H13003

NOAA Form 76-35A

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

DESCRIPTIVE REPORT

Type of Survey:	Navigable Area
Registry Number:	H13003

LOCALITY

State:	Alaska
General Locality:	Kodiak Island
Sub-locality:	William's Reef

2017

CHIEF OF PARTY
CDR John Lomnicky

LIBRARY & ARCHIVES

Date:

NOAA FORM 77-28 (11-72)	U.S. DEPARTMENT OF COMMERCE NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION	REGISTRY NUMBER:
HYDROGRAPHIC TITLE SHEET		**H13003**

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:	**Alaska**
General Locality:	**Kodiak Island**
Sub-Locality:	**William's Reef**
Scale:	**1: 40,000**
Dates of Survey:	**06/27/2017 to 08/14/2017**
Instructions Dated:	**03/09/2017**
Project Number:	**OPR-P136-RA-17**
Field Unit:	**NOAA Ship *Rainier***
Chief of Party:	**CDR John Lomnicky**
Soundings by:	**Multibeam Echo Sounder**
Imagery by:	**Multibeam Echo Sounder**
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 H13003

Project: OPR-P136-RA-17

Locality: Kodiak Island, AK

Sublocality: William's Reef

Scale: 1:40000

June 2017 - August 2017

NOAA Ship *Rainier*

Chief of Party: John Lomnicky, CDR/NOAA

A. Area Surveyed

The survey area is referred to as Williams Reef (sheet 8) within the Project Instructions. The area encompasses approximately 48 square nautical miles extending from south east of Long Island continuing north east of Williams Reef.

A.1 Survey Limits

Data were acquired within the following survey limits:

Northwest Limit	Southeast Limit
57° 55' 11.27" N 152° 18' 28.22" W	57° 44' 18.97" N 152° 3' 56.16" W

Table 1: Survey Limits

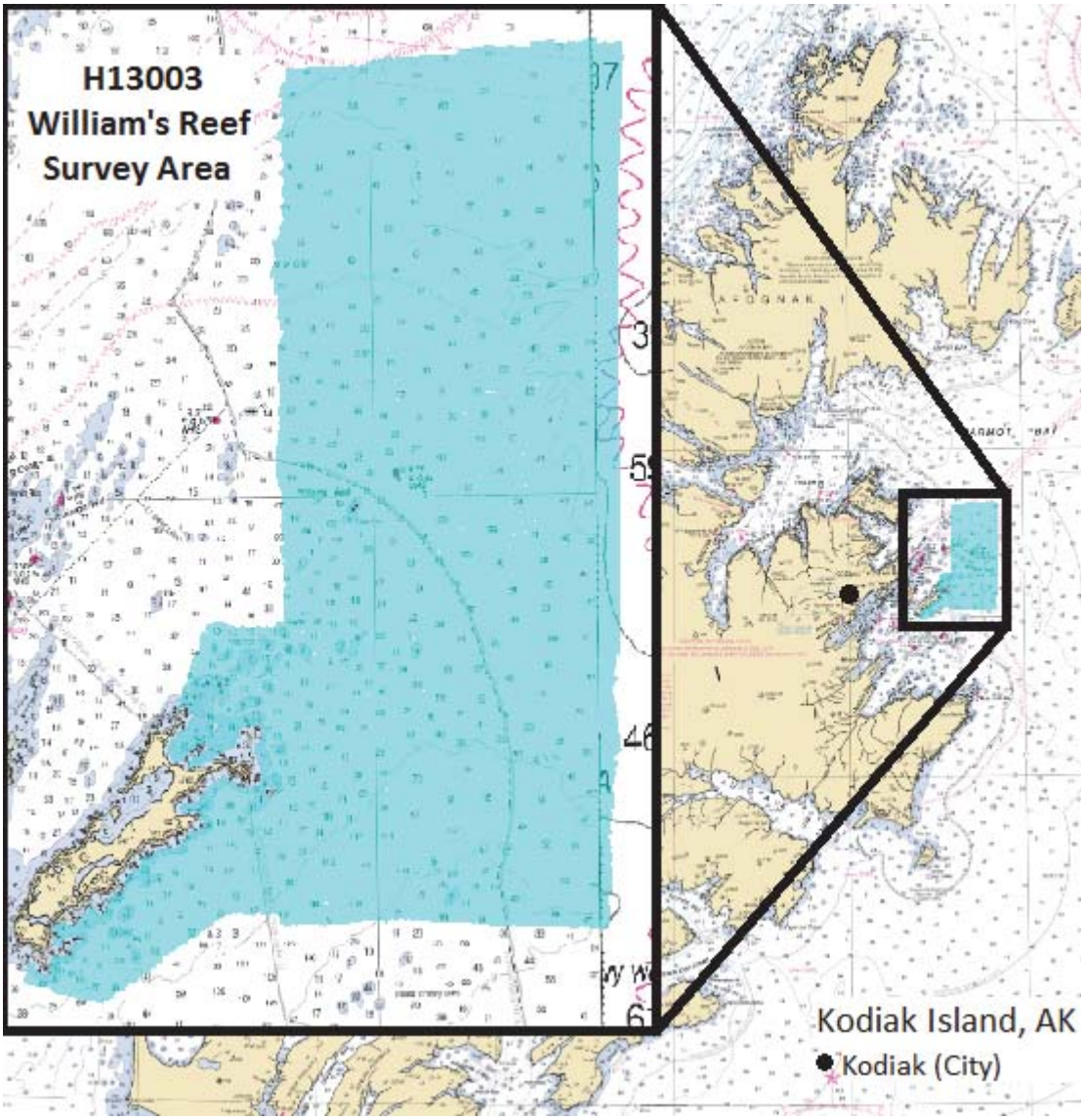


Figure 1: H13003 survey area as assigned in Project Instructions.
Cyan tint shows the coverage area of H13003 relative to Kodiak Island.

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

A.2 Survey Purpose

The area of Chiniak Bay supports the second busiest and third richest fisheries port in Alaska. In 2015, the Port of Kodiak was responsible for 515 million pounds of fish and $138 million dollars of product. Chiniak Bay is the gateway to Kodiak and has a survey vintage of 1933. This area has seen many groundings and near misses due to the number of dangers to navigation and submerged pinnacles that exist in this area. In recent years a number of groundings in and around the area have occurred, the most famous being a 174 foot

long Army landing craft that was outbound to deliver goods to a remote village in western Alaska in 2012. This survey will serve to update the nautical charts with modern data to support safe navigation.

A.3 Survey Quality

The entire survey is adequate to supersede previous data.

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

Pydro QC Tools 2 Grid QA was used to analyze H13003 multibeam echosounder (MBES) data density. The submitted H13003 variable-resolution (VR) surface met HSSD density requirements.

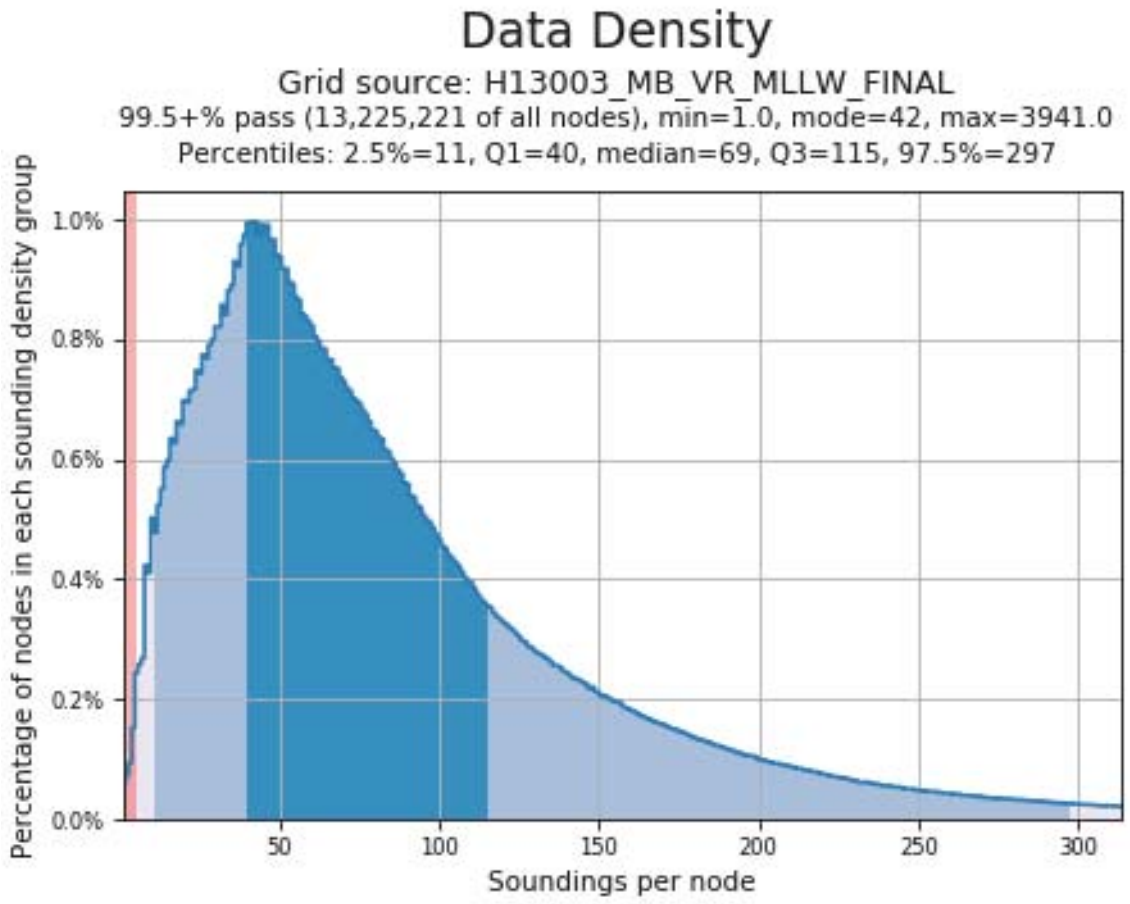


Figure 2: Pydro derived histogram plot showing HSSD density compliance of H13003 finalized variable-resolution MBES data.

A.4 Survey Coverage

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

Water Depth	Coverage Required
All waters in survey area except for H12997 and designated S-57 coverage areas	Complete Coverage (refer to HSSD Section 5.2.2.3). Note All MBES acquisition requires backscatter acquistion (refer to HSSD Section 6.2)

Table 2: Survey Coverage

Complete multibeam echosounder (MBES) coverage was acquired to the inshore limit of hydrography, the Navigable Area Limit Line (NALL). In areas where survey coverage did not reach the 4-meter depth contour nor the assigned sheet limits, it was due to the survey vessel reaching the inshore extent of safe navigation as shown in the figure below. These areas were generally located near shore and were subject to dangerous wave action and other hazards.

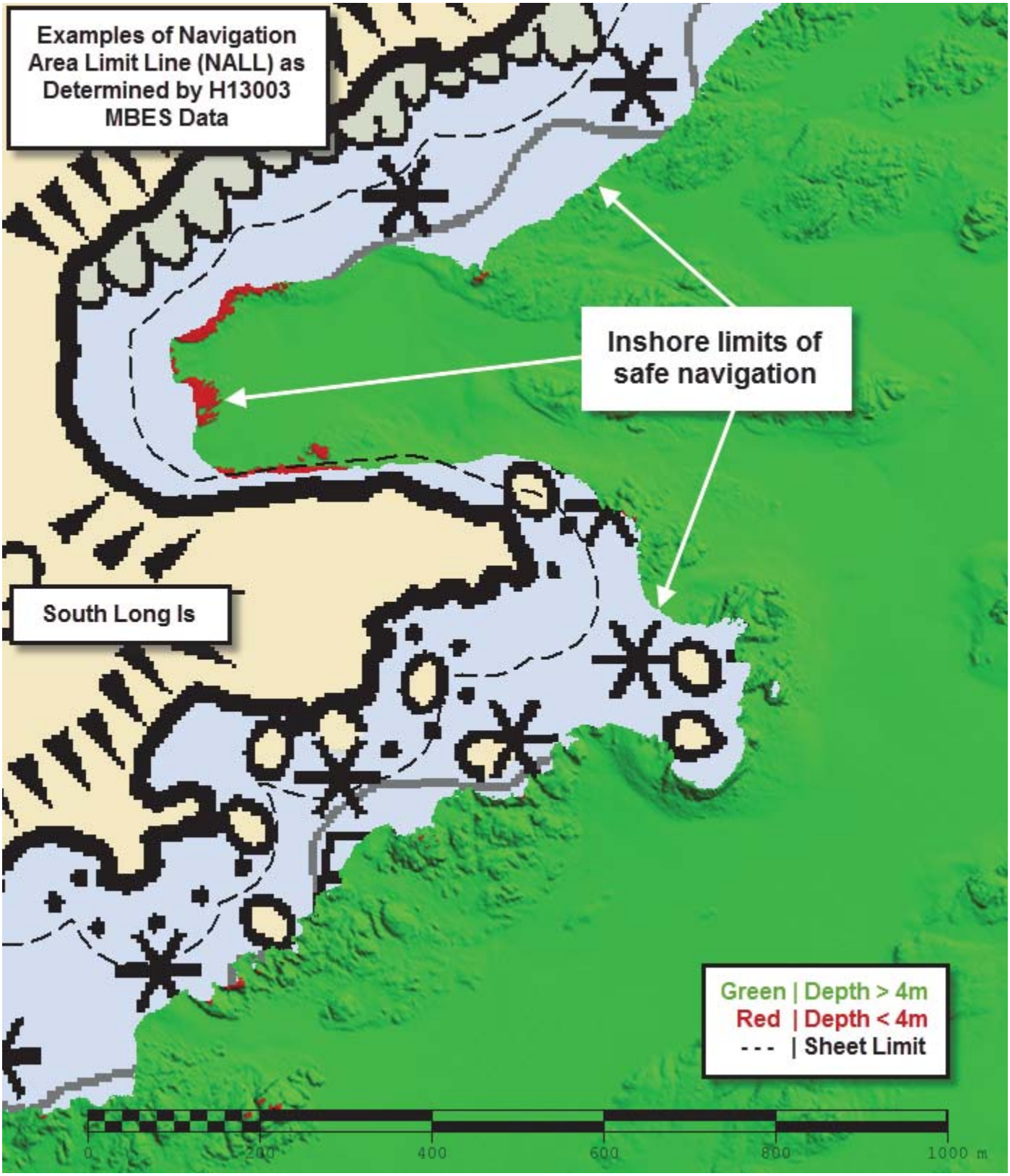


Figure 3: Example of H13003 NALL determination.

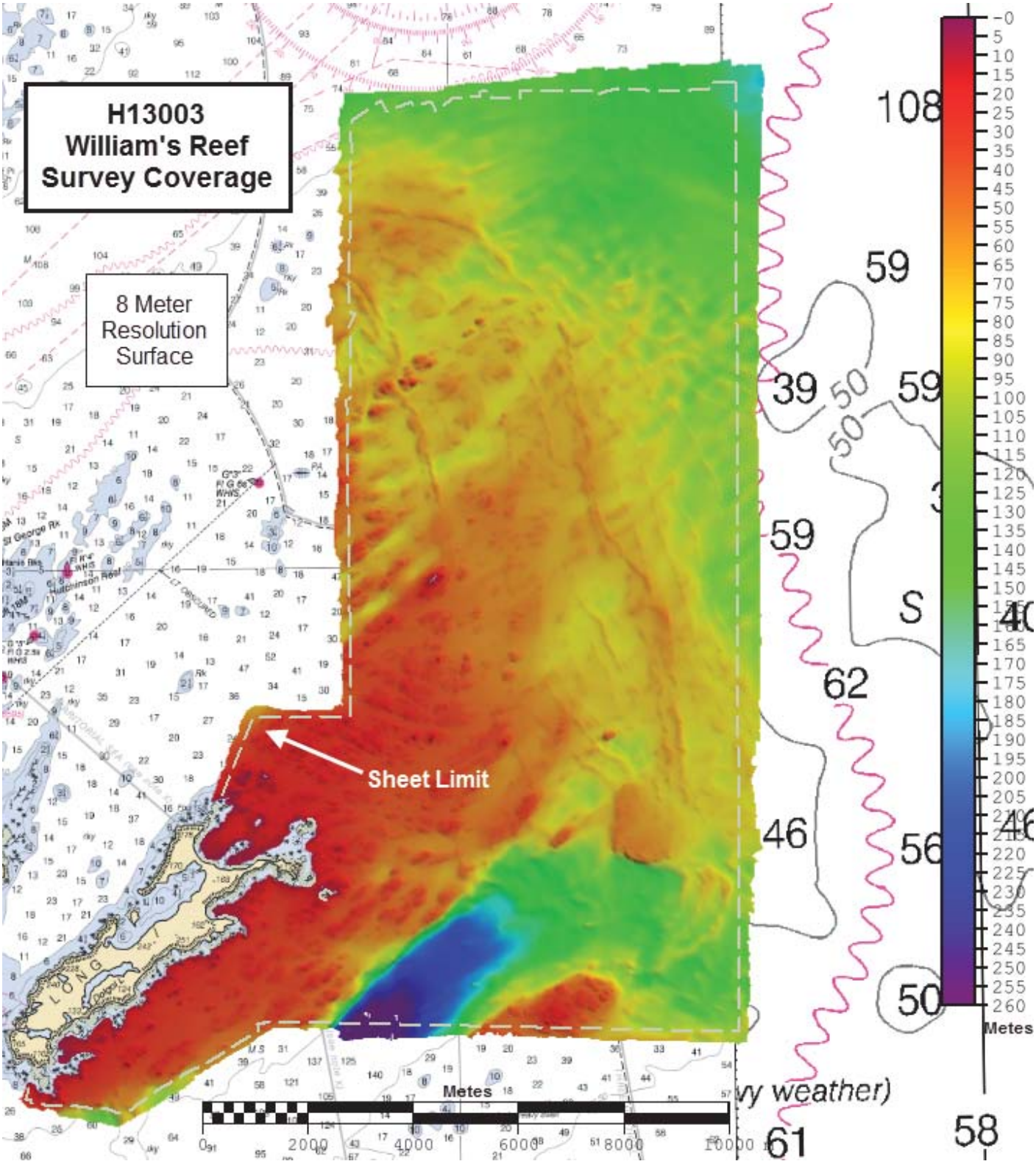


Figure 4: H13003 MBES coverage and assigned survey limits.

A.6 Survey Statistics

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

	HULL ID	*2801*	*2802*	*2803*	*2804*	*S221*	*Total*
LNM	**SBES Mainscheme**	0	0	0	0	0	0
	MBES Mainscheme	93.0	209.7	37.7	173.0	74.3	587.7
	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	0	27.7	0	11.3	0	39
	Lidar Crosslines	0	0	0	0	0	0
Number of Bottom Samples							5
Number Maritime Boundary Points Investigated							0
Number of DPs							98
Number of Items Investigated by Dive Ops							0
Total SNM							47.7

Table 3: Hydrographic Survey Statistics

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

Survey Dates	Day of the Year
06/28/2017	179
06/29/2017	180
07/02/2017	183
07/06/2017	187
07/07/2017	188
07/08/2017	189
07/25/2017	206
07/26/2017	207
07/27/2017	208
07/28/2017	209
07/29/2017	210
07/31/2017	212
08/03/2017	215
08/05/2017	217
08/06/2017	218
08/07/2017	219
08/14/2017	226

Table 4: Dates of Hydrography

B. Data Acquisition and Processing

B.1 Equipment and Vessels

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

B.1.1 Vessels

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

Hull ID	*2801*	*2802*	*2803*	*2804*	*1905*	*1907*	*S221*
LOA	8.8 meters	8.8 meters	8.8 meters	8.8 meters	5.7 meters	5.7 meters	70.4 meters
Draft	1.1 meters	1.1 meters	1.1 meters	1.1 meters	0.35 meters	0.35 meters	4.7 meters

Table 5: Vessels Used

Figure 5: NOAA Ship RAINIER with survey launches 2803 and 2802 in view.

All the survey data for H13003 was acquired by survey launches 2801 RA-4, 2802 RA-5, 2803 RA-3, RA-6 2804, and the NOAA Ship RAINIER S221. The launches and ship acquired the MBES soundings, sound velocity profiles and bottom samples. The skiffs (1907, 1905) conducted all shoreline verification.

B.1.2 Equipment

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

Manufacturer	Model	Type
Kongsberg	EM710	MBES
Teledyne Reson	SeaBat 7125-B	MBES
Teledyne Reson	SeaBat 7125 SV2	MBES
Teledyne Reson	SVP70/ SVP71	Surface Sound Speed Probes
Sea-Bird Electronics	SBE 19Plus SeaCat Profiler	Conductivity, Temperature, and Deapth Sensor
Applanix	POS M/V v5	Positioning and Attitude System
Odim Brooke Ocean	MVP 200 Moving Vessel Profiler	Sound Speed System

Table 6: Major Systems Used

B.2 Quality Control

B.2.1 Crosslines

Multibeam/single beam echo sounder/side scan sonar crosslines acquired for this survey totaled 6.64% of mainscheme acquisition.

Multibeam crosslines were acquired using RAINIER launches 2802 and 2804 across all depth ranges, water masses and boat days that were practical; they are adequate for verifying and evaluating the internal consistency of survey data. Some crosslines were acquired prior to mainscheme acquisition, on headings roughly orthonormal to the assumed orientation of the mainscheme lines. However, the actual azimuth of mainscheme lines was often dictated by the sea conditions encountered at the time of acquisition. Thus, some crosslines were not collected at least 45° to mainscheme. The minimum 4% crossline requirement was still met by collecting a total of 6.64% overlapping coverage lines most of which fall within the defined specifications of crosslines. A VR CUBE surface was created using only H13003 mainscheme, and a second VR CUBE surface was created using only crosslines. Analysis was performed using the Compare Grids function in Pydro Explorer using these two surfaces. For its respective depths, the difference surface was compared to IHO allowable Total Vertical Uncertainty (TVU) standards. 99.5+% of nodes met allowable uncertainties, for additional results, see plots below.

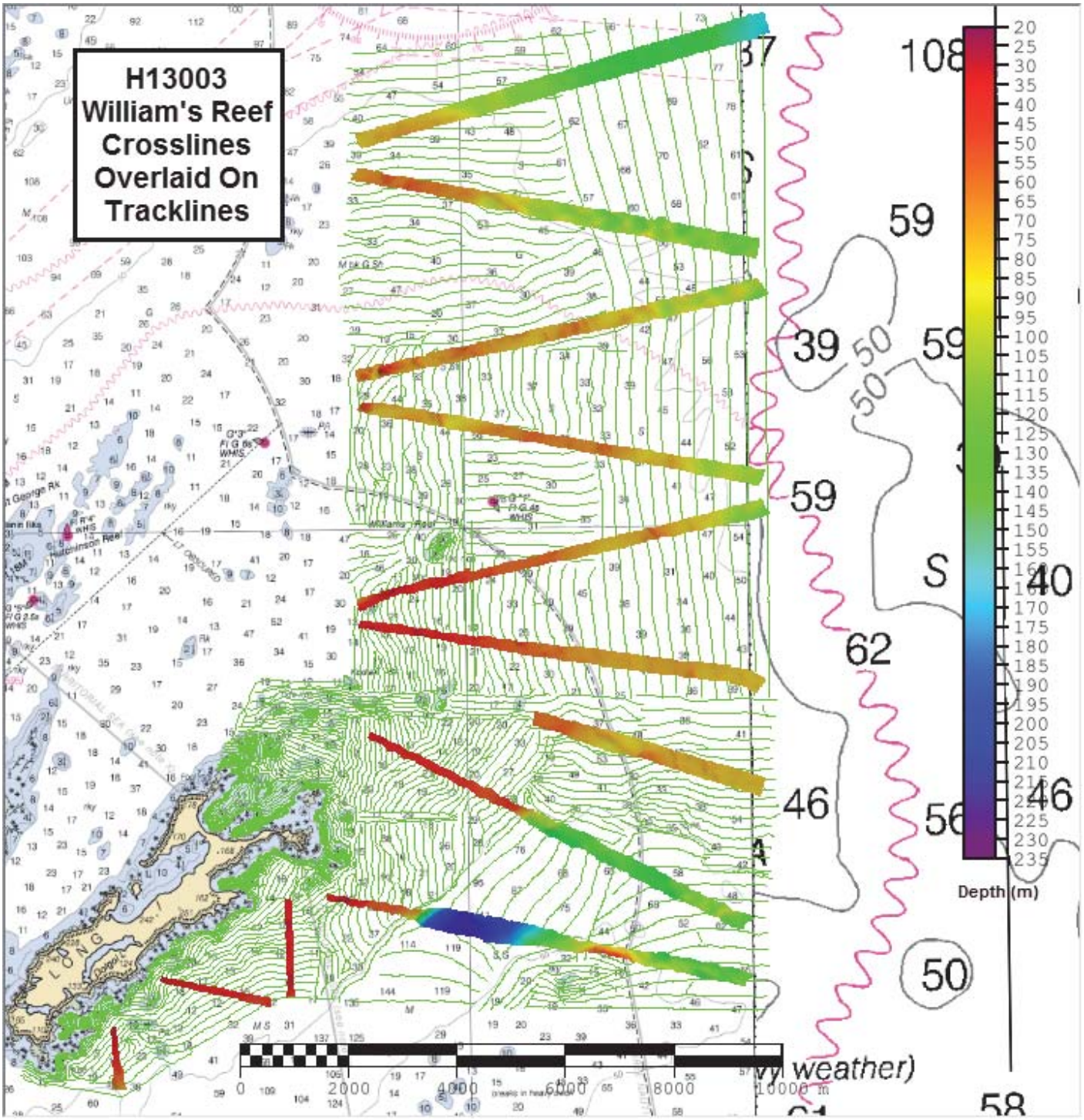


Figure 6: H13003 crosslines surface overlaid on mainscheme track lines.

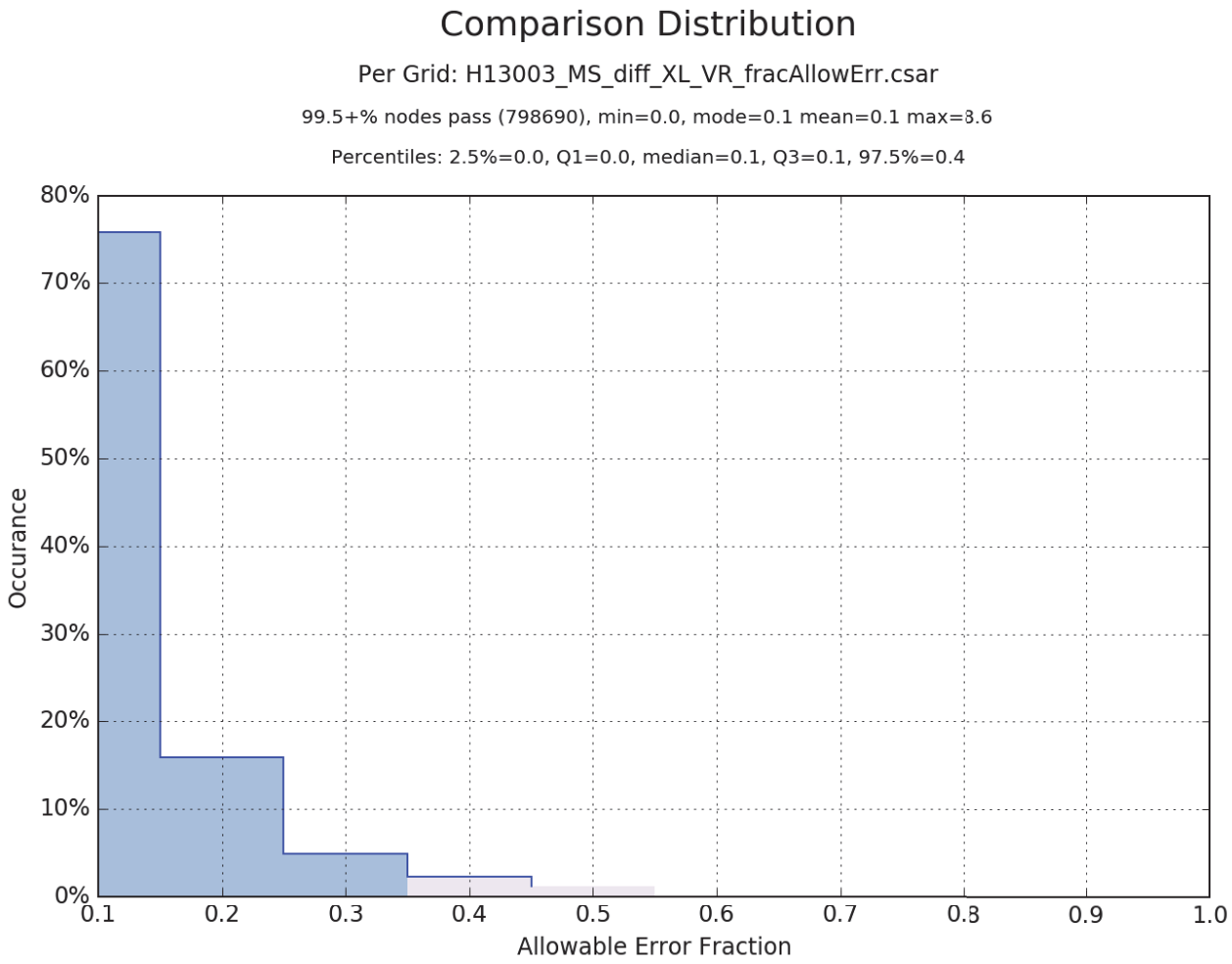
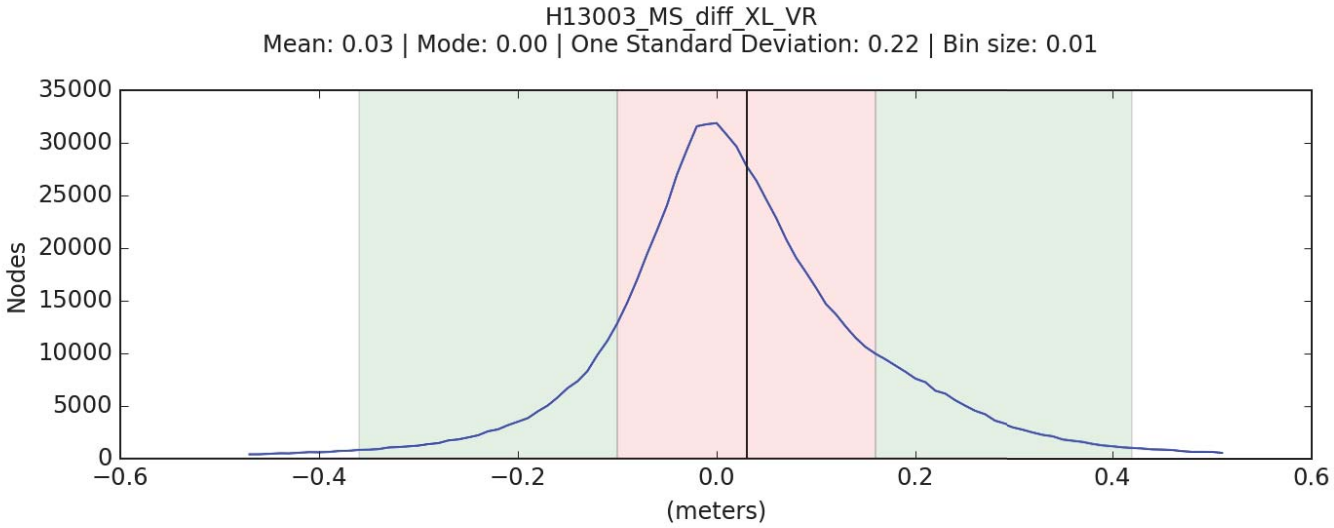
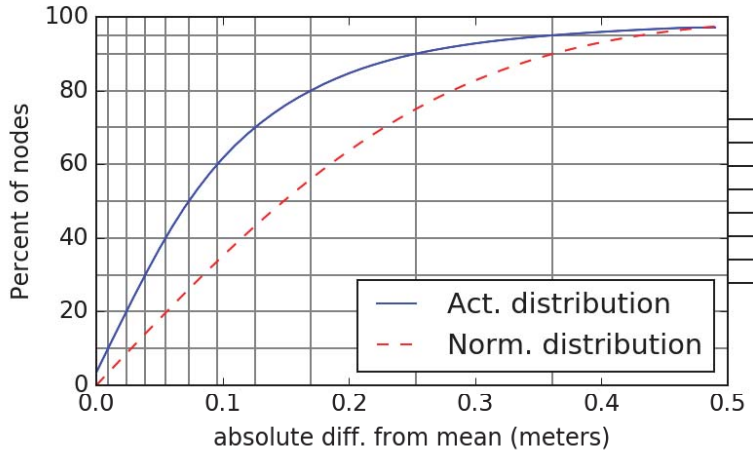


Figure 7: Pydro derived plot showing percentage-pass value of H13003 mainscheme to crossline data.





Percent of nodes	Deviation (m)
50%	+/- 0.07
60%	+/- 0.10
70%	+/- 0.13
80%	+/- 0.17
90%	+/- 0.25
95%	+/- 0.36

Figure 8: Pydro derived plot showing the statistical results of a comparison between H13003 mainscheme to crossline data.

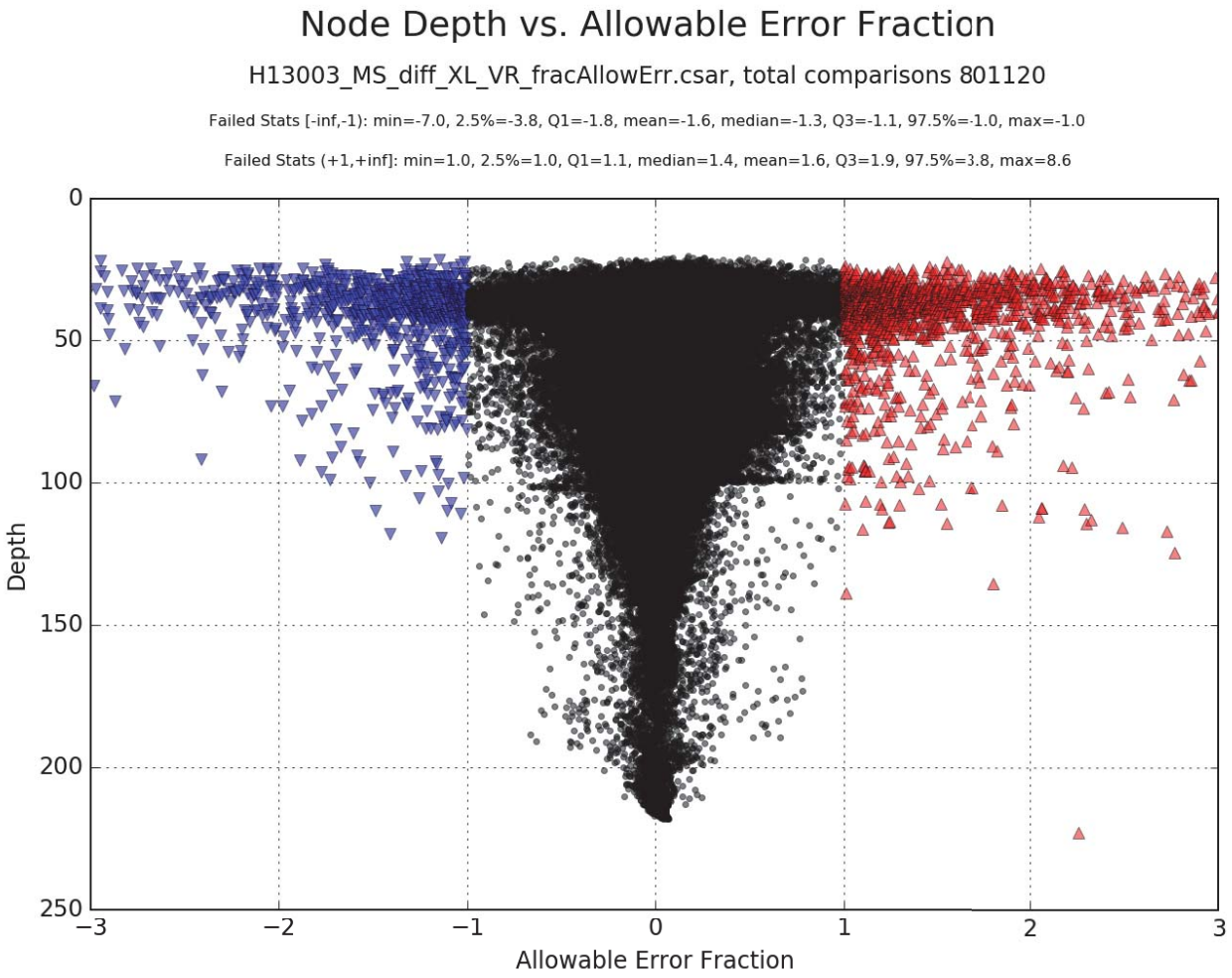


Figure 9: Pydro derived plot showing node depth vs. allowable error fraction of H13003 mainscheme to crossline data.

B.2.2 Uncertainty

The following survey specific parameters were used for this survey:

Method	Measured	Zoning
ERS via PMVD	0 meters	0.234327 meters

Table 7: Survey Specific Tide TPU Values.

Hull ID	Measured - CTD	Measured - MVP	Surface
S221	N/A meters/second	1 meters/second	0.05 meters/second
2801, 2802, 2803, 2804	3 meters/second	N/A meters/second	0.15 meters/second

Table 8: Survey Specific Sound Speed TPU Values.

Total Propagated Uncertainty (TPU) values for survey H13003 were derived from a combination of fixed values for equipment and vessel characteristics, as well as from field assigned values for sound speed uncertainties. Tidal uncertainty was accounted for by examining the Poor Man's VDATUM (PMVD) and statistically determining a measured value. See the 2017 DAPR for further information. A measured uncertainty of 0.234327 meters was entered to account for PMVD processing methods. See PMVD discussion and methods described by Jack Riley (HSTP) in the email “PMVD Uncertainty Value” in the supplemental survey records and correspondence.

For other contemporary surveys, the ellipsoidal referenced zoned tides (ERZT) method outlined in the 2017 DAPR was used to account for tidal uncertainties. The separation model generated using ERZT for H13003 contained unexplained errors. The PMVD derived separation model did not exhibit these problems and was therefore utilized for final reduction to MLLW.

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 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 2 were used to analyze H13003 TVU compliance; a histogram plot of the results is shown below.

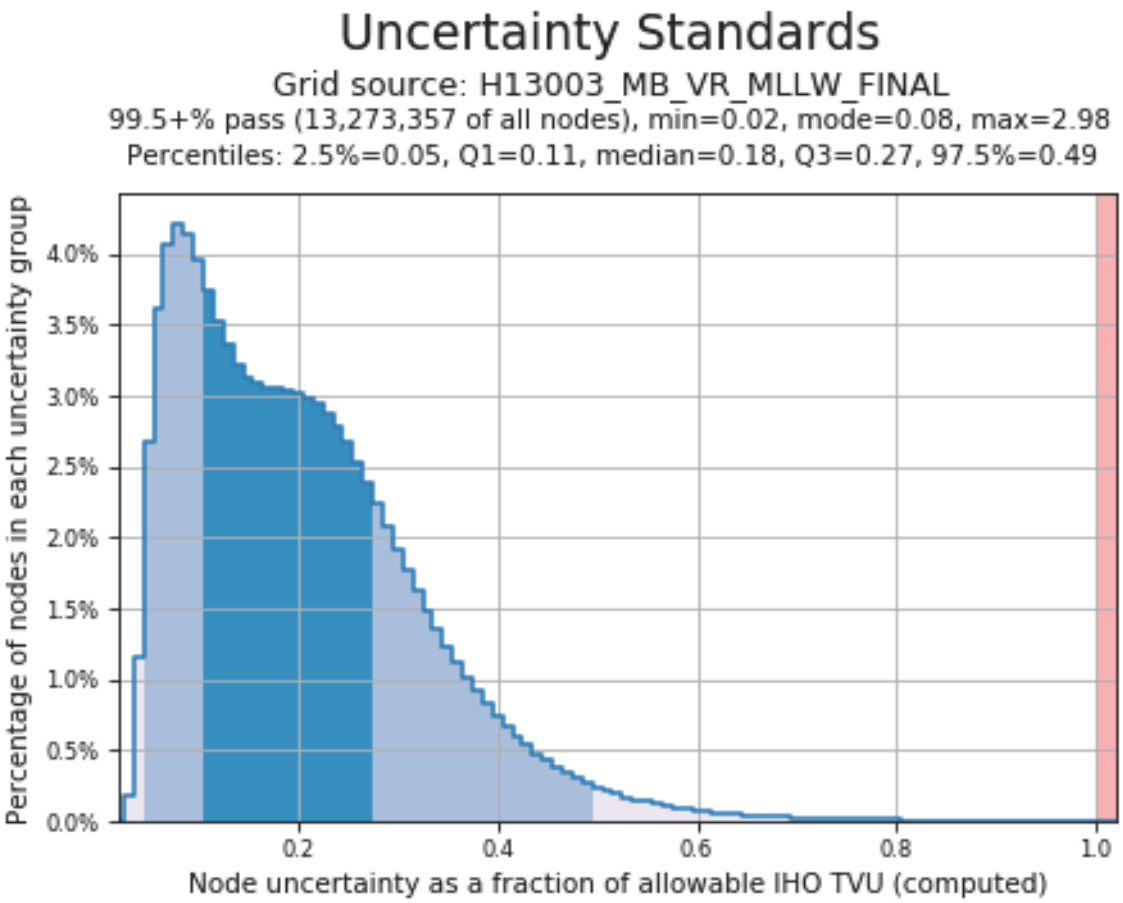


Figure 10: Pydro derived histogram plot showing TVU compliance of H13003 finalized multi-resolution MBES data.

B.2.3 Junctions

The following junctions were made with this survey:

Registry Number	Scale	Year	Field Unit	Relative Location
H10913	1:10000	1999	NOAA Ship RAINIER	SW
H12320	1:40000	2011	NOAA Ship FAIRWEATHER	N
H12996	1:40000	2017	NOAA Ship RAINIER	W
H12997	1:40000	2017	NOAA Ship RAINIER	SW
H13001	1:40000	2017	NOAA Ship RAINIER	S

Table 9: Junctioning Surveys

H10913

The junction with survey H10913 encompassed 0.24 square nautical miles along the southwestern boundary of H13003. The comparison was made using the Pydro tool "Compare Grids" application. The surfaces used for this comparison were 4-meter CUBE surfaces. Analysis of the difference surface indicate a standard deviation of 0.62 meters. For the respective depths, the difference surface was compared to the allowable TVU standards specified in the HSSD. In total, 97% of the depth differences between H13003 and junction survey H10913 were within allowable uncertainties. H13003 is shoaler by 0.58 meters on average in the junction area with H10913.

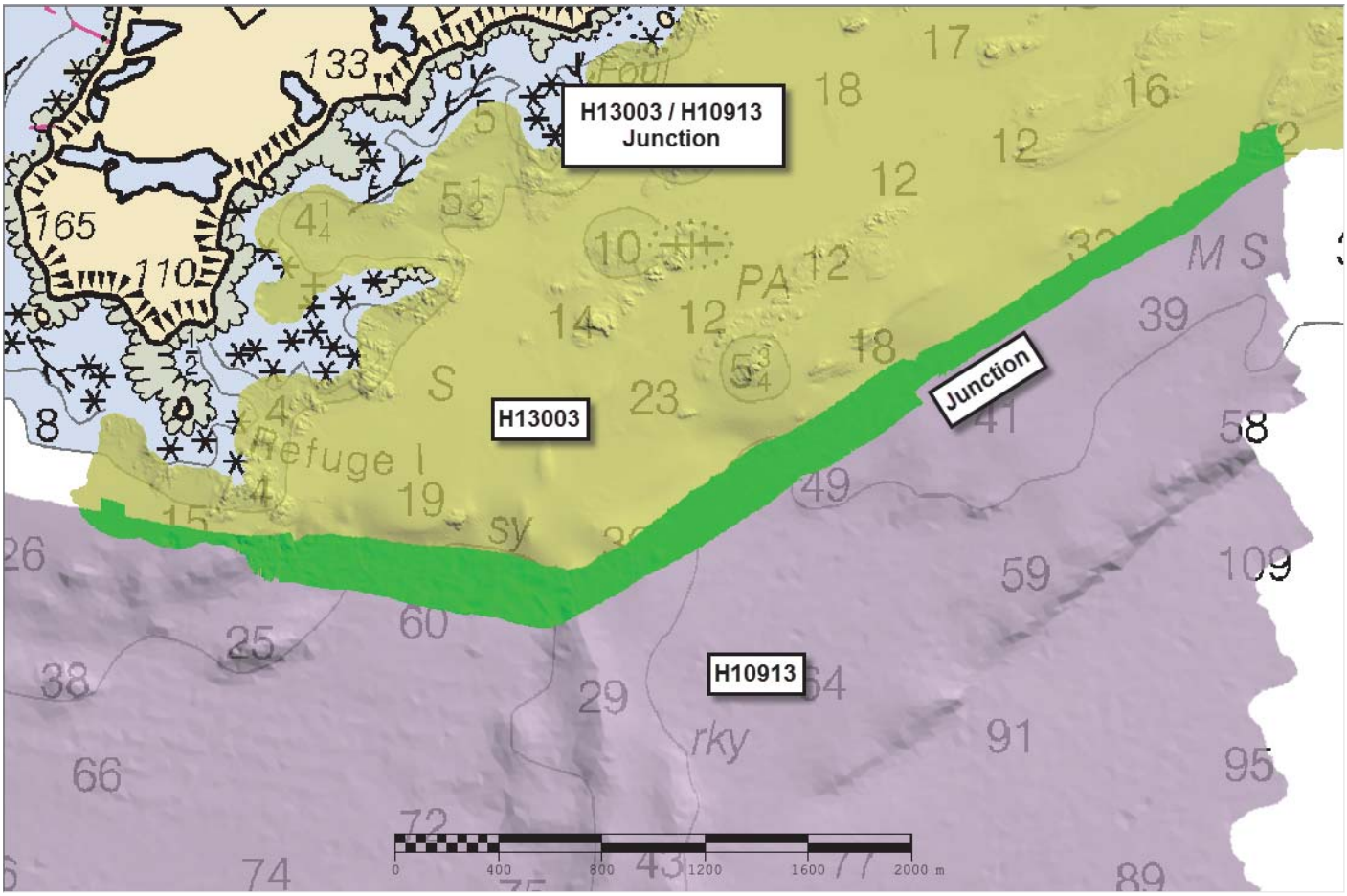


Figure 11: Junction survey area between H13003 and H10913.

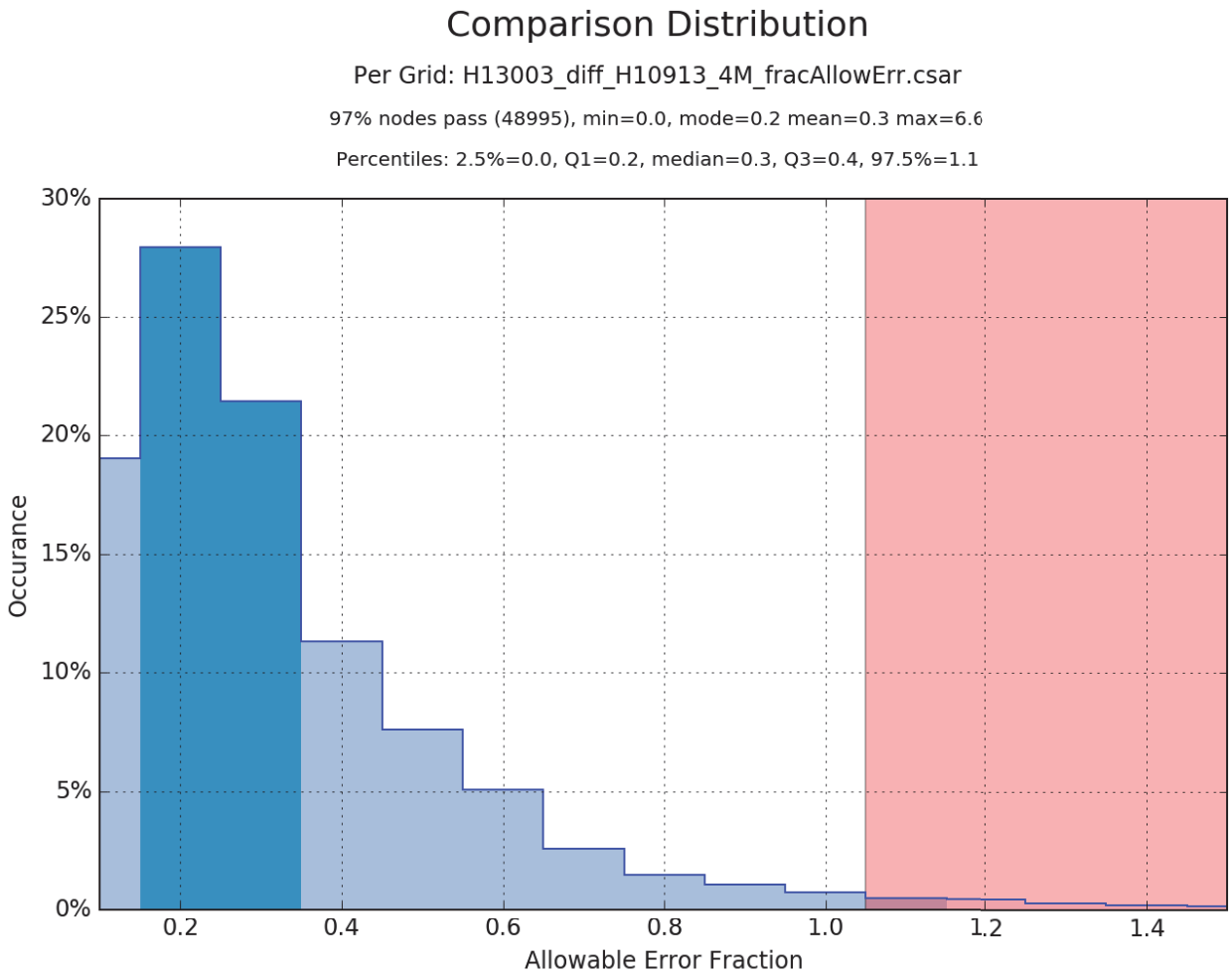
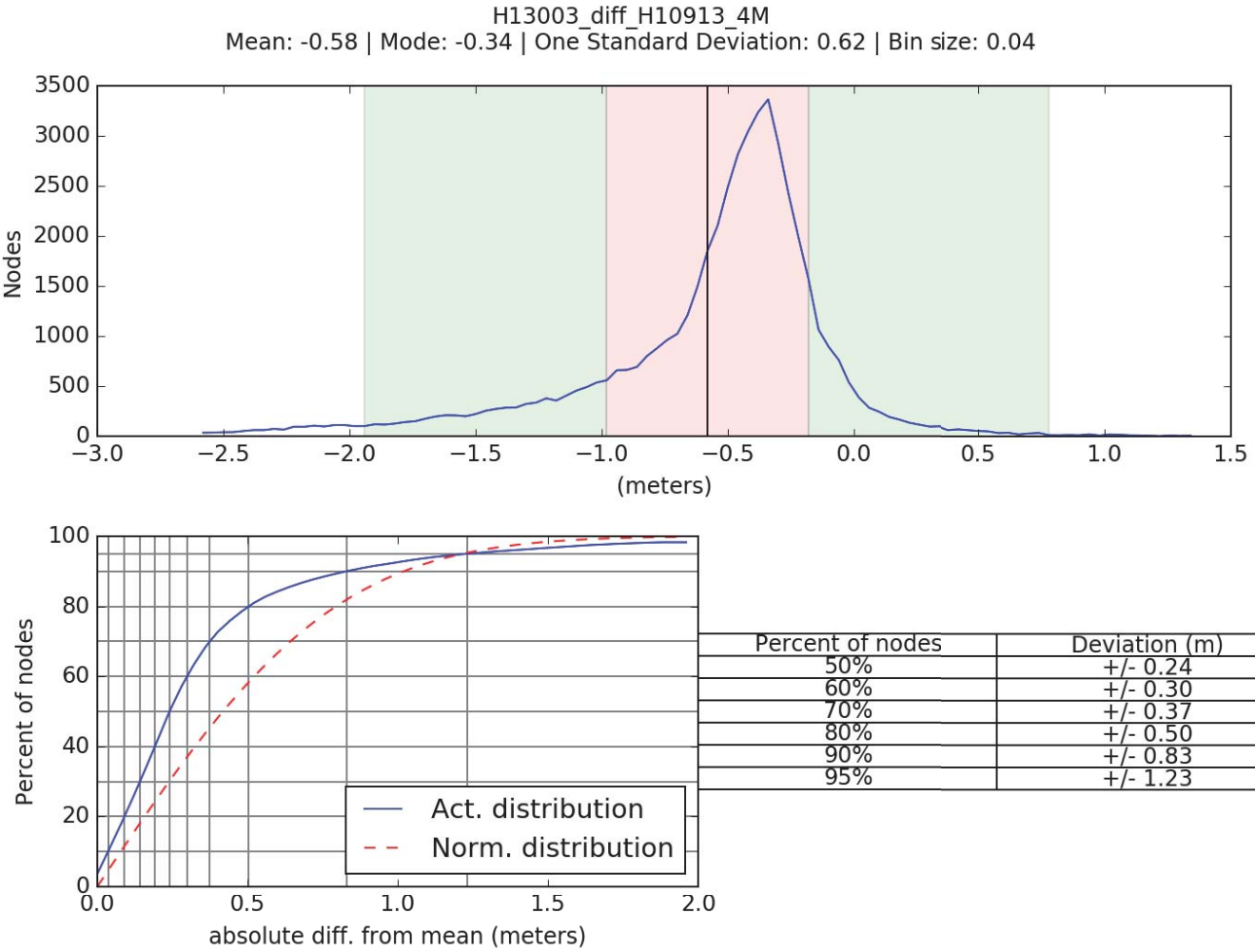


Figure 12: Pydro derived plot showing percentage-pass value of H13003 MBES data to H10913 MBES data.



Percent of nodes	Deviation (m)
50%	+/- 0.24
60%	+/- 0.30
70%	+/- 0.37
80%	+/- 0.50
90%	+/- 0.83
95%	+/- 1.23

Figure 13: Pydro derived plot showing the statistical results of a comparison between H13003 MBES data to H10913 MBES data.

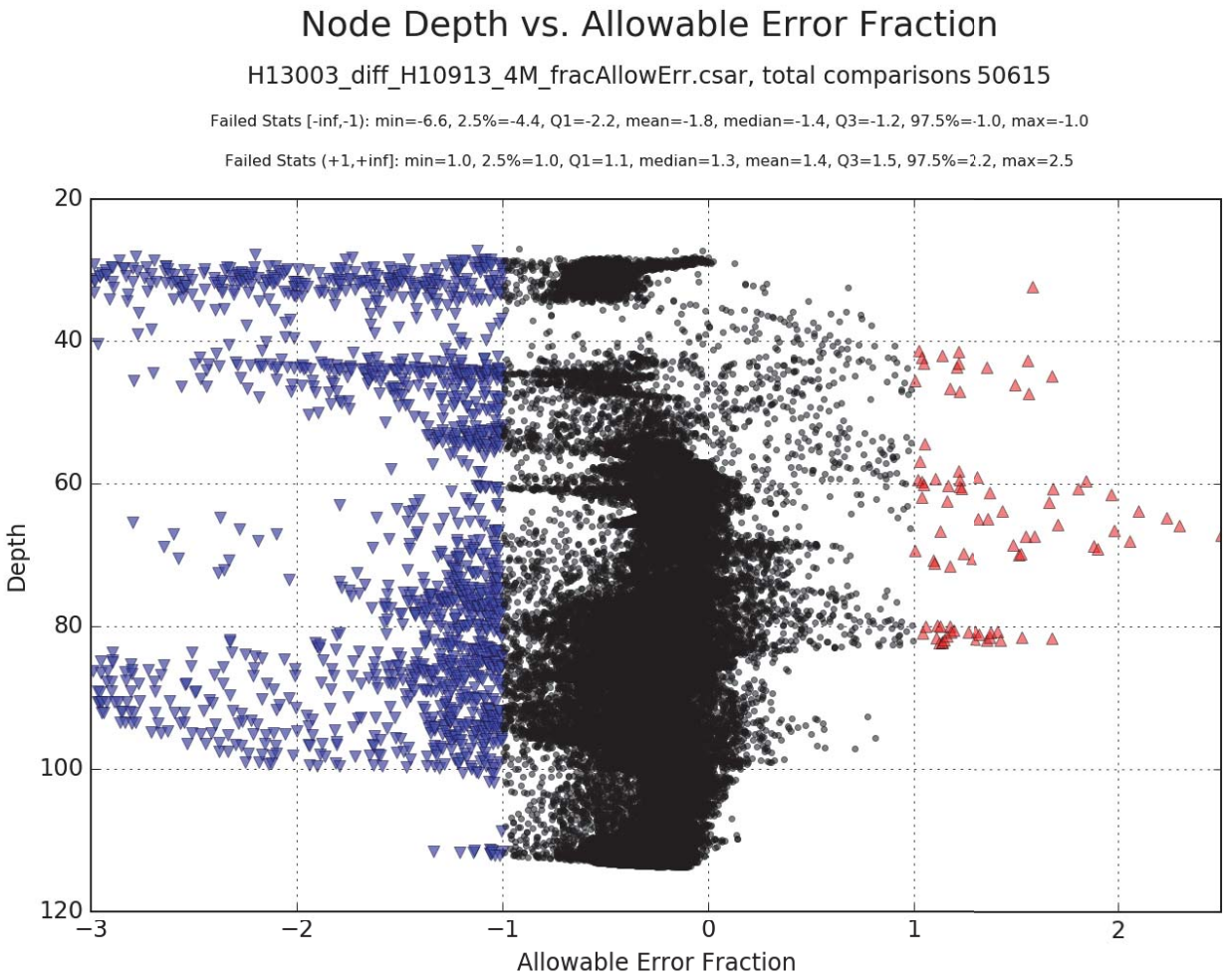


Figure 14: Pydro derived plot showing node depth vs. allowable error fraction of H13003 MBES data to H10913 MBES data.

H12320

The junction with survey H12320 encompassed 1.08 square nautical miles along the northern boundary of H13003. The comparison was made using the Pydro tool "Compare Grids" application. The surfaces used for this comparison were 8-meter CUBE surfaces. The 8-meter surface provided for H12320 only contained depths below 72 meters. This is the reason for the gaps in the junction area on the western side. Analysis of the difference surface indicate a standard deviation of 0.45 meters. For the respective depths, the difference surface was compared to the allowable TVU standards specified in the HSSD. In total, 99.5+% of the depth differences between H13003 and junction survey H12320 were within allowable uncertainties. H13003 is deeper by 0.40 meters on average in the junction area with H12320.

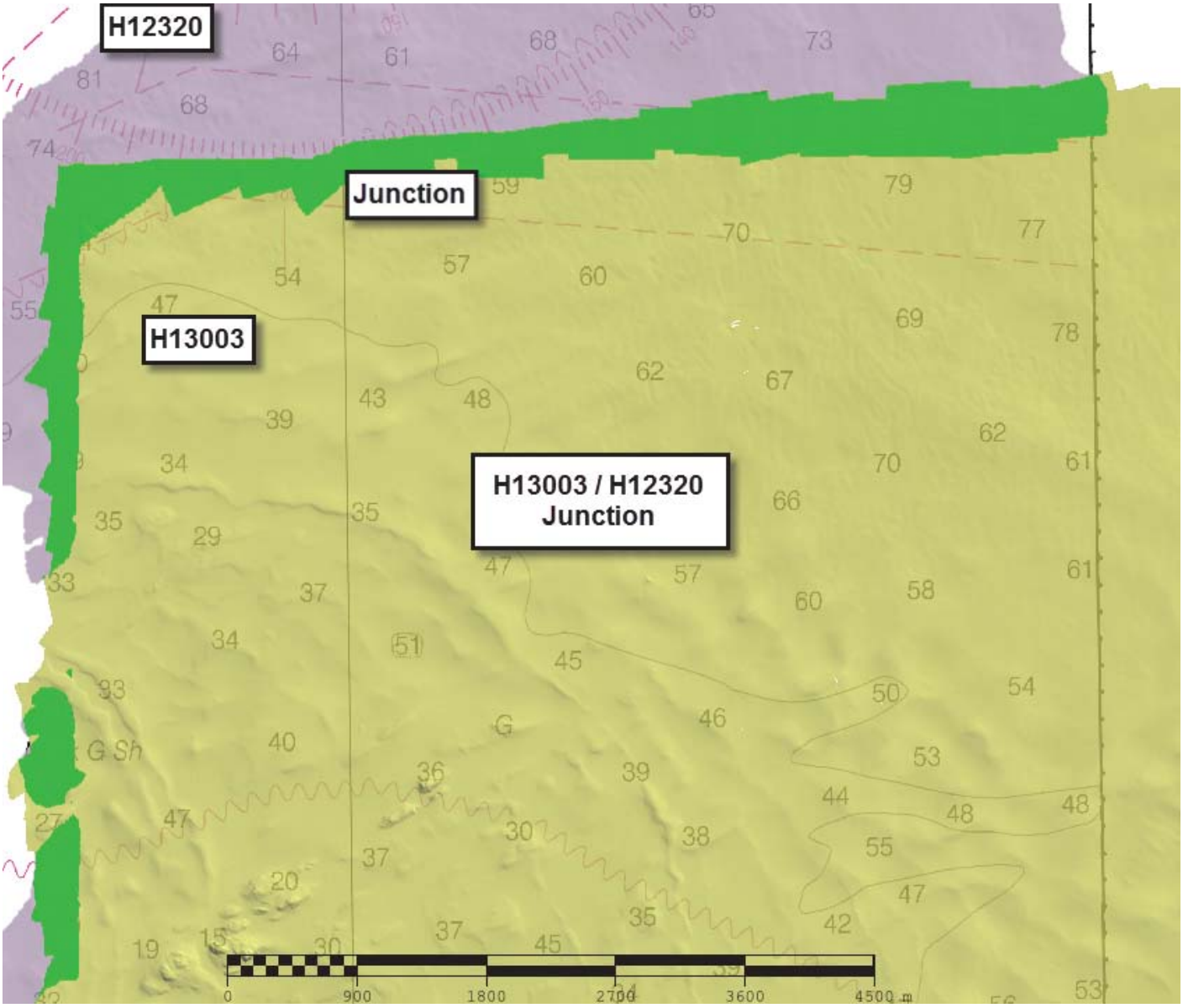


Figure 15: Junction survey area between H13003 and H12320.

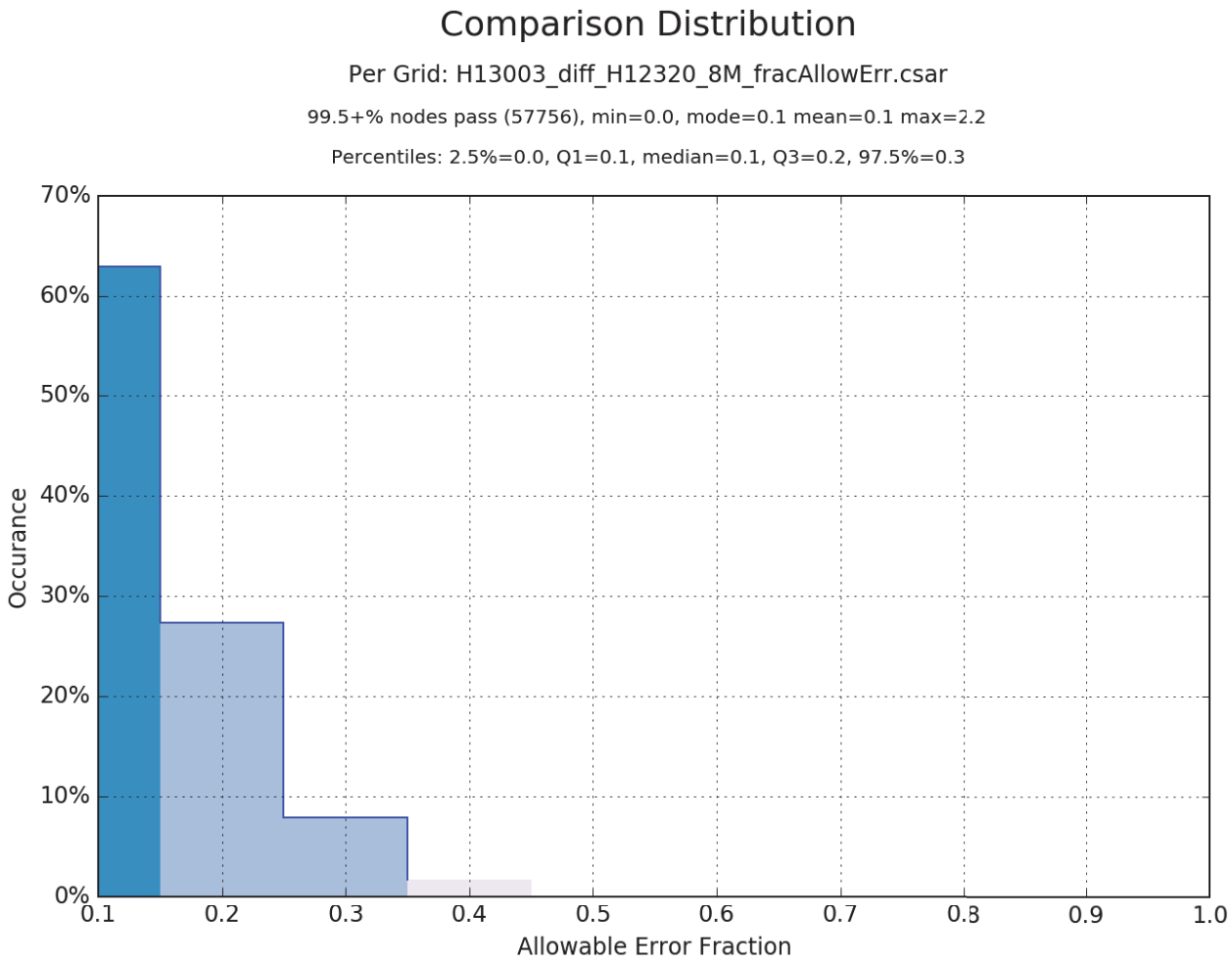
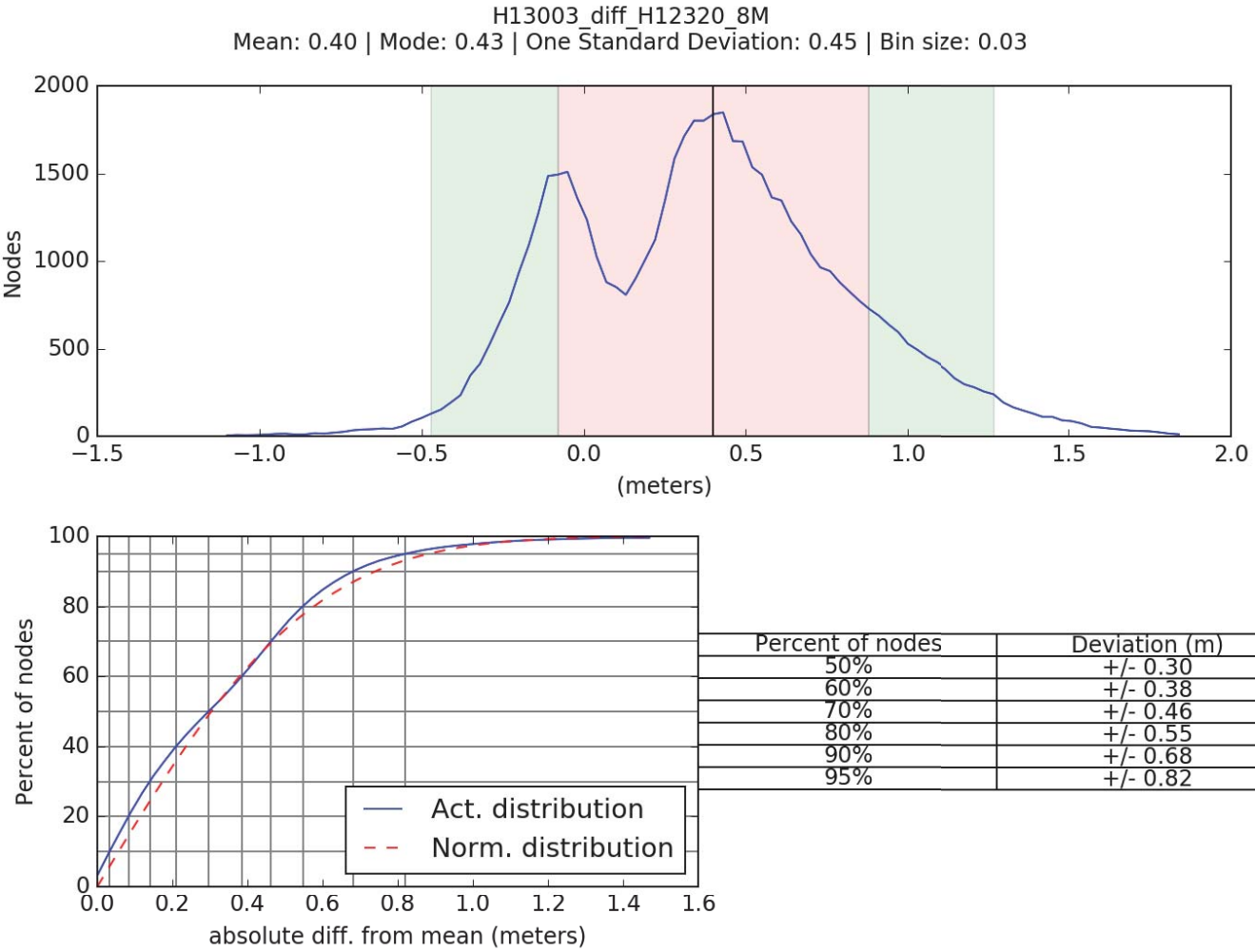


Figure 16: Pydro derived plot showing percentage-pass value of H13003 MBES data to H12320 MBES data.



Percent of nodes	Deviation (m)
50%	+/- 0.30
60%	+/- 0.38
70%	+/- 0.46
80%	+/- 0.55
90%	+/- 0.68
95%	+/- 0.82

Figure 17: Pydro derived plot showing the statistical results of a comparison between H13003 MBES data to H12320 MBES data.

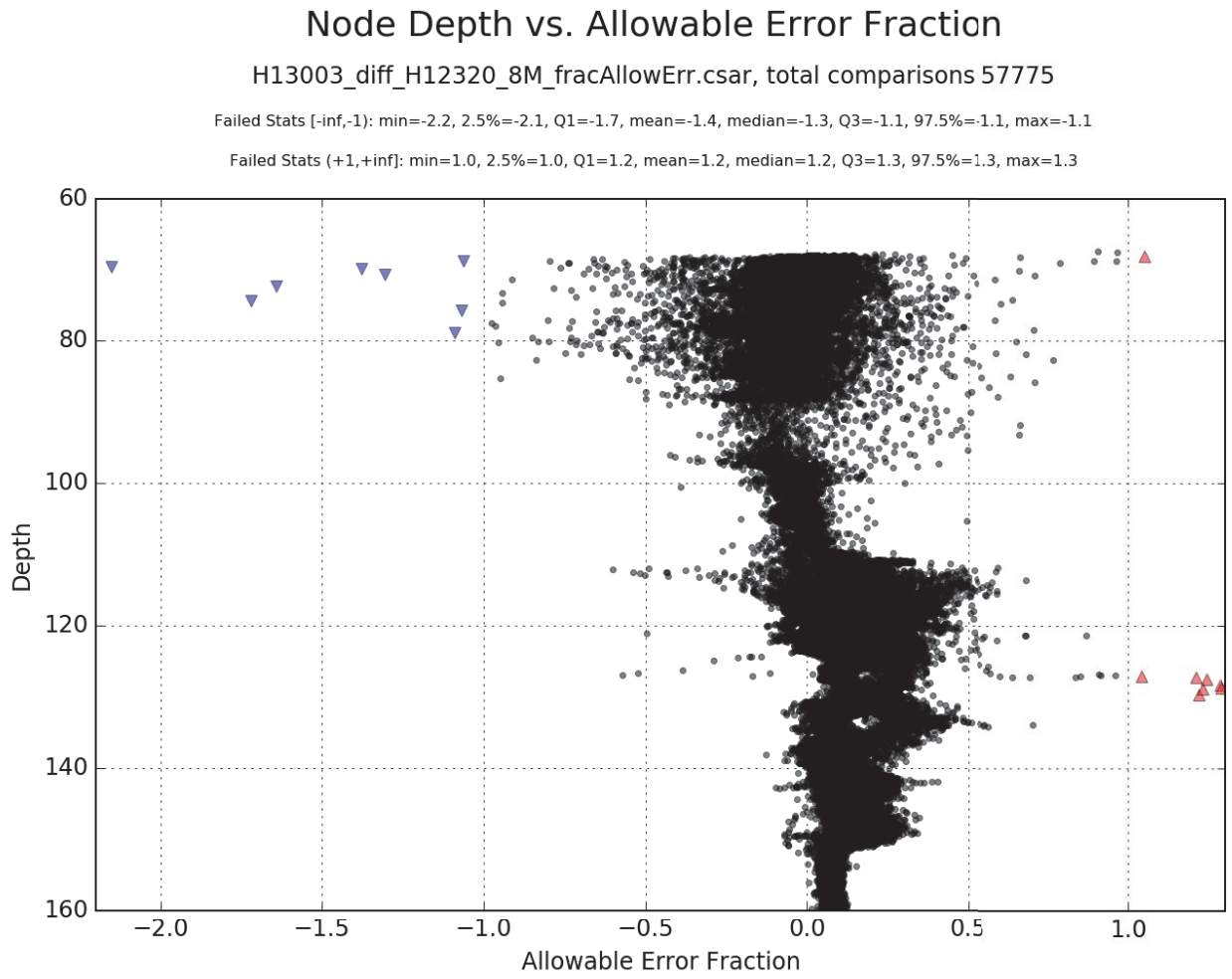


Figure 18: Pydro derived plot showing node depth vs. allowable error fraction of H13003 MBES data to H12320 MBES data.

H12996

The junction with survey H12996 encompassed 0.73 square nautical miles along the western boundary of H13003. The comparison was made using the Pydro tool "Compare Grids" application. The surfaces used for this comparison were 2-meter CUBE surfaces. Analysis of the difference surface indicate a standard deviation of 0.29 meters. For the respective depths, the difference surface was compared to the allowable TVU standards specified in the HSSD. In total, 98% of the depth differences between H13003 and junction survey H1996 were within allowable uncertainties. H13003 is shoaler by 0.20 meters on average in the junction area with H12996.

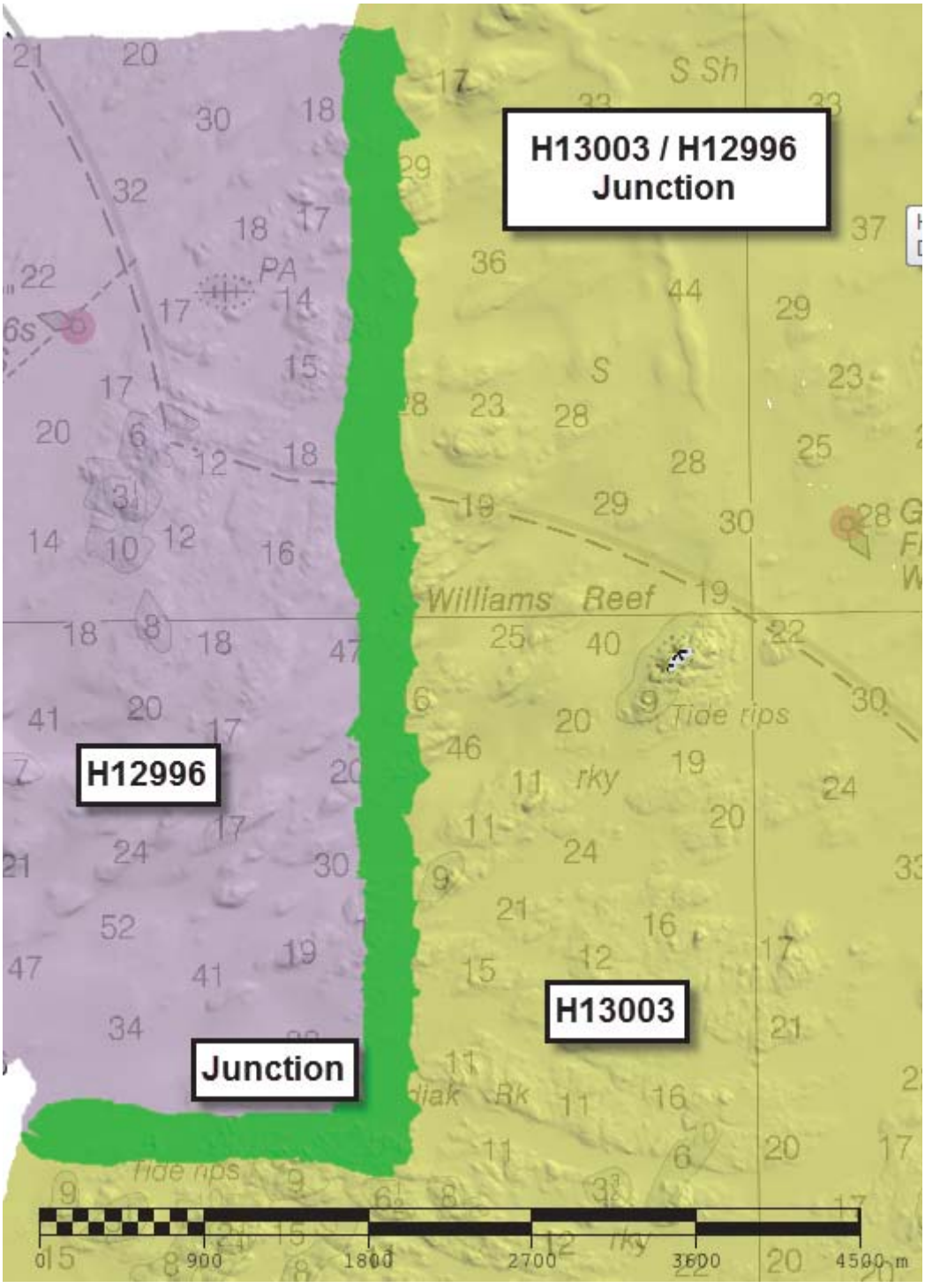


Figure 19: Junction survey area between H13003 and H12996.

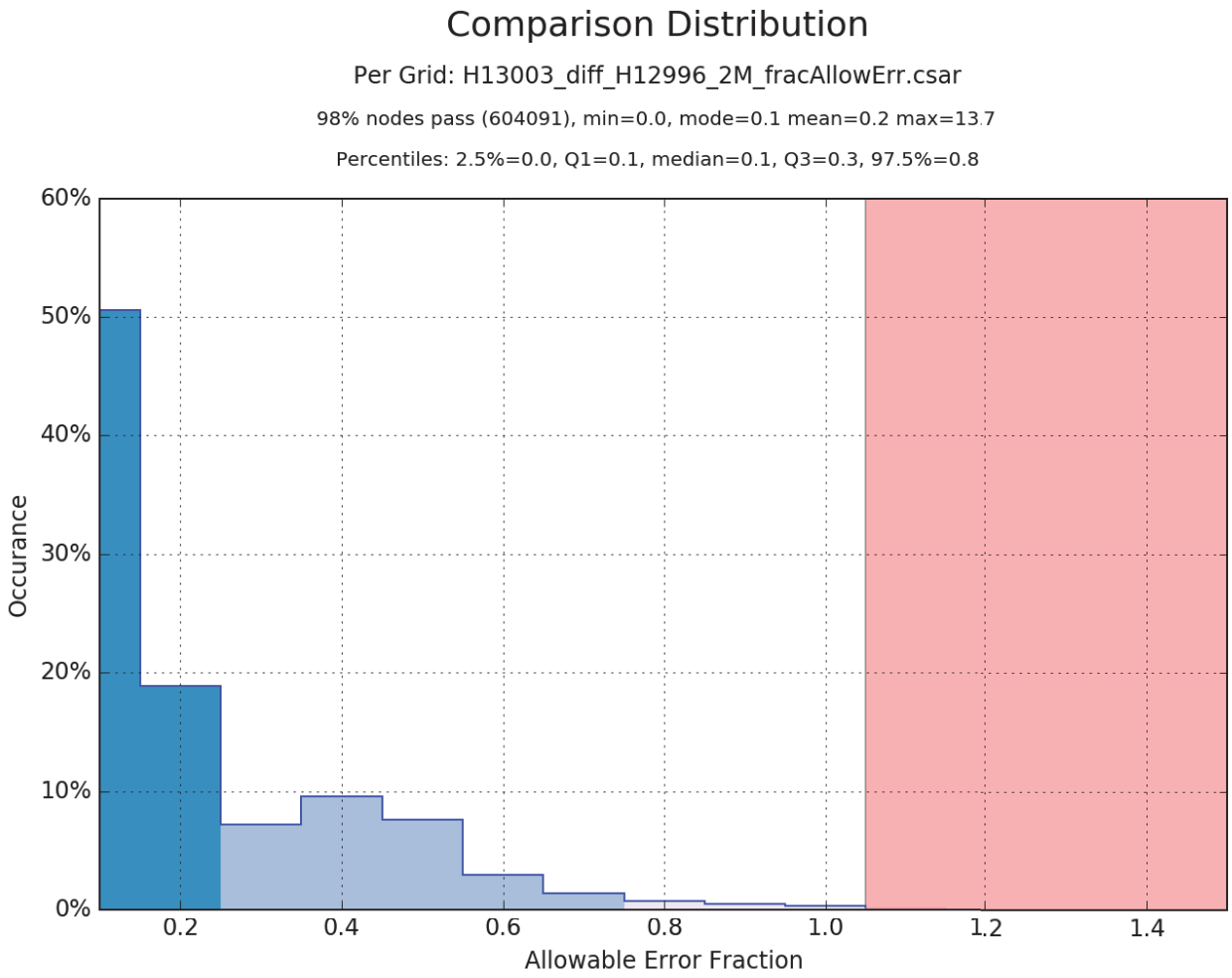
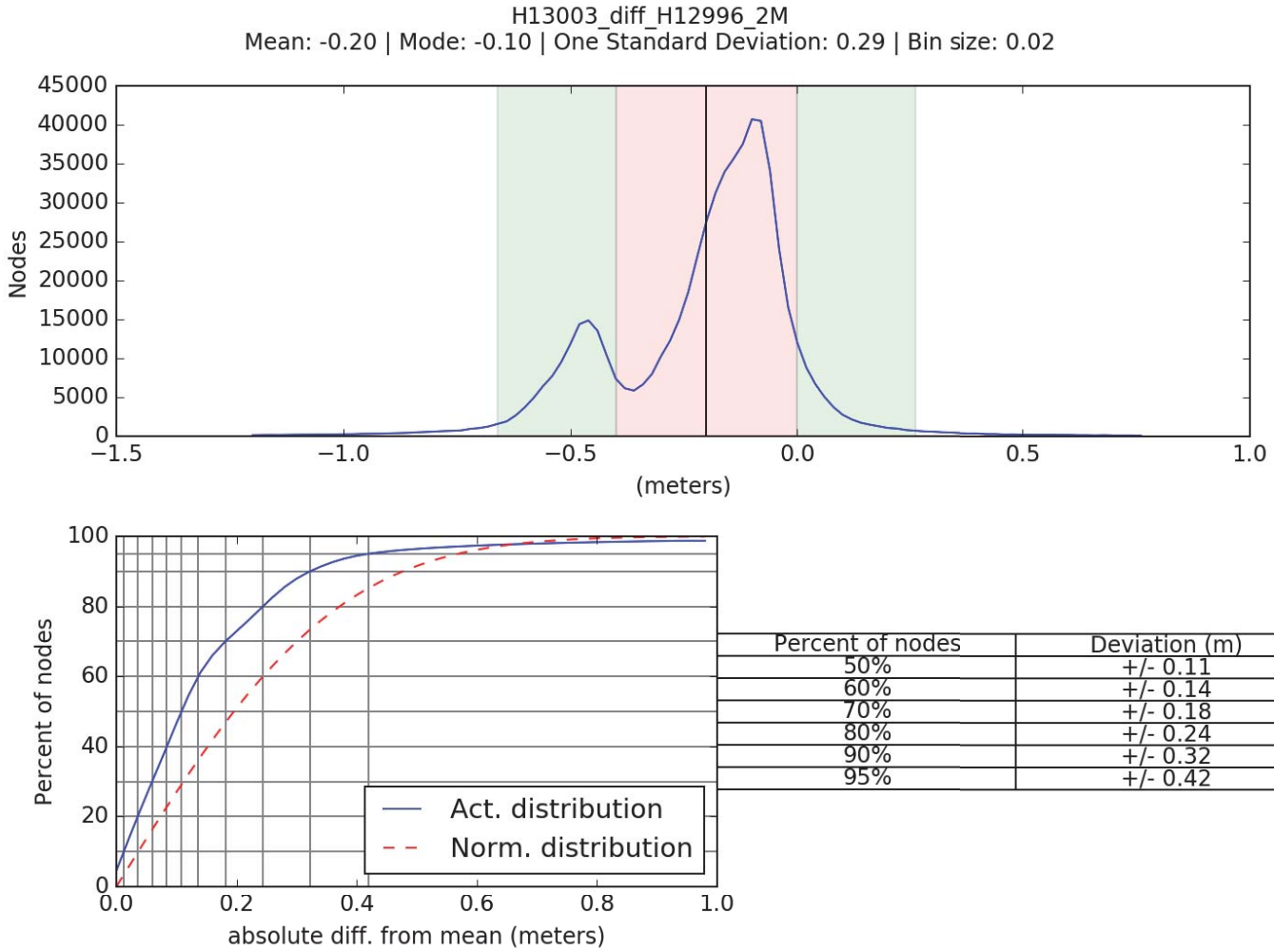


Figure 20: Pydro derived plot showing percentage-pass value of H13003 MBES data to H12996 MBES data.



Percent of nodes	Deviation (m)
50%	+/- 0.11
60%	+/- 0.14
70%	+/- 0.18
80%	+/- 0.24
90%	+/- 0.32
95%	+/- 0.42

Figure 21: Pydro derived plot showing the statistical results of a comparison between H13003 MBES data to H12996 MBES data.

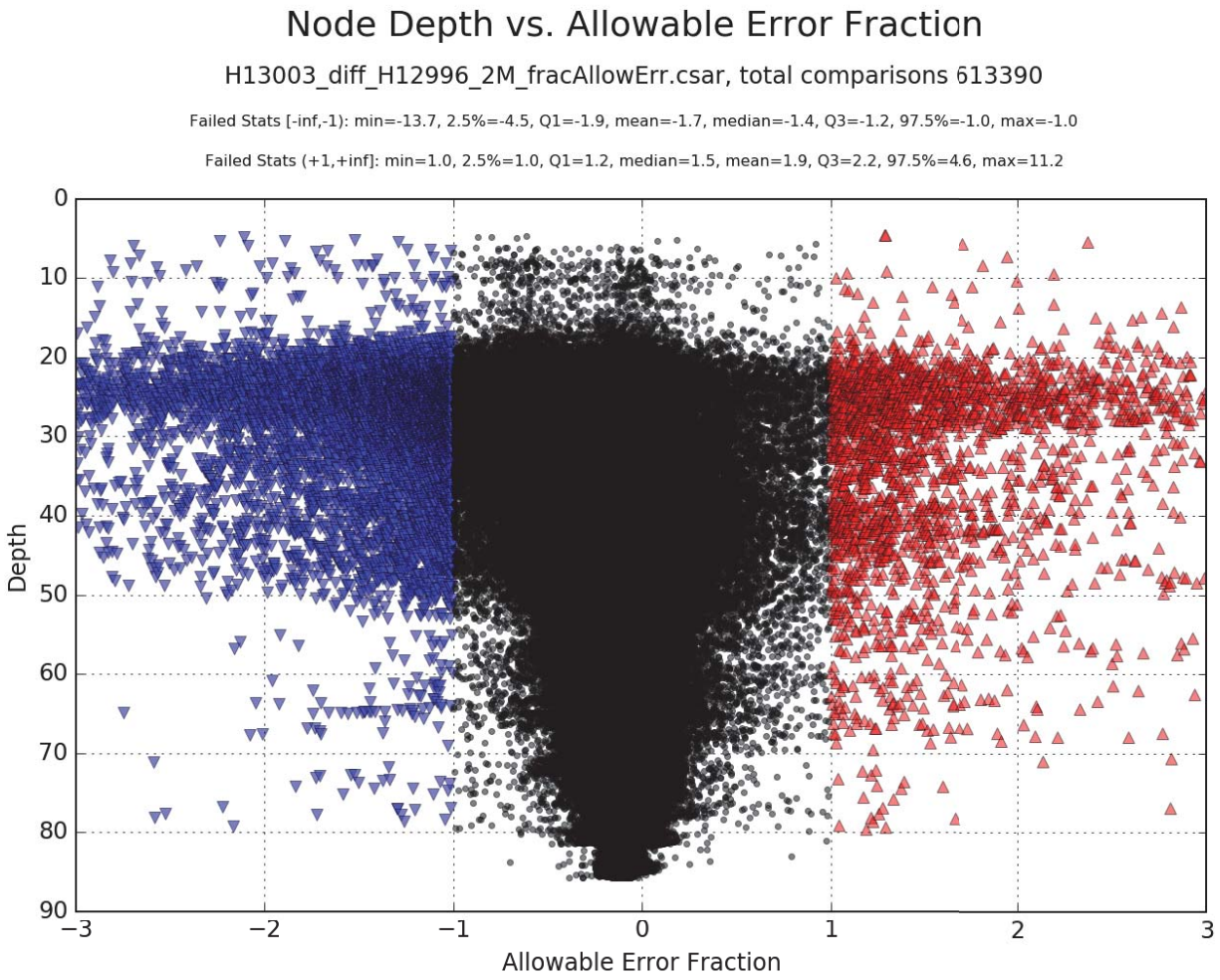


Figure 22: Pydro derived plot showing node depth vs. allowable error fraction of H13003 MBES data to H12996 MBES data.

H12997

The junction with survey H12997 encompassed 0.17 square nautical miles along the boundary of H13003 north and south of Long Island. The comparison was made using the Pydro tool "Compare Grids" application. The surfaces used for this comparison were 4-meter CUBE surfaces. Analysis of the difference surface indicate a standard deviation of 0.31 meters. For the respective depths, the difference surface was compared to the allowable TVU standards specified in the HSSD. In total, 95% of the depth differences between H13003 and junction survey H12997 were within allowable uncertainties. H13003 is shoaler by 0.68 meters on average in the junction area with H12997.

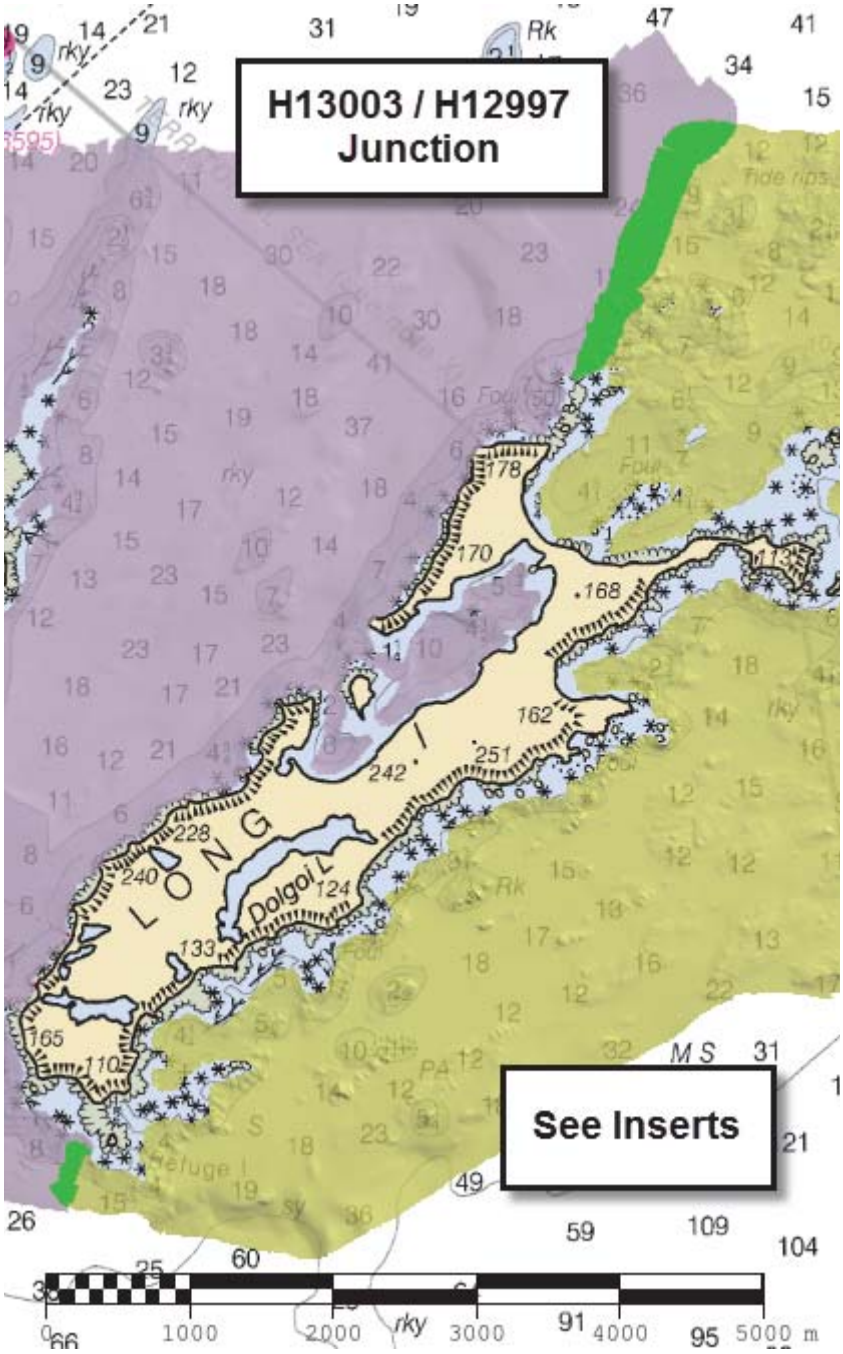


Figure 23: Junction survey area between H13003 and H12997.

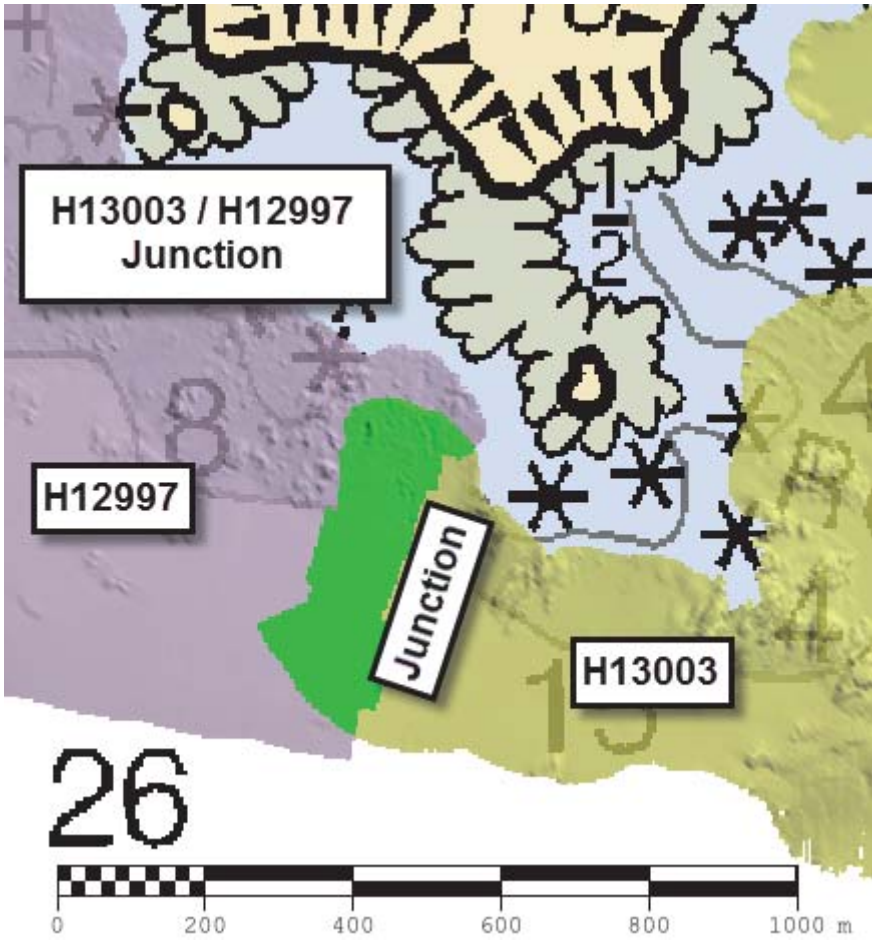


Figure 24: Junction survey area between H13003 and H12997 (southern insert).

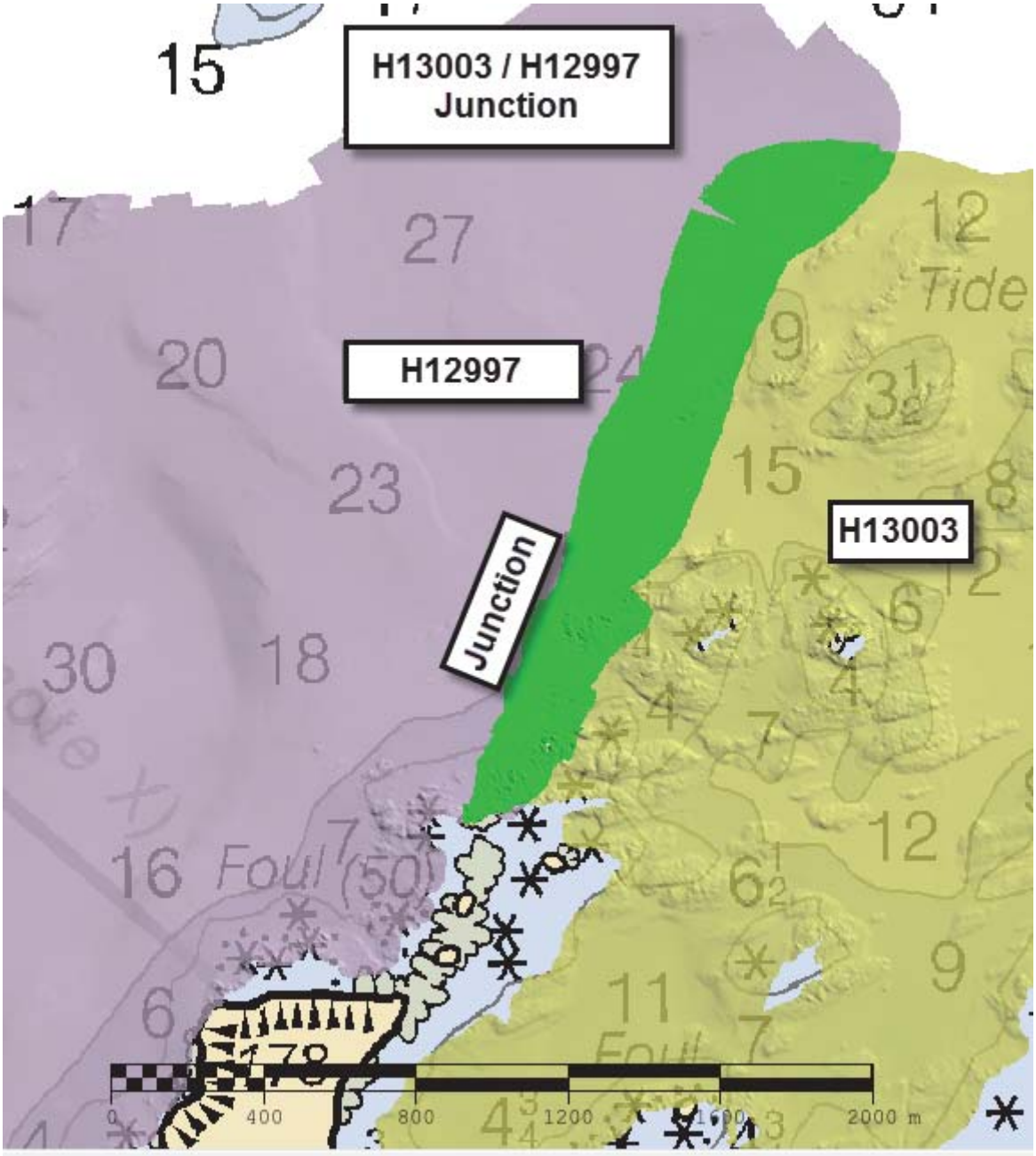


Figure 25: Junction survey area between H13003 and H12997 (northern insert).

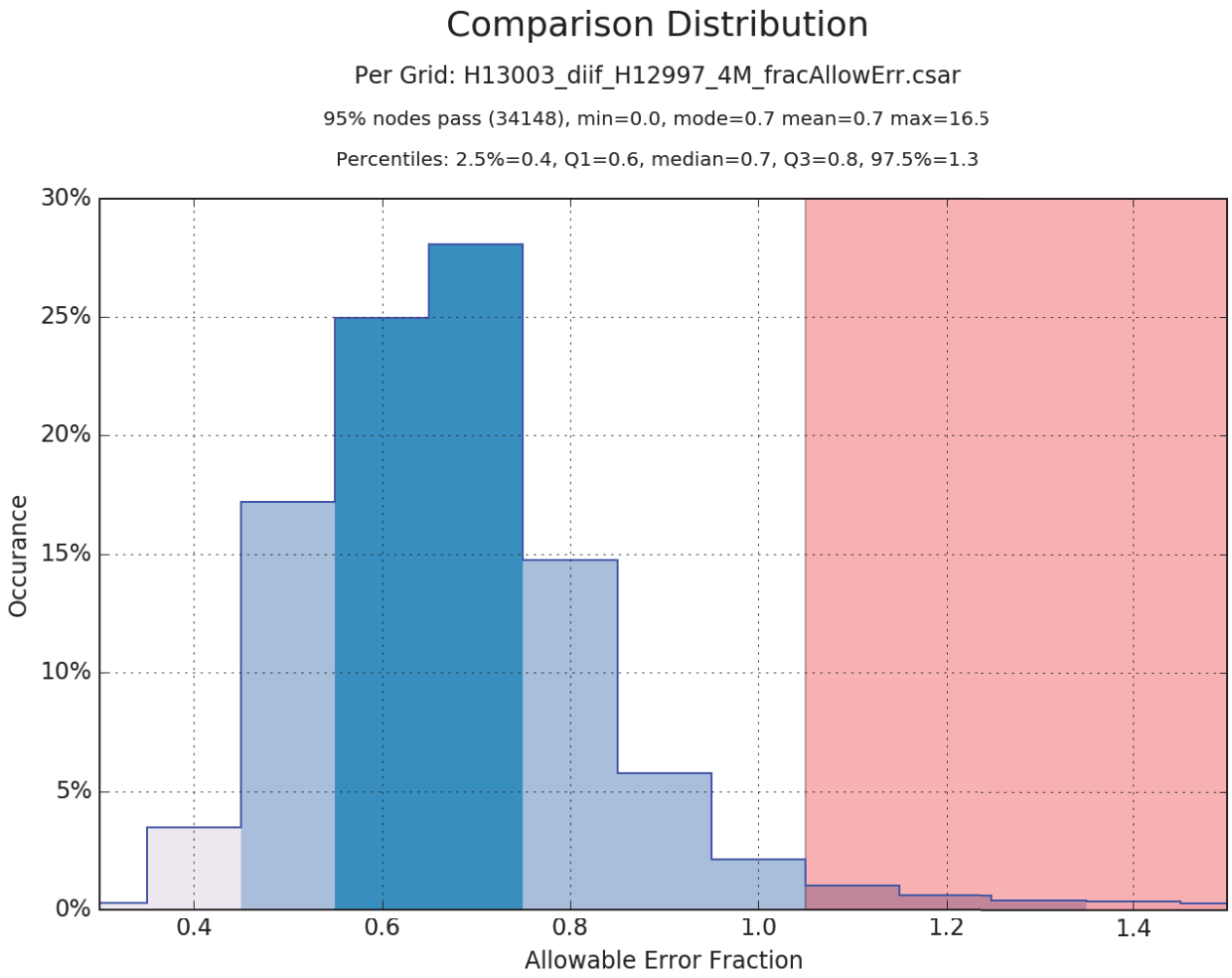
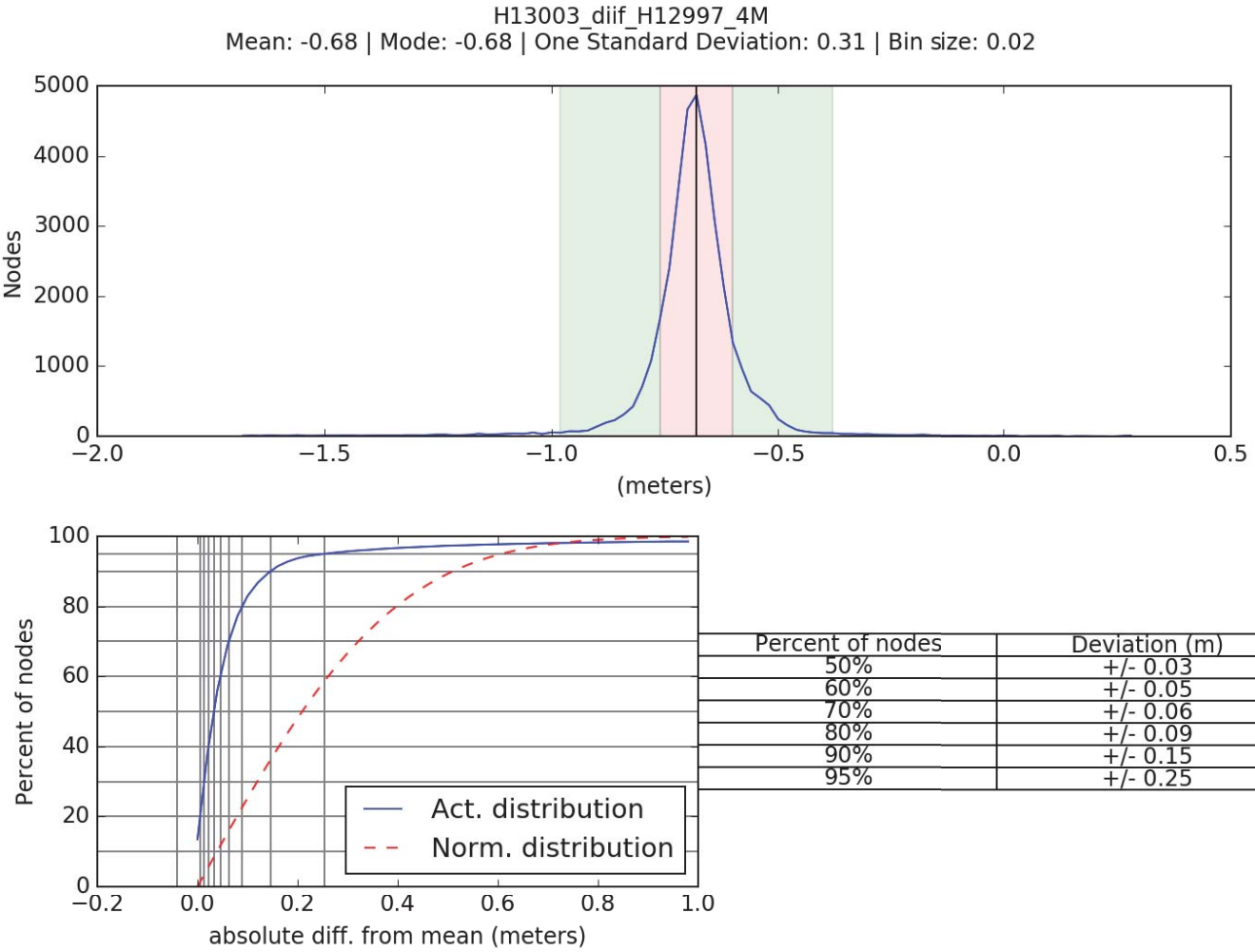


Figure 26: Pydro derived plot showing percentage-pass value of H13003 MBES data to H12997 MBES data.



Percent of nodes	Deviation (m)
50%	+/- 0.03
60%	+/- 0.05
70%	+/- 0.06
80%	+/- 0.09
90%	+/- 0.15
95%	+/- 0.25

Figure 27: Pydro derived plot showing the statistical results of a comparison between H13003 MBES data to H12997 MBES data.

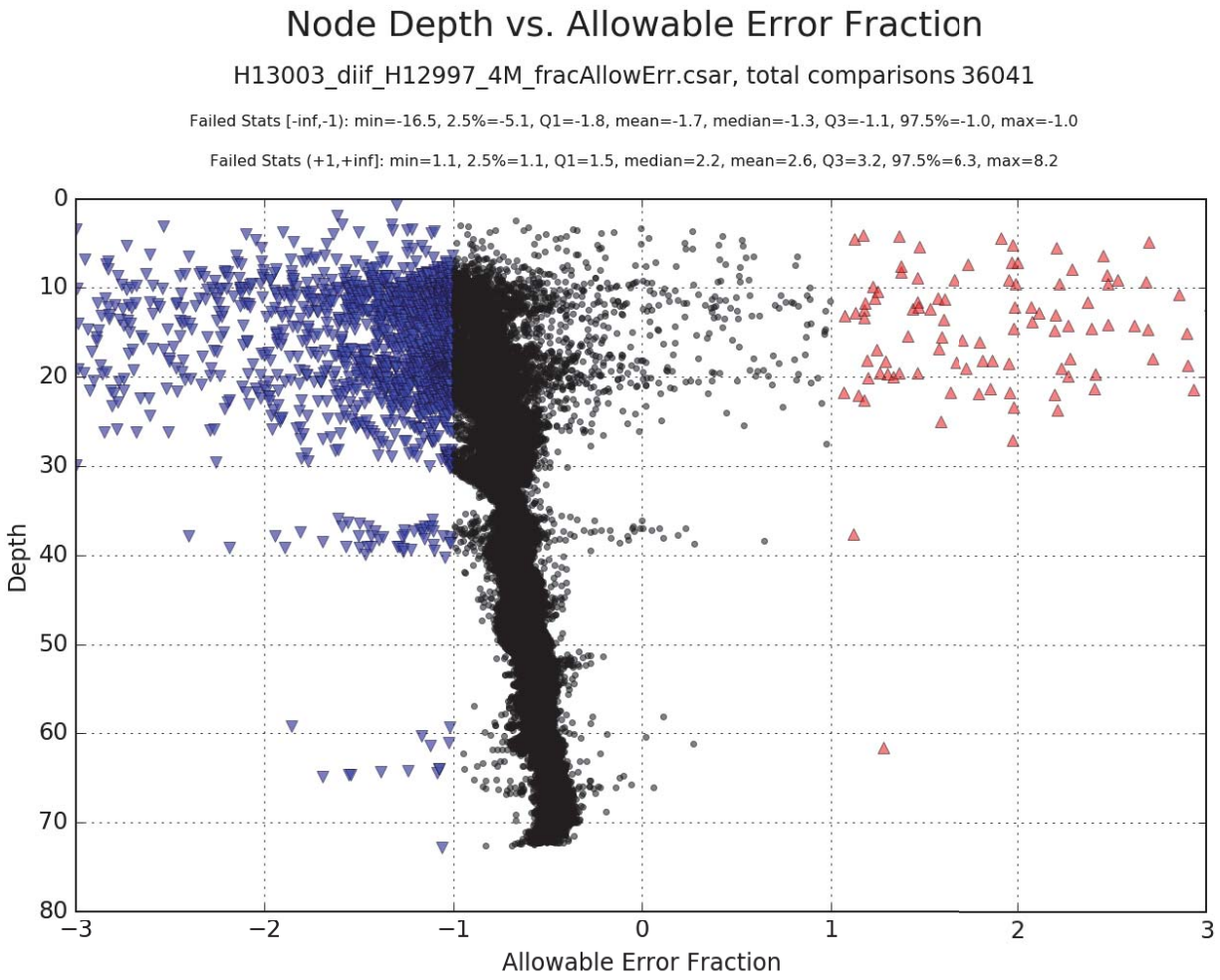


Figure 28: Pydro derived plot showing node depth vs. allowable error fraction of H13003 MBES data to H12997 MBES data.

H13001

The junction with survey H13001 encompassed 1.48 square nautical miles along the southern boundary of H13003. The comparison was made using the Pydro tool "Compare Grids" application. The surfaces used for this comparison were 8-meter CUBE surfaces. Analysis of the difference surface indicate a standard deviation of 0.60 meters. For the respective depths, the difference surface was compared to the allowable TVU standards specified in the HSSD. In total, 98% of the depth differences between H13003 and junction survey H13001 were within allowable uncertainties. H13003 is shoaler by 0.48 meters on average in the junction area with H10913.

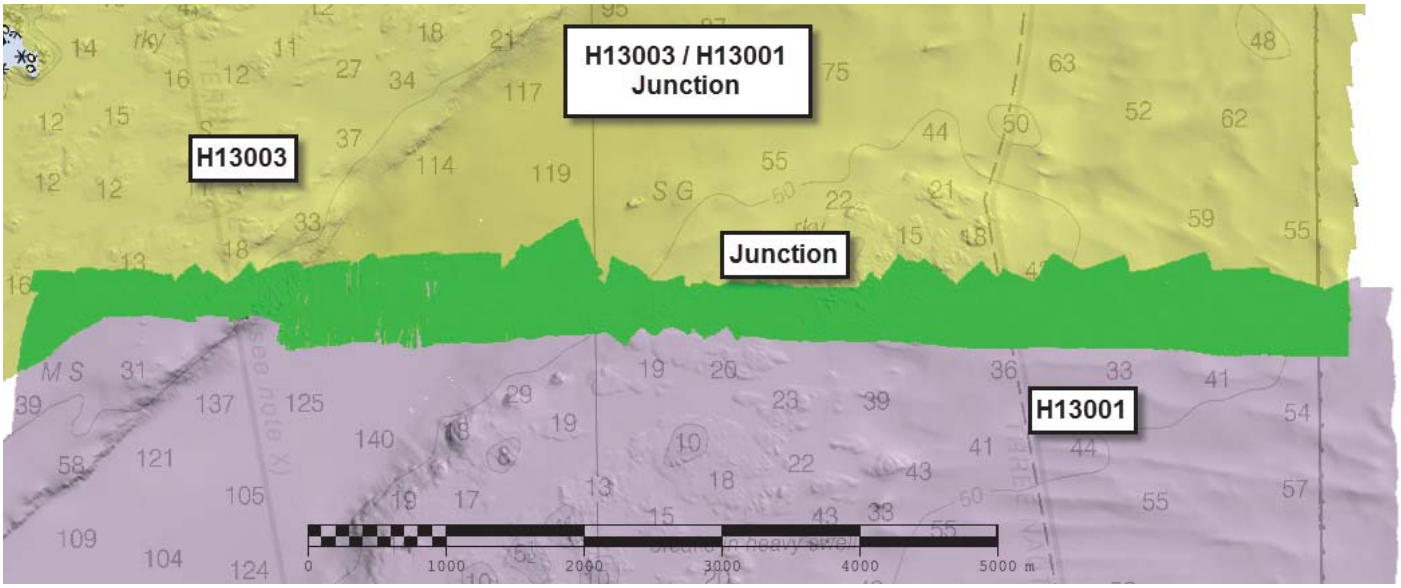


Figure 29: Junction survey area between H13003 and H13001.

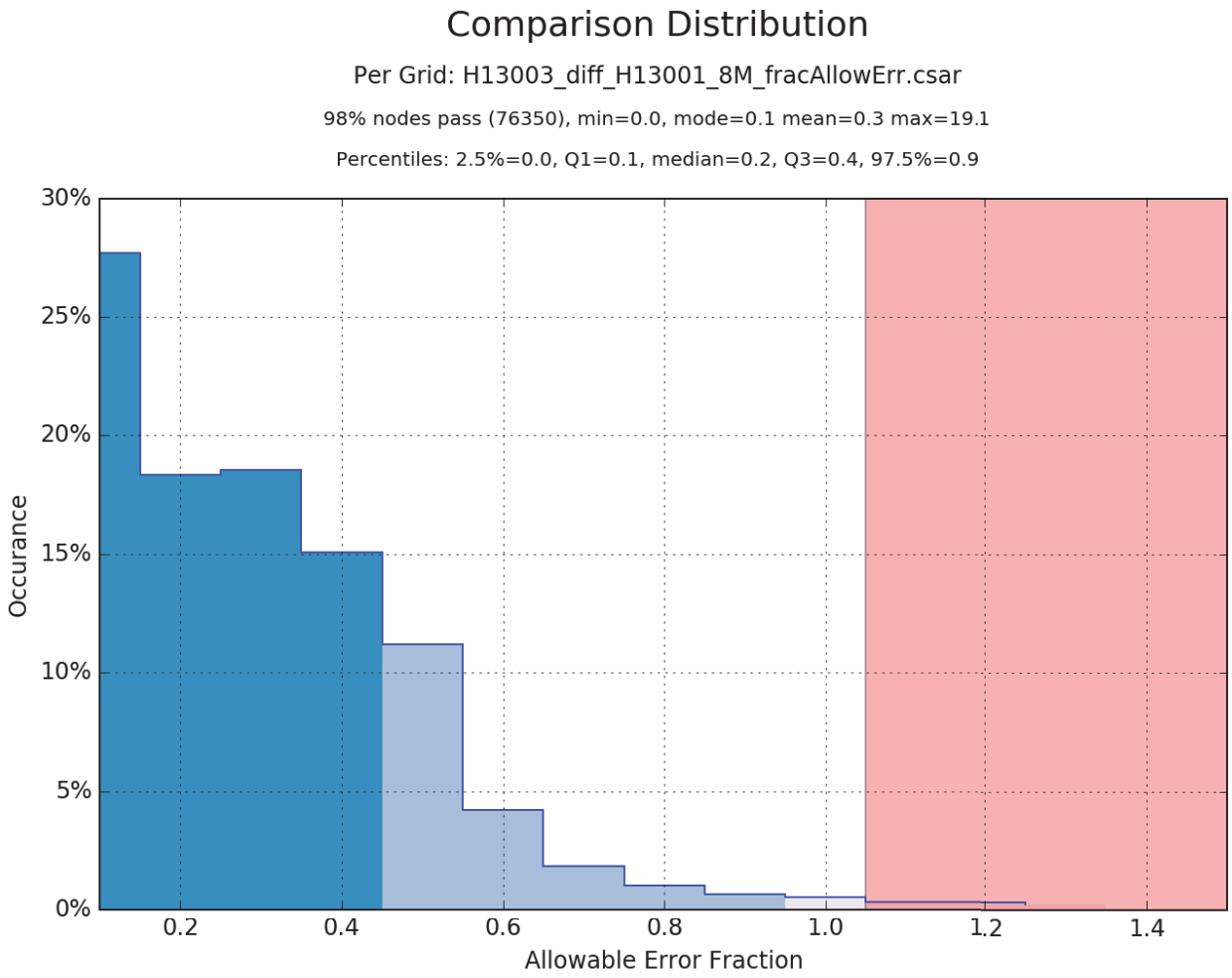
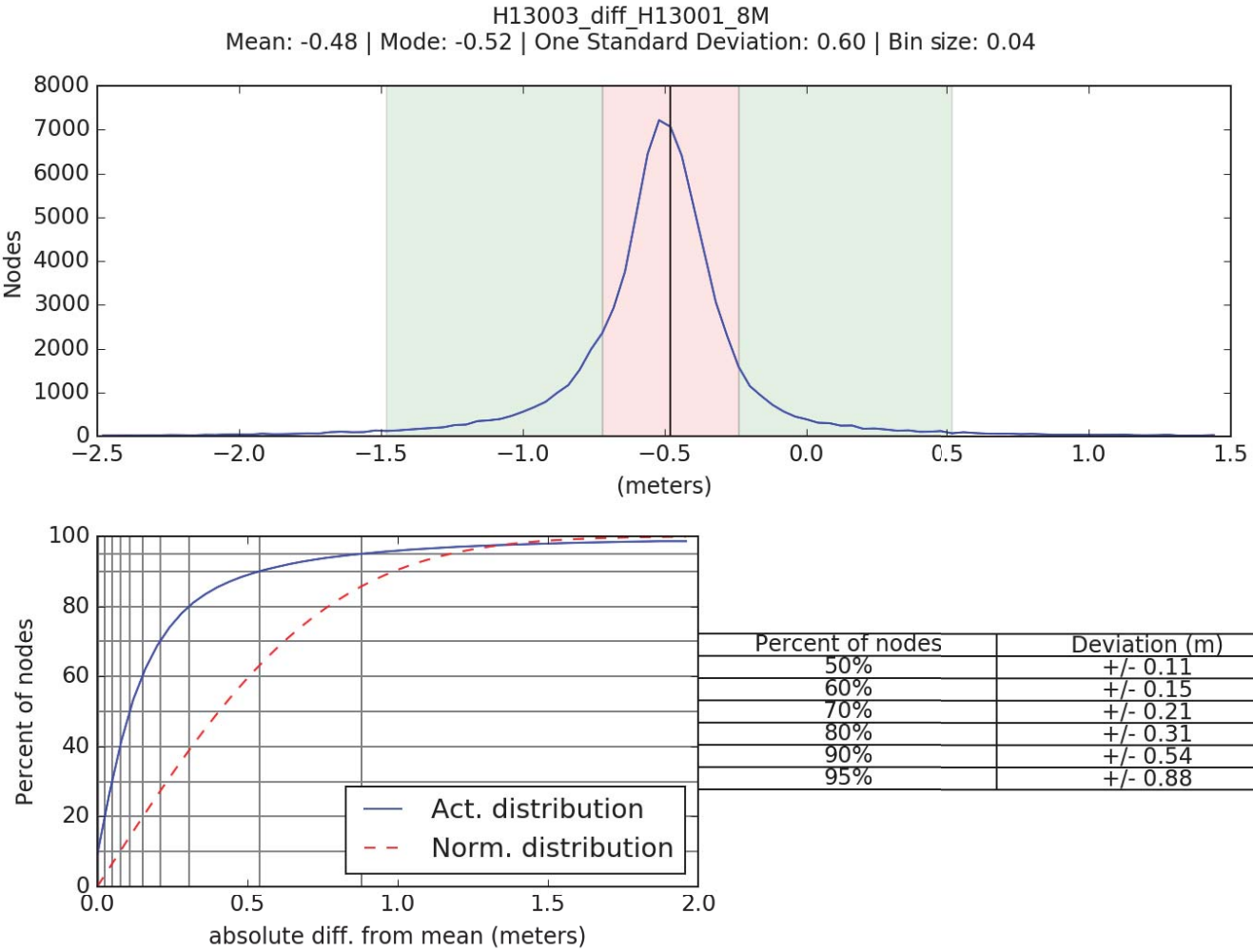


Figure 30: Pydro derived plot showing percentage-pass value of H13003 MBES data to H13001 MBES data.



Percent of nodes	Deviation (m)
50%	+/- 0.11
60%	+/- 0.15
70%	+/- 0.21
80%	+/- 0.31
90%	+/- 0.54
95%	+/- 0.88

Figure 31: Pydro derived plot showing the statistical results of a comparison between H13003 MBES data to H13001 MBES data.

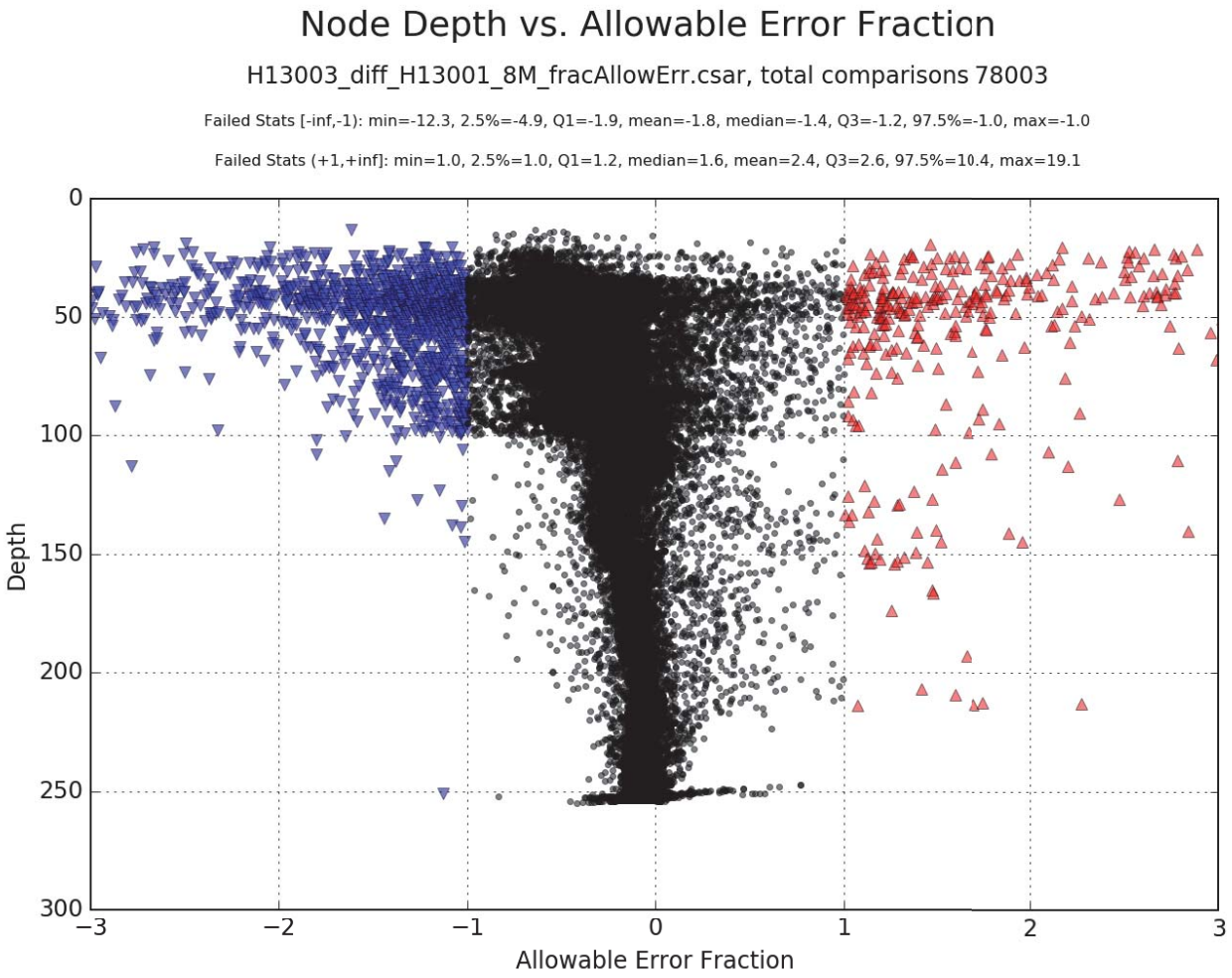


Figure 32: Pydro derived plot showing node depth vs. allowable error fraction of H13003 MBES data to H13001 MBES data.

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

Mid-Water Column Acoustic Scatter

In some nearshore areas, marine vegetation inhibited accurate bottom detection. In cases where it was possible to discern the true bottom from marine vegetation, the obscuring soundings were rejected. However, when unable to clearly distinguish between the apparent seafloor and vegetation, no soundings were rejected.

B.2.7 Sound Speed Methods

Sound Speed Cast Frequency: Seventy four 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 19plus SEACAT Profilers and the Odim Brooke Ocean MVP 200 Moving Vessel Profiler. All casts were concatenated into a master file and applied to MBES data using the "Nearest distance within time" (4 hours) profile selection method.

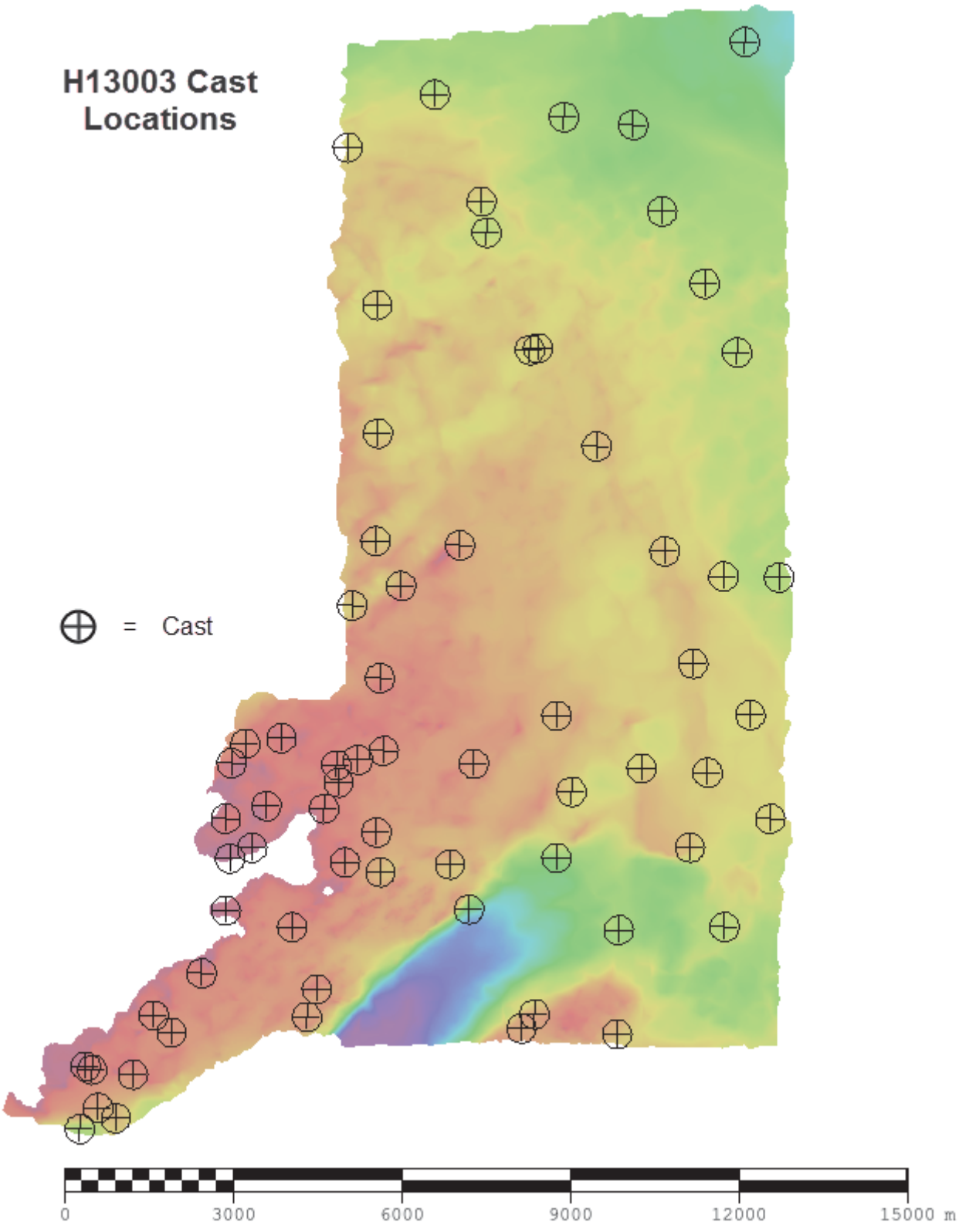


Figure 33: H13003 sound speed cast locations.

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	10.2 10.3 10.3.1

Table 10: Primary bathymetric data processing software

The following Feature Object Catalog was used: NOAA Extended Attribute Files V_5_6..

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
H13003_MB_VR_MLLW	CUBE	999 meters	0.6 meters - 256.1 meters	NOAA_VR	Complete MBES
H13003_MB_VR_MLLW_FINAL	CUBE	999 meters	0.6 meters - 256.1 meters	NOAA_VR	Complete MBES

Table 11: Submitted Surfaces

Submitted surfaces were generated using the recommended parameters for depth-based (Ranges) Caris variable-resolution bathymetric grids as specified in HSTD 2017-2. The resolution values in the table above are not accurate: the XML-DR schema used to generate this report did not accommodate variable resolution grids. The "999" value was entered merely as a place holder.

Eight critical soundings were created for this survey. All eight were identified as dangers to navigation.

C. Vertical and Horizontal Control

Shoreline features were reduced to MLLW using traditional tide methods via TCARI. All MBES bathymetry were acquired relative to the ellipsoid and reduced to MLLW via PMVD. 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
Kodiak Island, Womens Bay	9457292

Table 12: NWLON Tide Stations

File Name	Status
H13003_TCARI_Features.tid	Final Approved

Table 13: Water Level Files (.tid)

File Name	Status
P136RA2017.tc	Final

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

A request for final approved tides was sent to N/OPS1 on 09/26/2017. The final tide note was received on 10/10/2017.

H13003 shoreline features were tide corrected using a .tid file created in Pydro utilizing the "TCARI TID file via S-57" function then loaded in Caris Notebook. H13003 MBES data were reduced to MLLW using PMVD processing methods.

ERS Methods Used:

ERS via Poor Mans VDATUM

Ellipsoid to Chart Datum Separation File:

OPR-P136-RA-2017_PMVD_EPSG6334_NAD83-MLLWxGeoid16B.csar

PMVD methods were used to transform between the ellipsoid and water level data. OPR-P136-RA-2017_PMVD_EPSG6334_NAD83-MLLWxGeoid16B.csar was sent to the ship to resolve between the ellipsoid and MLLW. "GPS tides" were then computed using the aforementioned separation model and the corrected GPS-height-to water-level data (SBET). The SBETs were created in reference to NAD83. Refer to the RAINIER 2017 DAPR for additional information.

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:

Single Base

The following CORS Stations were used for horizontal control:

HVCR Site ID	Base Station ID
AC67	PILLARMTN_AK2006

Table 15: CORS Base Stations

The following user installed stations were used for horizontal control:

HVCR Site ID	Base Station ID
9715	Woody

Table 16: User Installed Base Stations

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

D. Results and Recommendations

D.1 Chart Comparison

A comparison was made between H13003 survey data and Electronic Navigation Chart (ENC) US4AK5PM using CUBE surfaces, selected soundings and contours created in Caris.

D.1.1 Electronic Navigational Charts

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

ENC	Scale	Edition	Update Application Date	Issue Date	Preliminary?
US4AK5PM	1:78900	11	04/28/2017	04/28/2017	NO
US3AK5KM	1:350000	22	01/19/2017	02/21/2017	NO
US5AK5EM	1:20000	12	01/05/2017	01/05/2017	NO

Table 17: Largest Scale ENCs

US4AK5PM

H13003 survey data coincide with sections of ENC US4AK5PM.

A comparison was made between H13003 derived contours (survey contours) and ENC US4AK5PM charted contours (charted depth curves) with the following results: Except as noted below, H13003 three and ten fathoms survey contours were generally inshore of the ENC positions. The 50 fathom survey contours generally agreed with the charted 50 fathom depth curve.

There were notable locations where charted depth curves misrepresented shoaler depths. These locations are highlighted in yellow in the following images.

Eight Dangers to Navigation (DTON) were identified in the H13003 survey area and submitted to Marine Chart Division's (MCD) Nautical Data Branch. Refer to the H13003_DTON_Report for location and description of these dangers.

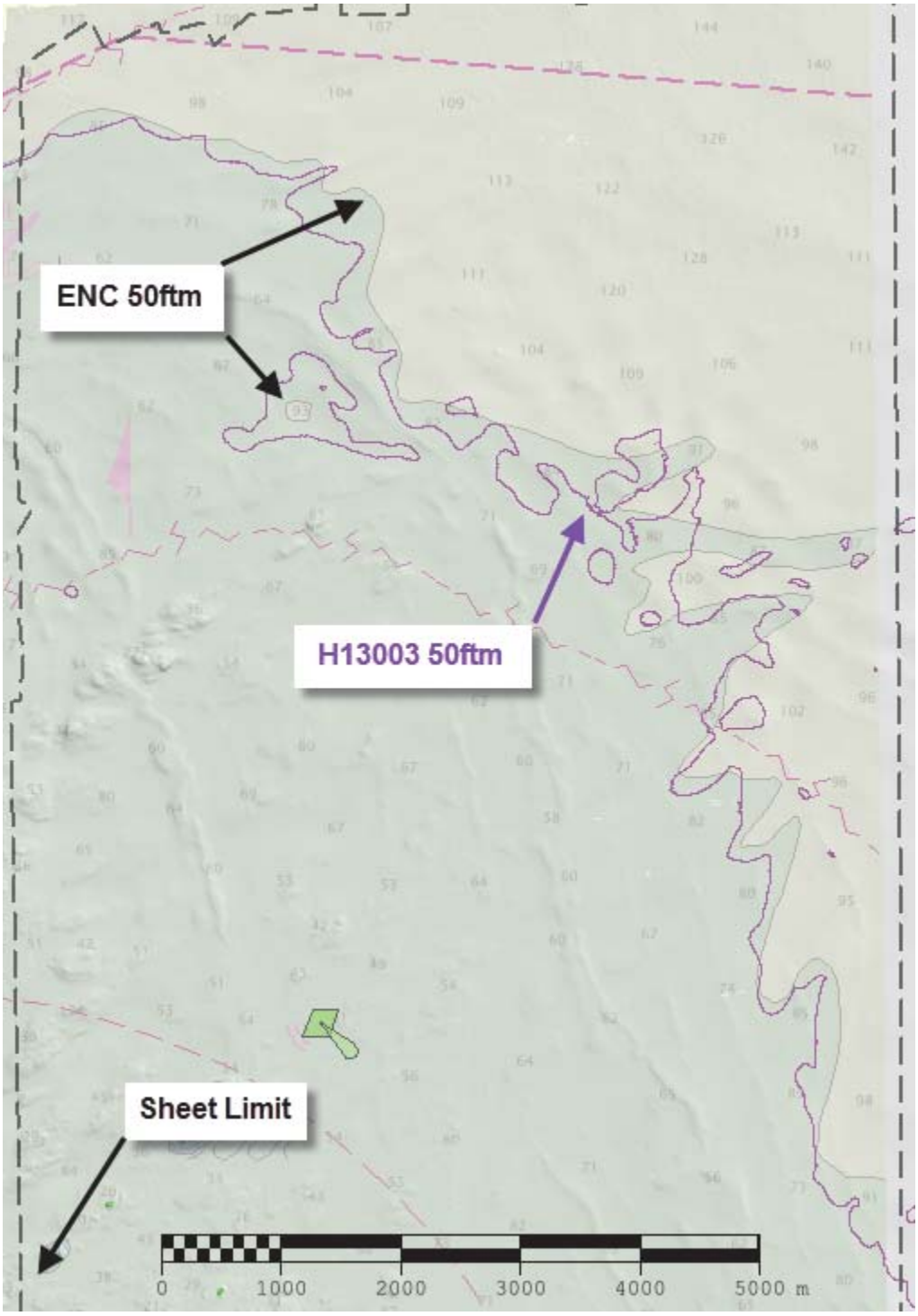


Figure 34: Charted 50ftm depth curves generally agree with survey contours.

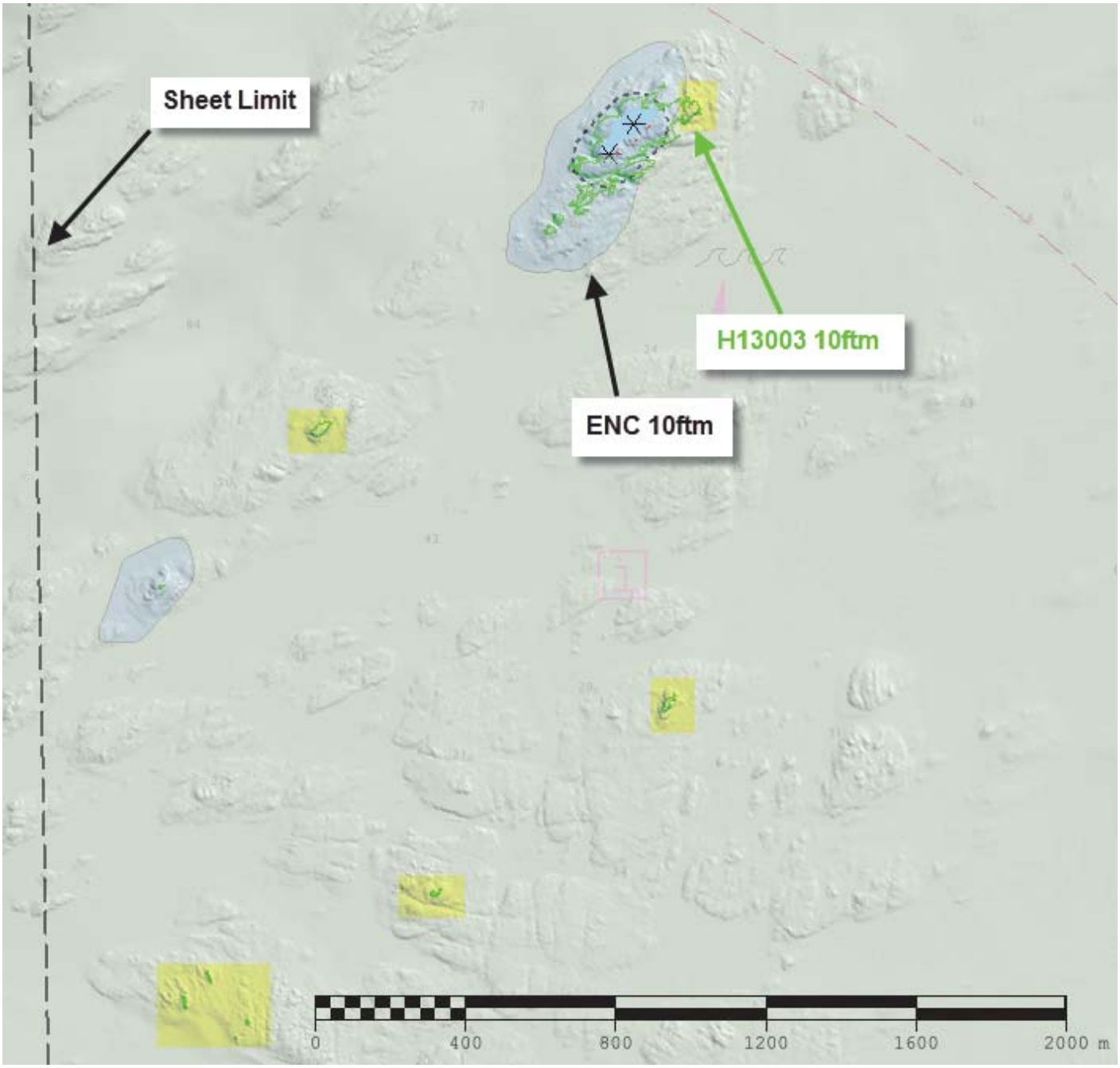


Figure 35: Charted 10ftm depth curves generally do not agree with survey contours (see highlights).

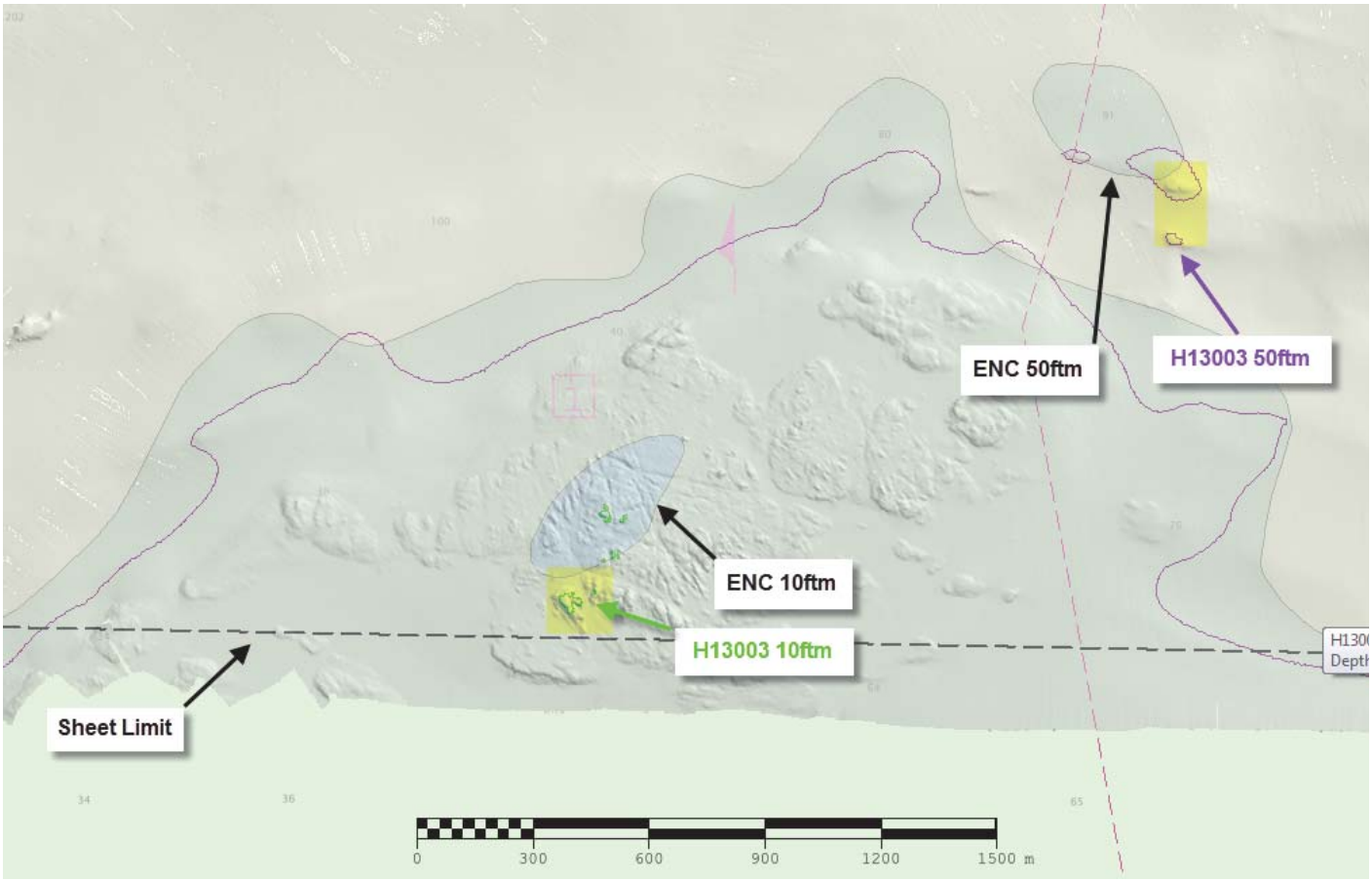


Figure 36: Charted depth curves generally agree with survey contours with 2 exceptions.

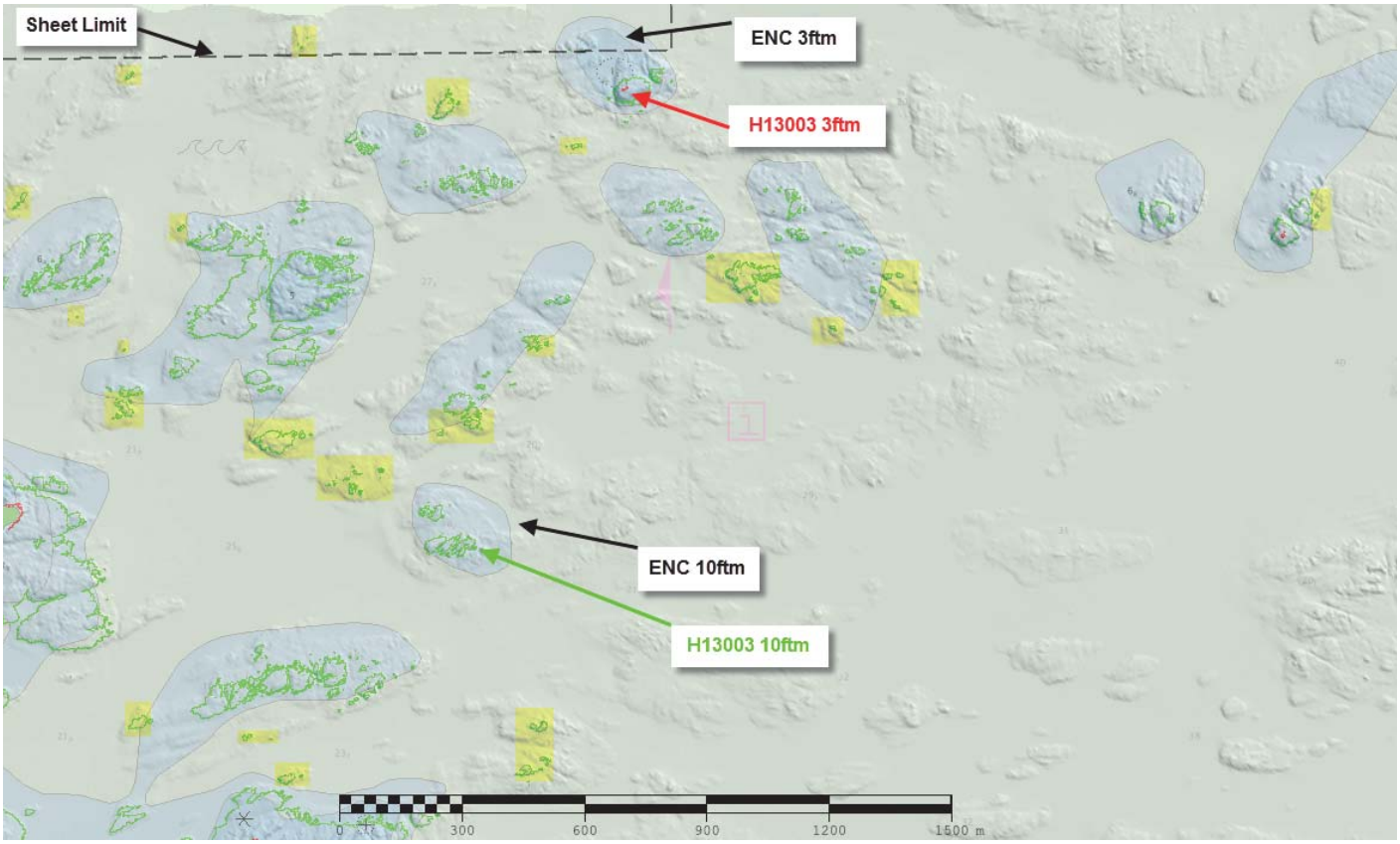


Figure 37: Charted 10ftm depth curves do not agree with survey contours.

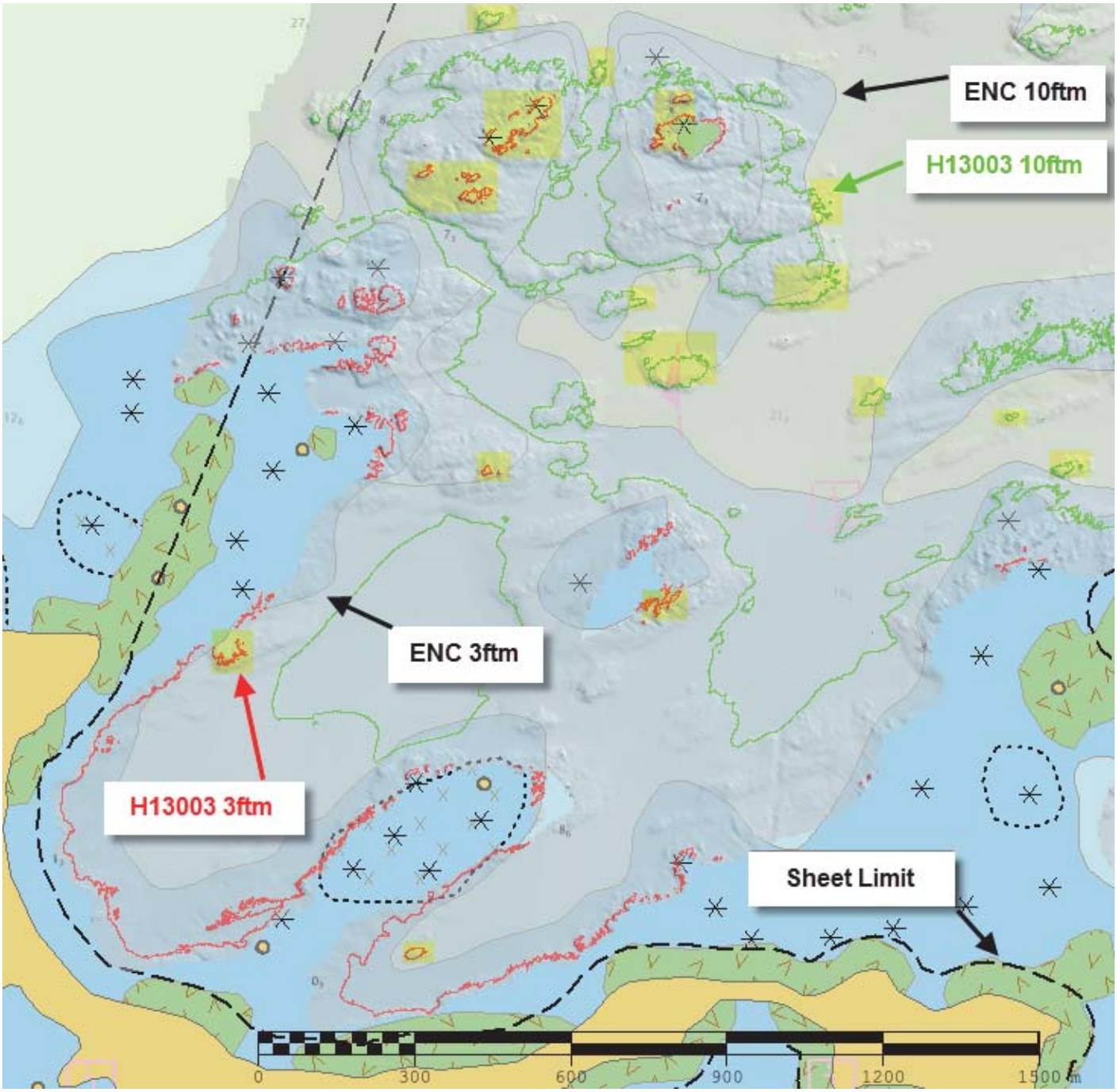


Figure 38: Charted 10ftm depth curves generally agree or are deeper than survey contours. Charted 3ftm depth curves generally agree with survey contours (dangerous exceptions highlighted).

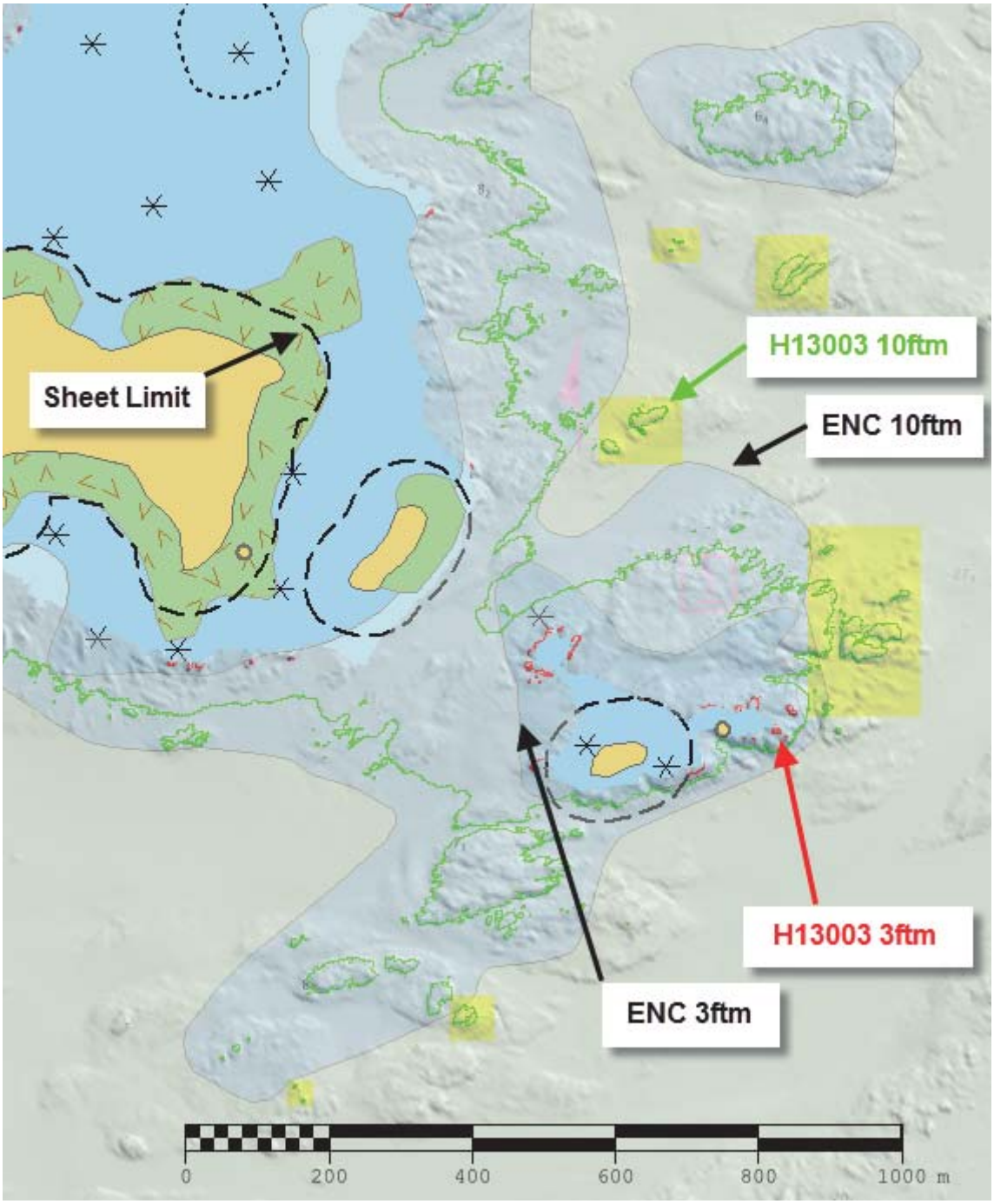


Figure 39: Charted 10ftm depth contours generally agree with survey contours (exceptions highlighted). Charted 3ftm depth curves generally agree with survey contours.

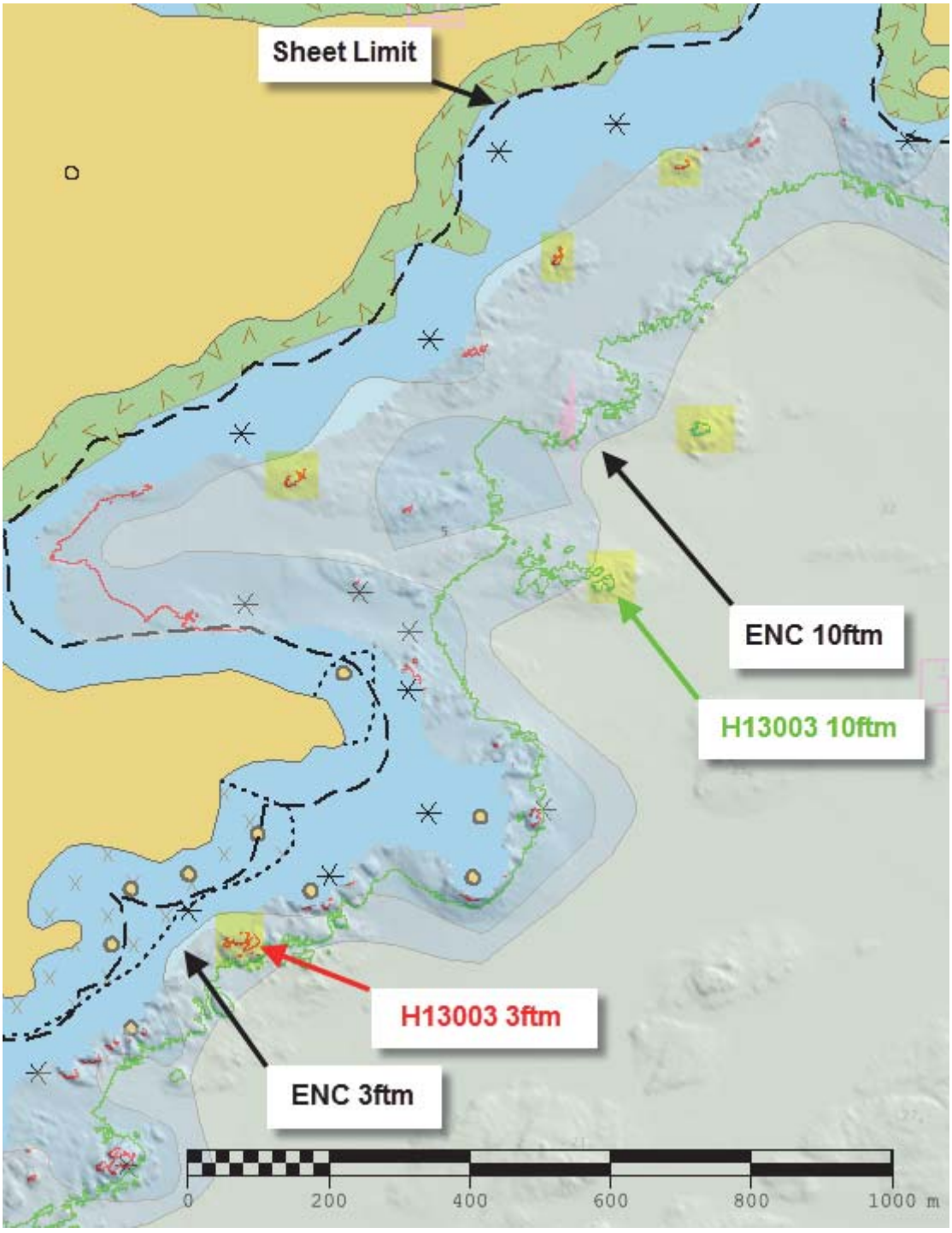


Figure 40: Charted 3 and 10 ftm depth curves generally agree with survey contours (exceptions highlighted). Charted 3ftm depth curve in center of bay poorly represents depth.

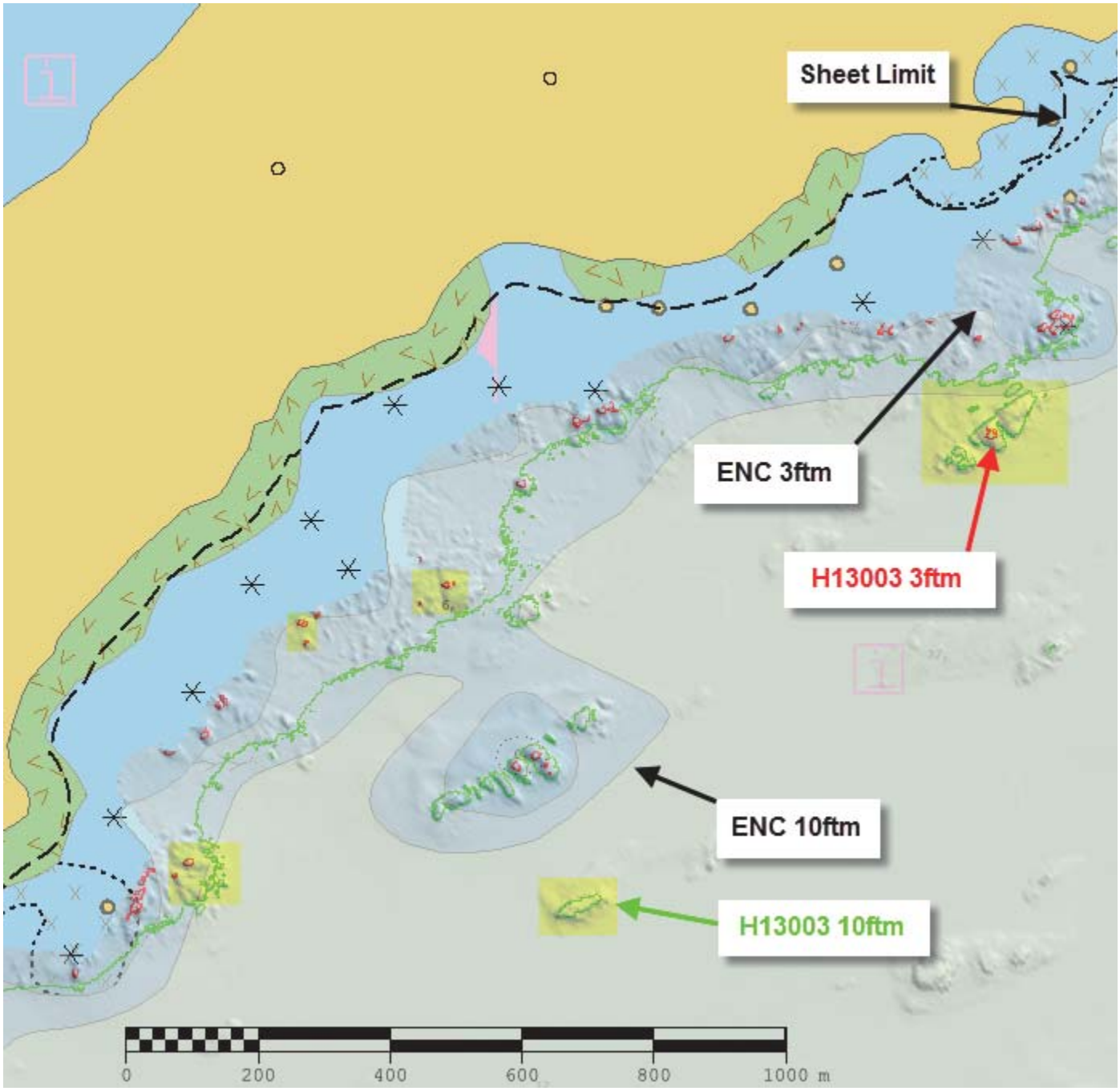


Figure 41: Charted depth curves generally are deeper than survey contours (exceptions highlighted).

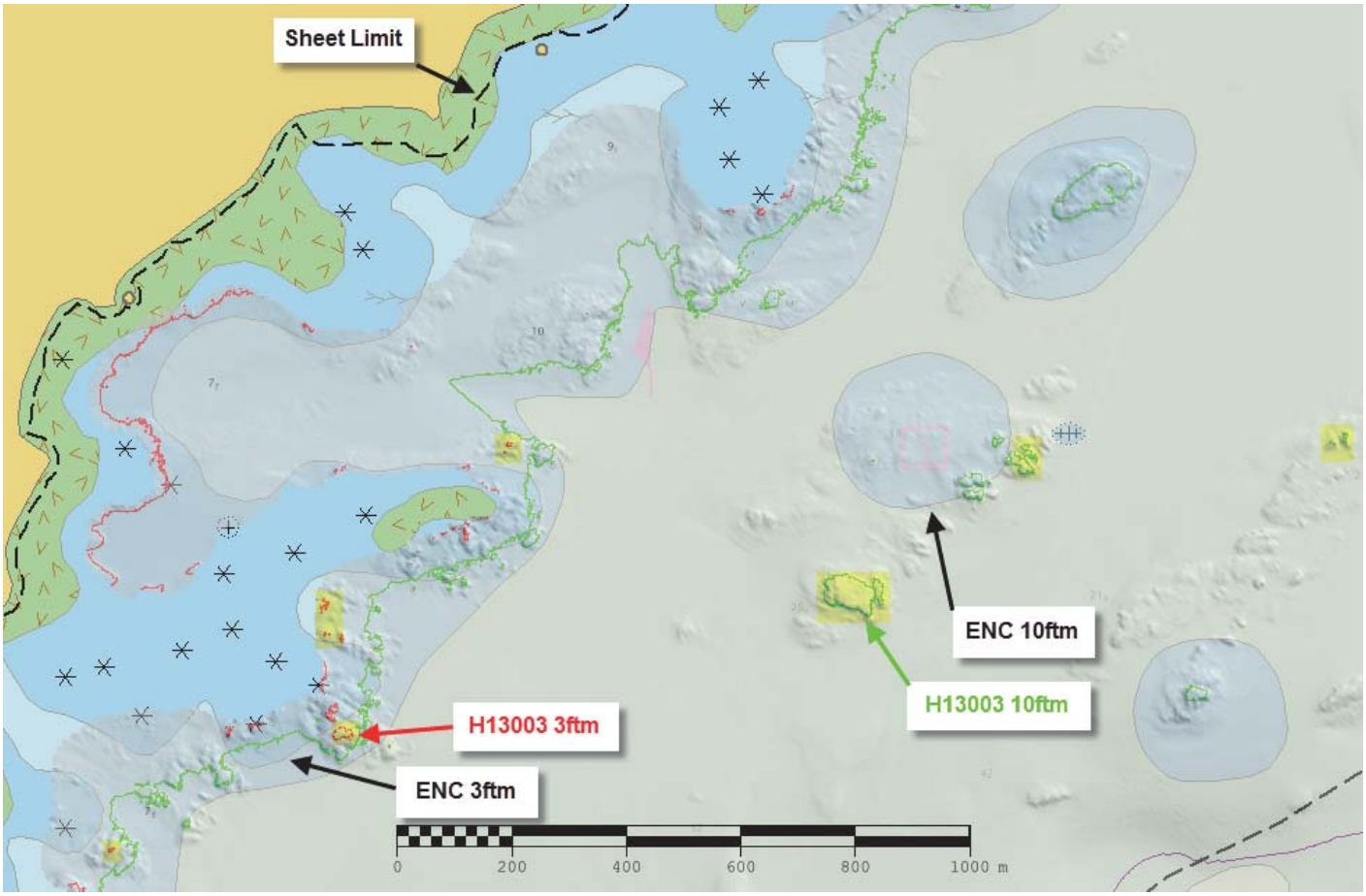


Figure 42: Charted depth curves generally are deeper than survey contours (exceptions highlighted). Charted 10ftm depth curve in center right of image does not accurately represent data.

US3AK5KM

H13003 survey data coincide with sections of ENC US4AK5PM. Most of H13003 can be located within the first ENC discussed, US5AKPM

The very small section that lies on the eastern portion of H13003 generally agrees with abutting ENC with insignificant offsets considering the small scale of US3AK5KM.

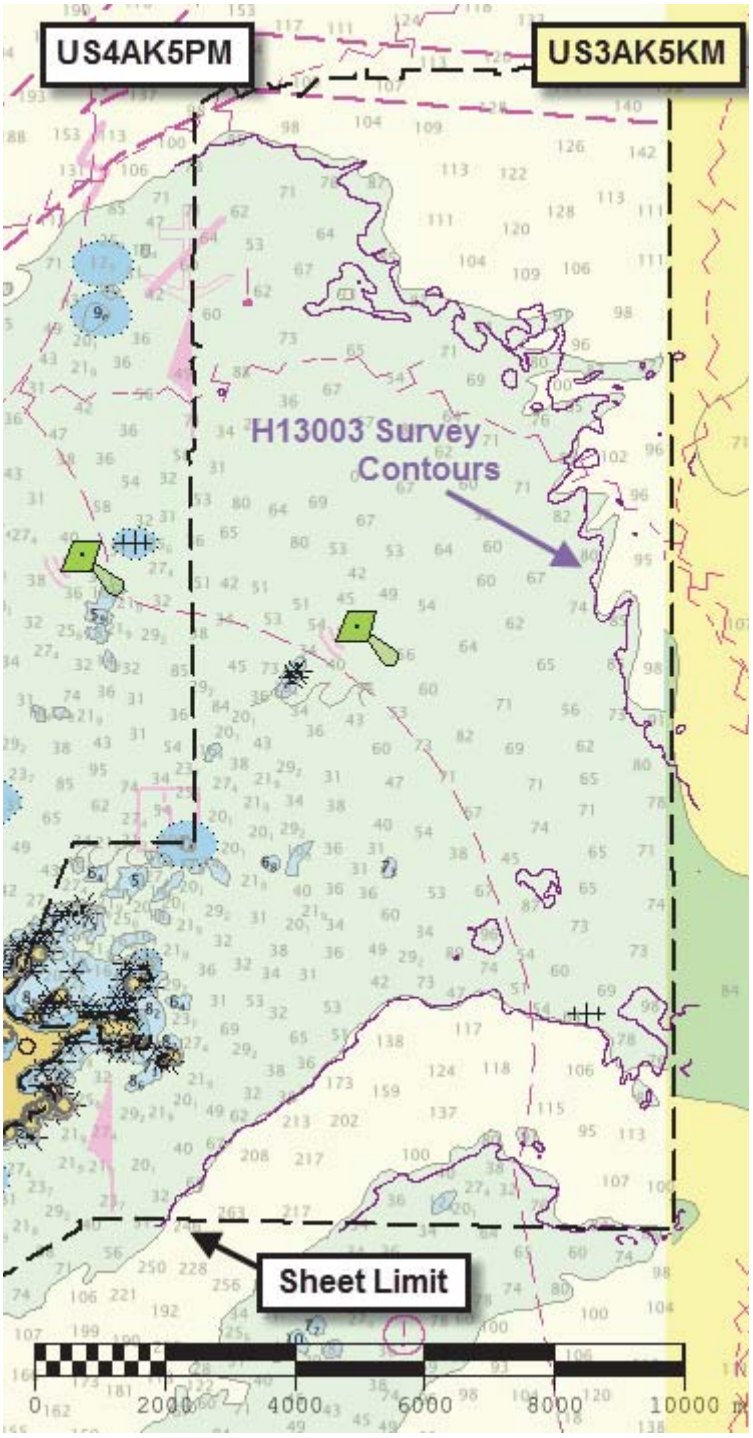


Figure 43: Charted depth curves generally agree with survey contours.

US5AK5EM

H13003 survey data coincide with sections of ENC US5AK5EM. Most of H13003 can be located within the first ENC discussed, US5AKPM.

The small section of US5AK5EM that lies on the southwestern portion of H13003 contains offsets to abutting ENC US3AK5KM.

Charted three and ten fathom depth curves generally agree with survey contours with several exceptions of the charted three fathom depth curve.

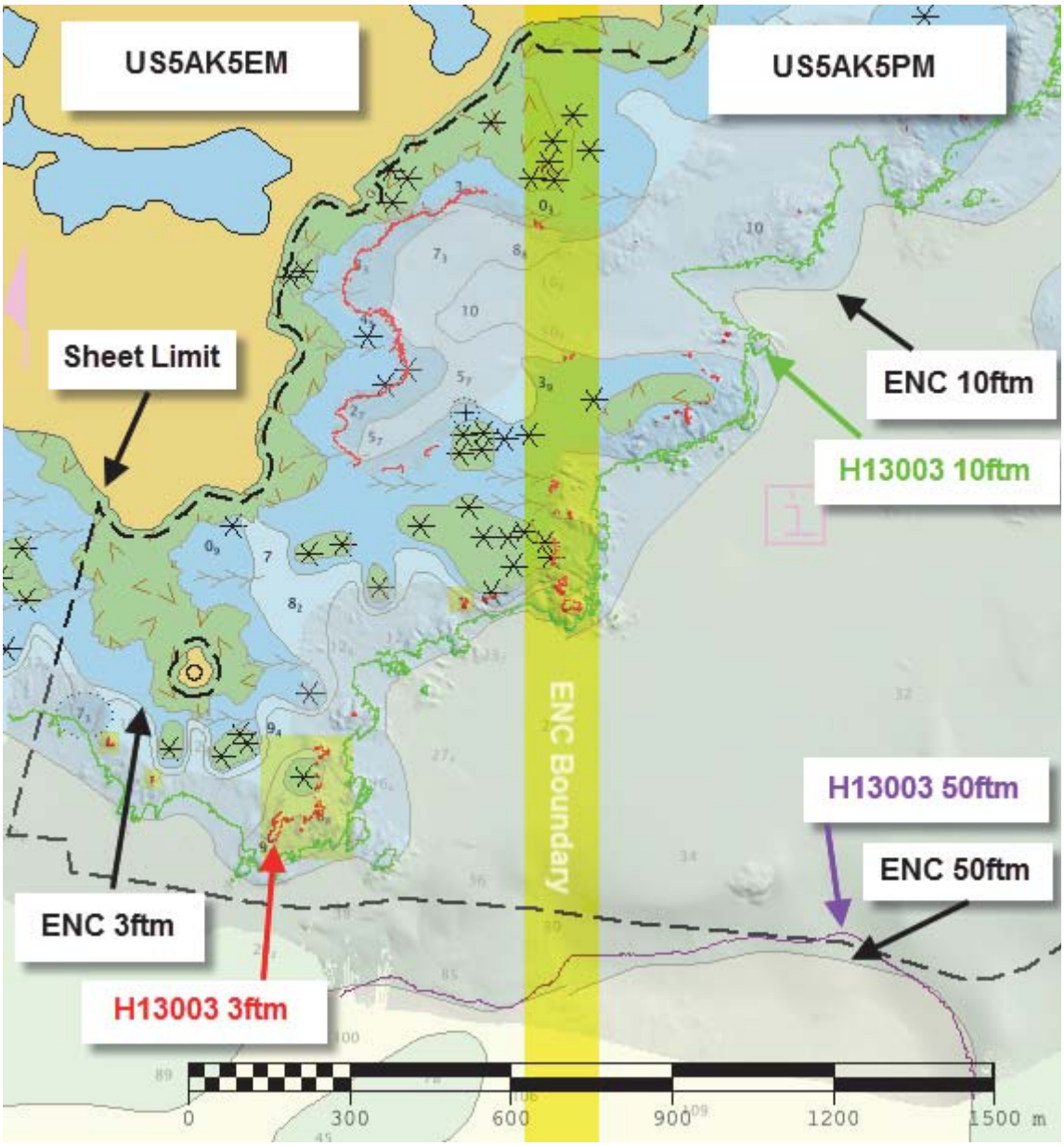


Figure 44: Charted depth curves generally agree with survey contours (exceptions highlighted).

D.1.2 Maritime Boundary Points

No Maritime Boundary Points were assigned for this survey.

D.1.3 Charted Features

There are two charted PA wrecks on H13003 as shown on Figure 45. See Final Feature File for hydrographer's recomendations.

H13003 MBES data do not reveal any wreck for the charted PA wreck near Long Island. See Figure 46

H13003 MBES data do not support a strong hypothesis for the charted PA wreck towards the east side of sheet, but cannot positively disprove the wreck location. The highly unlikely, but possible location is the same as the charted location. See Figures 47 and 48

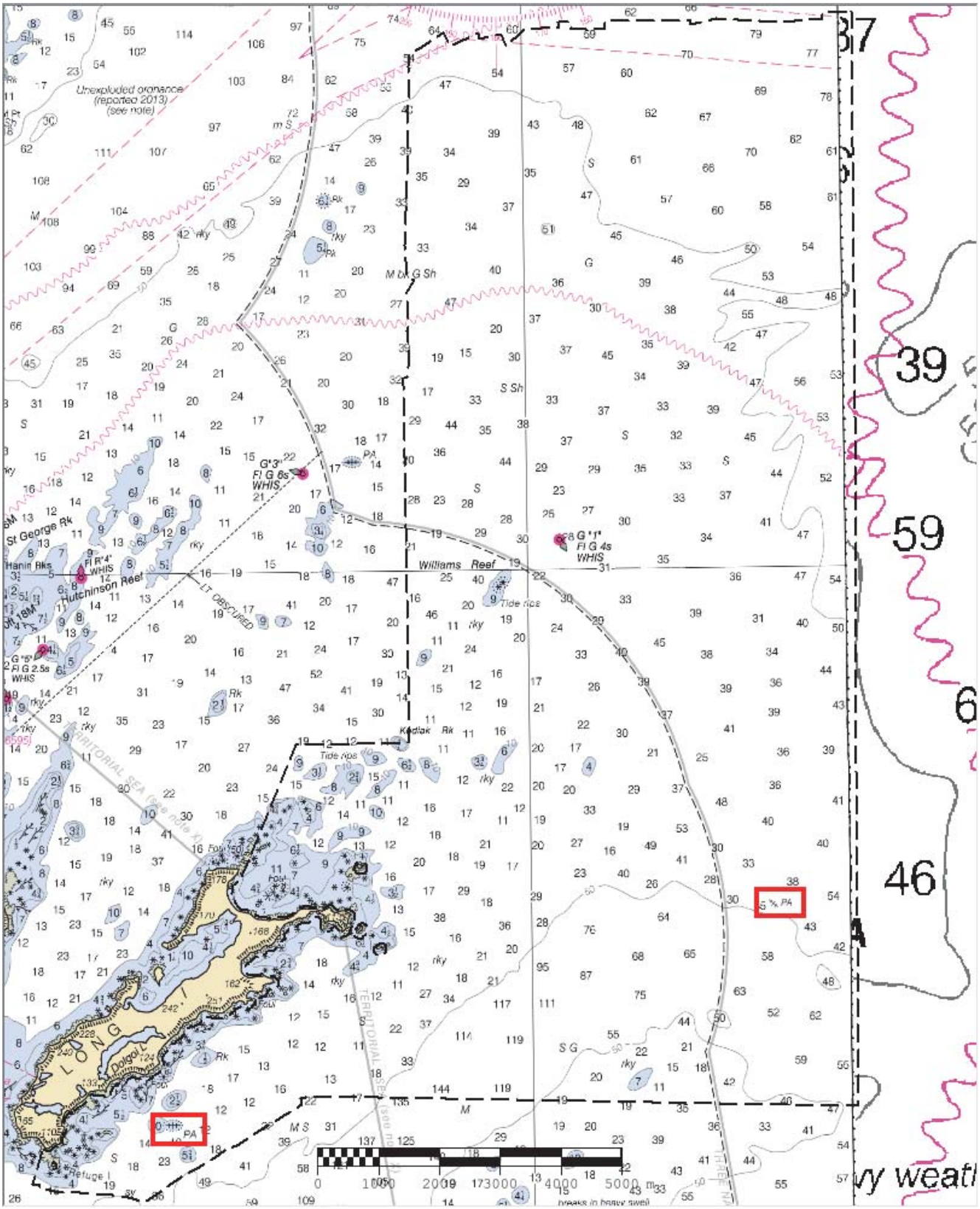


Figure 45: Overview of two PA wrecks for sheet H13003.

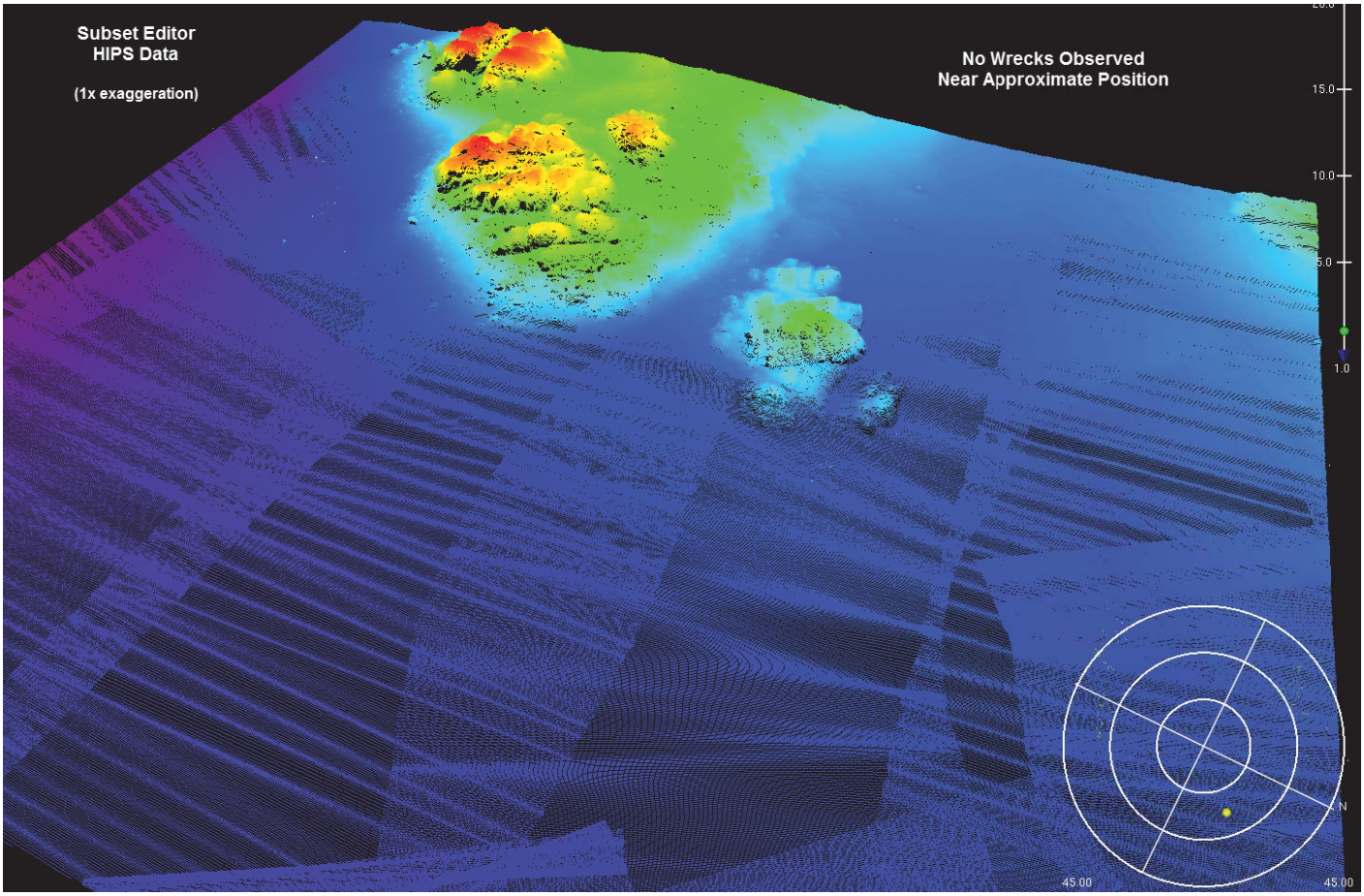


Figure 46: No wreck observed for charted PA wreck near Long Island (HIPS data).

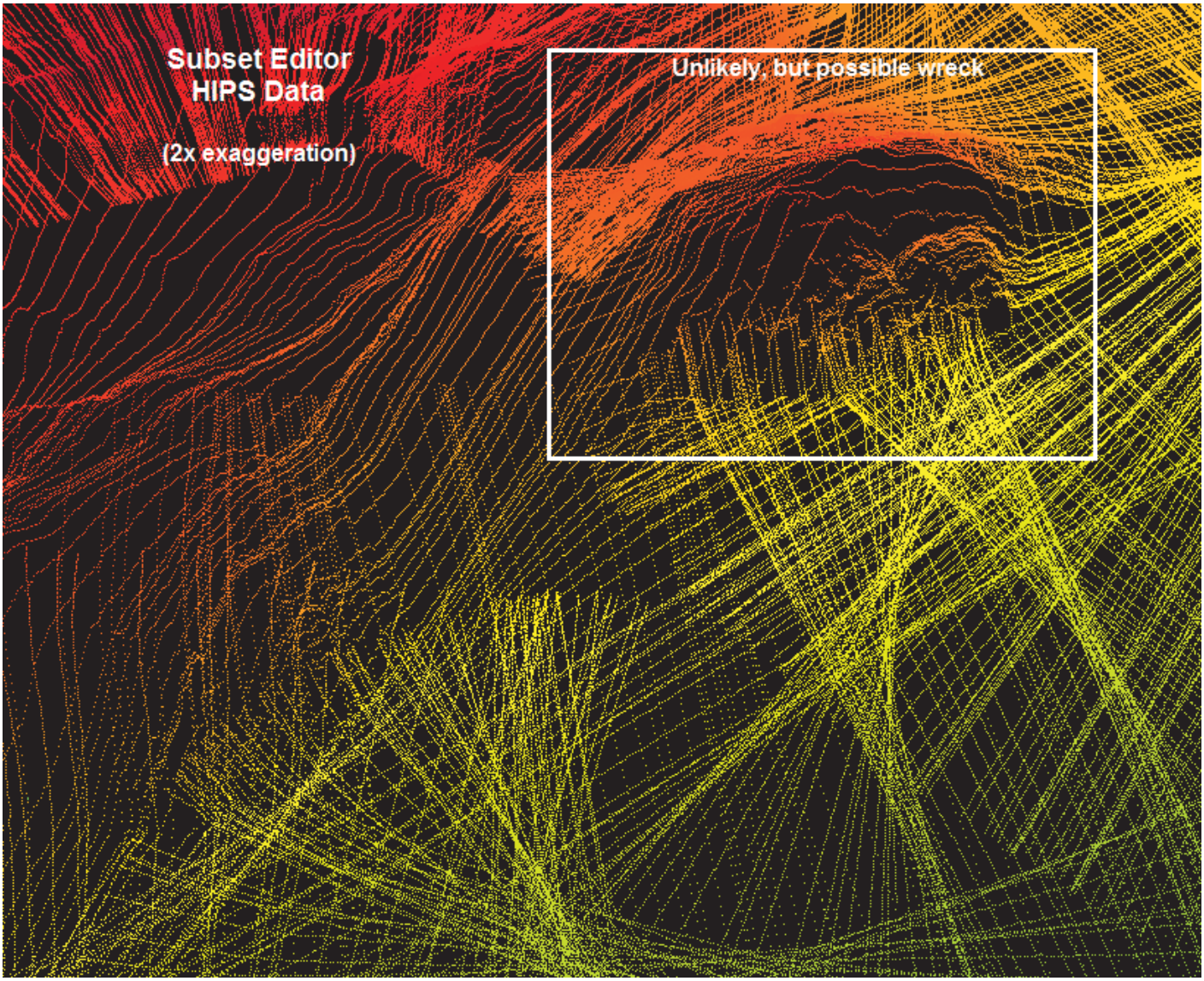


Figure 47: Unlikely, but possible location of charted PA wreck near east side of sheet (HIPS data).

Figure 48: Unlikely, but possible location of charted PA wreck near east side of sheet (Surface view).

D.1.4 Uncharted Features

No new navigationally significant features were detected that were not included in the H13003 Final Feature File or elsewhere in this report.

D.1.5 Shoal and Hazardous Features

Features of navigational significance are discussed in the chart comparison sections above or are included in the H13003 Final Feature File submitted with this report.

D.1.6 Channels

No channels exist for this survey. There are no designated anchorages, precautionary areas, safety fairways, traffic separation schemes, pilot boarding areas, or channel and range lines within the survey limits.

D.1.7 Bottom Samples

Five bottom samples were investigated for this survey; the results are included in the H13003 Final Feature File submitted with this report.

D.2 Additional Results

D.2.1 Shoreline

Limited 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 H13003_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.

D.2.2 Prior Surveys

No prior survey comparisons exist for this survey.

D.2.3 Aids to Navigation

There is one ATON on sheet H13003. The ATON characteristics were listed as G"1" Fl G 4s WHIS 00.4+(03.6). This ATON was observed in the field and appears to be serving its intended purpose.

D.2.4 Overhead Features

No overhead features exist for this survey.

D.2.5 Submarine Features

Two submarine cables were charted in the northern region of H13003. No cables were detectable above sea floor.

D.2.6 Platforms

No platforms exist for this survey.

D.2.7 Ferry Routes and Terminals

No ferry routes or terminals exist for this survey.

D.2.8 Abnormal Seafloor and/or Environmental Conditions

There are no significant features in the H13003 survey area that were 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 Holidays

For data quality control on H13003, Pydro QC Tools 2 was used. This program identified 5 potential holes in the data (holidays). Each holiday flag was investigated. All 5 were rocky or foul areas and not an actual gaps in coverage.

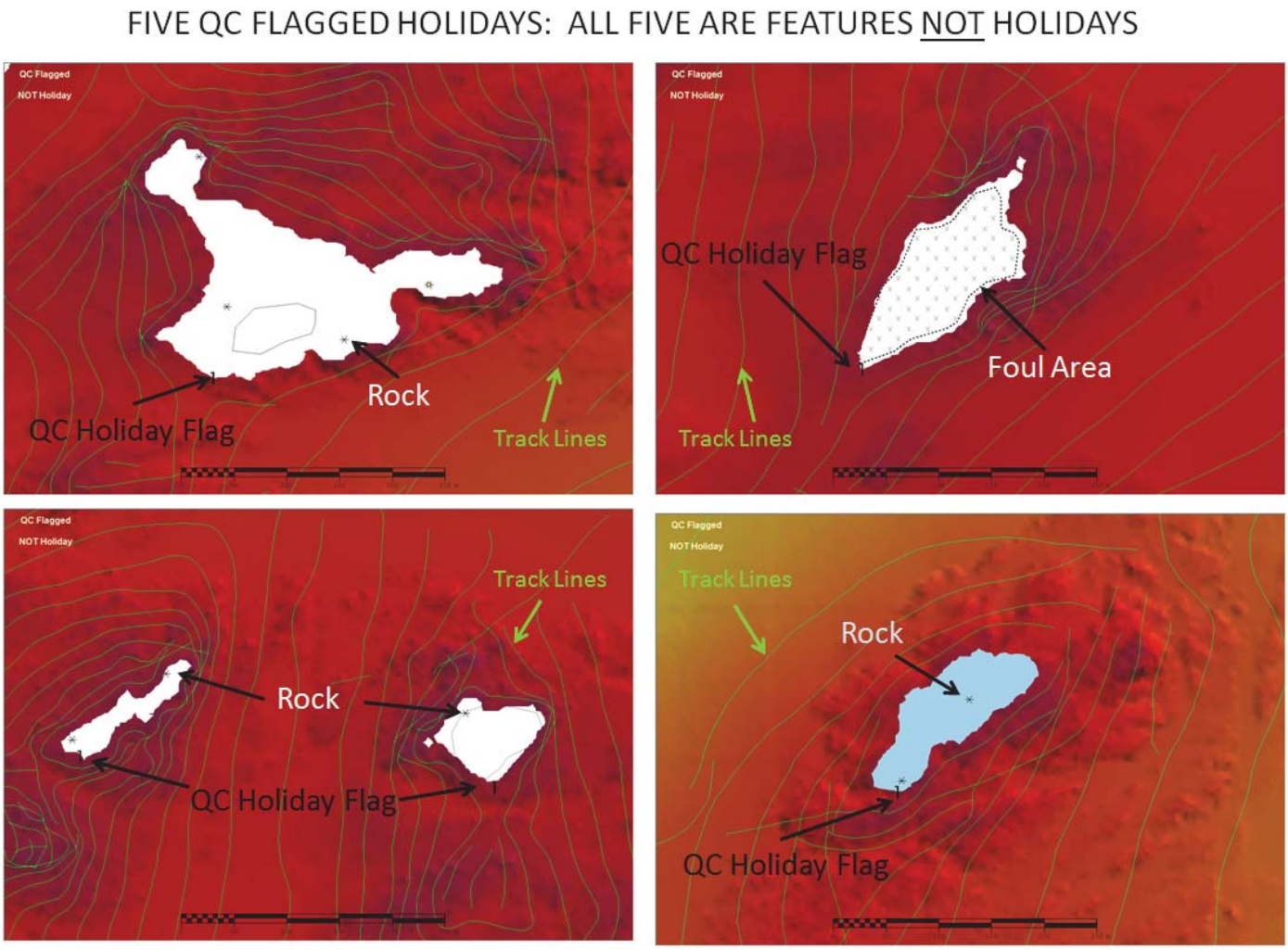


Figure 49: Five H13003 QC Flagged Holidays. None are actual holidays.

D.2.12 Fliers

For data quality control on H13003, Pydro QC Tools 2 was used. The program identified 57 areas where the CUBE surface honored soundings significantly above or below the surrounding grid nodes (fliers). Each flier flag was investigated using the final VR surface and subset editor. All flagged soundings were accurate depictions of the sea floor and did not represent noise, ephemeral vegetation, or sea life. The QC program had difficulty with small gaps of soundings, steep slopes, cliffs, and valleys. The following images are QC flier flag locations including an example of the underlying HIPS data. The images were separated into offshore (north, central, south, and east) and near shore of Long Island from south to north.

D.2.13 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
John J. Lomnicky, CDR/NOAA	Commanding Officer, NOAA Ship Rainier	03/19/2018	Digitally signed by EVANS.BENJAMIN.K.1237217094 Date: 2018.03.19 12:24:22 -07'00'
Scott Broo, LT/NOAA	Field Operations Officer, NOAA Ship Rainier	03/19/2018	BROO.SCOTT.EDWARD.1396599976 2018.03.26 09:27:56 -07'00'
James B. Jacobson	Chief Survey Technician, NOAA Ship Rainier	03/19/2018	JACOBSON.JAMES.BRYAN.1269664017 2018.04.04 13:23:48 -07'00'
Christopher Dunn, ENS/NOAA	Junior Officer, NOAA Ship Rainier	03/19/2018	DUNN.CHRISTOPHER.KYLE.1523730351 Digitally signed by DUNN.CHRISTOPHER.KYLE.1523730351 DN: c=US, o=U.S. Government, ou=DoD, ou=PKI, ou=NOAA, cn=DUNN.CHRISTOPHER.KYLE.1523730351 Date: 2018.03.19 07:56:10 -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	Linear Nautical Miles
MBAB	Multibeam Echosounder Acoustic Backscatter
MCD	Marine Chart Division
MHW	Mean High Water
MLLW	Mean Lower Low Water
NAD 83	North American Datum of 1983
NAIP	National Agriculture and Imagery Program
NALL	Navigable Area Limit Line
NM	Notice to Mariners
NMEA	National Marine Electronics Association
NOAA	National Oceanic and Atmospheric Administration
NOS	National Ocean Service
NRT	Navigation Response Team
NSD	Navigation Services Division
OCS	Office of Coast Survey
OMAO	Office of Marine and Aviation Operations (NOAA)
OPS	Operations Branch
MBES	Multibeam Echosounder
NWLON	National Water Level Observation Network
PDBS	Phase Differencing Bathymetric Sonar
PHB	Pacific Hydrographic Branch
POS/MV	Position and Orientation System for Marine Vessels
PPK	Post Processed Kinematic
PPP	Precise Point Positioning
PPS	Pulse per second

Acronym	Definition
PRF	Project Reference File
PS	Physical Scientist
PST	Physical Science Technician
RNC	Raster Navigational Chart
RTK	Real Time Kinematic
SBES	Singlebeam Echosounder
SBET	Smooth Best Estimate and Trajectory
SNM	Square Nautical Miles
SSS	Side Scan Sonar
SSSAB	Side Scan Sonar Acoustic Backscatter
ST	Survey Technician
SVP	Sound Velocity Profiler
TCARI	Tidal Constituent And Residual Interpolation
TPE	Total Propagated Error
TPU	Topside Processing Unit
USACE	United States Army Corps of Engineers
USCG	United Stated Coast Guard
UTM	Universal Transverse Mercator
XO	Executive Officer
ZDA	Global Positiong System timing message
ZDF	Zone Definition File

Subject: Fwd: Final Tide Notes for OPR-P136-RA-2017, H13003
From: Scott Broo - NOAA Federal <scott.e.broo@noaa.gov>
Date: 10/10/2017 10:45
To: Christopher Dunn - NOAA Federal <christopher.dunn@noaa.gov>, _OMAO MOP ChiefST RAINIER <chiefst.rainier@noaa.gov>

Final tide note for H13003 below/attached.

---------- Forwarded message ----------
From: **Hua Yang - NOAA Affiliate** <hua.yang@noaa.gov>
Date: Tue, Oct 10, 2017 at 9:43 AM
Subject: Final Tide Notes for OPR-P136-RA-2017, H13003
To: _OMAO MOP CO Rainier <co.rainier@noaa.gov>, _OMAO MOP OPS Rainier <ops.rainier@noaa.gov>, _OMAO MOP TIDES RAINIER <tides.rainier@noaa.gov>
Cc: Corey Allen - NOAA Federal <corey.allen@noaa.gov>, Grant Froelich - NOAA Federal <grant.froelich@noaa.gov>, PHB Chief - NOAA Service Account <phb.chief@noaa.gov>, Gerald Hovis - NOAA Federal <gerald.hovis@noaa.gov>, "_NOS.CO-OPS.HPT" <nos.coops.hpt@noaa.gov>

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

DATE: 10/10/2017

MEMORANDUM FOR: CDR Benjamin K Evans
Commanding Officer, NOAA Ship RAINIER

FROM: Gerald Hovis
Chief, Products and Services Branch, N/OPS3

SUBJECT: Delivery of Tide Requirements for Hydrographic Surveys

This is notification that the preliminary TCARI grid is accepted as the final grid for survey project OPR-P136-RA-17, Registry No. H13003 during the time period between June 28 to August 14, 2017. The accepted reference station is Kodiak Island, AK (9457292).

Included with this memo are the Tide Notes in .PDF format, stating that the preliminary grid has been accepted as the final grid.

Best regards,

Hua Yang

Hydrographic Planning Team
NOAA/National Ocean Service
Center for Operational Oceanographic Products and Services
Station 7128
1305 East West Highway, SSMC4
Silver Spring, MD 20910
Office: 240-533-0612
Email: Hua.Yang@noaa.gov
Web: http://tidesandcurrents.noaa.gov/

Hydro Hot List: http://tidesandcurrents.noaa.gov/hydro.shtml

--
Very Respectfully,

Lieutenant Scott E. Broo, NOAA
Operations Officer
NOAA Ship RAINIER
2002 SE Marine Science Drive
Newport, OR 97365

Ship: 541-272-9430
Cell: 248-302-0689

Attachments:

H13003.pdf 596 KB

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

TIDE NOTE FOR HYDROGRAPHIC SURVEY

DATE : October 10, 2017

HYDROGRAPHIC BRANCH: Pacific
HYDROGRAPHIC PROJECT: OPR-P136-RA-2017
HYDROGRAPHIC SHEET: H13003
LOCALITY: William's Reef, Kodiak Island, AK
TIME PERIOD: June 28 - August 14, 2017

TIDE STATION USED: 9457292 Kodiak Island, AK
Lat. 57° 43.8'N Long. 152° 30.8' W
PLANE OF REFERENCE (MEAN LOWER LOW WATER): 0.000 meters
HEIGHT OF HIGH WATER ABOVE PLANE OF REFERENCE: 2.400 meters

REMARKS: RECOMMENDED GRID Please use the TCARI grid "P136RA2017.tc" as the final grid for project OPR-P136-RA-2017, H13003, during the period between June 28 and August 14, 2017.

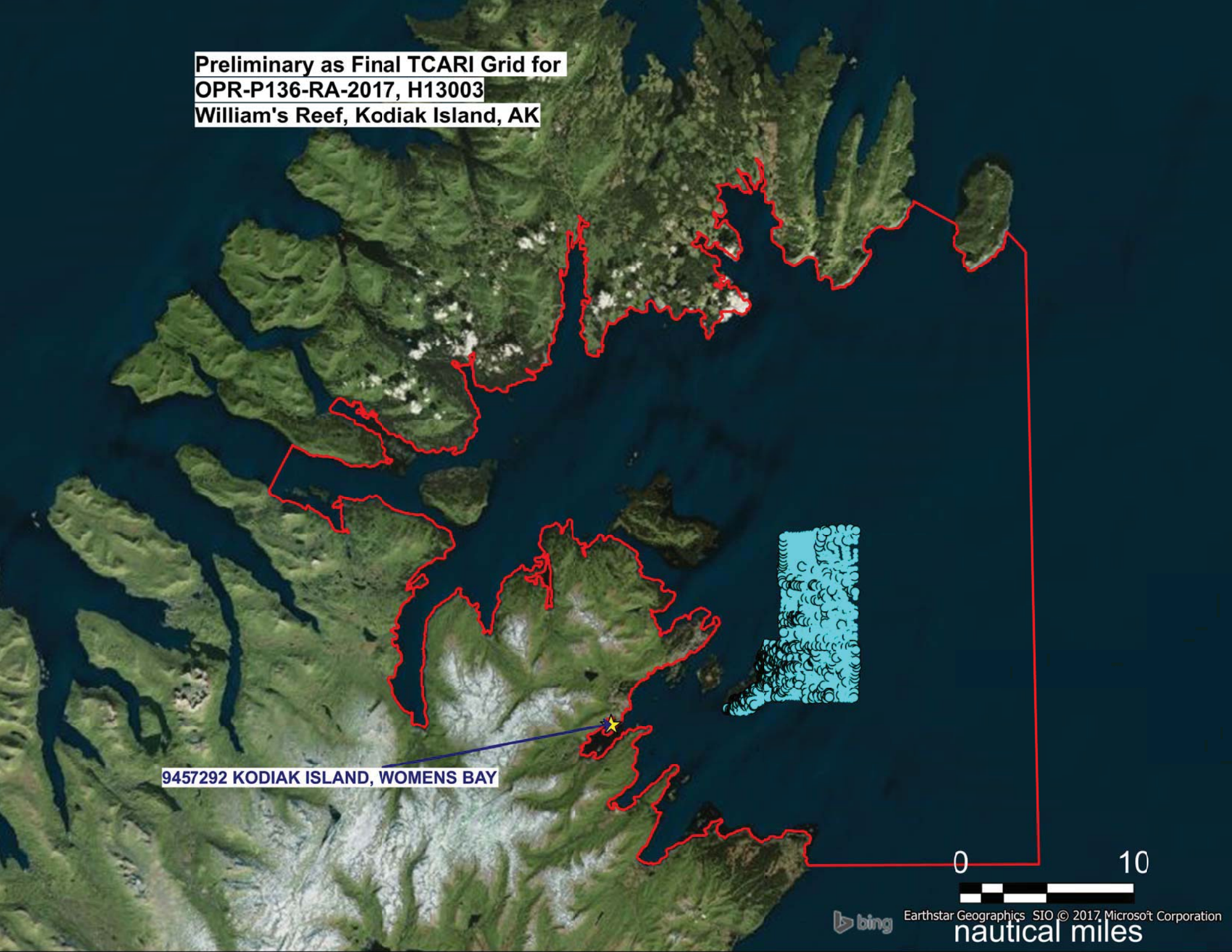
Refer to attachments for zoning information.

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).

HOVIS.GERALD.THOMAS.JR.1365860250

Digitally signed by HOVIS.GERALD.THOMAS.JR.1365860250
Date: 2017.10.10 12:34:28 -04'00'

CHIEF, PRODUCTS AND SERVICES BRANCH


Preliminary as Final TCARI Grid for
OPR-P136-RA-2017, H13003
William's Reef, Kodiak Island, AK
9457292 KODIAK ISLAND, WOMENS BAY
0
10
nautical miles
bing
Earthstar Geographics SIO © 2017 Microsoft Corporation

Christopher Dunn - NOAA Federal <christopher.dunn@noaa.gov>

PMVD Uncertainty Value

4 messages

RA OPS <ops.rainier@noaa.gov> Wed, Jan 3, 2018 at 5:21 PM
To: jack.riley@noaa.gov
Cc: christopher.dunn@noaa.gov, _OMAO MOP ChiefST RAINIER <chiefst.rainier@noaa.gov>

Hi Jack,

Scott Broo here. I'm writing to inquire about the uncertainty value for a PMVD model we're using for our North Coast of Kodiak project. Specifically, the grid is "OPR-P136-RA-2017_PMVD_EPSG6334_NAD83-MLLWxGeoid16B". We have determined that our ERZT separation model for a portion of this project is inferior to the PMVD and have chosen to use the latter to reduce our data to the ellipsoid. However, we don't seem to be able to find the uncertainty value associated with this PMVD grid. Since we need it as an input for calculating TPU, as you know, I'm reaching out for some assistance.

Our more recent Channel Islands project utilized VDATUM, contained this information in the metadata. Where may I find this information for a PMVD grid?

Thank you,

Scott

Jack Riley - NOAA Federal <jack.riley@noaa.gov> Thu, Jan 4, 2018 at 1:36 PM
To: RA OPS <ops.rainier@noaa.gov>
Cc: christopher.dunn@noaa.gov, _OMAO MOP ChiefST RAINIER <chiefst.rainier@noaa.gov>

Hi Scott,

You need to estimate one using stats from the comparison of PMVD - ERZT, along with a stat derived from the zoned tides model. I worked with both FA (Bart) & RA (Steve) to develop a procedure for that which they each documented to some extent. I'll summarize that again on my next email to you; sorry for the delayed response -- had a couple of other things in the way. I have to head out of the office at the moment, so I'll follow-up maybe later tonight or first thing tomorrow.

Jack
240-847-8271
[Quoted text hidden]

Jack Riley - NOAA Federal <jack.riley@noaa.gov> Fri, Jan 5, 2018 at 10:15 AM
To: RA OPS <ops.rainier@noaa.gov>
Cc: christopher.dunn@noaa.gov, _OMAO MOP ChiefST RAINIER <chiefst.rainier@noaa.gov>

Hi Scott,

Here's a summary on estimating PMVD SEP uncertainty using the 1-km ERZT SEP:

uncertainty of PMVD SEP = sqrt(***variance of PMVD SEP***)

variance of PMVD SEP **= {stdev of PMVD SEP - ERZT SEP}^2 -minus- {stderr of mean ERZT SEP}^2**

{stdev of PMVD SEP - ERZT SEP}^2 = just the standard deviation of the Diff layer, squared
Use BASE Editor, Tools -> Surfaces: Difference, then Compute Statistics on the resulting Diff layer: Std_dev value squared

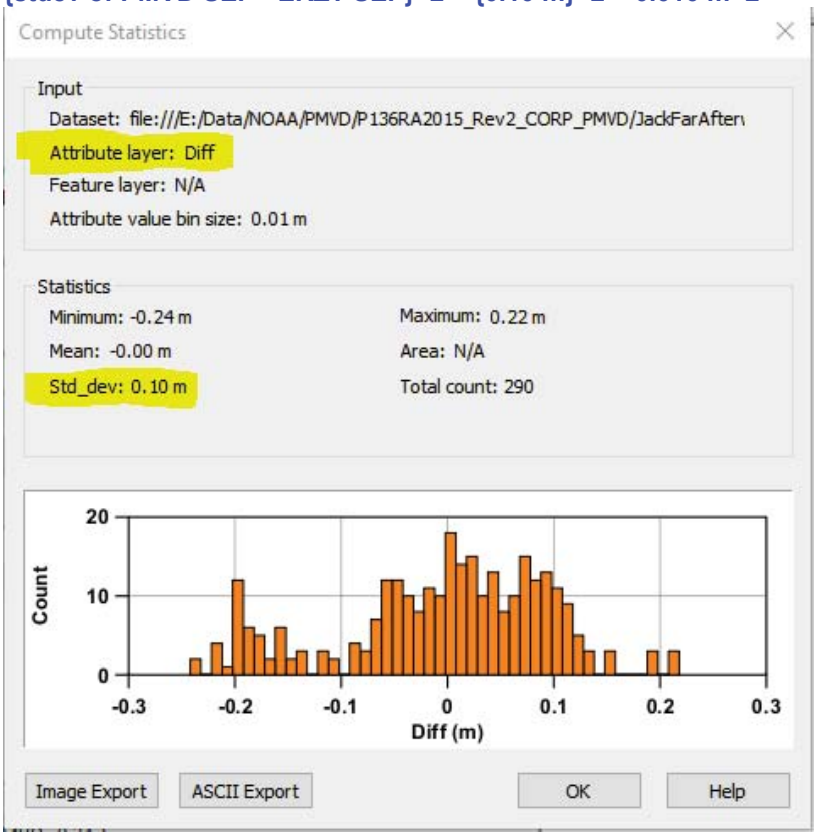
{stderr of mean ERZT SEP}^2 = (mean of 1-km ERZT Std_Dev layer / sqrt(survey linear km / # nodes in 1-km ERZT))^2
In BASE Editor, Compute Statistics on the 1-km ERZT Std_Dev layer: Mean value; also, # nodes from Total count
Survey linear km per however you do it for DR

--NOTE: It's important to make sure you use the 1-km ERZT SEP

Example Calculation -- let me know if you have any follow-up questions:

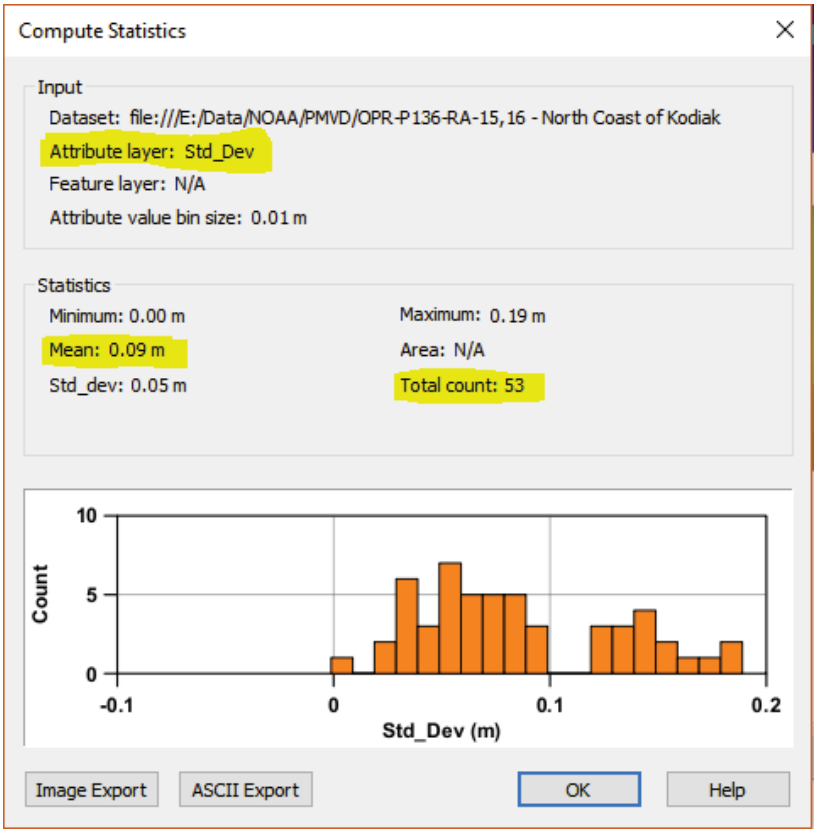
uncertainty of PMVD SEP = sqrt(**0.010 m^2 - 0.0011 m^2**) = 0.094 m ~ 9 cm
-where:

{stdev of PMVD SEP - ERZT SEP}^2 = {0.10 m}^2 = 0.010 m^2



Note that the PMVD SEP should be unbiased
In this example, this is demonstrated by the fact that the PMVD-ERZT Diff Mean is 0.00 (note in screenshot above)
PMVD SEP may be de-biased to comply with the ERZT SEP using BASE Editor, Tools -> Surfaces: Vertical Shift
(and you would use the de-biased one for everything going forward)

{stderr of mean ERZT SEP}^2 = {(0.09 m) / sqrt(385 / 53)}^2 = {0.09 m / 2.7}^2 = 0.0011 m^2
{(mean of 1-km ERZT Std_Dev layer) / sqrt(survey linear km / # nodes in 1-km ERZT)}^2
--and say LNM = 208 nm = 385 km for this particular survey



[Quoted text hidden]

Scott Broo - NOAA Federal <scott.e.broo@noaa.gov> Sat, Jan 6, 2018 at 8:01 PM
To: Jack Riley - NOAA Federal <jack.riley@noaa.gov>
Cc: RA OPS <ops.rainier@noaa.gov>, Christopher Dunn - NOAA Federal <christopher.dunn@noaa.gov>, _OMAO MOP ChiefST RAINIER <chiefst.rainier@noaa.gov>

Jack,

Thank you very much. I vaguely recall this now. Your help is greatly appreciated.

CST, when ENS Dunn returns to Newport for the week of 1/15, do you mind working with him on this? When I return from travel on Jan 21, I'll be Acting XO until CO returns in mid-February, and I don't expect to be able to get to this in a timely manner.

Thanks,

Scott
[Quoted text hidden]
--
Very Respectfully,

Lieutenant Scott E. Broo, NOAA
Operations Officer
NOAA Ship RAINIER
2002 SE Marine Science Drive
Newport, OR 97365

Ship: 541-272-9430
Cell: 248-302-0689

Subject: DTON Report for H13003 - OPR-P136-RA-17 (North Coast of Kodiak)
From: Scott Broo - NOAA Federal <scott.e.broo@noaa.gov>
Date: 11/14/2017 23:12
To: OCS NDB - NOAA Service Account <ocs.ndb@noaa.gov>, Corey Allen - NOAA Federal <corey.allen@noaa.gov>
CC: _OMAO MOP CO Rainier <co.rainier@noaa.gov>, _OMAO MOP ChiefST RAINIER <chiefst.rainier@noaa.gov>, Christopher Dunn - NOAA Federal <christopher.dunn@noaa.gov>, Bart Buesseler <bart.o.buesseler@noaa.gov>, LT Steve Loy <ops.rainier@noaa.gov>

Good evening,

RA has identified several DTONs east and north of Long Island in Chiniak Bay (Kodiak). Please see the attached DTON Report for sheet H13003 (Williams Reef) on project OPR-P136-RA-17, and let me know if you have any questions.

Regards,

LT Broo

--
Very Respectfully,

Lieutenant Scott E. Broo, NOAA
Operations Officer
NOAA Ship RAINIER
2002 SE Marine Science Drive
Newport, OR 97365

Ship: 541-272-9430
Cell: 248-302-0689

Attachments:

H13003_DTON_Report.zip	3.0 MB

H13003 Danger to Navigation Report

Registry Number: H13003
State: Alaska
Locality: Kodiak Island, AK
Sub-locality: Williams Reef
Project Number: OPR-P136-RA-17
Survey Dates: 20170628 - 20170814

Charts Affected

Number	Edition	Date	Scale (RNC)	RNC Correction(s)*
16594	13th	04/04/1998	1:78,900 (16594_1)	[L]NTM: ?
16593	11th	02/01/2003	1:80,000 (16593_1)	[L]NTM: ?
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

No.	Feature Type	Survey Depth	Survey Latitude	Survey Longitude	AWOIS Item
1.1	Shoal	1.61 m	57° 44' 49.6" N	152° 17' 16.4" W	---
1.2	Shoal	6.17 m	57° 44' 56.5" N	152° 16' 21.6" W	---
1.3	Shoal	3.80 m	57° 45' 06.0" N	152° 16' 58.9" W	---
1.4	Shoal	1.96 m	57° 46' 41.7" N	152° 12' 17.7" W	---
1.5	Shoal	2.24 m	57° 47' 28.6" N	152° 13' 45.3" W	---
1.6	Shoal	2.26 m	57° 47' 32.2" N	152° 14' 06.4" W	---
1.7	Shoal	1.64 m	57° 47' 49.4" N	152° 14' 07.7" W	---
1.8	Shoal	4.14 m	57° 48' 14.0" N	152° 10' 30.6" W	---

1 - Dangers To Navigation

1.1) Profile/Beam 90/393 / 2802_2017__2192225

DANGER TO NAVIGATION

Survey Summary

Survey Position:	57° 44' 49.6" N, 152° 17' 16.4" W
Least Depth:	1.61 m (= 5.30 ft = 0.883 fm = 0 fm 5.30 ft)
TPU (±1.96σ):	**THU (TPEh)** ±0.070 m ; **TVU (TPEv)** ±0.084 m
Timestamp:	2017-219.22:26:00.173 (08/07/2017)
Survey Line:	h13003 / 2802_reson7125_hf_512 / 2017-219 / 2802_2017__2192225
Profile/Beam:	90/393
Charts Affected:	16594_1, 16593_1, 16580_1, 16013_1, 531_1, 500_1, 530_1, 50_1

Remarks:

A 0.83 fathom DTON is located between 5 and 10 fathom contours.

Feature Correlation

Source	Feature	Range	Azimuth	Status
2802_2017__2192225	90/393	0.00	000.0	Primary

Hydrographer Recommendations

Update chart with 0.83 fathom depth at 57º44'49.6082"N, 152º17'16.4045"W

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

1fm (16594_1, 16593_1, 16580_1, 16013_1, 530_1)

0fm 5ft (531_1)

1.6m (500_1, 50_1)

S-57 Data

Geo object 1:	Sounding (SOUNDG)
Attributes:	QUASOU - 6:least depth known
	SORDAT - 20170814
	SORIND - US,US,graph,H13003
	TECSOU - 3:found by multi-beam

Feature Images

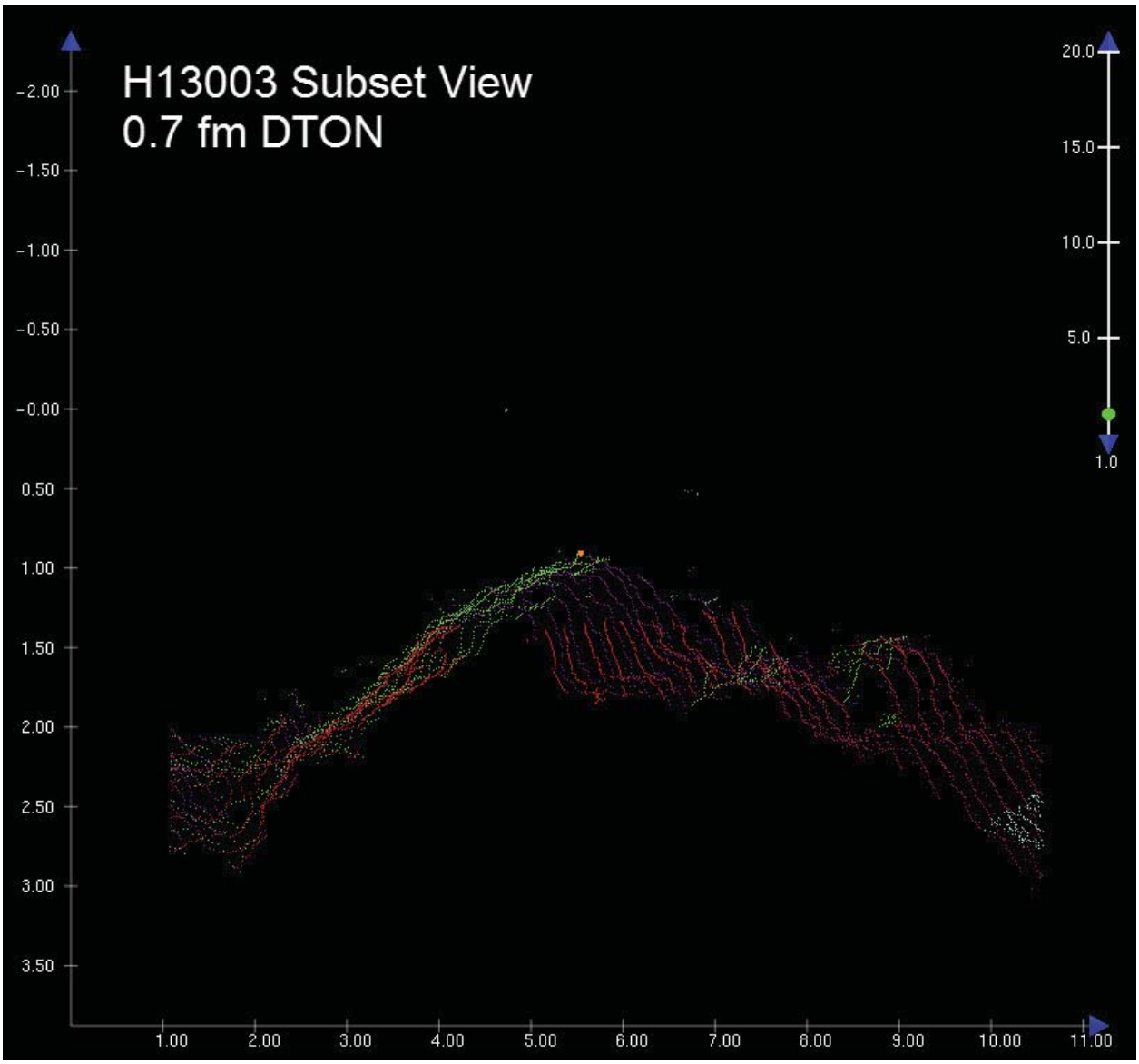


Figure 1.1.1

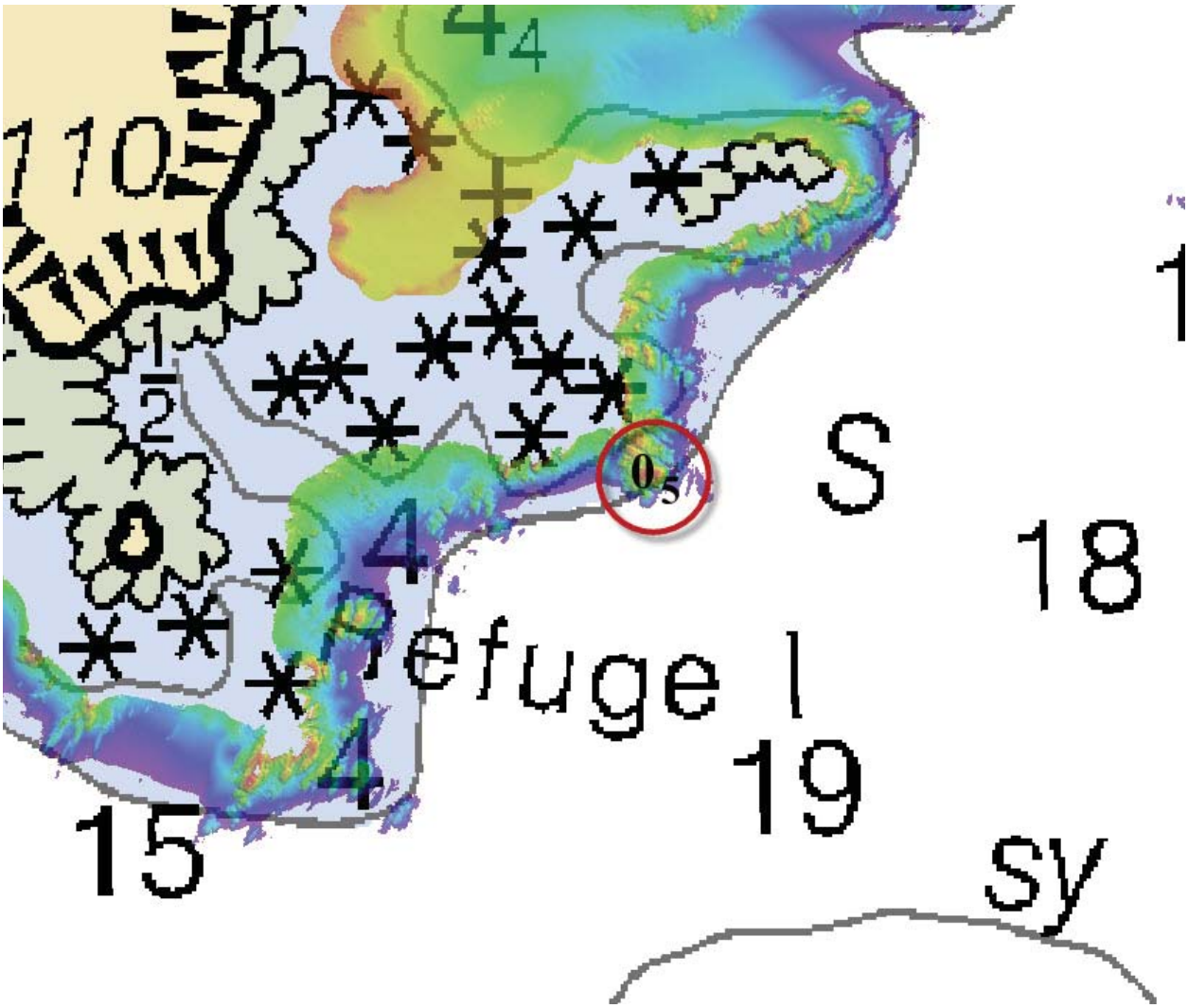


Figure 1.1.2

1.2) Profile/Beam 691/36 / 2804_2017__2082254

DANGER TO NAVIGATION

Survey Summary

Survey Position:	57° 44' 56.5" N, 152° 16' 21.6" W
Least Depth:	6.17 m (= 20.25 ft = 3.375 fm = 3 fm 2.25 ft)
TPU (±1.96σ):	**THU (TPEh)** ±0.128 m ; **TVU (TPEv)** ±0.098 m
Timestamp:	2017-208.22:56:05.534 (07/27/2017)
Survey Line:	h13003 / 2804_reson7125_hf_512 / 2017-208 / 2804_2017__2082254
Profile/Beam:	691/36
Charts Affected:	16594_1, 16593_1, 16580_1, 16013_1, 531_1, 500_1, 530_1, 50_1

Remarks:

A 3.4 fathom DTON is located offshore near a 14 fathom sounding.

Feature Correlation

Source	Feature	Range	Azimuth	Status
2804_2017__2082254	691/36	0.00	000.0	Primary

Hydrographer Recommendations

Update chart with 3.4 fathom depth at 57º44'56.5387"N, 152º16'21.6150"W

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

3 ¼fm (16594_1, 16593_1, 16580_1, 16013_1, 530_1)

3fm 2ft (531_1)

6.2m (500_1, 50_1)

S-57 Data

Geo object 1:	Sounding (SOUNDG)
Attributes:	QUASOU - 6:least depth known
	SORDAT - 20170814
	SORIND - US,US,graph,H13003
	TECSOU - 3:found by multi-beam

Feature Images

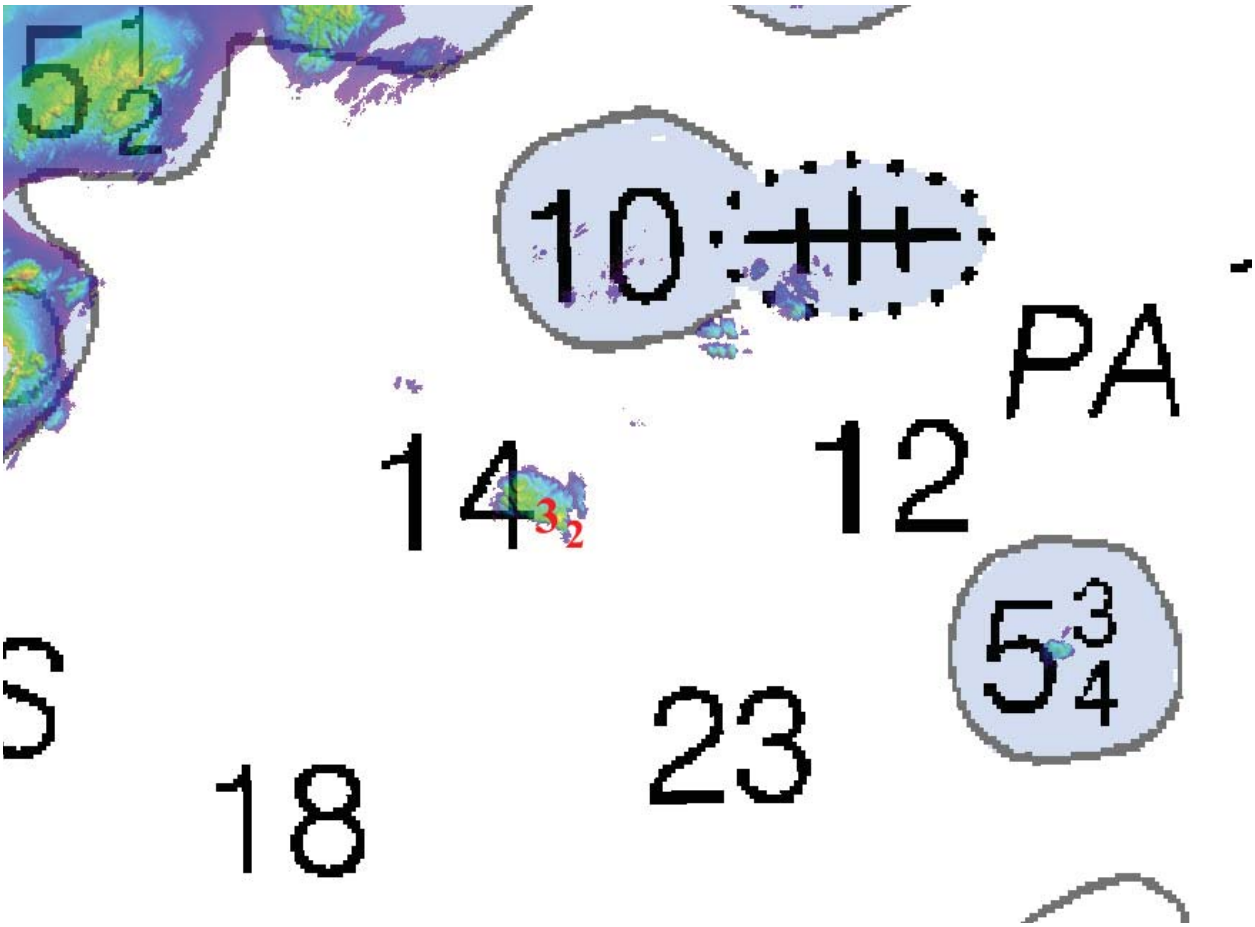


Figure 1.2.1

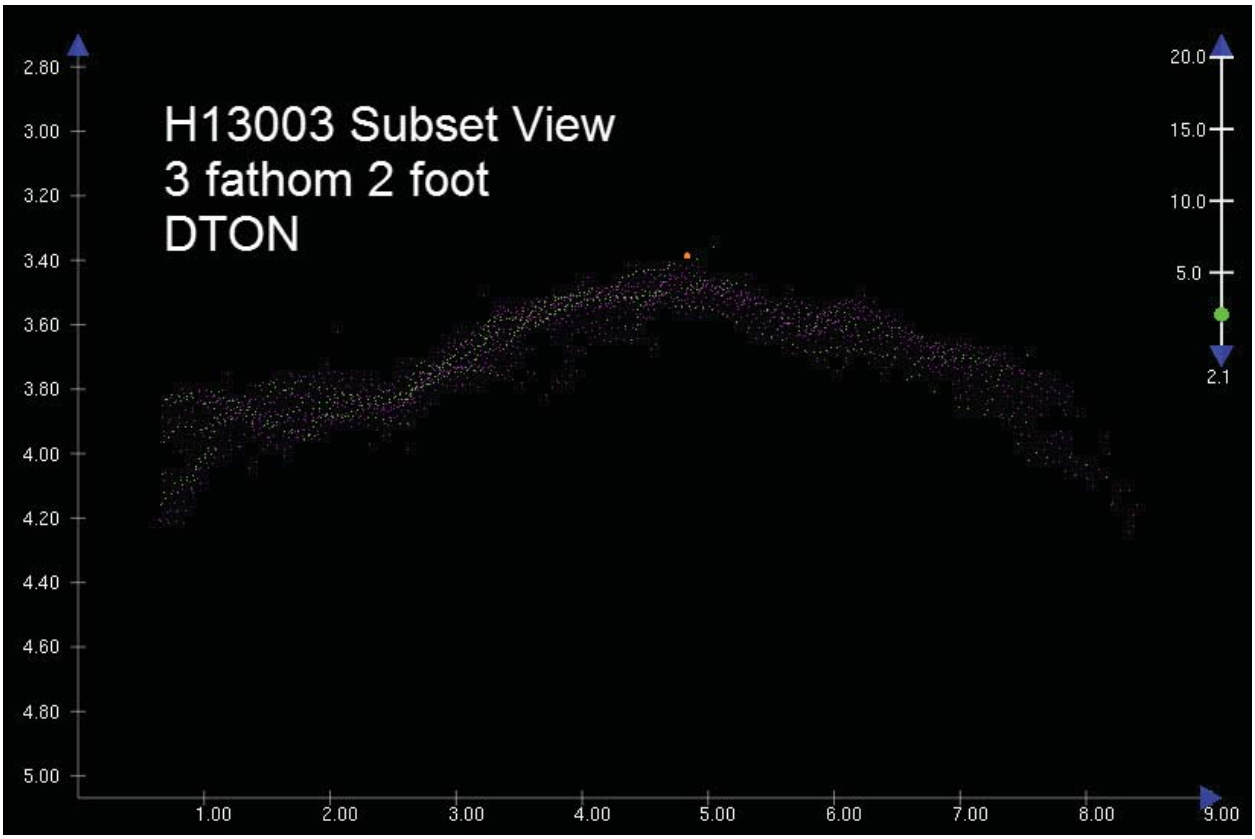

H13003 Subset View
3 fathom 2 foot
DTON
2.80
3.00
3.20
3.40
3.60
3.80
4.00
4.20
4.40
4.60
4.80
5.00
1.00
2.00
3.00
4.00
5.00
6.00
7.00
8.00
9.00
20.0
15.0
10.0
5.0
2.1

Figure 1.2.2

1.3) Profile/Beam 3094/109 / 2802_2017__2152256

DANGER TO NAVIGATION

Survey Summary

Survey Position:	57° 45' 06.0" N, 152° 16' 58.9" W
Least Depth:	3.80 m (= 12.45 ft = 2.076 fm = 2 fm 0.45 ft)
TPU (±1.96σ):	**THU (TPEh)** ±0.077 m ; **TVU (TPEv)** ±0.086 m
Timestamp:	2017-215.23:00:31.689 (08/03/2017)
Survey Line:	h13003 / 2802_reson7125_hf_512 / 2017-215 / 2802_2017__2152256
Profile/Beam:	3094/109
Charts Affected:	16594_1, 16593_1, 16580_1, 16013_1, 531_1, 500_1, 530_1, 50_1

Remarks:

A 2 fathom DTON is located between 5 fathom and 10 fathom contour.

Feature Correlation

Source	Feature	Range	Azimuth	Status
2802_2017__2152256	3094/109	0.00	000.0	Primary

Hydrographer Recommendations

Update chart with 2 fathom depth at 57º45'06.0056"N, 152º16'58.8774"W

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

2fm (16594_1, 16593_1, 16580_1, 16013_1, 530_1)

2fm 0ft (531_1)

3.8m (500_1, 50_1)

S-57 Data

Geo object 1:	Sounding (SOUNDG)
Attributes:	QUASOU - 6:least depth known
	SORDAT - 20170814
	SORIND - US,US,graph,H13003
	TECSOU - 3:found by multi-beam

Feature Images

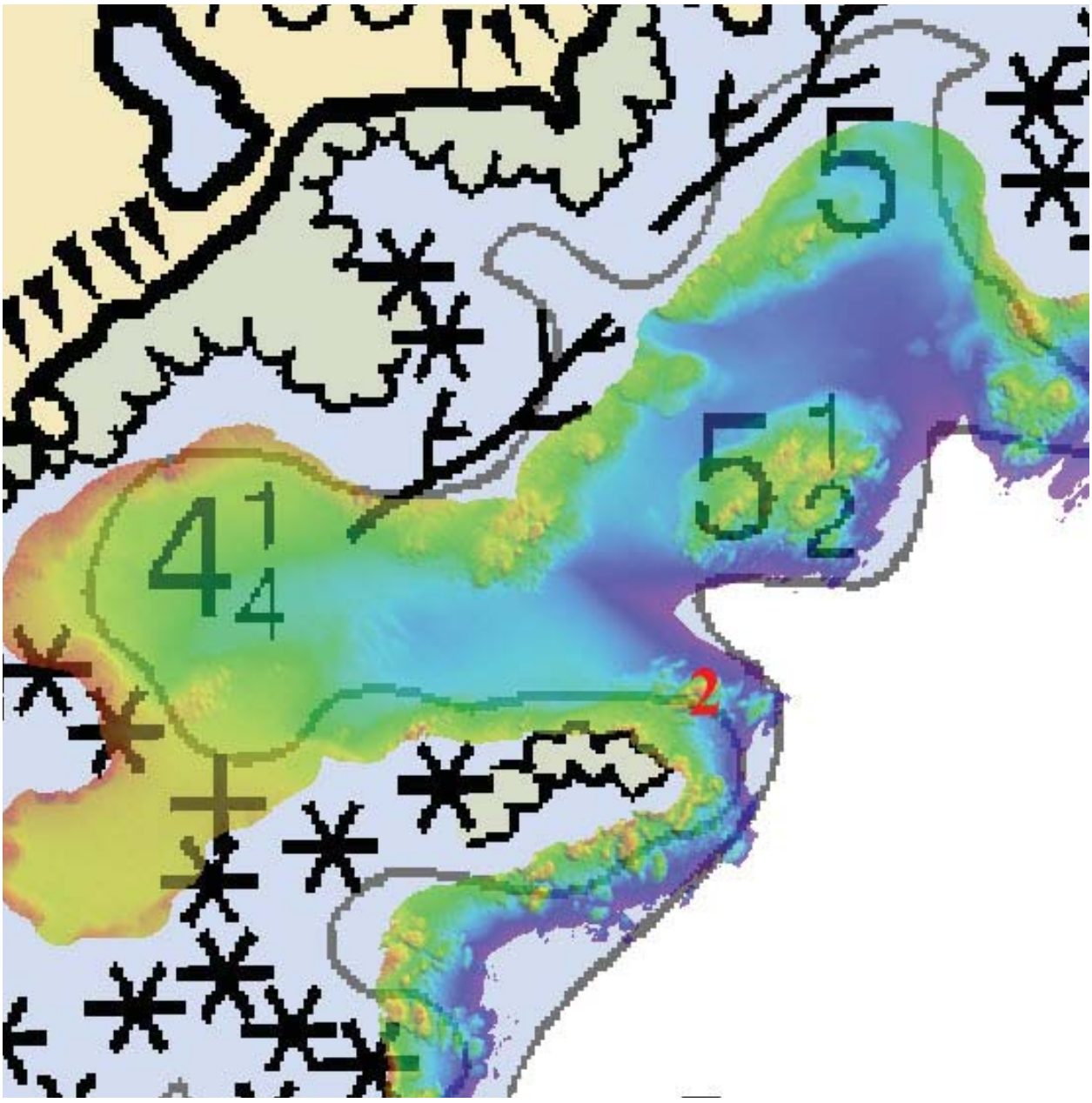


Figure 1.3.1

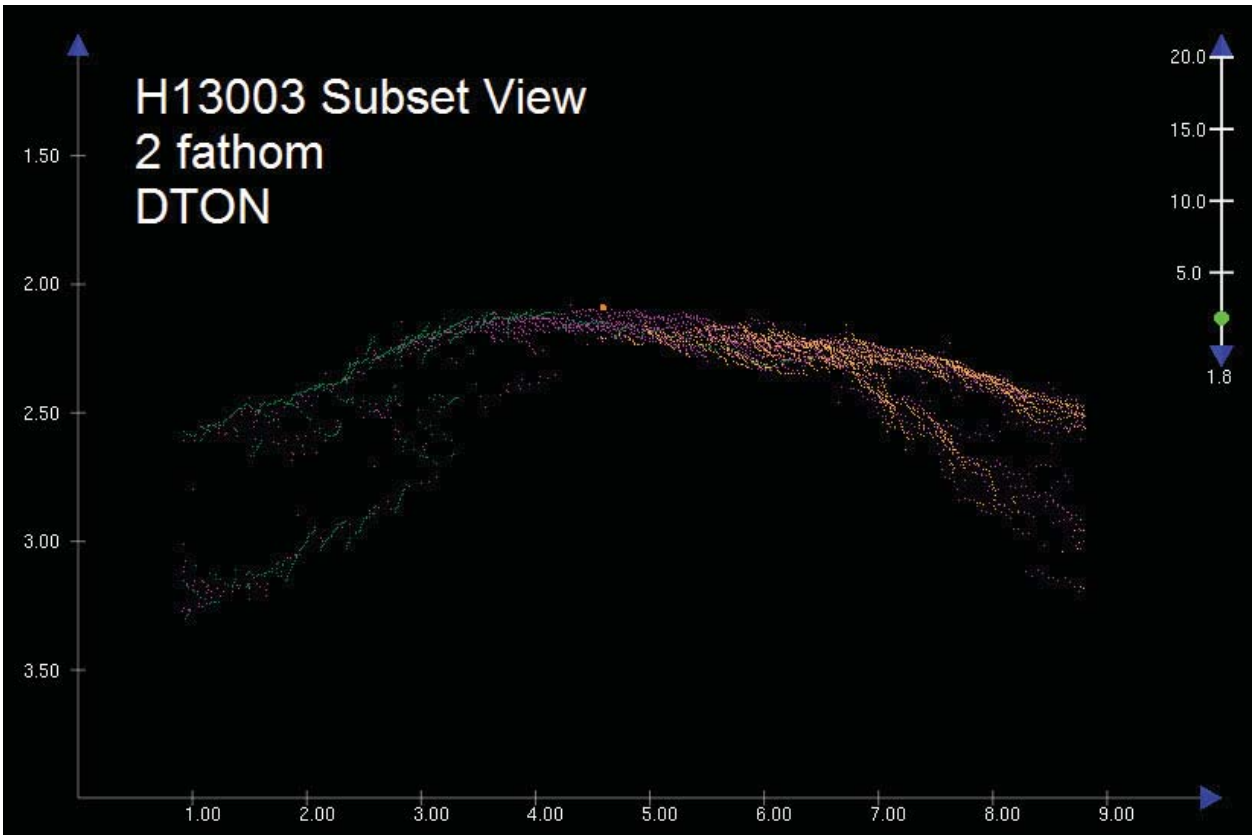

H13003 Subset View
2 fathom
DTON
1.50
2.00
2.50
3.00
3.50
1.00
2.00
3.00
4.00
5.00
6.00
7.00
8.00
9.00
20.0
15.0
10.0
5.0
1.8

Figure 1.3.2

1.4) Profile/Beam 2787/1 / 2804_2017__2102311

DANGER TO NAVIGATION

Survey Summary

Survey Position:	57° 46' 41.7" N, 152° 12' 17.7" W
Least Depth:	1.96 m (= 6.43 ft = 1.072 fm = 1 fm 0.43 ft)
TPU (±1.96σ):	**THU (TPEh)** ±0.082 m ; **TVU (TPEv)** ±0.083 m
Timestamp:	2017-210.23:14:47.977 (07/29/2017)
Survey Line:	h13003 / 2804_reson7125_hf_512 / 2017-210 / 2804_2017__2102311
Profile/Beam:	2787/1
Charts Affected:	16594_1, 16580_1, 16013_1, 531_1, 500_1, 530_1, 50_1

Remarks:

A 1 fathom DTON is located between 5 fathom and 10 fathom contour.

Feature Correlation

Source	Feature	Range	Azimuth	Status
2804_2017__2102311	2787/1	0.00	000.0	Primary

Hydrographer Recommendations

Update chart with 1 fathom depth at 57º46'41.6935"N, 152º12'17.6578"W

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

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

1fm 0ft (531_1)

2.0m (500_1, 50_1)

S-57 Data

Geo object 1:	Sounding (SOUNDG)
Attributes:	QUASOU - 6:least depth known
	SORDAT - 20170814
	SORIND - US,US,graph,H13003
	TECSOU - 3:found by multi-beam

Feature Images

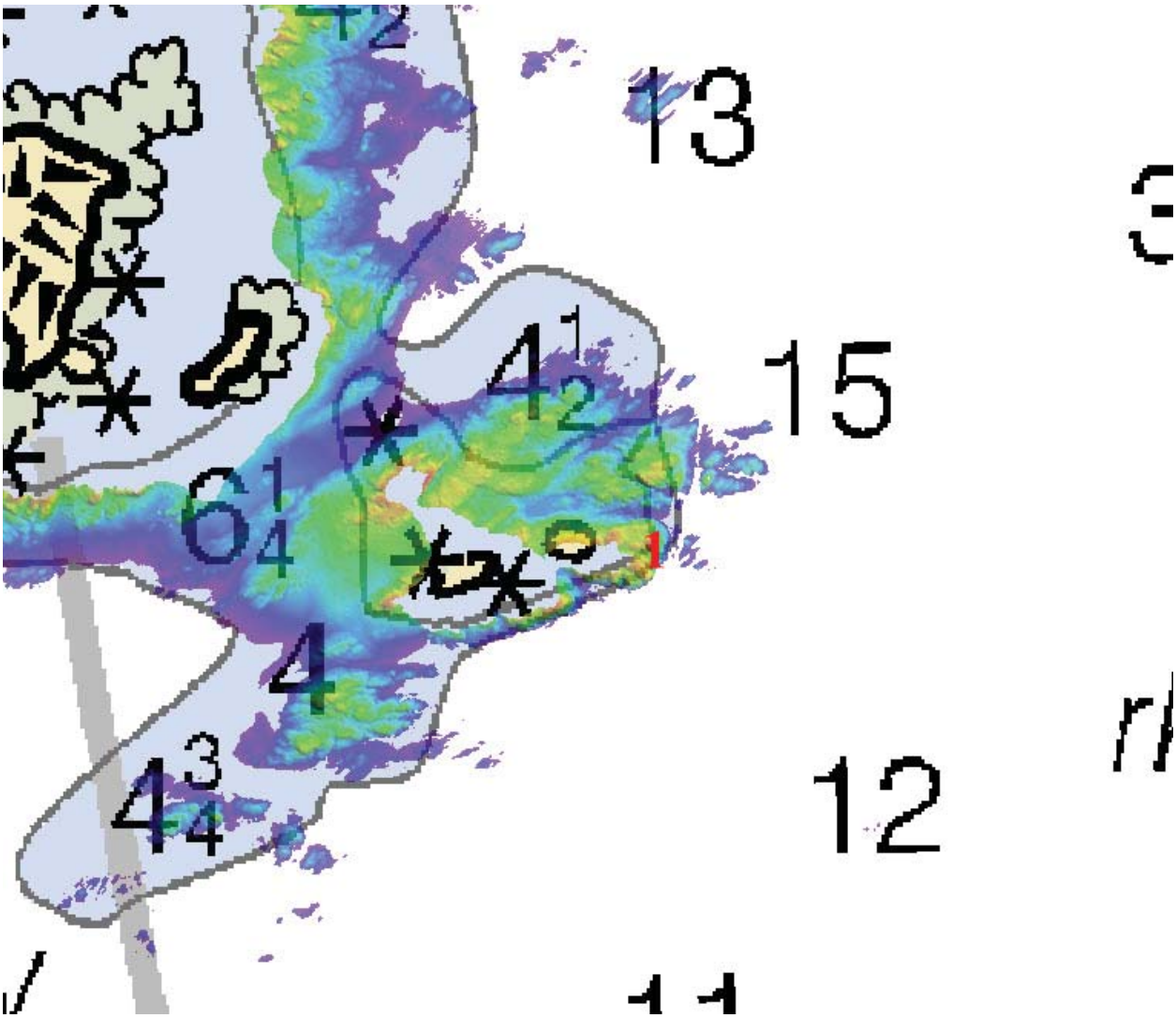


Figure 1.4.1

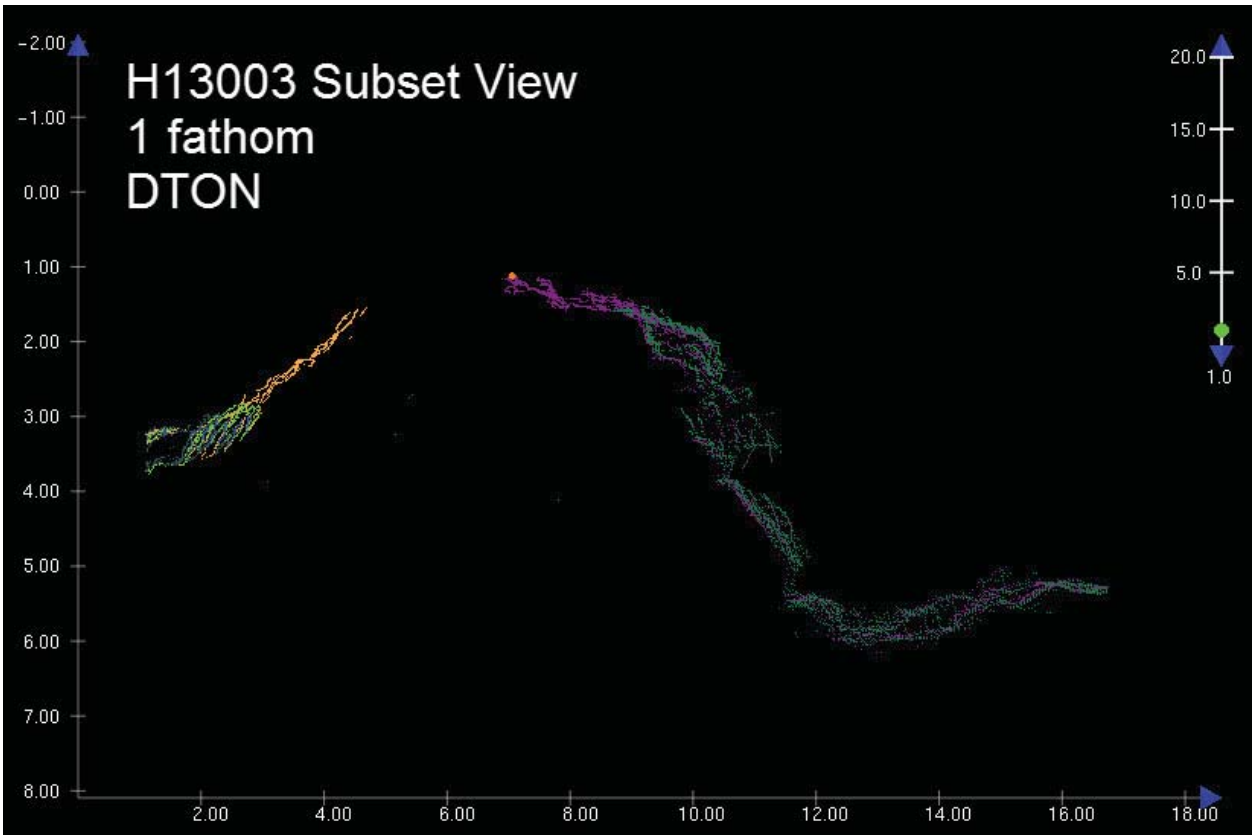

H13003 Subset View
1 fathom
DTON
-2.00
-1.00
0.00
1.00
2.00
3.00
4.00
5.00
6.00
7.00
8.00
2.00
4.00
6.00
8.00
10.00
12.00
14.00
16.00
18.00
20.0
15.0
10.0
5.0
1.0

Figure 1.4.2

1.5) Profile/Beam 350/103 / 2804_2017__2152301

DANGER TO NAVIGATION

Survey Summary

Survey Position:	57° 47' 28.6" N, 152° 13' 45.3" W
Least Depth:	2.24 m (= 7.36 ft = 1.226 fm = 1 fm 1.36 ft)
TPU (±1.96σ):	**THU (TPEh)** ±0.083 m ; **TVU (TPEv)** ±0.080 m
Timestamp:	2017-215.23:02:17.962 (08/03/2017)
Survey Line:	h13003 / 2804_reson7125_hf_512 / 2017-215 / 2804_2017__2152301
Profile/Beam:	350/103
Charts Affected:	16594_1, 16580_1, 16013_1, 531_1, 500_1, 530_1, 50_1

Remarks:

A 1.2 fathom DTON is located inside 5 fathom contour.

Feature Correlation

Source	Feature	Range	Azimuth	Status
2804_2017__2152301	350/103	0.00	000.0	Primary

Hydrographer Recommendations

Update chart with 1.2 fathom depth at 57º47'28.6495"N, 152º13'45.2886"W

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

1 ¼fm (16594_1, 16580_1, 16013_1, 530_1)

1fm 1ft (531_1)

2.2m (500_1, 50_1)

S-57 Data

Geo object 1:	Sounding (SOUNDG)
Attributes:	QUASOU - 6:least depth known
	SORDAT - 20170814
	SORIND - US,US,graph,H13003
	TECSOU - 3:found by multi-beam

Feature Images

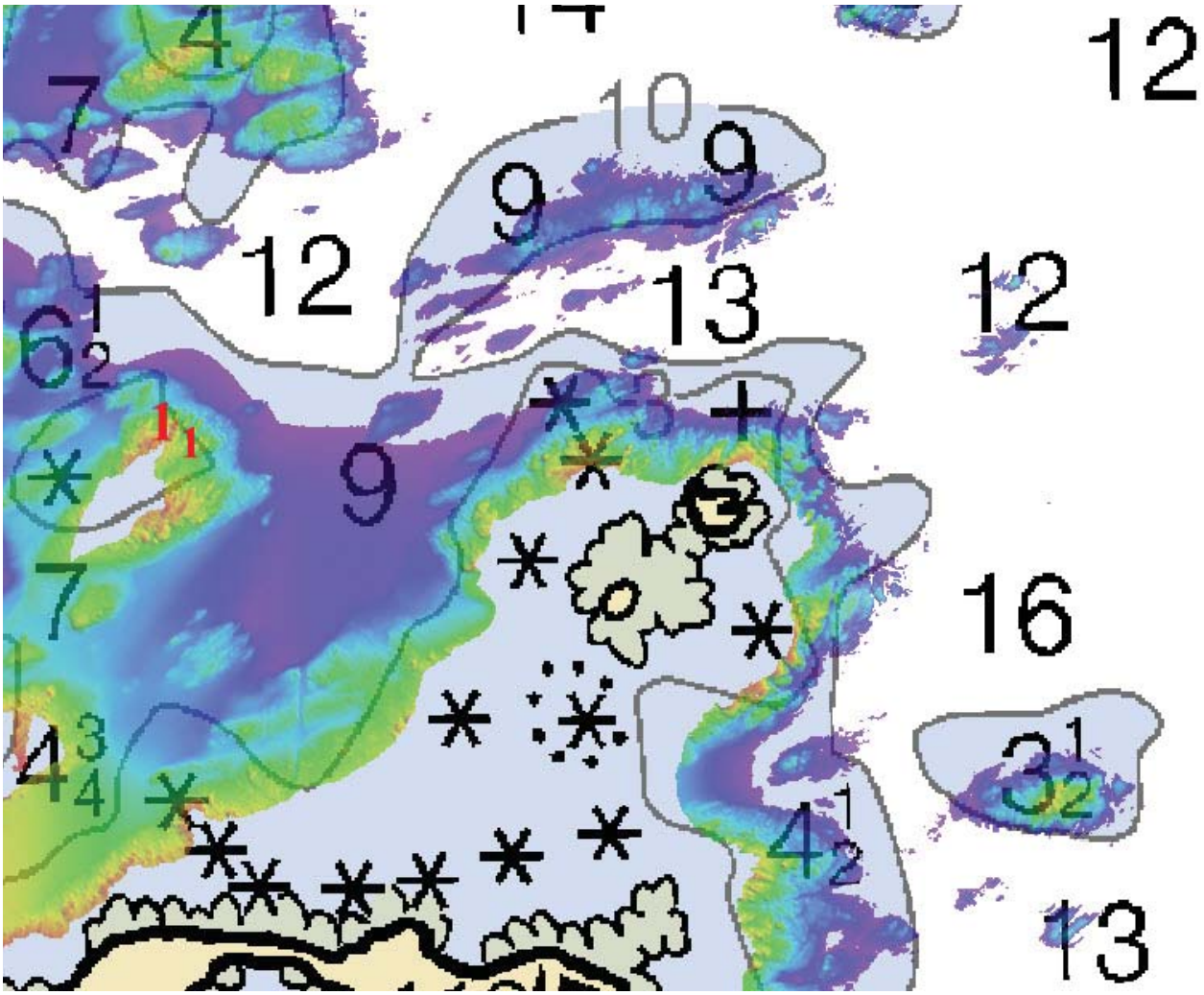


Figure 1.5.1

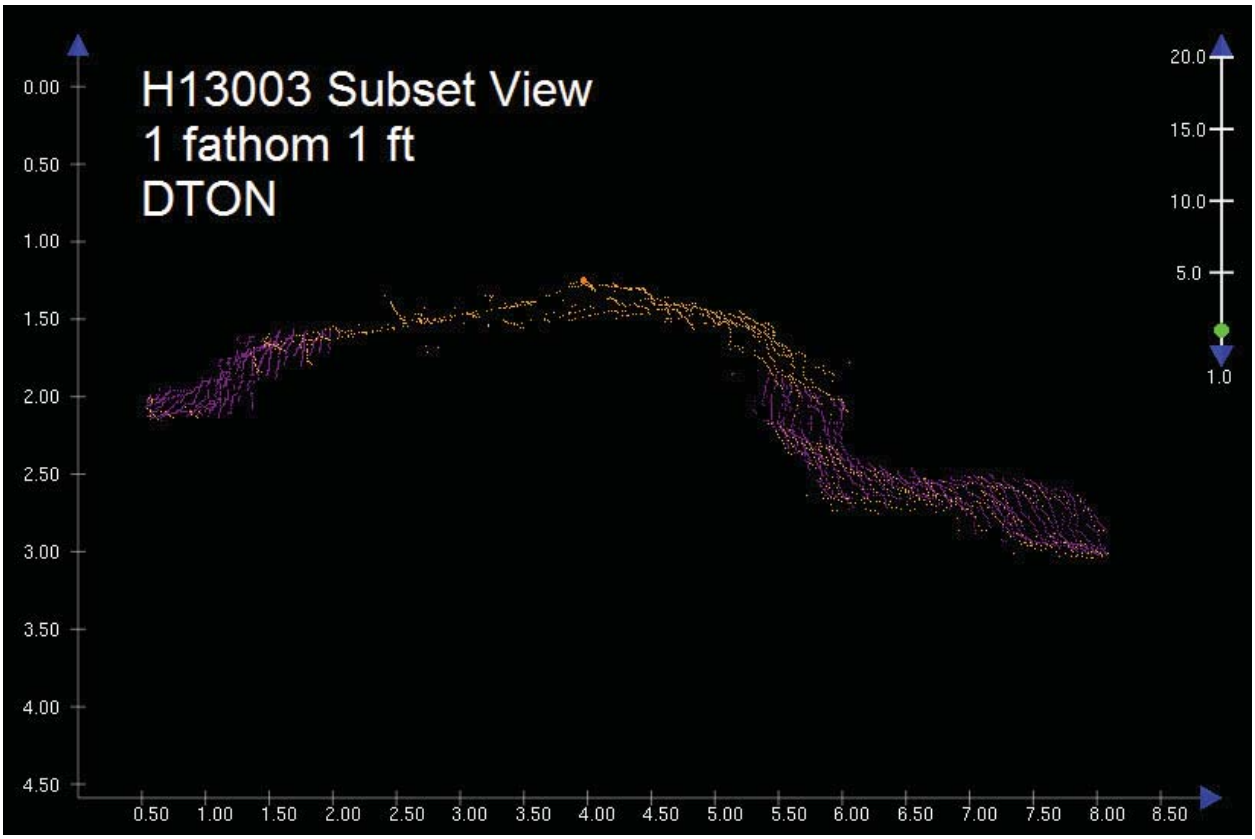

H13003 Subset View
1 fathom 1 ft
DTON
0.00
0.50
1.00
1.50
2.00
2.50
3.00
3.50
4.00
4.50
0.50 1.00 1.50 2.00 2.50 3.00 3.50 4.00 4.50 5.00 5.50 6.00 6.50 7.00 7.50 8.00 8.50
20.0
15.0
10.0
5.0
1.0

Figure 1.5.2

1.6) Profile/Beam 51/512 / 2804_2017__2151949

DANGER TO NAVIGATION

Survey Summary

Survey Position:	57° 47' 32.2" N, 152° 14' 06.4" W
Least Depth:	2.26 m (= 7.41 ft = 1.236 fm = 1 fm 1.41 ft)
TPU (±1.96σ):	**THU (TPEh)** ±0.090 m ; **TVU (TPEv)** ±0.086 m
Timestamp:	2017-215.19:49:21.316 (08/03/2017)
Survey Line:	h13003 / 2804_reson7125_hf_512 / 2017-215 / 2804_2017__2151949
Profile/Beam:	51/512
Charts Affected:	16594_1, 16580_1, 16013_1, 531_1, 500_1, 530_1, 50_1

Remarks:

A 1.2 fathom DTON is located between 5 fathom contour and 10 fathom contour.

Feature Correlation

Source	Feature	Range	Azimuth	Status
2804_2017__2151949	51/512	0.00	000.0	Primary

Hydrographer Recommendations

Update chart with 1.2 fathom depth at 57º47'32.2447"N, 152º14'06.4249"W

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

1 ¼fm (16594_1, 16580_1, 16013_1, 530_1)

1fm 1ft (531_1)

2.3m (500_1, 50_1)

S-57 Data

Geo object 1:	Sounding (SOUNDG)
Attributes:	QUASOU - 6:least depth known
	SORDAT - 20170814
	SORIND - US,US,graph,H13003
	TECSOU - 3:found by multi-beam

Feature Images

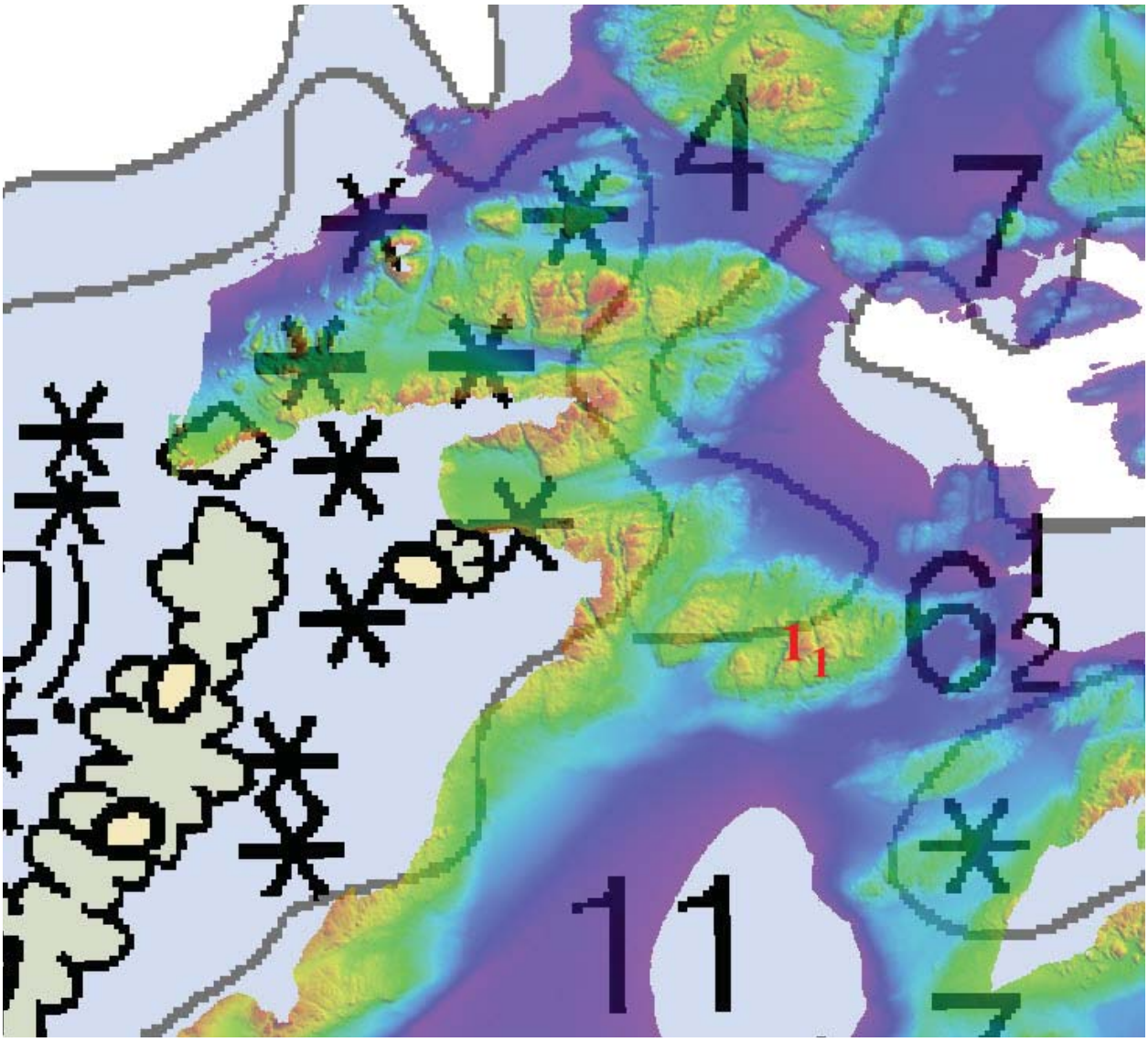


Figure 1.6.1

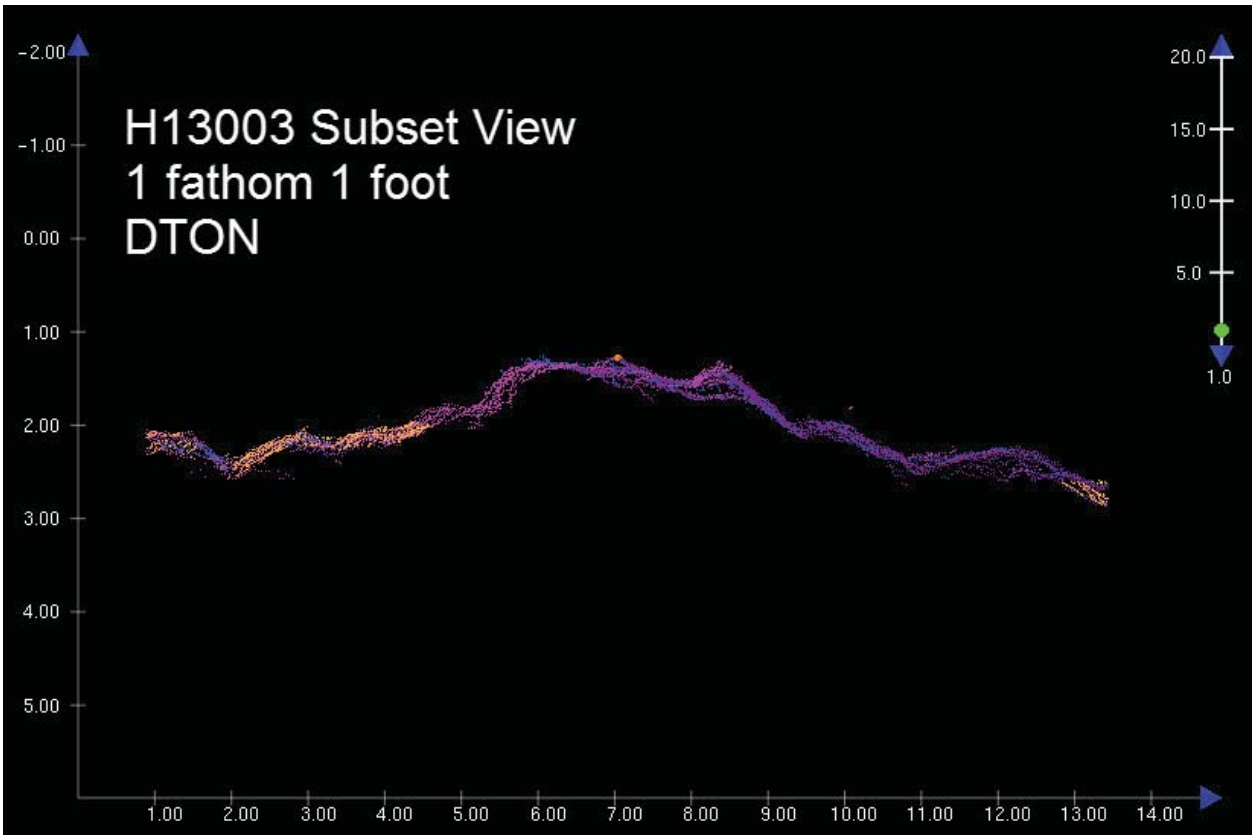

H13003 Subset View
1 fathom 1 foot
DTON
-2.00
-1.00
0.00
1.00
2.00
3.00
4.00
5.00
1.00
2.00
3.00
4.00
5.00
6.00
7.00
8.00
9.00
10.00
11.00
12.00
13.00
14.00
20.0
15.0
10.0
5.0
1.0

Figure 1.6.2

1.7) Profile/Beam 72/37 / 2804_2017__2151824

DANGER TO NAVIGATION

Survey Summary

Survey Position:	57° 47' 49.4" N, 152° 14' 07.7" W
Least Depth:	1.64 m (= 5.37 ft = 0.895 fm = 0 fm 5.37 ft)
TPU (±1.96σ):	**THU (TPEh)** ±0.076 m ; **TVU (TPEv)** ±0.084 m
Timestamp:	2017-215.18:24:29.111 (08/03/2017)
Survey Line:	h13003 / 2804_reson7125_hf_512 / 2017-215 / 2804_2017__2151824
Profile/Beam:	72/37
Charts Affected:	16594_1, 16580_1, 16013_1, 531_1, 500_1, 530_1, 50_1

Remarks:

A .9 fathom DTON is located between 5 fathom contour and 10 fathom contour.

Feature Correlation

Source	Feature	Range	Azimuth	Status
2804_2017__2151824	72/37	0.00	000.0	Primary

Hydrographer Recommendations

Update chart with 0.9 fathom depth at 57º47'49.4309"N, 152º14'07.6974"W

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

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

0fm 5ft (531_1)

1.6m (500_1, 50_1)

S-57 Data

Geo object 1:	Sounding (SOUNDG)
Attributes:	QUASOU - 6:least depth known
	SORDAT - 20170814
	SORIND - US,US,graph,H13003
	TECSOU - 3:found by multi-beam

Feature Images

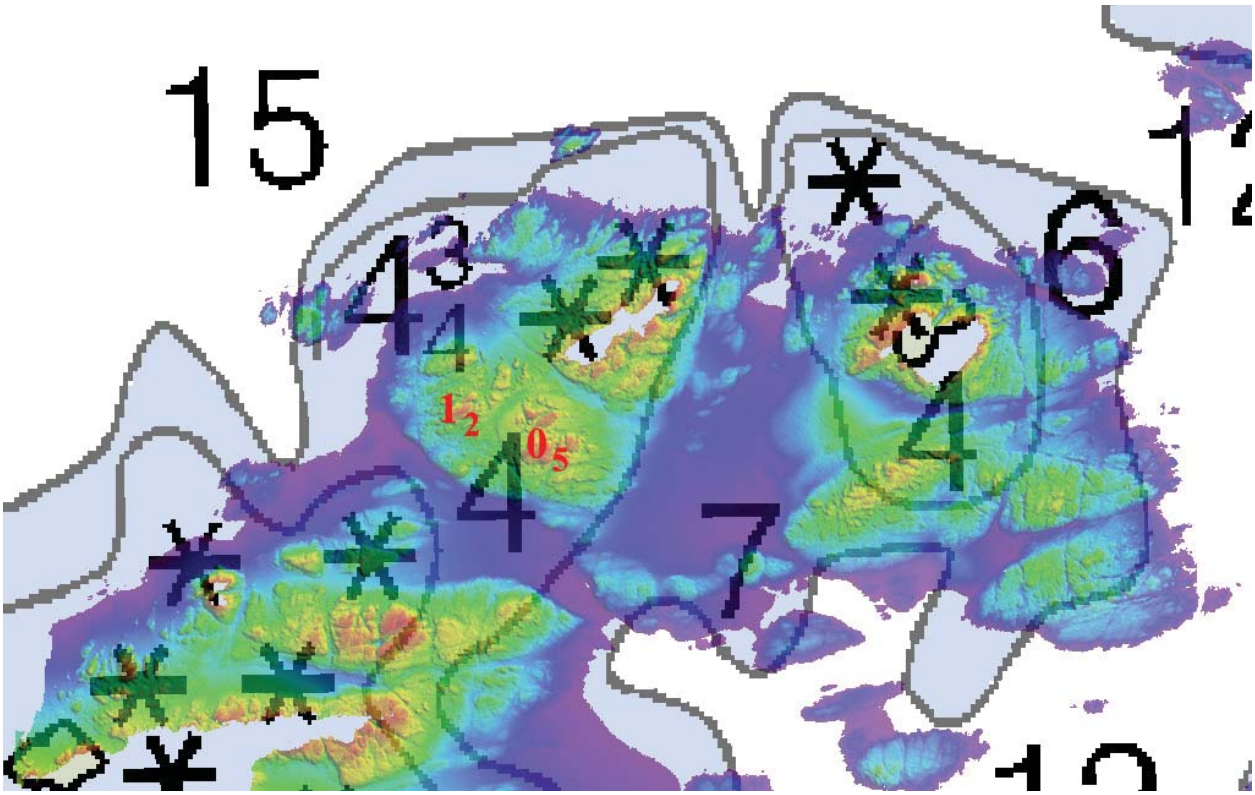


Figure 1.7.1

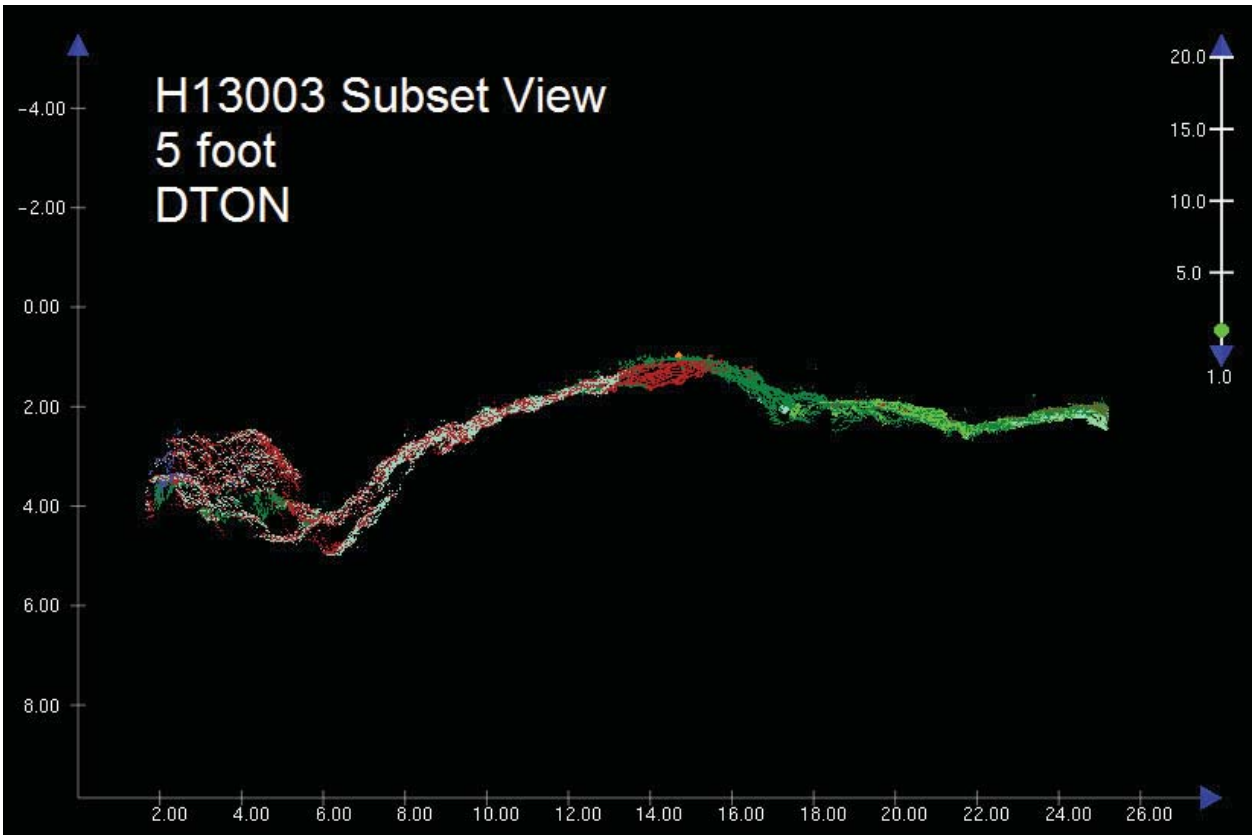

H13003 Subset View
5 foot
DTON
-4.00
-2.00
0.00
2.00
4.00
6.00
8.00
2.00
4.00
6.00
8.00
10.00
12.00
14.00
16.00
18.00
20.00
22.00
24.00
26.00
20.0
15.0
10.0
5.0
1.0

Figure 1.7.2

1.8) Profile/Beam 78/277 / 2803_2017__1832017

DANGER TO NAVIGATION

Survey Summary

Survey Position:	57° 48' 14.0" N, 152° 10' 30.6" W
Least Depth:	4.14 m (= 13.59 ft = 2.264 fm = 2 fm 1.59 ft)
TPU (±1.96σ):	**THU (TPEh)** ±0.060 m ; **TVU (TPEv)** ±0.092 m
Timestamp:	2017-183.20:17:24.930 (07/02/2017)
Survey Line:	h13003 / 2803_reson7125_hf_512 / 2017-183 / 2803_2017__1832017
Profile/Beam:	78/277
Charts Affected:	16594_1, 16580_1, 16013_1, 531_1, 500_1, 530_1, 50_1

Remarks:

A 2.3 fathom DTON is located just outside of 10 fathom contour.

Feature Correlation

Source	Feature	Range	Azimuth	Status
2803_2017__1832017	78/277	0.00	000.0	Primary

Hydrographer Recommendations

Update chart with 2.3 fathom depth at 57º48'14.0238"N, 152º10'30.6319"W

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

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

2fm 2ft (531_1)

4.1m (500_1, 50_1)

S-57 Data

Geo object 1:	Sounding (SOUNDG)
Attributes:	QUASOU - 6:least depth known
	SORDAT - 20170814
	SORIND - US,US,graph,H13003
	TECSOU - 3:found by multi-beam

Feature Images

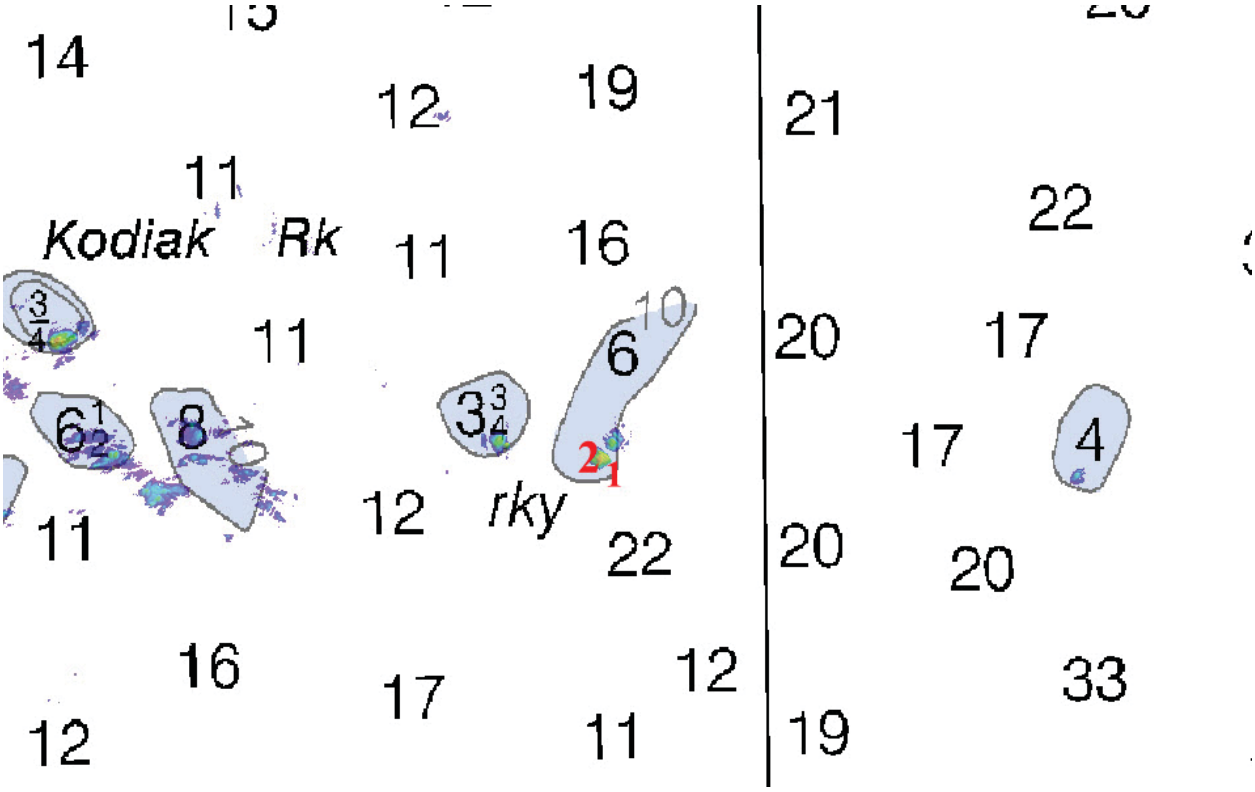


Figure 1.8.1

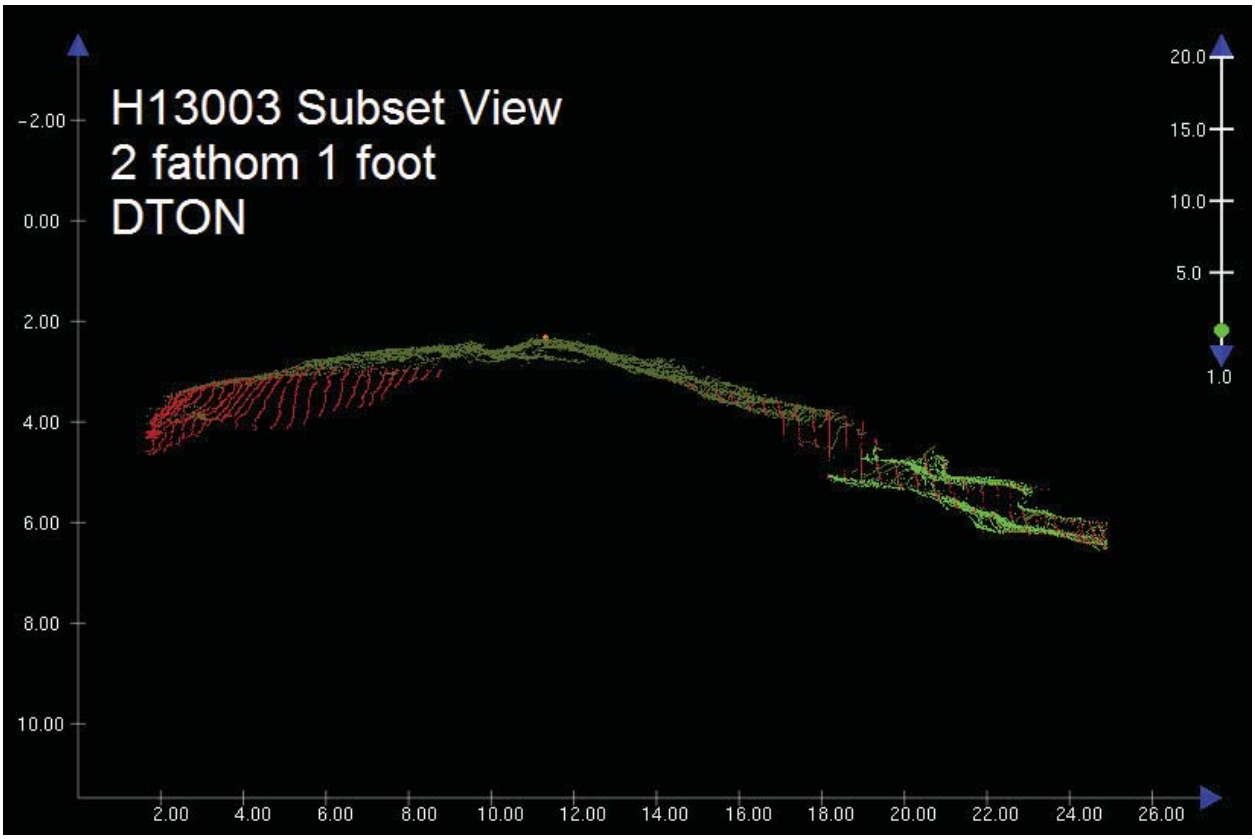

H13003 Subset View
2 fathom 1 foot
DTON
-2.00
0.00
2.00
4.00
6.00
8.00
10.00
2.00
4.00
6.00
8.00
10.00
12.00
14.00
16.00
18.00
20.00
22.00
24.00
26.00
20.0
15.0
10.0
5.0
1.0

Figure 1.8.2

Subject: Re: DTON Report for H13003 - OPR-P136-RA-17 (North Coast of Kodiak)
From: OCS NDB - NOAA Service Account <ocs.ndb@noaa.gov>
Date: 11/16/2017 05:53
To: Scott Broo - NOAA Federal <scott.e.broo@noaa.gov>
CC: Corey Allen - NOAA Federal <corey.allen@noaa.gov>, _OMAO MOP CO Rainier <co.rainier@noaa.gov>, _OMAO MOP ChiefST RAINIER <chiefst.rainier@noaa.gov>, Christopher Dunn - NOAA Federal <christopher.dunn@noaa.gov>, Bart Buesseler <bart.o.buesseler@noaa.gov>, LT Steve Loy <ops.rainier@noaa.gov>, Tara Wallace <Tara.Wallace@noaa.gov>, Lance Roddy <Lance.Roddy@noaa.gov>, Diane Melancon <Diane.Melancon@noaa.gov>

LT Broo,

There are errors that need to be revised on the DTON PDF report and XML file concerning eight shoal soundings recently submitted for registration by NDB.

Feature 1.1:

The Least Depth section Feature 1.1 of the DTON PDF report states, “1.61 m (= 5.30 ft = 0.883 fm = 0 fm 5.30 ft)”

0.883 fathoms is the correct depth in decimal fathoms for this feature.

The Remarks section for Feature 1.1 in the PDF and XML file states, “A 0.83 fathom DTON is located between 5 and 10 fathom contours”.

The Hydrographer Recommendations section for Feature 1.1 in the PDF and XML file states, “Update chart with 0.83 fathom depth at 57º44'49.6082"N, 152º17'16.4045"W”.

Figure 1.1.1 (H13003 Subset View) indicates a depth of 0.7 fm.

The Remarks section of the PDF report and XML file should state the following for Feature 1.1: “A 0.88 fathom DTON is located between 5 and 10 fathom contours”.

The Hydrographer Recommendations section of the PDF report and the XML file should state the following for Feature 1.1: “Update chart with 0.88 fathom depth at 57º44'49.6082"N, 152º17'16.4045"W”

Figure 1.1.1 should indicate a depth of .88 fm or 5 feet instead of 0.7 fm.

Feature 1.7:

Figure 1.7.1 shows two depths in red text, 0 fm 5 feet and 1 fm 2 ft. The 1 fm 2 ft sounding is included in the figure at this location, but it is not addressed in the PDF and XML files. Was the 1 fm 2 ft sounding not addressed in the PDF and XML files due to its proximity to the 5 foot shoal sounding?

NDB respectfully requests revisions to the PDF report and XML file, based on my feedback stated above.

Thanks in advance,

Johnny, NDB
Nautical Data Branch/Marine Chart Division/
Office of Coast Survey/National Ocean Service/
Contact: ocs.ndb@noaa.gov

On Wed, Nov 15, 2017 at 2:12 AM, Scott Broo - NOAA Federal <scott.e.broo@noaa.gov> wrote:

> Good evening,
>
> RA has identified several DTONs east and north of Long Island in Chiniak Bay (Kodiak). Please see the attached DTON Report for sheet H13003 (Williams Reef) on project OPR-P136-RA-17, and let me know if you have any questions.
>
> Regards,
>
> LT Broo
>
> --
> Very Respectfully,
>
> Lieutenant Scott E. Broo, NOAA
> Operations Officer
> NOAA Ship RAINIER
> 2002 SE Marine Science Drive
> Newport, OR 97365
>
> Ship: 541-272-9430
> Cell: 248-302-0689

APPROVAL PAGE

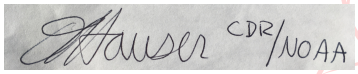
H13003

Data meet or exceed current specifications as certified by the OCS survey acceptance review process. Descriptive Report and survey data except where noted are adequate to supersede prior surveys and nautical charts in the common area.

The following products will be sent to NCEI for archive

- Descriptive Report
- Collection of Bathymetric Attributed Grids (BAGs)
- Collection of backscatter mosaics
- Processed survey data and records
- Bottom samples
- GeoPDF of survey products

The survey evaluation and verification has been conducted according current OCS Specifications, and the survey has been approved for dissemination and usage of updating NOAA's suite of nautical charts.



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2019.05.10 09:52:44 -07'00'

Approved:_____

Commander Olivia Hauser, NOAA
Chief, Pacific Hydrographic Branch