H12692

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

DESCRIPTIVE REPORT

Type of Survey:	Basic Hydrographic Survey
Registry Number:	H12692

LOCALITY

State(s):	Alaska
General Locality:	North Coast of Kodiak Island, AK
Sub-locality:	Entrance to Viekoda Bay

2015

CHIEF OF PARTY
Edward J. Van Den Ameele, CDR, NOAA

LIBRARY & ARCHIVES

Date:

U.S. DEPARTMENT OF COMMERCE NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION	REGISTRY NUMBER:
HYDROGRAPHIC TITLE SHEET	**H12692**

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:	**North Coast of Kodiak Island, AK**
Sub-Locality:	**Entrance to Viekoda Bay**
Scale:	**40000**
Dates of Survey:	**09/19/2015 to 10/19/2015**
Instructions Dated:	**09/09/2015**
Project Number:	**OPR-P136-RA-15**
Field Unit:	**NOAA Ship Rainier**
Chief of Party:	**Edward J. Van Den Ameele, 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:

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 H12692

Project: OPR-P136-RA-15

Locality: North Coast of Kodiak Island, AK

Sublocality: Entrance to Viekoda Bay

Scale: 1:40000

September 2015 - October 2015

NOAA Ship Rainier

Chief of Party: Edward J. Van Den Ameele, CDR, NOAA

A. Area Surveyed

The project area is referred to as H12692: "Entrance to Viekoda Bay" within the Project Instructions. The area is between Uganik Island and Raspberry Island, and west of Kupreanof Peninsula, Kodiak, Alaska (Figure 1).

A.1 Survey Limits

Data were acquired within the following survey limits:

Northwest Limit	Southeast Limit
58° 3' 27.41" N 153° 24' 53.99" W	57° 56' 5.55" N 153° 22' 24.61" W

Table 1: Survey Limits

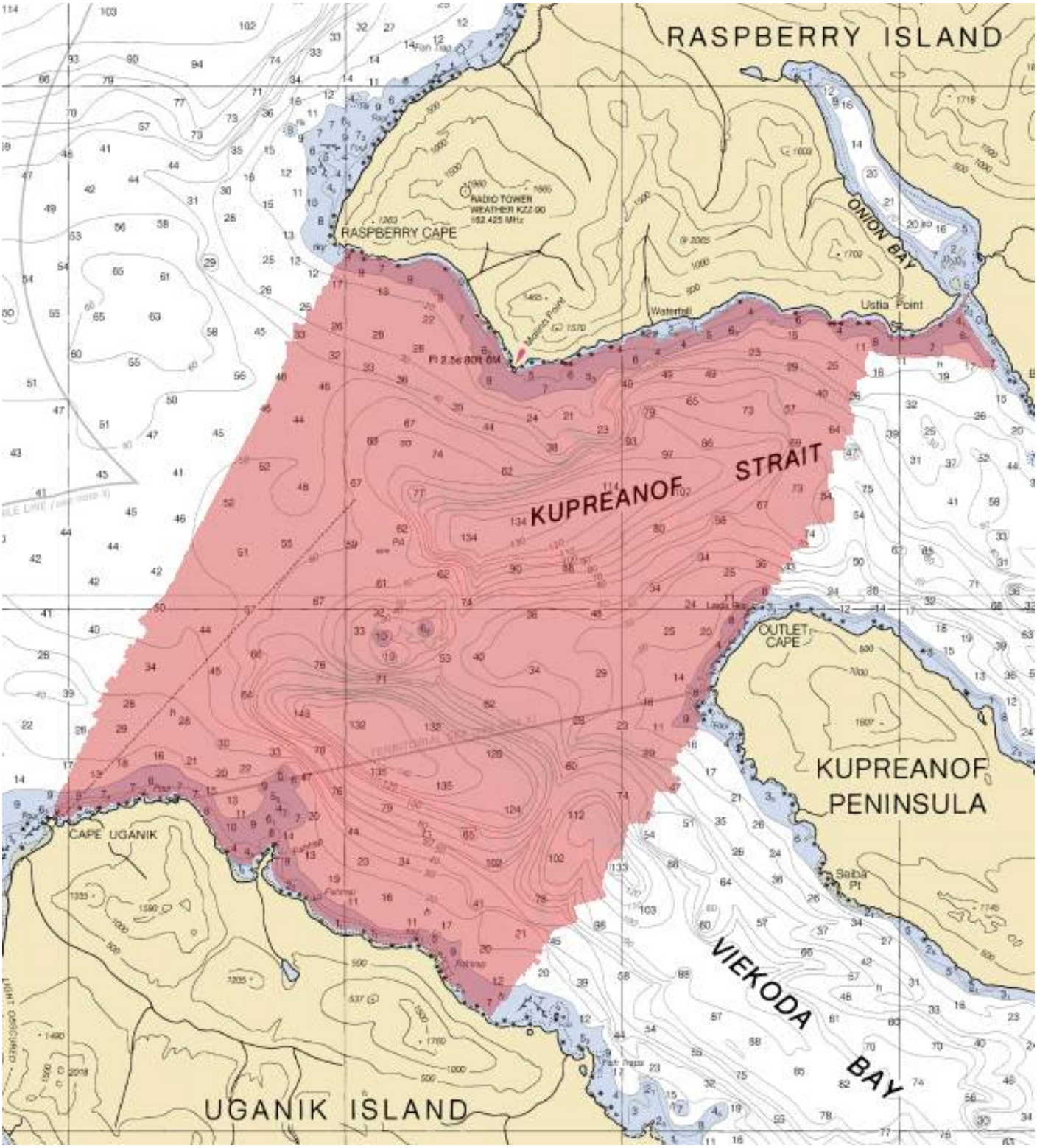


Figure 1: H12692 Survey Limits

Survey data were acquired beyond the survey limit requirements in the north east corner of the sheet. A more complete junction between H12692 and H12690 was realized by extending coverage to the mouth of Onion Bay. (Figure 2).

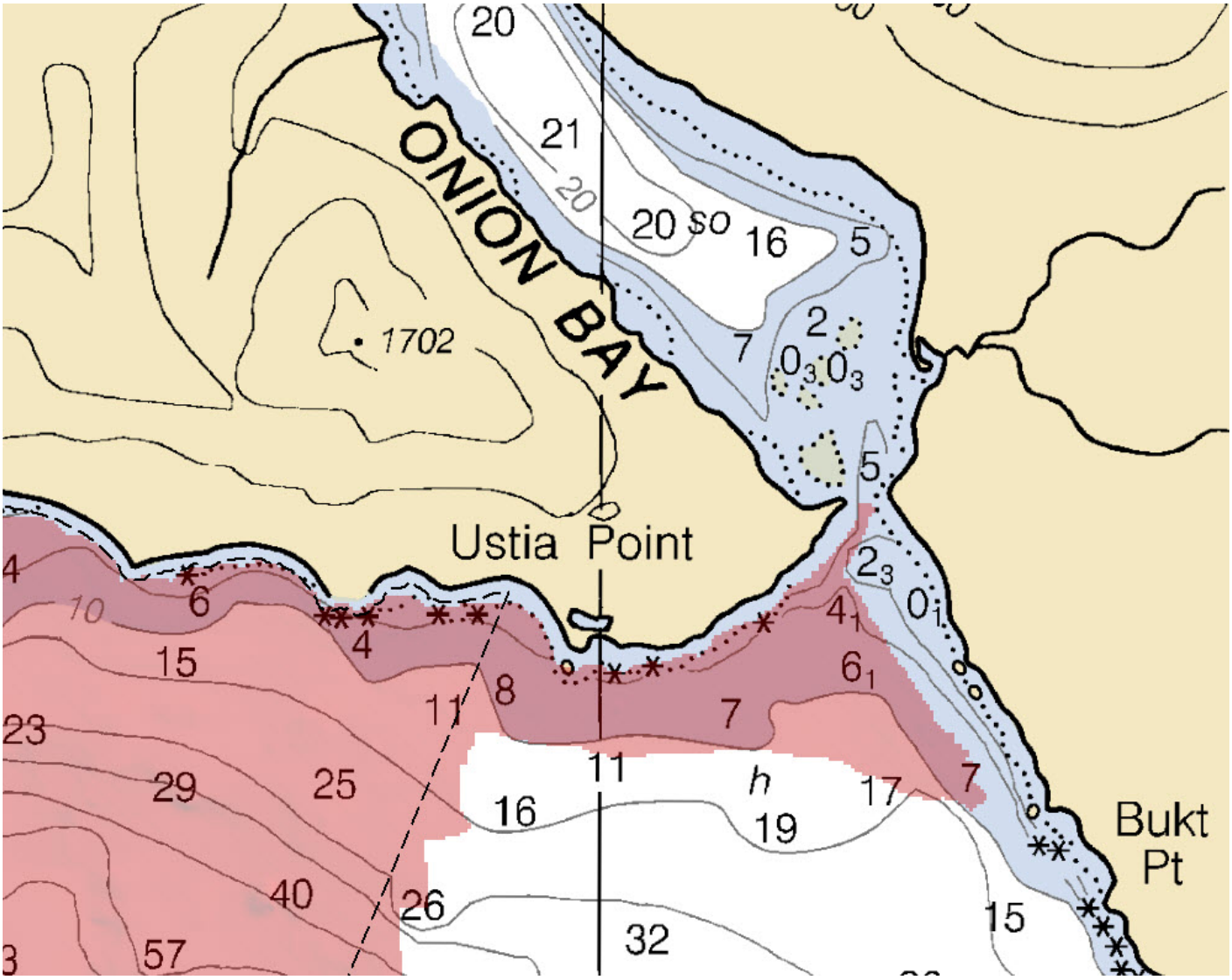


Figure 2: H12692 Surveyed area extending beyond sheet limits to the mouth of Onion Bay.

A.2 Survey Purpose

The purpose of this project is to provide contemporary surveys to update National Ocean Service (NOS) nautical charting products, which will support Kodiak's large fishing fleet and increasing levels of passenger vessel traffic.

A.3 Survey Quality

The entire survey is adequate to supersede previous data.

The entire survey is adequate to supersede previous data. Data acquired on survey H12692 met complete multibeam coverage requirements outlined in section 5.2.2.2 of the HSSD, including data density requirements. The finalized CSAR IHO compliance tool within Pydro was used to analyze multibeam echosounder (MBES) data density. All finalized surfaces were found to meet the Hydrographic Survey Specifications and Deliverables (HSSD) data density requirement (Figures 3-7).

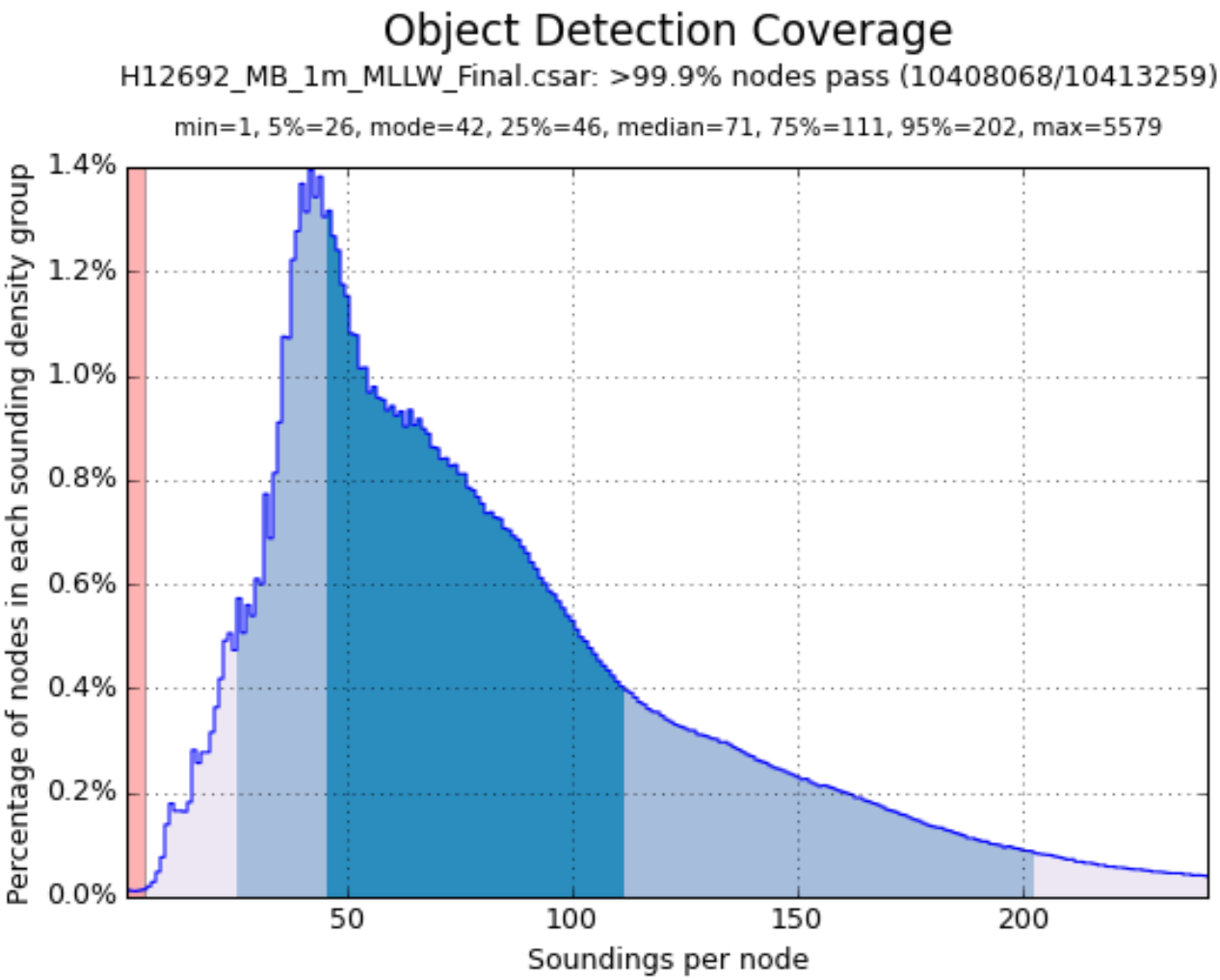


Figure 3: Surface Density Histograms: 1m Object Detection Coverage

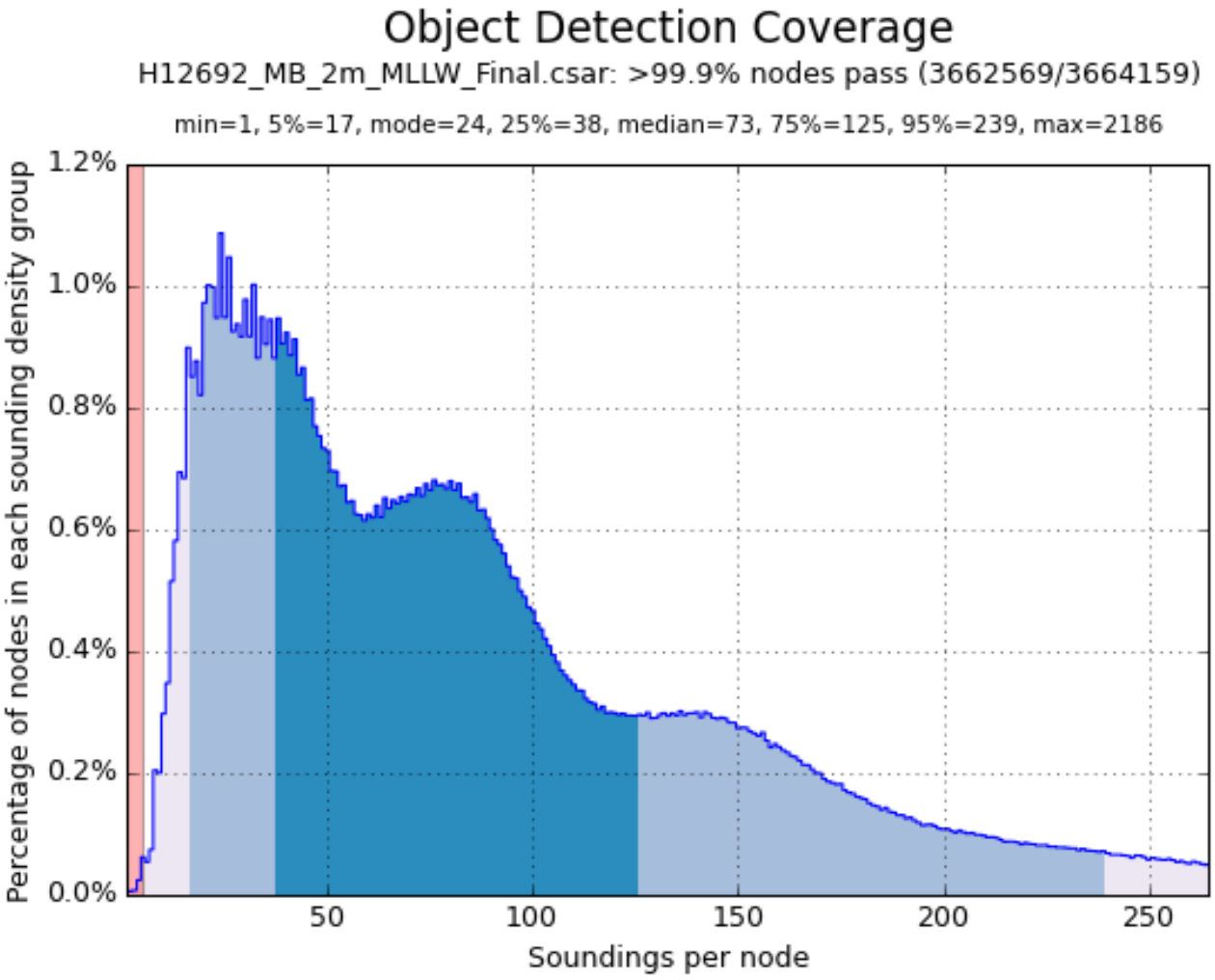


Figure 4: Surface Density Histograms: 2m Object Detection Coverage

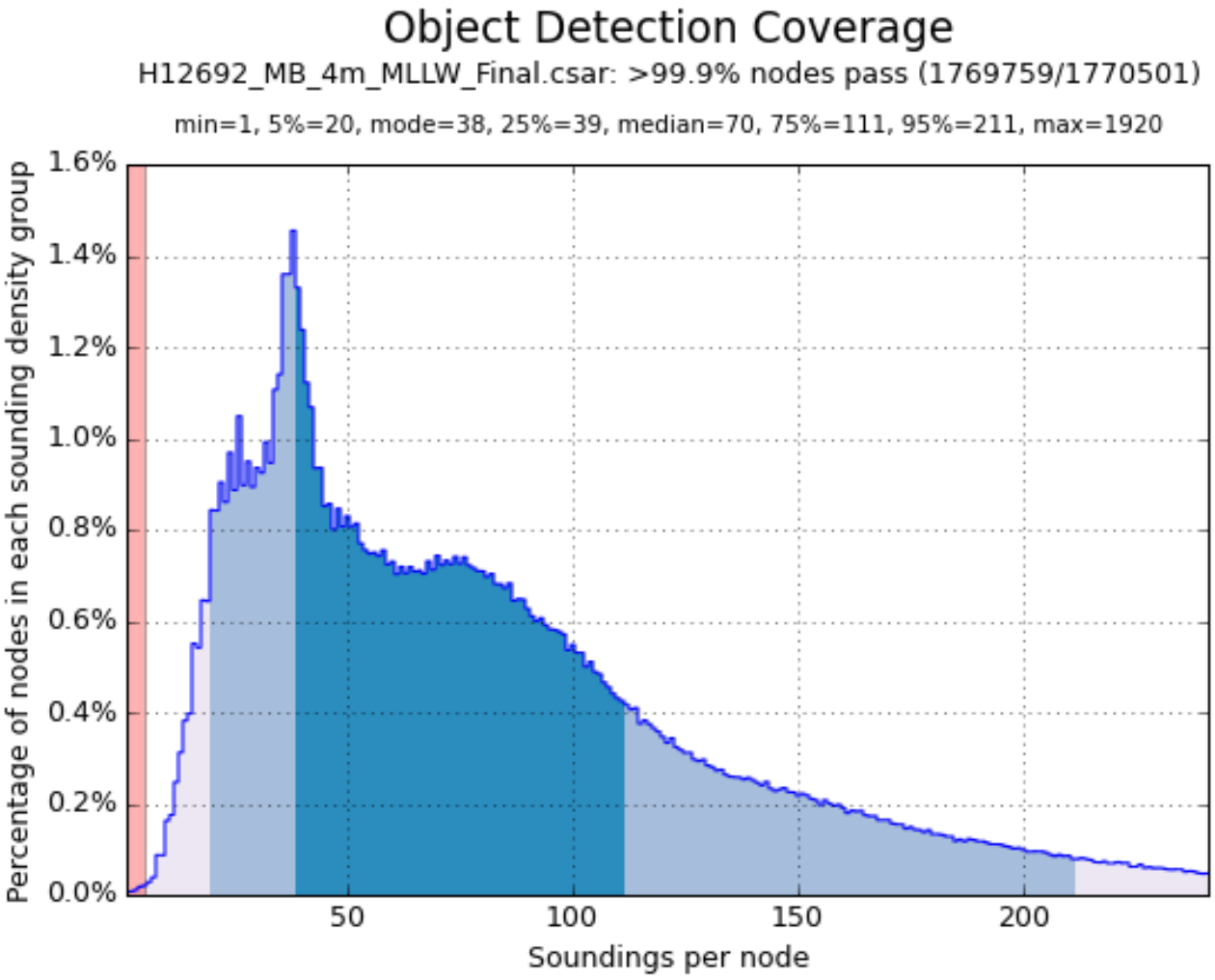


Figure 5: Surface Density Histograms: 4m Object Detection Coverage

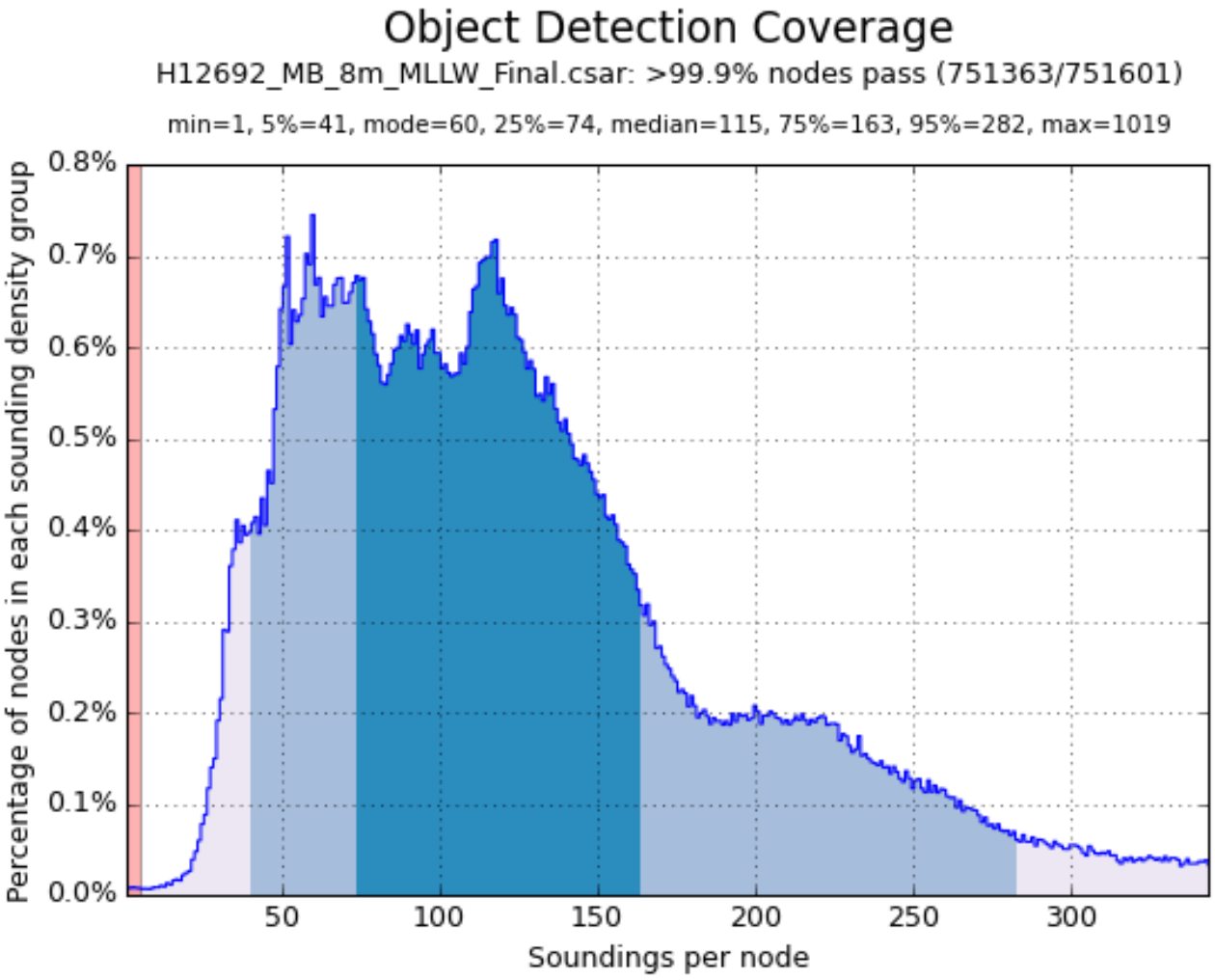


Figure 6: Surface Density Histograms: 8m Object Detection Coverage

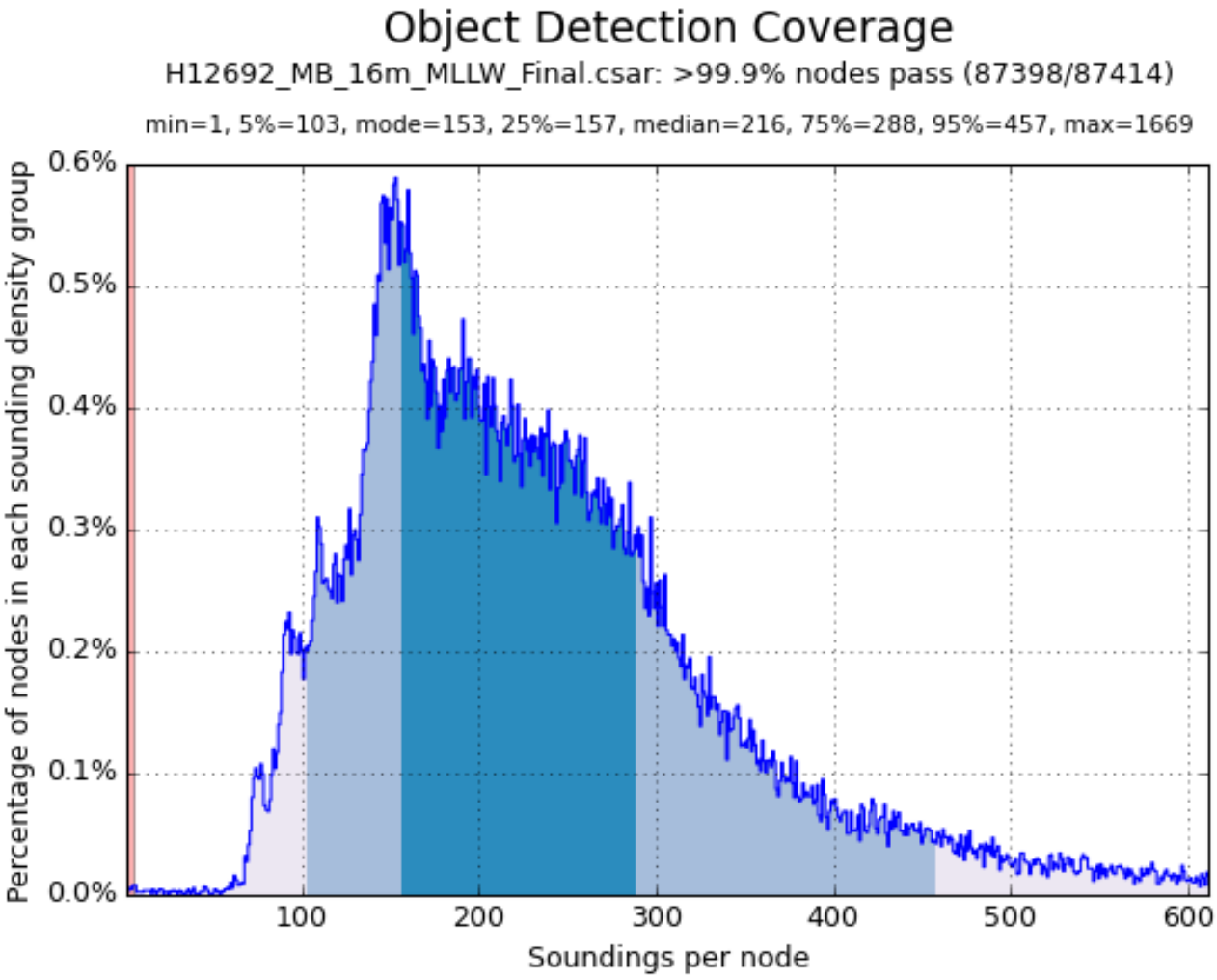


Figure 7: Surface Density Histograms: 16m Object Detection Coverage

A.4 Survey Coverage

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

Water Depth	Coverage Required
Inshore limit to 8 meters water depth	100m spaced Set Line Spacing with Single Beam Echosounder (SBES) or MBES with concurrent backscatter
Greater than 8 meters water depth	MBES with concurrent backscatter

Complete MBES coverage was achieved within the limits of hydrography as specified in the Project Instructions with the exception of following four holidays:

1.) A holiday measuring approximately 15 meters long by 5 meters wide is present at the end of line 2803_2015_2912204 (figures 9, 10, and 11).

2.) A holiday measuring approximately 12 meters long by 4 meters wide is present between lines 2802_2015_2790208 and 2802_2015_2790236 (figures 12, 13, and 14).

3.) A holiday measuring approximately 10 meters long by 5 meters wide is present in the close proximity of lines 2801_2015_2912356, 2801_2015_2912334, and 2801_2015_2912324 (figures 15, 16, and 17).

4.) A holiday measuring approximately 12 meters long by 4 meters wide is present between lines 2804_2015_2801948 and 2802_2015_2912219 (figures 18, 19, and 20).

Items 1 and 2 under section A.4 of this report are not holidays. These data gaps span less than three by three nodes and therefore do not meet the definition of a holiday as defined in section 5.2.2.2 of the 2015 HSSDM. Item 3 is a data gap caused by a rock awash which was unsafe to approach.

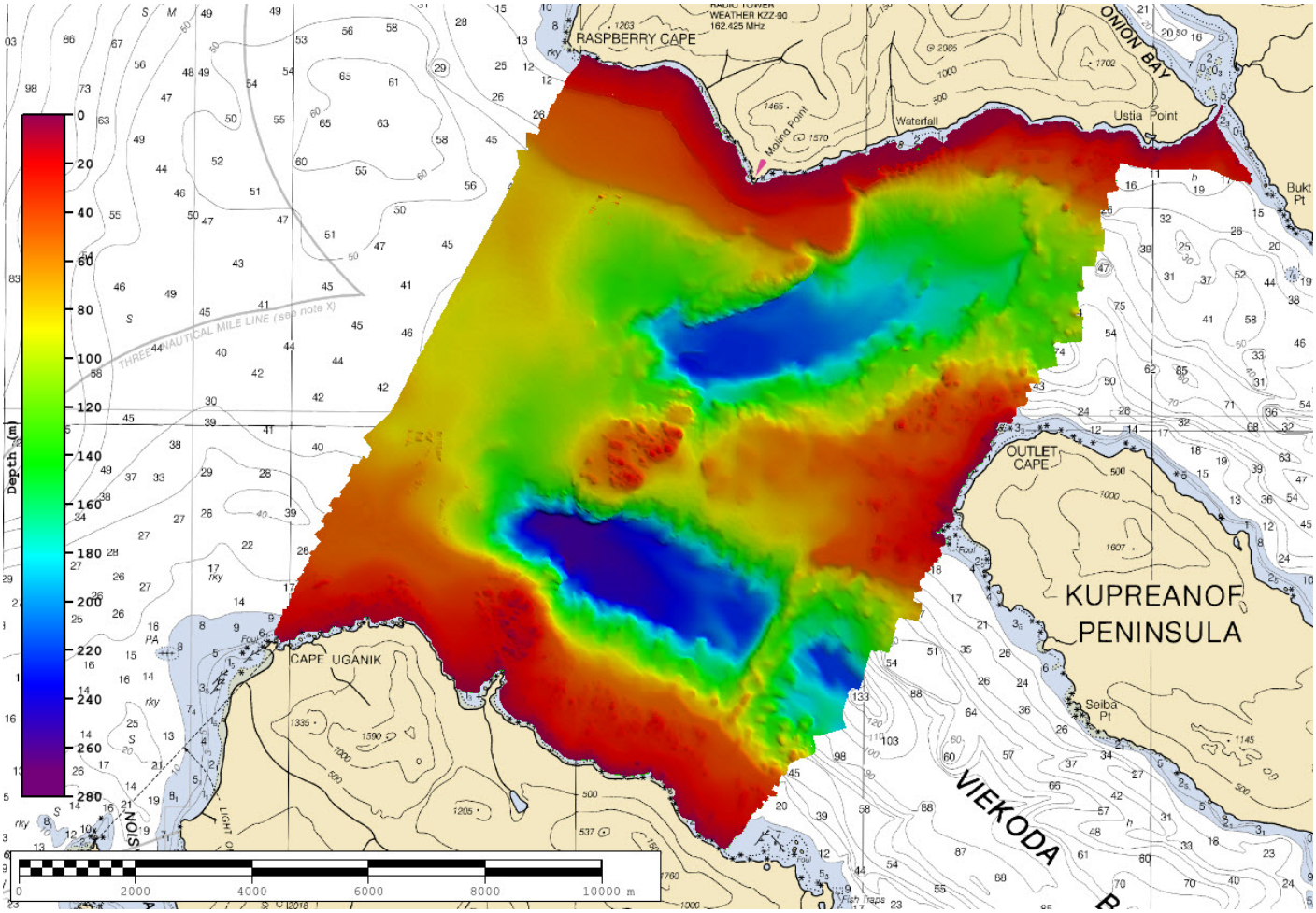


Figure 8: Acquired survey coverage overlaid on Chart 16576.

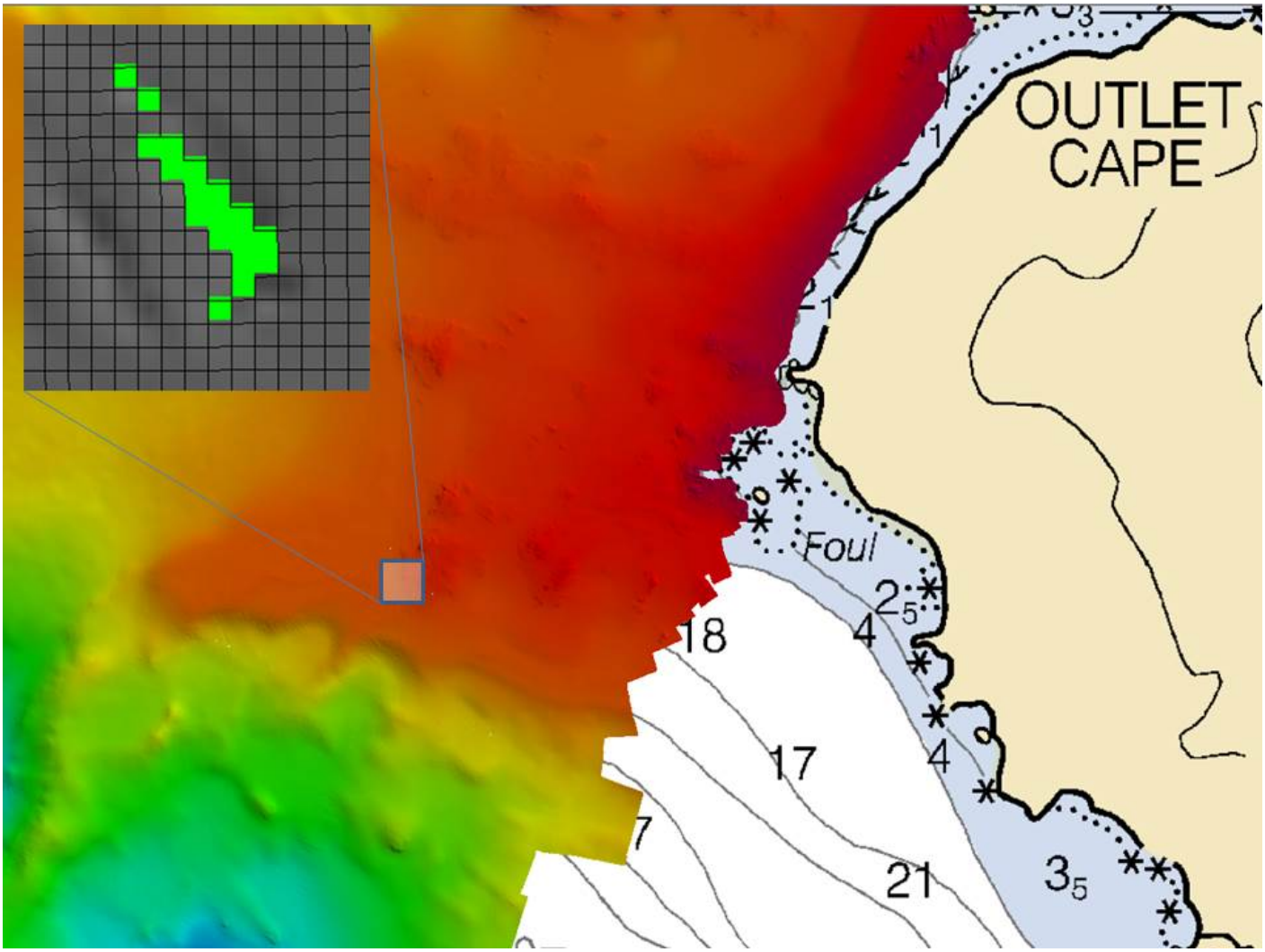


Figure 9: A 15m long by 5m wide holiday present in the 2-meter surface at a depth of 18 meters.

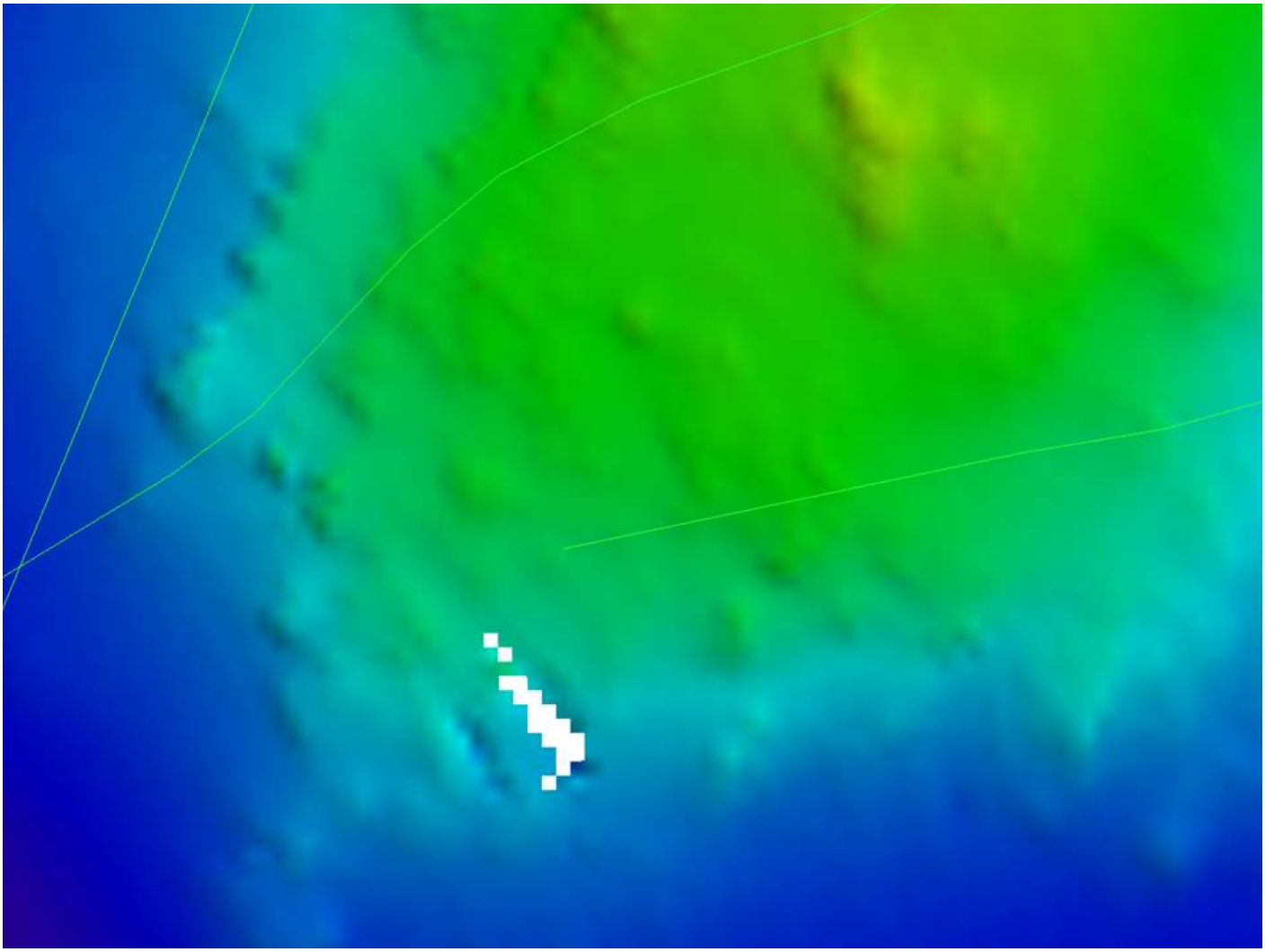


Figure 10: The holiday exists at the end of line 2803_2015_2912204.

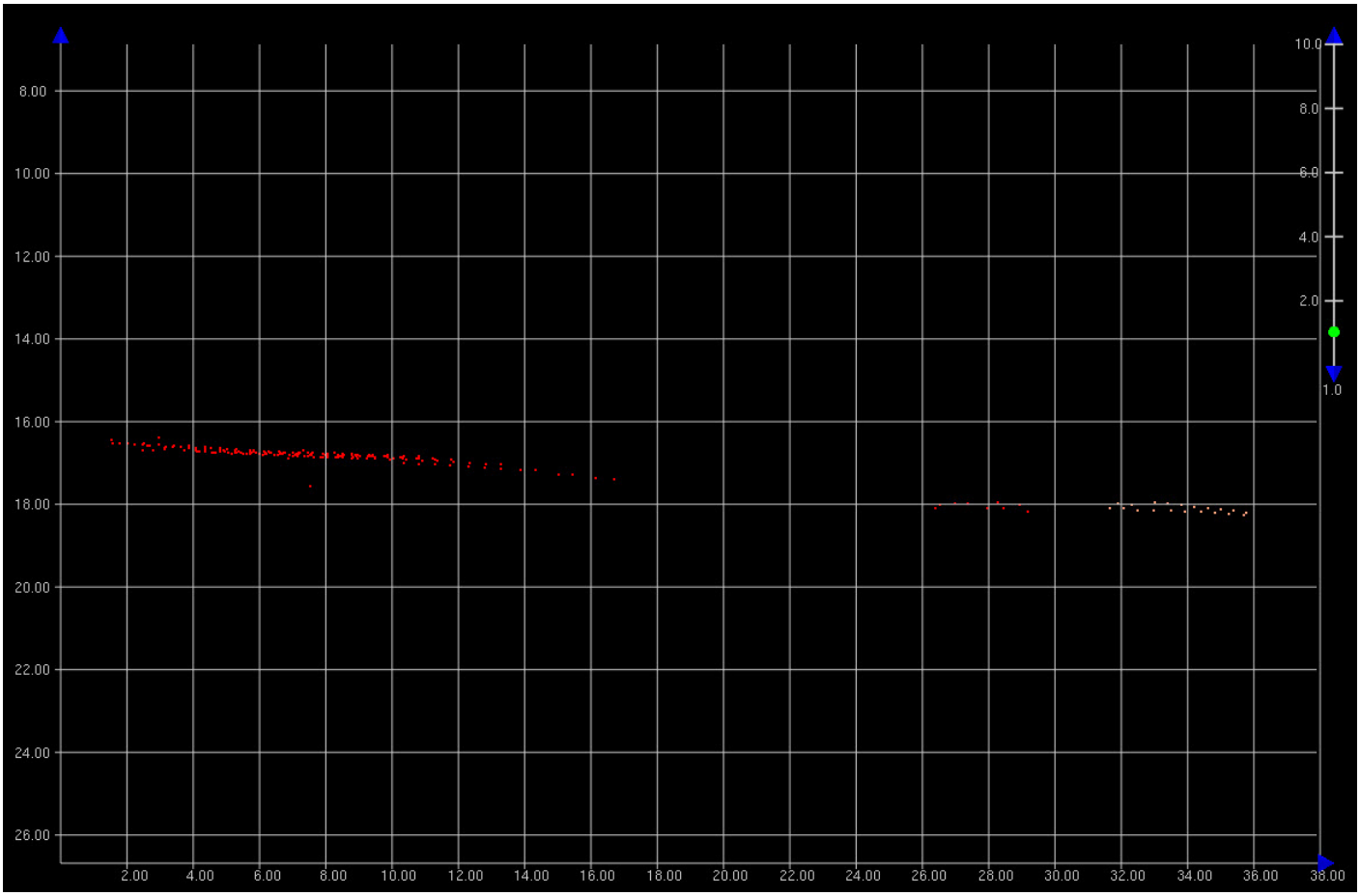


Figure 11: A Subset view of the lack of soundings creating the holiday.

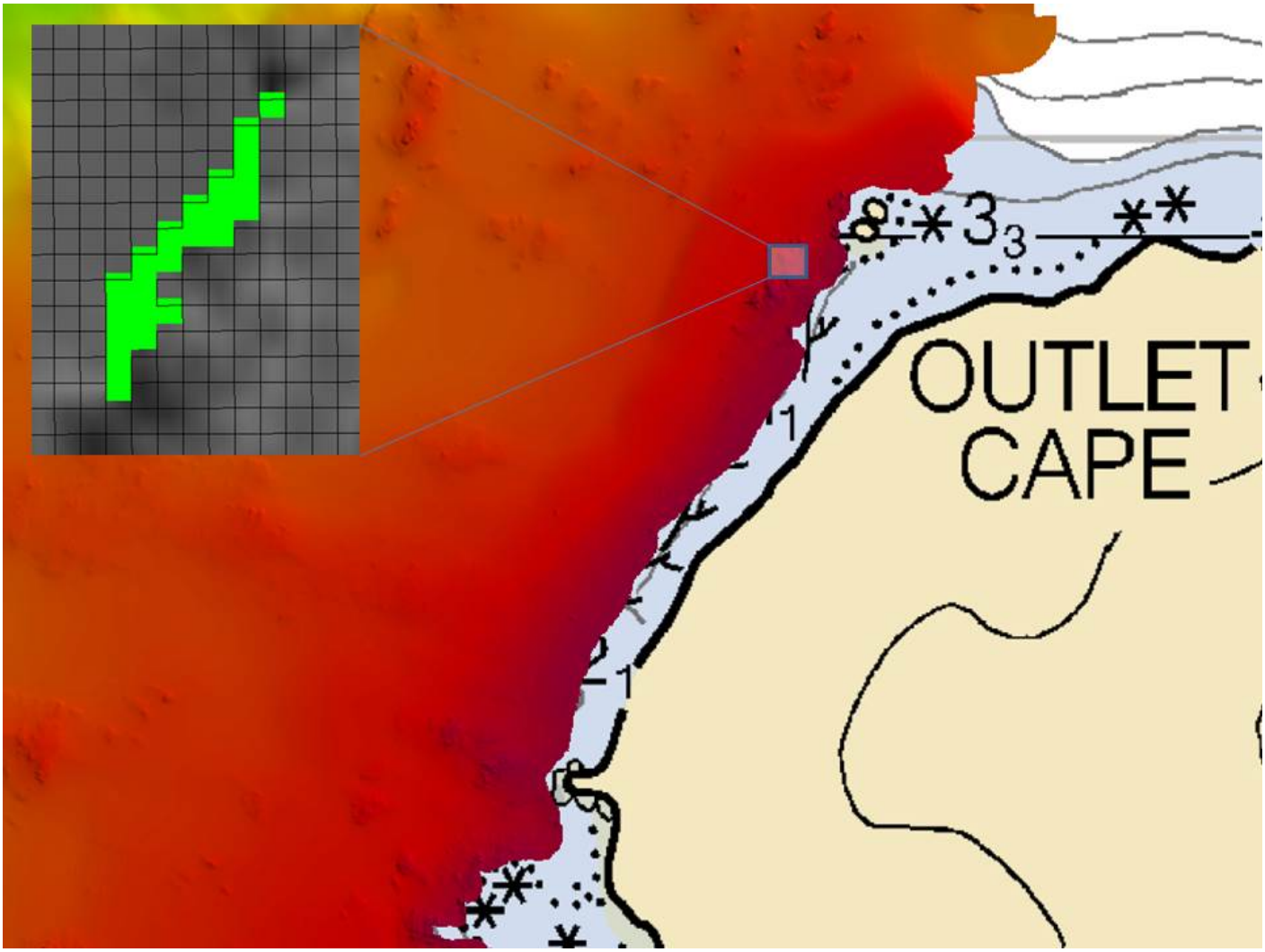


Figure 12: A 12m long by 4m wide holiday present in the 1-meter surface at a depth of 8 meters.

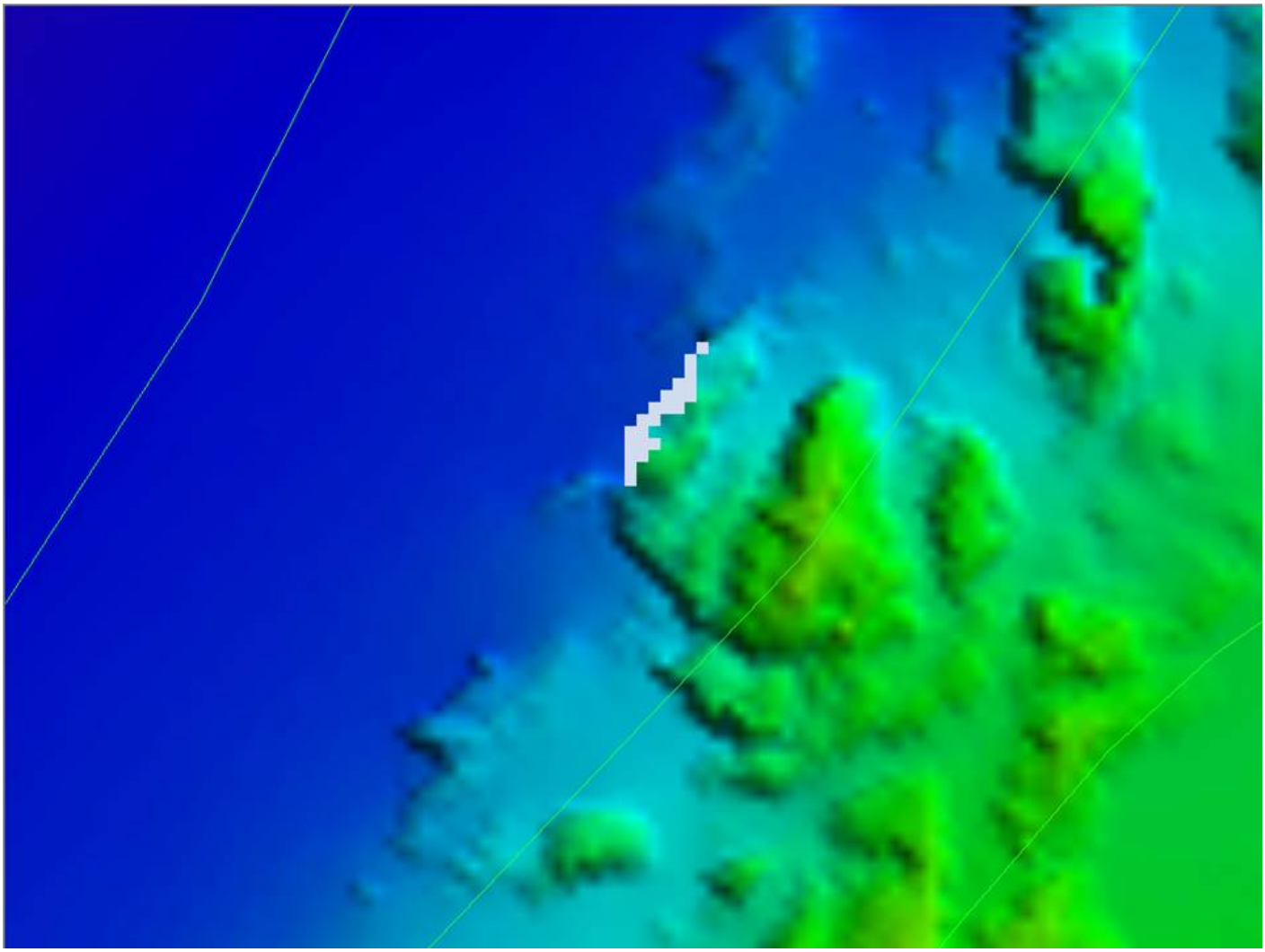


Figure 13: The holiday exists between lines 2802_2015_2790208 and 2802_2015_2790236.

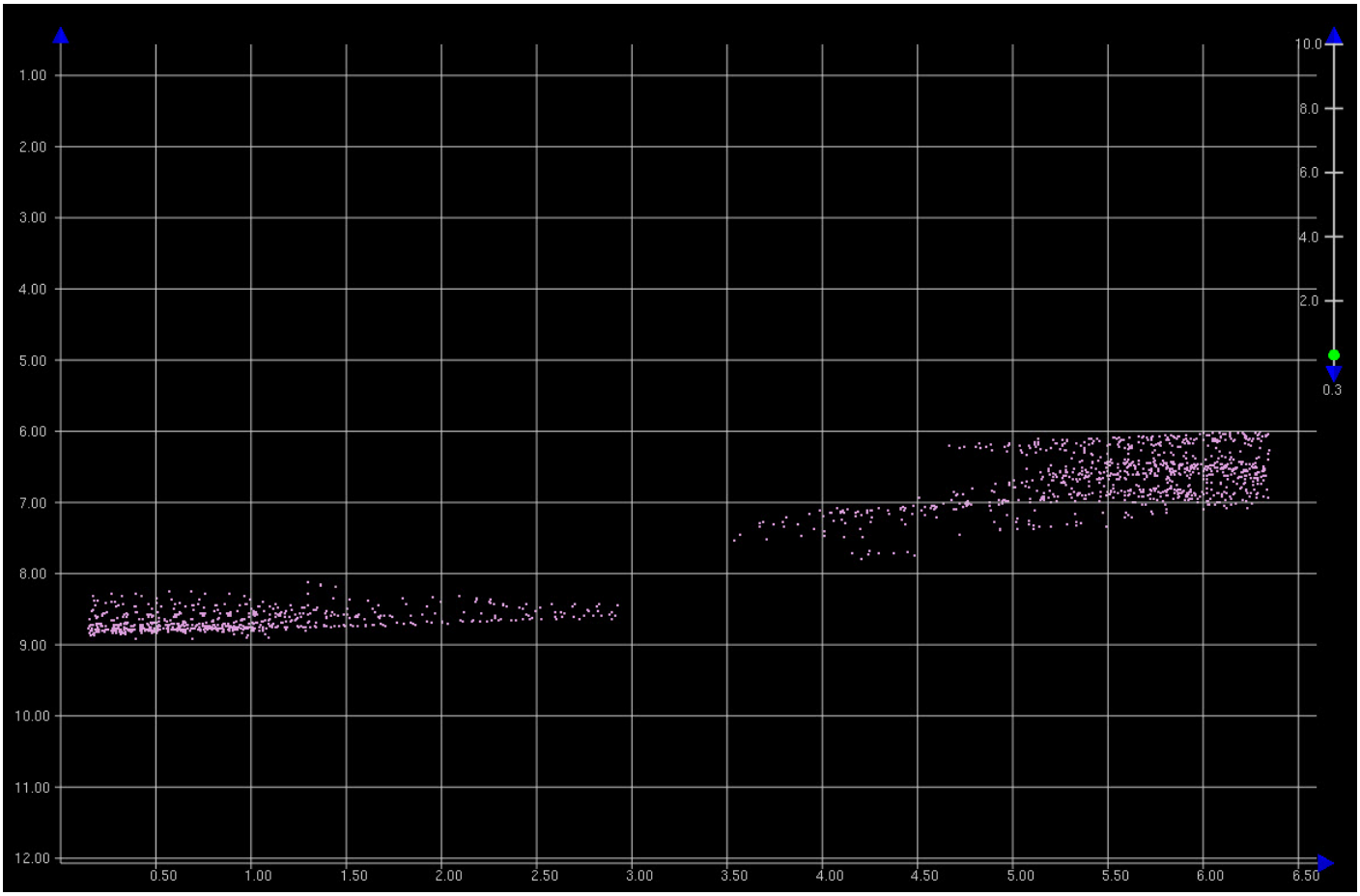


Figure 14: A Subset view of the lack of soundings creating the holiday.

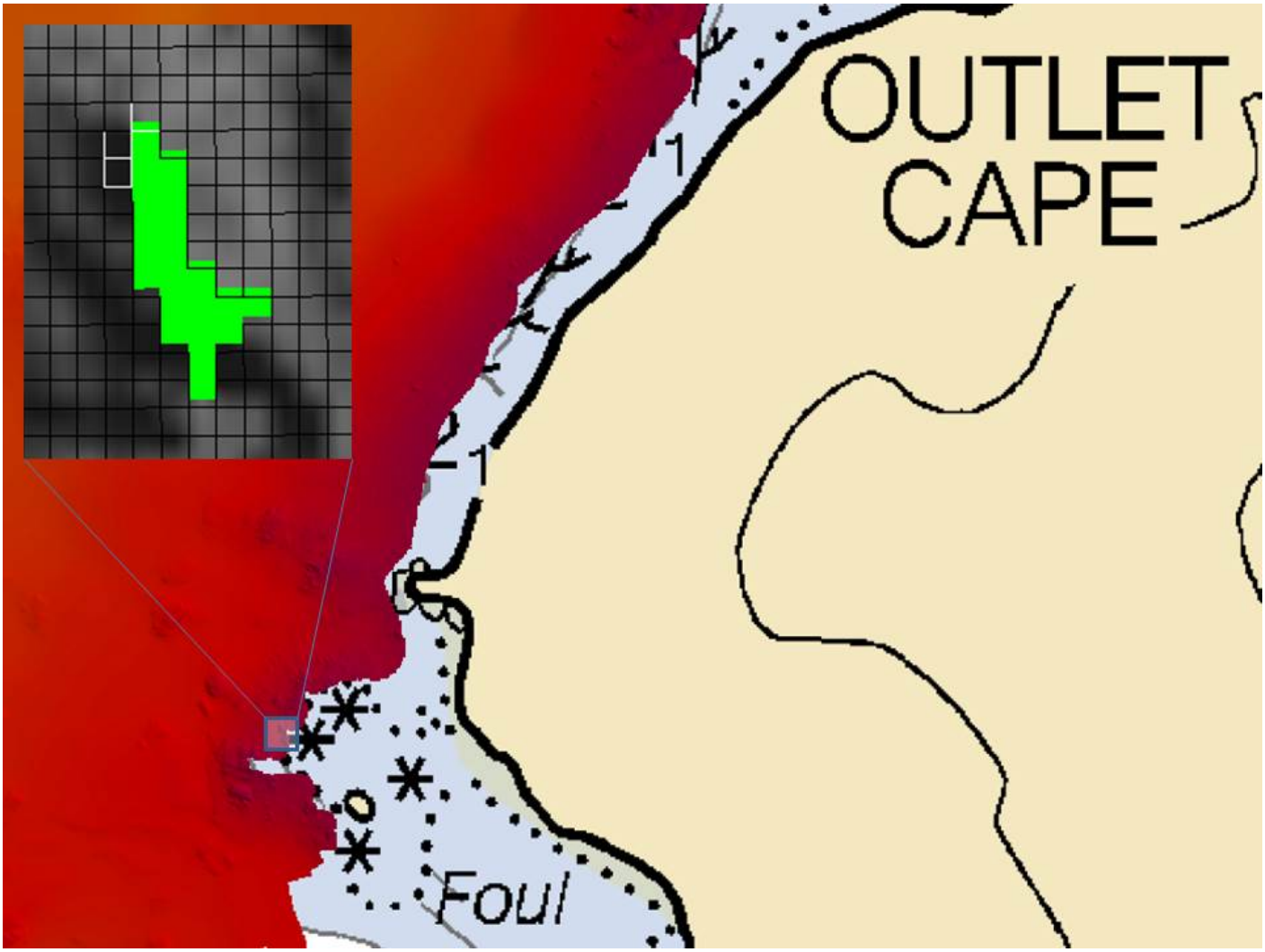


Figure 15: A 10m long by 5m wide holiday present in the 1-meter surface at a depth of 2 meters.

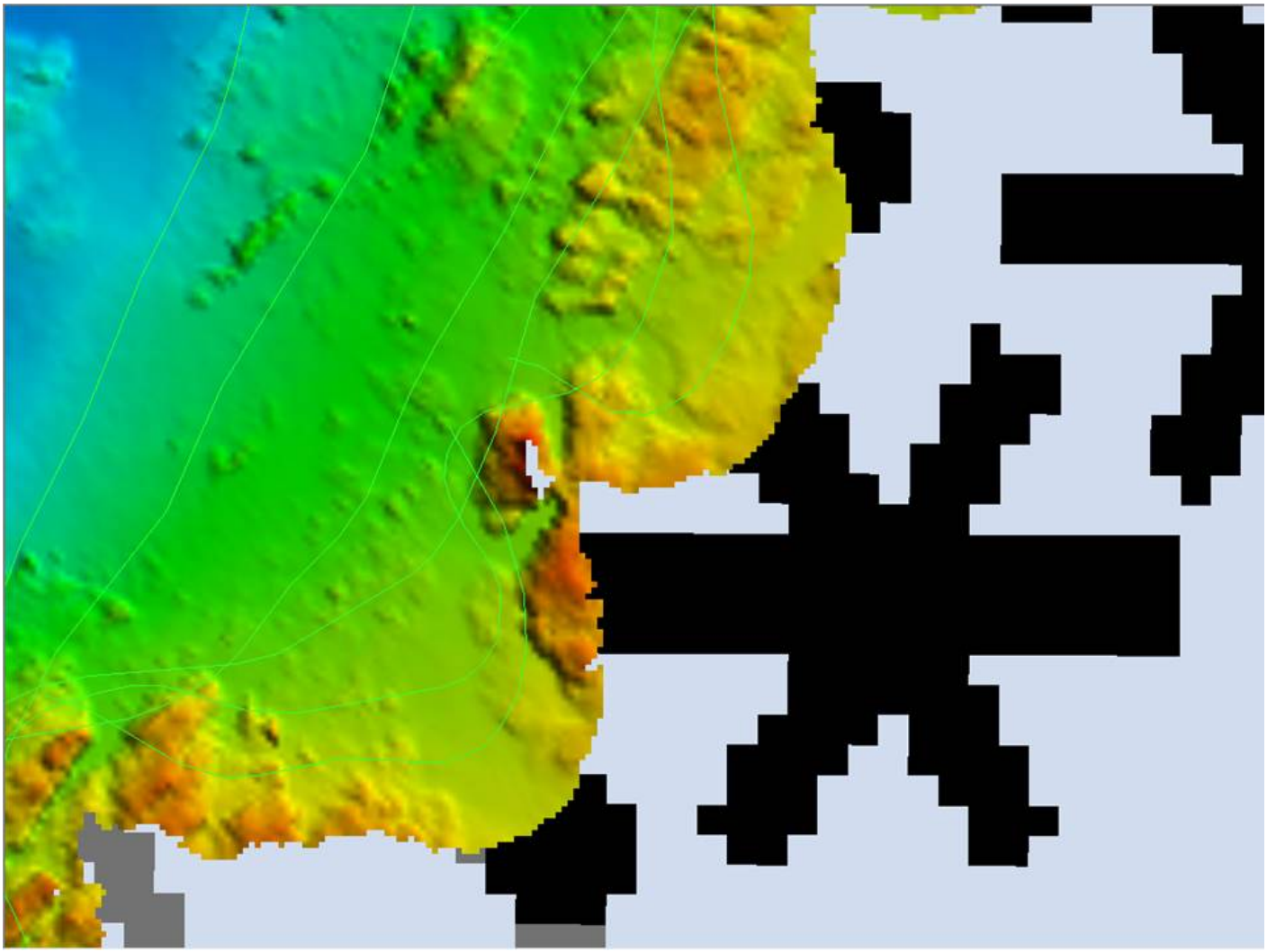


Figure 16: The holiday is in the close proximity of lines 2801_2015_2912356, 2801_2015_2912334, and 2801_2015_2912324.

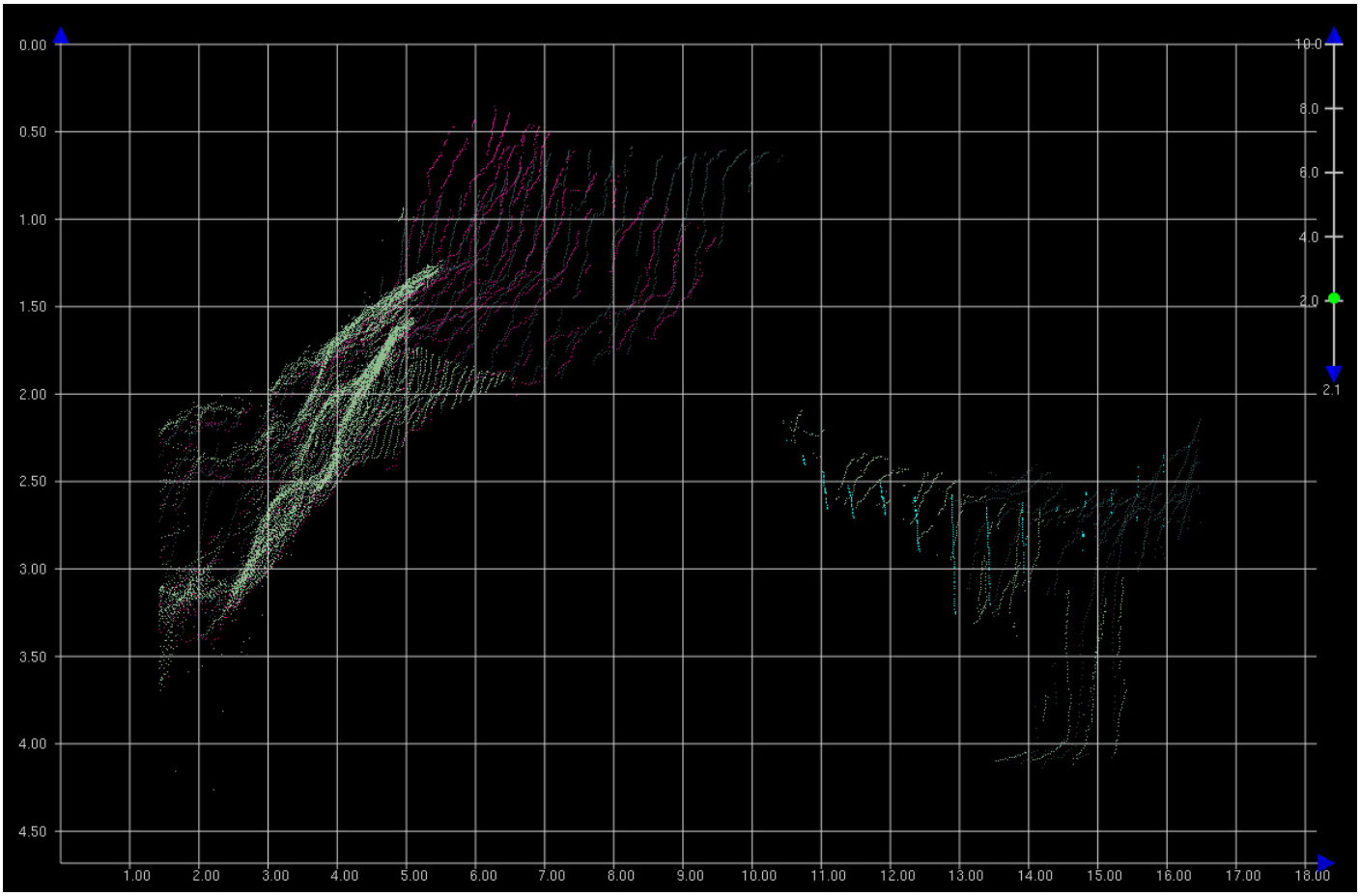


Figure 17: A Subset view of the lack of soundings creating the holiday.

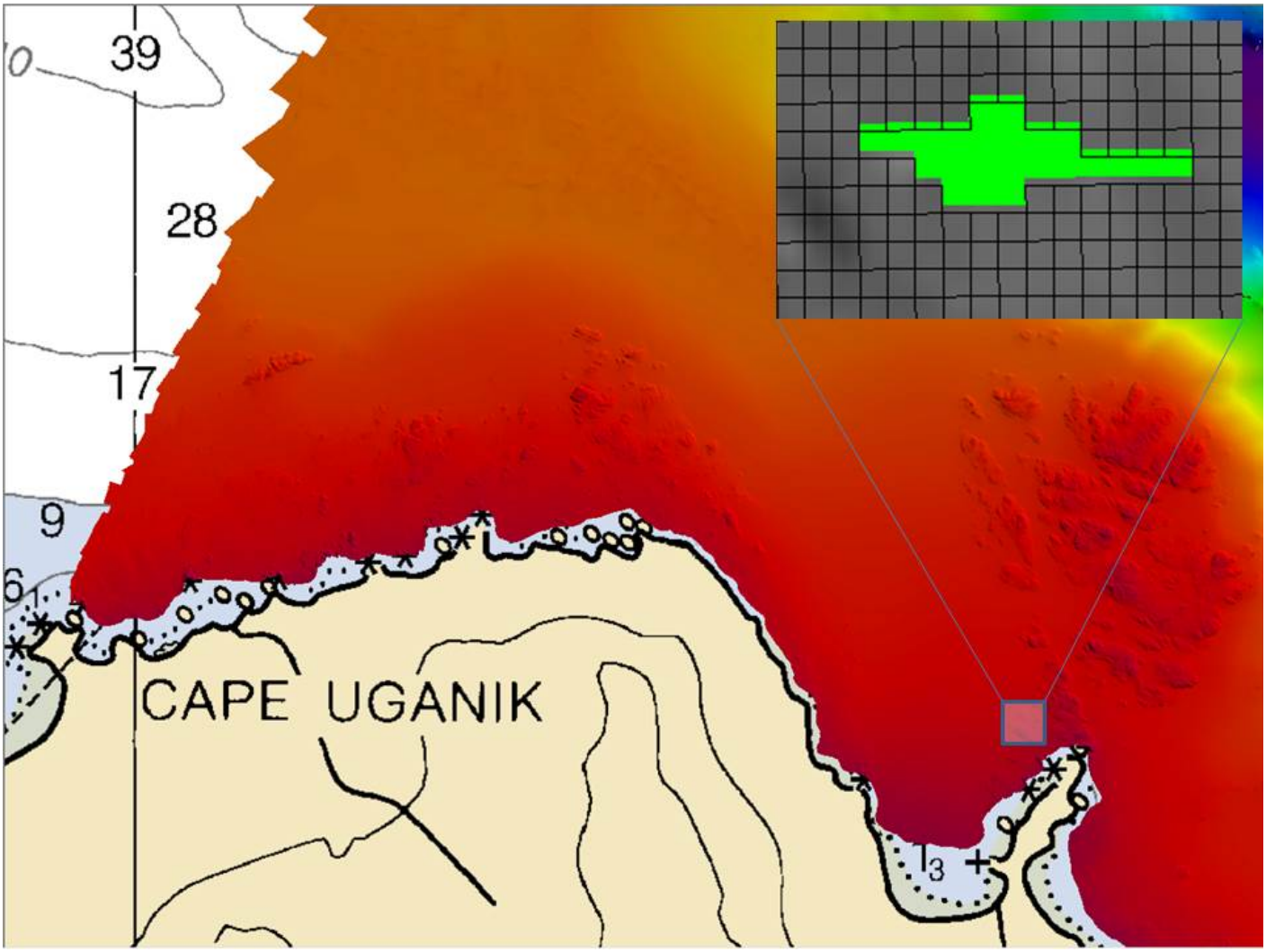


Figure 18: A 12m long by 4m wide holiday present in the 1-meter surface at a depth of 7 meters.

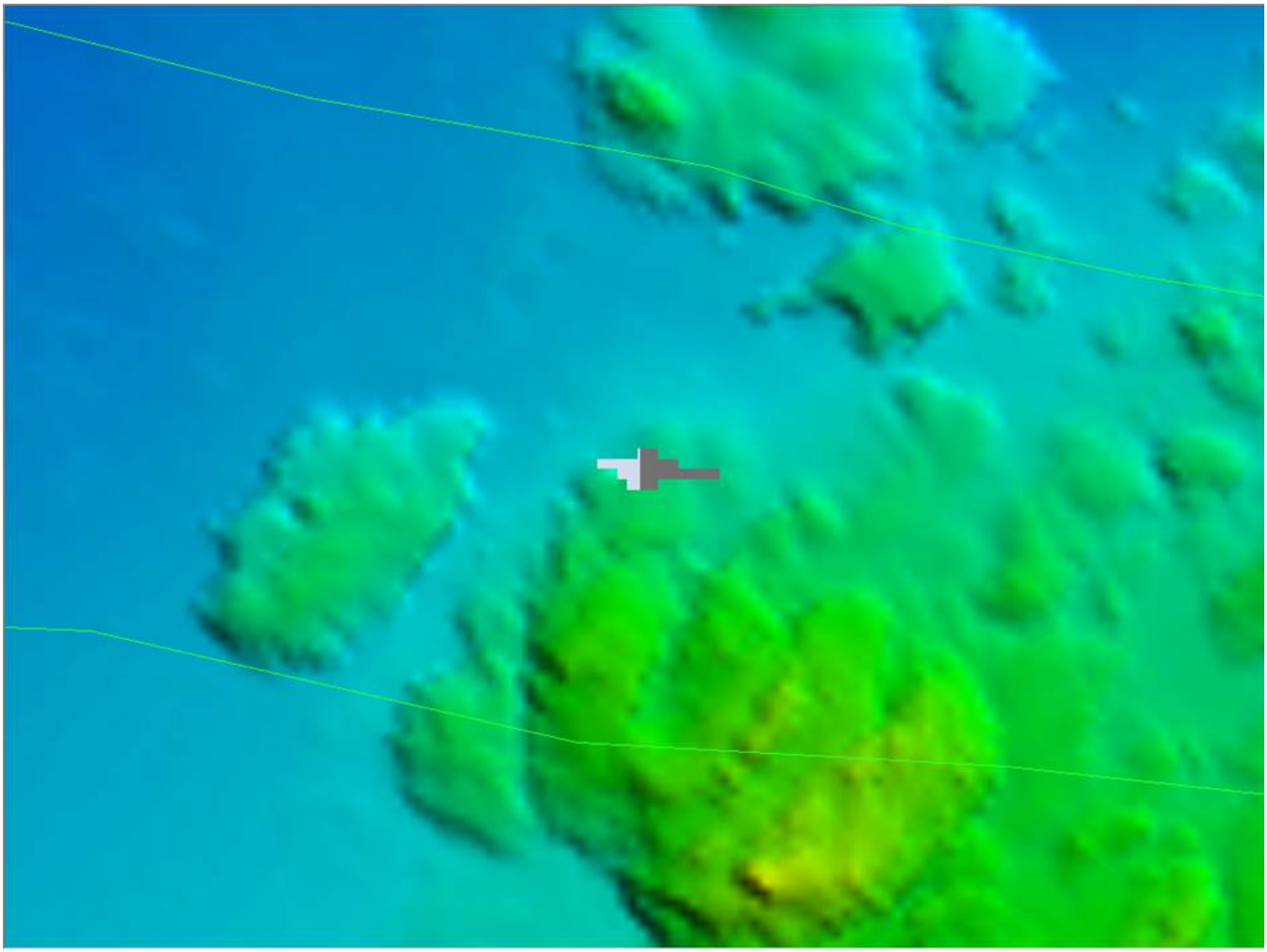


Figure 19: The holiday exists between lines 2804_2015_2801948 and 2802_2015_2912219.

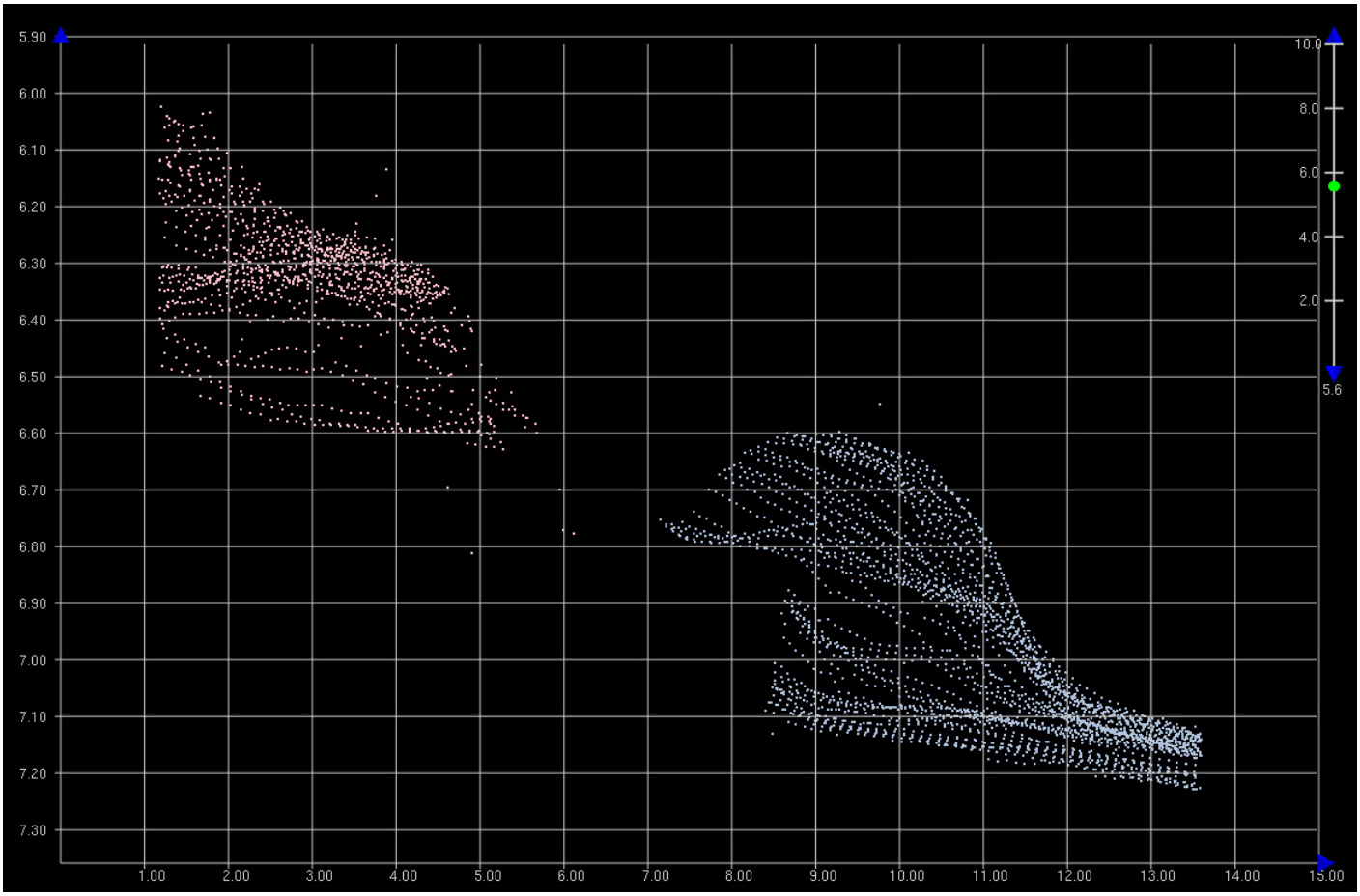


Figure 20: A Subset view of the lack of soundings creating the holiday.

A.5 Survey Statistics

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

	HULL ID	*RA-3 (2803)*	*RA-4 (2801)*	*RA-5 (2802)*	*RA-6 (2804)*	*Rainier (S-221)*	*Total*
LNM	**SBES Mainscheme**	0	0	0	0	0	0
	MBES Mainscheme	47.89	47.56	160.76	144.14	80.74	481.09
	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	6.48	0	0	4.94	19.14	30.56
	Lidar Crosslines	0	0	0	0	0	0
Number of Bottom Samples							8
Number Maritime Boundary Points Investigated							0
Number of DPs							60
Number of Items Investigated by Dive Ops							0
Total SNM							32.43

Table 2: Hydrographic Survey Statistics

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

Survey Dates	Day of the Year
09/19/2015	262

Survey Dates	Day of the Year
09/22/2015	265
10/03/2015	276
10/04/2015	277
10/05/2015	278
10/06/2015	279
10/07/2015	280
10/17/2015	290
10/18/2015	291
10/19/2015	292

Table 3: Dates of Hydrography

B. Data Acquisition and Processing

B.1 Equipment and Vessels

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

B.1.1 Vessels

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

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

Table 4: Vessels Used

B.1.2 Equipment

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

Manufacturer	Model	Type
Kongsberg	EM710	MBES
Applanix	POS-MV V4	Vessel Positioning and Attitude System
Odim Brooke Ocean (Royals Royce Group)	Moving Vessel Profiler 200	Conductivity, Temperature, and Depth Sensor
Reson	SeaBat 7125-B	MBES
Reson	SeaBat 7125 SV2	MBES
Reson	SVP70	Sound Speed System
Reson	SVP71	Sound Speed System
Sea-Bird Electronics	SBE 19plus SEACAT Profiler	Conductivity, Temperature, and Depth Sensor

Table 5: Major Systems Used

B.2 Quality Control

B.2.1 Crosslines

Crosslines acquired for this survey totaled 6.35% of mainscheme acquisition.

Multibeam crosslines were acquired using the Reson 7125 on launches 2803 (RA-3) and 2804 (RA-6) and using the EM710 on S221. An 8-meter CUBE surface was created using only mainscheme lines, and a second 8-meter CUBE surface was created using only crosslines. A difference surface was generated from these two surfaces in Caris at an 8-meter resolution. The absolute difference was compared to the IHO allowable total vertical uncertainty (TVU) standards for order 1 depths (0-100 meters) and order 2 depths (greater than 100 meters). In total, 99.5% of the depth differences between H12692 mainscheme and crossline data met HSSD TVU standards (Figure 22). This analysis was performed on H12692 data reduced to Mean Lower-Low Water (MLLW) using Ellipsoidally Referenced Zoned Tides (ERZT) methods.

A mainscheme to crossline comparison of H12692 data reduced to MLLW using Discrete Zoned Tides was also conducted. Discrete Zoned Tides mainscheme to crossline data differed by an average of 0.0039 meters with a standard deviation of 0.5798 meters. ERZT mainscheme to crossline data differed by an average of 0.0507 meters with a standard deviation of 0.4758 meters (Figure 23).

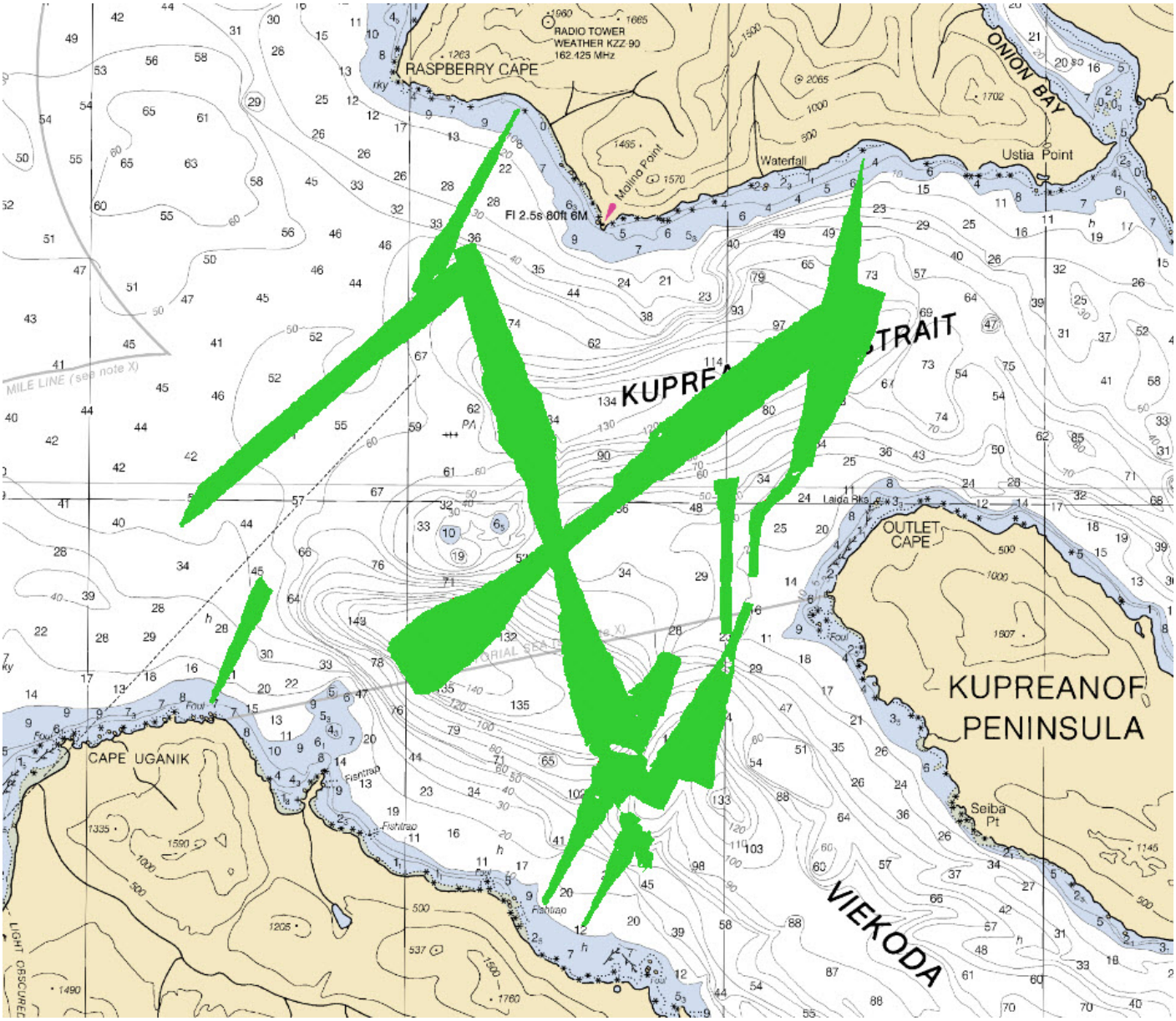


Figure 21: H12692 Crosslines

Depth range	IHO Order	Number of nodes	Nodes satisfying HSSD	Percent nodes satisfying HSSD accuracy
Less than 100m	Order 1	98,471	97,041	98.5%
Greater than 100m	Order 2	220,046	219,827	99.9%
	TOTAL:	318,517	316,868	99.5%

Figure 22: Crossline-based HSSD Compliance Statistics

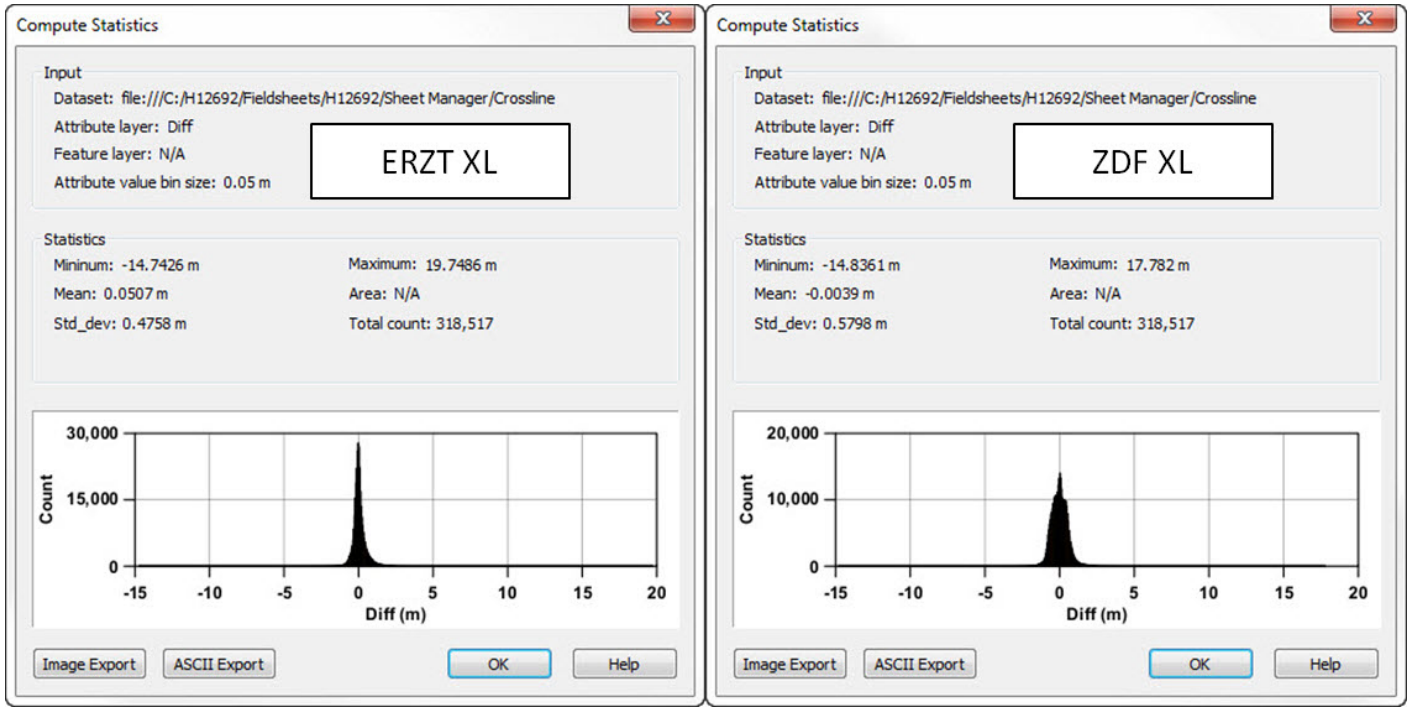


Figure 23: H12692 MBES mainscheme to crossline comparison statistics using ERZT (left) and Discrete Zoned Tides (right).

B.2.2 Uncertainty

The following survey specific parameters were used for this survey:

Measured	Zoning	Method
0.03527412 meters	0 meters	ERS via ERZT

Table 6: Survey Specific Tide TPU Values.

Uncertainty values were measured and applied in accordance with Section B.4 of the DAPR.

Total Propagated Uncertainty (TPU) values for H12692 were derived from a combination of fixed values for equipment and vessel characteristics, as well as field assigned values for sound speed uncertainties. Tidal uncertainties were accounted for by examining the created 1000-meter separation model and statistically determining a measured uncertainty. The measured tide error uncertainty value of 0.03527412 meters was entered to account for ERZT processing methods.

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 Reson MBES sonars were recorded and applied during post processing. Applanix True Heave (POS) files, which

record estimates of heave uncertainty, were also applied during post processing. Finally, the post processed uncertainties associated with vessel roll, pitch, yaw and navigation, were applied in Caris HIPS using SBET/ RMS files generated using POSPac software.

Uncertainty values of submitted final grids were calculated in Caris using the "Greater of the Two" of uncertainty and standard deviation (scaled to 95%). The finalized CSAR IHO compliance tool within Pydro was used to analyze H12692 MBES uncertainty. All H12692 MBES surfaces met HSSD uncertainty requirements (Figures 24-28).

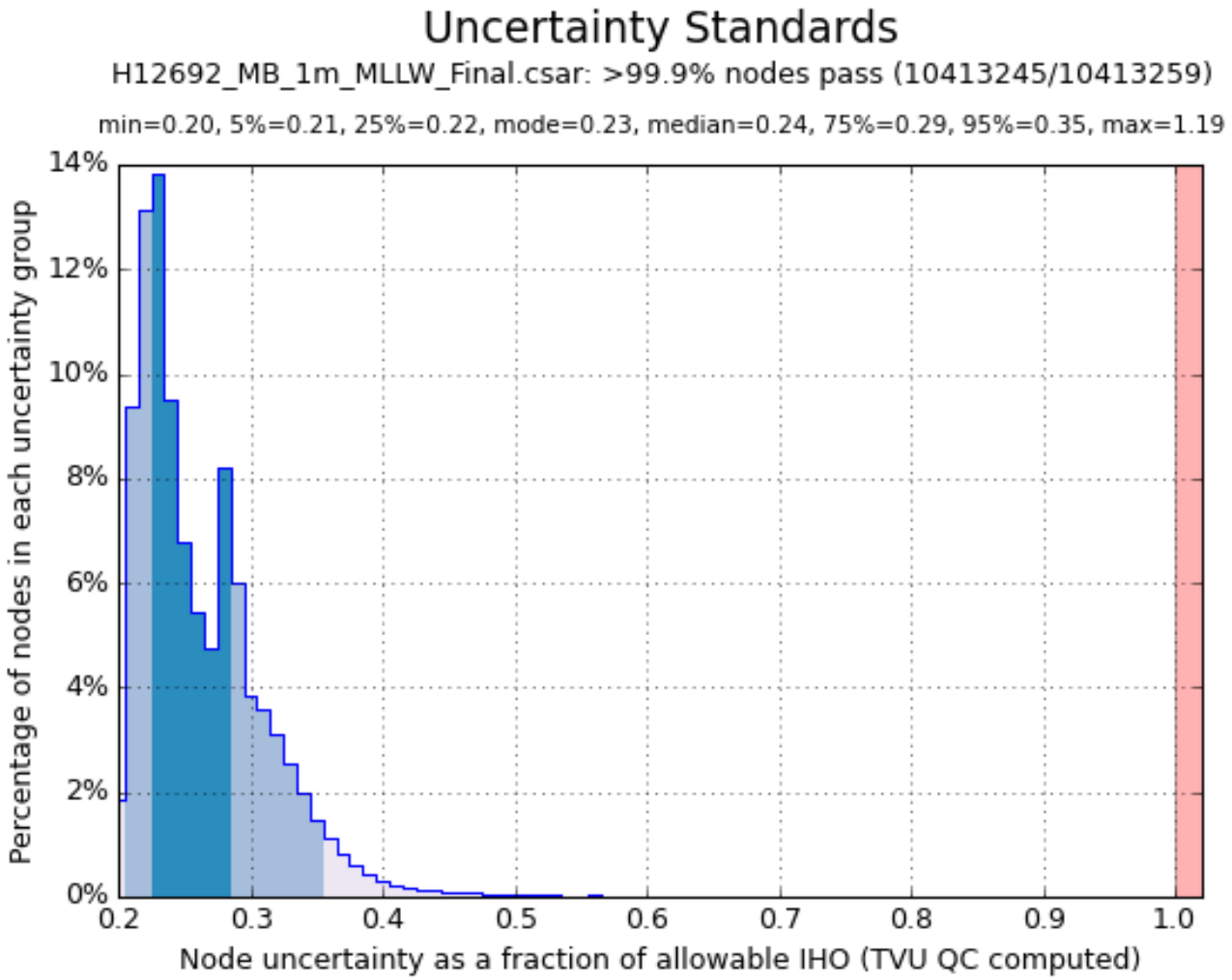


Figure 24: Surface density histograms of HSSD uncertainty standards for 1-meter finalized surface

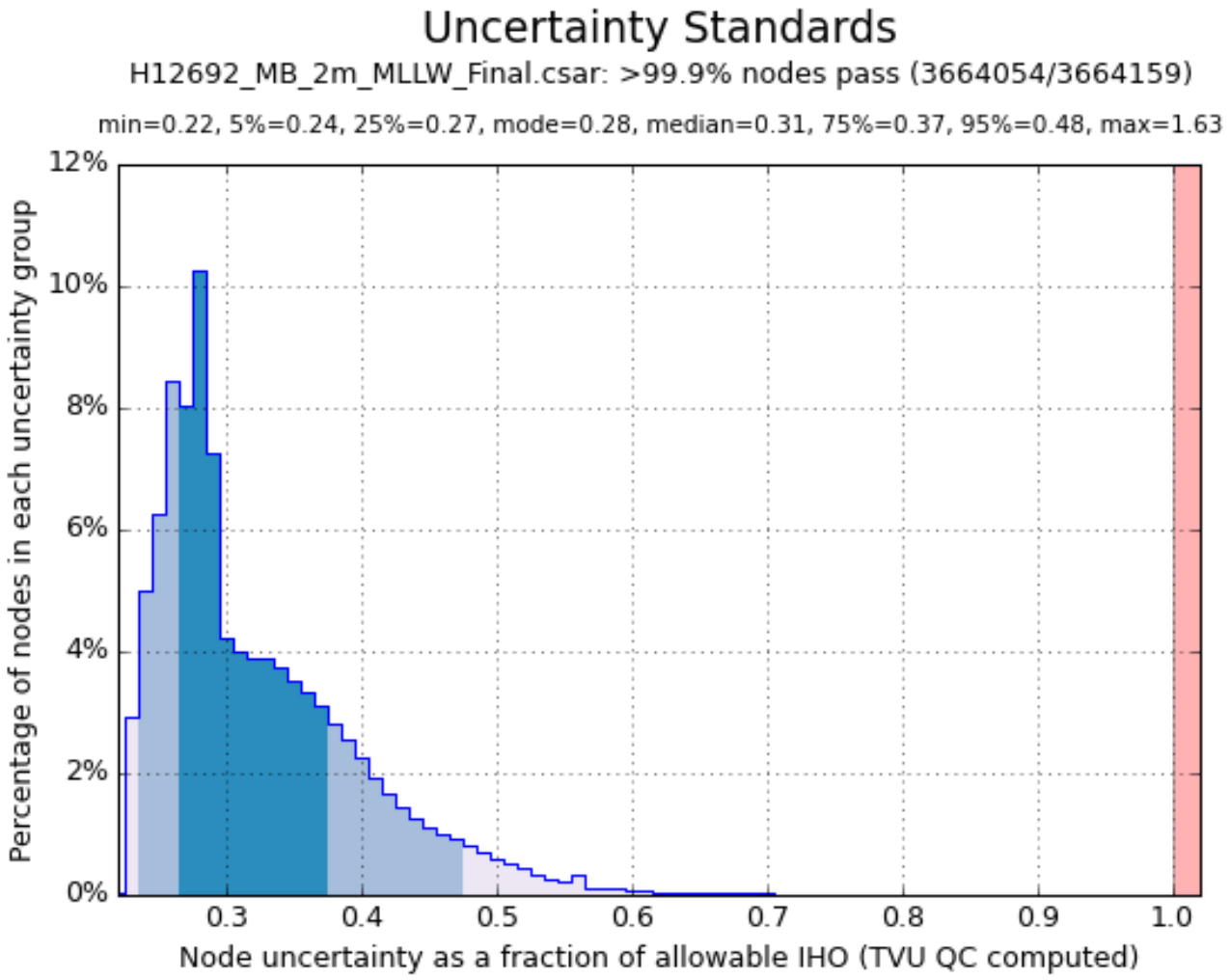


Figure 25: Surface density histograms of HSSD uncertainty standards for 2-meter finalized surface

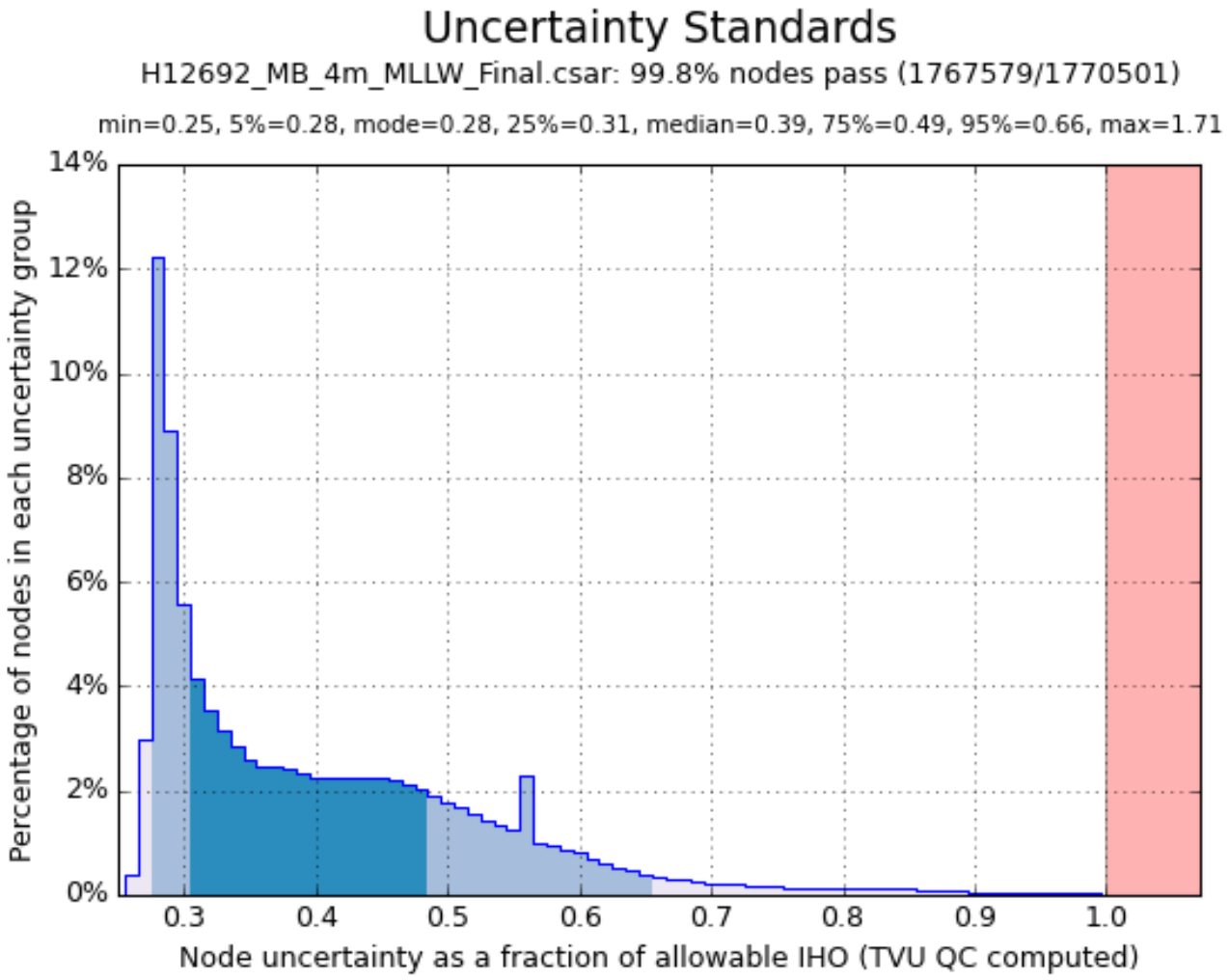


Figure 26: Surface density histograms of HSSD uncertainty standards for 4-meter finalized surface

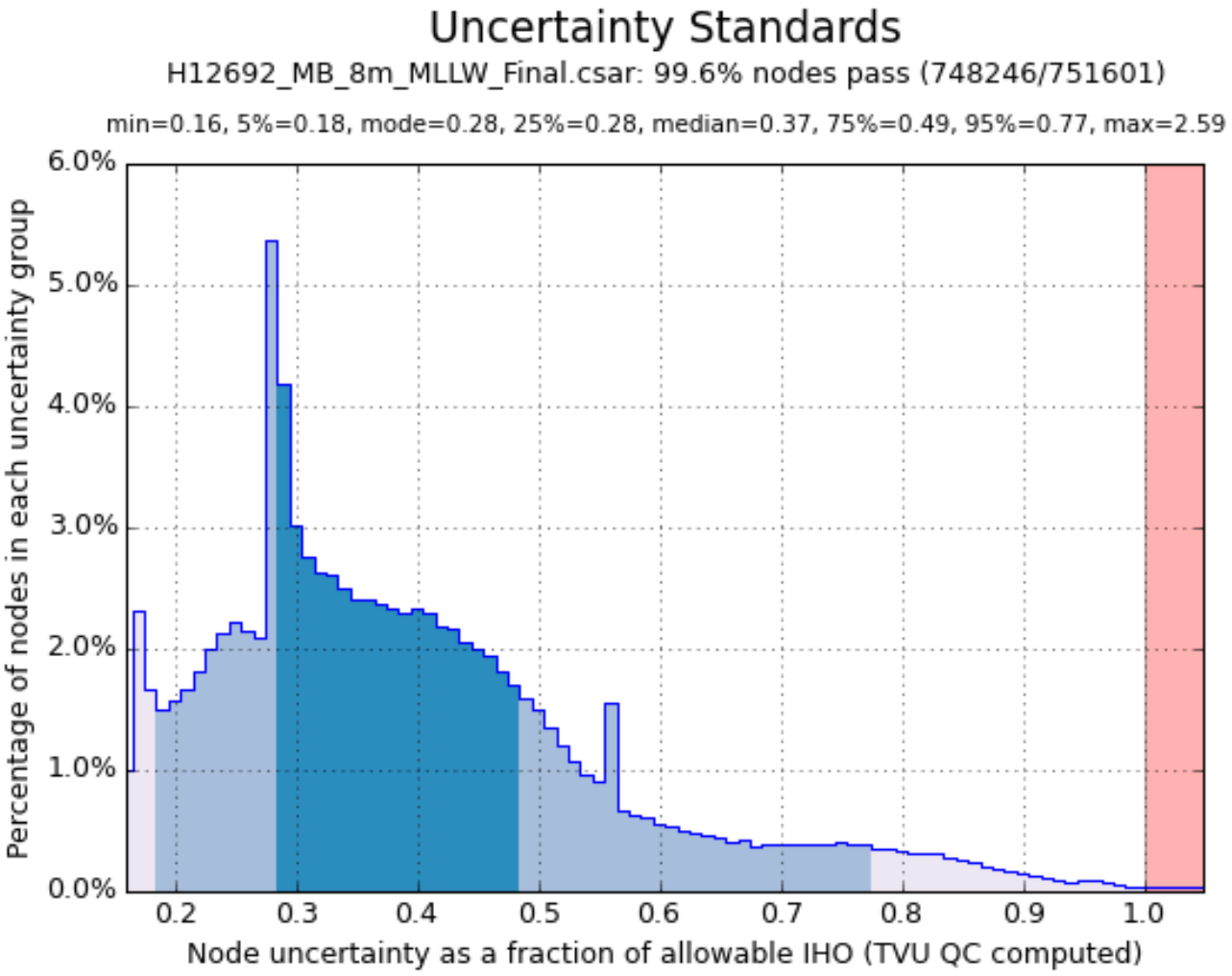


Figure 27: Surface density histograms of HSSD uncertainty standards for 8-meter finalized surface

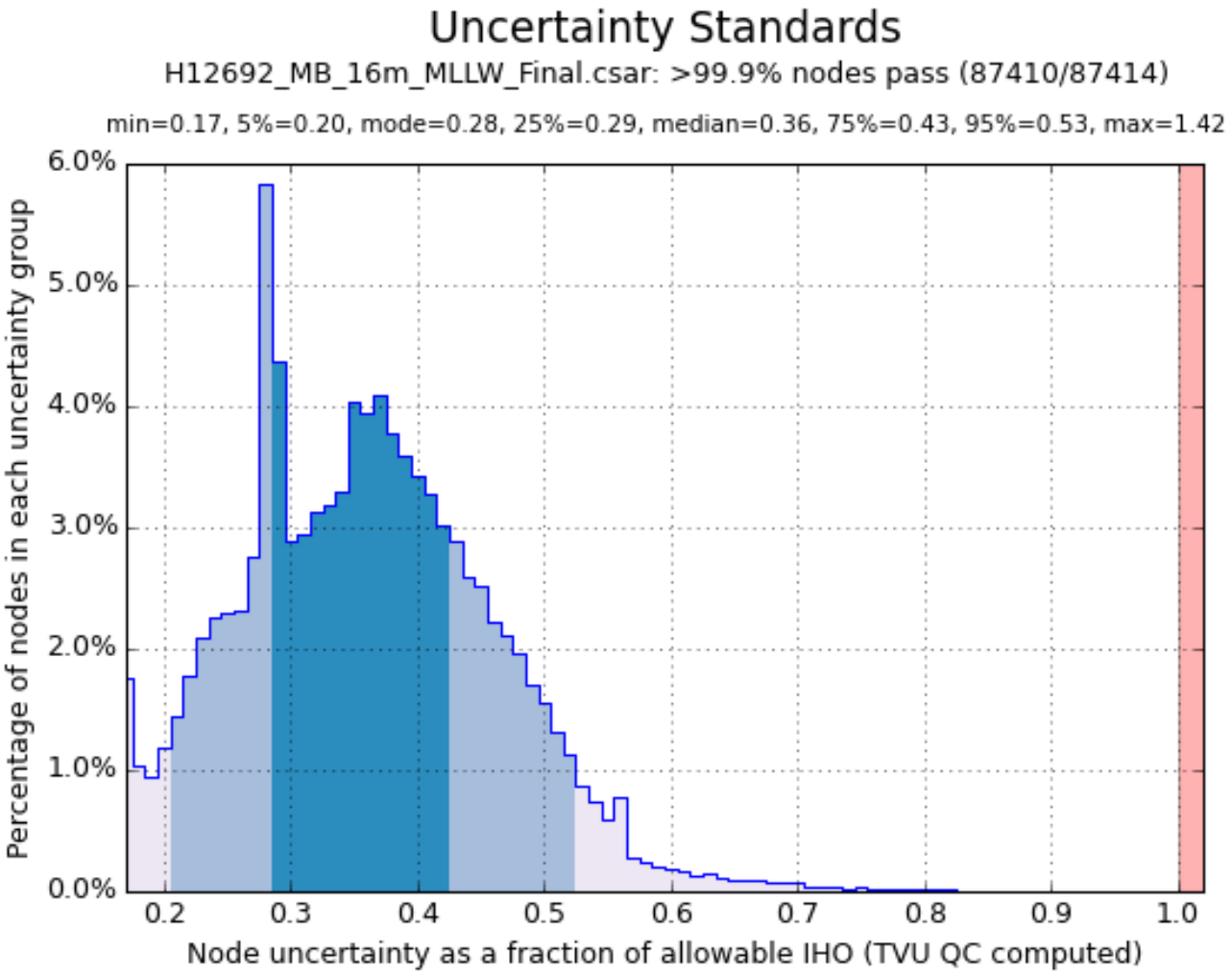


Figure 28: Surface density histograms of HSSD uncertainty standards for 16-meter finalized surface

Figures 24 through 28 under section B.2.2 of this report relate to node uncertainty and do not depict surface density.

B.2.3 Junctions

A junction analysis of H12692 was performed with each of the two adjoining surveys; H12690, and H12691. 8-meter surfaces were used throughout these analysis as that resolution was determined to best represent the area of overlap. Each junction analysis was performed in the following manner. The 8-meter surface of H12692 was finalized into two depth ranges (0-100 meters and 100-1000 meters). IHO order 1 and IHO order 2 compliance layers were calculated for each depth range respectively. A difference surface between the depth layers of H12692 and the adjoining survey was created. The resulting surface was used to calculate an absolute difference child-layer. The difference between the IHO compliance layer of the finalized surface and the absolute difference of the two sheet's depth layers demonstrates the degree of IHO compliance along the junction area.

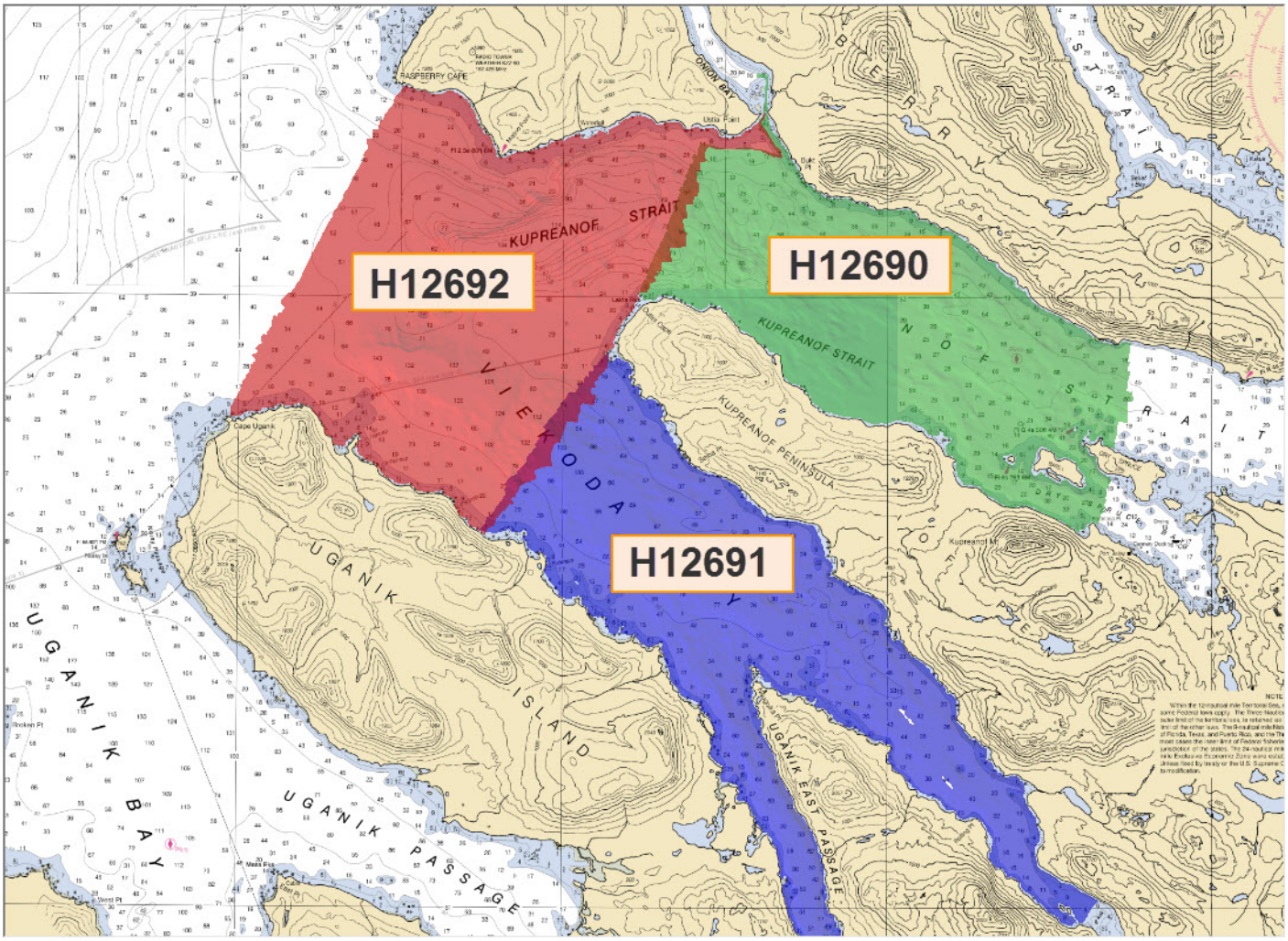


Figure 29: H12692 Junction with H12690 and H12691

The following junctions were made with this survey:

Registry Number	Scale	Year	Field Unit	Relative Location
H12690	1:40000	2014	NOAA Ship RAINIER	NE
H12691	1:40000	2015	NOAA Ship RAINIER	SE

Table 7: Junctioning Surveys

H12690

Overlap with survey H12690 was approximately 8,600 meters along the north eastern boundary of H12692 (Figure 29). The width of overlap between these two sheets varied from 60 meters to over 600 meters.

Depths in the junction area range from 2.7 meters to 135 meters. For the respective depths, the difference surface was compared to the allowable TVU standards specified in the HSSD. Analysis of the difference surface indicated a mean difference of 0.237 meters with a standard deviation of 0.3482 meters. In total, 97.9% of the depth differences between H12692 and junction survey H12690 are within allowable uncertainties.

Depth range	IHO Order	Number of nodes	Nodes satisfying HSSD accuracy	Percent nodes satisfying HSSD accuracy
Less than 100m	Order 1	33,363	32,256	96.7%
Greater than 100m	Order 2	33,363	33,092	99.2%
	TOTAL:	66,726	65,348	97.9%

Figure 30: Summary table indicating the percentage of nodes from the junction overlap with sheet H12690 that met HSSD allowable TVU standards.

H12691

Overlap with survey H12691 was approximately 6,500 meters along the south eastern boundary of H12692 (Figure 29). The width of overlap between these two sheets varied from 180 meters to 575 meters. Depths in the junction area range from 2.7 meters to 223 meters. For the respective depths, the difference surface was compared to the allowable TVU standards specified in the HSSD. Analysis of the difference surface indicated a mean difference of 0.2681 meters with a standard deviation of 0.344 meters. In total, 98.6% of the depth differences between H12692 and junction survey H12691 are within allowable uncertainties.

Depth range	IHO Order	Number of nodes	Nodes satisfying HSSD accuracy	Percent nodes satisfying HSSD accuracy
Less than 100m	Order 1	18,318	17,740	96.8%
Greater than 100m	Order 2	24,842	24,810	99.9%
	TOTAL:	43,160	42,550	98.6%

Figure 31: Summary table indicating the percentage of nodes from the junction overlap with sheet H12691 that met HSSD allowable TVU standards.

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: All launch sound speed profiles were acquired using SBE 19plus CTD probes at discrete locations within the survey area at least once every four hours, when significant changes in surface speed were observed, or when surveying a new area. For MBES operations conducted on S221 (Rainier), sound speed profiles were acquired using the ODIM Brooke Ocean MVP200 in the same manner and frequency as with the launch CTD casts. A sheet-wide concatenated sound speed file was created and applied to survey lines using the "Nearest in distance within time (4 hours)" profile selection method.

Sound speed profiles were collected, processed, and applied as described in the DAPR.

B.2.8 Coverage Equipment and Methods

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

B.3 Echo Sounding Corrections

B.3.1 Corrections to Echo Soundings

All data reduction procedures conform to those detailed in the DAPR.

B.3.2 Calibrations

All sounding systems were calibrated as detailed in the DAPR.

B.4 Backscatter

Raw Backscatter was logged as a 7k file and has been sent to the Processing Branch. Backscatter was not processed by the field unit.

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 and SIPS	9.0.21

Table 8: Primary bathymetric data processing software

The following Feature Object Catalog was used: NOAA Extended Attribute Files V_5_3_3All features were processed using Caris HIPS and SIPS 9.0 and Caris Notebook 3.1.

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
H12692_MB_1m_MLLW	CUBE	1 meters	-1.24 meters - 261.61 meters	NOAA_1m	Complete MBES
H12692_MB_2m_MLLW	CUBE	2 meters	-1.24 meters - 259.94 meters	NOAA_2m	Complete MBES
H12692_MB_4m_MLLW	CUBE	4 meters	-1.22 meters - 259.76 meters	NOAA_4m	Complete MBES
H12692_MB_8m_MLLW	CUBE	8 meters	-0.11 meters - 258.77 meters	NOAA_8m	Complete MBES
H12692_MB_16m_MLLW	CUBE	16 meters	0.60 meters - 258.46 meters	NOAA_16m	Complete MBES
H12692_MB_1m_MLLW_Final	CUBE	1 meters	-1.24 meters - 20 meters	NOAA_1m	Complete MBES
H12692_MB_2m_MLLW_Final	CUBE	2 meters	18 meters - 40 meters	NOAA_2m	Complete MBES

Surface Name	Surface Type	Resolution	Depth Range	Surface Parameter	Purpose
H12692_MB_4m_MLLW_Final	CUBE	4 meters	36 meters - 80 meters	NOAA_4m	Complete MBES
H12692_MB_8m_MLLW_Final	CUBE	8 meters	72 meters - 160 meters	NOAA_8m	Complete MBES
H12692_MB_16m_MLLW_Final	CUBE	16 meters	144 meters - 258.46 meters	NOAA_16m	Complete MBES

Table 9: Submitted Surfaces

All Caris CUBE surfaces were created with lines reduced to MLLW via ERZT methods. 16 soundings were designated in accordance with HSSD requirements.

C. Vertical and Horizontal Control

Additional information discussing the vertical or horizontal control for this survey can be found in the accompanying HVCR.

C.1 Vertical Control

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

ERS Methods Used:

ERS via ERZT

Ellipsoid to Chart Datum Separation File:

H12692_WGS84_MLLW_SEP_1000m.csar

Ellipsoidally Referenced Zoned Tides (ERZT) methods were used to transform between the ellipsoid and water level data. A 1000-meter resolution separation model between the ellipsoid and MLLW was computed using the real-time position measurements observed during the survey relative to the water line and the loaded ZDF tide file. GPS tides were then computed using the above separation model and the corrected GPS-height-to-water level data (SBET). The 1000-meter resolution separation model was generated in WGS84 due to the SBETs being exported in WGS84. For additional information see the OPR-P136-RA-15 ERS/ERZT Capability Memo included with the supplemental correspondence.

C.2 Horizontal Control

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

The projection used for this project is Universal Transverse Mercator (UTM) Zone 5 North.

The following PPK methods were used for horizontal control:

Smart Base

The following CORS Stations were used for horizontal control:

HVCR Site ID	Base Station ID
AC02	AkhiokCORP_ak2005
AC34	OldHarbor_AK2006
AC38	Quartz_CrkAK2005
AC67	PILLARMTN AK2006
AC39	ShuyaklsAPAK2006
KOD6	Kodiak 6
AC08	CapDouglasAK2007
AC45	SITKINAKISAK2006
KOD5	Kodiak 5
AC27	AC27MNEIL_AK2004
AC24	KingsalmonAK2006

Table 10: CORS Base Stations

The horizontal datum for survey H12692 is World Geodetic System 1984 (WGS 1984)

The following DGPS Stations were used for horizontal control:

DGPS Stations
Kodiak 313kHz

Table 11: USCG DGPS Stations

C.3 Additional Horizontal or Vertical Control Issues

3.3.1 Lines without SBETs

Applanix POSPac Smooth Best Estimate and Trajectory (SBET) corrections could not be applied to three survey lines. Line 0001_20150919_234545 acquired by vessel S221 on DN262, and lines 2803_2015_2911917 and 2803_2015_291 1938 acquired by vessel 2803 on DN291 did not accept SBET corrections because Delayed Heave time extents did not entirely cover the line. Lacking SBETs these lines could not be analyzed using ERZT methods. The HDCS data for these lines has been retained for submission, but has been omitted from the final CUBE surfaces. Because these three lines are crosslines their omission did not create holidays in the finalized surfaces.

While the primary purpose of crosslines are to identify systematic errors as outlined in section 5.2.4.3 of the HSSDM, the omission of line 2803_2015_2911917 did create two (2) data gaps in the 8 meter final grid submitted as part of survey H12692.

D. Results and Recommendations

D.1 Chart Comparison

Chart comparisons were performed using a Caris sounding layer based on the 1m surface from H12692 and a Caris contour layer based on the 8m surface. The contours and soundings were overlaid on the BSB Raster Chart 16576 and compared for general agreement and to identify areas of significant change. Chart 16576 was selected for this analysis because it contains more detail (soundings and contours) than charts 16594 and 16597. The Caris generated soundings and contours agree very well with those charted on chart 16576 with the following exceptions:

An uncharted wreck located outside the sheet limits in the southwest corner of sheet H12692 (figures 33 and 34).

A 17-fathom shoal was found near a charted 25-fathom sounding (figure 36).

A 29-fathom sounding was found near a charted 40-fathom sounding (figure 36).

An 8-fathom shoal was found seaward of the 10-fathom contour (figure 37).

Four uncharted Dangers To Navigation (DTON) were found during this analysis and are discussed in section D.1.5 of this report.

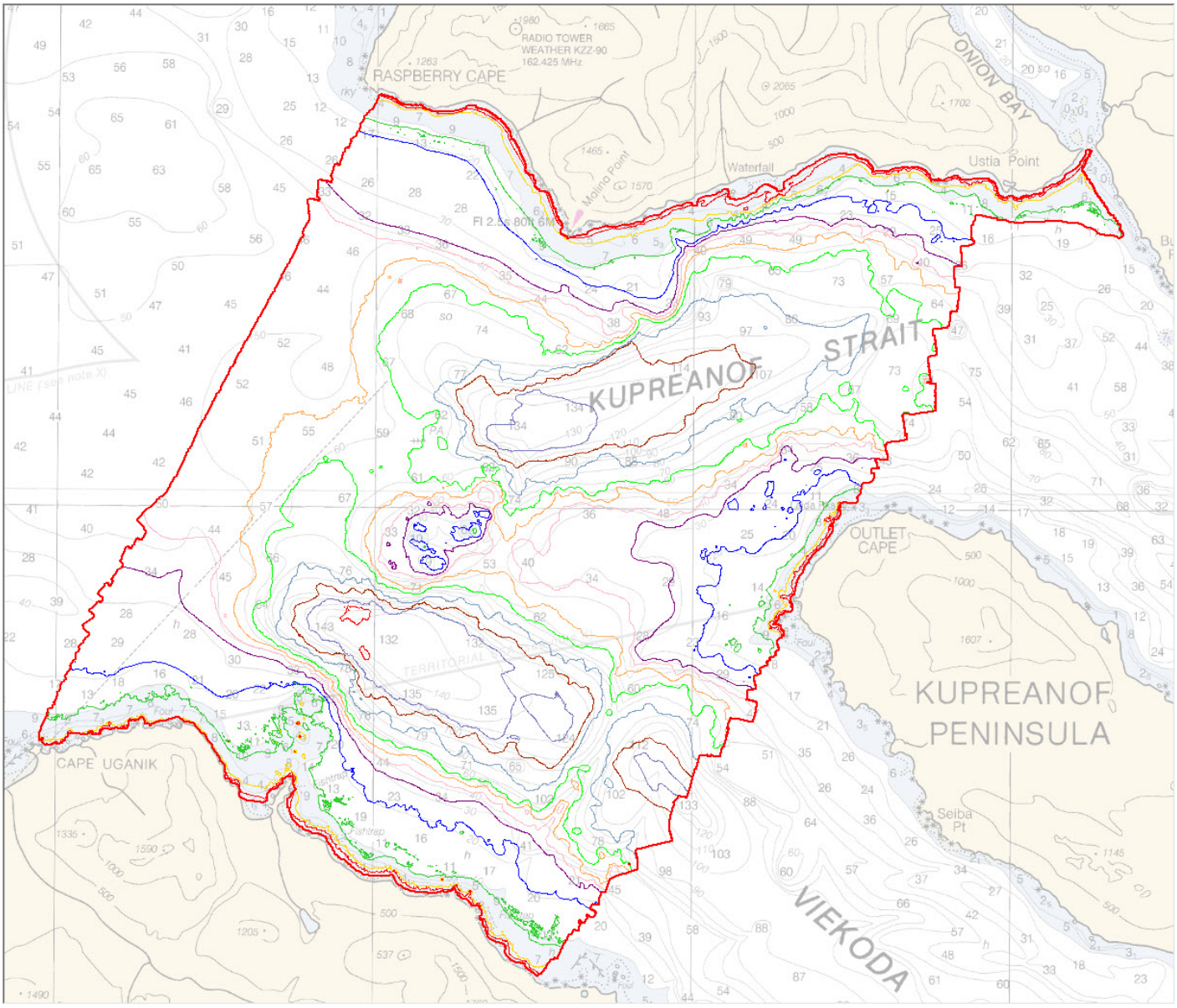


Figure 32: Caris generated soundings and contours agree very well with those charted on chart 16576.

D.1.1 Raster Charts

The following are the largest scale raster charts, which cover the survey area:

Chart	Scale	Edition	Edition Date	LNM Date	NM Date
16576	1:80000	5	04/2016	03/29/2016	04/02/2016

Table 12: Largest Scale Raster Charts

16576

The original chart comparison analysis described in this report was conducted using the 5th edition of chart 16576 published 04/2015 described in the project instructions. A final chart comparison was made using the most up-to-date publication 04/2016 of chart 16576 prior to submission of this report.

Raster chart 16594 (1:78,900), ENC US4AK5PM and ENC US4AK5QM also cover the area surveyed as part of H12692.

D.1.2 Maritime Boundary Points

No Maritime Boundary Points were assigned for this survey.

D.1.3 Charted Features

A charted wreck with an approximate position (PA) of 58-00.558N, 153-24.338W is depicted on chart 16576. A thorough search in the multibeam data around a 1-km radius of this point did not reveal any signs of a wreck. The removal of this wreck is recommended.

D.1.4 Uncharted Features

An uncharted wreck approximately 15 meters long, with a height of 2.4 meters above the sea floor was found in 18 meters of water. This wreck was observed in the multibeam data and is located outside of the sheet limits. The wreck was assigned a critical sounding of 8 fathoms 3 feet (figures 33, 34, and 35).

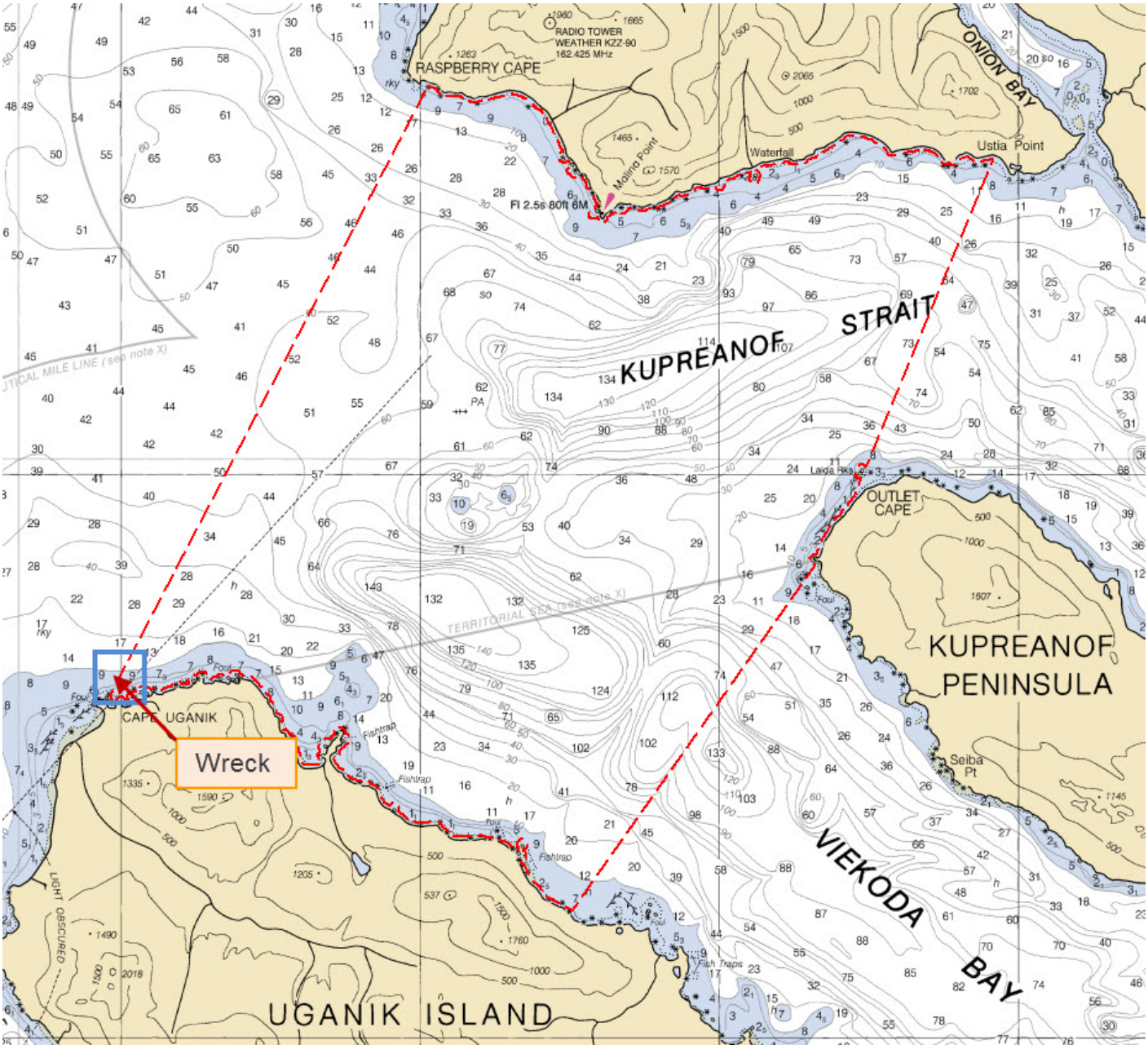


Figure 33: An uncharted wreck located outside of the sheet limits in the southwest corner of sheet H12692.

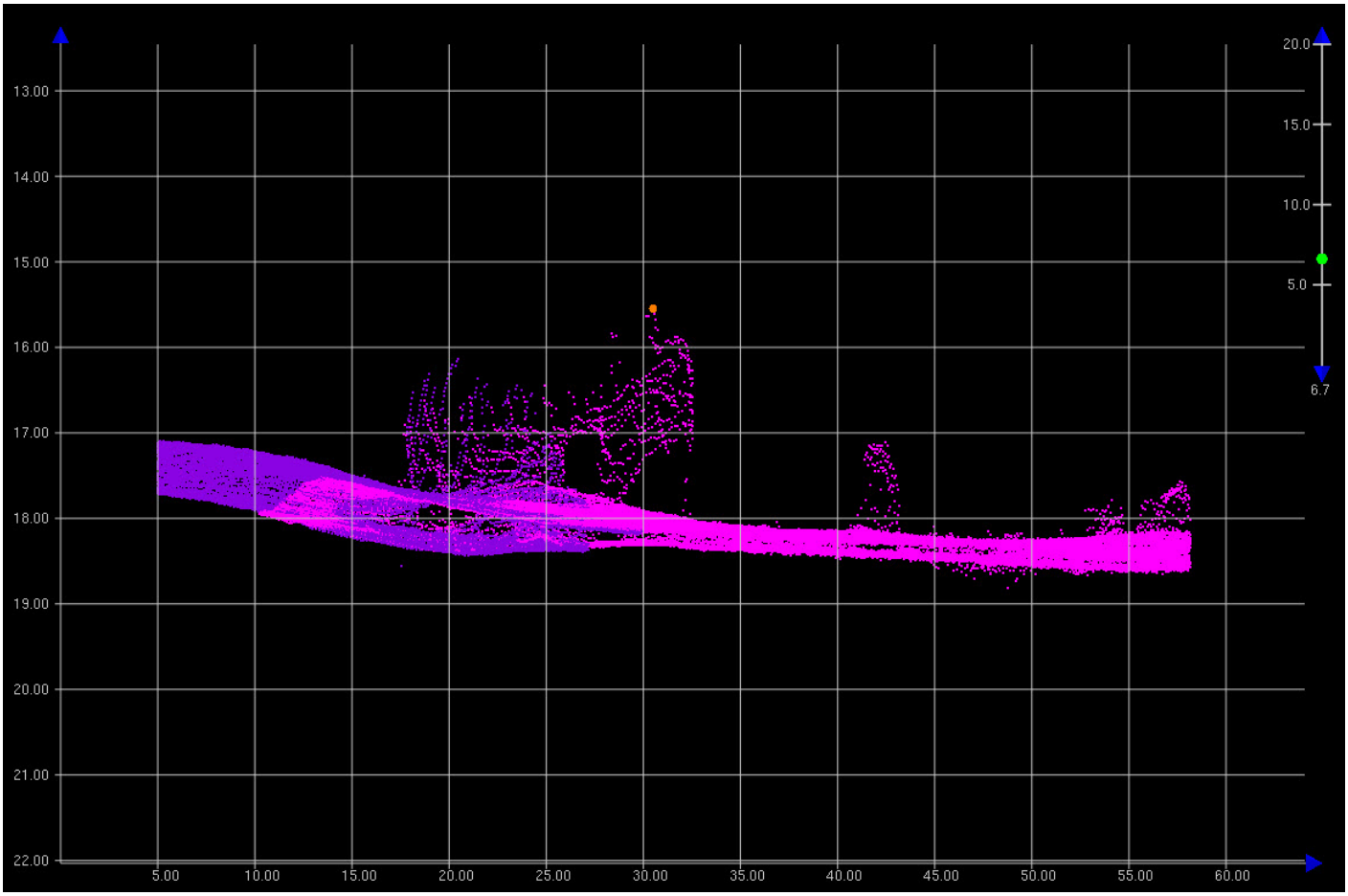


Figure 34: A 2-dimensional subset view of a 15 meter long wreck. The wreck was found in 18 meters of water and has a height of 2.4 meters from the sea floor.

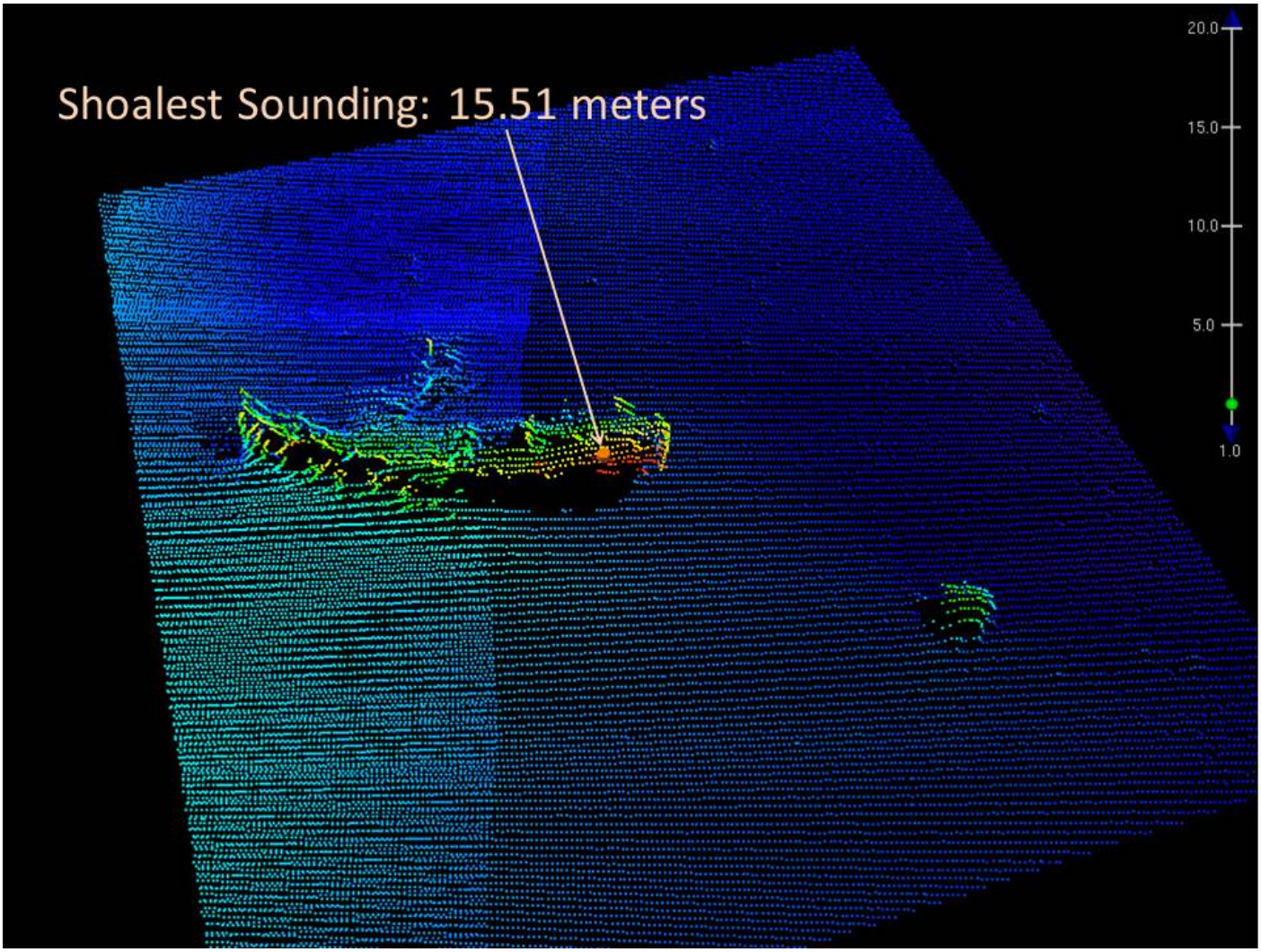


Figure 35: A 3-dimensional subset view of new-found wreck. The wreck's shoalest sounding is 15.51 meters.

D.1.5 Dangers to Navigation

The following DTON reports were submitted:

DTON Report Name	Date Submitted
H12692 Danger to Navigation Report	2016-03-26

Table 13: DTON Reports

Danger to Navigation Reports are included in Appendix II of this report.

D.1.6 Shoal and Hazardous Features

All shoals and hazardous features were investigated in accordance with the Project Instructions and the HSSD, and are addressed in the Final Feature File submitted with this report.

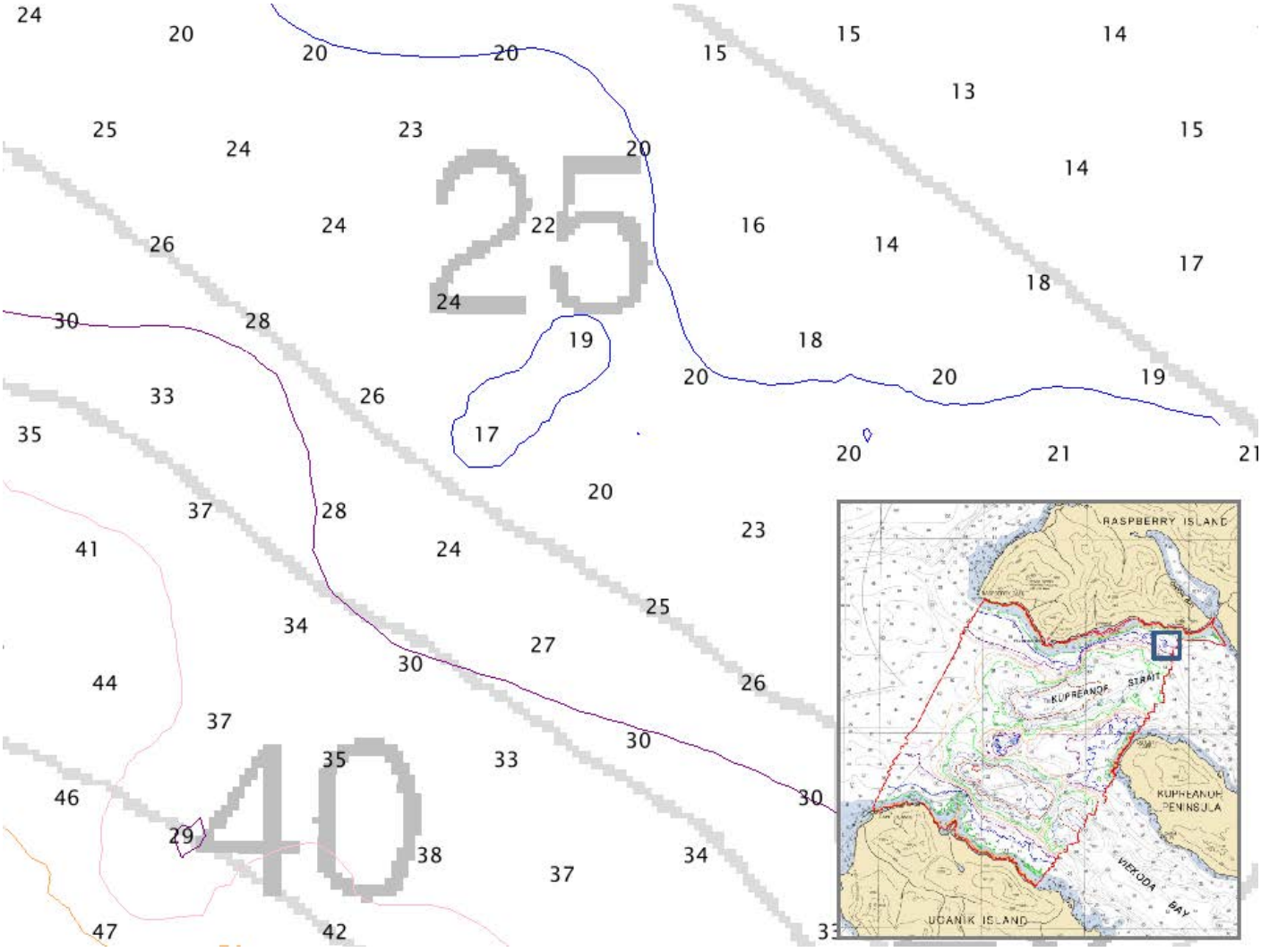


Figure 36: A 17-fathom shoal was found near a charted 25-fathom sounding. A 29-fathom sounding was found near a charted 40-fathom sounding.

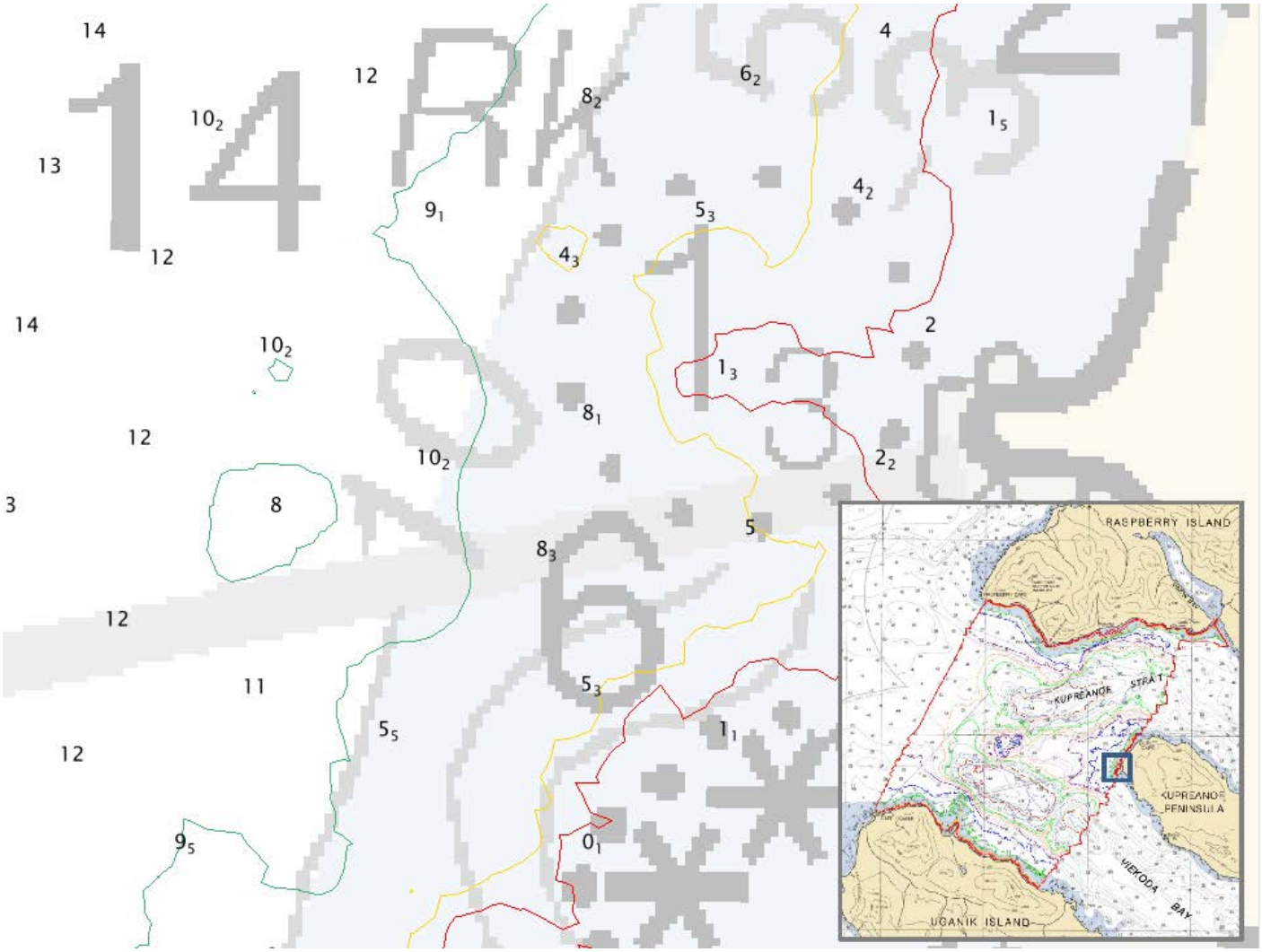


Figure 37: An 8-fathom shoal was found seaward of the 10-fathom contour.

D.1.7 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.1.8 Bottom Samples

Eight proposed bottom sample locations were identified in the Project Reference File for H12692. The proposed sample locations were altered slightly to better differentiate the varying bottom characteristics. One sample was not collected due to depth (103 meters). As a result, seven bottom samples were acquired, addressed with S-57 attribution, and recorded in the Final Feature File submitted with this report.

D.2 Additional Results

D.2.1 Shoreline

Shoreline verification was conducted near predicted low water in accordance with the applicable sections of the NOAA HSSD and FPM. There were 102 assigned features for this survey. 16 assigned features were not addressed because they either existed outside of the sheet limits, or they were positioned in areas unable to be safely navigated by the skiff. All addressed features were addressed as required with the S-57 attribution and recorded in the H12692 Final Features File to best represent the features at chart scale.

D.2.2 Prior Surveys

No prior survey comparisons exist for this survey.

D.2.3 Aids to Navigation

Sheet H12692 contains one aid to navigation, the Malina Point Light. The Malina Point Light was observed to be in good working condition. Remnants of an older replaced light were visible on the steep slope of the point.

D.2.4 Overhead Features

No overhead features exist for this survey.

D.2.5 Submarine Features

No submarine features exist for this survey.

D.2.6 Ferry Routes and Terminals

No charted ferry routes or terminals exist for this survey. However, the Alaskan State Ferry routinely transits the area.

D.2.7 Platforms

No platforms exist for this survey.

D.2.8 Significant Features

No Significant Features 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

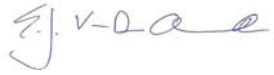
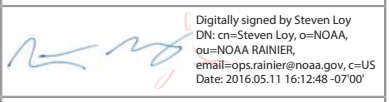
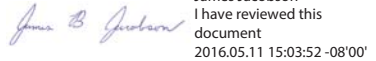
No new insets are recommended for this area.

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 and Specifications Deliverables Manual, 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
Edward J. Van Den Ameele, CDR/NOAA	Commanding Officer, NOAA Ship Rainier	05/10/2016	
Steven Loy, LT/NOAA	Field Operations Officer, NOAA Ship Rainier	05/10/2016	 Digitally signed by Steven Loy DN: cn=Steven Loy, o=NOAA, ou=NOAA RAINIER, email=ops.rainier@noaa.gov, c=US Date: 2016.05.11 16:12:48 -07'00'
James B. Jacobson	Chief Survey Technician, NOAA Ship Rainier	05/10/2016	 James Jacobson I have reviewed this document 2016.05.11 15:03:52 -08'00'
Matthew W. Bissell	Junior Officer, NOAA Ship Rainier	05/10/2016	 Digitally signed by Matthew Bissell DN: cn=Matthew Bissell, o=NOAA, ou=Rainier, email=matthew.bissell@noaa.gov, c=US Date: 2016.05.11 15:16:29 -07'00'

F. Table of Acronyms

Acronym	Definition
AHB	Atlantic Hydrographic Branch
AST	Assistant Survey Technician
ATON	Aid to Navigation
AWOIS	Automated Wreck and Obstruction Information System
BAG	Bathymetric Attributed Grid
BASE	Bathymetry Associated with Statistical Error
CO	Commanding Officer
CO-OPS	Center for Operational Products and Services
CORS	Continually Operating Reference Staiton
CTD	Conductivity Temperature Depth
CEF	Chart Evaluation File
CSF	Composite Source File
CST	Chief Survey Technician
CUBE	Combined Uncertainty and Bathymetry Estimator
DAPR	Data Acquisition and Processing Report
DGPS	Differential Global Positioning System
DP	Detached Position
DR	Descriptive Report
DTON	Danger to Navigation
ENC	Electronic Navigational Chart
ERS	Ellipsoidal Referenced Survey
ERZT	Ellipsoidally Referenced Zoned Tides
FFF	Final Feature File
FOO	Field Operations Officer
FPM	Field Procedures Manual
GAMS	GPS Azimuth Measurement Subsystem
GC	Geographic Cell
GPS	Global Positioning System
HIPS	Hydrographic Information Processing System
HSD	Hydrographic Surveys Division
HSSD	Hydrographic Survey Specifications and Deliverables

Acronym	Definition
HSTP	Hydrographic Systems Technology Programs
HSX	Hypack Hysweep File Format
HTD	Hydrographic Surveys Technical Directive
HVCR	Horizontal and Vertical Control Report
HVF	HIPS Vessel File
IHO	International Hydrographic Organization
IMU	Inertial Motion Unit
ITRF	International Terrestrial Reference Frame
LNM	Local Notice to Mariners
LNM	Linear Nautical Miles
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
ST	Survey Technician
SVP	Sound Velocity Profiler
TCARI	Tidal Constituent And Residual Interpolation
TPE	Total Propagated Error
TPU	Topside Processing Unit
USACE	United States Army Corps of Engineers
USCG	United Stated Coast Guard
UTM	Universal Transverse Mercator
XO	Executive Officer
ZDA	Global Positiong System timing message
ZDF	Zone Definition File

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

TIDE NOTE FOR HYDROGRAPHIC SURVEY

DATE : March 03, 2016

HYDROGRAPHIC BRANCH: Pacific
HYDROGRAPHIC PROJECT: OPR-P136-RA-2015
HYDROGRAPHIC SHEET: H12692

LOCALITY: Viekoda Bay and Kupreanof Strait, Kodiak Island, AK
TIME PERIOD: June 17 - October 19, 2015

TIDE STATION USED: 9455500 Seldovia, AK
Lat. 59° 26.4'N Long. 151° 43.2' W
PLANE OF REFERENCE (MEAN LOWER LOW WATER): 0.000
HEIGHT OF HIGH WATER ABOVE PLANE OF REFERENCE: 5.25 m

REMARKS: RECOMMENDED ZONING

Preliminary zoning for this project was provided under project P136-RA-2015. Preliminary zoning is accepted as the final zoning for Registry No. H12692 for the time period of June 17 - October 19, 2015.

Please use the zoning file P136RA2015_Rev2_CORP submitted with the project instructions for OPR-P136-RA-2015. Zones SS18, SS19, SS19A, SS23 and SS27 are the applicable zones for H12692.

Refer to attachments for zoning 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).

MICHALSKI.MICHAEL.PAUL.1280465174

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DN: c=US, o=U.S. Government, ou=DoD, ou=PKI, ou=OTHER, cn=MICHALSKI.MICHAEL.PAUL.1280465174
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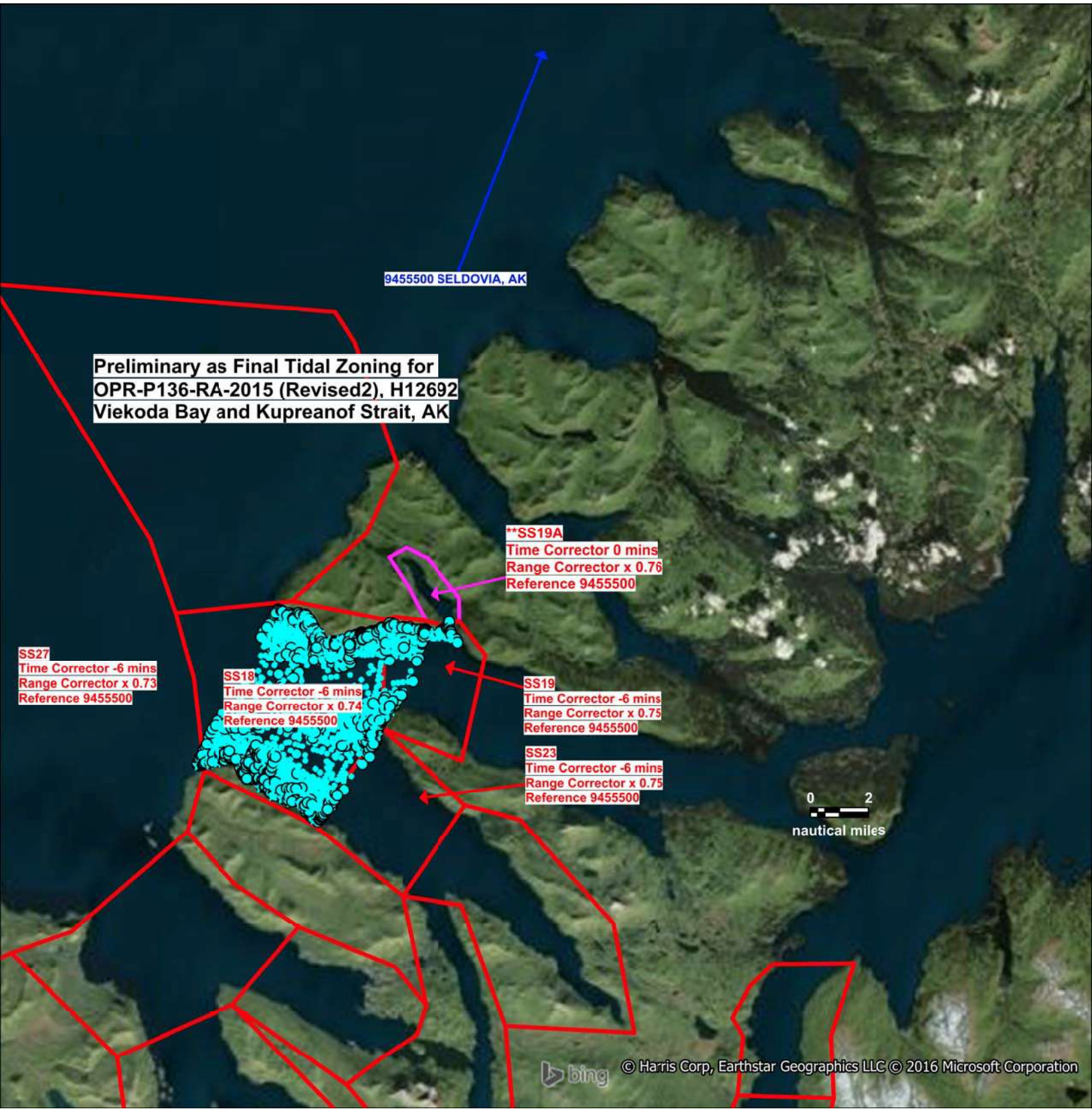
ACTING CHIEF, PRODUCTS AND SERVICES BRANCH


9455500 SELDOVIA, AK
Preliminary as Final Tidal Zoning for
OPR-P136-RA-2015 (Revised2), H12692
Viekoda Bay and Kupreanof Strait, AK
**SS19A
Time Corrector 0 mins
Range Corrector x 0.76
Reference 9455500
SS27
Time Corrector -6 mins
Range Corrector x 0.73
Reference 9455500
SS18
Time Corrector -6 mins
Range Corrector x 0.74
Reference 9455500
SS19
Time Corrector -6 mins
Range Corrector x 0.75
Reference 9455500
SS23
Time Corrector -6 mins
Range Corrector x 0.75
Reference 9455500
0
2
nautical miles
bing
© Harris Corp, Earthstar Geographics LLC © 2016 Microsoft Corporation

H12692 Feature Report

Registry Number: H12692
State: Alaska
Locality: North Coast of Kodiak Island
Sub-locality: Entrance to Viekoda Bay
Project Number: OPR-P136-RA-15
Survey Dates: 09/19/2015 - 10/19/2015

Charts Affected

Number	Edition	Date	Scale (RNC)	RNC Correction(s)*
16594	14th	01/01/2015	1:78,900 (16594_1)	USCG LNM: 7/26/2016 (8/2/2016) CHS NTM: None (7/29/2016) NGA NTM: 2/24/2007 (8/6/2016)
16597	10th	04/01/2015	1:80,000 (16597_1)	USCG LNM: 4/12/2016 (7/19/2016) CHS NTM: None (6/24/2016) NGA NTM: None (7/23/2016)
16576	5th	04/01/2015	1:80,000 (16576_1)	USCG LNM: 4/12/2016 (7/19/2016) CHS NTM: None (6/24/2016) NGA NTM: 8/27/2005 (7/23/2016)
16580	14th	01/01/2008	1:350,000 (16580_1)	[L]NTM: ?
16013	30th	07/01/2006	1:969,761 (16013_1)	[L]NTM: ?
531	24th	07/01/2007	1:2,100,000 (531_1)	[L]NTM: ?
500	8th	06/01/2003	1:3,500,000 (500_1)	[L]NTM: ?
530	32nd	06/01/2007	1:4,860,700 (530_1)	[L]NTM: ?
50	6th	06/01/2003	1:10,000,000 (50_1)	[L]NTM: ?

* Correction(s) - *source: last correction applied (last correction reviewed--"cleared date")*

Features

Name	Feature Type	Survey Depth	Survey Latitude	Survey Longitude
Disproved Charted Wreck	Wreck	[None]	58° 00' 33.5" N	153° 24' 18.7" W
New Wreck	Wreck	15.51 m	57° 58' 12.0" N	153° 30' 05.1" W
4.36m DtoN (shoal rock)	Rock	4.36 m	57° 57' 57.5" N	153° 26' 14.4" W
3.49m DtoN (shoal rock)	Rock	3.49 m	57° 58' 11.9" N	153° 26' 11.2" W

3.99m DtoN (shoal rock)	Rock	3.99 m	57° 58' 05.1" N	153° 26' 10.0" W
2.79m DtoN (shoal rock)	Rock	2.79 m	57° 59' 16.8" N	153° 18' 35.1" W

1 - Charted Features

1.1) Disproved Charted Wreck

Survey Summary

Survey Position:	58° 00' 33.5" N, 153° 24' 18.7" W
Least Depth:	[None]
TPU (±1.96σ):	**THU (TPEh)** [None] ; **TVU (TPEv)** [None]
Timestamp:	1998-094.00:00:00.000 (04/04/1998)
Dataset:	H12692_Feature_Report.000
FOID:	US 0002153436 00001(02260020DBDC0001)
Charts Affected:	16594_1, 16576_1, 16580_1, 16013_1, 531_1, 500_1, 530_1, 50_1

Remarks:

WRECKS/remrks: Wreck not seen in multibeam coverage.

Hydrographer Recommendations

Remove wreck from chart.

S-57 Data

Geo object 1:	Wreck (WRECKS)
Attributes:	CATWRK - 1:non-dangerous wreck
	SORDAT - 19980404
	SORIND - US,US,graph,Chart 16594
	WATLEV - 3:always under water/submerged

Office Notes

Concur. Delete charted wreck.

2 - New Features

2.1) New Wreck

Survey Summary

Survey Position:	57° 58' 12.0" N, 153° 30' 05.1" W
Least Depth:	15.51 m (= 50.90 ft = 8.483 fm = 8 fm 2.90 ft)
TPU (±1.96σ):	**THU (TPEh)** [None] ; **TVU (TPEv)** [None]
Timestamp:	2016-076.17:51:32.000 (03/16/2016)
Dataset:	H12692_Feature_Report.000
FOID:	US 0002153439 00001(02260020DBDF0001)
Charts Affected:	16594_1, 16576_1, 16597_1, 16580_1, 16013_1, 531_1, 500_1, 530_1, 50_1

Remarks:

WRECKS/remrks: New Wreck.

Hydrographer Recommendations

Recommend chart new wreck as surveyed.

Arithmetically-Rounded Depth (Unit-wise Affected Charts):

8 ½fm (16594_1, 16597_1, 16580_1, 16013_1, 530_1)

8fm 3ft (16576_1, 531_1)

15.5m (500_1, 50_1)

S-57 Data

Geo object 1:	Wreck (WRECKS)
Attributes:	CATWRK - 2:dangerous wreck
	QUASOU - 6:least depth known
	SORDAT - 20151019
	SORIND - US,US,graph,H12692
	TECSOU - 3:found by multi-beam
	VALSOU - 15.513 m
	WATLEV - 3:always under water/submerged

Office Notes

SAR: New WRECK noted, dimensions approximately 14 meters in length, 4 meters in width with a least depth of 15.51 meters. Chart as surveyed.

Feature Images

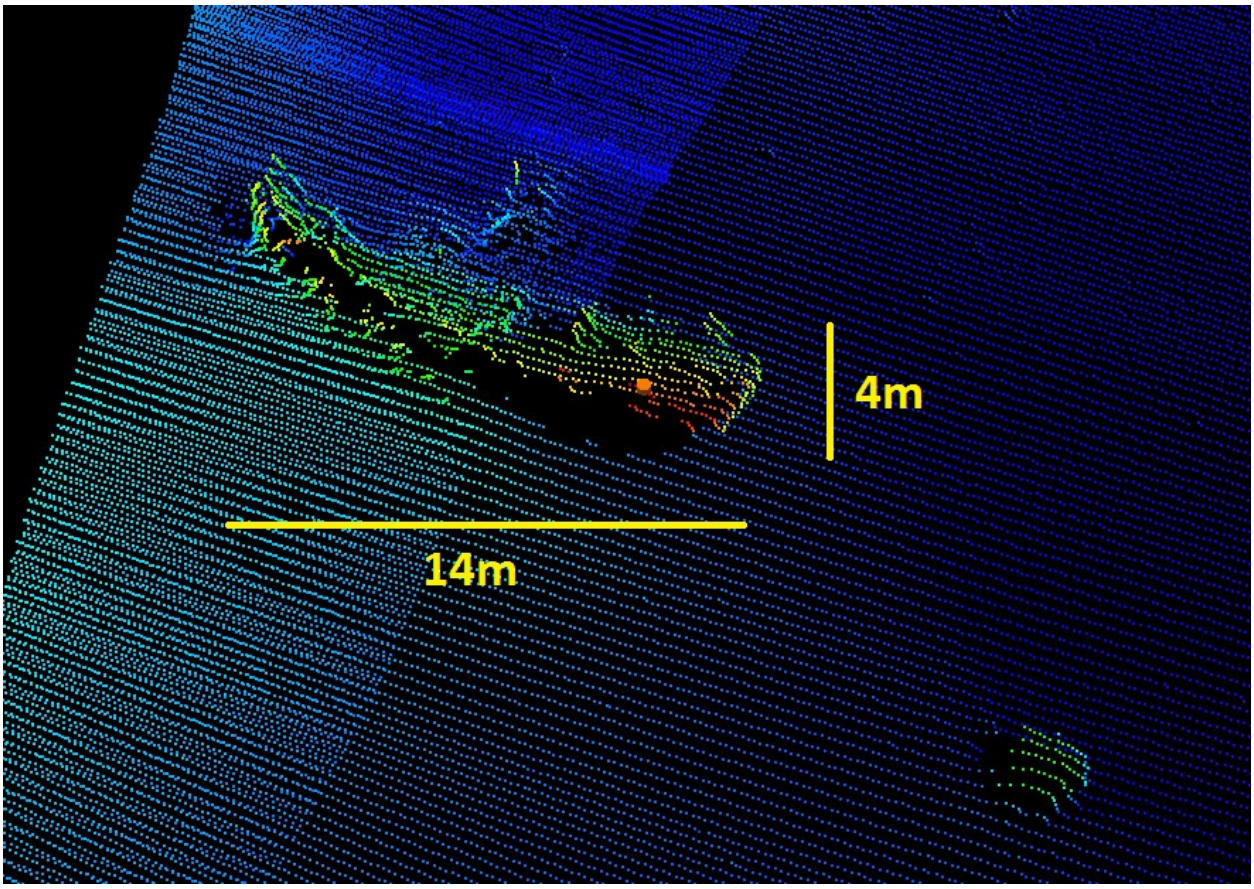


Figure 2.1.1

3 - Dangers To Navigation

3.1) 4.36m DtoN (shoal rock)

DANGER TO NAVIGATION

Survey Summary

Survey Position:	57° 57' 57.5" N, 153° 26' 14.4" W
Least Depth:	4.36 m (= 14.31 ft = 2.385 fm = 2 fm 2.31 ft)
TPU (±1.96σ):	**THU (TPEh)** [None] ; **TVU (TPEv)** [None]
Timestamp:	2015-292.00:00:00.000 (10/19/2015)
Dataset:	H12692_Feature_Report.000
FOID:	US 0002153445 00001(02260020DBE50001)
Charts Affected:	16594_1, 16576_1, 16597_1, 16580_1, 16013_1, 531_1, 500_1, 530_1, 50_1

Remarks:

UWTROC/remrks: DTON #3, shoal rock

Hydrographer Recommendations

Chart as surveyed.

Arithmetically-Rounded Depth (Unit-wise Affected Charts):

2 ½fm (16594_1, 16597_1, 16580_1, 16013_1, 530_1)

2fm 2ft (16576_1, 531_1)

4.4m (500_1, 50_1)

S-57 Data

Geo object 1:	Underwater rock / awash rock (UWTROC)
Attributes:	QUASOU - 6:least depth known
	SORDAT - 20151019
	SORIND - US,US,graph,H12692
	TECSOU - 3:found by multi-beam
	VALSOU - 4.361 m
	WATLEV - 3:always under water/submerged

Office Notes

DtoN has been added to most recent editions of applicable chart(s).

Feature Images

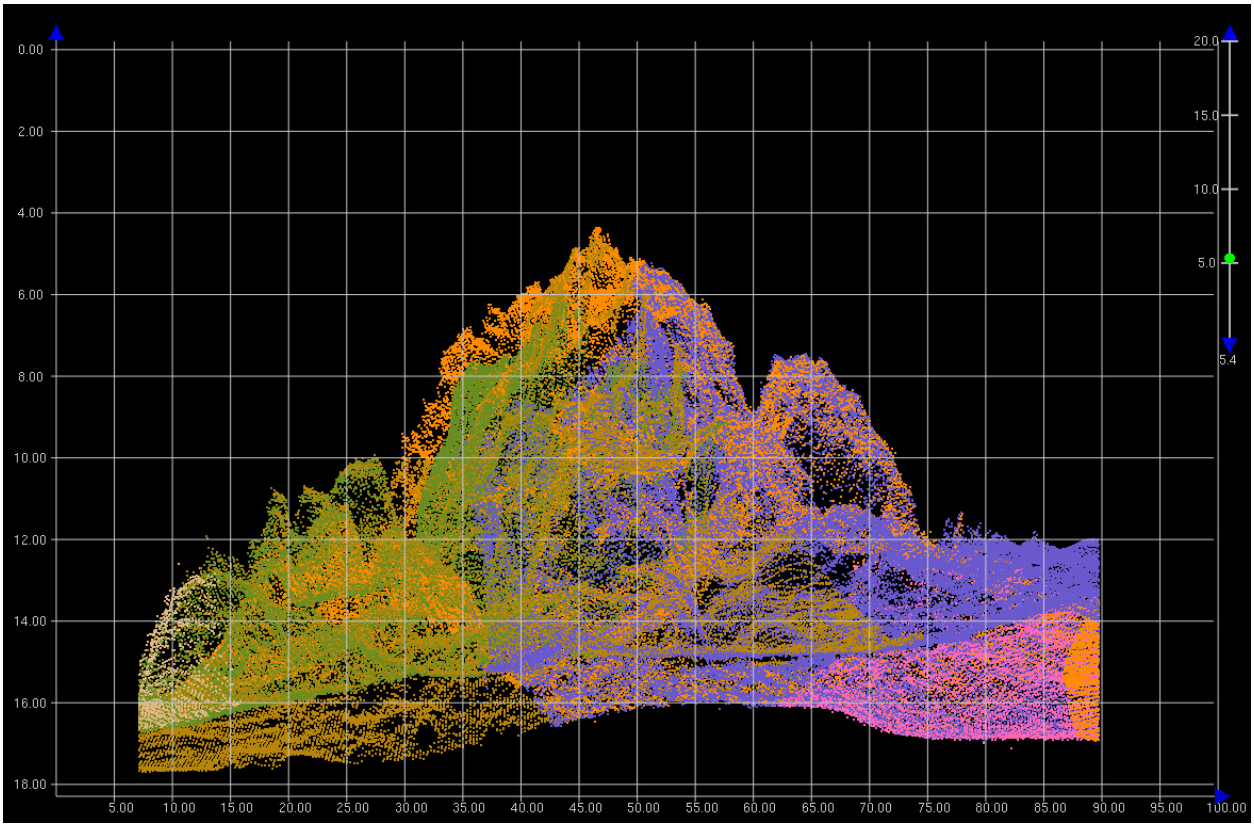


Figure 3.1.1

3.2) 3.49m DtoN (shoal rock)

DANGER TO NAVIGATION

Survey Summary

Survey Position:	57° 58' 11.9" N, 153° 26' 11.2" W
Least Depth:	3.49 m (= 11.44 ft = 1.907 fm = 1 fm 5.44 ft)
TPU (±1.96σ):	**THU (TPEh)** [None] ; **TVU (TPEv)** [None]
Timestamp:	2015-292.00:00:00.000 (10/19/2015)
Dataset:	H12692_Feature_Report.000
FOID:	US 0002153440 00001(02260020DBE00001)
Charts Affected:	16594_1, 16576_1, 16597_1, 16580_1, 16013_1, 531_1, 500_1, 530_1, 50_1

Remarks:

UWTROC/remrks: DTON #1, shoal rock

Hydrographer Recommendations

Chart as surveyed.

Arithmetically-Rounded Depth (Unit-wise Affected Charts):

2fm (16594_1, 16597_1, 16580_1, 16013_1, 530_1)

1fm 5ft (16576_1, 531_1)

3.5m (500_1, 50_1)

S-57 Data

Geo object 1:	Underwater rock / awash rock (UWTROC)
Attributes:	QUASOU - 6:least depth known
	SORDAT - 20151019
	SORIND - US,US,graph,H12692
	TECSOU - 3:found by multi-beam
	VALSOU - 3.488 m
	WATLEV - 3:always under water/submerged

Office Notes

DtoN has been added to most recent editions of applicable chart(s).

Feature Images

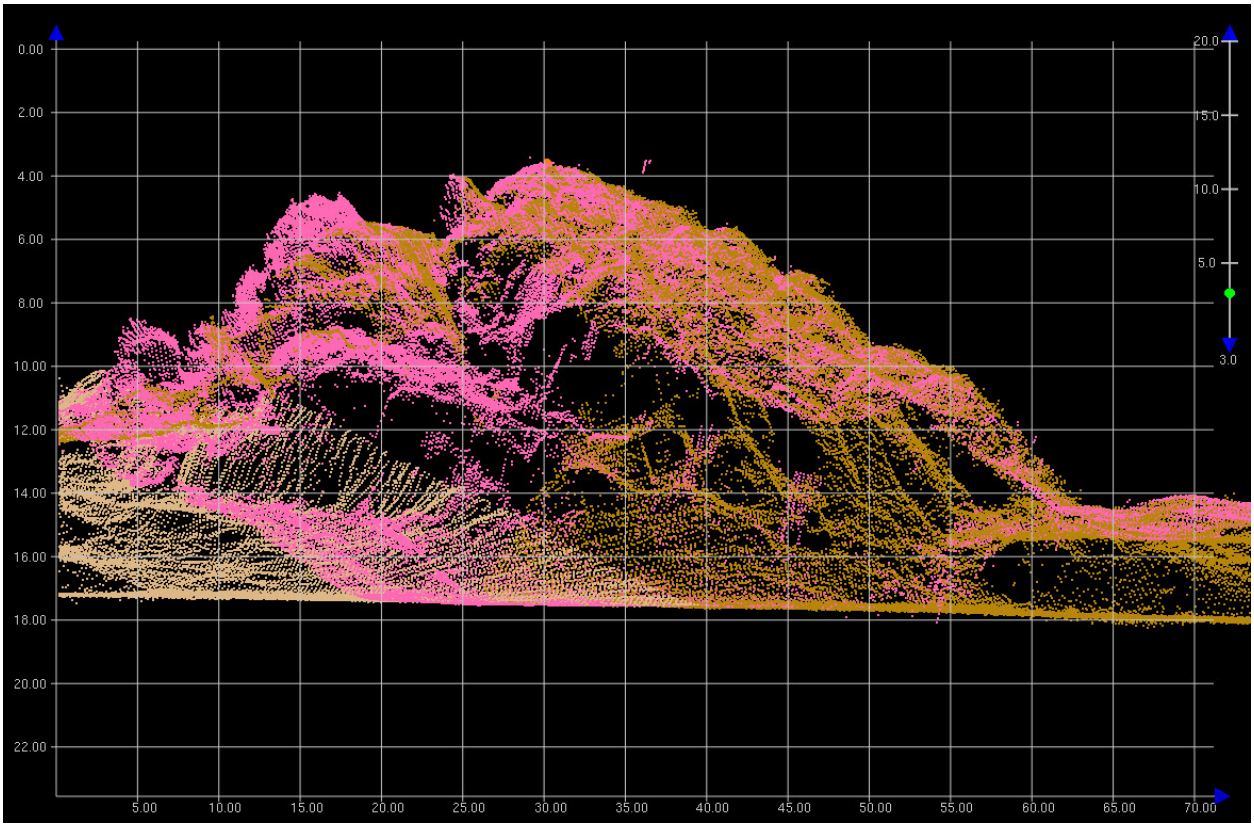


Figure 3.2.1

3.3) 3.99m DtoN (shoal rock)

DANGER TO NAVIGATION

Survey Summary

Survey Position:	57° 58' 05.1" N, 153° 26' 10.0" W
Least Depth:	3.99 m (= 13.08 ft = 2.180 fm = 2 fm 1.08 ft)
TPU (±1.96σ):	**THU (TPEh)** [None] ; **TVU (TPEv)** [None]
Timestamp:	2015-292.00:00:00.000 (10/19/2015)
Dataset:	H12692_Feature_Report.000
FOID:	US 0002153443 00001(02260020DBE30001)
Charts Affected:	16594_1, 16576_1, 16597_1, 16580_1, 16013_1, 531_1, 500_1, 530_1, 50_1

Remarks:

UWTROC/remrks: DTON #2, shoal rock

Hydrographer Recommendations

Chart as surveyed.

Arithmetically-Rounded Depth (Unit-wise Affected Charts):

2 ¼fm (16594_1, 16597_1, 16580_1, 16013_1, 530_1)

2fm 1ft (16576_1, 531_1)

4.0m (500_1, 50_1)

S-57 Data

Geo object 1:	Underwater rock / awash rock (UWTROC)
Attributes:	QUASOU - 6:least depth known
	SORDAT - 20151019
	SORIND - US,US,graph,H12692
	TECSOU - 3:found by multi-beam
	VALSOU - 3.986 m
	WATLEV - 3:always under water/submerged

Office Notes

DtoN has been added to most recent editions of applicable chart(s).

Feature Images

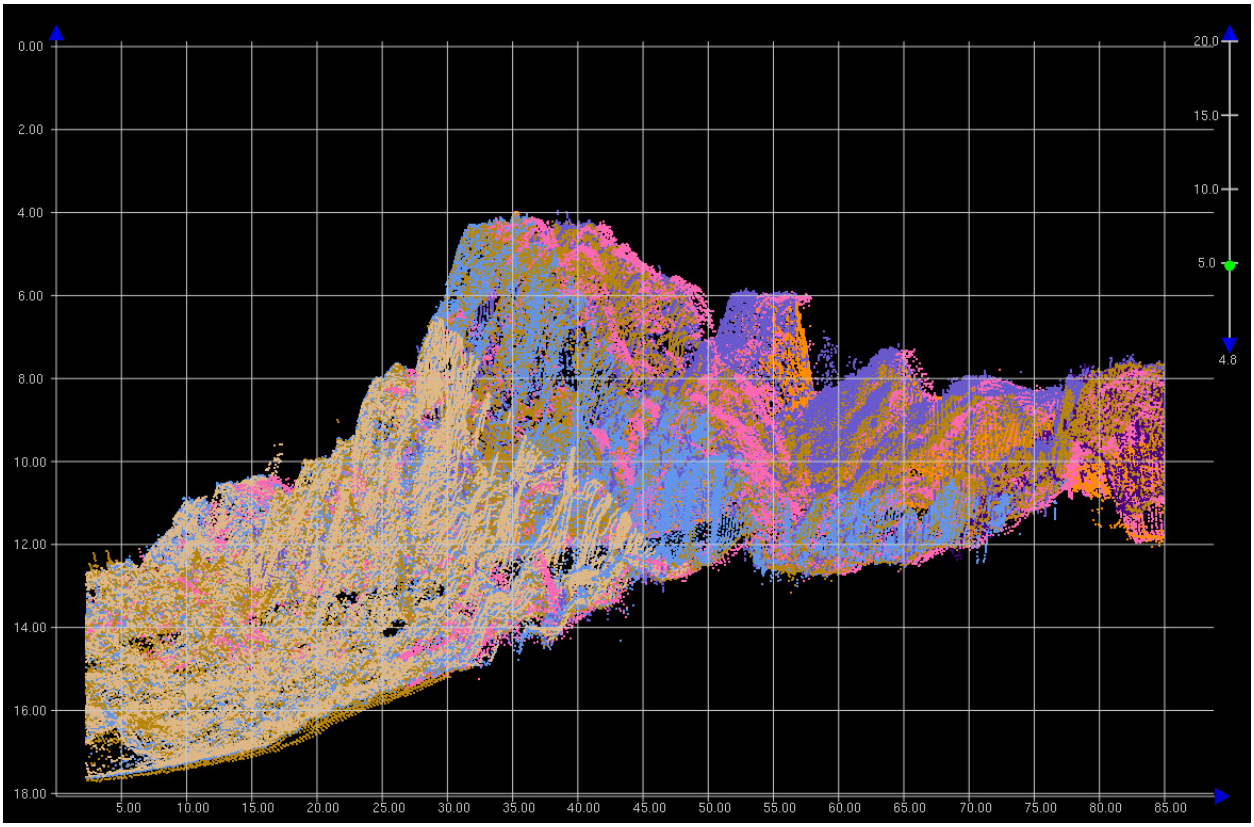


Figure 3.3.1

3.4) 2.79m DtoN (shoal rock)

DANGER TO NAVIGATION

Survey Summary

Survey Position:	57° 59' 16.8" N, 153° 18' 35.1" W
Least Depth:	2.79 m (= 9.15 ft = 1.524 fm = 1 fm 3.15 ft)
TPU (±1.96σ):	**THU (TPEh)** [None] ; **TVU (TPEv)** [None]
Timestamp:	2015-292.00:00:00.000 (10/19/2015)
Dataset:	H12692_Feature_Report.000
FOID:	US 0002153442 00001(02260020DBE20001)
Charts Affected:	16594_1, 16576_1, 16597_1, 16580_1, 16013_1, 531_1, 500_1, 530_1, 50_1

Remarks:

UWTROC/remrks: DTON #4, shoal rock

Hydrographer Recommendations

Chart as surveyed.

Arithmetically-Rounded Depth (Unit-wise Affected Charts):

1 ½fm (16594_1, 16597_1, 16580_1, 16013_1, 530_1)

1fm 3ft (16576_1, 531_1)

2.8m (500_1, 50_1)

S-57 Data

Geo object 1:	Underwater rock / awash rock (UWTROC)
Attributes:	QUASOU - 6:least depth known
	SORDAT - 20151019
	SORIND - US,US,graph,H12692
	TECSOU - 3:found by multi-beam
	VALSOU - 2.788 m
	WATLEV - 3:always under water/submerged

Office Notes

DtoN has been added to most recent editions of applicable chart(s).

Feature Images

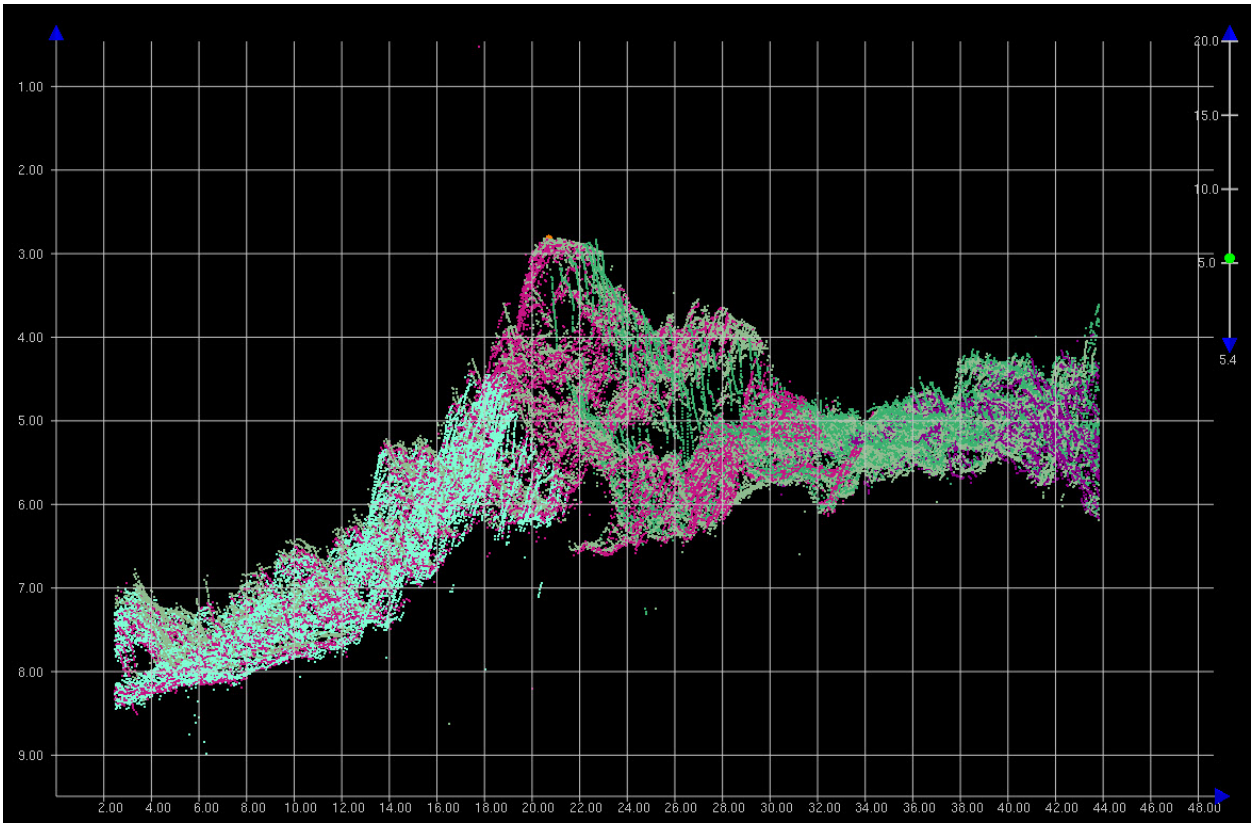


Figure 3.4.1

APPROVAL PAGE

H12692

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 NGDC for archive

- H12692_DR.pdf
- Collection of depth varied resolution BAGS
- Processed survey data and records
- H12692_GeoImage.pdf

The survey evaluation and verification has been conducted according current OCS Specifications.

Digitally signed by HOLMBERG.PETER.SCOTT.1365886101
DN: c=US, o=U.S. Government, ou=DoD, ou=PKI, ou=OTHER, cn=HOLMBERG.PETER.SCOTT.1365886101
Date: 2017.03.07 06:48:35 -08'00'

Approved:_____

Peter Holmberg
Cartographic Team Lead, Pacific Hydrographic Branch

The survey has been approved for dissemination and usage of updating NOAA's suite of nautical charts.

Digitally signed by EVANS.BENJAMIN.K.1237217094
Date: 2017.03.07 21:58:59 -05'00'

Approved:_____

CDR, Benjamin K. Evans, NOAA
Chief, Pacific Hydrographic Branch