H13124

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

DESCRIPTIVE REPORT

Type of Survey:	Navigable Area
Registry Number:	H13124

LOCALITY

State(s):	Alaska
General Locality:	Lisburne Peninsula
Sub-locality:	10 NM Northwest of Cape Lisburne

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	**H13124**

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:	**10 NM Northwest of Cape Lisburne**
Scale:	**20000**
Dates of Survey:	**08/14/2018 to 08/15/2018**
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 H13124

Project: OPR-S347-FA-18

Locality: Lisburne Peninsula

Sublocality: 10 NM Northwest of Cape Lisburne

Scale: 1:20000

August 2018 - August 2018

NOAA Ship Fairweather

Chief of Party: CDR Marc Moser, NOAA

A. Area Surveyed

The survey area is located in the vicinity of the Lisburne Peninsula, AK, within the sublocality of 10 NM Northwest of the Lisburne Peninsula.

A.1 Survey Limits

Data were acquired within the following survey limits:

Northwest Limit	Southeast Limit
69° 9' 4.46" N 166° 28' 50.84" W	68° 58' 1.42" N 165° 53' 12.4" W

Table 1: Survey Limits

Data were not 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). Due to time constraints, sheets H13124 and H13125 were combined into one sheet, H13124. This combination was approved by the Project Manager, and documented in Appendix II. Data were acquired to some, but not all, of the survey limits of the new, larger H13124 sheet. An outline of the assigned and expanded sheet limits is detailed in Figure 1. The purpose of the sheet limit expansion was to prioritize the survey of two areas enclosed by 10 fathom contours on ENC US2AK92M. Analysis of marine traffic in the area revealed that ships were avoiding these apparent shoal areas, and survey operations were targeted here to confirm or disprove the accuracy of these charted contoured areas.

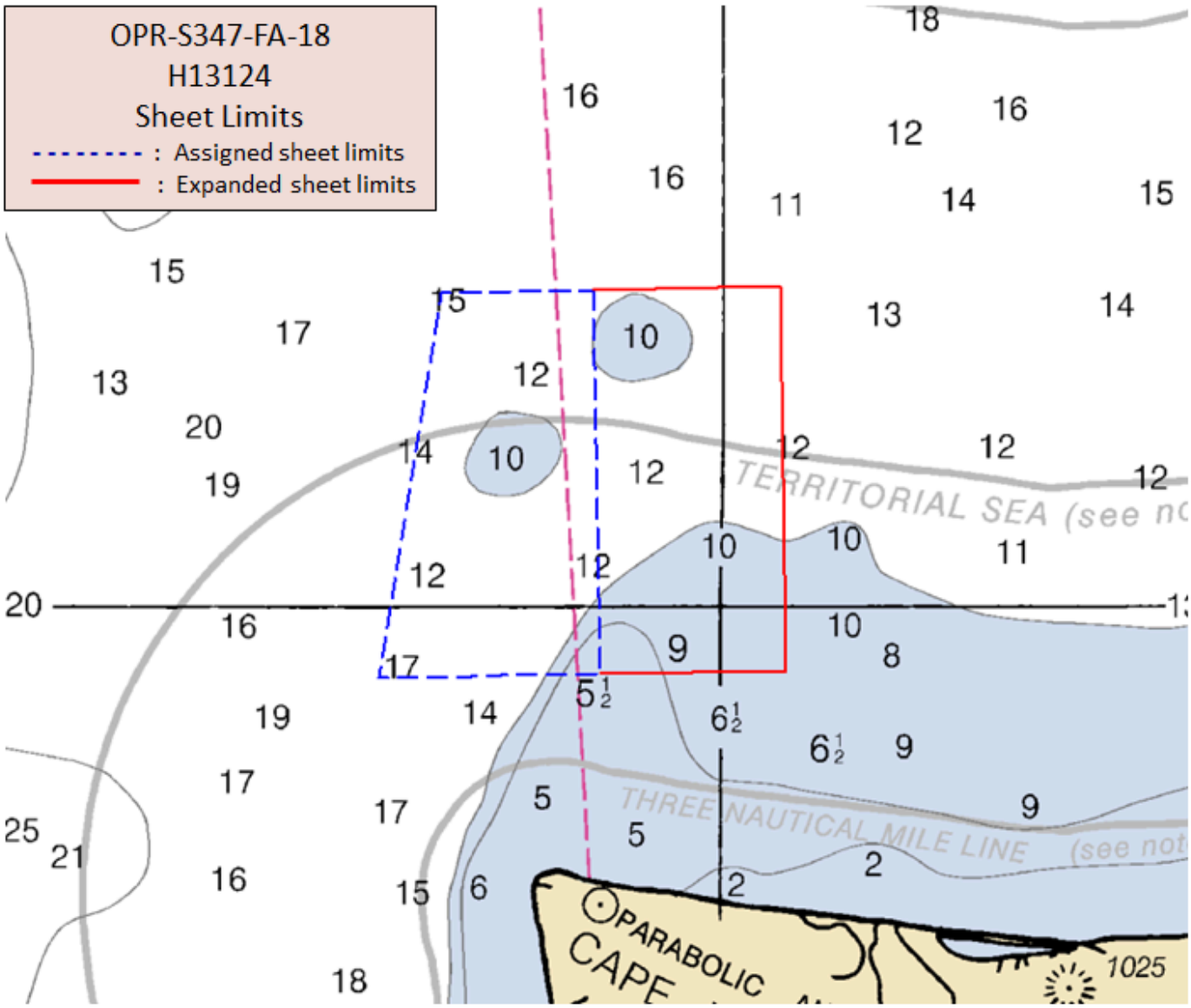


Figure 1: Expanded sheet limits of H13124 overlaid into Chart 16005. Original survey limits of H13124 in blue, while added survey area of H13125 in red.

A.2 Survey Purpose

"Tikigaq" is the name of Point Hope in the Inupiaq language, meaning "index finger". True to its name, Point Hope is five square mile point of landhead jutting into the Chukchi Sea. Despite its prominent location and exposure to nearby vessel traffic, much of the area remains unsurveyed. The Point Hope project area has ~30% bottom coverage from 1960's surveys. The remaining 70% is unsurveyed. As the size of vessels transiting through the arctic continues to expand there are increasing risks to maritime safety and the livelihood of the local subsistence based community. This project provides critical data to update National

Ocean Service (NOS) nautical chart products. Additionally, acquired data assists in storm surge and wave modeling for the local community, increasing their coastal resilience.

A.3 Survey Quality

The entire survey is adequate to supersede previous data.

Data acquired in H13124 meet multibeam echo sounder (MBES) coverage requirements for set line spacing, as required by the HSSD. This includes crosslines (see Section B.2.1), NOAA allowable uncertainty (see Section B.2.9), and density requirements (see Section B.2.10).

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	Set line spacing MBES at 400 m

Table 2: Survey Coverage

Data acquired in H13124 meet multibeam echosounder (MBES) coverage requirements for set line spacing. Following the first two days of acquisition on OPR-S347-FA-18, the standard spacing between lines was requested and granted by HSD OPS to be increased from 200 m to 400 m, as this increased line spacing was deemed adequate to characterize the general bathymetric trends within the project area. The modification request can be found in Appendix II of this report. See Figure 2 for an overview of coverage.

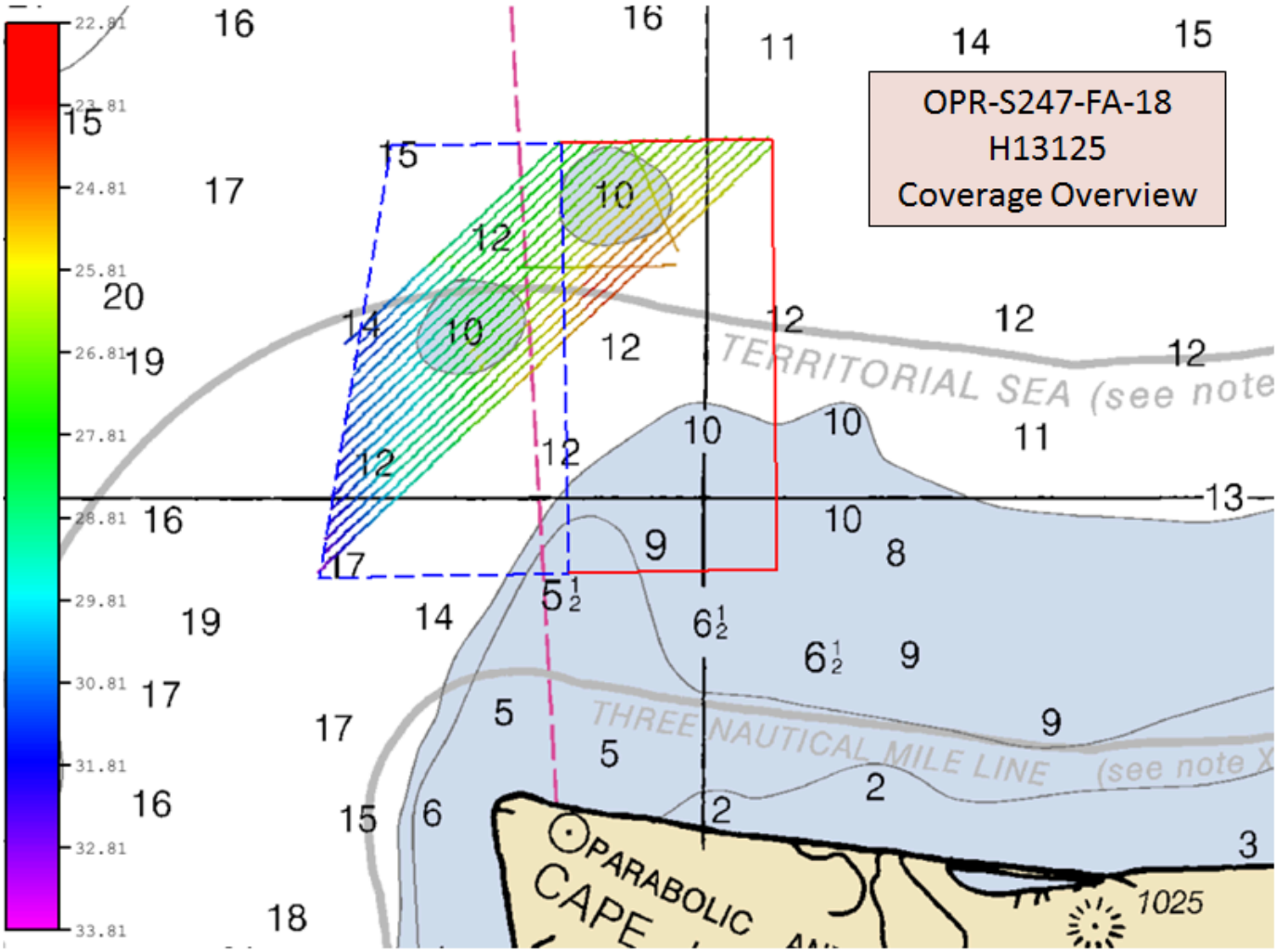


Figure 2: Survey Coverage of H13124

The Survey Coverage Discussion mentions the first two days of Project OPR-S347-FA-18, not the first two days of Survey H13124. Multiple surveys are encompassed in this paragraph.

A.6 Survey Statistics

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

	HULL ID	*S220*	*2806*	*Total*
LNM	**SBES Mainscheme**	0	0	0
	MBES Mainscheme	157.76	24.07	181.83
	Lidar Mainscheme	0	0	0
	SSS Mainscheme	0	0	0
	SBES/SSS Mainscheme	0	0	0
	MBES/SSS Mainscheme	0	0	0
	SBES/MBES Crosslines	0	6.62	6.62
	Lidar Crosslines	0	0	0
Number of Bottom Samples				0
Number Maritime Boundary Points Investigated				0
Number of DPs				0
Number of Items Investigated by Dive Ops				0
Total SNM				37.87

Table 3: Hydrographic Survey Statistics

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

Survey Dates	Day of the Year
08/14/2018	226
08/15/2018	227

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***	***2806***
LOA	70.4 meters	8.6 meters
Draft	4.8 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
Applanix	POS MV 320 v5	Positioning and Attitude System
Teledyne RESON	SVP 71	Sound Speed System
AML Oceanographic	MVP200	Conductivity, Temperature, and Depth Sensor
Sea-Bird Scientific	SBE 19plus V2	Conductivity, Temperature, and Depth Sensor
Kongsberg Maritime	EM 710	MBES
Kongsberg Maritime	EM 2040	MBES
Sea-Bird Scientific	SBE 45	Sound Speed System
Reson	SVP 70	Sound Speed System

Table 6: Major Systems Used

The equipment was installed on the survey platforms as follows: All MBES survey vessels are equipped with POS MV v5 systems for positioning and attitude. S220 utilizes the Kongsberg EM 710 MBES, Sea-Bird Scientific SBE 45 TSG for continuous determination of surface sound speed, and AML Oceanographic MVP 200 for conductivity, temperature, and depth (CTD) casts. All launches utilize Kongsberg EM 2040 MBES, Teledyne RESON SVP 71 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 3.64% of mainscheme acquisition.

Crosslines were collected, processed and compared in accordance with Section 5.2.4.2 of the HSSD. Due to time constraints, the required 8% of the mainscheme mileage was not able to be collected as crosslines. The crosslines collected allow for a comparison between both vessels utilized during acquisition on this project, and provide confidence that no biases exceeding the TVU exist within the data.

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 -0.01 m, with 95% of nodes falling within +/- 0.10 m. (Figure 4). For the respective depths, the difference surface was compared to the allowable NOAA uncertainty standards. In total, 99.5% of the depth differences between H13124 mainscheme and crossline data were within allowable NOAA uncertainties.

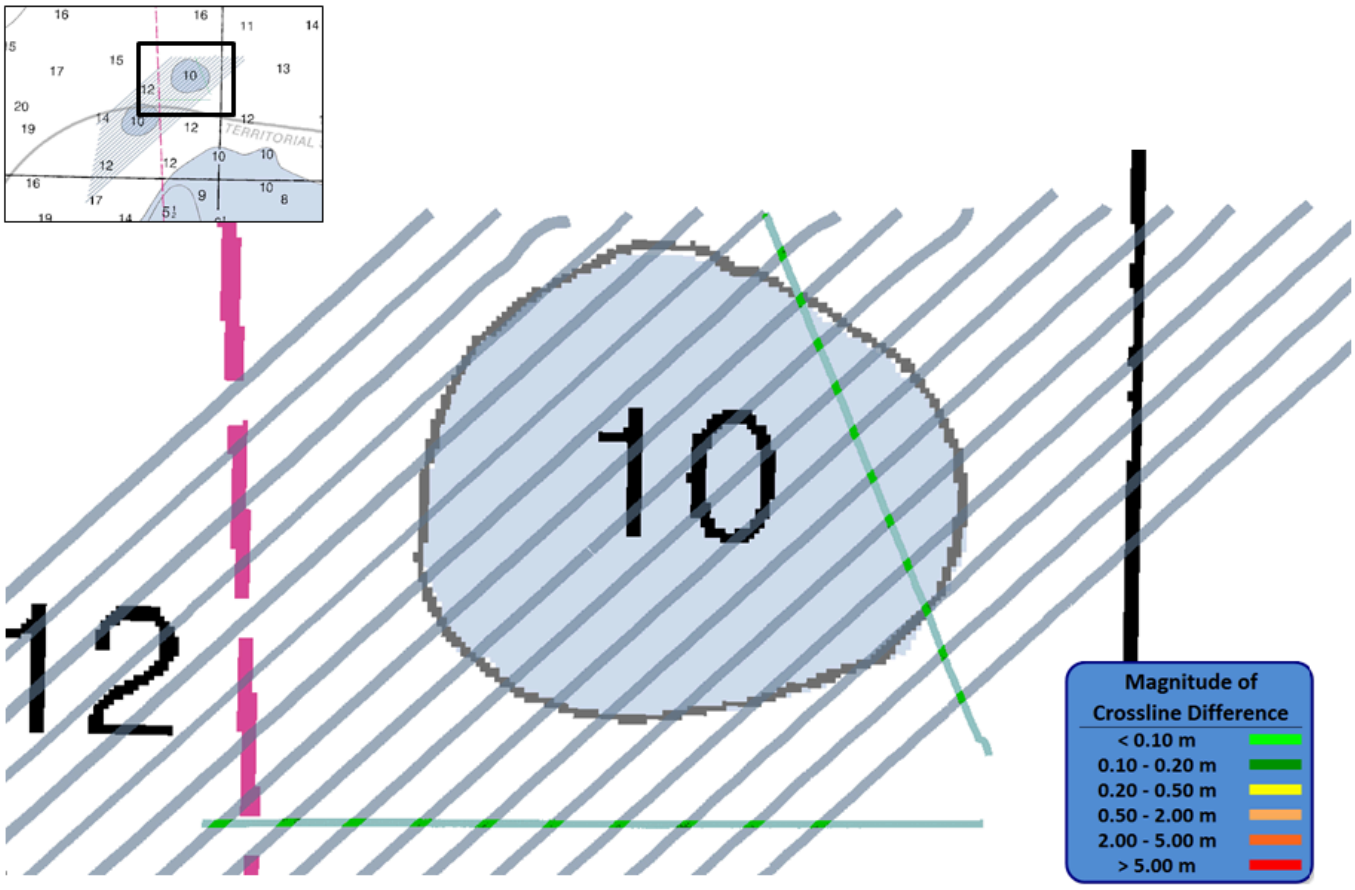
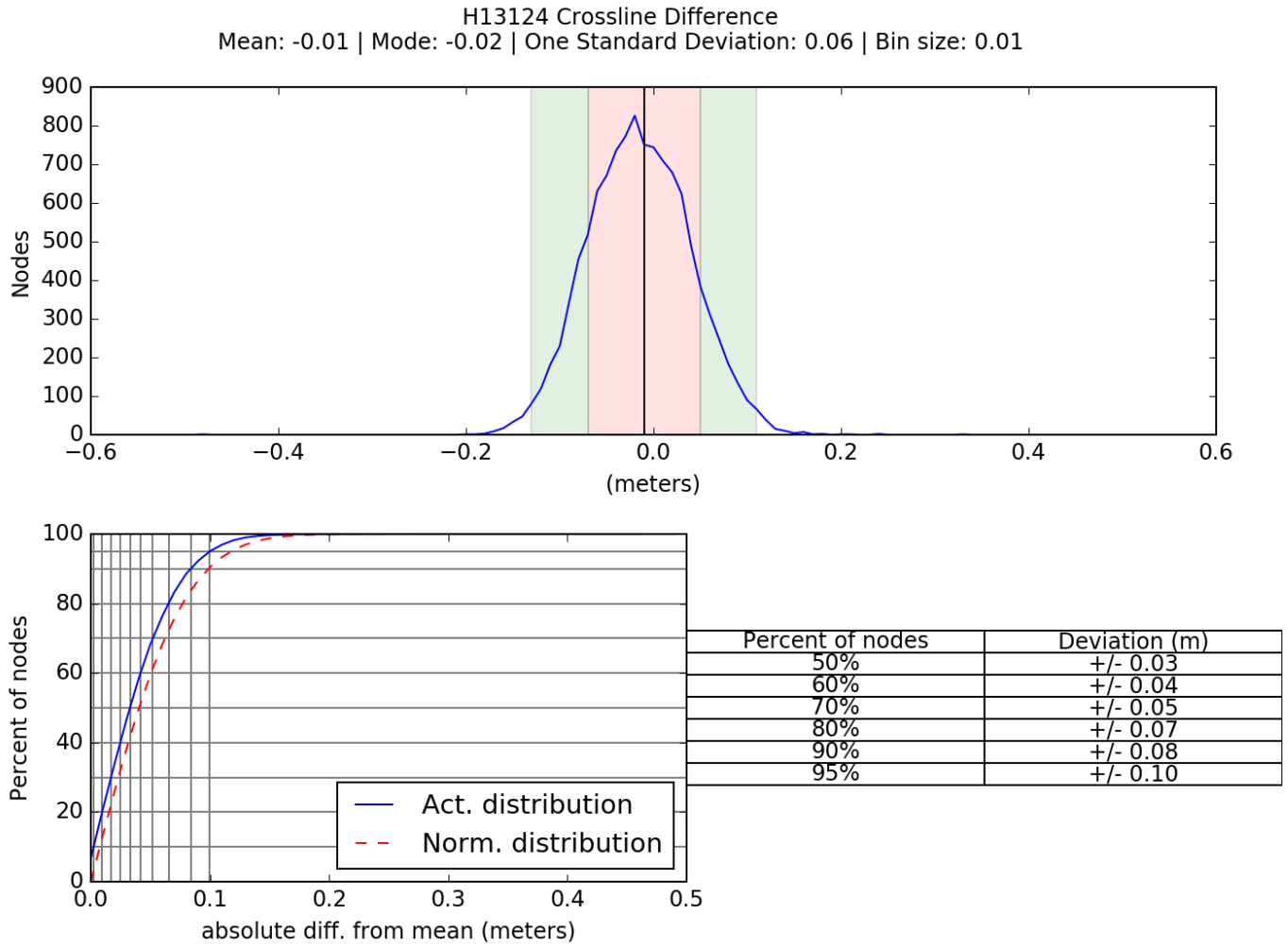


Figure 3: Overview of H13124 crosslines.



Percent of nodes	Deviation (m)
50%	+/- 0.03
60%	+/- 0.04
70%	+/- 0.05
80%	+/- 0.07
90%	+/- 0.08
95%	+/- 0.10

Figure 4: H13124 Crossline Difference

B.2.2 Uncertainty

The following survey specific parameters were used for this survey:

Method	Measured	Zoning
ERS via ERTDM	0.0 meters	0.090 meters

Table 7: Survey Specific Tide TPU Values.

Hull ID	Measured - CTD	Measured - MVP	Surface
2806	2 meters/second	N/A meters/second	0.5 meters/second
S220	N/A meters/second	1.0 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 Not So Poor Man's VDatum (NSPMVD), real-time and post-processed uncertainty sources were also incorporated into the depth estimates of survey H13124. 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 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 the 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 (1,000m). 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
$\sigma^2_{(PMVDsep-ERZTsep)}$	0.11 m
TCARI 1σ uncertainty	0.15 m
SEP grid size	1000 m
Survey area	129,890,131.80 m²
Linear distance of survey	348,999.20 m
$\sigma_{NSPMVDsep}$	0.061 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: H13124 NSPMVD TPU determination

B.2.3 Junctions

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

Data artifacts caused by rough sea state

Acquisition of data occurred during rough sea state conditions, resulting in the appearance of motion artifacts in the computed surfaces (Figure 6). These artifacts were inspected by the hydrographer to ensure that they do not exceed the TVU for the respective depths.

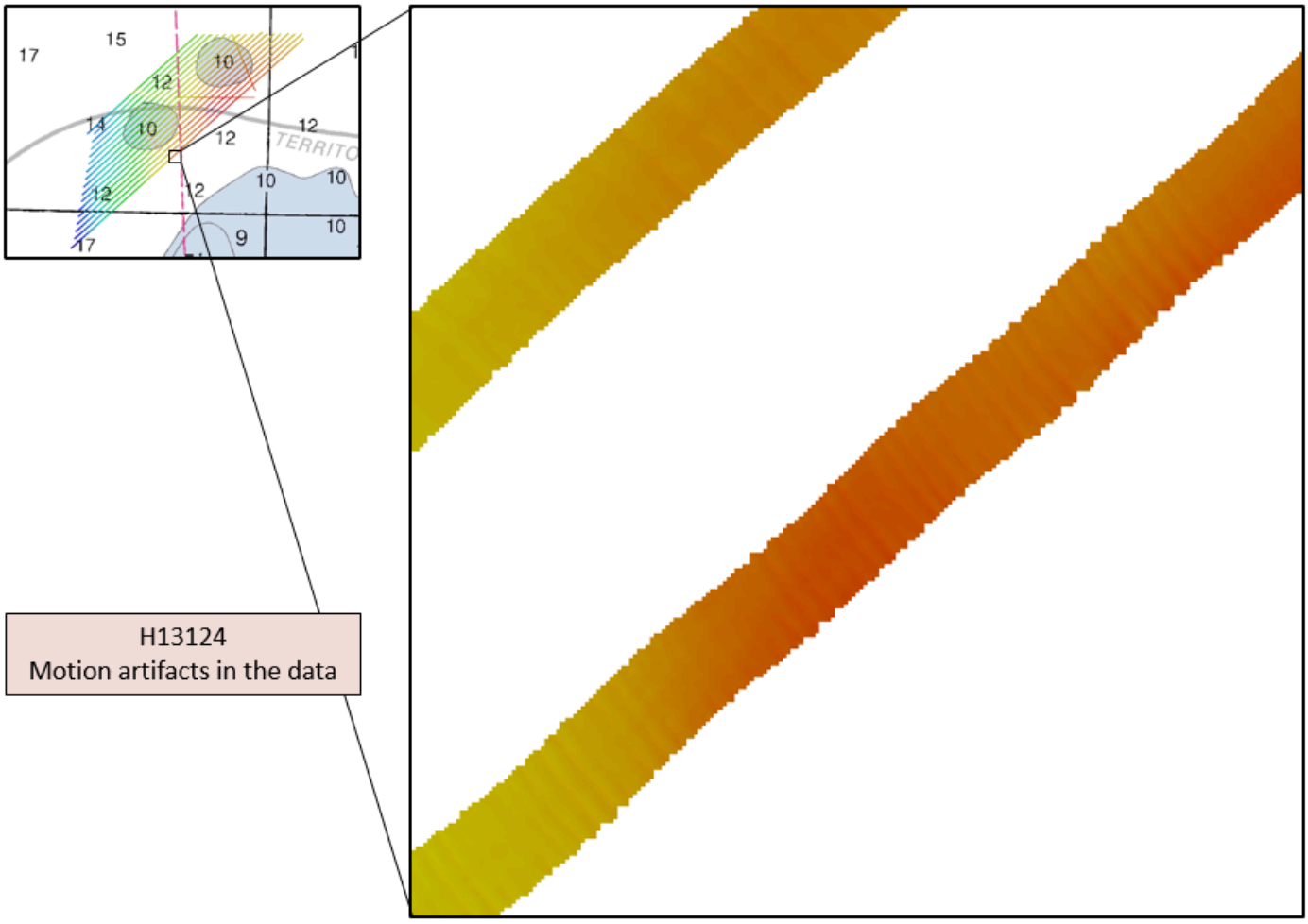


Figure 6: H13124 Motion Artifacts

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 2 hours, guided by observation of the sound speed and targeted to deeper areas. All sound speed methods were used as detailed in the DAPR.

During acquisition, both Teledyne RESON SVP 70 surface sound speed sensors on S220 failed in operation. To account for loss of surface sound speed input, a script was written to incorporate the data from the TSG intake to be sent to SIS as surface sound speed data input. The TSG data were compared to the real time data collected by the MVP while in the docked position at the approximate depth of the TSG to ensure that the surface sound speed was consistently modeled correctly.

B.2.8 Coverage Equipment and Methods

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

B.2.9 NOAA Allowable Uncertainty

The surface was analyzed using the Pydro QC Tools Grid QA feature to determine compliance with specifications. Overall more than 99.99% of nodes meet NOAA allowable uncertainty specifications for H13124, as shown in Figure 7.

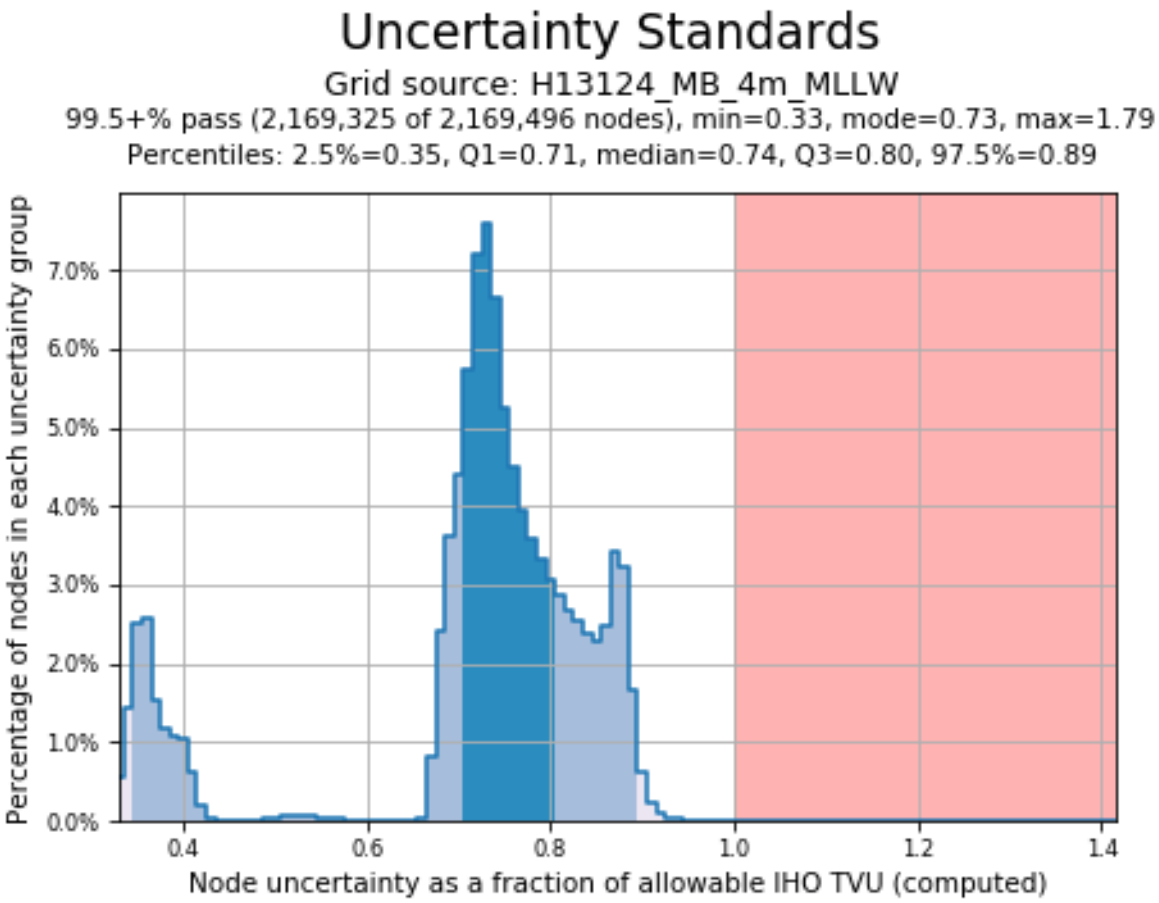


Figure 7: NOAA Allowable uncertainty statistics for H13124

B.2.10 Density

The surface was analyzed using the Pydro QC Tools Grid QA feature. Density requirements for H13124 were achieved with at least 99.60% of surface nodes containing five or more soundings as required by HSSD section 5.2.2.4, as shown in Figure 8.

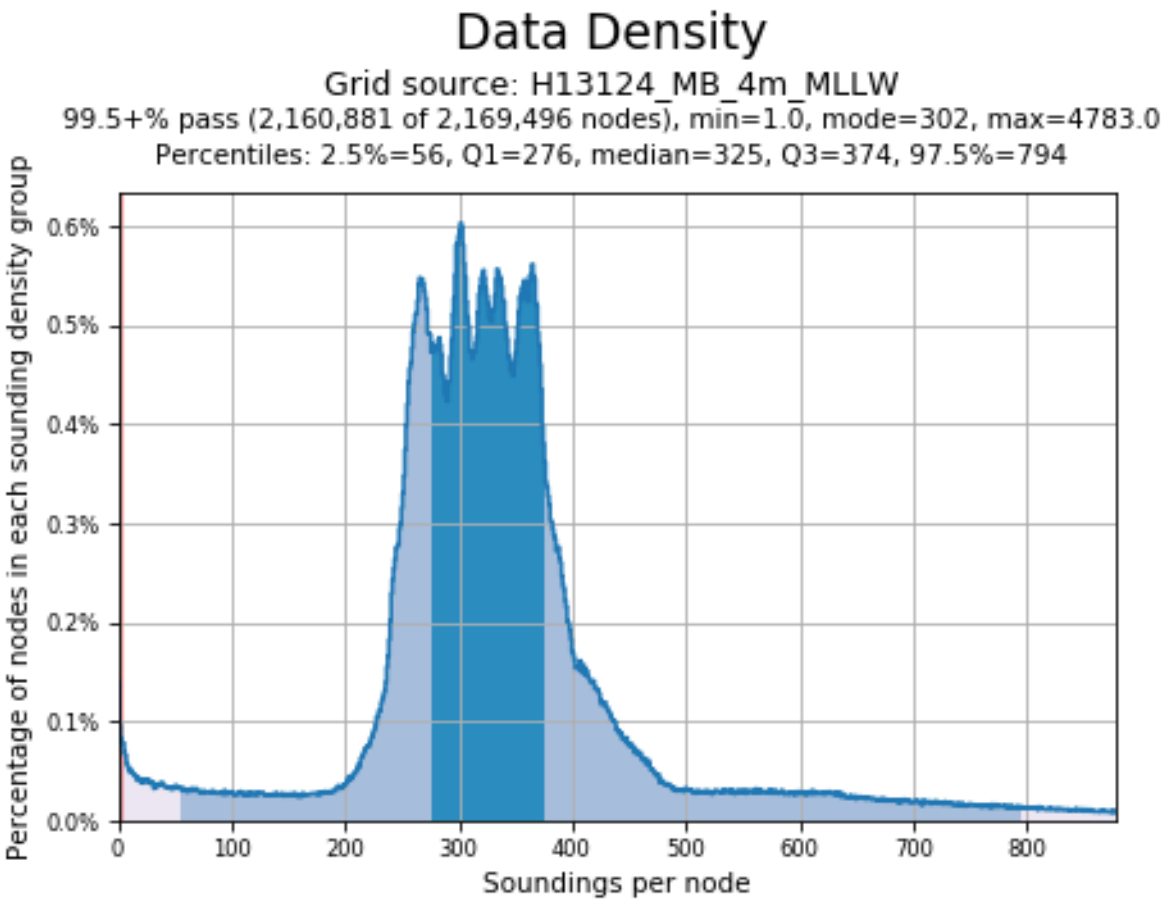


Figure 8: Density statistics for H13124

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 were stored in the .all file for Kongsberg systems. All backscatter were processed by the field unit via Fledermaus FMGT 7.8.5. All processed floating point mosaics and .gsf files have been submitted to the Pacific Hydrographic Branch. See Figure 9 for a complete mosaic.

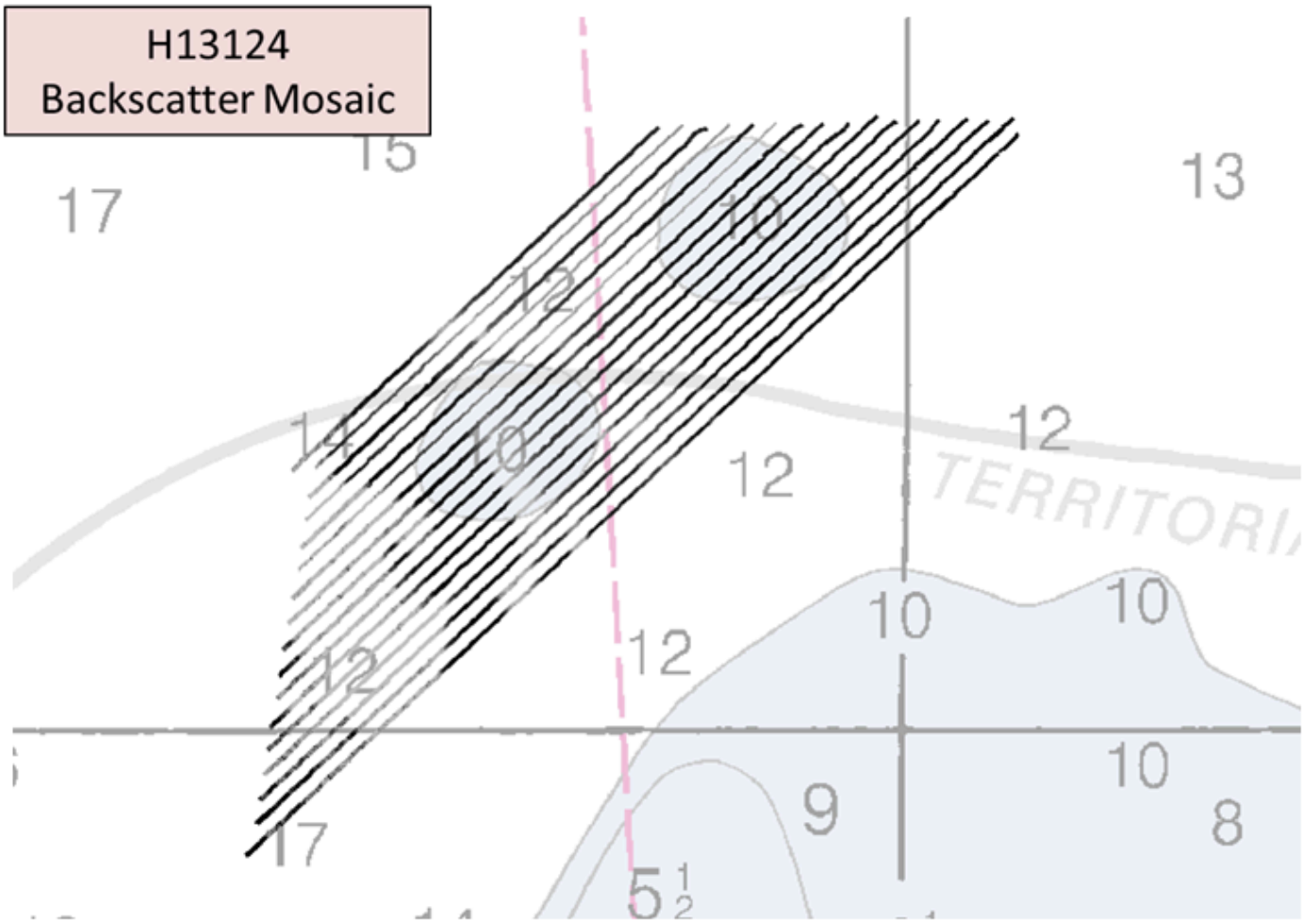


Figure 9: Complete backscatter mosaic overlaid on Chart 16005.

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	10.4.3

Table 9: 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 10: Primary imagery data processing software

The following Feature Object Catalog was used: NOAA Extended Attribute Files 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
H13124_MB_MLLW_4m	CARIS Raster Surface (CUBE)	4 meters	23.8 meters - 33.8 meters	NOAA_4m	Set Line Spacing
H13124_MB_MLLW_4m_Final	CARIS Raster Surface (CUBE)	4 meters	23.8 meters - 33.8 meters	NOAA_4m	Set Line Spacing

Table 11: Submitted Surfaces

The NOAA CUBE parameters defined in the HSSD were used for the creation of all CUBE surfaces for H13124. 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 assisted the search for spurious soundings following gross cleaning. Flier Finder was run iteratively until no flagged fliers remained.

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 H13124 Data Log spreadsheet. All data logs were submitted digitally in the Separates I folder.

C. Vertical and Horizontal Control

Per Section 5.1.2.3 of the 2014 Field Procedures Manual, no Horizontal and Vertical Control Report has been generated for H13124.

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 12: NWLON Tide Stations

File Name	Status
9491094.tid	Final Approved

Table 13: Water Level Files (.tid)

File Name	Status
S347FA2018_WLs.tc	Final

Table 14: Tide Correctors (.zdf or .tc)

A request for final approved tides was sent to N/OPS1 on 08/16/2018. The final tide note was received on 08/27/2018.

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. Following the successful application of SBETs, ERS methods were used to reduce all data to MLLW.

ERS Datum Transformation

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

Method	Ellipsoid to Chart Datum Separation File
ERS via ERTDM	OPR-S347-FA-18-PointHope_NSPMVD_NAD83-MLLW_Revised

Table 15: ERS method and SEP file

ERS methods were used as the final means of reducing H13124 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. The NSPMVD separation model was then used to reduce all data to MLLW.

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 3.

WAAS

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 H13124 POSPac Processing Logs spreadsheet located in Separates I folder. During real-time acquisition, S220 and launch 2806 received correctors from the Wide Area Augmentation System (WAAS) for increased accuracies similar to USCG DGPS stations. WAAS and SBETs were the sole methods of positioning for H13124, 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 H13124 and ENCs US5AK9ZM and US5AK92M. The hydrographer first generated a sounding layer from the H13124 4m surface. This layer was then transposed over the existing charts to assess all differences between charted depths and contours from the surveyed soundings.

The word "transposed" is not the correct word. The word should be "superimposed."

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?
US2AK92M	1:700000	14	01/03/2018	01/03/2018	NO
US5AK9ZM	1:50000	30	02/14/2017	02/14/2017	NO

Table 16: Largest Scale ENCs

US2AK92M

The smallest scale ENC, US2AK92M, had very few soundings and required a detailed visual evaluation. Significant depth discrepancies exist near the five charted soundings in the survey area. Each chart sounding was shoaler than the surveyed depth, as shown in Figure 9. Therefore, the existing US2AK92M contours do not define the 10 fathom contour. The hydrographer deems the acquired data is adequate to supersede the previous data.

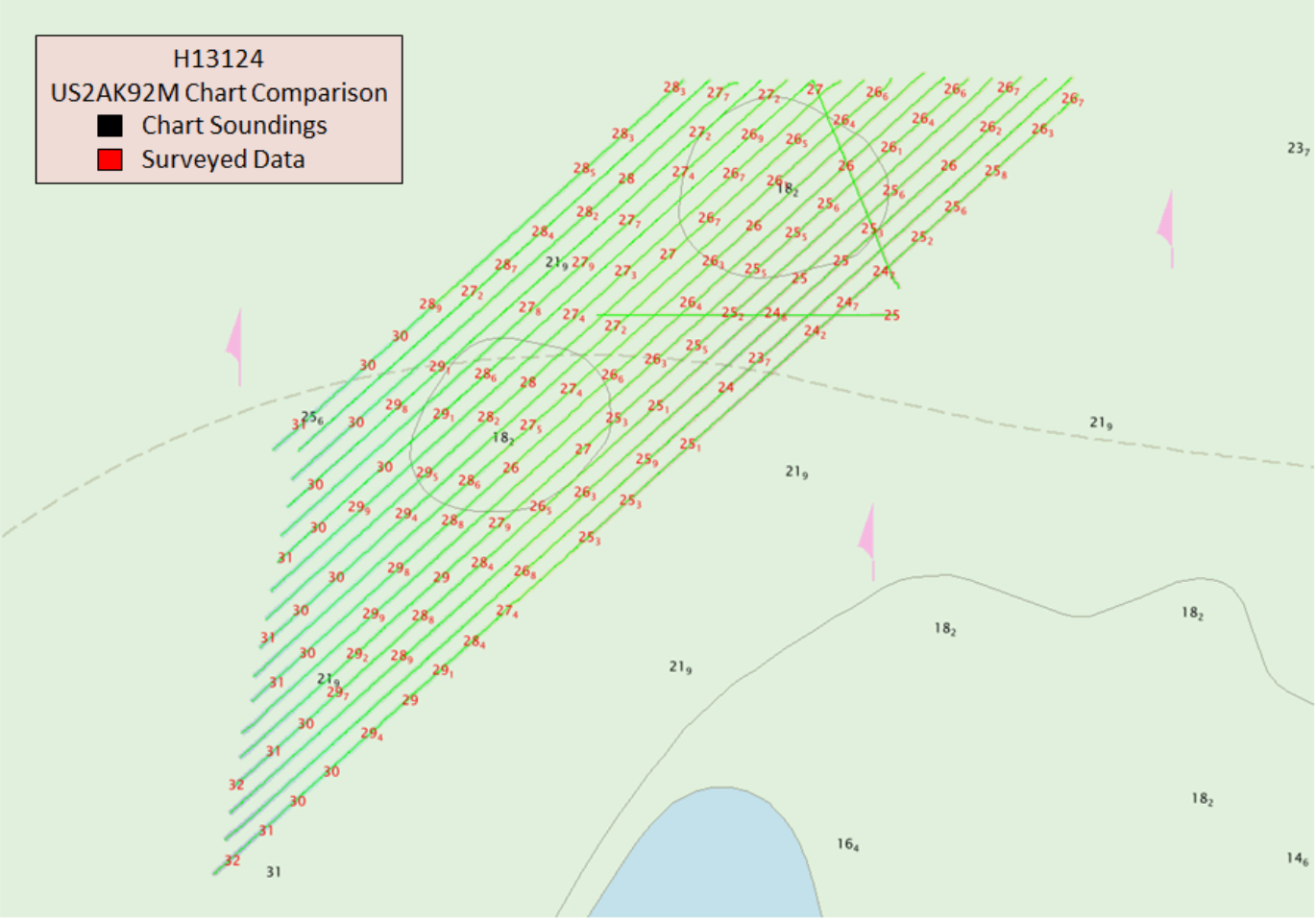


Figure 10: US2AK92M Visual Inspection

US5AK9ZM

On the largest scale ENC charts US5AK9ZM, there were few charted soundings. Due to the scarcity of charted data, a detailed visual evaluation was conducted and little difference was found between the charted soundings and the surveyed depths. The hydrographer deems that the acquired survey data is adequate to supersede the previous data.

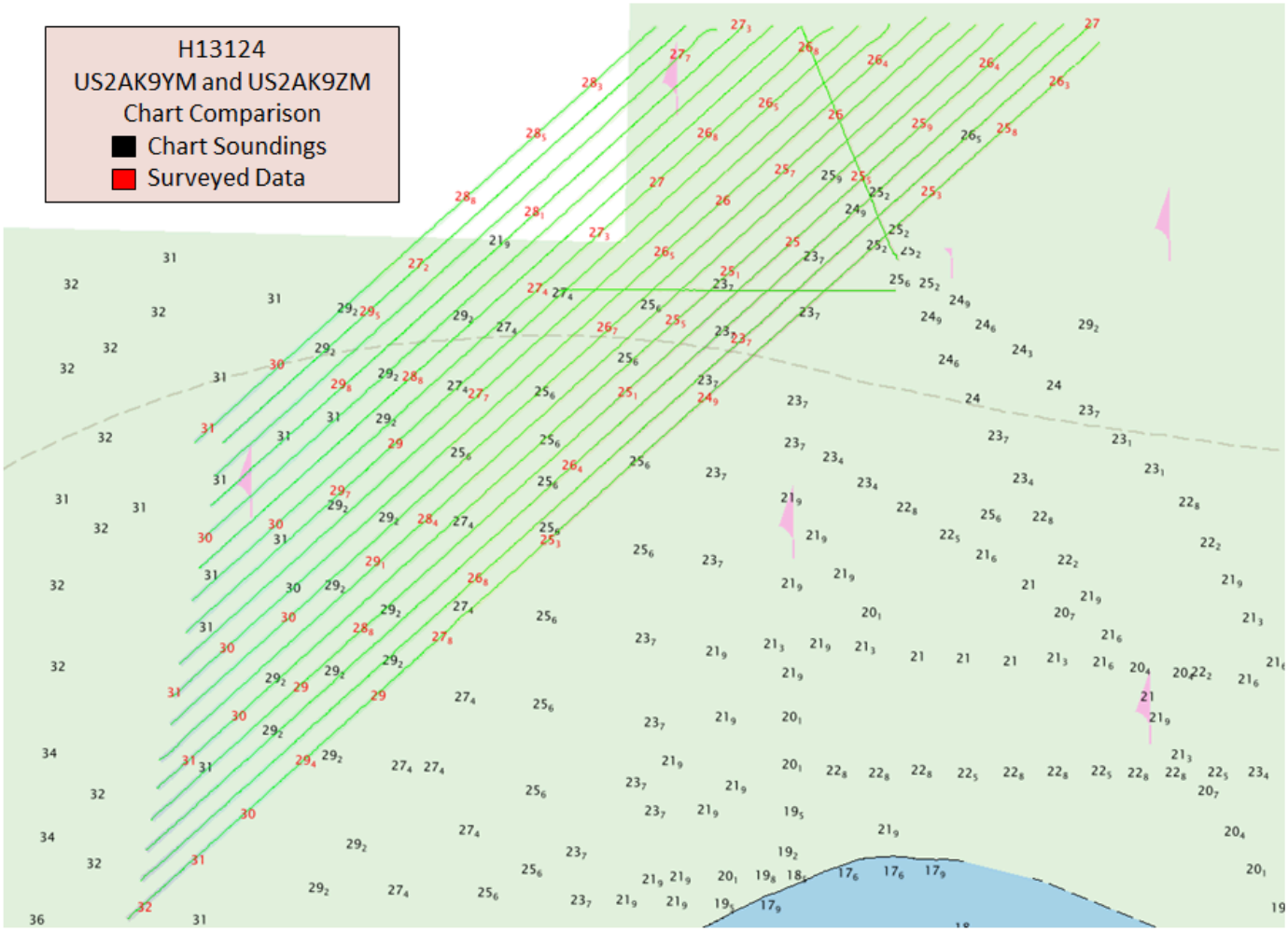


Figure 11: US2AK9YM and US1AK9ZM chart comparison

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

Bottom samples were assigned for this survey, but were not acquired due to time constraints.

D.2 Additional Results

D.2.1 Shoreline

Shoreline was assigned in the Hydrographic Survey Project Instructions, however no assigned features exist for this survey.

D.2.2 Aids to Navigation

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

D.2.3 Overhead Features

No overhead features exist for this survey.

D.2.4 Submarine Features

No submarine features exist for this survey.

D.2.5 Platforms

No platforms exist for this survey.

D.2.6 Ferry Routes and Terminals

No ferry routes or terminals exist for this survey.

D.2.7 Abnormal Seafloor and/or Environmental Conditions

No abnormal seafloor and/or environmental conditions exist for this survey.

D.2.8 Construction and Dredging

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

D.2.9 New Survey Recommendation

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

D.2.10 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, NOAA	Chief of Party	02/14/2019	MOSER.MARC.STANTON.1163193902 Digitally signed by MOSER.MARC.STANTON.1163193902 Date: 2019.02.14 10:06:56 -08'00'
Sam Candio	Chief Survey Technician	02/14/2019	
ENS Linda Junge, NOAA	Sheet Manager	02/14/2019	Digitally signed by JUNGE.LINDA.J.1534349544 Date: 2019.02.14 09:41:34 -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

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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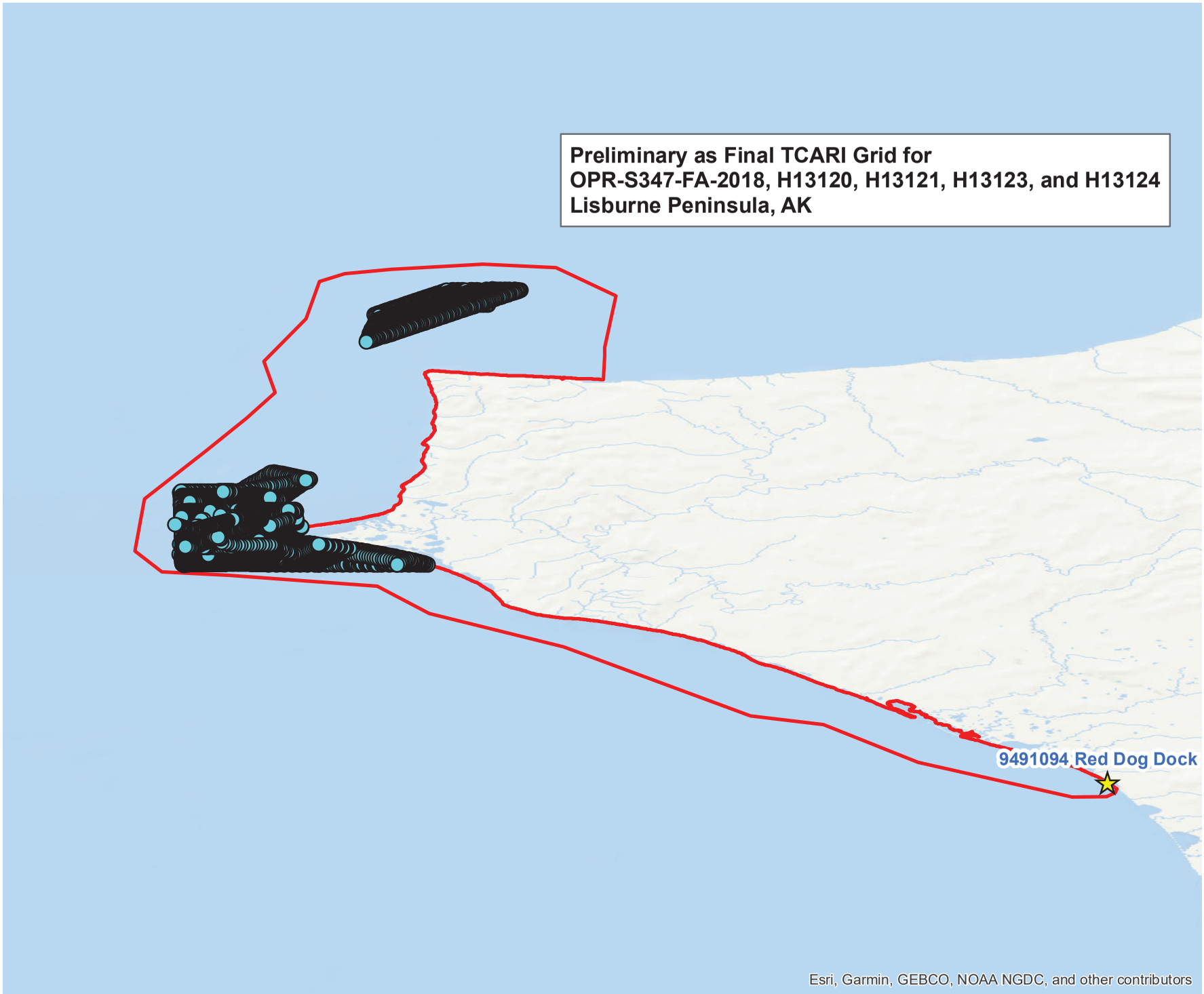
Date: 2018.08.29 15:57:38 -04'00'

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*

MOSER.MARC.STANTON.1163193902
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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

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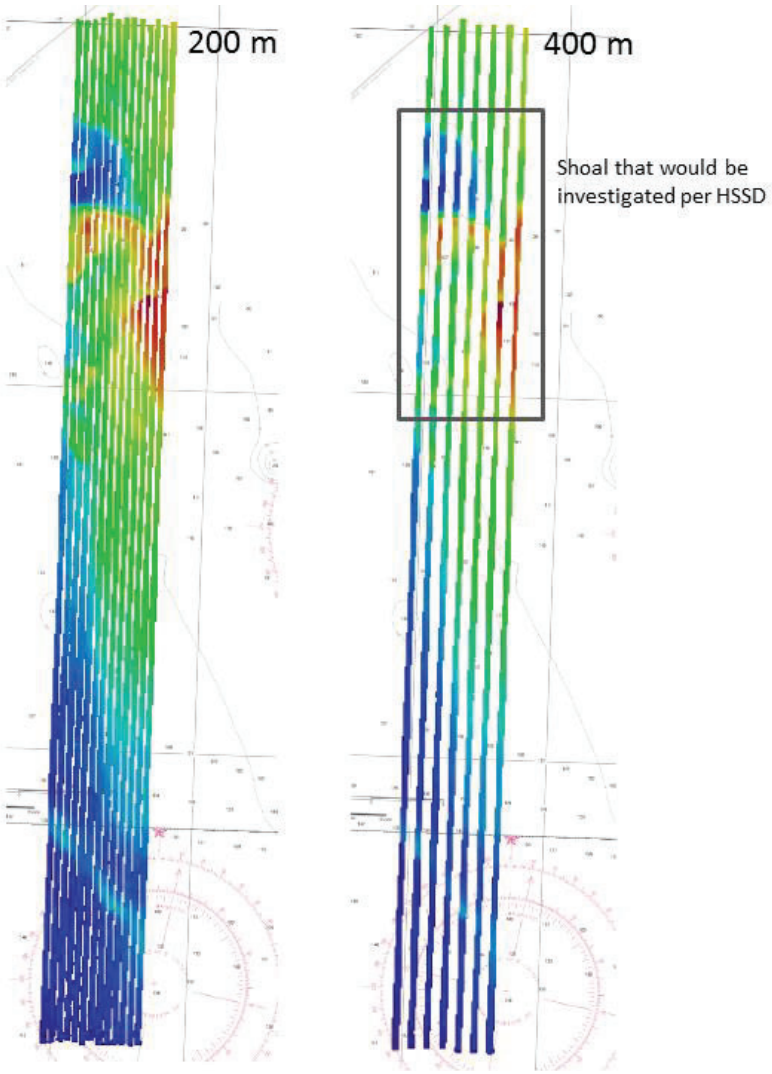
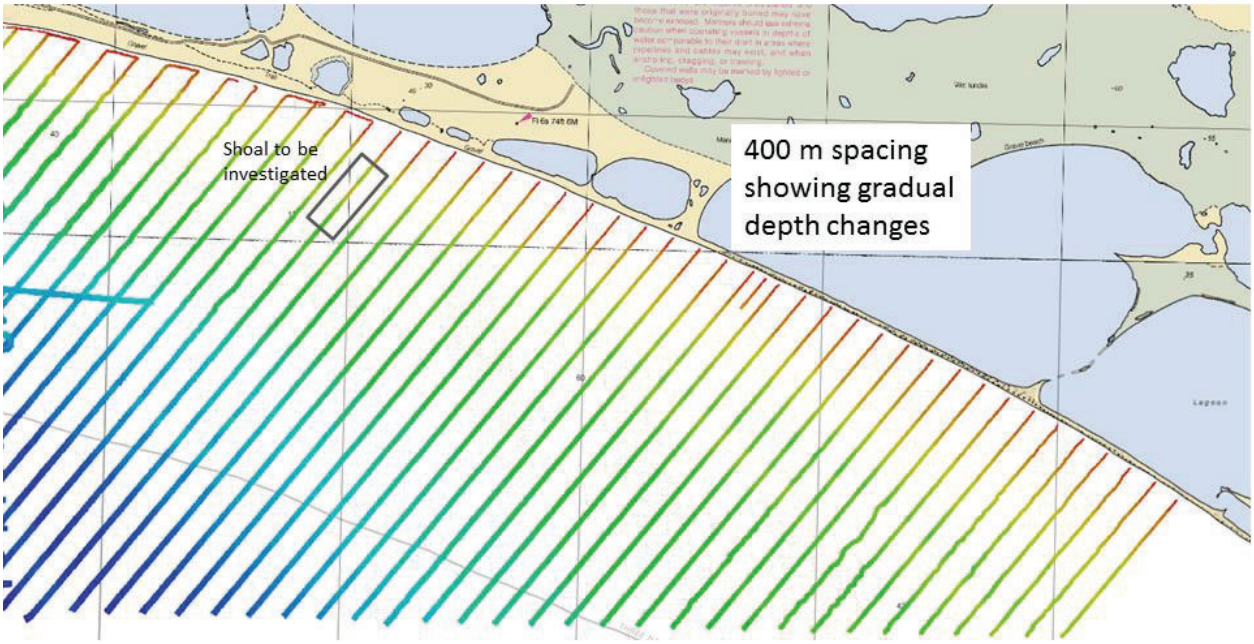
Waiver is: Granted _____ Denied _____

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

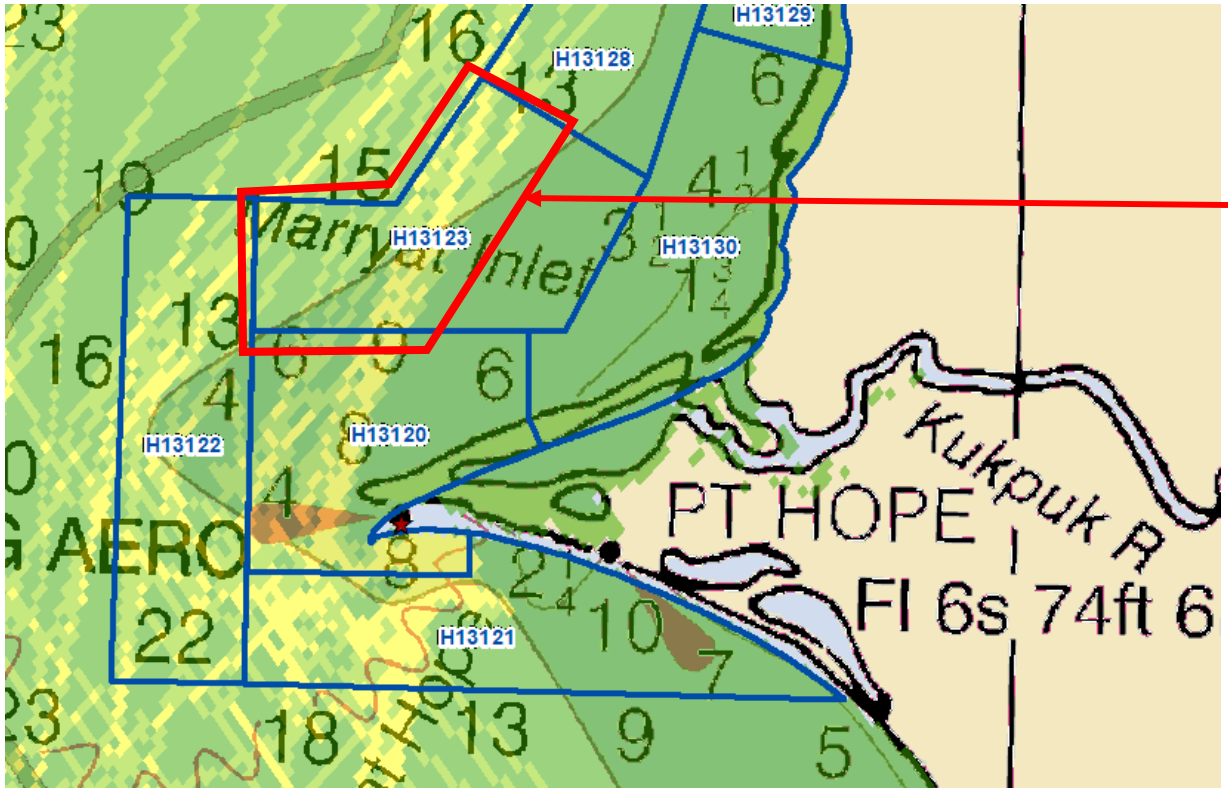
H13122



H13121

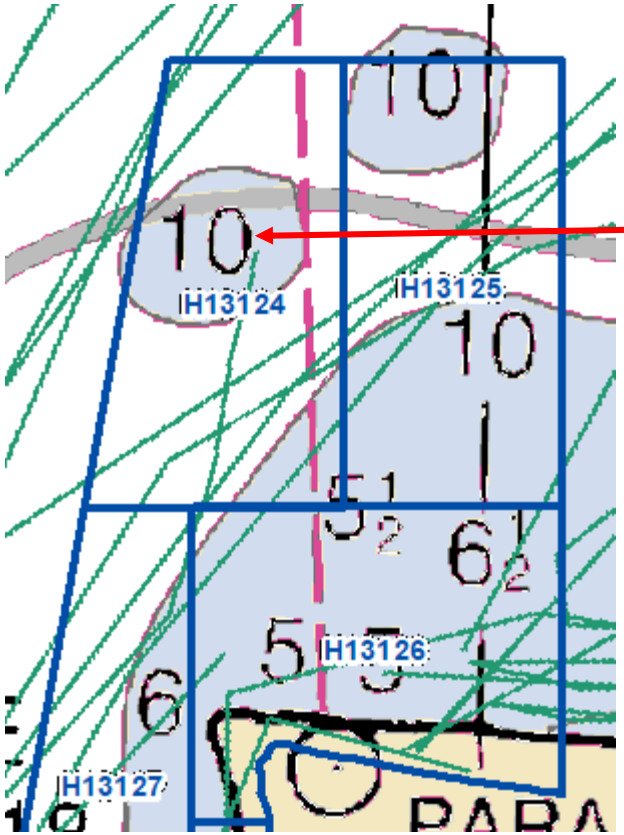


August 7-8, 2018, Re-Prioritization Discussion
OPR-S347-FA-18



This approximate area of H13123 would be good to get <u>if FA has time</u> before heading up to the north end for Sheet H13124 and buoy.

August 7-8, 2018, Re-Prioritization Discussion
OPR-S347-FA-18



It would be good to complete H13124 before departure.

APPROVAL PAGE

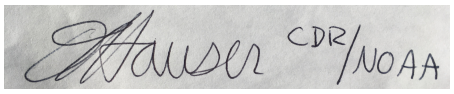
H13124

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