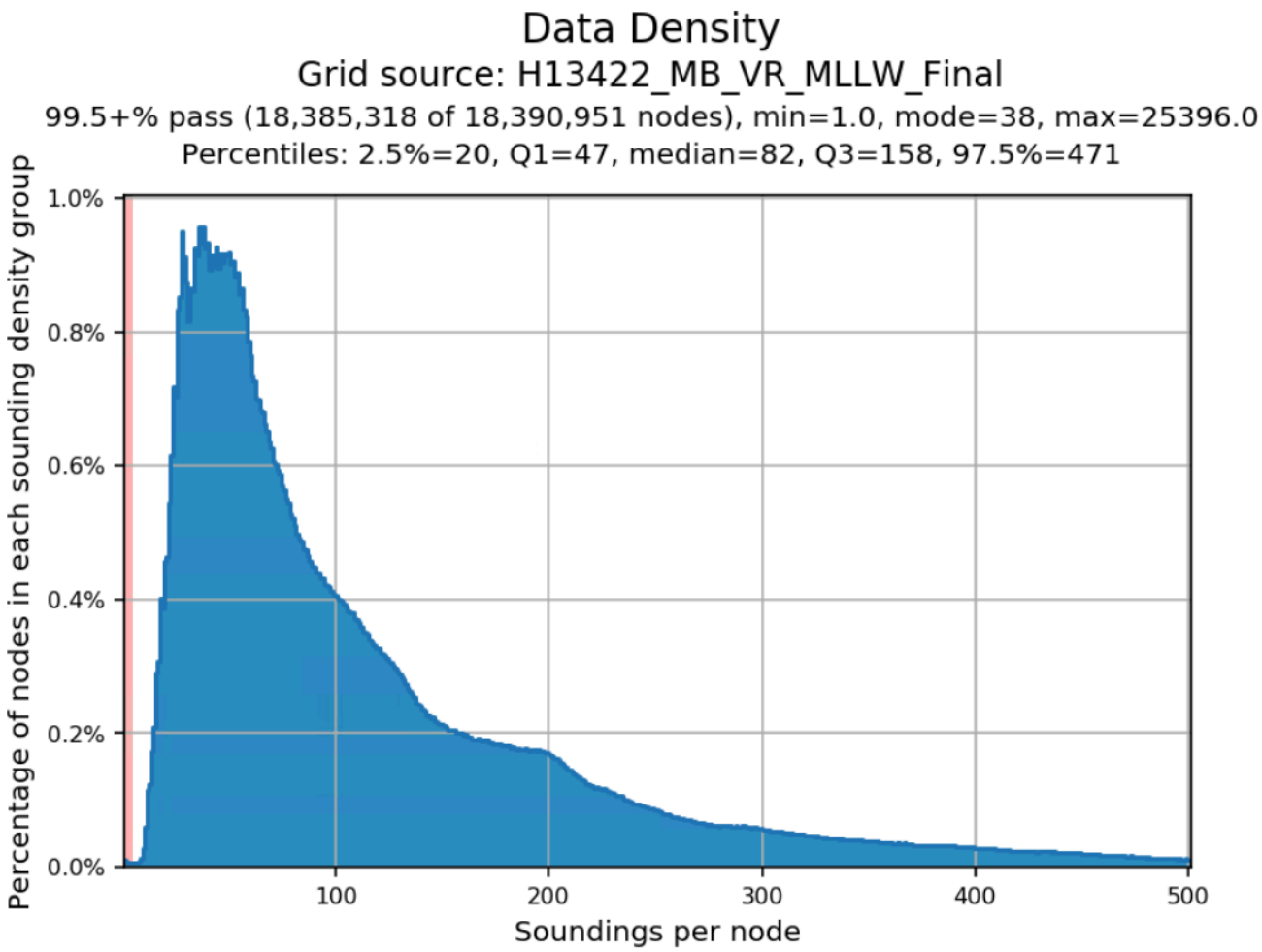


Figure 16: H13422 data density statistics

B.3 Echo Sounding Corrections

B.3.1 Corrections to Echo Soundings

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

B.3.2 Calibrations

All sounding systems were calibrated as detailed in the DAPR.

B.4 Backscatter

Raw backscatter data were stored in the .all file for Kongsberg systems. All backscatter were processed to GSF files and a floating point mosaic was created by the field unit via Fledermaus FMGT 7.9.0. See Figure 18 for a greyscale representation of the complete mosaic. 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 19 for a table of the calibration values entered into the Processing Settings within FMGT. Approximate inter-calibration corrections for offsets between Kongsberg EM2040 sonar systems were applied to the mosaic.

Figure 17: Backscatter mosaic for H13422

	200				300				400		
	Short CW	Med CW	Long CW	FM (Both)	Short CW	Med CW	Long CW	FM (Both)	Short CW	Med CW	Long CW
2805	0.6	0.3	0.0	0.0	0	0.45	0.9	0	-1.2	-0.75	-0.3
2806	-	-	-	-	-	-	-	-	-	-	-
2807	0.6	0.45	0.3	0.6	-0.9	-0.45	0	-1.2	0.3	0.75	1.2
2808	1.5	1.2	0.9	0.6	-0.3	0.15	0.6	0	-2.4	-1.5	-0.6

Figure 18: Backscatter calibration values

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	11.3

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	7.9.0

Table 11: Primary imagery data processing software

The following Feature Object Catalog was used: NOAA Profile Version 2021.

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
H13422_MB_VR_MLLW	CARIS VR Surface (CUBE)	Variable Resolution	0 meters - 44.2 meters	NOAA_VR	Complete MBES
H13422_MB_VR_MLLW_Final	CARIS VR Surface (CUBE)	Variable Resolution	0 meters - 44.2 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 H13422. 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 all remaining flagged fliers were deemed to be valid aspects of the surface.

C. Vertical and Horizontal Control

Per Section 5.2.2.1.3 of the 2020 Field Procedures Manual no Horizontal and Vertical Control Report has been generated for H13422.

C.1 Vertical Control

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

ERS Datum Transformation

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

Method	Ellipsoid to Chart Datum Separation File
ERS via ERTDM	OPR-P358-FA-21_PWS_ERTDM21-1_NAD83-MHW

Table 13: ERS method and SEP file

ERS methods were used as the final means of reducing H13422 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 6.

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 H13422 as no DGPS stations were available for real-time horizontal control.

D. Results and Recommendations

D.1 Chart Comparison

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
US5AK2CM	1:10000	13	09/29/2021	09/29/2021

Table 14: 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

Survey H13422 has 21 new features that are addressed in the H13422 Final Feature File. Of these features, there is 1 new Buoy, 1 new Light, 1 new Land area, 1 new Land elevation, 1 new Mooring/warping facility, 1 new Obstruction, 2 new Piles, 7 new Seabed areas, 1 new Shoreline construction, 4 new Underwater/awash rocks, and 1 new wreck , none of which are submitted as DTONs.

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

All ATONS on sheet H13422 were investigated and attributed in the Final Feature File.

D.2.2 Maritime Boundary Points

No Maritime Boundary Points were assigned for this survey.

D.2.3 Bottom Samples

Six bottom samples were acquired in accordance with the Project Instructions for survey H13422. All bottom samples were entered in the H13422 Final Feature File. See Figure 20 for a graphical overview of sample locations.

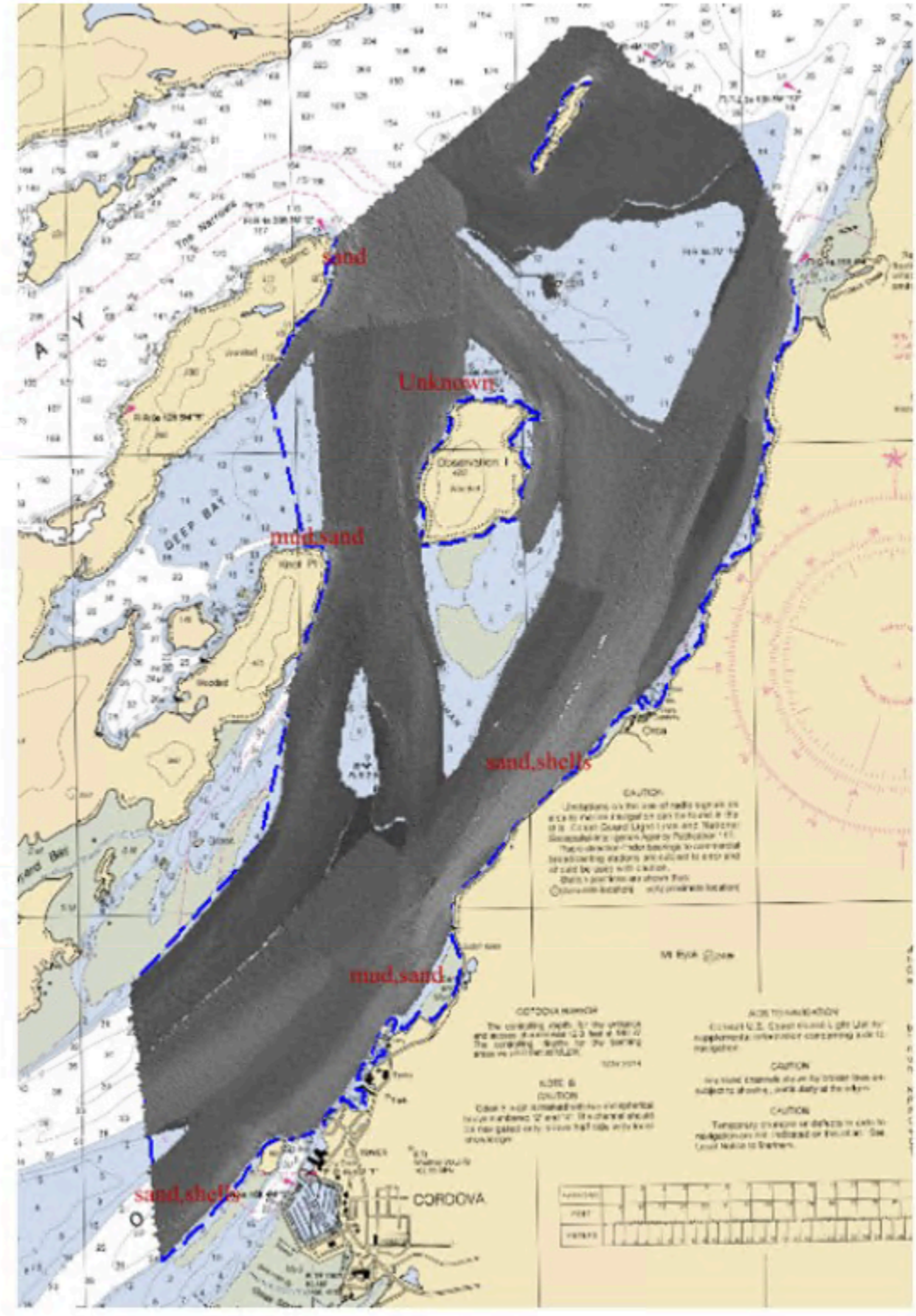


Figure 19: H13422 Bottom sample locations

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

The Cordova Port and Terminal are part of the Alaska Marine Highway System, however, no ferry routes are currently charted for this area.

D.2.8 Abnormal Seafloor or Environmental Conditions

A large portion of the sea floor in Sheet H13422 consisted of dynamic sand waves. This area was surveyed over two periods of time, separated by approximately 3 months. During this time, the sand waves changed enough to create surface tears in several areas of the sheet. Figure 21 shows one of those areas.

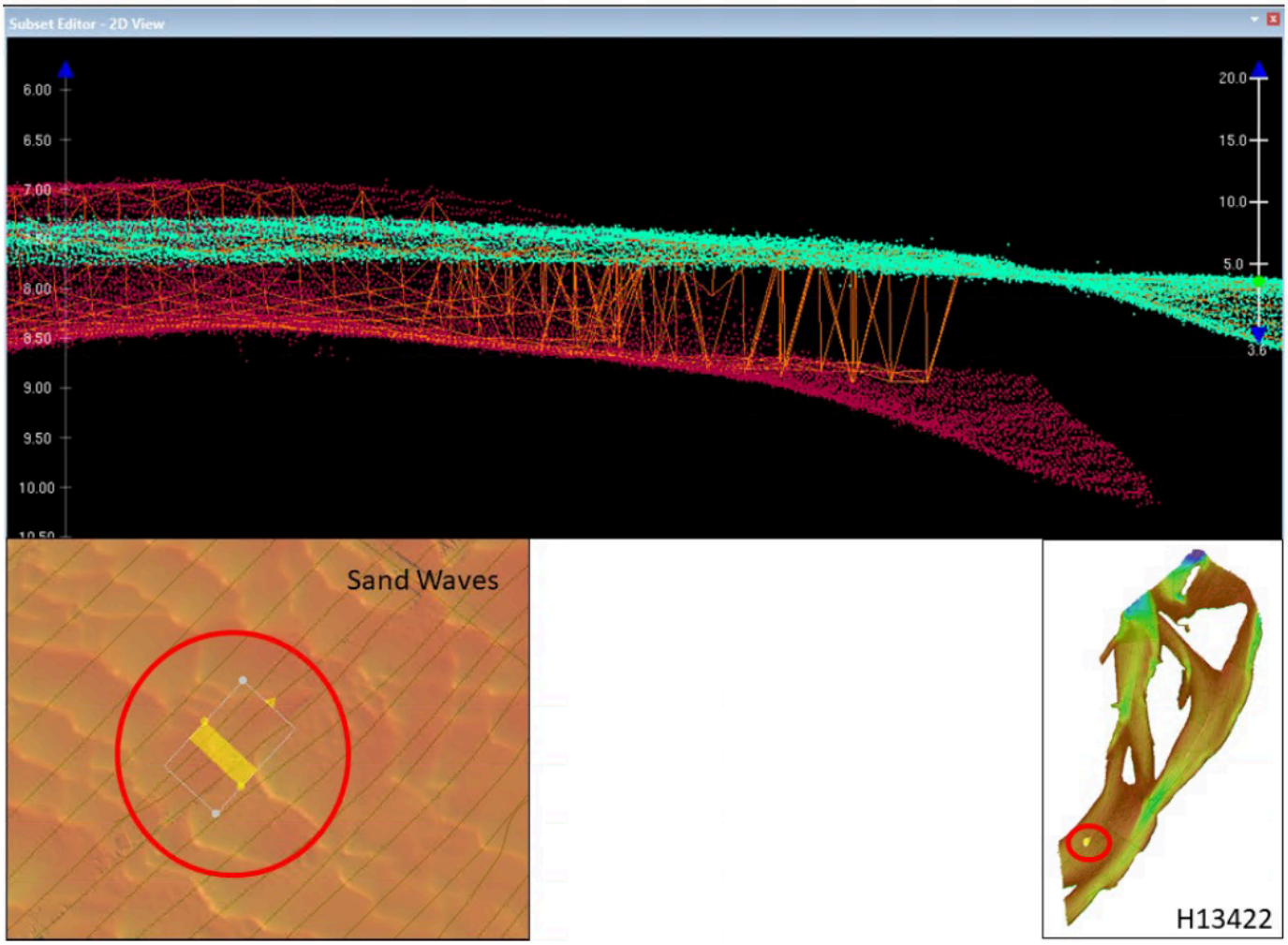


Figure 20: H13422 Temporal sand wave anomaly

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
CAPT John Lomnicky	Commanding Officer	11/19/2021	Digitally signed by LOMNICKY.JOHN.JOSEPH.1257920239 Location: CO, NOAA Ship FAIRWEATHER Date: 2021.11.19 14:51:03 -08'00'
HSST Simon Swart	Chief Survey Technician	11/19/2021	Simon E Swart Digitally signed by Simon E Swart Date: 2021.11.19 11:50:21 -08'00'
LT Shelley Devereaux	Operations Officer	11/19/2021	DEVEREAUX.SHELLEY.TIERA.1504466902 Digitally signed by DEVEREAUX.SHELLEY.TIERA.1504466902 Date: 2021.11.19 11:43:21 -08'00'
ENS Kelly Wooten	Sheet Manager	11/19/2021	WOOTEN.KELLY.M.1042865067 Digitally signed by WOOTEN.KELLY.M.1042865067 Date: 2021.11.19 11:29:42 -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