H13420

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

DESCRIPTIVE REPORT

Type of Survey:	Navigable Area
Registry Number:	H13420

LOCALITY

State(s):	Alaska
General Locality:	Prince William Sound
Sub-locality:	College Fiord

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	**H13420**

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**
Sub-Locality:	**College Fiord**
Scale:	**40000**
Dates of Survey:	**03/25/2021 to 08/06/2021**
Instructions Dated:	**05/05/2021**
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 H13420

Project: OPR-P358-FA-21

Locality: Prince William Sound

Sublocality: College Fiord

Scale: 1:40000

March 2021 - August 2021

NOAA Ship *Fairweather*

Chief of Party: CAPT John Lomnicky

A. Area Surveyed

The survey area is located in Prince William Sound, AK.

A.1 Survey Limits

Data were acquired within the following survey limits:

Northwest Limit	Southeast Limit
61° 16' 26.89" N 148° 5' 44.83" W	60° 57' 44.64" N 147° 36' 21.17" W

Table 1: Survey Limits

H13420 - OVERVIEW
OPR-P358-FA-21 Launch: Day number:

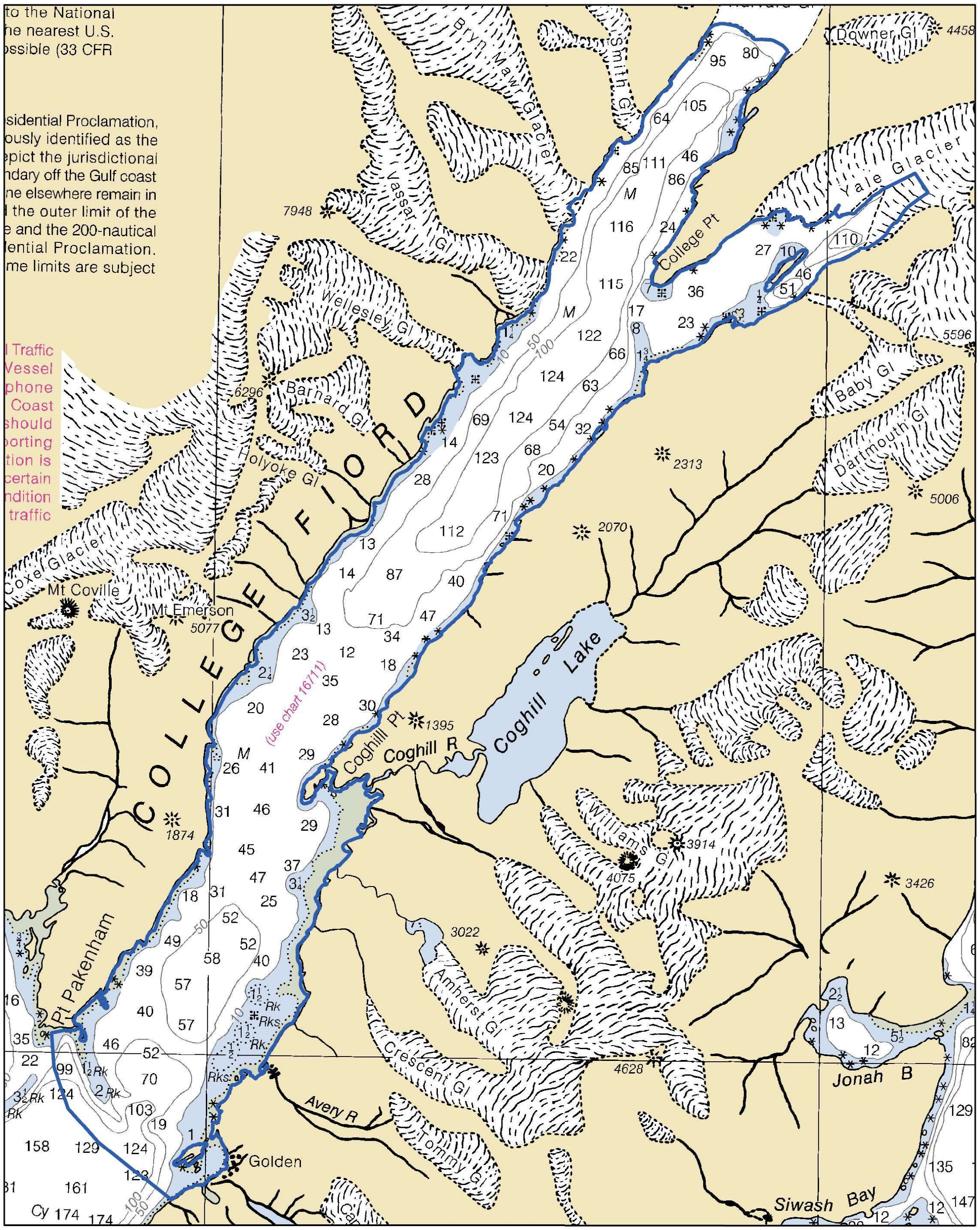


Figure 1: Survey limits in blue overlayed onto Chart 16700

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 H13420 is shown in Figure 4. In all areas where the 3.5 meter depth contour or the sheet limits were 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 clustered shoals or rocks, or ice fields. An example of such an area is shown in Figure 2 and 3.

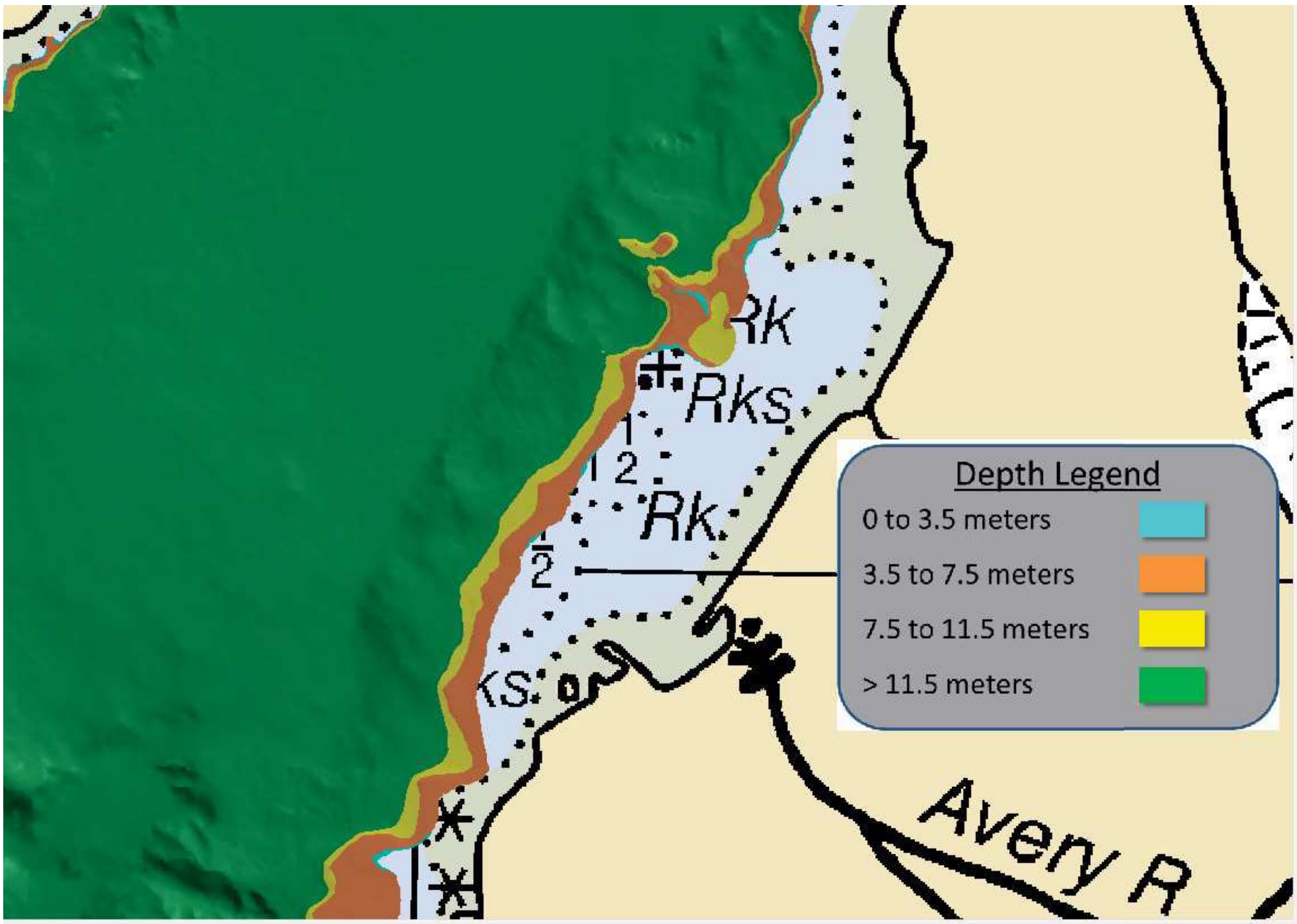


Figure 2: Area where the NALL was defined by clustered shoals

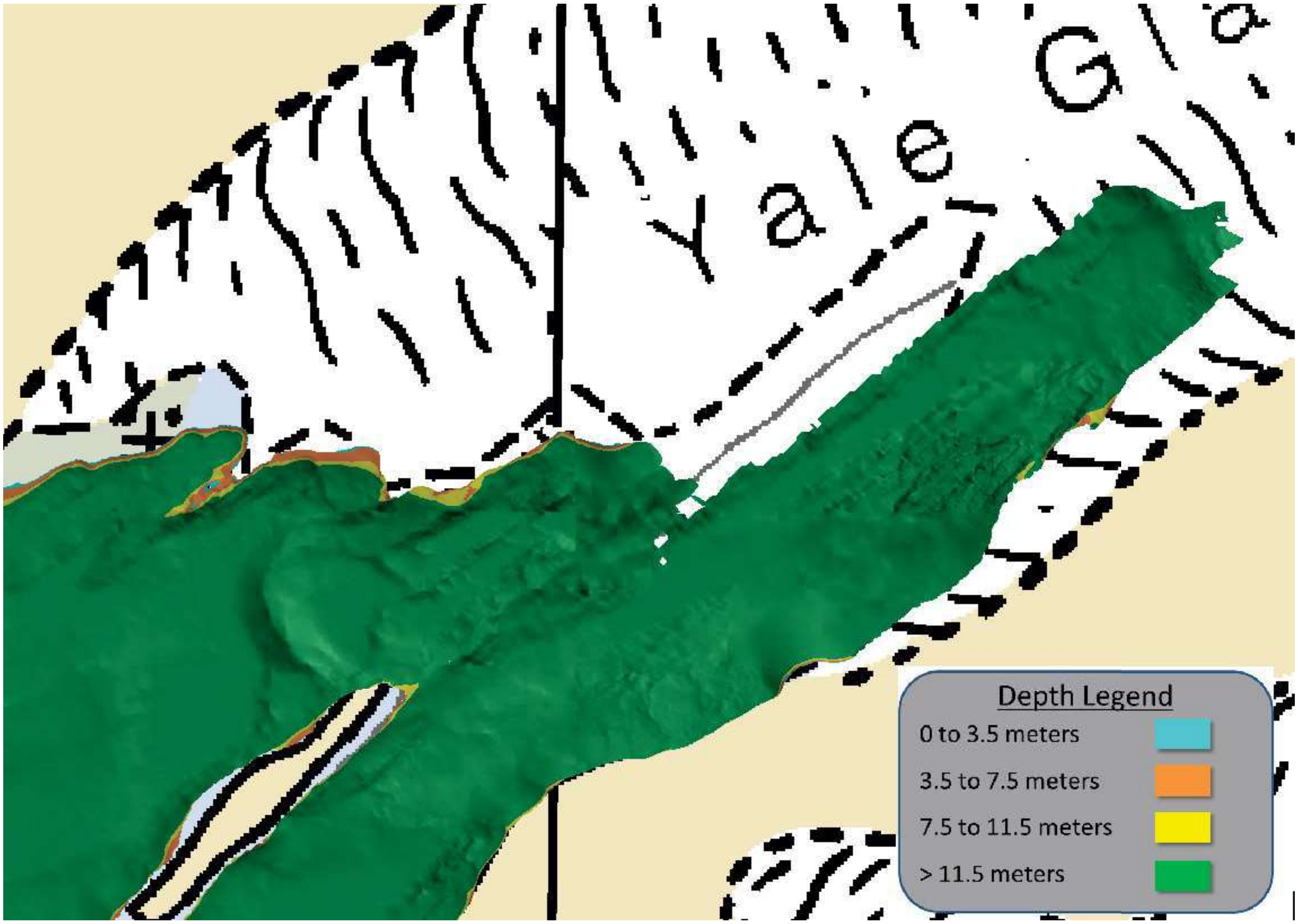


Figure 3: Area where NALL was determined by ice fields

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, primarily focusing on areas left unsurveyed due to significant glacial retreat. The area 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 near the unmapped glacier faces. Most of these glacier areas have not been surveyed since the 1990s with sedimentation potentially changing the submerged glacial moraines. Conducting a modern bathymetric survey in this area will address Seabed 2030 data gaps, identify hazards and changes to the seafloor, 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 H13420 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 H13420 was acquired with Complete Coverage, meeting the requirements listed above and in the HSSD. See Figure 4 for an overview of coverage.

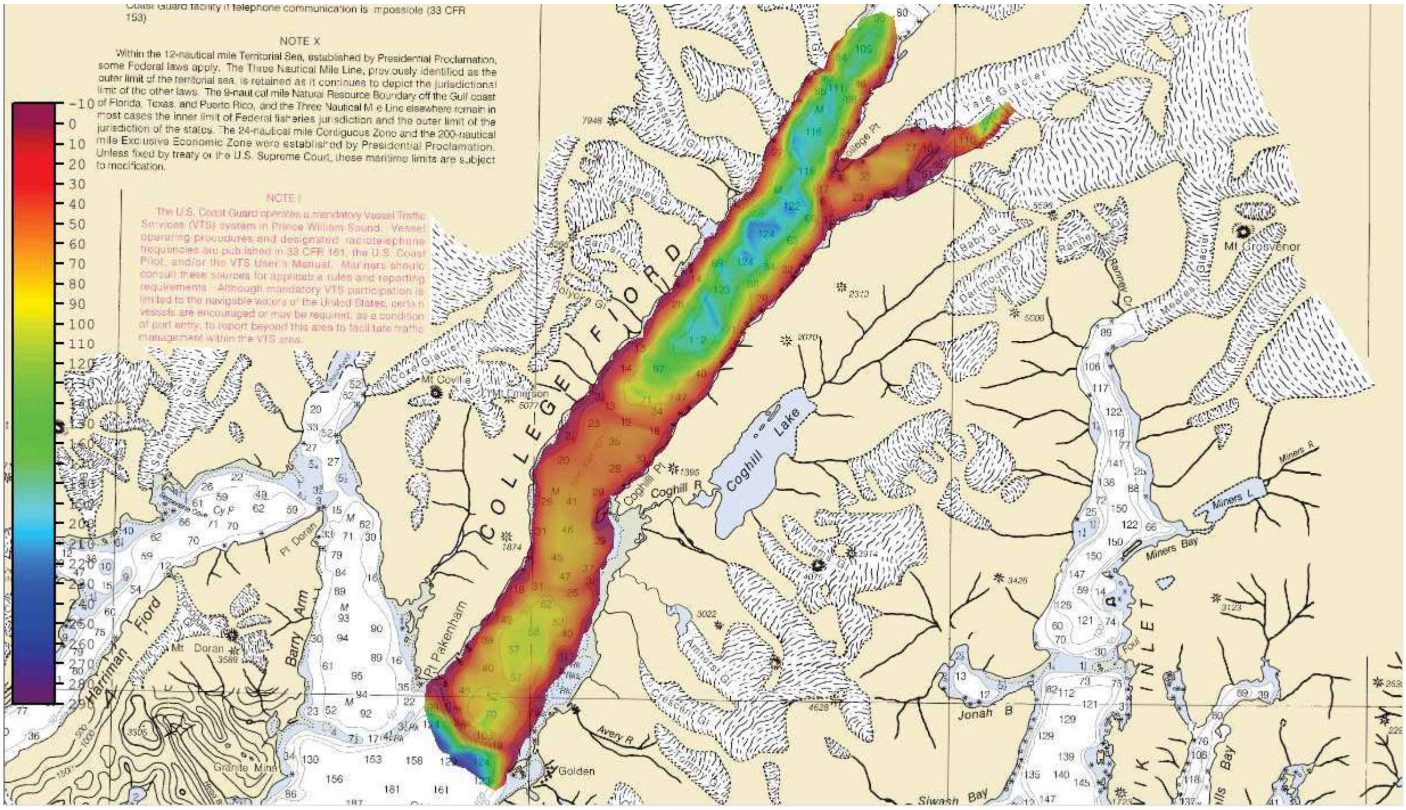


Figure 4: H13420 survey coverage overlaid onto Chart 16700

A.6 Survey Statistics

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

	HULL ID	*2805*	*2807*	*2808*	*S220*	*Total*
LNM	SBES Mainscheme	0	0	0	0	0
	MBES Mainscheme	181.09	205.13	183.67	77.78	647.66
	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	0	24.74	1.26	5.71	31.72
	Lidar Crosslines	0	0	0	0	0
Number of Bottom Samples						7
Number Maritime Boundary Points Investigated						0
Number of DPs						0
Number of Items Investigated by Dive Ops						0
Total SNM						42.92

Table 3: Hydrographic Survey Statistics

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

Survey Dates	Day of the Year
03/25/2021	84
03/31/2021	90

Survey Dates	Day of the Year
08/02/2021	214
08/03/2021	215
08/04/2021	216
08/06/2021	218

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	***S220***	***2805***	***2807***	***2808***
LOA	70.4 meters	8.6 meters	8.6 meters	8.6 meters
Draft	4.8 meters	1.1 meters	1.1 meters	1.1 meters

Table 5: Vessels Used

B.1.2 Equipment

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

Manufacturer	Model	Type
Kongsberg Maritime	EM 2040	MBES
Kongsberg Maritime	EM 710	MBES
Sea-Bird Scientific	SBE 19plus V2	Conductivity, Temperature, and Depth Sensor
AML Oceanographic	MVP200	Conductivity, Temperature, and Depth Sensor
Teledyne RESON	SVP 70	Sound Speed System
Teledyne RESON	SVP 71	Sound Speed System
Applanix	POS MV 320 v5	Positioning and Attitude System

Table 6: Major Systems Used

The equipment was installed on the survey platform as follows: S220 utilizes the Kongsberg EM 710 MBES, a POS M/V v5 system for position and attitude, SVP 70 surface sound speed sensors, and AML Oceanographic MVP 200 for conductivity, temperature, and depth (CTD) casts. All launches utilize the Kongsberg EM 2040 MBES, a POS M/V v5 system for position and attitude, SVP 71 surface sound speed sensors, and Sea-Bird SBE 19plus v2 CTDs for conductivity, temperature, and depth casts.

B.2 Quality Control

B.2.1 Crosslines

Crosslines were collected, processed and compared in accordance with Section 5.2.4.2 of the HSSD. 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 5). Statistics show the mean difference between the depths derived from mainscheme data and crossline data was 0.05 meters (with mainscheme being deeper) and 95% of nodes falling within 0.98 meters (Figure 6). For the respective depths, the difference surface was compared to the allowable NOAA uncertainty standards (Figure 6). In total, 99.40% of the depth differences between H13420 mainscheme and crossline data were within allowable NOAA uncertainties.

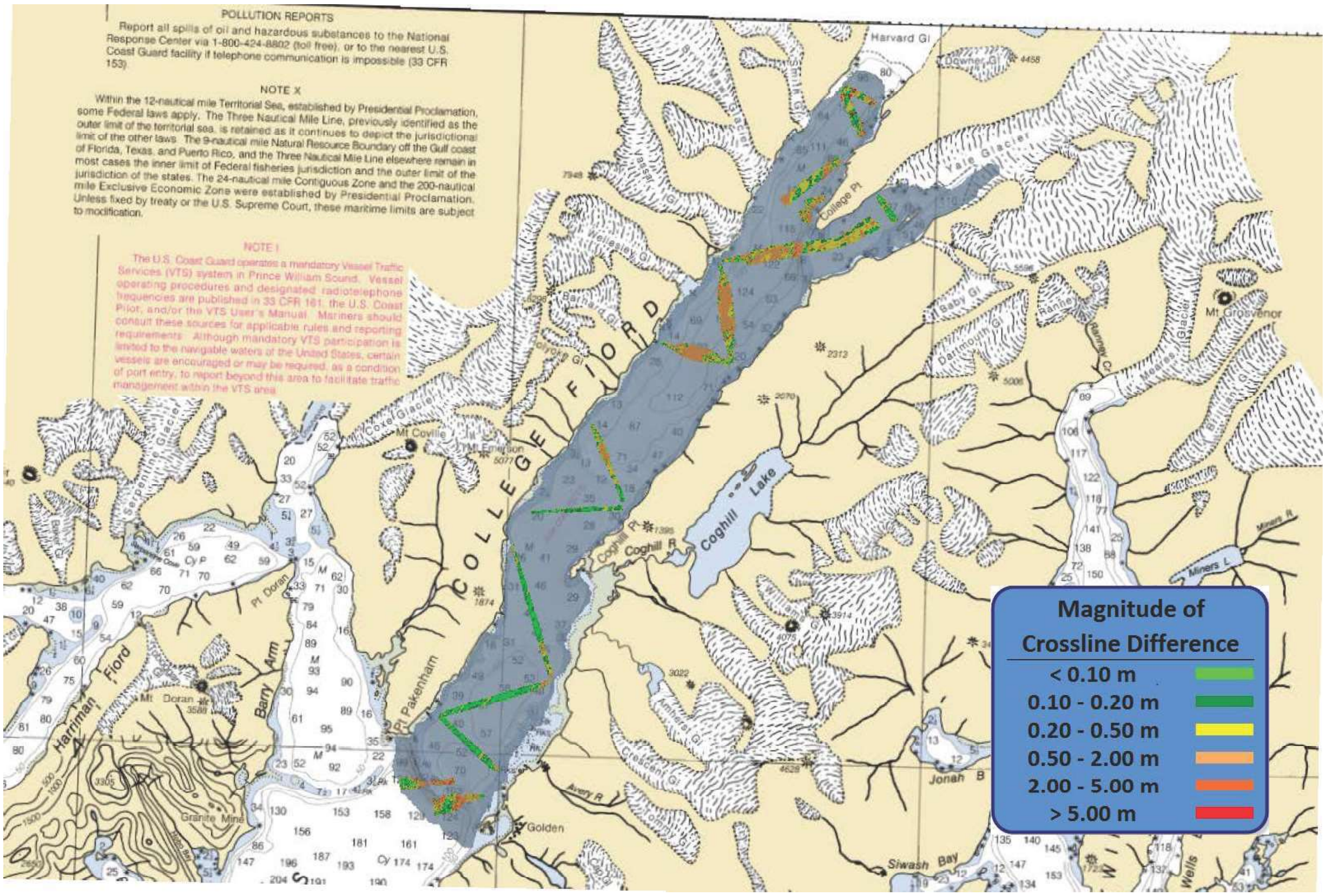


Figure 5: Overview of H13420 crosslines

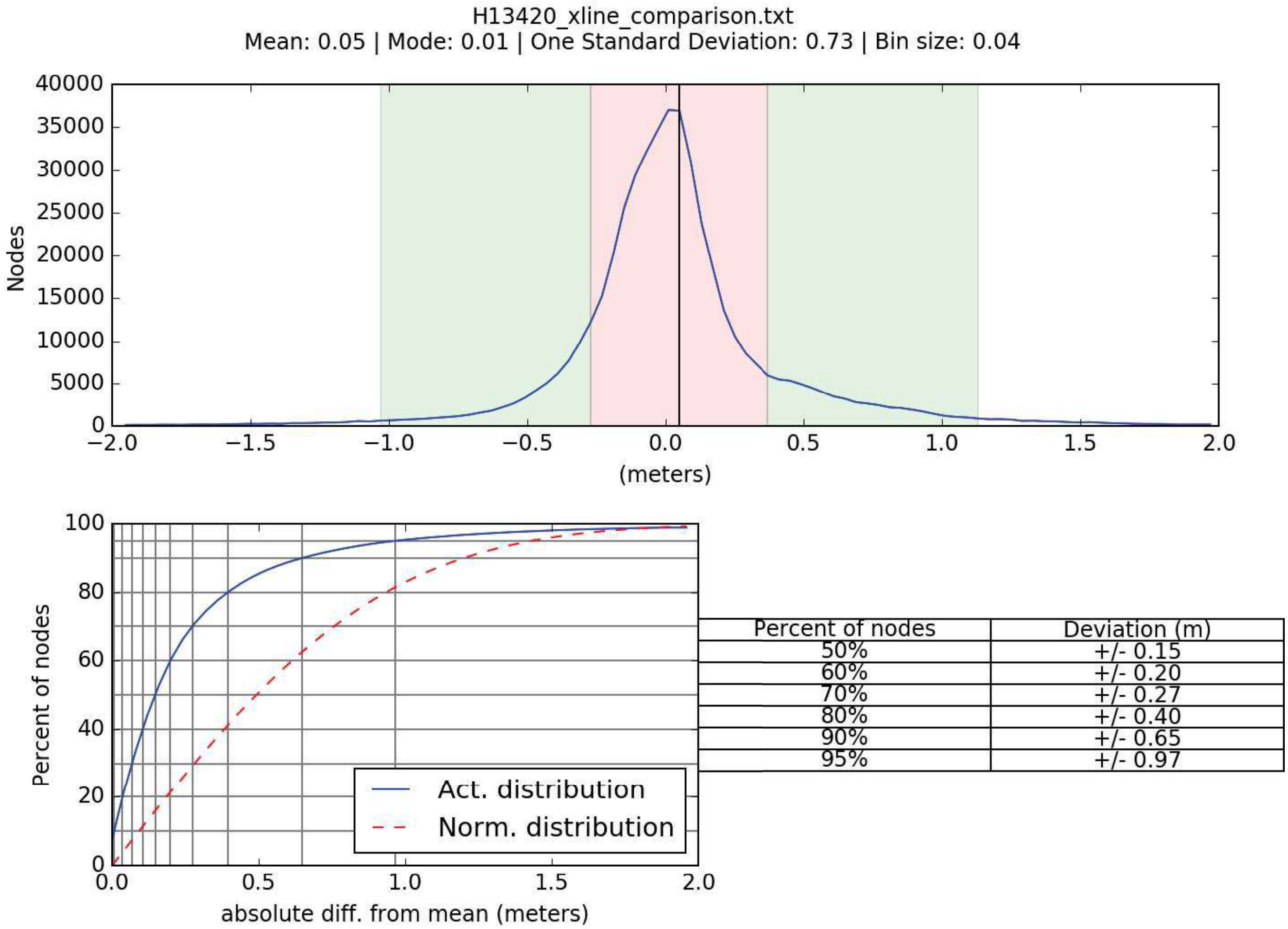


Figure 6: H13420 crossline and mainscheme difference statistics

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	Surface
280x	2 meters/second	N/A	0.5 meters/second
S220	N/A	1 meters/second	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 H13420. Real-time uncertainties were provided via EM 710 and 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

H13420 junctions with 0 adjacent surveys from this project and 1 survey from prior projects, H13396, as shown in Figure 7. Data overlap between H13420 and the 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 junction with H13420 exceeds the NOAA allowable uncertainty in their areas of overlap. For the junction with H13396, a negative difference indicates H13420 was shoaler and a positive difference indicates H13420 was deeper.

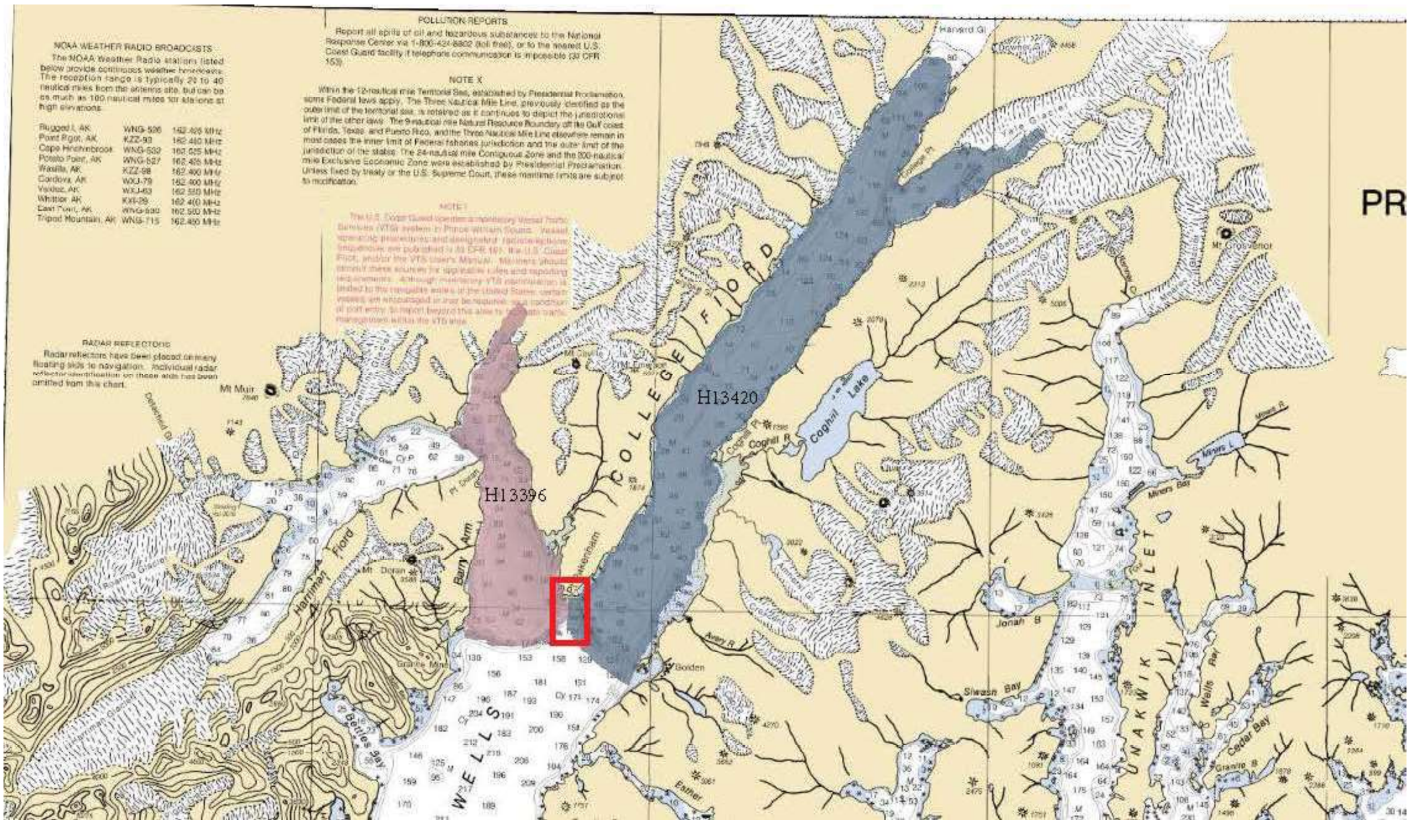


Figure 7: Overview of H13420 junctions

The following junctions were made with this survey:

Registry Number	Scale	Year	Field Unit	Relative Location
H13396	1:25000	2020	eTrac	W

Table 9: Junctioning Surveys

<u>H13396</u>

Surface differencing in CARIS HIPS and SIPS was used to assess junction agreement between the surface from H13420 and the surface from H13396 (Figure 8). The statistical analysis of the difference surface shows a mean of 0.35 meters with 95% of the nodes having a maximum deviation of +/- 1.23 meters, as seen in Figure 9. It was found that 93.06% of nodes are within NOAA allowable uncertainty. The leading hypothesis for the uncertainty is due to the dynamism of the seafloor surface; a high gradient rise on the boundary of both surveys has a higher chance to have more errors than flat or shallow locales. Glacial silt and water column dynamics may have altered the data differently in comparison to the surveys as each survey was conducted during a different season with differing conditions.

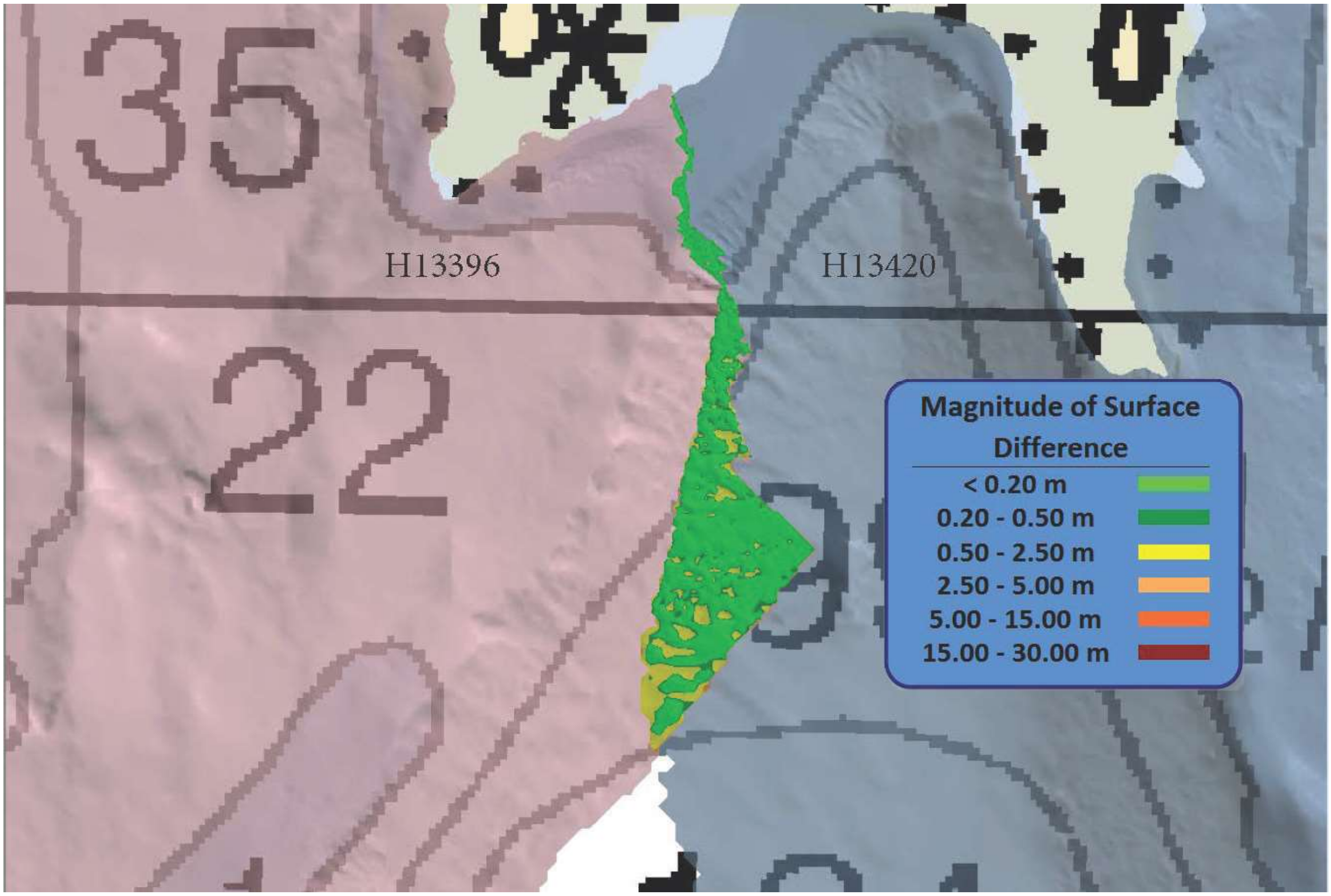
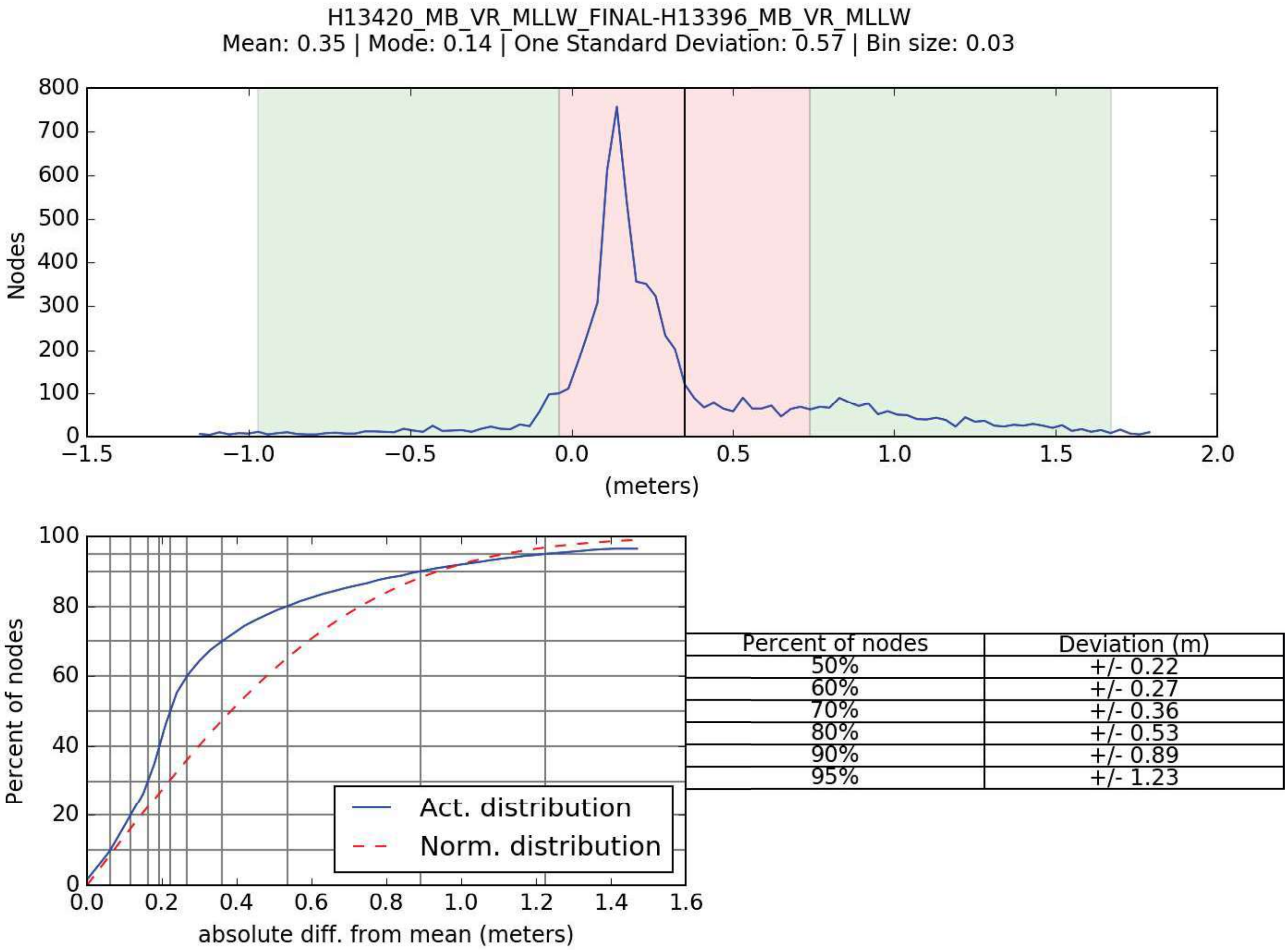


Figure 8: Difference surface between H13420 (blue) and junction survey H13396 (pink)



Percent of nodes	Deviation (m)
50%	+/- 0.22
60%	+/- 0.27
70%	+/- 0.36
80%	+/- 0.53
90%	+/- 0.89
95%	+/- 1.23

Figure 9: Difference statistics between H13420 and H13396

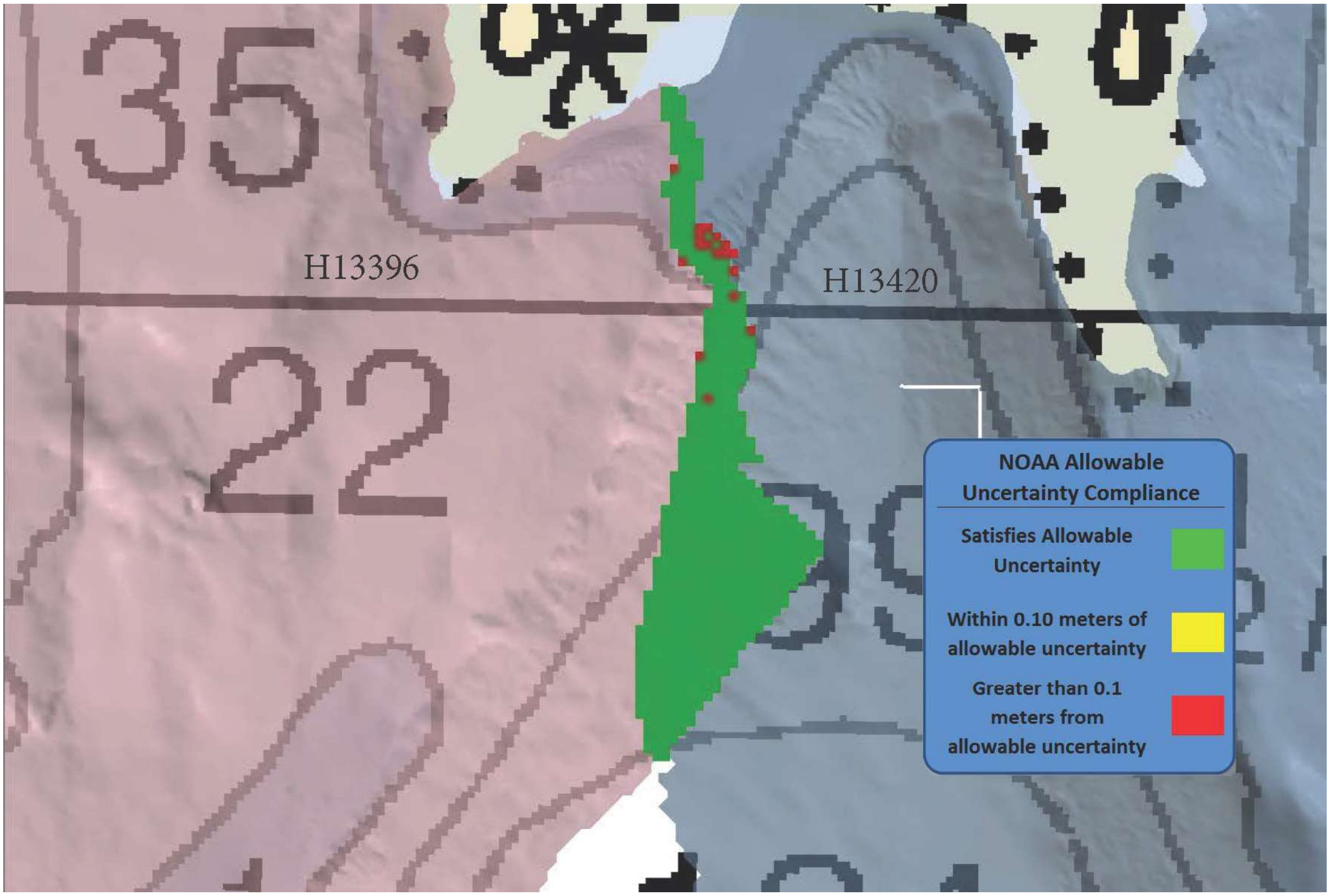


Figure 10: Difference surface compliance with NOAA allowable uncertainty between H13420 (blue) and junction survey H13396 (pink)

H13420 NOAA Allowable Uncertainty

Variable Resolution Surface	
Total Nodes	7,359
Total Nodes Pass	6,849
Total Percent Pass	93.07%

Figure 11: Difference surface statistics between H13420 and H13396 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

Glacial runoff

College Fiord is a glacial fjord and has multiple glaciers intersecting the survey area. Glacial runoff due to spring and summer melt cycles caused freshwater and glacial silt to mix in with the natural sea water, creating varying thermocline and halocline conditions. During acquisition, hydrographers observed momentary differences between surface sound speed and the CTD profile of up to 10 m/s. Surfaces were not significantly impacted, and the data still meet NOAA allowable uncertainty parameters from HSSD Section 5.1.3, and as such, the data remain sufficient to supersede previous data.

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. MVP casts on S220 were conducted at an average interval of 120 minutes, guided by observation of the surface sound speed and targeted to deeper areas. 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

H13420 data were reviewed in CARIS HIPS and SIPS for holidays in accordance with Section 5.2.2.3 of the HSSD. Three 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. Reasonable attempts were made to cover all gaps in coverage that resulted from lack of coverage over the tops of features and underwater rocks when it was safe and prudent to do so. For areas where it was unsafe to do so the features were added or updated accordingly in the Final Feature File accompanying this submission. The two holidays created from rock features are shown in overview in Figure 12 and with close up views in Figures 13 and 14. The southern holiday has been attributed as a foul area in the Final Feature File. The last holiday, shown in Figure 15, shows the holiday created by a shoal area with NALL reached around its border.

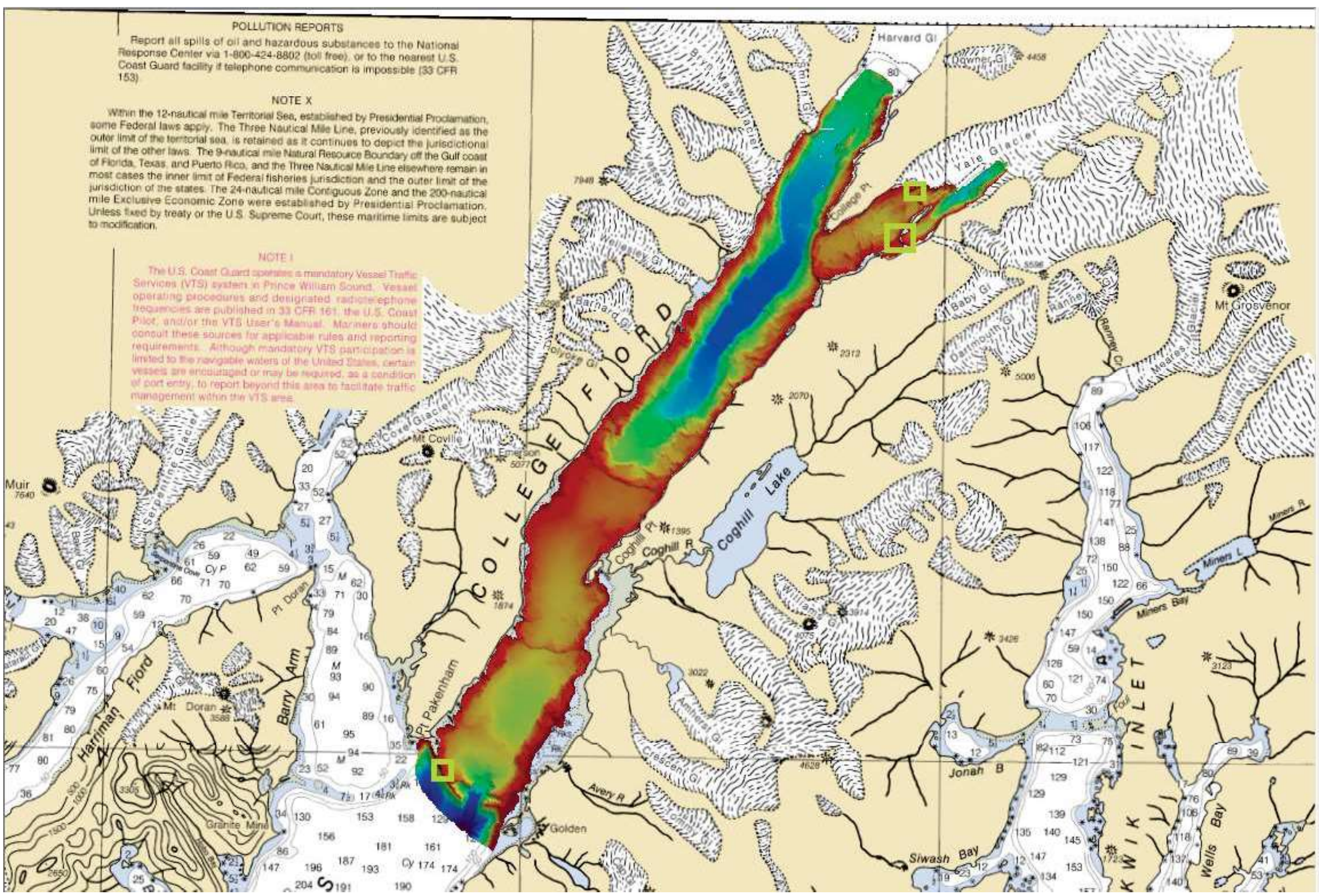


Figure 12: Location of holidays in H13420 overview bound in green boxes

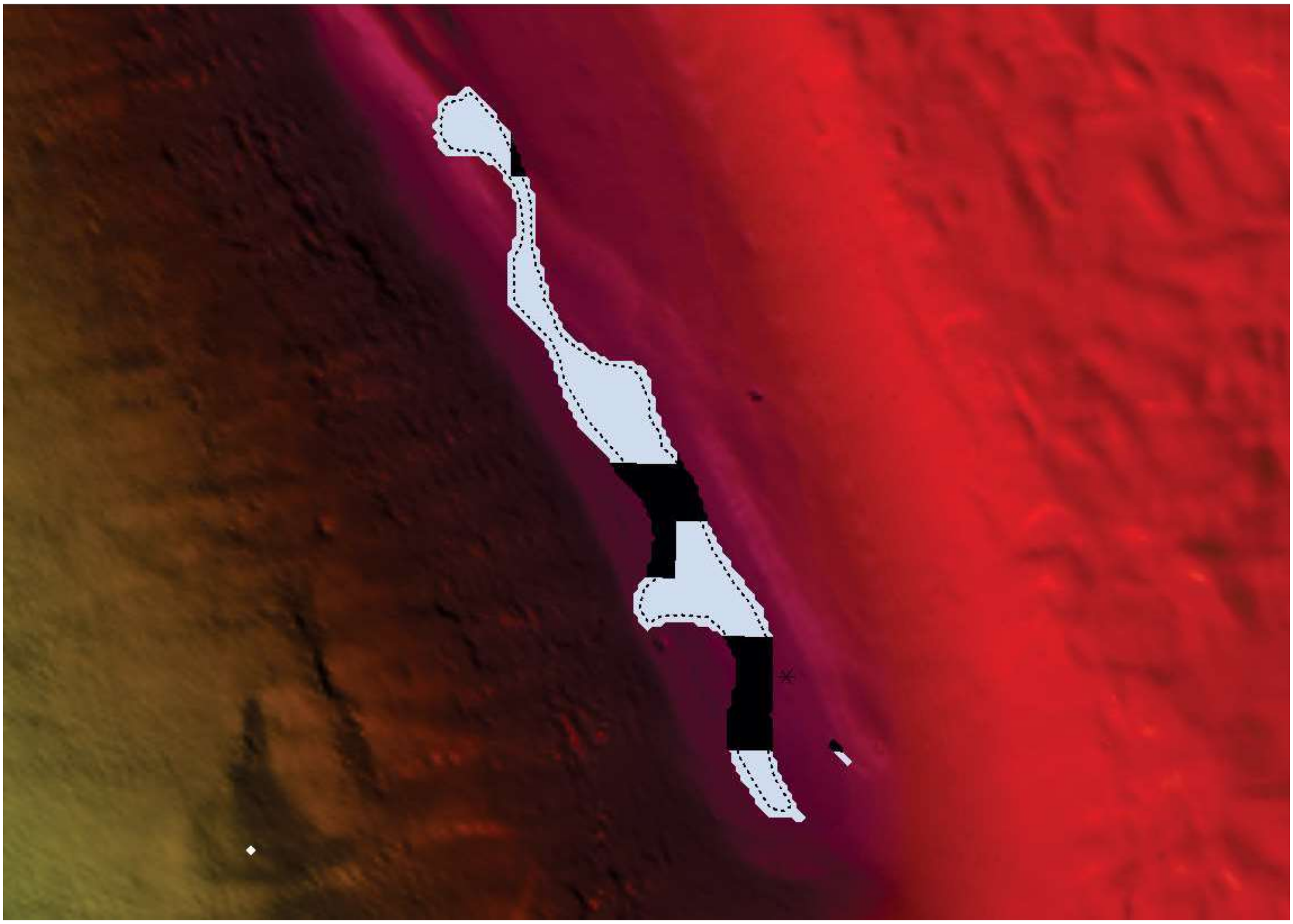


Figure 13: Southern holiday discovered in H13420 by QC Tools Holiday Finder and marked as foul area.

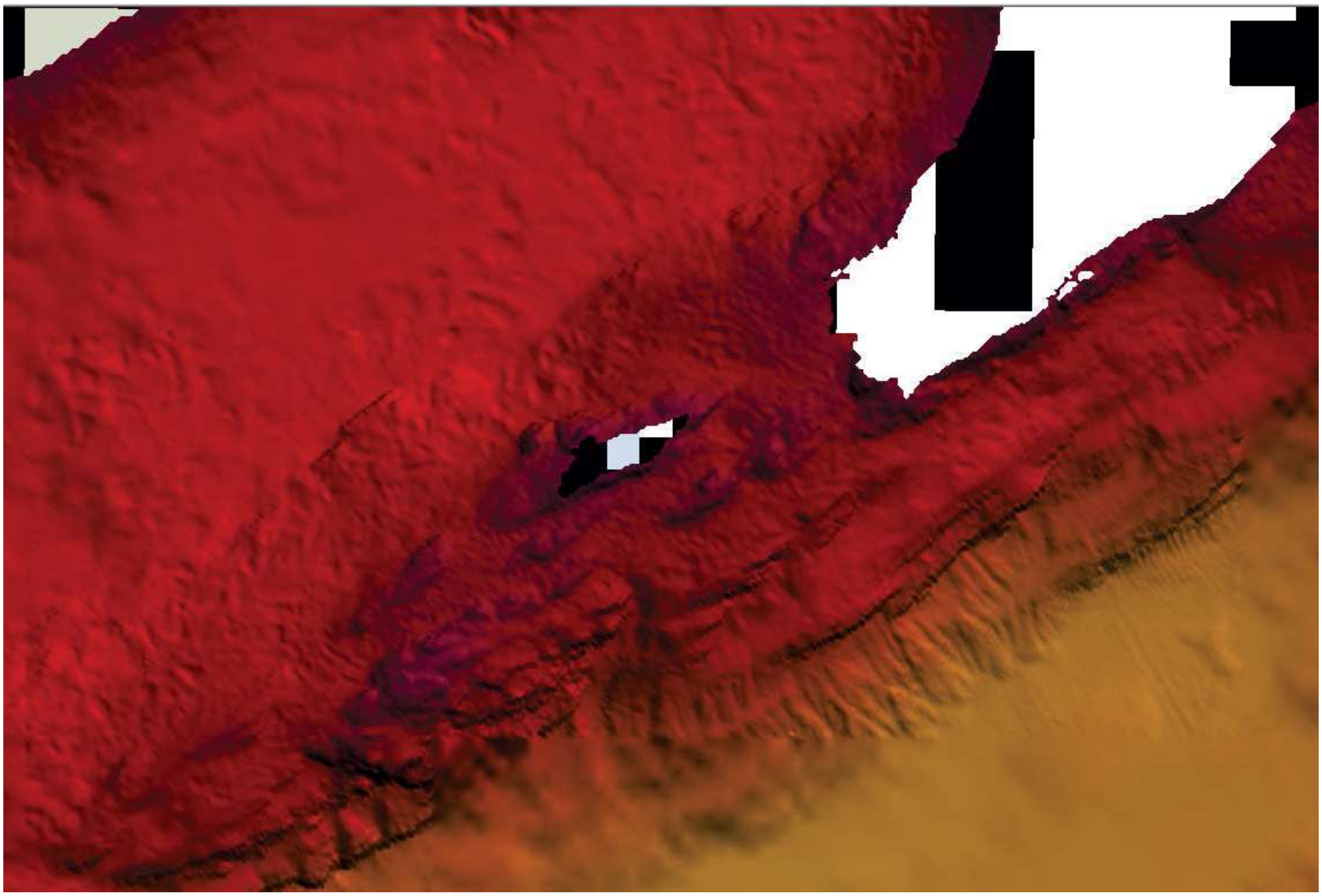


Figure 14: Northern holiday discovered in H13420 by QC Tools Holiday Finder

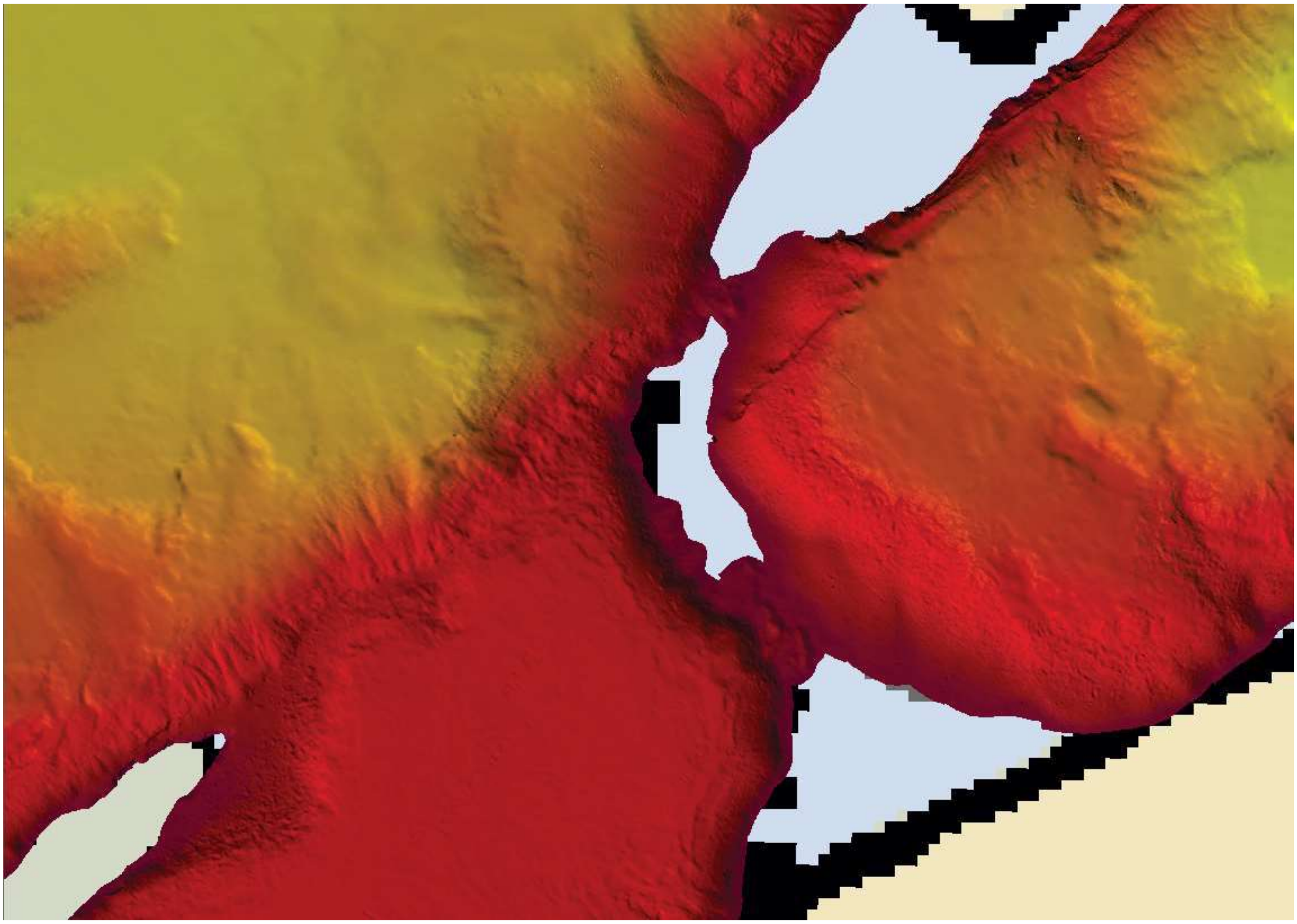


Figure 15: Shoal area creating holiday in H13420 data, discovered by QC Tools Holiday Finder

B.2.10 NOAA Allowable Uncertainty

The surface was analyzed using the HydrOffice QC Tools Grid QA feature to determine compliance with specifications. Overall, over 99.5% of nodes within the surface meet NOAA Allowable Uncertainty specifications for H13420 (Figure 16).

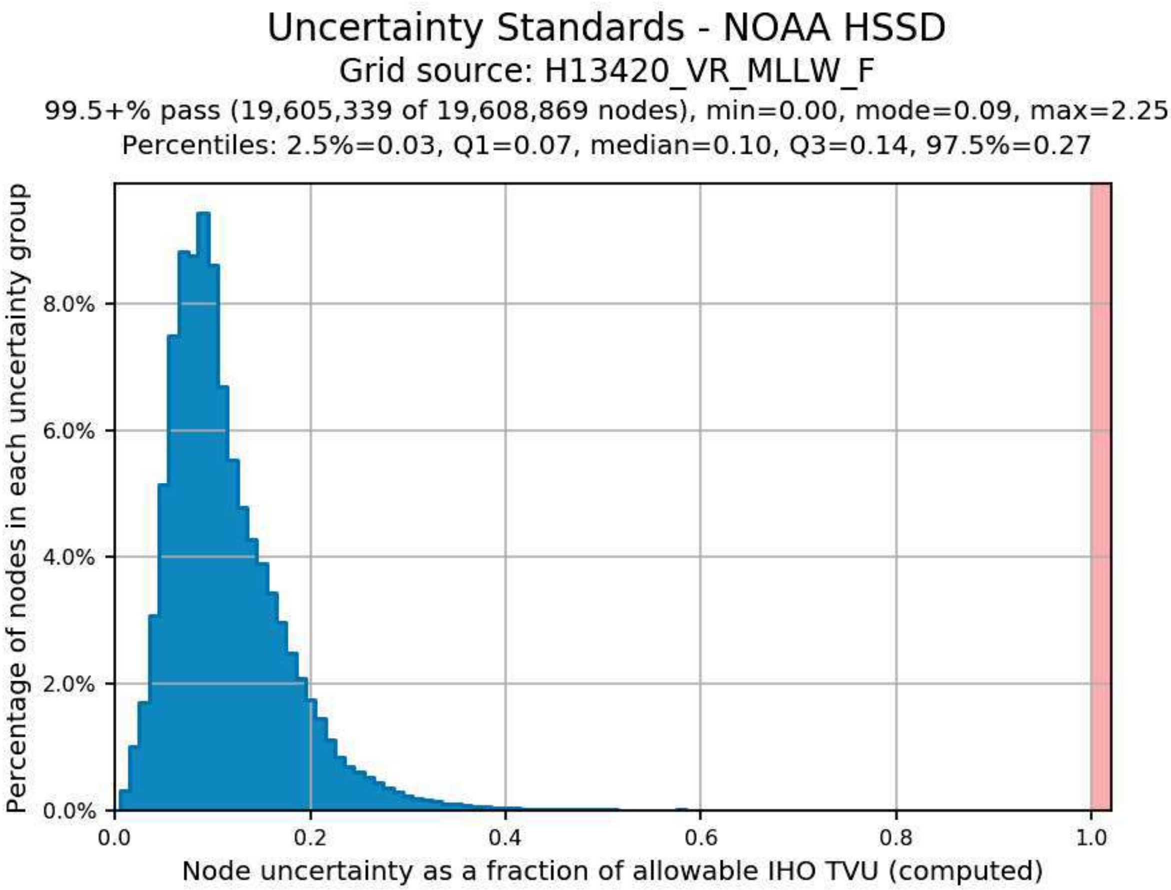


Figure 16: H13420 allowable uncertainty statistics

B.2.11 Density

The surface was analyzed using the HydrOffice QC Tools Grid QA feature to determine compliance with specifications. Density requirements for H13420 were achieved with at least 99% of surface nodes containing five or more soundings as required by HSSD Section 5.2.2.3 (Figure 17).

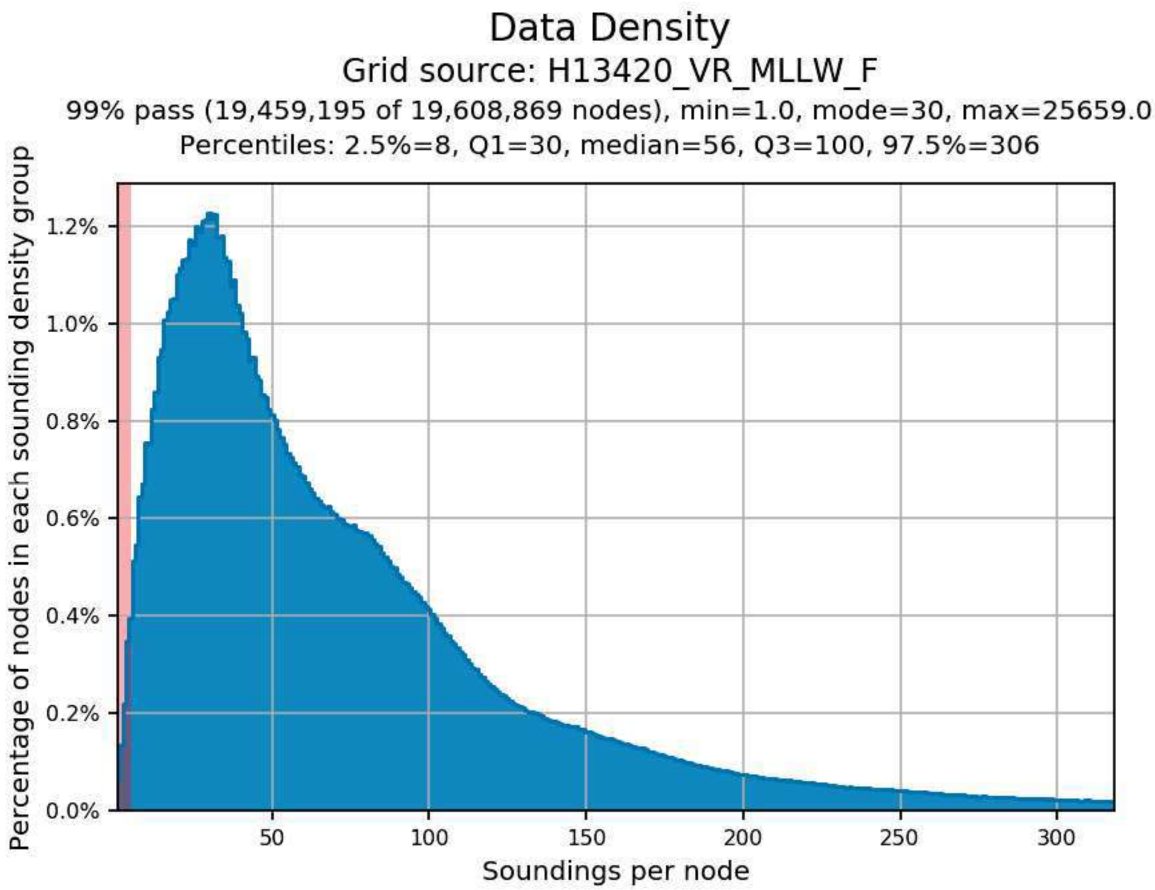


Figure 17: H13420 data density statitistics

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 sonar systems were applied to the mosaic.

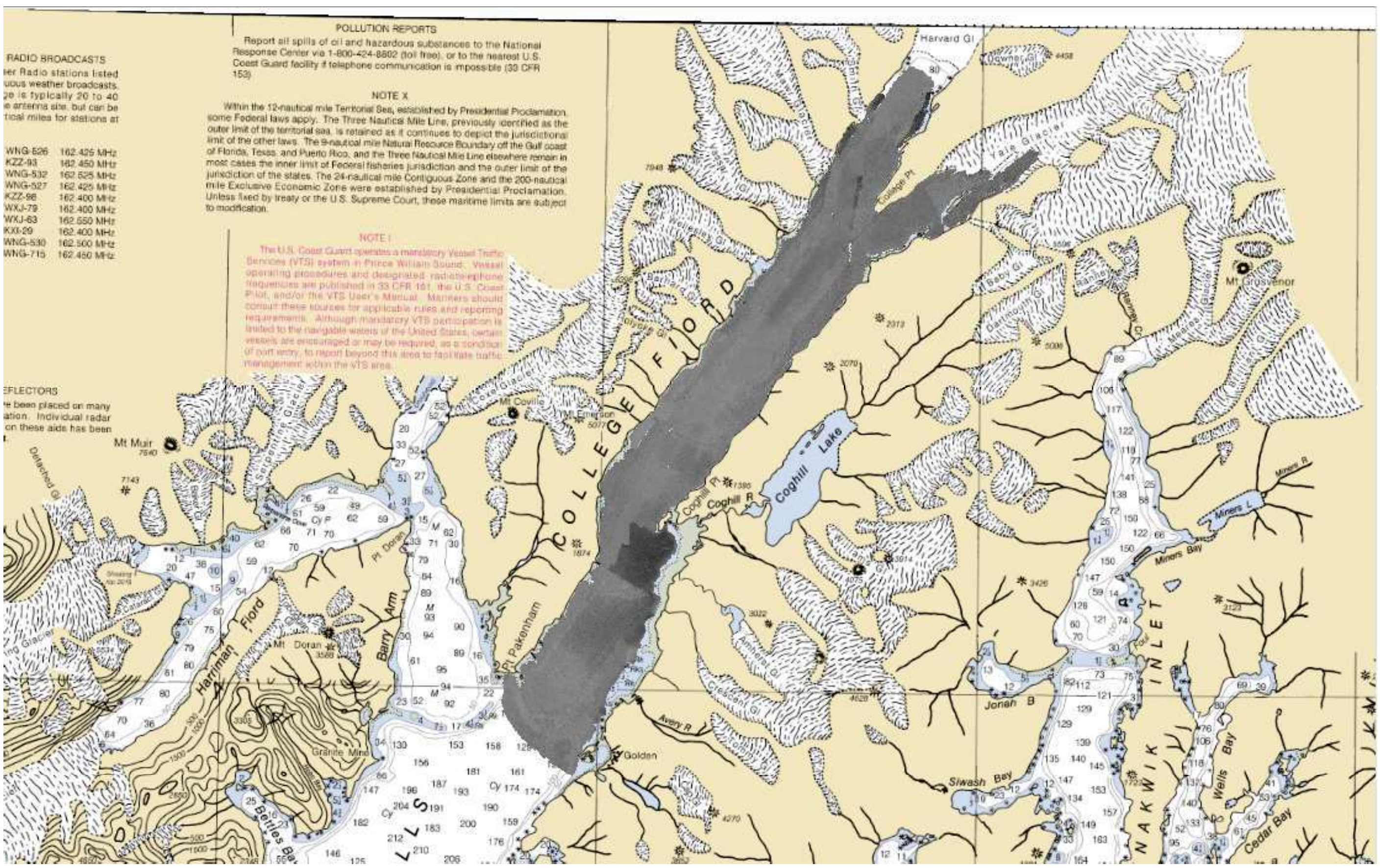


Figure 18: Backscatter mosaic for H13420

	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 19: 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
H13420_MB_VR_MLLW	CARIS VR Surface (CUBE)	Variable Resolution	-0.5 meters - 287 meters	NOAA_VR	Complete MBES
H13420_MB_VR_MLLW_FINAL	CARIS VR Surface (CUBE)	Variable Resolution	-0.5 meters - 287 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 H13420. 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 H13420.

C.1 Vertical Control

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

<u>ERS Datum Transformation</u>

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_NAD83-MLLW

Table 13: ERS method and SEP file

ERS methods were used as the final means of reducing H13420 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.

<u>The following PPK methods were used for horizontal control:</u>

- 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.

<u>WAAS</u>

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 H13420 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
US3AK21M	1:200000	18	08/14/2018	03/05/2020

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

All assigned charted features are attributed in the Final Feature File.

D.1.4 Uncharted Features

Survey H13420 has 18 new features that are addressed in the H13420 Final Feature File. 13 features are new seabed areas, one feature is a new land area, one is a new land elevation, and one is a new foul area.

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 Aids to Navigation (ATONs) exist for this survey.

D.2.2 Maritime Boundary Points

No Maritime Boundary Points were assigned for this survey.

D.2.3 Bottom Samples

Eight bottom samples were acquired in accordance with the Project Instructions for survey H13420. All bottom samples were entered in the H13420 Final Feature File. See Figure 20 for a graphical overview of sample locations.

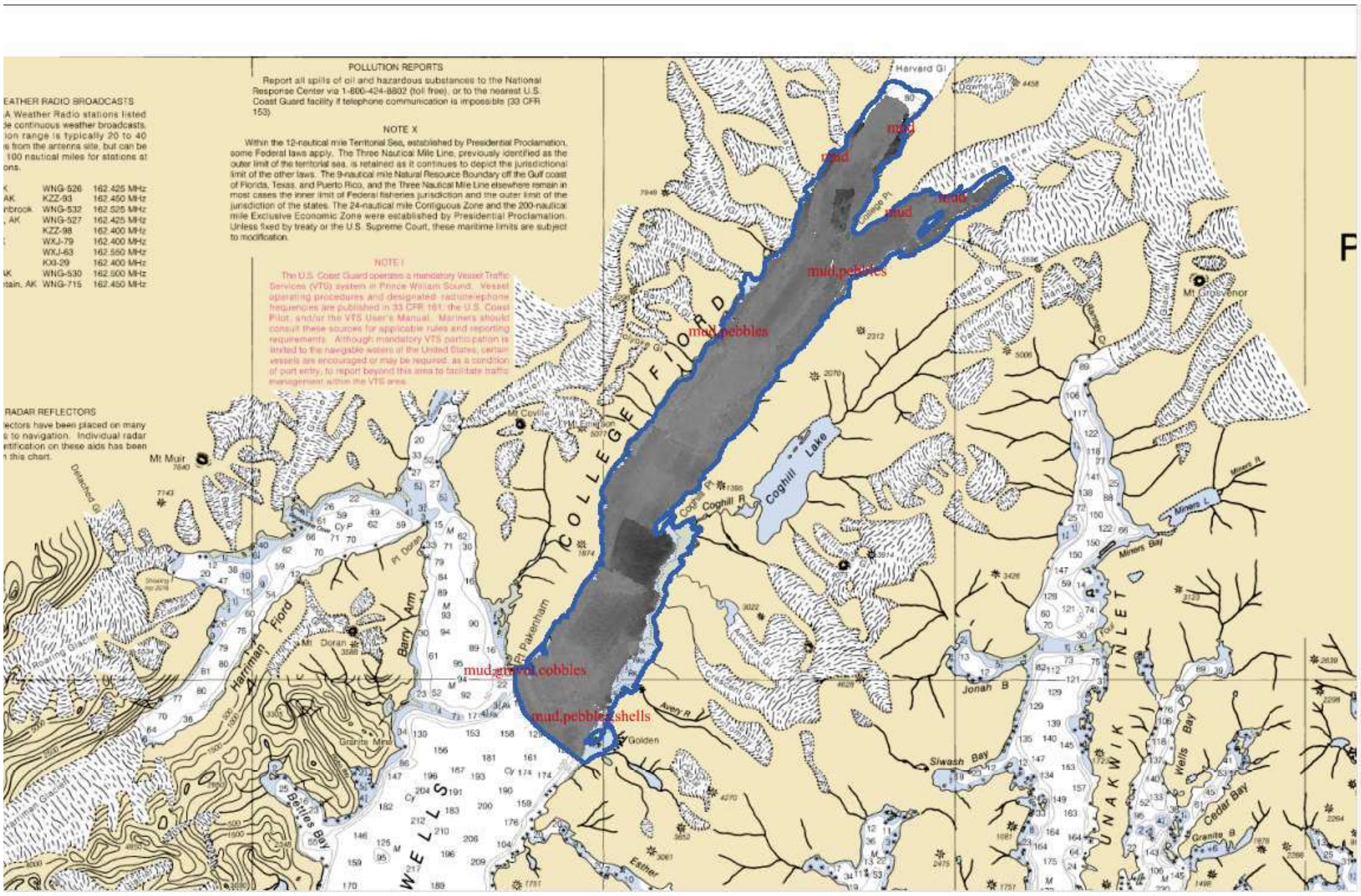


Figure 20: H13420 Bottom sample locations

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

No ferry routes or terminals exist for this survey.

D.2.8 Abnormal Seafloor or Environmental Conditions

H13420 survey has a dynamic seafloor environment, attributed to the retreat of glaciers in the region showcasing the gouges caused by their movement. Moraines are common and shift depths considerably, as shown in Figures 21 and 22. Further, the presence of icebergs and glacial silt caused sea water thermoclines and haloclines that altered sound speed calculations during acquisition. Icebergs also caused obstacles for vessels, potentially causing gaps in data or hazards to said vessel during acquisition.

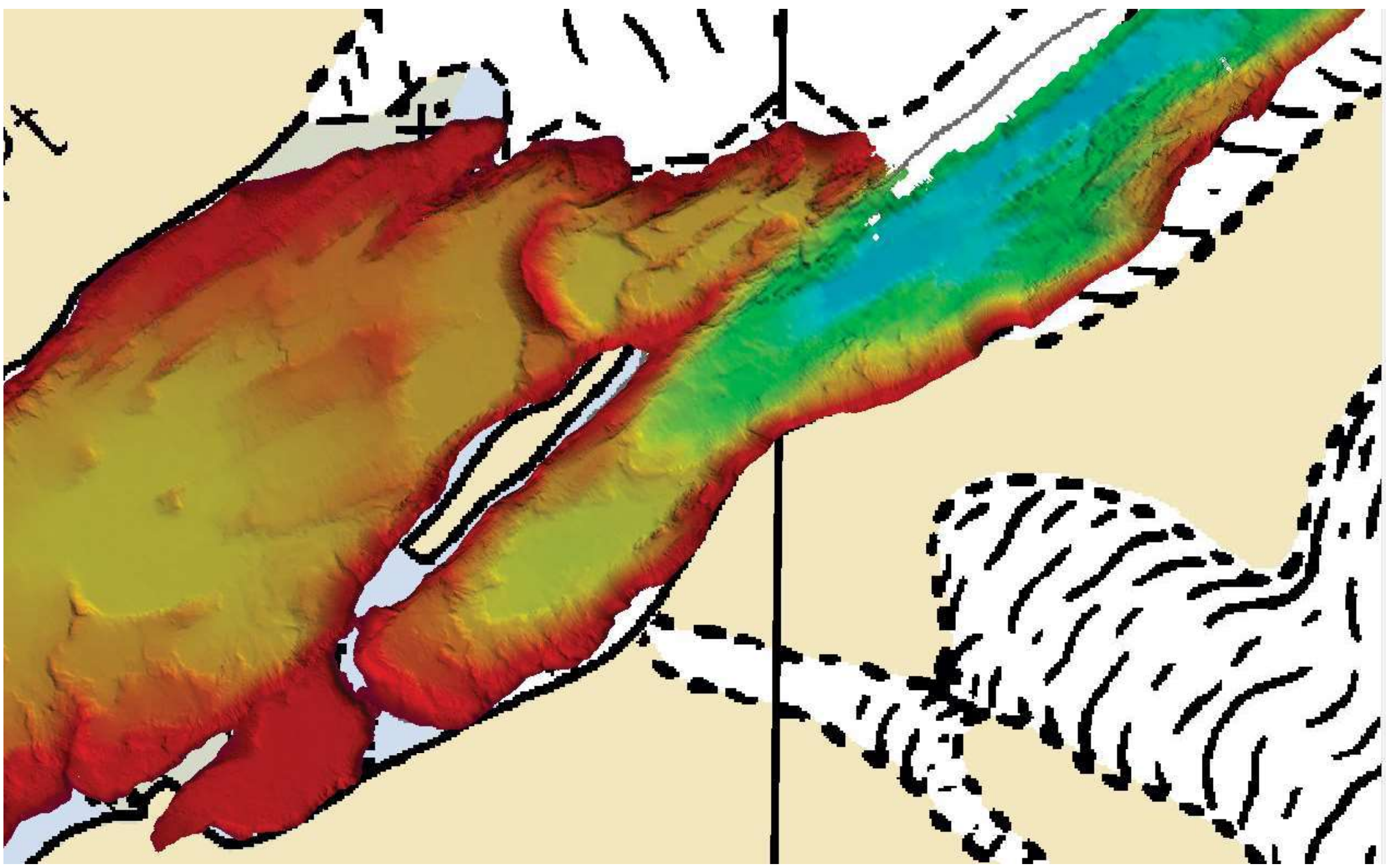


Figure 21: View of moraine in Yale Arm H13420

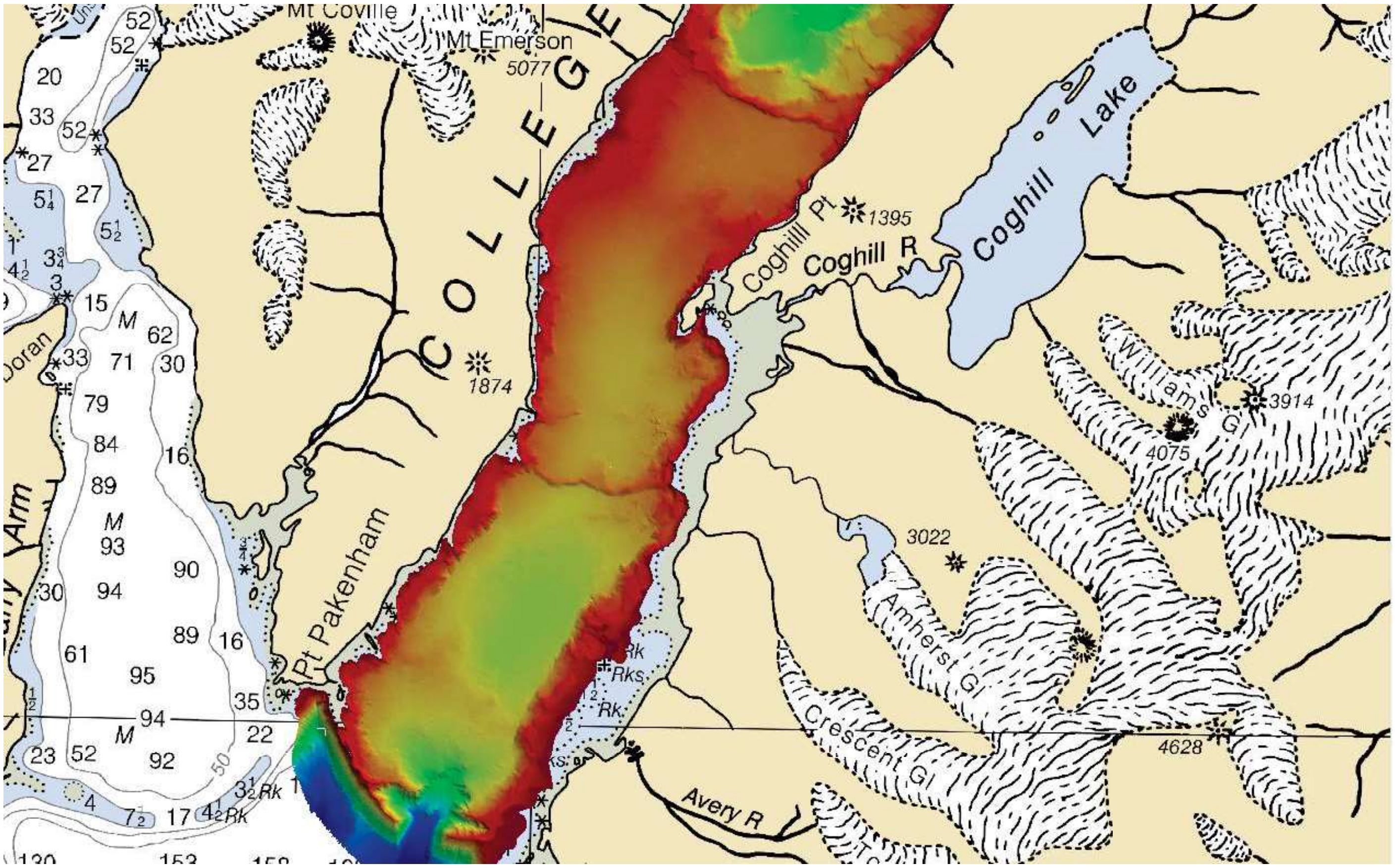


Figure 22: View of multiple moraines along College Fiord H13420

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
HST Matthew Canning	Sheet Manager	10/09/2021	CANNING.MATTHEW.1601599321 Digitally signed by CANNING.MATTHEW.1601599321 Date: 2021.10.09 11:42:37 -07'00'
ACST Simon Swart	Chief Survey Technician	10/09/2021	SWART.SIMON.EDWARD.1543761962 Digitally signed by SWART.SIMON.EDWARD.1543761962 Date: 2021.10.09 11:59:47 -07'00'
LT Shelley Devereaux	Operations Officer	10/09/2021	DEVEREAUX.SHELLEY.TIERA.1504466902 Digitally signed by DEVEREAUX.SHELLEY.TIERA.1504466902 Date: 2021.10.09 12:06:42 -07'00'
CAPT John Lomnickey	Chief of Party	10/09/2021	Digitally signed by LOMNICKY.JOHN.JOSEPH.1257920239 Reason: I attest to the accuracy and integrity of this document Location: CO, NOAA Ship FAIRWEATHER Date: 2021.10.09 18:11:01 -07'00'

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