H12812

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

DESCRIPTIVE REPORT

Type of Survey:	Navigable Area
Registry Number:	H12812

LOCALITY

State(s):	Alaska
General Locality:	Kotzebue Sound, AK
Sub-locality:	Entrance to Kotzebue Sound

2015

CHIEF OF PARTY
CDR David J. Zezula, NOAA

LIBRARY & ARCHIVES

Date:

U.S. DEPARTMENT OF COMMERCE NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION	REGISTRY NUMBER:
HYDROGRAPHIC TITLE SHEET	**H12812**

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:	**Kotzebue Sound, AK**
Sub-Locality:	**Entrance to Kotzebue Sound**
Scale:	**40000**
Dates of Survey:	**06/25/2015 to 08/05/2015**
Instructions Dated:	**05/28/2015**
Project Number:	**OPR-S327-FA-15**
Field Unit:	**NOAA Ship *Fairweather***
Chief of Party:	**CDR David J. Zezula, NOAA**
Soundings by:	**Multibeam Echo Sounder**
Imagery by:	**Multibeam Echo Sounder Backscatter**
Verification by:	**Pacific Hydrographic Branch**
Soundings Acquired in:	**meters at Mean Lower Low Water**

Remarks:

The purpose of this survey is to provide contemporary surveys to update National Ocean Service (NOS) nautical charts. All separates are filed with the hydrographic data. Any revisions to the Descriptive Report (DR) generated during office processing are shown in bold, red italic text. The processing branch maintains the DR as a field unit product, therefore, all information and recommendations within the body of the DR are considered preliminary unless otherwise noted. The final disposition of surveyed features is represented in the OCS nautical chart update products. All pertinent records for this survey, including the DR, are archived at the National Centers for Environmental Information (NCEI) and can be retrieved via http://www.ncei.noaa.gov/.

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Descriptive Report to Accompany Survey H12812

Project: OPR-S327-FA-15

Locality: Kotzebue Sound, AK

Sublocality: Entrance to Kotzebue Sound

Scale: 1:40000

June 2015 - August 2015

NOAA Ship *Fairweather*

Chief of Party: CDR David J. Zezula, NOAA

A. Area Surveyed

The survey area is located at the Entrance to Kotzebue Sound approximately 3 nautical miles offshore of Cape Espenberg within Kotzebue Sound, AK. (Refer to figure 1)

A.1 Survey Limits

Data were acquired within the following survey limits:

Northwest Limit	Southeast Limit
66° 40' 18.08" N 163° 28' 24.31" W	66° 33' 28.01" N 163° 10' 31.39" W

Table 1: Survey Limits

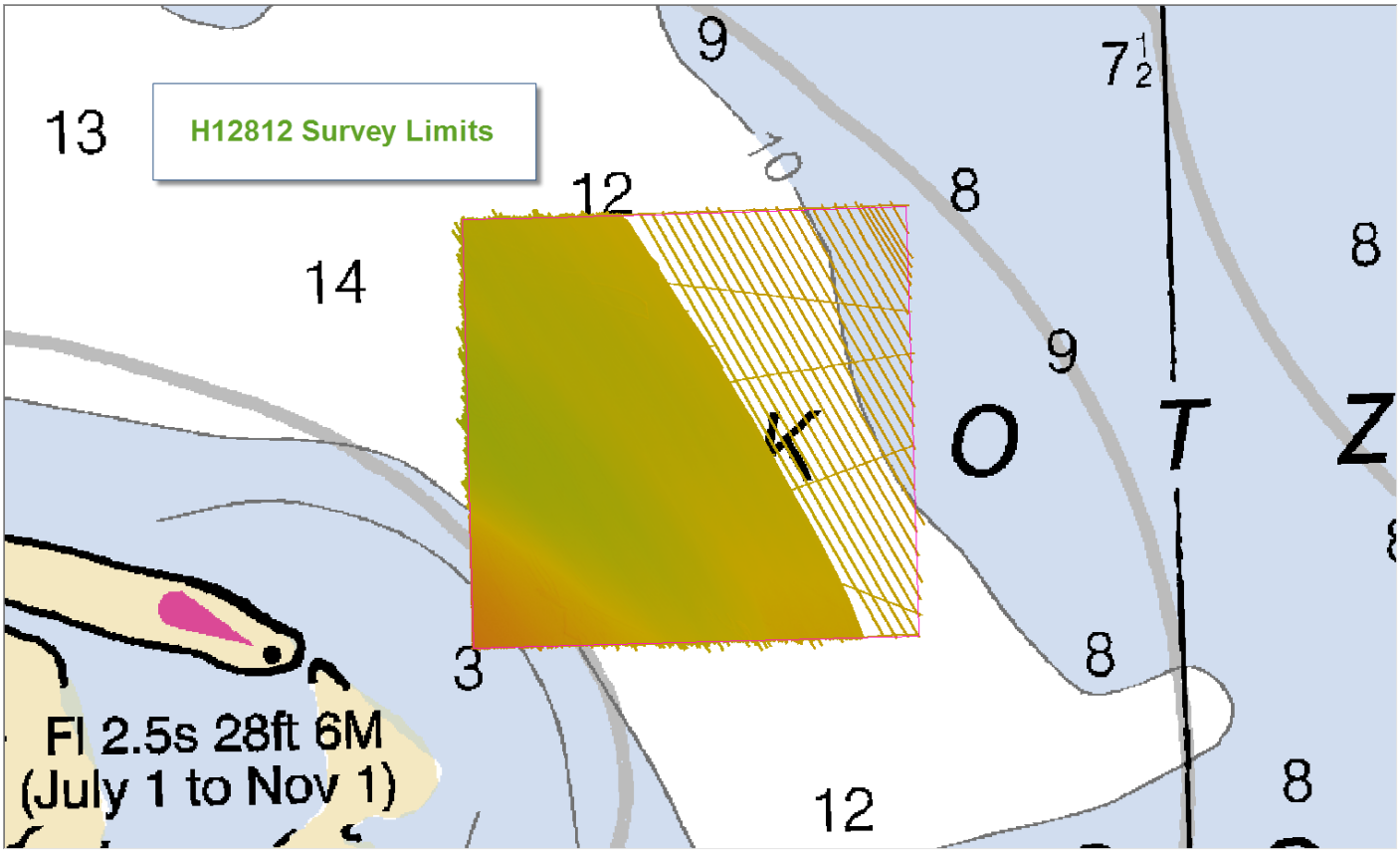


Figure 1: H12812 Survey Limits

Survey limits were acquired in accordance with the requirements in the Project Instructions and the Hydrographic Survey Specifications and Deliverables (HSSD) 2015.

A.2 Survey Purpose

The purpose of this survey is to provide contemporary surveys to update National Ocean Service (NOS) nautical charting products. Information for survey priorities was collected and compiled from a number of users/customers in the region: Alaska Marine Pilots, USCG D17 & the buoy tender Hickory, Crowley Tug & Barge, as well as field reports from USCG and NOAA personnel. Assigned survey area will address 50.20 square nautical miles all of which are Navigationally Significant in accordance with the National Hydrographic Survey Priorities Edition 2012.

A.3 Survey Quality

The entire survey is adequate to supersede previous 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
Greater than 20 meters water depth	Complete MBES coverage with backscatter.
8 meters to 20 meters water depth	Either 1) 100% SSS with concurrent set line spacing SBES or MBES with backscatter, or 2) complete MBES with backscatter. Note: Complete MBES is sufficient for both determination of least depth identified with SSS and for disproving a feature - 100% SSS is insufficient to disprove a feature. Refer to Section 6.1.2 of the HSSD to confirm proper SSS acquisition parameters. Gaps in SSS coverage should be treated as gaps in MBES coverage and addressed accordingly.
Inshore limit to 8 meters water depth	300 meter spaced Set Line Spacing SBES or MBES with backscatter. Please ensure the following: 1) Indications of shoaling falling between set line spacing main scheme lines must be investigated 2) Set Line Spacing Line orientation should be approximately perpendicular to isobaths whenever possible.

Due to a pycnocline at 5-8 meters in depth and dynamic variability of sound velocity throughout the water column producing significant refraction over the entire survey area (refer to figure 2), Shipboard Sidescan was determined to be an inefficient method of surveying a major portion of the area and full coverage multibeam was used. Also due to time constraints and the size of sheets it was determined by HSD OPS that a priority corridor (refer to figure 3) would be established with 100% Multibeam retained within the corridor and areas outside the corridor would be surveyed with 300 meter set line spacing. (please refer to appendix 2 "OPRS327FA15 Kotzebue Sound Project Instruction Change Request")

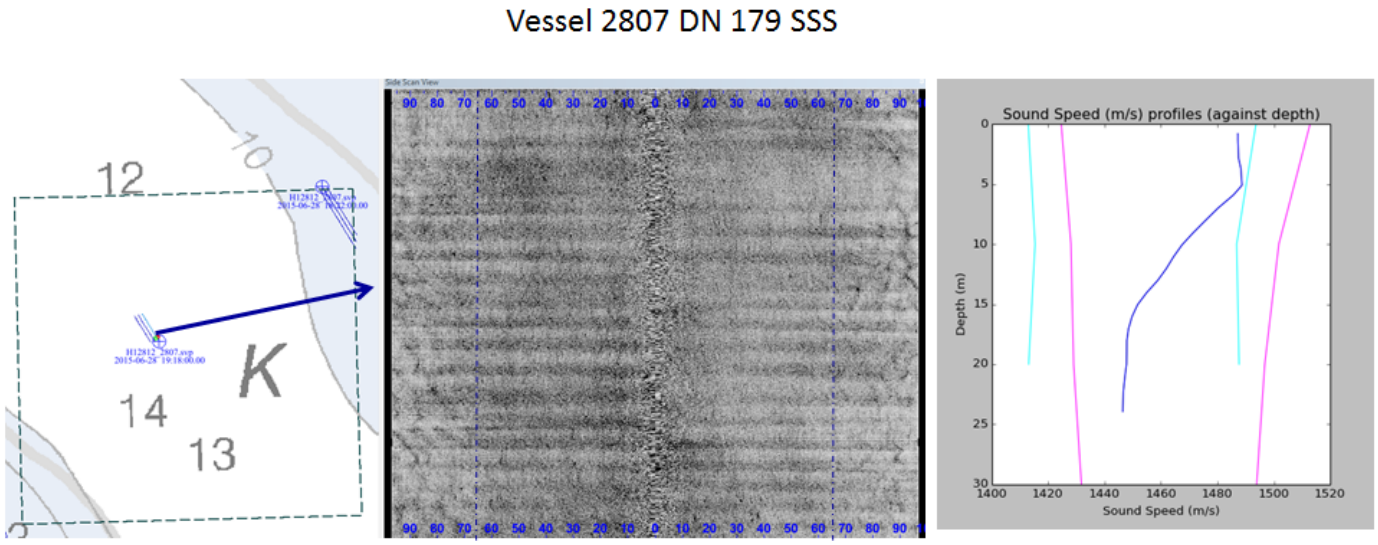


Figure 2: Side scan refraction error analysis for sheet H12812

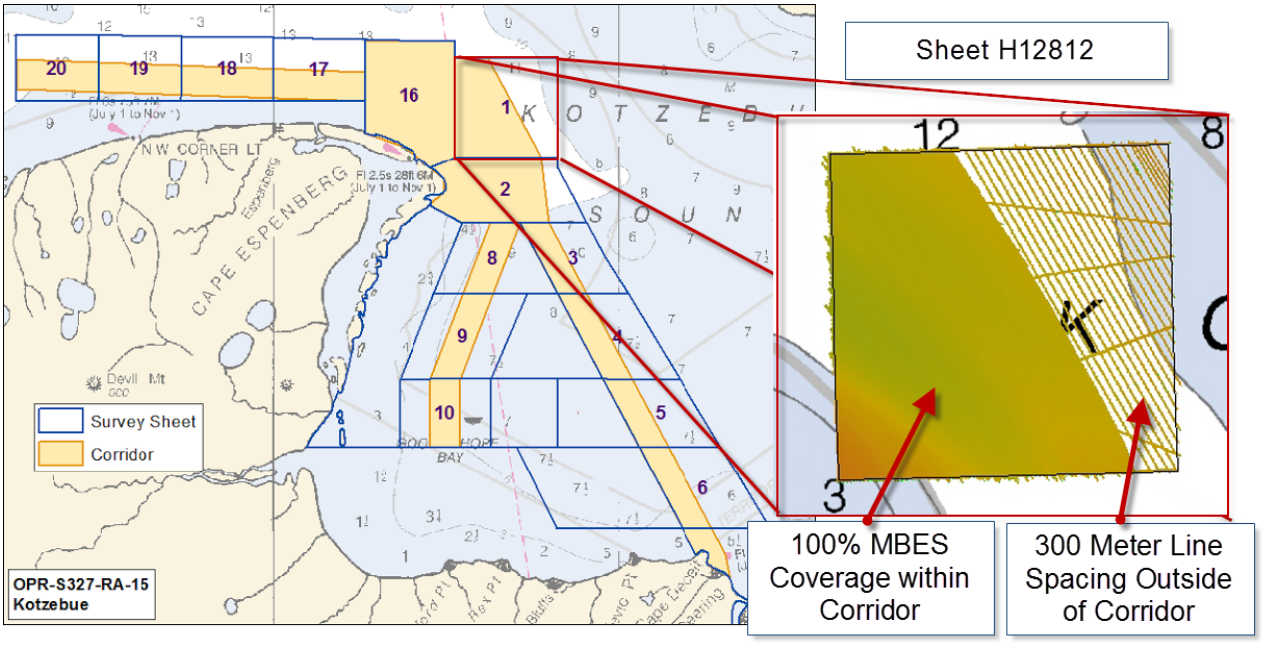


Figure 3: Revised coverage map for survey area.

See attached correspondence regarding revisions to sheet limits and coverage requirements.

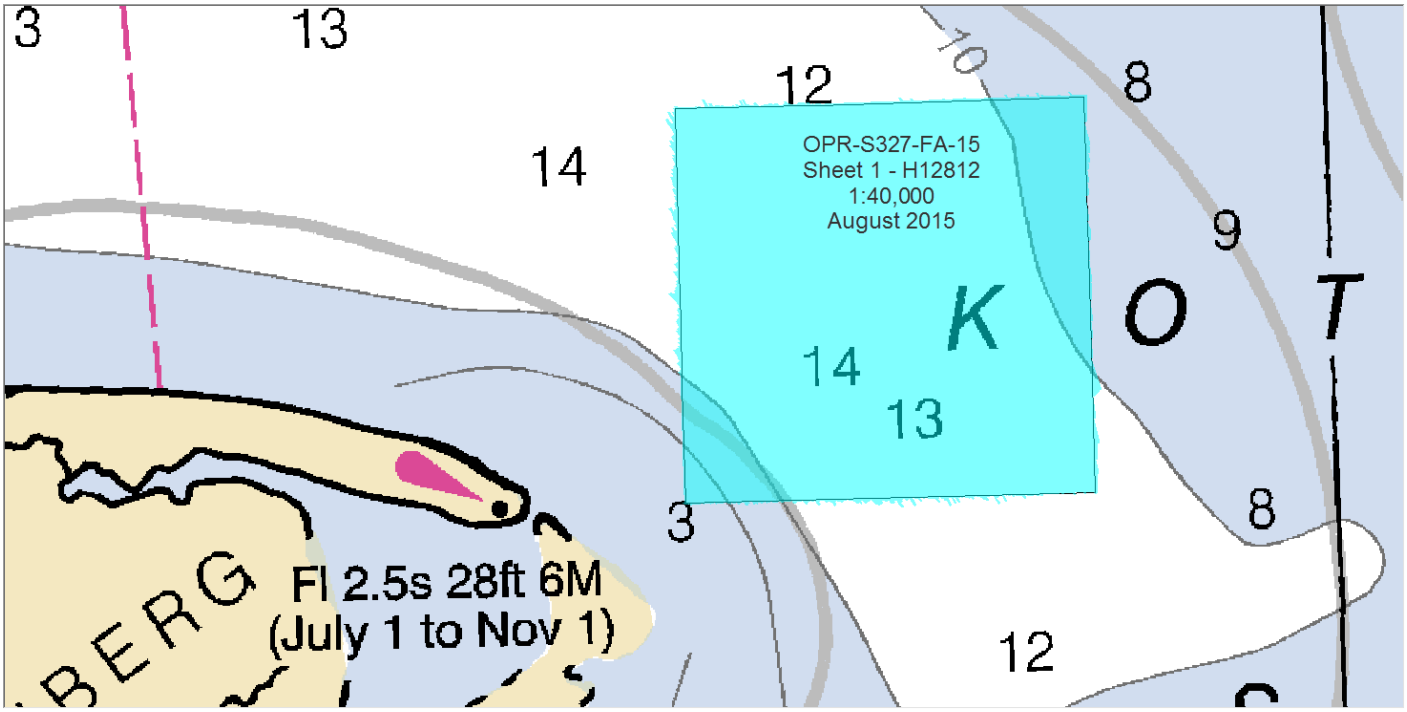


Figure 4: Sheet H12812 Outline

A.5 Survey Statistics

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

	HULL ID	*2805*	*2806*	*2807*	*2808*	*S220*	*Total*
LNM	**SBES Mainscheme**	0	0	0	0	0	0
	MBES Mainscheme	52.322	44.981	5.999	0	927.937	1031.239
	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	14.555	0	0	21.451	20.185	56.191
	Lidar Crosslines	0	0	0	0	0	0
Number of Bottom Samples							1
Number Maritime Boundary Points Investigated							0
Number of DPs							0
Number of Items Investigated by Dive Ops							0
Total SNM							50.199

Table 2: Hydrographic Survey Statistics

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

Survey Dates	Day of the Year
06/25/2015	176
06/26/2015	177

Survey Dates	Day of the Year
06/27/2015	178
06/28/2015	179
06/29/2015	180
06/30/2015	181
07/01/2015	182
07/14/2015	195
07/15/2015	196
07/16/2015	197
07/17/2015	198
08/04/2015	216
08/05/2015	217

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	*S220*	*2805*	*2806*	*2807*	*2808*
LOA	70.4 meters	8.64 meters	8.64 meters	8.64 meters	8.64 US Survey feet
Draft	4.7 meters	1.12 meters	1.12 meters	1.12 meters	1.12 meters

Table 4: Vessels Used

B.1.2 Equipment

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

Manufacturer	Model	Type
Kongsberg	EM710	MBES
Reson	7125	MBES
Applanix	POS/MV V4	Positioning and Attitude System
Rolls Royce	MVP 200	Conductivity, Temperature, and Depth Sensor
Seabird	SBE-19Plus	Conductivity, Temperature, and Depth Sensor
Reson	SVP70	Sound Speed System
Reson	SVP71	Sound Speed System

Table 5: Major Systems Used

B.2 Quality Control

B.2.1 Crosslines

Crosslines acquired for this survey totaled 5.45% of mainscheme acquisition.

Crosslines were collected, processed and compared in accordance with section 5.2.4.3 of the May 2015 Hydrographic Surveys Specifications and Deliverables (HSSD). Surface Differencing in CARIS HIPS and SIPS was used to assess crossline agreement with mainscheme lines. Crosslines were filtered 45 degrees from nadir due to sound velocity issues creating excessive bending in the outer beams. A difference surface was created from a 2 meter mainscheme and a 2 meter crossline surface for full coverage and a 4 meter mainscheme and 4 meter crossline surface was created for the 300 meter line spaced portion. Statistical analysis of the difference surface full coverage indicates that 95% of all nodes have a maximum deviation of +/- 0.0.16 meters, as shown in figure 5. Statistical difference for 300 meter line spacing indicates that 95% of nodes had a maximum deviation of +/-0.14 meters, as shown in figure 6. The surface difference is submitted digitally in the Separates\II Digital Data folder.

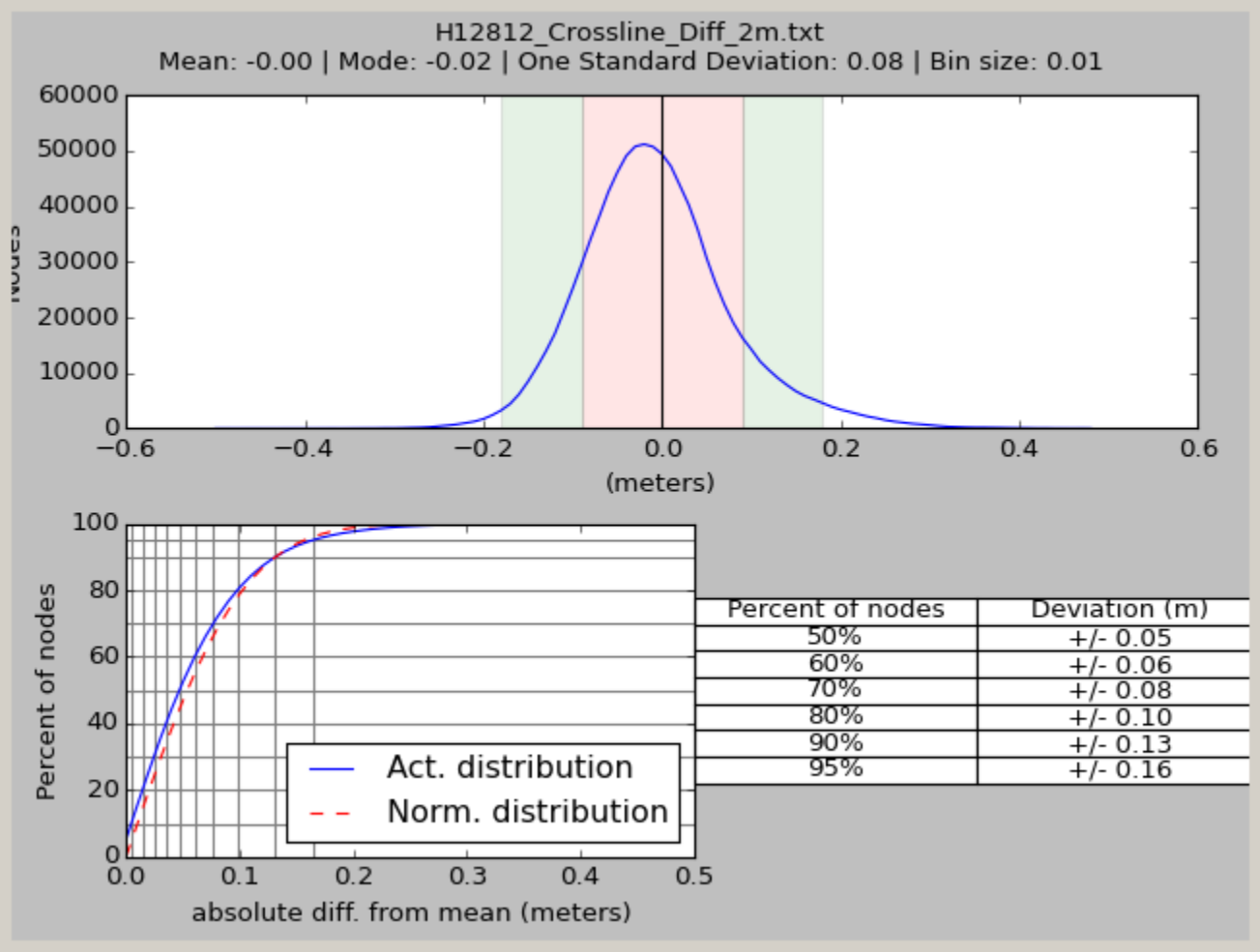


Figure 5: Crossline Difference of 2 Meter Surface

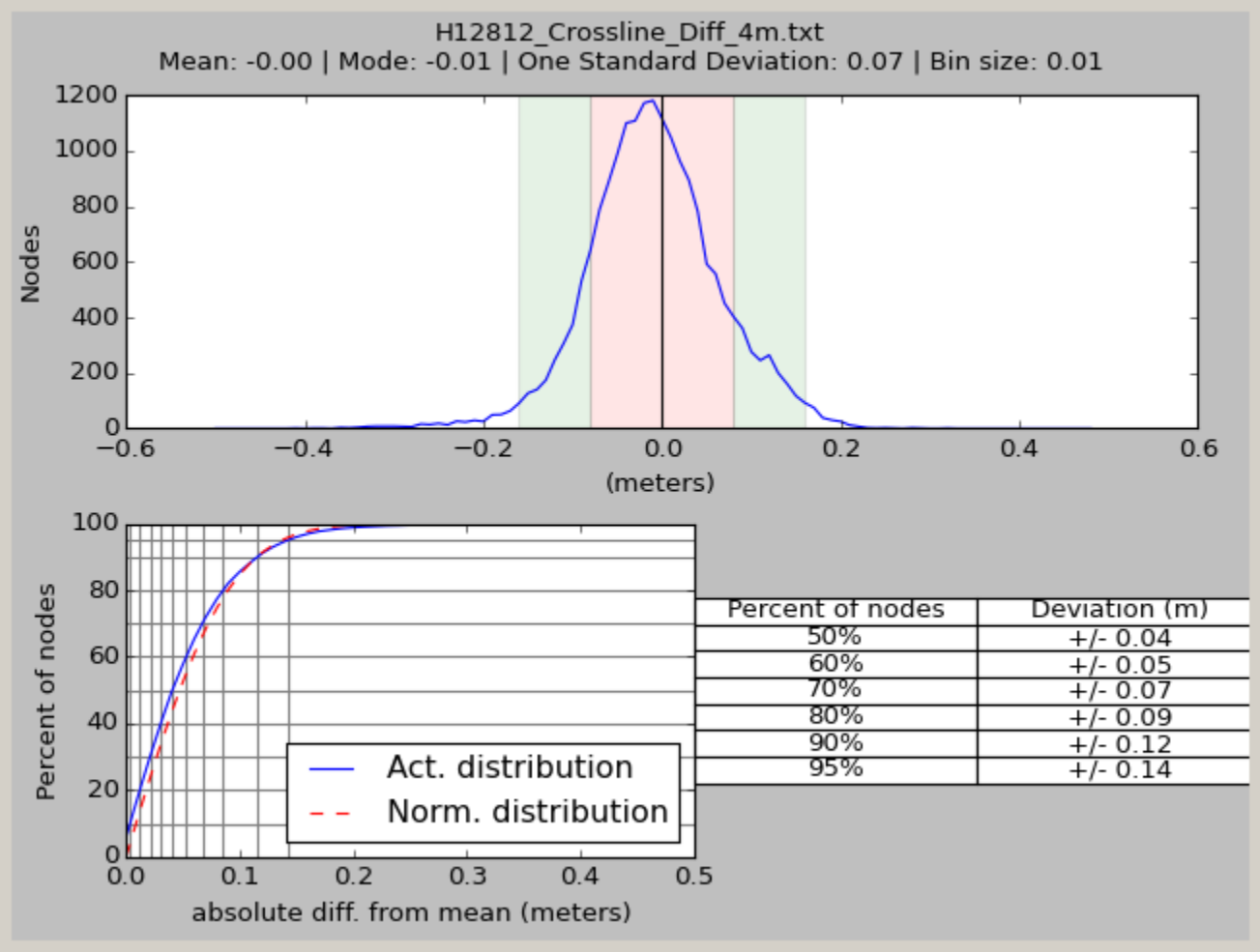


Figure 6: Crossline comparison 4 Meter Surface

Crosslines totaled 4.0% of the complete multibeam coverage and 14.4% of the set spacing coverage. The surface difference is not appended to this report.

B.2.2 Uncertainty

The following survey specific parameters were used for this survey:

Measured	Zoning	Method
0.0235 meters	0 meters	ERZT

Table 6: Survey Specific Tide TPU Values

Hull ID	Measured - CTD	Measured - MVP	Surface
S220		1 meters/second	0.5 meters/second
2805	2 meters/second		0.5 meters/second
2806	2 meters/second		0.5 meters/second
2807	2 meters/second		0.5 meters/second
2808	2 meters/second		0.5 meters/second

Table 7: Survey Specific Sound Speed TPU Values

In addition to the a priori estimates of sound speed uncertainty, real-time and post processed uncertainty sources were incorporated into the depth estimates of Survey H12812. Real-time uncertainties from Kongsberg EM710 and RESON 7125 were recorded and applied in CARIS. Applanix TrueHeave files record an estimate of the heave uncertainty and the files were applied in CARIS. Lastly, the post-processed uncertainties associated with vessel roll, pitch, gyro, and navigation were applied in CARIS via the SBET's RMS file generated in POSPac.

B.2.3 Junctions

Junction analysis was conducted with surveys H12352 which lies directly to the north of H12812, and H12813 which lies directly to the South of H12812. The survey H12352 was conducted and completed by NOAA Ship Fairweather during the summer of 2011. The survey H12813 was conducted and completed by NOAA Ship Fairweather during the summer of 2015. A 2m combined surface was created for H12812 and compared with a combined 2m surface from survey H12352 and H12813. Surface differencing between the two surfaces was run in Caris and the results were processed using Pydro to get the statistical differencing of areas of overlap between the two surveys.

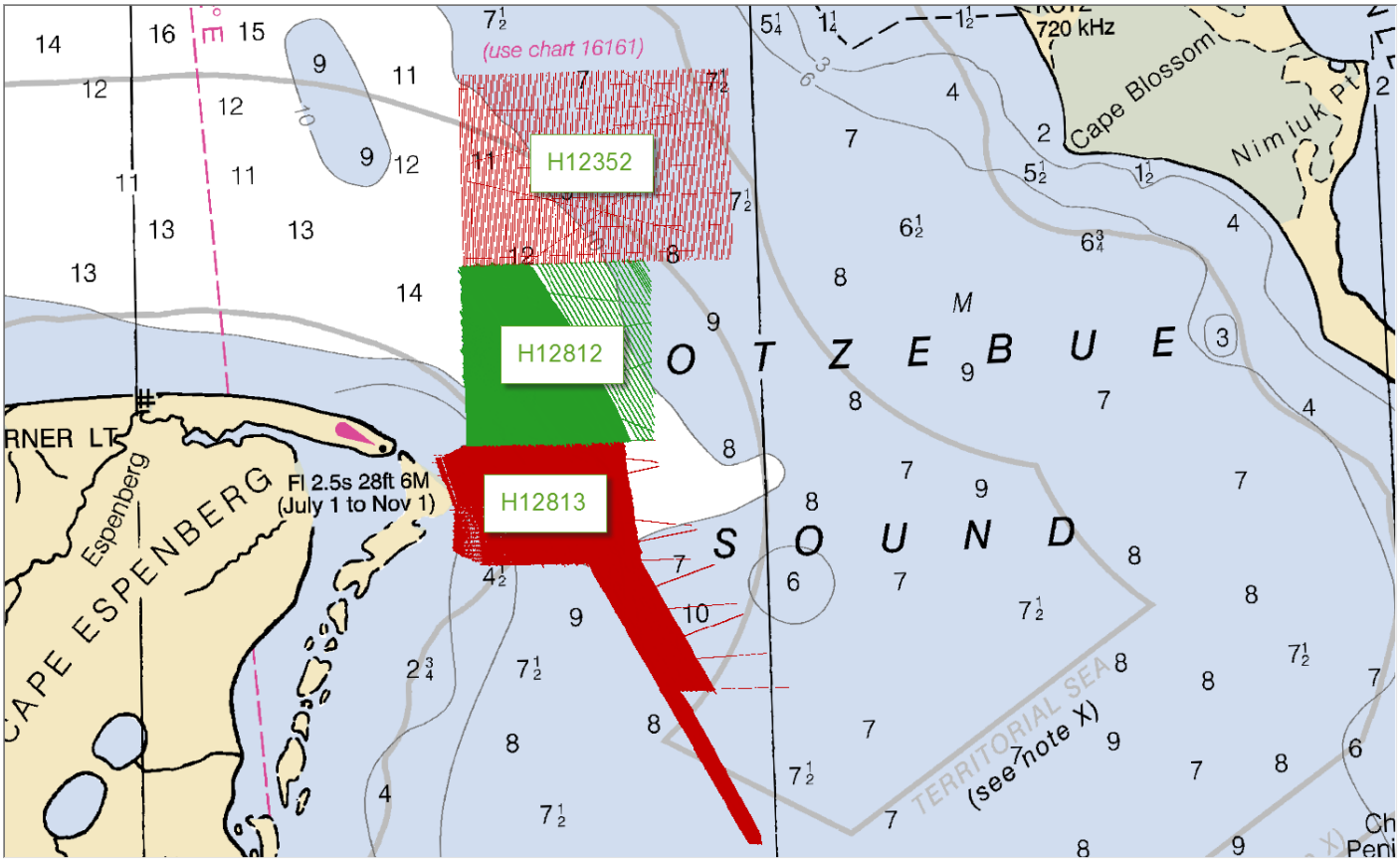


Figure 7: Overview of Sheet H12812 Junction surveys

The following junctions were made with this survey:

Registry Number	Scale	Year	Field Unit	Relative Location
H12352	1:40000	2011	NOAA Ship FAIRWEATHER	N
H12813	1:40000	2015	NOAA Ship FAIRWEATHER	S

Table 8: Junctioning Surveys

H12352

The areas of overlap for all sheets, shown in Figure 8 are reviewed in CARIS Subset Editor for sounding consistency as well as by surface differencing the two meter combined surfaces to assess surface agreement. The soundings and surfaces agree within 1 meter and 95% of all nodes are within +/- 0.41 for junctions between H12812 and H12352 as shown in figure 9. The excessive vertical uncertainty may be due to the use of a new technique on this sheet, ERZT, which uses statistical averaging to supplement local tidal solutions and provide a more robust tidal model versus the TCARI model which was used on Sheet H12352.

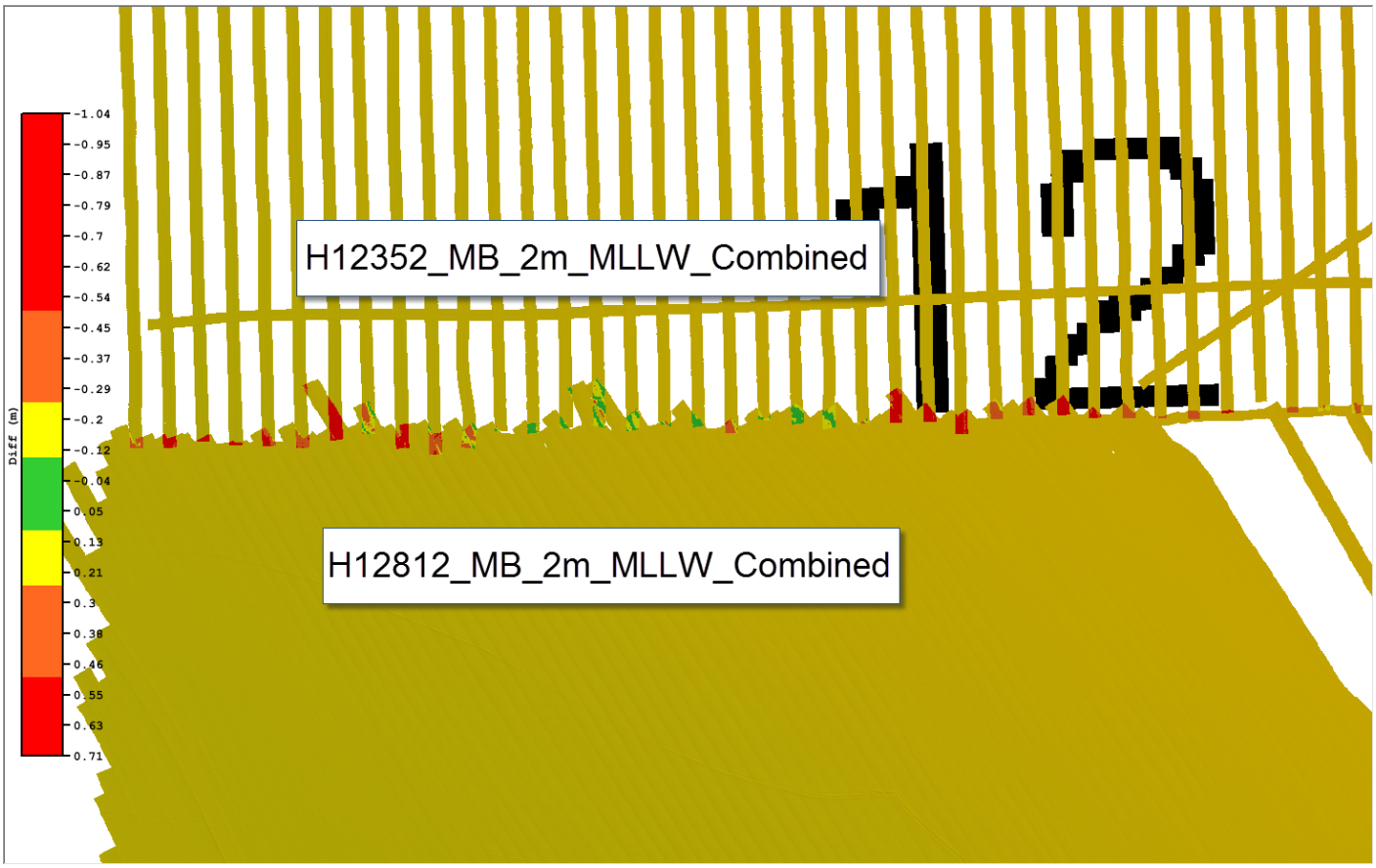


Figure 8: Surfaces of Junction Survey between H12812 and H12352.

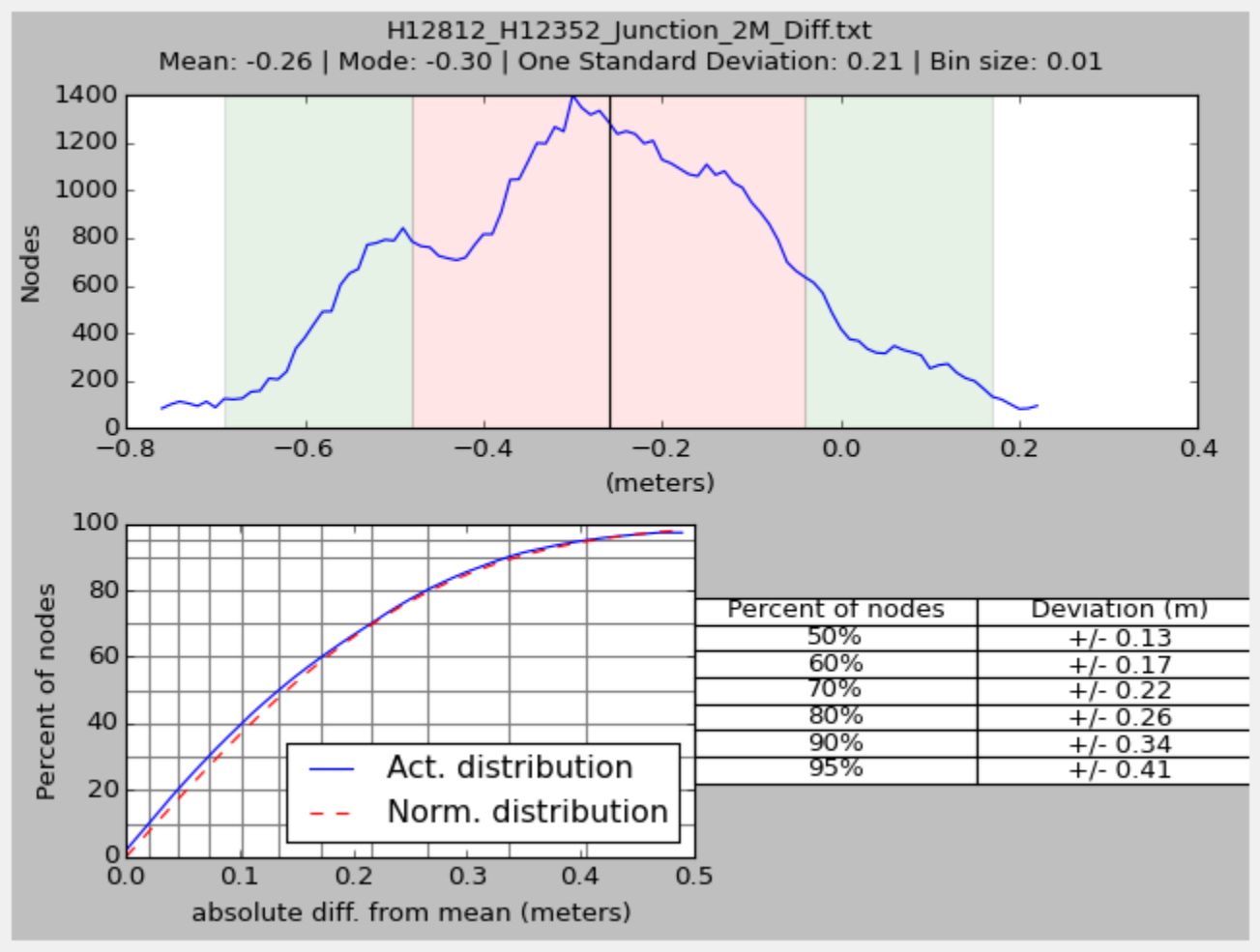


Figure 9: Statistical output for Junction Survey between H12812 and H12352.

H12813

The areas of overlap for all sheets, shown in Figure 10 are reviewed in CARIS Subset Editor for sounding consistency as well as by surface differencing the two meter combined surfaces to assess surface agreement. The soundings and surfaces agree within 1 meter and 95% of all nodes are within +/- 0.31 for junctions between H12812 and H12813 as shown in figure 11. The excessive vertical uncertainty may be due to the use of a new technique on this sheet, ERZT, which uses statistical averaging to supplement local tidal solutions and provide a more robust tidal model versus the TCARI model which was used on Sheet H12813.

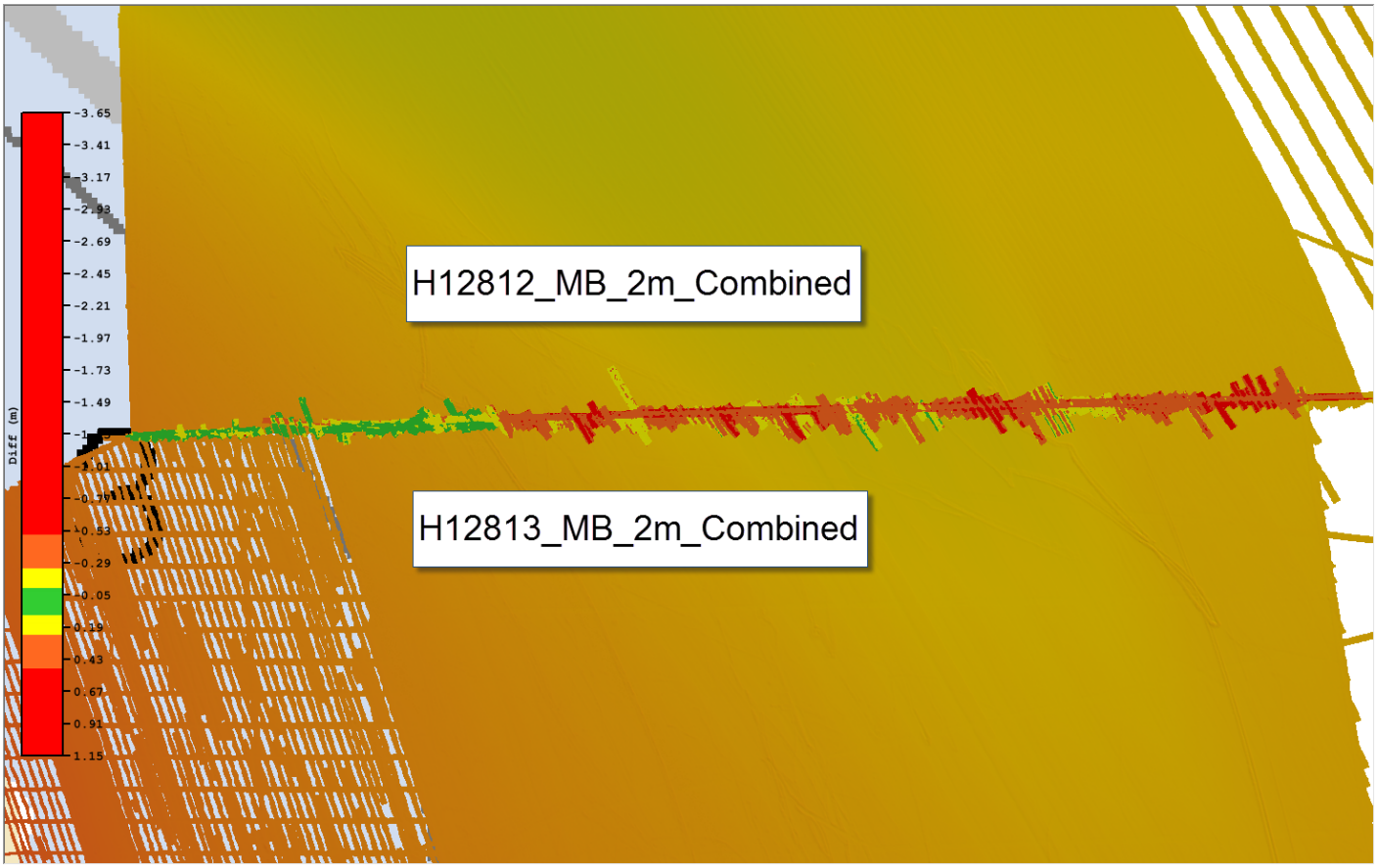
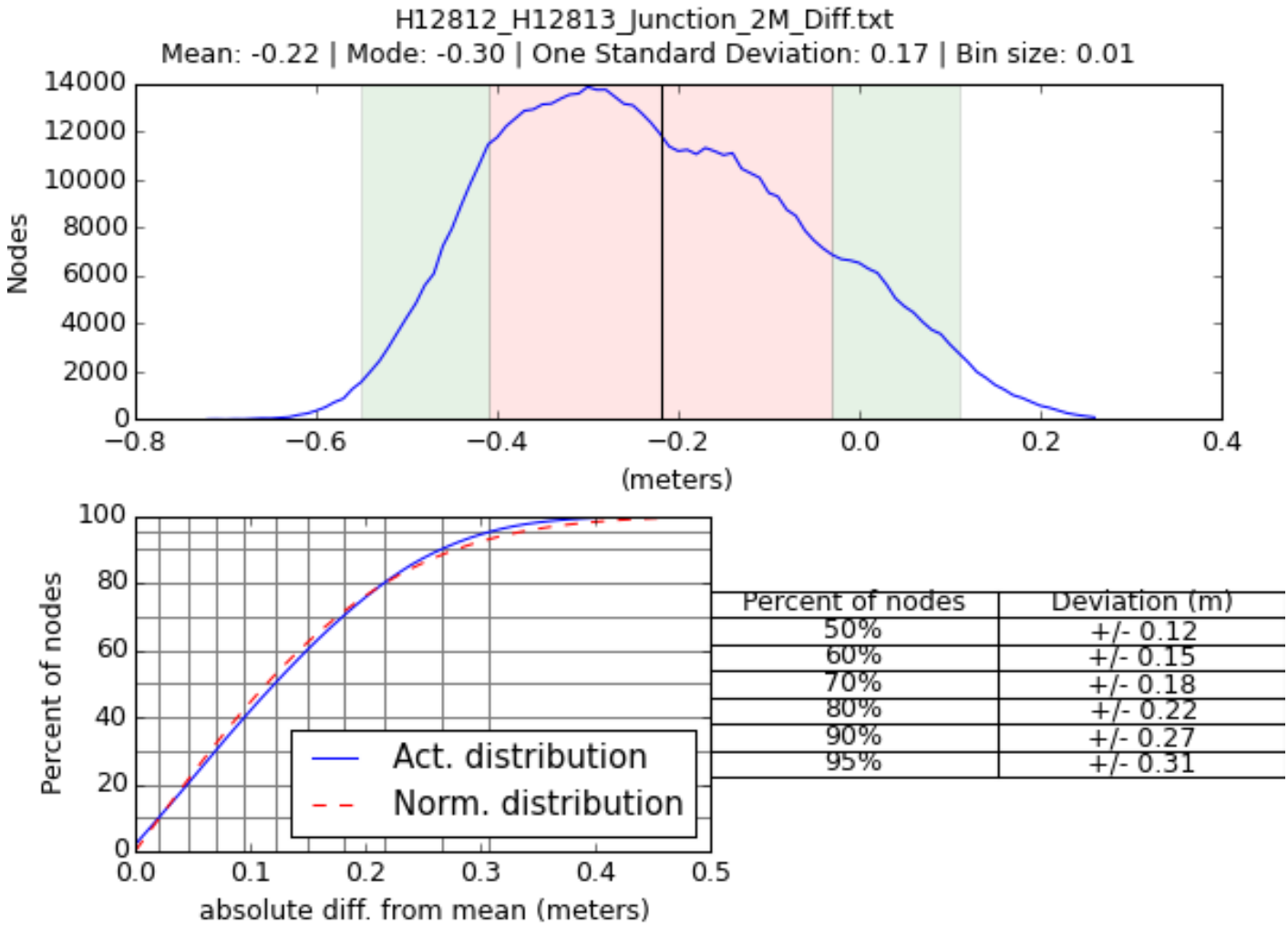


Figure 10: Surfaces of Junction Survey between H12812 and H12813



Percent of nodes	Deviation (m)
50%	+/- 0.12
60%	+/- 0.15
70%	+/- 0.18
80%	+/- 0.22
90%	+/- 0.27
95%	+/- 0.31

Figure 11: Statistical output for Junction Survey between H12812 and H12813.

The junction analysis with H12827 was performed during office review. The mean difference between the two surveys is -0.298 meters with a standard deviation of 0.211 meters.

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

Rolls Royce MVP

As an operational safety feature, the Rolls Royce MVP is programmed to keep the freefall sensor towfish at a minimum of 4 meters above the seafloor during casts. This prevents the possibility of the sensor snagging on obstructions near the seafloor. As the sound speed profile is traditionally consistent in the well mixed

region near the seafloor, this procedure generally has negligible impacts on the sound speed accuracy within the survey area. For this project area however, there was a dynamic layer throughout the survey area due to significant fresh water influx and ice melt (Refer to "Factors Affecting Soundings") . This pycnocline resulted in dynamic sound speed changes, primarily in the region 1- 10 meters adjacent to the seafloor as seen in Figures 12 and 14 (Refer to Figures 13 and 15 for corresponding locations of CTD and MVP casts). Therefore, in H12812 the MVP was not able to provide complete sound speed profiles, resulting in sound speed errors throughout the survey, particularly in the outer beams of the swath (Figure 18). Launches utilized hand-deployed Seabird CTD's (which extended all the way to the seafloor), and resulted in a better sound speed solution and smoother data. As a result of the mitigation and quality control performed (Refer to "Factors Affecting Soundings"), the hydrographer is confident that the data remains sufficient to supersede charted data.

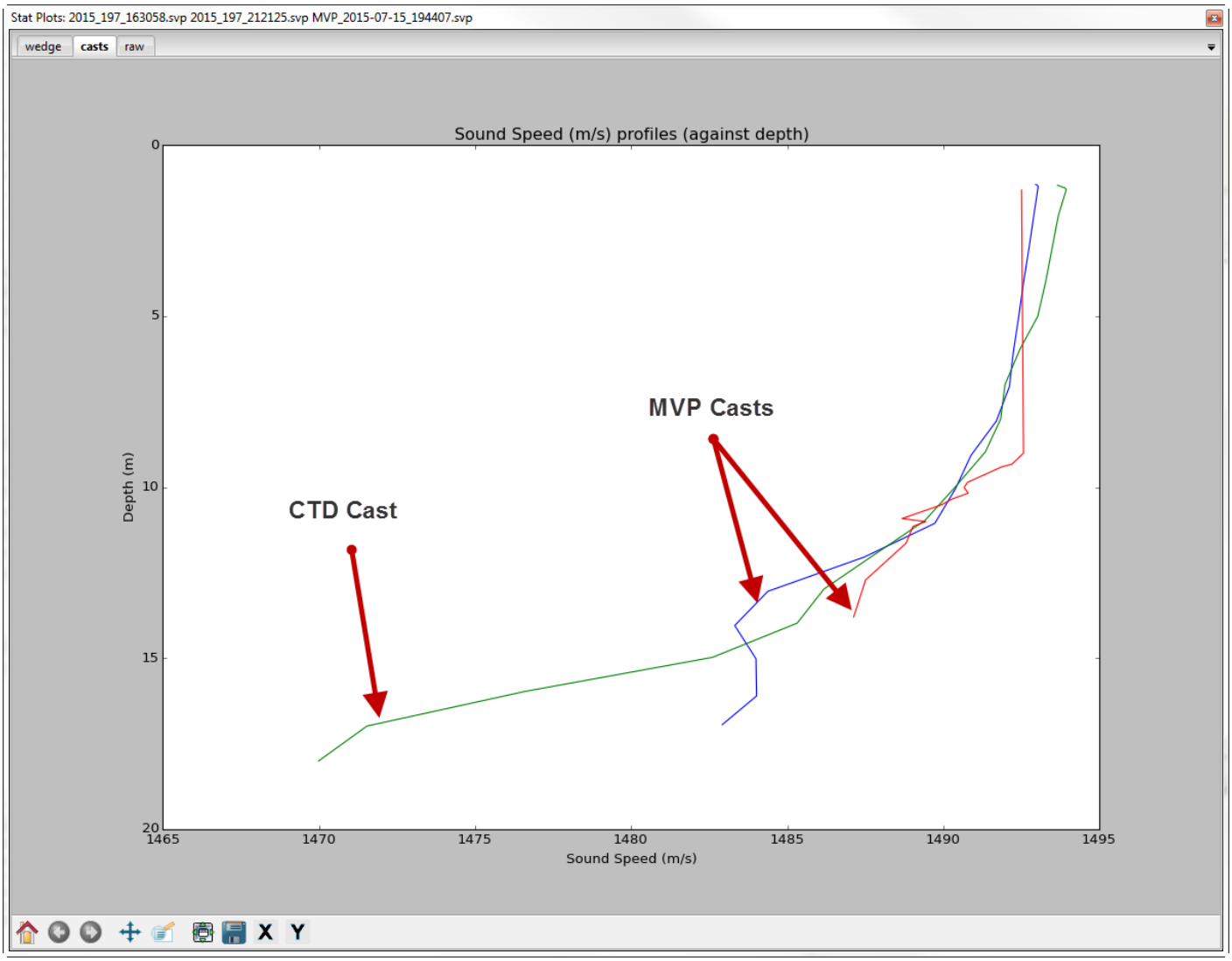


Figure 12: Graph of CTD 2806_197_163058 vs MVP cast extents

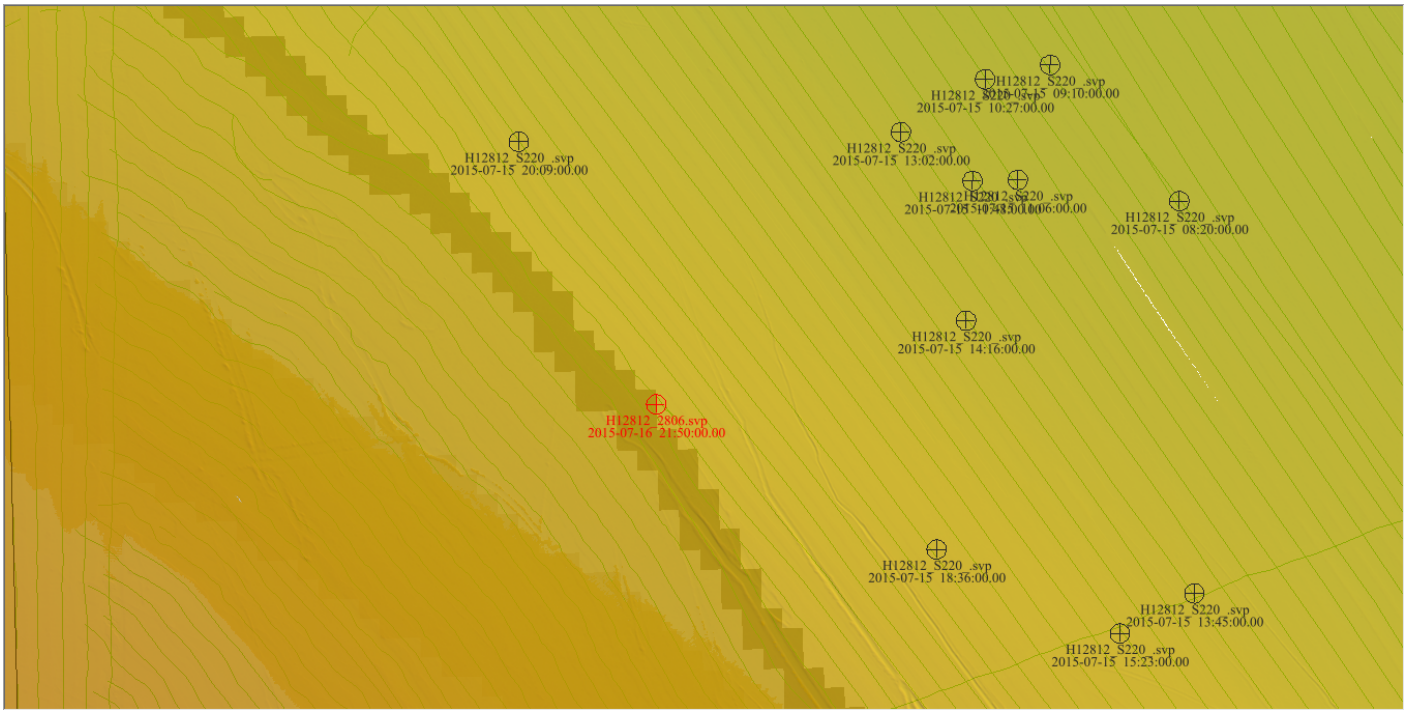


Figure 13: Location of CTD 2806_197_163058 cast

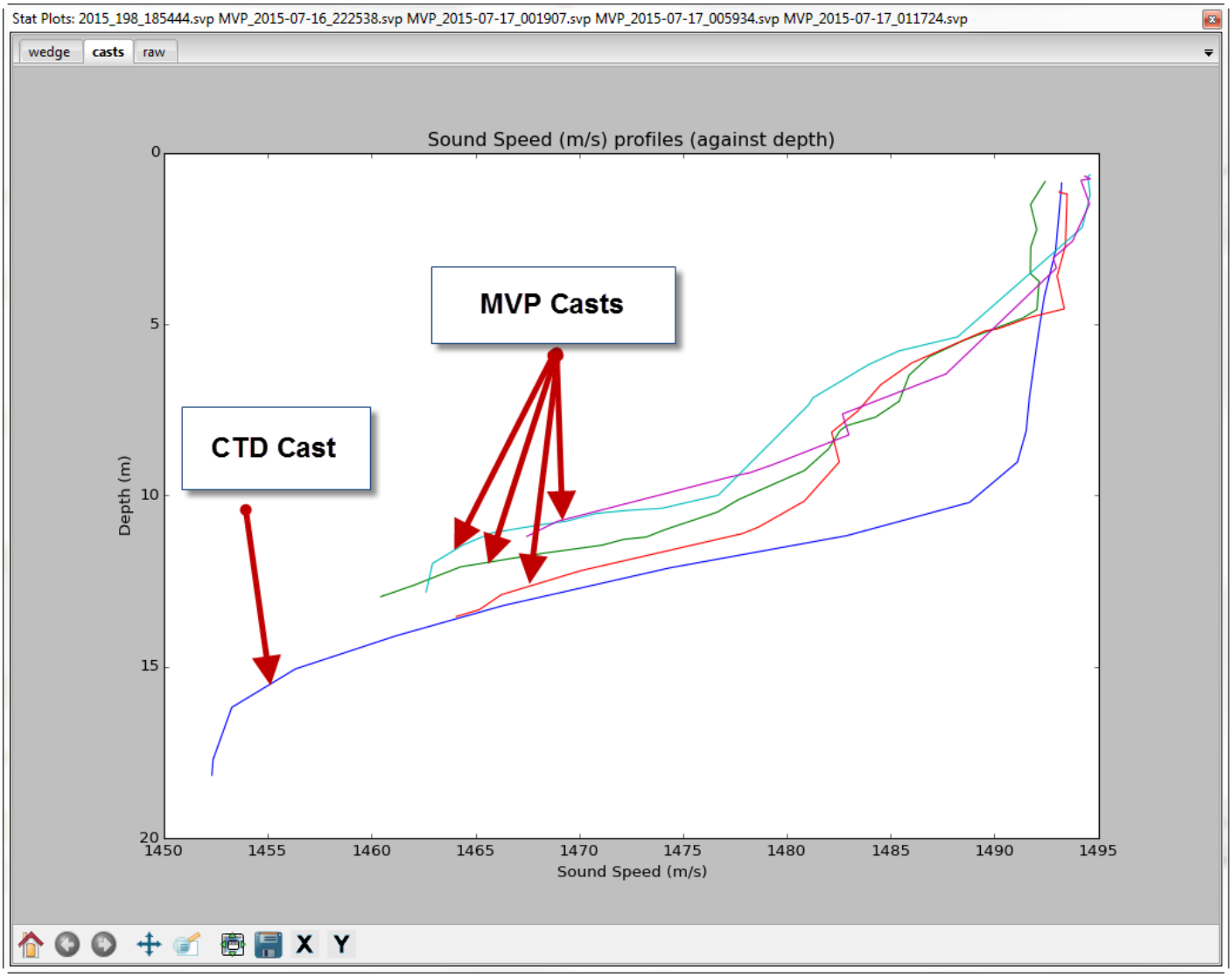


Figure 14: Graph of CTD 2806_198_185400 vs MVP cast extents

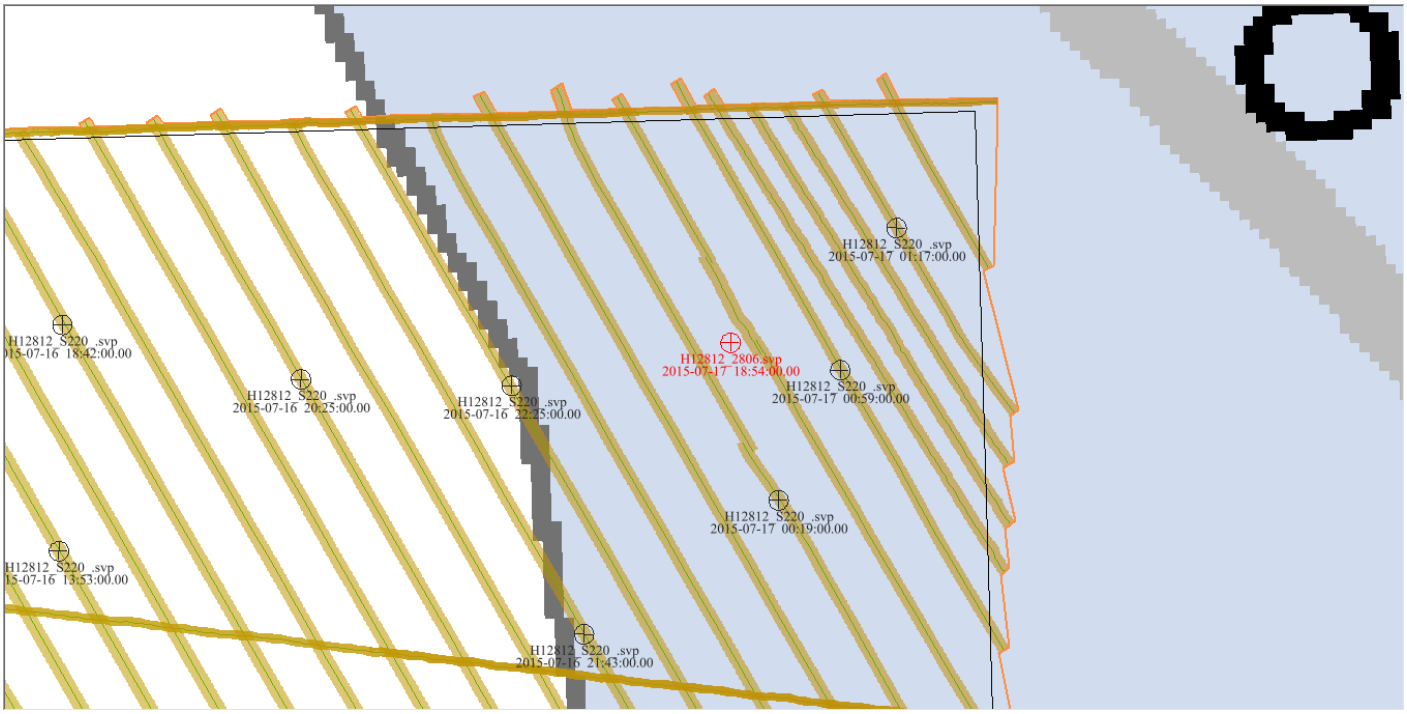


Figure 15: Location of CTD 2806_198_185400 cast

B.2.6 Factors Affecting Soundings

Dynamic Pycnocline and Significant Refraction

There are two major rivers, the Kobuk River and the Noatuk River with a combined average discharge of approximatley 26600 cubic feet per second along with approximately 45 smaller streams that discharge into Kotzebue Sound (Refer to Figure 16), The discharge from these rivers and streams along with a significant ice melt in close proximity in time prior to the beginning of the survey combined with a sluggish current are contributing factors creating significant variability of the pycnocline in the water column that was observed both spatially and temporally. (Refer to Figure 17)

Sound speed corrections were applied in CARIS using multiple parameters which included nearest in time, nearest in distance, nearest in time and distance = 1 hour, nearest in distance and time = 2 hours, and nearest in distance and time = 3 hours. Nearest in distance and time = 3 hours appeared to be the best overall solution for the Ship data.

While portions of these data do not meet the individual HSSD error budget for sound speed, the overall data (99.9% of the nodes), as noted in section B.2.9 of the 2015 HSSD, meet NOAA Specifications.

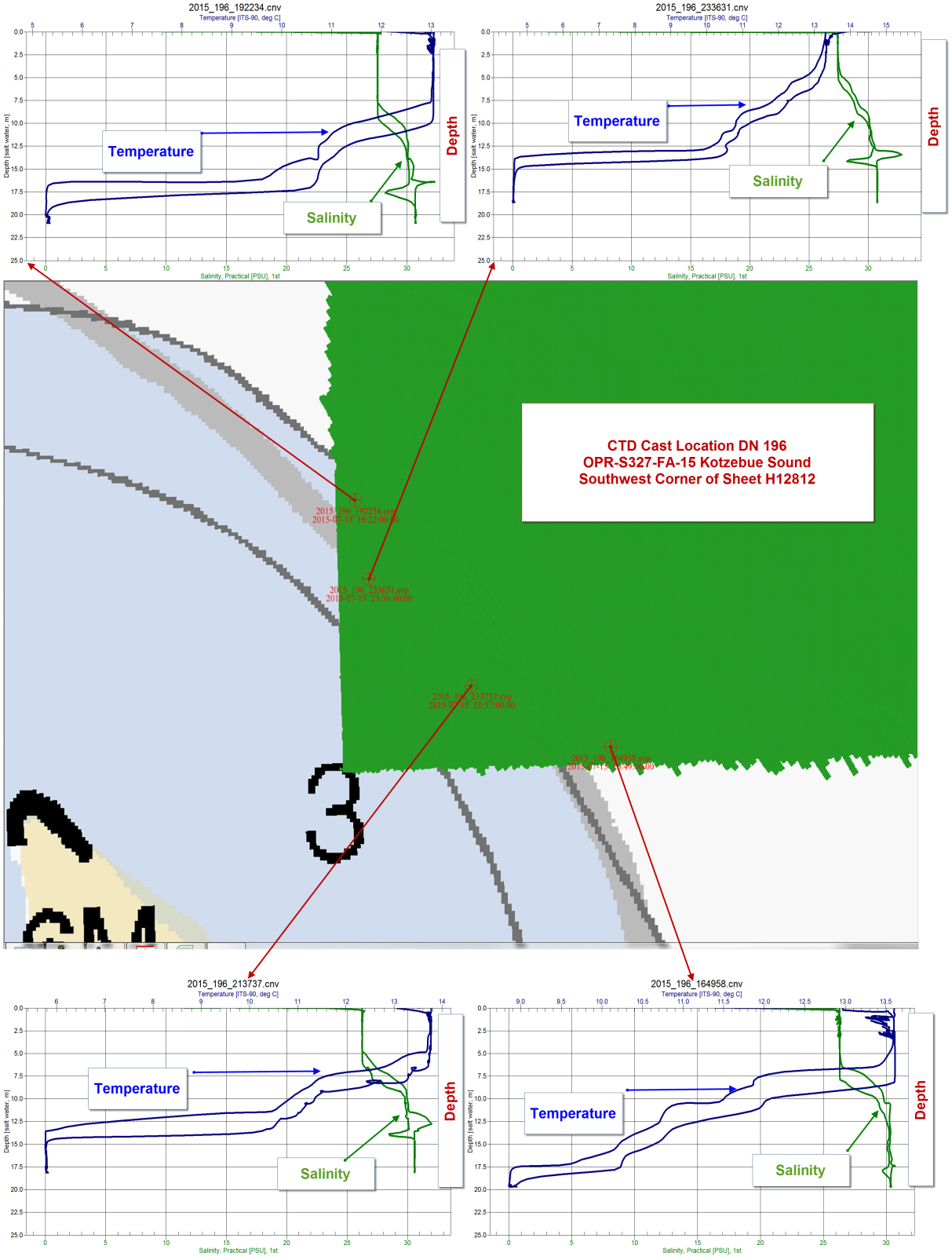


Figure 16: Major river and stream outlets contributing to fresh water influence of Kotzebue Sound.

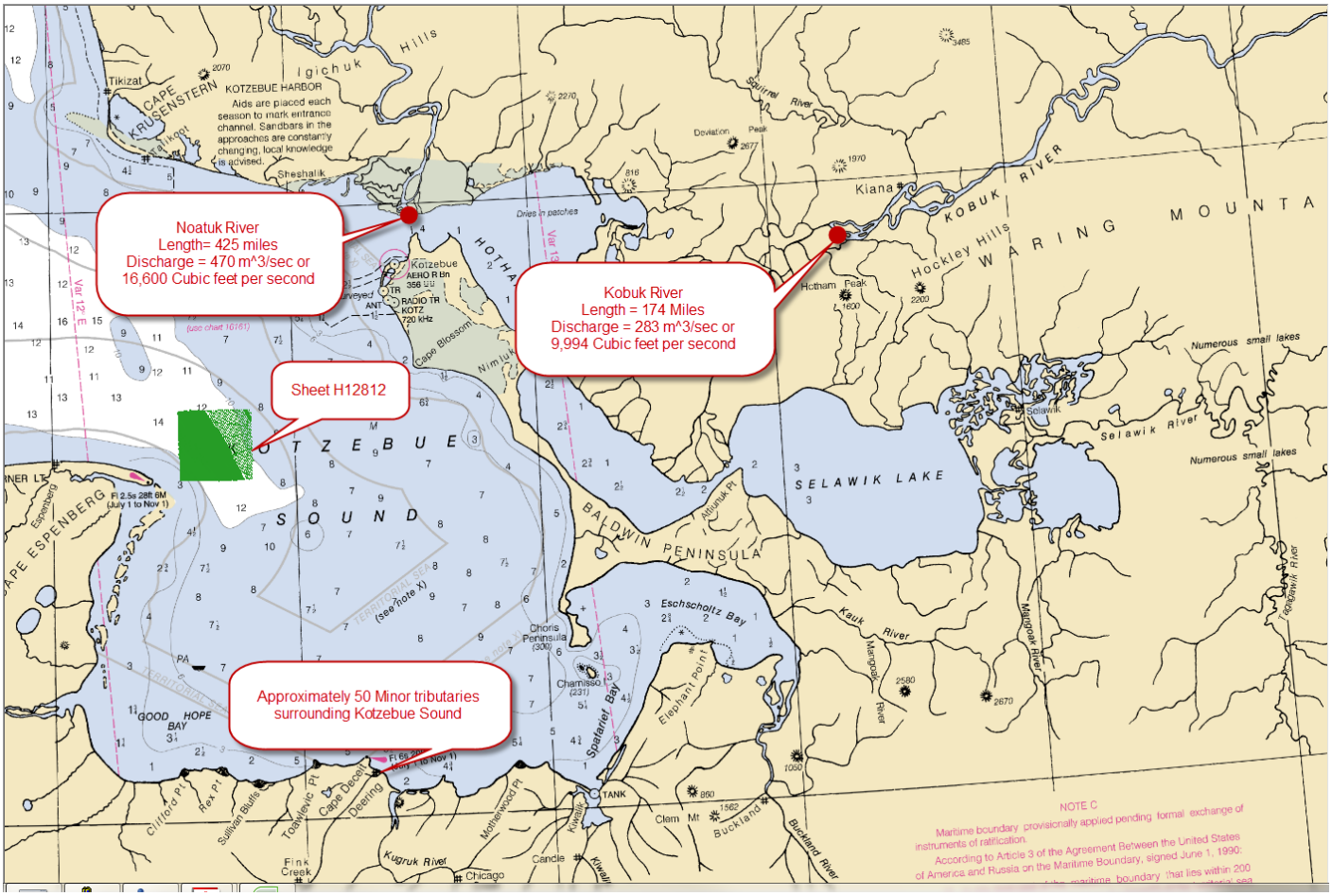


Figure 17: CTD casts indicating very dynamic conditions within the water column spatially.

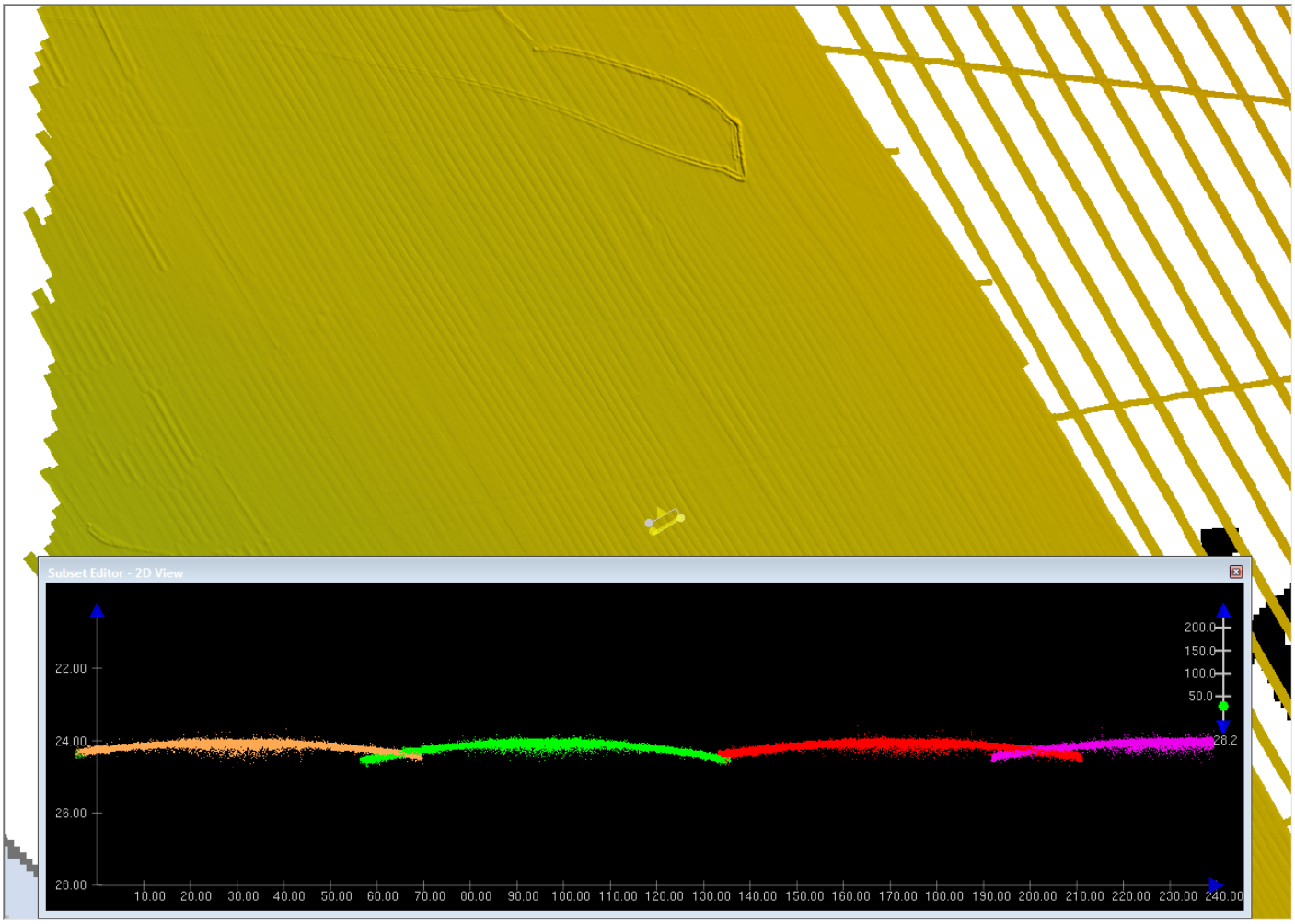


Figure 18: Sound Speed Error propagation throughout entire survey

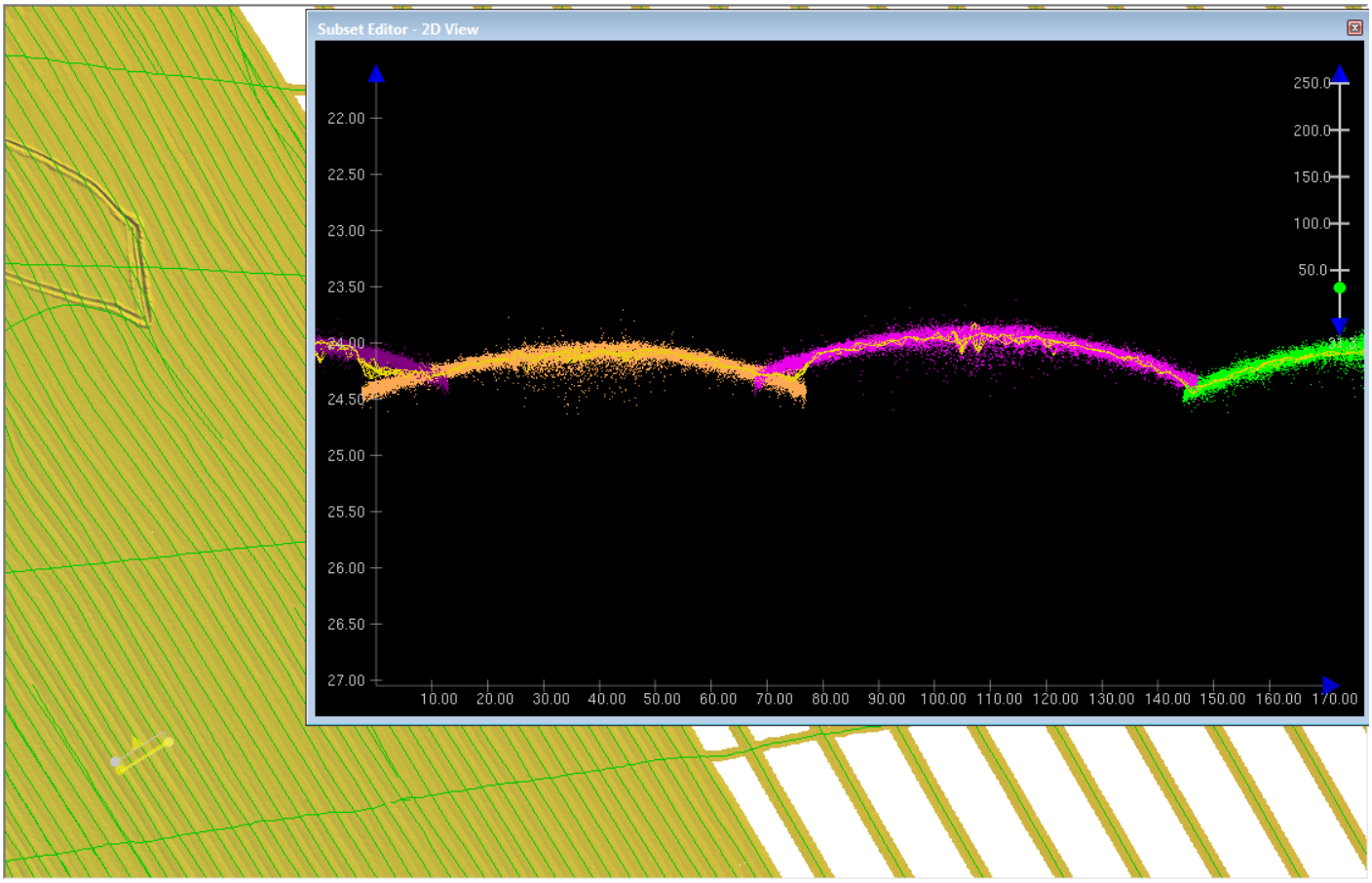


Figure 19: Area of Excessive Sound Speed Error

While portions of data acquired as part of H12812 exceed the sound speed error budget as defined in the HSSD section 5.2.3.5, data were determined to be adequate for charting during office review.

B.2.7 Sound Speed Methods

Sound Speed Cast Frequency: Cast frequency was guided by Pydro Contribs / Cast Time. S220 used the Rolls Royce MVP. Cast frequency varied from as little as 6 minute intervals to as much as 1 hr and 20 minutes depending on Pydro Cast Time indication. On occasion, SV readings were either faulty (spikes), or lacking robustness (too few data points), and were excluded from being sent to SIS in favor of a new cast taken in immediate succession. After acquisition, a total inventory of all casts were accounted for, and any faulty casts that were previously applied were excluded from the daily concatenated file and then reapplied in Caris. During launch acquisition casts were conducted approximately every two hours with a SeaBird SBE19plus CTD.

Casts were extended by slope and vertical profile during the first week of acquisition which created erroneous data. These extended points were identified and deleted in CARIS SV Editor, returning the casts to their original, non-extended condition.

B.2.8 Coverage Equipment and Methods

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

B.2.9 IHO Assessment

Uncertainty values of the submitted finalized surfaces were calculated in CARIS using standard deviation (scaled to 95%). To quantify the extent to which accuracy requirements were met, descriptive statistics of the CARIS finalized surfaces were analyzed using Pydro's analysis tools. Overall, 99.9% of nodes for the 1m surface (Figure 20) , 99.9% of nodes for the 2m surface (Figure 21) and 99.9% of nodes for the 4m surface (Figure 22) of Survey H12812 meet the accuracy requirements stated in Section 5.1.3 of the HSSD.

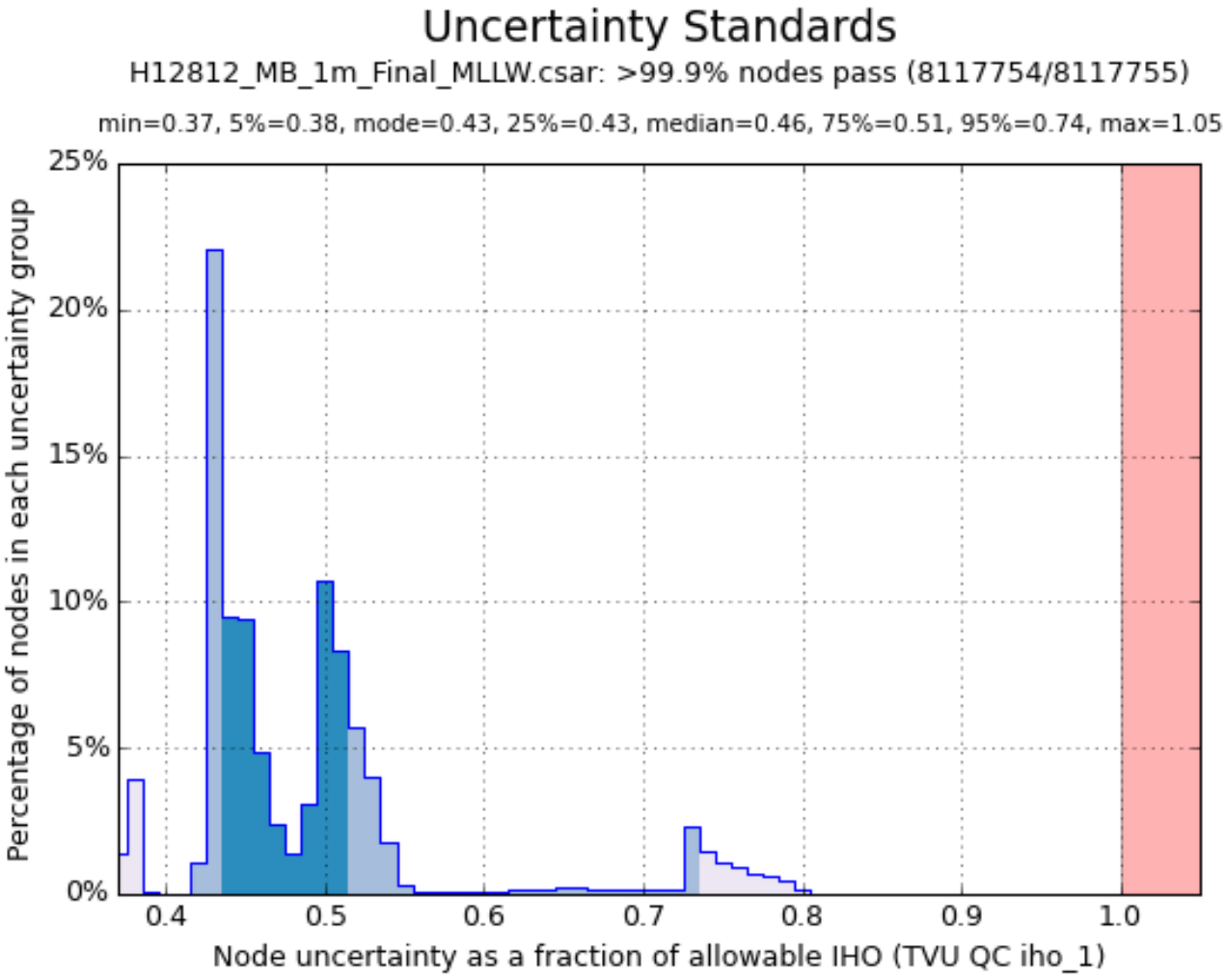


Figure 20: H12812 1 meter TVU

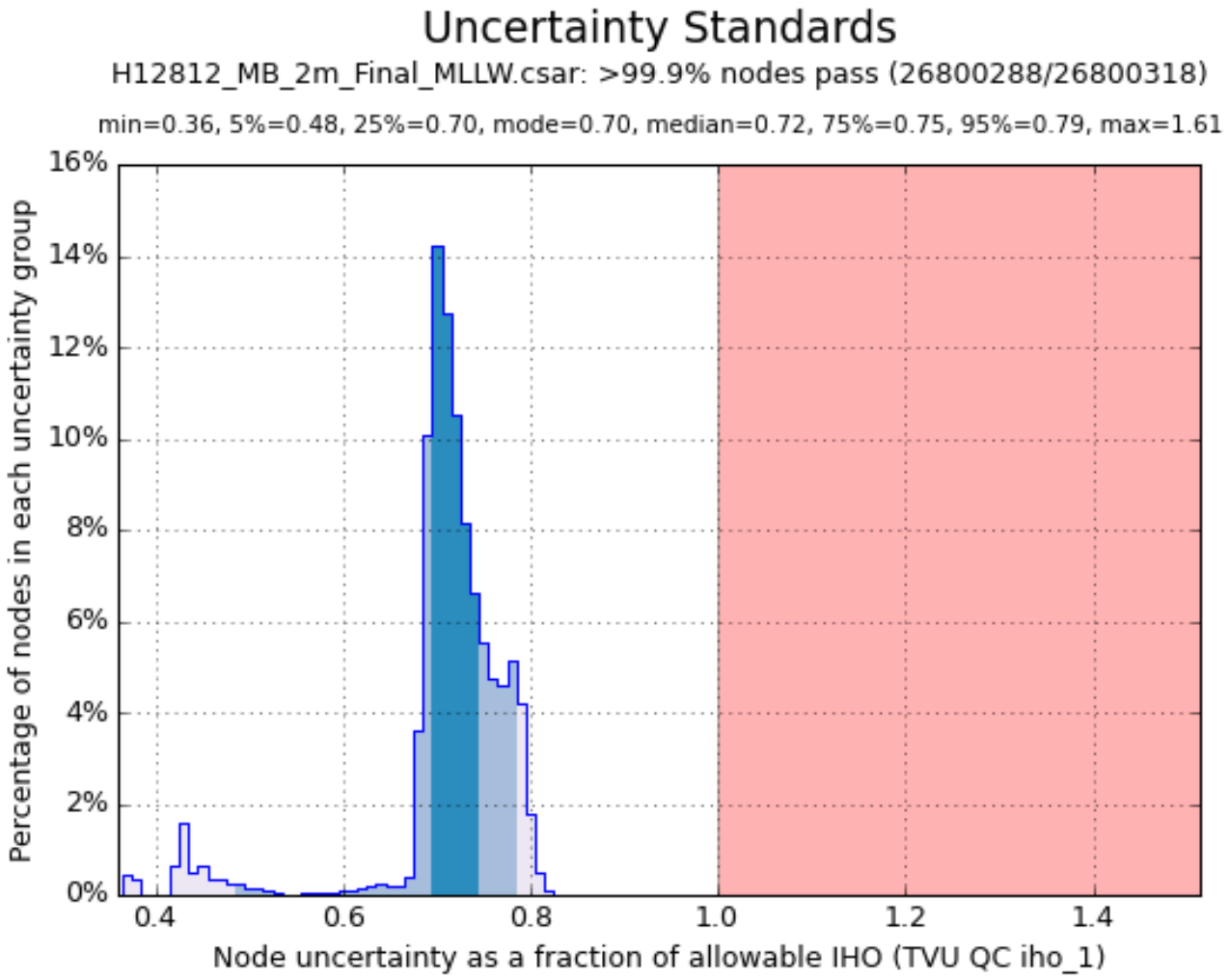


Figure 21: H12812 2 meter TVU

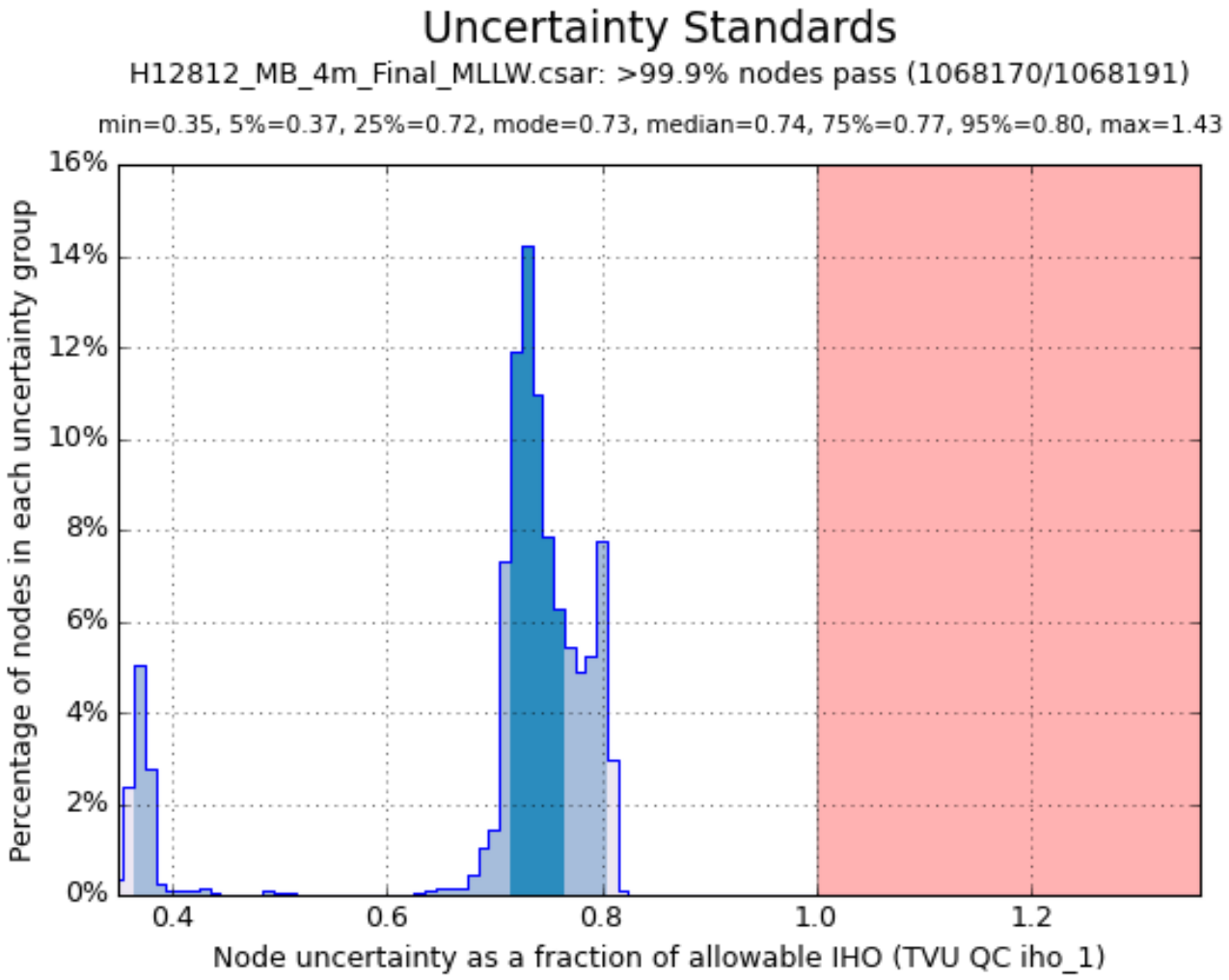


Figure 22: H12812 4 meter TVU

B.2.10 Density

Data acquired in H12812 exceeded MBES density requirements for MBES with backscatter. In order to extract descriptive statistics the CARIS finalized surfaces were analyzed using Pydro's analysis tools. Overall, the required data density was achieved in 99.9% of the nodes for the 1m surface (Figure 23), 99.9% of the nodes for the 2m surface (Figure 24) and 99.6%of the nodes for the 4m surface. This exceeds the requirement for 95% of nodes being populated with five soundings as per Section 5.2.2.2 of the HSSD.

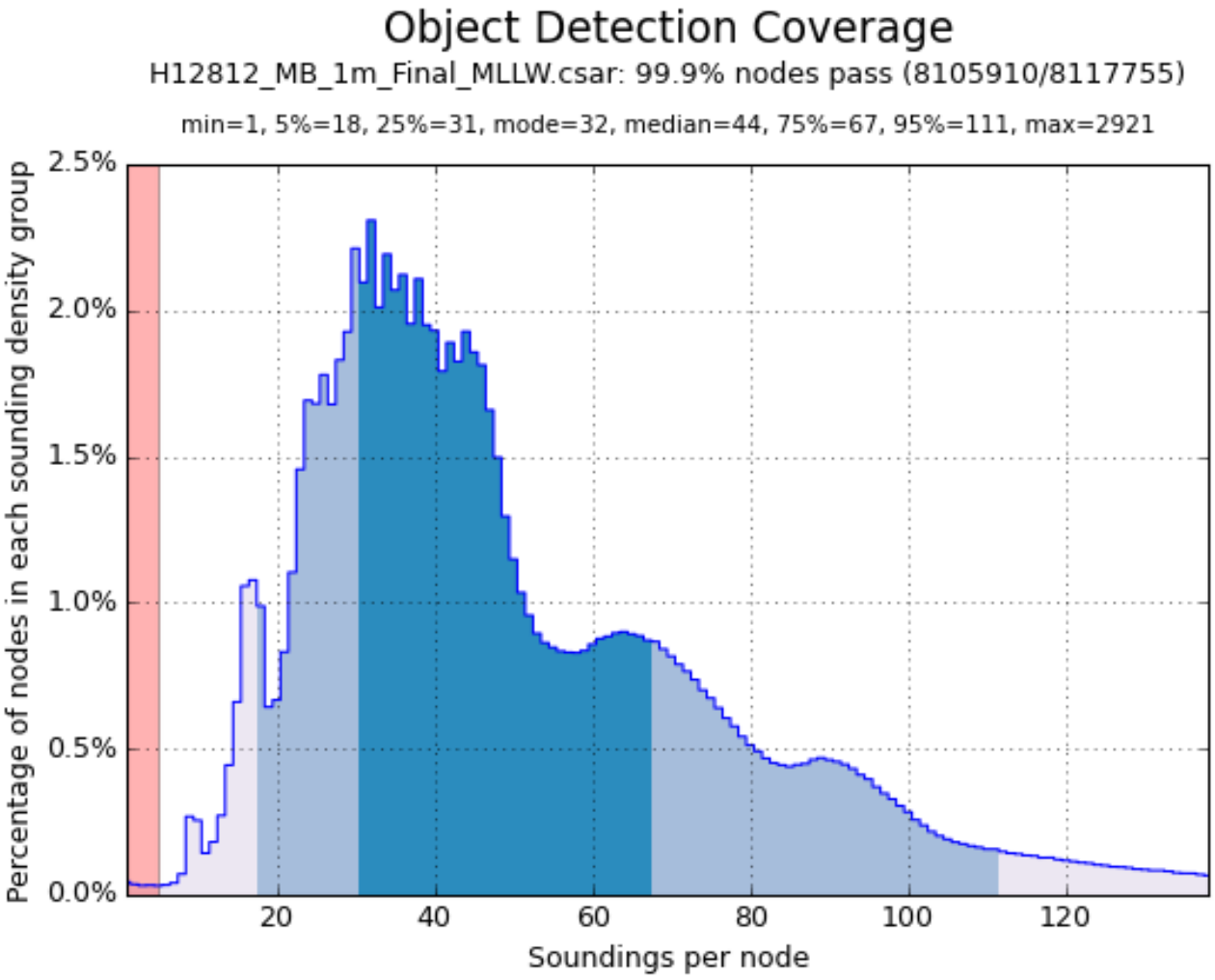


Figure 23: H12812 1 Meter Denisity

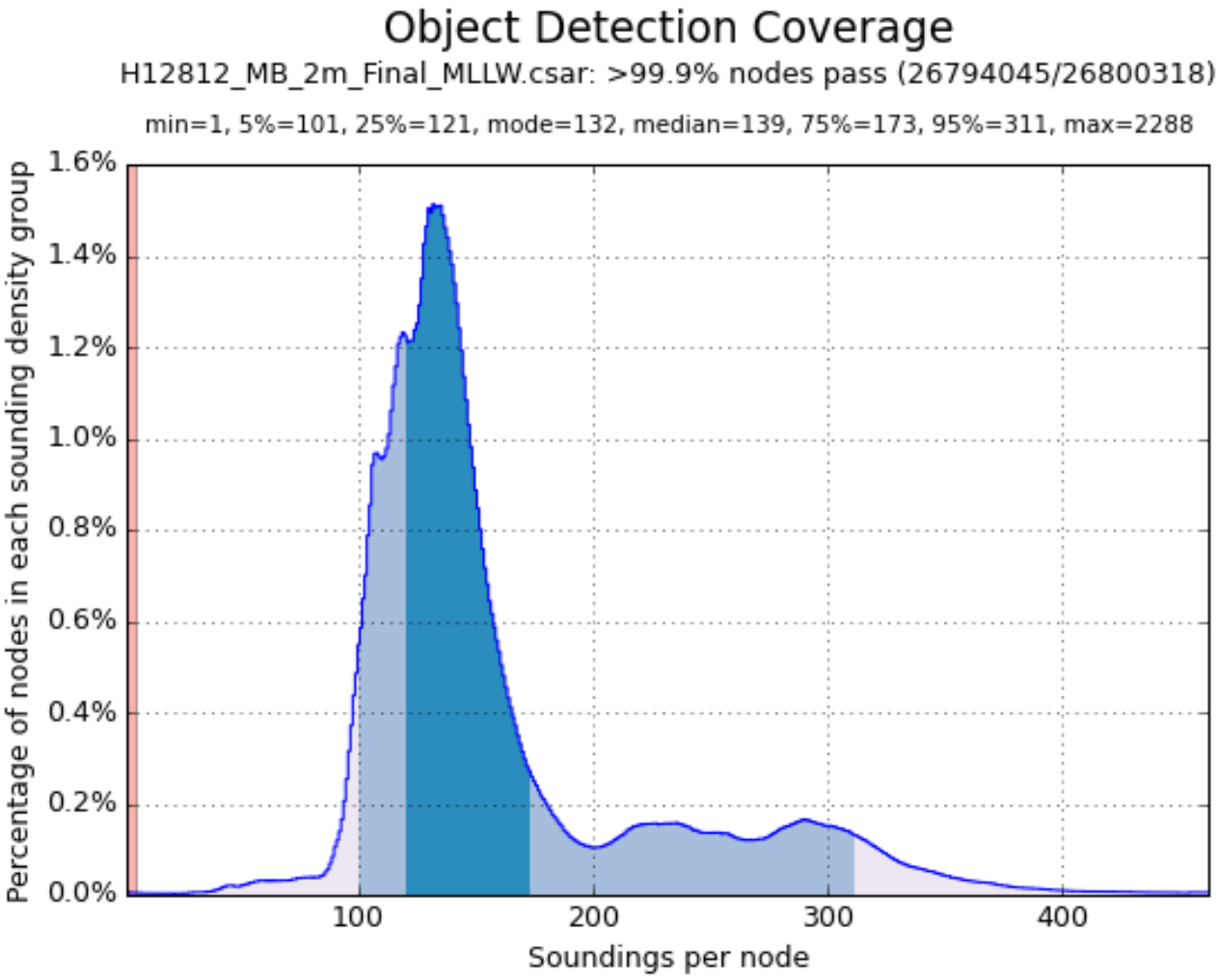


Figure 24: H12812 2 Meter Denisity

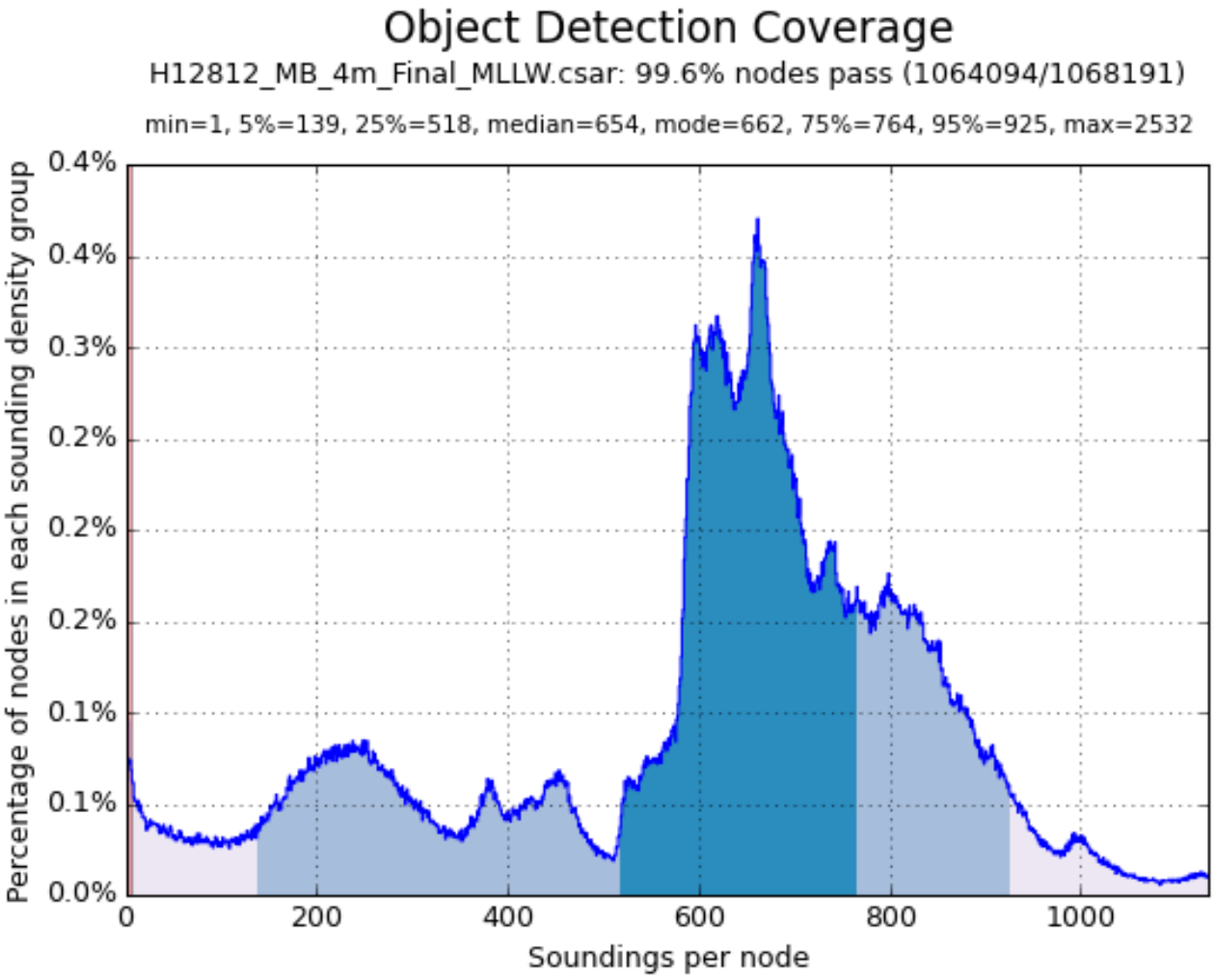


Figure 25: H12812 4 Meter Density

B.2.11 Holiday Assesment

H12812 was analyzed for holidays as defined by the 2015 HSSD. Based on this analysis, two holidays were found within the survey, and both occurred between the Full Coverage MBES section and 300 Meter Line Spacing section (Refer to Figures 26 and 27 for locations). These holidays were not observed until the final days of survey operations in the area. Due to time constraints with the ship, we were unable to return and fill in the holidays. As these holidays are relatively minor and no obstructions or contacts were found in any MBES data in adjacent areas, the hydrographer is confident they do not negatively impact survey quality.

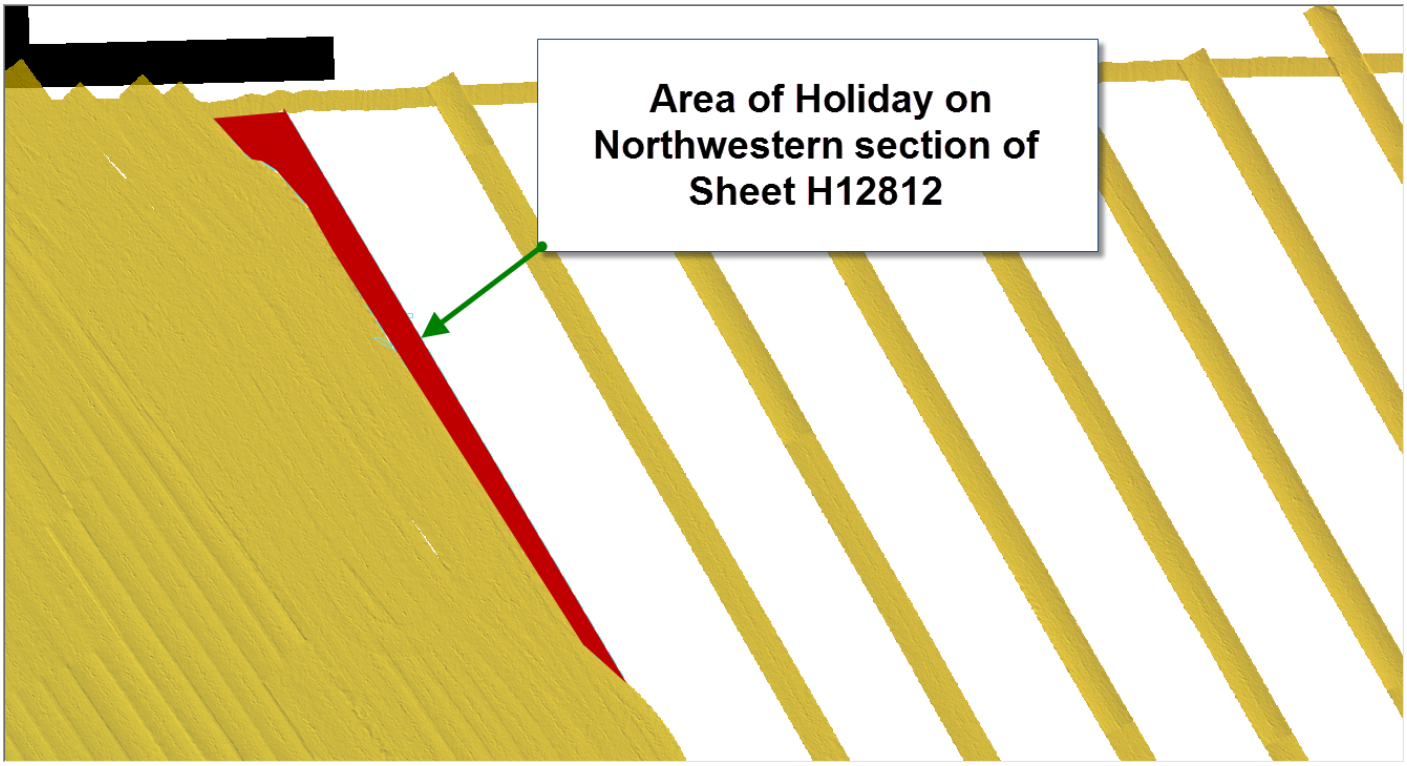


Figure 26: Holiday occurring at the Northwest area of sheet H12812.

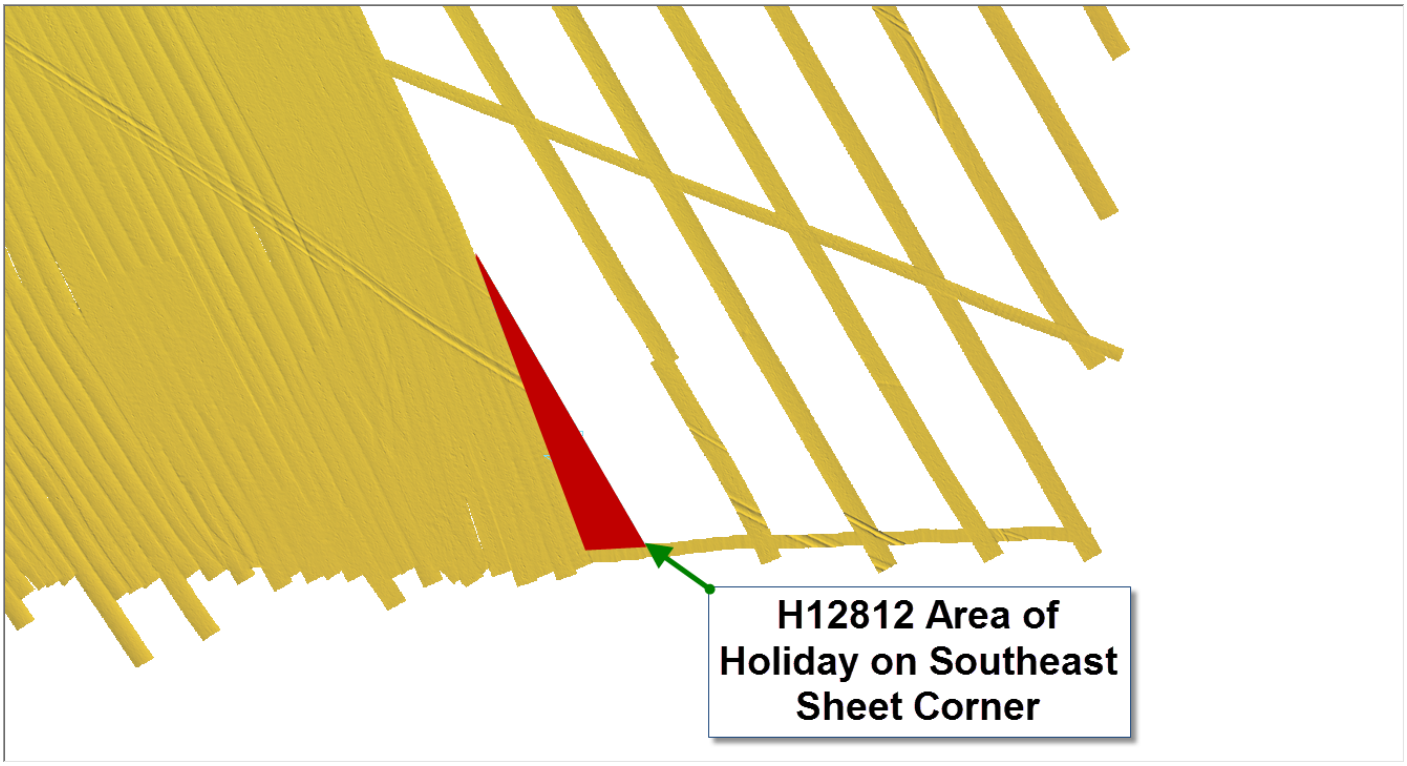


Figure 27: Holiday occurring at the Southeastern area of sheet H12812.

While minor holidays occurred as part of H12812, data are adequate to supersede charted depths in their common area.

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 .7k file for Reson 7125 data. Kongsberg EM710 stores the backscatter data in the .all file. The data was submitted directly to NGDC to be archived, and to PHB where the data will be processed. One line per day of backscatter was processed in the field by the field unit for quality control.

B.5 Data Processing

B.5.1 Primary Data Processing Software

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

Manufacturer	Name	Version
Caris	HIPS/SIPS	9.0

Table 9: Primary bathymetric data processing software

The following Feature Object Catalog was used: NOAA Profile V_5_3_3

B.5.2 Surfaces

The following surfaces and/or BAGs were submitted to the Processing Branch:

Surface Name	Surface Type	Resolution	Depth Range	Surface Parameter	Purpose
H12812_MB_1m_MLLW	CUBE	1 meters	-	NOAA_1m	Complete MBES
H12812_MB_1m_Final_MLLW	CUBE	1 meters	0 meters - 20 meters	NOAA_1m	Complete MBES
H12812_2m_MLLW	CUBE	2 meters	-	NOAA_2m	Complete MBES
H12812_2m_Final_MLLW	CUBE	2 meters	18 meters - 40 meters	NOAA_2m	Complete MBES
H12812_4m_MLLW	CUBE	4 meters	-	NOAA_4m	MBES TracklineSBES Set Line Spacing
H12812_4m_Final_MLLW	CUBE	4 meters	0 meters - 80 meters	NOAA_4m	MBES TracklineSBES Set Line Spacing

Table 10: Submitted Surfaces

The NOAA CUBE parameters mandated in HSSD were used for the creation of all CUBE BASE surfaces in Survey H12812. The surfaces have been reviewed where noisy data, or ‘fliers’ are incorporated into the

gridded solution causing the surface to be more shoal or deeper than the true seafloor. Where these spurious soundings cause the gridded surface to be shoaler or deeper than the reliably measured seabed by greater than the maximum allowable Total Vertical Uncertainty at that depth, the noisy data have been rejected and the surface recomputed.

The names of the submitted finalized surfaces are as follows: H12812_MB_1m_MLLW_Final, H12812_MB_2m_MLLW_Final and H12812_MB_4m_MLLW_Final

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:

ERZT

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

Station Name	Station ID
Red Dog Dock	9491094
Nome	9468756

Table 11: NWLON Tide Stations

The following subordinate water level stations were established for this survey:

Station Name	Station ID
Kotzebue	9490424
Goodhope Bay, AK	9469833
Central Kotzebue Sound, AK	9469993
Cape Espenberg, AK	9490096
South of Cape Krusenstern, AK	9490487

Table 12: Subordinate Tide Stations

There was no Water Level file associated with this survey.

File Name	Status
S327RA2015.tc	Final

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

A request for final approved tides was sent to N/OPS1 on 08/10/2015. The final tide note was received on 01/29/2016.

See attached Tide Note dated January 28, 2016.

Non-Standard Vertical Control Methods Used:

Constant Separation

Ellipsoid to Chart Datum Separation File:

H12812_NAD83_MLLW_SEP_1000m.csar

Ellipsoidally Referenced Zoned Tides (ERZT) datum separation model file was created in the field and applied to H12812 data in accordance with guidance provided by the Kotzebue ERZT memorandum. Constant Separation is selected in the above field since datum model is not an option in the input field. The separation model was used for the vertical transformation of the ellipsoid-referenced data to MLLW and was applied for data submission. Soundings were merged in CARIS HIPS and SIPS using the Apply GPS Tide function and TPU was computed with the new separation model uncertainty value. See correspondence in Appendix II for additional information on separation model use and approval.

See attached ERZT Capability Memo.

C.2 Horizontal Control

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

The projection used for this project is UTM zone 3 North.

The following PPK methods were used for horizontal control:

Single Base

Vessel Kinematic data was post processed using the Applanix POSPac processing software and the Single Base method was used as described in the DAPR. Smoothed Best Estimates of Trajectory (SBET) and associated error (RMS) data were applied to all MBES data in CARIS HIPS

The following user installed stations were used for horizontal control:

HVCR Site ID	Base Station ID
9677	Cape Espenberg

Table 14: User Installed Base Stations

C.3 Additional Horizontal or Vertical Control Issues

3.3.1 WAAS Correctors

During acquisition, S220 and all Launches received WAAS correctors for increased accuracies similar to USCG DGPS stations.

WAAS correctors are referenced to WGS84 while the HSSD section 2.1 requires NAD83 for all geographic positions. As part of H12812, all WGS84 positions were overwritten by NAD83 positions through computation and application of SBET navigation files.

D. Results and Recommendations

D.1 Chart Comparison

A comparison was made between survey H12812 and Charts 16005_1 and 16161_1 using CARIS soundings and contours layers derived from the 2 meter combined surface. The contours and soundings were overlaid on the chart to assess differences. All data from H12812 should supersede charted data.

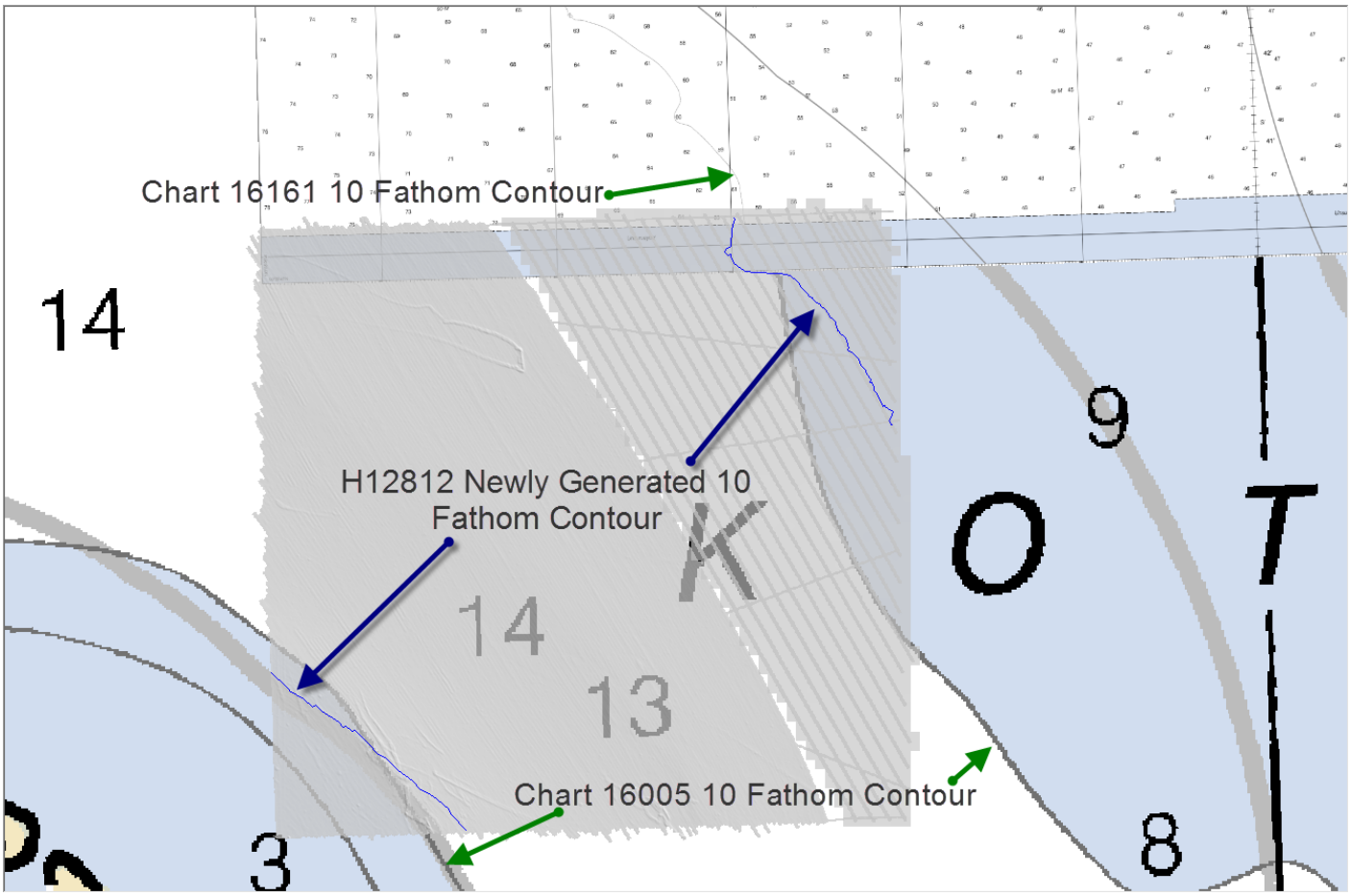


Figure 28: Newly derived 10 Fathom Contours

D.1.1 Raster Charts

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

Chart	Scale	Edition	Edition Date	LNM Date	NM Date
16161	1:50000	1	04/2012	03/29/2016	03/19/2016
16005	1:700000	15	10/2014	03/10/2015	03/07/2015

Table 15: Largest Scale Raster Charts

16161

The soundings from survey H12812 generally agreed within 0 to 1 feet with the charted depths on chart 16161_1. It is recommended that additional soundings be added to the chart in the previously unsurveyed area.

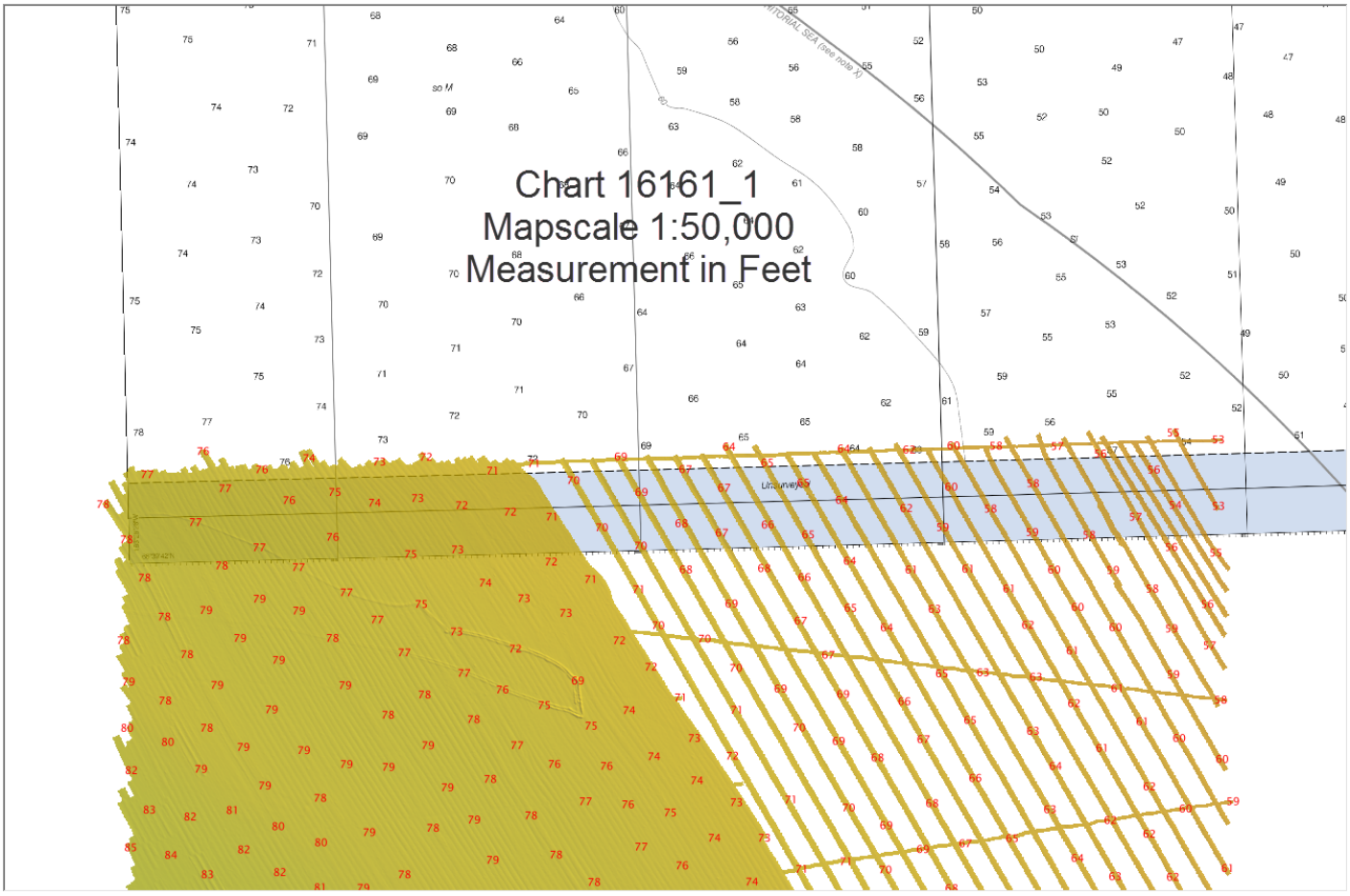


Figure 29: Sounding Comparison of Sheet H12812 and Chart 16161_1

16005

The soundings from survey H12812 generally agreed within 0 to 1 fathoms with the 2 charted depths on chart 16005. It is recommended that additional soundings be added to the chart due to sounding sparsity in this region.

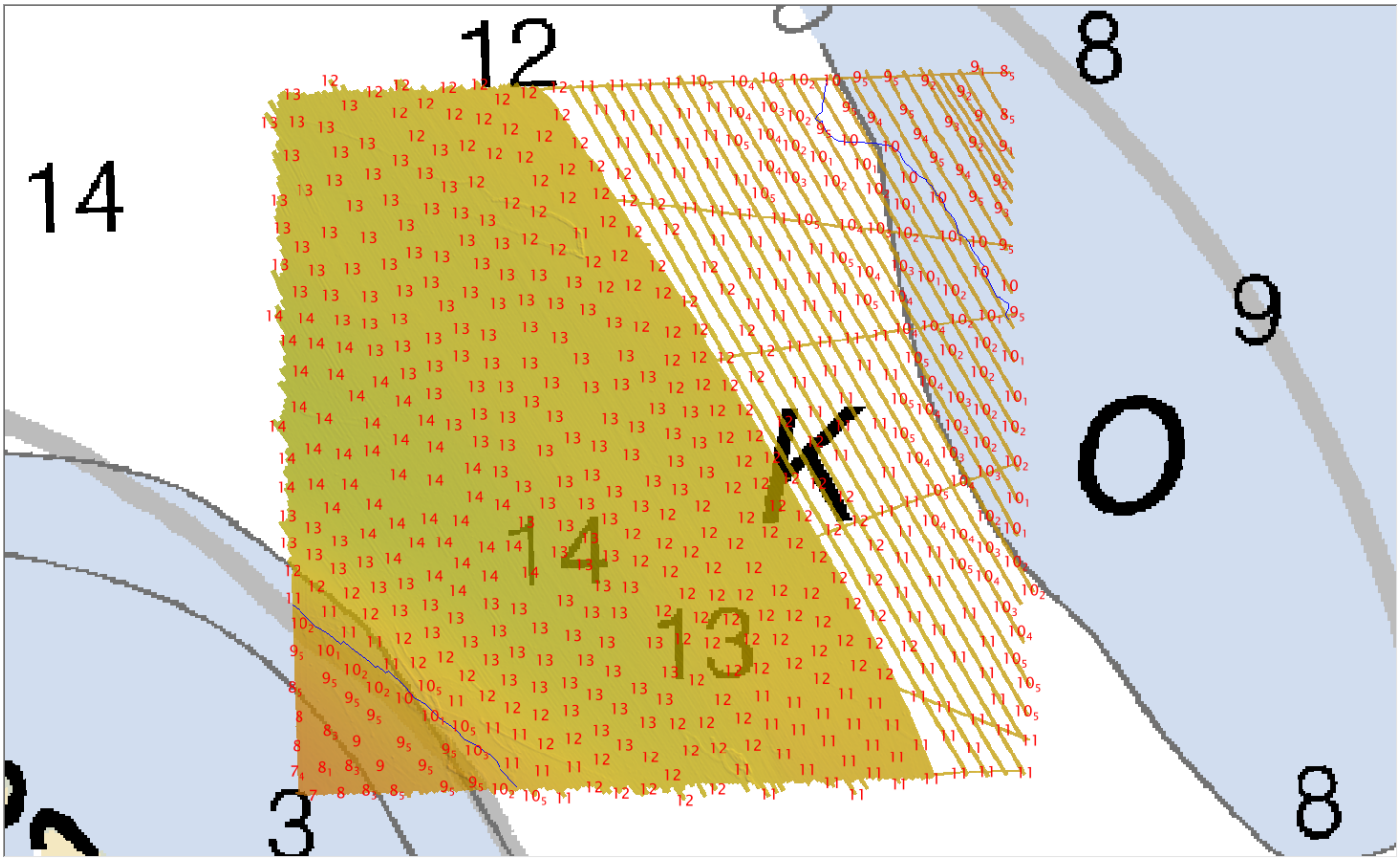


Figure 30: Sounding Comparison of Sheet H12812 and Chart 16005_1

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?
US2AK92M	1:700000	8	11/17/2015	11/17/2015	NO

Table 16: Largest Scale ENCs

US2AK92M

The ENC chart matches the raster chart 16005 for both soundings and contours within the sheet limits.

A small portion of survey H12812 also falls on ENC US5AK97M, which directly corresponds to Chart 16161 described above. The results of the chart comparison with Chart 16161 also apply to this ENC.

D.1.3 Maritime Boundary Points

No Maritime Boundary Points were assigned for this survey.

D.1.4 Charted Features

No charted features exist for this survey.

D.1.5 Uncharted Features

No uncharted features exist for this survey.

D.1.6 Dangers to Navigation

No Danger to Navigation Reports were submitted for this survey.

D.1.7 Shoal and Hazardous Features

No shoals or potentially hazardous features exist for this survey.

D.1.8 Channels

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

D.1.9 Bottom Samples

One bottom sample was collected for H12812. The bottom sample was collected in the area that was originally assigned to sheet 1.

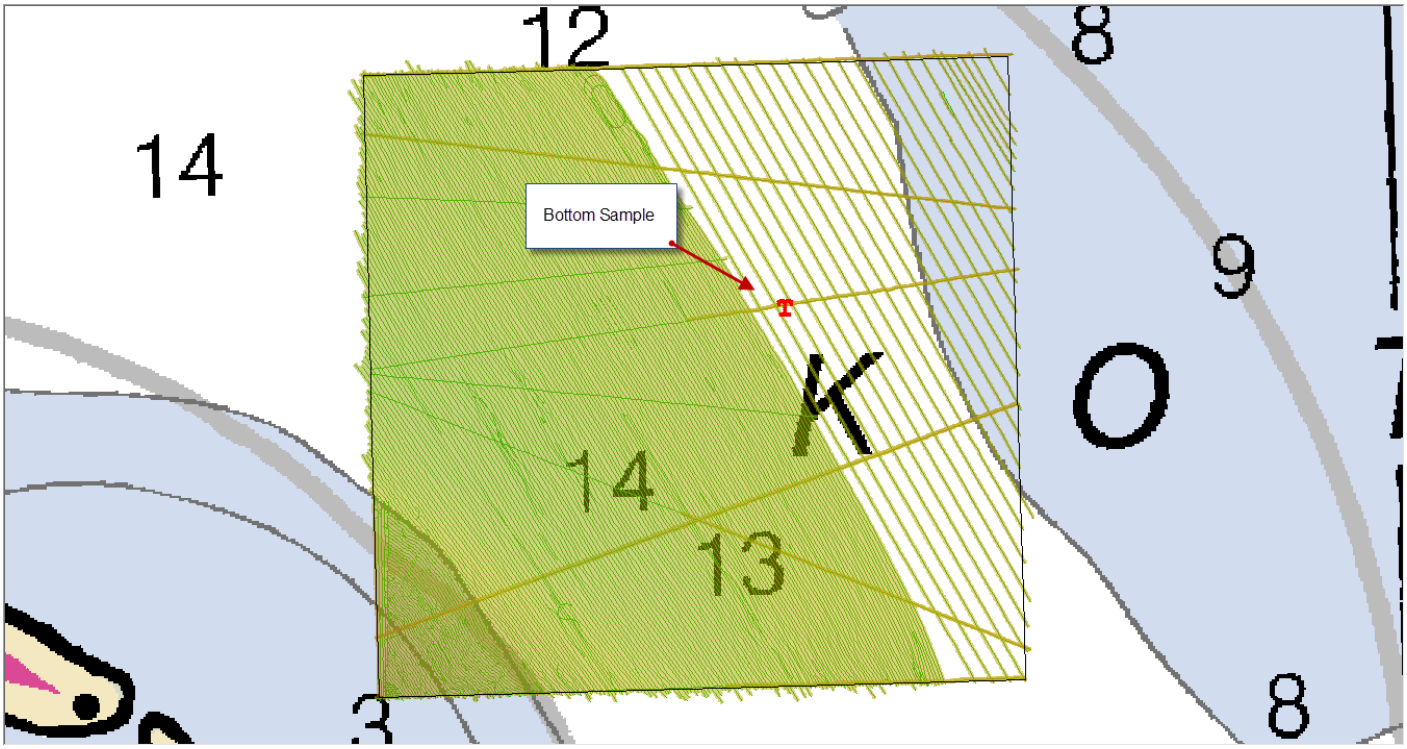


Figure 31: H12812 bottom sample location

D.2 Additional Results

D.2.1 Shoreline

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

D.2.2 Prior Surveys

No prior survey comparisons exist for this survey.

D.2.3 Aids to Navigation

No Aids to navigation (ATONs) exist for this survey.

D.2.4 Overhead Features

No overhead features exist for this survey.

D.2.5 Submarine Features

No submarine features 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

Ice scours and their banks with heights measuring up to 1.7 meter exist in the northern section of survey the area. Smaller scours exist in the southern portion of the area.

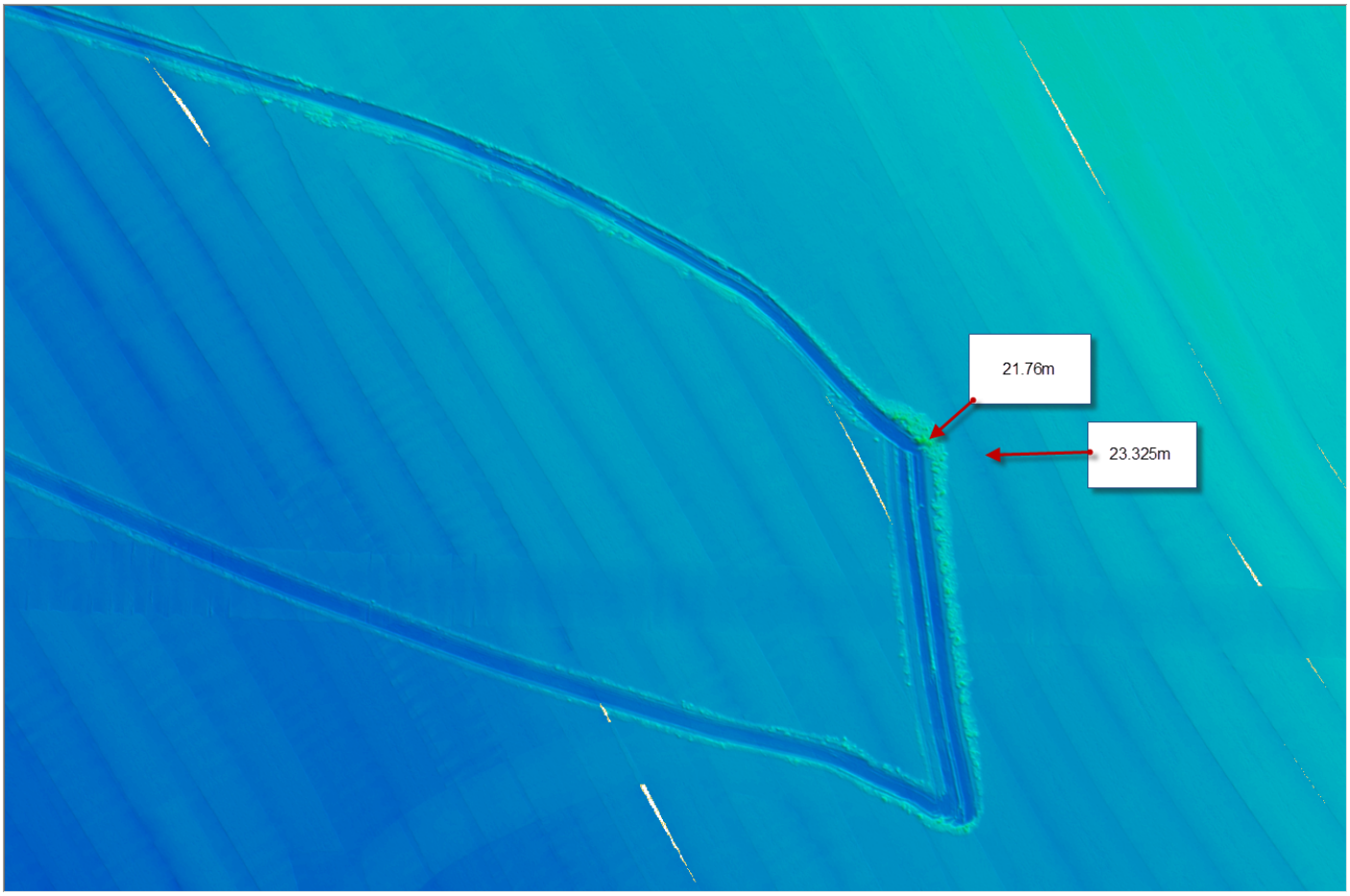


Figure 32: Ice Scour located on the NorthEast section of the sheet.

D.2.9 Construction and Dredging

No present or planned construction or dredging exist within the survey limits.

D.2.10 New Survey Recommendation

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

D.2.11 Inset Recommendation

No new insets are recommended for this area.

E. Approval Sheet

As Chief of Party, field operations for this hydrographic survey were conducted under my direct supervision, with frequent personal checks of progress and adequacy. I have reviewed the attached survey data and reports.

All field sheets, this Descriptive Report, and all accompanying records and data are approved. All records are forwarded for final review and processing to the Processing Branch.

The survey data meets or exceeds requirements as set forth in the NOS Hydrographic Surveys and Specifications Deliverables Manual, Field Procedures Manual, Letter Instructions, and all HSD Technical Directives. These data are adequate to supersede charted data in their common areas. This survey is complete and no additional work is required with the exception of deficiencies noted in the Descriptive Report.

Report Name	Report Date Sent
Data Acquisition and Processing Report	2016-04-21
Horizontal and Vertical Control Report	2016-04-14
Coast Pilot Report	2016-04-21
ERS Capability Memorandum	2016-04-25

Approver Name	Approver Title	Approval Date	Signature
CDR David J. Zezula	Chief of Party	04/24/2016	ZEZULA.DAVID.J.1097241836 2016.04.27 20:33:43 -07'00'
LT Mathew Forney	Field Operations Officer	04/24/2016	FORNEY.MATTHEW.MICHAEL.1365213409 2016.04.27 15:09:43 -07'00'
HCST Douglas Bravo	Chief Survey Technician	04/24/2016	2016.04.27 10:50:35 -07'00'
HAST Steven J. Eykelhoff	Sheet Manager	04/24/2016	Steven Eykelhoff 2016.04.27 10:49:14 -07'00'

F. Table of Acronyms

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

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

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

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

TIDE NOTE FOR HYDROGRAPHIC SURVEY

DATE : January 28, 2016

HYDROGRAPHIC BRANCH: Alaska
HYDROGRAPHIC PROJECT: OPR-S327-FA-2015
HYDROGRAPHIC SHEET: H12812

LOCALITY: Entrance to Kotzebue Sound, AK
TIME PERIOD: June 25 - August 5, 2015

TIDE STATION USED: 9491094 Red Dog Dock, AK
Lat.67° 34.6' N Long. 164° 03.9' W
PLANE OF REFERENCE (MEAN LOWER LOW WATER): 0.000 meters
HEIGHT OF HIGH WATER ABOVE PLANE OF REFERENCE: 0.240 meters

TIDE STATION USED: 9490424 Kotzebue, AK
Lat. 66° 54.3' N Long. 162° 35.0' W
PLANE OF REFERENCE (MEAN LOWER LOW WATER): 0.000 meters
HEIGHT OF HIGH WATER ABOVE PLANE OF REFERENCE: 0.192 meters

TIDE STATION USED: 9490096 Cape Espenberg, AK
Lat. 66° 35.1' Long. 164° 15.06'
PLANE OF REFERENCE (MEAN LOWER LOW WATER): 0.000 meters
HEIGHT OF HIGH WATER ABOVE PLANE OF REFERENCE: 0.270 meters

TIDE STATION USED: 9469833 Goodhope Bay, AK
Lat. 66° 13.8' Long. 163° 54.3'
PLANE OF REFERENCE (MEAN LOWER LOW WATER): 0.000 meters
HEIGHT OF HIGH WATER ABOVE PLANE OF REFERENCE: 0.477 meters

REMARKS: RECOMMENDED Grid

Please use the TCARI grid "S327FARA2015_Final.tc" as the final grid for project OPR-S327-FA-2015, H12812, during the time period between June 25 and August 5, 2015.

Refer to attachments for grid information.

Note 1: Provided time series data are tabulated in metric units (meters), relative to MLLW and on Greenwich Mean Time on the 1983-2001 National Tidal Datum Epoch (NTDE).

Note 2: Tidal datums at Goodhope Bay and Cape Espenberg are provisional due to higher uncertainties resulting from either a lack of benchmarks or data processing that accounted for gauge slippage events.

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Date: 2016.01.28 13:10:05 -05'00'

CHIEF, PRODUCTS AND SERVICES BRANCH


Final TCARI Grid for OPR-S327-RA-2015, H12812
Entrance to Kotzebue Sound, AK
9491094 RED DOG DOCK
9490424 KOTZEBUE
9490096 CAPE ESPENBERG
9469833 GOODHOPE BAY
Image courtesy of NASA Earthstar Geographics SIO © 2016 Microsoft Corporation

UNITED STATES DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration
NOAA Marine and Aviation Operations
NOAA Ship FAIRWEATHER S-220
1010 Stedman Street
Ketchikan, AK 99901

April 20, 2016

MEMORANDUM FOR: Lieutenant Commander Michael Gonsalves, NOAA
Chief, Operations Branch
Hydrographic Surveys Division

FROM: Commander David J. Zezula, NOAA
Commanding Officer, NOAA Ship *Fairweather*

SUBJECT: OPR-S327-FA-15 ERS/ERZT Capability Memorandum

NOAA Ship *Fairweather* personnel conducted a comparison of Ellipsoid Referenced Zoned Tides (ERZT) versus Tidal Constituent and Residual Interpolation (TCARI) vertical transformation techniques using check lines per the OPR-S327-FA-15 Project Instructions (PIs). While there are differences between the two data reduction methods, results indicate that the differences are within acceptable limits and both are valid methods for reducing sounding data to chart datum. Results and analysis of the comparison are in the attached report.

I recommend that survey H12812 and H12830 be reduced to Mean Lower-Low Water (MLLW) using ERZT, and survey H12813 be submitted with data reduced using TCARI, as detailed in the attached report.

It is understood that upon review of this report, a determination will be made for the final vertical transformation technique to be used to create the final deliverables.

Attachment

1.0 Introduction

This document is intended to satisfy the ERZT component of the Vertical Control Requirements of the Hydrographic Survey Project Instructions (PI) for OPR-327-FA-15. This report addresses hydrographic surveys H12812, H12830 and H12813. See figure 1.

The Project Instructions required *Fairweather* to recommend the final vertical transformation technique after comparing crossline data. The recommendations and supporting data included in this report are intended for use by the hydrographic Surveys Division (HSD) to support the final decision on the use of Ellipsoidally-Referenced Zoned Tides (ERZT) methods to reduce hydrographic data to chart datum using the field-generated separation model in lieu of reduction using measured water levels and the Tidal Constituent and Residual Interpolation (TCARI) methodology for the OPR-S327-RA-15 surveys.

The basis of this analysis is a comparison of the results of using both TCARI and ERZT bathymetry for vertical control for each survey, and a comparison of different ERZT separation models (SEP).

2.0 Procedure

The ERZT evaluation was conducted with a Standard Operating Procedure (SOP) provided by HSD OPS. NOAA Ship Rainier capability memo for Kotzebue Sound was used as reference in an effort to standardize procedures and documentation of our ERZT analysis across the NOAA fleet.

Survey data for H12812 and H12830 were reduced to Mean Lower Low Water (MLLW) using the final approved TCARI grid and water levels to produce the traditional surfaces. Survey data were also reduced to MLLW via application of GPS Tides using a field generated ERZT Separation Model. ERZT SEPs were first created at a fine resolution, grid size was determined using the approximate average value of the line spacing, 100m for H12830 and 20m for H12812. The finer grid resolution helped identifying issues with vertical positioning, primarily caused by the quality of the Smoothed Best Estimate of Trajectories (SBET) data.

Once all SBETs were resolved, or a consistent ERZT SEP model could be generated with a majority of the SBETs being correct, a coarser ERZT SEP was generated (1000 m) for sounding reduction in application of GPS Tides. ERZT SEP models were also compared to an estimated separation surface provided by HSTB based on Geoid12B, the TCARI model amplitudes, and a model of sea-surface topography. These estimated separation models (ESEP) provided by HSTB were used as an additional means of evaluation and troubleshooting and were not used to reduce final data to MLLW.

ERZT uncertainty was calculated using a standard error estimator, wherein the mean of the ERZT standard deviation layer was divided by the square root of an estimated number of survey lines in a given node. This value was then applied when computing Total Propagated Uncertainty (TPU).

Crossline difference surfaces (main-scheme versus crossline data), and statistics were generated for each method of reduction to MLLW and compared against each other to verify internal consistency.

3.0 Results

This report will answer two questions:

• What are the quantitative differences between the two reduction methods?

• Which method of reduction to MLLW is appropriate for each specific survey?

3.1 ERZT Separation Model

The ERZT separation models were generated using the ERZT Processing work flow SOP. These models provide the separation between the NAD83 ellipsoid and MLLW tidal datum. The slope of the separation model was examined for errors and inconsistencies that could produce vertical offsets in reduced data. See Table 1 for a list of ERZT Models generated, and Figures 1-4 for images and statistics of each SEP model.

Sheet	Resolution	Separation Model File Name
H12812	1000 m	H12812_NAD83_MLLW_SEP_1000m.csar
H12830	1000 m	H12830_NAD83_MLLW_SEP_1000m.csar

Table 1. Separation models submitted

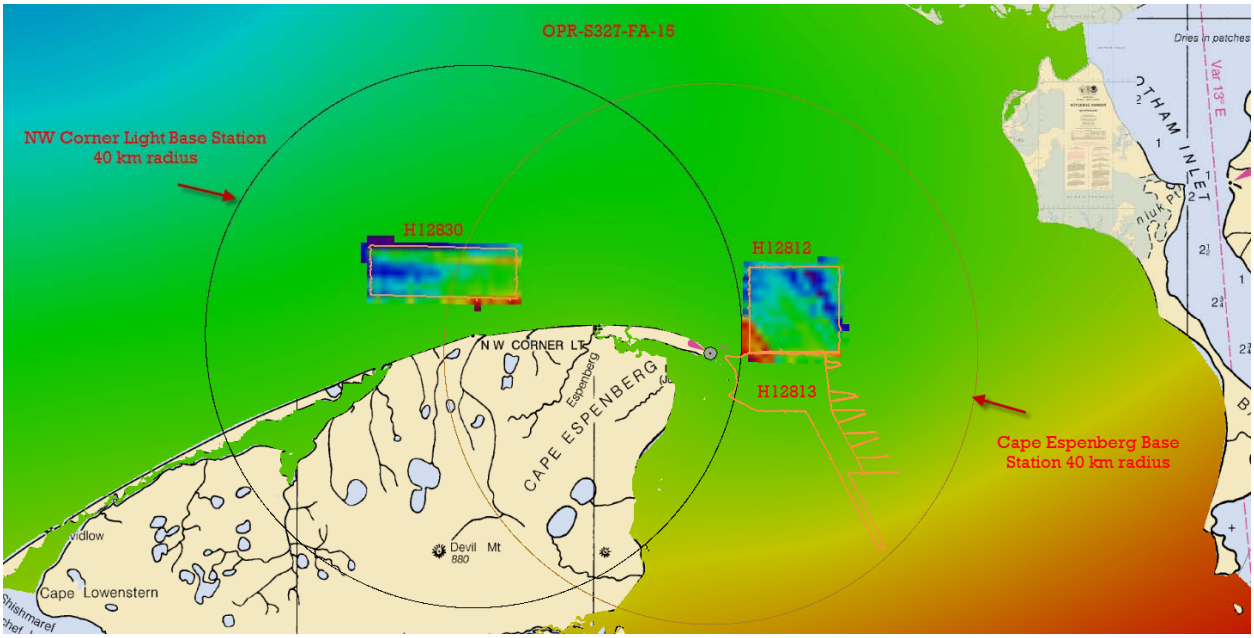


Figure 1. OPR-S327-FA-15. H12812 and H12830 ERZT Separation Models overlaid over Estimated Separation Model.

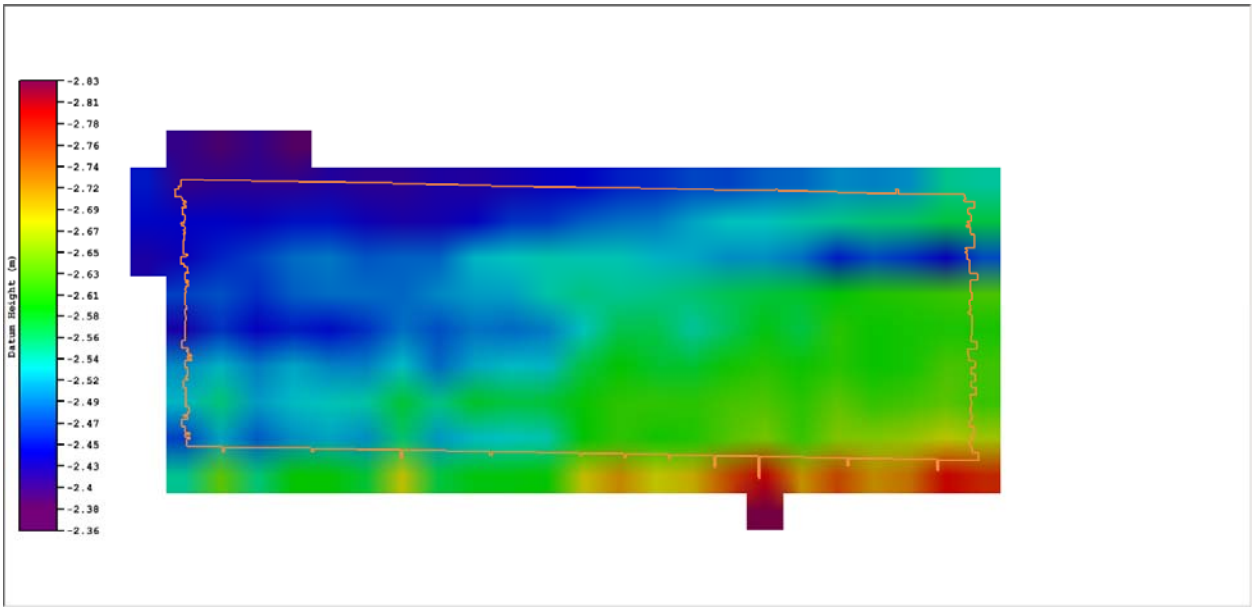


Figure 2. Graphical representation of H12812 ERZT Separation Model at 1000 meter resolution
H12830_NAD83_MLLW_SEP_1000m.csar

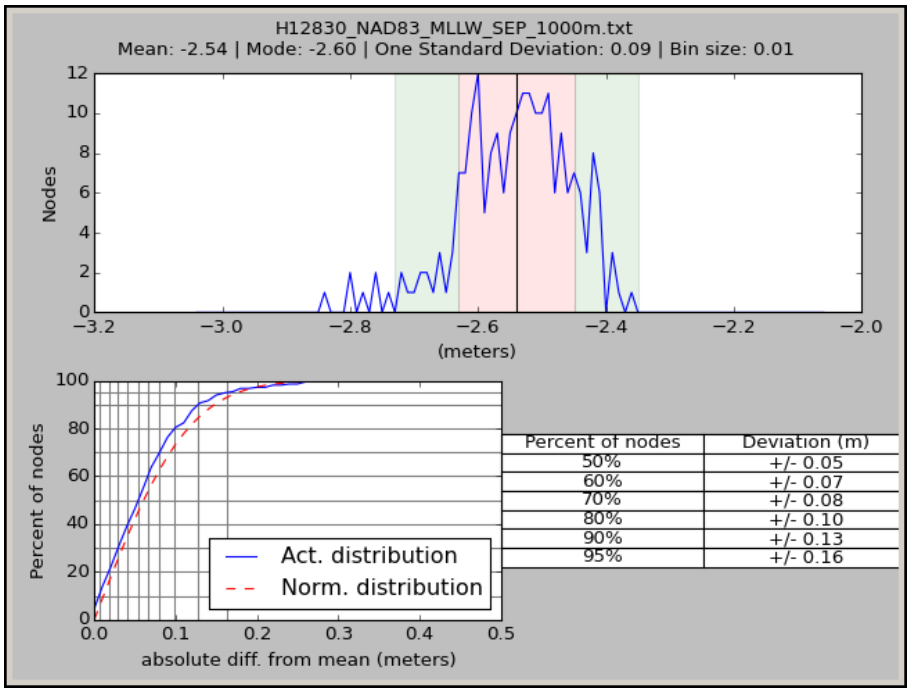


Figure 3. Statistical information of H12812 ERZT Separation Model at 1000 meter resolution
H12830_NAD83_MLLW_SEP_1000m.csar

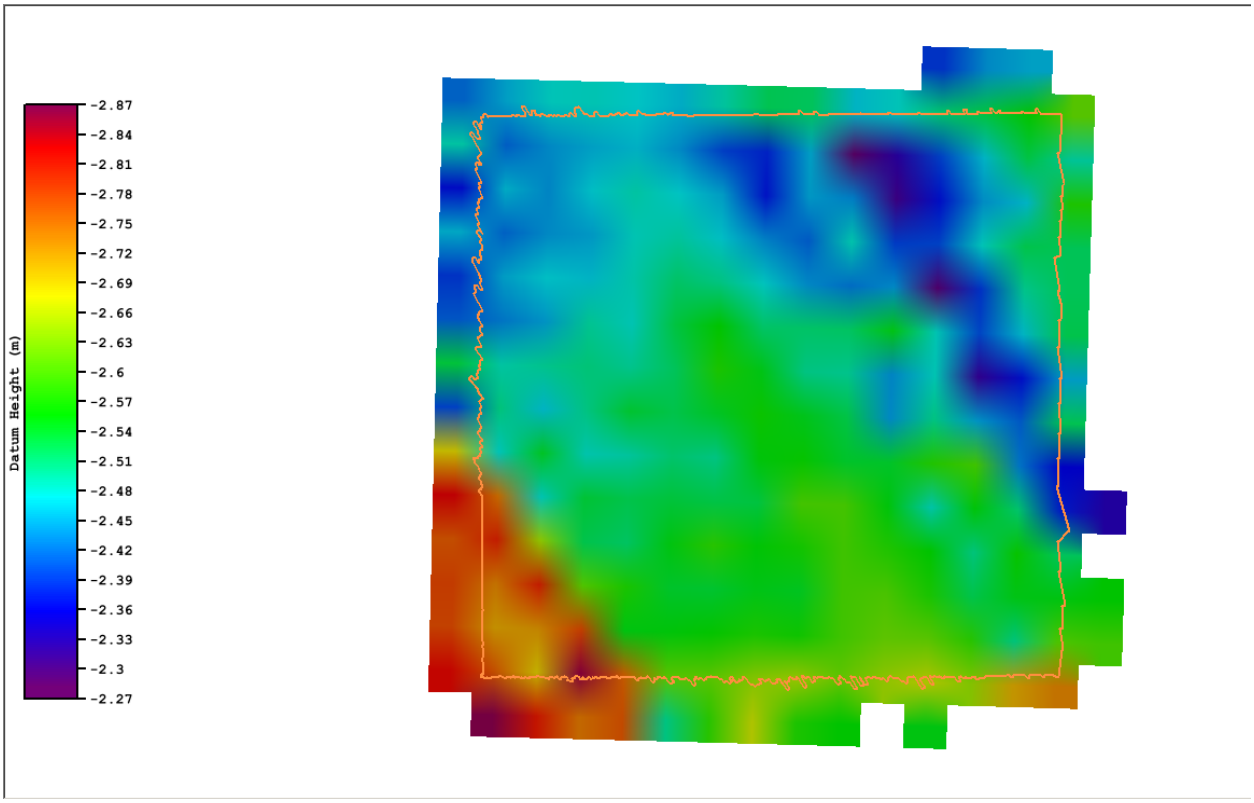


Figure 4. Graphical representation of H12812 ERZT Separation Model at 1000 meter resolution
H12812_NAD83_MLLW_SEP_1000m.csar

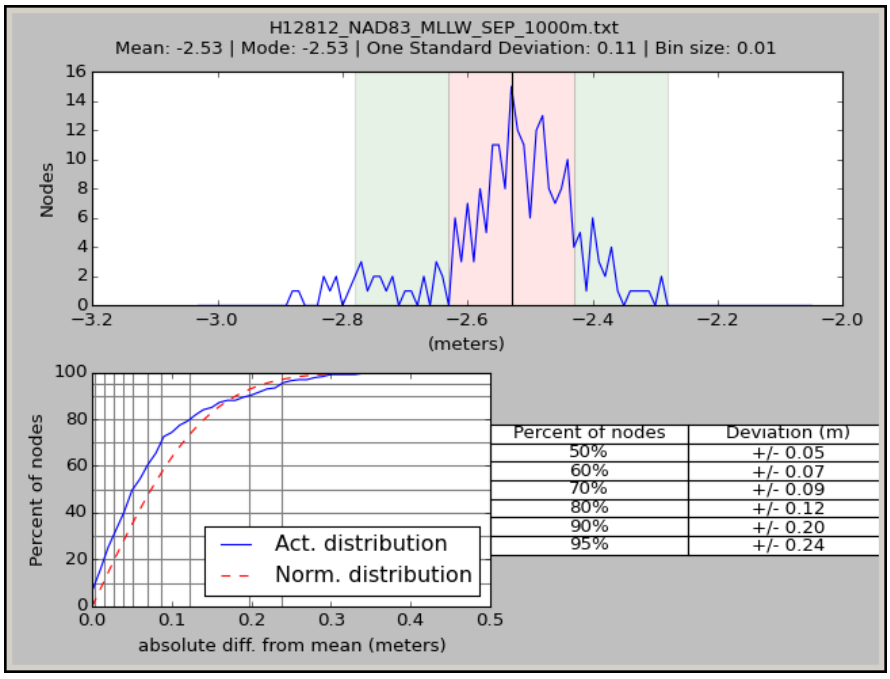


Figure 5. Statistical information of H12812 ERZT Separation Model at 1000 meter resolution
H12812_NAD83_MLLW_SEP_1000m.csar

The separation surface is free of gaps and anomalies within the H12812 and H12830 survey areas. Variability (as seen in Figures 2-5) in the ERZT separation surface is due to variation in the SBETs, Tide Model, Sea Surface topography, heave, dynamic and static draft. More gradual trends represent the variation of the SEP over large distances.

Examining the SEP alone within the limits of H12812 and H12830 there are no anomalous spikes or discontinuities, suggesting the overall vertical positioning and using the model as a means of sounding reduction are both reasonable.

3.2. Quantitative Analysis

	TCARI XL Difference		ERZT XL Difference		TCARI MLLW-ERZT MLLW Difference	
Sheet	**Mean**	**SD**	**Mean**	**SD**	**Mean**	**SD**
H12812	-0.13	0.19	0	0.09	0.27	0.13
H12830	0.04	0.09	0.02	0.14	-0.03	0.09

Table 2. Results of difference surface analysis.

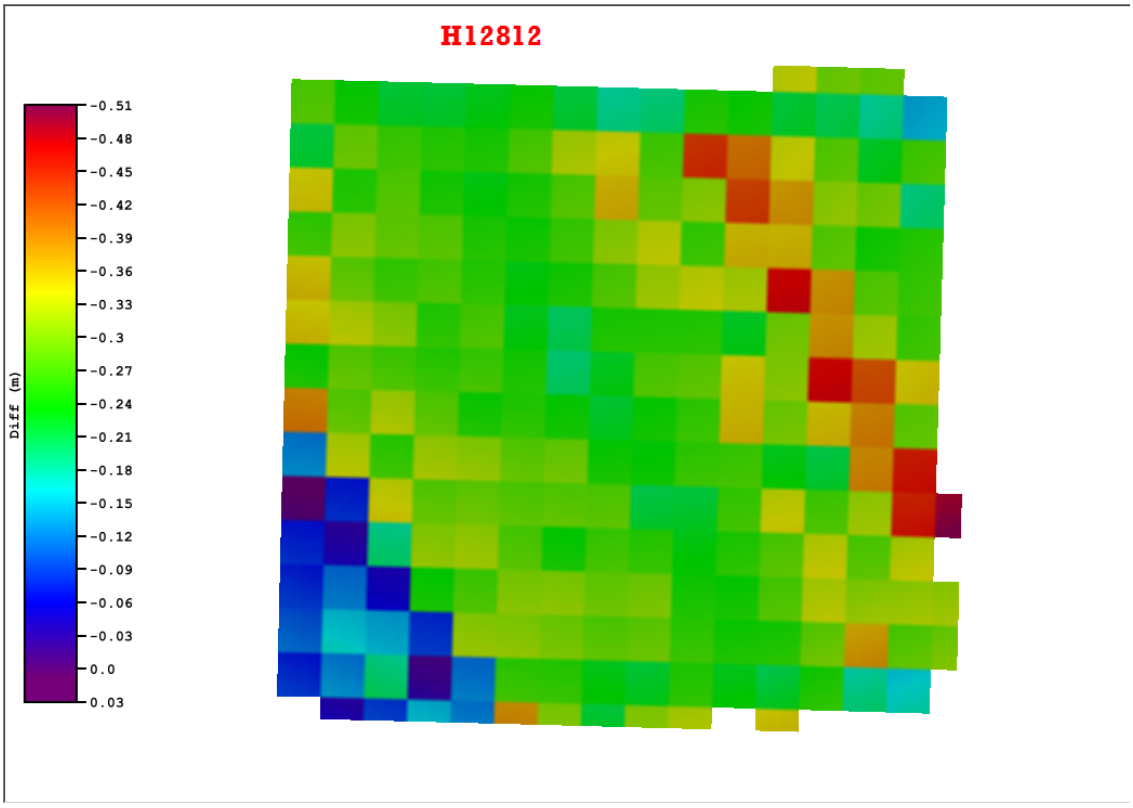


Figure 6. Graphical representation of H12812 ESEP –ERZT difference surface at 1000 meter resolution.

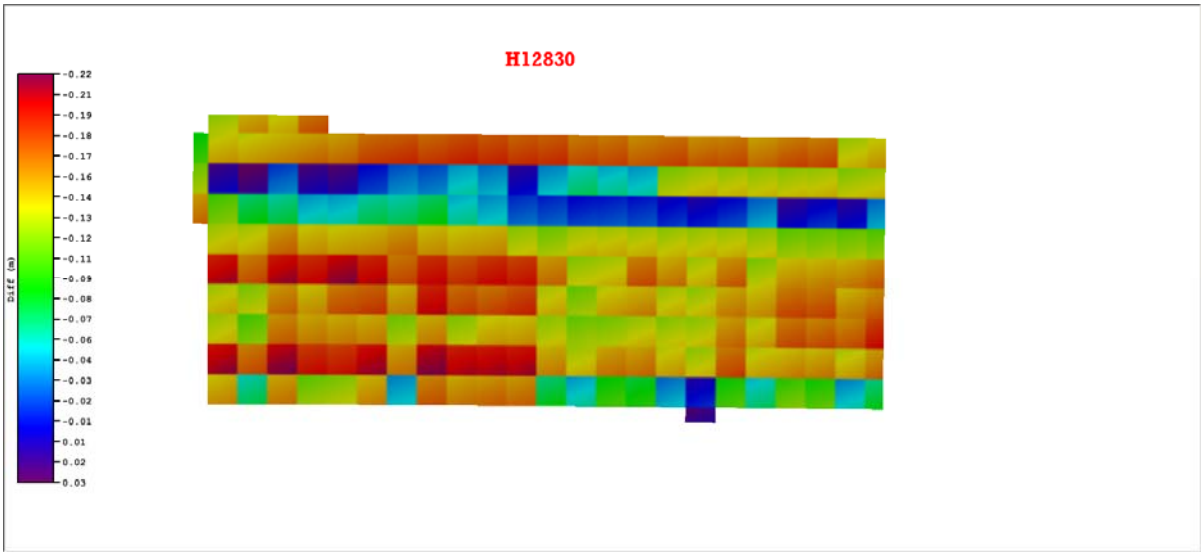


Figure 7. Graphical representation of H12830 ESEP –ERZT Separation Model difference surface at 1000 meter resolution.

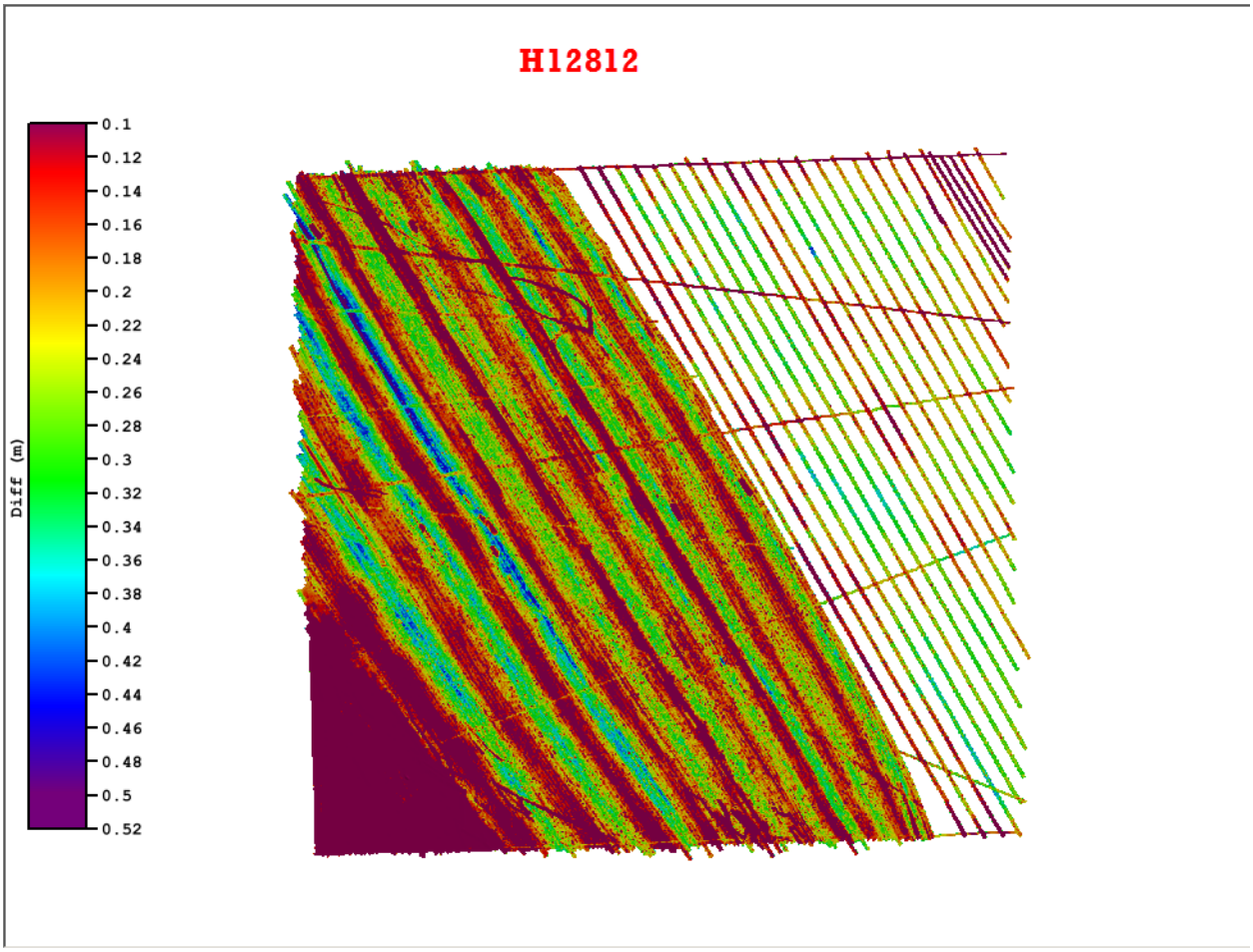


Figure 8. Graphical representation of H12812 ERZT MLLW-TCARI MLLW difference surface.

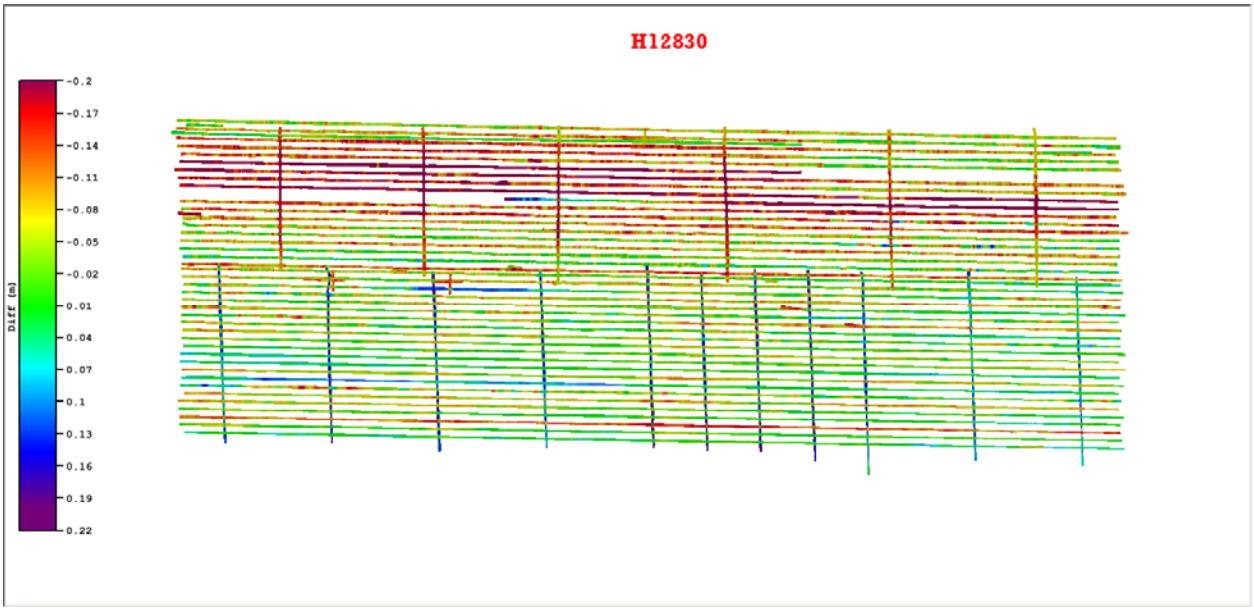


Figure 9. Graphical representation of H12830 ERZT MLLW-TCARI MLLW difference surface.

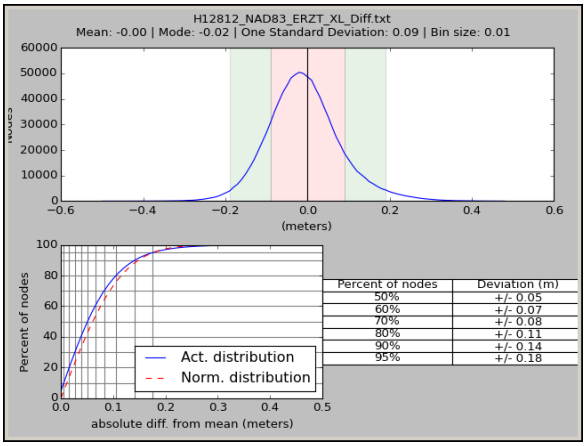


Figure 10. H12812 ERZT Statistical information of crossline difference

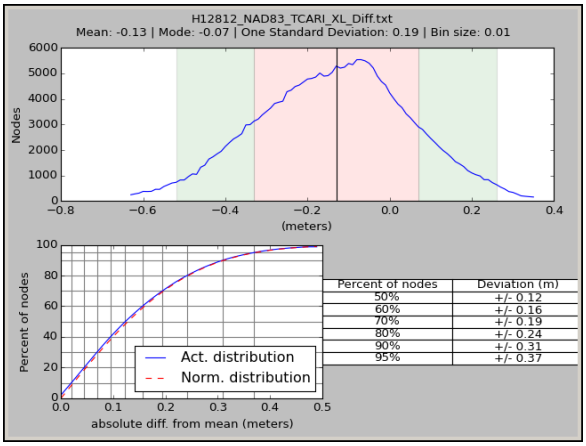


Figure 11. H12812 TCARI Statistical information of crossline difference

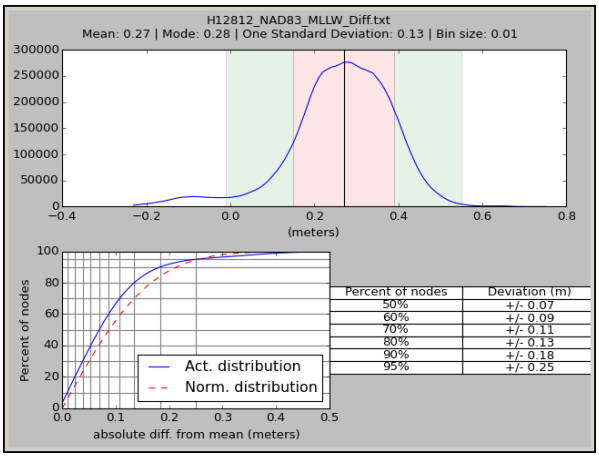


Figure 12. H12812 Statistical Information of MLLW (full data set) difference.

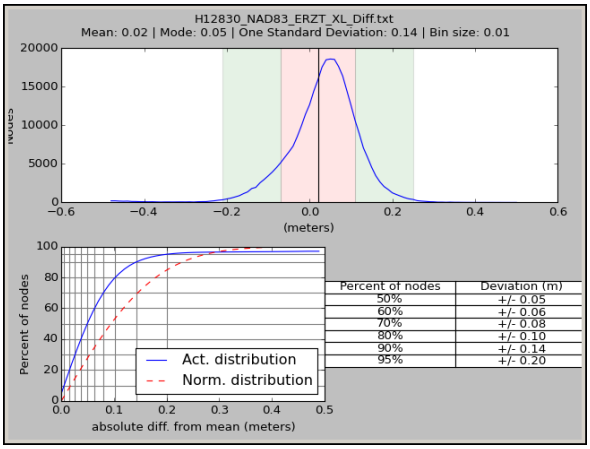


Figure 13. H12830 ERZT Statistical information of crossline difference

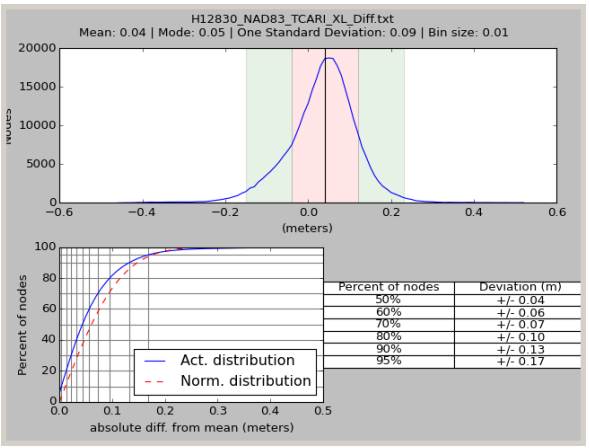


Figure 14. H12830 TCARI Statistical information of crossline difference

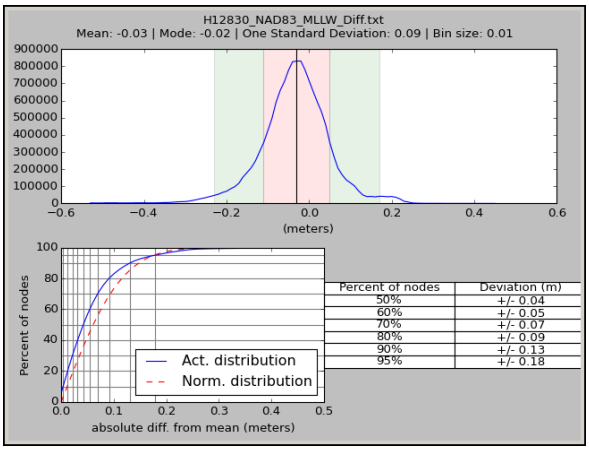


Figure 15. H12830 Statistical Information of MLLW (full data set) difference.

For surveys H12812 and H12830 the ERZT-reduced data show a smaller mean difference in the mainscheme to crossline depth analysis. This result suggests for this survey, ERZT is an acceptable and more internally consistent method of sounding reduction.

A difference surface of ESEP minus ERZT were created to examine the variation between field vessel derived separation models as compared to those created using datum differences at tide stations.

The two realizations of MLLW were differenced, and show mean differences -0.03 meters for H12830 and 0.27 meters for H12812. The higher difference observed H12812 is believed to be caused by sound velocity artifacts observed throughout the data in addition to SBET quality, errors in dynamic draft values and vessel loading. The results of the H12812 ERZT mainscheme to crossline comparison show great internal consistency. The difference between both realizations of bathymetry data are within the Total Allowable Uncertainty.

3.3 Uncertainty determination

The table below shows the uncertainty value determination for H12812 and H12830:

Sheet	ERZT Separation model	Mean of Std_Devchild layer (Mean)	Estimated lines per grid (L)	Resultant 1 sigma uncertainty (Mean/Sqrt(L)
H12812	H12812_NAD83_MLLW_SEP_1000m	0.1	18	0.0235 m
H12830	H12830_NAD83_MLLW_SEP_1000m	0.1	7	0.0377 m

Table 4. Uncertainty determination.

3.4 H12813 findings

A number of ERS holidays were found within H12813. The ERS holidays were caused by poor quality of trajectories and user error when ending POS data logging after acquisition. Examples are shown below:

2807 Dn 181: All lines

Message log

IMU FDIR5 failure ratio 89.13%

GNSS

Min # GPS/GLONASS SVs Used: 6 / 0
Max PDOP: 2.70
Max Baseline: 0 m
Mean RMS Errors (StDev,95%) - 95% Tolerance
North: 0.96 (0.115,1.156) - 0.07 m
East: 0.78 (0.059,0.872) - 0.07 m
Down: 1.87 (0.218,2.345) - 0.07 m
Roll: 0.96 (0.070,1.102) - 1.20 arc-min
Pitch: 0.98 (0.073,1.126) - 1.20 arc-min
Heading: 3.00 (0.729,4.531) - 3.00 arc-min

IMU Model (SMERS,SMRMS,GYRO)

The variation of Accelerometer Bias x is 1229.98, which exceeded the tolerance 600 µg.
The variation of Gyro Bias z is 7.22, which exceeded the tolerance 4 °/hr.
The variation of Gyro Scale Error z is 653.02, which exceeded the tolerance 400 ppm.

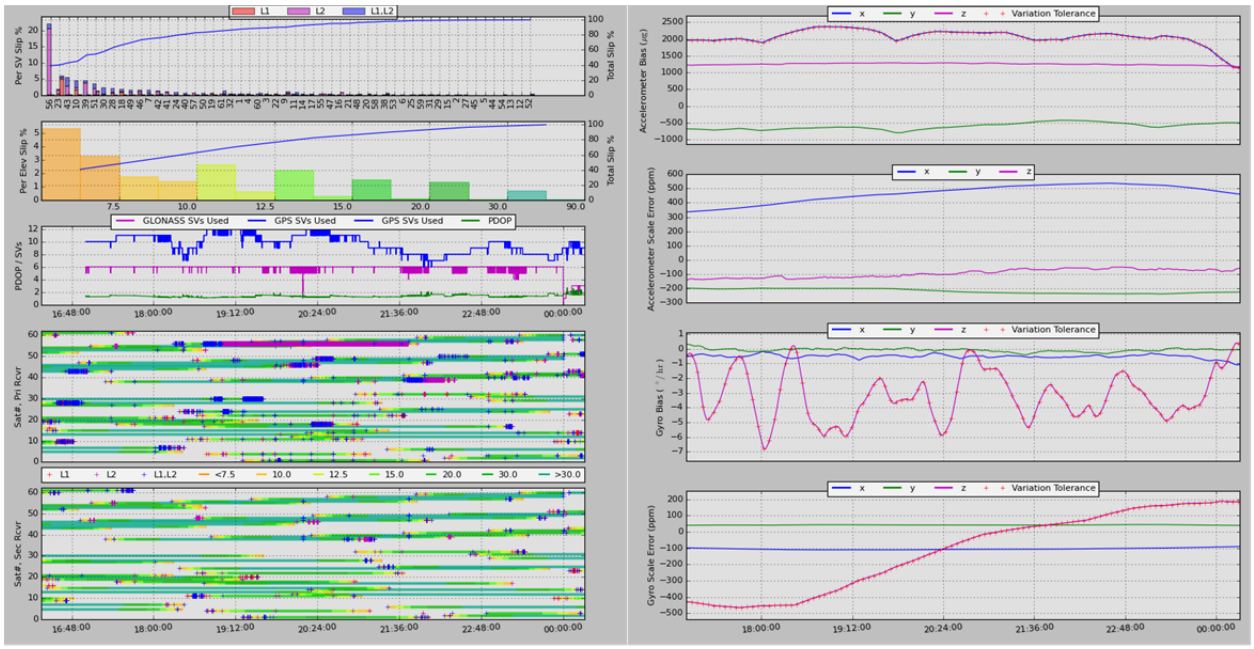


Figure 16. GNSS QC – IMU Model Stats

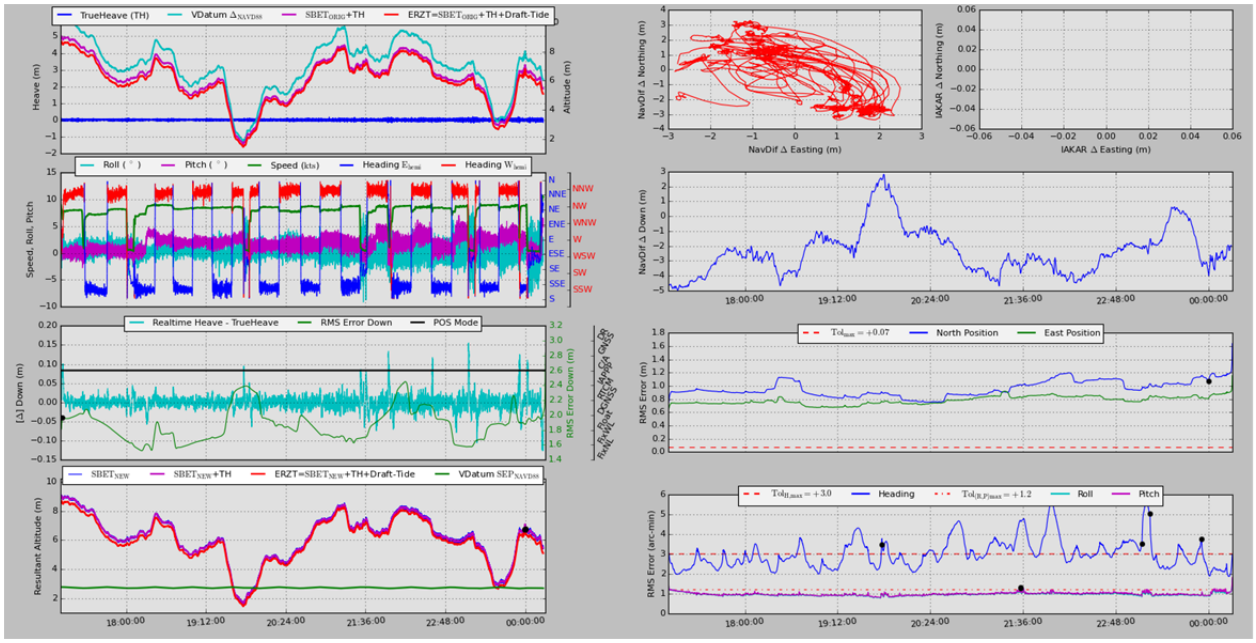


Figure 17. SBET QC – Reference QC

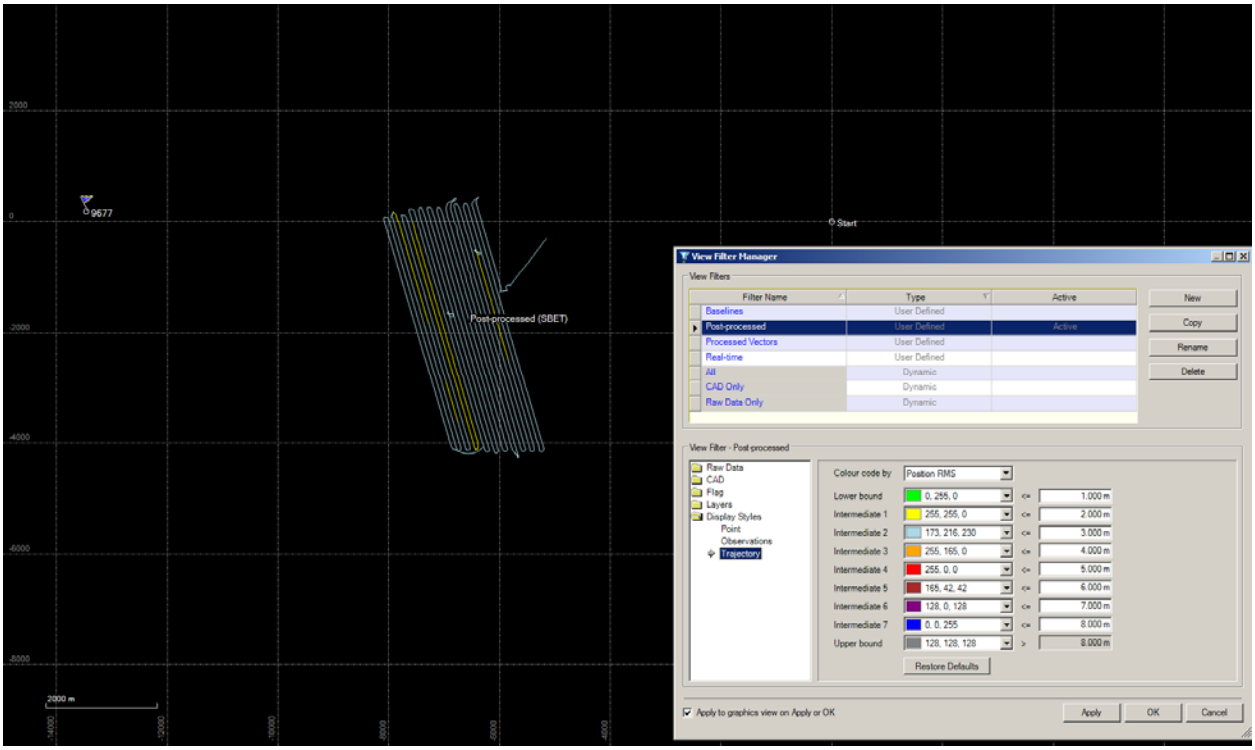


Figure 18. View filter manager – Position RMS

The position RMS values are way above the tolerance. The image shown above depicts position RMS values of 1 to 2 m, questioning the quality of the trajectory. The SBETs generated were never applied to the data (2807 DN181).

2806 Dn 200: M_28062015M_2010027. POS file was stopped in less than 5 minutes after acquisition was completed.

The processing time for H12813 was found to be taking more time than normal. For example merging the entire data set takes about a week. This issue was reported to CARIS under service ticket number **01600442**, entitled "**Overzealous HIPS batch engines**". CARIS Technical support was unable to determine the source of the issue.

4.0 Recommendations

For H12812 and H12830 it is recommended that soundings be reduced to MLLW using the ERZT method. This analysis show a strong agreement between the two reduction methods, and the greater internal consistency of the data transformed with the ERZT separation model. Qualitatively, hydrographers involved in the production of the survey believe the ERZT reduced data to be a potential improvement as compared to the TCARI reduction.

For H12813 it is recommended that soundings be reduced to MLLW using TCARI, due to the existence of unresolved ERS holidays.

For future ERZT and ERS surveys, the following recommendations should be considered:

1. Procedures and workflows should be fully tested and documented prior to delivery to the field units. The staffing issue that currently affects the field units limits the ability to do any kind of testing.

2. Best practices and tools to determine ERZT uncertainty should be explored. Determination of applied SEP model resolution should be evaluated further, likely in consideration of the tide model resolution in areas where ERZT could be applied. Geographic information system type tools could be used to better count and determine uncertainty for a grid allowing for standardized procedures and results.

3. Original SBETs were typically generated and applied within 2 weeks upon receipt of base station data for the Kotzebue project, though due to equipment limitations of radio range and data throughput, base station downloads were infrequent. Low internet bandwidth also limited ability for the ship to download required clock and ephemeris data in a consistent and timely manner. A lot of reprocessing had to be done due to the poor quality of solutions initially created. Full use of ERZT methods and troubleshooting occurred months after completion of the project.

4. *Fairweather* only has 2 POSPAC MMS keys, limiting the amount of data that can be processed concurrently. Also affects the ability to train people in the use of POSPac MMS. Basically, we can't efficiently process the amount of data coming in, as we have 5 platforms collecting data daily.

5. Implementation of decimeter or centimeter level real time corrections should be further investigated. Our current procedures of post-processing the entire data set is getting on the way of productivity, delaying data delivery deadlines.

6. *Fairweather* POSMV 4 units have over the years increased the amount of IMU data gaps, creating integration errors during processing. This issue forces the processor to split a POSPac project into 2 and sometime 3 different projects, generating 3 different SBETs for a single day. This is affecting efficiency greatly.

7. Merging sheets 3, 4, 5 represented a problem for referencing data to the ellipse. In the case of H12813, only the original limits of sheet 3 could not be reduced to MLLW via ERZT leaving sheet 4 and 5 without the option of using ERZT. Also a big survey area represents a large increase in the processing time in order to accomplish the necessary testing for an ERZT analysis.

8. It will be advantageous to have an Applanix representative sailing with Fairweather, to identify deficiencies in the work flow and equipment functionality during survey operations.

Douglas Bravo - NOAA Federal <douglas.a.bravo@noaa.gov>

OPR-S327-FA-15 Kotzebue Sound Project Instruction Change Request

6 messages

David J. Zezula <co.fairweather@noaa.gov> Tue, Jul 28, 2015 at 11:13 AM
To: Megan Greenaway - NOAA Federal <Megan.Greenaway@noaa.gov>, Starla Robinson <Starla.Robinson@noaa.gov>, Michael Gonsalves <Michael.Gonsalves@noaa.gov>, "ChiefST.Fairweather" <chiefst.fairweather@noaa.gov>, _OMAO MOP OPS Fairweather <OPS.Fairweather@noaa.gov>

HSD OPS,

Request the following changes to OPR-S327-FA-15 Kotzebue Sound Project:

1. Combine Sheet 2 and Sheet 3 for efficiency. With the new narrow corridor requirement we can save 12 hours in turning time and all the DR write up time if we combine these two sheet.

2. Request change to coverage to allow 100% SSS with concurrent multibeam for depths great that 20m.

3. Request change to coverage allowing 300 m set line spacing for areas outside of the narrow corridor if time permits.

DZ
--

David Zezula, CDR/NOAA

Commanding Officer
NOAA Ship Fairweather (S-220)
2002 SE Marine Science Dr.
Newport, OR 97365-5229

(907) 254-2842: Ships Cell
(907) 254-2836: CO Cell
(301) 713-7779: VOIP

www.moc.noaa.gov/fa

Megan Greenaway - NOAA Federal <Megan.Greenaway@noaa.gov> Tue, Jul 28, 2015 at 1:33 PM
To: "David J. Zezula" <CO.Fairweather@noaa.gov>
Cc: Starla Robinson <Starla.Robinson@noaa.gov>, Michael Gonsalves <Michael.Gonsalves@noaa.gov>, "ChiefST.Fairweather" <ChiefST.Fairweather@noaa.gov>, _OMAO MOP OPS Fairweather <OPS.Fairweather@noaa.gov>, Grant Froelich - NOAA Federal <Grant.Froelich@noaa.gov>

CO,
Please see inline response in blue. I have also included Grant.

On Tue, Jul 28, 2015 at 2:13 PM, David J. Zezula <co.fairweather@noaa.gov> wrote:

> HSD OPS,
>
> Request the following changes to OPR-S327-FA-15 Kotzebue Sound Project:
>
> 1. Combine Sheet 2 and Sheet 3 for efficiency. With the new narrow corridor requirement we can save 12 hours in turning time and all the DR write up time if we combine these two sheet.

Combining sheets 2 and 3 is fine with OPS as long as it does not cause issues in CARIS. I am cc'ing Grant

because I'd like to know what PHB's thoughts are on sheet size. Grant, can you give a ball park number for a maximum sheet size for water depths < 22 meters run at 100% SSS with concurrent set spacing MBES (FA correct me if I'm wrong)? I have included a project overview graphic so you know which sheets FA is referring to. The FA is only working in the corridor.

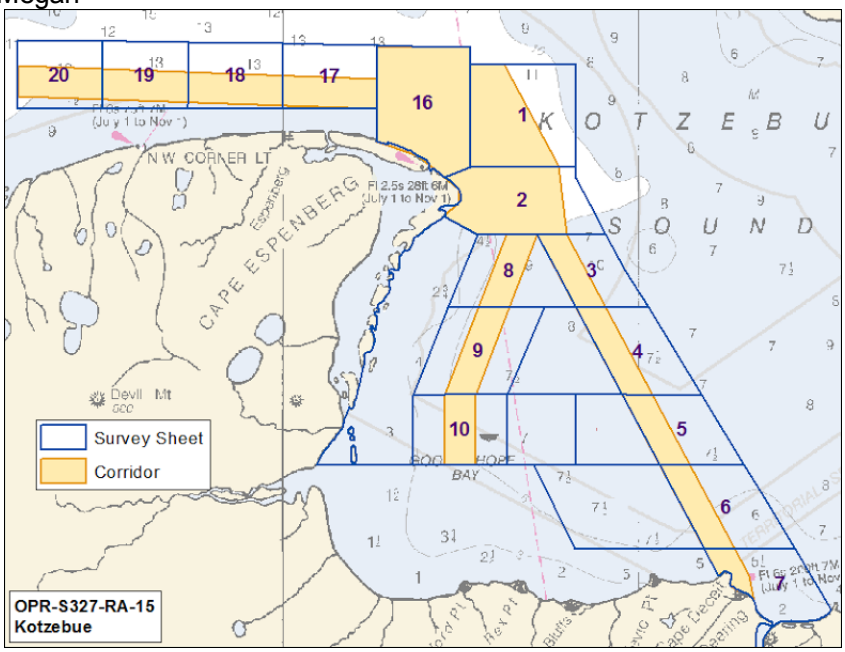
> 2. Request change to coverage to allow 100% SSS with concurrent multibeam for depths great that 20m.

We are struggling with seeing the advantage of 100% SSS with concurrent MBES for depths > 20 meters. Can you explain from your perspective the advantage of collecting 100% SSS with MBES vs. MBES alone in depths > 20 meters? The SSS with MBES is double the processing.

> 3. Request change to coverage allowing 300 m set line spacing for areas outside of the narrow corridor if time permits.

We are fine with changing the coverage allowing 300 meter set line spacing for areas outside of the narrow corridor if time permits. But, please clarify, "if time permits". Once the FA finishes the corridor on sheets 2 & 3 then OPS recommends moving on to the corridors of sheets 4 or 17 (depending on weather). Are you stating once the FA finishes all of the corridor?

Megan



> DZ
> --
>
> **David Zezula, CDR/NOAA**
>
> Commanding Officer
> NOAA Ship Fairweather (S-220)
> 2002 SE Marine Science Dr.
> Newport, OR 97365-5229
>
> (907) 254-2842: Ships Cell
> (907) 254-2836: CO Cell
> (301) 713-7779: VOIP
>
> www.moc.noaa.gov/fa

Grant Froelich <Grant.Froelich@noaa.gov> Tue, Jul 28, 2015 at 1:48 PM
To: Megan Greenaway - NOAA Federal <Megan.Greenaway@noaa.gov>
Cc: "David J. Zezula" <CO.Fairweather@noaa.gov>, Starla Robinson <Starla.Robinson@noaa.gov>, Michael

Gonsalves <Michael.Gonsalves@noaa.gov>, "ChiefST.Fairweather" <ChiefST.Fairweather@noaa.gov>, _OMAO MOP OPS Fairweather <OPS.Fairweather@noaa.gov>, Katie Reser <Katie.Reser@noaa.gov>

Hi Megan,

From a SAR perspective if the field unit can handle it, we can handle it. The issue in the past was during compilation and the number of nodes for the S-57 objects that covered large sheets. Pete is out of the office this week but I spoke to Katie (cc'd to keep me honest) and she said that in this case it shouldn't really be a problem because these are fairly straightforward sheet limits and won't have a lot of complexity to the meta objects. However, we are now creating contours for HCells as deliverables and there may be some issues with creating contours over a large area due to the number of nodes and complexity of the bathymetry. But we won't really know what the upper limit on that is until we experiment more with contour creation and smoothing as part of the new HCell process.

I'm sorry that is not a very good answer but I would say, in general, to keep the sheet limit sizes as they have been and we can deal with requests to merge sheets on a as-needed basis until we figure out what those upper limits are during compilation. I have a feeling VR surfaces will throw us for a bit of a loop anyway with what we can handle when those come out next year.

grant
[Quoted text hidden]
--

Grant Froelich

Hydrographic Team Lead
NOAA's National Ocean Service
Office of Coast Survey, Hydrographic Surveys Division
Pacific Hydrographic Branch, N/CS34
7600 Sand Point Way N.E.
Seattle, WA 98115-6349

w: (206)526-4374 | grant.froelich@noaa.gov

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starla.robinson <Starla.Robinson@noaa.gov> Tue, Jul 28, 2015 at 2:16 PM
To: Grant Froelich <Grant.Froelich@noaa.gov>
Cc: Megan Greenaway - NOAA Federal <Megan.Greenaway@noaa.gov>, "David J. Zezula" <CO.Fairweather@noaa.gov>, Michael Gonsalves <Michael.Gonsalves@noaa.gov>, "ChiefST.Fairweather" <ChiefST.Fairweather@noaa.gov>, _OMAO MOP OPS Fairweather <OPS.Fairweather@noaa.gov>, Katie Reser <Katie.Reser@noaa.gov>

I think it may help to say the expected LNM of the combination of sheet 2 and 3 is less than 1000 LNM. The 2011 surveys were about 1000 LNM so I think we may be fine.

Thank you,
Starla
[Quoted text hidden]

David J. Zezula <co.fairweather@noaa.gov> Tue, Jul 28, 2015 at 10:23 PM
To: Megan Greenaway - NOAA Federal <Megan.Greenaway@noaa.gov>
Cc: Starla Robinson <Starla.Robinson@noaa.gov>, Michael Gonsalves <Michael.Gonsalves@noaa.gov>, "ChiefST.Fairweather" <chiefst.fairweather@noaa.gov>, _OMAO MOP OPS Fairweather <ops.fairweather@noaa.gov>, Grant Froelich - NOAA Federal <Grant.Froelich@noaa.gov>

Megan,

See inline response in green.

On 7/28/2015 12:33 PM, Megan Greenaway - NOAA Federal wrote:

> CO,

Please see inline response in blue. I have also included Grant.

On Tue, Jul 28, 2015 at 2:13 PM, David J. Zezula <co.fairweather@noaa.gov> wrote:

> HSD OPS,
>
> Request the following changes to OPR-S327-FA-15 Kotzebue Sound Project:
>
> 1. Combine Sheet 2 and Sheet 3 for efficiency. With the new narrow corridor requirement we can save 12 hours in turning time and all the DR write up time if we combine these two sheet.

Combining sheets 2 and 3 is fine with OPS as long as it does not cause issues in CARIS. I am cc'ing Grant because I'd like to know what PHB's thoughts are on sheet size. Grant, can you give a ball park number for a maximum sheet size for water depths < 22 meters run at 100% SSS with concurrent set spacing MBES (FA correct me if I'm wrong)? I have included a project overview graphic so you know which sheets FA is referring to. The FA is only working in the corridor.

See Grant's email response, as I read it, they have no problem with sheet size. The ship does not have a problem, new Sheet 2 and new Sheet 3 combined are smaller than the current Sheet 1.

> 2. Request change to coverage to allow 100% SSS with concurrent multibeam for depths greater that 20m.

We are struggling with seeing the advantage of 100% SSS with concurrent MBES for depths > 20 meters. Can you explain from your perspective the advantage of collecting 100% SSS with MBES vs. MBES alone in depths > 20 meters? The SSS with MBES is double the processing.

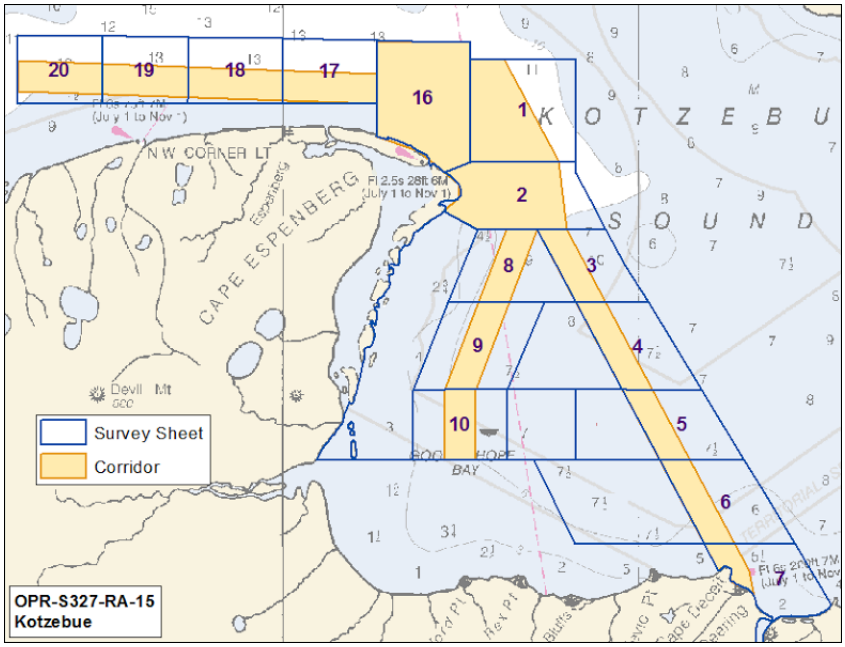
IF we run at 75m range scale with 100 m line spacing (due to refraction issues) we still get a 20-30% advantage in coverage over MB (deepest part of Sheet 2 is 24-26m). We can acquire more in the limited time we have left. Also we are towing SSS from the ship so there is a huge training and proficiency advantage. No one on FA except 4 people have ever seen towed SSS operations. As for processing, I don't think SSS while produce many contacts as we are finding the same thing we found in 2011, ice scars with mound at the end and nothing else.

> 3. Request change to coverage allowing 300 m set line spacing for areas outside of the narrow corridor if time permits.

We are fine with changing the coverage allowing 300 meter set line spacing for areas outside of the narrow corridor if time permits. But, please clarify, "if time permits". Once the FA finishes the corridor on sheets 2 & 3 then OPS recommends moving on to the corridors of sheets 4 or 17 (depending on weather). Are you stating once the FA finishes all of the corridor?

If time permits is based on HSD OPS previous definition of if there is down time and a boat available. Priorities were understood to be after all assigned sheets are completed, but there have been opportunities to have a boat work set line spacing due to geographical limitations to where launches and the ship are working (wx or logistics or safety). We'd like the flexibility put into the project instructions.

Megan



DZ
--

David Zezula, CDR/NOAA

Commanding Officer
NOAA Ship Fairweather (S-220)
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www.moc.noaa.gov/fa

Megan Greenaway - NOAA Federal <Megan.Greenaway@noaa.gov> Wed, Jul 29, 2015 at 8:20 AM
To: "David J. Zezula" <CO.Fairweather@noaa.gov>
Cc: Starla Robinson <Starla.Robinson@noaa.gov>, Michael Gonsalves <Michael.Gonsalves@noaa.gov>, "ChiefST.Fairweather" <ChiefST.Fairweather@noaa.gov>, _OMAO MOP OPS Fairweather <OPS.Fairweather@noaa.gov>, Grant Froelich - NOAA Federal <Grant.Froelich@noaa.gov>, Corey Allen - NOAA Federal <Corey.Allen@noaa.gov>

CO,

OPS agrees with your reasoning for your proposal. The following changes to OPR-S327-FA-15 are:

1. Combine sheets 2 & 3 for efficiency.
2. Change coverage requirements to allow 100% SSS with concurrent multibeam for depths greater than 20 meters where appropriate.
3. Change coverage allowing 300 meter set line spacing for areas outside the narrow corridor if time permits. The FA will stick to the priorities describes by OPS but when opportunities arise (due to geographical limitations) to put a boat in the water the FA may do so.

Please include this email correspondence in the project Correspondence folder so that the changes are clear to the processing branch.
Thanks,
Megan
[Quoted text hidden]

Douglas Bravo - NOAA Federal <douglas.a.bravo@noaa.gov>

OPR-S327-RAFA-15 Updated Coverage Requirements

13 messages

Starla Robinson - NOAA Federal <Starla.Robinson@noaa.gov> Fri, Jul 10, 2015 at 2:52 PM
To: CO - Rainier <CO.Rainier@noaa.gov>, "CO - Fairweather (Zezula)" <CO.Fairweather@noaa.gov>
Cc: _OMAO MOP OPS Rainier <OPS.Rainier@noaa.gov>, _OMAO MOP ChiefST RAINIER <ChiefST.Rainier@noaa.gov>, Michael Gonsalves - NOAA Federal <Michael.Gonsalves@noaa.gov>, Kathryn Pridgen - NOAA Federal <Kathryn.Pridgen@noaa.gov>, Eric Berkowitz - NOAA Federal <Eric.W.Berkowitz@noaa.gov>, Megan Greenaway - NOAA Federal <Megan.Greenaway@noaa.gov>, Corey Allen - NOAA Federal <Corey.Allen@noaa.gov>, Katrina Wyllie - NOAA Federal <Katrina.Wyllie@noaa.gov>, _OMAO MOP OPS Fairweather <OPS.Fairweather@noaa.gov>, Douglas Bravo - NOAA Federal <ChiefST.Fairweather@noaa.gov>, Timothy Smith - NOAA Federal <Timothy.M.Smith@noaa.gov>

Fairweather and *Rainier*,

Based on preliminary data acquired by *Fairweather* and *Rainier*, we are altering the coverage requirements for Kotzebue Sound as follows (New requirement highlighted in red):

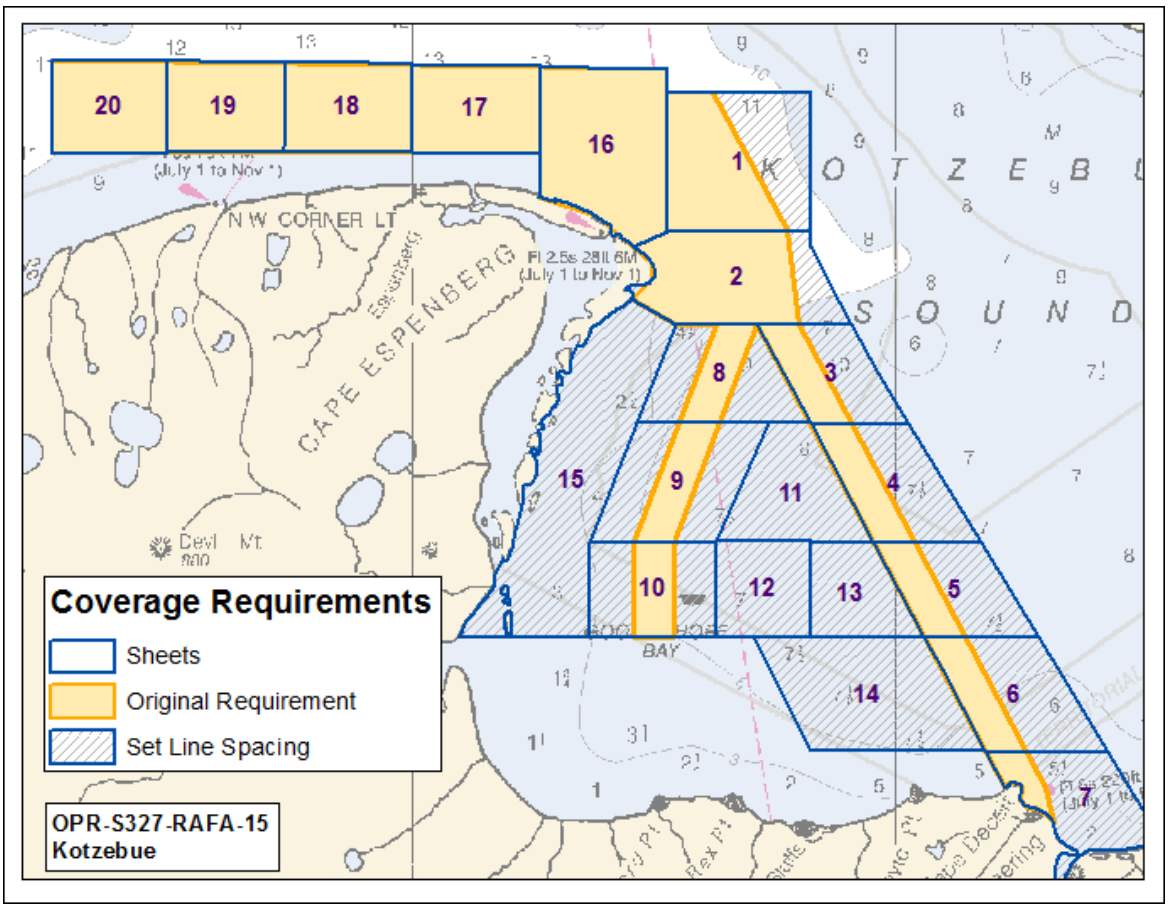
Greater than 20 meters water depth (outside of the designated set line spacing zone):
Complete MBES coverage with backscatter.

8 meters to 20 meters water depth (outside of the designated set line spacing zone):
Either 1) 100% SSS with concurrent set line spacing SBES or MBES with backscatter, or 2) complete MBES with backscatter. Note: Complete MBES is sufficient for both determination of least depth identified with SSS and for disproving a feature - 100% SSS is insufficient to disprove a feature. Refer to Section 6.1.2 of the HSSD to confirm proper SSS acquisition parameters. Gaps in SSS coverage should be treated as gaps in MBES coverage and addressed accordingly.

Inshore limit to 8 meters water depth OR in the designated set line spacing zone:
No greater than 300 meter Set Line Spacing SBES or MBES with backscatter. Please ensure the following: 1) Indications of shoaling falling between set line spacing main scheme lines must be investigated 2) Set Line Spacing Line orientation should be approximately perpendicular to isobaths whenever possible.

Attached is a shapefile designating the boundary for the set line spacing zone.

Thank you,
Starla Robinson



--

Starla D. Robinson, Physical Scientist
NOS - OCS - HSD - Operations Branch
National Oceanic Atmospheric Administration
Office: 301-713-7202 x125
Cell: 360-689-1431

Corridor_Line_0710.zip
5K

Douglas Bravo - NOAA Federal <ChiefST.fairweather@noaa.gov> Fri, Jul 10, 2015 at 4:02 PM
To: Daniel Devereaux - NOAA Federal <Daniel.R.Devereaux@noaa.gov>, Steven Eykelhoff <steven.j.eykelhoff@noaa.gov>, John Doroba - NOAA Federal <John.Doroba@noaa.gov>
Cc: _OMAO MOP OPS Fairweather <ops.fairweather@noaa.gov>

Sheet Managers,

Please find the new corridor shape file at:

H:\2015_Data\OPR-S327-FA-15 Kotzebue Sound\Project_Files\GIS Files\Kotz

Read below for new coverage requirements and plan as required.

Let me know if you have any question,

--
Douglas Bravo
Chief Survey Technician
NOAA Ship Fairweather (S-220)

1010 Stedman St
Ketchikan, AK 99901
Ship Cell: 907-254-2842
Iridium: 808-659-0054
Cell: 360-4501622
ChiefST.Fairweather@noaa.gov
[Quoted text hidden]

David J. Zezula <co.fairweather@noaa.gov> Sat, Jul 11, 2015 at 1:26 PM
To: Starla Robinson - NOAA Federal <Starla.Robinson@noaa.gov>, CO - Rainier <CO.Rainier@noaa.gov>
Cc: _OMAO MOP OPS Rainier <OPS.Rainier@noaa.gov>, _OMAO MOP ChiefST RAINIER <ChiefST.Rainier@noaa.gov>, Michael Gonsalves - NOAA Federal <Michael.Gonsalves@noaa.gov>, Kathryn Pridgen - NOAA Federal <Kathryn.Pridgen@noaa.gov>, Eric Berkowitz - NOAA Federal <Eric.W.Berkowitz@noaa.gov>, Megan Greenaway - NOAA Federal <Megan.Greenaway@noaa.gov>, Corey Allen - NOAA Federal <Corey.Allen@noaa.gov>, Katrina Wyllie - NOAA Federal <Katrina.Wyllie@noaa.gov>, _OMAO MOP OPS Fairweather <ops.fairweather@noaa.gov>, Douglas Bravo - NOAA Federal <chiefst.fairweather@noaa.gov>, Timothy Smith - NOAA Federal <Timothy.M.Smith@noaa.gov>

Starla,

Thought we were doing a 2nm wide corridor on sheets 17-20 also? See Attached.

DZ
[Quoted text hidden]
--

David Zezula, CDR/NOAA

Commanding Officer
NOAA Ship Fairweather (S-220)
2002 SE Marine Science Dr.
Newport, OR 97365-5229

(907) 254-2842: Ships Cell
(907) 254-2836: CO Cell
(301) 713-7779: VOIP

www.moc.noaa.gov/fa

---

image.pdf
88K

CO - Rainier <CO.Rainier@noaa.gov> Sun, Jul 12, 2015 at 11:32 AM
To: "David J. Zezula" <CO.Fairweather@noaa.gov>, Starla Robinson - NOAA Federal <Starla.Robinson@noaa.gov>
Cc: _OMAO MOP OPS Rainier <OPS.Rainier@noaa.gov>, _OMAO MOP ChiefST RAINIER <ChiefST.Rainier@noaa.gov>, Michael Gonsalves - NOAA Federal <Michael.Gonsalves@noaa.gov>, Kathryn Pridgen - NOAA Federal <Kathryn.Pridgen@noaa.gov>, Eric Berkowitz - NOAA Federal <Eric.W.Berkowitz@noaa.gov>, Megan Greenaway - NOAA Federal <Megan.Greenaway@noaa.gov>, Corey Allen - NOAA Federal <Corey.Allen@noaa.gov>, Katrina Wyllie - NOAA Federal <Katrina.Wyllie@noaa.gov>, _OMAO MOP OPS Fairweather <OPS.Fairweather@noaa.gov>, Douglas Bravo - NOAA Federal <ChiefST.Fairweather@noaa.gov>, Timothy Smith - NOAA Federal <Timothy.M.Smith@noaa.gov>

All,

Attached is RA's coverage on Sheet 16 after 72 hours of ship operations. It's not a considerable extra effort extending 100% MBES north to the sheet limits of 16-20, so I recommend we hold fast with the original requirements in waters deeper than 20m.

Requirements inshore of the 20m contour on sheets 16-20 may be worth further consideration. Completing

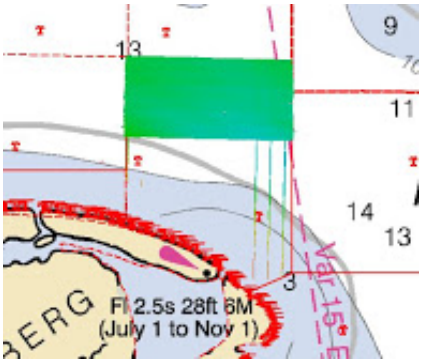
100% MBES or 100% SSS coverage in the 8-20m "ribbon" will be the most time consuming and least efficient part of these surveys. It is debatable how much value would be added to the surveys, and we have a high degree of confidence from survey results so far that we would not miss any significant shoals or features in this area by shifting to set line spacing inshore of 20m. Recommend that inshore of 20m (or perhaps 18, as that's the 10-fathom curve), coverage requirements are set line spacing no greater than 300m apart, with all shoals and features further developed. This would roughly coincide with the southern limit of FA's proposed corridor anyway.

Also, we've found to date that we can only get launches out about 50% of the time due to weather (Have yet to have launches in the water for a full day so far, out of 5 days on project this leg), so we want to be able to get the most bang for the buck when we can get boats out.

-EJ

--
CDR E.J. Van Den Ameele, NOAA
Commanding Officer, NOAA Ship Rainier
2002 SE Marine Science Drive
Newport, OR 97365
Land Line (541) 867-8770
Ship's Cell (206) 660-8747
At sea: (301) 713-7771

[Quoted text hidden]



H12827.JPG
54K

David J. Zezula <co.fairweather@noaa.gov> Sun, Jul 12, 2015 at 1:18 PM
To: CO - Rainier <CO.Rainier@noaa.gov>, Starla Robinson - NOAA Federal <Starla.Robinson@noaa.gov>
Cc: _OMAO MOP OPS Rainier <OPS.Rainier@noaa.gov>, _OMAO MOP ChiefST RAINIER <ChiefST.Rainier@noaa.gov>, Michael Gonsalves - NOAA Federal <Michael.Gonsalves@noaa.gov>, Kathryn Pridgen - NOAA Federal <Kathryn.Pridgen@noaa.gov>, Eric Berkowitz - NOAA Federal <Eric.W.Berkowitz@noaa.gov>, Megan Greenaway - NOAA Federal <Megan.Greenaway@noaa.gov>, Corey Allen - NOAA Federal <Corey.Allen@noaa.gov>, Katrina Wyllie - NOAA Federal <Katrina.Wyllie@noaa.gov>, _OMAO MOP OPS Fairweather <ops.fairweather@noaa.gov>, Douglas Bravo - NOAA Federal <chiefst.fairweather@noaa.gov>, Timothy Smith - NOAA Federal <Timothy.M.Smith@noaa.gov>

My only concern it that AIS Data show's that coastal traffic is cutting the corner inside the 20m curve. If the intent of our survey is to provide marine traffic with a full bottom corridor it seems we should be doing that where they are already transiting. 8-20 m on sheet 2 and 16 is going to be a significant effort, but I don't see a way around it and still provide the mariner CATZOC A.

DZ
[Quoted text hidden]

Starla Robinson - NOAA Federal <Starla.Robinson@noaa.gov> Mon, Jul 13, 2015 at 9:11 AM
To: "David J. Zezula" <CO.Fairweather@noaa.gov>
Cc: CO - Rainier <CO.Rainier@noaa.gov>, _OMAO MOP OPS Rainier <OPS.Rainier@noaa.gov>, _OMAO MOP ChiefST RAINIER <ChiefST.Rainier@noaa.gov>, Michael Gonsalves - NOAA Federal

<Michael.Gonsalves@noaa.gov>, Kathryn Pridgen - NOAA Federal <Kathryn.Pridgen@noaa.gov>, Eric Berkowitz - NOAA Federal <Eric.W.Berkowitz@noaa.gov>, Megan Greenaway - NOAA Federal <Megan.Greenaway@noaa.gov>, Corey Allen - NOAA Federal <Corey.Allen@noaa.gov>, Katrina Wyllie - NOAA Federal <Katrina.Wyllie@noaa.gov>, _OMAO MOP OPS Fairweather <OPS.Fairweather@noaa.gov>, Douglas Bravo - NOAA Federal <ChiefST.Fairweather@noaa.gov>, Timothy Smith - NOAA Federal <Timothy.M.Smith@noaa.gov>

We are discussing our options, including your proposed corridor.
[Quoted text hidden]

Starla Robinson - NOAA Federal <Starla.Robinson@noaa.gov> Mon, Jul 13, 2015 at 1:05 PM
To: "David J. Zezula" <CO.Fairweather@noaa.gov>
Cc: CO - Rainier <CO.Rainier@noaa.gov>, _OMAO MOP OPS Rainier <OPS.Rainier@noaa.gov>, _OMAO MOP ChiefST RAINIER <ChiefST.Rainier@noaa.gov>, Michael Gonsalves - NOAA Federal <Michael.Gonsalves@noaa.gov>, Kathryn Pridgen - NOAA Federal <Kathryn.Pridgen@noaa.gov>, Eric Berkowitz - NOAA Federal <Eric.W.Berkowitz@noaa.gov>, Megan Greenaway - NOAA Federal <Megan.Greenaway@noaa.gov>, Corey Allen - NOAA Federal <Corey.Allen@noaa.gov>, Katrina Wyllie - NOAA Federal <Katrina.Wyllie@noaa.gov>, _OMAO MOP OPS Fairweather <OPS.Fairweather@noaa.gov>, Douglas Bravo - NOAA Federal <ChiefST.Fairweather@noaa.gov>, Timothy Smith - NOAA Federal <Timothy.M.Smith@noaa.gov>, Jacklyn James - NOAA Federal <Jacklyn.C.James@noaa.gov>

Hello Fairweather and Rainier,

We are planning to amend the coverage requirements to focus on complete coverage corridors, and drop the 300m line spacing outside of sheets 1, 2, and 16.

Sheets 1, 2, and 16 cover the point of Cape Espenberg. As an area of converging traffic we intend to retain the coverage requirements as stated in the previous email. Our primary objective after that is to acquire the corridors for the North, Deering, and Good Hope Bay.

The Fairweathers next leg (Clarence or Kotzebue) will be determined by how much we get done in Kotzebue this leg. Given the weather constraints it will be hard to predict the progress we can achieve on the launch sheets.

I will have another shapefile with a 2nm corridor for sheets 17 through 20, soon.

Thank you for your flexibility on this project,
Starla

On Sun, Jul 12, 2015 at 4:18 PM, David J. Zezula <co.fairweather@noaa.gov> wrote:
[Quoted text hidden]
[Quoted text hidden]

Starla Robinson - NOAA Federal <Starla.Robinson@noaa.gov> Tue, Jul 14, 2015 at 7:13 AM
To: "David J. Zezula" <CO.Fairweather@noaa.gov>
Cc: CO - Rainier <CO.Rainier@noaa.gov>, _OMAO MOP OPS Rainier <OPS.Rainier@noaa.gov>, _OMAO MOP ChiefST RAINIER <ChiefST.Rainier@noaa.gov>, Michael Gonsalves - NOAA Federal <Michael.Gonsalves@noaa.gov>, Kathryn Pridgen - NOAA Federal <Kathryn.Pridgen@noaa.gov>, Eric Berkowitz - NOAA Federal <Eric.W.Berkowitz@noaa.gov>, Megan Greenaway - NOAA Federal <Megan.Greenaway@noaa.gov>, Corey Allen - NOAA Federal <Corey.Allen@noaa.gov>, Katrina Wyllie - NOAA Federal <Katrina.Wyllie@noaa.gov>, _OMAO MOP OPS Fairweather <OPS.Fairweather@noaa.gov>, Douglas Bravo - NOAA Federal <ChiefST.Fairweather@noaa.gov>, Timothy Smith - NOAA Federal <Timothy.M.Smith@noaa.gov>, Jacklyn James - NOAA Federal <Jacklyn.C.James@noaa.gov>

CO's,

Based on present acquisition rates, and with consultation with the navigation manager we are refining the priorities on the Kotzebue Project. Specifically we wish to 1) develop transit corridors within sheets 17 -20, 3-7, and 8-10; 2) develop the shoal around Cape Espenberg in sheets 1, 2 and 16; and 3) forego the 300 meter line

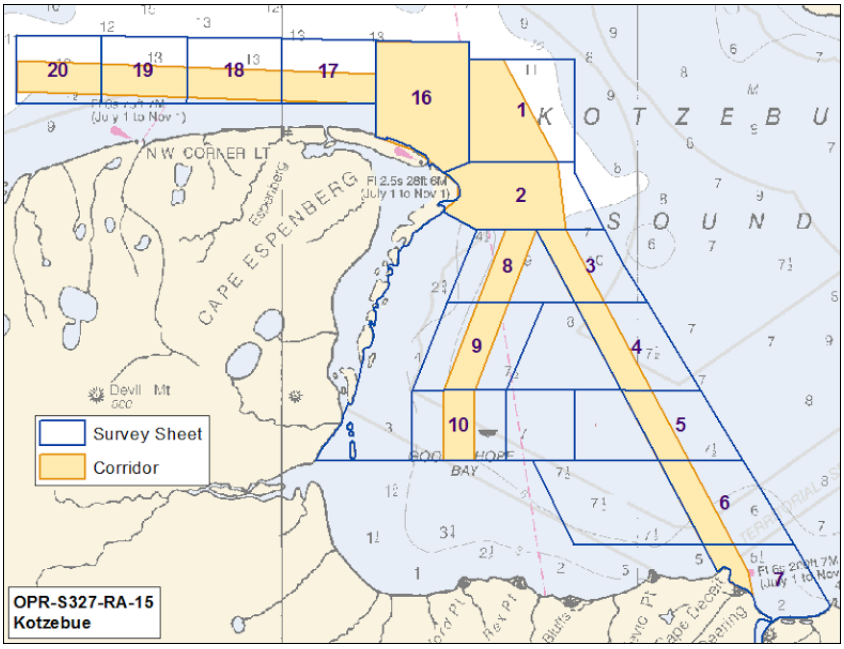
spacing zones outside the preceding areas.

When launch operations are untenable the ships may survey outside the corridors.

Sheets 19 and 20 are dependent on a tide gauge that will be removed 7/30. So while COOPS feel they can resolve vertical control without the gauge, they cannot speak towards the accuracy at this point in time. If possible we would like the Rainier to prioritize the corridor in sheets 19 and 20 for this leg.

These are our latest thoughts on the matter. Does this make sense from the field's perspective?

Thank you,
Starla



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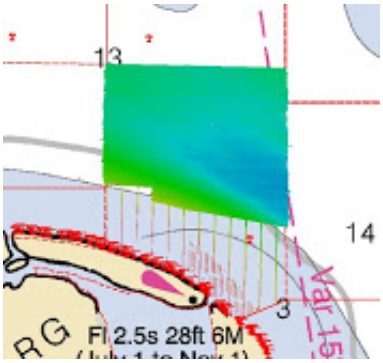
CO - Rainier <CO.Rainier@noaa.gov> Tue, Jul 14, 2015 at 7:42 AM
To: Starla Robinson - NOAA Federal <Starla.Robinson@noaa.gov>, "David J. Zezula" <CO.Fairweather@noaa.gov>
Cc: _OMAO MOP OPS Rainier <OPS.Rainier@noaa.gov>, _OMAO MOP ChiefST RAINIER <ChiefST.Rainier@noaa.gov>, Michael Gonsalves - NOAA Federal <Michael.Gonsalves@noaa.gov>, Kathryn Pridgen - NOAA Federal <Kathryn.Pridgen@noaa.gov>, Eric Berkowitz - NOAA Federal <Eric.W.Berkowitz@noaa.gov>, Megan Greenaway - NOAA Federal <Megan.Greenaway@noaa.gov>, Corey Allen - NOAA Federal <Corey.Allen@noaa.gov>, Katrina Wyllie - NOAA Federal <Katrina.Wyllie@noaa.gov>, _OMAO MOP OPS Fairweather <OPS.Fairweather@noaa.gov>, Douglas Bravo - NOAA Federal <ChiefST.Fairweather@noaa.gov>, Timothy Smith - NOAA Federal <Timothy.M.Smith@noaa.gov>, Jacklyn James - NOAA Federal <Jacklyn.C.James@noaa.gov>

Hi Starla,

What is the relationship between Sheet 16 and the gauge being removed 7/30? Is that gauge 94B-BBBB?

RA anticipated needing most of our time on project this leg (between now and our ~7/19 departure from the project area) to complete sheet 16. See attached for completion as of this morning. We have pretty much completed what we can with the ship; today we are deploying launches to start the 100% SSS requirement in the 8-20m zone, as well as continue mainscheme set line spacing in the 4-8m zone.

-EJ
[Quoted text hidden]



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65K

Starla Robinson - NOAA Federal <Starla.Robinson@noaa.gov> Tue, Jul 14, 2015 at 8:17 AM
To: "David J. Zezula" <CO.Fairweather@noaa.gov>
Cc: CO - Rainier <CO.Rainier@noaa.gov>, _OMAO MOP OPS Rainier <OPS.Rainier@noaa.gov>, _OMAO MOP ChiefST RAINIER <ChiefST.Rainier@noaa.gov>, Michael Gonsalves - NOAA Federal <Michael.Gonsalves@noaa.gov>, Kathryn Pridgen - NOAA Federal <Kathryn.Pridgen@noaa.gov>, Eric Berkowitz - NOAA Federal <Eric.W.Berkowitz@noaa.gov>, Megan Greenaway - NOAA Federal <Megan.Greenaway@noaa.gov>, Corey Allen - NOAA Federal <Corey.Allen@noaa.gov>, Katrina Wyllie - NOAA Federal <Katrina.Wyllie@noaa.gov>, _OMAO MOP OPS Fairweather <OPS.Fairweather@noaa.gov>, Douglas Bravo - NOAA Federal <ChiefST.Fairweather@noaa.gov>, Timothy Smith - NOAA Federal <Timothy.M.Smith@noaa.gov>, Jacklyn James - NOAA Federal <Jacklyn.C.James@noaa.gov>

Attached is the corridor shapefile.

Thanks,
Starla
[Quoted text hidden]

Corridor_Poly_0714.zip
3K

Michael Gonsalves - NOAA Federal <Michael.Gonsalves@noaa.gov> Tue, Jul 14, 2015 at 8:37 AM
To: CO - Rainier <CO.Rainier@noaa.gov>
Cc: Starla Robinson - NOAA Federal <Starla.Robinson@noaa.gov>, "David J. Zezula" <CO.Fairweather@noaa.gov>, _OMAO MOP OPS Rainier <OPS.Rainier@noaa.gov>, _OMAO MOP ChiefST RAINIER <ChiefST.Rainier@noaa.gov>, Kathryn Pridgen - NOAA Federal <Kathryn.Pridgen@noaa.gov>, Eric Berkowitz - NOAA Federal <Eric.W.Berkowitz@noaa.gov>, Megan Greenaway - NOAA Federal <Megan.Greenaway@noaa.gov>, Corey Allen - NOAA Federal <Corey.Allen@noaa.gov>, Katrina Wyllie - NOAA Federal <Katrina.Wyllie@noaa.gov>, _OMAO MOP OPS Fairweather <OPS.Fairweather@noaa.gov>, Douglas Bravo - NOAA Federal <ChiefST.Fairweather@noaa.gov>, Timothy Smith - NOAA Federal <Timothy.M.Smith@noaa.gov>, Jacklyn James - NOAA Federal <Jacklyn.C.James@noaa.gov>

CDR Van Den Ameele,

Sheet 16 is also dependent on Gauge B, but not *as* dependent as 19 and 20. I understand your desire to complete 16. Please continue as you were until I can get clarification from CO-OPS.

Very respectfully,
~~ michael.gonsalves, LCDR/NOAA
HSD Operations Branch, Chief
[Quoted text hidden]

Michael Gonsalves - NOAA Federal <Michael.Gonsalves@noaa.gov> Tue, Jul 14, 2015 at 9:06 AM
To: CO - Rainier <CO.Rainier@noaa.gov>
Cc: Starla Robinson - NOAA Federal <Starla.Robinson@noaa.gov>, "David J. Zezula" <CO.Fairweather@noaa.gov>, _OMAO MOP OPS Rainier <OPS.Rainier@noaa.gov>, _OMAO MOP ChiefST

RAINIER <ChiefST.Rainier@noaa.gov>, Kathryn Pridgen - NOAA Federal <Kathryn.Pridgen@noaa.gov>, Eric Berkowitz - NOAA Federal <Eric.W.Berkowitz@noaa.gov>, Megan Greenaway - NOAA Federal <Megan.Greenaway@noaa.gov>, Corey Allen - NOAA Federal <Corey.Allen@noaa.gov>, Katrina Wyllie - NOAA Federal <Katrina.Wyllie@noaa.gov>, _OMAO MOP OPS Fairweather <OPS.Fairweather@noaa.gov>, Douglas Bravo - NOAA Federal <ChiefST.Fairweather@noaa.gov>, Timothy Smith - NOAA Federal <Timothy.M.Smith@noaa.gov>, Jacklyn James - NOAA Federal <Jacklyn.C.James@noaa.gov>

Hello again CDR Van Den Ameele,

Please continue with your plan to address Sheet 16.

Sheets 16-20 all benefit from water level data from Gauge B. The farther west we go, the greater the benefit. This is not to say it will be impossible to resolve water levels without that gauge.

Give us a shout when you're thinking of moving on from Sheets 8 or 16.

Very respectfully,
~~ michael.gonsalves, LCDR/NOAA
HSD Operations Branch, Chief.

[Quoted text hidden]

CO - Rainier <CO.Rainier@noaa.gov> Tue, Jul 14, 2015 at 9:39 AM
To: Michael Gonsalves - NOAA Federal <Michael.Gonsalves@noaa.gov>
Cc: Starla Robinson - NOAA Federal <Starla.Robinson@noaa.gov>, "David J. Zezula" <CO.Fairweather@noaa.gov>, _OMAO MOP OPS Rainier <OPS.Rainier@noaa.gov>, _OMAO MOP ChiefST RAINIER <ChiefST.Rainier@noaa.gov>, Kathryn Pridgen - NOAA Federal <Kathryn.Pridgen@noaa.gov>, Eric Berkowitz - NOAA Federal <Eric.W.Berkowitz@noaa.gov>, Megan Greenaway - NOAA Federal <Megan.Greenaway@noaa.gov>, Corey Allen - NOAA Federal <Corey.Allen@noaa.gov>, Katrina Wyllie - NOAA Federal <Katrina.Wyllie@noaa.gov>, _OMAO MOP OPS Fairweather <OPS.Fairweather@noaa.gov>, Douglas Bravo - NOAA Federal <ChiefST.Fairweather@noaa.gov>, Timothy Smith - NOAA Federal <Timothy.M.Smith@noaa.gov>, Jacklyn James - NOAA Federal <Jacklyn.C.James@noaa.gov>

Mike-

Roger that, thanks. Our current plan then is to try to wrap up sheet 16, then assess what we could complete with any days remaining, and touch base with HSD to decide if we move to 19 or continue working on 8.

Food for thought: after a few visits to NW Corner for our HorCon station, we feel it may be a viable site for a shore-based bubbler gauge. It gets deep enough just offshore for an orifice, the tide range is slight, and the shoreline is a little rocky at that location. Not sure exactly where Station B is located but it appears to be very close to NW Corner ("9 miles west of Espenberg River"). If so, we could potentially utilize the benchmarks already installed by JOA and possibly replace their BMP gauge with one of our bubbler gauges to maintain vertical control for sheets 16-20 past 7/30.

Landing there has been a challenge - I think we've had a 50% success ratio (3 out of 6 attempts), but we have had good days where landing has been easy.

Thanks
-EJ

--
CDR E.J. Van Den Ameele, NOAA
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Newport, OR 97365
Land Line (541) 867-8770
Ship's Cell (206) 660-8747
At sea: (301) 713-7771

APPROVAL PAGE

H12812

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

- H12812_DR.pdf
- Collection of depth varied resolution BAGS
- Processed survey data and records
- H12812_GeoImage.pdf

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

Digitally signed by HOLMBERG.PETER.SCOTT.1365886101
DN: c=US, o=U.S. Government, ou=DoD, ou=PKI, ou=OTHER, cn=HOLMBERG.PETER.SCOTT.1365886101
Date: 2017.03.22 08:05:56 -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.

RAYMOND.ANNEMIEKE.S.1365883048
2017.03.24 09:09:00 -07'00'

Approved: _____

Annemieke Raymond
Physical Scientist, Pacific Hydrographic Branch