

H13151

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

DESCRIPTIVE REPORT

Type of Survey: Navigable Area

Registry Number: H13151

LOCALITY

State(s): California

General Locality: Offshore South-Central California

Sub-locality: Offshore Estero Bay to Offshore Cape San Martin

2018

CHIEF OF PARTY
Benjamin K. Evans, CDR/NOAA

LIBRARY & ARCHIVES

Date:

U.S. DEPARTMENT OF COMMERCE NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION		REGISTRY NUMBER:
HYDROGRAPHIC TITLE SHEET		H13151
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):	California	
General Locality:	Offshore South-Central California	
Sub-Locality:	Offshore Estero Bay to Offshore Cape San Martin	
Scale:	80000	
Dates of Survey:	08/29/2018 to 10/28/2018	
Instructions Dated:	08/23/2018	
Project Number:	OPR-L373-RA-18	
Field Unit:	NOAA Ship <i>Rainier</i>	
Chief of Party:	Benjamin K. Evans, CDR/NOAA	
Soundings by:	Multibeam Echo Sounder	
Imagery by:	Multibeam Echo Sounder Backscatter	
Verification by:	Pacific Hydrographic Branch	
Soundings Acquired in:	meters at Mean Lower Low Water	
Remarks: <i>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/.</i>		

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Descriptive Report to Accompany Survey H13151

Project: OPR-L373-RA-18

Locality: Offshore South-Central California

Sublocality: Offshore Estero Bay to Offshore Cape San Martin

Scale: 1:80000

August 2018 - October 2018

NOAA Ship *Rainier*

Chief of Party: Benjamin K. Evans, CDR/NOAA

A. Area Surveyed

The survey area is referred to as H13151, "Offshore Estero Bay to Offshore Cape San Martin (Sheet 1)". This area is outlined in the project instructions and encompasses approximately 865 square nautical miles.

A.1 Survey Limits

Data were acquired within the following survey limits:

Northwest Limit	Southeast Limit
35° 35' 32.5" N 121° 58' 54.29" W	35° 14' 57.92" N 121° 11' 39.09" W

Table 1: Survey Limits

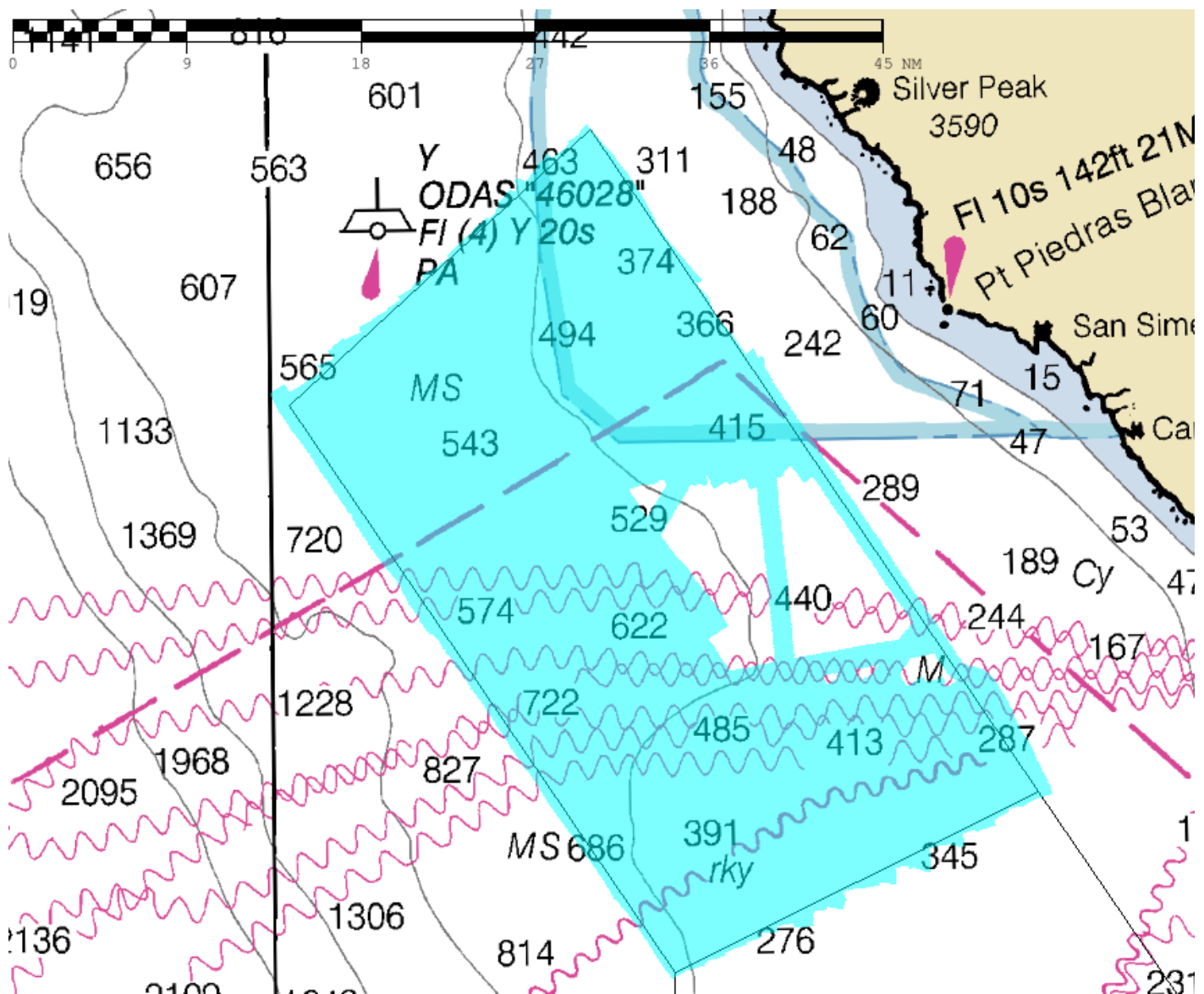


Figure 1: H13151 assigned survey area and survey coverage (Chart 18020)

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

A.2 Survey Purpose

This survey is a part of the California Deepwater Investigation and Groundtruthing (CalDIG) project, which is a collaboration between NOAA's Office of Coast Survey (OCS), the Coastal and Marine Geology Program (CMGP) of the USGS, and the Environmental Studies Program of the Bureau of Ocean Energy Management (BOEM). The primary purpose of the CalDIG project is to collect data for surficial geology, benthic habitats, sub-bottom faults, geologic hazards, and sedimentary processes. To accomplish this goal,

USGS operated towed seismic survey equipment from RAINIER, while RAINIER personnel simultaneously acquired multibeam bathymetry, backscatter, and watercolumn data. Survey H13151 and the contents of this Descriptive Report refer only to the NOAA-acquired multibeam data; the seismic data acquired simultaneously will be managed and published by USGS. This project also supports the Expanding Pacific Research and Exploration of Submerged Systems (EXPRESS) campaign to explore deepwater areas off the U.S. Pacific Coast.

Data collected throughout this survey will be used to determine the viability of potential lease locations for offshore wind energy production. Additionally, USGS will use the bathymetric and seismic data to investigate a field of potential gas seeps in the northern portion of the survey area.

A.3 Survey Quality

The entire survey is adequate to supersede previous data.

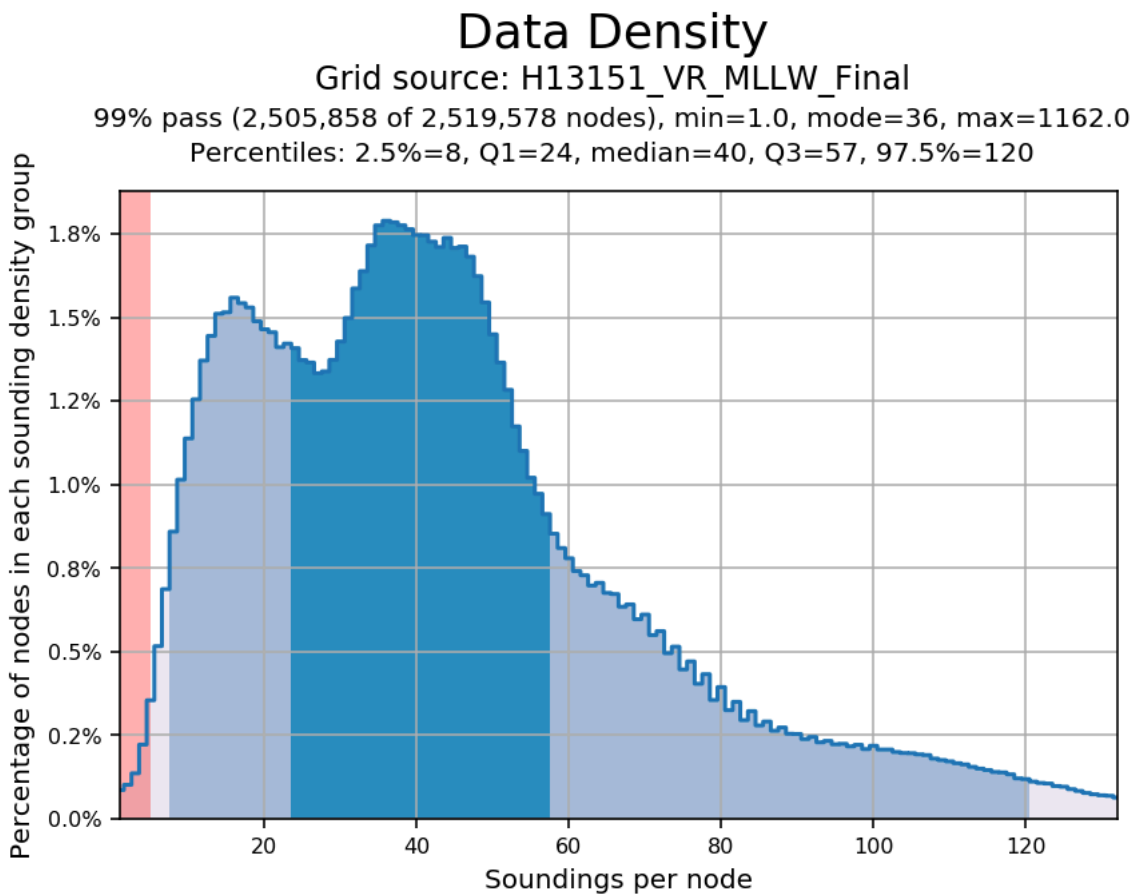


Figure 2: Pydro derived plot showing HSSD density compliance of H13151 finalized variable-resolution MBES data.

A.4 Survey Coverage

The following table lists the coverage requirements for this survey as assigned in the project instructions:

Water Depth	Coverage Required
All waters in survey area	Complete Coverage MBES data, backscatter data and water column data. (refer to HSSD Section 5.2.2.3)
All waters in survey area	The USGS will simultaneously collect high resolution, low energy multichannel seismic (MCS) and CHIRP subbottom data during acquisition requiring a survey speed of 6 knots.

Table 2: Survey Coverage

The USGS and BOEM teams prioritized maximal multibeam coverage and requested to minimize overlap between adjacent lines and omit holiday runs from the cruise. To best balance the goals of NOAA, USGS, and BOEM, the survey team accepted an increased probability of leaving holidays in exchange for multibeam coverage over a larger area. As a result, a waiver was requested from the NOAA Hydrographic Survey Division to dispense the requirement for holiday acquisition. This memo is included in Appendix II.

The Pydro QC Tools Holiday Finder was used and 19 holidays were identified within the H13151 surveyed area. All areas were examined and determined to be small enough in size and sufficiently deep as to effectively rule out the possibility of any hazards to navigation.

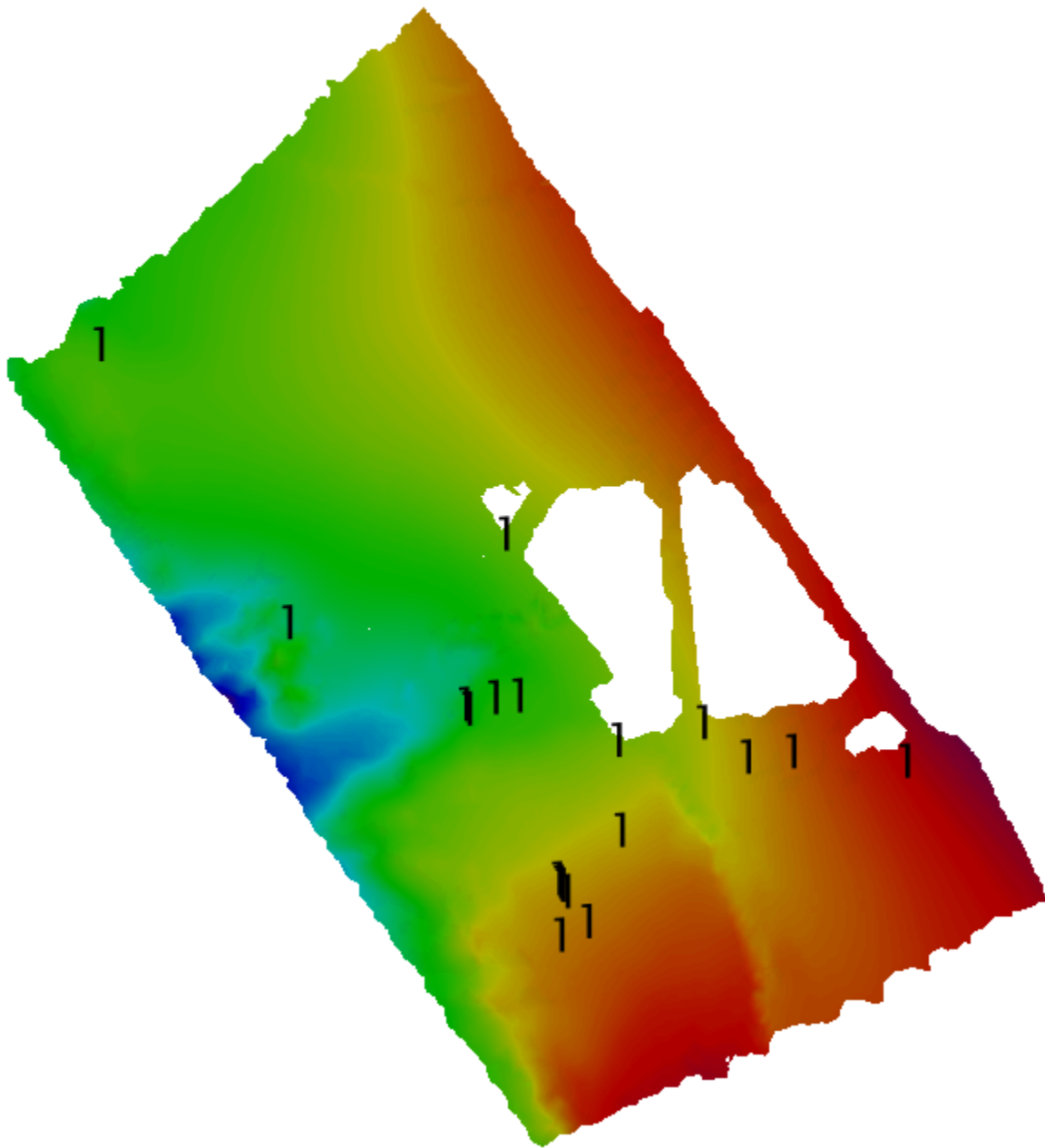


Figure 3: VR Surface showing locations of holidays derived from Pydro.

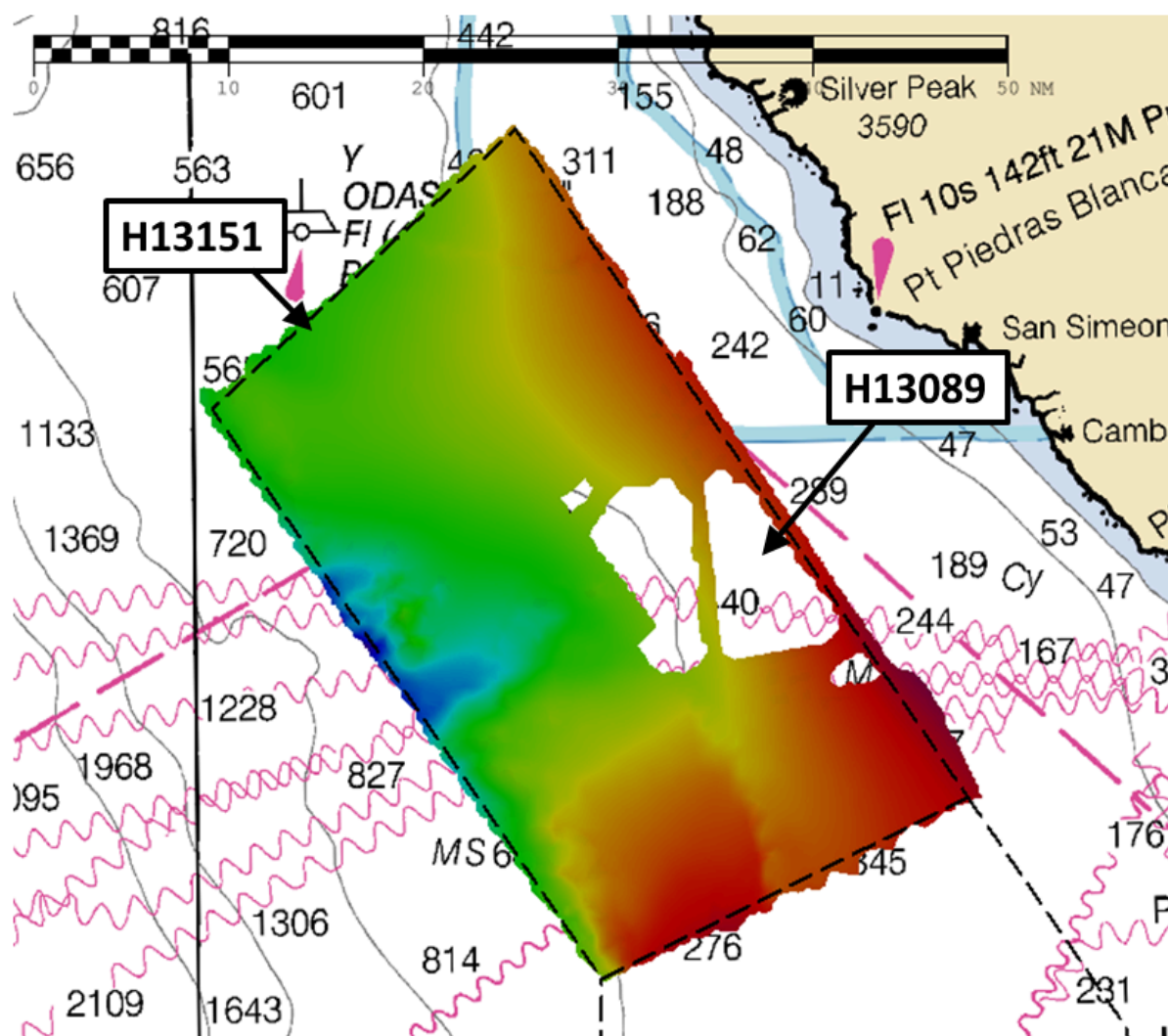


Figure 4: H13151 MBES coverage and assigned survey limits (Chart 18020)

A.5 Survey Statistics

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

	HULL ID	<i>S-221</i>	<i>Total</i>
LNM	SBES Mainscheme	0	0
	MBES Mainscheme	891.7	891.7
	Lidar Mainscheme	0	0
	SSS Mainscheme	0	0
	SBES/SSS Mainscheme	0	0
	MBES/SSS Mainscheme	0	0
	SBES/MBES Crosslines	112.2	112.2
	Lidar Crosslines	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			777.88

Table 3: Hydrographic Survey Statistics

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

Survey Dates	Day of the Year
10/28/2018	301
09/15/2018	258

Survey Dates	Day of the Year
09/14/2018	257
09/13/2018	256
09/06/2018	249
09/05/2018	248
09/04/2018	247
09/03/2018	246
09/02/2018	245
08/31/2018	243
08/30/2018	242
08/29/2018	241

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	<i>S221</i>
LOA	70.4 meters
Draft	4.7 meters

Table 5: Vessels Used



Figure 5: NOAA Ship Rainier in Williams Cove, AK

All data for H13151 were acquired by NOAA Ship Rainier. The vessel acquired depth soundings, backscatter imagery and sound speed profiles.

B.1.2 Equipment

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

Manufacturer	Model	Type
Applanix	POS MV 320 v5	Positioning and Attitude System
Kongsberg Maritime	EM 710	MBES
Teolodyne RESON	SVP 70	Surface Sound Speed System
Lockheed Martin	Sippican Deep Blue	Temperature Sensor

Table 6: Major Systems Used

B.2 Quality Control

Multibeam/single beam echo sounder/side scan sonar crosslines acquired for this survey totaled 12.58% of mainscheme acquisition.

NOAA Ship Rainier acquired 112.15 nautical miles of multibeam crosslines. The Compare Grids function in Pydro Explorer analyzed finalized VR surfaces of H13151 crossline-only data and mainscheme-only data. In the difference surface, 99.5% of nodes were within allowable error limits.

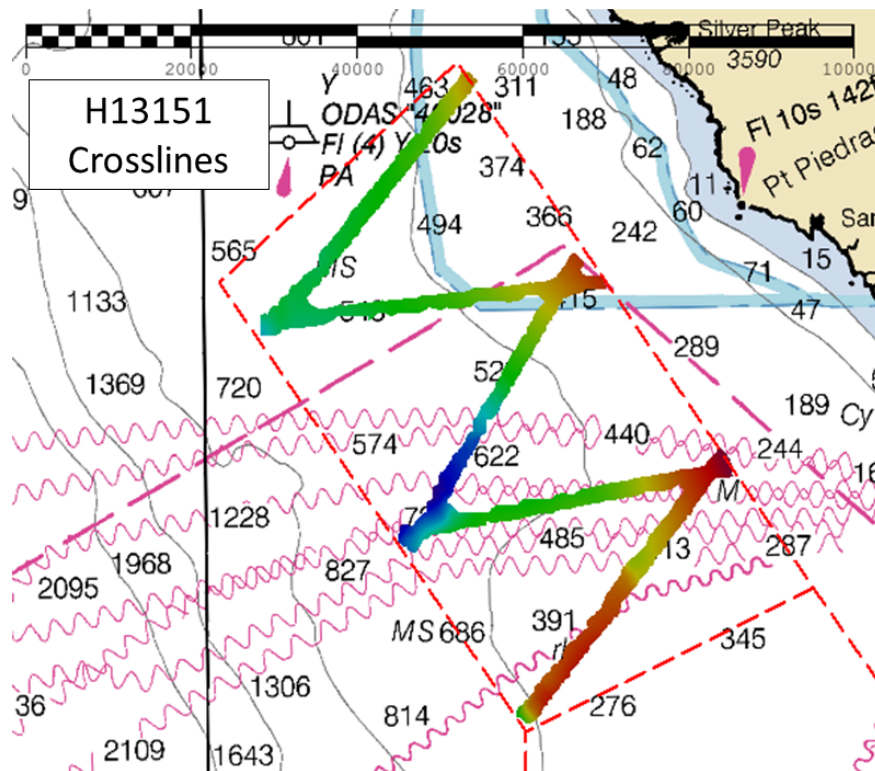


Figure 6: Overview of crosslines on H13151

Comparison Distribution

Per Grid: H13151_MS_diff_XL_VR_fracAllowErr.csar

99.5+% nodes pass (316563), min=0.00, mode=0.01 mean=0.02 max=3.02

Percentiles: 2.5%=0.00, Q1=0.01, median=0.01, Q3=0.03, 97.5%=0.08

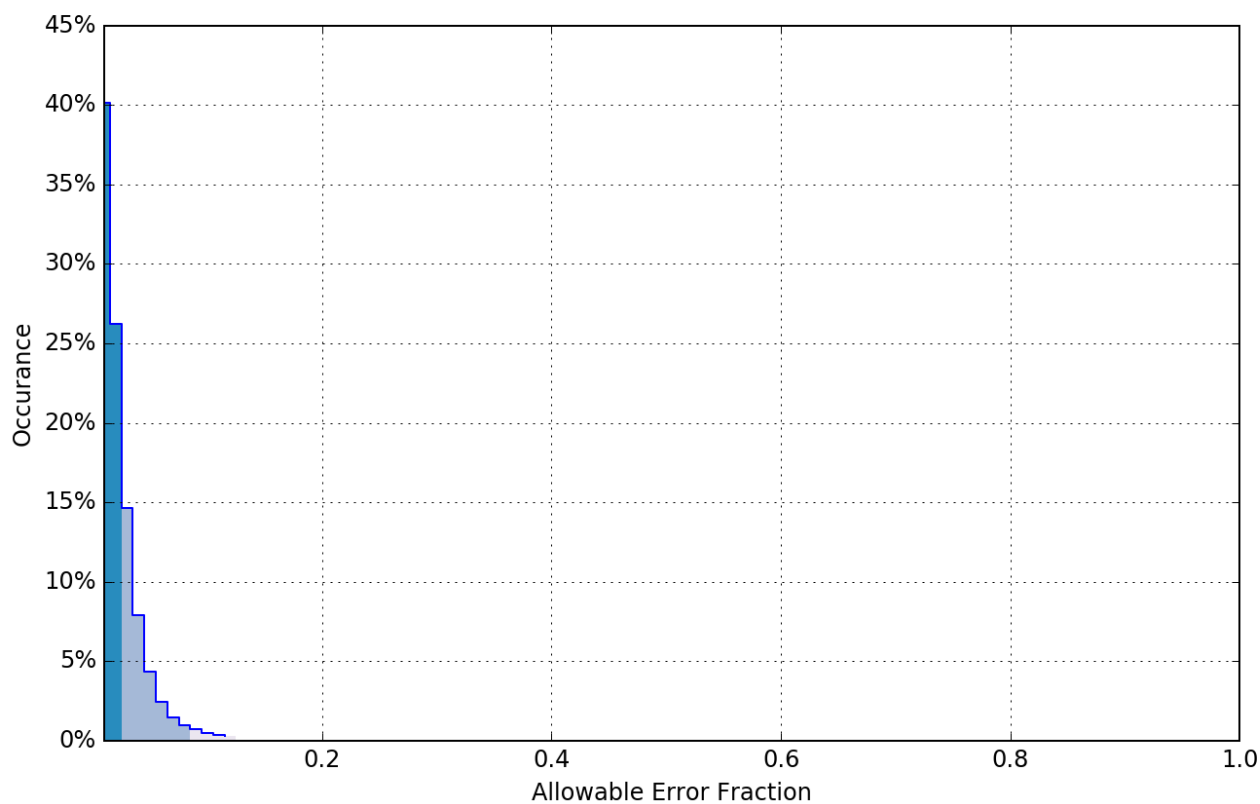


Figure 7: H13151 crossline comparison distribution

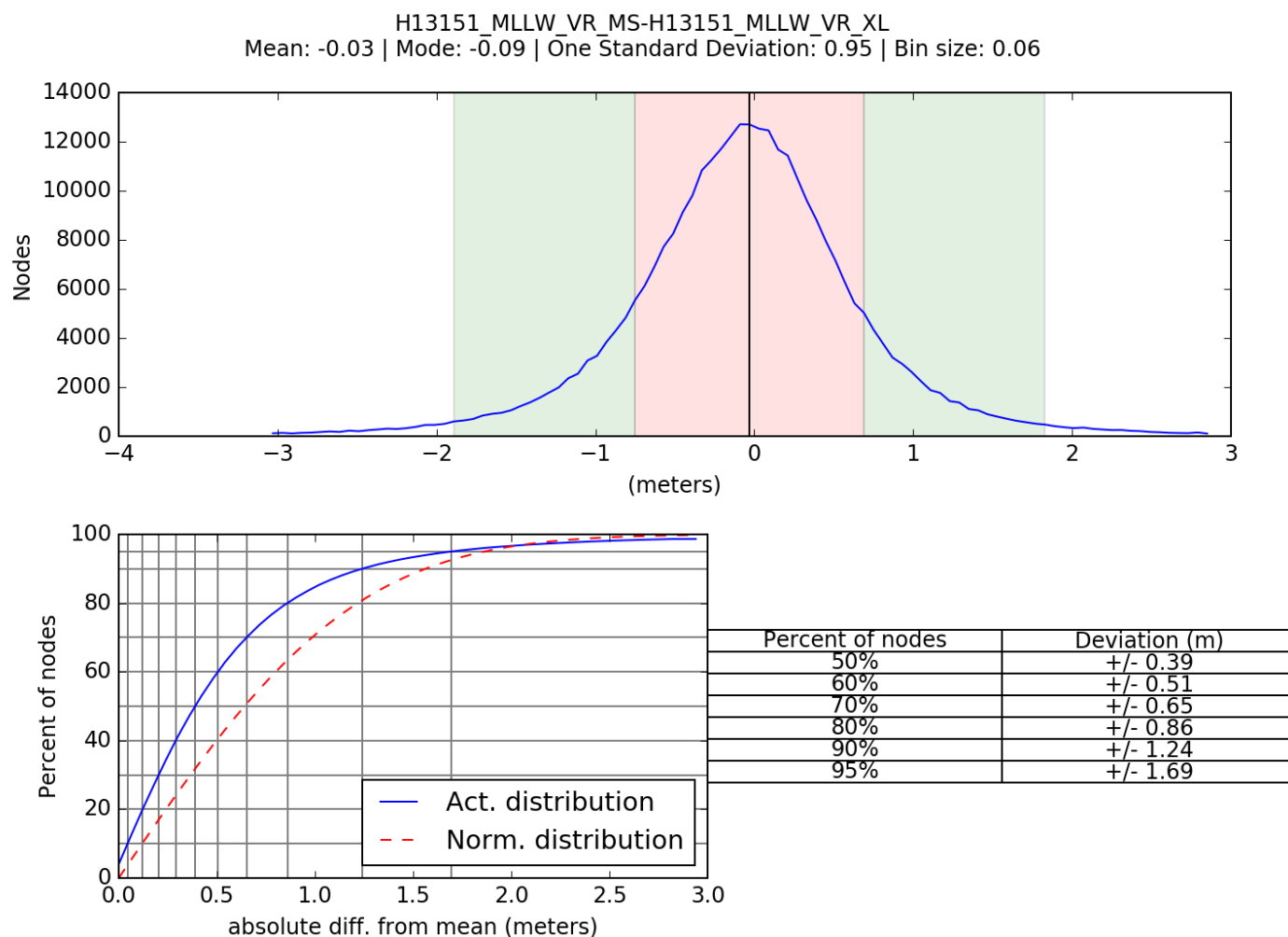


Figure 8: H13151 crossline absolute difference statistics

B.2.2 Uncertainty

The following survey specific parameters were used for this survey:

Method	Measured	Zoning
ERS via VDATUM	0 meters	0.083018 meters

Table 7: Survey Specific Tide TPU Values.

Hull ID	Measured - CTD	Measured - MVP	Surface
S-221	N/A meters/second	N/A meters/second	.05 meters/second

Table 8: Survey Specific Sound Speed TPU Values.

Expendable Bathythermographs (XBT) were used for sound speed profiles throughout the survey in lieu of CTD and MVP casts due to the survey depth and risk of entanglement in the towed USGS gear. An uncertainty value of 4 m/s was used for processing total propagated uncertainty.

Total Propagated Uncertainty (TPU) values for survey H13151 were derived from a combination of fixed values for equipment and vessel characteristics, as well as from field assigned values for sound speed uncertainties. Tidal zoning uncertainty of .083018 meters was provided in the Project Instructions as part of the VDatum. See the 2018 DAPR for further information.

In addition to the usual a priori estimates of uncertainty, some real-time and post-processed uncertainty sources were also incorporated into the depth estimates of this survey. Real-time uncertainties from Kongsberg MBES sonars were recorded and applied in post-processing. Applanix TrueHeave (POS) files, which record estimates of heave uncertainty, were applied during post-processing. Finally, the post-processed uncertainties associated with vessel roll, pitch, yaw and position were applied in Caris HIPS using SBET and RMS files generated using POSPac MMS software.

Uncertainty values of the submitted finalized grid was calculated in Caris using "Greater of the Two" of uncertainty and standard deviation (scaled to 95%). Grid QA v5 within Pydro QC Tools 2 was used to analyze H13151 TVU compliance; a histogram plot of the results is shown below (Figure 8).

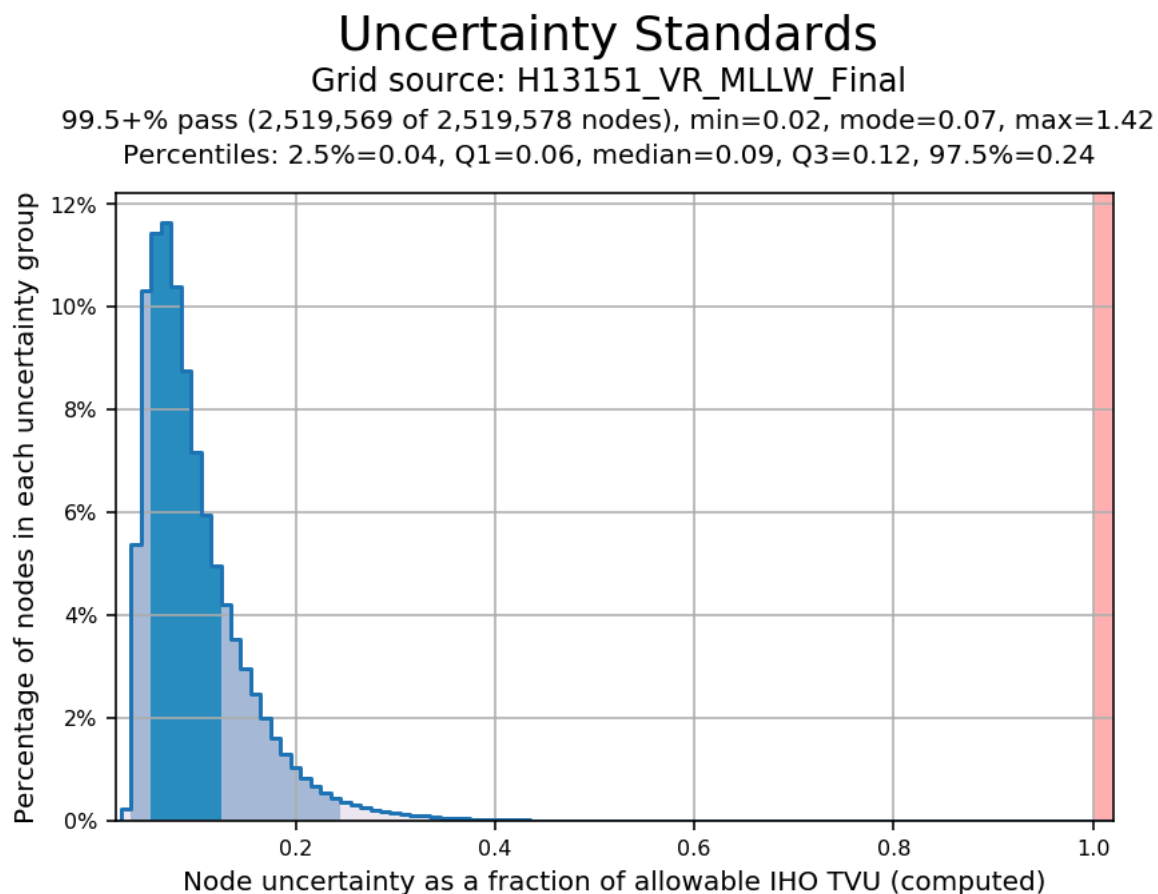


Figure 9: Pydro derived histogram plot illustrating TVU compliance of H13151 finalized multi-resolution MBES data.

B.2.3 Junctions

Two junction comparisons were completed for survey H13151. Survey H13152 was acquired concurrently with this survey. Survey H13089 was completed by Rainier in October 2017.

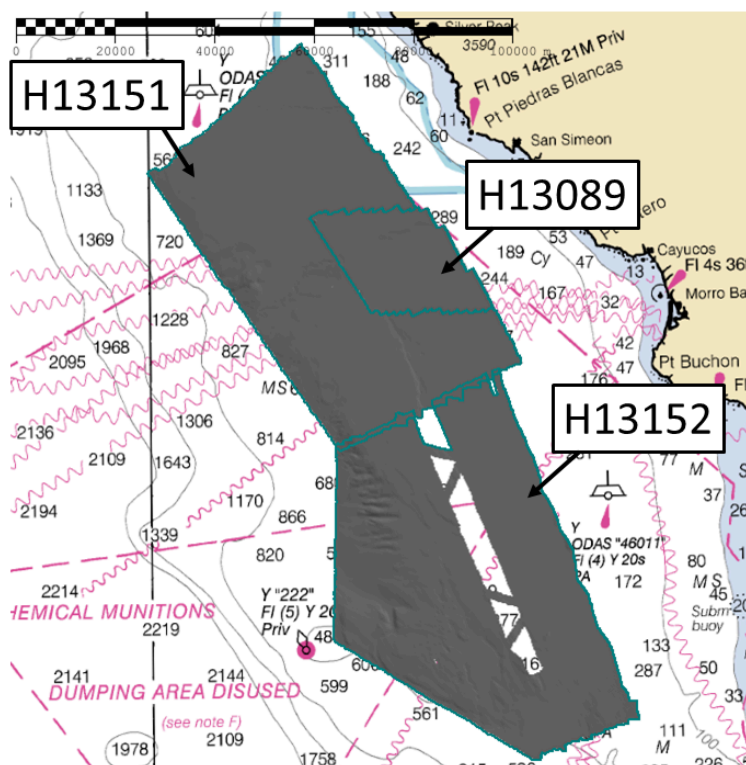


Figure 10: Overview of H13151, H13152 and H13089 coverage.

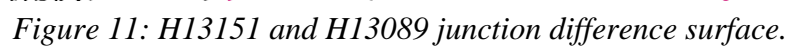
The following junctions were made with this survey:

Registry Number	Scale	Year	Field Unit	Relative Location
H13089	1:80000	2017	NOAA Ship RAINIER	E
H13152	1:80000	2018	NOAA Ship RAINIER	S

Table 9: Junctioning Surveys

H13089

The junction with survey H13089 encompasses 55.58 square nautical miles within survey H13151. The Compare Grids functions of Pydro Explorer derived a difference surface from the variable-resolution CUBE surface of each survey for comparison. Analysis of the difference surface indicated that survey H13089 is an average of 0.19 meters deeper than survey H13151 with a standard deviation of 0.73 meters.



Comparison Distribution

Per Grid: H13151_VR_MLLW_Final-H13089_MB_VR_MLLW_Final_fracAllowErr.csar

99.5+% nodes pass (184381), min=0.00, mode=0.01 mean=0.02 max=1.40

Percentiles: 2.5%=0.00, Q1=0.01, median=0.01, Q3=0.03, 97.5%=0.07

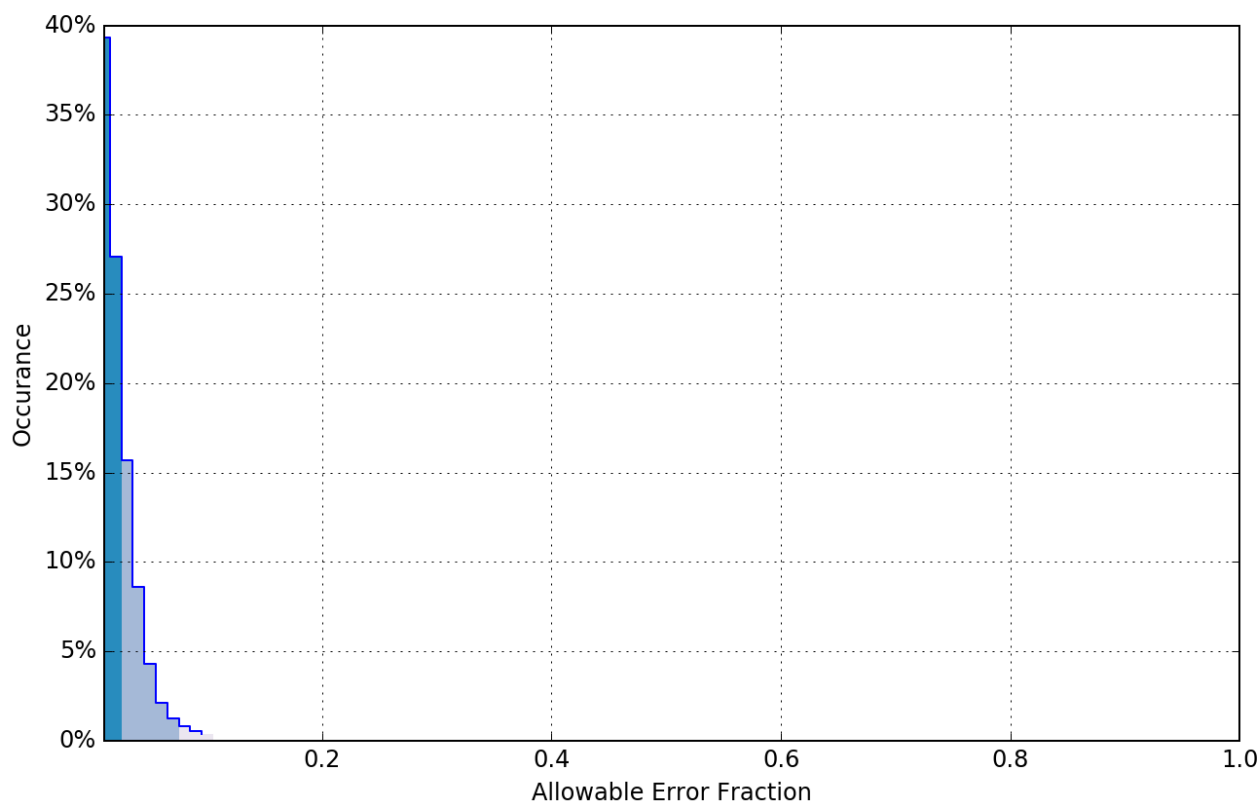


Figure 12: Pydro derived plot showing percentage-pass value of the junction between surveys H13151 and H13089.

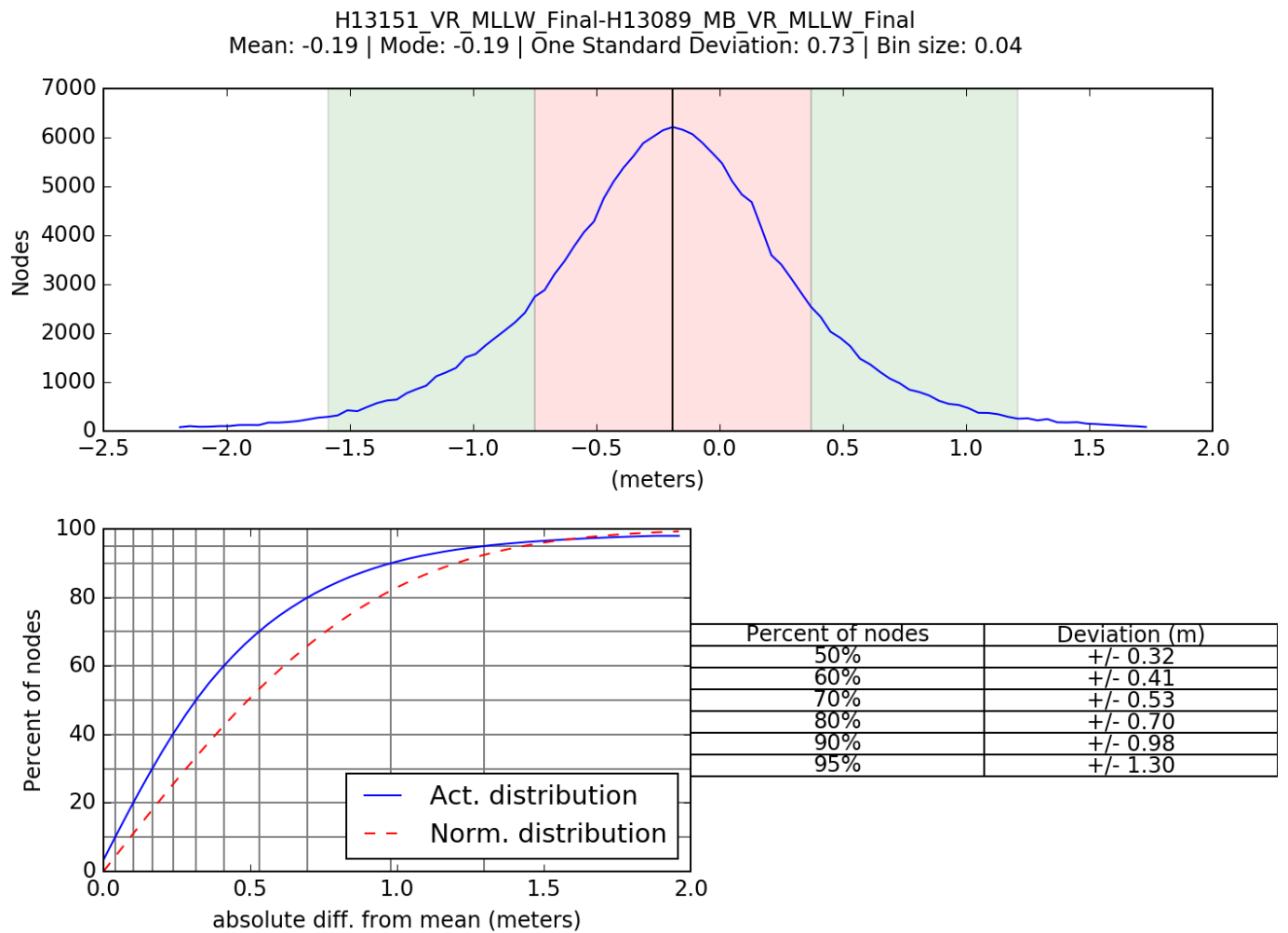


Figure 13: Pydro derived plot showing absolute difference statistics of the junction between surveys H13151 and H13089.

Node Depth vs. Allowable Error Fraction

H13151_VR_MLLW_Final-H13089_MB_VR_MLLW_Final_fracAllowErr.csar, total comparisons 184383

Failed Stats [-inf,-1): min=-1.4, 2.5%=-1.4, Q1=-1.3, median=-1.2, mean=-1.2, Q3=-1.1, 97.5%=-1.1, max=-1.0

Failed Stats (+1,+inf]: N/A

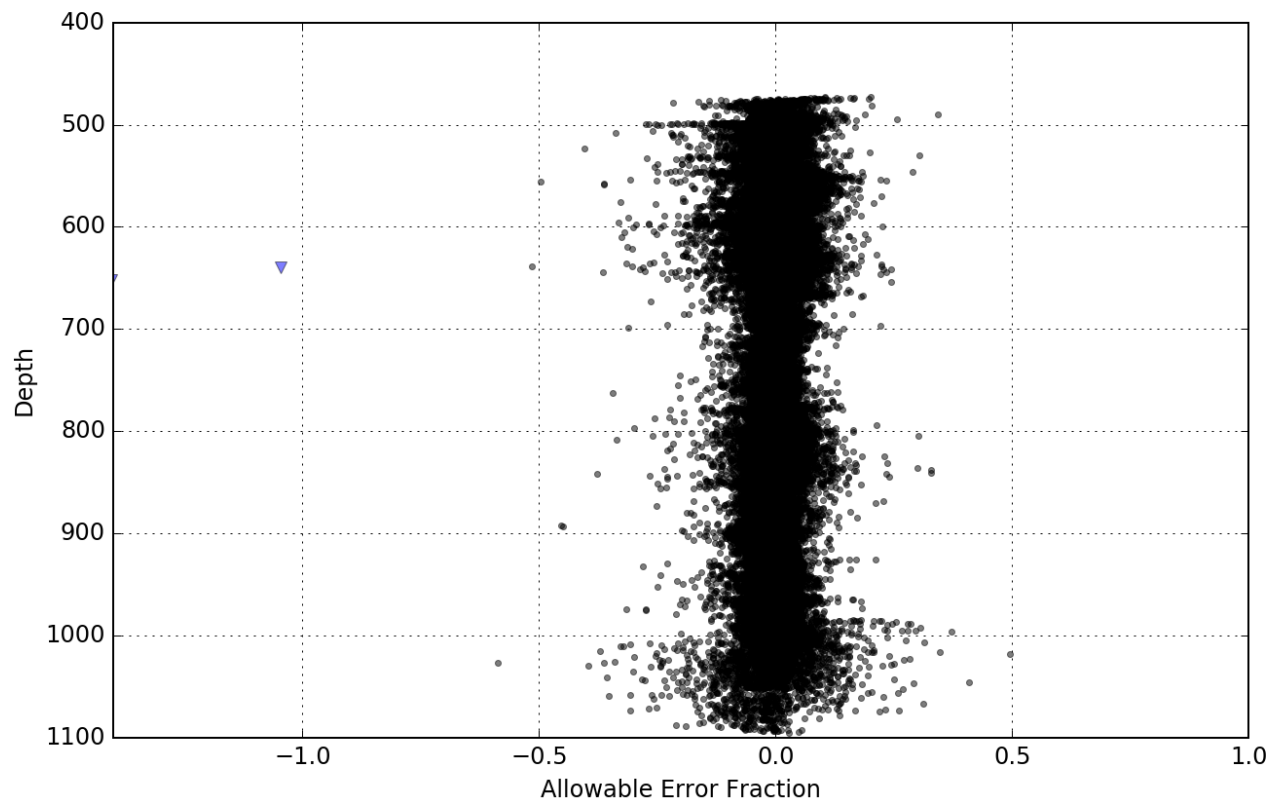


Figure 14: Pydro derived plot showing node depth vs. allowable error fraction of the junction between surveys H13151 and H13089.

H13152

The junction with survey H13152 encompasses 11.43 square nautical miles along the southern boundary of survey H13151.

The junction analysis between H13151 and H13152 can be found in the H13152 Descriptive Report.

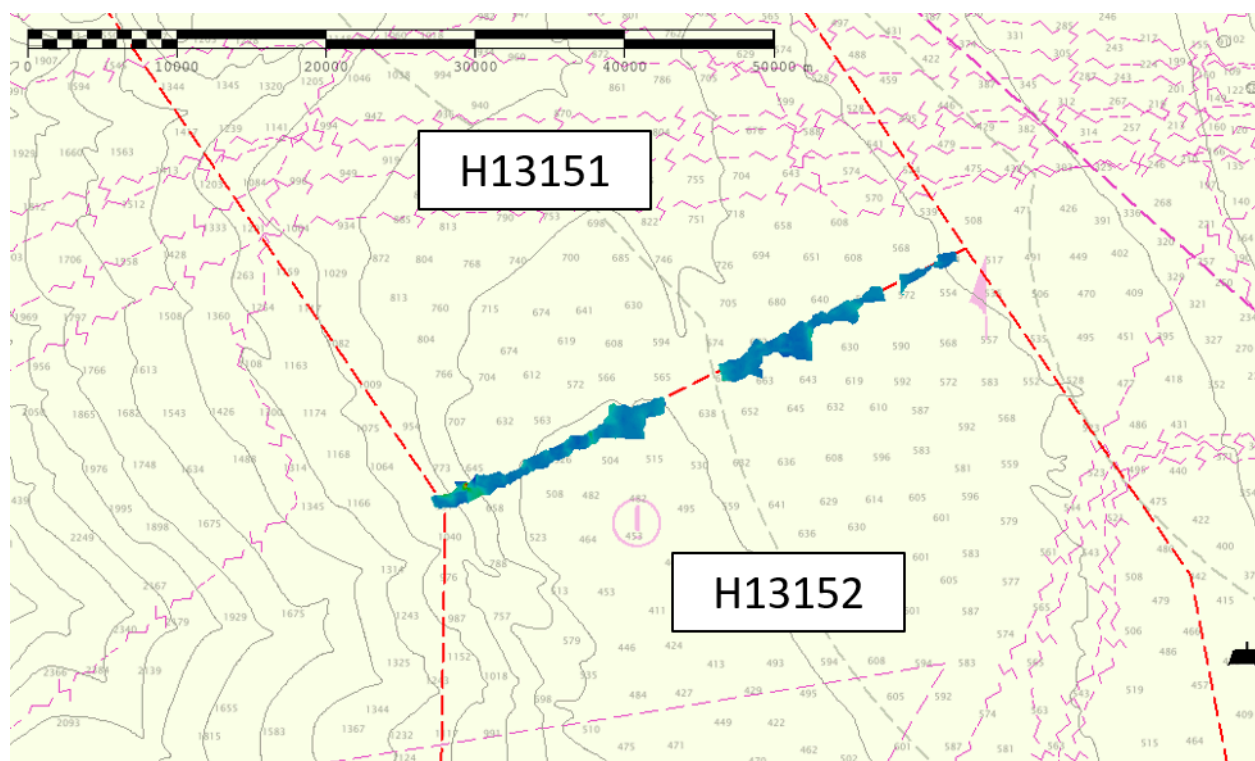


Figure 15: H13151 and H13152 junction difference surface.

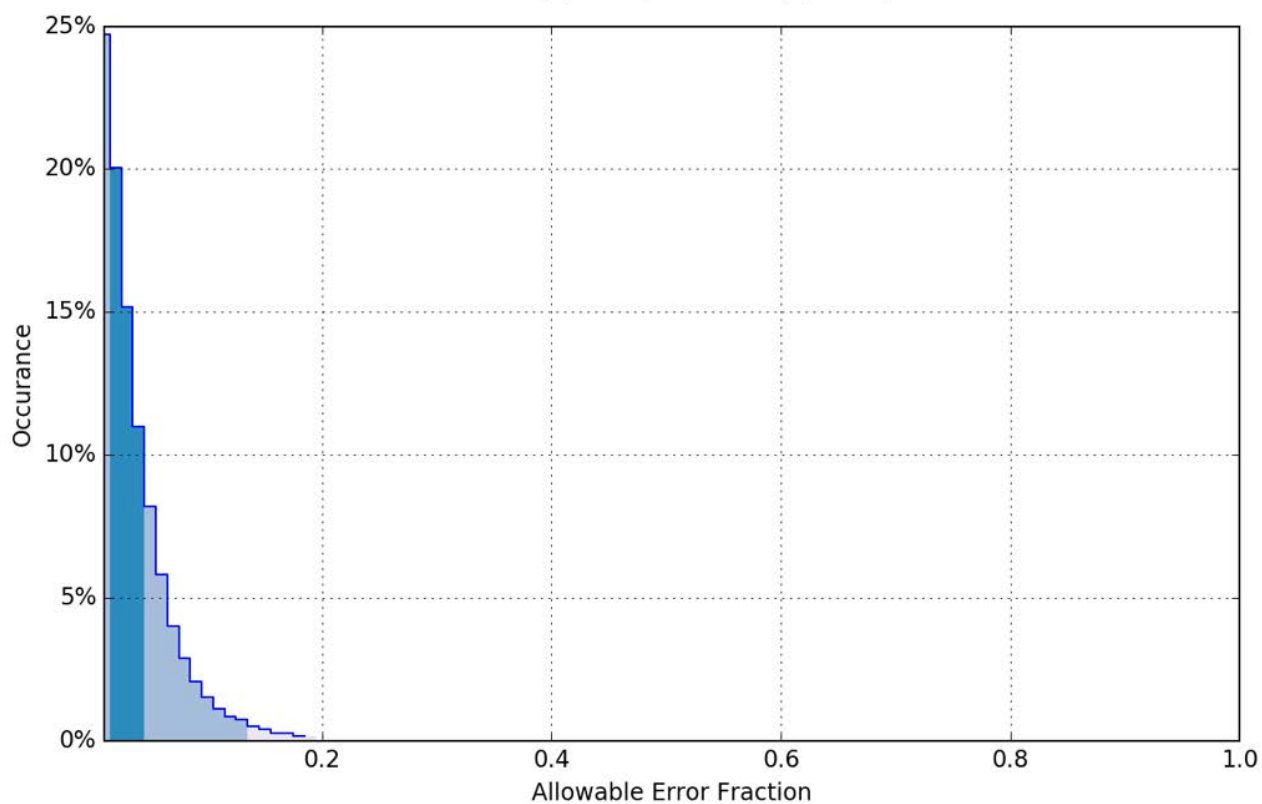
The Compare Grids functions of Pydro Explorer derived a difference surface from the variable-resolution CUBE surface of each survey for comparison. Analysis of the difference surface indicated that survey H13151 is an average of 0.08 meters deeper than survey H13152 with a standard deviation of 1.02 meters.

Comparison Distribution

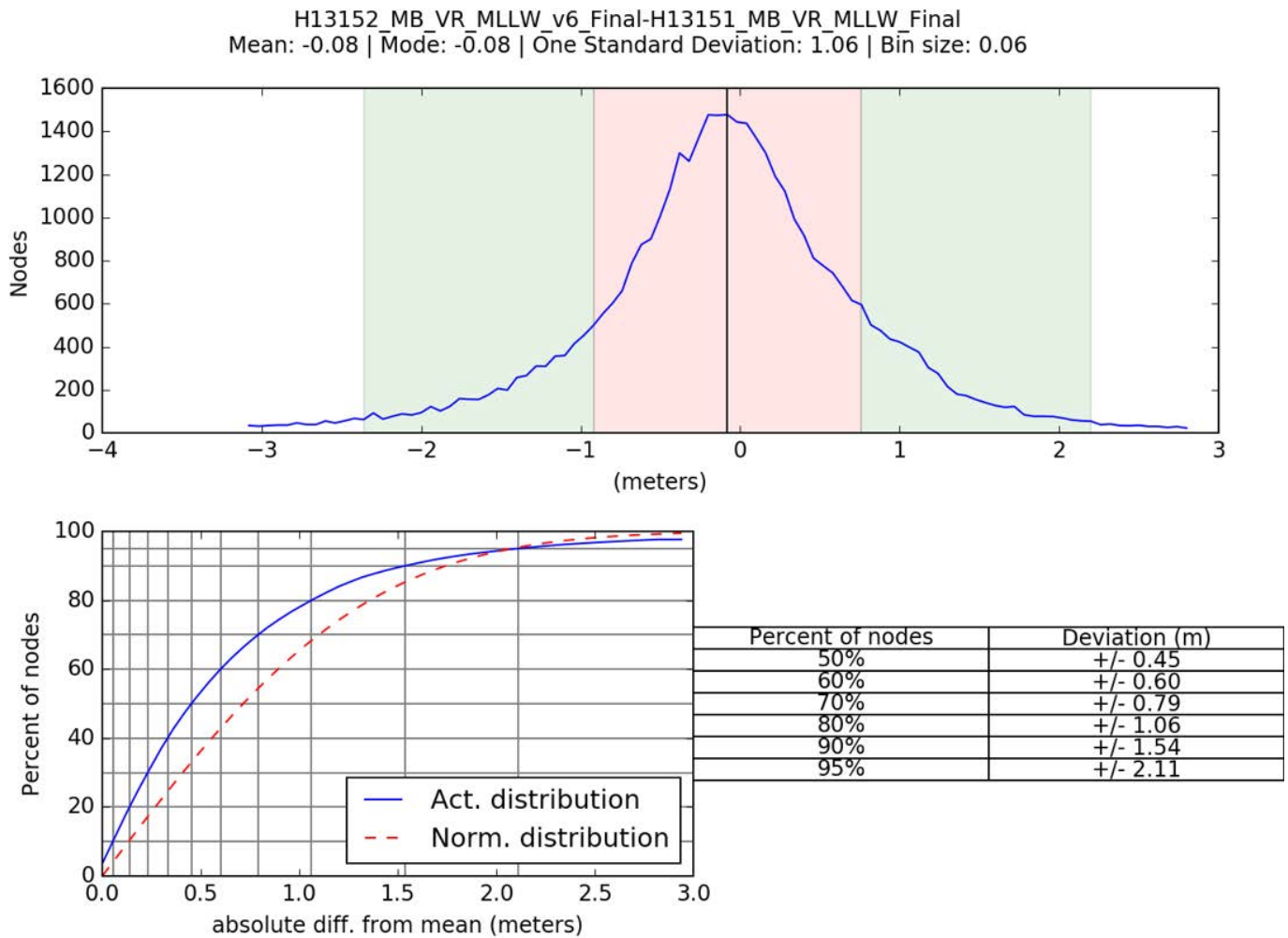
Per Grid: H13152_H13151_MB_VR_MLLW_Junction_fracAllowErr.csar

99.5+% nodes pass (40679), min=0.00, mode=0.01 mean=0.03 max=1.37

Percentiles: 2.5%=0.00, Q1=0.01, median=0.02, Q3=0.05, 97.5%=0.13



Pydro derived plot showing percentage-pass



Pydro derived plot showing absolute difference

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

Sig Mini-Sparker

As a joint USGS/BOEM/NOAA mission other pieces of equipment were being towed during the survey. The Sig Mini-Sparker was used concurrently and spikes were observed in the Sound Velocity Profiles collected while in use. The spikes were smoothed using the "magic wand" tool in Sound Speed Manager.

Kongsberg EM710

The sonar was operating at the deeper end of its depth range and high wave conditions led to blowouts throughout the survey.

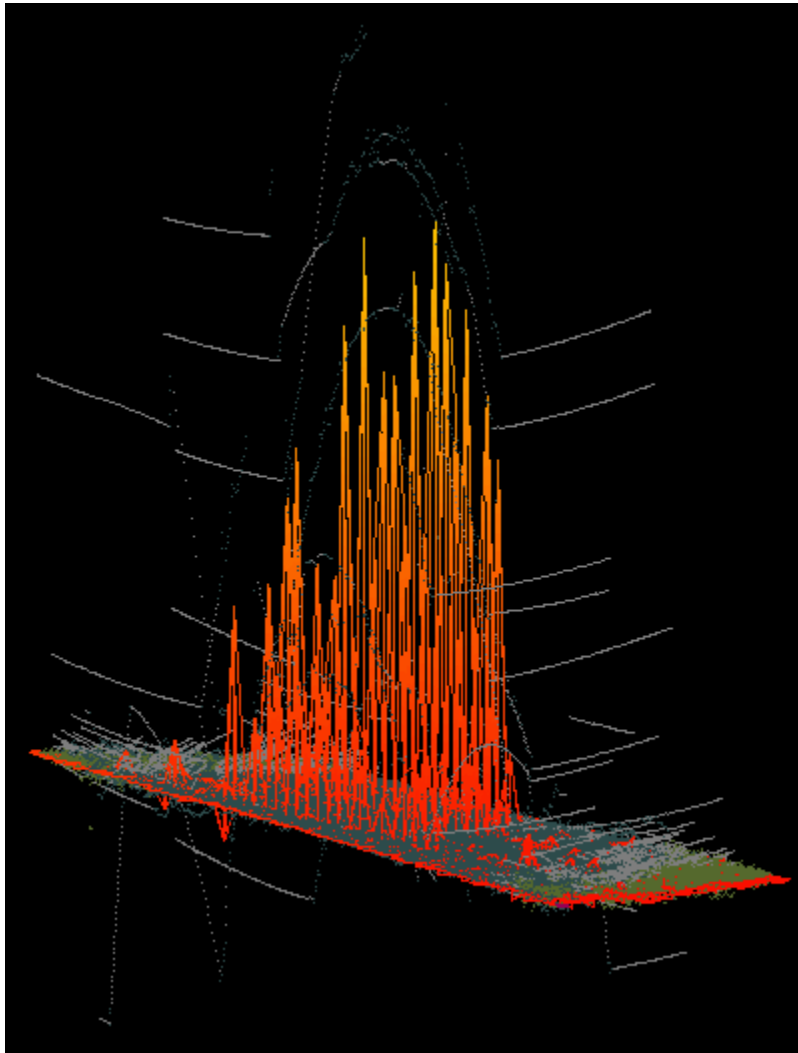


Figure 16: Example of a blowout from Raw data.

B.2.6 Factors Affecting Soundings

Sea State

Throughout the survey, the ship was subject to sustained high sea states, including both long-period swell and locally generated wind waves. The result was increased bubble sweep-down that led to blowouts and higher than normal noise levels.

B.2.7 Sound Speed Methods

Sound Speed Cast Frequency: At least every 4 hours.

A total of 53 sound speed profiles were acquired for this survey at discrete locations within the survey area at least once every four hours, when significant changes to surface sound speed were observed, or when operating in a new area. For MBES operations from S221, sound speed profiles were acquired using the Lockheed Martin Sippican Deep Blue Expendable Bathymetric Thermographs (XBTs). All casts were concatenated into a master file and applied using the "Nearest distance within time" (4 hours) profile selection method.

Sound velocity profiles were processed with the MK21 software produced by Lockheed Martin.

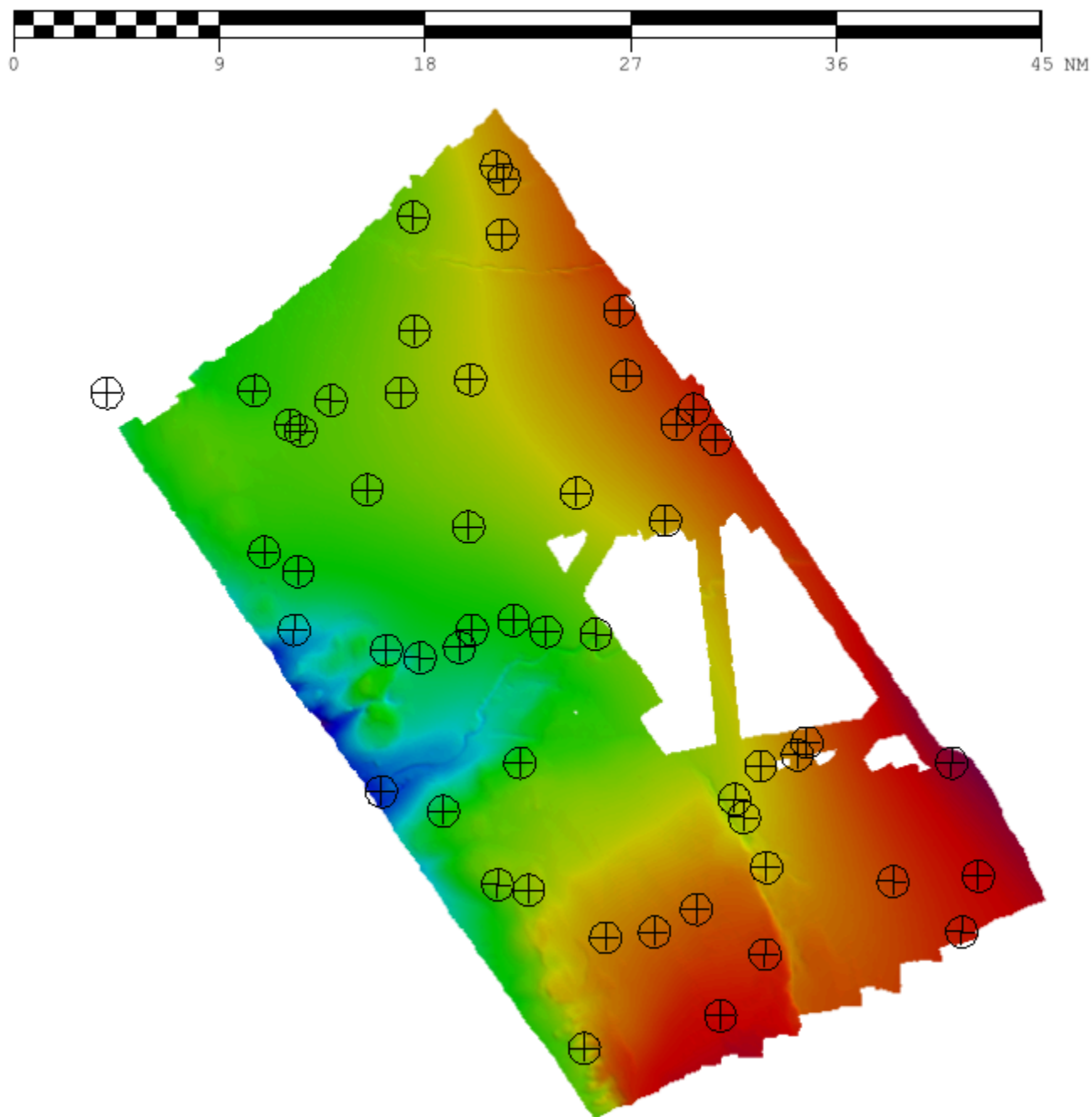


Figure 17: Figure 6: H13151 sound speed cast locations

B.2.8 Coverage Equipment and Methods

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

B.2.9 Detect Fliers

Pydro QC Tools 2 v2.6.7 Detect Fliers v5 was used to find fliers in the finalized variable resolution surface. Detect Fliers parameters included Gaussian Curvature, Adjacent Cells, Edge Slivers, and Isolated Nodes. Flier height was not restricted.

Obvious noise was rejected by the hydrographer in Caris subset editor. After data cleaning, Detect Fliers was run again and found 24 fliers in the surface. These were investigated and found to be false positives. The results of the Detect Fliers tool are included as a .000 file in the Separates section of this report.

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 logged as .all files for delivery to NOAA's Pacific Hydrographic Branch. Backscatter data were processed by the field unit and mosaics generated. One processed 6-meter mosaic was generated for the H13151 survey area. The processed mosaic paired .all files with HDCS data.

During backscatter processing the following error was encountered: Could not find BathysSummary tag in LogFile.xml or Process.log in HDCS directory for file. This resulted in some of the lines not being processed. A work around was identified in which a copy of the HDCS data was created, the lines identified and a backup of the process log (Process.log.bak) was used to generate the 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	10.3.3

Table 10: Primary bathymetric data processing software

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

Manufacturer	Name	Version
Fledermaus	Fledermaus Geocoder Toolbox (FMGT)	7.8.1

Table 11: Primary imagery data processing software

The following Feature Object Catalog was used: NOAA Profile V_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
H13151_MB_VR_MLLW_Final	CARIS VR Surface (CUBE)	Variable Resolution	468.6 meters - 1621.8 meters	NOAA_VR	Complete MBES
H13151_MB_VR_MLLW	CARIS VR Surface (CUBE)	Variable Resolution	468.6 meters - 1621.8 meters	NOAA_VR	Complete MBES

Table 12: Submitted Surfaces

Submitted surfaces were generated using the recommended parameters for "Ranges" style variable resolution bathymetric grids as specified in HSSD 2018. No soundings were designated in this survey and no Dangers to Navigation (DTONs) were detected throughout the survey area.

C. Vertical and Horizontal Control

There were no tide gauges or base stations installed by the survey vessel crew for this project; no Horizontal and Vertical Control Report (HVCR) was submitted.

C.1 Vertical Control

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

ERS Methods Used:

ERS via VDATUM

Ellipsoid to Chart Datum Separation File:

OPR_L373_RA_18_20181115b_xyNAD83-MLLW_geoid12b.csar

C.2 Horizontal Control

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

The projection used for this project is Projected UTM 10N.

Post Processed Real-Time-Extended (PP-RTX) processing methods were used in the Applanix POSPac MMS 8.2.1 software to produce Smoothed Best-Estimate Trajectories (SBET) for post-processing horizontal correction.

D. Results and Recommendations

D.1 Chart Comparison

A comparison was made between H13151 survey data and Electronic Navigation Chart (ENC) US3CA85M. This was accomplished by creating CUBE surfaces and contours in Caris and comparing the surveyed contours with the charted depth curves on chart US3CA85M. The chart used is the most recent edition.

D.1.1 Electronic Navigational Charts

The following are the largest scale ENC's, which cover the survey area:

ENC	Scale	Edition	Update Application Date	Issue Date	Preliminary?
US3CA85M	1:1216116	20	10/17/2017	10/11/2018	NO

Table 13: Largest Scale ENC's

US3CA85M

A comparison with H13151 surveyed contours and ENC US3CA85N revealed the following: All surveyed contours generally agree with the ENC charted depth curves.

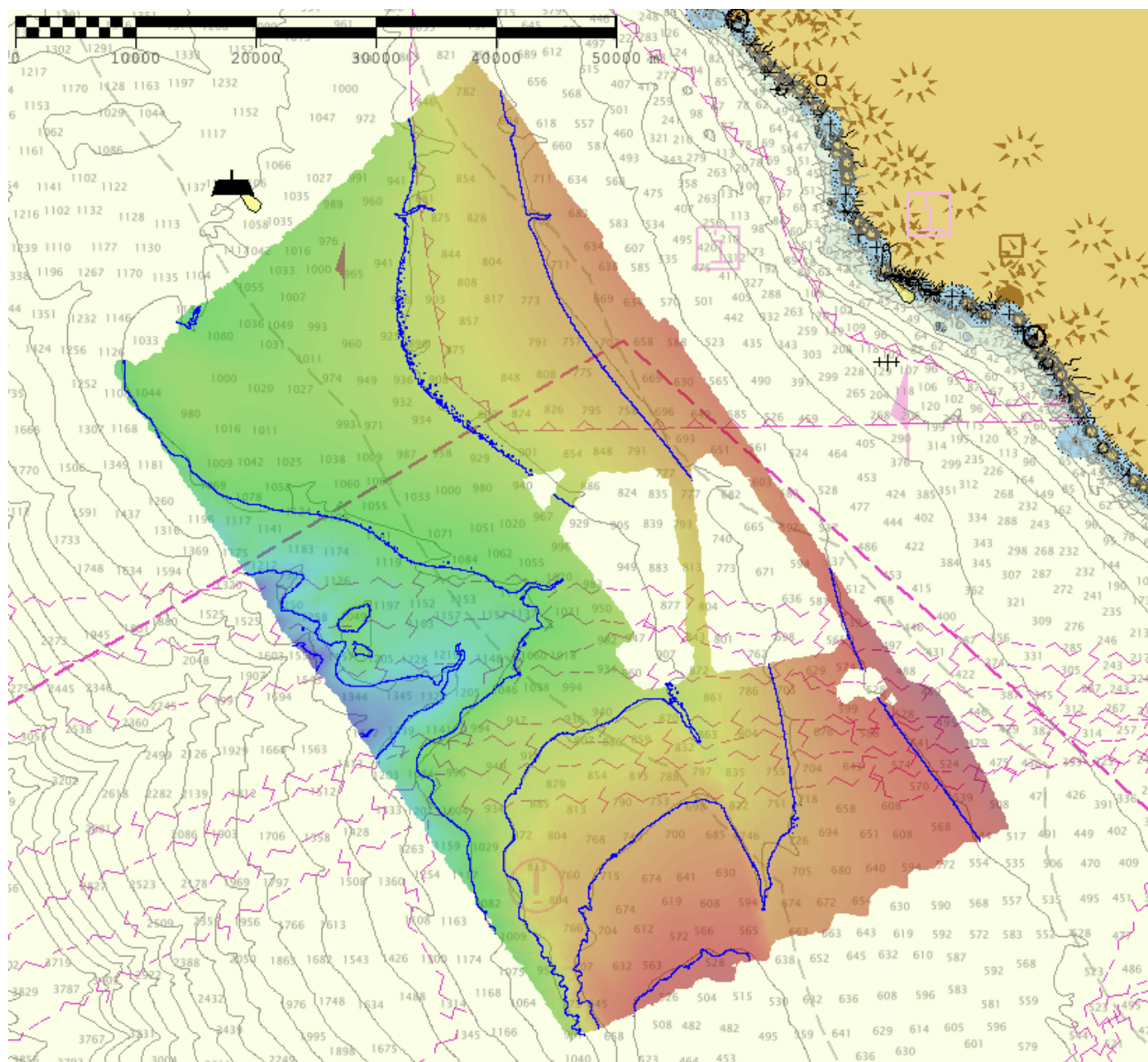


Figure 18: ENC US3CA85M overlaid with H13151 surveyed contours.

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

No bottom samples were required for this survey.

D.2 Additional Results**D.2.1 Shoreline**

Shoreline was not assigned in the Hydrographic Survey Project Instructions or Statement of Work.

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

Multiple submarine pipelines are charted and were investigated. There was no evidence of pipelines in the bathymetry data.

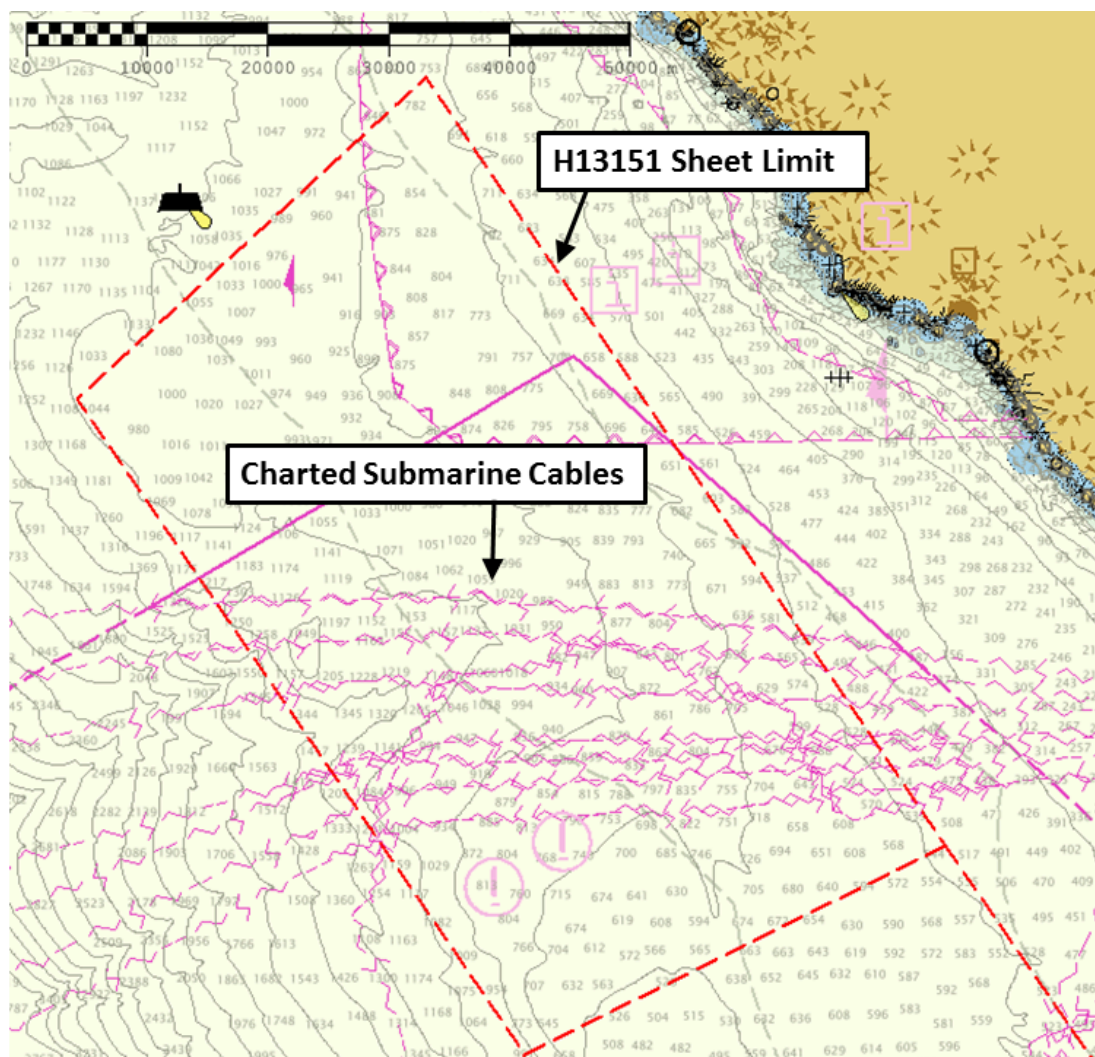


Figure 19: Charted submarine cables within assigned survey area on ENC Chart USCA85M.

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

A field of "pock-marks" is visible within the survey extents. They are most heavily concentrated in the Northeast quadrant of the survey but can be found throughout the survey extents.

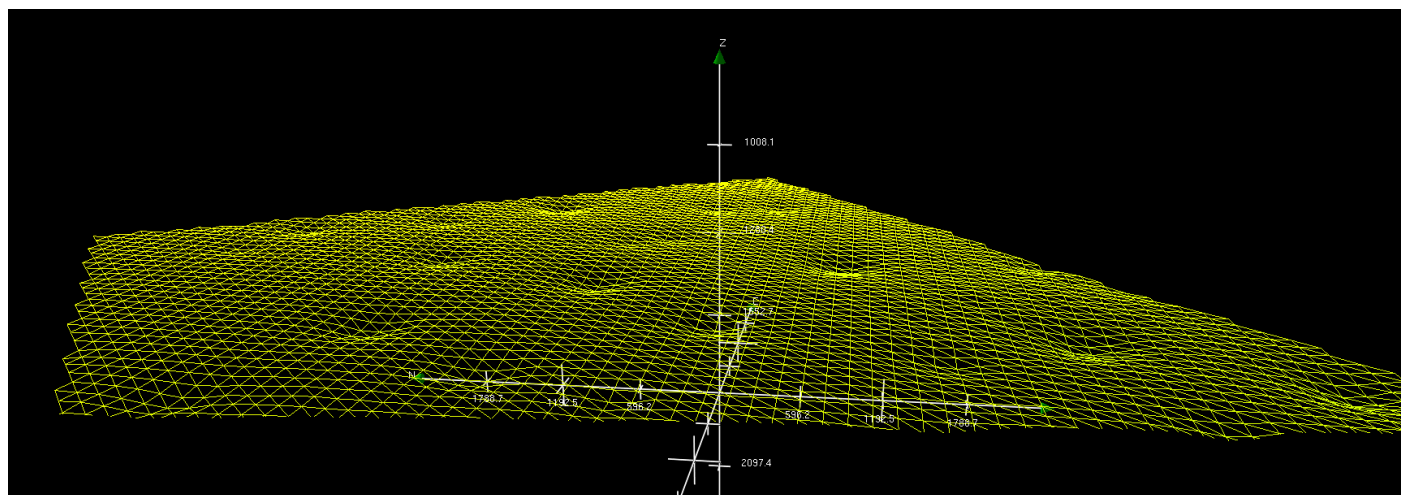


Figure 20: Example of "pock-marks" observed in H13151.

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



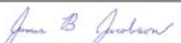
No new insets are recommended for this area.

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
Benjamin K. Evans, CDR/NOAA	Commanding Officer	01/16/2019	 Digitally signed by EVANS.BENJAMIN.K.1237217094 Date: 2019.01.31 16:44:59 -08'00'
Andrew R. Clos, LT/NOAA	Field Operations Officer	01/16/2019	 2019.02.01 00:14:30 Z
James B. Jacobson	Chief Survey Technician	01/16/2019	 JACOBSON.JAMES.BRYAN.1269664017 I have reviewed this document 2019.02.06 09:19:56 -08'00'
Airlie G. Pickett, ENS/NOAA	Sheet Manager	01/16/2019	PICKETT.AIRLIE.GR ACE.1539170089 Digitally signed by PICKETT.AIRLIE.GRACE.15391700 89 Date: 2019.01.31 16:13:39 -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 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
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 States Coast Guard
UTM	Universal Transverse Mercator
XO	Executive Officer
ZDA	Global Positioning System timing message
ZDF	Zone Definition File



UNITED STATES DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration

NOAA Ship Rainier
2002 SE Marine Science Drive
Newport, OR 97365-5229

November 16th, 2018

MEMORANDUM FOR: Paul Turner, NOAA
Cascadia Margin and CalDIG Project Manager, HSD

FROM: Commander Benjamin Evans, NOAA
Commanding Officer, NOAA Ship *Rainier*

SUBJECT: Waiver Request: Crossline and Holiday Acquisition
Projects: OPR-L373-RA-18 and OPR-M367-RA-18

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EVANS.BENJAMIN.K.12372170
94
Date: 2018.11.16 16:38:51
-08'00'

Due to the priorities of USGS and BOEM to maximize the amount of area covered by MBES data, *Rainier* is requesting a waiver to modify our crossline and holiday acquisition requirements. *Rainier* requests that the requirement to acquire crossline data and fill in gaps in MBES coverage be waived for surveys with projects OPR-L373-RA-18 and OPR-M367-RA-18.

The following sheets are affected:

H13117, H13118, H13119, H13137, H13206, D00248, H13151 and H13152.

Justification

These surveys are primarily for seafloor mapping and sub-bottom profiling as opposed to nautical charting. The surveys areas are miles offshore of the Oregon and California coasts and in sufficiently deep water that the potential for hazards to navigation is extremely small.

The partnering organizations (USGS and BOEM) do not have use for crossline or holiday coverage, and specifically requested that we dispense with this requirement. As a result, the crossline requirement was not met on all surveys of these projects. While every effort was made to avoid holidays, some small gaps between lines do exist and were not filled.

Decision

Waiver is:

TURNER.PAUL.TO
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Digitally signed by
TURNER.PAUL.TOWERS.13658
99394
Date: 2018.11.18 08:18:21
-05'00'

Granted

Denied

cc: Chief, HSD OPS; OPS-RA, CHST-RA



APPROVAL PAGE

H13151

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
- 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.

Approved: _____

Commander Olivia Hauser, NOAA
Chief, Pacific Hydrographic Branch