H13121

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

DESCRIPTIVE REPORT

Type of Survey:	Navigable Area
Registry Number:	H13121

LOCALITY

State(s):	Alaska
General Locality:	Lisburne Peninsula
Sub-locality:	4 NM SE of Point Hope

2018

CHIEF OF PARTY
CDR Marc Moser, NOAA

LIBRARY & ARCHIVES

Date:

U.S. DEPARTMENT OF COMMERCE NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION	REGISTRY NUMBER:
HYDROGRAPHIC TITLE SHEET	**H13121**

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:	**Lisburne Peninsula**
Sub-Locality:	**4 NM SE of Point Hope**
Scale:	**20000**
Dates of Survey:	**07/30/2018 to 08/10/2018**
Instructions Dated:	**06/07/2018**
Project Number:	**OPR-S347-FA-18**
Field Unit:	**NOAA Ship Fairweather**
Chief of Party:	**CDR Marc Moser, 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 H13121

Project: OPR-S347-FA-18

Locality: Lisburne Peninsula

Sublocality: 4 NM SE of Point Hope

Scale: 1:20000

July 2018 - August 2018

NOAA Ship Fairweather

Chief of Party: CDR Marc Moser, NOAA

A. Area Surveyed

The survey is located on Lisburne Peninsula, within the sublocality of 4 NM SE of Point Hope.

A.1 Survey Limits

Data were acquired within the following survey limits:

Northwest Limit	Southeast Limit
68° 20' 23.97" N 167° 0' 0.52" W	68° 16' 1.36" N 166° 13' 4.16" W

Table 1: Survey Limits

Data were acquired to the survey limits in accordance with the requirements in the Project Instructions and the April 2018 NOS Hydrographic Surveys Specifications and Deliverables (HSSD) as shown in Figure 1.

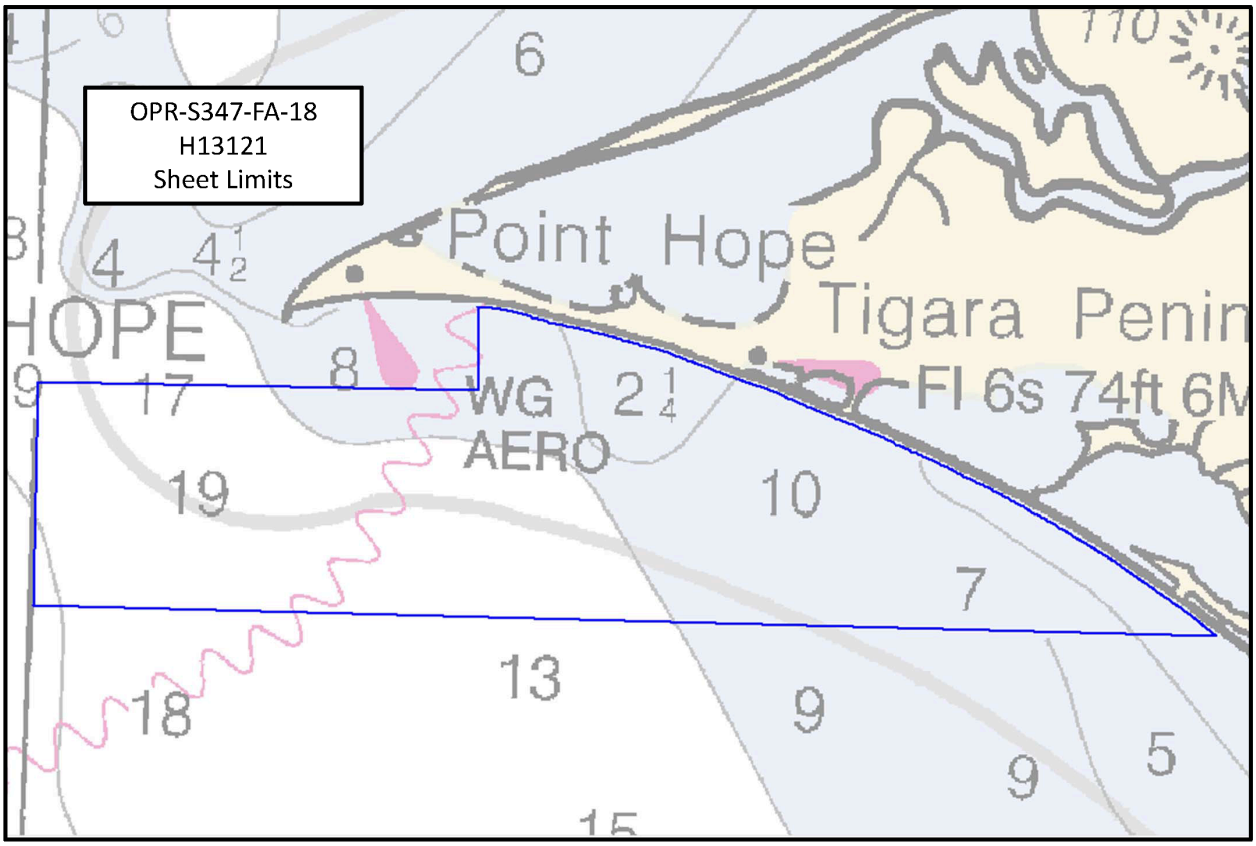


Figure 1: H13121 sheet limits (in blue) overlaid onto Chart 16005

A.2 Survey Purpose

This project provides critical data for the updating of National Ocean Service (NOS) nautical charting products to increase maritime safety in the region. Additionally, acquired data will be available to assist developments in storm surge and wave modeling for the local community.

A.3 Survey Quality

The entire survey is adequate to supersede previous data.

Data acquired in H13121 meet multibeam echo sounder (MBES) coverage requirements for set line spacing coverage, as required by the HSSD. This includes crosslines (see Section B.2.1), density (see Section B.2.11), and NOAA allowable uncertainty requirements (see Section B.2.12).

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 sheet H13121	Set line spacing MBES at 200m.

Table 2: Survey Coverage

A request was granted to expand the line spacing from 200 m to 400 m on account of negligible bathymetric variation and restricted time for data acquisition. See Appendix II for a record of this correspondence. H13121 was therefore completed at 400 m line spacing with the exception of two distinct areas in the northwest quadrant of the sheet, which were completed at 200 m line spacing. These areas of 200 m line spacing along with other varied coverage patterns such as the practice of logging data through turns was the result of the use of the research ASV BEN. See Figure 2 for an overview of coverage.

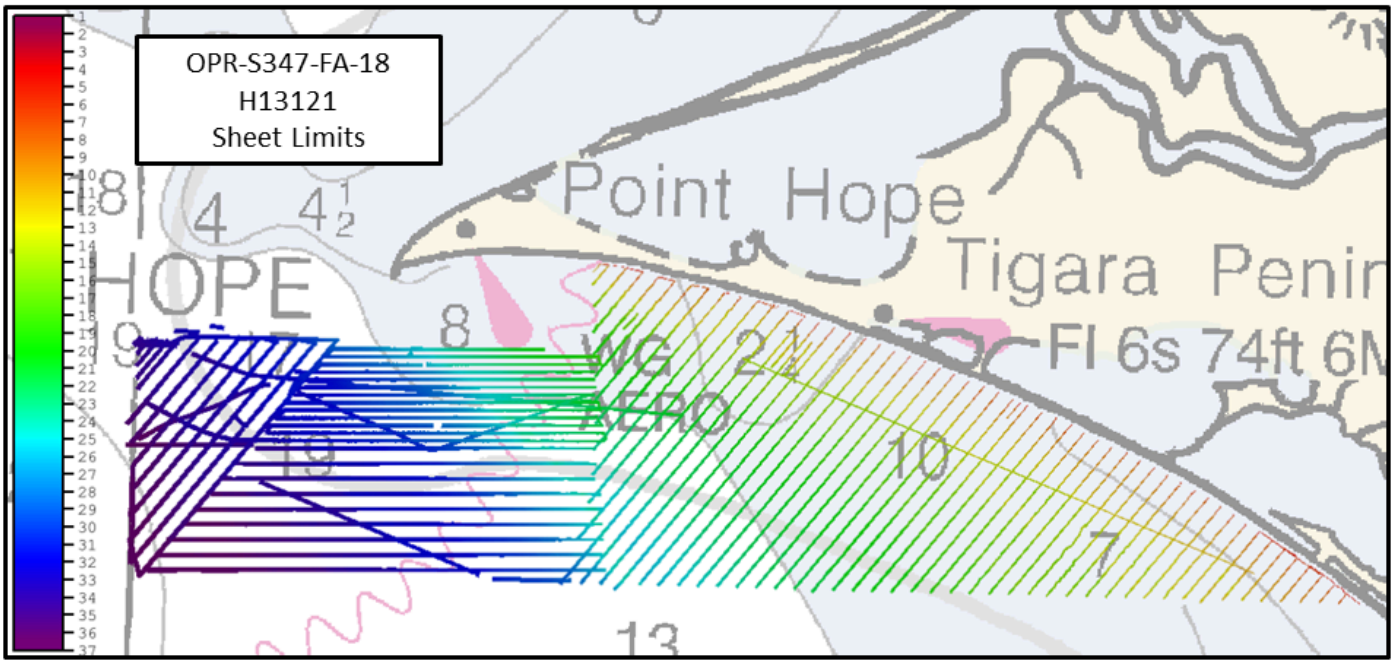


Figure 2: H13121 survey coverage overlaid on Chart 16005

A.5 Survey Statistics

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

	HULL ID	*S220*	*FA 2805*	*FA 2807*	*FA 2808*	*UNH ASV Ben*	*Total*
LNM	**SBES Mainscheme**	0	0	0	0	0	0
	MBES Mainscheme	68.3	53.8	14.5	85.2	74.3	296.1
	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	6.4	7.3	9.5	1.4	3.1	27.7
	Lidar Crosslines	0	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							51.5

Table 3: Hydrographic Survey Statistics

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

Survey Dates	Day of the Year
07/30/2018	211

Survey Dates	Day of the Year
07/31/2018	212
08/01/2018	213
08/10/2018	222

Table 4: Dates of Hydrography

B. Data Acquisition and Processing

B.1 Equipment and Vessels

Refer to the OPR-S347-FA-18 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*	*UNH ASV Ben*	*2805*	*2807*	*2808*
LOA	70.4 meters	4.0 meters	8.6 meters	8.6 meters	8.6 meters
Draft	8.6 meters	0.7 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 710	MBES
Kongsberg Maritime	EM 2040	MBES
Kongsberg Maritime	EM 2040 P	MBES
Sea-Bird Scientific	19plus V2	Conductivity, Temperature, and Depth Sensor
AML Oceanographic	MVP200	Sound Speed System
AML Oceanographic	MicroX SVS	Sound Speed System
Teledyne RESON	SVP 71	Sound Speed System
Teledyne RESON	SBE 35	TSG
Applanix	POS MV v5	Positioning and Attitude System

Table 6: Major Systems Used

All MBES survey vessels are equipped with POS MV v5 systems for positioning and attitude. S220 utilizes the Kongsberg EM 710 MBES, and AML Oceanographic MVP 200 for conductivity, temperature, and depth (CTD) casts. As both shipborne SVP-70 sound velocity probes were not functioning throughout acquisition of H13121 realtime surface sound speed measurements were instead generated from the SBE 45 Thermosalinograph (TSG), which is part of the SCS package. These readings were visually checked against realtime sound speed measurements from the Moving Vessel Profiler (MVP) to ensure the measurements were within an expected range. All launches utilize Kongsberg EM 2040 MBES, Teledyne RESON SVP 71 surface sound speed sensors, and Sea-Bird Scientific 19plus CTD casts. UNH ASV BEN utilizes Kongsberg EM 2040P MBES and AML MicroX SVS realtime sound speed sensor in conjunction with CTD casts from nearby launches.

B.2 Quality Control

B.2.1 Crosslines

Multibeam/single beam echo sounder/side scan sonar crosslines acquired for this survey totaled 9.35% of mainscheme acquisition.

Crosslines were collected, processed and compared in accordance with 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 3), and is submitted in the Separates II Digital Data folder. Statistics show

the mean difference between the depths derived from mainscheme data and crossline data was 0.05 meters (with mainscheme being shoaler) and 95% of nodes falling within 0.27 meters (Figure 4). For the respective depths, the difference surface was compared to the allowable NOAA uncertainty standards. In total greater than 99.95% of the depth differences between H13121 mainscheme and crossline data were within allowable NOAA uncertainties.

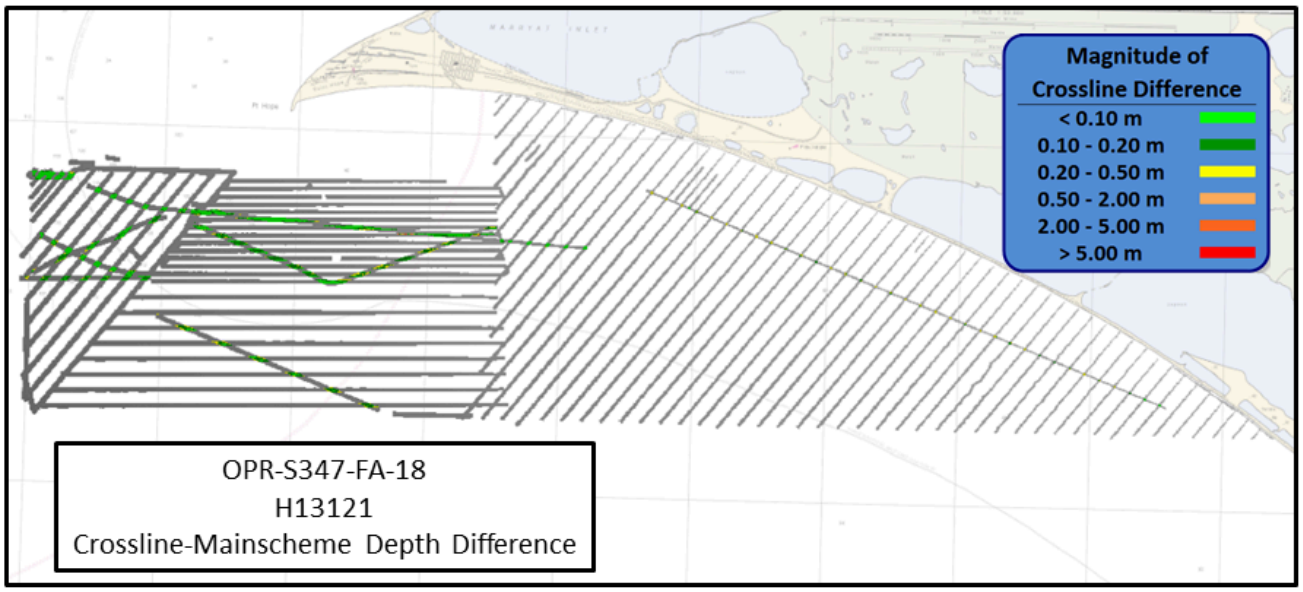
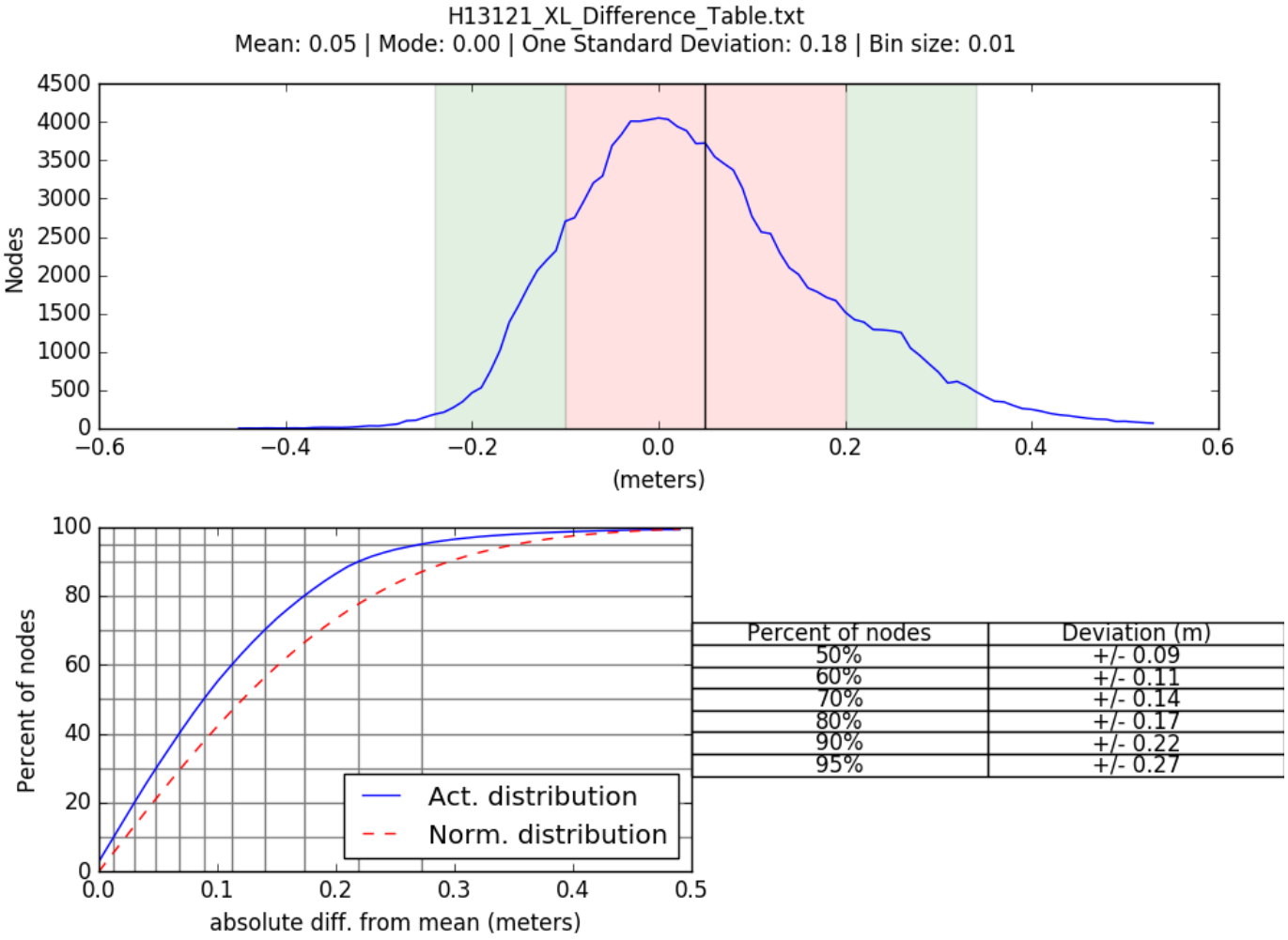


Figure 3: Overview of crosslines



Percent of nodes	Deviation (m)
50%	+/- 0.09
60%	+/- 0.11
70%	+/- 0.14
80%	+/- 0.17
90%	+/- 0.22
95%	+/- 0.27

Figure 4: H13121 crosslines 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	0.046 meters

Table 7: Survey Specific Tide TPU Values.

Hull ID	Measured - CTD	Measured - MVP	Surface
S220	N/A meters/second	1.0 meters/second	0.5 meters/second
2805	2.0 meters/second	N/A meters/second	0.5 meters/second
2807	2.0 meters/second	N/A meters/second	0.5 meters/second
2808	2.0 meters/second	N/A meters/second	0.5 meters/second
ASV Ben	2.0 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, discrete zoning tides, ERZT, and Not So Poor Man's VDatum (NSPMVD), real-time and post-processed uncertainty sources were also incorporated into the depth estimates of survey H13121. 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.

To determine the uncertainty value of the NSPMVD model, the variance sum law was used between the independent variables of the ERZT model and the NSPMVD model. As the ERZT model's uncertainty is driven primarily from tidal uncertainties, the uncertainty in the TCARI grid was used as the starting point for ERZT uncertainty. This is then adjusted based on the average number of survey lines for the given nodes which represent individual "samples" and serves to tighten the ERZT uncertainty. Other ERZT factors such as SBET and waterline are small enough to be absorbed by the gridding resolution (1,000 m). The NSPMVD uncertainty value was then calculated using this value and the standard deviations of the NSPMVD-ERZT difference surfaces. See Figure 5 for the equation and variables utilized in this determination.

Variables	Value
$\sigma^2_{(PMVDsep-ERZTsep)}$	0.08 m
TCARI 1σ uncertainty	0.12 m
SEP grid size	1000 m
Survey area	179,371,471.70 m^2
Linear distance of survey	599,553.90 m
$\sigma_{NSPMVDsep}$	0.046 m

$$\sqrt{(\sigma^2_{NSPMVDsep})} = \sqrt{[\sigma^2_{(NSPMVDsep-ERZTsep)} - \frac{(TCARI\ 1\sigma\ \text{uncertainty}\ )^2}{\left(\frac{SEP\ grid\ size}{Survey\ Area/Linear\ distance\ of\ survey}\right)}]}$$

Figure 5: Equation and variables used to determine the NSPMVD separation model uncertainty

B.2.3 Junctions

H13121 junctions with two adjacent surveys from this project, H13120 and H13122 as shown in Figure 6. Data overlap between H13121 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 H13121 are generally within the NOAA allowable uncertainty in their areas of overlap. For all junctions with H13121, a negative difference indicates H13121 was deeper, and a positive difference indicates H13121 was shoaler.

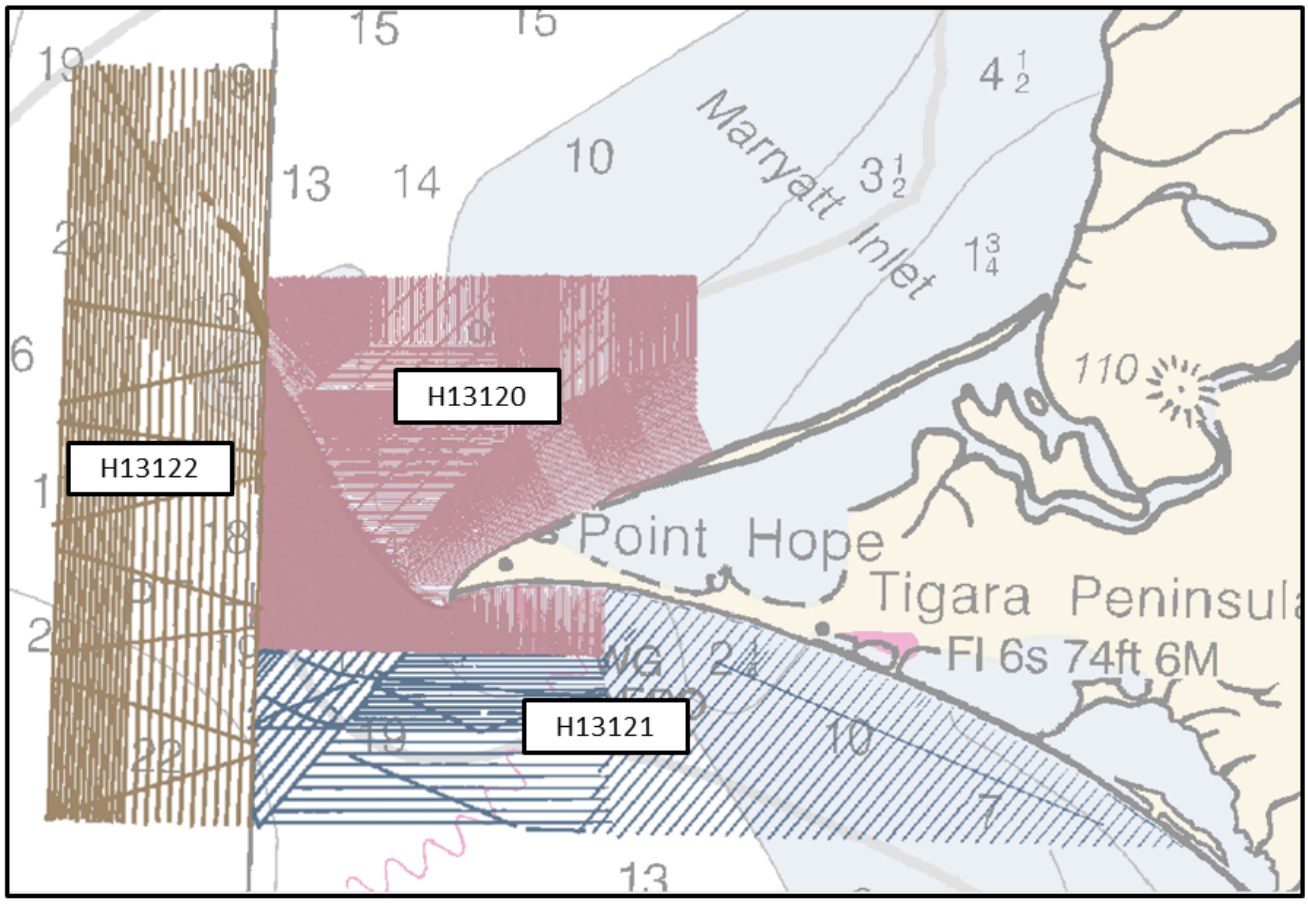


Figure 6: Overview of H13121 junction surveys

The following junctions were made with this survey:

Registry Number	Scale	Year	Field Unit	Relative Location
H13120	1:20000	2018	NOAA Ship FAIRWEATHER	N
H13122	1:20000	2018	NOAA Ship FAIRWEATHER	W

Table 9: Junctioning Surveys

H13120

Surface differencing in CARIS HIPS and SIPS was used to assess junction agreement between the surface from H13121 and the surface from H13120 (Figure 7). The statistical analysis of the difference surface

shows a mean of 0.28 with 95% of all nodes having a maximum deviation of +/-0.24 meters, as seen in Figure 8. It was found that greater than 99.95% of nodes are within NOAA allowable uncertainty. The largest differences exhibited are from the outer beams of either survey's swath.

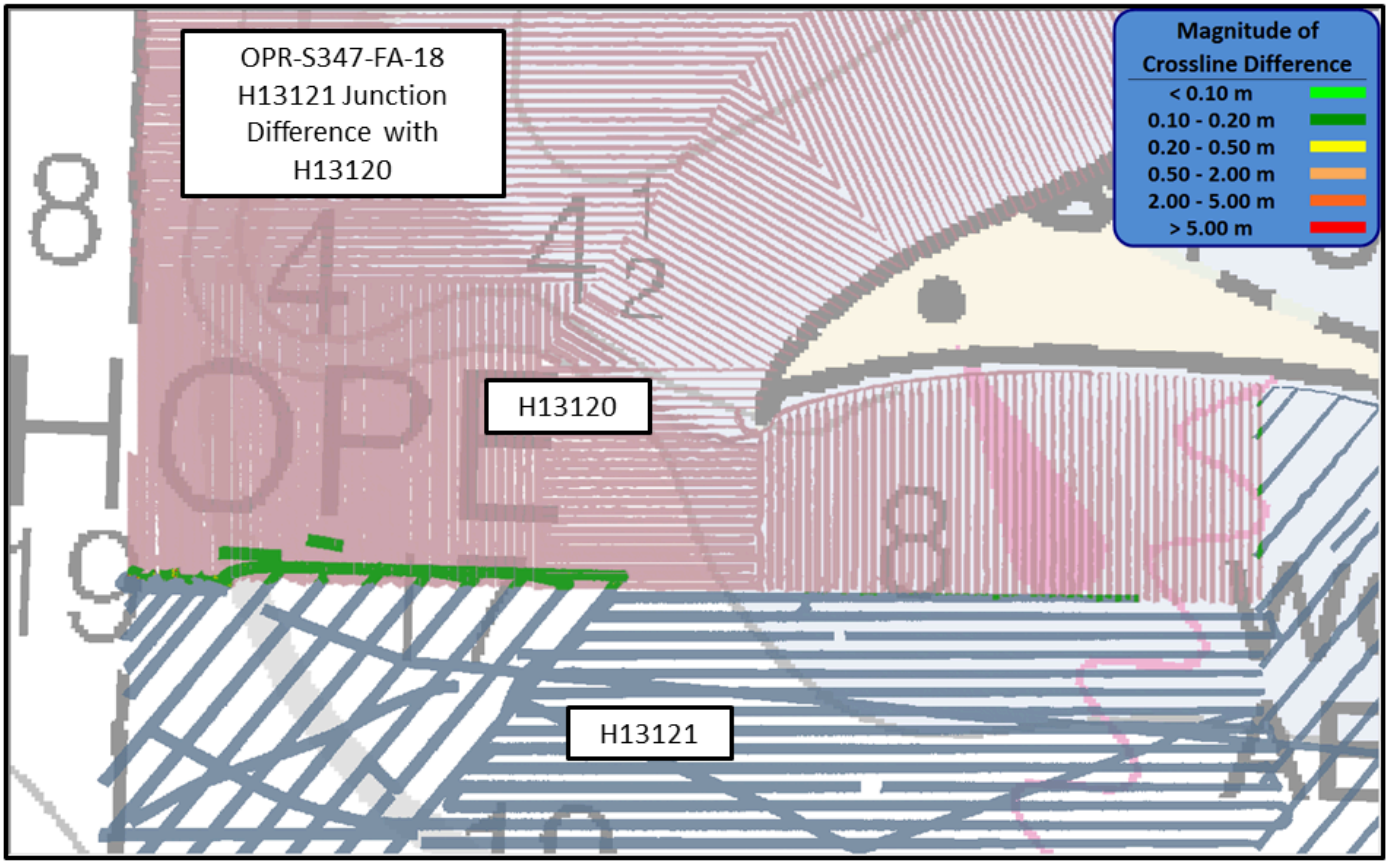
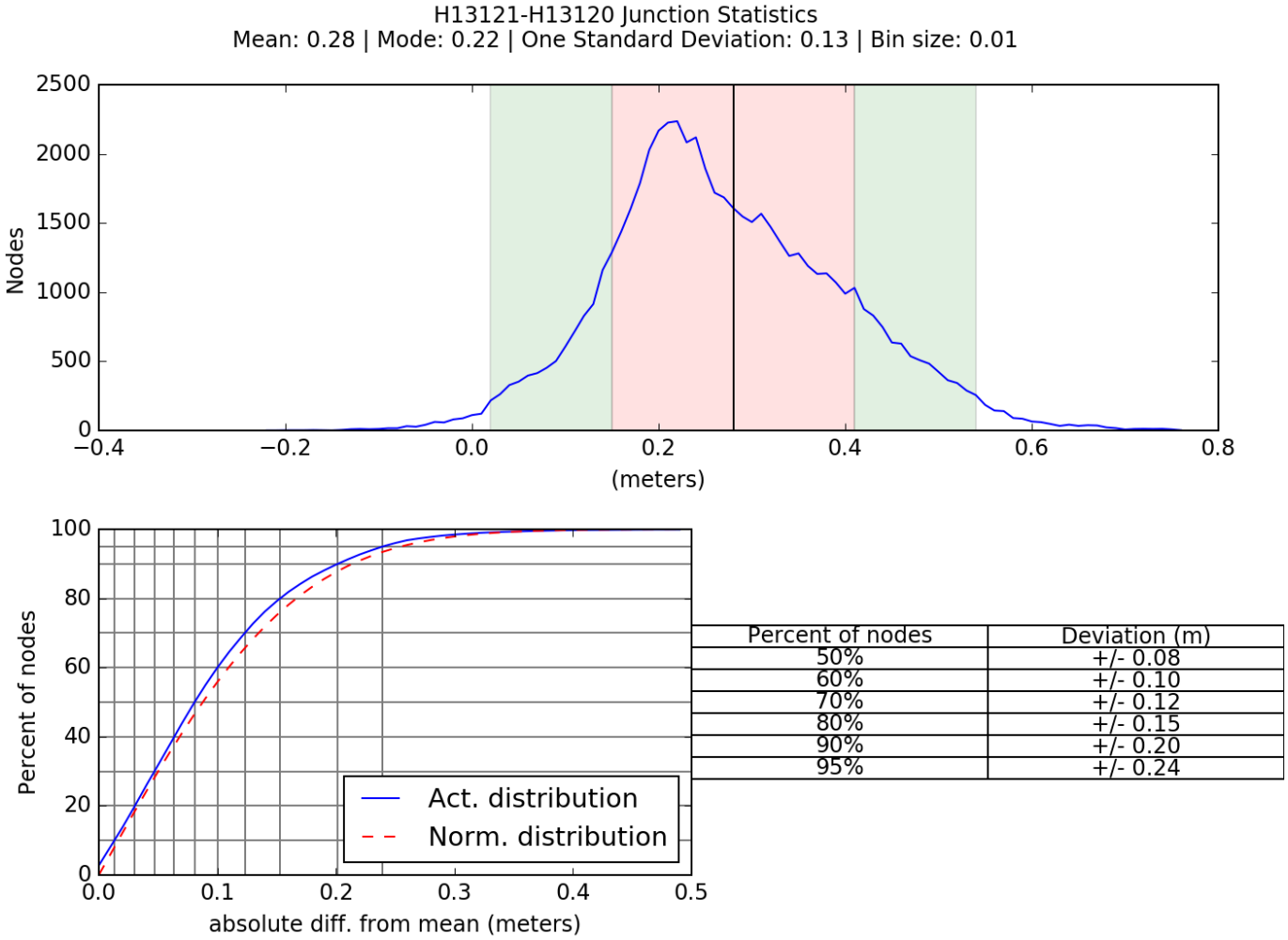


Figure 7: Difference surface between H13121 (gray) and junctioning survey H13120 (red)



Percent of nodes	Deviation (m)
50%	+/- 0.08
60%	+/- 0.10
70%	+/- 0.12
80%	+/- 0.15
90%	+/- 0.20
95%	+/- 0.24

Figure 8: Difference surface statistics between H13121 and H13120 (4 m surface)

H13122

Surface differencing in CARIS HIPS and SIPS was used to assess junction agreement between the surface from H13121 and the surface from H13122 (Figure 9). The statistical analysis of the difference surface shows a mean of 0.35 with 95% of all nodes having a maximum deviation of +/-0.18 meters, as seen in Figure 10. It was found that greater than 99.95% of nodes are within NOAA allowable uncertainty. The largest differences exhibited are from the outer beams of either survey's swath.

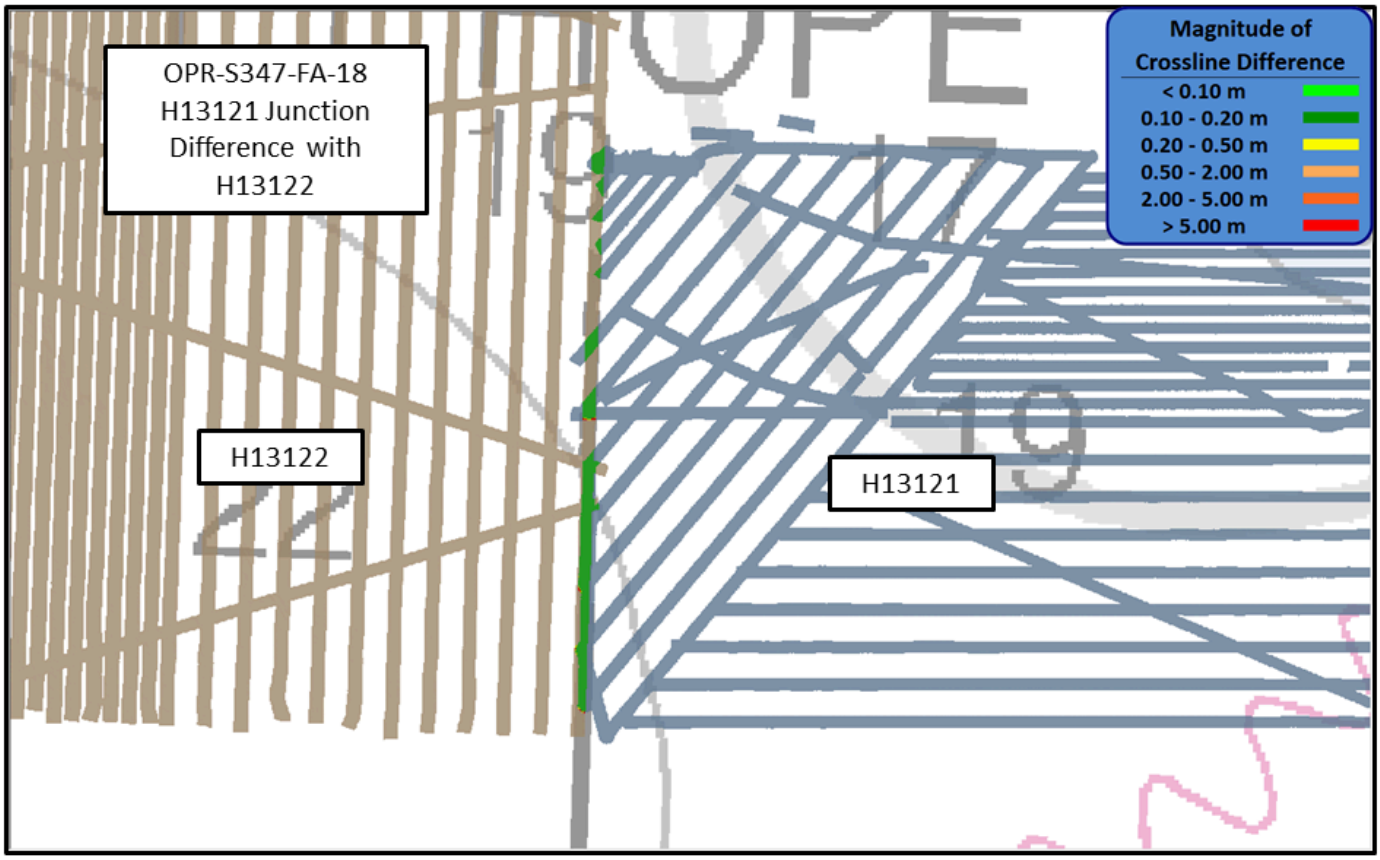
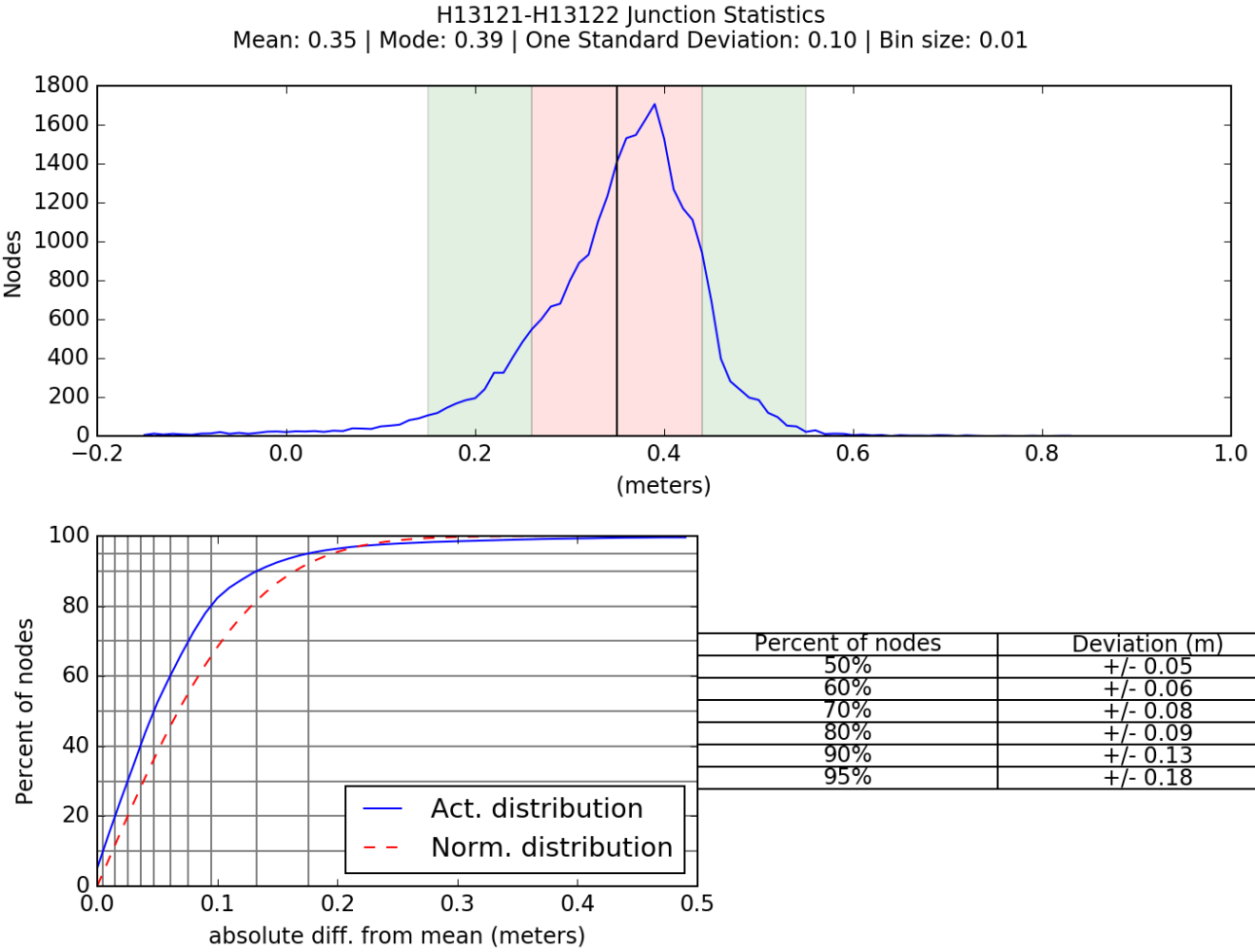


Figure 9: Difference surface between H13121 (gray) and junctioning survey H13122 (brown)



Percent of nodes	Deviation (m)
50%	+/- 0.05
60%	+/- 0.06
70%	+/- 0.08
80%	+/- 0.09
90%	+/- 0.13
95%	+/- 0.18

Figure 10: Difference surface statistics between H13121 and H13122 (4 m surface)

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 20 minutes, guided by observation of the surface sound speed and targeted to deeper areas. Cast intervals were increased on S220 after an MVP malfunction. Static casts were taken every three hours following this malfunction. ASV BEN used CTD casts from nearby launches or S220 in post processing. 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

H13121 data were reviewed in CARIS HIPS and SIPS for holidays in accordance with Section 5.2.2.4 (Option A) of the HSSD. Two ERS gaps in along track coverage which measure greater than three nodes are present in H13121 (Figure 11). These gaps are due to ASV system crashes leading to issues in SBET generation. Each of the gaps were judged to be acceptable due to the homogeneous nature of the surrounding sea floor. These gaps are in depths greater than 20 m and as such need not be addressed per Section 5.2.2.4 of the HSSD.

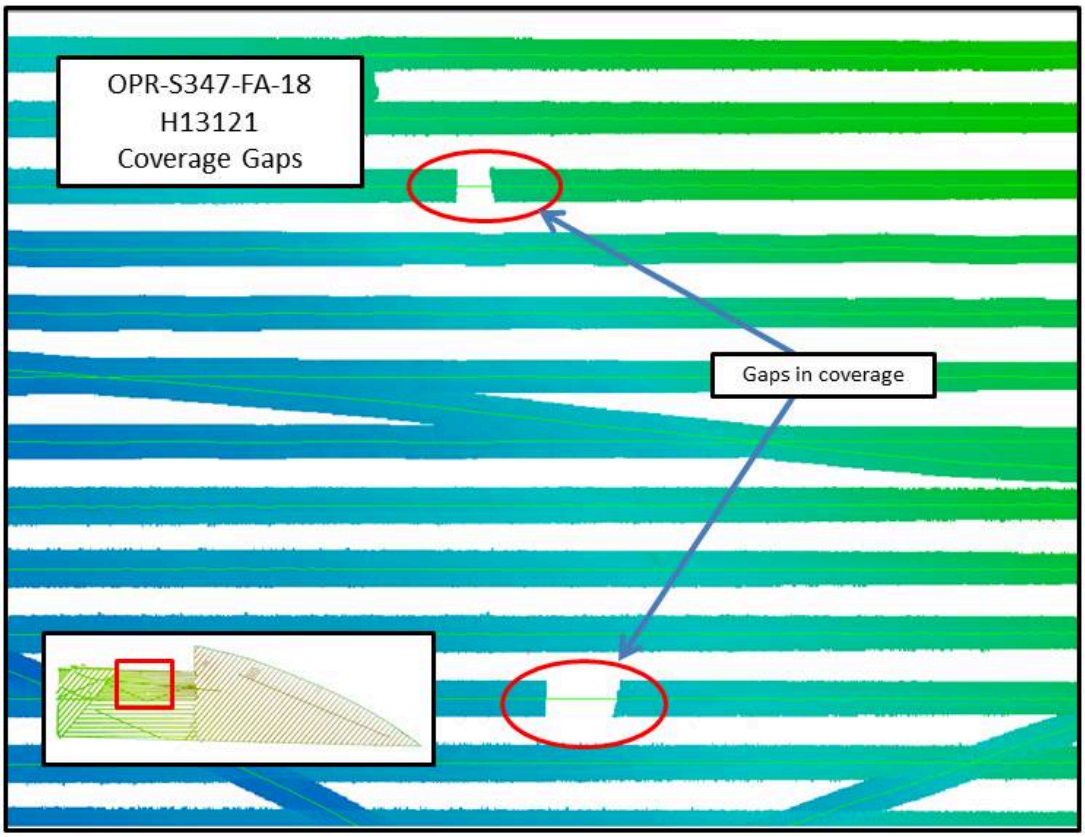


Figure 11: H13121 gaps in along-track coverage

B.2.10 Charted Sounding Investigation

One charted sounding was identified as being significantly shallower than the two adjacent lines of acquired data (Figure 12). This sounding was investigated per Section 5.2.2.4 of the HSSD. The sounding was disproved as in fact being the same depth as the two adjacent lines.

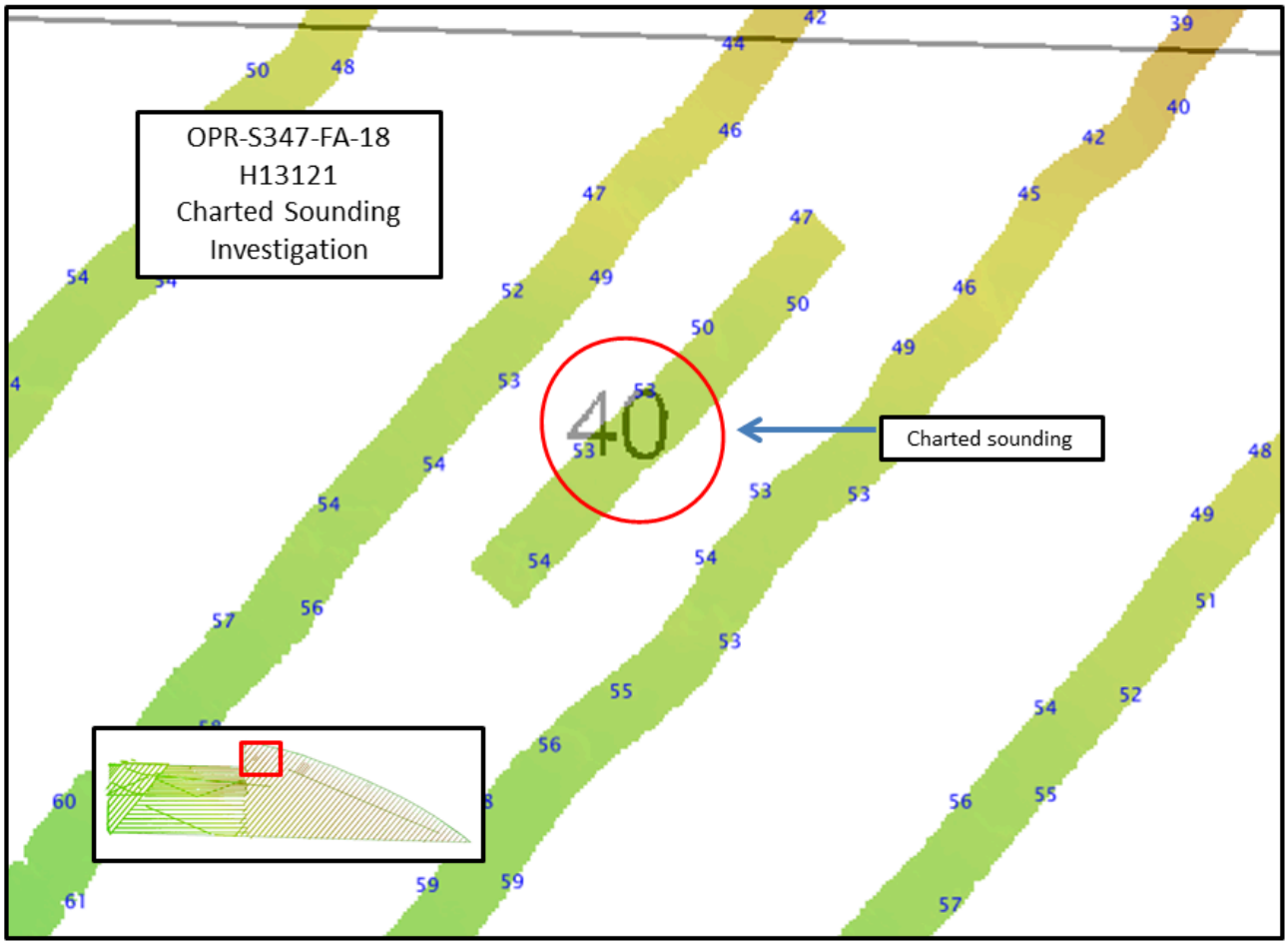


Figure 12: H13121 investigation and disprove of charted shallow sounding (MBES soundings in blue)

B.2.11 Density

The surface was analyzed using the HydrOffice QC Tools Grid QA feature and the results are shown in Figure 13 below. Density requirements for H13121 were achieved with 99.00% of surface nodes containing five or more soundings as required by HSSD Section 5.2.2.3.

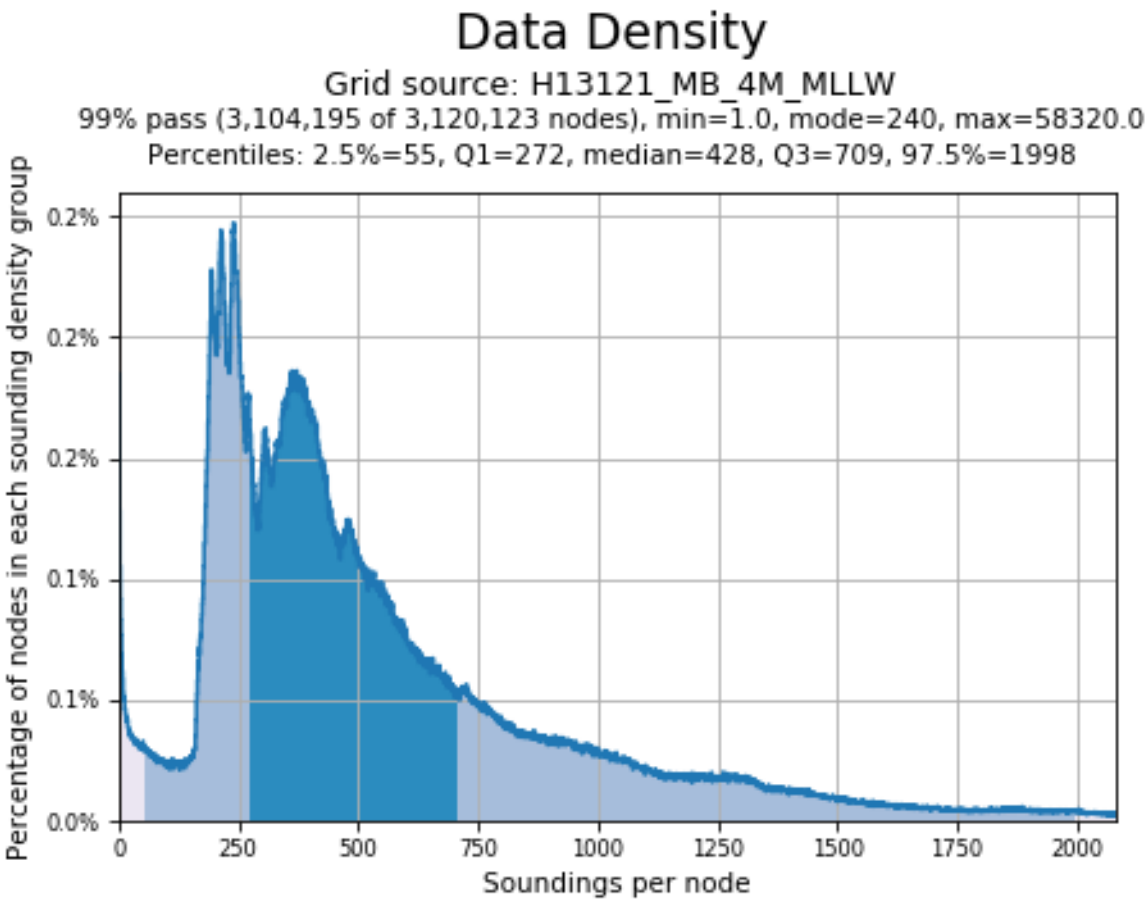


Figure 13: H13121_MB_4M_MLLW data density

B.2.12 Uncertainty

The surface was analyzed via Pydro QC Tools Grid QA feature to determine the percentage of surface nodes that meet specifications. Overall, greater than 99.5% of nodes meet NOAA allowable uncertainty standards for H13121. For a graphical representation of uncertainty compliance see Figure 14.

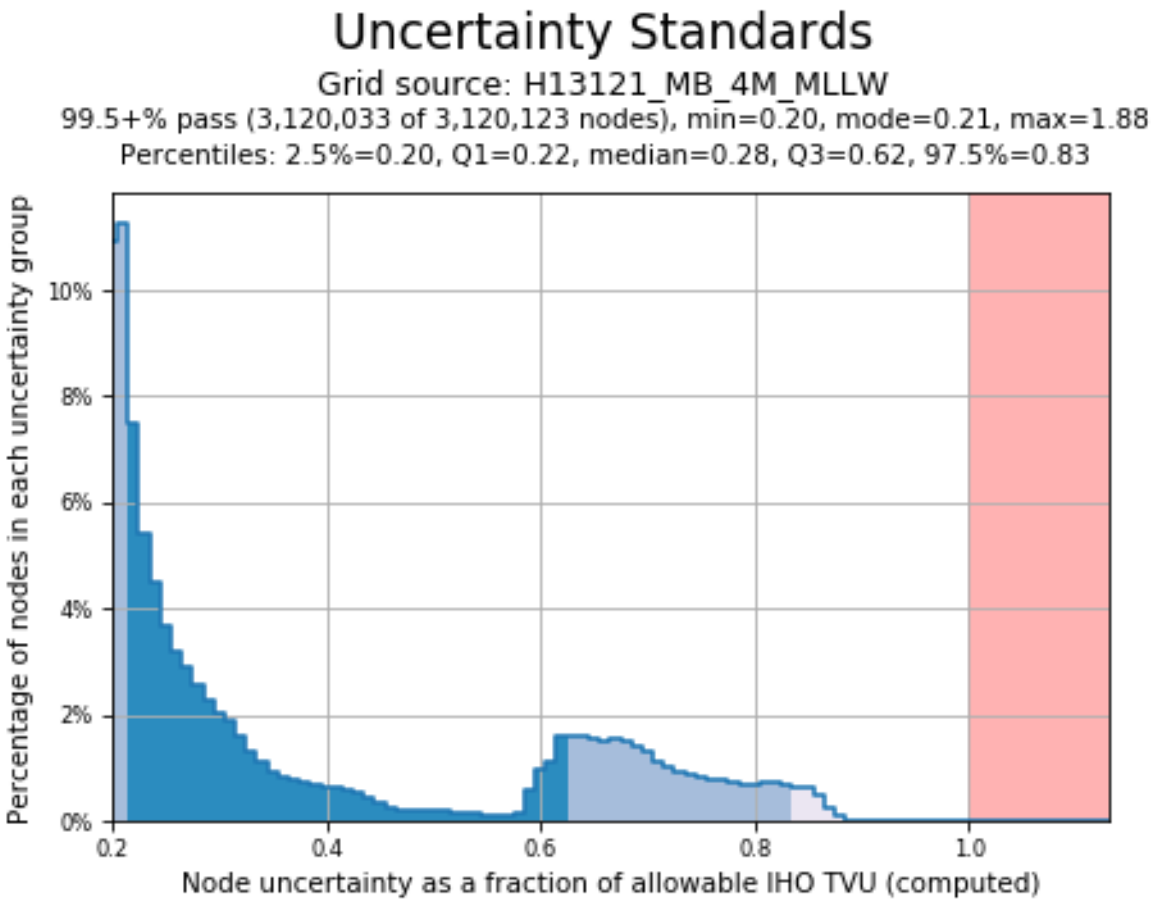


Figure 14: H13121_MB_4M_MLLW uncertainty standards

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 by the field unit via Fledermaus FMGT 7.8.5. See Figure 15 for a complete mosaic.

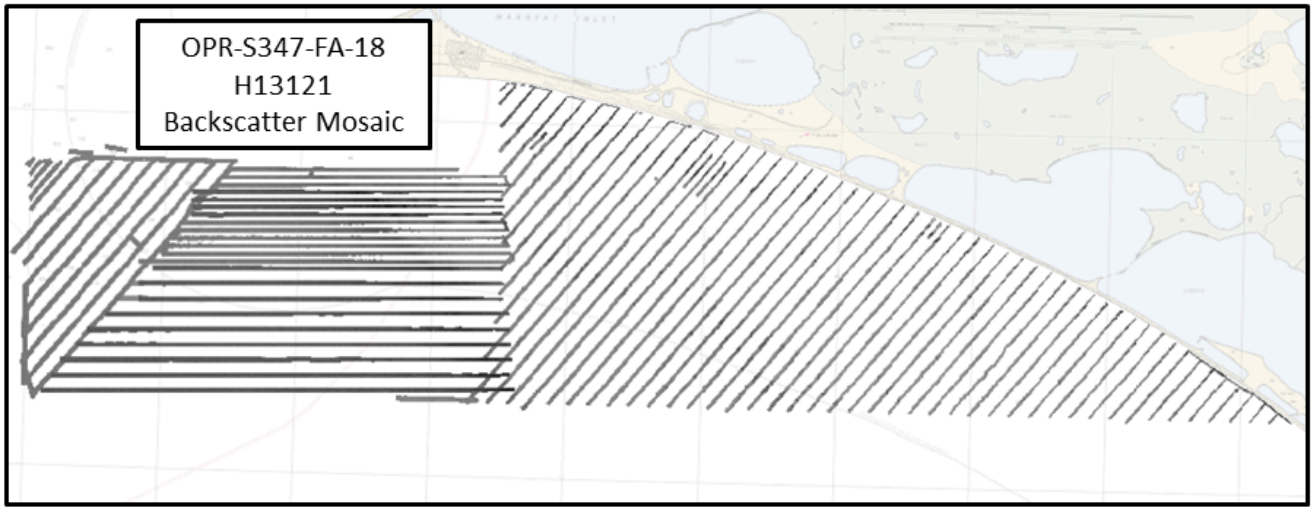


Figure 15: H13121 Backscatter mosaic

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
Caris	HIPS/SIPS	10.4

Table 10: Primary bathymetric data processing software

The following software program was the primary program used for imagery data processing:

Manufacturer	Name	Version
QPS	Fledermaus FMGT	7.8.5

Table 11: Primary imagery data processing software

The following Feature Object Catalog was used: NOAA Extended Attribute File version 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
H13121_MB_4m_MLLW	CARIS Raster Surface (CUBE)	4 meters	2.7 meters - 38.4 meters	NOAA_4m	MBES Set Line Spacing
H13121_MB_4m_MLLW_Final	CARIS Raster Surface (CUBE)	4 meters	2.7 meters - 38.4 meters	NOAA_4m	MBES Set Line Spacing

Table 12: Submitted Surfaces

The NOAA CUBE parameters defined in the HSSD were used for the creation of all CUBE surfaces for H13121. 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 be shoaler or deeper than 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 edge fliers which don't exceed the TVU threshold.

C. Vertical and Horizontal Control

Per Section 5.1.2.3 of the 2014 Field Procedures Manual, no Horizontal Control Report has been generated for H13121.

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
Red Dog Dock	9491094

Table 13: NWLON Tide Stations

File Name	Status
9491094.tid	Final Approved

Table 14: Water Level Files (.tid)

File Name	Status
S347FA2018.tc	Final

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

A request for final approved tides was sent to N/OPS1 on 08/12/2018. The final tide note was received on 08/30/2018.

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

ERS Methods Used:

ERS via Poor Mans VDATUM

Ellipsoid to Chart Datum Separation File:

OPR-S347-FA-18-PointHope_NSPMVD_NAD83-MLLW_Revised.csar

ERS methods were used as the final means of reducing H13121 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 Not So Poor Man's VDatum (NSPMVD) separation model provided with the Project Instructions.

C.2 Horizontal Control

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

The projection used for this project is UTM Zone 03 North.

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. For further details regarding the processing and quality control checks performed, see the H13121 POSPAC Processing Logs spreadsheet located in the Separates folder.

During real-time acquisition S220 and launches 2805, 2807, 2808 and ASV BEN received correctors from the Wide Area Augmentations System (WAAS) for increased accuracies similar to USCG DGPS stations. WAAS and SBETs were the sole methods of correcting position data for H13121 as no DGPS stations were available for realtime horizontal control.

D. Results and Recommendations

D.1 Chart Comparison

A manual comparison was performed between survey H13121 and ENC US2AK92M, the largest scale chart, using CARIS HIPS and SIPS sounding layer derived from the 4 m surface. The soundings were overlaid on the chart to assess differences between the surveyed soundings and the charted depths and contours.

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?
US5AK94M	1:50000	4	05/30/2017	05/30/2017	NO

Table 16: Largest Scale ENCs

US5AK94M

The charted soundings and contours of Chart 16124 and 16005 are identical to those found on ENC US5AK94M. As such, all discussions regarding comparisons between surveyed soundings and charted depths are covered under the ENC US5AK94M discussion. Soundings from H13121 are in a general agreement with charted depths on ENC US5AK94M (Figure 16). The greatest differences observed between the charted depths and MBES data were in the western side of H13121 (Figures 17 and 18).

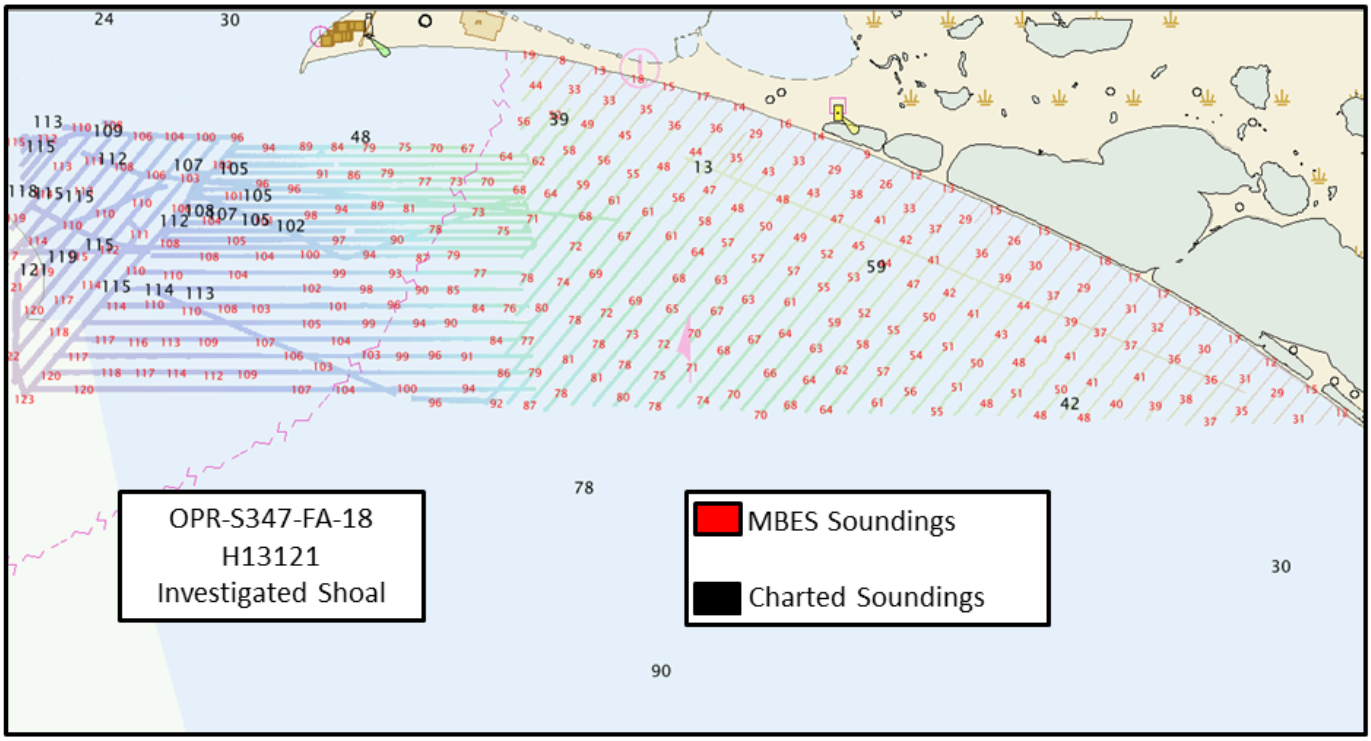


Figure 16: Comparison between H13121 soundings and ENC US5AK94M

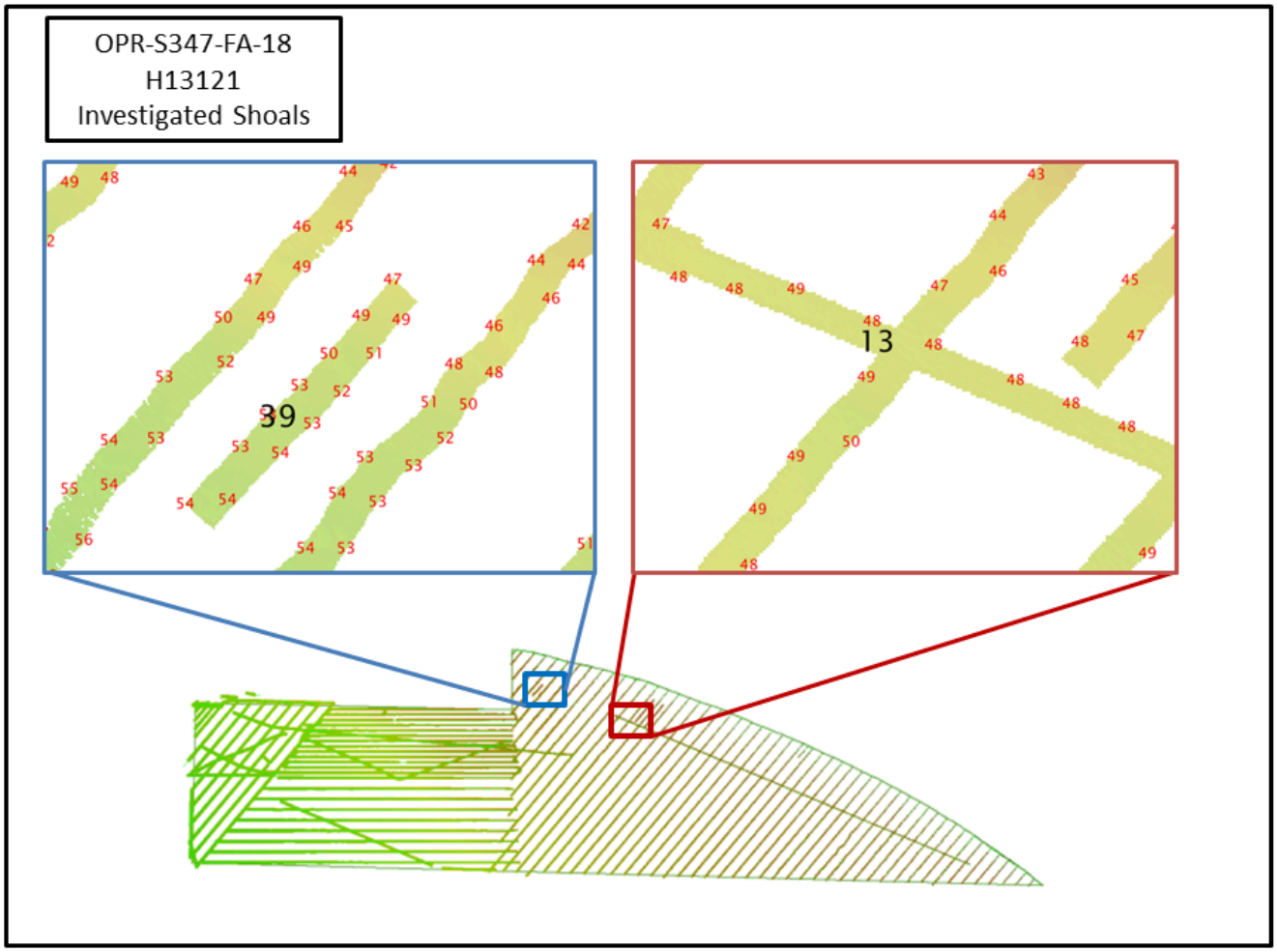


Figure 17: Investigated soundings (in red) as compared to Chart 16124 (in black)

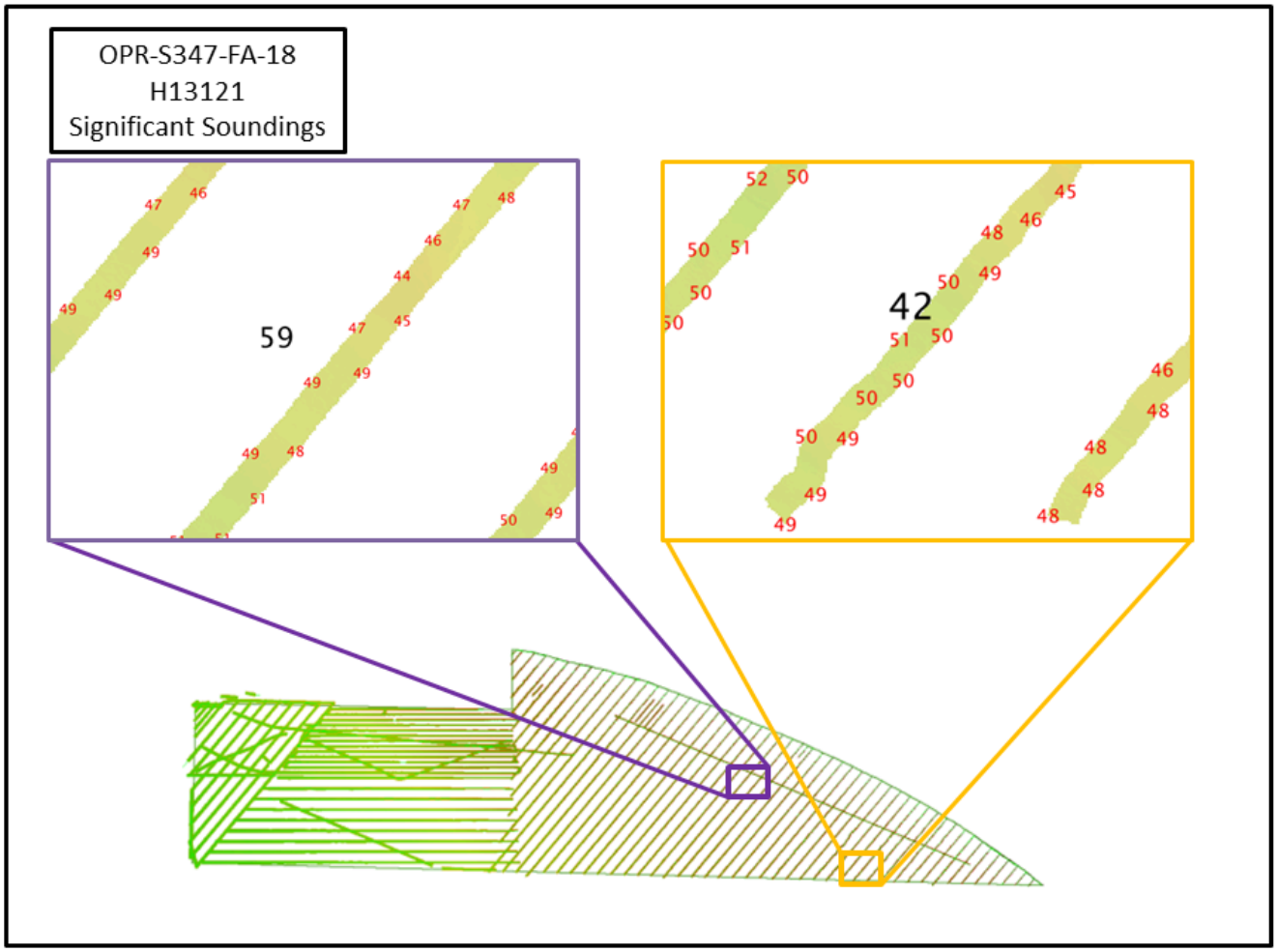


Figure 18: Soundings which show significant variation

D.1.2 Maritime Boundary Points

No Maritime Boundary Points were assigned for this survey.

D.1.3 Charted Features

No charted features exist for this survey.

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, pilot boarding areas, or channel and range lines within the survey limits.

D.1.7 Bottom Samples

Three bottom samples were acquired in accordance with the Project Instructions for survey H13121. All bottom samples were entered in the H13121 Final Feature File. See Figure 19 for a graphical overview of sample locations.

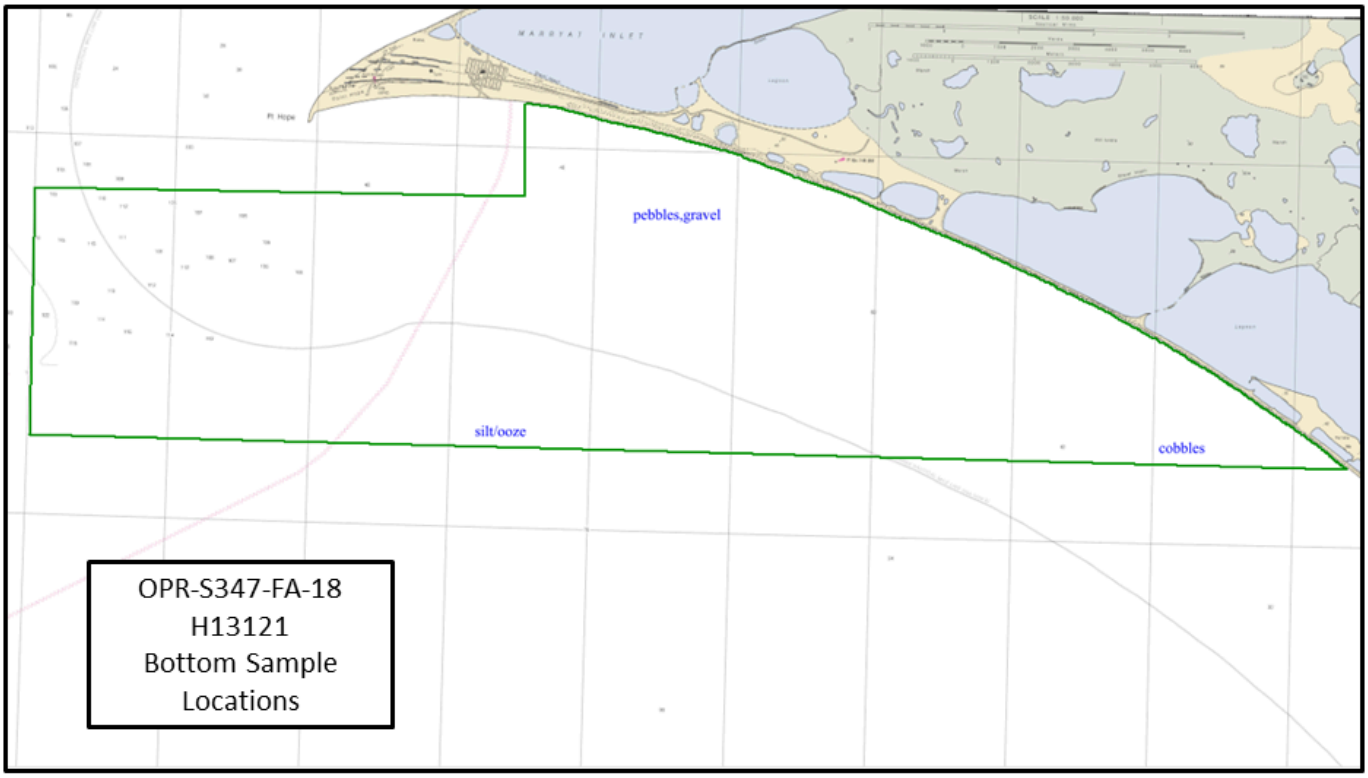


Figure 19: H13121 bottom samples

D.2 Additional Results

D.2.1 Shoreline

H13121 survey limits extended to the NALL. The single assigned feature was a submarine cable, which was not observed in the data (see section D.2.5).

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

A submarine cable was assigned for verification, the charted cable was not observed in multibeam data.

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 herein.

Approver Name	Approver Title	Approval Date	Signature
CDR Marc Moser	Chief of Party	11/08/2018	MOSER.MARC.STANTON.1163193902 Digitally signed by MOSER.MARC.STANTON.1163193902 DN: c=US, o=U.S. Government, ou=DoD, ou=PKI, ou=NOAA, cn=MOSER.MARC.STANTON.1163193902 Date: 2018.11.08 15:44:28 -08'00'
LT Damian Manda	Field Operations Officer	11/08/2018	MANDA.DAMIAN.CURTIS.1396610660 2018.11.08 15:10:53 -08'00'
HCST Sam Candio	Chief Survey Technician	11/08/2018	
LTJG Peter Siegenthaler	Sheet Manager	11/08/2018	Digitally signed by SIEGENTHALER.PETER.ROBERT.1523757500 DN: c=US, o=U.S. Government, ou=DoD, ou=PKI, ou=NOAA, cn=SIEGENTHALER.PETER.ROBERT.1523757500 Date: 2018.11.26 13:58:01 -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	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

PROVISIONAL TIDE NOTE FOR HYDROGRAPHIC SURVEY

DATE : August 27, 2018

HYDROGRAPHIC BRANCH: Pacific
HYDROGRAPHIC PROJECT: OPR-S347-FA-18
HYDROGRAPHIC SHEETS: H13120,13121,H13123,and H13124

LOCALITY: Lisburne Peninsula, Alaska
TIME PERIOD: July 14 - August 15, 2018

TIDE STATION USED: 9491094 Red Dog Dock, AK
Lat. 67° 34.5′ N Long. 164° 3.8' W
PLANE OF REFERENCE (MEAN LOWER LOW WATER): 0.000 meters
HEIGHT OF HIGH WATER ABOVE PLANE OF REFERENCE: 0.240 meters

REMARKS: RECOMMENDED GRID

Please use the TCARI grid "S347FA2018.tc" as the final grid for project OPR-S347-FA-18, Registry Nos. H13120,13121,H13123,and H13124, during the time period between July 14 - August 15, 2018.

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).

Note 2: Annual leveling for Red Dog Dock, AK (9491094)was not completed in the past year. A review of the verified leveling records from August 2007 to August 2017 shows the tide station benchmark network to be stable within an allowable 0.009 m tolerance. This Tide Note may be used as final stability verification for survey OPR-S347-FA-18, H13120,H13121,H13123,and H13124. CO-OPS will immediately provide a revised Tide Note should subsequent leveling records indicate any benchmark network stability movement beyond the allowable 0.009 m tolerance.

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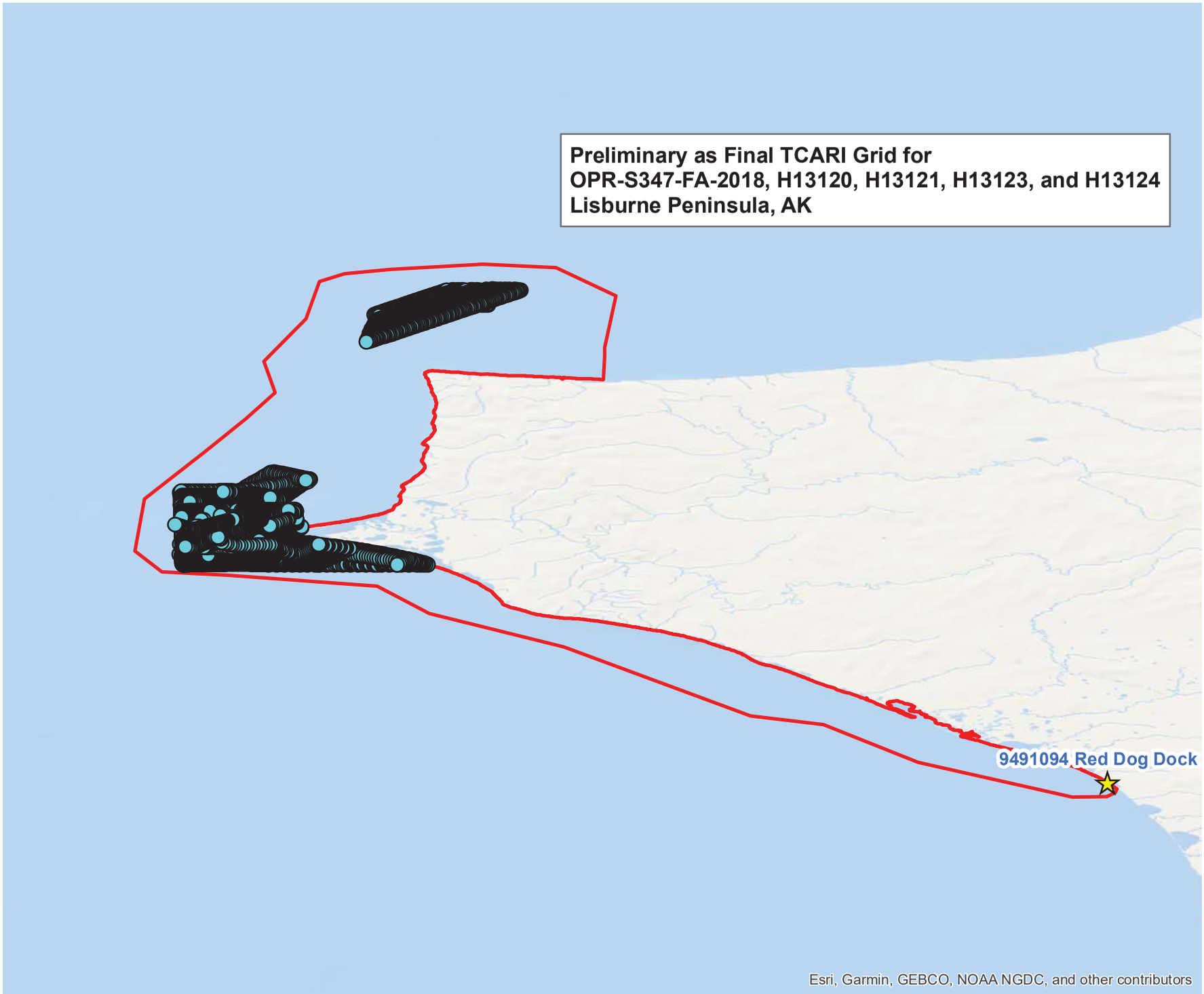
CHIEF, PRODUCTS AND SERVICES BRANCH


Preliminary as Final TCARI Grid for
OPR-S347-FA-2018, H13120, H13121, H13123, and H13124
Lisburne Peninsula, AK
9491094 Red Dog Dock
Esri, Garmin, GEBCO, NOAA NGDC, and other contributors

UNITED STATES DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration
Office of Marine and Aviation Operations
NOAA Ship *Fairweather* (S220)
1010 Stedman Street, Ketchikan, Alaska 99901

August 5, 2018

MEMORANDUM FOR: Christina Belton
Project Manager, OPR-S347-FA-18
Hydrographic Surveys Division Operations Branch

FROM: Commander Marc Moser, NOAA
Commanding Officer, NOAA Ship *Fairweather*

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Date: 2018.08.05 22:32:50 -08'00'

SUBJECT: Modification Request – Adjustment of Set Line Spacing for OPR-S347-FA-18

Fairweather requests a modification to the set line spacing for sheets 2-11 of project OPR-S347-FA-18. The standard spacing between lines is requested to be increased to 400 m, retaining the ability to reduce line spacing or acquire complete coverage to define shoals as per HSSD Section 5.2.2.4 Option A.

Justification

After acquisition on Sheets 1 through 3, it has been observed that the set line spacing requirements in the project instructions oversample the bathymetric changes, particularly in offshore areas. For the purpose of charting, double the required line spacing is adequate to characterize the general bathymetric trends and the Specifications and Deliverables define criteria for further investigation and splits. PHB PS Reser has conducted tests to ensure that this data is adequate for downstream products and concurs with our recommendation.

In the 15-20 fathom sections of Sheet 3, over 70% coverage is achieved, but only gradual bathymetric trends are observed, and only one shoal area rising more than 10% of the water depth is observed and is clearly visible in more widely spaced lines. These depths and trends are expected in the majority of the sheets, with the exception of Sheet 1, which will be completed at 100 m spacing due to significant existing progress.

Limited time on project and lack of shelter from foul weather requires maximization of available efficiency. Increased line spacing will allow for equivalent characterization of bathymetric trends while doubling areal acquisition speed. Examples of processed data at the proposed line spacing are shown below.

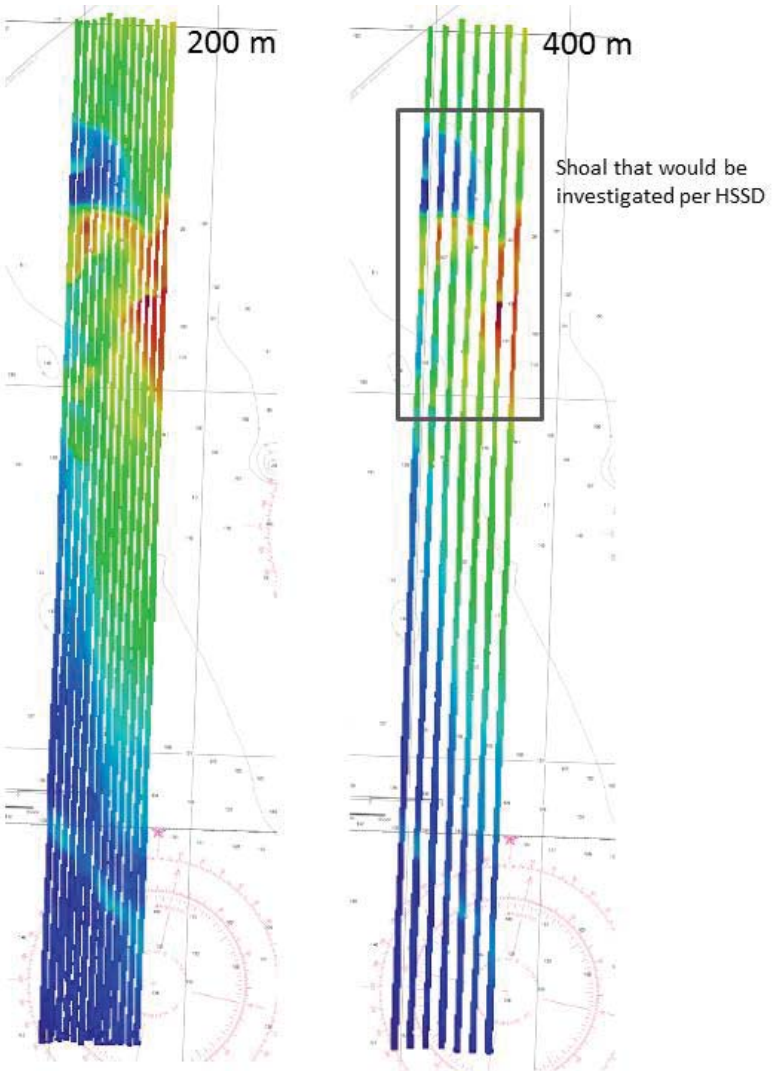
Decision

2018.08.07 08:52:45 -04'00'

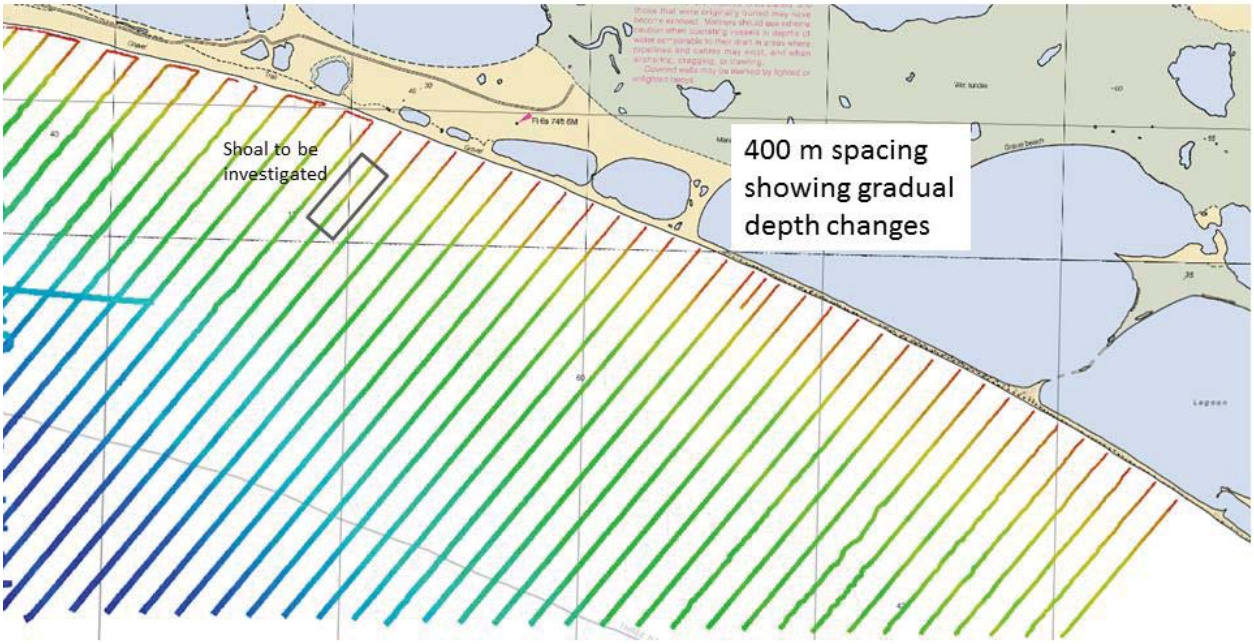
Waiver is: Granted _____ Denied _____

cc: Chief, HSD OPS
OPS, FA
HCST, FA

H13122



H13121



APPROVAL PAGE

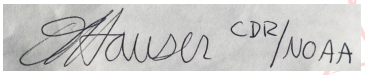
H13121

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 products

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.



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Approved:_____

Commander Olivia Hauser, NOAA
Chief, Pacific Hydrographic Branch