H12917

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

DESCRIPTIVE REPORT

Type of Survey:	Navigable Area
Registry Number:	H12917

LOCALITY

State(s):	Alaska
General Locality:	North Coast of Kodiak
Sub-locality:	Village Islands

2016

CHIEF OF PARTY
Edward J. Van Den Ameele CAPT/NOAA

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Date:

U.S. DEPARTMENT OF COMMERCE NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION	REGISTRY NUMBER:
HYDROGRAPHIC TITLE SHEET	**H12917**

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**
Sub-Locality:	**Village Islands**
Scale:	**40000**
Dates of Survey:	**09/18/2016 to 10/16/2016**
Instructions Dated:	**05/16/2016**
Project Number:	**OPR-P136-RA-16**
Field Unit:	**NOAA Ship *Rainier***
Chief of Party:	**Edward J. Van Den Ameele CAPT/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 H12917

Project: OPR-P136-RA-16

Locality: North Coast of Kodiak

Sublocality: Village Islands

Scale: 1:40000

September 2016 - October 2016

NOAA Ship *Rainier*

Chief of Party: Edward J. Van Den Ameele CAPT/NOAA

A. Area Surveyed

The project area is referred to as Sheet 7: "Village Islands" within the Project Instructions. The area is east of Village Islands, Alaska (Figure 1). The area encompasses a total of 12.88 SNM.

A.1 Survey Limits

Data were acquired within the following survey limits:

Northwest Limit	Southeast Limit
57° 49' 57.12" N 153° 25' 56.58" W	57° 42' 53.64" N 153° 33' 19.8" W

Table 1: Survey Limits

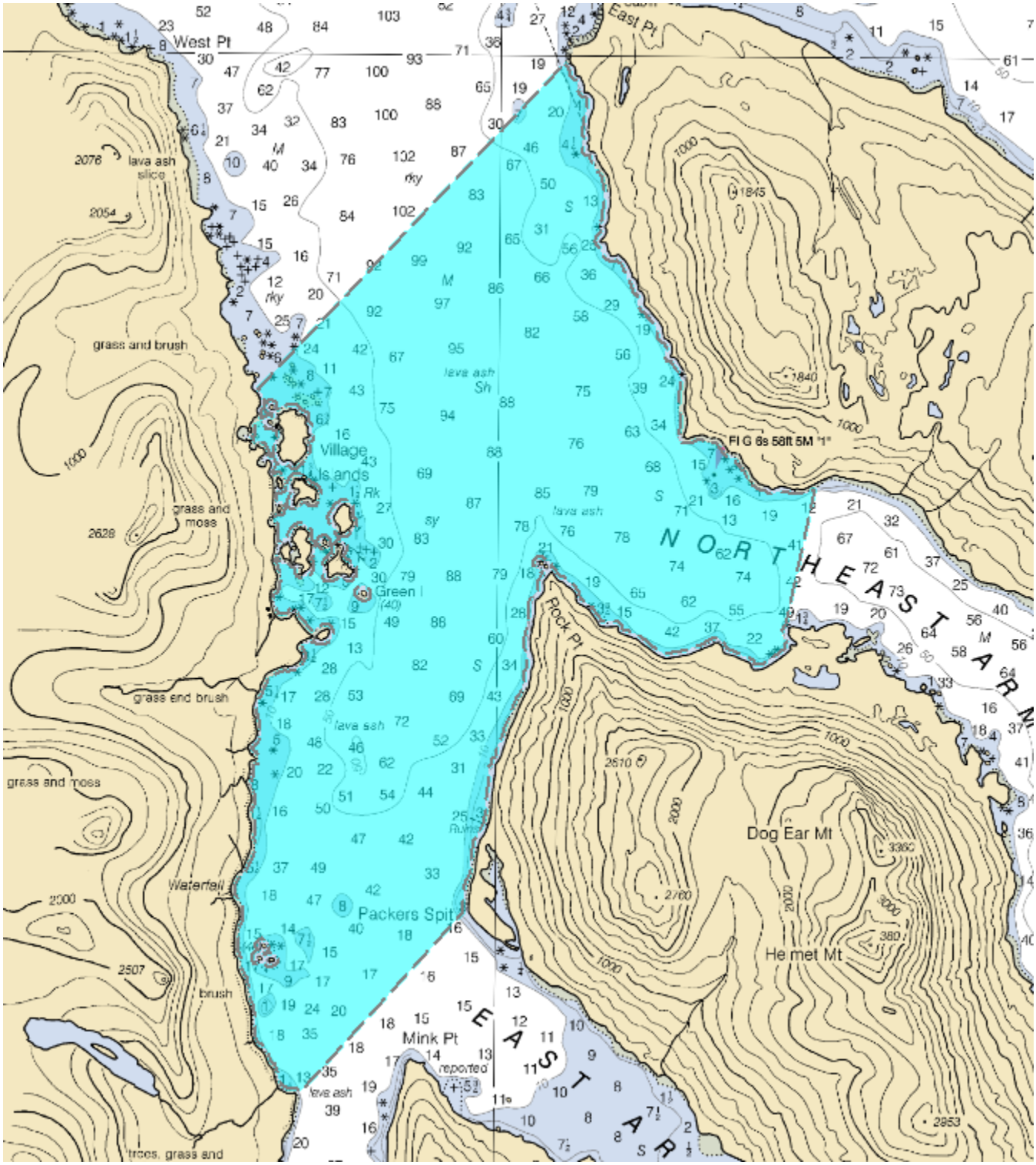

Figure 1: H12917 assigned survey limits

Survey data were acquired within survey limits in accordance with the requirements in the Project Instructions and the Hydrographic Surveys Specifications and Deliverables (HSSD).

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 Pydro QC Tools Grid QA function was used to analyze H12917 multibeam echo sounder (MBES) data density. Each finalized, single-resolution surface met HSSD density requirements (Figures 2-6).

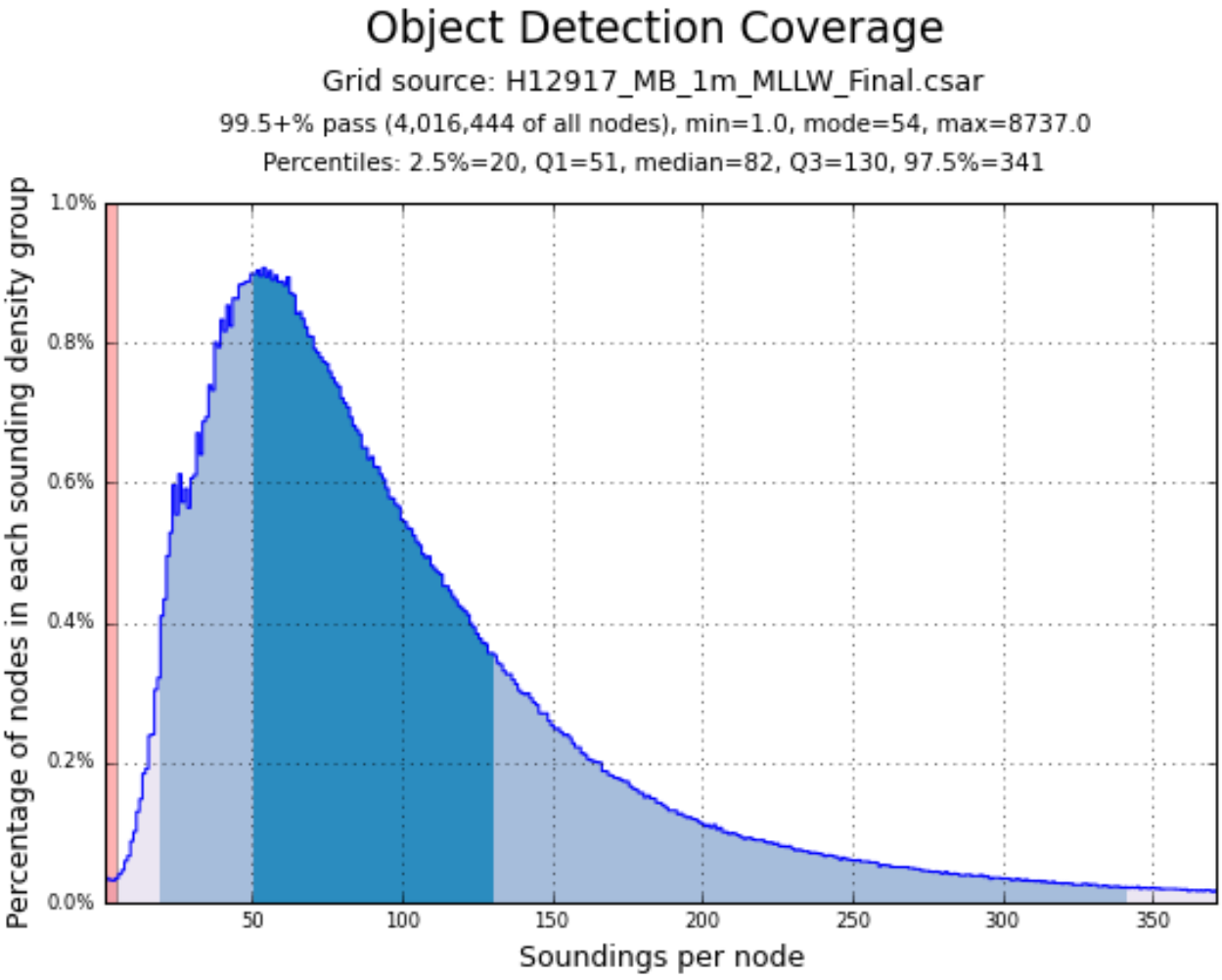

Figure 2: Pydro derived histogram plot showing HSSD density compliance of H12917 1-meter resolution MBES data.

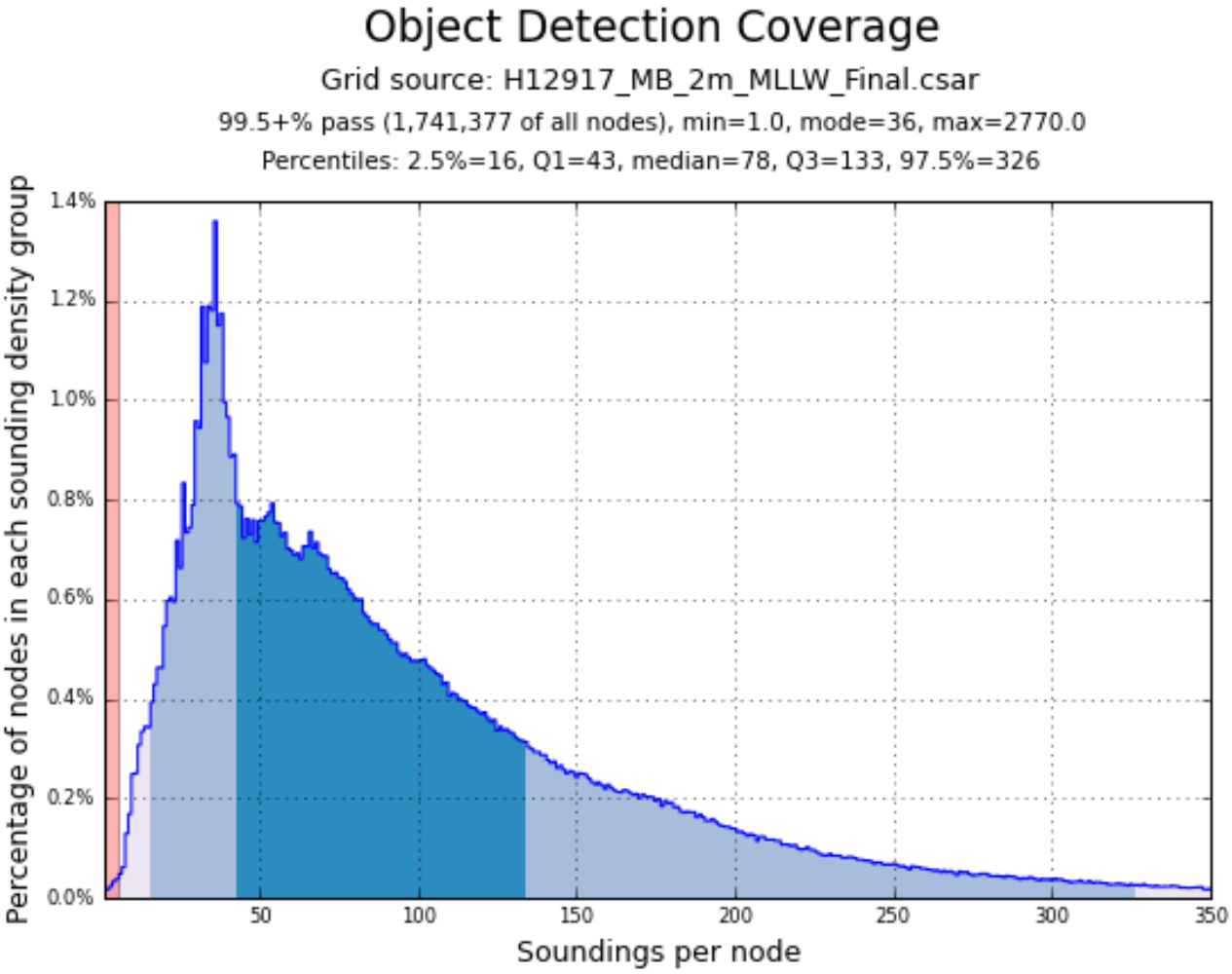

Figure 3: Pydro derived histogram plot showing HSSD density compliance of H12917 2-meter resolution MBES data.

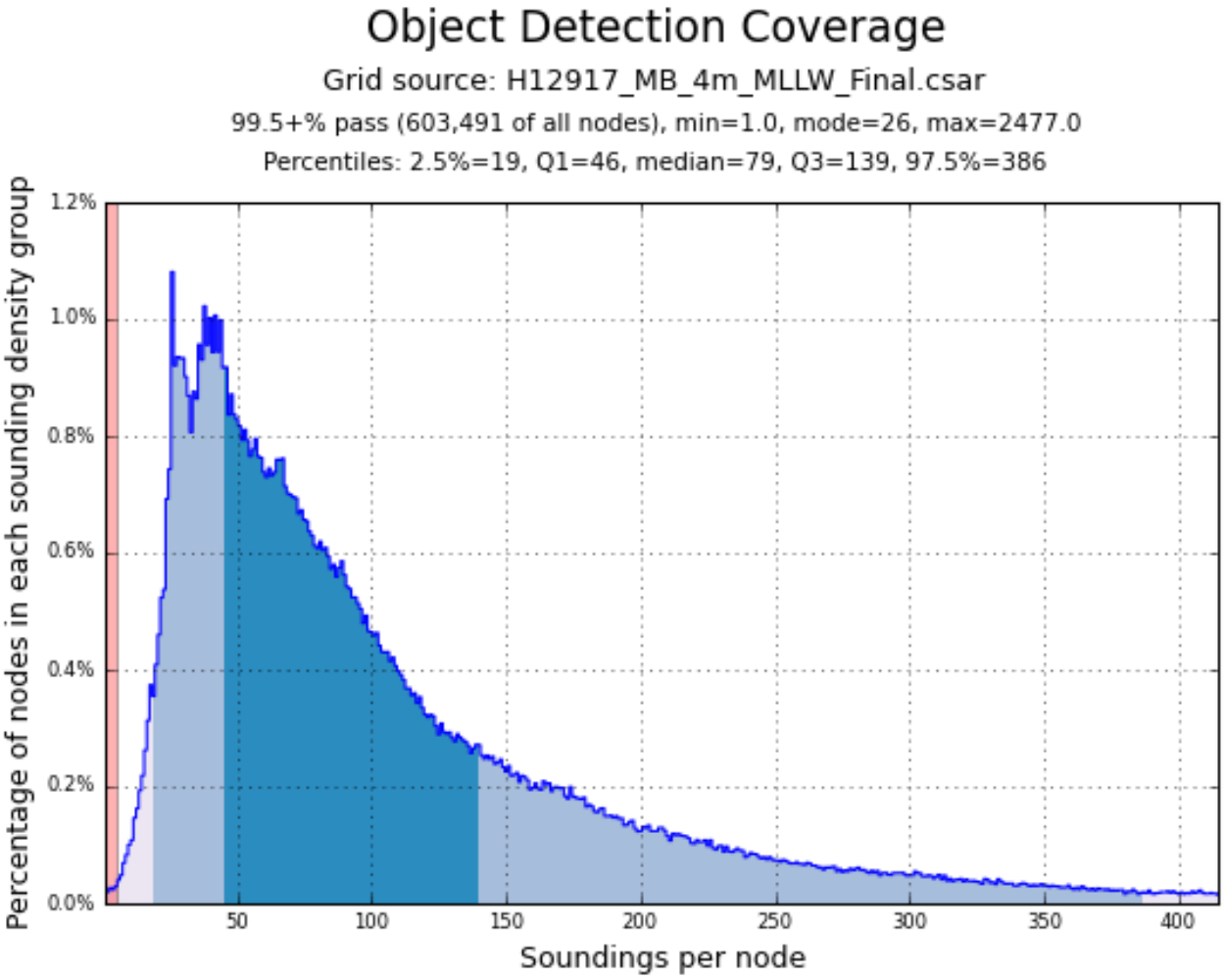

Figure 4: Pydro derived histogram plot showing HSSD density compliance of H12917 4-meter resolution MBES data.

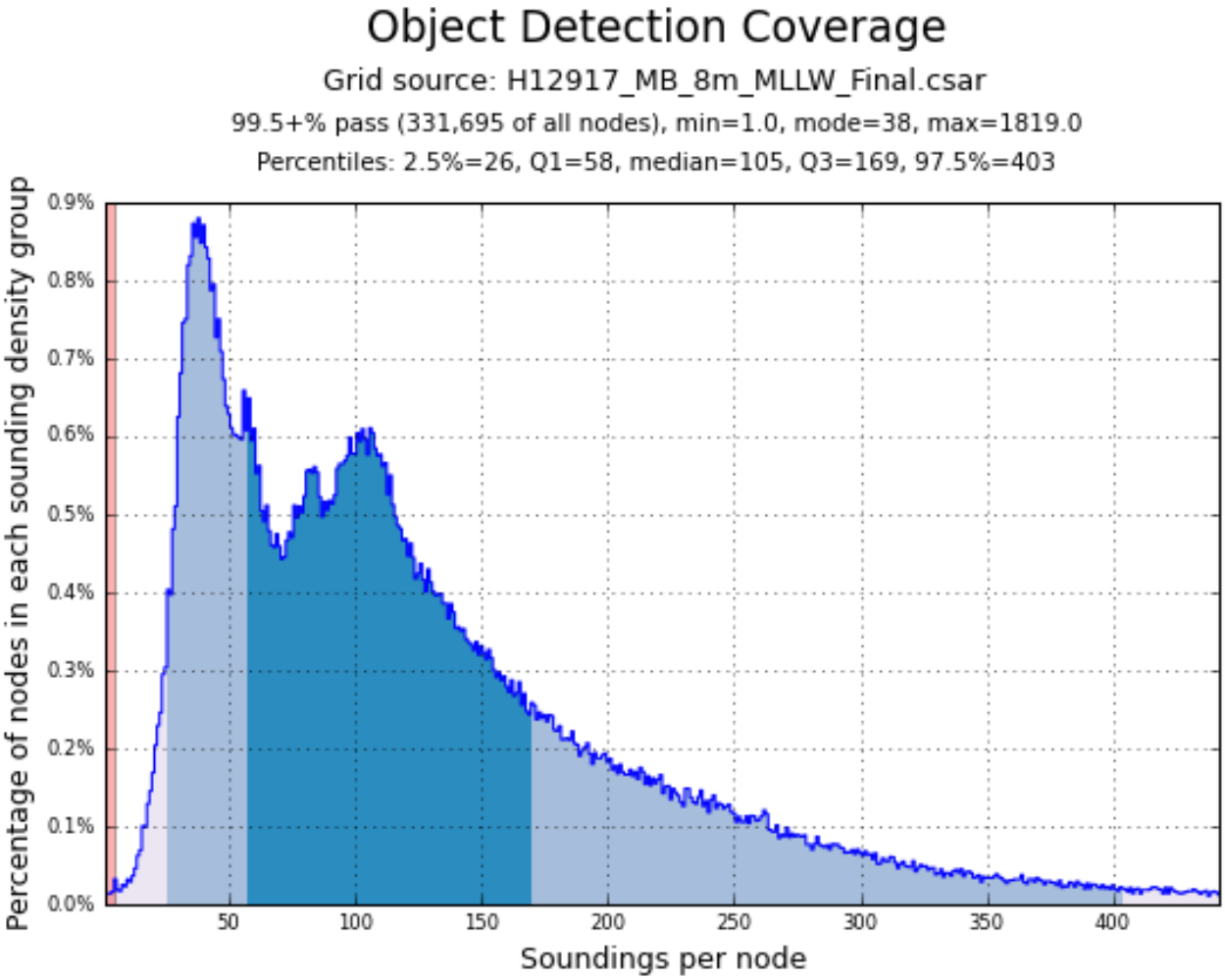

Figure 5: Pydro derived histogram plot showing HSSD density compliance of H12917 8-meter resolution MBES data.

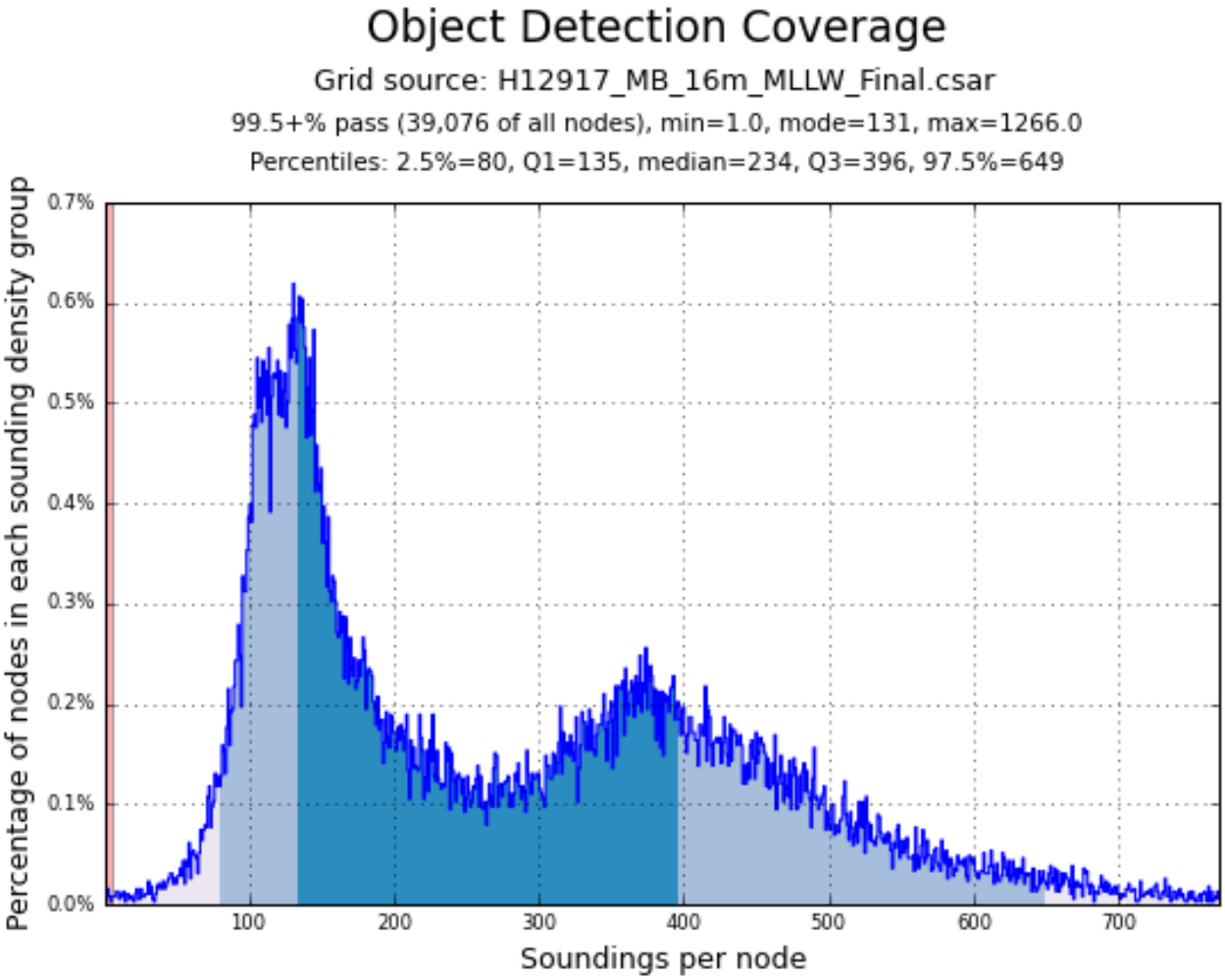

Figure 6: Pydro derived histogram plot showing HSSD density compliance of H12917 16-meter resolution MBES data.

A.4 Survey Coverage

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

Water Depth	Coverage Required
Inshore limit greater than 8 meters water depth	Complete Coverage MBES (HSSD Section 5.2.2.3 Option A)
Inshore limit to 8 meters water depth.	Complete coverage MB with backscatter (Section 5.2.2.3) or Set Line Spacing MBES or SBES at 100m (HSSD Section 5.2.2.4).

Complete multibeam echo sounder (MBES) coverage was achieved within the assigned survey area except where kelp, rocks or other dangerous conditions prevented survey operations to continue further inshore. These areas were generally located very near shore, were subject to dangerous wave action, and judged to be navigationally insignificant.

The Village Islands are a challenging location to survey as there were many navigationally significant rocks and features. In addition there were several areas where the NALL was reached before the sheet limits.

Figure 7 depicts an area that was not surveyed due to the NALL being reached at all entrances. Local knowledge is required to operate in the area west of the largest village island.

Figure 8 depicts where the NALL was reached around hazardous shoals which preclude further acquisition inshore around these features. This area has been submitted as a foul area due to rocks.

Figure 9 shows a small holiday caused by acoustic shadowing. The holiday is in the 1-meter surface between the depths of 10 and 18 meters. Based on the coverage the shoalest most navigationally significant part of the feature has been covered.

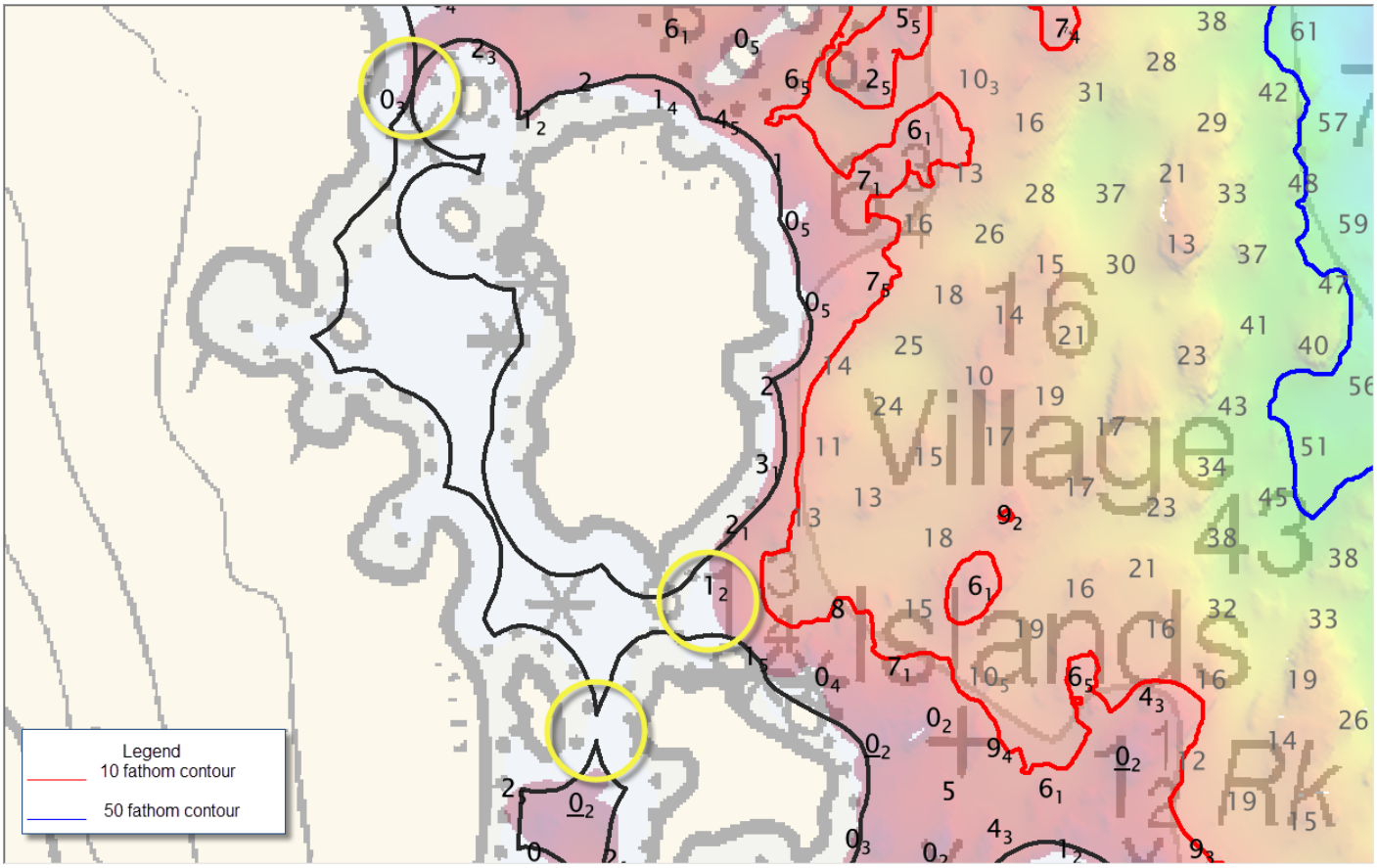

Figure 7: Northern section of the Village Islands on chart 16597 overlaid with H12917 contours and soundings (sheet limits shown as black line.) This area was deemed unsafe to survey without local knowledge.

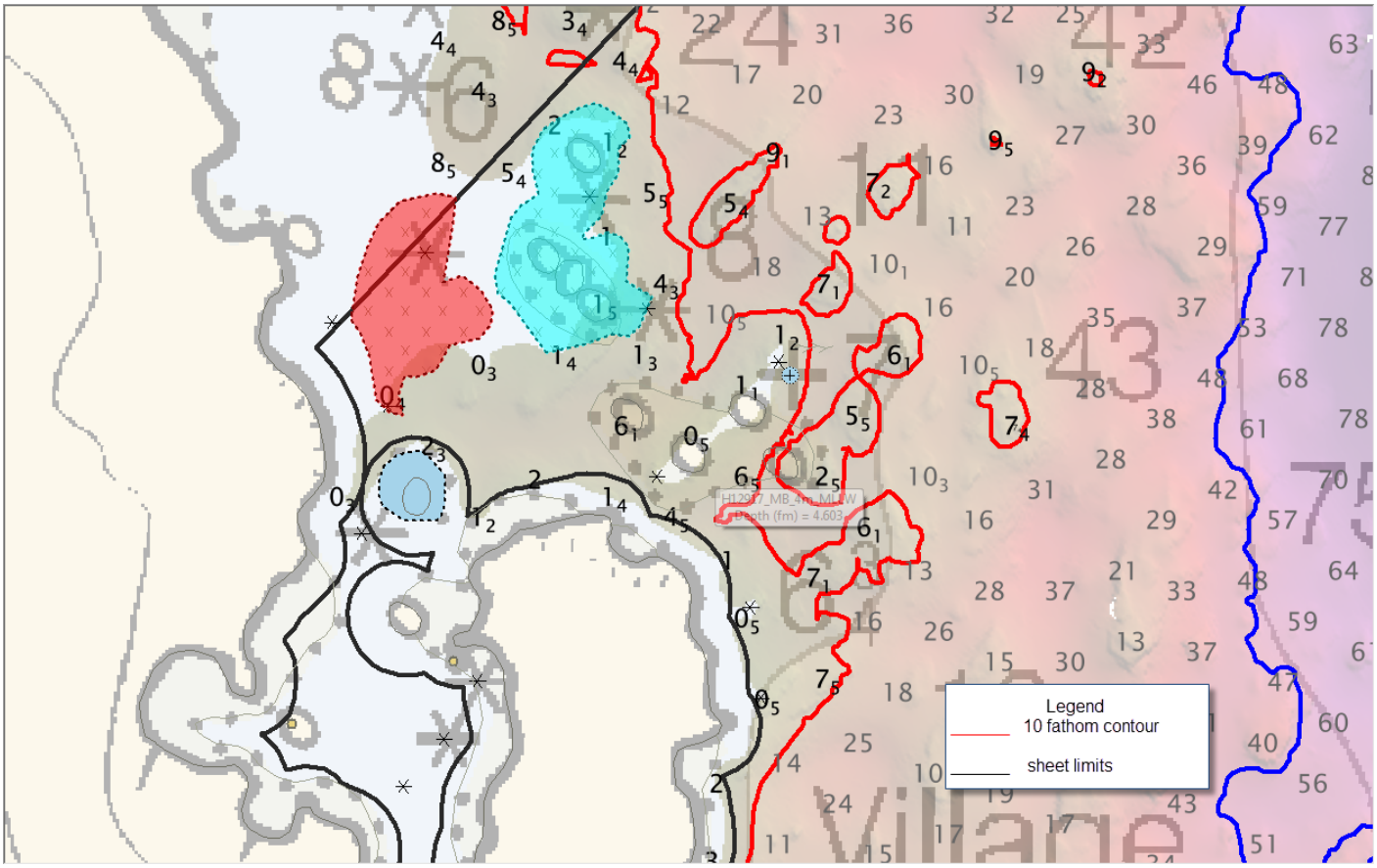

Figure 8: Northern section of the Village Islands on chart Chart 16597 overlaid with H12917 contours and soundings (sheet limits shown as black line.) Area not safe to transit inside due to reaching the NALL via depth.

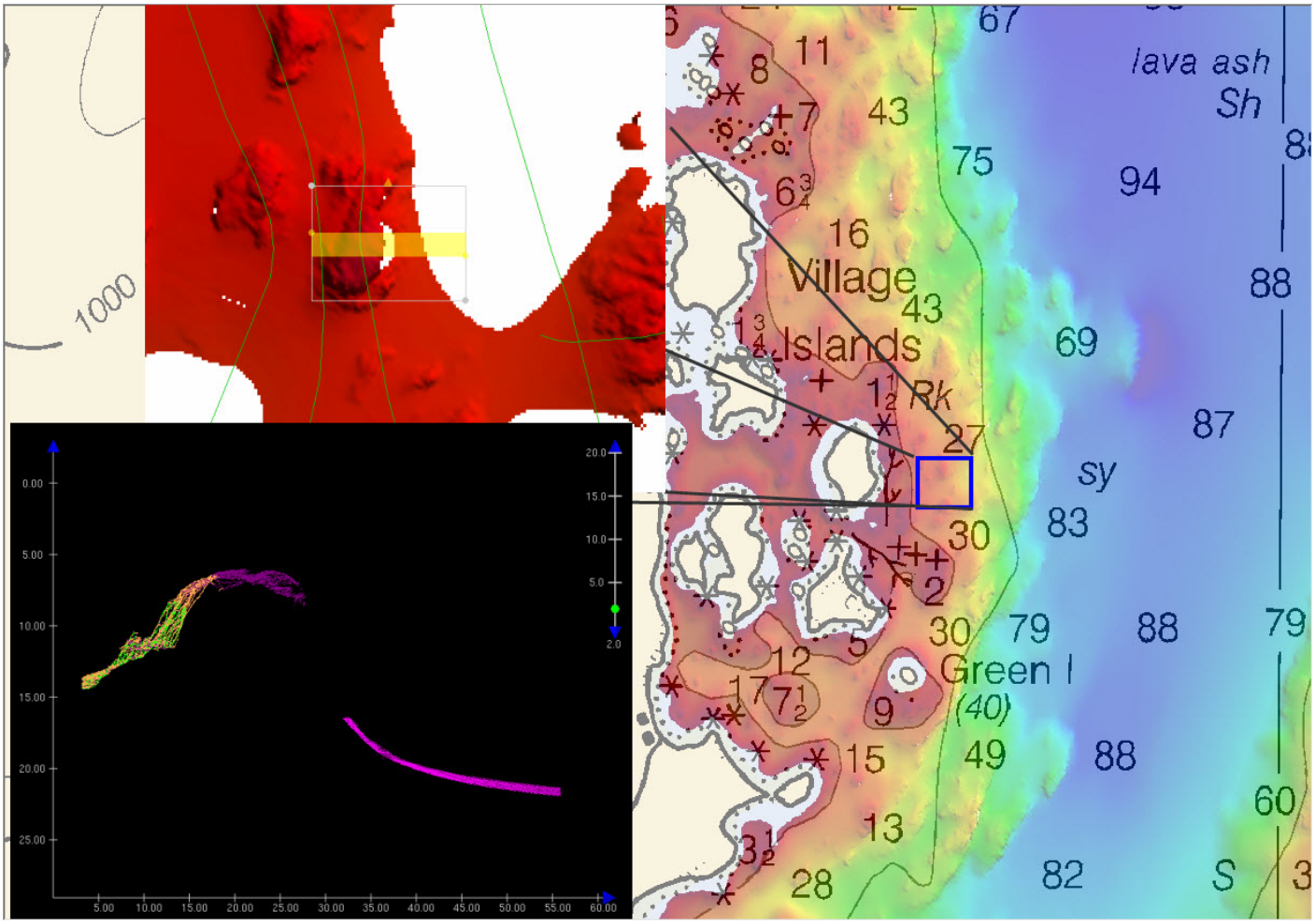

Figure 9: Village Islands section of Chart 16597 overlaid with H12917 survey coverage. The subset editor is shown of a small holiday in the 1-meter surface caused by acoustic shadowing.

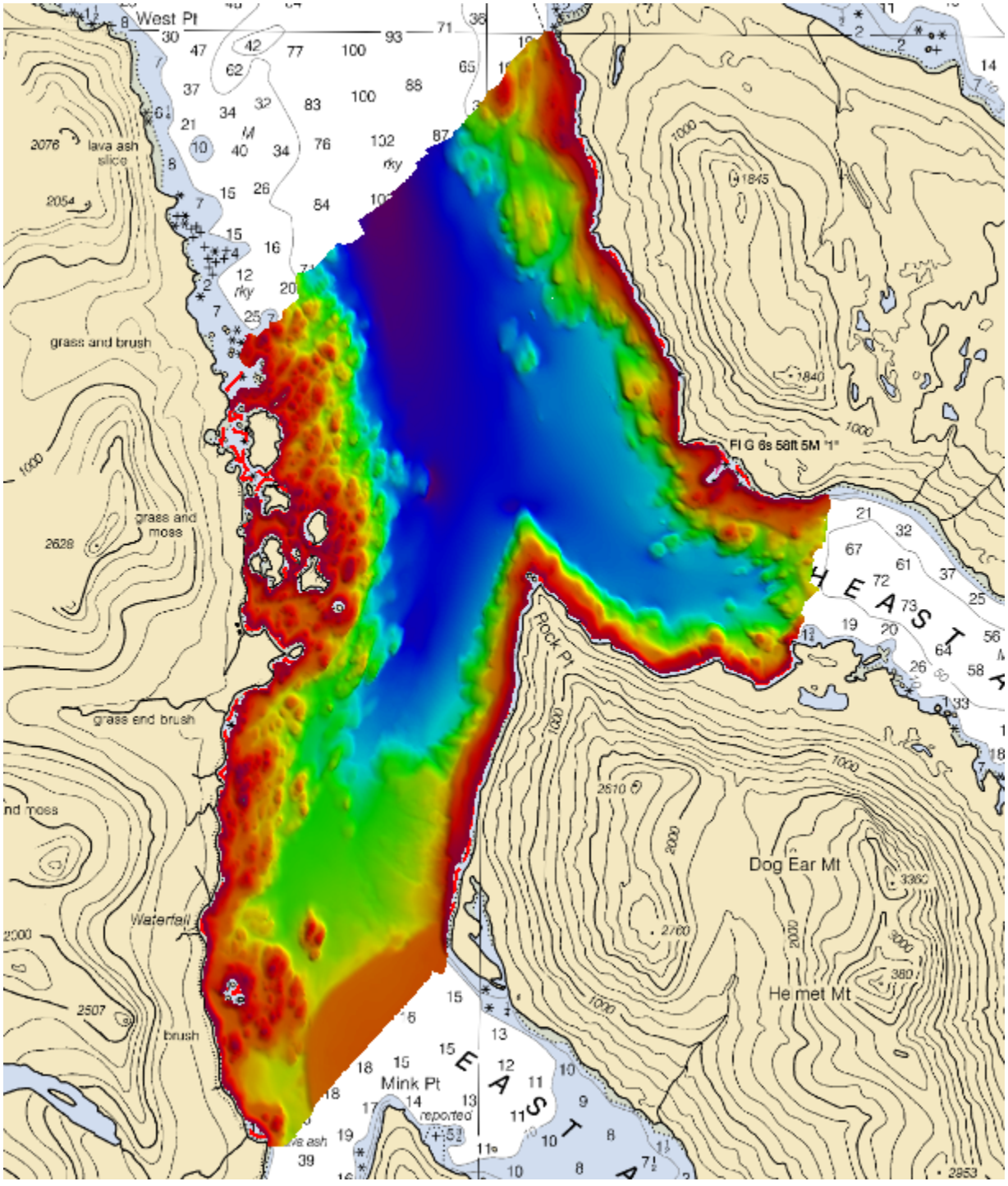

Figure 10: Acquired survey coverage overlaid on chart 16597

A.5 Survey Statistics

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

	HULL ID	*2801*	*2802*	*2803*	*2804*	*Total*
LNM	**SBES Mainscheme**	0	0	0	0	0
	MBES Mainscheme	37.85	83.81	18.62	80.37	220.65
	Lidar Mainscheme	0	0	0	0	0
	SSS Mainscheme	0	0	0	0	0
	SBES/SSS Mainscheme	0	0	0	0	0
	MBES/SSS Mainscheme	0	0	0	0	0
	SBES/MBES Crosslines	0	0	0	20.60	20.6
	Lidar Crosslines	0	0	0	0	0
Number of Bottom Samples						7
Number Maritime Boundary Points Investigated						0
Number of DPs						71
Number of Items Investigated by Dive Ops						0
Total SNM						12.88

Table 2: Hydrographic Survey Statistics

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

Survey Dates	Day of the Year
09/18/2016	262
09/19/2016	263
09/20/2016	264
09/21/2016	265
09/29/2016	273
09/30/2016	274
10/01/2016	275
10/03/2016	277
10/04/2016	278
10/05/2016	279
10/06/2016	280
10/07/2016	281
10/14/2016	288
10/15/2016	289
10/16/2016	290

Table 3: Dates of Hydrography

No data was submitted for 9/29/2016 (DN273) and no entries for this day were noted in the submitted acquisition and processing logs.

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	*1905*	*1906*	*2804*	*2802*	*2801*	*2803*
LOA	5.7 meters	5.8 meters	8.8 meters	8.8 meters	8.8 meters	8.8 meters
Draft	0.35 meters	0.33 meters	1.1 meters	1.1 meters	1.1 meters	1.1 meters

Table 4: Vessels Used

All data for H12917 were acquired by survey launches (2801, 2802, 2803, 2804) and skiffs (1905, 1906). The launches acquired MBES depth soundings, sound speed profiles, bottom samples, and backscatter data. The skiffs (1905, 1906) conducted shoreline verification.

B.1.2 Equipment

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

Manufacturer	Model	Type
Reson	SeaBat 7125-B	MBES
Reson	SeaBat 7125 SV2	MBES
Reson	SVP71	Surface Sound Speed Probe
Sea-Bird Electronics	SBE 19plus SEACAT Profiler	Conductivity, Temperature, and Depth Sensor
Applanix	POS MV v5	Positioning and Attitude System

Table 5: Major Systems Used

B.2 Quality Control

B.2.1 Crosslines

Crosslines acquired for this survey totaled 9.34% of mainscheme acquisition.

Multibeam crosslines were acquired using the Reson 7125 SV2 on launch 2804 (RA-6). A 4-meter CUBE surface was created using only mainscheme lines, and a second 4-meter CUBE surface was created

using only crosslines. A difference surface was generated from these two surfaces in CARIS at a 4-meter resolution. This difference surface was compared to the IHO allowable total vertical uncertainty (TVU) standards. In total, 99.06% of the depth differences between H12917 mainscheme and crossline data met HSSD TVU standards. This analysis was performed on H12917 data reduced to Mean Lower Low Water (MLLW) using Ellipsoidally Referenced Zoned Tides (ERZT) methods.

Depth range	IHO Order	Number of nodes	Nodes satisfying HSSD	Percent nodes satisfying HSSD accuracy
Less than 100m	Order 1	175,478	170,043	96.90%
Greater than 100m	Order 2	448,488	448,041	99.90%
	TOTAL:	623,966	618,084	99.06%

Figure 11: Summary table indicating percentage of difference surface nodes between H12917 mainscheme and crossline data that met HSSD allowable TVU standards.

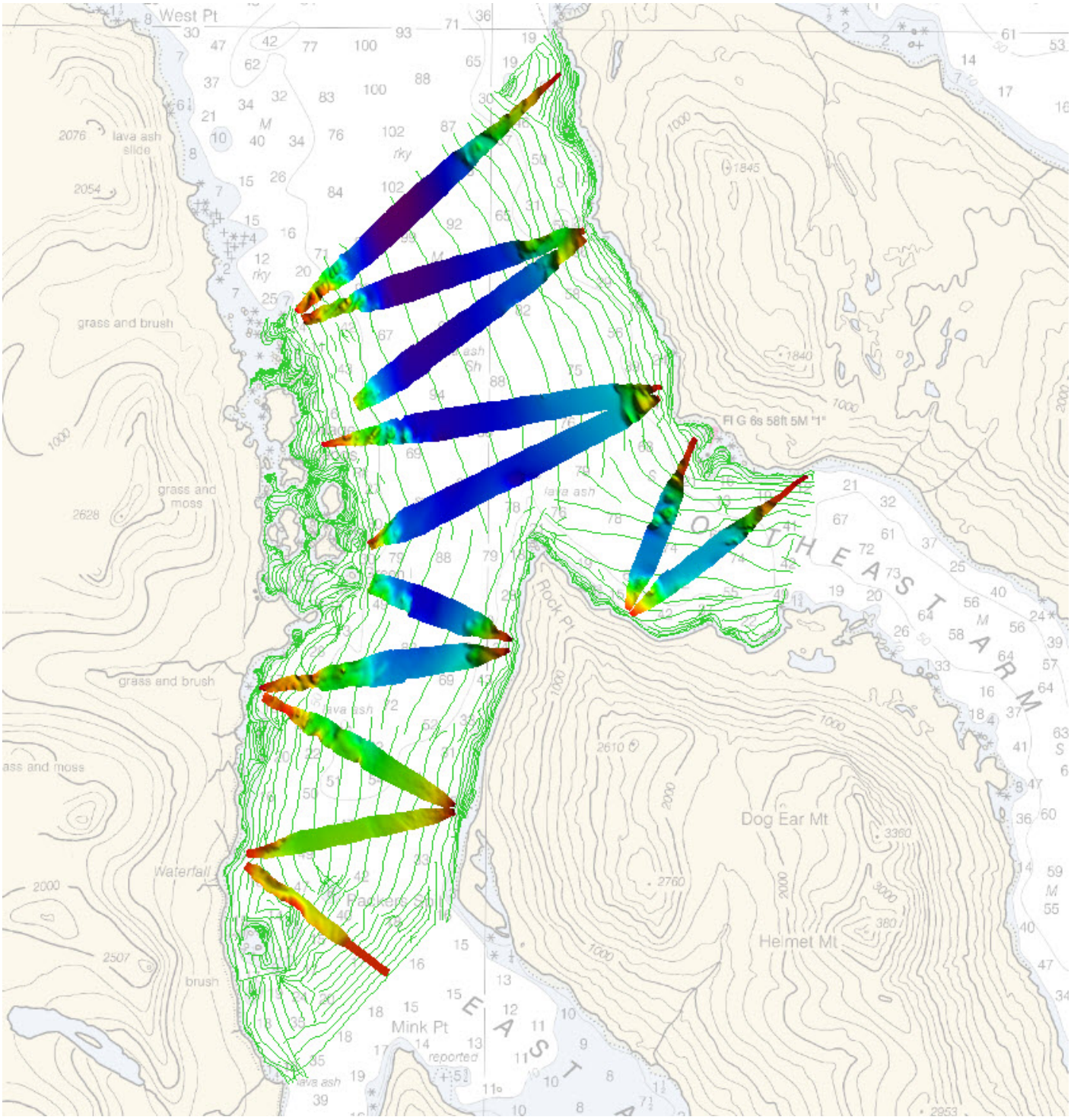

Figure 12: H12917 crossline surface overlaid on mainscheme tracklines.

B.2.2 Uncertainty

The following survey specific parameters were used for this survey:

Measured	Zoning	Method
0 meters	0.037 meters	ERS via ERZT

Table 6: Survey Specific Tide TPU Values.

Hull ID	Measured - CTD	Measured - MVP	Surface
2801,2802,2803,2804	3 meters/second	0 meters/second	0.15 meters/second

Table 7: Survey Specific Sound Speed TPU Values.

Total Propagated Uncertainty (TPU) values for survey H12917 were derived from a combination of fixed values for equipment and vessel characteristics, as well as field assigned values for sound speed uncertainties. Tidal uncertainty was accounted for by examining the filed generated 1,000-meter separation model and statistically determining a measured value. A measured uncertainty of 0.037 meters was entered into CARIS TPU tide zoning value to account for ERZT processing methods. See the OPR-P136-RA-16 ERZT memo included in Supplemental Correspondence 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 Reson MBES sonars were recorded and applied during post-processing. Applanix TrueHeave (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 position were applied in CARIS HIPS using SBET / RMS files generated using POSPac software.

Uncertainty values of submitted finalized grids were calculated in CARIS using "Greater of the Two" of uncertainty and standard deviation (scaled to 95%). Pydro QC tools were used to analyze H12917 TVU compliance, histogram plots of the results are shown below.

In order to visualize where uncertainty requirements were met, uncertainty compliance layers were created for each individual resolution surface. The surfaces were based on the difference between the calculated node uncertainty and the allowable uncertainty defined in the HSSD.

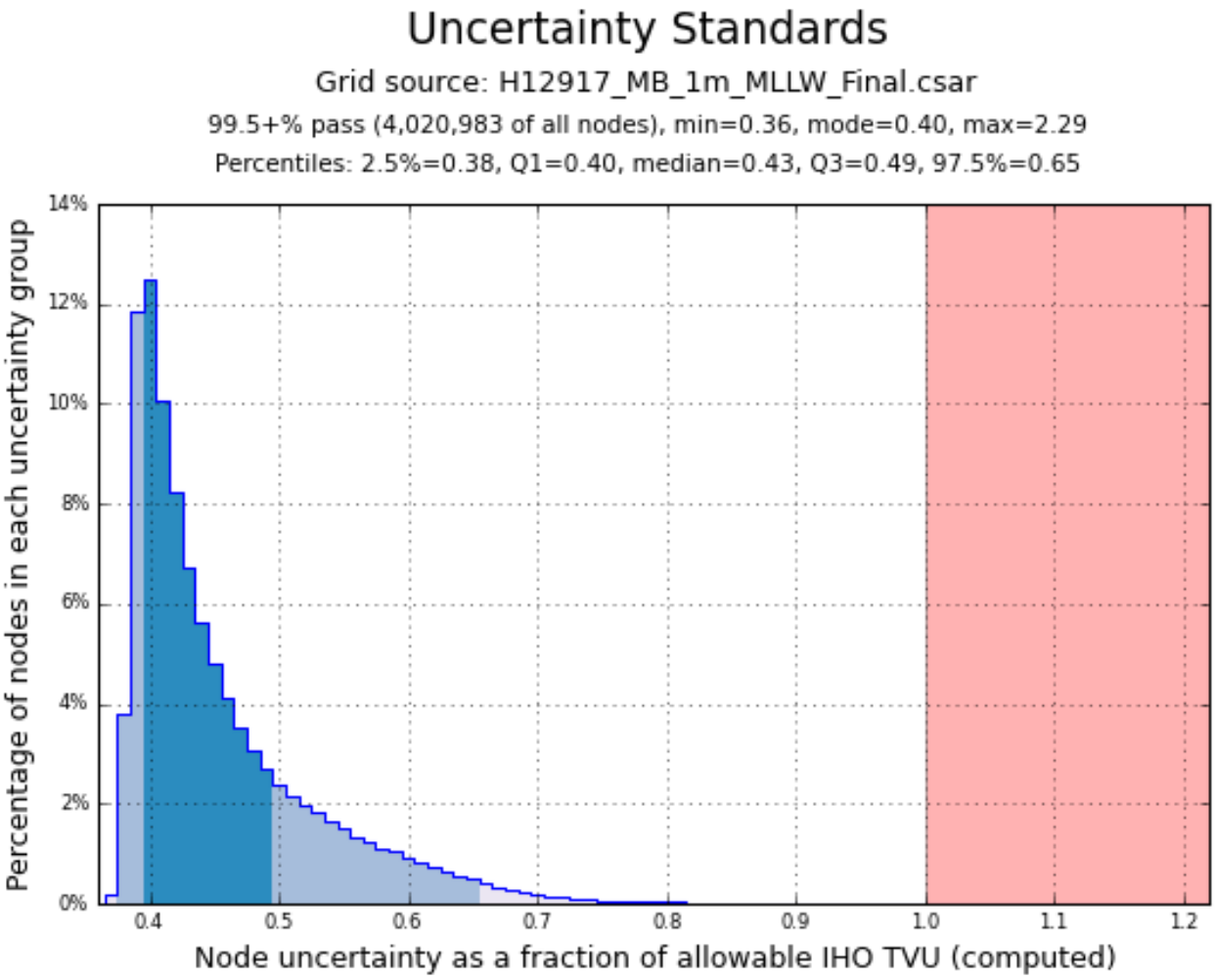

Figure 13: Pydro derived histogram plot showing TVU compliance of H12917 1-meter resolution MBES data.

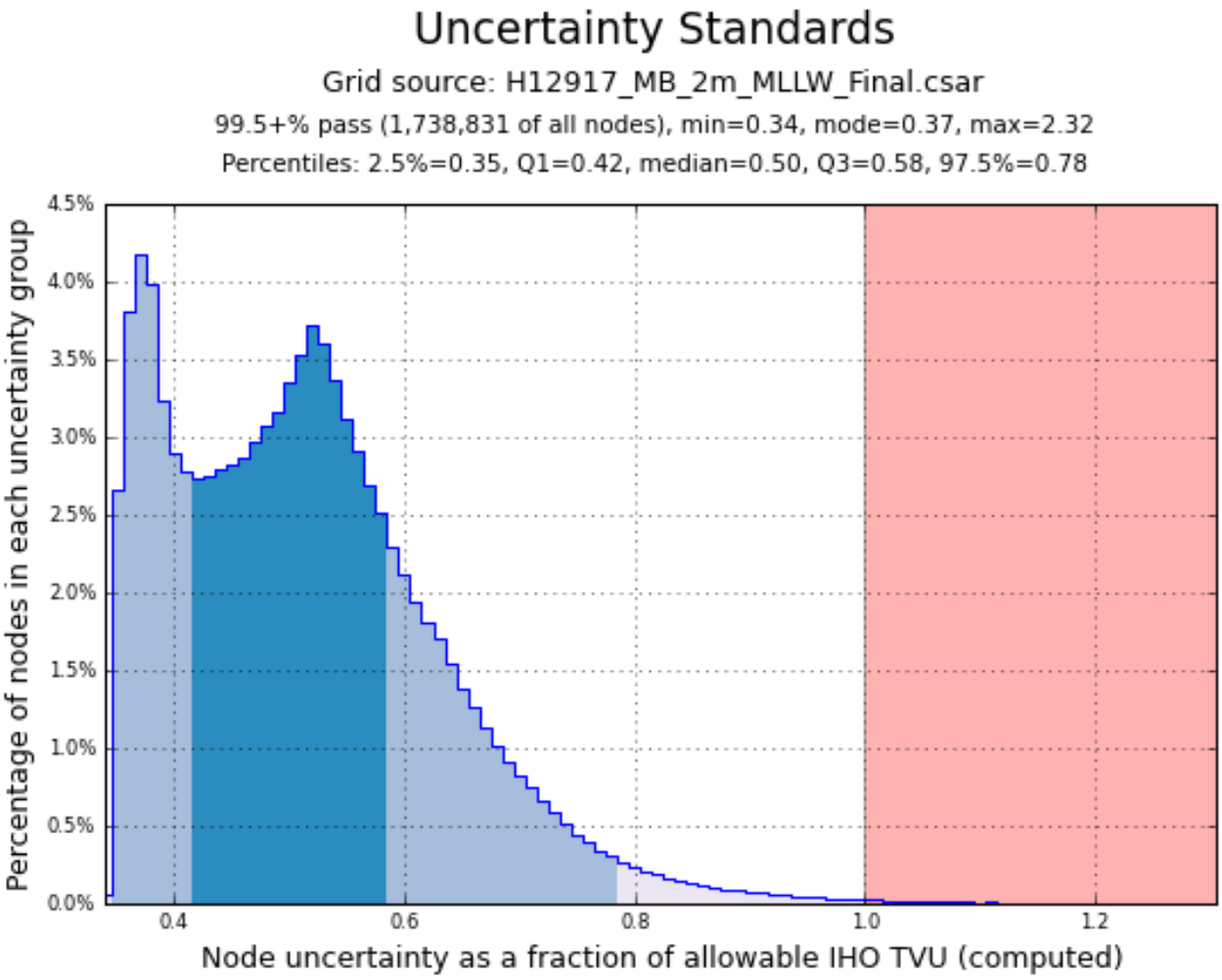

Figure 14: Pydro derived histogram plot showing TVU compliance of H12917 2-meter resolution MBES data.

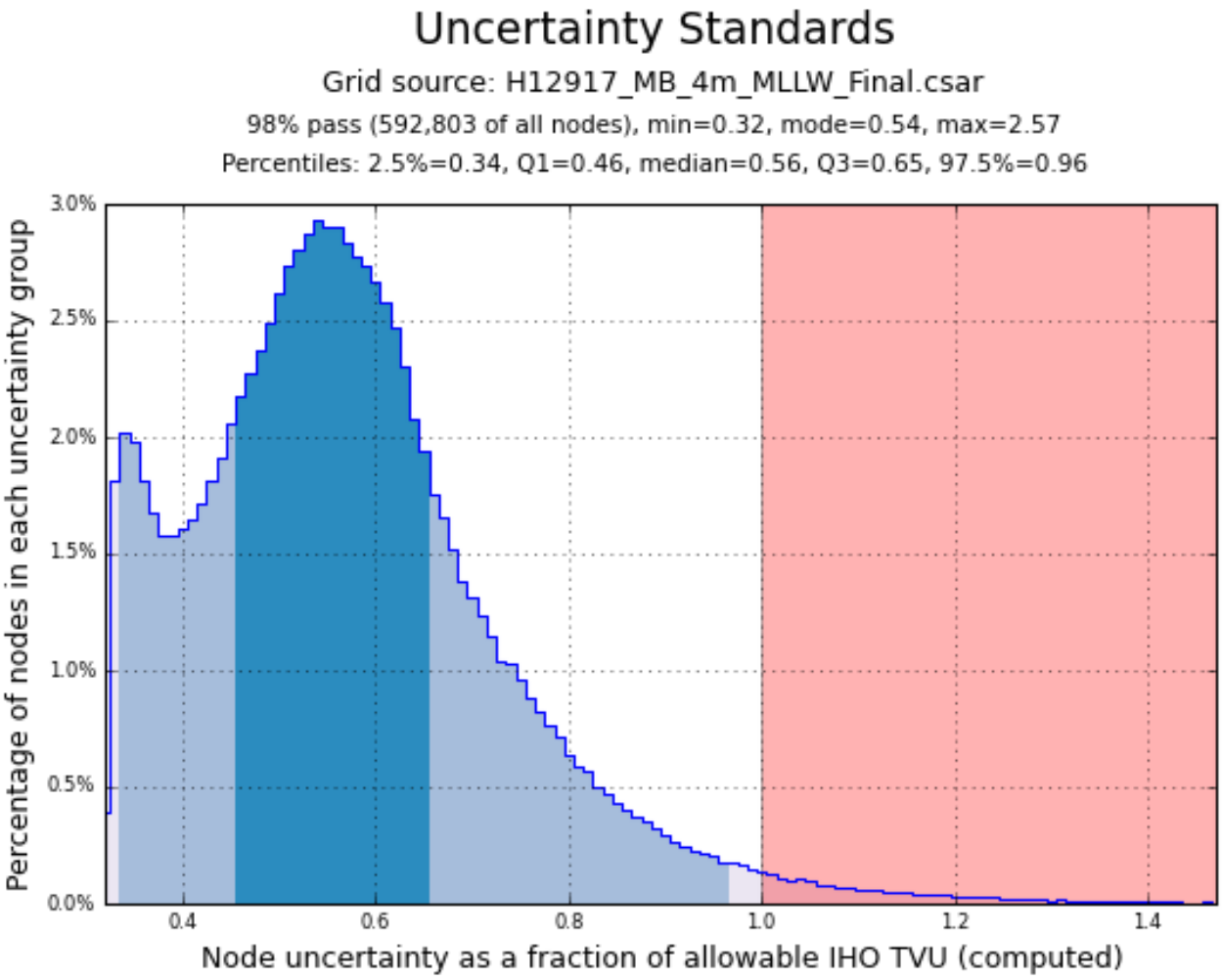

Figure 15: Pydro derived histogram plot showing TVU compliance of H12917 4-meter resolution MBES data.

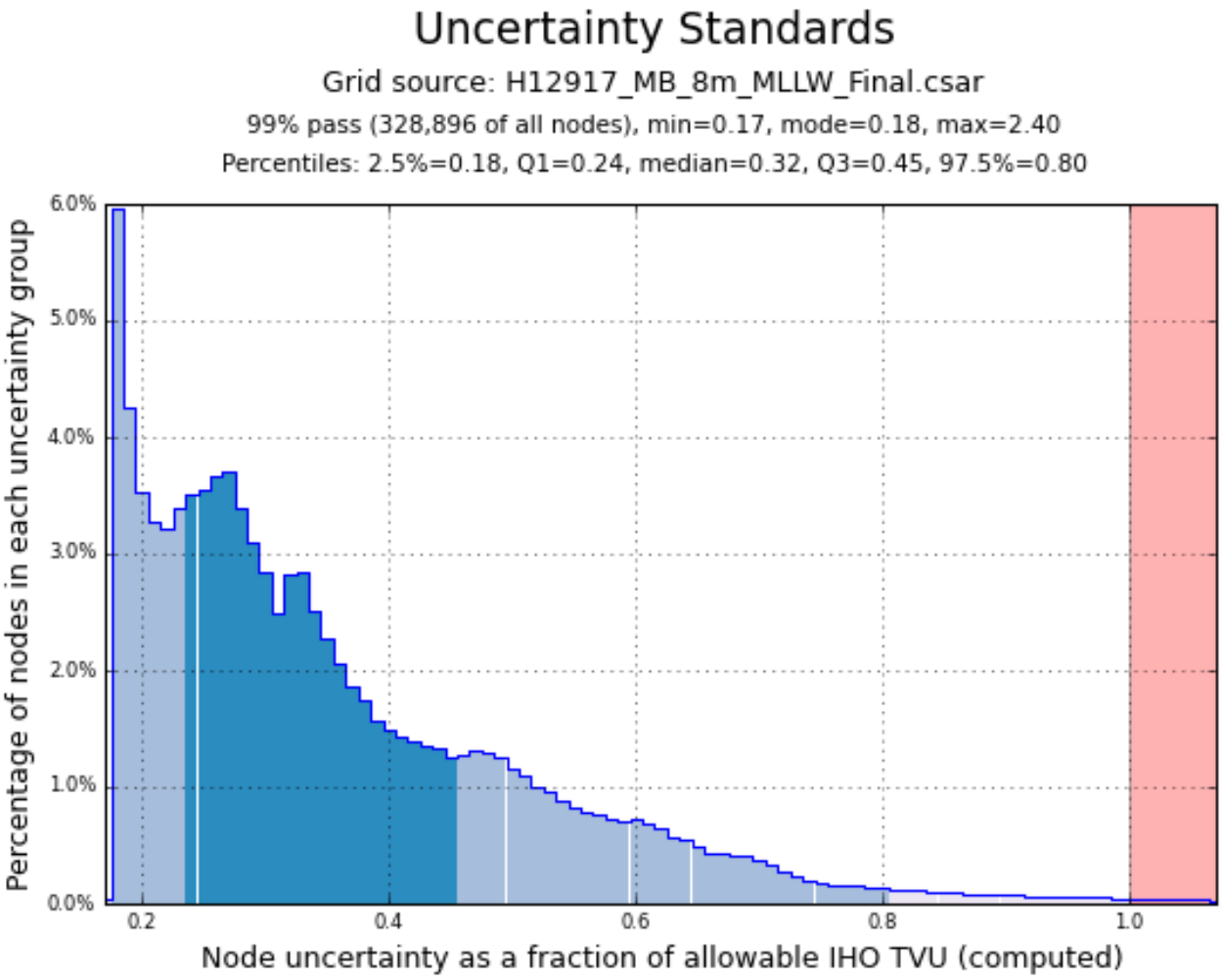

Figure 16: Pydro derived histogram plot showing TVU compliance of H12917 8-meter resolution MBES data.

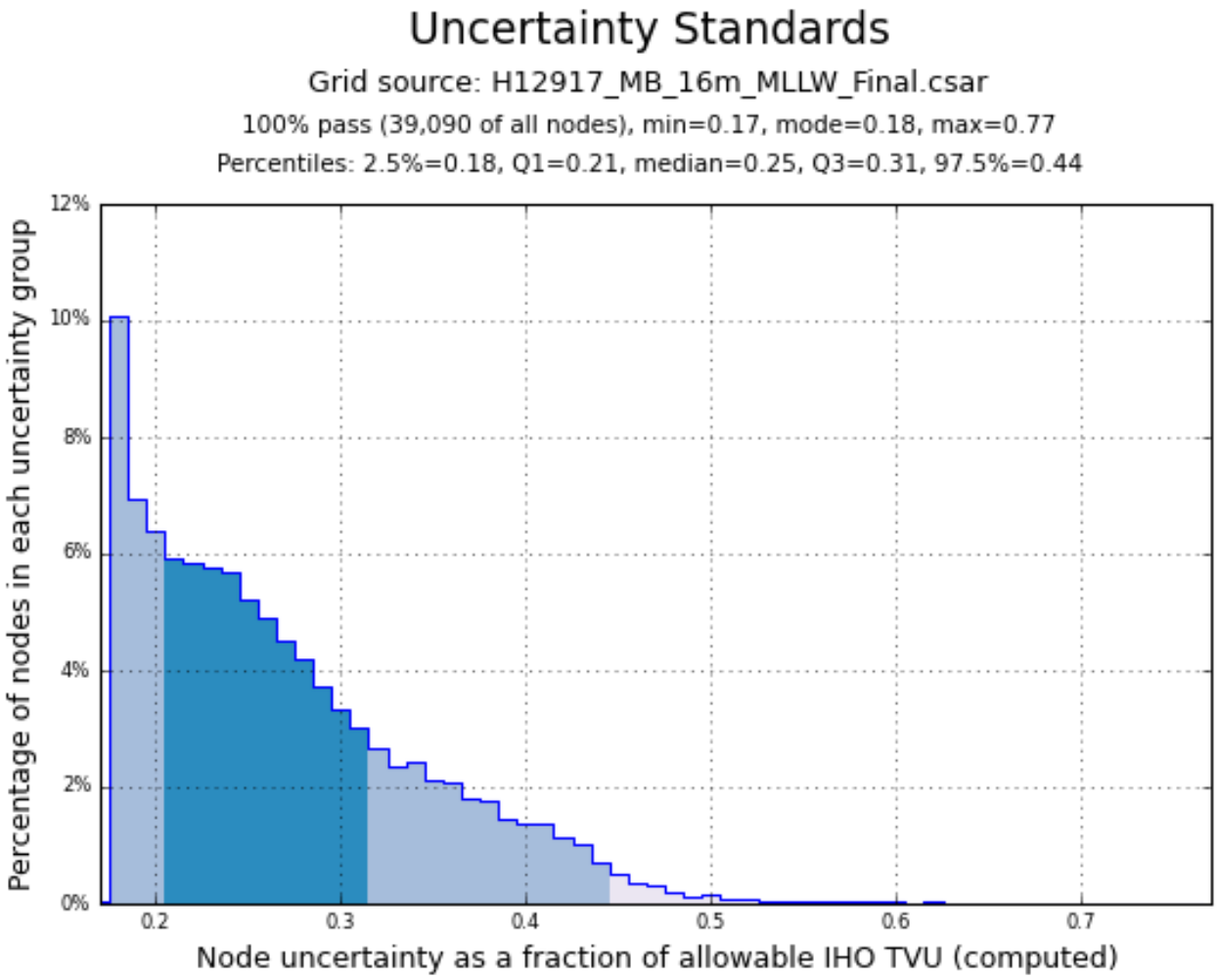

Figure 17: Pydro derived histogram plot showing TVU compliance of H12917 16-meter resolution MBES data.

The value listed in Table 6 for Zoning uncertainty and applied to the survey does not agree with the ERS Capablility Memo. The correct value is .034 meteres. Due to the small difference between the values the reviewer did not reprocess TPU.

B.2.3 Junctions

Three contemporary surveys, all part of project OPR-P136-RA-16, junction with H12917.

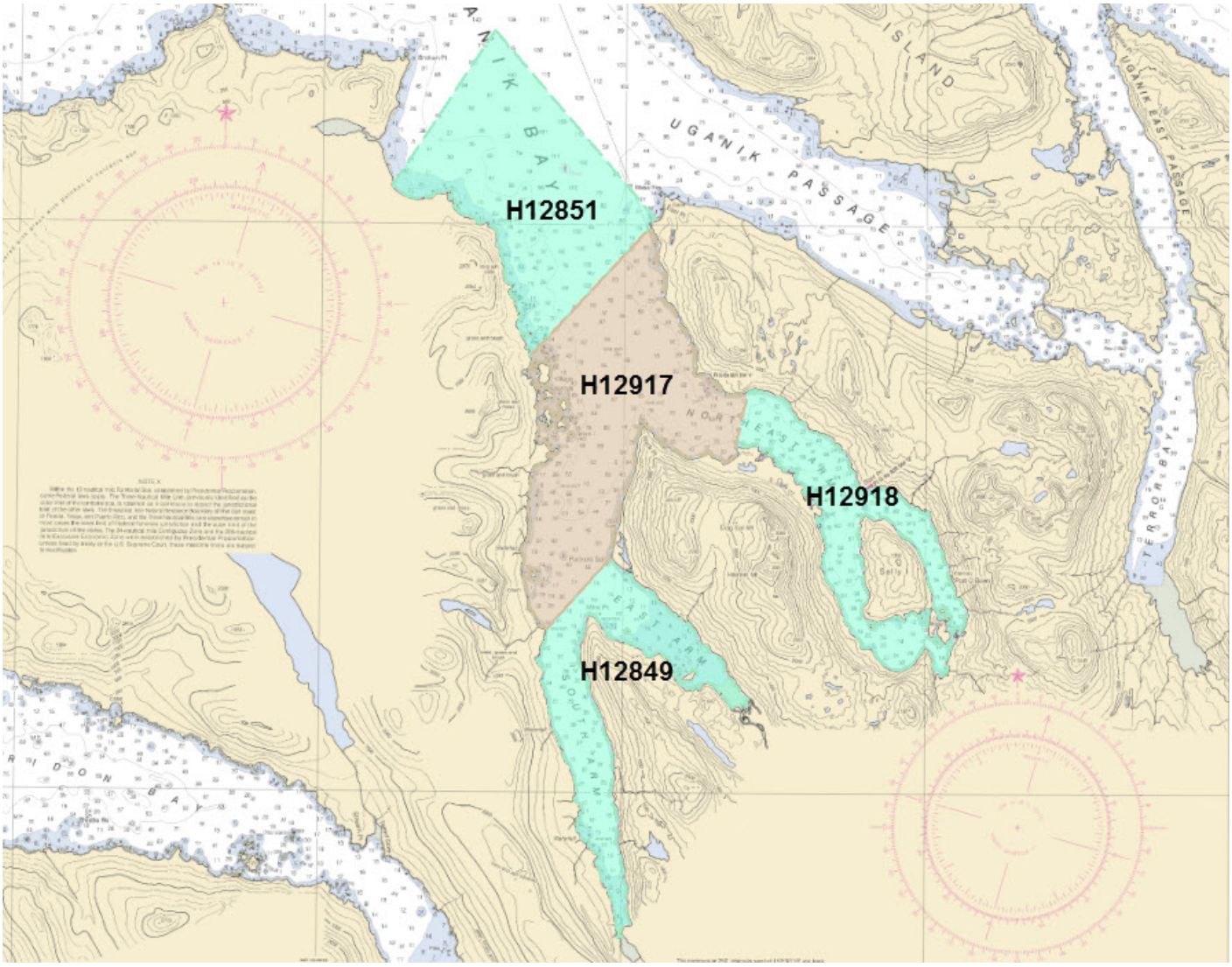

Figure 18: H12917 junction surveys.

The following junctions were made with this survey:

Registry Number	Scale	Year	Field Unit	Relative Location
H12851	1:40000	2016	NOAA Ship RAINIER	N
H12849	1:40000	2016	NOAA Ship RAINIER	S
H12918	1:40000	2016	NOAA Ship RAINIER	SE

Table 8: Junctioning Surveys

H12851

The overlap with survey H12851 encompassed 0.52 square nautical miles along the northern boundary of H12917. A comparison was made using a difference surface derived from the 8-meter CUBE surfaces of each survey. Analysis of the difference surface indicated that H12917 is an average of 0.08 meters deeper than H12851 with a standard deviation of 0.54 meters. For the respective depths, the difference surface was compared to the allowable TVU standards specified in the HSSD. In total, 94.67% of the depth differences between H12917 and junction survey H12851 were within allowable uncertainties. The highest uncertainties corresponded with areas of dynamic seafloor topography.

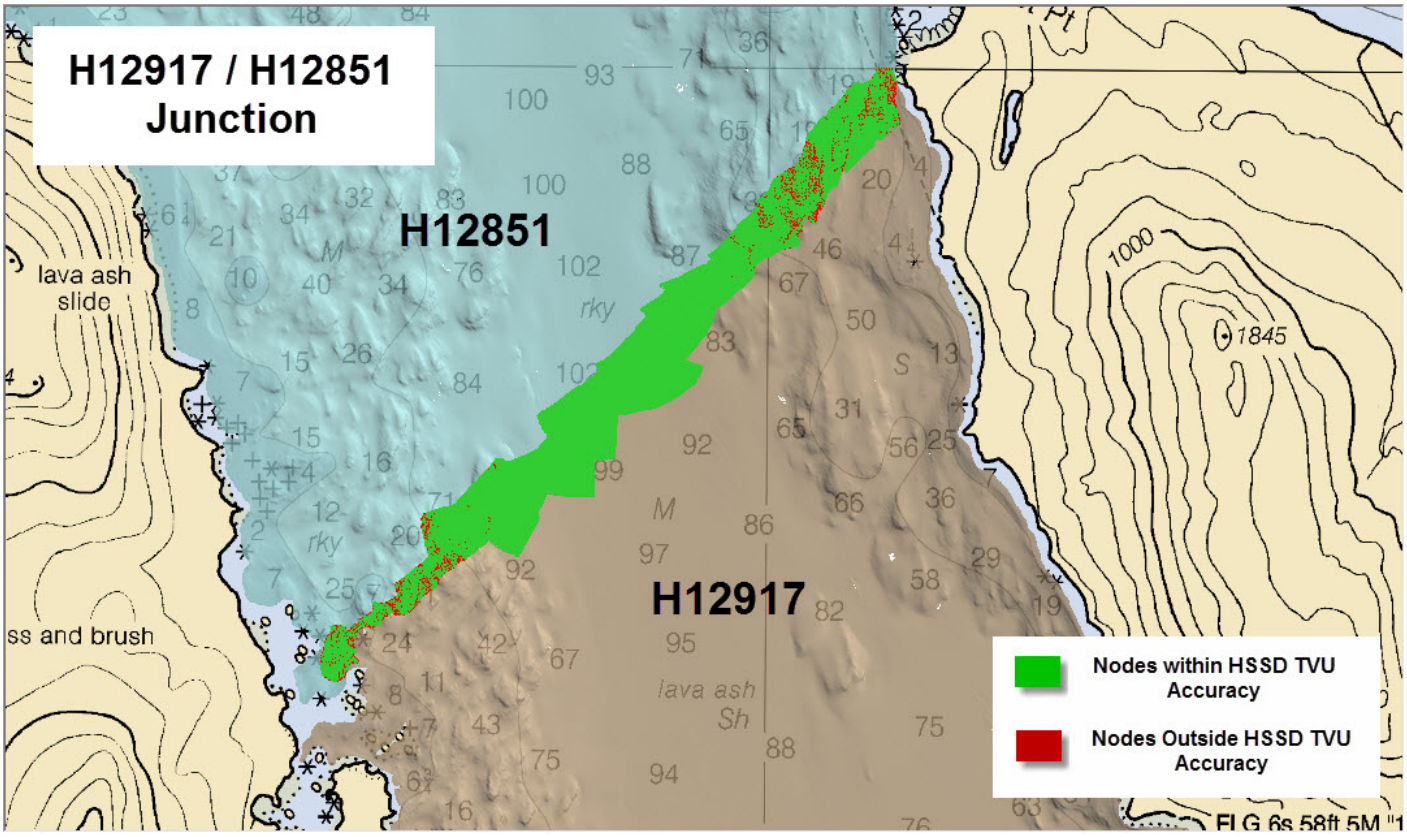

Figure 19: H12917 / H12851 junction.

Depth range	IHO Order	Number of nodes	Nodes satisfying HSSD accuracy	Percent nodes satisfying HSSD accuracy
Less than 100m	Order 1	10,800	9,314	86.24%
Greater than 100m	Order 2	17,755	17,720	99.80%
	TOTAL:	28,555	27,034	94.67%

Figure 20: Summary table indicating percentage of nodes that met HSSD allowable TVU standards for H12917 / H12851 junction.

H12849

The overlap with survey H12849 encompassed 0.18 square nautical miles along the southern boundary of H12917. A comparison was made using a difference surface derived from the 2-meter CUBE surfaces of each survey. Analysis of the difference surface indicated that H12917 is an average of 0.003 meters shoaler than H12849 with a standard deviation of 0.172 meters. For the respective depths, the difference surface was compared to the allowable TVU standards specified in the HSSD. In total, 99.53% of the depth differences between H12917 and junction survey H12849 were within allowable uncertainties.

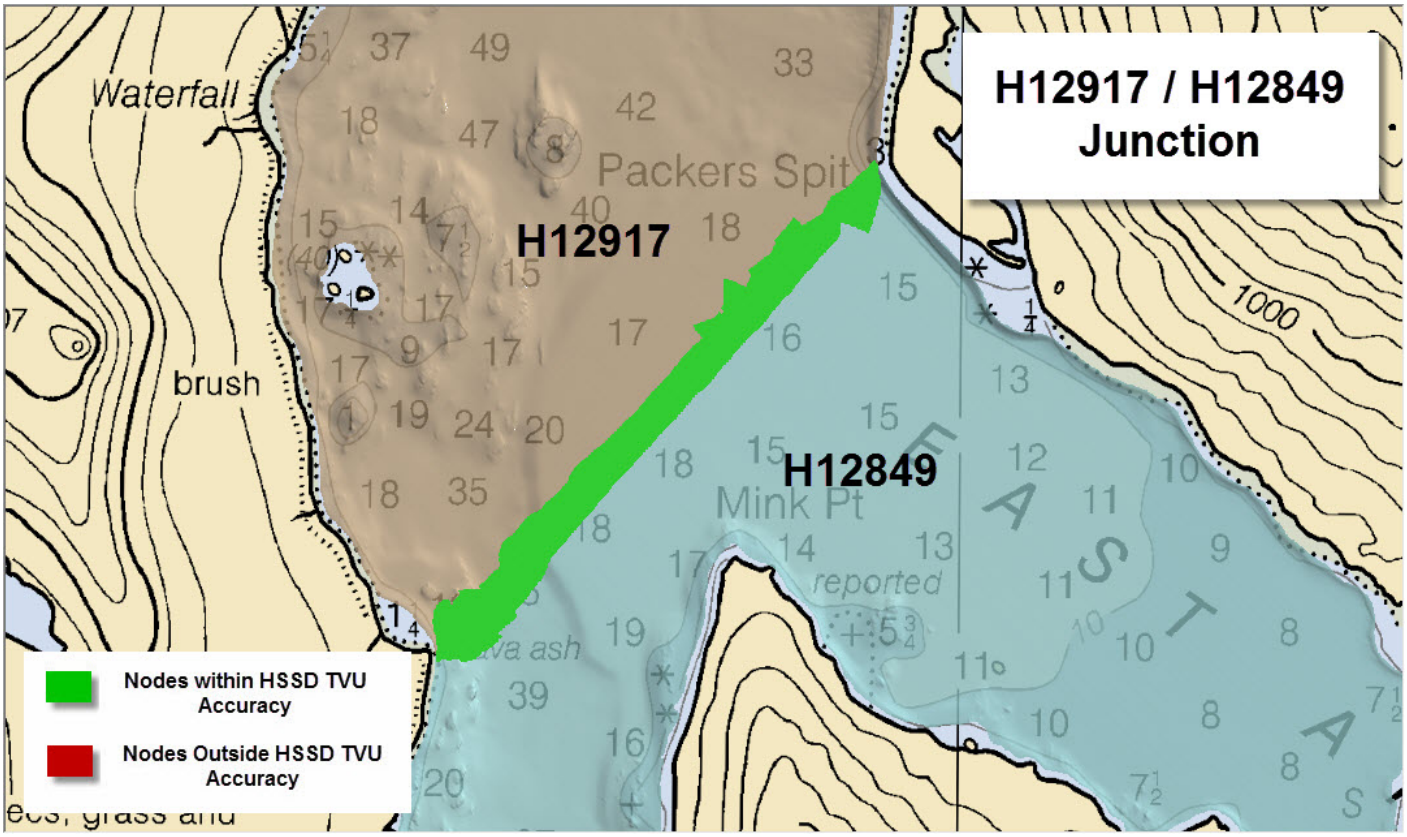

Figure 21: H12917 / H12849 junction.

Depth range	IHO Order	Number of nodes	Nodes satisfying HSSD accuracy	Percent nodes satisfying HSSD accuracy
Less than 100m	Order 1	151,751	151,033	99.53%

Figure 22: Summary table indicating percentage of nodes that met HSSD allowable TVU standards for H12917 / H12849 junction.

H12918

The overlap with survey H12918 encompassed 0.18 square nautical miles along the south eastern boundary of H12917. A comparison was made using a difference surface derived from the 4-meter CUBE surfaces of

each survey. Analysis of the difference surface indicated that H12917 is an average of 0.29 meters deeper than H12918 with a standard deviation of 0.41 meters. For the respective depths, the difference surface was compared to the allowable TVU standards specified in the HSSD. In total, 96.16% of the depth differences between H12917 and junction survey H12918 were within allowable uncertainties. The highest uncertainties corresponded with areas of dynamic seafloor topography.

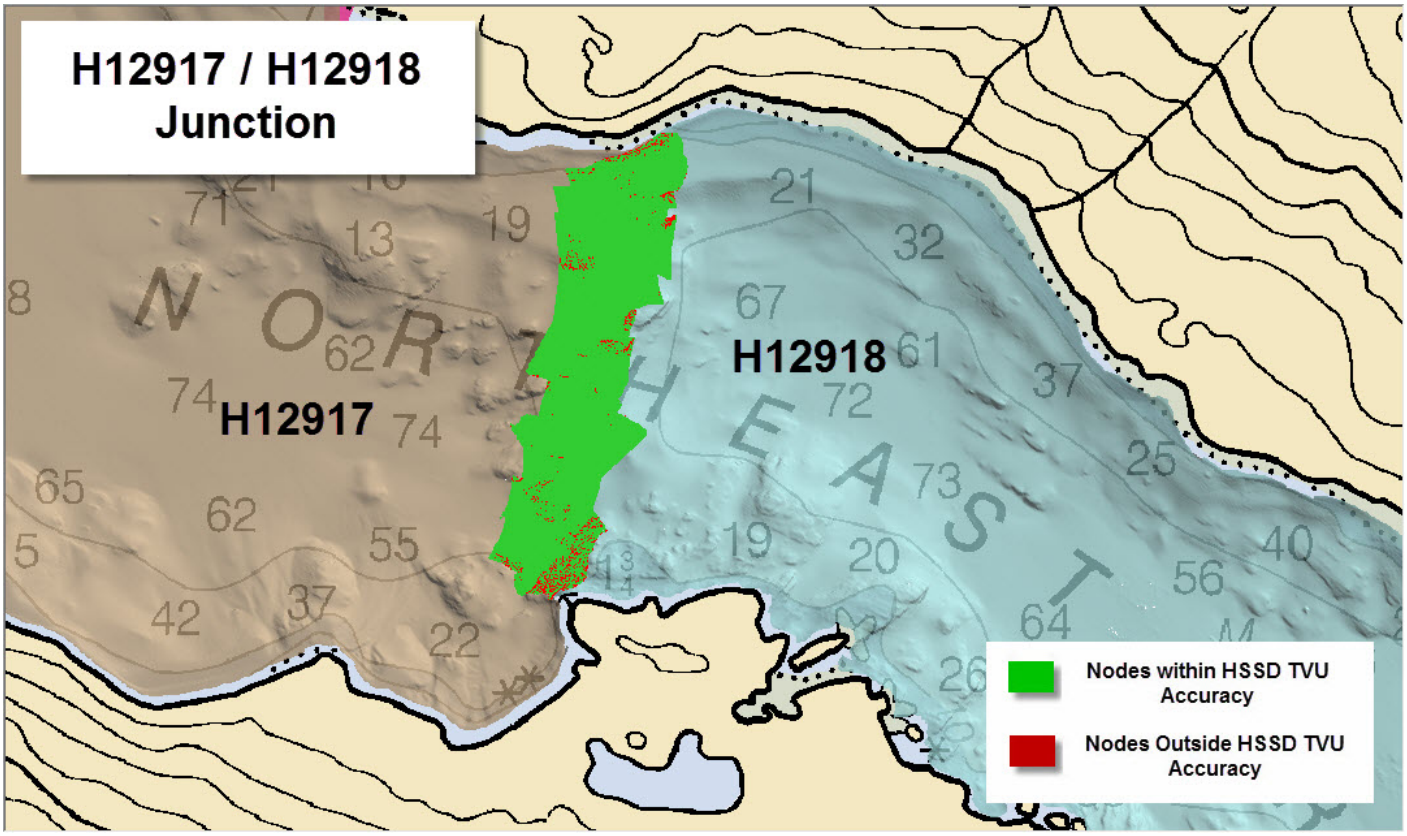

Figure 23: H12917 / H12918 junction.

Depth range	IHO Order	Number of nodes	Nodes satisfying HSSD accuracy	Percent nodes satisfying HSSD accuracy
Less than 100m	Order 1	35,790	34,299	95.83%
Greater than 100m	Order 2	3,071	3,068	99.90%
	TOTAL:	38,861	37,367	96.16%

Figure 24: Summary table indicating percentage of nodes that met HSSD allowable TVU standards for H12917 / H12918 junction.

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: Thirty seven sound speed profiles were acquired for this survey at discrete locations within the survey area at least once every four hours, when significant changes in surface sound speed were observed, or when operating in a new area. Sound speed profiles were acquired using Sea-Bird SBE 19plus SEACAT Profilers. All casts were concatenated into a master file and applied to lines using the "Nearest distance within time" (4 hours) profile selection method.

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

Backscatter data, logged as .7k files, were acquired but not formally processed by Rainier personnel. Sample backscatter lines were reviewed on Rainier for quality control purposes. The data shall be submitted directly to the Processing Branch.

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	9.1.7

Table 9: Primary bathymetric data processing software

The following Feature Object Catalog was used: NOAA Profile V_5_3

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
H12917_MB_1m_MLLW	CUBE	1 meters	-1.90 meters - 188.76 meters	NOAA_1m	Complete MBES
H12917_MB_1m_MLLW_Final	CUBE	1 meters	-1.9 meters - 20 meters	NOAA_1m	Complete MBES
H12917_MB_2m_MLLW	CUBE	2 meters	-1.81 meters - 184.41 meters	NOAA_2m	Complete MBES
H12917_MB_2m_MLLW_Final	CUBE	2 meters	18 meters - 40 meters	NOAA_2m	Complete MBES
H12917_MB_4m_MLLW	CUBE	4 meters	-1.32 meters - 184.38 meters	NOAA_4m	Complete MBES
H12917_MB_4m_MLLW_Final	CUBE	4 meters	36 meters - 80 meters	NOAA_4m	Complete MBES
H12917_MB_8m_MLLW	CUBE	8 meters	-1.18 meters - 184.34 meters	NOAA_8m	Complete MBES
H12917_MB_8m_MLLW_Final	CUBE	8 meters	72 meters - 160 meters	NOAA_8m	Complete MBES

Surface Name	Surface Type	Resolution	Depth Range	Surface Parameter	Purpose
H12917_MB_16m_MLLW	CUBE	16 meters	-0.32 meters - 184.32 meters	NOAA_16m	Complete MBES
H12917_MB_16m_MLLW_Final	CUBE	16 meters	144 meters - 184.32 meters	NOAA_16m	Complete MBES

Table 10: Submitted Surfaces

All CARIS CUBE surfaces were created with lines reduced to MLLW via ERZT methods. A total of 23 soundings were designated: nine as a DTONs and fourteen as least depths for features found by multibeam. No soundings needed to be designated to force the submitted finalized surface to honor least depths in accordance with HSSD requirements.

The 1-meter grid resolution range was expanded to include the full range of survey coverage. See Supplemental Correspondence for Project Manager approval.

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.

Traditional Methods Used:

TCARI

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

Station Name	Station ID
Seldovia	945-5500

Table 11: NWLON Tide Stations

File Name	Status
9455500.tid	Final Approved

Table 12: Water Level Files (.tid)

File Name	Status
P136RA2016.tc	Final

Table 13: Tide Correctors (.zdf or .tc)

A request for final approved tides was sent to N/OPS1 on 10/24/2016. The final tide note was received on 10/28/2016.

H12917 features were tide corrected using a .tid file created in Pydro using the "TCARI TID file via S-57" function then loaded in CARIS Notebook.

ERS Methods Used:

ERS via ERZT

Ellipsoid to Chart Datum Separation File:

H12917_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 was computed between the ellipsoid and MLLW using real-time position measurements observed during the survey relative to the vessel water line and the TCARI 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 as were the SBETs. For additional information see the OPR-P136-RA-16 ERS Capability Memo included with the supplemental correspondence.

C.2 Horizontal Control

The horizontal datum for this project is World Geodetic System of 1984 (WGS84(G1674)).

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

The following PPK methods were used for horizontal control:

Single Base

The Wide Area Augmentation System (WAAS) was used as real-time horizontal control for this survey.

The following user installed stations were used for horizontal control:

HVCR Site ID	Base Station ID
Greg's Vista	9715

Table 14: User Installed Base Stations

D. Results and Recommendations

D.1 Chart Comparison

A comparison was made between H12917 survey data and Chart 16597 using a range of single resolution CARIS CUBE surfaces, selected soundings and contours.

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
16597	1:80000	10	04/2015	02/08/2017	02/04/2017

Table 15: Largest Scale Raster Charts

16597

Chart 16597 covers the entire H12917 survey area. Numerous inconsistencies between H12917 data and Chart 16597 were found, those with navigational significance are discussed below:

The area around the village islands generally has shoaler areas, not identified from the previous survey of the area. See Figure 25 and 26 for general reference to the northern and southern portions of H12917.

In figure 27 there is a row of shoaler soundings less than 10 fathoms extending 530 meters NE off the northern village islands 10 fathom contour. The furthermost sounding is a 9.3 fathom depth at a 42 fathom

chart sounding. There are also two other soundings less than 10 fathoms off shore from the 10 fathom contour.

In figure 28 there are several examples of soundings less than 10 fathoms that are navigationally significant.

In figure 29 there are several examples of soundings less than 10 fathoms that are navigationally significant. There is also a 225 m difference in the charted 50 fathom contour and the surveyed contour.

In figure 30 an example of a sounding less than 10 fathoms outside of a 10 fathom contour near the ATON in the SE portion of H12917 coverage area.

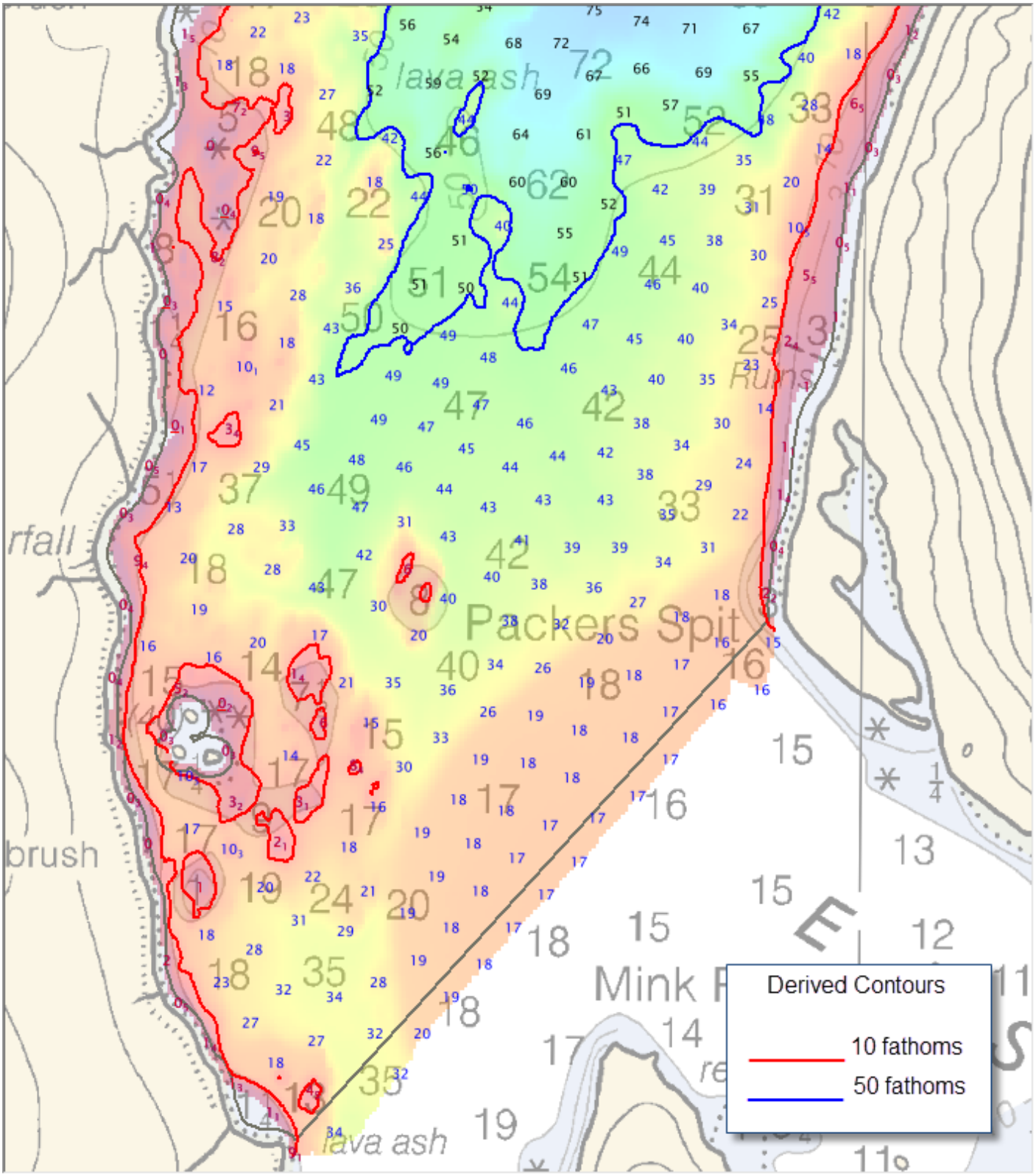

Figure 25: Village Islands southern section of Chart 16597 overlaid with H12917 contours and soundings (sheet limits shown as dashed black line.)

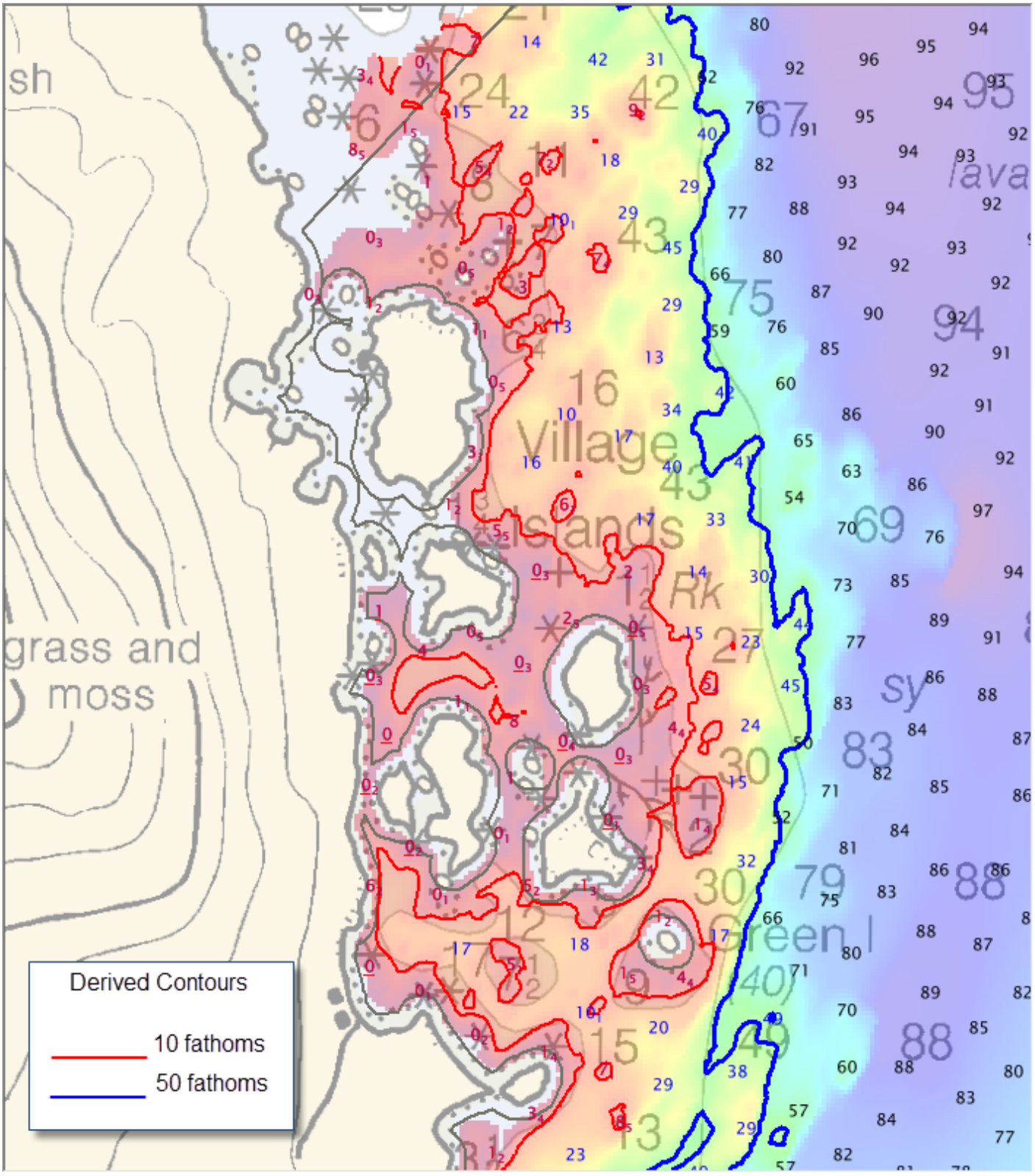

Figure 26: Village Islands northern section of Chart 16597 overlaid with H12917 contours and soundings (sheet limits shown as dashed black line.)

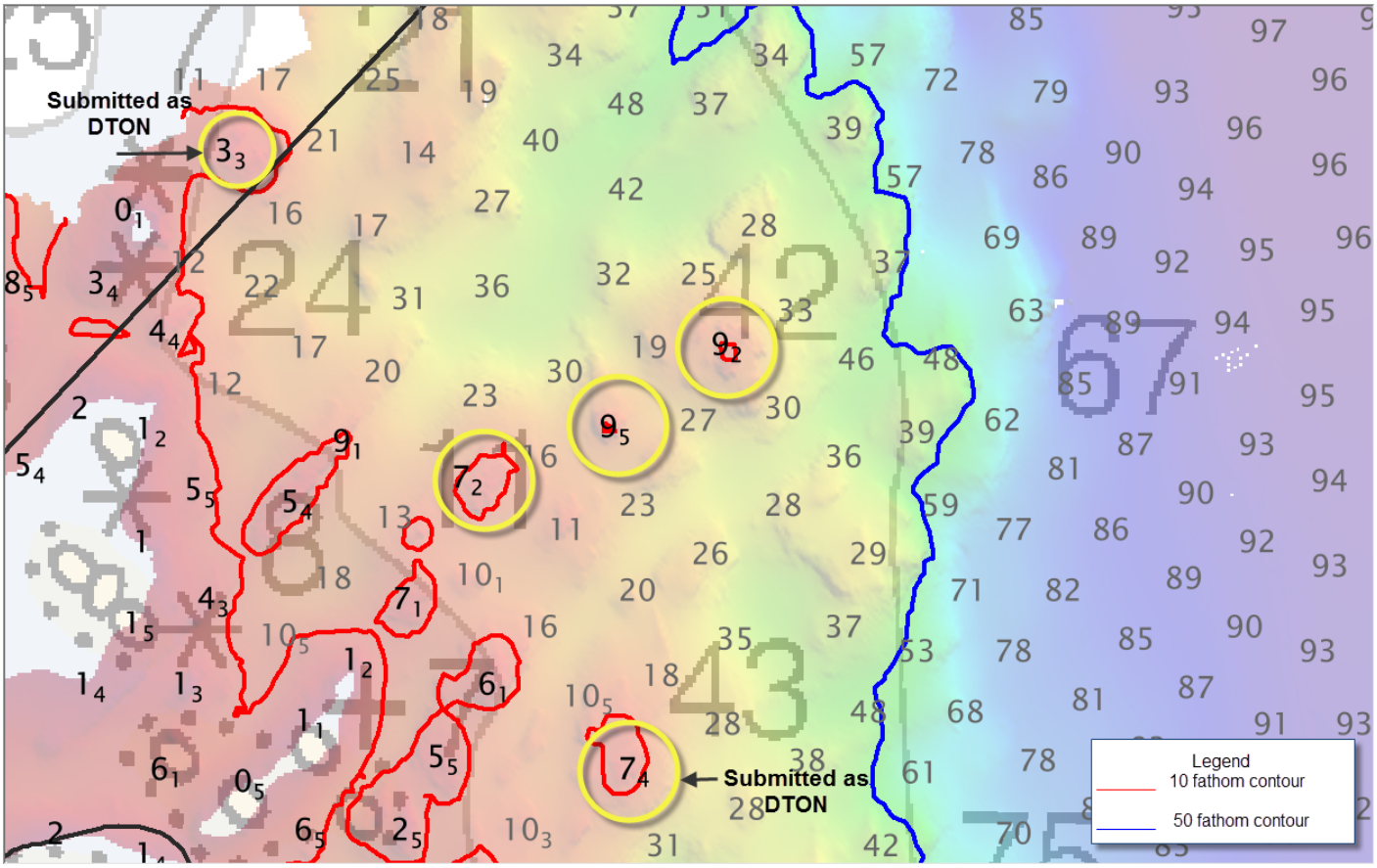

Figure 27: Village Islands northern section of Chart 16597 overlaid with H12917 contours and soundings (shoal areas highlighted with yellow circle.)

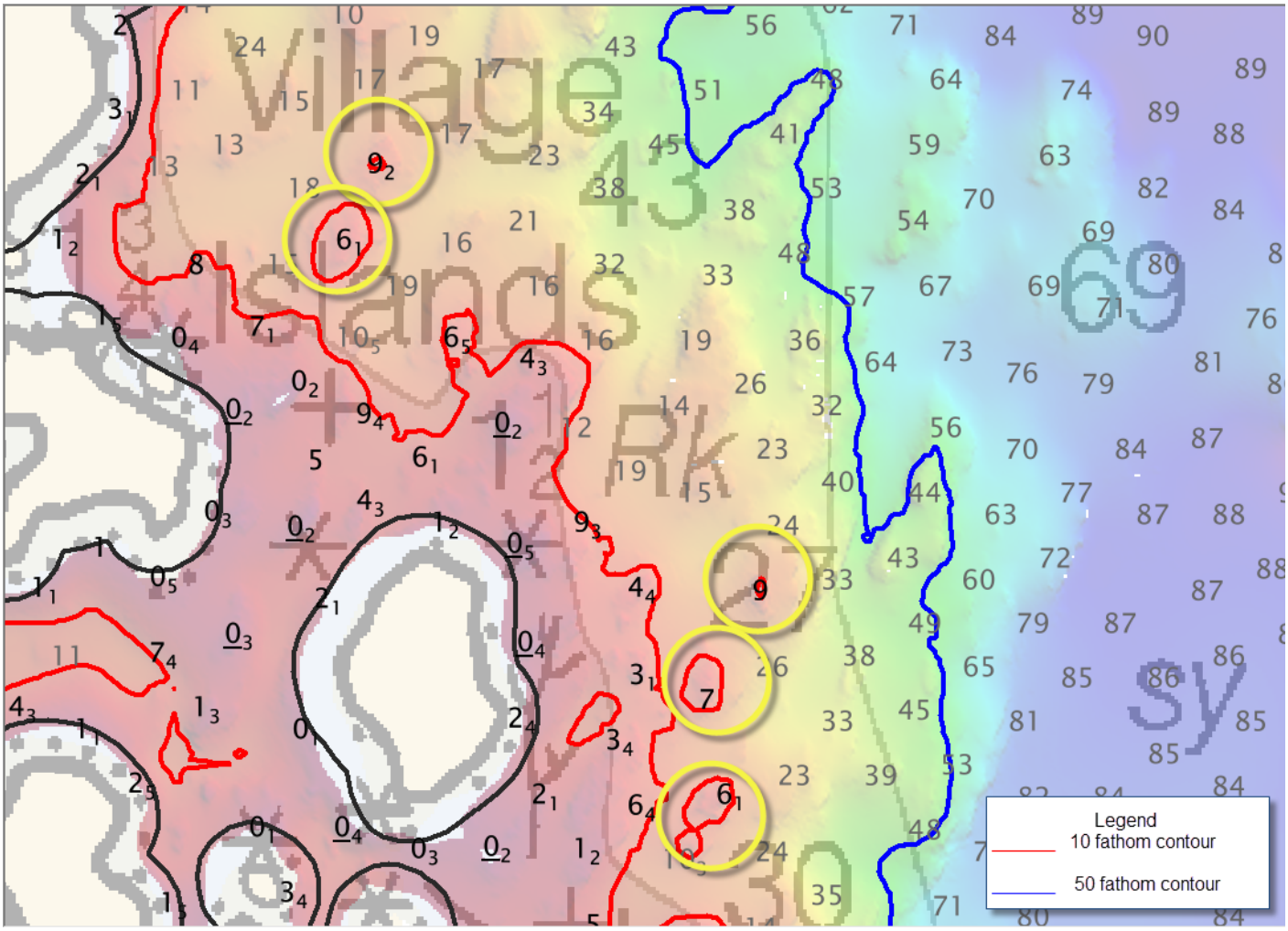

Figure 28: Village Islands section of Chart 16597 overlaid with H12917 contours and soundings (shoal areas highlighted with yellow circle.)

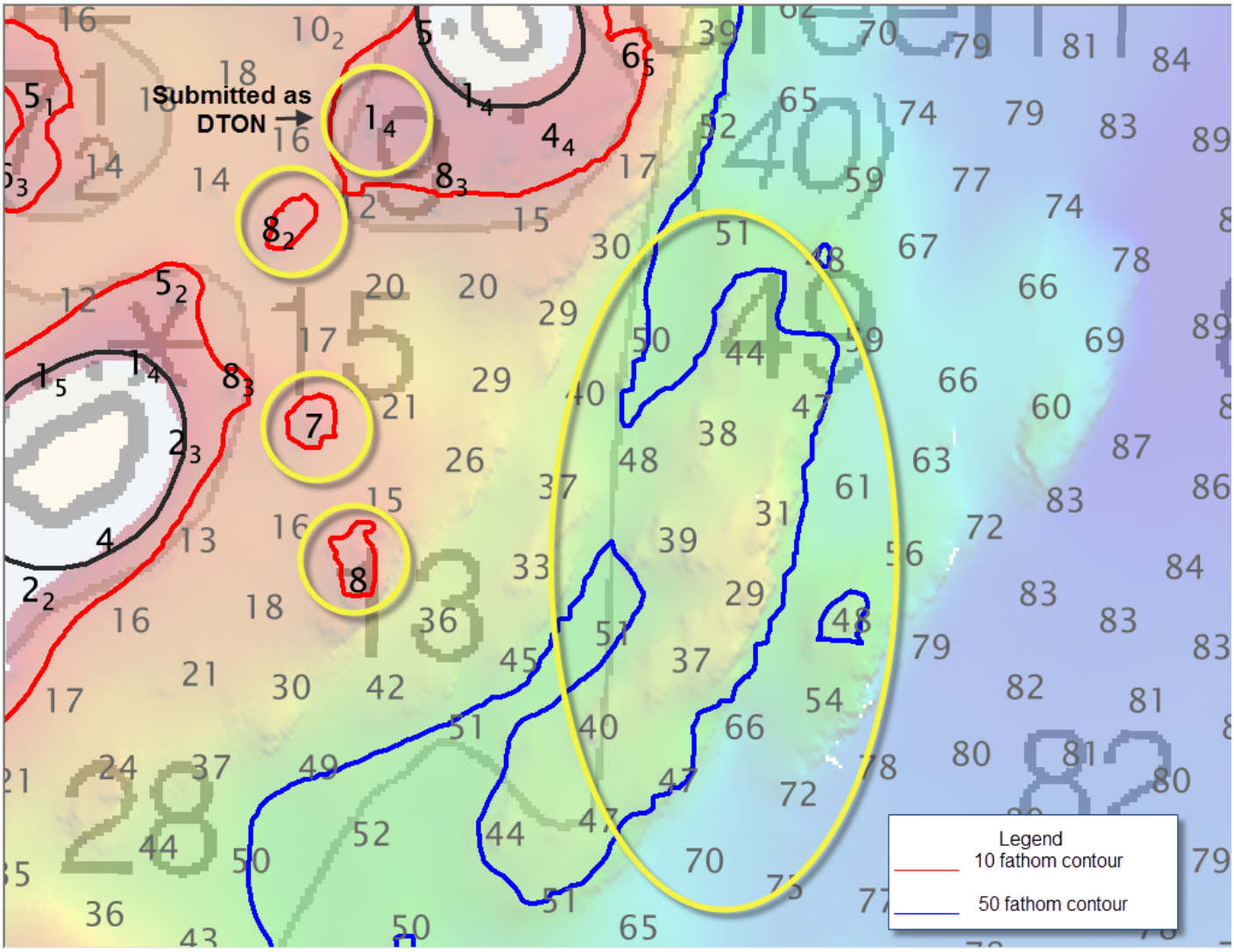

Figure 29: Village Islands section of Chart 16597 overlaid with H12917 contours and soundings (shoal areas highlighted with yellow circle.)

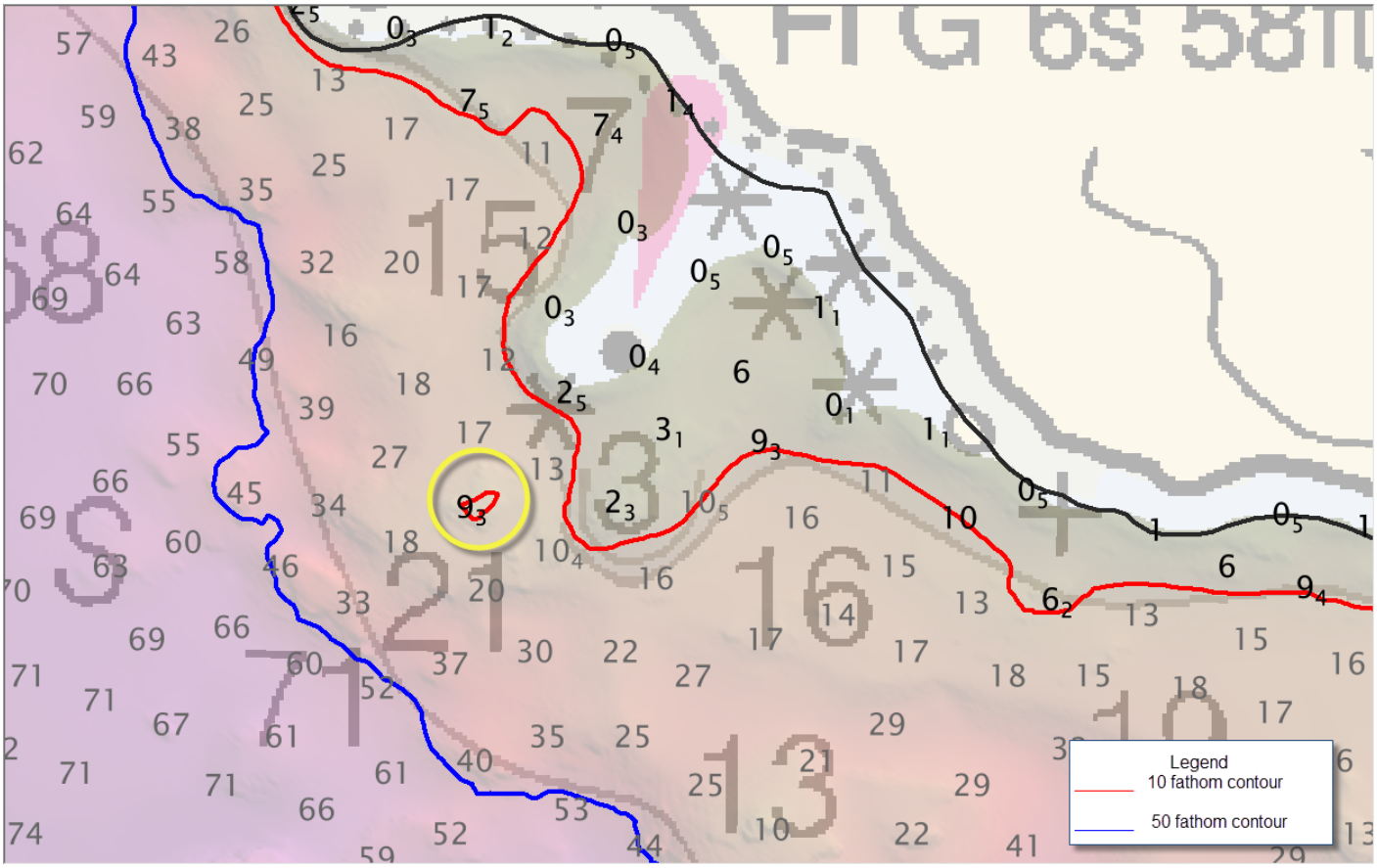

Figure 30: Chart 16597 overlaid with H12917 contours and soundings (shoal areas highlighted with yellow circle.)

D.1.2 Electronic Navigational Charts

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

ENC	Scale	Edition	Update Application Date	Issue Date	Preliminary?
US4AK5QM	1:80000	7	10/24/2016	04/17/2016	NO

Table 16: Largest Scale ENCs

US4AK5QM

Electronic Navigation Chart (ENC) US4AK5QM coincides with Chart 16597, therefore a comparison between H12917 and the ENC is equivalent to the preceding comparison with Chart 16597.

D.1.3 Maritime Boundary Points

No Maritime Boundary Points were assigned for this survey.

D.1.4 Charted Features

No charted features exist for this survey.

D.1.5 Uncharted Features

No uncharted features exist for this survey.

D.1.6 Dangers to Navigation

The following DTON reports were submitted:

DTON Report Name	Date Submitted
H12917 Danger to Navigation Report.pdf	2016-12-12
H12917 Danger to Navigation Report Part 2.pdf	2017-02-09

Table 17: DTON Reports

Two danger to navigation reports were submitted and are included in Appendix II of this report.

D.1.7 Shoal and Hazardous Features

Features of navigational significance are discussed in the chart comparison sections above or are included in the H12917 Final Feature File submitted with this report.

D.1.8 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.1.9 Bottom Samples

Seven bottom samples were investigated for this survey; the results are included in the H12917 Final Feature File submitted with this report.

D.2 Additional Results

D.2.1 Shoreline

Shoreline verification was conducted in accordance with applicable sections of NOAA HSSD and FPM using the Project Reference File (PRF) and Composite Source File (CSF) provided with the Project Instructions. In the field, all assigned features that were safe to approach, were addressed as required with S-57 attribution and recorded in the H12917 Final Feature File (FFF) to best represent the features at chart scale. This file also includes new features found in the field as well as recommendations to update, retain or delete assigned features. Refer to the Supplemental Correspondence folder submitted with this report for a discussion concerning incomplete attribution of CSF features provided by HSD OPS.

Assigned feature ID US 0000000361 00001 was not addressed during shoreline verification due to the area being too shoal to access. In Figure 31 the assigned feature is shown 92 meters off shore.

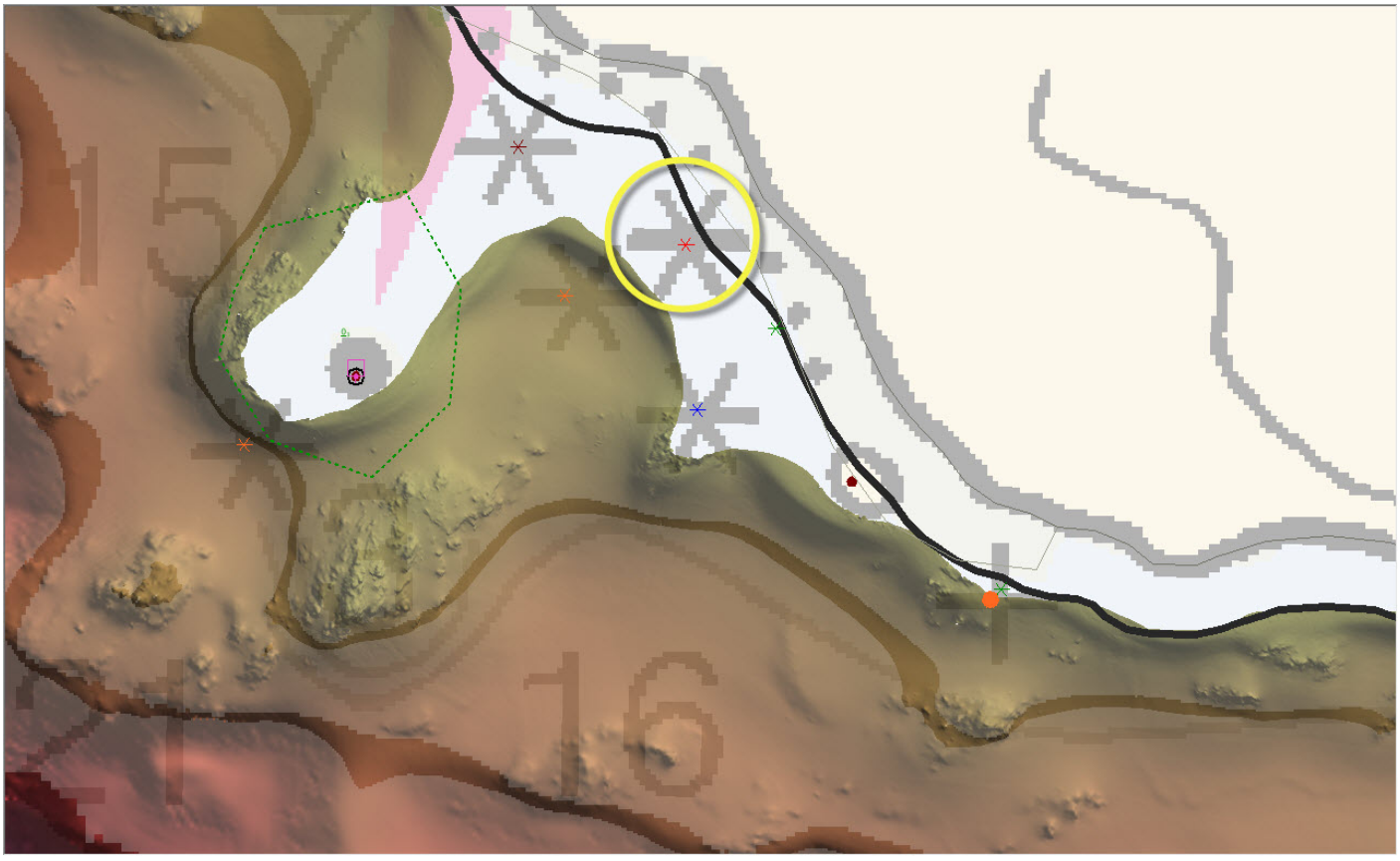

Figure 31: Assigned feature ID US 0000000361 00001 was not addressed due to the area being too shoal to access.

D.2.2 Prior Surveys

No prior surveys were provided for this project.

D.2.3 Aids to Navigation

No Aids to Navigation (ATONs) were specifically assigned for this survey. The FL G 6s 58ft 5M "1" light was visually verified and appears to serve its intended purpose.

Figure 32: FL G 6s 58ft "1" Aid to Navigation

D.2.4 Overhead Features

No overhead features exist for this survey.

D.2.5 Submarine Features

No submarine features such as cables, pipelines or tunnels were detected within the H12917 survey area.

D.2.6 Ferry Routes and Terminals

No ferry routes or terminals exist for this survey.

D.2.7 Platforms

No platforms exist for this survey.

D.2.8 Significant Features

There are no significant features in the survey area that are not discussed elsewhere in this report.

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, CAPT/NOAA	Commanding Officer, NOAA Ship Rainier	05/13/2017	Digitally signed by LOMNICKY.JOHN.JOSEPH.1257920239 DN: c=US, o=U.S. Government, ou=DoD, ou=PKI, ou=NOAA, cn=LOMNICKY.JOHN.JOSEPH.1257920239 Reason: I am signing for CAPT Van Den Ameele Date: 2017.05.13 16:23:07 -08'00'
Steven Loy, LT/NOAA	Field Operations Officer, NOAA Ship Rainier	05/13/2017	
James B. Jacobson	Chief Survey Technician, NOAA Ship Rainier	05/13/2017	JACOBSON.JAMES.BRYAN.1269664017 I have reviewed this document 2017.05.13 16:07:08 -08'00'
Timothy Brown, ENS/NOAA	Sheet Manager	05/13/2017	BROWN.TIMOTHY.JONATHAN.1464010447 2017.05.13 14:32:51 -08'00' 11.0.19

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

PROVISIONAL TIDE NOTE FOR HYDROGRAPHIC SURVEY

DATE : October 26, 2016

HYDROGRAPHIC BRANCH: Pacific
HYDROGRAPHIC PROJECT: OPR-P136-RA-16
HYDROGRAPHIC SHEET: H12917
LOCALITY: Village Islands, North Coast of Kodiak Island
TIME PERIOD: September 18 - October 16, 2016

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 meters
HEIGHT OF HIGH WATER ABOVE PLANE OF REFERENCE: 5.252 meters

REMARKS: RECOMMENDED GRID Please use the TCARI grid "P136RA2016.tc" as the final grid for project OPR-P136-RA-16, H12917, during the time period between September 18 - October 16, 2016.

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).

Note 2: Annual leveling for Seldovia, AK (9455500) was not completed in FY16. A review of the verified leveling records from June 2005 - July 2015 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-P136-RA-16, H12917. 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.

Note 3: Survey tracklines fall outside of the TCARI grid boundaries in some areas due to inaccurate shoreline. TCARI will extrapolate the tide corrector to cover these soundings.

HOVIS.GERALD.THOMAS.JR.1365860250

Digitally signed by HOVIS.GERALD.THOMAS.JR.1365860250
DN: c=US, o=U.S. Government, ou=DoD, ou=PKI, ou=OTHER, cn=HOVIS.GERALD.THOMAS.JR.1365860250
Date: 2016.10.28 07:42:30 -04'00'

CHIEF, PRODUCTS AND SERVICES BRANCH


9455500 SELDOVIA, COOK INLET
Preliminary as Final TCARI Grid for
OPR-P136-RA-2016, H12917
Village Islands, North Coast of Kodiak Island
Shelikof Strait
Uganik Island
0
5
nautical miles
© Harris Corp, Earthstar Geographics LLC © 2016 Microsoft Corporation © 2010 NAVTEQ

APPROVAL PAGE

H12917

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

- H12917_DR.pdf
- Collection of depth varied resolution BAGS
- Processed survey data and records
- H12917_GeoImage.pdf

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

Approved: Digitally signed by Peter Holmberg
Reason: I am approving this document
Date: 2018.08.27 08:04:28 -07'00'

Pete Holmberg
Cartographic Team Lead, Pacific Hydrographic Branch

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

Approved: Digitally signed by HAUSER.OLIVIA.A.1275636009
Date: 2018.08.24 09:51:56 -07'00'

LCDR Olivia Hauser, NOAA
Chief, Pacific Hydrographic Branch