H12472

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

DESCRIPTIVE REPORT

Type of Survey:	Navigable Area
Registry Number:	H12472

LOCALITY

State(s):	Alaska
General Locality:	Shumagin Islands
Sub-locality:	Northeast Harbor to Twelve Fathom Strait

2012

CHIEF OF PARTY
Richard T. Brennan, CDR/NOAA

LIBRARY & ARCHIVES

Date:

U.S. DEPARTMENT OF COMMERCE NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION	REGISTRY NUMBER:
HYDROGRAPHIC TITLE SHEET	**H12472**

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:	**Shumagin Islands**
Sub-Locality:	**Northeast Harbor to Twelve Fathom Strait**
Scale:	**40000**
Dates of Survey:	**08/12/2012 to 09/30/2012**
Instructions Dated:	**05/16/2012**
Project Number:	**OPR-P183-RA-12**
Field Unit:	**NOAA Ship *Rainier***
Chief of Party:	**Richard T. Brennan, CDR/NOAA**
Soundings by:	**Multibeam Echo Sounder**
Imagery by:	**Multibeam Echo Sounder Backscatter**
Verification by:	**Pacific Hydrographic Branch**
Soundings Acquired in:	**meters at Mean Lower Low Water**

Remarks:

Horizontal Coordinate System: UTM Zone 4N. The purpose of this survey is to provide contemporary survey to update National Ocean Service (NOS) charts. All separates are filed with the hydrographic data. Revisions and notes in red were generated during office processing. The processing branch concurs with all information and recommendations in the DR unless otherwise noted. Page numbering may be interrupted or non-sequential. All pertinent records for this survey, including the Descriptive Report, are archived at the National Geophysical Data Center (NGDC) and can be retrieved via http://www.ngdc.noaa.gov/. Compilation units is Meters at MLLW.

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Descriptive Report to Accompany Survey H12472

Project: OPR-P183-RA-12

Locality: Shumagin Islands

Sublocality: Northeast Harbor to Twelve Fathom Strait

Scale: 1:40000

August 2012 - September 2012

NOAA Ship *Rainier*

Chief of Party: Richard T. Brennan, CDR/NOAA

A. Area Surveyed

The area surveyed for H12472 (Figure 1) extends from Northeast Harbor and wraps around the southwest side of Little Koniuji Island and through to the northeast extent of Twelve Fathom Strait. The area is used by small to medium vessels, as well local and regional inhabitants, for transit, fishing, and refuge. This survey is approximately 40 nautical miles southeast of Sand Point, the nearest significantly populated area.

A.1 Survey Limits

Data were acquired within the following survey limits:

Northwest Limit	Southeast Limit
55° 2" 17.12' N 159° 17" 7.2' W	54° 55" 7.85' N 159° 30" 48.84' W

Table 1: Survey Limits

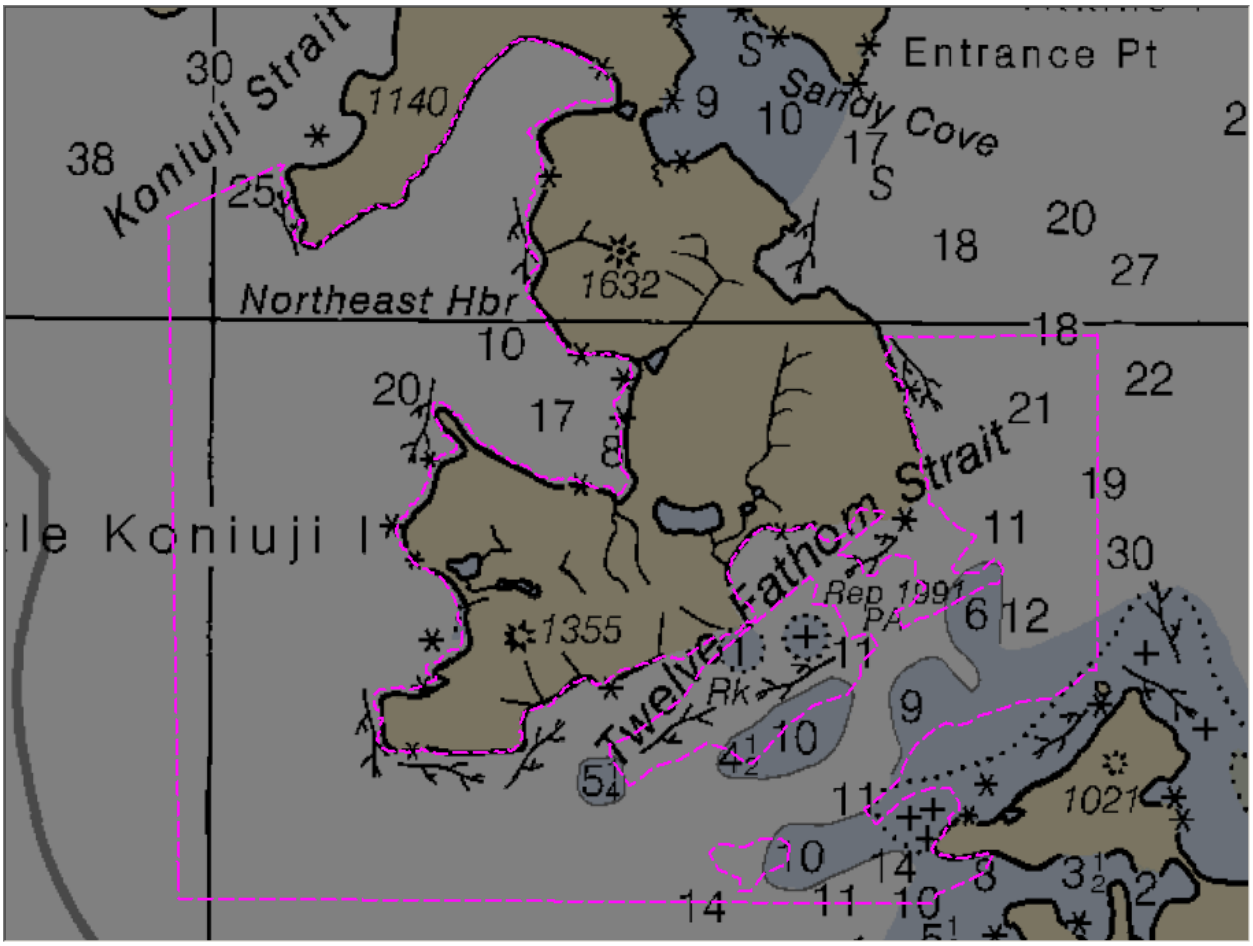


Figure 1: H12472 Survey Limits

Survey limits (Figure 1) were met in accordance with the requirements in the Project Instructions and the Hydrographic Survey Specifications and Deliverables Manual (HSSDM).

A.2 Survey Purpose

The purpose of this survey is to update existing NOS nautical charts (Figure 2). The project includes critical areas of the Shumagin Islands.

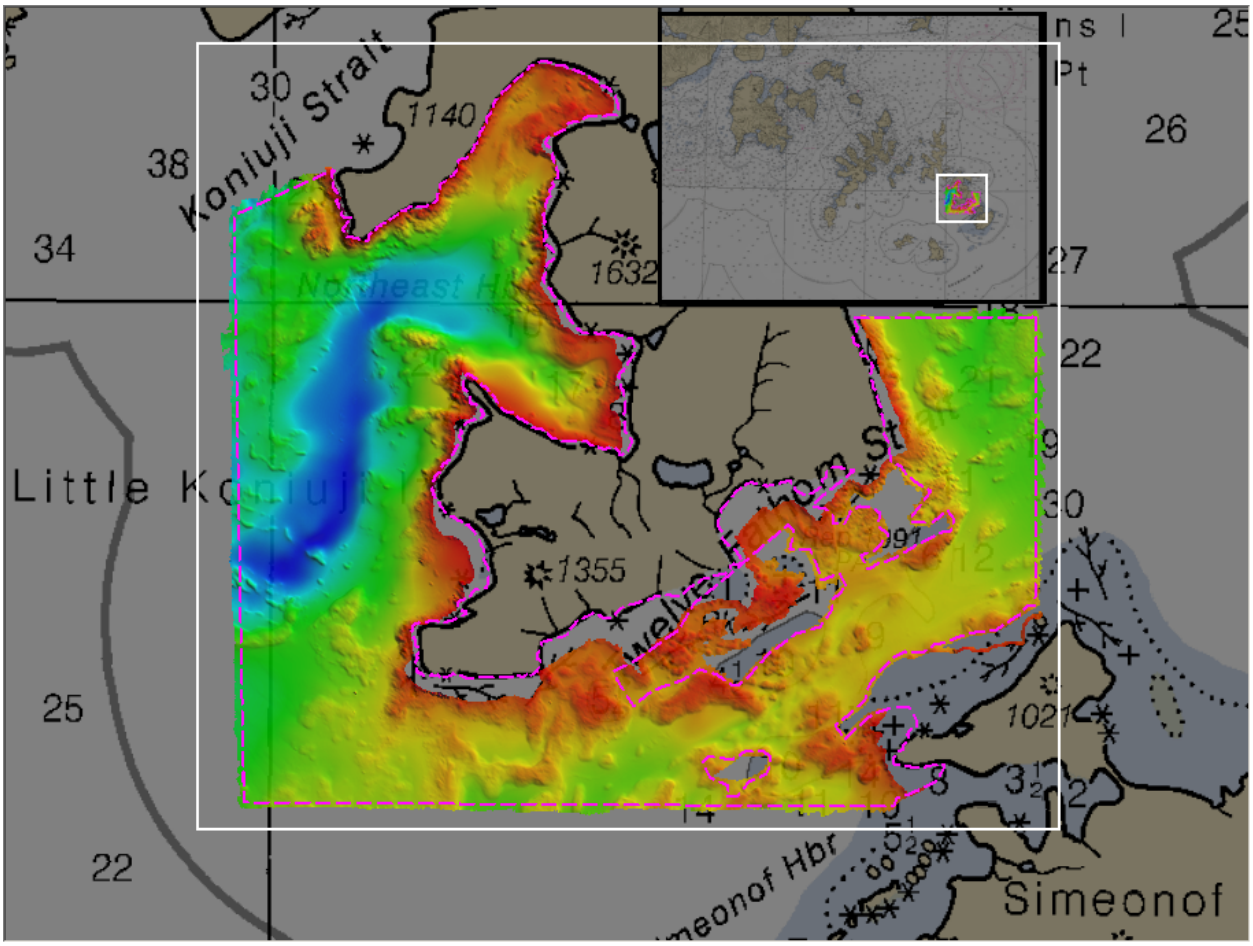


Figure 2: H12472 CUBE Surface and Sheet Limits (pink)

A.3 Survey Quality

The entire survey is adequate to supersede previous data.

Data acquired on survey H12472 met complete multibeam echosounder (MBES) coverage requirements, including the 5 soundings per node data density requirements outlined in section 5.2.2.2 of the HSSDM (Figure 3). In order to extract some descriptive statistics of the data density achievements, the density layer of each finalized surface was queried within CARIS and then examined in Excel (Figure 4). Overall, the required data density was achieved in 99.1% of the nodes. Despite meeting specifications, there were several areas where data did not meet density requirements (Figure 3). A significant contributing factor was the use of a 34-degree tilt-mounted Reson 8125 multibeam sonar (Launch 2803), which was generally used to survey nearshore, identify submerged hazards, and to identify maritime boundaries. In contrast to the Reson 7125, used for the majority of data acquisition for survey H12472, the 8125 produces fewer beams (240 versus 512 beams) and only operates in an equi-angular mode. In an equi-angular paradigm, the further from nadir a beam is directed, the larger the horizontal spacing between its neighbors; an increased beam spacing is exacerbated by a tilted sonar mount. As such, the outer beams seldom satisfy data density requirements.

Sparse data was also seen in several areas of high bathymetric relief, and also in areas where data was collected during poor weather conditions.

All areas of sparse data density were analyzed and determined to be satisfactory for use in superseding previously collected data.

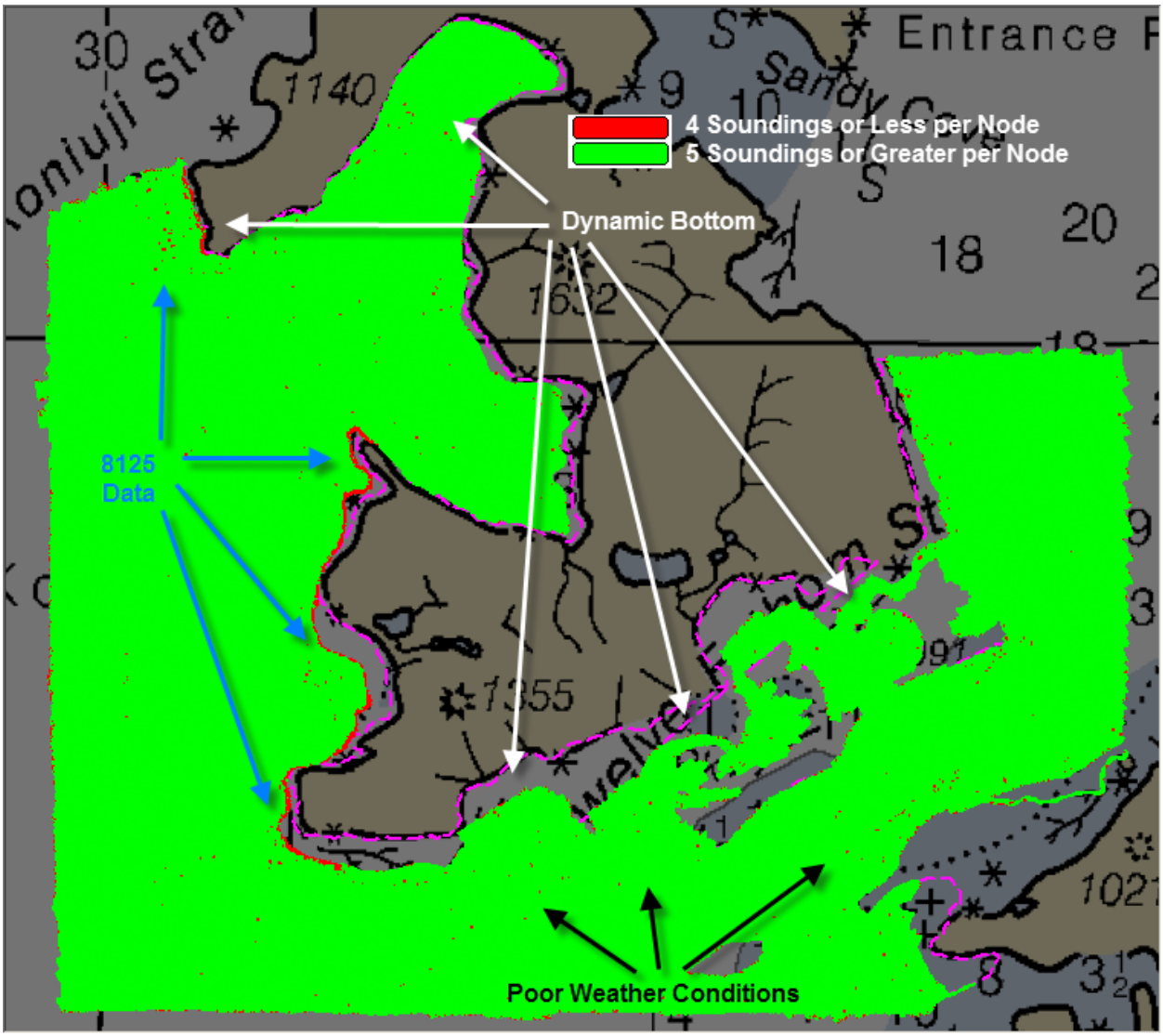


Figure 3: H12472 Density Surface and Related Issues

Resolution	Depth range	Number of nodes	Fewer than five soundings per node	Percent of nodes with greater than five soundings per node
1m	0 - 20m	14,986,149	222,658	98.5%
2m	18 - 40m	11,560,252	21,339	99.8%
4m	36 - 80m	2,646,343	5,892	99.8%
8m	72 - 160m	29,329	4	100.0%
	TOTAL:	29,222,073	249,893	**99.1%**
	TOTAL (by area):	105,445,701	402,542	**99.6%**

Figure 4: H12472 Density Statistics

A.4 Survey Coverage

Figure 5: H12472 Survey Outline

Complete MBES (with backscatter) coverage was achieved within the survey limits as defined in the Project Instructions. Thick kelp beds were the major factor when not reaching the sheet limit or the 8-meter curve. These kelp areas are noted in the Final Feature File. In some cases, additional MBES data was collected beyond the survey limits in the vicinity of Twelve Fathom Strait, where lidar data was determined by the Hydrographer to be sparse.

A.5 Survey Statistics

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

	Vessel	***2801***	***2802***	***2803***	***2804***	***Total***
LNM	**SBES Mainscheme**	0	0	0	0	0
	MBES Mainscheme	133.47	165.99	206.22	136.78	642.46
	Lidar Mainscheme	0	0	0	0	0
	SSS Mainscheme	0	0	0	0	0
	SBES/MBES Combo Mainscheme	0	0	0	0	0
	SBES/SSS Combo Mainscheme	0	0	0	0	0
	MBES/SSS Combo Mainscheme	0	0	0	0	0
	SBES/MBES Combo Crosslines	0	20.05	0	0	20.05
	Lidar Crosslines	0	0	0	0	0
Number of Bottom Samples						7
Number AWOIS Items Investigated						2
Number Maritime Boundary Points Investigated						2
Number of DPs						0
Number of Items Items Investigated by Dive Ops						0
Total Number of SNM						28.21

Table 2: Hydrographic Survey Statistics

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

Survey Dates	Julian Day Number
08/12/2012	225
08/25/2012	238
08/27/2012	240
08/28/2012	241
09/09/2012	253
09/10/2012	254
09/11/2012	255
09/15/2012	259
09/26/2012	270
09/28/2012	272
09/29/2012	273
09/30/2012	274

Table 3: Dates of Hydrography

B. Data Acquisition and Processing

B.1 Equipment and Vessels

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

B.1.1 Vessels

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

Hull ID	*2801*	*2802*	*2803*	*2804*
LOA	28 feet	28 feet	28 feet	28 feet
Draft	3.5 feet	3.5 feet	3.5 feet	3.5 feet

Table 4: Vessels Used

B.1.2 Equipment

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

Manufacturer	Model	Type
Reson	Seabat 7125	MBES
Reson	Seabat 8125	MBES
Applanix	POS M/V V4	Positioning and Attitude System
Reson	SVP71	Sound Speed System
Odim Brooke Ocean (Rolls Royce Groups)	Moving Vessel Profiler 30	Conductivity, Temperature and Depth Sensor
Seabird	SBE 19+	Conductivity, Temperature and Depth Sensor

Table 5: Major Systems Used

B.2 Quality Control

B.2.1 Crosslines

Crosslines, acquired for this survey, totalled 3.22% of mainscheme acquisition.

Crossline data did not meet minimum NOAA requirements as a percentage of total mainscheme data. Crosslines totaled 3.22% of mainscheme data, less than the minimum 4% required in the HSSDM. Two crosslines (one each day) were acquired on DN225 Launch 2804 and DN259 Launch 2803, but most crosslines were collected on day number (DN) 238, while the remainder were planned for the final day of acquisition (DN274). On the final day, time constraints limited data collection, and it was determined that mainscheme and holiday coverage take precedence over crossline acquisition. As a result, the remaining crosslines were not acquired. MBES crosslines were in general agreement with MBES mainscheme lines (Figure 7). The statistical mean difference is 0.02m and the standard deviation is 0.08m (Figure 8).

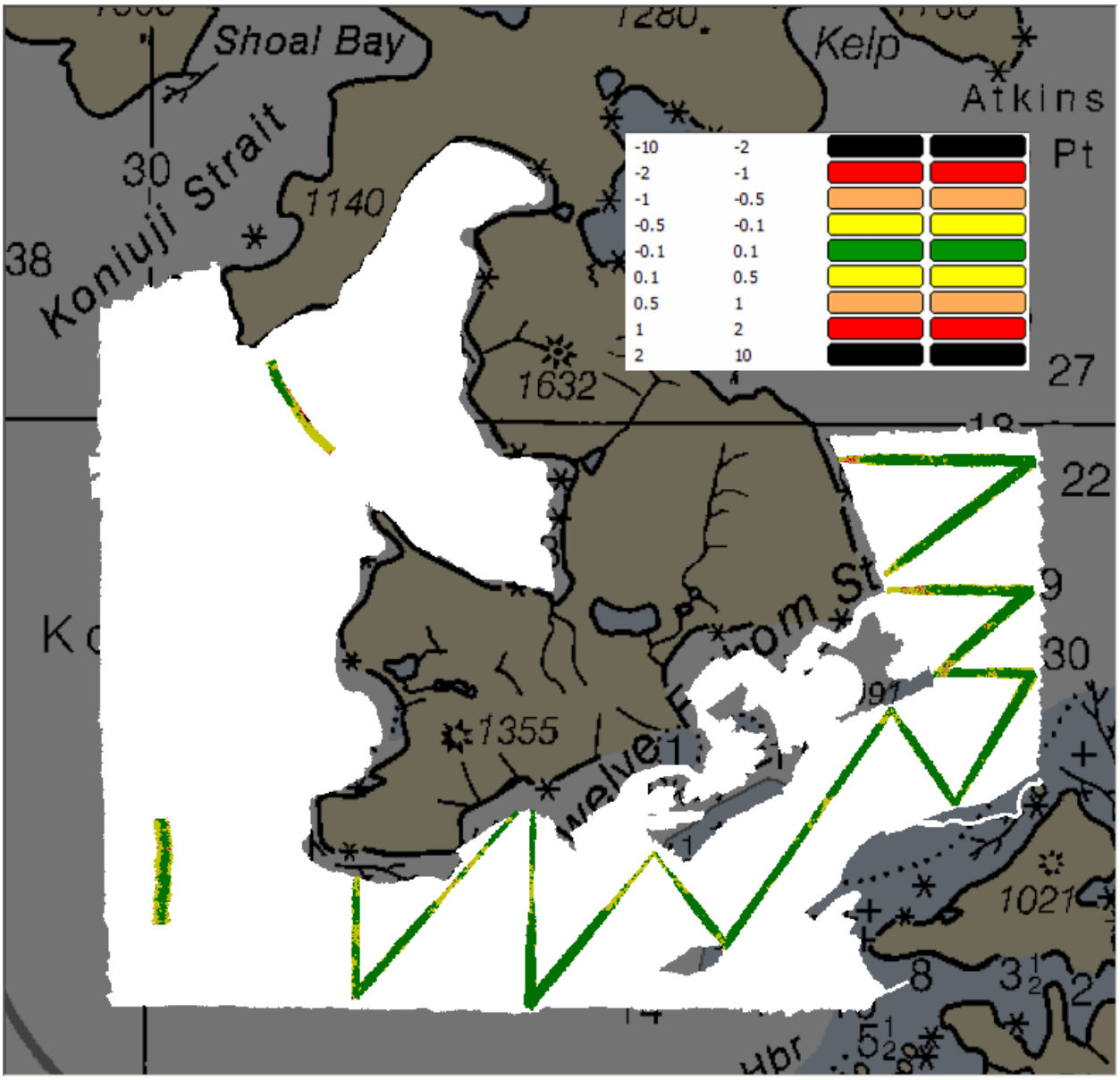


Figure 6: H12472 Crosslines & Mainscheme Difference Surface (in meters)

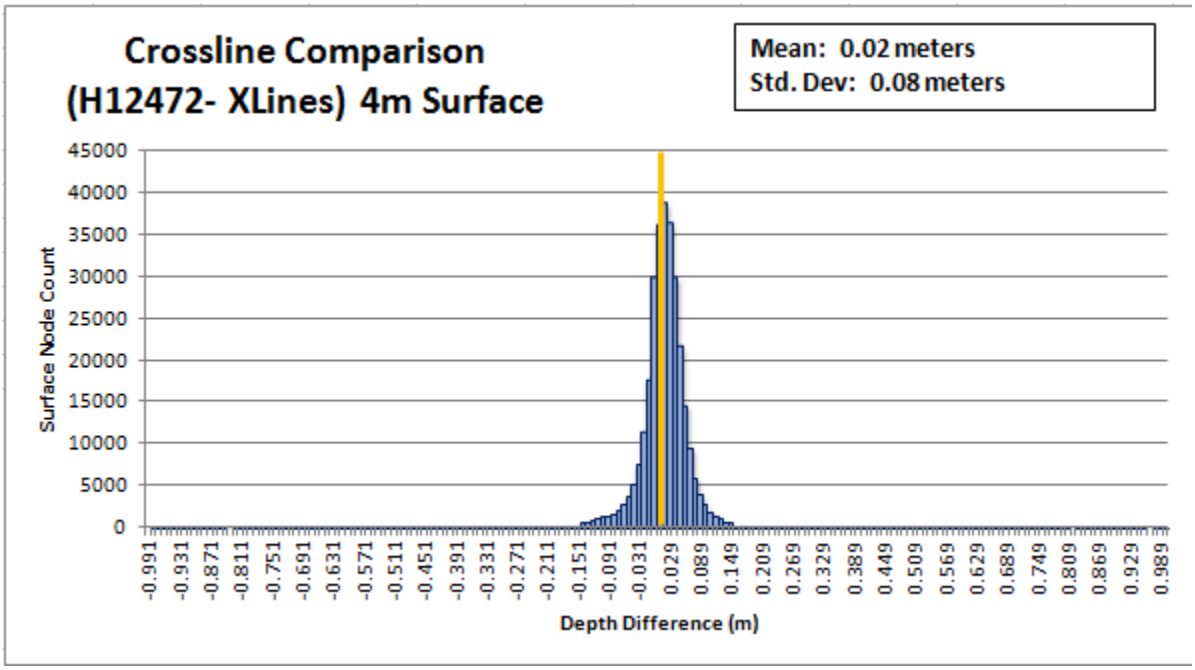


Figure 7: H12472 Crosslines & Mainscheme Difference Surface (in meters)

The survey is adequate for charting despite not meeting the minimum crossline requirement.

B.2.2 Uncertainty

The following survey specific parameters were used for this survey:

Measured	Zoning
0.0 meters	0.065 meters

Table 6: Survey Specific Tide TPU Values

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

Table 7: Survey Specific Sound Speed TPU Values

Uncertainty values of submitted, finalized grids were calculated in CARIS using the "Greater of the Two" of uncertainty and standard deviation. To visualize the locations in which accuracy requirements were met for each finalized surface, an "IHO" layer was created (Figure 9), based on the difference between calculated uncertainty of the nodes and the allowable IHO uncertainty. To quantify the extent to which accuracy

requirements were met, the "IHO" layers were queried within CARIS and then examined in Excel. Overall, 99.7% and 99.1%, by area and node respectively, of H12472 met the accuracy requirements stated in the HSSDM (Figure 10).

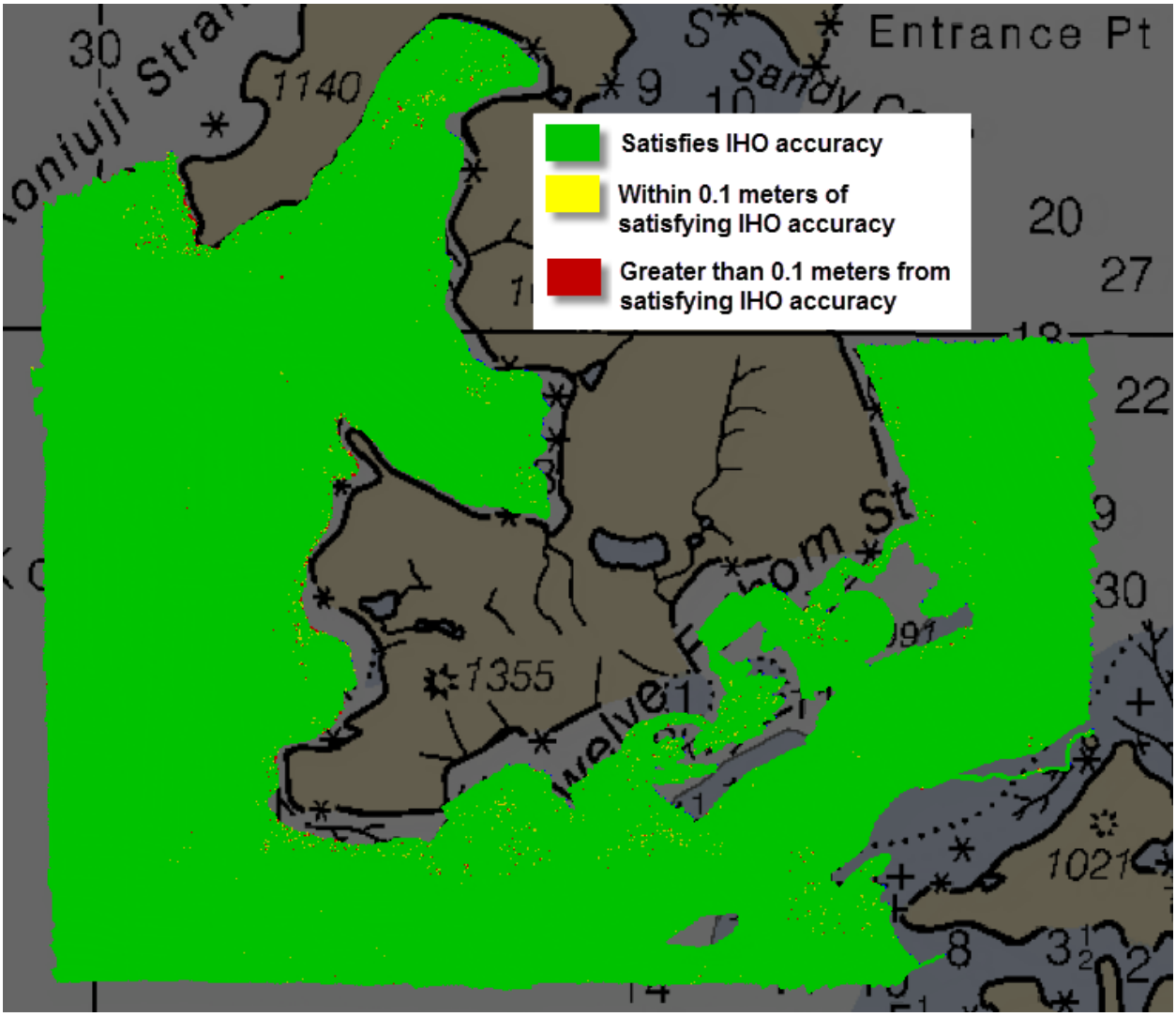


Figure 8: H12472 IHO Surface

Resolution	Depth range	IHO Order	Number of nodes	Nodes satisfying given IHO Order accuracy	Percent of nodes satisfying given IHO Order accuracy
1m	0 - 20m	Order 1	14,986,149	14,724,764	98.3%
2m	18 - 40m	Order 1	11,560,252	11,548,143	99.9%
4m	36 - 80m	Order 1	2,646,343	2,645,645	100.0%
8m	72 - 100m	Order 1	29,329	29,317	100.0%
		TOTAL:	29,222,073	28,947,869	**99.1%**
		TOTAL (by area):	105,445,701	105,123,944	**99.7%**

Figure 9: H12472 IHO Statistics

B.2.3 Junctions

Five junction comparisons were completed for H12472 (Figure 11). The surfaces were compared using the CARIS difference surface tool. ASCII files were exported for statistical comparison while the CARIS difference surface was used for visualization. All junctions were differenced with H12472 and a positive value indicates H12472 was the shoaler surface.

Lidar surveys H12103 and H12104 overlapped with H12472. For comparison purposes, a 5m surface was generated to match the resolution of the lidar grids. For gridding at the 5m node size, the "Capture_Distance_Min" of the CUBE Parameter file was changed to 5/sqrt(2) meters. No other changes were necessary. The depth layer of H12472 was differenced with the shoal layer of H12103 and H12104 (as specified to be used for survey depths in the DR for H12103 and H12104).

The following junctions were made with this survey:

Registry Number	Scale	Year	Field Unit	Relative Location
H12472	1:40000	2012	NOAA Ship RAINIER	N
H12103	1:10000	2009	Fugro LADS	S
H12104	1:10000	2009	Fugro LADS	SE
H12119	1:40000	2009	NOAA Ship FAIRWEATHER	NW
H12473	1:40000	2012	NOAA Ship RAINIER	S
H12474	1:40000	2012	NOAA Ship RAINIER	E

Table 8: Junctioning Surveys

H12472

H12472

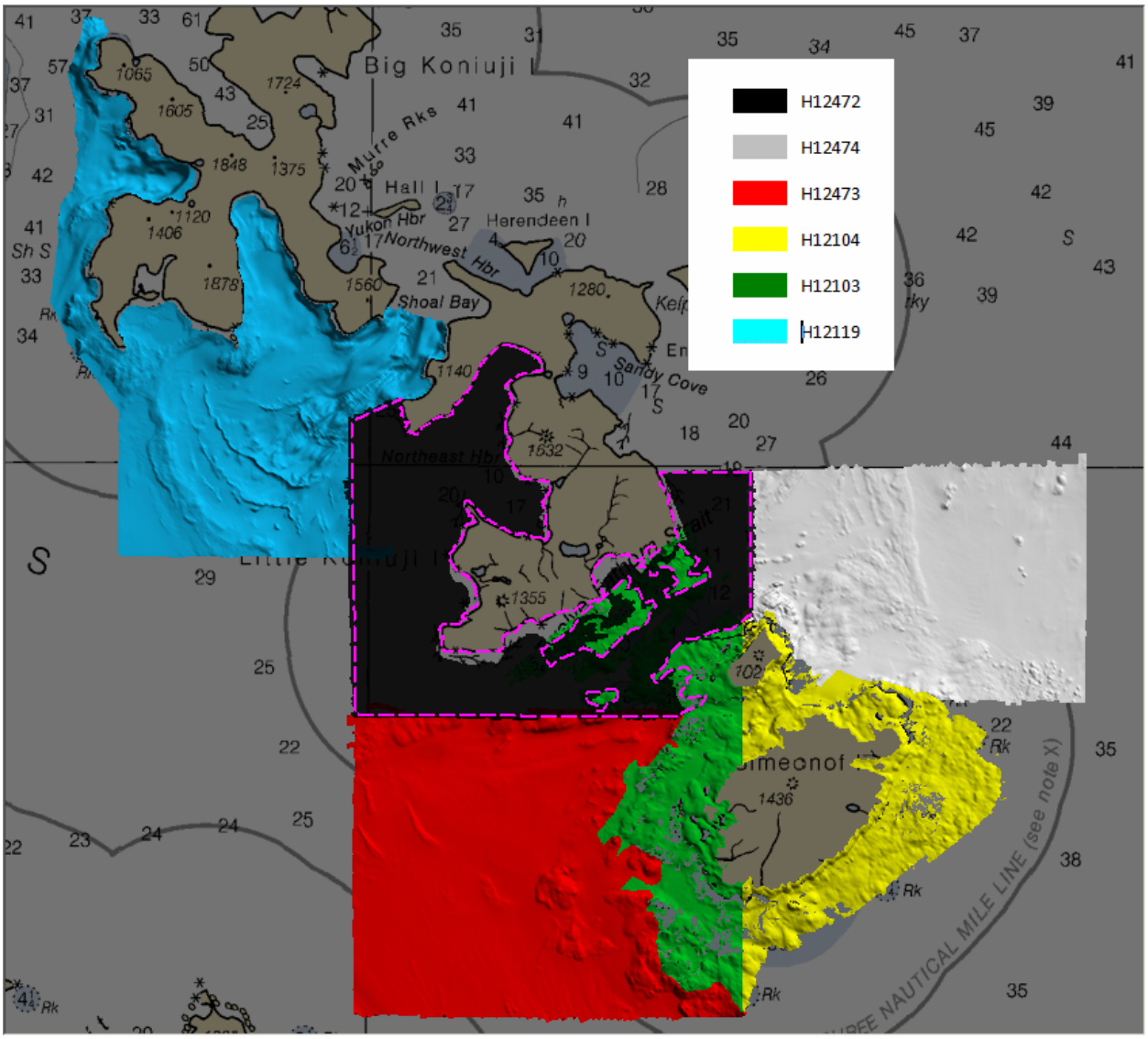


Figure 10: H12472 Sheet Limits (black surface with pink outline) and Junction Surveys

H12103

H12103 was acquired by Fugro LADS in 2009. A difference surface was used to visually and statistically compare the two surveys (Figures 12 & 13) yielding a mean difference of 0.06m and a standard deviation of 0.33m, with an overlap intermittent throughout the junction.

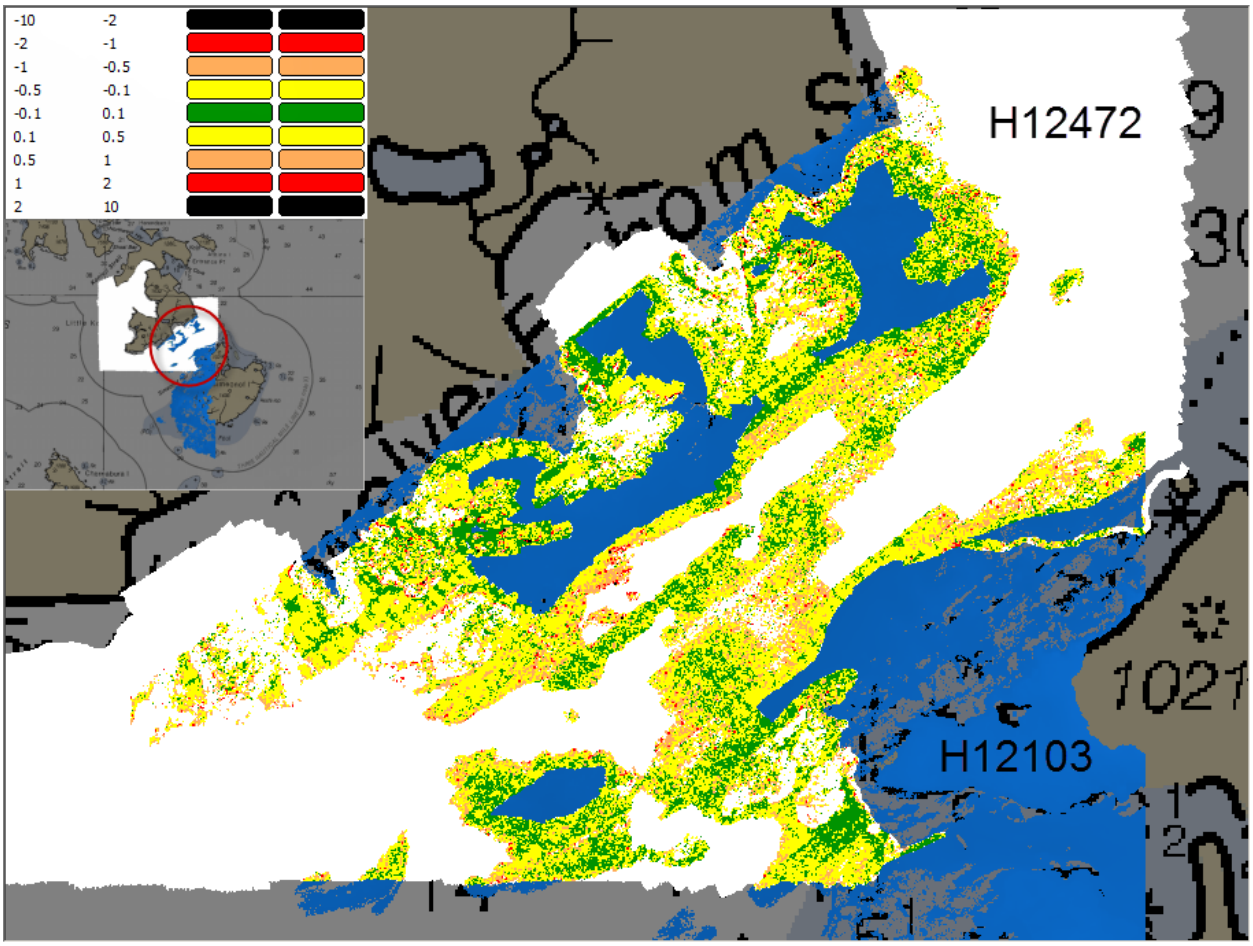


Figure 11: H12472 & H12103 5m Difference Surface (legend in meters)

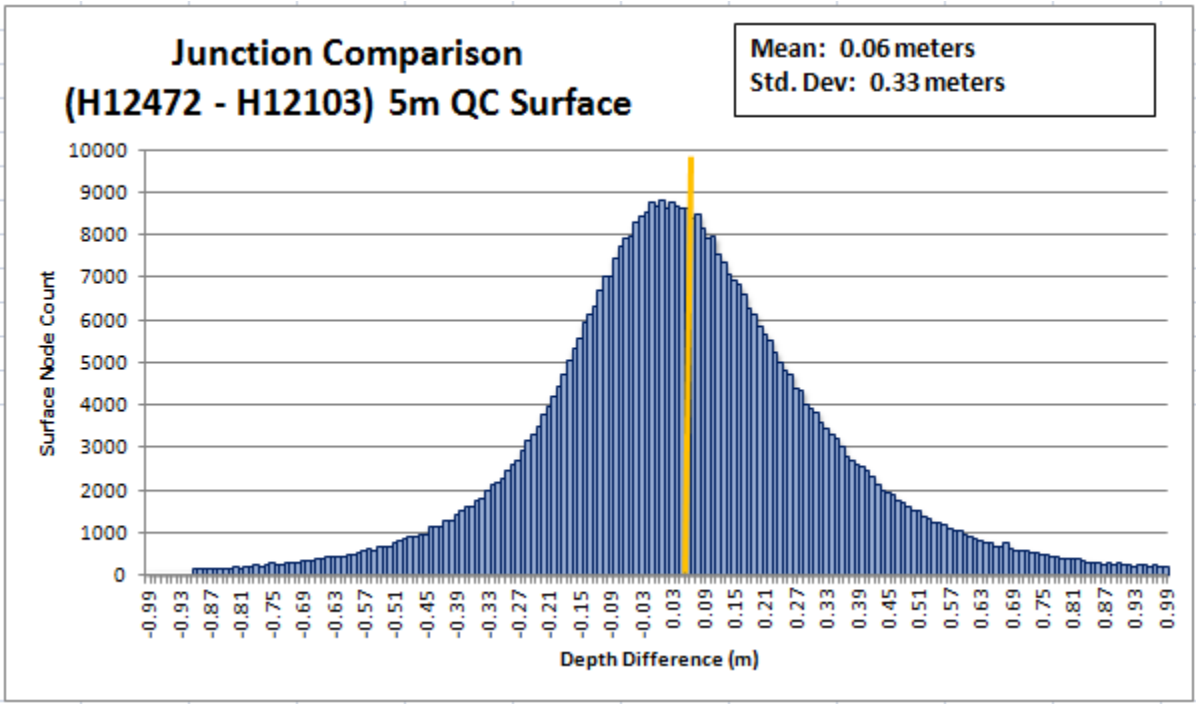


Figure 12: H12472 & H12103 5m Difference Surface (H12472 being shoaler)

H12104

H12104 was acquired by Fugro LADS in 2009. A difference surface was used to visually and statistically compare the two surveys (Figures 14 & 15) yielding a mean difference of 0.17m (H12472 being shoaler) and a standard deviation of 0.26m, with an overlap of approximately 9,000 sq. meters at the junction. The junction was small with respect to the area of overlap and had an irregular bottom with kelp that may affect the lidar surface, and thus the difference surface.

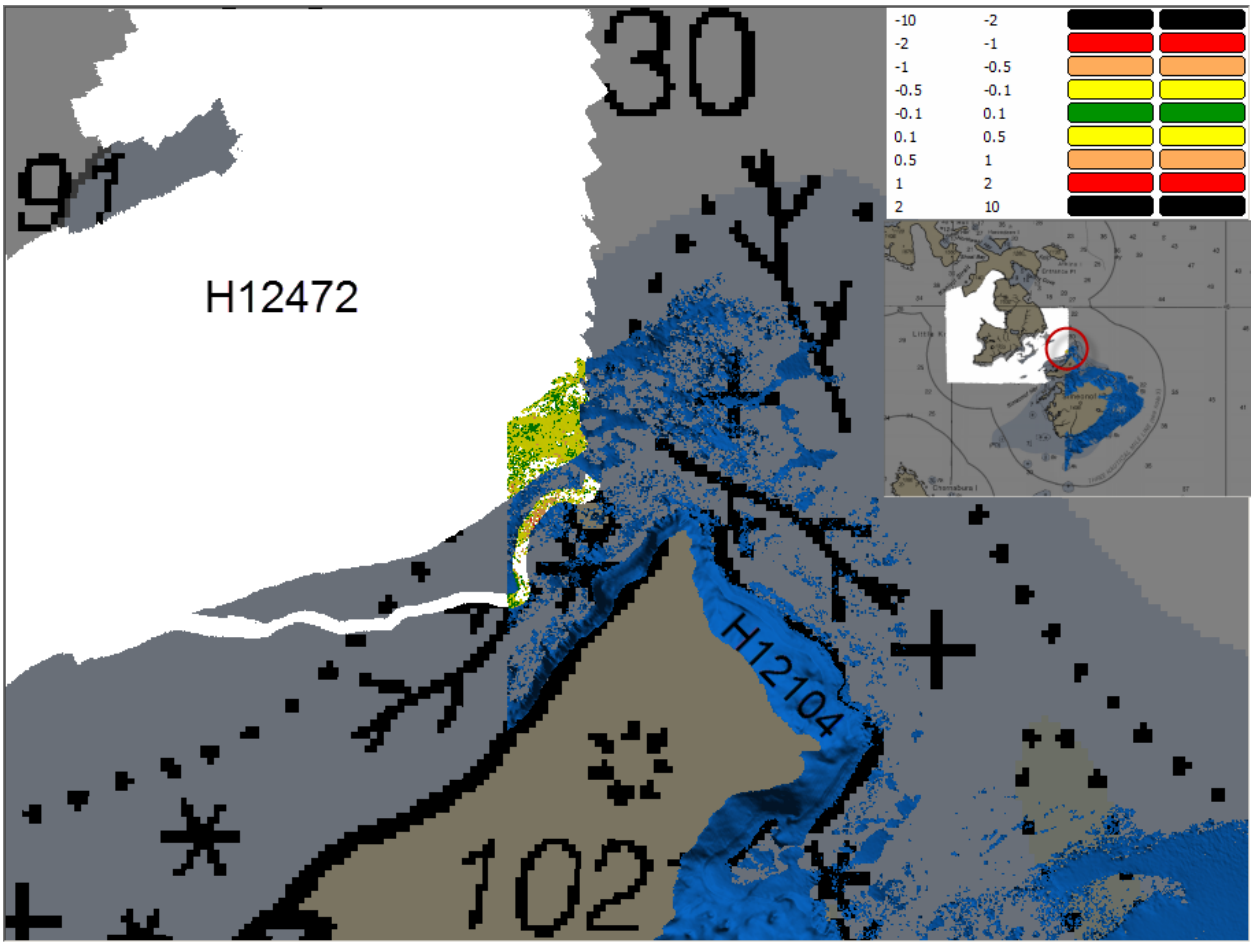


Figure 13: H12472 & H12104 5m Difference Surface (legend in meters)

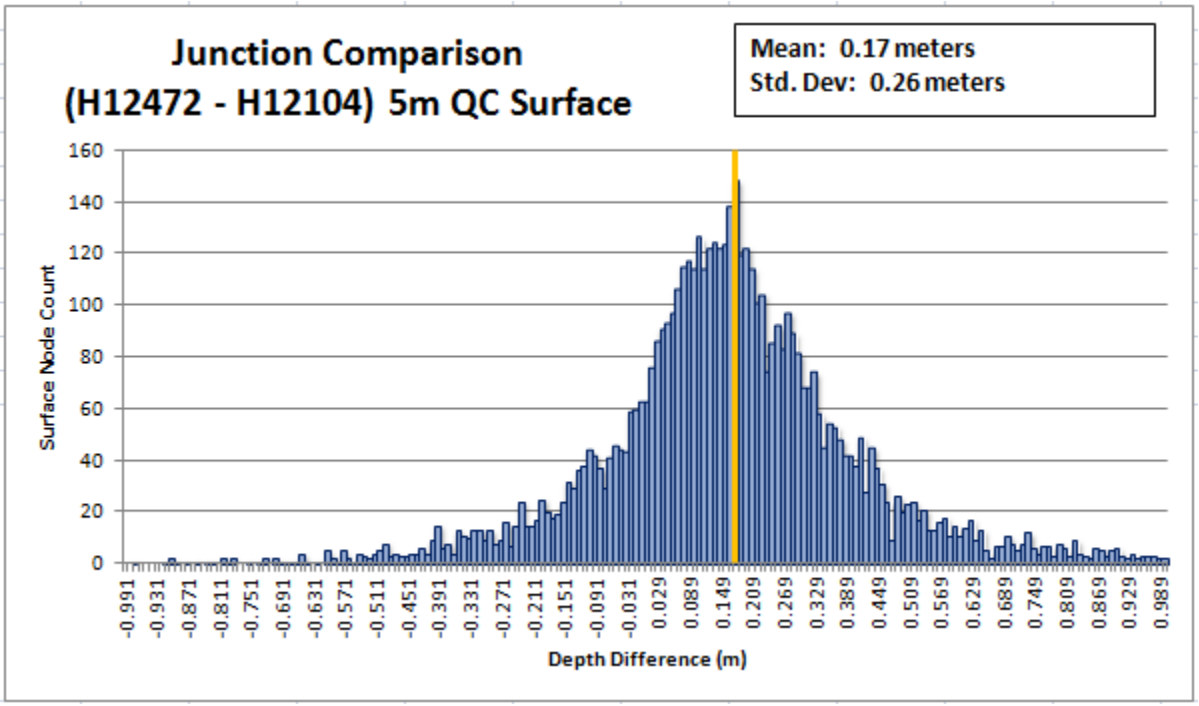


Figure 14: H12472 & H12104 5m Difference Surface (H12472 being shoaler)

H12119

H12119 was acquired by the NOAA ship FAIRWEATHER in 2009. A difference surface was used to visually and statistically compare the two surveys (Figures 16 & 17) yielding a mean difference of -0.15m (H12472 being deeper) and a standard deviation of 0.39m, with an overlap of about 100 to 150 meters along the length of the junction.

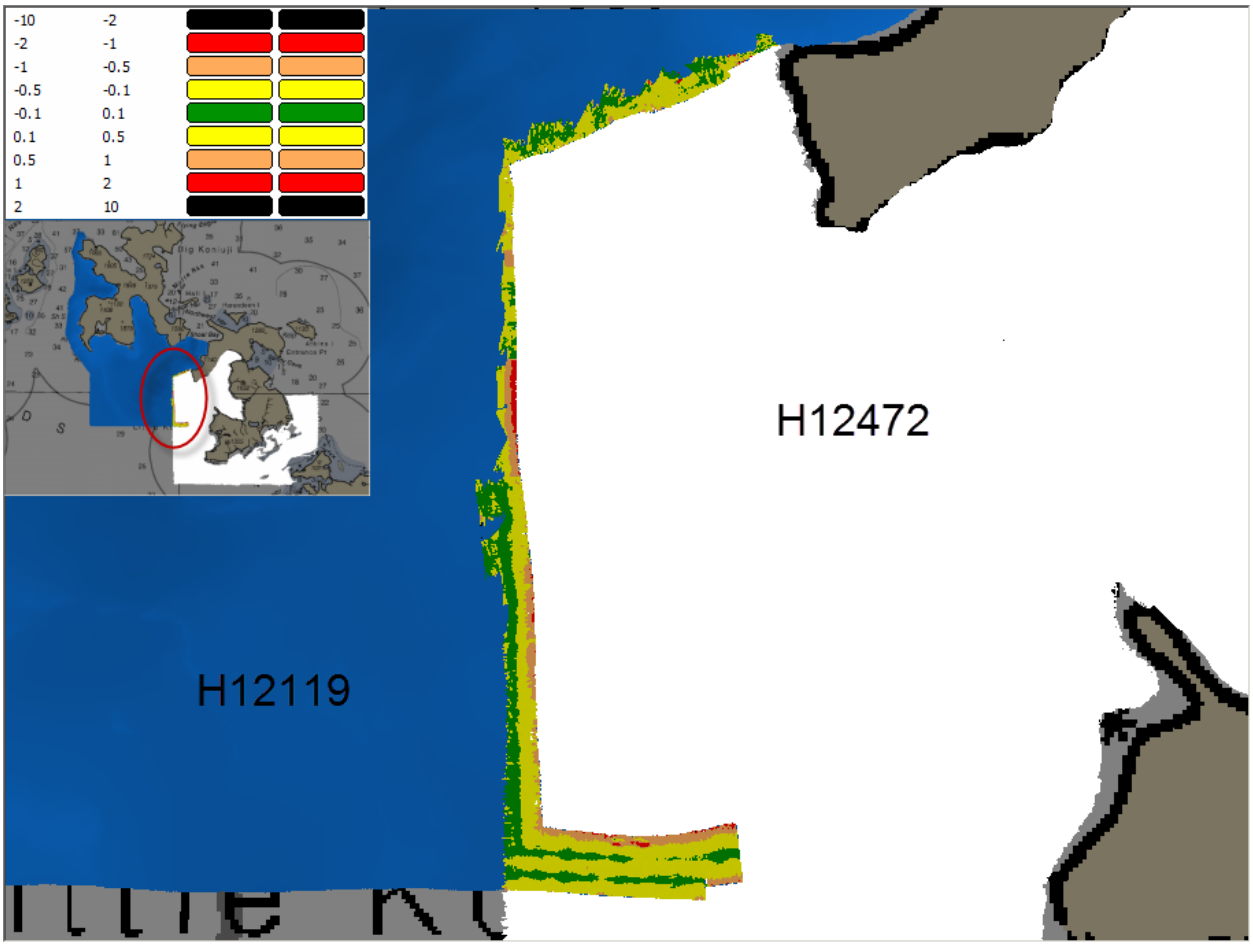


Figure 15: H12472 & H12119 4m Difference Surface (legend in meters)

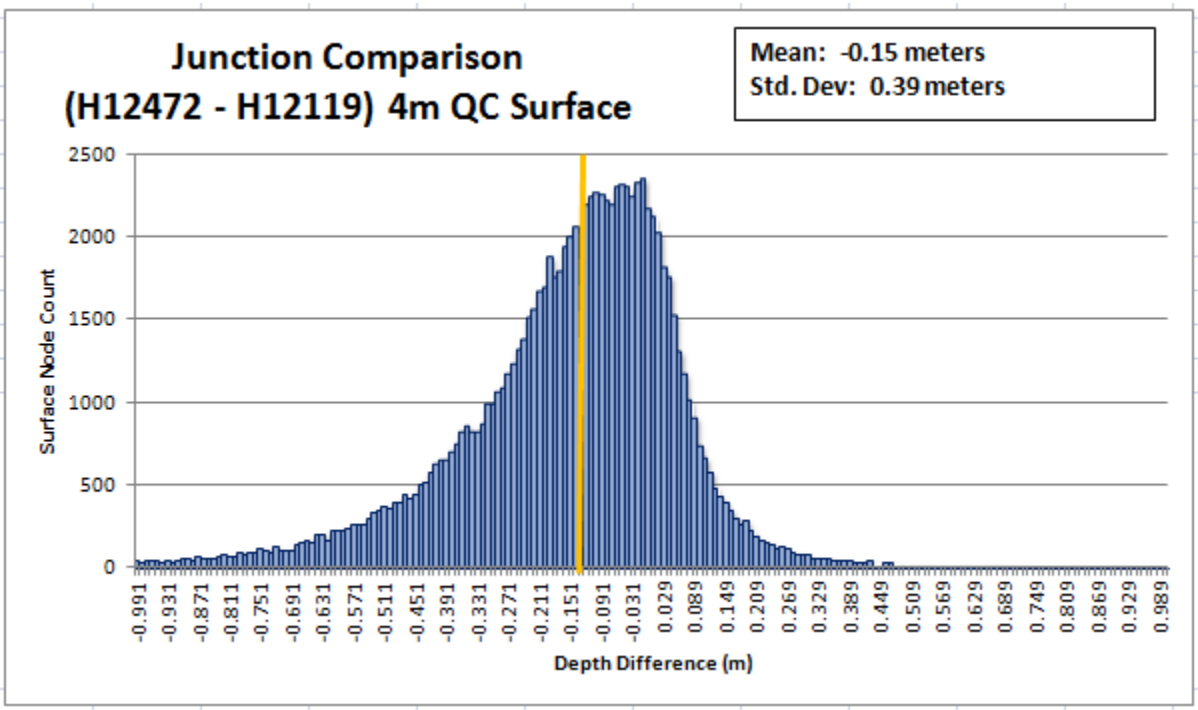


Figure 16: H12472 & H12119 4m Difference Surface (H12472 being deeper)

H12473

H12473 was acquired during the same period as H12472 for project OPR-P138-RA-12. A difference surface was used to visually and statistically compare the two surveys (Figures 18 & 19) yielding a mean difference of -0.04m (H12472 being deeper) and a standard deviation of 0.19m, with an overlap of about 250 meters along the length of the junction.

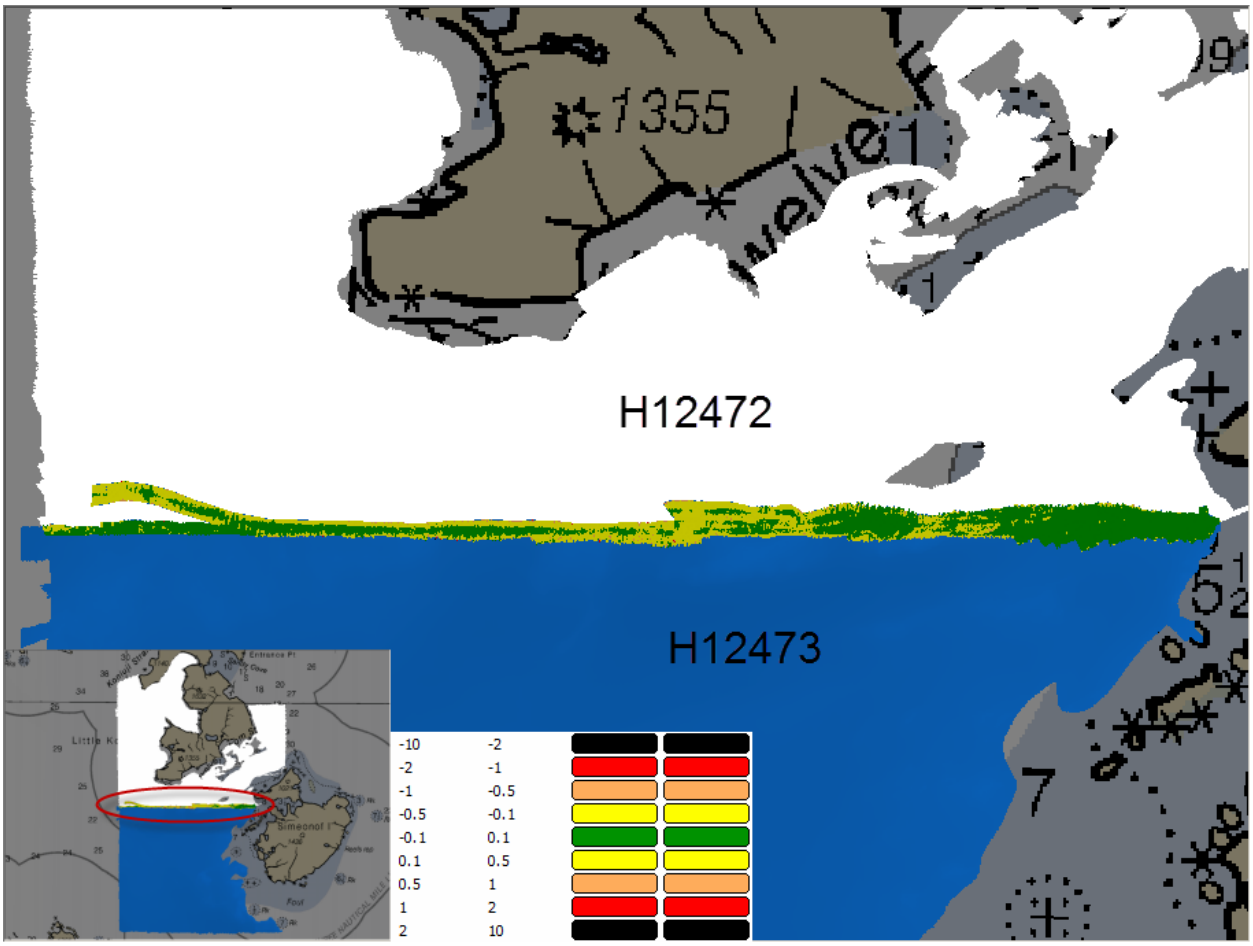


Figure 17: H12472 & H12473 4m Difference Surface (legend in meters)

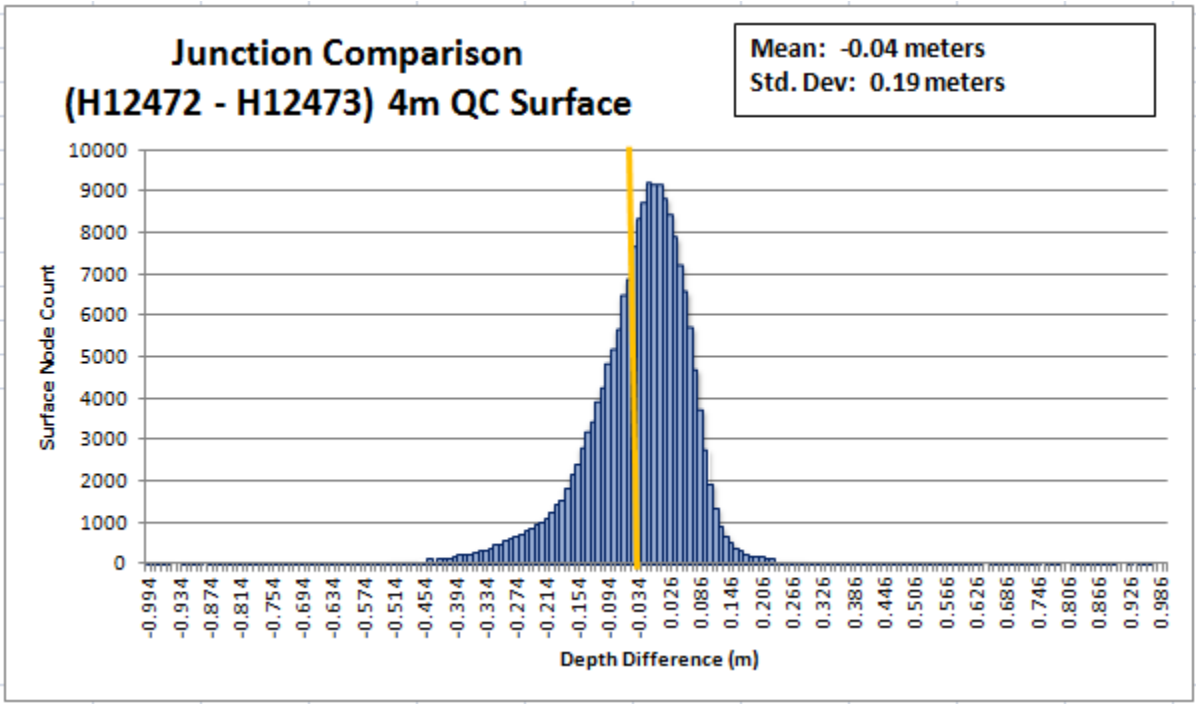


Figure 18: H12472 & H12473 4m Difference Surface (H12472 being deeper)

H12474

H12474 was acquired during the same period as H12472 for project OPR-P138-RA-12. A difference surface was used to visually and statistically compare the two surveys (Figures 20 & 21) yielding a mean difference of 0.07m (H12472 being shoaler) and a standard deviation of 0.14m, with an overlap of about 150 meters along the length of the junction.

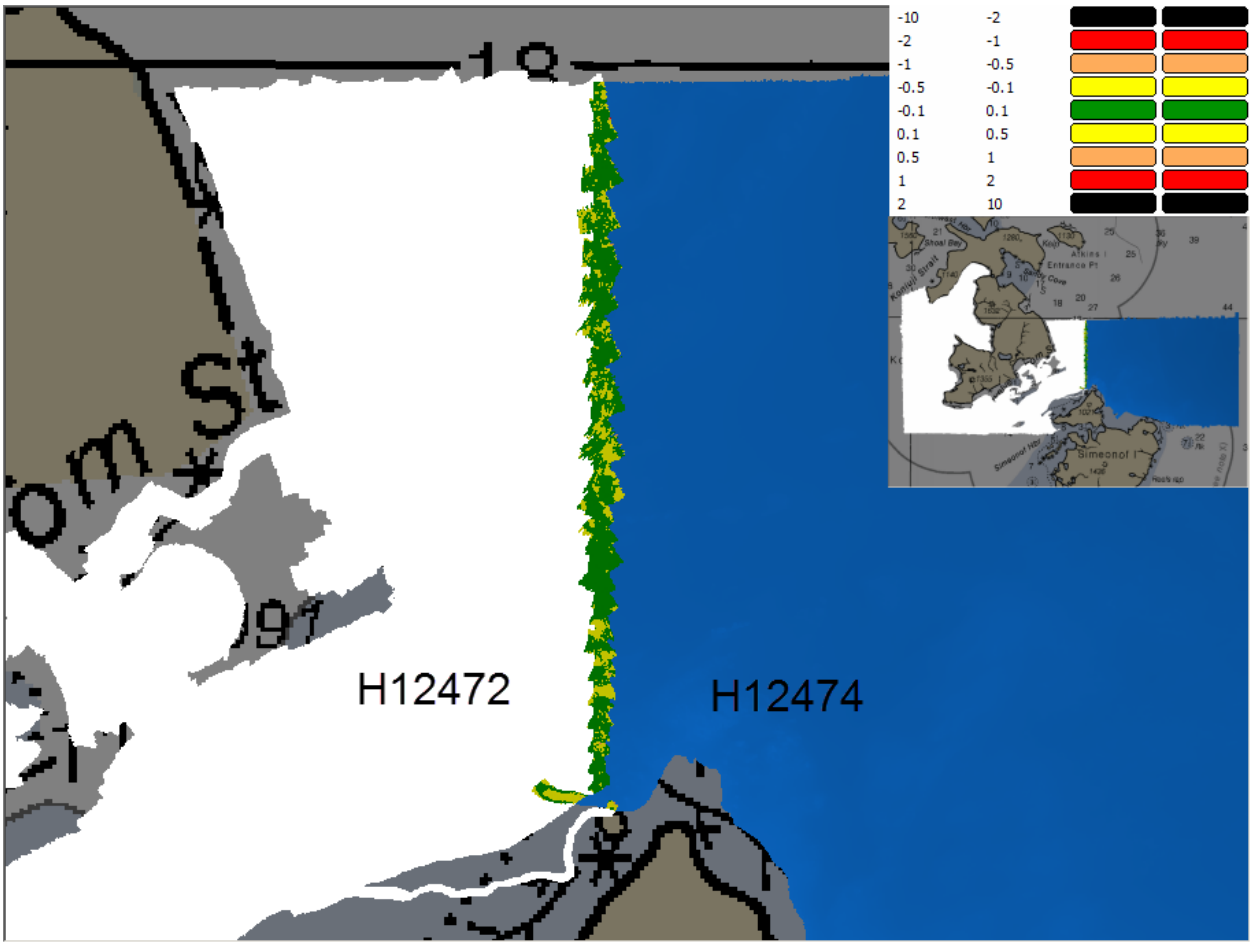


Figure 19: H12472 & H12474 4m Difference Surface (legend in meters)

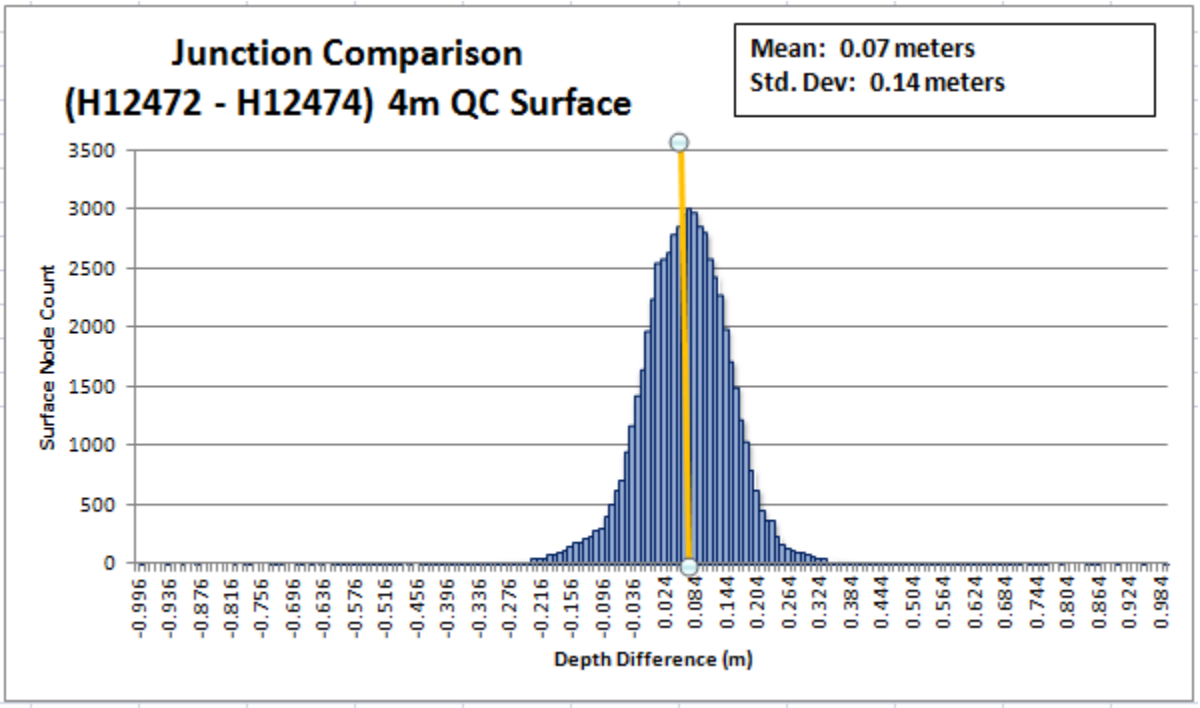


Figure 20: H12472 & H12474 4m Difference Surface (H12472 being shoaler)

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: Sound velocity casts were acquired every four hours at discrete locations within the working area using SBE 19/19+ CTD instruments. The casts were then used to post-process MBES data in CARIS using "nearest in distance within time (4 hours)". One concatenated SVP file was made for each launch creating a total of four SVP files (Figure 22). Two casts fell outside the sheet limits. Both were considered applicable to H12472. A cast for Launch 2802 on DN271 was taken by the ship due to 2802 CTD failure that day. The ship was on sheet H12473, but was in vicinity of launch, and ship cast was

used. The other cast that was outside sheet limits was acquired by Launch 2803 and was used for H12472 data, but acquired at that location because S221's MVP failed while it was working in H12473.

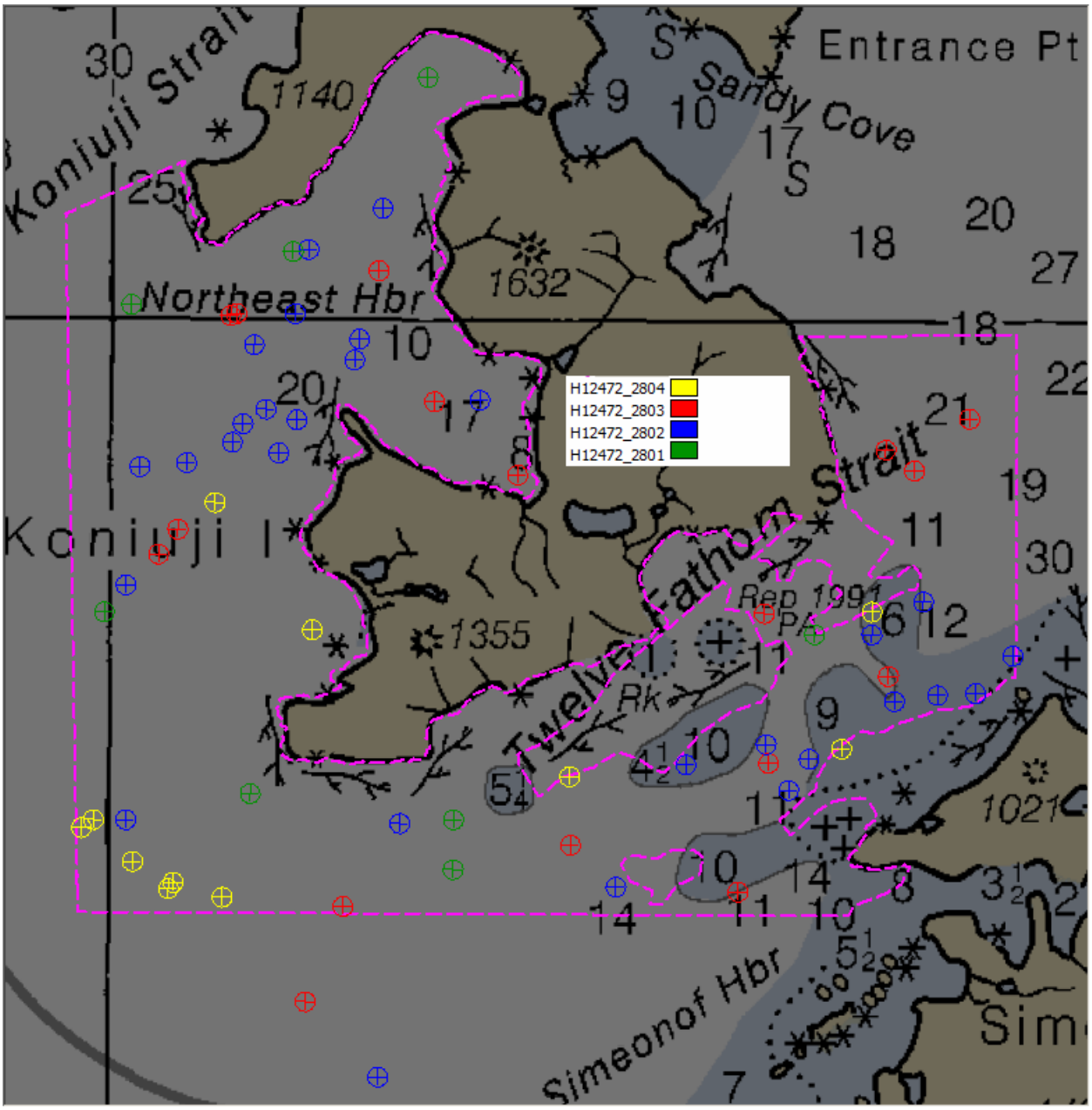


Figure 21: H12472 Sound Velocity Casts

The data corrected by the casts that fell outside the sheet limits meets specifications and is adequate to supersede charted data.

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

The following calibrations were conducted after the initial system calibration discussed in the DAPR:

Calibration Type	Date	Reason
Patch test	2012-11-27	The Reson 7125 Receiver array from RA-3 was put on RA-5 after failure, and the receiver array from RA-3 was later replaced.

Table 9: Calibrations not discussed in the DAPR.

Launches 2803 and 2802 were recalibrated after the Reson 7125 receiver array on 2802 was refitted with the receiver from 2803 on DN258. A replacement for 2803 was later procured and attached. The patch tests were conducted and applied to the vessel file (HVF) with no noticeable artifacts.

Replacement and re-calibration of the Reson 7125 receivers did not negatively affect the quality of the data acquired by Launches 2802 and 2803.

B.3.3 Sound Velocity Artifact

Due to the dynamic nature of the water column and its effects on sound speed, data artifacts were seen from Launch 2803 on DN240 and Launch 2804 DN270. These data artifacts were most evident in the outer beams, and were generally seen as "frowns" or foul-weather induced SSV artifacts in CARIS Subset Editor (Figure 23 & 24). The CUBE surface generated by CARIS largely ignored these outer beams and stayed true to the seafloor. All data meets or exceeds accuracy specifications as outlined in the HSSDM.

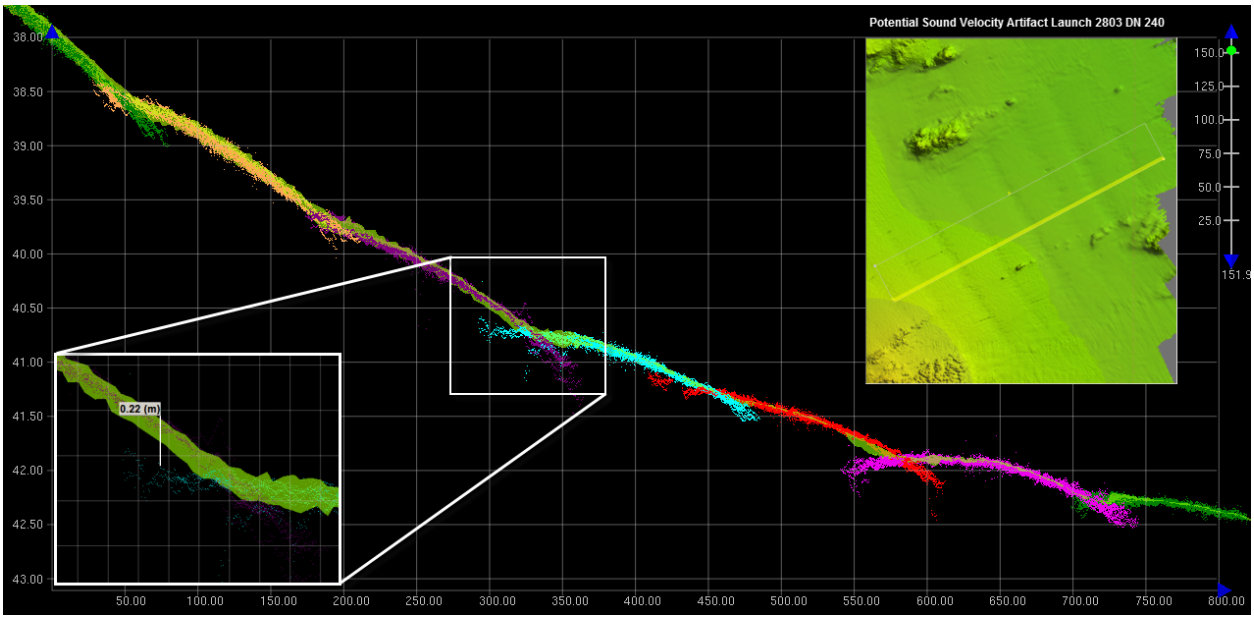


Figure 22: Potential Sound Velocity Data Artifact (Launch 2803, DN240, 400 kHz)

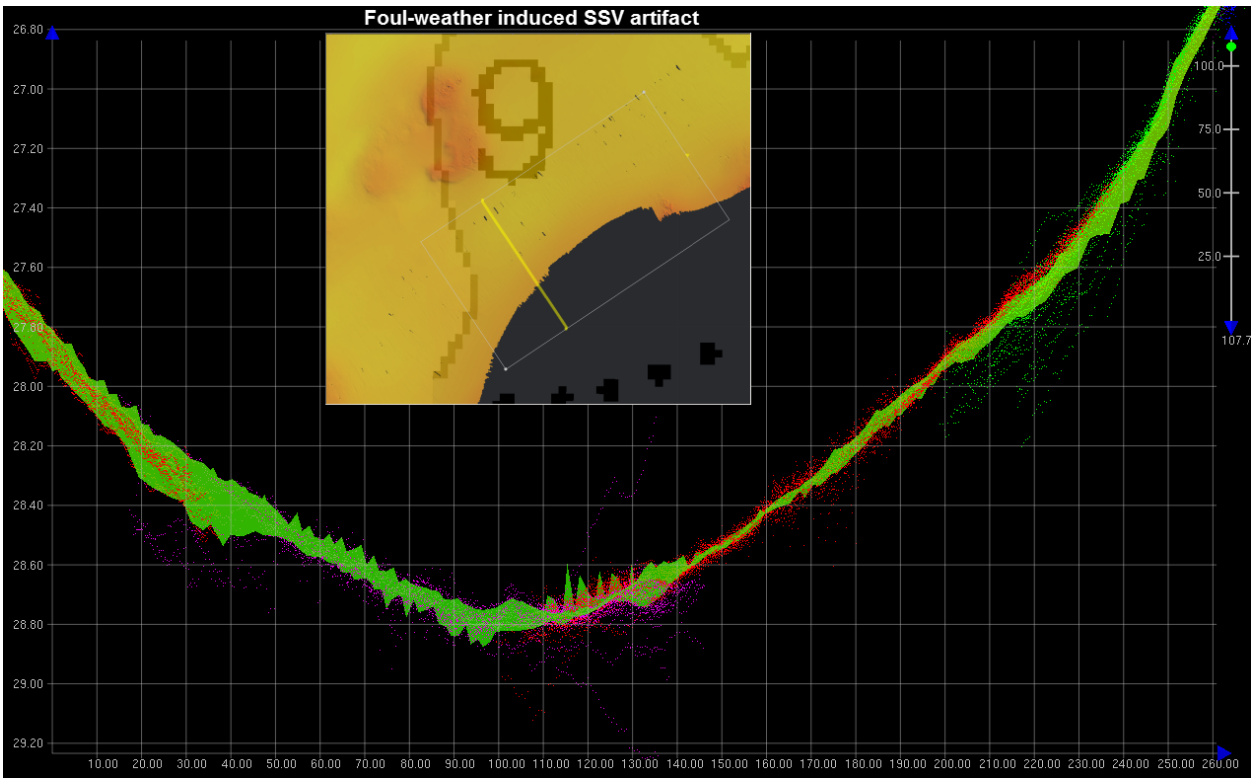


Figure 23: Potential Sound Velocity Data Artifact (Launch 2804, DN270 400kHz)

B.4 Backscatter

Backscatter data was logged as 7k files and submitted directly to NGDC and is not included with the data submitted to the Branch.

B.5 Data Processing

B.5.1 Software Updates

There were no software configuration changes after the DAPR was submitted.

The following Feature Object Catalog was used: NOAA Catalogue Control Version 5.2 & NOAA Profile Product Version 2.0

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
H12472_QC_8m	CUBE	8 meters	-2 meters - 100 meters	NOAA_8m	Complete MBES
H12472_QC_4m	CUBE	4 meters	-2 meters - 100 meters	NOAA_4m	Complete MBES
H12472_QC_2m	CUBE	2 meters	-2 meters - 100 meters	NOAA_2m	Complete MBES
H12472_QC_1m	CUBE	1 meters	-2 meters - 100 meters	NOAA_1m	Complete MBES
H12472_QC_8m_Final	CUBE	8 meters	72 meters - 160 meters	NOAA_8m	Complete MBES
H12472_QC_4m_Final	CUBE	4 meters	36 meters - 80 meters	NOAA_4m	Complete MBES
H12472_QC_2m_Final	CUBE	2 meters	18 meters - 40 meters	NOAA_2m	Complete MBES
H12472_QC_1m_Final	CUBE	1 meters	-2 meters - 20 meters	NOAA_1m	Complete MBES
H12472_Combined_8m	CUBE	8 meters	-2 meters -	NOAA_8m	Complete MBES

Surface Name	Surface Type	Resolution	Depth Range	Surface Parameter	Purpose
			100 meters		

Table 10: Submitted Surfaces

Multibeam data above 0 meters referenced to MLLW was retained in all surfaces per guidance from the Pacific Hydrographic Branch (See supplemental correspondence - Negative_Depths.jpg).

See attached supplemental correspondence.

B.5.3 Heading Error

Heading errors were observed in four lines from Launch 2803 on DN274 (lines 2741733-1743). These lines were run sequentially at the beginning of the day and were inadvertently logged prior to or very shortly after starting the POS file. These lines showed a northerly heading when the launch was not traveling in that direction (Figure 25). Since these lines were collected to improve data density in relatively insignificant density holidays, these lines were removed from the HDCS data and not included in the CUBE surfaces.

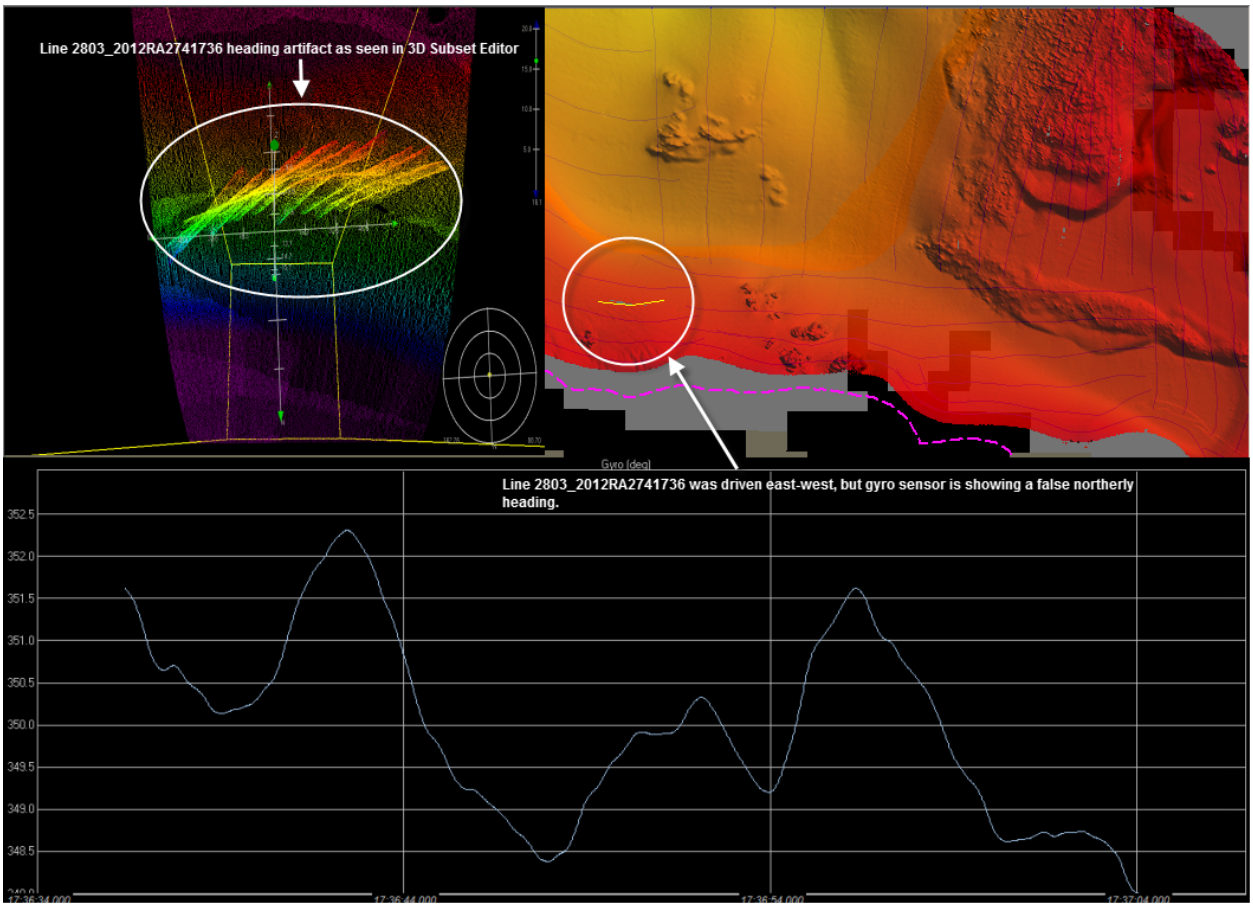


Figure 24: Line 2803_2012RA2741736 Heading Error

The data is adequate for charting despite removing the data with the heading error and thus reducing the data density in the affected area.

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.

Standard Vertical Control Methods Used:

Discrete Zoning

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

Station Name	Station ID
Sand Point, AK	9459450

Table 11: NWLON Tide Stations

File Name	Status
9459450.tid	Final Approved

Table 12: Water Level Files (.tid)

File Name	Status
P183RA2012CORP.zdf	Final

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

A request for final approved tides was sent to N/OPS1 on 10/01/2012. The final tide note was received on 10/18/2012.

See attached tide note dated October 9, 2012.

C.2 Horizontal Control

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

The projection used for this project is 4N.

The following PPK methods were used for horizontal control:

Single Base

A GPS Control station was established on the Murie Islets on the WSW side of Simeonof Island. POS files were post-processed in POSPac MMS using PPK or PPP SingleBase processing methods. SBET and RMS files were applied in CARIS.

The following user installed stations were used for horizontal control:

HVCR Site ID	Base Station ID
Simeonof Island	n/a

Table 14: User Installed Base Stations

PPP SingleBase processing was used when PPK methods did not work due to lack of base station data (DN 254), corrupt POS files, temporal proximity to UTC midnight, or other unknown reasons. These are discussed in Section C.3.3.1 SBET/RMS Application Issues.

Cold Bay, AK was the only USCG DGPS station used on survey H12472.

The following DGPS Stations were used for horizontal control:

DGPS Stations
Cold Bay (289kHz)

Table 15: USCG DGPS Stations

C.3 Additional Horizontal or Vertical Control Issues

3.3.1 SBET/RMS Application Issues

Smoothed Best Estimate Trajectory (SBET) and Root Mean Square (RMS) data could not be loaded to certain lines. Lines 2801 LF DN253 2532352 and 2803 HF DN255 2550001 would not load SBETs, possibly due to temporal proximity to UTC midnight. Line 2804 LF DN270 2710032 would not load the RMS file for an unknown reason, so SBETs were unapplied.

The failure loading the SBET and RMS data to the lines in question did not negatively affect the data and the data is adequate for charting.

D. Results and Recommendations

D.1 Chart Comparison

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
16540	1:300000	13	10/2012	10/30/2012	10/27/2012

Table 16: Largest Scale Raster Charts

16540

H12472 is a largely uncharted area that has only partial bottom coverage from NOS surveys that took place between 1940-1969. There is a general agreement between the limited number of charted soundings and observed MBES depths in that the two agree within 1-2 fathoms. There are large areas where there are no charted soundings, particularly closer to shore, but the charted depths represent the general trends found in acquisition (Figure 26).

Twelve Fathom Strait is the only area within the project that is charted with some detail. There are a number of soundings in the strait, but more importantly, there are rocky outcroppings (blue polygons) end-to-end along the northern half of Twelve Fathom Strait (Figure 27). Soundings that are significantly shoaler than charted depths in Twelve Fathom Strait are circled in blue (Figure 27). The chart also depicts shoals and dominant bottom features extending from the south side of the strait as indicated by blue tint and 10 fathom depth curve. Newly acquired MBES and coincident lidar data show that this does occur, but is limited and does not extend out as far as depicted on the chart. The opposite appears to be true, in that the blue tint and shoal areas tend to extend from the northern side of Twelve Fathom Strait into the middle of the waterway and this is not shown through a continuous 10 fathom depth curve, but rather isolated shoals.

Northeast Harbor, in the NW section of H12472 has a total of 5 charted soundings. All survey soundings are deeper than the charted depths with the exception of a 25 ftm charted depth in the northwest corner of the survey that shoals offshore (observed 6-10 ftm depths) of the presently charted depths. There are also several offshore rocky areas that are noted by blue rectangles (Figure 28) at the south end of the harbor entrance.

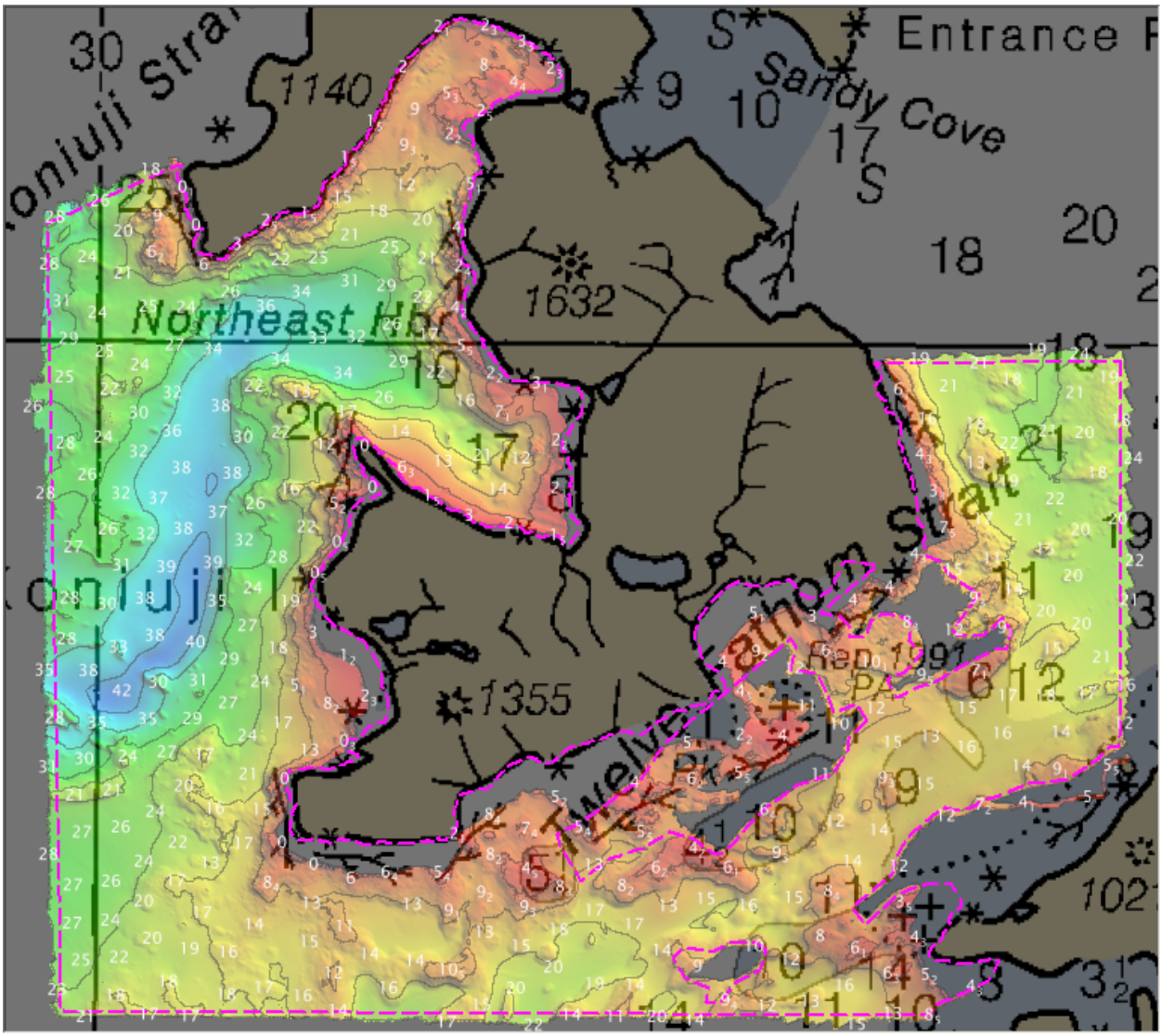


Figure 25: Chart 16540 Comparison for H12472 Overall (Soundings in Fathoms)

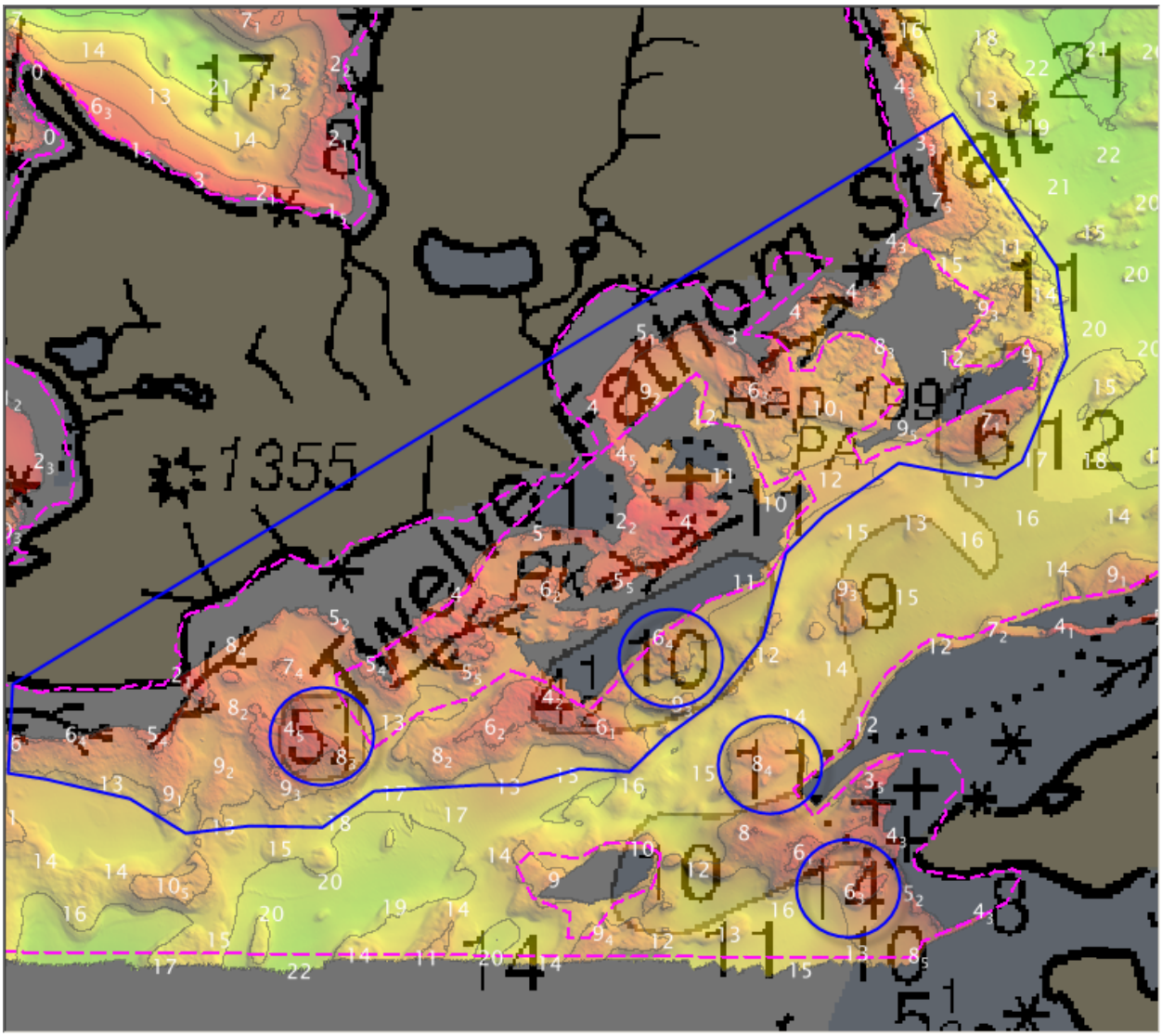


Figure 26: Chart 16540 Comparison for Twelve Fathom Strait (Soundings in Fathoms)

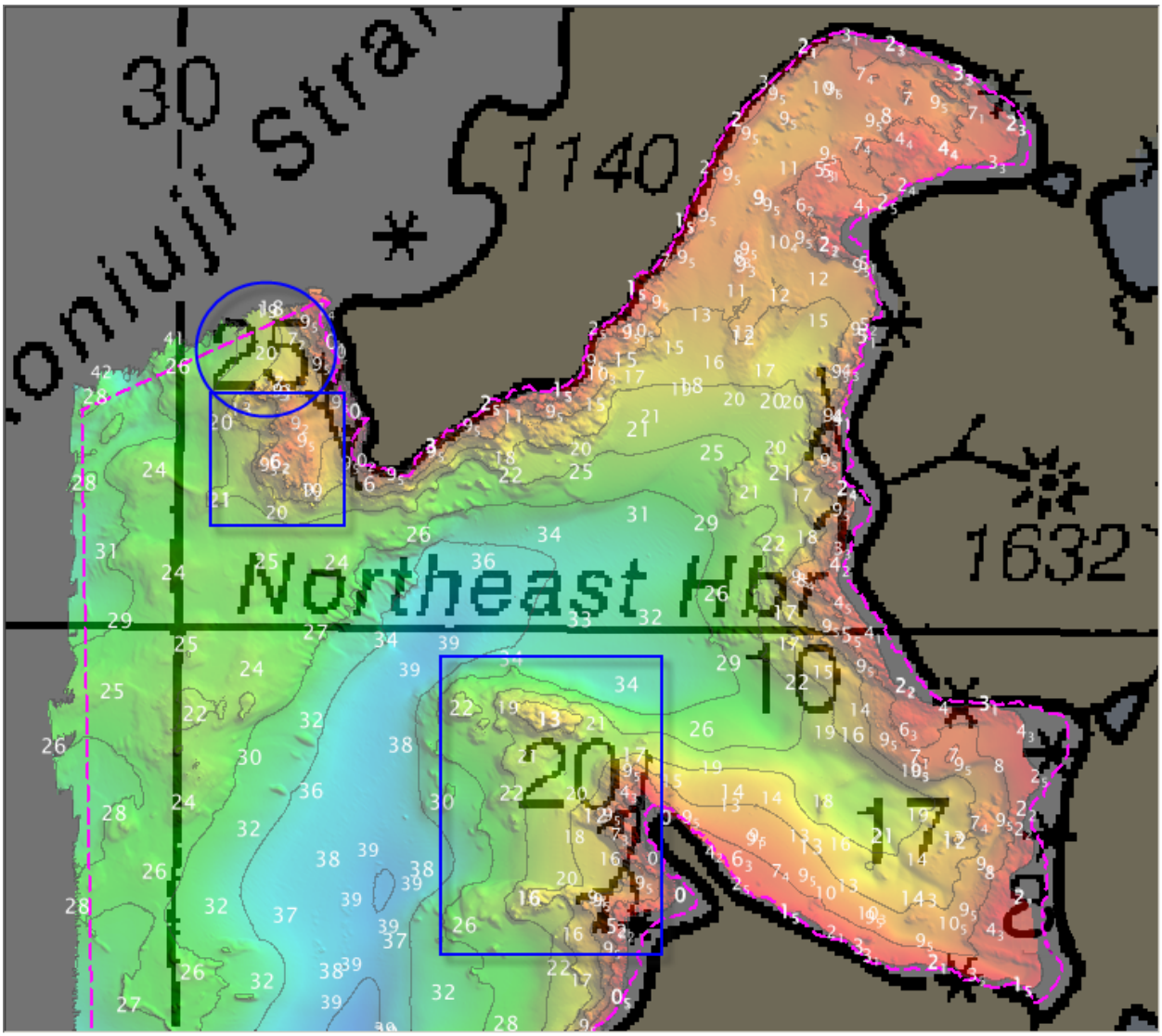


Figure 27: Chart 16540 Comparison for Northeast Harbor (Soundings in Fathoms)

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?
US3AK50M	1:300000	17	06/29/2012	06/29/2012	NO

Table 17: Largest Scale ENCs

US3AK50M

ENC US3AK50M coincides with raster 16450. The depths and contours on the ENC match the raster, and the comparison between survey H12473 and the ENC is equivalent to the preceding comparison with Chart 16450.

There are cases where the ENC soundings display 1 foot shoaler than the RNC soundings. All charted soundings will be updated with the new surveyed depths. There is also an issue where the latest GC source has been applied to the ENC, but it was not applied at the scale of the chart. Therefore, there are numerous rocks and foul areas depicted in the ENC that are not and can not be displayed on the RNC. All charted features will be updated with the new survey verified features.

D.1.3 AWOIS Items

Two AWOIS items were located within the sheet limits of H12472 and both were Maritime Boundary Point (MBP) investigations (Figures 29 & 30). The assigned MBPs were not found within the assigned 100m search radius, as there were no points within said radius that were dry at MLLW; however, approximately 150-200m east of the MBPs, the 0m curve was acquired with 2803 using the tilted Reson 8125 MBES. Two line features were added to the final features file delineating the shoalest depths acquired for the MBPs. The 0m curve was digitized as COALNE with the "sftype" flagged as "AWOIS", within the Final Feature File. For reference, the assigned MBPs are included as S57 CRANES objects in a custom H12472_Maritime_Boundary.hob file.

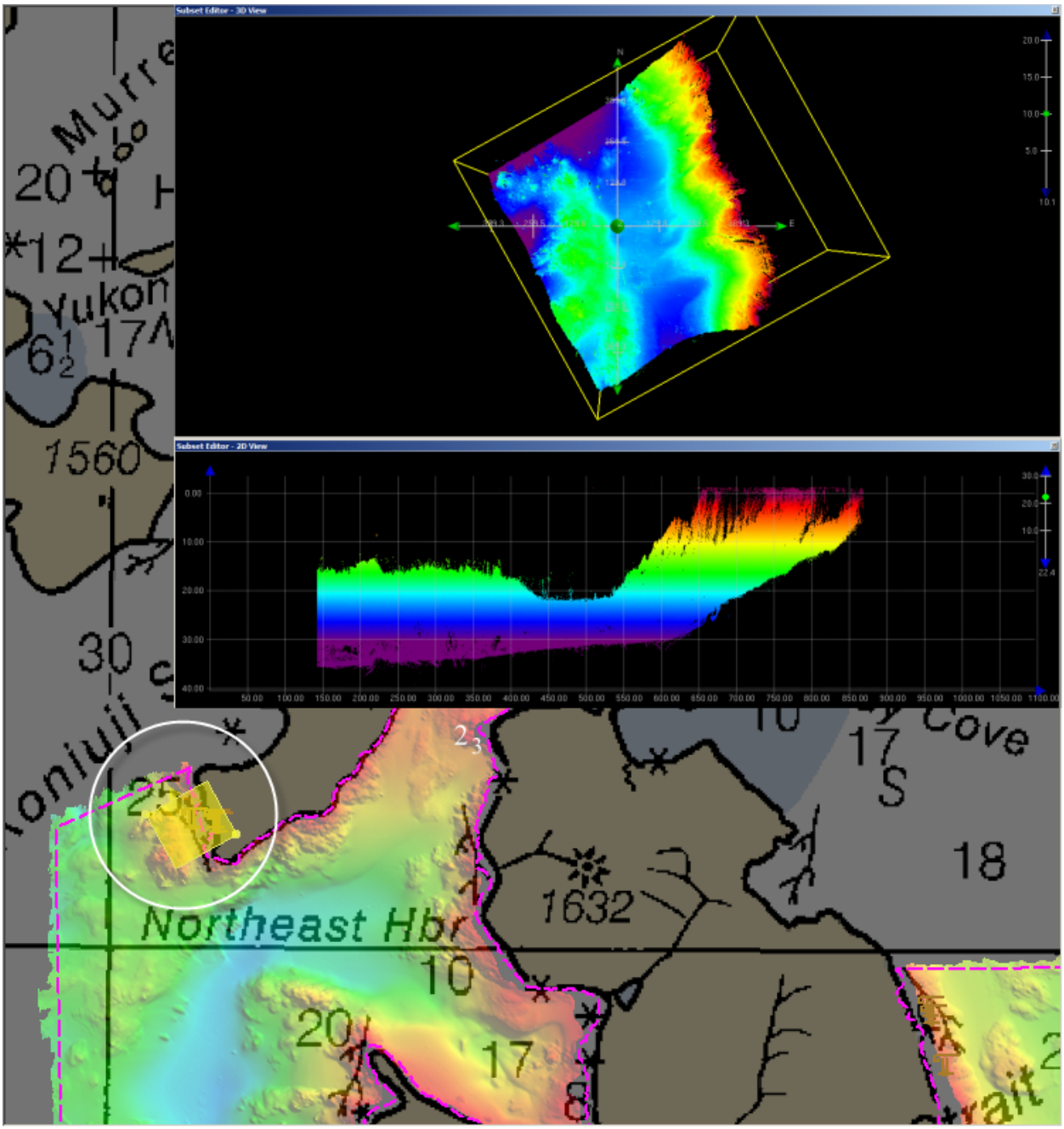


Figure 28: H12472 Maritime Boundary Point (North)

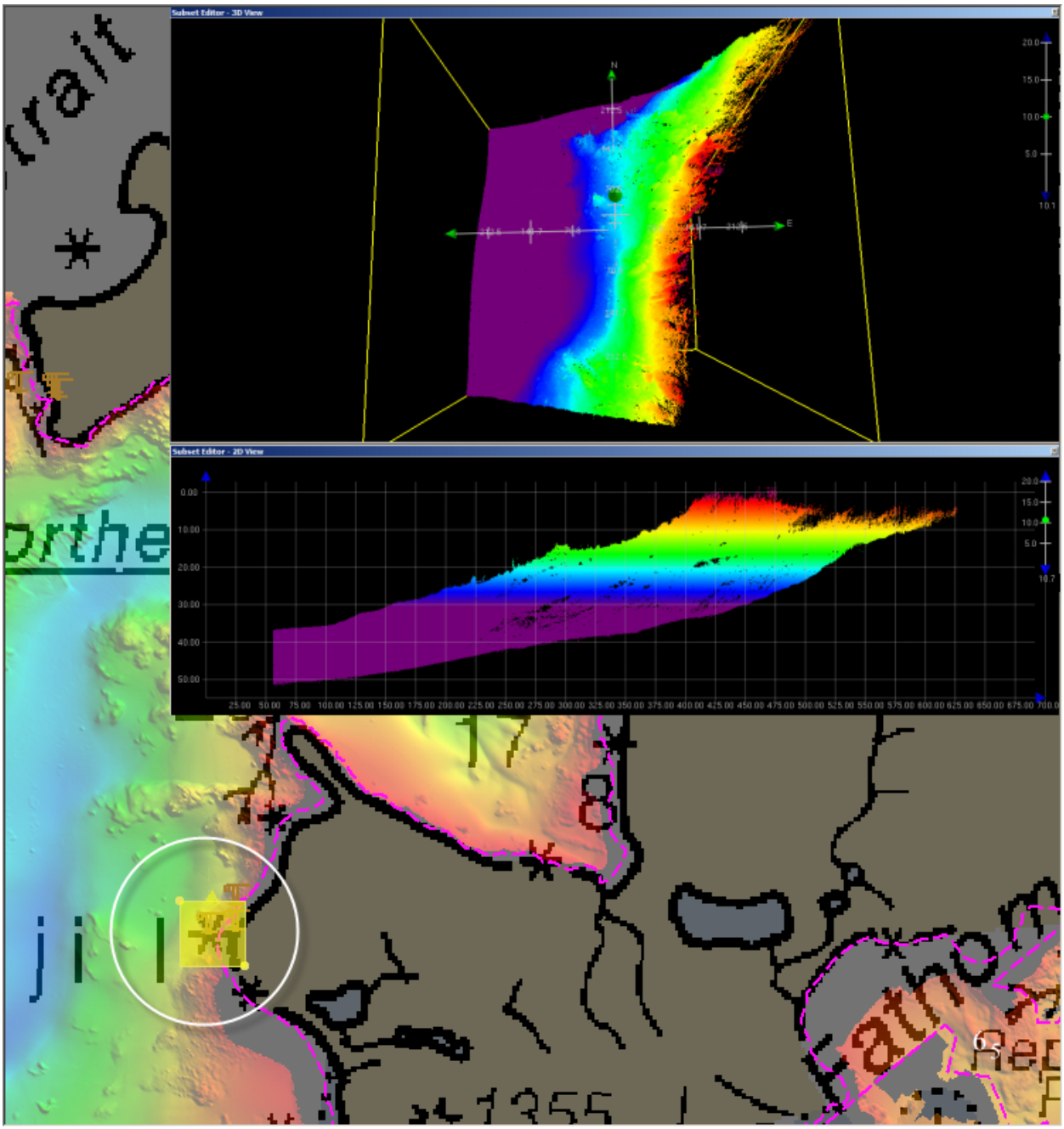


Figure 29: H12472 Maritime Boundary Point (South)

D.1.4 Maritime Boundary Points

See section D.1.3 for discussion on the Maritime Boundary point investigations.

D.1.5 Charted Features

Only one charted feature (submerged rock PA reported 1991) was investigated (Figure 31). The feature is discussed in the Final Feature File. It is recommended that the charted submerged rock be removed from the chart, and the shoalest sounding from the current MBES and lidar junction be charted instead.

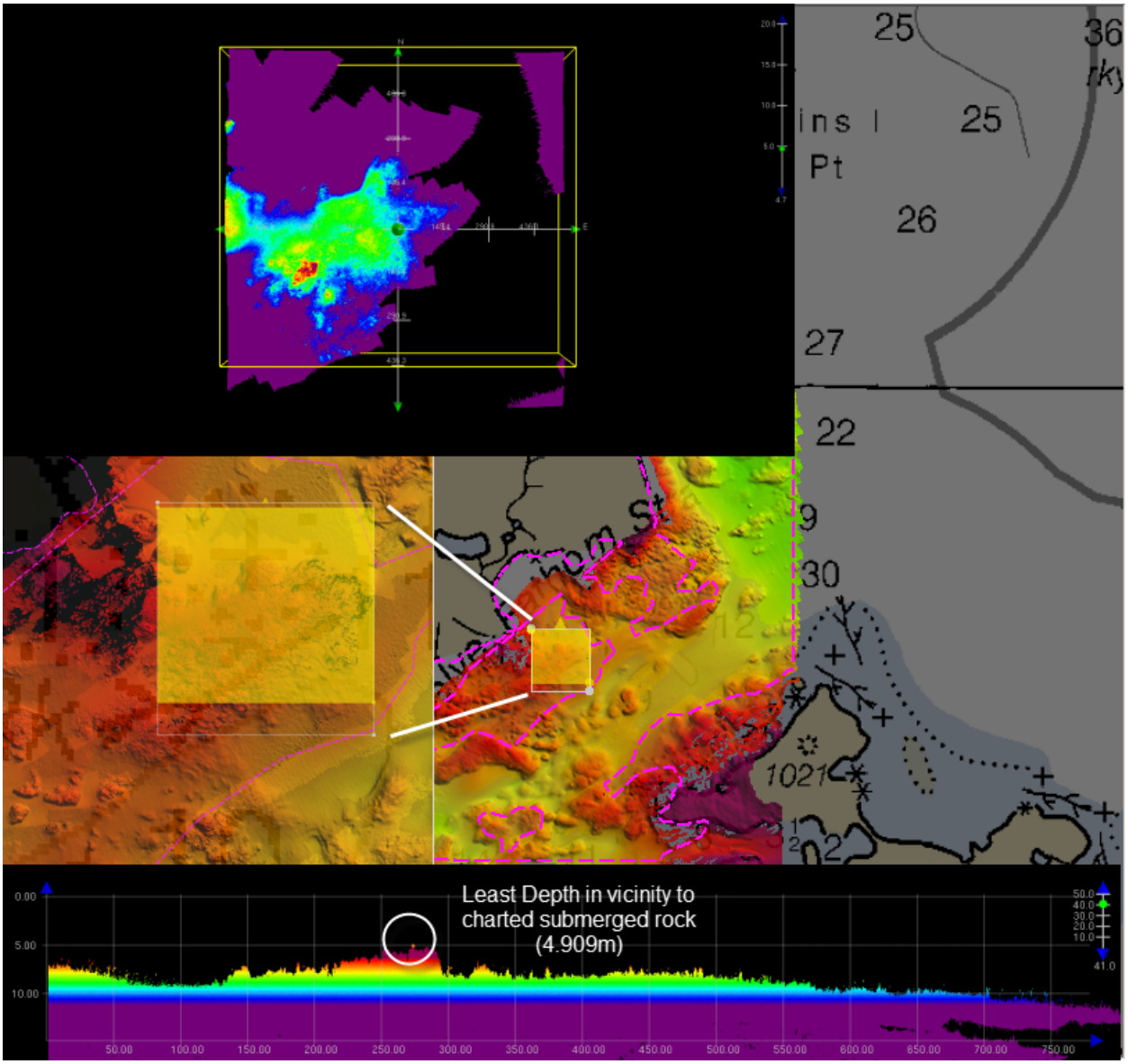


Figure 30: H12472 Submerged Rock (PA rep 1991)

D.1.6 Uncharted Features

No uncharted features exist for this survey.

D.1.7 Dangers to Navigation

No Danger to Navigation Reports were submitted for this survey.

There were no DTONs found during H12472, however, there were 3 DTONs identified during 2009 LIDAR survey H12103 that junctions with this survey. The DTONs reported from H12103 have been applied to the charts. See attached H12103 DTON report.

D.1.8 Shoal and Hazardous Features

No shoals or potentially hazardous features exist for this survey.

D.1.9 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.1.10 Bottom Samples

Bottom Samples were acquired in accordance with the Project Instructions and the HSSDM and are attributed in the Final Feature File. A total of 7 bottom samples were collected within the sheet limits. After three attempts, one of the seven samples did not produce a sample and was labeled "unknown."

D.2 Additional Results

D.2.1 Shoreline

All assigned features were addressed in the Final Features File (Figure 32).

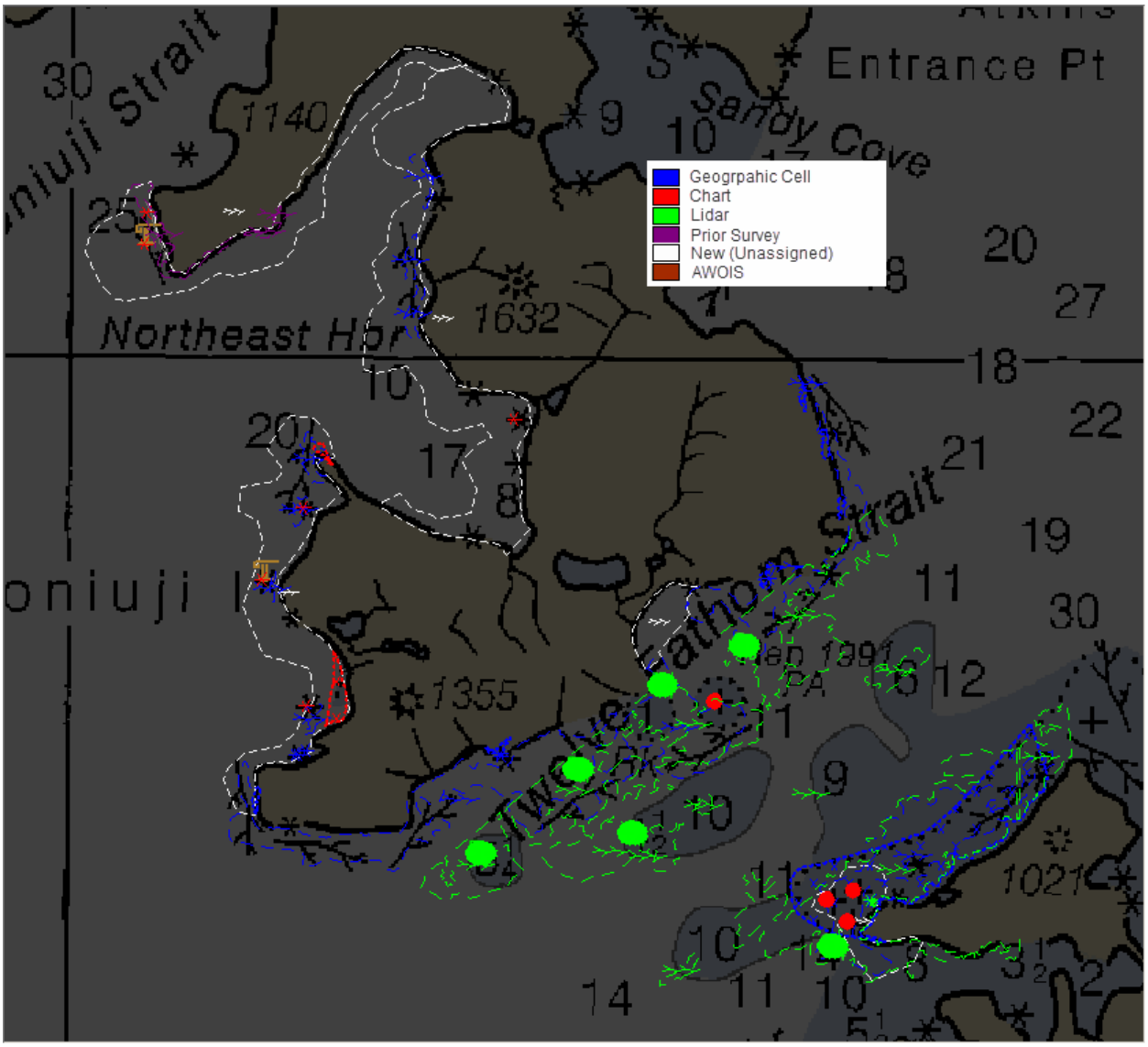


Figure 31: H12472 Assigned Features and New Kelp Areas (classified by source)

There were 64 assigned features for this survey. All assigned features outside the NALL were addressed as required with S-57 attribution and recorded in the H12472 Final Feature File to best represent the features at chart scale.

D.2.2 Prior Surveys

No prior survey comparisons exist for this survey.

D.2.3 Aids to Navigation

Aids to navigation (ATONs) do not exist for this survey.

D.2.4 Overhead Features

Overhead features do not exist for this survey.

D.2.5 Submarine Features

Submarine features do not exist for this survey.

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

No significant features exist for this survey.

D.2.9 Construction and Dredging

There is no present or planned construction or dredging within the survey limits.

D.2.10 New Survey Recommendations

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

D.2.11 New Inset Recommendations

Northeast Harbor is an excellent refuge and anchorage, Simeonof Harbor and Sandy Cove are usable anchorages, and Twelve Fathom Strait is used for transit. All of this indicates a need for larger scale charts of this immediate 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, Standing and 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
Richard T. Brennan, CDR/NOAA	Chief of Party	01/23/2013	Richard T. Brennan 2013.04.18 17:24:08 -07'00'
Michael O. Gonsalves, LT/NOAA	Field Operations Officer	01/23/2013	Michael O. Gonsalves 2013.04.15 08:43:37 -07'00'
James B. Jacobson	Chief Survey Technician	01/23/2013	James Jacobson I have reviewed this document 2013.04.15 08:52:30 -07'00'
John G. Doroba Jr.	Sheet Manager	01/23/2013	John G. Doroba Jr. I am the author of this document 2013.04.15 08:42:26 -07'00'

F. Table of Acronyms

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

Acronym	Definition
HSTP	Hydrographic Systems Technology Programs
HSX	Hypack Hysweep File Format
HTD	Hydrographic Surveys Technical Directive
HVCR	Horizontal and Vertical Control Report
HVF	HIPS Vessel File
IHO	International Hydrographic Organization
IMU	Inertial Motion Unit
ITRF	International Terrestrial Reference Frame
LNM	Local Notice to Mariners
LNM	Linear Nautical Miles
MCD	Marine Chart Division
MHW	Mean High Water
MLLW	Mean Lower Low Water
NAD 83	North American Datum of 1983
NAIP	National Agriculture and Imagery Program
NALL	Navigable Area Limit Line
NM	Notice to Mariners
NMEA	National Marine Electronics Association
NOAA	National Oceanic and Atmospheric Administration
NOS	National Ocean Service
NRT	Navigation Response Team
NSD	Navigation Services Division
OCS	Office of Coast Survey
OMAO	Office of Marine and Aviation Operations (NOAA)
OPS	Operations Branch
MBES	Multibeam Echosounder
NWLON	National Water Level Observation Network
PDBS	Phase Differencing Bathymetric Sonar
PHB	Pacific Hydrographic Branch
POS/MV	Position and Orientation System for Marine Vessels
PPK	Post Processed Kinematic
PPP	Precise Point Positioning
PPS	Pulse per second

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

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

TIDE NOTE FOR HYDROGRAPHIC SURVEY

DATE : October 9, 2012

HYDROGRAPHIC BRANCH: Pacific
HYDROGRAPHIC PROJECT: OPR-P183-RA-2012
HYDROGRAPHIC SHEET: H12472

LOCALITY: Northeast Harbor to Twelve Fathom Strait, Shumagin Islands, AK
TIME PERIOD: August 12 - September 30, 2012

TIDE STATION USED: 945-9450 Sand Point, AK
Lat. 55° 20.2'N Long. 160° 30.1' W
PLANE OF REFERENCE (MEAN LOWER LOW WATER): 0.000 meters
HEIGHT OF HIGH WATER ABOVE PLANE OF REFERENCE: 1.988 meters

REMARKS: RECOMMENDED ZONING

Preliminary zoning is accepted as the final zoning for project OPR-P183-RA-2012, H12472, during the time period between August 12 - September 30, 2012.

Please use the zoning file P183RA2012CORP submitted with the project instructions for OPR-P183-RA-2012. Zones SWA193 and SWA204 are the applicable zones for H12472.

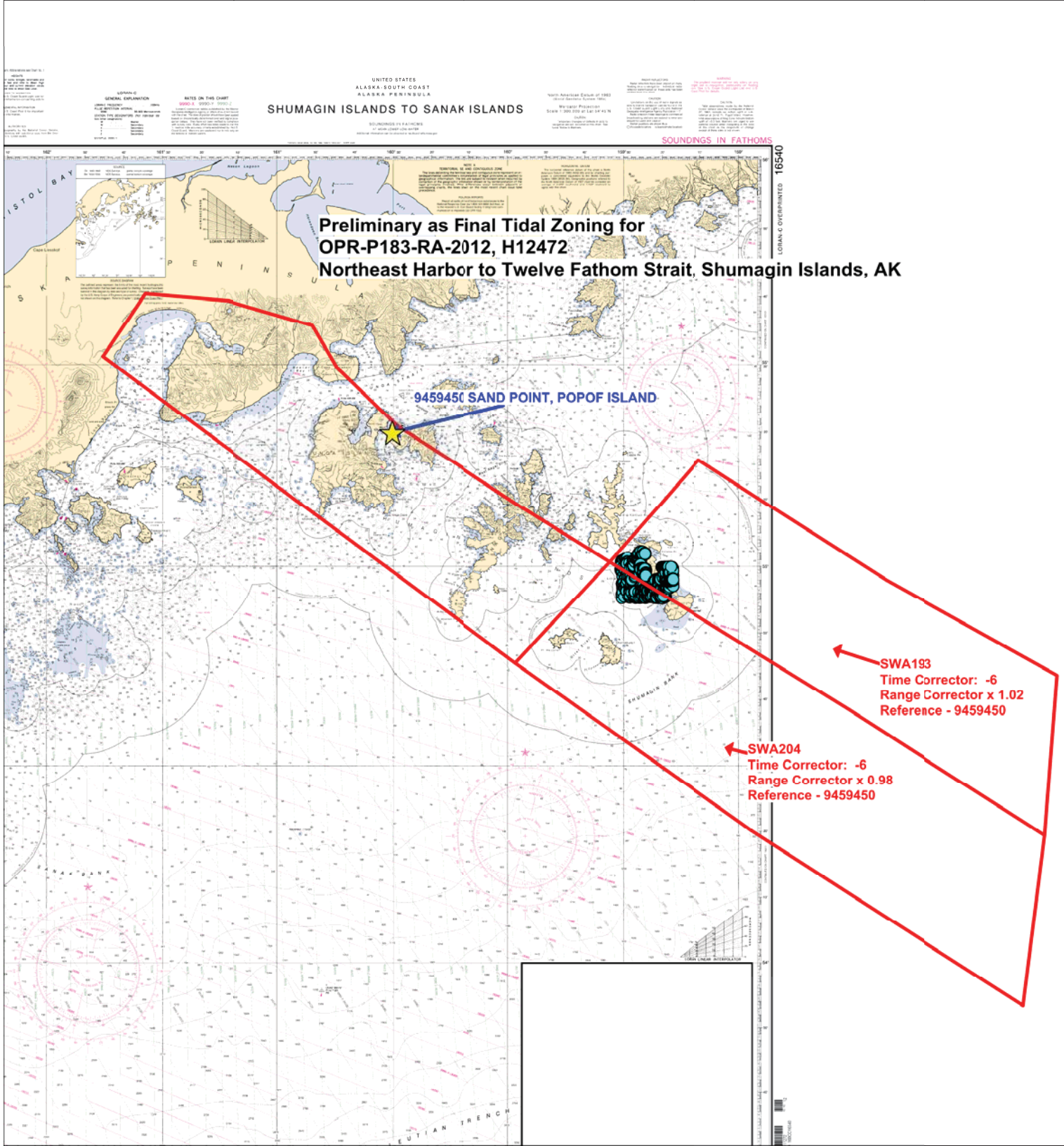
Refer to attachments for zoning information.

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.1365860250

Digitally signed by HOVIS.GERALD.THOMAS.1365860250
DN: c=US, o=U.S. Government, ou=DoD, ou=PKI, ou=OTHER, cn=HOVIS.GERALD.THOMAS.1365860250
Date: 2012.10.18 08:29:25 -04'00'

CHIEF, PRODUCTS AND SERVICES BRANCH


UNITED STATES
ALASKA-SOUTH COAST
ALASKA PENINSULA
SHUMAGIN ISLANDS TO SANAK ISLANDS
SOUNDINGS IN FATHOMS
16540
Preliminary as Final Tidal Zoning for
OPR-P183-RA-2012, H12472
Northeast Harbor to Twelve Fathom Strait, Shumagin Islands, AK
9459450 SAND POINT, POPOF ISLAND
SWA193
Time Corrector: -6
Range Corrector x 1.02
Reference - 9459450
SWA204
Time Corrector: -6
Range Corrector x 0.98
Reference - 9459450

Re: Negative depths...

Inbox x

ops 7:51 AM (22 minutes ago)

to Peter, Crescent, me, John, Starla, Rita, CO

Thanks for the advice Pete!
Sheet managers, please add the email below to your supplemental correspondence.

~~ mog

On 3/25/2013 7:51 AM, Peter Holmberg - NOAA Federal wrote:

> Mike,
>
> Please leave the negative depths in. Even though we don't chart negative soundings, its helpful to see the entire picture, or at least all data that was collected.
>
> Pete
>
> On Mon, Mar 25, 2013 at 7:42 AM, Crescent Moegling <crescent.moegling@noaa.gov> wrote:
> I think I know the answer (leave them in) but I'll defer to you. Thanks!
>
> Crescent Moegling
> Pacific Hydrographic Branch
> O 206.526.6840
> C 206.707.5409
>
> Begin forwarded message:
>
> **From:** ops <ops.rainier@noaa.gov>
> **Date:** March 25, 2013, 7:29:12 AM PDT
> **To:** crescent moegling <crescent.moegling@noaa.gov>
> **Cc:** meghan.mcgovern@noaa.gov, David Zezula - NOAA Federal <David.J.Zezula@noaa.gov>, CO Rainier <CO.Rainier@noaa.gov>
> **Subject: Negative depths...**
>
> Hey Crescent!
>
> What are your thoughts on negative depths? We have a couple surveys (one with Maritime Boundary Investigations and one without) in which we surveyed up to, and a little bit past, the zero-meter contour. How would you suggest should we handle these points in our processing pipeline?
>
> For our finalized surfaces, if we use the traditional depth thresholding (1m-resolution between 0m & 20m), then we'll chop out all these depths and exclude them from the final combined surface. Is this what we want?
>
> Presently I have our people shifting the finalization boundaries slightly (say, -2m to 20m), just to make sure the depths are pushed forward. From there PHB or MCD can elect to chop them at their will.
>
> What would you suggest?
>
> Cheers!
>
> ~~ mike.g.
>
> ...

H12472 Feature Report

Registry Number: H12472
State: Alaska
Locality: Shumagin Islands
Sub-locality: Northeast Harbor to Twelve Fathom Strait
Project Number: OPR-P183-RA-12
Survey Dates: August 8th, 2012 - September 30th, 2012

Charts Affected

Number	Edition	Date	Scale (RNC)	RNC Correction(s)*
16540	13th	10/01/2010	1:300,000 (16540_1)	USCG LNM: 5/7/2013 (7/16/2013) CHS NTM: None (4/26/2013) NGA NTM: 1/21/2006 (7/27/2013)
16011	37th	11/01/2007	1:1,023,188 (16011_1)	[L]NTM: ?
16006	35th	04/01/2008	1:1,534,076 (16006_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

Feature Type	Survey Depth	Survey Latitude	Survey Longitude
GP	[None]	55° 01' 09.5" N	159° 28' 58.9" W
GP	[None]	54° 58' 20.8" N	159° 27' 13.2" W

1 - New Features

1.1) US 0000002449 00001 / H12472_AWOIS.000

Survey Summary

Survey Position:	55° 01' 09.5" N, 159° 28' 58.9" W
Least Depth:	[None]
TPU (±1.96σ):	**THU (TPEh)** [None] ; **TVU (TPEv)** [None]
Timestamp:	1981-001.01:01:01.001 (01/01/1981)
Dataset:	H12472_AWOIS.000
FOID:	US 0000002449 00001(0226000009910001)
Charts Affected:	16540_1, 16011_1, 16006_1, 500_1, 530_1, 50_1

Remarks:

COALNE/remrks: Nearest offshore dry @ MLLW point to Maritime Boundary Point

Hydrographer Recommendations

Hydrographer recommends using coastline feature to indicate farthest offshore maritime boundary point

S-57 Data

Geo object 1:	Coastline (COALNE)
Attributes:	CATCOA - 1:steep coast
	OBJNAM - New Maritime Boundary Line
	SORDAT - 20120930
	SORIND - US,US,graph,H12472

Office Notes:

Do not concur. It is recommended that the maritime boundary points are determined by the zero depth curves generated from surveyed. The depth curves are included in the HCell at this location and indicated as maritime boundary AWOIS items in the NINFOM field.

Feature Images

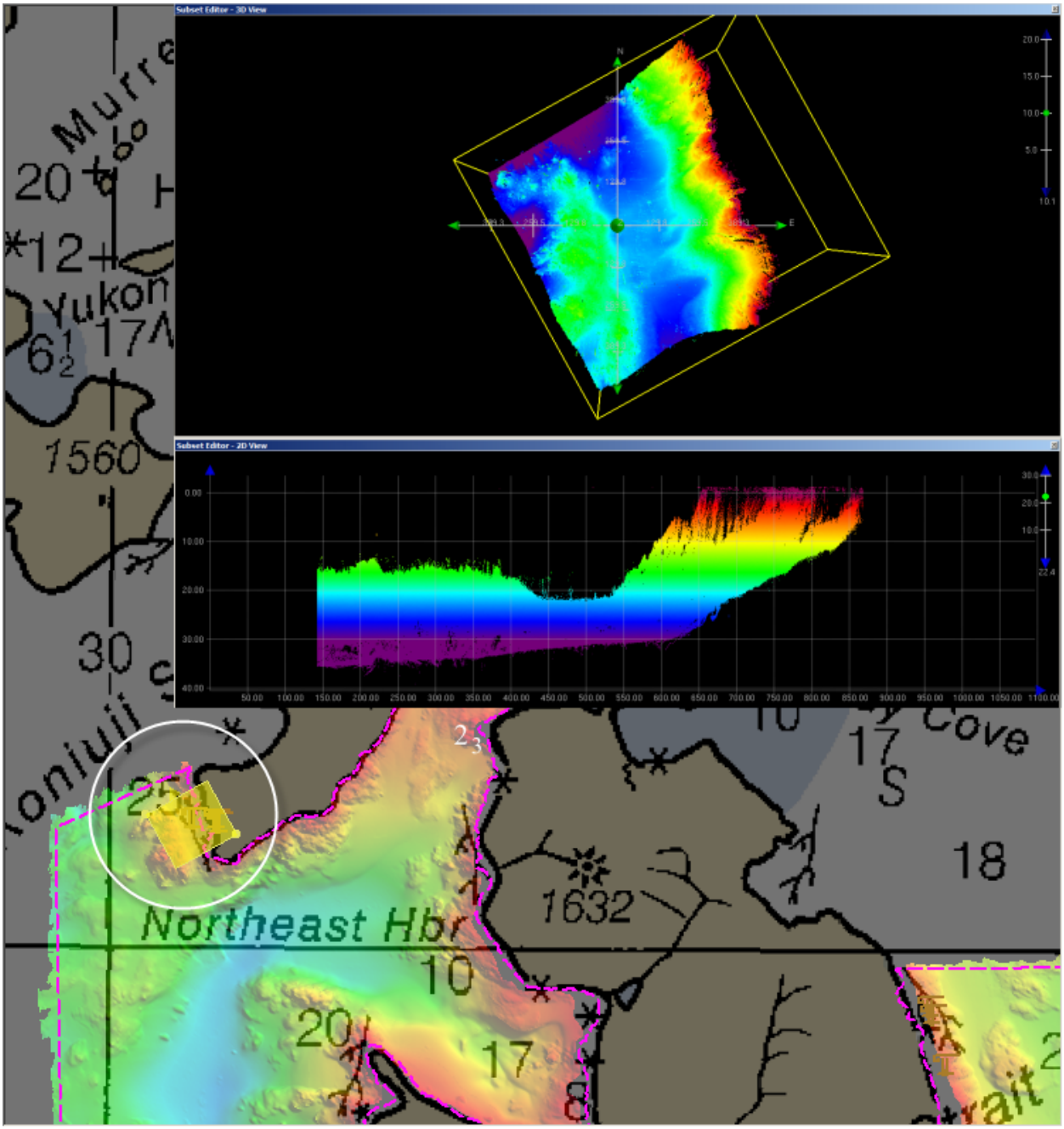


Figure 1.1.1

1.2) US 0000002450 00001 / H12472_AWOIS.000

Survey Summary

Survey Position:	54° 58' 20.8" N, 159° 27' 13.2" W
Least Depth:	[None]
TPU (±1.96σ):	**THU (TPEh)** [None] ; **TVU (TPEv)** [None]
Timestamp:	2013-011.18:20:29.000 (01/11/2013)
Dataset:	H12472_AWOIS.000
FOID:	US 0000002450 00001(0226000009920001)
Charts Affected:	16540_1, 16011_1, 16006_1, 500_1, 530_1, 50_1

Remarks:

COALNE/remrks: Nearest offshore dry @ MLLW point to Maritime Boundary Point

Hydrographer Recommendations

Hydrographer recommends using coastline feature to indicate farthest offshore maritime boundary point

S-57 Data

Geo object 1:	Coastline (COALNE)
Attributes:	CATCOA - 1:steep coast
	OBJNAM - New Maritime Boundary Line
	SORDAT - 20120930
	SORIND - US,US,graph,H12472

Office Notes:

Do not concur. It is recommended that the maritime boundary points are determined by the zero depth curves generated from surveyed. The depth curves are included in the HCell at this location and indicated as maritime boundary AWOIS items in the NINFOM field.

Feature Images

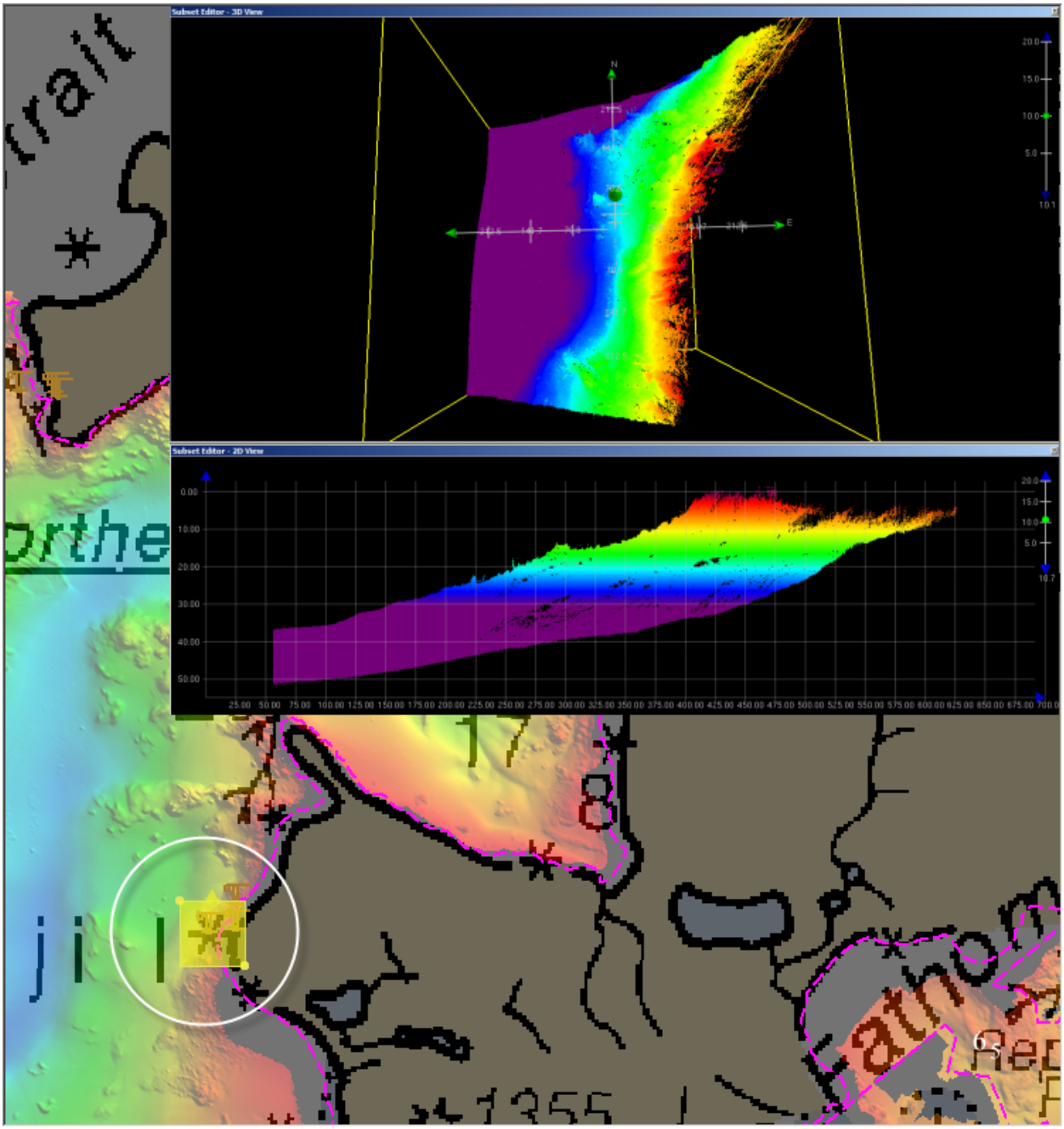


Figure 1.2.1

APPENDIX I – DANGERS TO NAVIGATION

DTONS Submitted to PHB

I.1.1 Danger to Navigation Report

Hydrographic Survey Registry Number: H12103

State: Alaska

Locality: Vicinity of Shumagin Islands

Sub-locality: West of Simeonof Island

Project Number: OPR-P183-KRL-09

Survey Dates: June – August, 2009

Depths are in meters and reduced to Mean Lower Low Water using final verified tides. Drying heights are in meters relative to MLLW. Islets are related to MHW. Positions are based on the NAD83 horizontal datum. All times and dates are relative to UTC.

Number	Edition	Date	Scale
US3AK50M	12th	12/1/2009	1:300,000

The following items were found during hydrographic survey operations:

No.	Feature	Depth (m)	Latitude (N)	Longitude (W)	Time, Date, Year	Investigate
1	Rk	8.5	54° 56' 25.57"	159° 22' 33.92"	22:21:53, July 15, 2009	Yes
2	Rk	9.8	54° 56' 16.29"	159° 24' 32.40"	22:14:19, July 15, 2009	Yes
3	Rk Awash	0.4	54° 53' 11.55"	159° 21' 08.76"	18:13:45, June 23, 2009	No
4	Rk	1.1	54° 50' 33.11"	159° 19' 40.78"	04:41:31, July 16, 2009	Yes
5	Rk	1.9	54° 57' 18.05"	159° 22' 25.32"	21:44:21, July 25, 2009	No

COMMENTS: Final verified tides have been applied from the Sand Point tide gauge (9459450). The shoals were found using LIDAR. DTON items 1 through 4 were submitted during data collection from the field. DTON item 5 was submitted upon the completion of product compilation from the Biloxi MS office.

Questions concerning this report should be directed to the Survey Manager, Mr. Scott Ramsay, in the Fugro LADS Inc. office in Biloxi MS. at (228) 594 6800.

DTONS Submitted to MCD

I.1.2 Danger to Navigation Report (Submitted during field operations)

Danger to Navigation Report for Lidar Survey H12103

Registry Number: H12103
State: Alaska
Locality: Vicinity of Shumagin Islands
Sub-locality: West of Simeonof Island
Project Number: OPR-P183-KRL-09
Survey Dates: June 13, 2009 - August 11,2009

Charts Affected

Number	Edition	Date	Scale (RNC)	RNC Correction(s)*
16540	12th	01/01/2005	1:300,000 (16540_1)	USCG LNM: 02/24/2009 (07/21/2009) NGA NTM: 01/21/2006 (08/01/2009)
16013	30th	07/01/2006	1:969,761 (16013_1)	[L]NTM: ?
16011	37th	11/01/2007	1:1,023,188 (16011_1)	[L]NTM: ?
16006	35th	04/01/2008	1:1,534,076 (16006_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
1.1	Shoal	8.50 m	54° 56' 25.6" N	159° 22' 33.9" W
1.2	Shoal	9.80 m	54° 56' 16.3" N	159° 24' 32.4" W
1.3	Rock	0.40 m	54° 53' 11.6" N	159° 21' 08.8" W
1.4	Rock	1.10 m	54° 50' 33.1" N	159° 19' 40.8" W

Generated by Pydro v9.6 (r2698) on Wed Aug 26 20:44:32 2009 [UTC]

1 - Danger To Navigation

1.1) GP No. - 1 from H12103_Pydro.xls

DANGER TO NAVIGATION

Survey Summary

Survey Position:	54° 56' 25.6" N, 159° 22' 33.9" W
Least Depth:	8.50 m (= 27.89 ft = 4.648 fm = 4 fm 3.89 ft)
TPU (±1.96σ):	**THU (TPEh)** [None] ; **TVU (TPEv)** [None]
Timestamp:	2009-196.22:21:53.000 (07/15/2009)
GP Dataset:	H12103_Pydro.xls
GP No.:	1
Charts Affected:	16540_1, 16011_1, 16006_1, 500_1, 530_1, 50_1

Remarks:

This sounding was found during Lidar hydrographic survey operation by Fugro LADS Inc. Depth was reduced to Mean Lower Low Water using preliminary tides from the King Cove tide gauge (9459881). Least depth determination by field investigation is recommended for this feature. The S-57 attribute QUASOU is set to '3' for doubtful sounding.

Hydrographer Recommendations

Chart as surveyed.

Cartographically-Rounded Depth (Affected Charts):

4 ½fm (16540_1, 16011_1, 16006_1, 530_1)

8.5m (500_1, 50_1)

S-57 Data

Geo object 1:	Sounding (SOUNDG)
Attributes:	QUASOU - 3:doubtful sounding
	SORDAT - 20090811
	SORIND - US,US,nsurf,H12103
	TECSOU - 7:found by laser
	VERDAT - 12:Mean lower low water

1.2) GP No. - 2 from H12103_Pydro.xls

DANGER TO NAVIGATION

Survey Summary

Survey Position:	54° 56' 16.3" N, 159° 24' 32.4" W
Least Depth:	9.80 m (= 32.15 ft = 5.359 fm = 5 fm 2.15 ft)
TPU (±1.96σ):	**THU (TPEh)** [None] ; **TVU (TPEv)** [None]
Timestamp:	2009-196.22:14:19.000 (07/15/2009)
GP Dataset:	H12103_Pydro.xls
GP No.:	2
Charts Affected:	16540_1, 16011_1, 16006_1, 500_1, 530_1, 50_1

Remarks:

This sounding was found during Lidar hydrographic survey operation by Fugro LADS Inc. Depth was reduced to Mean Lower Low Water using preliminary tides from the King Cove tide gauge (9459881). Least depth determination by field investigation is recommended for this feature. The S-57 attribute QUASOU is set to '3' for doubtful sounding.

Hydrographer Recommendations

Chart as surveyed.

Cartographically-Rounded Depth (Affected Charts):

5 ¼fm (16540_1, 16011_1, 16006_1, 530_1)

9.8m (500_1, 50_1)

S-57 Data

Geo object 1:	Sounding (SOUNDG)
Attributes:	QUASOU - 3:doubtful sounding
	SORDAT - 20090811
	SORIND - US,US,nsurf,H12103
	TECSOU - 7:found by laser
	VERDAT - 12:Mean lower low water

1.3) GP No. - 3 from H12103_Pydro.xls

DANGER TO NAVIGATION

Survey Summary

Survey Position:	54° 53' 11.6" N, 159° 21' 08.8" W
Least Depth:	0.40 m (= 1.31 ft = 0.219 fm = 0 fm 1.31 ft)
TPU (±1.96σ):	**THU (TPEh)** [None] ; **TVU (TPEv)** [None]
Timestamp:	2009-174.18:13:45.000 (06/23/2009)
GP Dataset:	H12103_Pydro.xls
GP No.:	3
Charts Affected:	16540_1, 16011_1, 16006_1, 500_1, 530_1, 50_1

Remarks:

This feature was found during Lidar hydrographic survey operation by Fugro LADS Inc. Depth was reduced to Mean Lower Low Water using preliminary tides from the King Cove tide gauge (9459881).

Hydrographer Recommendations

Chart as surveyed.

Cartographically-Rounded Depth (Affected Charts):

0 ¼fm (16540_1, 16011_1, 16006_1, 530_1)

.4m (500_1, 50_1)

S-57 Data

Geo object 1:	Underwater rock / awash rock (UWTROC)
Attributes:	SORDAT - 20090811
	SORIND - US,US,nsurf,H12103
	TECSOU - 7:found by laser
	VALSOU - 0.4 m
	VERDAT - 12:Mean lower low water
	WATLEV - 5:awash

1.4) GP No. - 4 from H12103_Pydro.xls

DANGER TO NAVIGATION

Survey Summary

Survey Position:	54° 50' 33.1" N, 159° 19' 40.8" W
Least Depth:	1.10 m (= 3.61 ft = 0.601 fm = 0 fm 3.61 ft)
TPU (±1.96σ):	**THU (TPEh)** [None] ; **TVU (TPEv)** [None]
Timestamp:	2009-197.04:41:31.000 (07/16/2009)
GP Dataset:	H12103_Pydro.xls
GP No.:	4
Charts Affected:	16540_1, 16013_1, 16011_1, 16006_1, 500_1, 530_1, 50_1

Remarks:

is feature was found during Lidar hydrographic survey operation by Fugro LADS Inc. Depth was reduced to Mean Lower Low Water using preliminary tides from the King Cove tide gauge (9459881). Least depth determination by field investigation is recommended for this feature. The S-57 attribute QUASOU is set to '3' for doubtful sounding.

Hydrographer Recommendations

Chart as surveyed.

Cartographically-Rounded Depth (Affected Charts):

0 ½fm (16540_1, 16013_1, 16011_1, 16006_1, 530_1)

1.1m (500_1, 50_1)

S-57 Data

Geo object 1:	Underwater rock / awash rock (UWTROC)
Attributes:	QUASOU - 3:doubtful sounding
	SORDAT - 20090811
	SORIND - US,US,nsurf,H12104
	TECSOU - 7:found by laser
	VALSOU - 1.1 m
	VERDAT - 12:Mean lower low water
	WATLEV - 3:always under water/submerged

DTONS Submitted to MCD

I.1.3 Danger to Navigation Report (Submitted following field operations)

Dton Report for Lidary Survey H12103

Registry Number: H12103
State: Alaska
Locality: Shumagin Bank
Sub-locality: West of Simeonof Island
Project Number: OPR-P183-KRL-09
Survey Dates: 6/12/2009 - 8/11/2009

Charts Affected

Number	Edition	Date	Scale (RNC)	RNC Correction(s)*
16540	12th	01/01/2005	1:300,000 (16540_1)	USCG LNM: 02/24/2009 (12/08/2009) CHS NTM: None (09/25/2009) NGA NTM: 01/21/2006 (12/19/2009)
16011	37th	11/01/2007	1:1,023,188 (16011_1)	[L]NTM: ?
16006	35th	04/01/2008	1:1,534,076 (16006_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

Feature Type	Survey Depth	Survey Latitude	Survey Longitude
Rock	1.90 m	54° 57' 18.1" N	159° 22' 25.3" W

Generated by Pydro v9.10 (r2735) on Wed Jan 20 20:00:30 2010 [UTC]

1 - Danger To Navigation

1.1) GP No. - 5 from H12103_Dton_Pydro.xls

DANGER TO NAVIGATION

Survey Summary

Survey Position:	54° 57' 18.1" N, 159° 22' 25.3" W
Least Depth:	1.90 m (= 6.23 ft = 1.039 fm = 1 fm 0.23 ft)
TPU (±1.96σ):	**THU (TPEh)** [None] ; **TVU (TPEv)** [None]
Timestamp:	2009-206.21:44:21.000 (07/25/2009)
GP Dataset:	H12103_Dton_Pydro.xls
GP No.:	5
Charts Affected:	16540_1, 16011_1, 16006_1, 500_1, 530_1, 50_1

Remarks:

This feature was found during Lidar hydrographic survey operation. Depth was reduced to Mean Lower Low Water using verified tides from Sand Point tide gauge (9459450).

Feature Correlation

Address	Feature	Range	Azimuth	Status
H12103_Dton_Pydro.xls	5	0.00	000.0	Primary

Hydrographer Recommendations

Chart as surveyed.

Cartographically-Rounded Depth (Affected Charts):

1fm (16540_1, 16011_1, 16006_1, 530_1)

1.9m (500_1, 50_1)

S-57 Data

Geo object 1:	Underwater rock / awash rock (UWTROC)
Attributes:	SORDAT - 20090811
	SORIND - US,US,nsurf,H12103
	TECSOU - 7:found by laser
	VALSOU - 1.9 m

VERDAT - 12:Mean lower low water

WATLEV - 3:always under water/submerged

APPROVAL PAGE

H12472

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

The following products will be sent to NGDC for archive

- H12472_DR.pdf
- Collection of depth varied resolution BAGS
- Processed survey data and records
- H12472_GeoImage.pdf

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

Digitally signed by HOLMBERG.PETER.SCOTT.1365886101
DN: c=US, o=U.S. Government, ou=DoD, ou=PKI, ou=OTHER, cn=HOLMBERG.PETER.SCOTT.1365886101
Date: 2014.07.11 13:09:43 -07'00'

Approved:_____

Peter Holmberg
Cartographic Team Lead, Pacific Hydrographic Branch

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

Benjamin K. Evans
2014.07.11 13:42:53
-07'00'

Approved:_____

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