H13073

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

DESCRIPTIVE REPORT

Type of Survey:	Navigable Area
Registry Number:	H13073

LOCALITY

State(s):	Alaska
General Locality:	Yakutat Bay
Sub-locality:	East Yakutat Bay

2017

CHIEF OF PARTY
CDR Mark Van Waes, NOAA

LIBRARY & ARCHIVES

Date:

U.S. DEPARTMENT OF COMMERCE
NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION

REGISTRY NUMBER:

HYDROGRAPHIC TITLE SHEET

H13073

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:	**Yakutat Bay**
Sub-Locality:	**East Yakutat Bay**
Scale:	**40000**
Dates of Survey:	**09/16/2017 to 10/29/2017**
Instructions Dated:	**08/10/2017**
Project Number:	**OPR-O346-FA-17**
Field Unit:	**NOAA Ship *Fairweather***
Chief of Party:	**CDR Mark Van Waes, 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:

The purpose of this survey is to provide contemporary surveys to update National Ocean Service (NOS) nautical charts. All separates are filed with the hydrographic data. Any revisions to the Descriptive Report (DR) generated during office processing are shown in bold red italic text. The processing branch maintains the DR as a field unit product, therefore, all information and recommendations within the body of the DR are considered preliminary unless otherwise noted. The final disposition of surveyed features is represented in the OCS nautical chart update products. All pertinent records for this survey, including the DR, are archived at the National Centers for Environmental Information (NCEI) and can be retrieved via http://www.ncei.noaa.gov/.

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Descriptive Report to Accompany Survey H13073

Project: OPR-O346-FA-17

Locality: Yakutat Bay

Sublocality: East Yakutat Bay

Scale: 1:40000

September 2017 - October 2017

NOAA Ship *Fairweather*

Chief of Party: CDR Mark Van Waes, NOAA

A. Area Surveyed

The survey area is located in Yakutat Bay, Alaska within the sub locality of East Yakutat Bay.

A.1 Survey Limits

Data were acquired within the following survey limits:

Northwest Limit	Southeast Limit
59° 48' 8.08" N 139° 46' 16.67" W	59° 33' 32.13" N 139° 54' 57.36" W

Table 1: Survey Limits

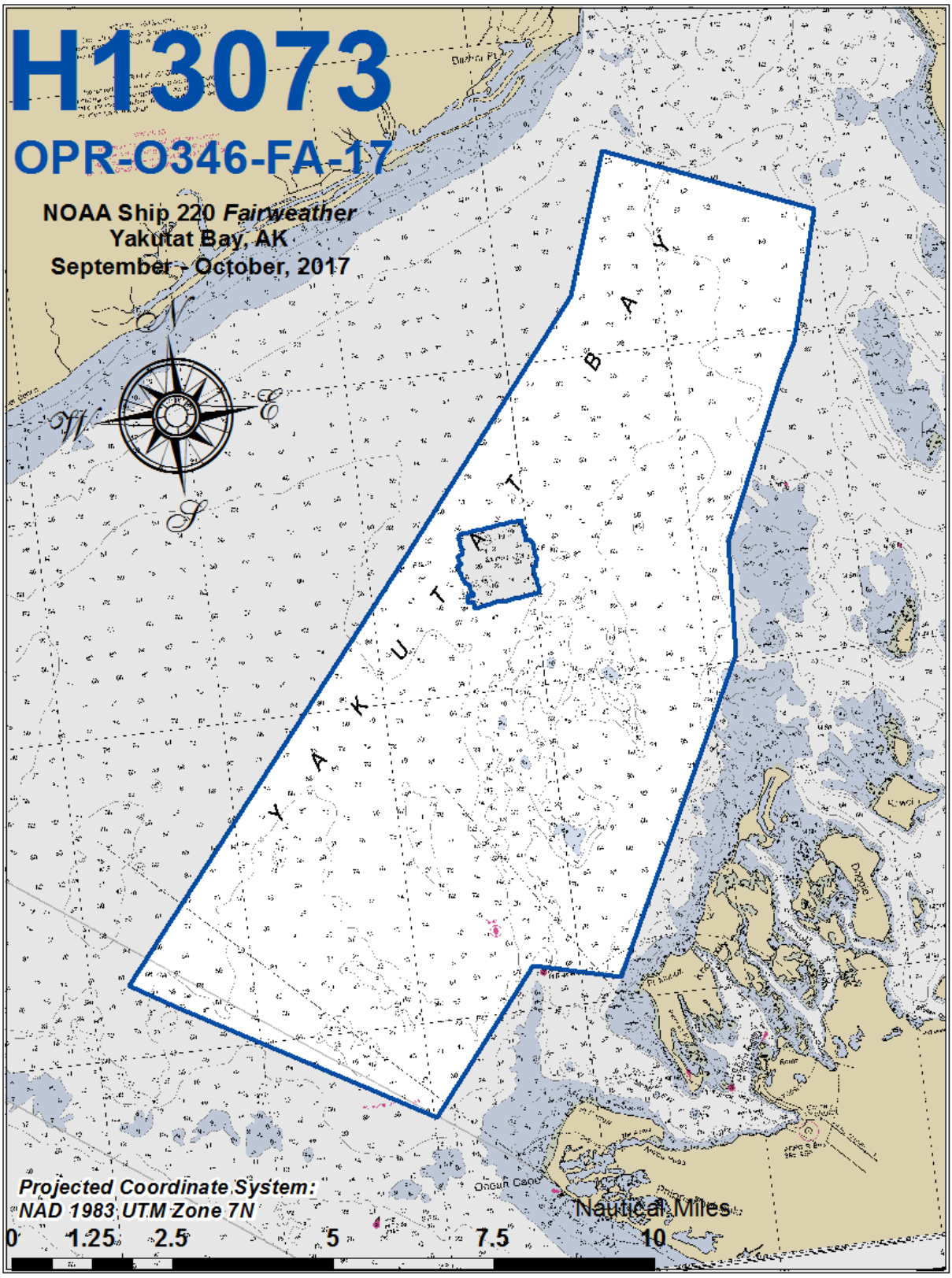


Figure 1: H13073 sheet limits (in blue) overlaid onto Chart 16761

Data were acquired to the survey limits in accordance with the requirements in the Project Instructions and the April 2017 NOS Hydrographic Surveys Specifications and Deliverables (HSSD) as shown in Figure 1.

A.2 Survey Purpose

Yakutat Bay has seen a rapid increase in the number and size of visiting vessels in recent years. Additionally, the local community of Yakutat is dependent on barge access for delivery of supplies and groceries. Their economy is largely timber, subsistence hunting, fishing, and tourism; modern survey data will increase the safety of all these activities.

The purpose of this project is to provide contemporary surveys to update National Ocean Service (NOS) nautical charting products, providing modern bathymetry to update the 1978 vintage survey data. H13073 will address approximately 78 square nautical miles of navigationally significant water.

A.3 Survey Quality

The entire survey is adequate to supersede previous data.

Data acquired in H13073 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). Additional compliance statistics can be found in the Standards and Compliance Review located in Appendix II of this report.

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 H13073 was acquired with complete coverage MBES, meeting the requirements listed above and in the HSSD. See Figure 2 for an overview of coverage.

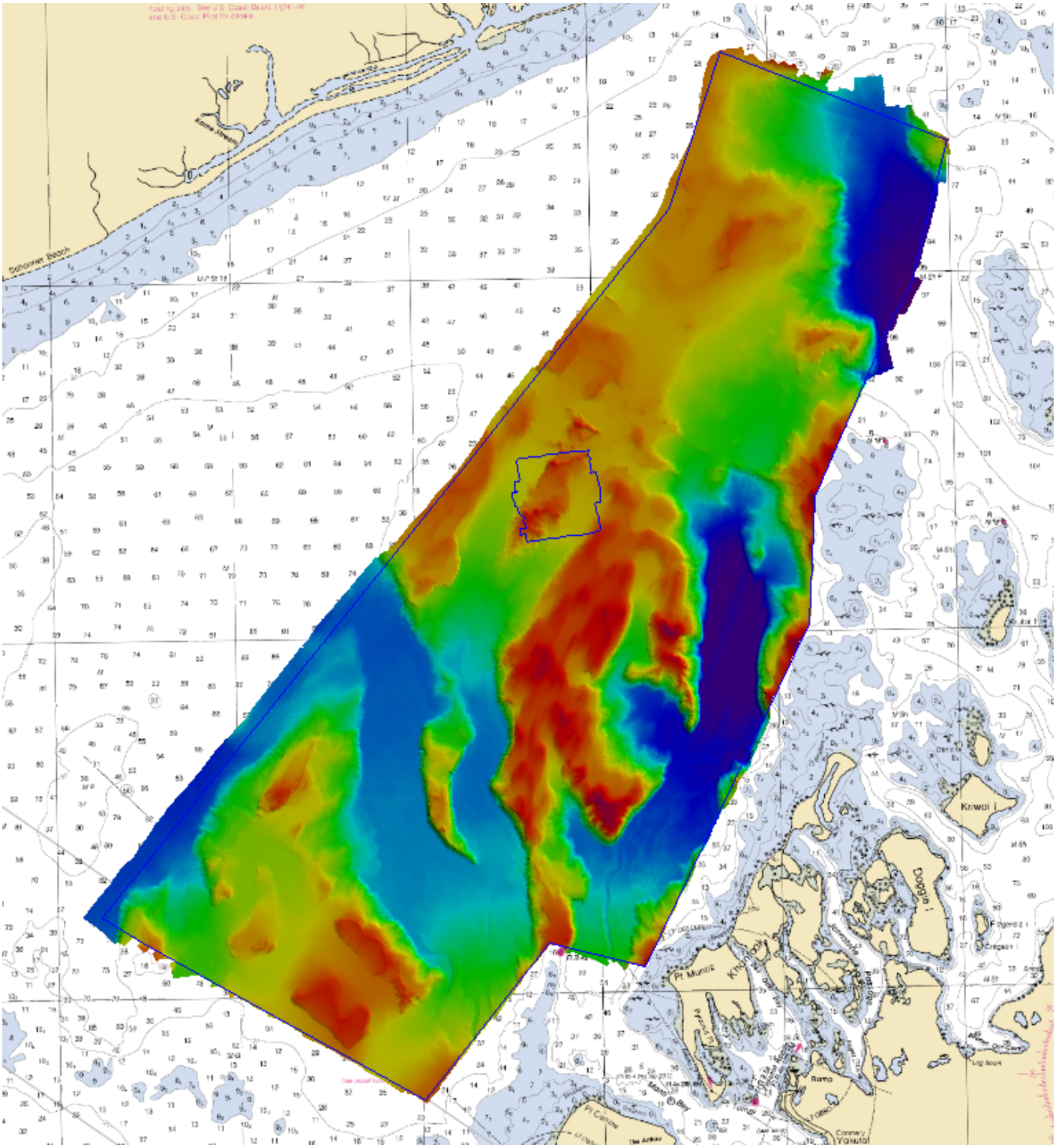


Figure 2: H13073 survey coverage overlaid onto Chart 16761

A.5 Survey Statistics

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

	HULL ID	*FA 2806*	*FA 2807*	*FA 2808*	*S 220*	*Total*
LNM	SBES Mainscheme	0	0	0	0	0
	MBES Mainscheme	164.78	169.02	69.10	233.64	636.54
	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	0	19.16	5.89	25.05
	Lidar Crosslines	0	0	0	0	0
Number of Bottom Samples						20
Number Maritime Boundary Points Investigated						0
Number of DPs						0
Number of Items Investigated by Dive Ops						0
Total SNM						78.07

Table 3: Hydrographic Survey Statistics

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

Survey Dates	Day of the Year
09/16/2017	259
09/18/2017	261
09/21/2017	264
10/02/2017	275
10/11/2017	284
10/12/2017	285
10/13/2017	286
10/16/2017	289
10/17/2017	290
10/24/2017	297
10/25/2017	298
10/27/2017	300
10/28/2017	301
10/29/2017	302

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	***S220***	***2806***	***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
AML Oceanographic	MVP200	Conductivity, Temperature, and Depth Sensor
Sea-Bird Scientific	SBE 19plus V2	Conductivity, Temperature, and Depth Sensor
Applanix	POS MV 320 v5	Positioning and Attitude System
Teledyne RESON	SVP 70	Sound Speed System
Teledyne RESON	SVP 71	Sound Speed System

Table 6: Major Systems Used

The equipment was installed on the survey platforms as follows: S220 utilizes the Kongsberg EM 710 MBES, SVP 70 surface sound speed sensors, and AML Oceanographic MVP 200 for conductivity, temperature, and depth (CTD) casts. All launches utilize Kongsberg EM 2040 MBES, Teledyne RESON SVP71 surface sound speed sensors, and Sea-Bird Scientific 19plus CTD casts.

B.2 Quality Control

B.2.1 Crosslines

Multibeam/single beam echo sounder/side scan sonar crosslines acquired for this survey totaled 3.94% of mainscheme acquisition.

Crosslines were collected, processed, and compared in accordance with Section 5.2.4.3 of the HSSD. To evaluate crosslines, a surface using strictly mainscheme lines and a surface using strictly crosslines was created. From these two surfaces, a difference surface (mainscheme - crosslines = difference surface) was generated (Figure 3) and is submitted in the Separates II Digital Data folder. Statistics show the mean difference between the depths derived from mainscheme and crosslines to be 0.03 meters (mainscheme being deeper) with 95% of nodes falling within +/- 0.44 meters (Figure 4). For the respective depths, the difference surface was compared to the allowable NOAA accuracy standards. In total, greater than 99.5% of the depth differences between H13073 mainscheme and crossline data are within allowable NOAA uncertainties.

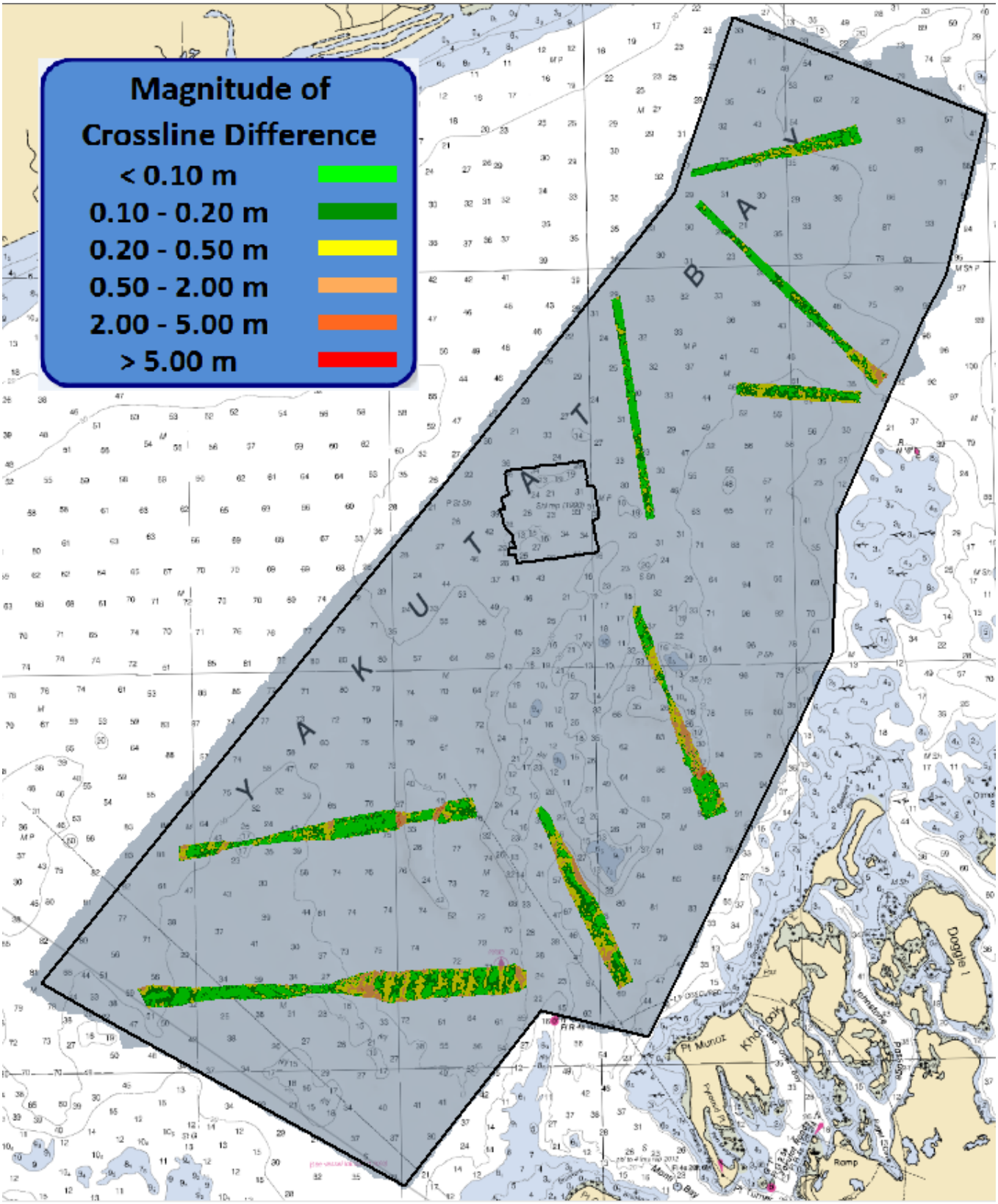
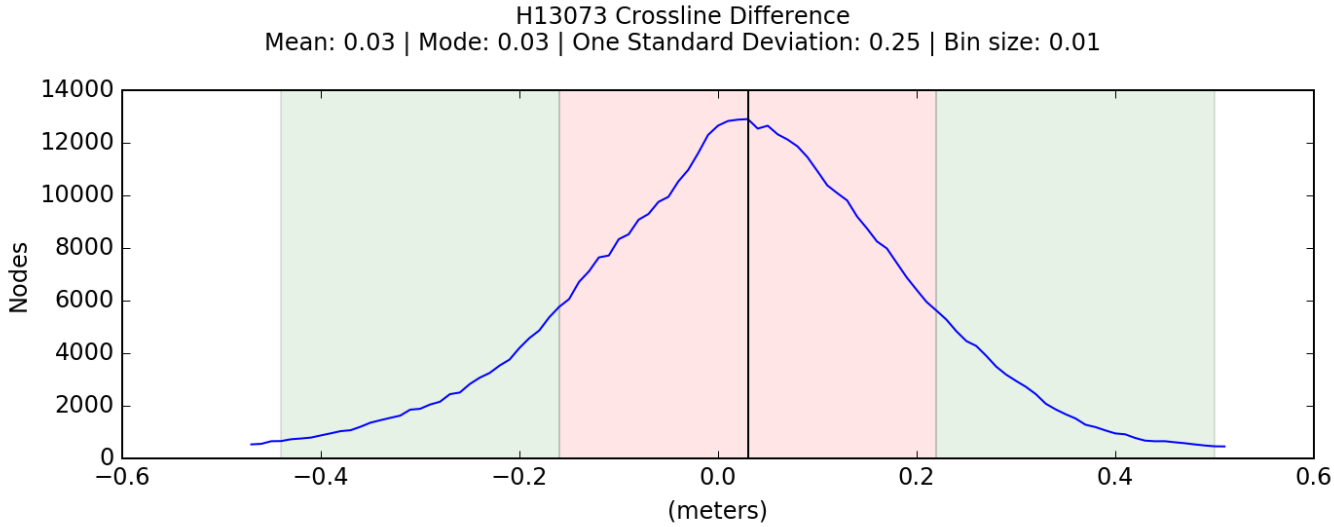
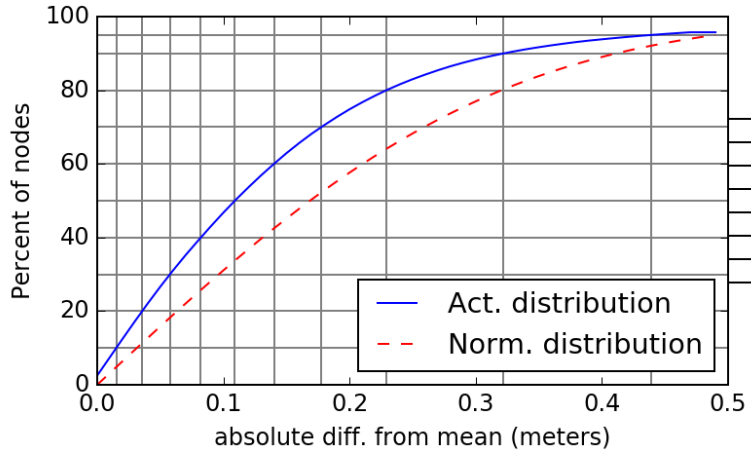


Figure 3: Overview of H13073 crosslines





Percent of nodes	Deviation (m)
50%	+/- 0.11
60%	+/- 0.14
70%	+/- 0.18
80%	+/- 0.23
90%	+/- 0.32
95%	+/- 0.44

Figure 4: H13073 crossline and mainscheme difference statistics

B.2.2 Uncertainty

The following survey specific parameters were used for this survey:

Method	Measured	Zoning
ERS via PMVD	0 meters	0.13 meters

Table 7: Survey Specific Tide TPU Values.

Hull ID	Measured - CTD	Measured - MVP	Surface
S220	N/A meters/second	1 meters/second	0.5 meters/second
280X	2 meters/second	N/A meters/second	0.5 meters/second

Table 8: Survey Specific Sound Speed TPU Values.

In addition to the usual a priori estimates of uncertainty provided via device models for vessel motion, ERZT, and Poor Man's VDatum (PMVD), real-time and post-processed uncertainty sources were also incorporated into the depth estimates of survey H13073. Real-time uncertainties were provided via EM 710 and EM 2040 MBES data, Applanix Delayed Heave RMS, and TCARI tides. 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

H13073 junctions with four adjacent surveys from this project: H13069, H13070, H13072 and H13075. See Figure 5 for an overview of H13073 junctions.

Data overlap between H13073 and each adjacent survey was achieved. These areas of overlap between surveys were reviewed with CARIS HIPS and SIPS by surface differencing (at equal resolutions) to assess surface agreement. The junctions with H13073 are generally within the NOAA allowable uncertainty in their areas of overlap. For all junctions with H13073, a negative difference indicates H13073 was shoaler, and a positive difference indicates H13073 was deeper.

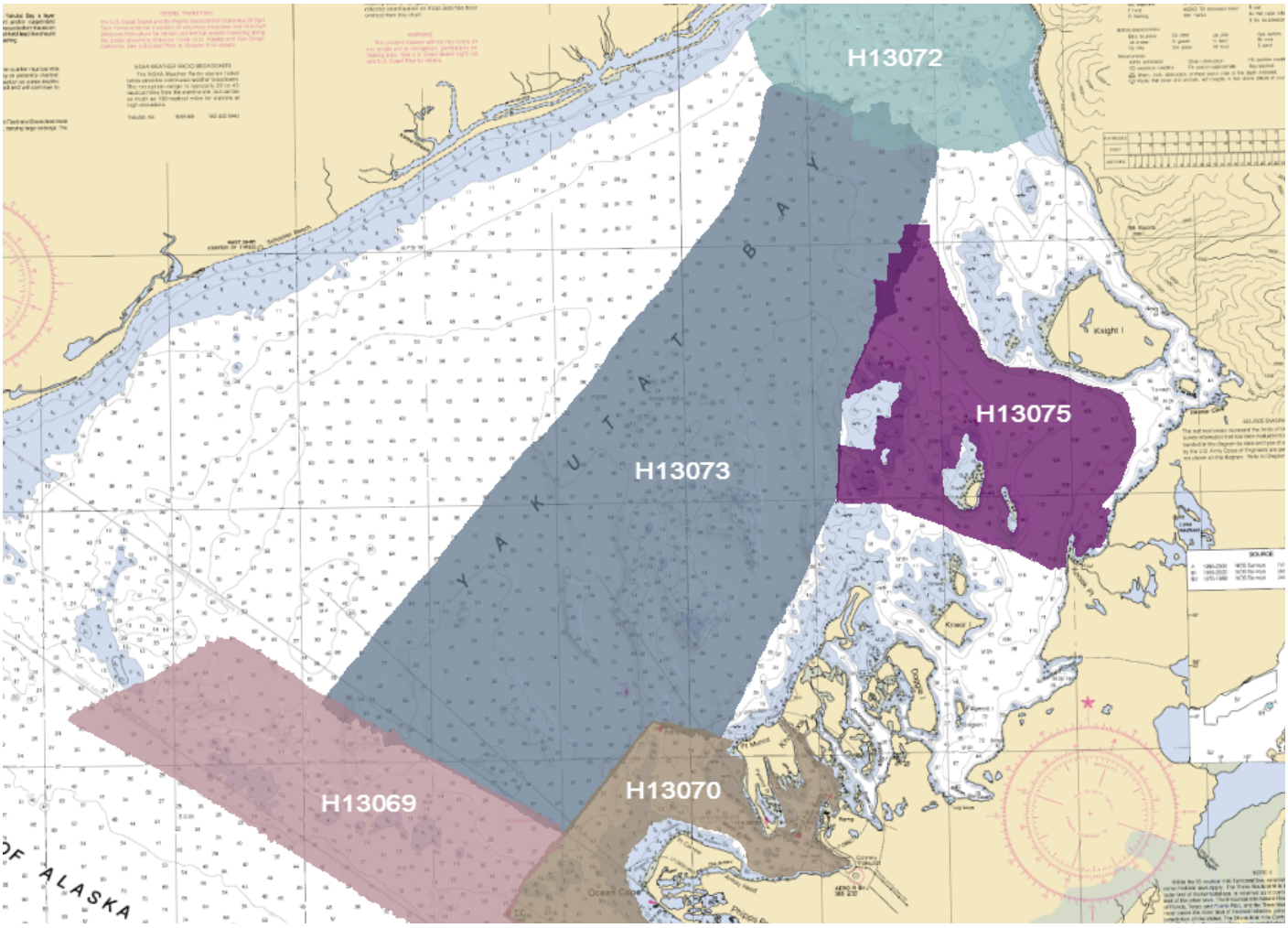


Figure 5: Overview of H13073 junction surveys

The following junctions were made with this survey:

Registry Number	Scale	Year	Field Unit	Relative Location
H13069	1:40000	2017	NOAA Ship FAIRWEATHER	S
H13070	1:40000	2017	NOAA Ship FAIRWEATHER	SE
H13072	1:40000	2017	NOAA Ship FAIRWEATHER	N
H13075	1:40000	2017	NOAA Ship FAIRWEATHER	E

Table 9: Junctioning Surveys

H13069

Surface differencing in CARIS HIPS and SIPS was used to assess junction agreement between the surface generated from H13073 data and the surface generated from H13069 data (Figure 6).

The statistical analysis of the difference surface shows a mean of -0.04 meters with 95% of all nodes having a maximum deviation of +/- 0.49 meters, as seen in Figure 7. It was found that 99.73% of nodes are within the NOAA allowable uncertainty.

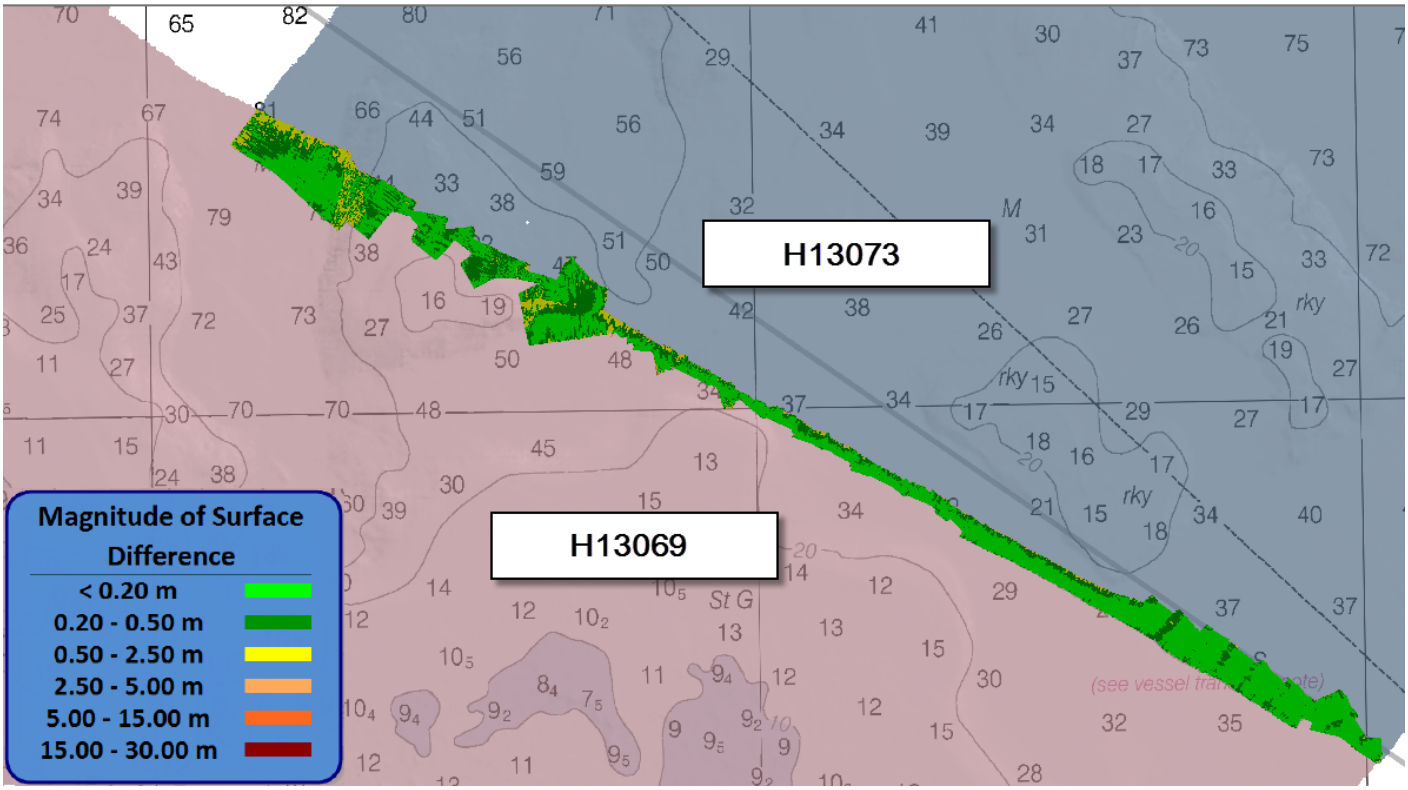
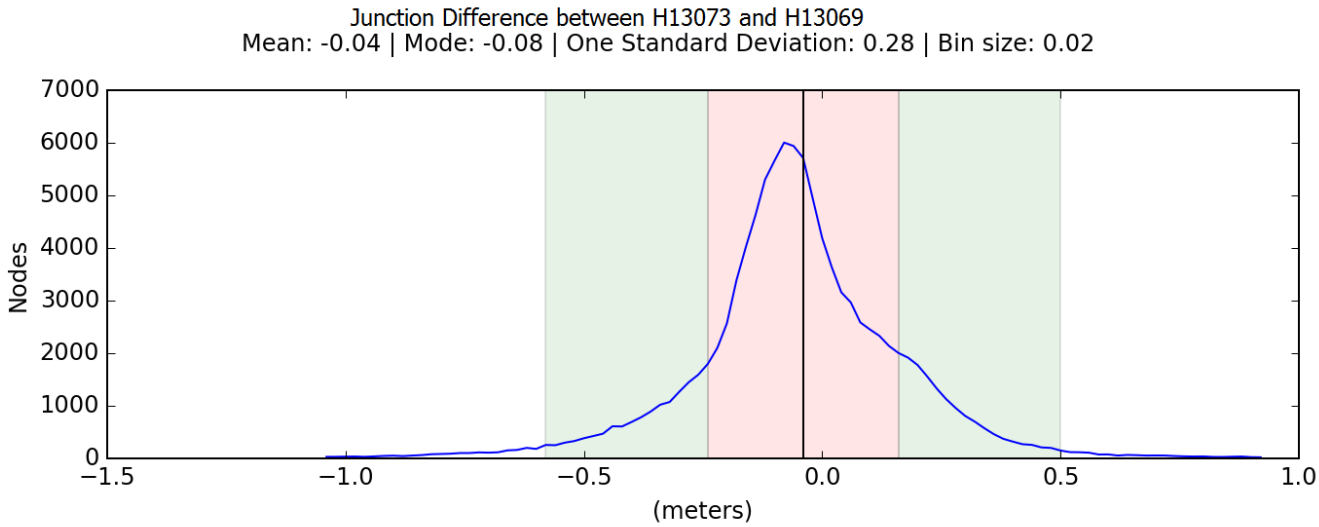
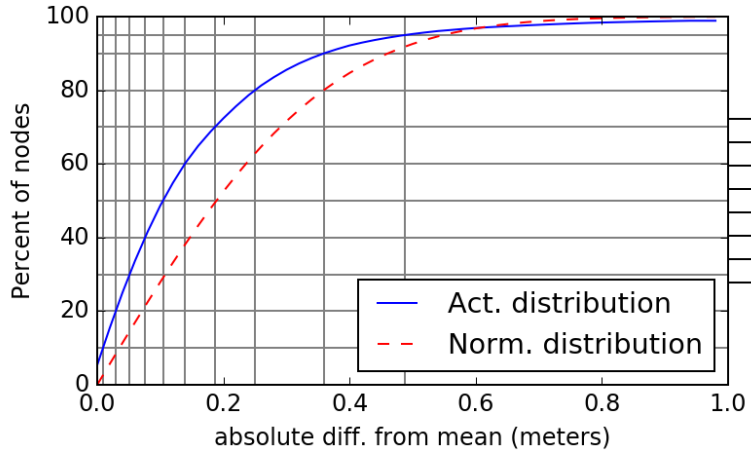


Figure 6: Difference surface between H13073 (grey) and junctioning survey H13069 (pink)





Percent of nodes	Deviation (m)
50%	+/- 0.10
60%	+/- 0.14
70%	+/- 0.19
80%	+/- 0.25
90%	+/- 0.36
95%	+/- 0.49

Figure 7: Difference surface statistics between H13073 and H13069

H13070

Surface differencing in CARIS HIPS and SIPS was used to assess junction agreement between the surface generated from H13073 data and the surface generated from H13070 data (Figure 8).

The statistical analysis of the difference surface shows a mean of 0.03 meters with 95% of all nodes having a maximum deviation of +/- 0.63 meters, as seen in Figure 9. It was found that 99.66% of nodes are within the NOAA allowable uncertainty.

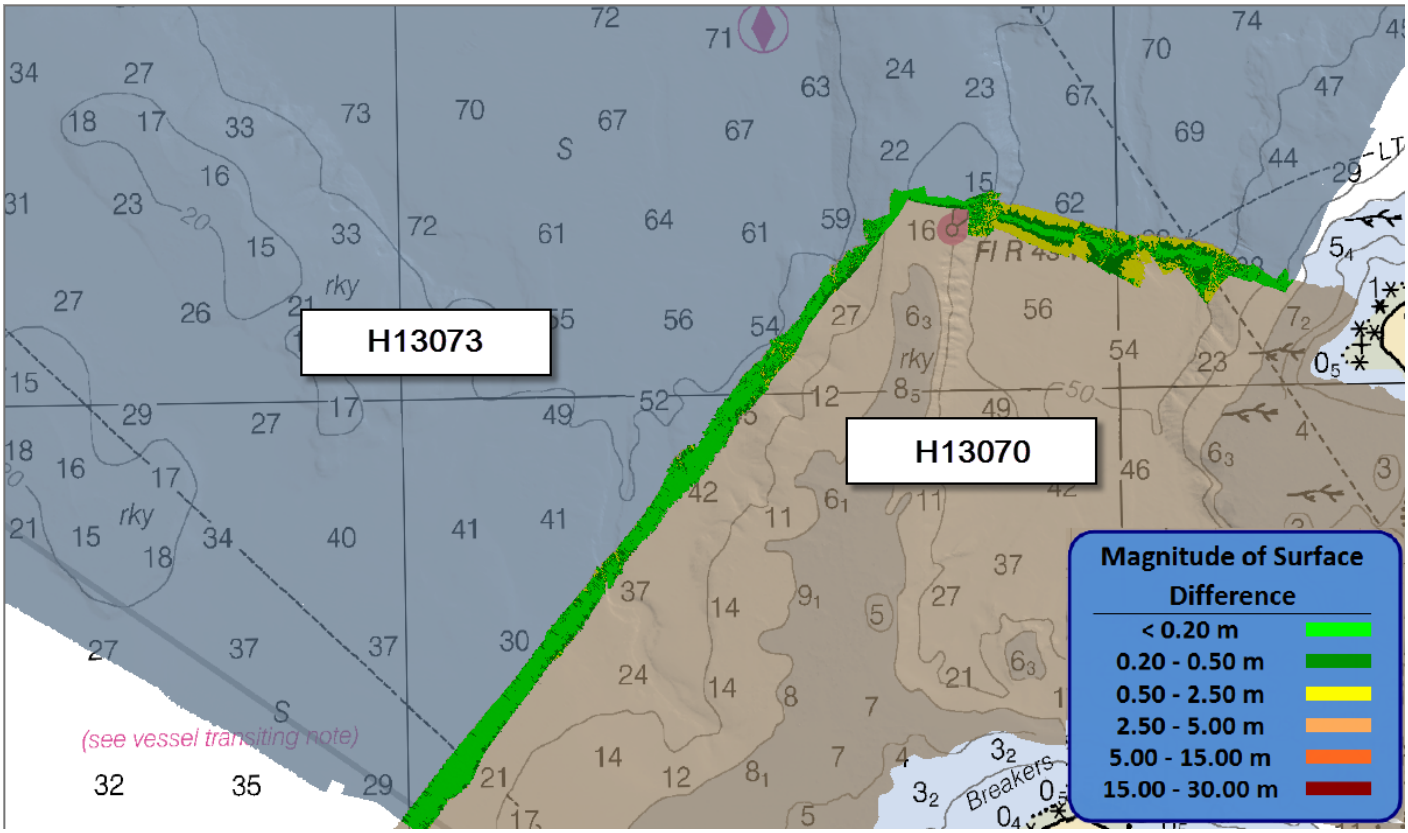
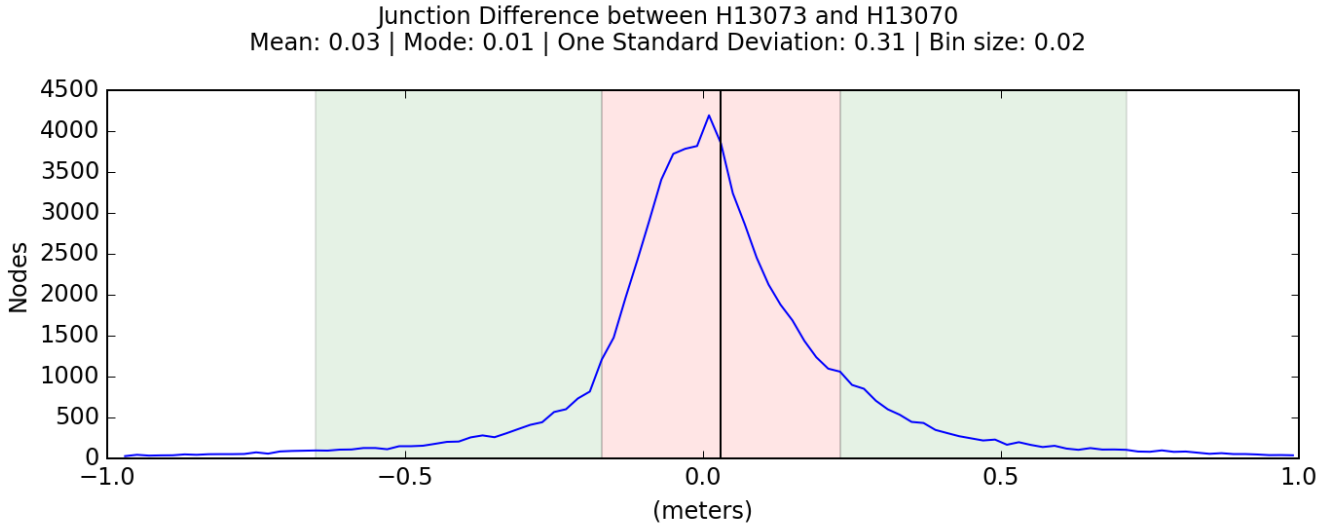
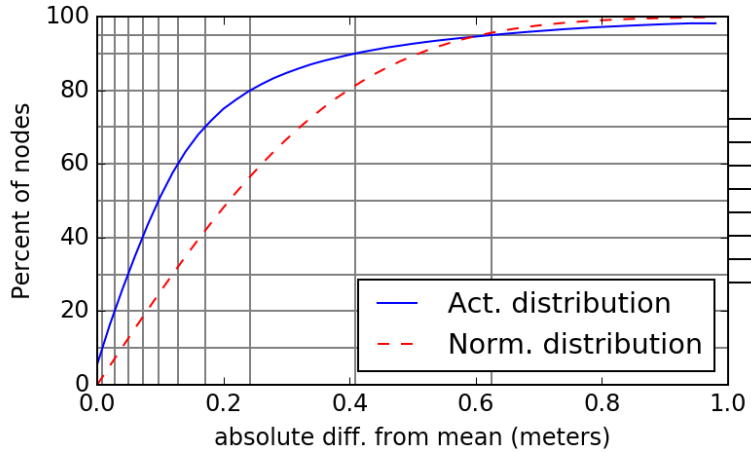


Figure 8: Difference surface between H13073 (grey) and junctioning survey H13070 (brown)





Percent of nodes	Deviation (m)
50%	+/- 0.10
60%	+/- 0.13
70%	+/- 0.17
80%	+/- 0.24
90%	+/- 0.41
95%	+/- 0.63

Figure 9: Difference surface statistics between H13073 and H13070

H13072

Surface differencing in CARIS HIPS and SIPS was used to assess junction agreement between the surface generated from H13073 data and the surface generated from H13072 data (Figure 10).

The statistical analysis of the difference surface shows a mean of -0.04 meters with 95% of all nodes having a maximum deviation of +/- 0.65 meters, as seen in Figure 11. It was found that 99.80% of nodes are within the NOAA allowable uncertainty.

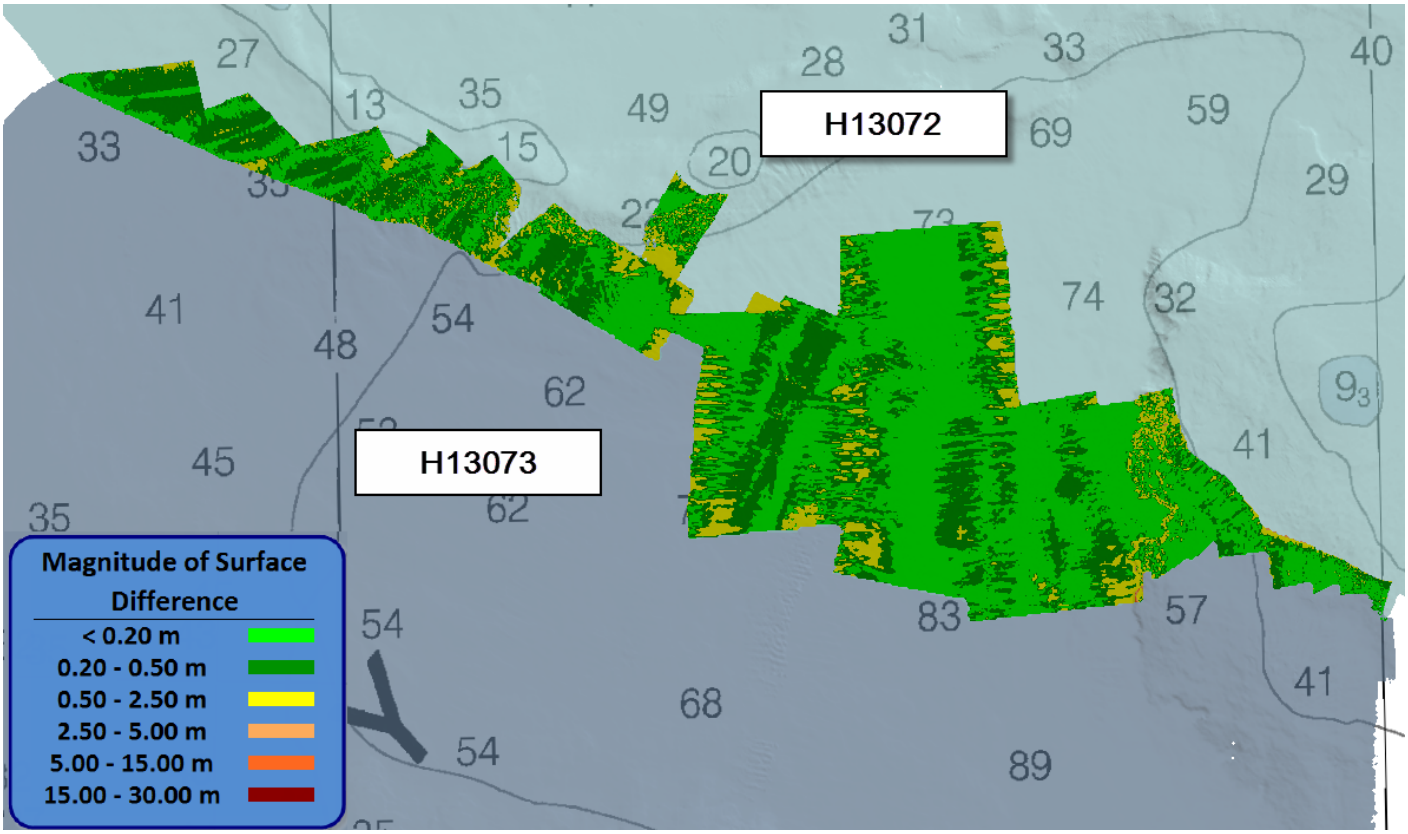
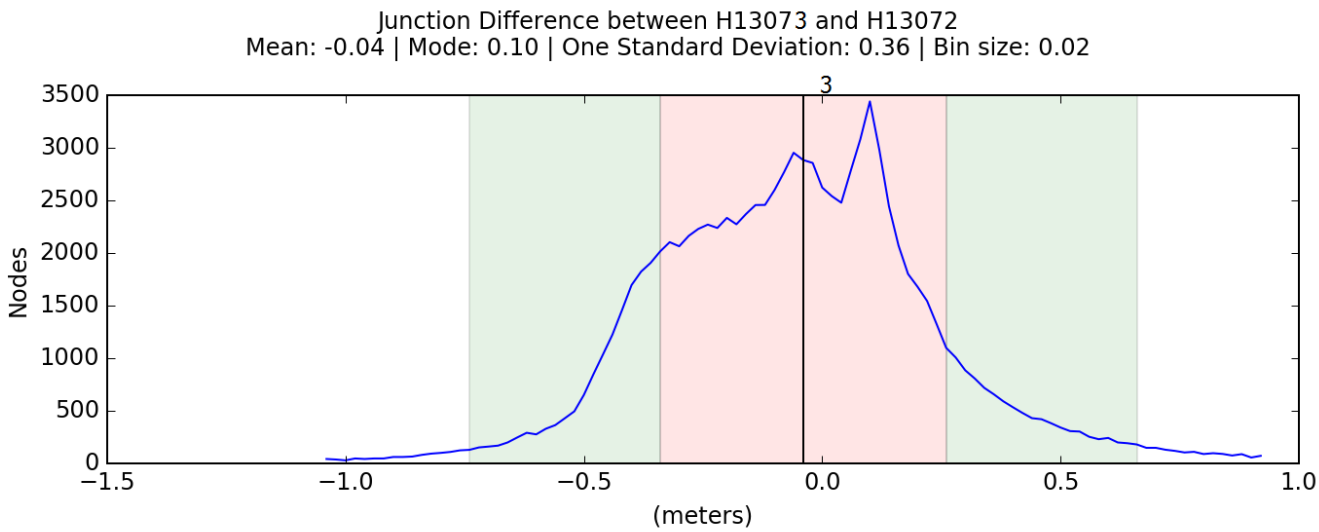
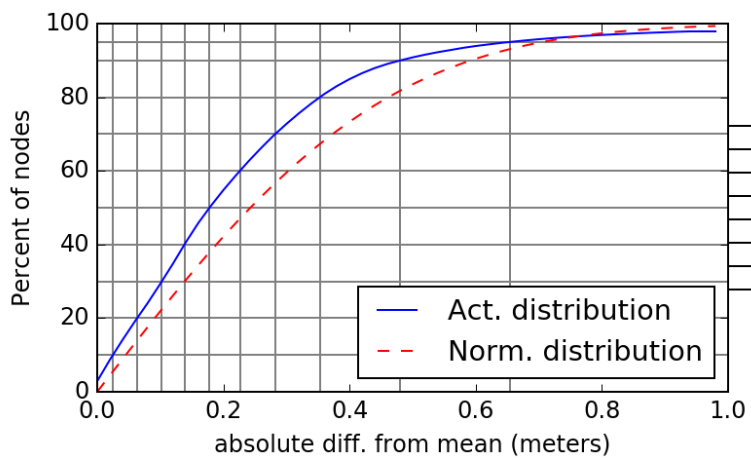


Figure 10: Difference surface between H13073 (grey) and junctioning survey H13072 (green)





Percent of nodes	Deviation (m)
50%	+/- 0.18
60%	+/- 0.23
70%	+/- 0.28
80%	+/- 0.35
90%	+/- 0.48
95%	+/- 0.65

Figure 11: Difference surface statistics between H13073 and H13072

H13075

Surface differencing in CARIS HIPS and SIPS was used to assess junction agreement between the surface generated from H13073 data and the surface generated from H13075 data (Figure 12).

The statistical analysis of the difference surface shows a mean of -0.11 meters with 95% of all nodes having a maximum deviation of +/- 0.58 meters, as seen in Figure 13. It was found that 99.93% of nodes are within the NOAA allowable uncertainty.

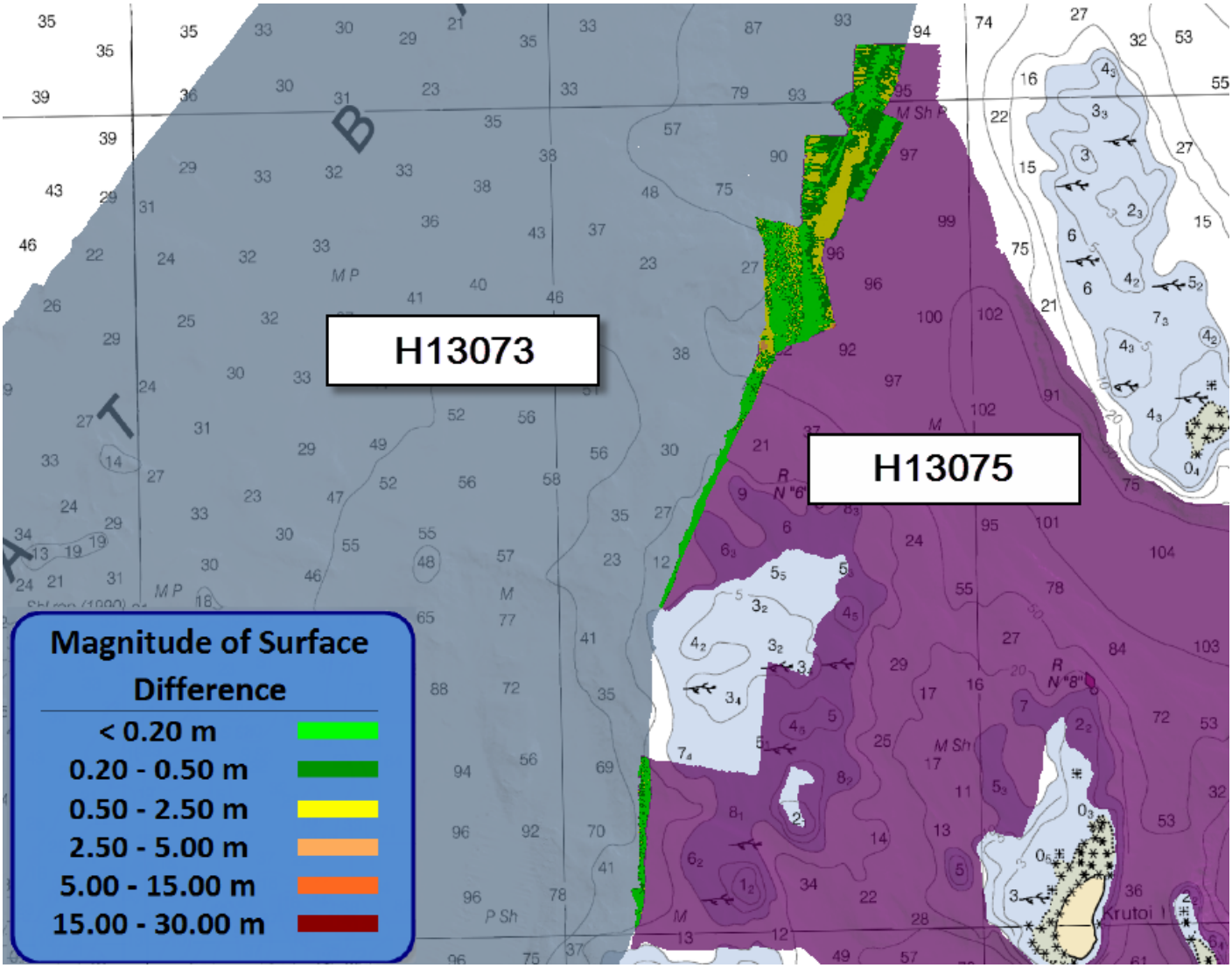
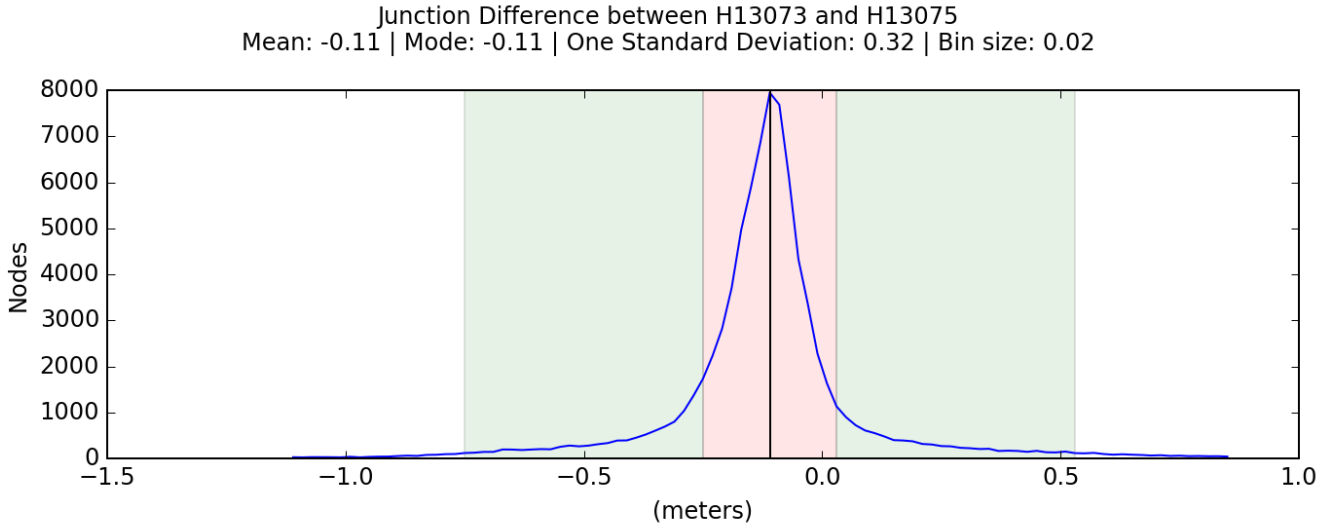
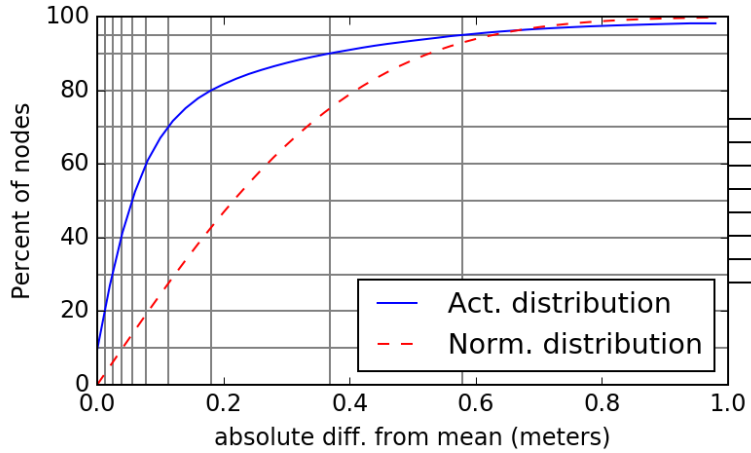


Figure 12: Difference surface between H13073 (grey) and junctioning survey H13075 (purple)





Percent of nodes	Deviation (m)
50%	+/- 0.06
60%	+/- 0.08
70%	+/- 0.11
80%	+/- 0.18
90%	+/- 0.37
95%	+/- 0.58

Figure 13: Difference surface statistics between H13073 and H13075

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 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 3 hours, 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

H13073 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 HTD 2017-2 for complete coverage were identified via Pydro 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 Uncertainty

The surface was analyzed using the Pydro QC Tools Grid QA feature to determine compliance with specifications. Overall, 99.98% of nodes meet NOAA allowable uncertainty specifications for H13073. See the Standards and Compliance Review located in Appendix II for a graphical representation of uncertainty compliance.

B.2.11 Density

The surface was analyzed using the Pydro QC Tools Grid QA feature to determine compliance with specifications. Overall, 99.98% of nodes meet density specifications for H13073. See the Standards and Compliance Review located in Appendix II for a graphical representation of density compliance.

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 both Kongsberg systems. All backscatter data were processed by the field unit via Fledermaus FMGT 7.7.4. See Figure 14 for a complete mosaic.

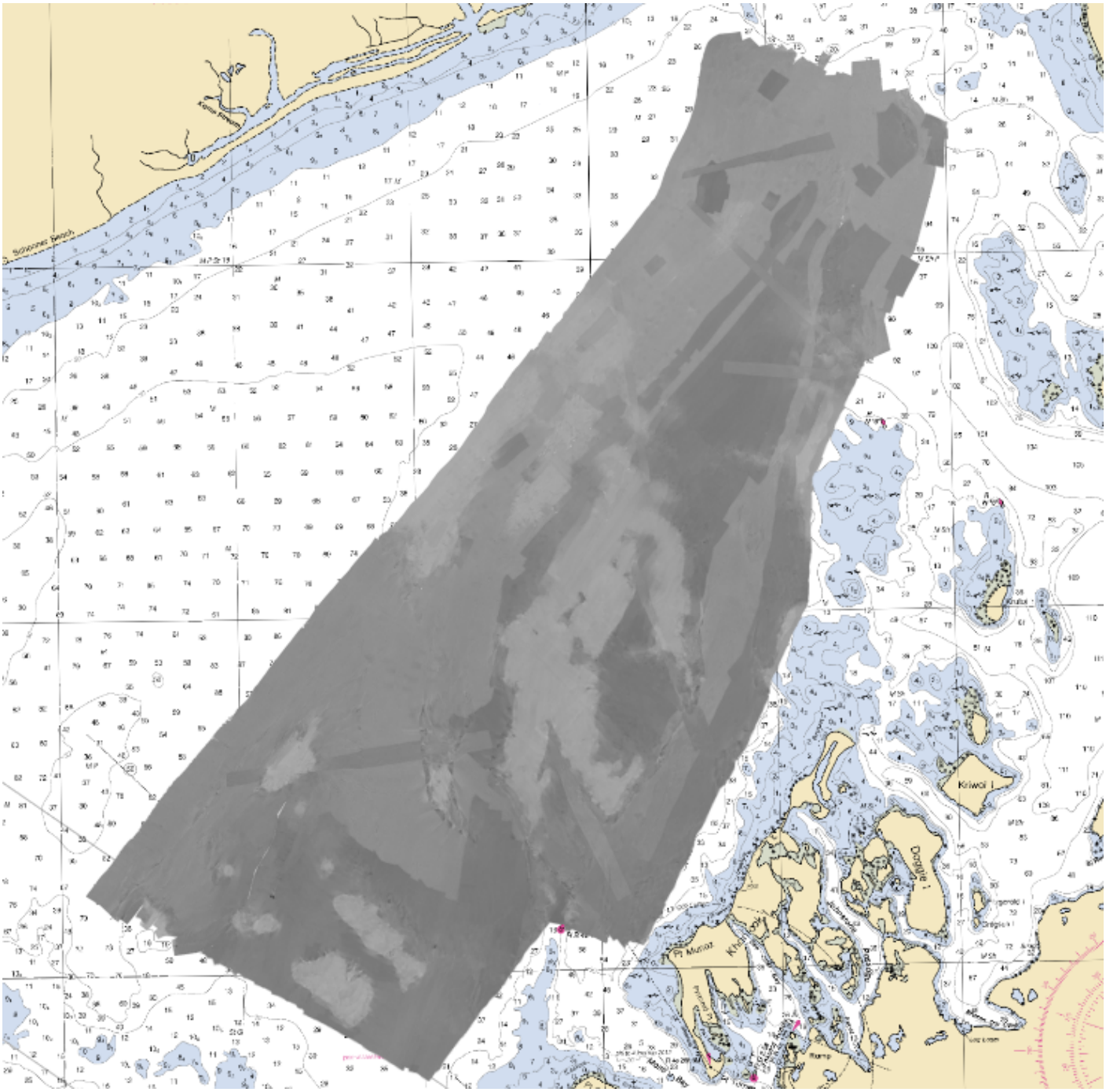


Figure 14: H13073 Backscatter Mosaic

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
Teledyne CARIS	HIPS and SIPS	10.3.3

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 FMGT	7.7.4

Table 11: Primary imagery data processing software

The following Feature Object Catalog was used: NOAA Extended Attribute Files version 5.6.

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
H13073_MB_VR_MLLW	CARIS VR Surface (CUBE)	1-16 meters	11 meters - 180 meters	NOAA_VR	Complete MBES
H13073_MB_VR_MLLW_Final	CARIS VR Surface (CUBE)	1-16 meters	11 meters - 180 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 in Survey H13073. 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 v5, part of the QC Tools package within Pydro, was used to assist the search for spurious soundings following gross cleaning. Flier Finder was run in iteratively until all remaining flagged fliers were deemed to be valid aspects of the steep slopes and dynamic nature of the seafloor.

B.5.3 Data Logs

Data acquisition and processing notes are included in the acquisition and processing logs, and additional processing such as final tide and sound speed application are noted in the H13073 Data Log spreadsheet. All data logs are submitted digitally in the Separates I folder.

C. Vertical and Horizontal Control

Per section 5.1.2.3. of the Field Procedures Manual (2014 ed), no Horizontal and Vertical Control Report has been generated for H13073.

C.1 Vertical Control

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

Traditional Methods Used:

TCARI

The following National Water Level Observation Network (NWLON) stations served as datum control for this survey:

Station Name	Station ID
Yakutat, Yakutat Bay, AK	9453220

Table 13: NWLON Tide Stations

File Name	Status
9453220.tid	Final Approved

Table 14: Water Level Files (.tid)

File Name	Status
O346FA2017.tc	Final

Table 15: Tide Correctors (.zdf or .tc)

A request for final approved tides was sent to N/OPS1 on 11/11/2017. The final tide note was received on 11/21/2017.

After final tides were received, the final TCARI grid was applied to the data and used for reducing features to MLLW.

Initial reduction of acquired data to MLLW was accomplished via traditional tidal means using the TCARI grid provided by HSD-OPS. Following the successful application of SBETs and computation of an Ellipsoid ally Referenced Zone Tide (ERZT) separation model, ERS methods were used for reducing data to MLLW.

ERS Methods Used:

ERS via Poor Mans VDATUM

Ellipsoid to Chart Datum Separation File:

O346FA2017_PMVD_EPSG6332_NAD83_MLLW_Debiased.csar

ERS methods were used as the final means of reducing H13073 to MLLW for submission. Data were initially reduced via traditional tidal means until an ERZT separation model could be calculated. This empirically derived model was then checked for consistency and compared to the Poor Man's VDatum (PMVD) separation model provided with the Project Instructions. The PMVD separation model was then vertically shifted such that the average difference between these two separation models is zero. This vertical shift de-biases the PMVD separation model, correcting for local offsets that cannot be effectively modeled by the PMVD.

C.2 Horizontal Control

The horizontal datum for this project is North American Datum of 1983 (NAD83).

The projection used for this project is UTM Zone 7N.

Vessel kinematic data were post-processed using Applanix POSPac processing software and RTX 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. For further details regarding the processing and

quality control checks performed, see the H13073 POSPac Processing Logs spreadsheet located in the Separates folder.

During real-time acquisition S220 and launches 2806, 2807 and 2808 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 correcting position for H13073, as no DGPS stations were available for realtime horizontal control.

D. Results and Recommendations

D.1 Chart Comparison

A comparison was performed between survey H13073 and ENC US4AK3XM using CARIS HIPS and SIPS sounding and contour layers derived from the surface generated from H13073 data. The contours and soundings were overlaid on the chart to assess differences between the surveyed soundings and charted depths. An eight meter grid was generated from the ENC by extracting all soundings from the chart and creating an interpolated TIN surface which could be differenced with the surface generated from H13073 data. All data from H13073 should supersede charted data. In general, surveyed soundings agree with the majority of charted depths. A full discussion of the comparison follows below.

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	Preliminary?
US4AK3XM	1:80000	4	02/13/2018	02/13/2018	NO

Table 16: Largest Scale ENCs

US4AK3XM

In order to visualize trends in the comparison of H13073 data and ENC US4AK3XM, an eight meter TIN surface was interpolated from the ENC sounding layer. This surface was then differenced with a corresponding surface from H13073 and is visualized in Figure 15. In this difference surface red colors indicate H13073 is shoaler than the ENC US4AK3XM, green colors indicate agreement, and blue colors indicate H13073 is deeper than ENC US4AK3XM.

Soundings from H13073 are in general agreement with charted depths on ENC US4AK3XM, with most depths agreeing to 1-2 fathoms as shown in Figure 17.

Contours from H13073 are in general agreement with charted contours on ENC US4AK3XM as shown in Figure 18.

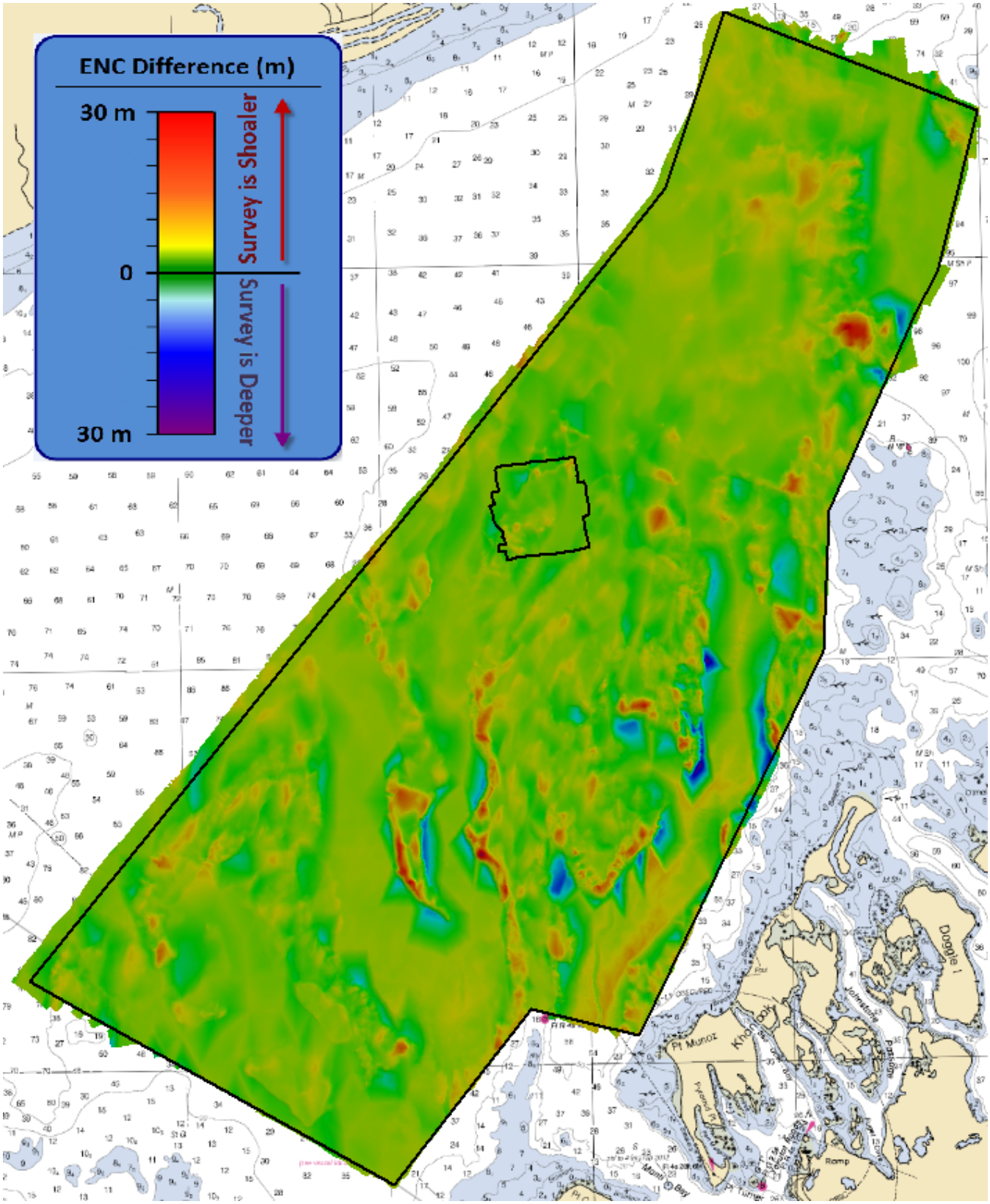
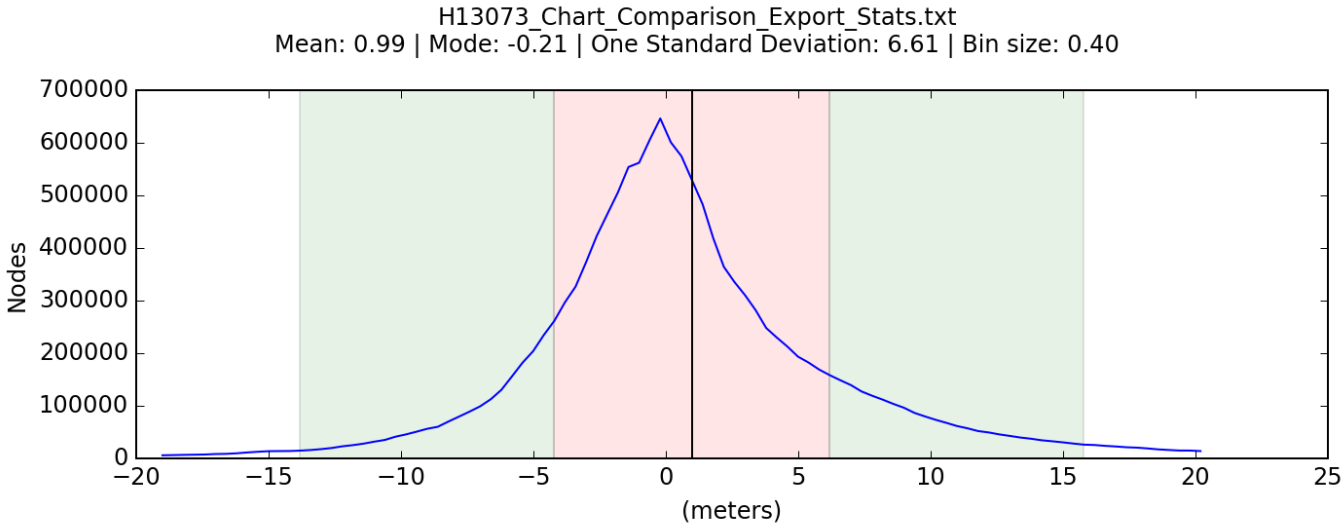
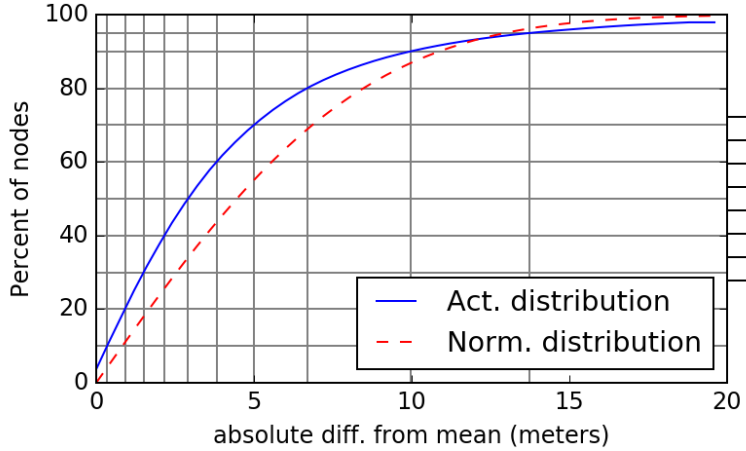


Figure 15: Difference surface between H13073 and interpolated TIN surface from US4AK3XM





Percent of nodes	Deviation (m)
50%	+/- 2.91
60%	+/- 3.82
70%	+/- 5.00
80%	+/- 6.69
90%	+/- 9.96
95%	+/- 13.74

Figure 16: Difference surface statistics between H13073 and interpolated TIN surface from US4AK3XM

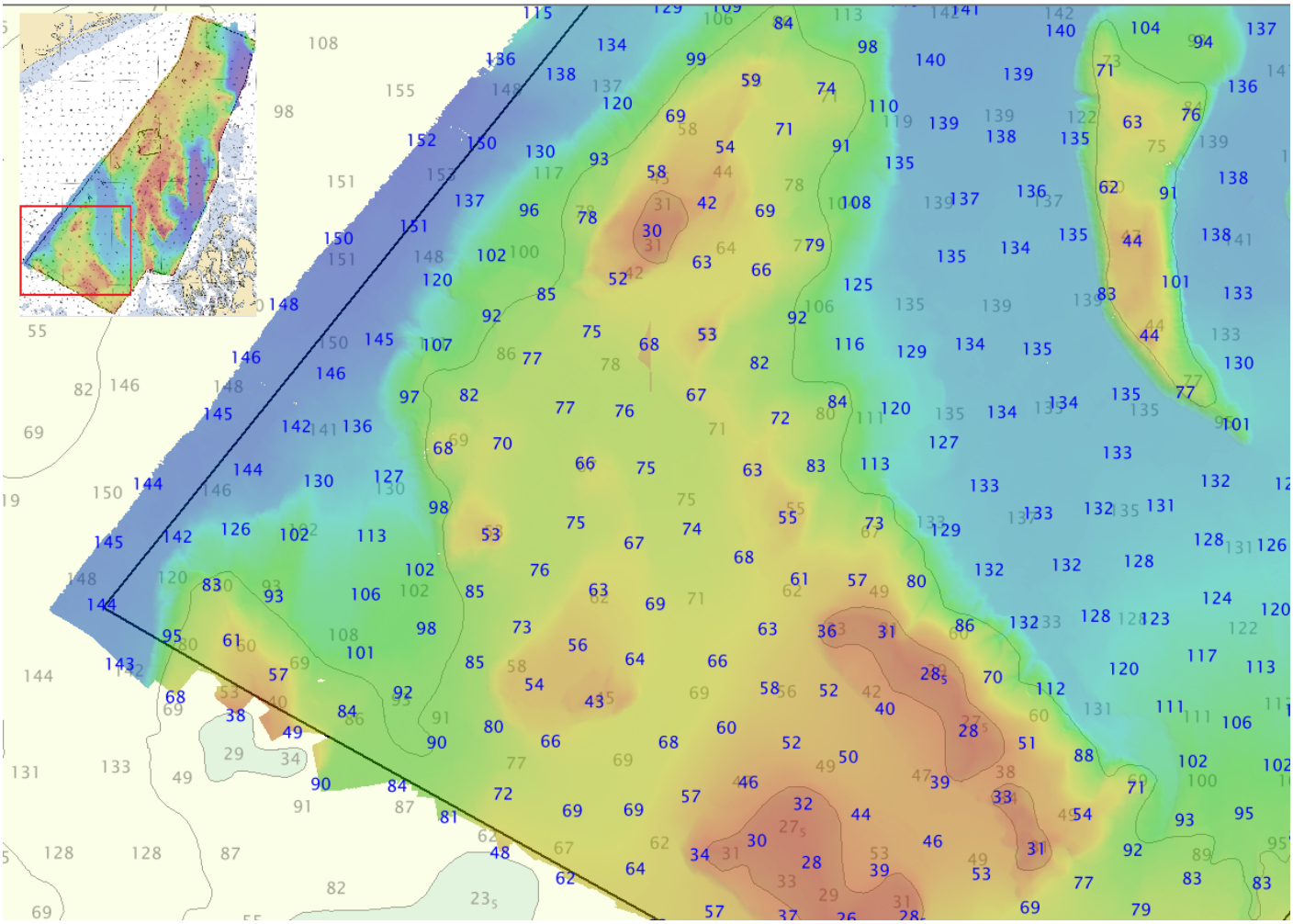


Figure 17: Sounding comparison between H13073 and ENC US4AK3XM

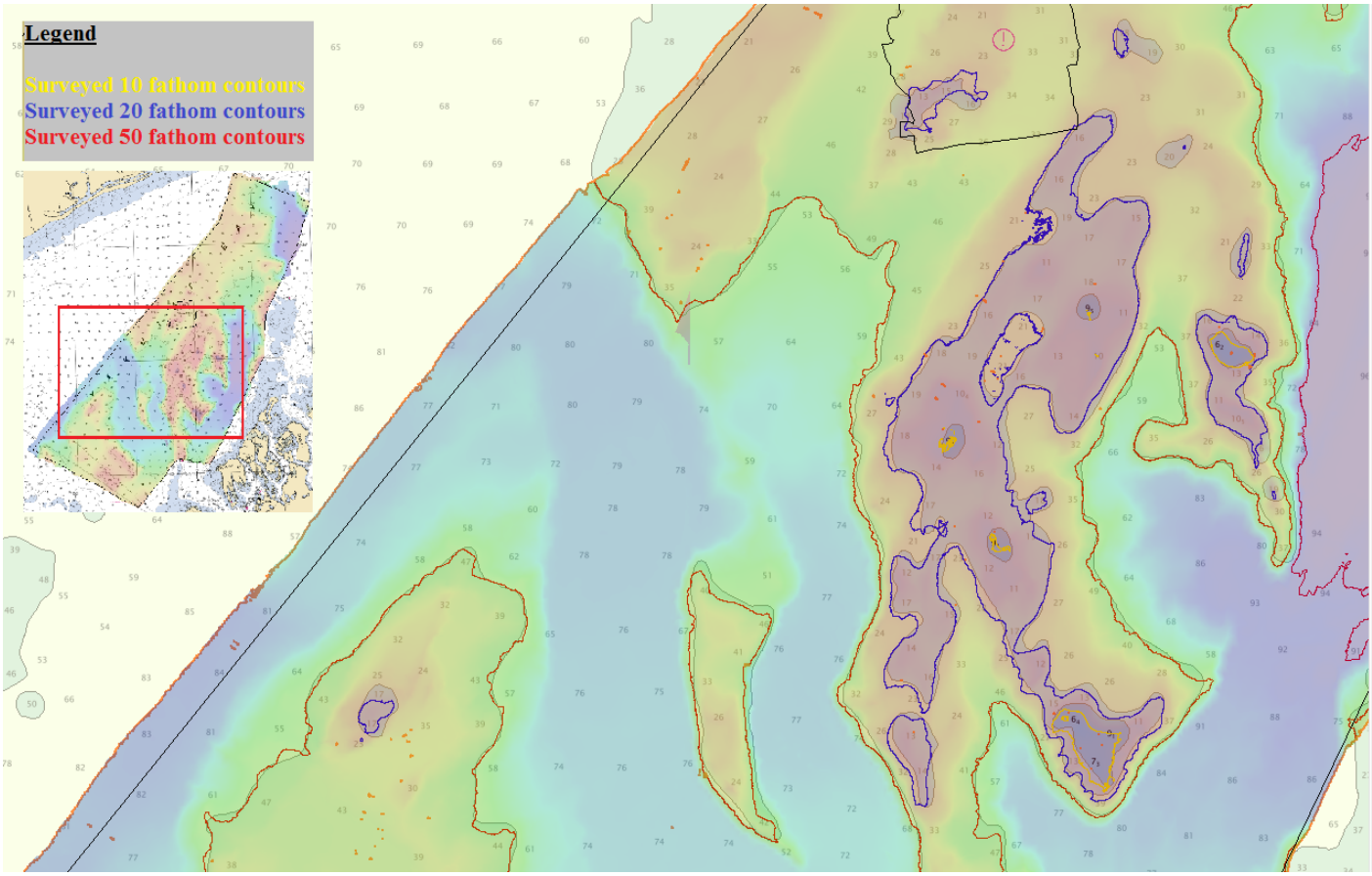


Figure 18: Contour comparison between H13073 and ENC US4AK3XM

D.1.2 Maritime Boundary Points

No Maritime Boundary Points were assigned for this survey.

D.1.3 Charted Features

A reported shoal ("Shl Rep 1990") is located in an area surveyed by the NOAA Ship Rainier in 1997 during acquisition of H10902, which was therefore excluded from the H13073 sheet limits. Due to acquisition techniques, this area was covered by MBES data in H13073, and subsequently compared to the data acquired within H10902. It was found that soundings generated from the data of the two surveys are in general agreement to within one to two fathoms, as shown in Figure 19. The shoalest depth in the area from H13073 is 13 fathoms. Agreement was also observed between the contours generated from H13073 and H10902 data (Figure 20).

The hydrographer recommends removing the "Shl Rep 1990" and charting the surveyed soundings in this area.

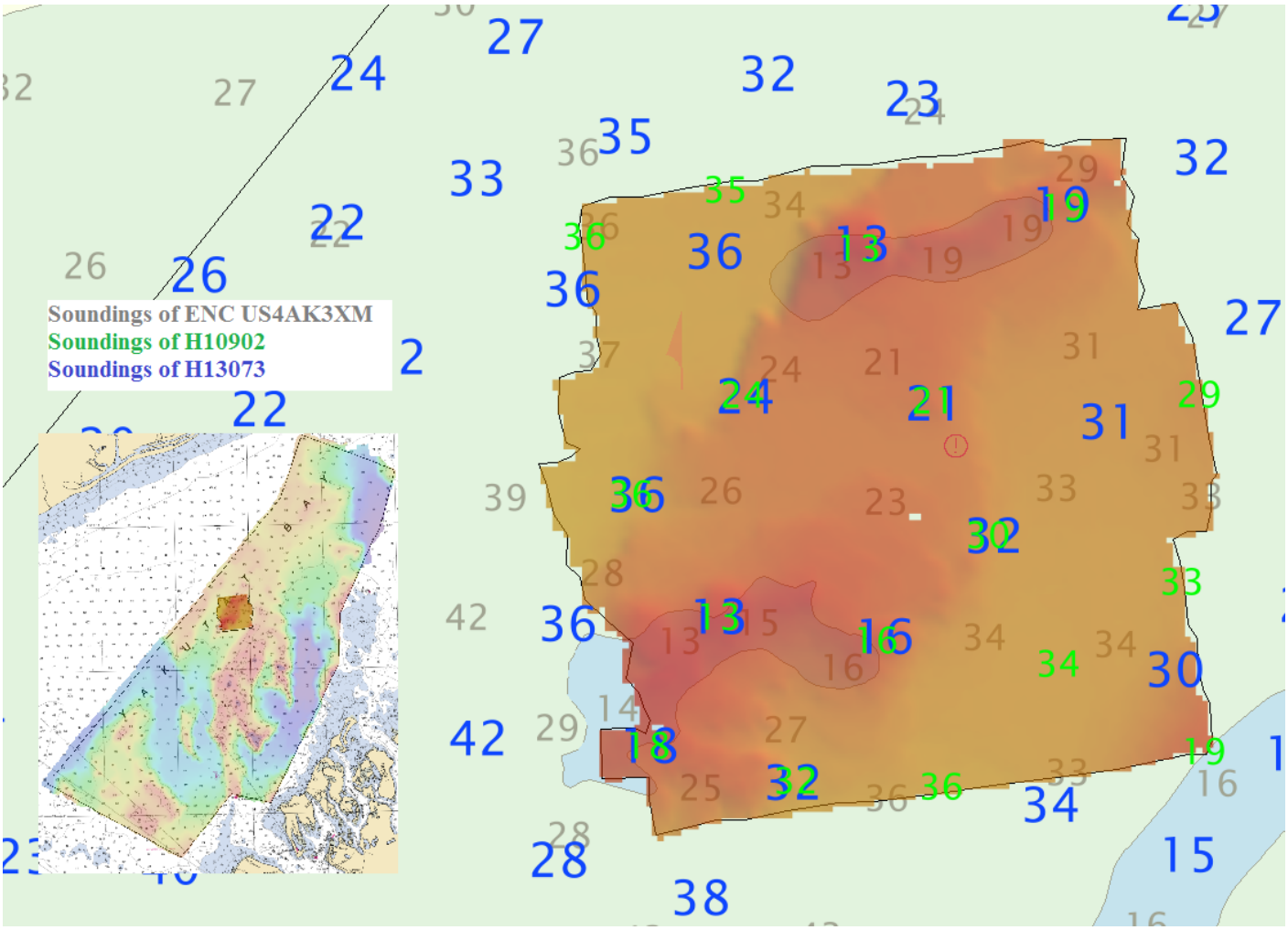


Figure 19: Sounding agreement between H13073, H10902 and ENC US4AK3XM

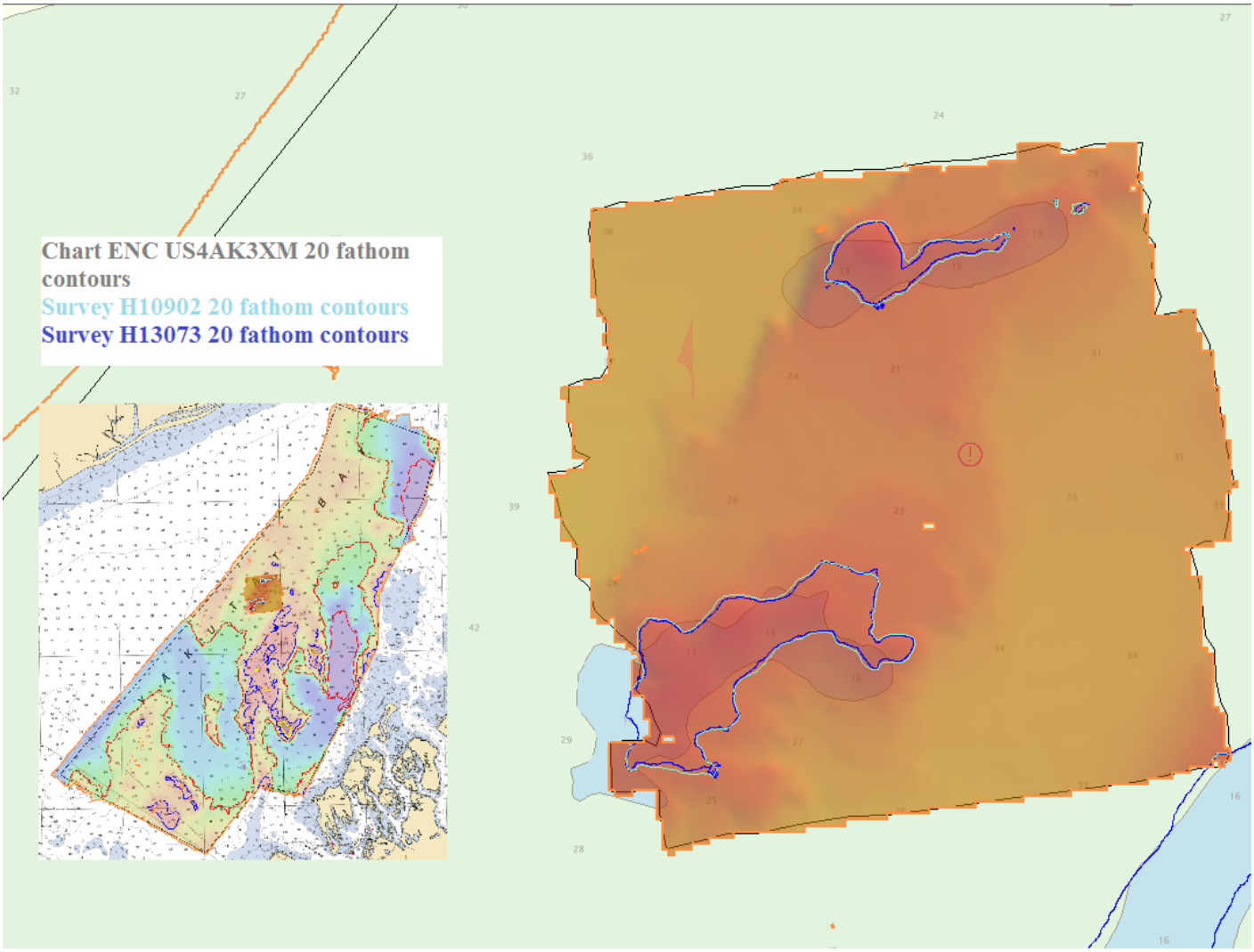


Figure 20: Contour agreement between H13073, H10902 and ENC US4AK3XM

D.1.4 Uncharted Features

No uncharted features exist for this survey.

D.1.5 Shoal and Hazardous Features

No shoals or potentially hazardous features exist for this survey.

D.1.6 Channels

No channels exist for this survey. There are no designated anchorages, precautionary areas, safety fairways, traffic separation schemes or channel and range lines within the survey limits. A pilot boarding area exists

within the sheet limits of H13073 to the northwest of the entrance to Monti Bay. Surveyed soundings in this area agree with the charted soundings in this area to within one fathom.

D.1.7 Bottom Samples

20 bottom samples were acquired in accordance with the Project Instructions for survey H13073. All bottom samples were entered in the H13073 Final Feature File. See Figure 21 for a graphical overview of sample locations.

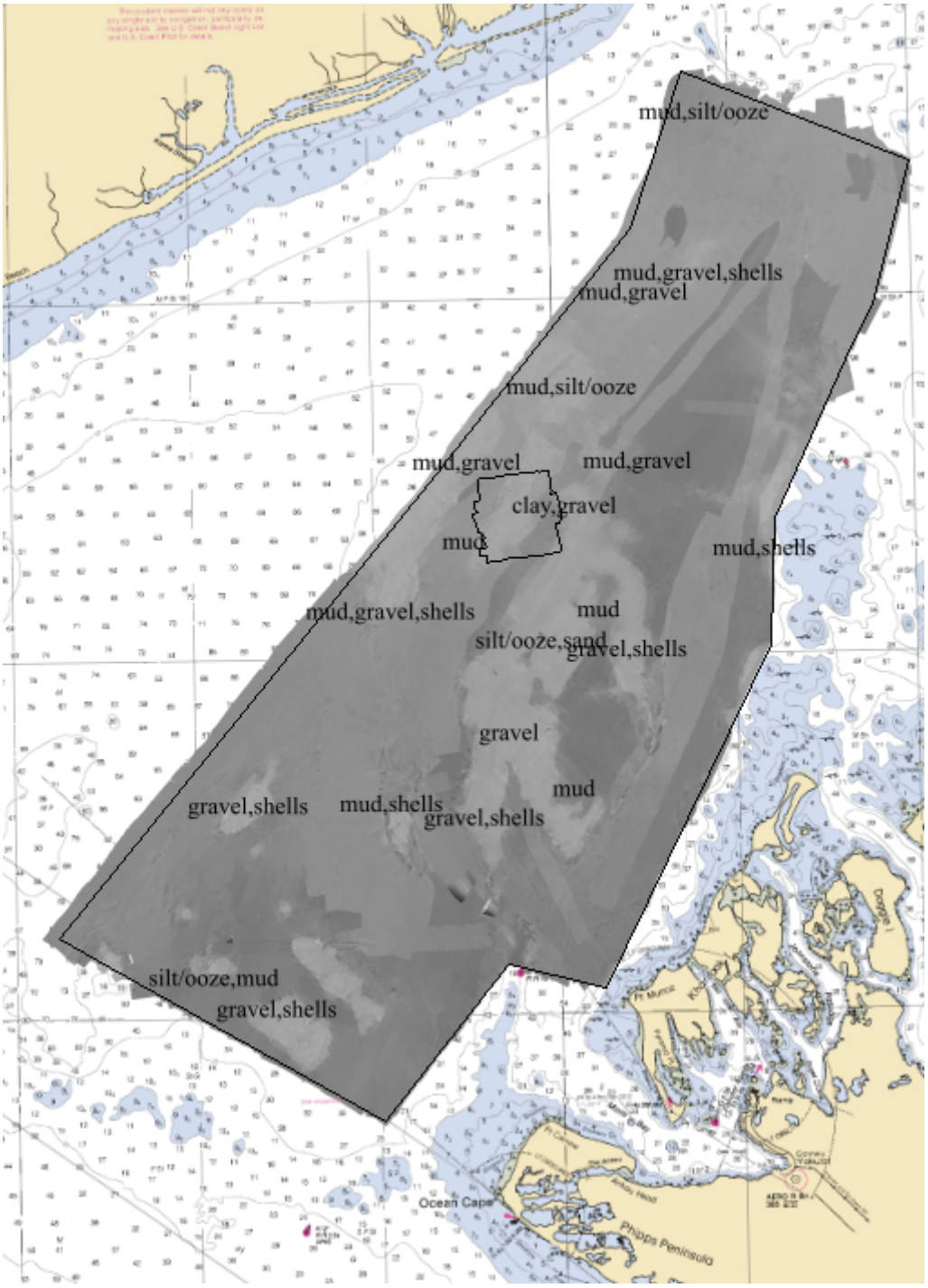


Figure 21: H13073 bottom sample locations

D.2 Additional Results

D.2.1 Shoreline

No shoreline features assigned for verification exist within the sheet limits, and no gaps in coverage were left due to features.

D.2.2 Prior Surveys

No prior survey comparisons exist for this survey.

D.2.3 Aids to Navigation

No Aids to navigation (ATONs) exist for this survey.

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 and/or Environmental Conditions

No abnormal seafloor and/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 Recommendation

No new surveys or further investigations are recommended for this area.

D.2.11 Inset Recommendation

No new insets 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 Mark Van Waes	Chief of Party	04/12/2018	VAN WAES.MARK.1240076329 2018.04.12 17:39:43 -07'00'
LT Damian Manda	Field Operations Officer	04/12/2018	MANDA.DAMIAN.CURTIS.1396610660 2018.04.12 16:30:55 -07'00'
HCST Samuel Candio	Chief Survey Technician	04/12/2018	2018.04.12 14:19:34 -07'00'
HST Dmitry V. Malinkin	Sheet Manager	04/12/2018	Digitally signed by MALINKIN.DMITRY.VALERIEVICH.1535499655 DN: c=US, o=U.S. Government, ou=DoD, ou=PKI, ou=OTHER, cn=MALINKIN.DMITRY.VALERIEVICH.1535499655 Date: 2018.04.12 12:59:29 -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	Continually Operating Reference Staiton
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
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
HSSD	Hydrographic Survey Specifications and Deliverables

Acronym	Definition
HSTP	Hydrographic Systems Technology Programs
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
NAIP	National Agriculture and Imagery Program
NALL	Navigable Area Limit Line
NM	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
PST	Physical Science Technician
RNC	Raster Navigational Chart
RTK	Real Time Kinematic
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
TPE	Total Propagated Error
TPU	Topside Processing Unit
USACE	United States Army Corps of Engineers
USCG	United Stated Coast Guard
UTM	Universal Transverse Mercator
XO	Executive Officer
ZDA	Global Positiong System timing message
ZDF	Zone Definition File

UNITED STATES DEPARMENT OF COMMERCE
National Oceanic and Atmospheric Administration
National Ocean Service
Silver Spring, Maryland 20910

TIDE NOTE FOR HYDROGRAPHIC SURVEY

DATE : November 21, 2017

HYDROGRAPHIC BRANCH: Pacific
HYDROGRAPHIC PROJECT: OPR-O346-FA-2017
HYDROGRAPHIC SHEET: H13073

LOCALITY: East Yakutat Bay, Yakutat Bay, AK
TIME PERIOD: September 16 - October 29, 2017

TIDE STATION USED: 945-3220 Yakutat, AK
Lat. 59° 32.9'N Long. 139° 44.0' W
PLANE OF REFERENCE (MEAN LOWER LOW WATER): 0.000 meters
HEIGHT OF HIGH WATER ABOVE PLANE OF REFERENCE: 2.807 meters

REMARKS: RECOMMENDED GRID

Please use the TCARI grid "O346FA2017.tc" as the final grid for project OPR-O346-FA-2017, H13073, during the time period between September 16 and October 29, 2017.

Refer to attachments for grid information.

Note 1: Provided time series data are tabulated in metric units (meters), relative to MLLW and on Greenwich Mean Time on the 1983-2001 National Tidal Datum Epoch (NTDE).

HOVIS.GERALD.THOMAS.JR.1365860250

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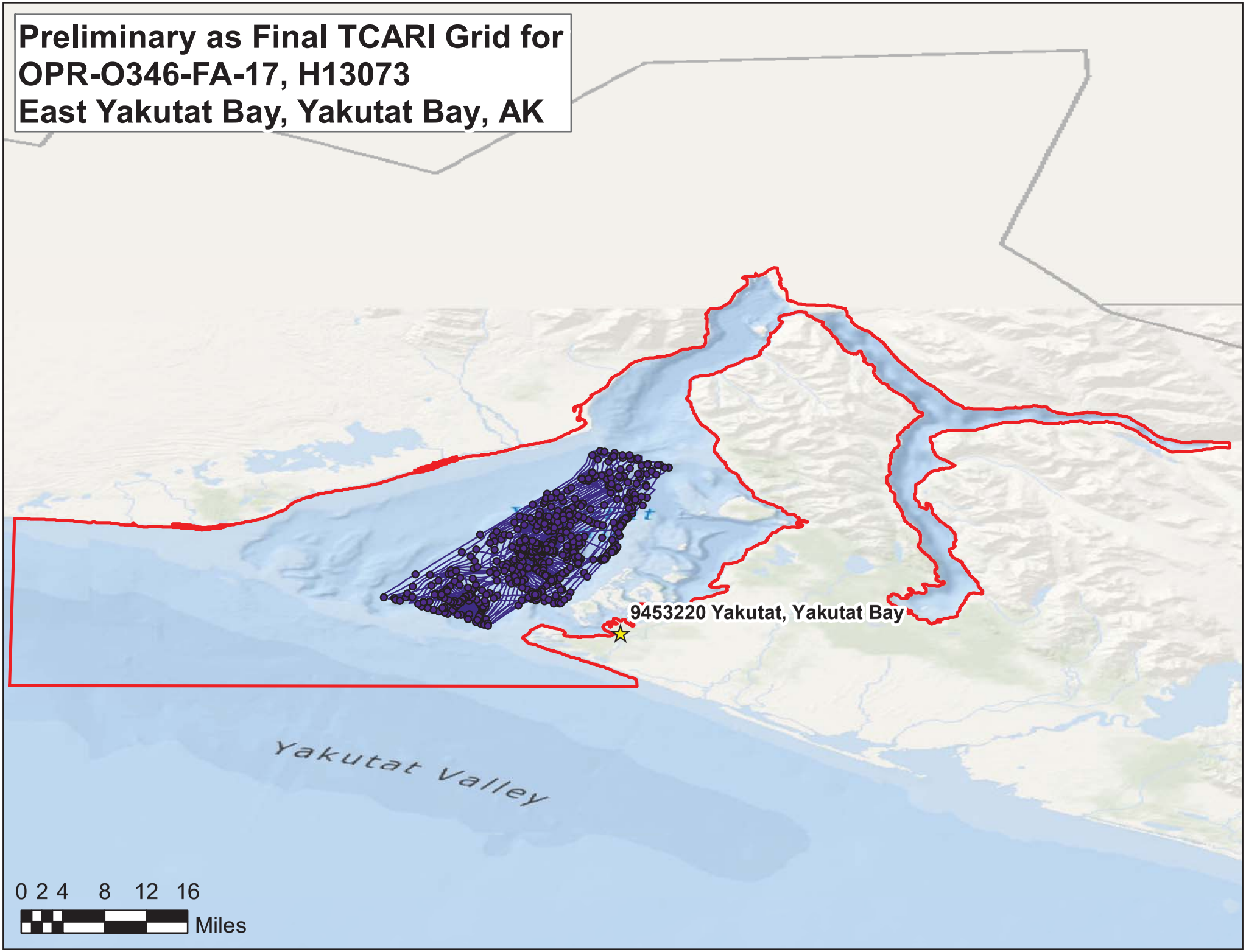
Date: 2017.11.21 08:33:41 -05'00'

CHIEF, PRODUCTS AND SERVICES BRANCH


Preliminary as Final TCARI Grid for
OPR-O346-FA-17, H13073
East Yakutat Bay, Yakutat Bay, AK
9453220 Yakutat, Yakutat Bay
Yakutat Valley
0 2 4 8 12 16
Miles

APPROVAL PAGE

H13073

Data meet or exceed current specifications as certified by the OCS survey acceptance review process. Descriptive Report and survey data except where noted are adequate to supersede prior surveys and nautical charts in the common area.

The following products will be sent to NCEI for archive

- Descriptive Report
- Collection of Bathymetric Attributed Grids (BAGs)
- Collection of backscatter mosaics
- Processed survey data and records
- Bottom Samples
- GeoPDF of survey product

The survey evaluation and verification has been conducted according current OCS Specifications, and the survey has been approved for dissemination and usage of updating NOAA's suite of nautical charts.

Approved: HAUSER.OLIVIA.A.1275636009 2019.07.02 11:36:36 -07'00'

Commander Olivia Hauser, NOAA
Chief, Pacific Hydrographic Branch