H13405

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

DESCRIPTIVE REPORT

Type of Survey:	Navigable Area
Registry Number:	H13405

LOCALITY

State(s):	Alaska
General Locality:	Southeast Alaska
Sub-locality:	Thomas Bay

2020

CHIEF OF PARTY
Samuel F. Greenaway, CDR /NOAA

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Date:

U.S. DEPARTMENT OF COMMERCE NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION	REGISTRY NUMBER:
HYDROGRAPHIC TITLE SHEET	**H13405**

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:	**Thomas Bay**
Scale:	**20000**
Dates of Survey:	**09/06/2020 to 09/13/2020**
Instructions Dated:	**08/26/2020**
Project Number:	**OPR-O392-RA-20**
Field Unit:	**NOAA Ship *Rainier***
Chief of Party:	**Samuel F. Greenaway, CDR /NOAA**
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 8N, 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 H13405

Project: OPR-O392-RA-20

Locality: Southeast Alaska

Sublocality: Thomas Bay

Scale: 1:20000

September 2020 - September 2020

NOAA Ship *Rainier*

Chief of Party: Samuel F. Greenaway, CDR /NOAA

A. Area Surveyed

The survey area is referred to as H13405, "Thomas Bay" (sheet 2) in the Project Instructions. The survey area is approximately 25 square nautical miles and located northeast of Petersburg, AK.

A.1 Survey Limits

Data were acquired within the following survey limits:

Northwest Limit	Southeast Limit
57° 6' 15" N 133° 1' 15" W	56° 57' 44" N 132° 46' 35" W

Table 1: Survey Limits

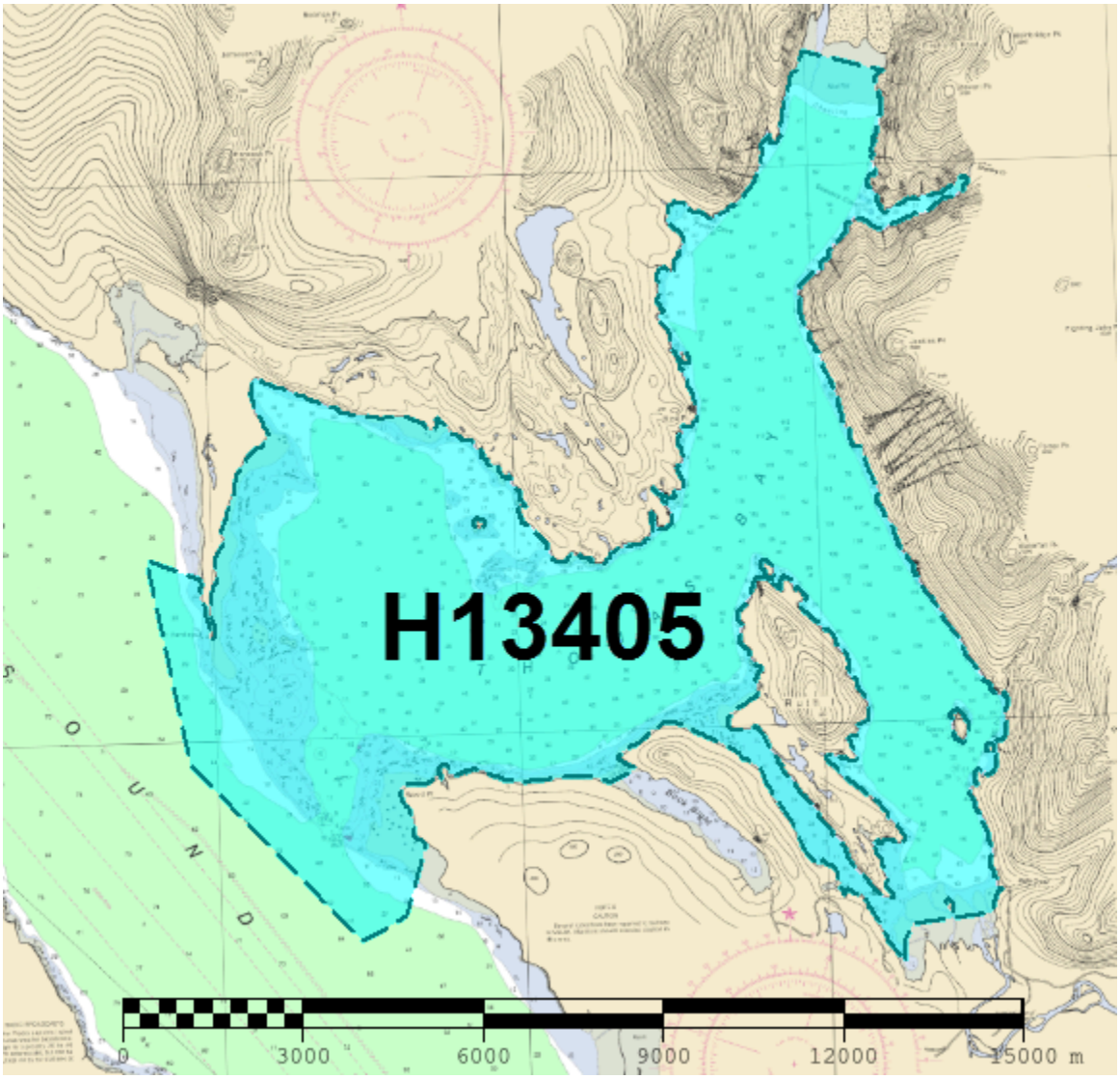


Figure 1: H13405 assigned survey area (Chart 17367).

Data were acquired within the assigned survey limits as required in the Project Instructions and HSSD unless otherwise noted in this report.

A.2 Survey Purpose

Thomas Bay is a large estuary on the north side of Frederick Sound with views Baird and Patterson Glacier. The bay provides protection from southeast weather and good anchorages for small craft. As such, the area is becoming increasingly popular with recreational boaters and tourism vessels.

Despite the increase in small vessel traffic much, of the existing depth data of this area dates back to 1880s and 1920s vintage, and is not surveyed to modern standards. Adding to the concern of survey vintage

numerous chart discrepancies have been reported in the area. This poses a serious risk to life, property, and the delicate ecosystem around Thomas Bay. This survey will provide contemporary data to update National Ocean Service (NOS) nautical charting products and generate backscatter data, which will be used in habitat mapping and substrate analysis.

A.3 Survey Quality

The entire survey is adequate to supersede previous data.

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

Complete multibeam echosounder coverage was acquired to the inshore limit of hydrography, the Navigable Area Limit Line (NALL). The NALL is defined as the most seaward of the following: the surveyed 3.5-meter depth contour, the line defined by the distance seaward from the observed MHW line which is equivalent to 0.8 millimeters at chart scale (the assigned sheet limits closely reflect this) or the inshore limit of safe navigation. Areas where H13405 survey coverage reached neither 3.5 meters water depth, nor the assigned sheet limits, were due to the presence of hazardous rocks and / or thick kelp.

In many areas of this sheet, the charted MHW water line is conspicuously out of position (discussed further in sec. D.2.10) where distance from MHW was the controlling factor for the NALL, we used 32 m (0.8mm at chart scale of 1:40,000) from the observed MHW.

We used Pydro Explorer QC Tool Holiday Finder to detect gaps in data (holidays) on the finalized Variable Resolution (VR) surfaces for submission. Holiday finder yielded 4 certain holidays. In all cases, the holidays are along the inshore NALL and do not affect the cartographic interpretation of the coverage. Images and descriptions of these holidays are includeed below.

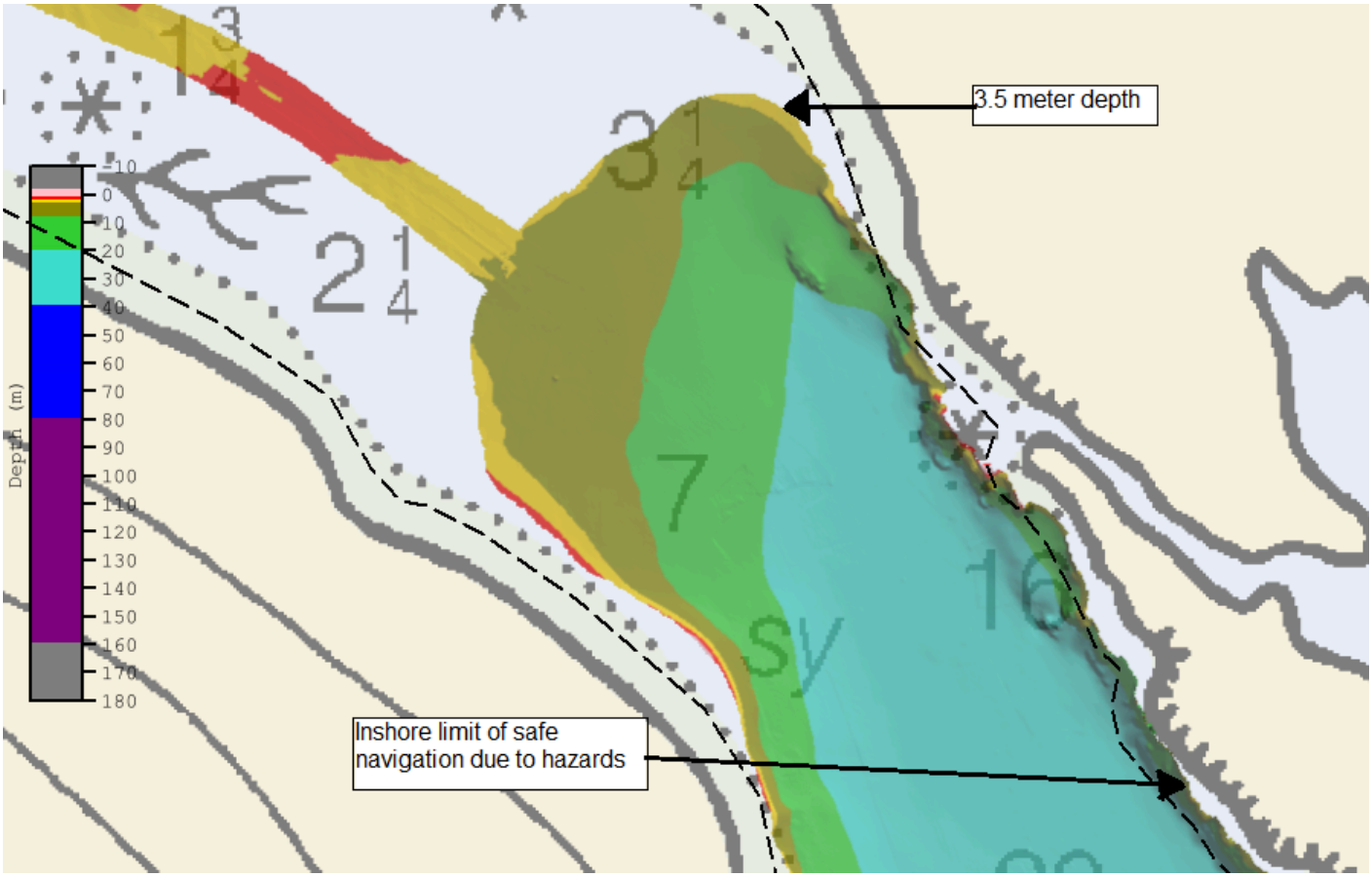


Figure 2: Examples of H13405 NALL determination; the black dashed line indicates assigned sheet limits and the yellow indicates where the 3.5-meter contour was reached.

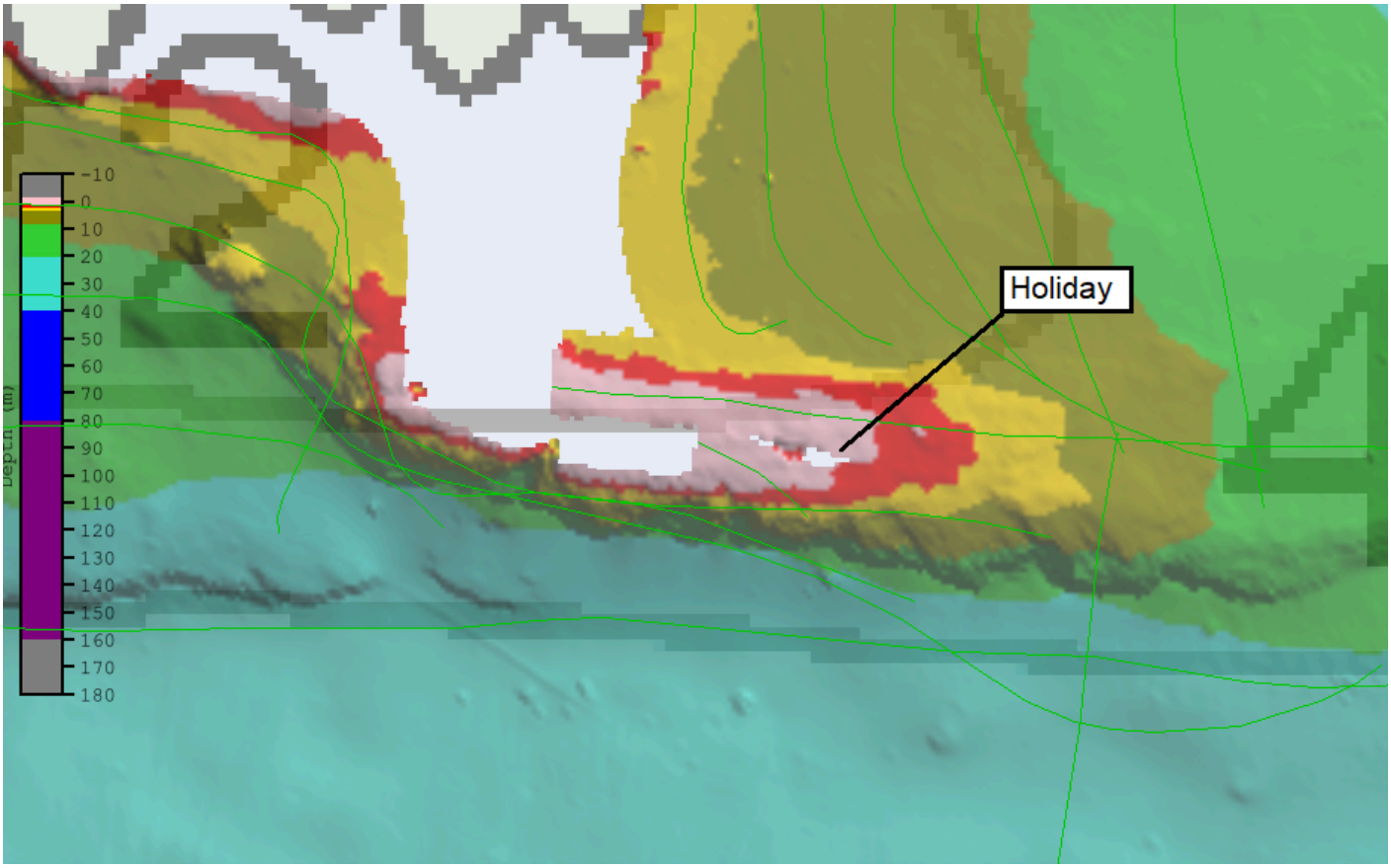


Figure 3: Holiday on top of an area that was too shoal to safely acquire complete MBES coverage safely with a launch. The least depth aquired was 1.19 meters above MLLW.

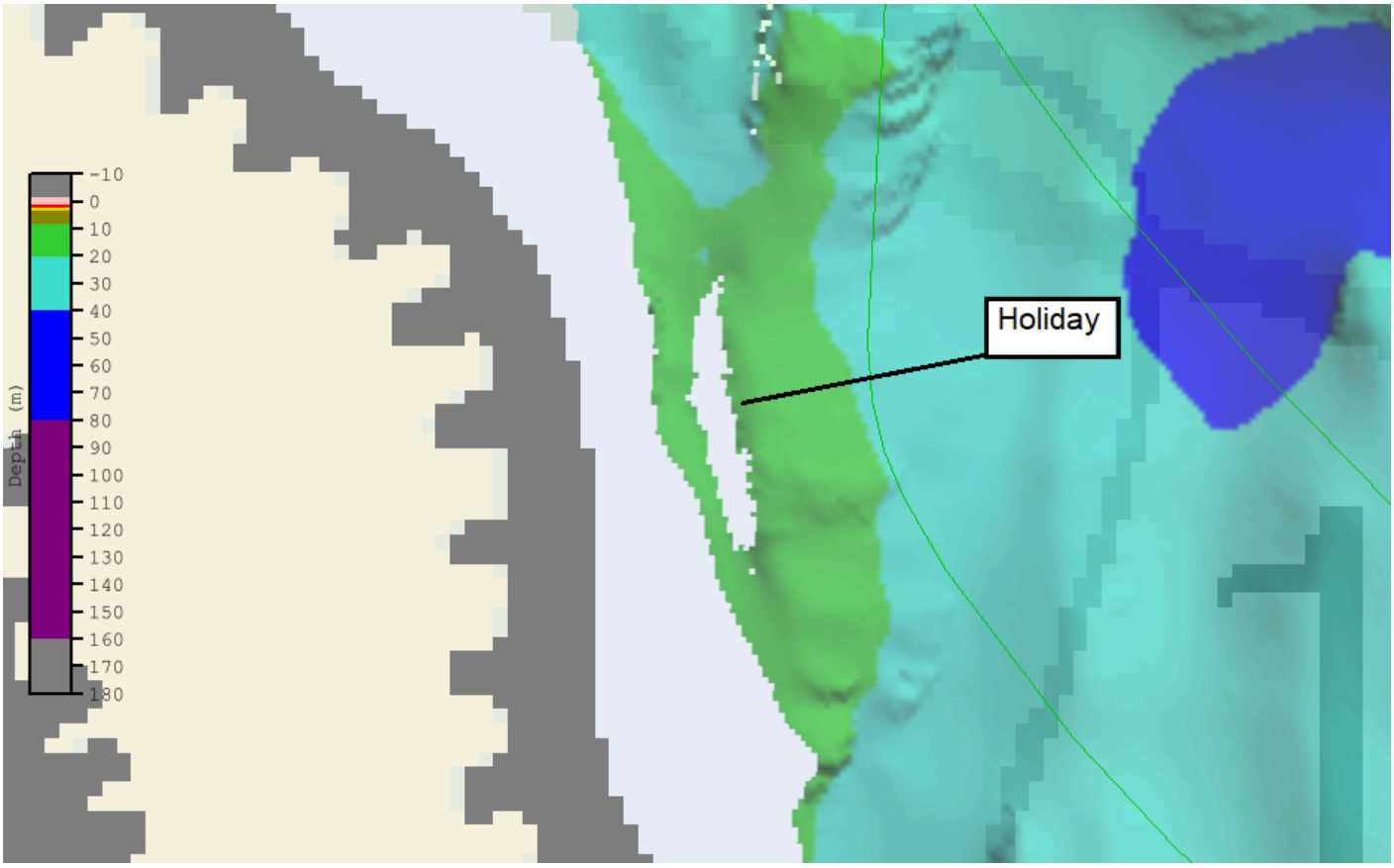


Figure 4: Down slope holiday caused by an acoustic shadow along the northeast side of Ruth Island.

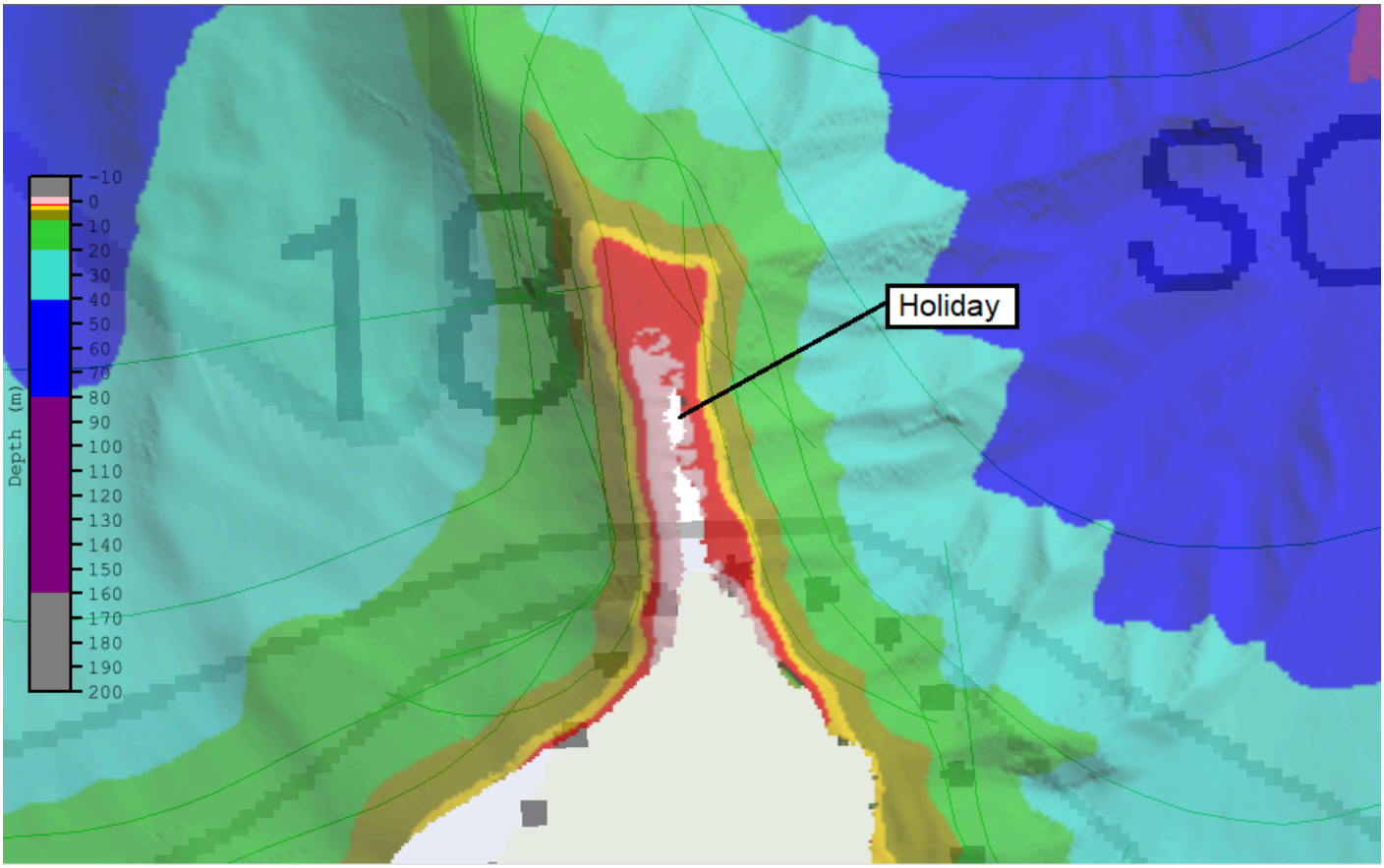


Figure 5: Holiday on top of an area that was too shoal to safely acquire complete MBES coverage safely with a launch. The least depth acquired was 0.50 meters below MLLW.

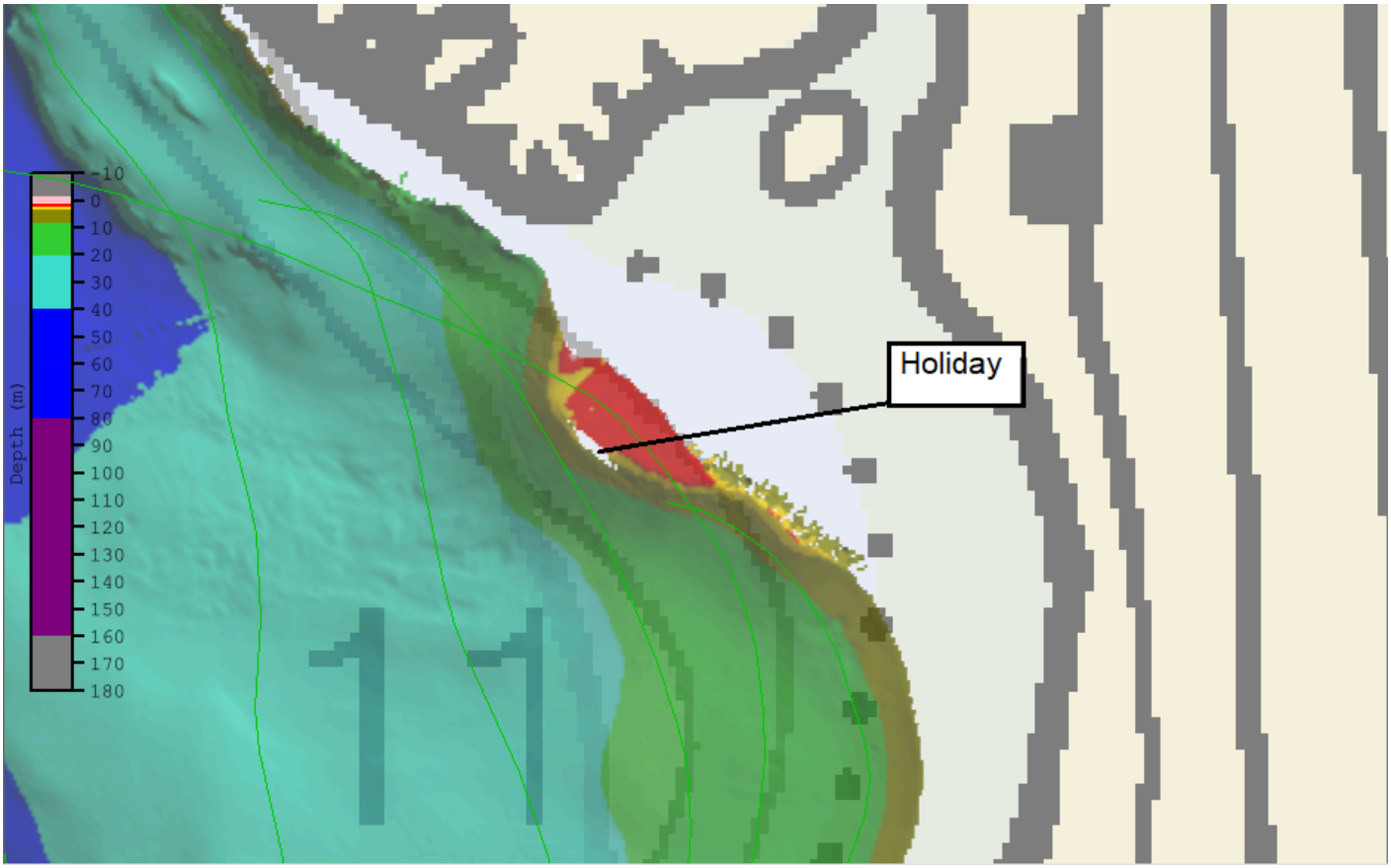


Figure 6: Holiday southwest of cascade creek caused by the boat steering too far from previous coverage.

A.6 Survey Statistics

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

	HULL ID	*S221*	*2801*	*2802*	*2803*	*2804*	*Total*
LNM	**SBES Mainscheme**	0	1	0	0	0	0
	MBES Mainscheme	18.8	143.4	52.8	91.4	126.0	432.4
	Lidar Mainscheme	0	0	0	0	0	0
	SSS Mainscheme	0	0	0	0	0	0
	SBES/SSS Mainscheme	0	0	0	0	0	0
	MBES/SSS Mainscheme	0	0	0	0	0	0
	SBES/MBES Crosslines	0	13.6	0	0	0	13.6
	Lidar Crosslines	0	0	0	0	0	0
Number of Bottom Samples							8
Number Maritime Boundary Points Investigated							0
Number of DPs							9
Number of Items Investigated by Dive Ops							0
Total SNM							23

Table 3: Hydrographic Survey Statistics

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

Survey Dates	Day of the Year
09/06/2020	250
09/07/2020	251

Survey Dates	Day of the Year
09/08/2020	252
09/09/2020	253
09/10/2020	254
09/11/2020	255
09/12/2020	256
09/13/2020	257

Table 4: Dates of Hydrography

B. Data Acquisition and Processing

B.1 Equipment and Vessels

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

B.1.1 Vessels

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

Hull ID	*S221*	*2801*	*2802*	*2803*	*2804*	*2701*
LOA	70.4 meters	8.8 meters	8.8 meters	8.8 meters	8.8 meters	7.6 meters
Draft	4.7 meters	1.1 meters	1.1 meters	1.1 meters	1.1 meters	0.47 meters

Table 5: Vessels Used

All data for survey H13405 was acquired by NOAA Ship RAINIER and her survey launches 2801, 2802, 2803 and 2804. The vessels acquired MBES bathymetry, backscatter, and sound velocity profiles. Shoreline verification was conducted from RAINIER Jetboat 2701.

Singlebeam (SB) data from 2701 was used for reconnaissance and planning. In all cases, we accomplished full coverage with the MBES over any reconnaissance SB and are not submitting the SB data with this project.

B.1.2 Equipment

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

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

Table 6: Major Systems Used

B.2 Quality Control

B.2.1 Crosslines

RAINIER launch 2801 acquired 13.6 nm of crosslines across most depth ranges and multiple boat days. We performed analysis using the Compare Grids function in Pydro Explorer on finalized VR surfaces of H13405 mainscheme only and crossline only data. 98% of nodes met allowable uncertainties. For additional results, see plots below.

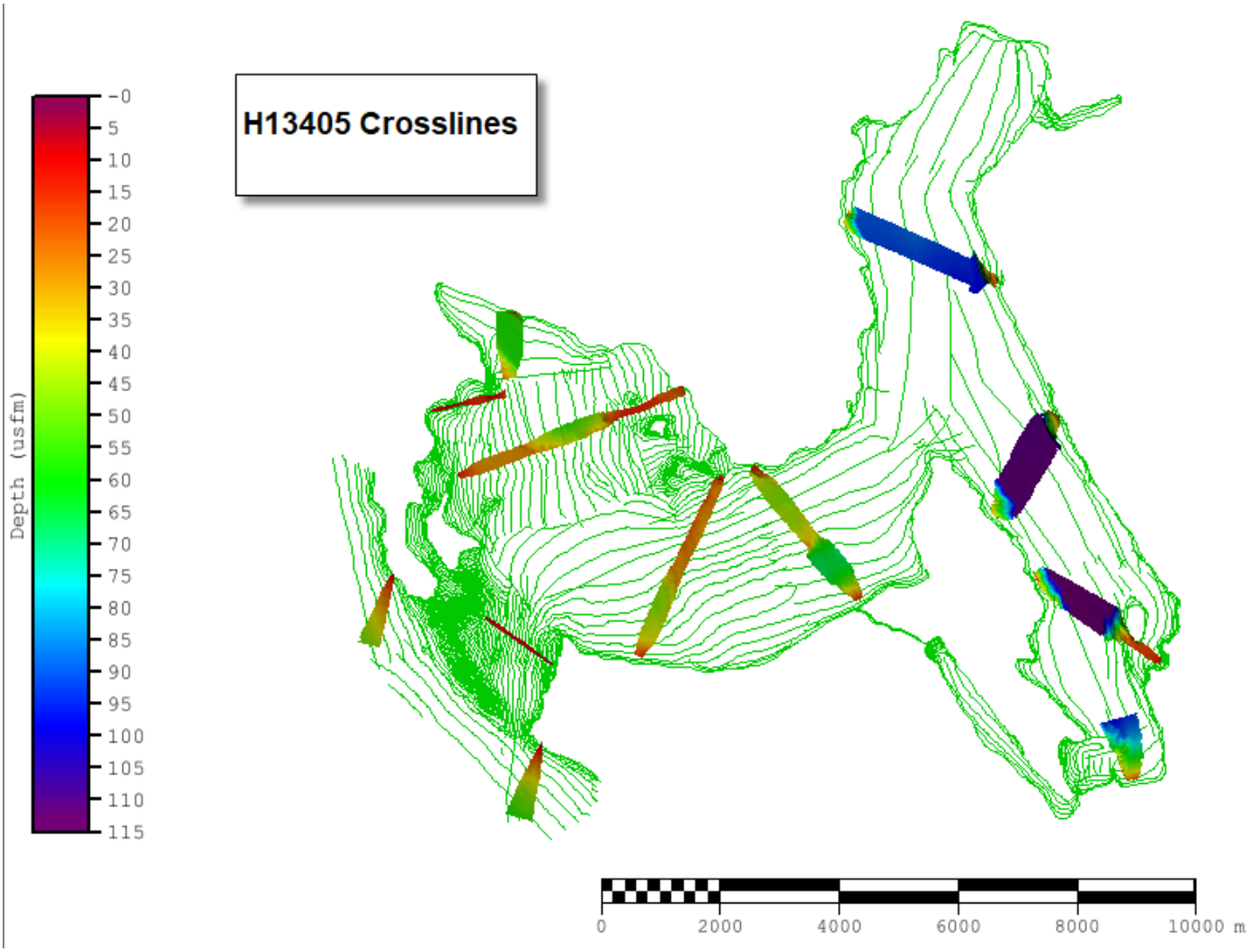
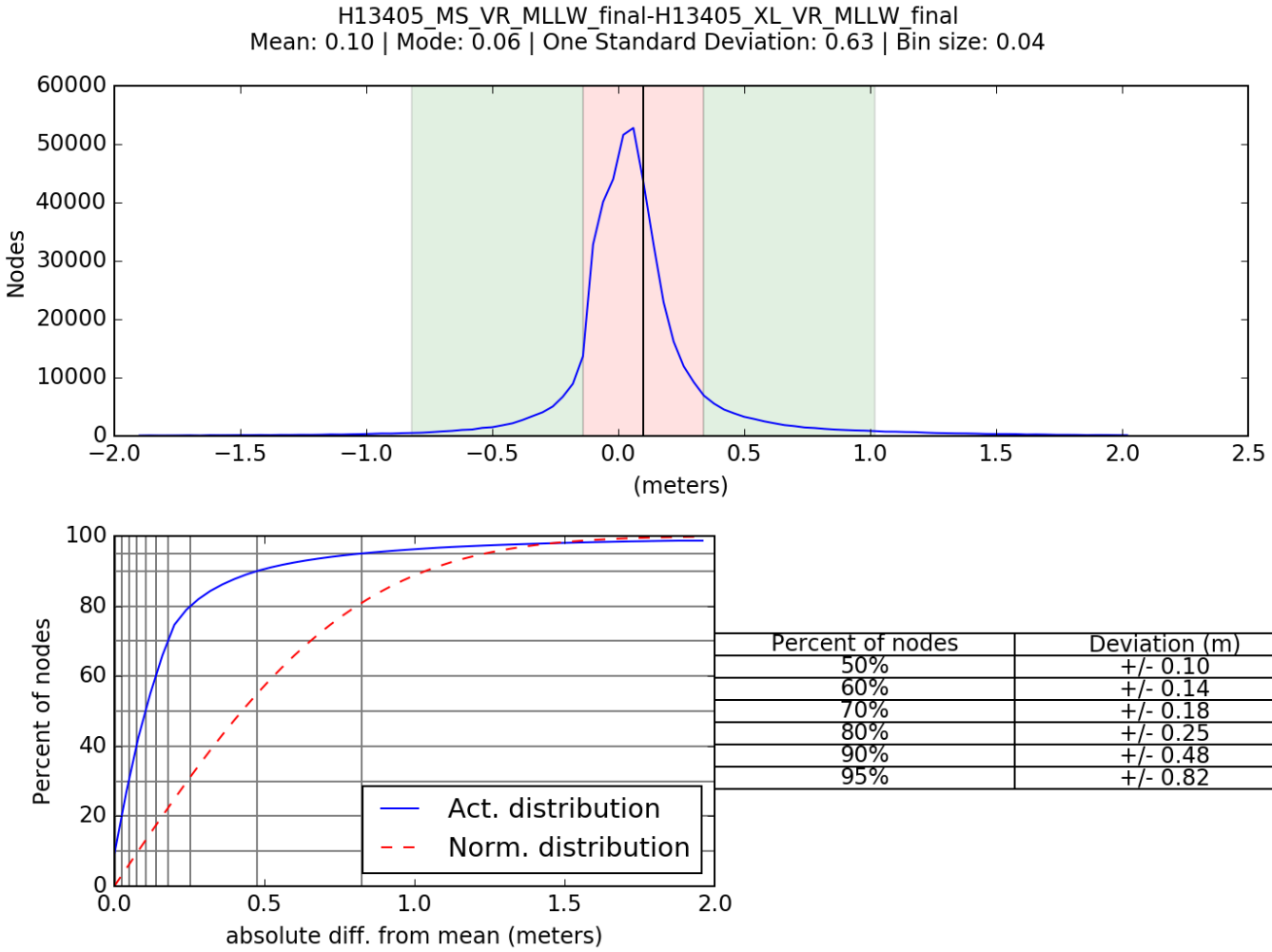


Figure 7: H13405 crossline surface overlaid on mainscheme tracklines.



Percent of nodes	Deviation (m)
50%	+/- 0.10
60%	+/- 0.14
70%	+/- 0.18
80%	+/- 0.25
90%	+/- 0.48
95%	+/- 0.82

Figure 8: Pydro derived plot showing percentage-pass value of H13405 mainscheme to crossline data.

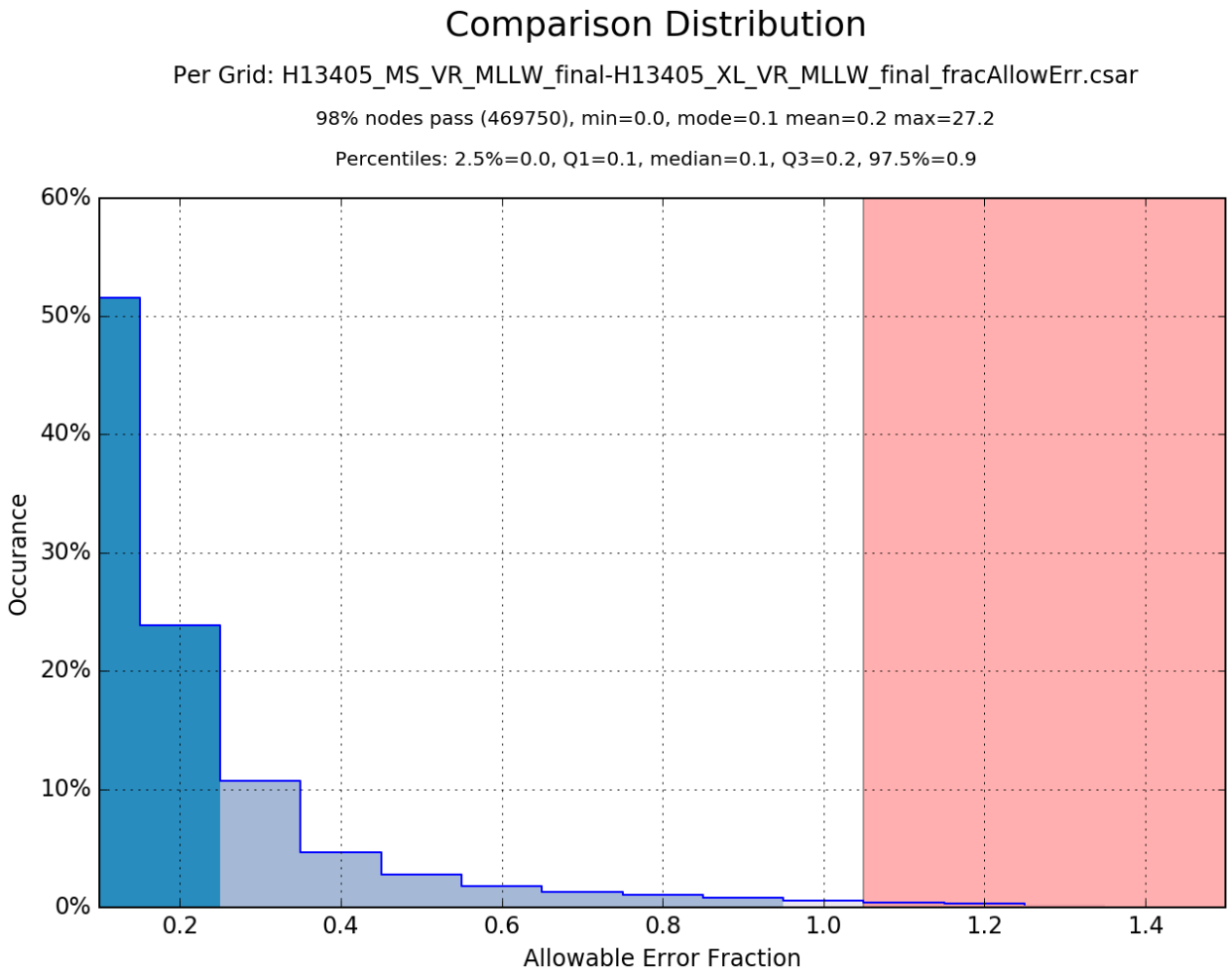


Figure 9: Pydro derived plot showing absolute difference statistics of H13405 mainscheme to crossline data.

B.2.2 Uncertainty

The following survey specific parameters were used for this survey:

Method	Measured	Zoning
ERS via VDATUM	0 meters	12.9 centimeters

Table 7: Survey Specific Tide TPU Values.

Hull ID	Measured - CTD	Measured - MVP	Measured - XBT	Surface
All vessels	3 meters/second	NA meters/second	NA meters/second	0.05 meters/second

Table 8: Survey Specific Sound Speed TPU Values.

Total Propagated Uncertainty (TPU) values for survey H13405 were derived from a combination of fixed values for equipment and vessel characteristics, as well as from field assigned values for sound speed uncertainties. Tidal uncertainty was provided in the project instructions for the NOAA vertical datum transformation model used for this survey.

In addition to the usual a priori estimates of uncertainty, some real-time and post-processed uncertainty sources were also incorporated into the depth estimates of this survey. Real-time uncertainties for position, navigation, attitude, and vessel motion data from Applanix POS MV were applied during acquisition and initially in postprocessing. However, the SBET and RMS files, which were generated using POSPac MMS software and applied in CARIS HIPS to supersede POS MV data, have post-processed uncertainties associated with the GPS height and position.

Uncertainty values of the submitted finalized grids were calculated in Caris using "Greater of the Two" of uncertainty and standard deviation (scaled to 95%). Grid QA v5 within Pydro QC Tools was used to analyze H13405 TVU compliance. H13405 met HSSD requirements in over 99.5 percent of grid nodes, which is shown in the histogram plot below.

Pydro QC Tools 2 Grid QA was used to analyze H13405 multibeam echosounder (MBES) data density. The submitted H13405 variable-resolution (VR) surface met HSSD density requirements as shown in the histograms below.

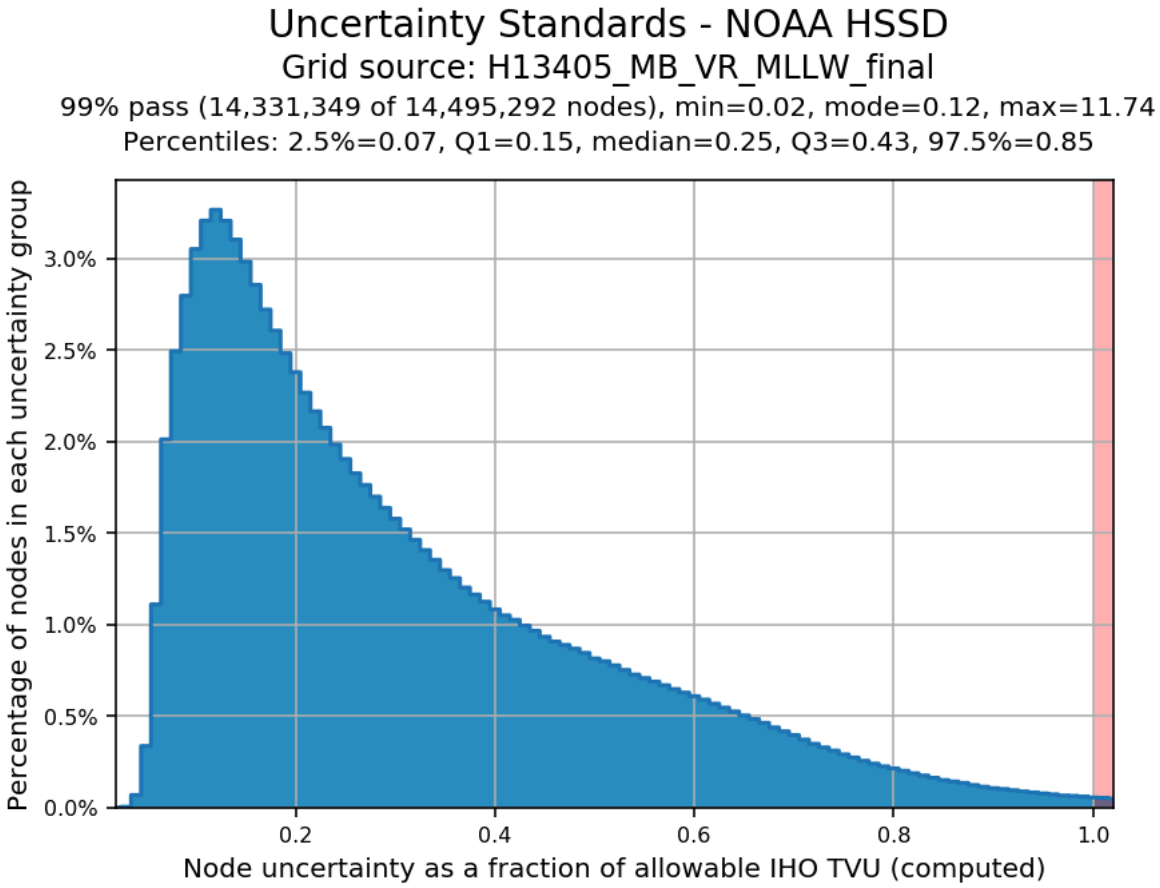


Figure 10: Pydro derived plot showing TVU compliance of H13405 finalized multi-resolution MBES data.

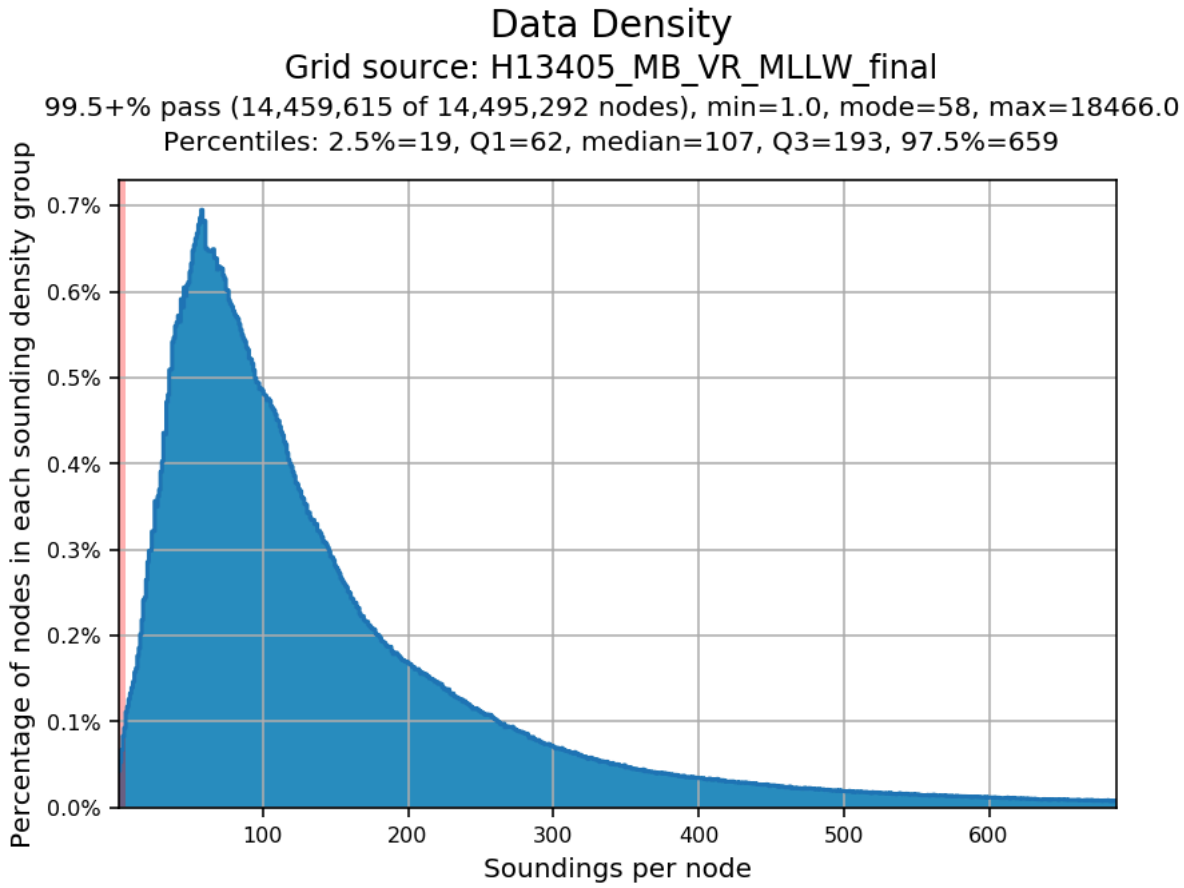


Figure 11: Pydro derived histogram plot showing HSSD density compliance of H13405 finalized variable-resolution MBES data.

B.2.3 Junctions

No prior survey junction was assigned according to the project instructions.

There are no contemporary surveys that junction with this survey.

B.2.4 Sonar QC Checks

Sonar system quality control checks were conducted as detailed in the quality control section of the DAPR.

B.2.5 Equipment Effectiveness

There were no conditions or deficiencies that affected equipment operational effectiveness.

B.2.6 Factors Affecting Soundings

Vertical Control

Three lines running through a narrow channel along the west side of Ruth Island exhibited issues with vertical control. The exact source of the error was not determined however it appears to be related to the SBET from that day. Due to the navigation insignificance of the area the issue was not investigated and further and a solution was not found.

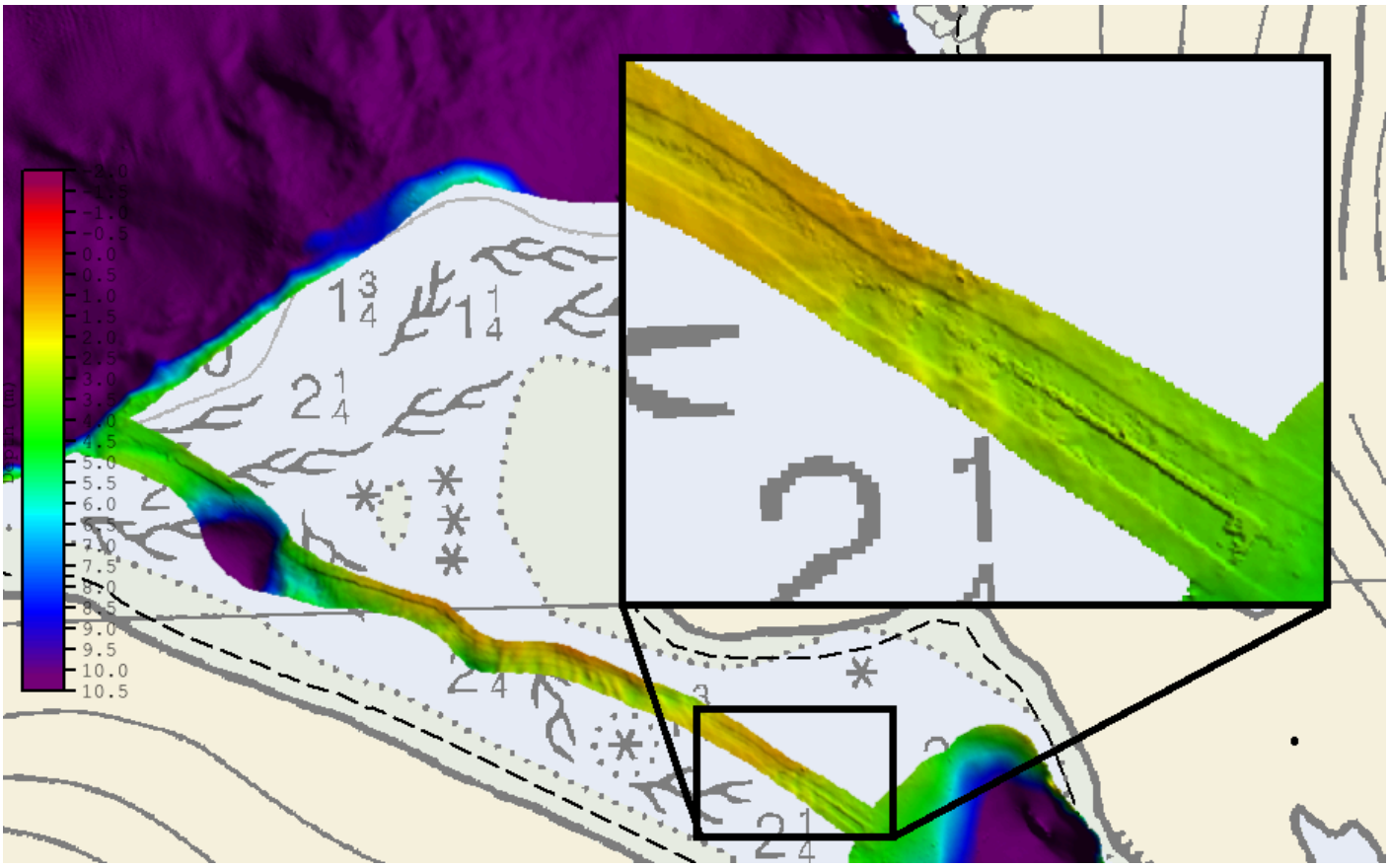


Figure 12: Overview of narrow channel exhibiting vertical control issues. Note surface is shown at five times vertical exaggeration.

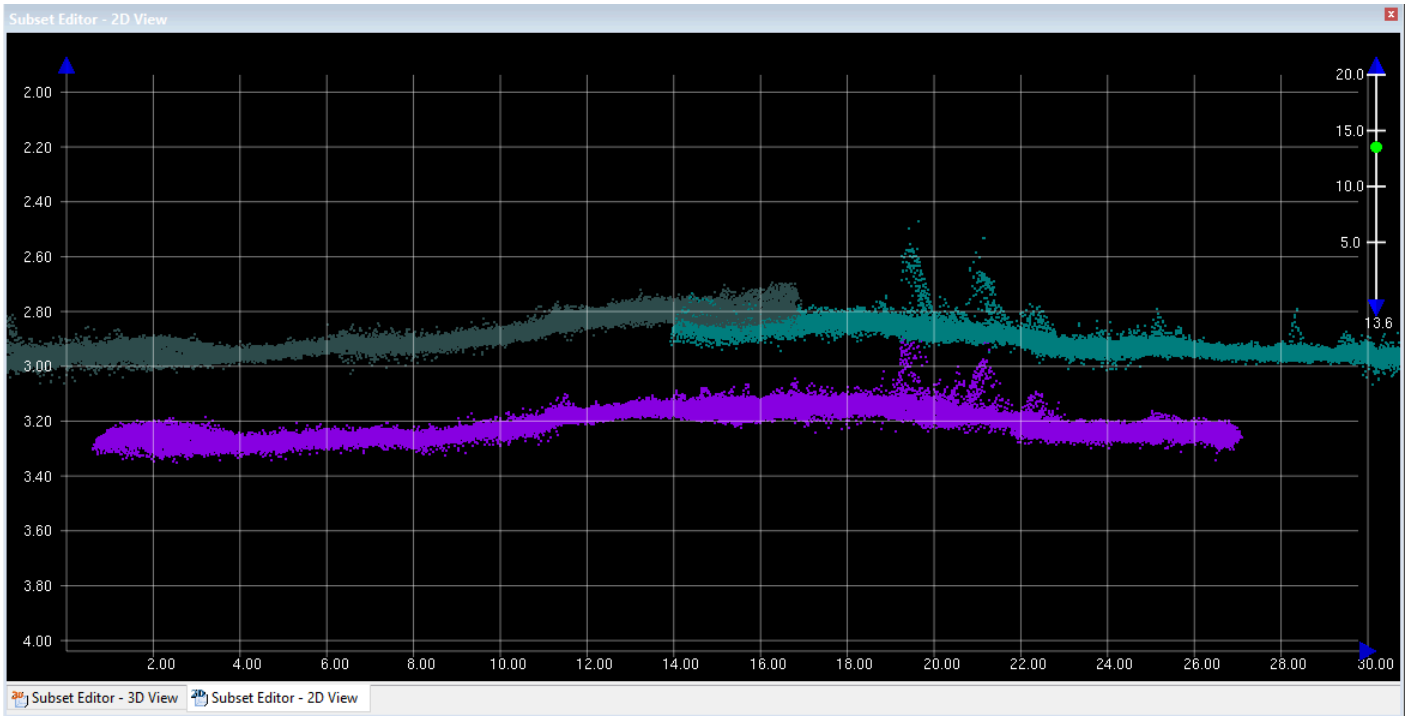


Figure 13: Subset view of H13405 data exhibiting vertical control issues.

Sound Speed

Due to water column variations such as thermal layering and salinity differences, a distinct demarcation of water masses was sometimes encountered in the field. At times, this proved problematic in the acquisition and application of optimal sound speed correction data. Despite the best efforts of the hydrographers to conduct sufficient sound speed casts distributed spatially and temporally, in some areas, particularly in the northern part of the survey, sound speed correction was suboptimal. This was evidenced by the appearance of systematic artifacts in the survey grid and the characteristic "smiles" or "frowns" of the data when viewed in subset editor. Even with these sound speed errors 99% of H13405 grid nodes passed uncertainty standards. As such data was left as is and no manual cleaning of sound speed errors was attempted.

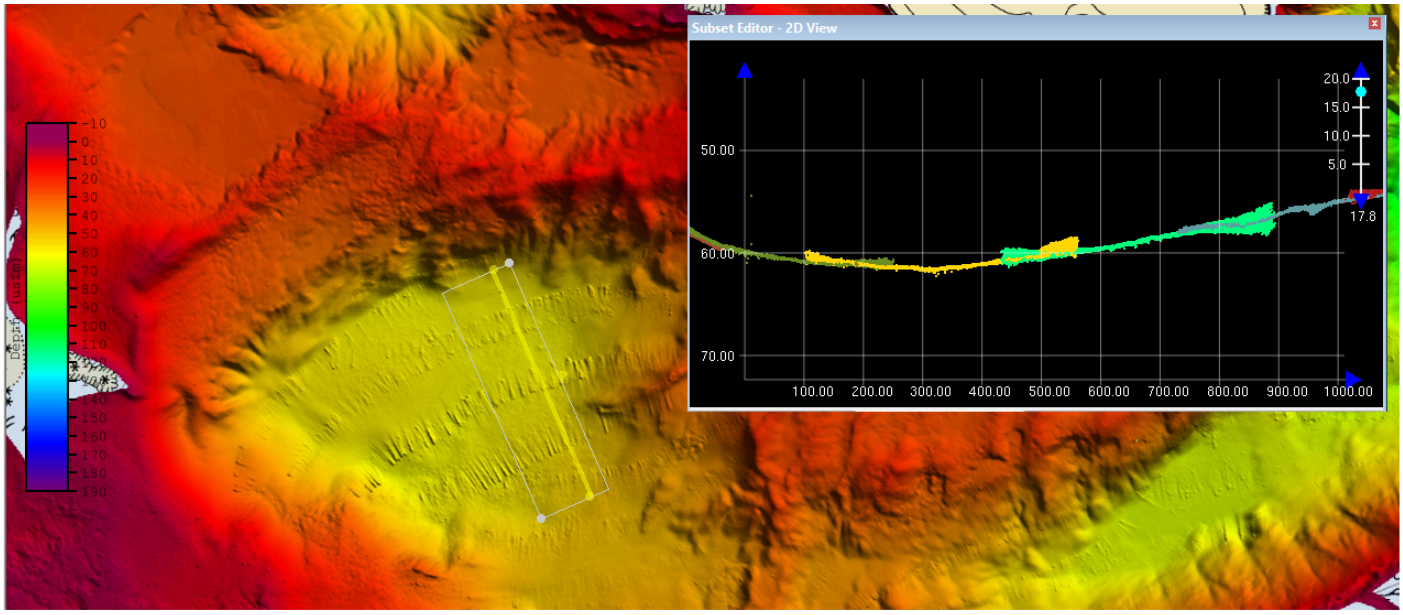


Figure 14: Example of area with suboptimal sound speed correction. It should be noted that both surface and subset are shown with high vertical exaggeration.

B.2.7 Sound Speed Methods

Sound Speed Cast Frequency: At least once every 4 hours or as needed.

Seventy two sound speed profiles were acquired for this survey at discrete locations within the survey area at least once every four hours, when significant changes in surface sound speed were observed, or when operating in a new area. Sound speed profiles were obtained using Sea-Bird 19plus SEACAT Profilers. All casts were concatenated into a master file and applied to MBES data using the "Nearest distance within time" (4 hours) profile selection method. The ship's MVP was broken during this survey and that ship hydro collected utilized cast taken by launches running during the same day.

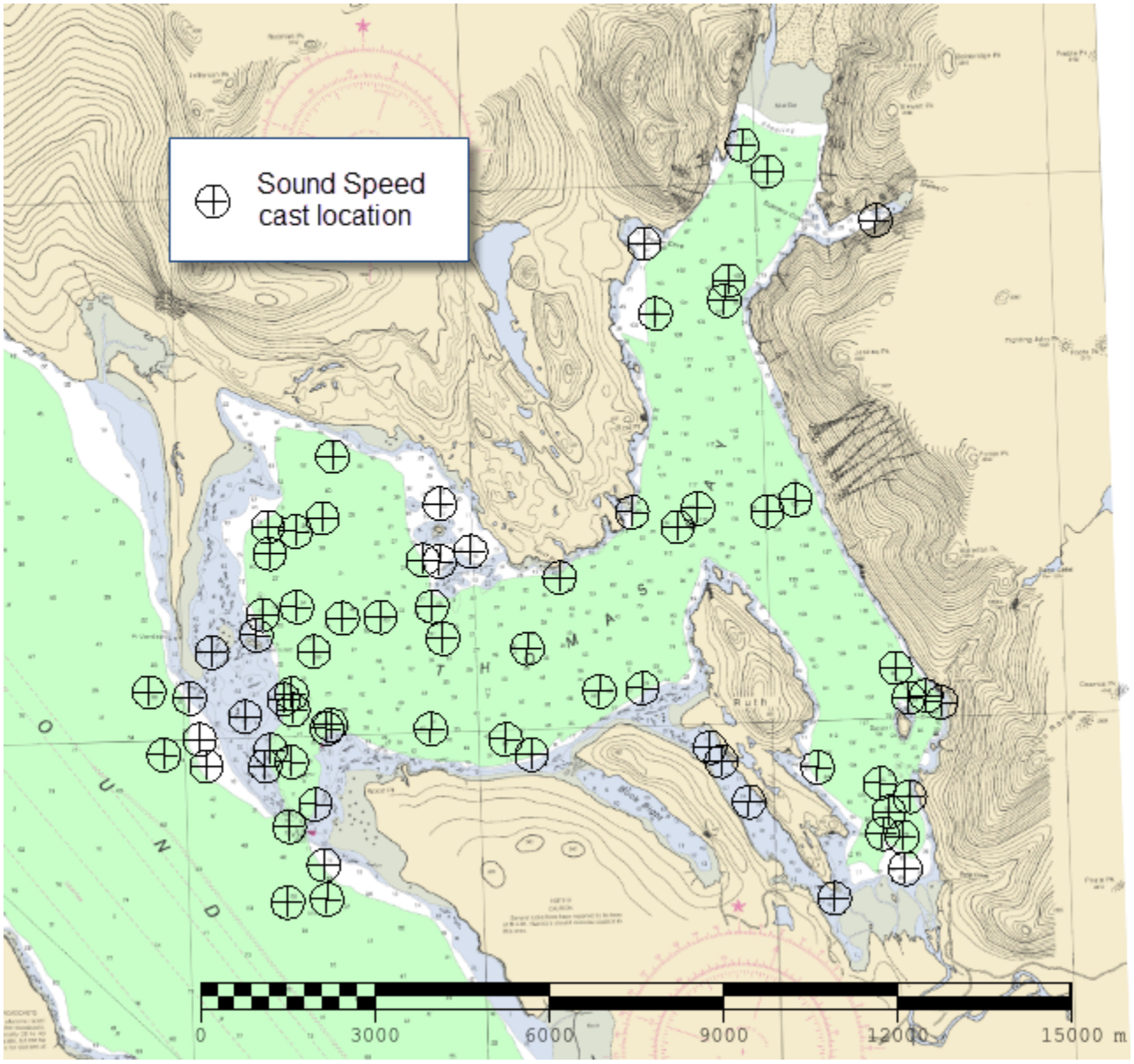


Figure 15: H13405 sound speed cast locations.

B.2.8 Coverage Equipment and Methods

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

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

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

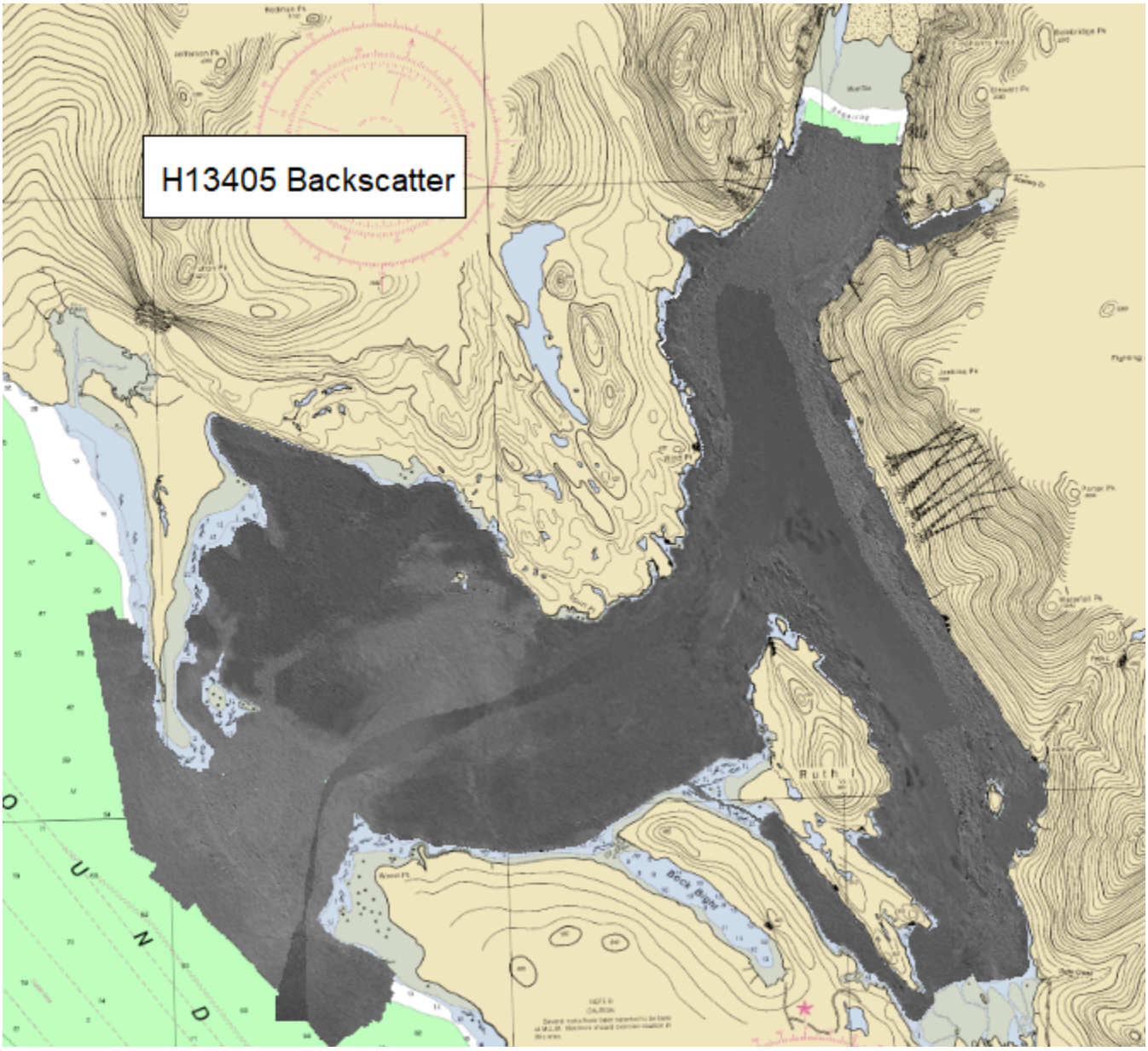


Figure 16: Overview of H13405 backscatter mosaics.

B.5 Data Processing

B.5.1 Primary Data Processing Software

The following Feature Object Catalog was used: Object Catalog was used: 5_7..

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
H13405_MB_VR_MLLW	CARIS VR Surface (CUBE)	Variable Resolution	-0.96 meters - 113.29 meters	NOAA_VR	Complete MBES
H13405_MB_VR_MLLW_final	CARIS VR Surface (CUBE)	Variable Resolution	-0.96 meters - 113.29 meters	NOAA_VR	Complete MBES

Table 9: Submitted Surfaces

Submitted surfaces were generated using the recommended parameters for depth-based (Ranges) Caris variable-resolution bathymetric grids as specified in the 2020 HSSD.

Pydro QC Tools Detect Fliers was used with default settings to find fliers in a finalized VR surfaces. Obvious noise was rejected by the hydrographer in Caris Subset Editor. After data cleaning, Detect Fliers was run again and found 134 potential fliers in the Complete Coverage surface in the Complete Coverage surface. These were investigated and found to be false positives. The results of the Detect Fliers tool are included as a .000 files in the Separates section of this report.

B.5.3 SBET Processing Method

Post Processed-Real Time Extended (PP-RTX) processing methods were used in Applanix POSPac MMS 8.2.1 software to produce SBETs for post-processing horizontal correction.

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-20_VDATUM_100m_NAD83_2011-MLLW.csar

Table 10: ERS method and SEP file

We used ellipsoid referenced GNSS derived heights and applied a seperation model to reduce soundings to chart datum

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 8.

The following PPK methods were used for horizontal control:

- RTX

WAAS

The Wide Area Augmentation System (WAAS) was used for real-time horizontal control during data acquisition.

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
US5AK0EM	1:40000	2	06/22/2017	02/28/2019

Table 11: Largest Scale ENCs

D.1.2 Shoal and Hazardous Features

The most striking observation made from comparing H13405 survey data with the ENC is the area south of Baird Glacier. Survey data relieved shoaling significantly further offshore than what is currently charted. As an example, near the center of the waterway is a charted 83 fathom sounding, survey derived soundings show depths of 4.2 fathoms.

A total of six DTONs were identified within the H13405 survey area and submitted to the Office of Coast Survey Nautical Data Branch. See Supplemental Correspondence folder for further information.

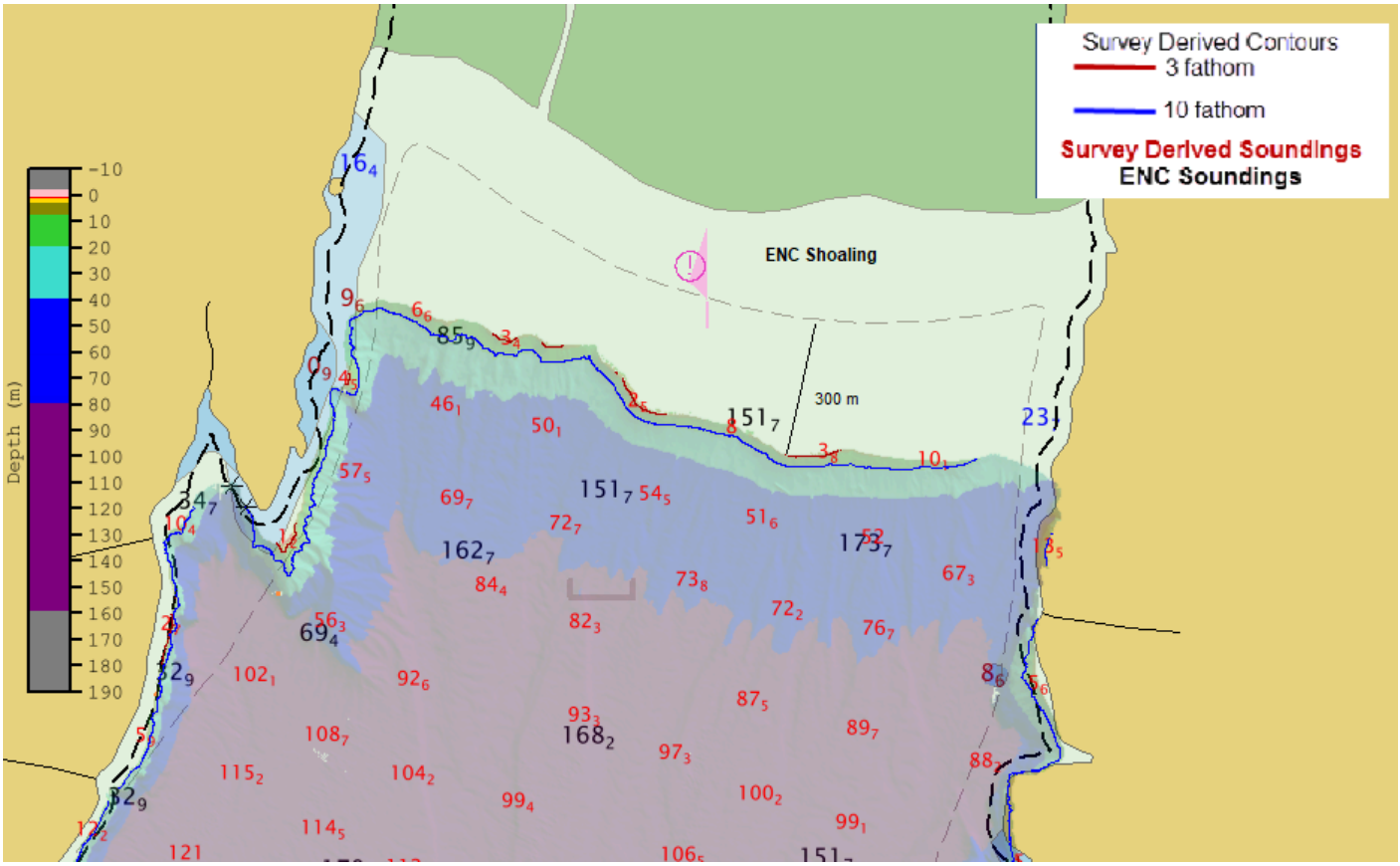


Figure 17: ENC US5AK0EM overlaid with H13405 soundings and contours to show the extent of shoaling south of Baird Glacier.

D.1.3 Charted Features

Four hundred feet of the southwest corner of Ruth Island is a charted mooring. Field investigations showed a permanent looking outpost of three barges at this mooring. All other charted features in this survey are addressed in the final feature file.

Figure 18: Permanent looking outpost.

D.1.4 Uncharted Features

No uncharted features exist for this survey.

D.1.5 Channels

Though there is no federally maintained channel, the 'entrance channel' into Thomas Bay is marked by buoys. One hundred percent multibeam coverage was acquired over this area and depths were found to be accurately charted. Two designated anchorages exist in the survey area, one on the southeast side of Ruth Island and one east of Spray island. Survey depths and bottom sample analysis shows these areas to be good anchorages for vessels. There are no designated 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

Three ATONs are located within the assigned limits of survey H13405 and were confirmed to be on station and serving their intended purpose.

D.2.2 Maritime Boundary Points

No Maritime Boundary Points were assigned for this survey.

D.2.3 Bottom Samples

Six bottom sample locations were assigned for H13405 after their positions were revised at the request of the Hydrographer; see supplemental correspondence for further details. Eight bottom samples were acquired in the field. In-situ bottom sample photographs were not acquired with the Imaging Grab Sampler equipment due its cumbersome operation. In-situ video was attempted with a live feed underwater drop camera however due to the amount of sediment in the water this video was unusable. The results of the bottom samples acquired are included in the H13405 Final Feature File submitted with this report.

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

The H13405 survey area contains several interesting geological features including a likely terminal moraine and submarine channel.

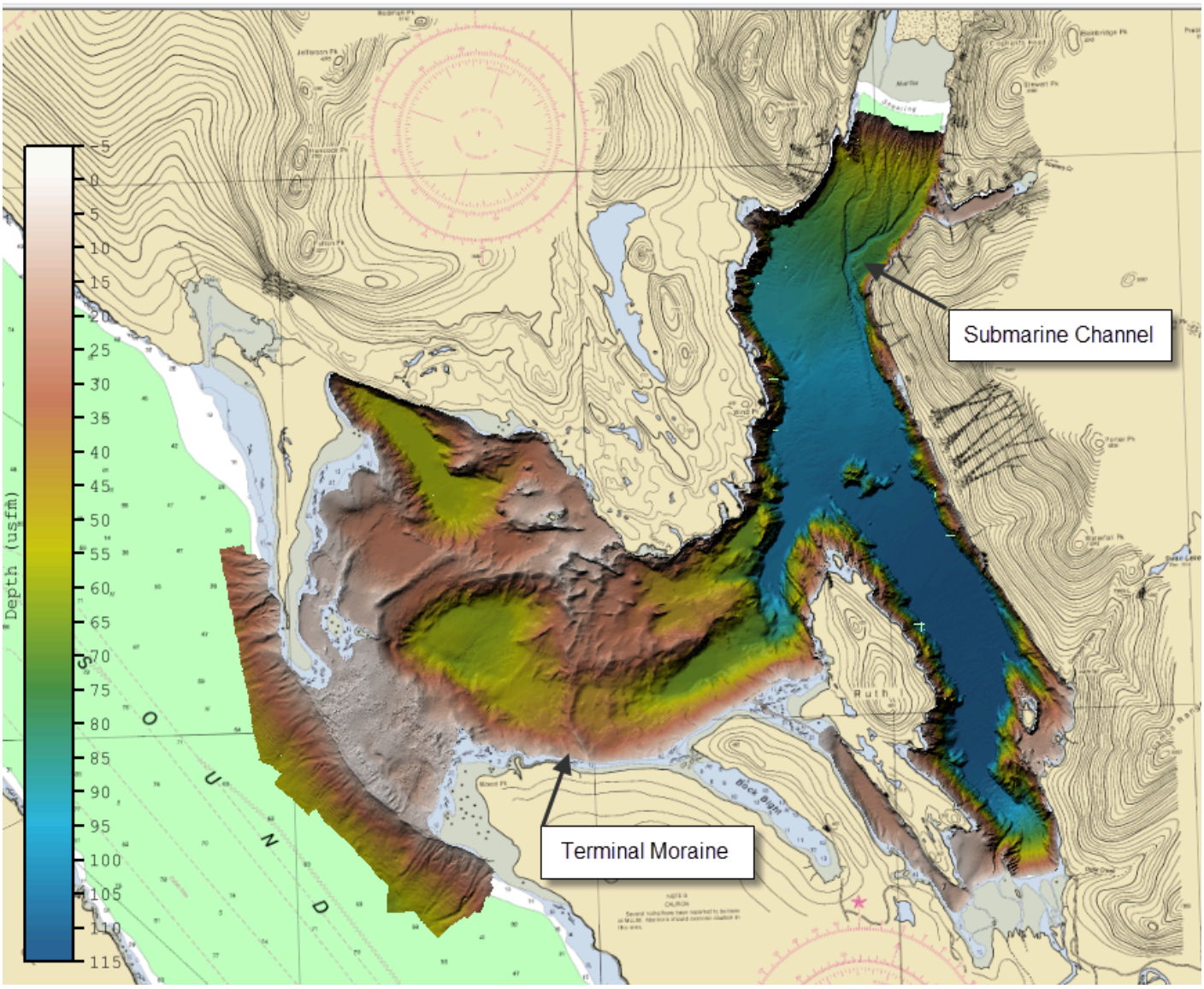


Figure 19: Overview of H13405 survey area rich in geologic features. Surface is shown at five times vertical exaggeration.

D.2.9 Construction and Dredging

No present or planned construction or dredging exist within the survey limits.

D.2.10 New Survey Recommendations

In many areas in this sheet shoreline data appears to be slightly out of position compared to acquired MBES data. This is most apparent in areas such as scenery cove where MBES data was logged over top what is

currently charted as land. We recommend that this area be resurveyed by NOAA's Remote Sensing Division and new photogrammetry be used to create revised shoreline data.

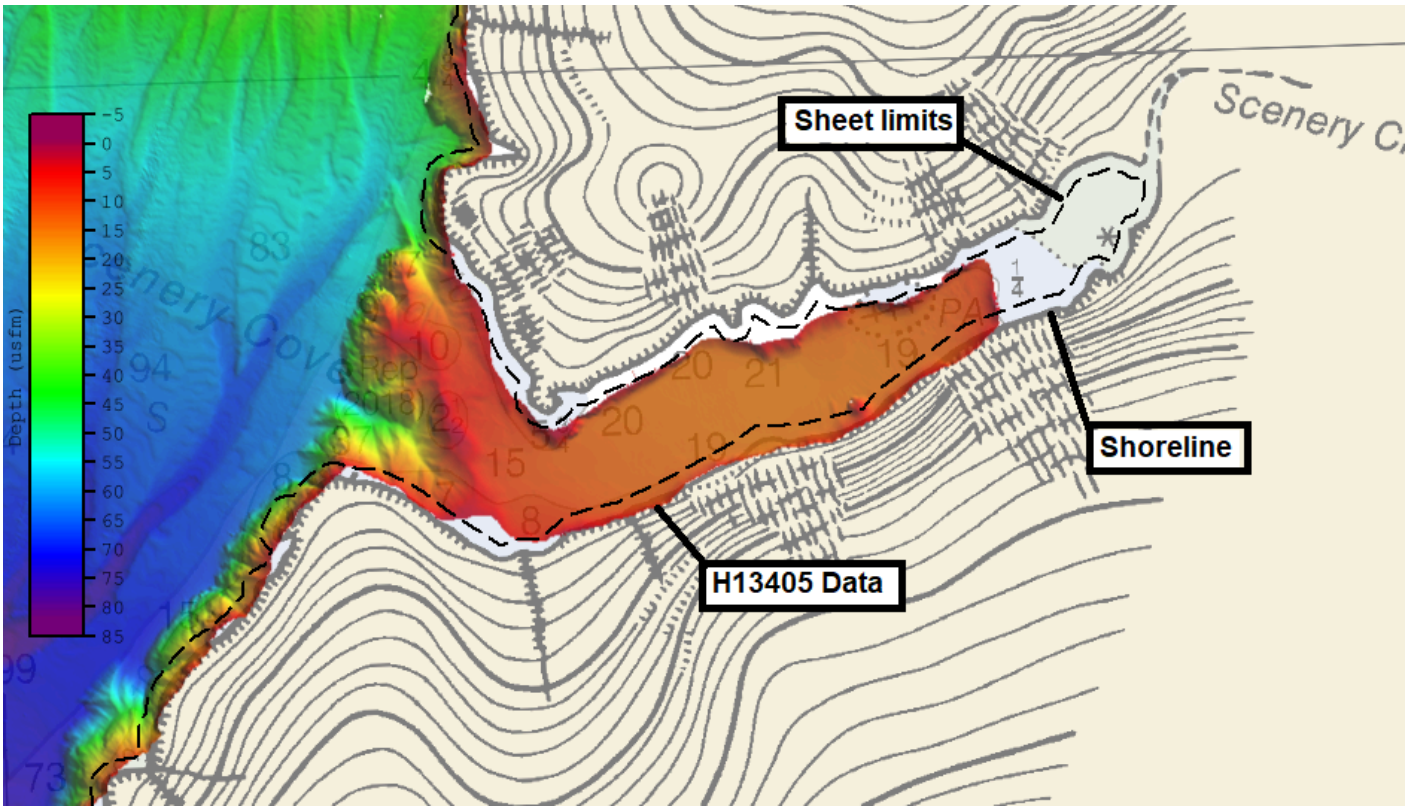


Figure 20: Example of area with inaccurate shoreline data.

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
Samuel F. Greenaway, CDR/ NOAA	Chief of Party	10/12/2020	Digitally signed by GREENAWAY.SAMUEL.F.1275635347 Date: 2020.10.12 10:13:21 -08'00'
Matthew B. Sharr, LT/NOAA	Operations Officer	10/12/2020	SHARR.MATTHEW.BRANDON.1503637126 2020.10.12 12:52:23 -08'00'
James B. Jacobson	Chief Survey Technician	10/12/2020	JACOBSON.JAMES.BRYAN.1269664017 I have reviewed this document 2020.10.12 10:10:22 -08'00'
Audrey E. Jerauld	Senior Survey Technician	10/12/2020	Digitally signed by JERAULD.AUDREY.ELIZABETH.1170496260 Date: 2020.10.12 10:08:03 -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