

H12841

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

DESCRIPTIVE REPORT

Type of Survey: Navigable Area

Registry Number: H12841

LOCALITY

State(s): North Carolina

General Locality: Approaches to Chesapeake Bay

Sub-locality: 23 Miles East of Currituck Beach

2015

CHIEF OF PARTY
LCDR Briana Welton, NOAA

LIBRARY & ARCHIVES

Date:

HYDROGRAPHIC TITLE SHEET

H12841

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): **North Carolina**

General Locality: **Approaches to Chesapeake Bay**

Sub-Locality: **23 Miles East of Currituck Beach**

Scale: **40000**

Dates of Survey: **07/29/2015 to 10/24/2015**

Instructions Dated: **07/24/2015**

Project Number: **OPR-D304-FH-15**

Field Unit: **NOAA Ship *Ferdinand R. Hassler***

Chief of Party: **LCDR Briana Welton, NOAA**

Soundings by: **Multibeam Echo Sounder**

Imagery by: **Multibeam Echo Sounder Backscatter**

Verification by: **Atlantic 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/>.

Table of Contents

A. Area Surveyed.....	1
A.1 Survey Limits.....	1
A.2 Survey Purpose.....	3
A.3 Survey Quality.....	3
A.4 Survey Coverage.....	3
A.5 Survey Statistics.....	4
B. Data Acquisition and Processing.....	6
B.1 Equipment and Vessels.....	6
B.1.1 Vessels.....	6
B.1.2 Equipment.....	8
B.2 Quality Control.....	8
B.2.1 Crosslines.....	8
B.2.2 Uncertainty.....	10
B.2.3 Junctions.....	13
B.2.4 Sonar QC Checks.....	15
B.2.5 Equipment Effectiveness.....	15
B.2.6 Factors Affecting Soundings.....	16
B.2.7 Sound Speed Methods.....	19
B.2.8 Coverage Equipment and Methods.....	21
B.3 Echo Sounding Corrections.....	21
B.3.1 Corrections to Echo Soundings.....	21
B.3.2 Calibrations.....	21
B.4 Backscatter.....	21
B.5 Data Processing.....	21
B.5.1 Primary Data Processing Software.....	21
B.5.2 Surfaces.....	22
B.5.3 Surface not honoring sea floor.....	22
C. Vertical and Horizontal Control.....	23
C.1 Vertical Control.....	23
C.2 Horizontal Control.....	24
C.3 Additional Horizontal or Vertical Control Issues.....	25
3.3.1 Base station outages.....	25
3.3.2 Interpolation of SBETs.....	30
3.3.3 Vertical offset.....	30
D. Results and Recommendations.....	31
D.1 Chart Comparison.....	31
D.1.1 Raster Charts.....	32
D.1.2 Electronic Navigational Charts.....	36
D.1.3 Maritime Boundary Points.....	36
D.1.4 Charted Features.....	36
D.1.5 Uncharted Features.....	37
D.1.6 Dangers to Navigation.....	38
D.1.7 Shoal and Hazardous Features.....	38

D.1.8 Channels	38
D.1.9 Bottom Samples	39
D.2 Additional Results	41
D.2.1 Shoreline	41
D.2.2 Prior Surveys	41
D.2.3 Aids to Navigation	41
D.2.4 Overhead Features	41
D.2.5 Submarine Features	41
D.2.6 Ferry Routes and Terminals	41
D.2.7 Platforms	41
D.2.8 Significant Features	41
D.2.9 Construction and Dredging	41
D.2.10 New Survey Recommendation	42
D.2.11 Inset Recommendation	42
E. Approval Sheet	43
F. Table of Acronyms	44

List of Tables

Table 1: Survey Limits	1
Table 2: Hydrographic Survey Statistics	5
Table 3: Dates of Hydrography	6
Table 4: Vessels Used	6
Table 5: Major Systems Used	8
Table 6: Survey Specific Tide TPU Values	10
Table 7: Survey Specific Sound Speed TPU Values	11
Table 8: Junctioning Surveys	13
Table 9: Primary bathymetric data processing software	21
Table 10: Primary imagery data processing software	21
Table 11: Submitted Surfaces	22
Table 12: NWLON Tide Stations	24
Table 13: Water Level Files (.tid)	24
Table 14: Tide Correctors (.zdf or .tc)	24
Table 15: CORS Base Stations	25
Table 16: USCG DGPS Stations	25
Table 17: Largest Scale Raster Charts	32
Table 18: Largest Scale ENCs	36

List of Figures

Figure 1: H12841 Survey Limits	2
Figure 2: Survey layout for OPR-D304-FH-15 over raster chart 12200	4
Figure 3: NOAA Ship FERDINAND R. HASSLER alongside pier at Marine Operations Center-Atlantic	7

Figure 4: H12841 Crossline overview.....	9
Figure 5: H12841 Crossline difference statistics.....	10
Figure 6: H12841 IHO uncertainty layer overview.....	12
Figure 7: H12841 IHO uncertainty statistics.....	13
Figure 8: Junctioning area between surveys H12841 and H12840.....	14
Figure 9: H12841 H12840 Junction statistics.....	15
Figure 10: H12841 Sound velocity artifact.....	16
Figure 11: H12841 Loss of sea floor detection.....	17
Figure 12: H12841 Data density analysis for 2-meter finalized surface.....	18
Figure 13: H12841 Holidays.....	19
Figure 14: H12841 Survey line overview.....	20
Figure 15: H12841 Designation.....	23
Figure 16: NCBI Base station overview.....	27
Figure 17: LS03 Base station overview.....	28
Figure 18: COVX Base station overview.....	29
Figure 19: H12841 Interpolated SBET example.....	30
Figure 20: H12841 Vertical offset.....	31
Figure 21: H12841 Southern sounding disagreement with RNC 12204.....	33
Figure 22: H12841 Central sounding disagreement with RNC 12204.....	34
Figure 23: H12841 Sand wave shoal area.....	35
Figure 24: H12841 Wreck disproval.....	37
Figure 25: Uncharted rock.....	38
Figure 26: H12841 Bottom sample overview.....	40

Descriptive Report to Accompany Survey H12841

Project: OPR-D304-FH-15

Locality: Approaches to Chesapeake Bay

Sublocality: 23 Miles East of Currituck Beach

Scale: 1:40000

July 2015 - October 2015

NOAA Ship *Ferdinand R. Hassler*

Chief of Party: LCDR Briana Welton, NOAA

A. Area Surveyed

The survey area is located in the approaches to Chesapeake Bay, within the sub-locality 23 miles east of Currituck Beach.

A.1 Survey Limits

Data were acquired within the following survey limits:

Northwest Limit	Southeast Limit
36° 29' 59.58" N 75° 30' 8.38" W	36° 11' 57.53" N 75° 23' 47.29" W

Table 1: Survey Limits

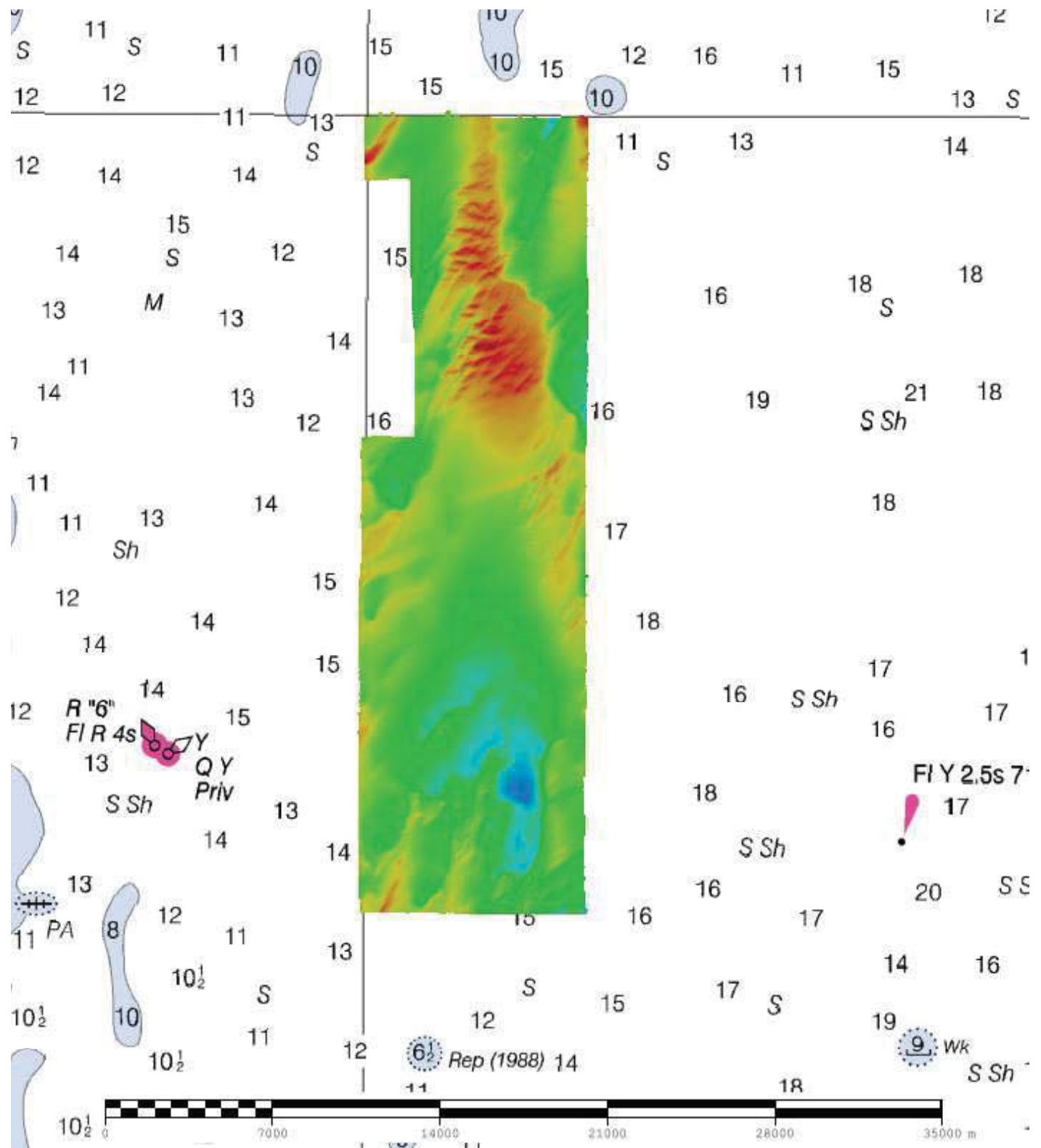


Figure 1: H12841 Survey Limits

Survey Limits were acquired with the requirements in the Project Instructions and the HSSD with the exception of the Northeast portion of the sheet. Operations were suspended before the Northeast portion could be completed due to mechanical issues with the ship.

A.2 Survey Purpose

The purpose of this project is to provide contemporary surveys to update National Ocean Service (NOS) nautical charting products. In addition, this project will improve the chart for traffic navigating the Atlantic Ocean Channel and will support BOEM research in this area.

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
All waters in survey area	Complete Multibeam with Backscatter

Survey coverage was in accordance with the requirements listed above and in the HSSD.

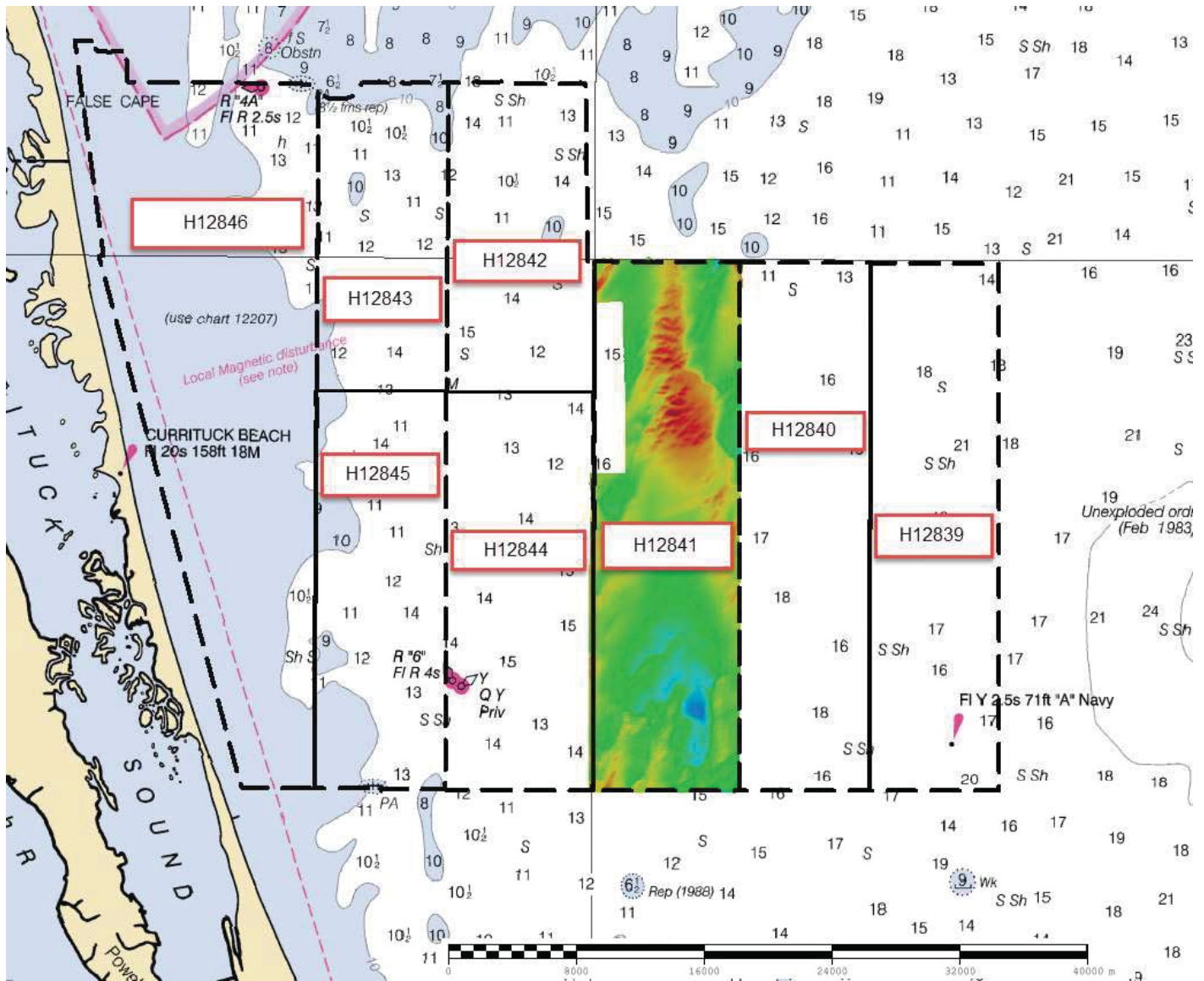


Figure 2: Survey layout for OPR-D304-FH-15 over raster chart 12200

A.5 Survey Statistics

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

	HULL ID	<i>S250</i>	<i>Total</i>
LNM	SBES Mainscheme	0	0
	MBES Mainscheme	1364.43	1364.43
	Lidar Mainscheme	0	0
	SSS Mainscheme	0	0
	SBES/SSS Mainscheme	0	0
	MBES/SSS Mainscheme	0	0
	SBES/MBES Crosslines	72.42	72.42
	Lidar Crosslines	0	0
Number of Bottom Samples			7
Number Maritime Boundary Points Investigated			0
Number of DPs			0
Number of Items Investigated by Dive Ops			0
Total SNM			85.02

Table 2: Hydrographic Survey Statistics

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

Survey Dates	Day of the Year
09/08/2015	251
09/09/2015	252

Survey Dates	Day of the Year
09/10/2015	253
09/11/2015	254
09/16/2015	259
09/17/2015	260
09/18/2015	261
09/19/2015	262
10/17/2015	290
10/18/2015	291
10/20/2015	293
10/21/2015	294
10/22/2015	295
10/24/2015	297

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	<i>S250</i>
LOA	37.7 meters
Draft	3.77 meters

Table 4: Vessels Used



Figure 3: NOAA Ship FERDINAND R. HASSLER alongside pier at Marine Operations Center-Atlantic

NOAA Ship FERDINAND R. HASSLER (S250), shown in Figure 3, acquired all data within the limits of H12841.

B.1.2 Equipment

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

Manufacturer	Model	Type
RESON	7125	MBES
Applanix	POS M/V 320 V5	Positioning and Attitude System
Hemisphere	MBX-4	Positioning System
AML	MicroCTD	Sound Speed System
Brooke Ocean	MVP-200	Sound Speed System
RESON	SVP-70	Sound Speed System
Sea Bird	SBE 19+	Sound Speed System

Table 5: Major Systems Used

B.2 Quality Control

B.2.1 Crosslines

Crosslines acquired for this survey totaled 5.31% of mainscheme acquisition.

A geographic plot of crosslines is shown in Figure 4. To evaluate crossline agreement, two 2-meter surfaces were created: one from crossline soundings, the other from mainscheme soundings. These two surfaces were differenced using CARIS HIPS and SIPS. The statistical analysis of the differences between the mainscheme and crossline surfaces is shown as follows in Figure 5. The average difference between the surfaces is 0.06 meters with a standard deviation of 0.10 meters; 95% of all differences were less than 0.19 meters from the mean.

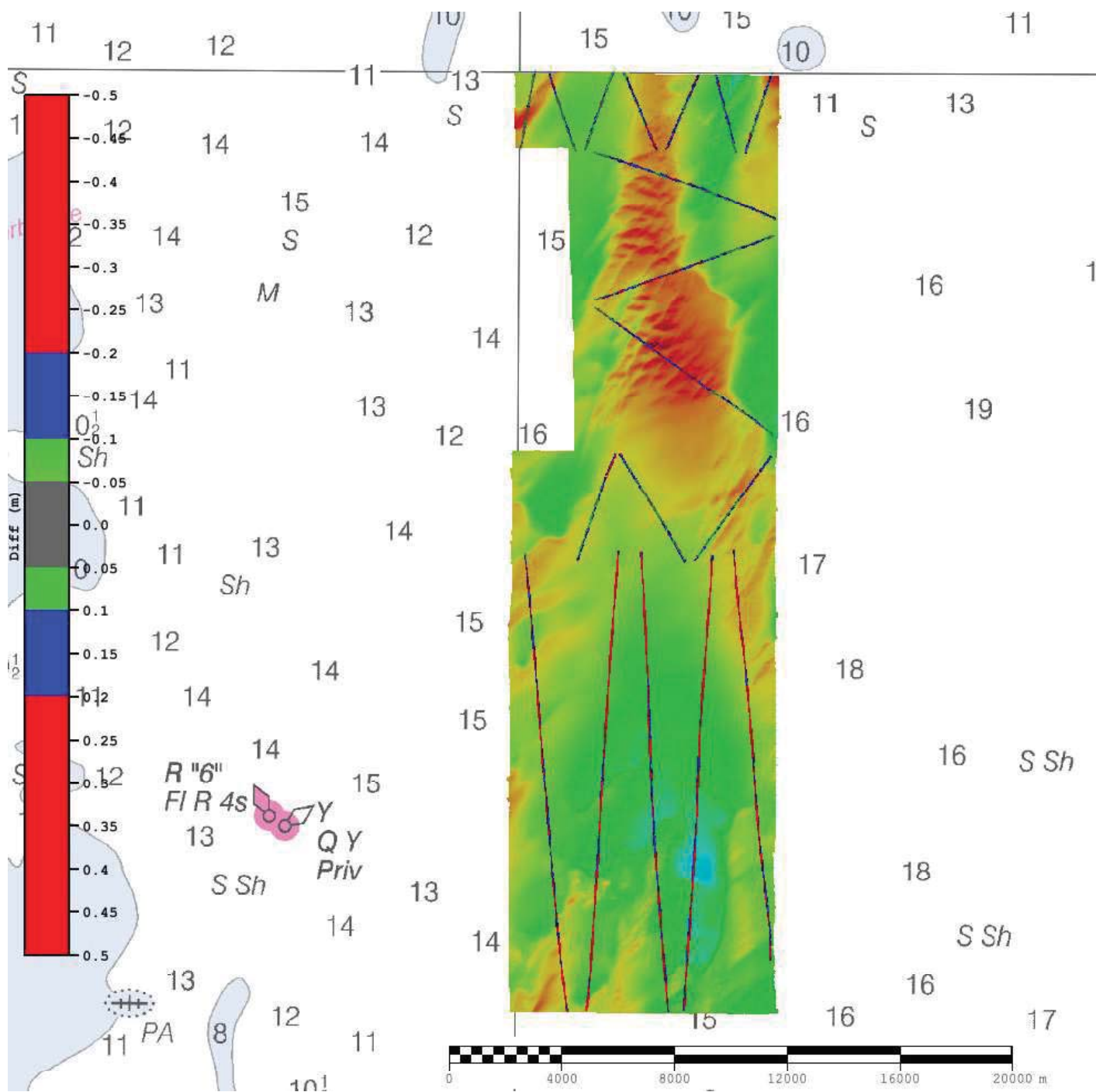


Figure 4: H12841 Crossline overview

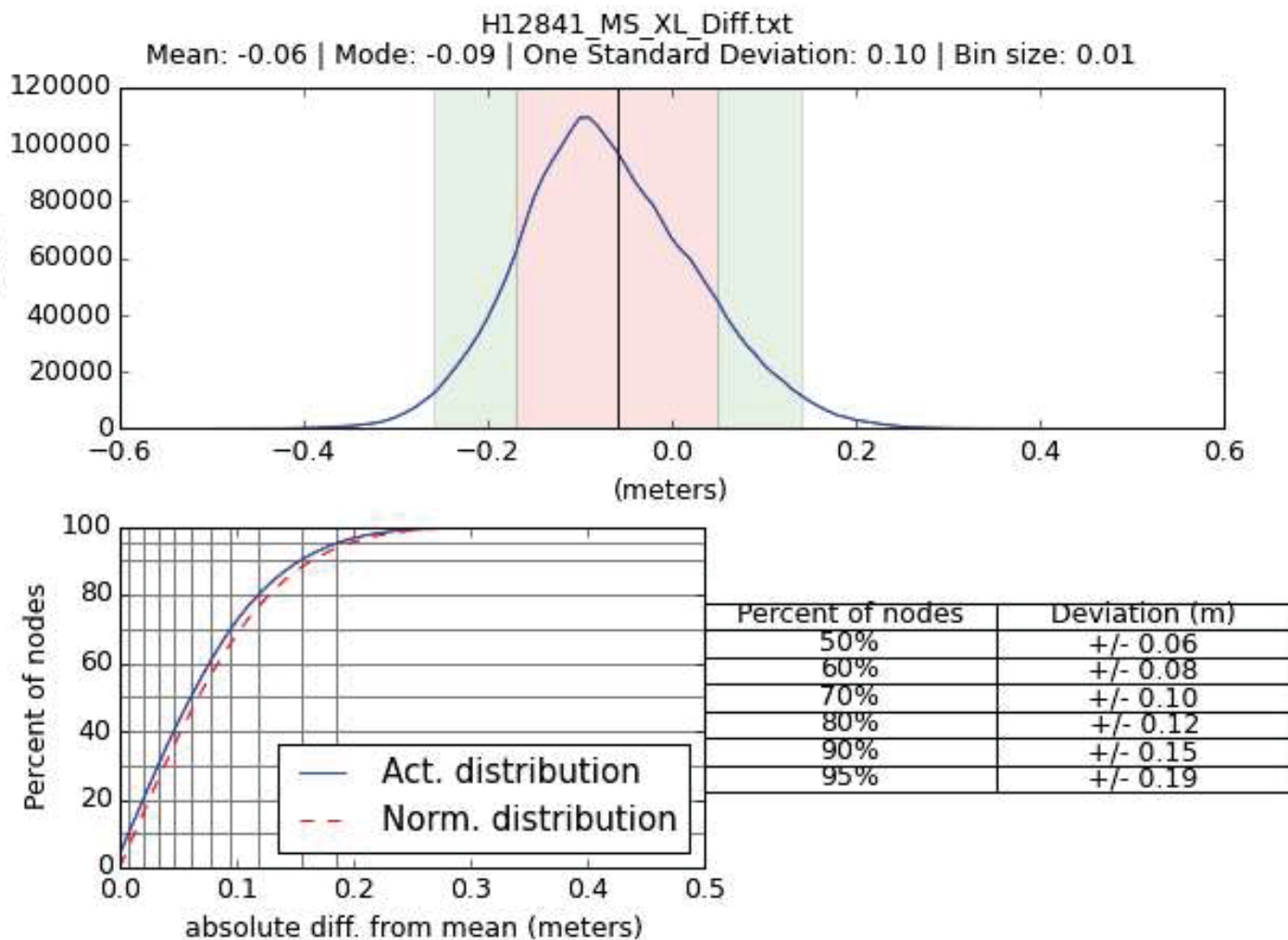


Figure 5: H12841 Crossline difference statistics

B.2.2 Uncertainty

The following survey specific parameters were used for this survey:

Measured	Zoning	Method
0.01 meters	0.16 meters	Discrete Zoning
0.01 meters	0.102 meters	VDATUM

Table 6: Survey Specific Tide TPU Values

Hull ID	Measured - CTD	Measured - MVP	Surface
S250	1.0 meters/second	0.1 meters/second	0.5 meters/second

Table 7: Survey Specific Sound Speed TPU Values

All data for survey H12841 were reduced to MLLW via VDatum. This model functioned as a gridded separation model for GPS tide computations with a 0.102 meter uncertainty. Final TPU calculations are derived from the following sources: VDatum separation model, sound velocity (MVP and surface sound velocimeter), HVF uncertainties, and SBET post processed uncertainty. Error data sources applied through CARIS processing software are listed in Tables 6 and 7.

Total vertical uncertainty analysis was performed by creating an IHO order one layer and exporting it to ASCII for statistical analysis. This layer yielded an average uncertainty of 0.47 meters, with a standard deviation of 0.04 meters. Ninety five percent of grid nodes were within 0.08 meters of the average uncertainty.

Each H12841 finalized surface was processed with the Finalized CSAR Surface QA tool within Pydro to generate TVU statistics. Greater than 99.9% of nodes within the 2-meter finalized surface meet the vertical uncertainty standards of section 5.1.3 of the Hydrographic Surveys Specifications and Deliverables (2015). See H12841_Standards_Compliance report submitted in Appendix III of this report.

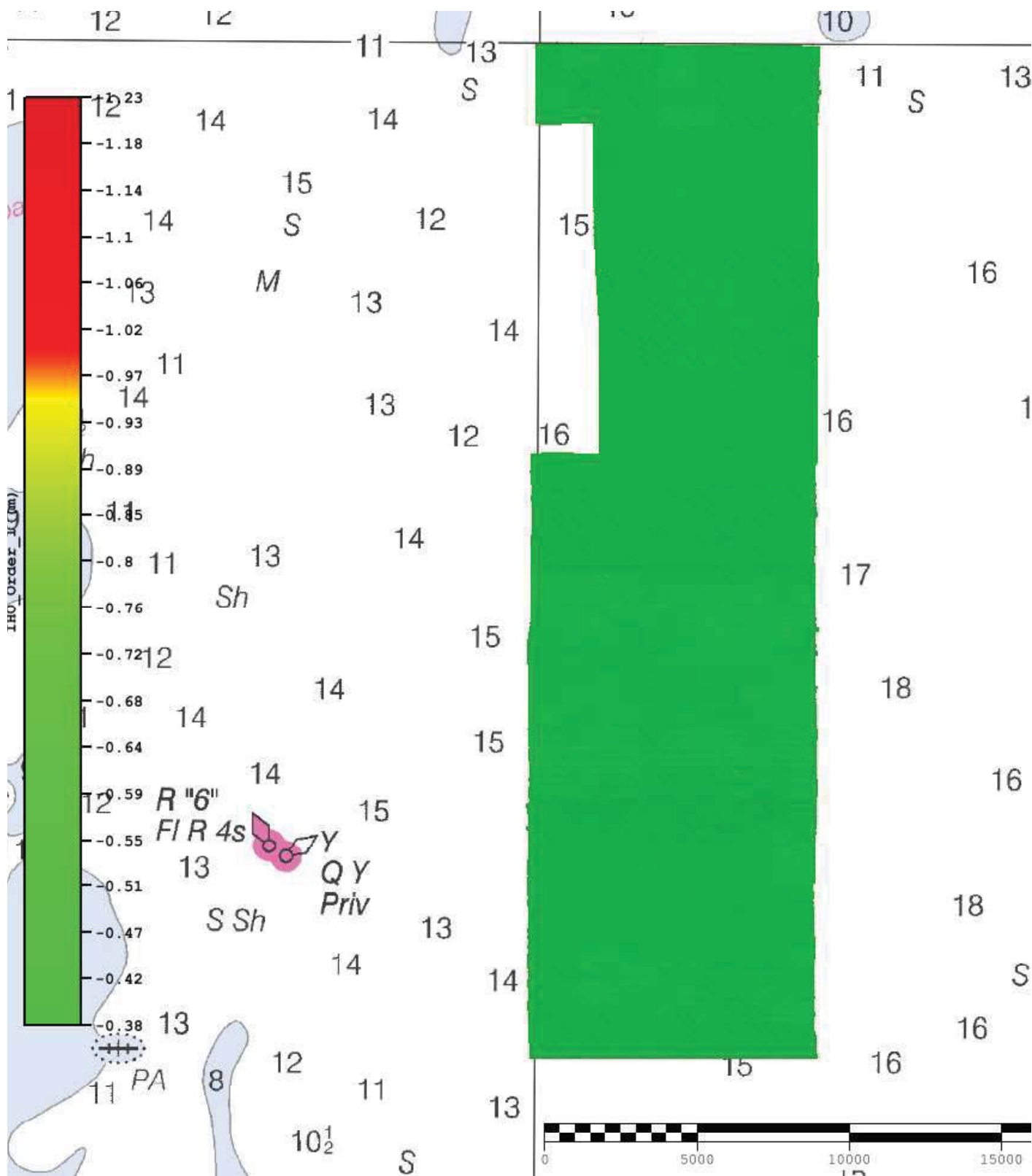


Figure 6: H12841 IHO uncertainty layer overview

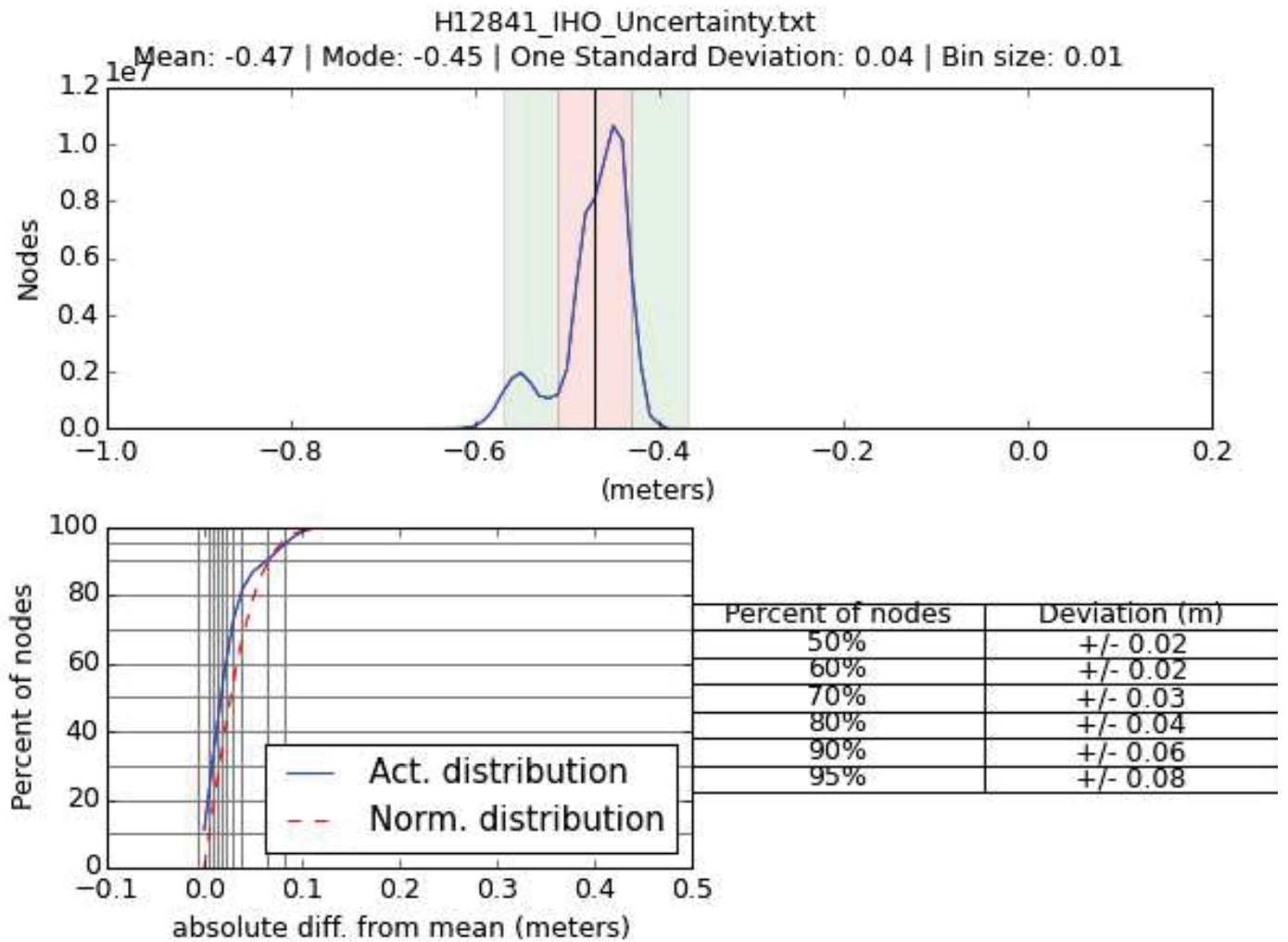


Figure 7: H12841 IHO uncertainty statistics

B.2.3 Junctions

One junction comparison was completed for H12841 as shown in Figure 8. The junction survey, H12840, was completed by NOAA Ship FERDINAND R. HASSLER in 2015.

The following junctions were made with this survey:

Registry Number	Scale	Year	Field Unit	Relative Location
H12840	1:40000	2015	NOAA Ship FERDINAND R. HASSLER	E

Table 8: Junctioning Surveys

H12840

The area of overlap between sheets H12841 and its junction sheet, H12840, shown in Figure 8, was reviewed in CARIS Subset Editor. The functioning 2-meter surface was subtracted from the 2-meter surface from H12841 to assess sounding consistency.

Survey H12840 was conducted by NOAA Ship FERDINAND R. HASSLER in 2015 during the course of project OPR-D304-FH-15. A difference surface analysis between the H12841 and H12840 2-meter resolution surfaces showed H12840 to be on average 0.01 meters shoaler than H12841, with a standard deviation of 0.09 meters. Ninety five percent of all differences are less than 0.17 meters from the mean.

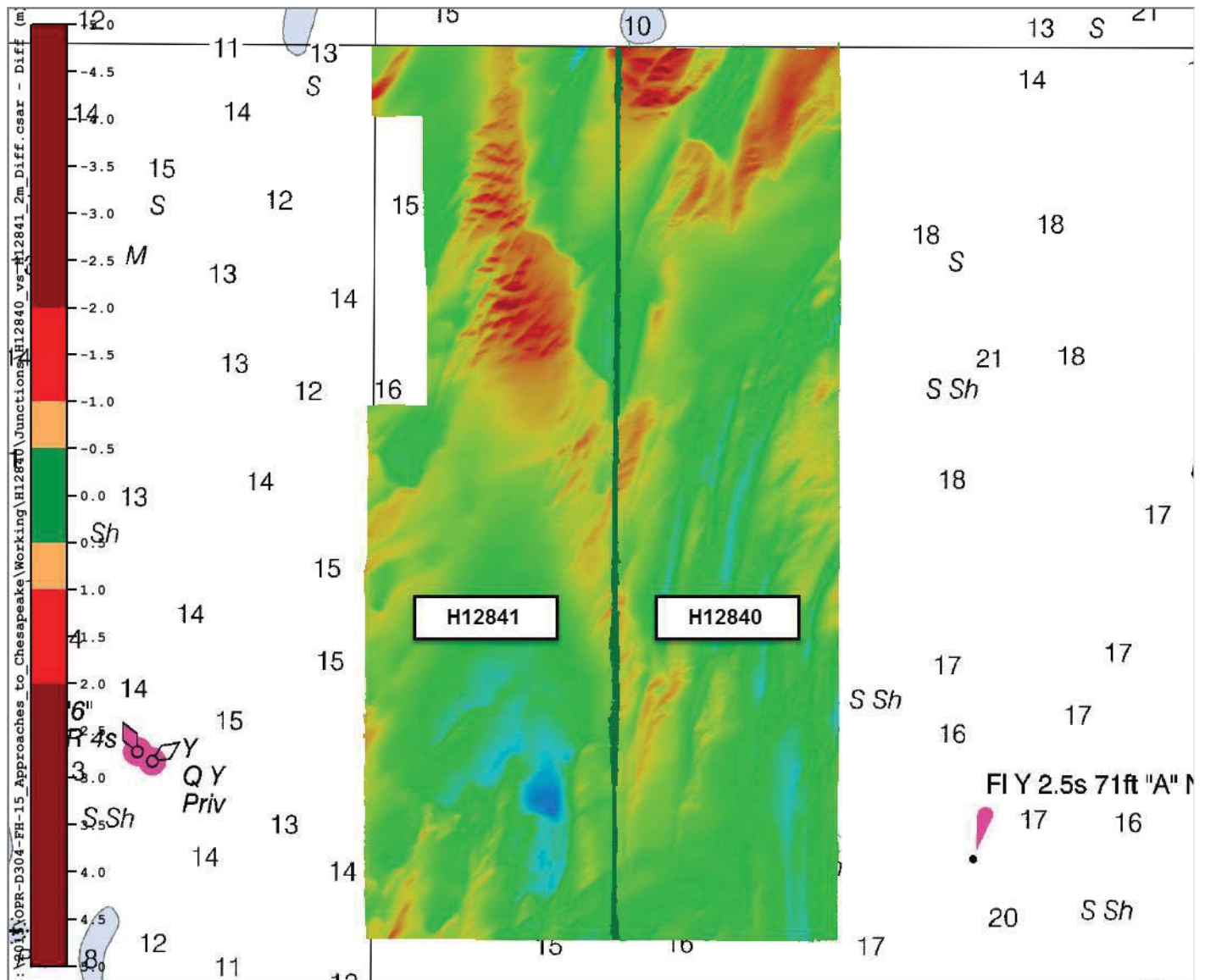


Figure 8: Junctioning area between surveys H12841 and H12840

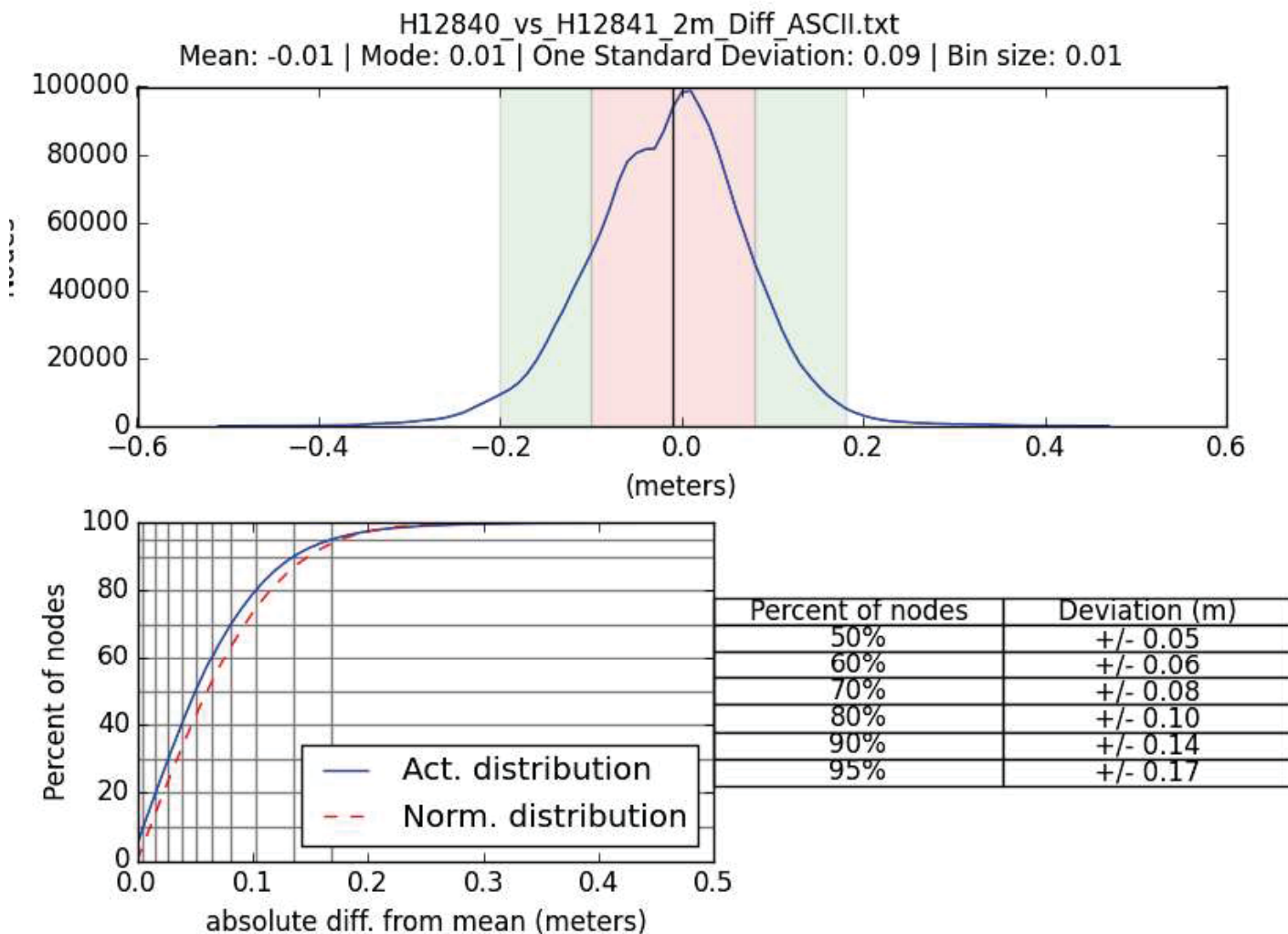


Figure 9: H12841 H12840 Junction statistics

B.2.4 Sonar QC Checks

Sonar system quality control checks were conducted as detailed in the quality control section of the DAPR.

B.2.5 Equipment Effectiveness

There were no conditions or deficiencies that affected equipment operational effectiveness.

B.2.6 Factors Affecting Soundings

Sound Velocity Artifacts

During acquisition on sheet H12841 several sound speed artifacts were observed. As shown in figure 10, most artifacts were within total vertical uncertainty standards for the survey. Soundings were rejected by the hydrographer to make the grid best represent the sea floor.

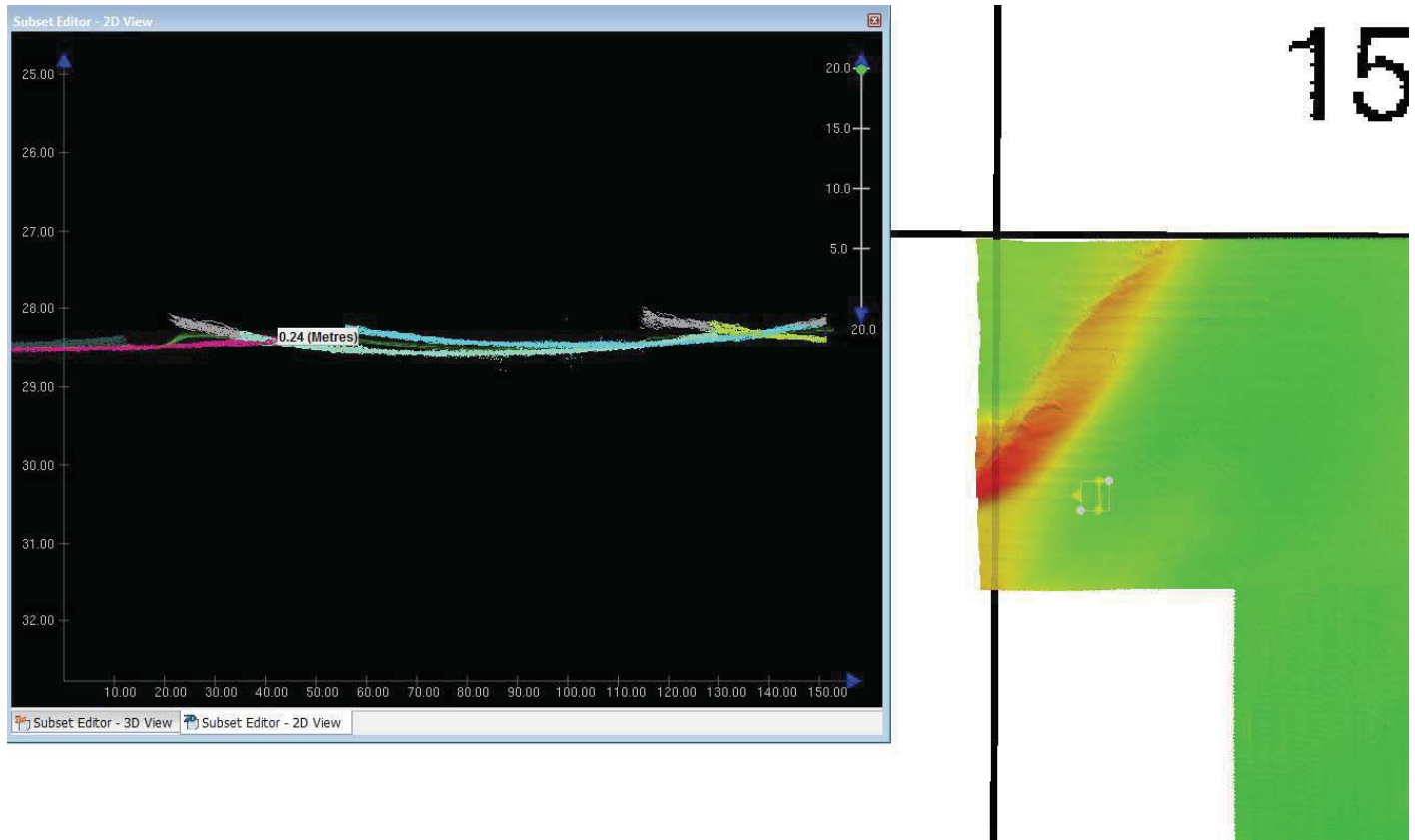


Figure 10: H12841 Sound velocity artifact

Loss of sea floor detection

Throughout the acquisition of H12841 there were several instances where accurate sea floor detection was by the outer most beams. Generally there was enough overlap to compensate for the loss of sea floor detection. Erroneous sea floor detections were rejected.

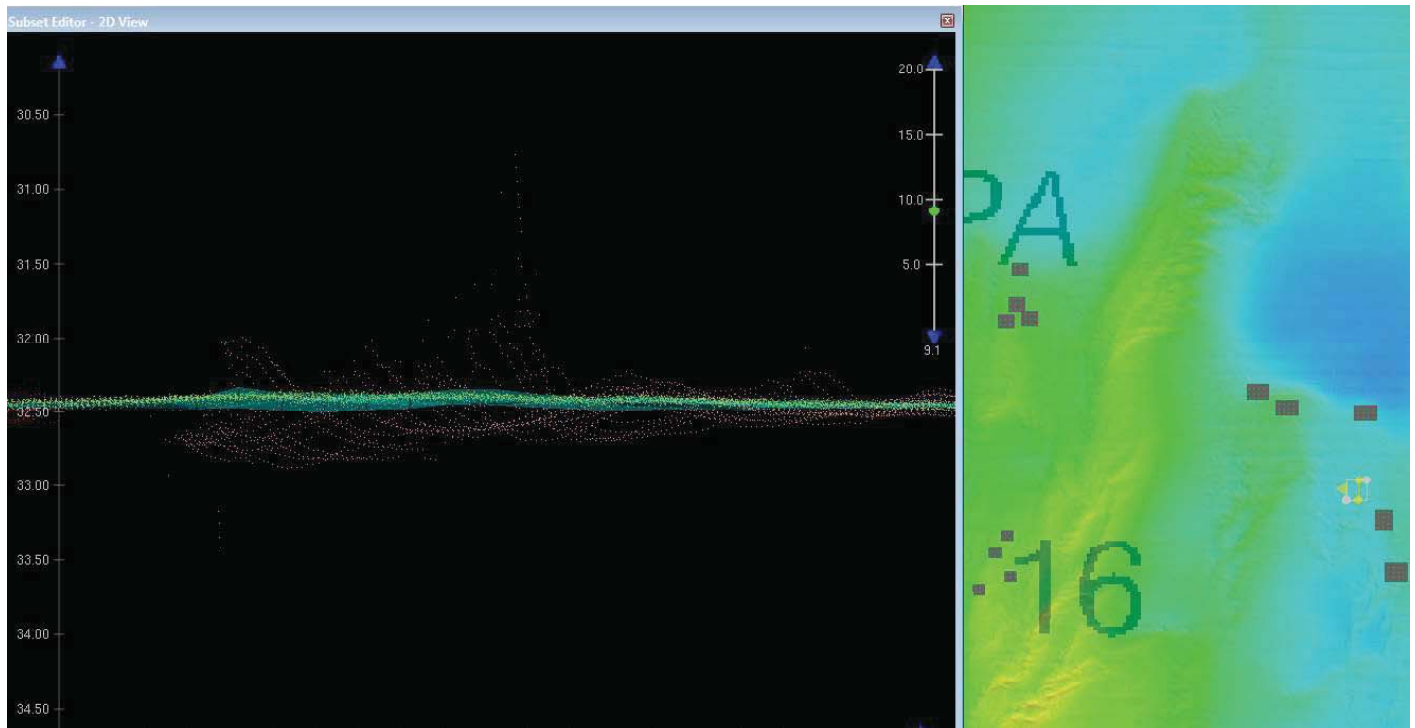


Figure 11: H12841 Loss of sea floor detection

Data Density Analysis

A density analysis determined that over 99.9% of all nodes in the only finalized surface contain five or more soundings. The density analysis was executed on nodes which were populated by at least one sounding and did not account for holidays located within the surface.

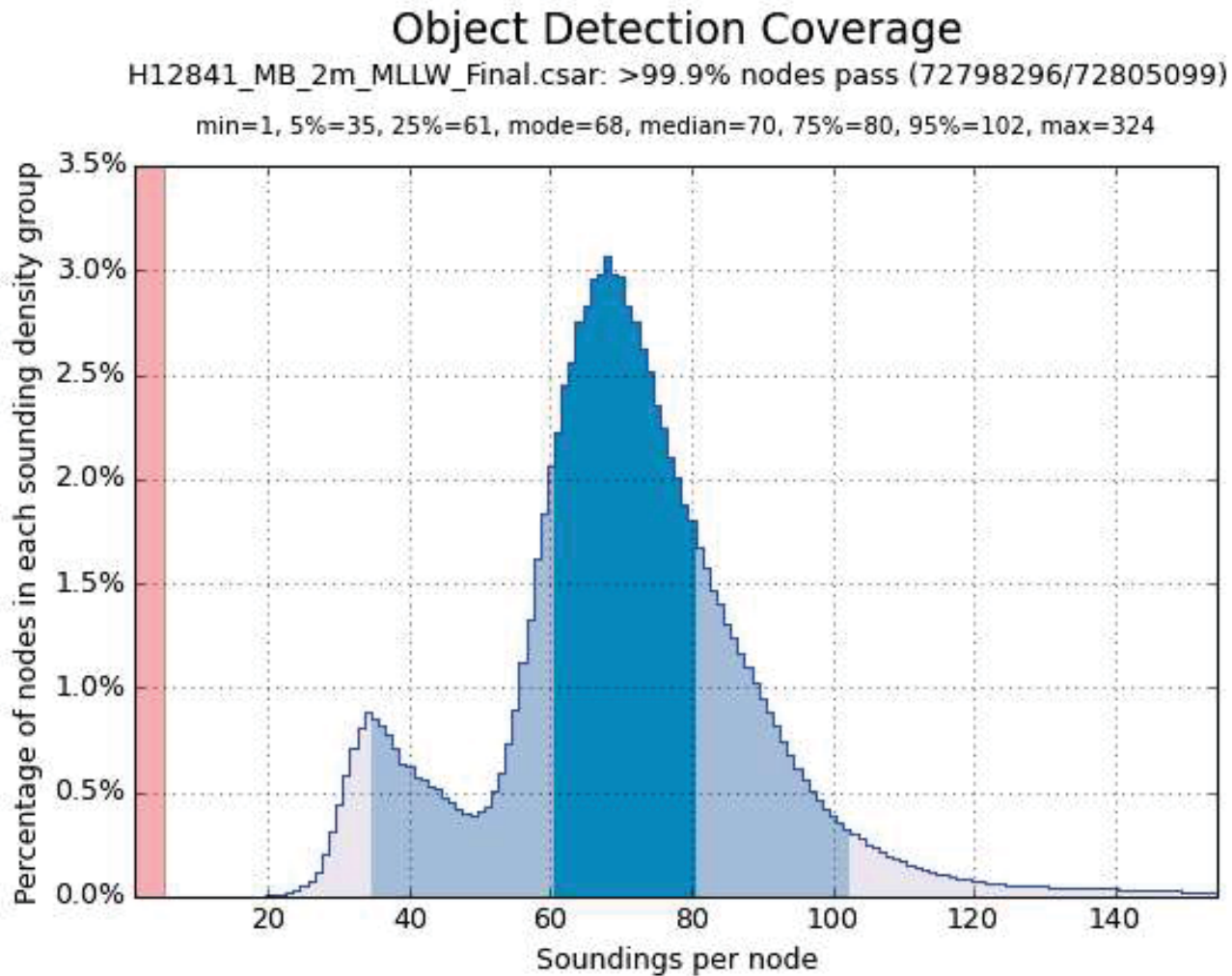


Figure 12: H12841 Data density analysis for 2-meter finalized surface.

Holidays

On the north west edge of survey H12841 several holidays occurred near the northern most 14 fathom sounding on chart 12200. These holidays occurred due to not enough overlap on pre-existing coverage. The ship left the project area without an opportunity to acquire data over the holidays.

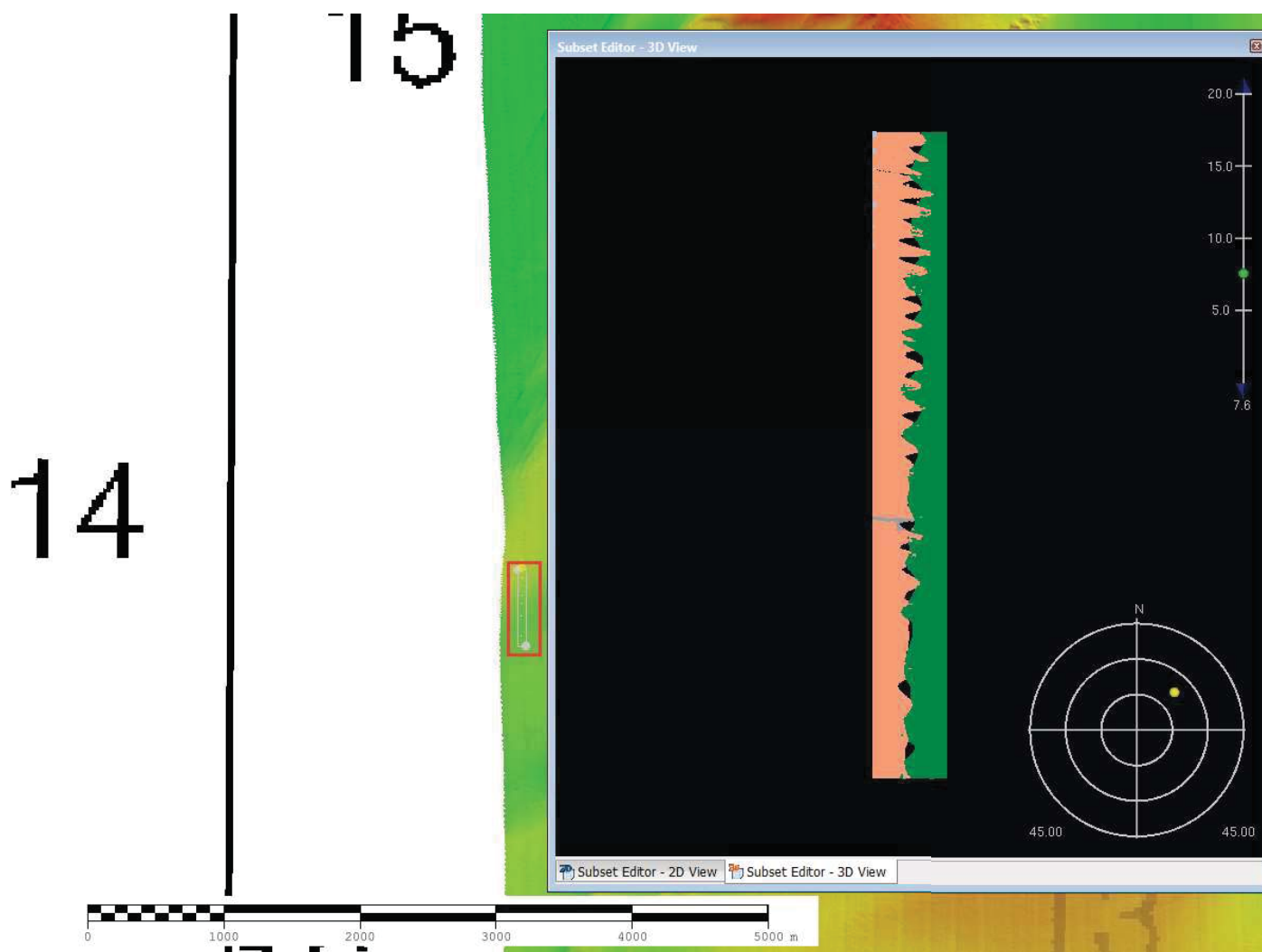


Figure 13: H12841 Holidays

B.2.7 Sound Speed Methods

Sound Speed Cast Frequency: A total of 576 sound speed measurements were taken within the boundaries of survey H12841. Sound speed casts were performed using the MVP 200 at intervals ranging from 5 minutes to 30 minutes. The shorter intervals were necessary due to high stratification of the water column and high variance between the consecutive sound speed profiles. Sound speed corrections were applied in CARIS using Nearest in Distance Within Time (NDWIT) of 1 hour for the entire survey.

Survey coverage was run from east to west to decrease the distance between consecutive sound speed profiles. This mitigated the high sound speed variability observed between casts and resulted in better data quality with fewer sound speed artifacts.

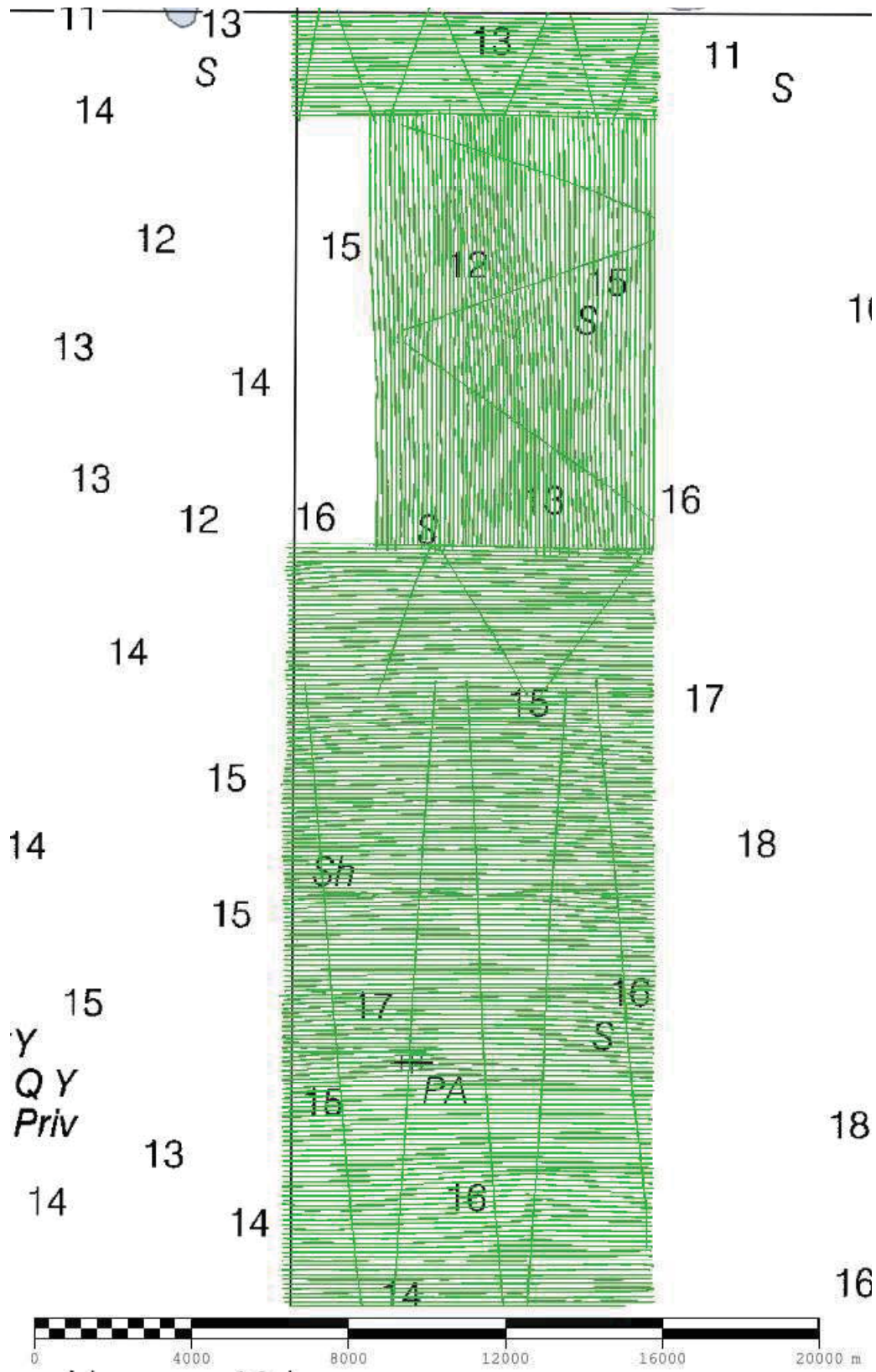


Figure 14: H12841 Survey line overview

B.2.8 Coverage Equipment and Methods

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

B.3 Echo Sounding Corrections

B.3.1 Corrections to Echo Soundings

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

B.3.2 Calibrations

All sounding systems were calibrated as detailed in the DAPR.

B.4 Backscatter

Raw Backscatter was logged as a 7k file and is included in the submission to the Processing Branch. Backscatter was processed by the field unit.

B.5 Data Processing

B.5.1 Primary Data Processing Software

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

Manufacturer	Name	Version
Caris	CARIS HIPS	9.0.21

Table 9: Primary bathymetric data processing software

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

Manufacturer	Name	Version
Fledermaus	FMGT	7.4.5b 64-bit

Table 10: Primary imagery data processing software

The following Feature Object Catalog was used: NOAA Profile V_5_3

B.5.2 Surfaces

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

Surface Name	Surface Type	Resolution	Depth Range	Surface Parameter	Purpose
H12841_MB_2m_MLLW	CUBE	2 meters	20.04 meters - 40.4 meters	NOAA_2m	Complete MBES
H12841_MB_2m_MLLW_Final	CUBE	2 meters	20.04 meters - 38.56 meters	NOAA_2m	Complete MBES

Table 11: Submitted Surfaces

All soundings fell within the 2 meter resolution.

B.5.3 Surface not honoring sea floor

Southwest of the 15 fathom sounding on chart 12200 in the vicinity of the sand waves there is an area where the 2 meter surface is not honoring the sea floor. The hydrographer designated the sounding determined to represent the least depth of the sea floor.

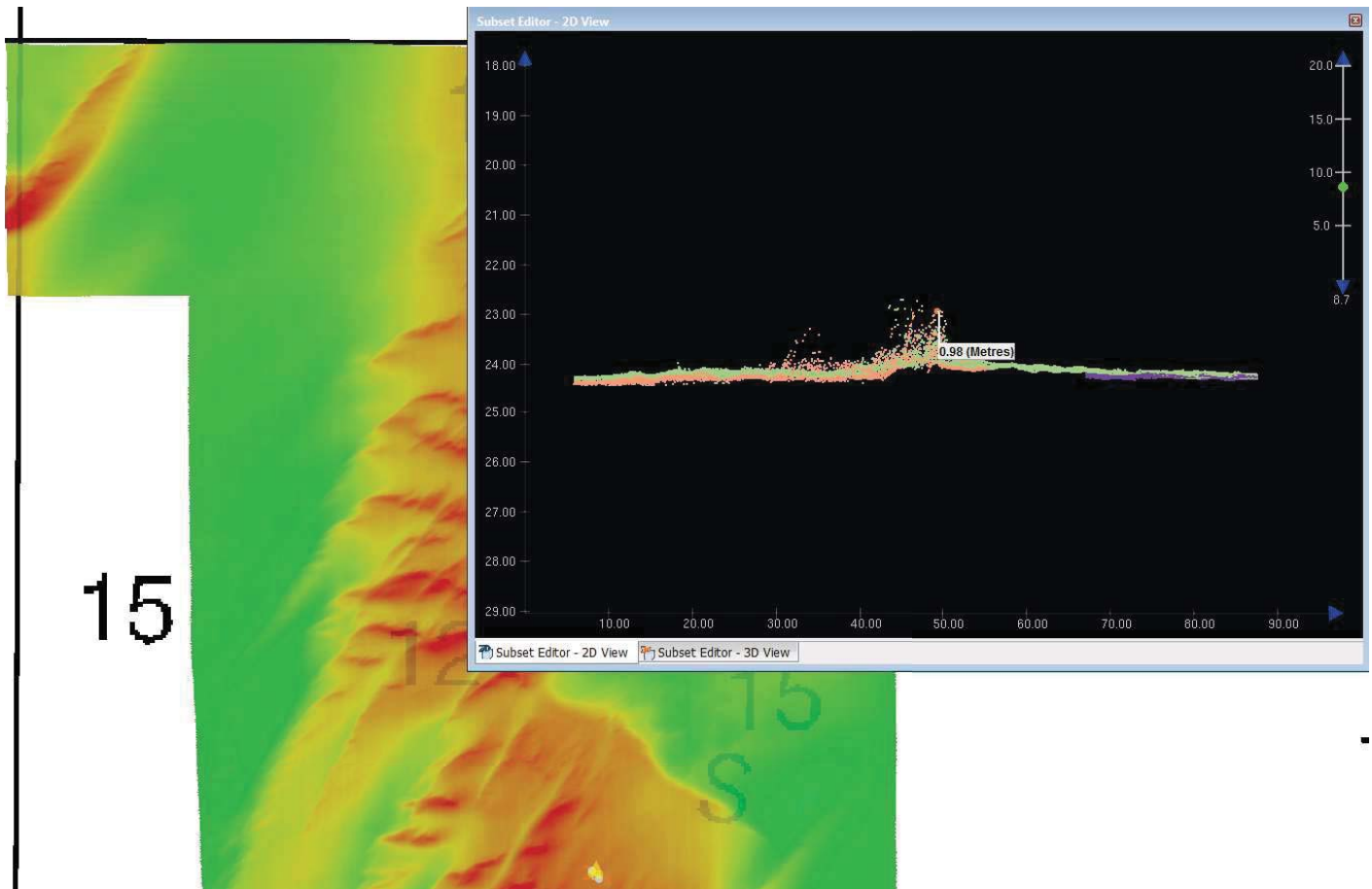


Figure 15: H12841 Designation

C. Vertical and Horizontal Control

All vertical and horizontal control activities conducted during the course of this survey are fully addressed in the following sections. No separate HVCR is submitted.

C.1 Vertical Control

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

Standard Vertical Control Methods Used:

Discrete Zoning

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

Station Name	Station ID
Duck, NC	8651370

Table 12: *NWLON Tide Stations*

File Name	Status
8651370.tid	Verified Observed

Table 13: *Water Level Files (.tid)*

File Name	Status
D304FH2015CORP.zdf	Final

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

A request for final approved tides was sent to N/OPS1 on 11/06/2015. The final tide note was received on 11/20/2015.

Non-Standard Vertical Control Methods Used:

VDatum

Ellipsoid to Chart Datum Separation File:

2015_D304_VDatum_NAD83_MLLW.csar

All soundings submitted are reduced to Mean Lower Low Water (MLLW) using a VDatum separation model provided by HSD Operations Branch. A VDatum model evaluation was conducted prior to commencing acquisition on OPR-D304-FH-15 by running checklines across the entire project area. This checkline analysis yielded a combined horizontal and vertical position RMS of less than or equal to 0.07 meters. The checkline analysis report has been submitted as an appendix.

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 18N.

The following PPK methods were used for horizontal control:

Single Base

The following CORS Stations were used for horizontal control:

HVCR Site ID	Base Station ID
LOYOLA Virginia Beach, VA	LS03
BODIE ISLAND Bodie Island, NC	NCBI
DUCK 3 Duck, NC	NCDU
Chesapeake Light, VA	COVX

Table 15: CORS Base Stations

The following DGPS Stations were used for horizontal control:

DGPS Stations
Driver, VA (289 kHz)

Table 16: USCG DGPS Stations

C.3 Additional Horizontal or Vertical Control Issues

3.3.1 Base station outages

Throughout acquisition of H12841 the preferred base station used for single base processing was DUCK. During acquisition there were outages of the DUCK base station, requiring the use of three other stations. NCBI station was the preferred alternate station, with ship to station distances ranging from 39km to 84km. There were several cases where both DUCK and NCBI were not available, in which case station LS03 was used, with ship to station distance ranging from 149km to 183km. COVX was used as the last option with the ship to station ranging from 48km to 83km. An overview of all alternate base stations has been provided

below. Though LS03 was far outside the recommended base station range, the SBETs that used LS03 were only applied on data acquired during days 262 and 290. No adverse effects are seen in the data.

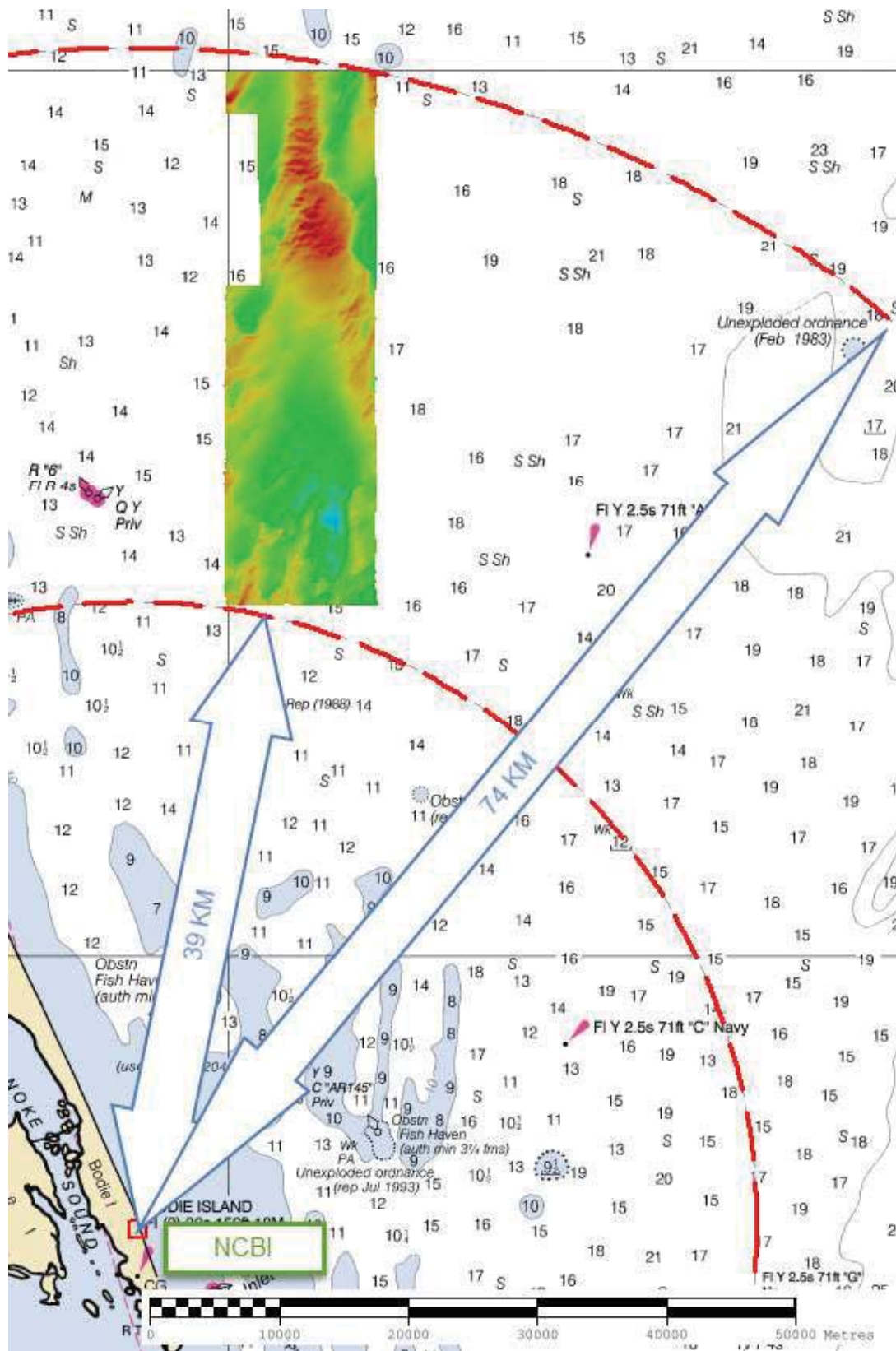


Figure 16: NCBI Base station overview

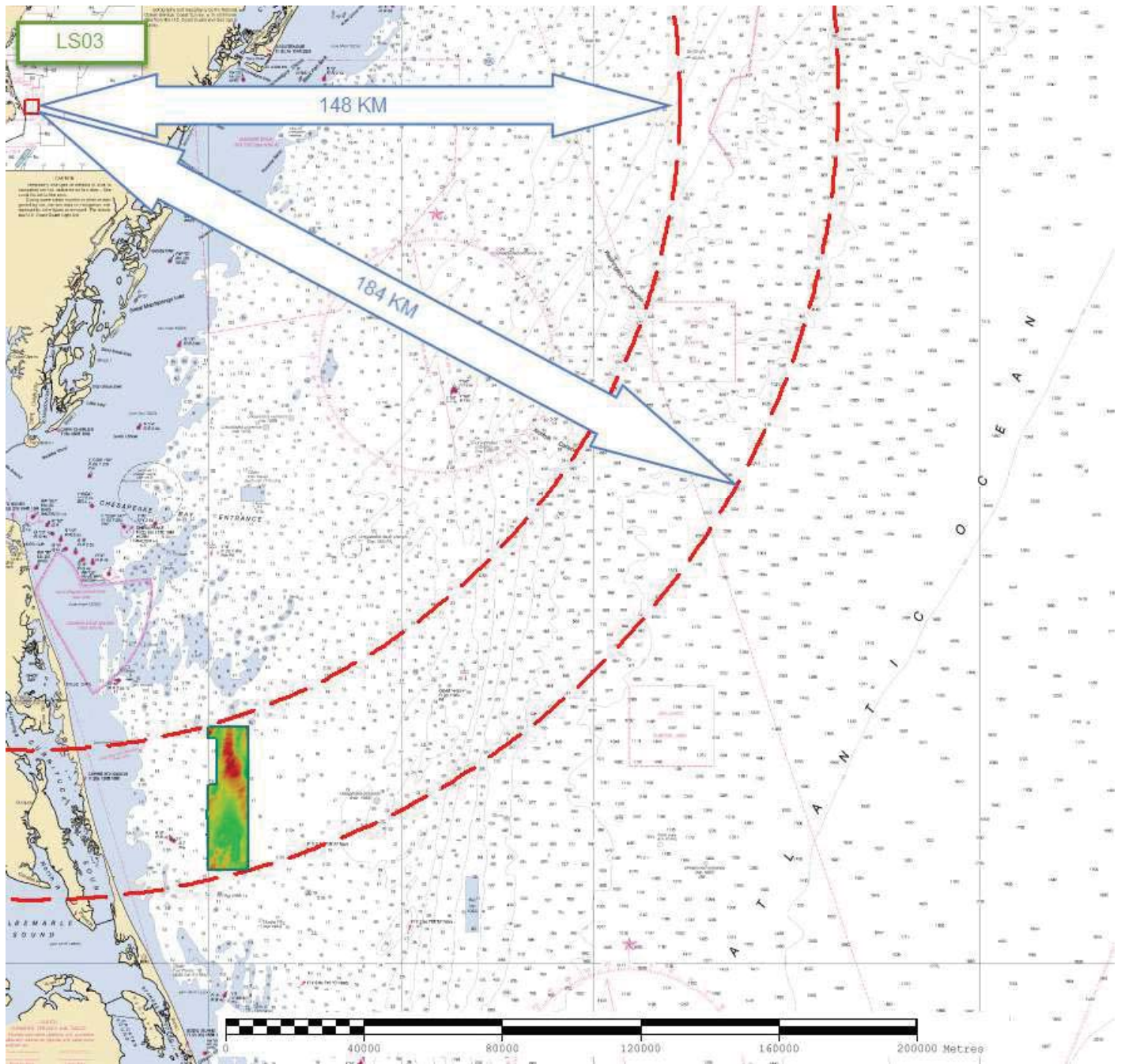


Figure 17: LS03 Base station overview

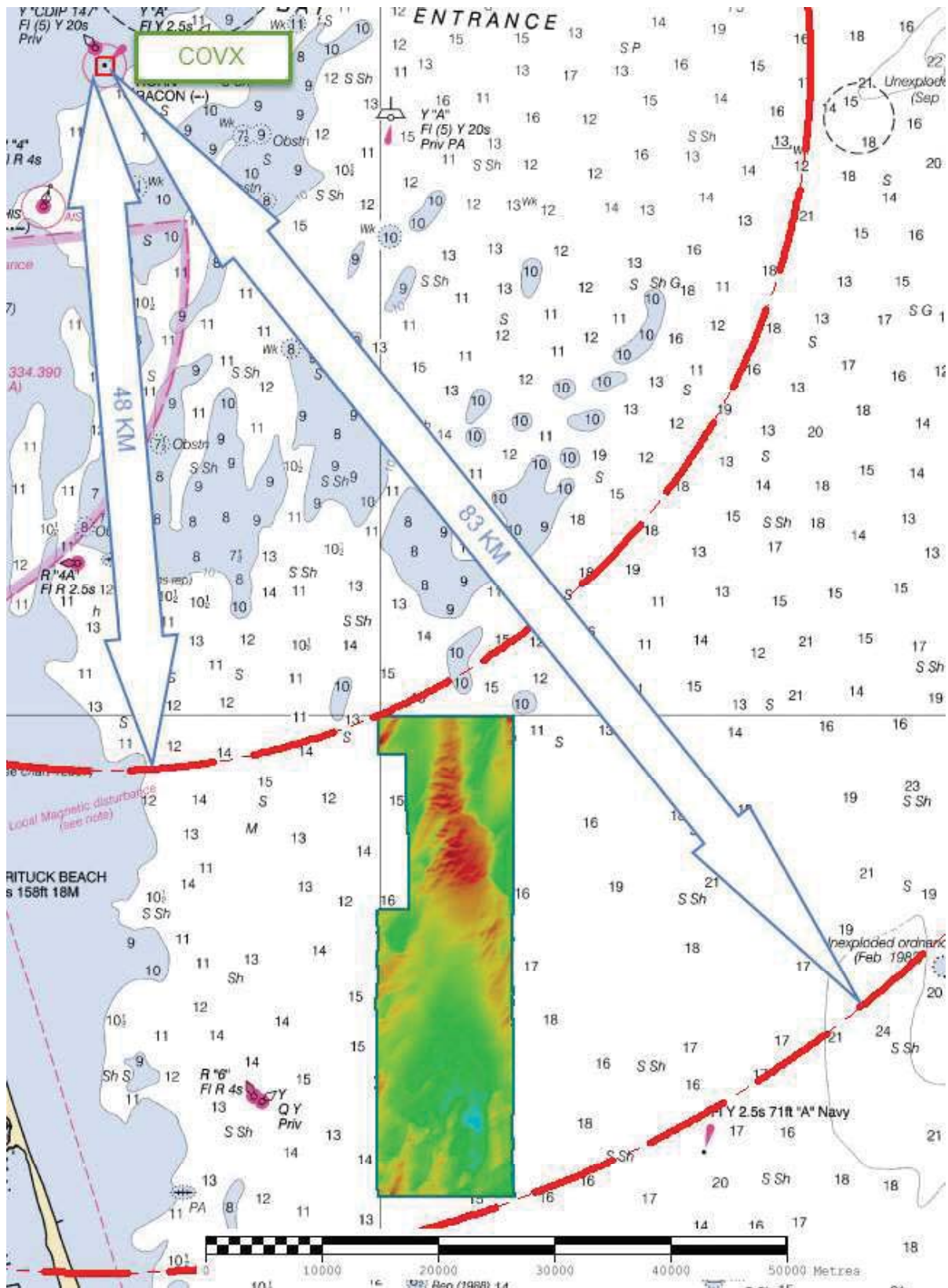


Figure 18: COVX Base station overview

3.3.2 Interpolation of SBETs

On occasion, SBET altitude spikes compromised the data's ability to meet TVU specifications. In these instances, Pydro's POSPAC Automated QC tools were used to delete the altitude spike and interpolate across the gap. (See Figure 19 for an example). The interpolated SBET was exported out of POSPAC Automated QC tool, opened in POSPAC MMS, and exported again to ensure the SBET was in the correct datum (NAD83). The new SBET contains the prefix "interpolated" for easy identification. The following SBETs were interpolated for H12841: interpolated_2015_294_S250S_b.

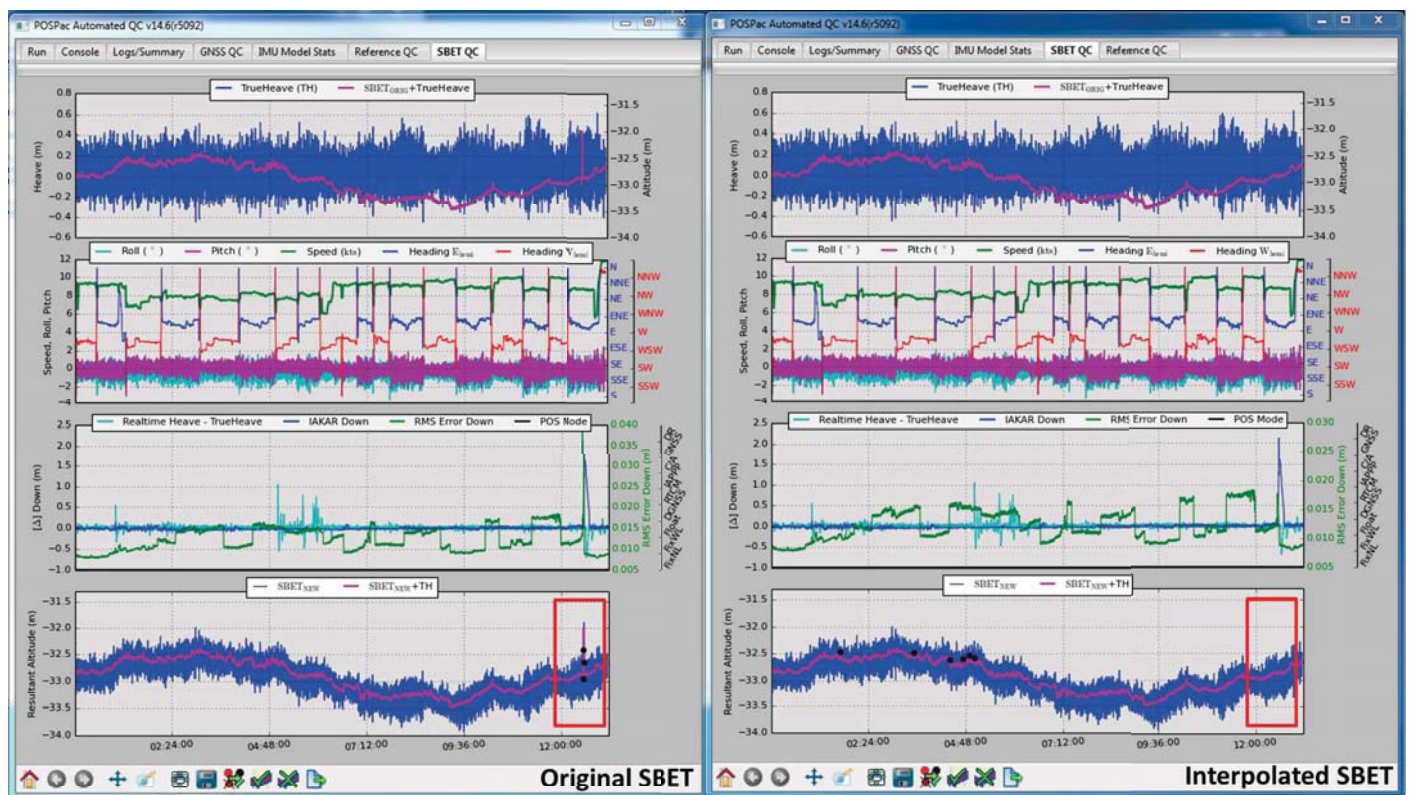


Figure 19: H12841_Interpolated SBET example

3.3.3 Vertical offset

During acquisition on H12841 several vertical offsets were observed after GPS tides were applied. The areas affected by the vertical offset were within TVU for the survey and were not investigated further. The POSPAC Automated QC tool was unable to interpolate in these instances.

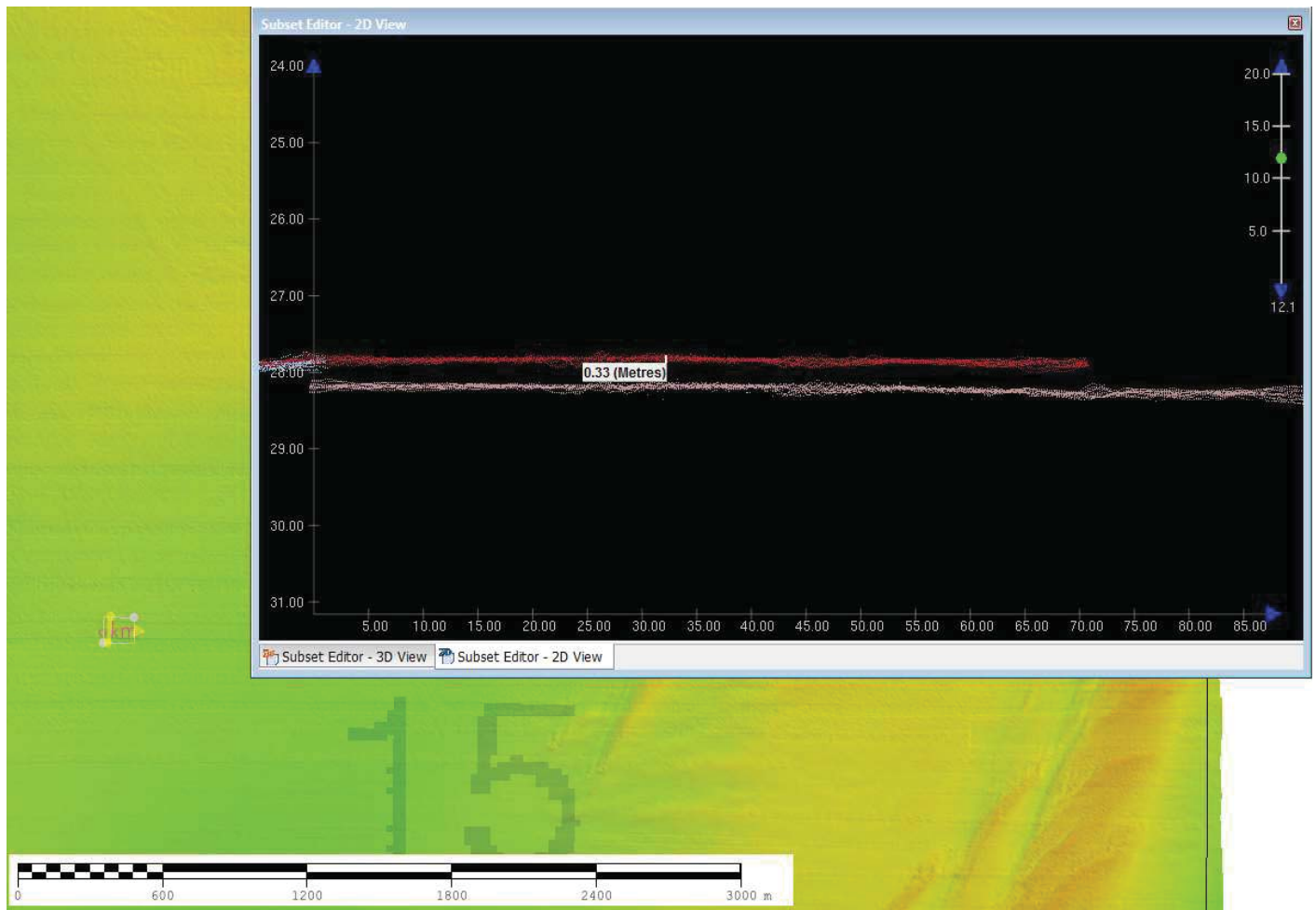


Figure 20: H12841 Vertical offset

D. Results and Recommendations

D.1 Chart Comparison

The hydrographer has compared a sounding plot from the surveyed area to the charted soundings. There are no charted contours to compare.

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
12204	1:80000	38	12/2012	05/06/2015	06/06/2016
12200	1:419706	51	06/2014	06/02/2015	06/13/2015

Table 17: Largest Scale Raster Charts

12204

Surveyed soundings varied in comparison to charted soundings. Most surveyed soundings were one to two feet deeper than charted soundings with some isolated cases of surveyed soundings being shoaler than charted soundings. There are also some extreme examples where surveyed soundings were either four to six feet deeper or shoaler than charted soundings. The largest disagreement between charted and surveyed soundings exists on the southern most 100-foot sounding. Surveyed soundings produced an 86-foot sounding in the vicinity. This can be seen below with other examples of sounding disagreement. Red circles in the figures below show gross disagreement while green circles show minor disagreement.

The charted wreck located in the southern portion of the sheet was not seen in the multibeam coverage or the surface. See the charted feature section of the descriptive report for discussion.

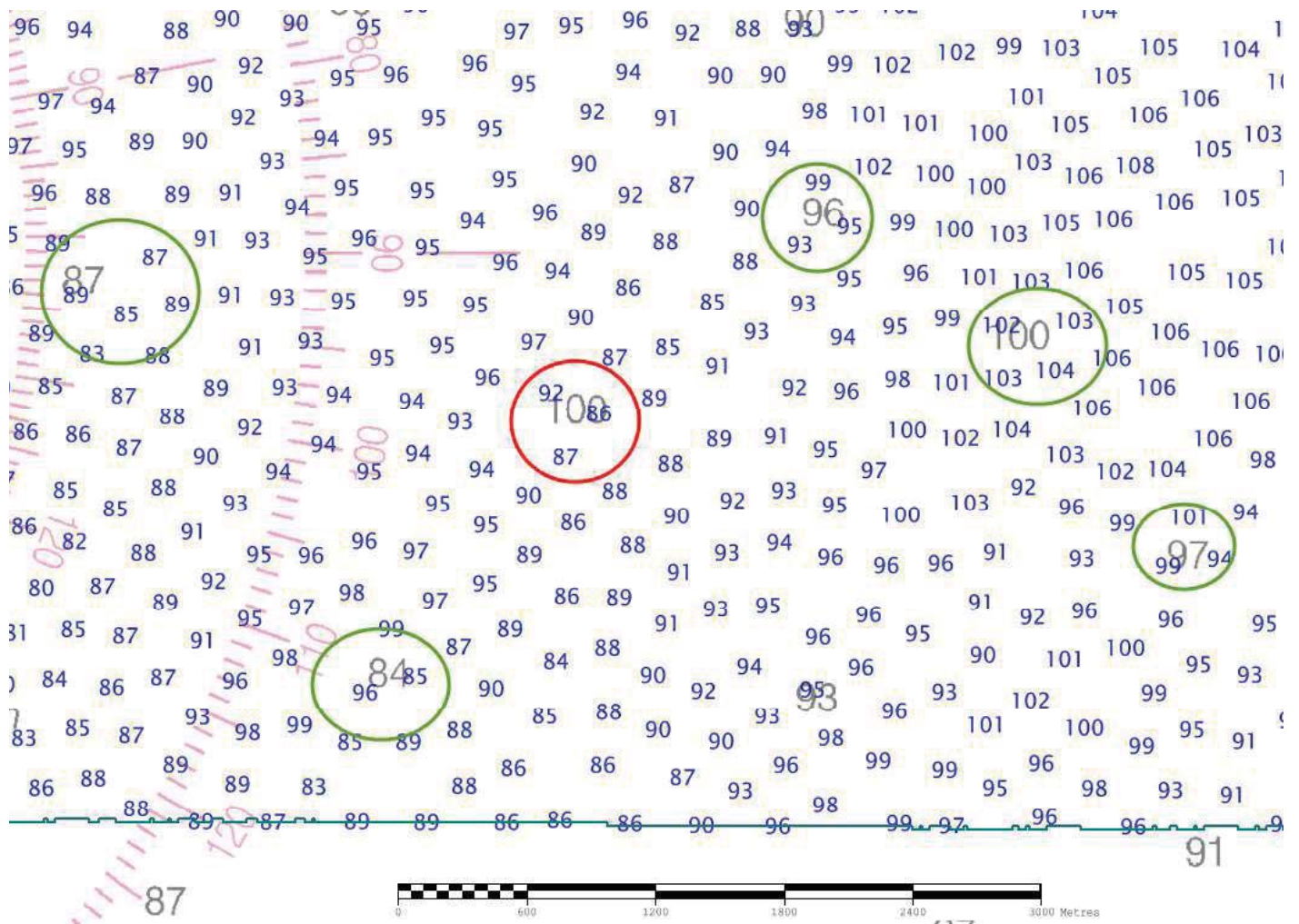


Figure 21: H12841 Southern sounding disagreement with RNC 12204

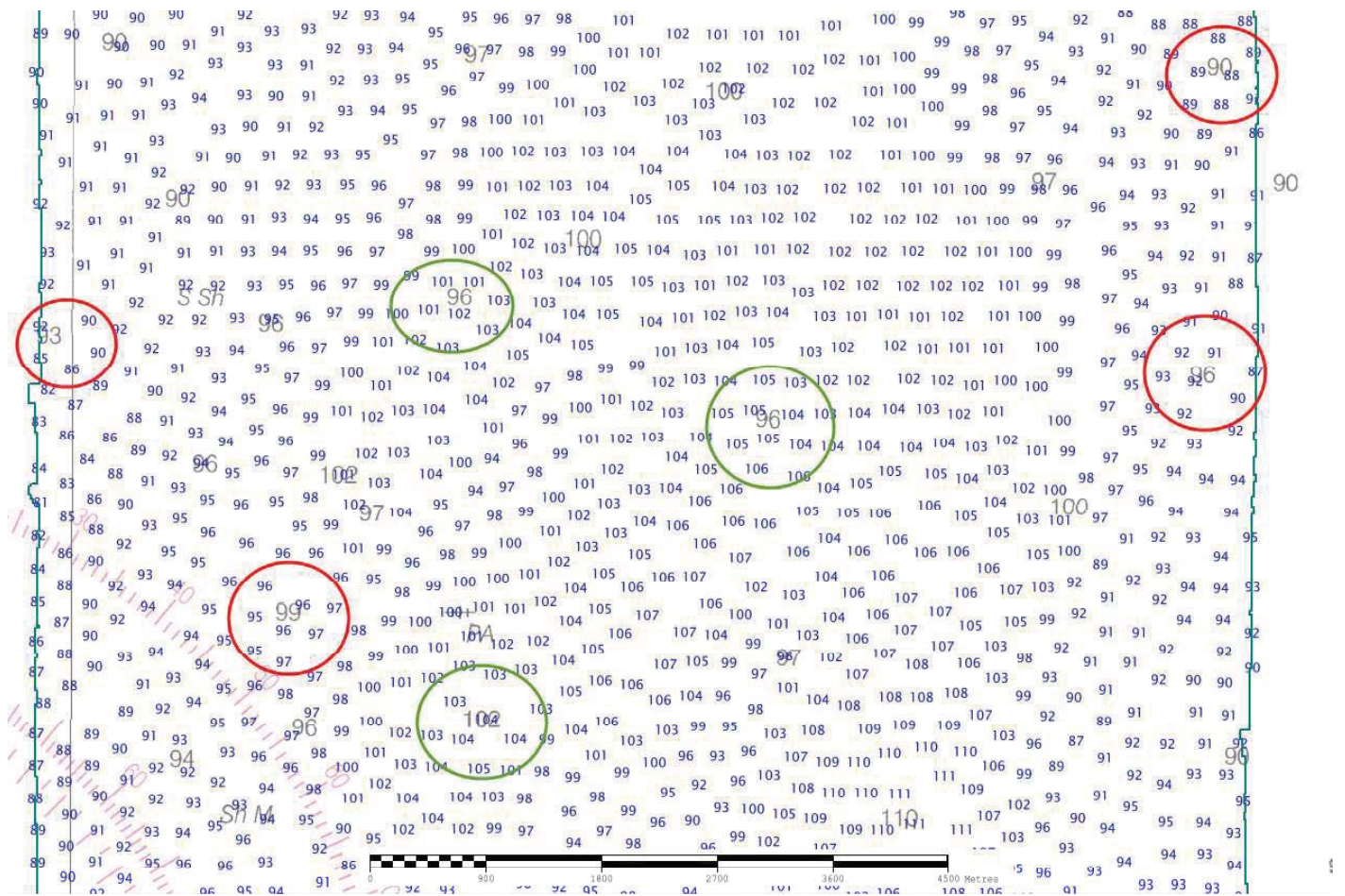


Figure 22: H12841 Central sounding disagreement with RNC 12204

12200

Surveyed soundings agree with charted soundings.

The charted wreck located in the southern portion of the sheet was not seen in the multibeam coverage or the surface. See the charted feature section of the descriptive report for discussion.

Towards the northern portion of the sheet large sand waves appear between charted soundings. This resulted in a large shoal area in between two correctly charted soundings; with the shoalest sounding being 10.5 fathoms between a 12 and 13 fathom sounding.

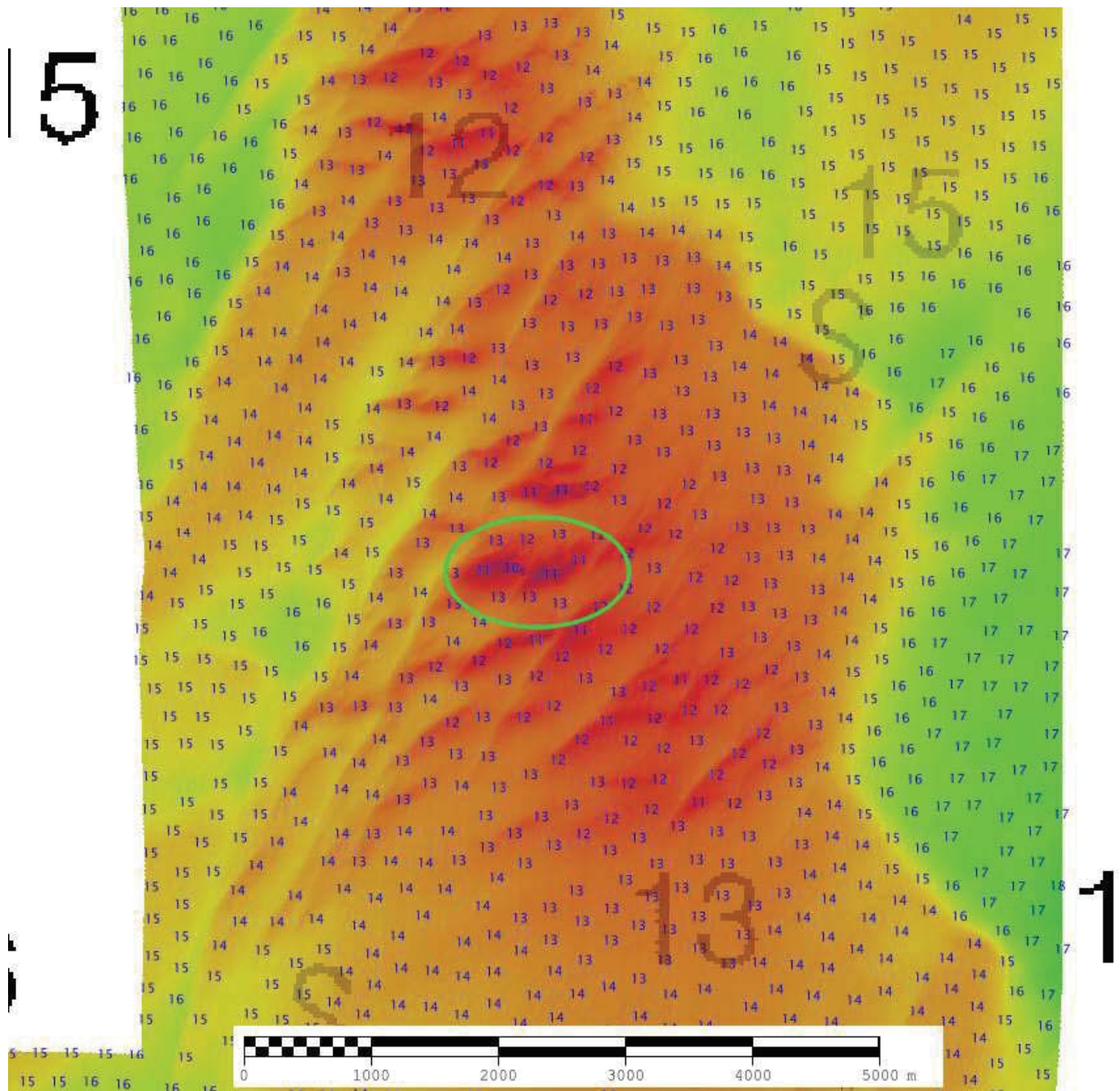


Figure 23: H12841 Sand wave shoal area

D.1.2 Electronic Navigational Charts

The following are the largest scale ENC's, which cover the survey area:

ENC	Scale	Edition	Update Application Date	Issue Date	Preliminary?
US4NC31M	1:80000	18	10/09/2014	06/03/2015	NO
US3DE01M	1:80000	15	05/06/2015	05/31/2015	NO

Table 18: Largest Scale ENC's

US4NC31M

ENC US4NC31M soundings correspond with RNC 12204 soundings. Refer to RNC 12204 for chart comparison.

US3DE01M

ENC US3DE01M soundings correspond with RNC 12200 soundings. Refer to RNC 12200 for chart comparison.

D.1.3 Maritime Boundary Points

No Maritime Boundary Points were assigned for this survey.

D.1.4 Charted Features

One charted wreck exists on both chart 12200 and 12204, but was not found during survey acquisition. The area was covered with 100% multibeam and did not appear in the surface or when examined in CARIS subset editor.

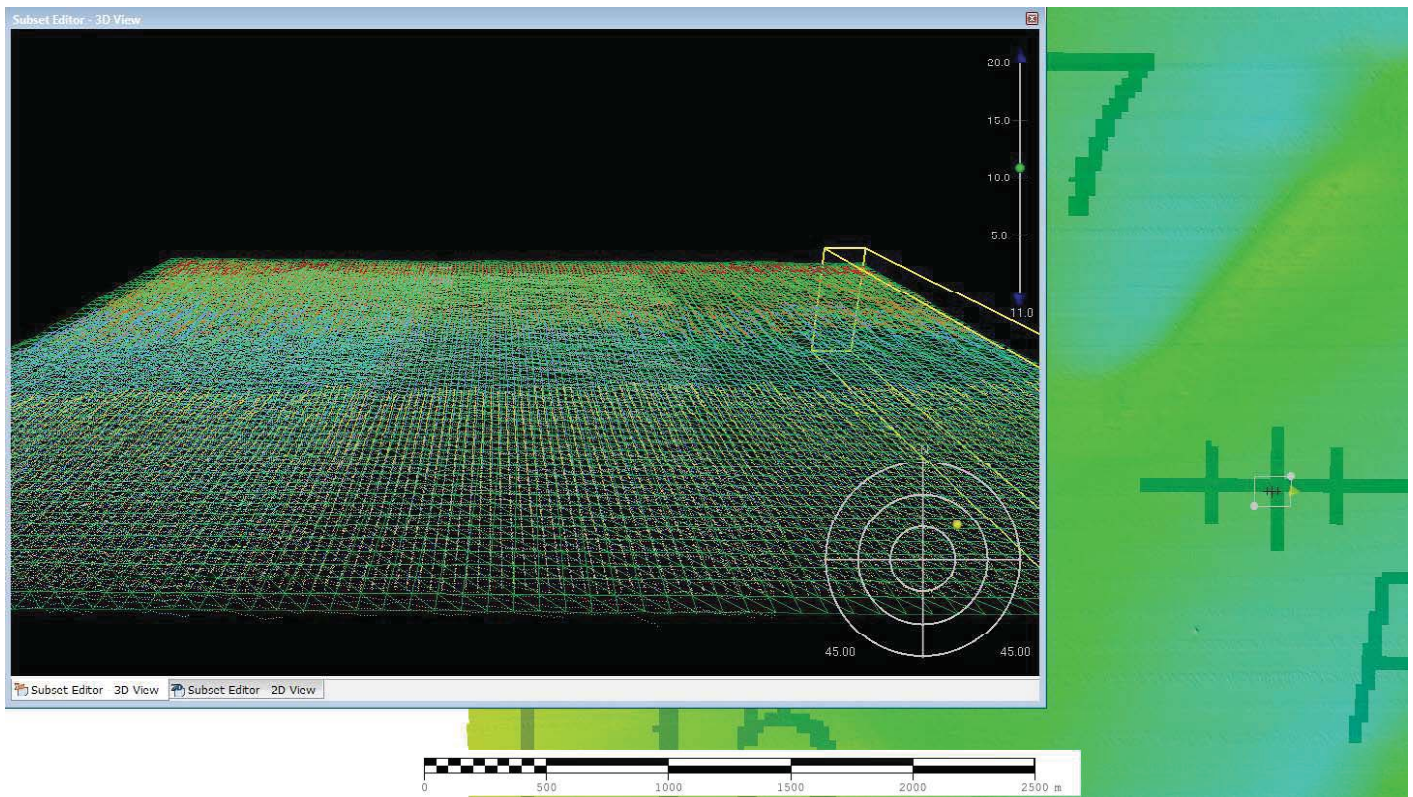


Figure 24: H12841 Wreck disproval

D.1.5 Uncharted Features

An uncharted underwater rock was found to the south of the southwest 15 fathom sounding on chart 12200. The rock protruded from the sea floor approximately 3.39 meters and was measured at approximately 6.3 meters across at its widest point. The hydrographer felt the sounding that was designated was the shoalest point on the rock, and the soundings above appear to be vegetation growth off the top of the rock.

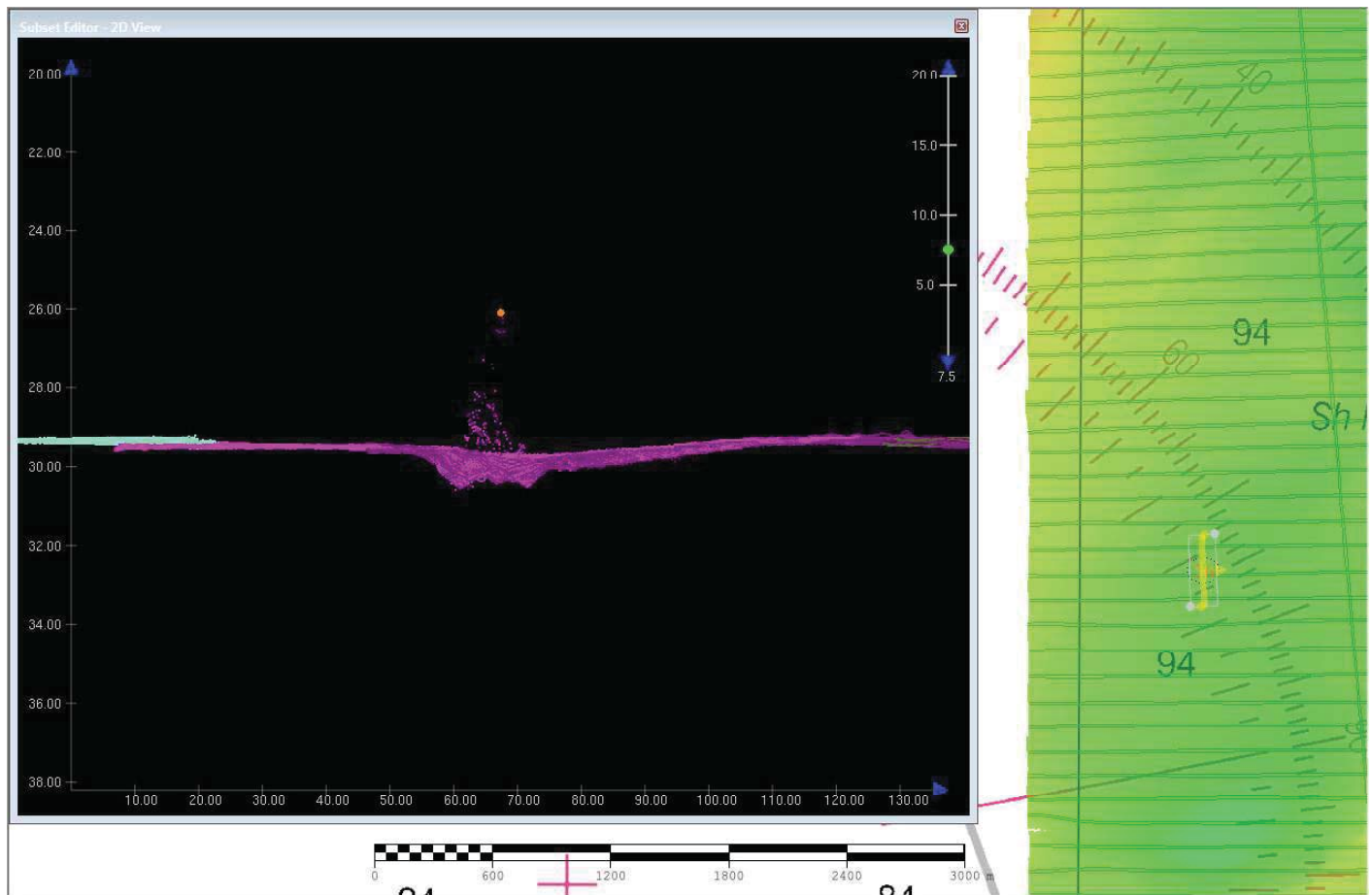


Figure 25: Uncharted rock

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

Six bottom samples, chosen from HSD Operations Branch's suggestions and acquired backscatter, were taken within the limits of H12841 and are submitted with the final feature file, as shown in Figure 24. Bottom samples consisted mainly of fine sand.

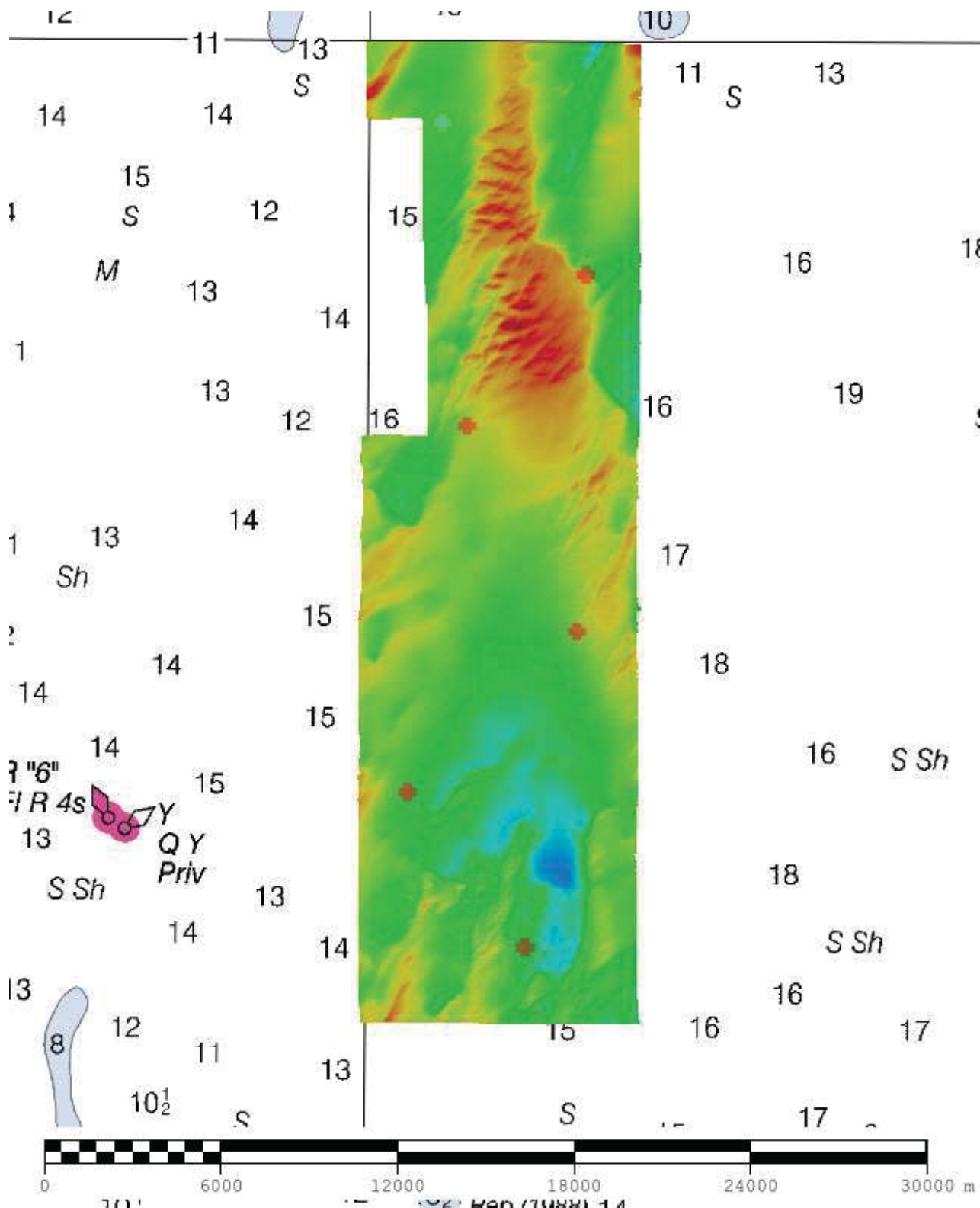


Figure 26: H12841 Bottom sample overview

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

No Significant Features exist for this survey.

D.2.9 Construction and Dredging

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

D.2.10 New Survey Recommendation

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

D.2.11 Inset Recommendation

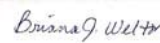


No new insets are recommended for this area.

E. Approval Sheet

Field operations for this hydrographic survey were conducted under the direct supervision of the then Chief of Party, Commander Marc S. Moser, with frequent personal checks of progress and adequacy. I have reviewed the attached survey data and reports.

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

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

Approver Name	Approver Title	Approval Date	Signature
LCDR Briana Welton, NOAA	Chief of Party	05/04/2016	 WELTON.BRIANA.JANE.126 7667531 2016.05.04 10:58:43 -04'00'
LT Nicholas Morgan, NOAA	Field Operations Officer	04/28/2016	 MORGAN.NICHOLAS.C.129 2288138 2016.04.28 13:57:11 -04'00'
HSST Patrick Berube	Senior Survey Technician	04/28/2016	

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 Station
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 States Coast Guard
UTM	Universal Transverse Mercator
XO	Executive Officer
ZDA	Global Positioning System timing message
ZDF	Zone Definition File

APPENDIX I
TIDES AND WATER LEVELS



UNITED STATES DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration
NOAA Ship FERDINAND R. HASSLER (MOA-FH)
29 Wentworth Road
New Castle, NH 03854

November 05, 2015

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

FROM: CDR Marc Moser, NOAA Ship FERDINAND R. HASSLER (MOA-FH)

SUBJECT: Request for Approved Tides/Water Levels

Please provide the following data:

1. Tide Note
2. Final zoning in MapInfo and .MIX format
3. Six Minute Water Level data (Co-ops web site)

Transmit data to the following:

Atlantic Hydrographic Branch (N/CS33)
439 West York St
Norfolk, VA 23510

NOAA Ship FERDINAND R. HASSLER (MOA-FH)
29 Wentworth Road
New Castle, NH 03854

These data are required for the processing of the following hydrographic survey:

Project No.: OPR-D304-FH-15
Registry No.: H12841
State: North Carolina
Locality: Approaches to Chesapeake Bay
Sublocality: 23 Miles East of Currituck Beach

Attachments containing:

- 1) an Abstract of Times of Hydrography,
- 2) digital MID MIF files of the track lines from Pydro

cc: N/CS33



Year_DOY	Min Time	Max Time
2015_251	00:27:04	23:55:44
2015_252	00:10:53	11:41:36
2015_253	12:28:51	23:58:39
2015_254	00:11:32	03:35:48
2015_259	00:08:31	13:28:54
2015_260	09:41:18	23:53:51
2015_261	09:44:39	23:41:09
2015_262	09:44:44	23:51:01
2015_289	20:57:55	23:59:58
2015_290	00:00:03	23:42:03
2015_291	00:15:05	03:57:42
2015_293	01:12:49	23:55:04
2015_294	00:15:38	23:55:06
2015_295	00:38:24	03:46:59
2015_297	16:38:00	21:13:19



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

TIDE NOTE FOR HYDROGRAPHIC SURVEY

DATE : November 17, 2015

HYDROGRAPHIC BRANCH: Atlantic
HYDROGRAPHIC PROJECT: OPR-D304-FH-2015
HYDROGRAPHIC SHEET: H12841

LOCALITY: 23 Miles East of Currituck Beach, NC
TIME PERIOD: September 08 - October 24, 2015

TIDE STATION USED: 8651370 Duck, NC
Lat. 36° 11.0'N Long. 75° 44.8' W

PLANE OF REFERENCE (MEAN LOWER LOW WATER): 0.000 meters
HEIGHT OF HIGH WATER ABOVE PLANE OF REFERENCE: 1.027 meters

REMARKS: RECOMMENDED ZONING

Preliminary zoning is accepted as the final zoning for project OPR-D304-FH-2015, H12841, during the time period between September 08 - October 24, 2015.

Please use the zoning file D304FH2015CORP submitted with the project instructions for D304-FH-2015. Zones SA46 and SA57 are the applicable zones for H12841.

Refer to attachments for zoning information.

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

HOVIS.GERALD.THOMAS.JR.1365860250

Digitally signed by
HOVIS.GERALD.THOMAS.JR.1365860250
DN: c=US, o=U.S. Government, ou=DoD,
ou=PKI, ou=OTHER,
cn=HOVIS.GERALD.THOMAS.JR.1365860250
Date: 2015.11.19 15:38:02 -05'00'

CHIEF, PRODUCTS AND SERVICES BRANCH



**Preliminary as Final Tidal Zoning for
OPR-D304-FH-2015, H12841
23 Miles East of Currituck Beach,
Approaches to Chesapeake Bay, NC**

SA46
Reference 8651370

SA57
Reference 8651370

8651370 Duck, NC

0 10
nautical miles

APPENDIX II

SUPPLEMENTAL SURVEY RECORDS AND CORRESPONDENCE



OPS.Ferdinand Hassler - NOAA Service Account <ops.ferdinand.hassler@noaa.gov>

Hydro Hot List request, OPR-D304-FH-15

1 message

OPS.Ferdinand Hassler - NOAA Service Account

<ops.ferdinand.hassler@noaa.gov>

Mon, Jul 27, 2015 at 7:39 AM

To: _NOS CO-OPS OET Team <nos.coops.oetteam@noaa.gov>

Bcc: Nicholas Morgan - NOAA Federal <nicholas.morgan@noaa.gov>

Good morning,

NOAA Ship *Ferdinand Hassler* is scheduled to begin survey operations on OPR-D304-FH-15 on July 29, 2015. Please add the following station to the Hydro Hot List for OPR-D304-FH-15:

8651370 - Duck, NC

Thank you,
LT Jon Andvick, NOAA

Field Operations Officer, NOAA Ship *Ferdinand R. Hassler*
29 Wentworth Road
New Castle, NH, 03854



OPS.Ferdinand Hassler - NOAA Service Account <ops.ferdinand.hassler@noaa.gov>

Final Tide Notes for OPR-D304-FH-2015, Registry Nos. H12839 & 12843

1 message

Hua Yang - NOAA Affiliate <hua.yang@noaa.gov>

Wed, Sep 16, 2015 at 8:49 AM

To: "CO.Ferdinand Hassler - NOAA Service Account" <co.ferdinand.hassler@noaa.gov>, "OPS.Ferdinand Hassler - NOAA Service Account" <ops.ferdinand.hassler@noaa.gov>

Cc: Corey Allen - NOAA Federal <Corey.allen@noaa.gov>, Michael Gonsalves - NOAA Federal <michael.gonsalves@noaa.gov>, Castle Parker - NOAA Federal <Castle.E.Parker@noaa.gov>, AHB Chief - NOAA Service Account <ahb.chief@noaa.gov>, "_NOS.CO-OPS.HPT" <nos.coops.hpt@noaa.gov>



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

DATE: 9/16/2015

MEMORANDUM FOR: CDR Marc Moser
Commanding Officer, Ferdinand HasslerFROM: Gerald Hovis
Chief, Products and Services Branch, N/OPS3

SUBJECT: Delivery of Tide Requirements for Hydrographic Surveys

This is notification that the preliminary zoning is accepted as the final zoning for survey project OPR-D304-FH-2015, Registry Nos. H12839 & 12843, during the time period between July 30 and September 03, 2015. The accepted reference station for Registry Nos. H12839 & 12843 is Duck, NC (8651370).

Included with this memo are Tide Note in .PDF format, stating the preliminary zoning has been accepted as the final zoning.

Thanks,


Hua Yang

Hydrographic Planning Team
NOAA/National Ocean Service
Center for Operational Oceanographic Products and Services
Station 7128
1305 East West Highway, SSMC4
Silver Spring, MD 20910
Office: 301-713-2890 x210
Email: Hua.Yang@noaa.gov
Web: <http://tidesandcurrents.noaa.gov/>

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

2 attachments

 **H12843.pdf**
597K

 **H12839.pdf**
605K



Patrick Berube - NOAA Federal <patrick.j.berube@noaa.gov>

Bottom Samples (Starla is away substitution)

7 messages

Patrick Berube - NOAA Federal <patrick.j.berube@noaa.gov>

Thu, Sep 17, 2015 at 9:03 AM

To: Megan Greenaway - NOAA Federal <megan.greenaway@noaa.gov>, "OPS.Ferdinand Hassler - NOAA Service Account" <ops.ferdinand.hassler@noaa.gov>

Good Morning

I have been checking out the proposed bottom samples for sheet H12841 and noticed that there are 12 of them again. I was wondering if it would be possible for us to decrease the amount of bottom samples required if we can provide evidence through the backscatter mosaic that the sea floor looks rather homogeneous. We processed the backscatter before we did bottom samples for the last sheet and it appeared to have moderately uniform coloring and what appeared to be sand waves. We performed 10 out of the 11 bottom samples and they all came up as fine sand with broken shells except one sample.

Thanks,

Patrick Berube

—
NOAA Ship Ferdinand Hassler

Megan Greenaway - NOAA Federal <megan.greenaway@noaa.gov>

Thu, Sep 17, 2015 at 11:34 AM

To: Patrick Berube - NOAA Federal <patrick.j.berube@noaa.gov>

Cc: "OPS.Ferdinand Hassler - NOAA Service Account" <ops.ferdinand.hassler@noaa.gov>

Patrick,

I talked to Corey and the waiver that you received for your prior survey is applicable to the entire project area. The waiver states that the FH must attest that the variability in the backscatter mosaic has been sufficiently sampled.

Let me know if this is not clear or if you have further questions. Also, please put a copy of this email (or Starla's previous email regarding the BS waiver) into the Correspondence folder so the waiver is clear to the processing branch when they review the survey.

Megan

[Quoted text hidden]

Patrick Berube - NOAA Federal <patrick.j.berube@noaa.gov>

Thu, Sep 17, 2015 at 11:36 AM

To: Megan Greenaway - NOAA Federal <megan.greenaway@noaa.gov>, "OPS.Ferdinand Hassler - NOAA Service Account" <ops.ferdinand.hassler@noaa.gov>

Megan,

I think I need a little clarification. Was the waiver addressing the location of the bottom samples only or did it cover the amount of bottom samples as well?

Thanks,

Pat

[Quoted text hidden]

Megan Greenaway - NOAA Federal <megan.greenaway@noaa.gov>

Thu, Sep 17, 2015 at 11:40 AM

To: Patrick Berube - NOAA Federal <patrick.j.berube@noaa.gov>
Cc: "OPS.Ferdinand Hassler - NOAA Service Account" <ops.ferdinand.hassler@noaa.gov>

Pat,
The waiver covers both the location and the amount of bottom samples.
Megan
[Quoted text hidden]

Patrick Berube - NOAA Federal <patrick.j.berube@noaa.gov> Thu, Sep 17, 2015 at 11:48 AM
To: Megan Greenaway - NOAA Federal <megan.greenaway@noaa.gov>, "OPS.Ferdinand Hassler - NOAA Service Account" <ops.ferdinand.hassler@noaa.gov>

Megan,

Would it be possible to have the waiver resent to use or would this correspondence be enough to suffice the documentation.

Thanks,

Pat
[Quoted text hidden]

Megan Greenaway - NOAA Federal <megan.greenaway@noaa.gov> Thu, Sep 17, 2015 at 12:00 PM
To: Patrick Berube - NOAA Federal <patrick.j.berube@noaa.gov>
Cc: "OPS.Ferdinand Hassler - NOAA Service Account" <ops.ferdinand.hassler@noaa.gov>

Pat,
This correspondence will suffice.
Megan
[Quoted text hidden]

Patrick Berube - NOAA Federal <patrick.j.berube@noaa.gov> Thu, Sep 17, 2015 at 12:05 PM
To: Megan Greenaway - NOAA Federal <megan.greenaway@noaa.gov>

Excellent thank you for your help
[Quoted text hidden]

ERS Checkline Analysis and VDatum ERZT comparison

OPR-D304-FH-15 Approaches to Chesapeake Bay

NOAA Ship *Ferdinand R. Hassler*

ERS checklines were run spanning the total project area of OPR-D304-FH-15. Bathymetry was collected, SBETs applied, and an ERZT separation model was created and a difference surface was created using the datum height of the separation model and Vdatum model. A preliminary .tid file was used with the project .zdf file.

SBETs were colored by RMS position error (both vertical and horizontal) and the highest RMS value was less than or equal to 0.07 m. This maximum uncertainty value was seen on the checkline that was run furthest away from the base station assigned for the project (DUCK). All of the other SBETs that were processed have yielded a position RMS value of less than or equal to 0.05 m. This is lower than our zoned tide uncertainty value of 0.16 m, suggesting it would be beneficial to use SBETs in processing. The ERZT Vdatum difference surface was exported to ASCII and the statistics utility was used giving a mean of -0.03 m and a deviation of 0.09 m.

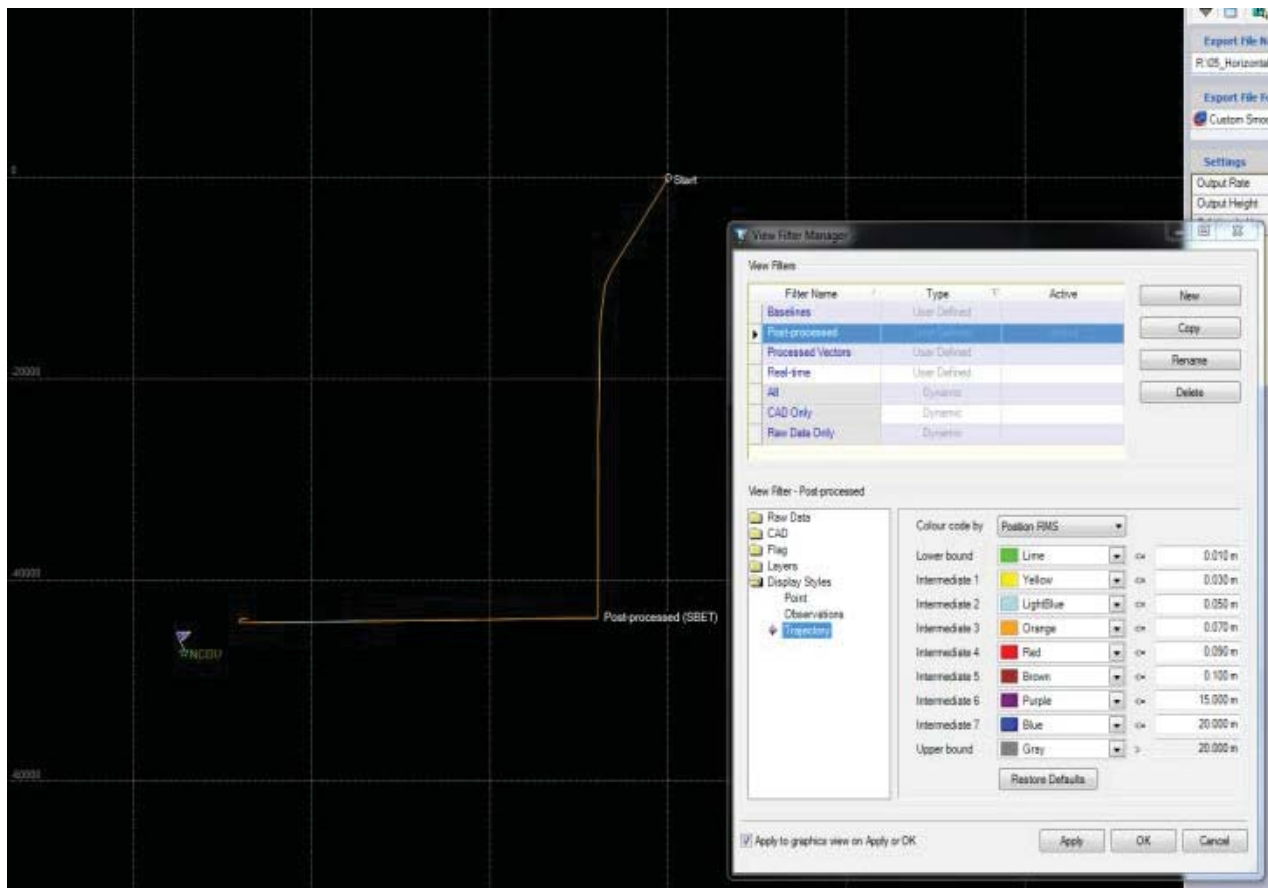


Figure 1: Day 210 Port SONAR SBET position RMS

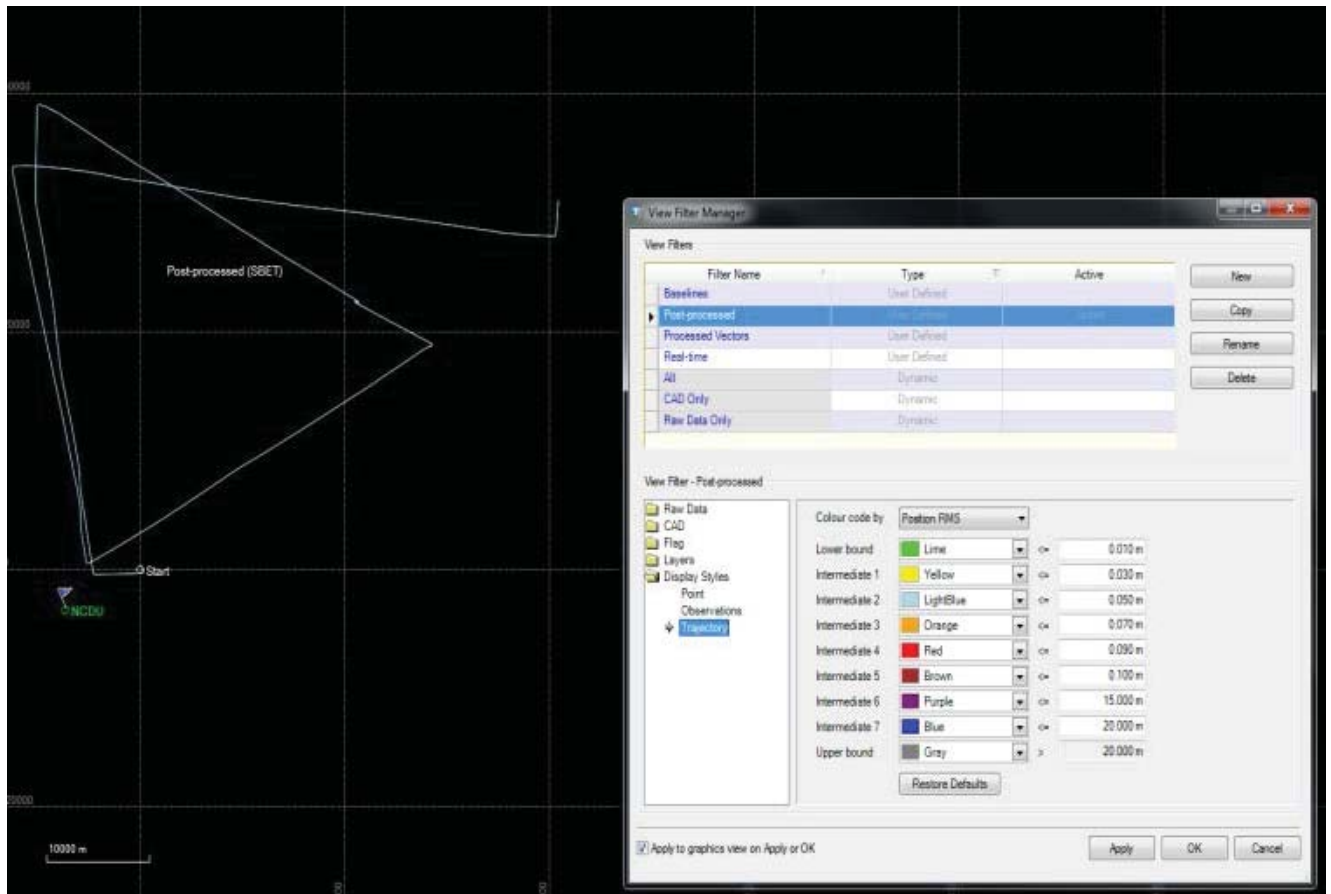


Figure 2: Day 210 Port SONAR position RMS Continued

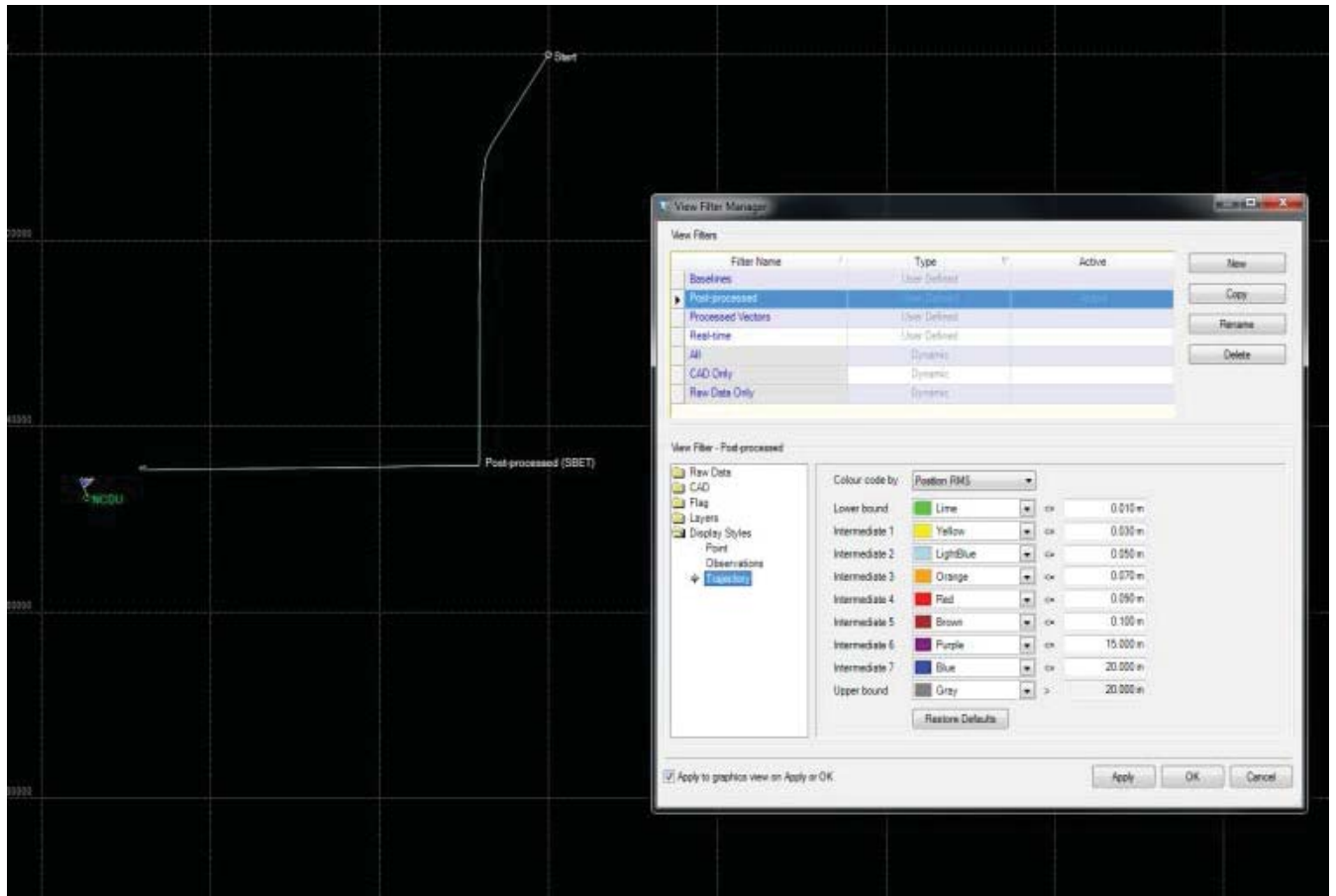


Figure 3: Day 20 Starboard SONAR SBET positon RMS

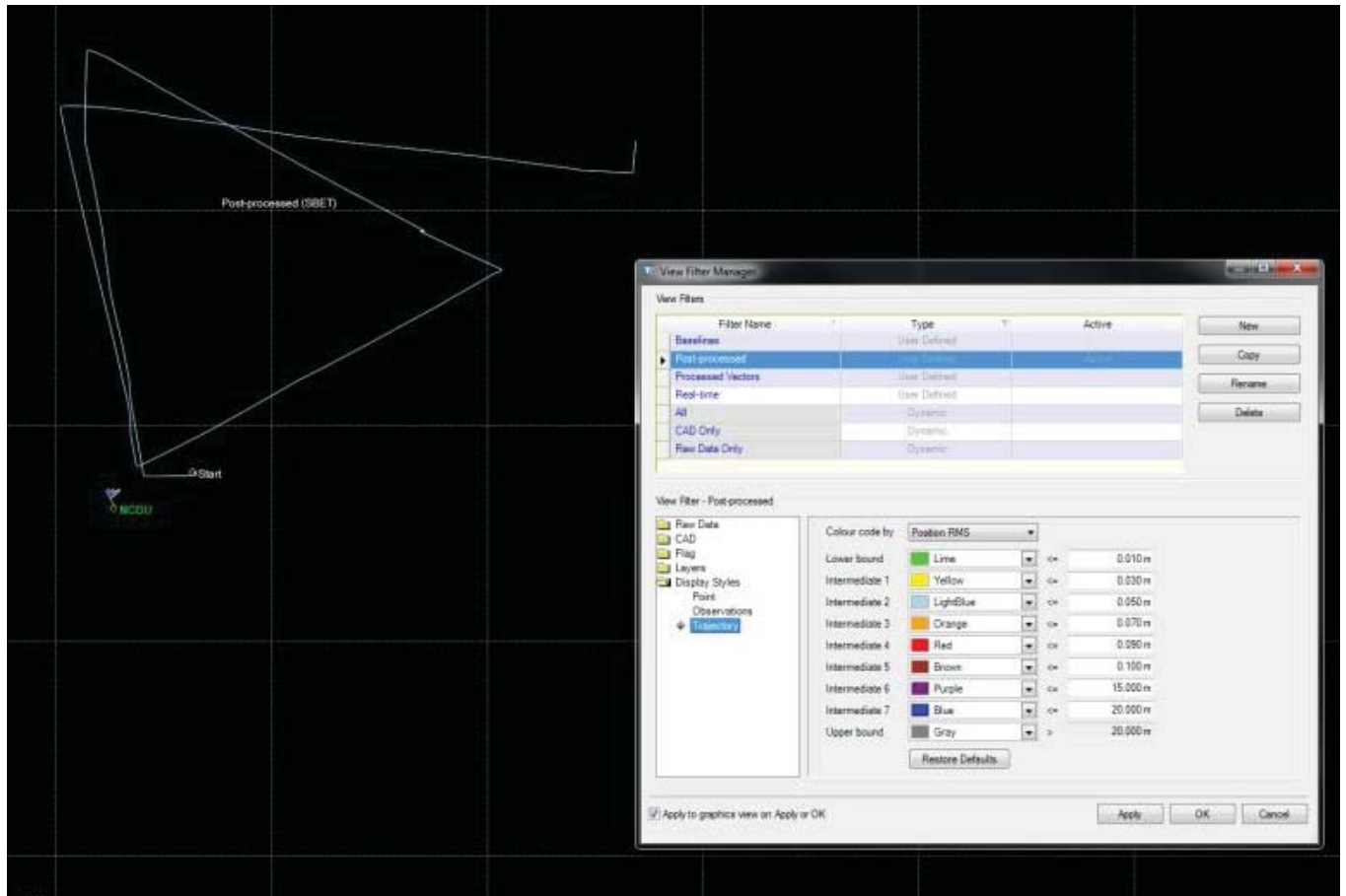


Figure 4: Day 210 Starboard SONAR SBET position RMS continued

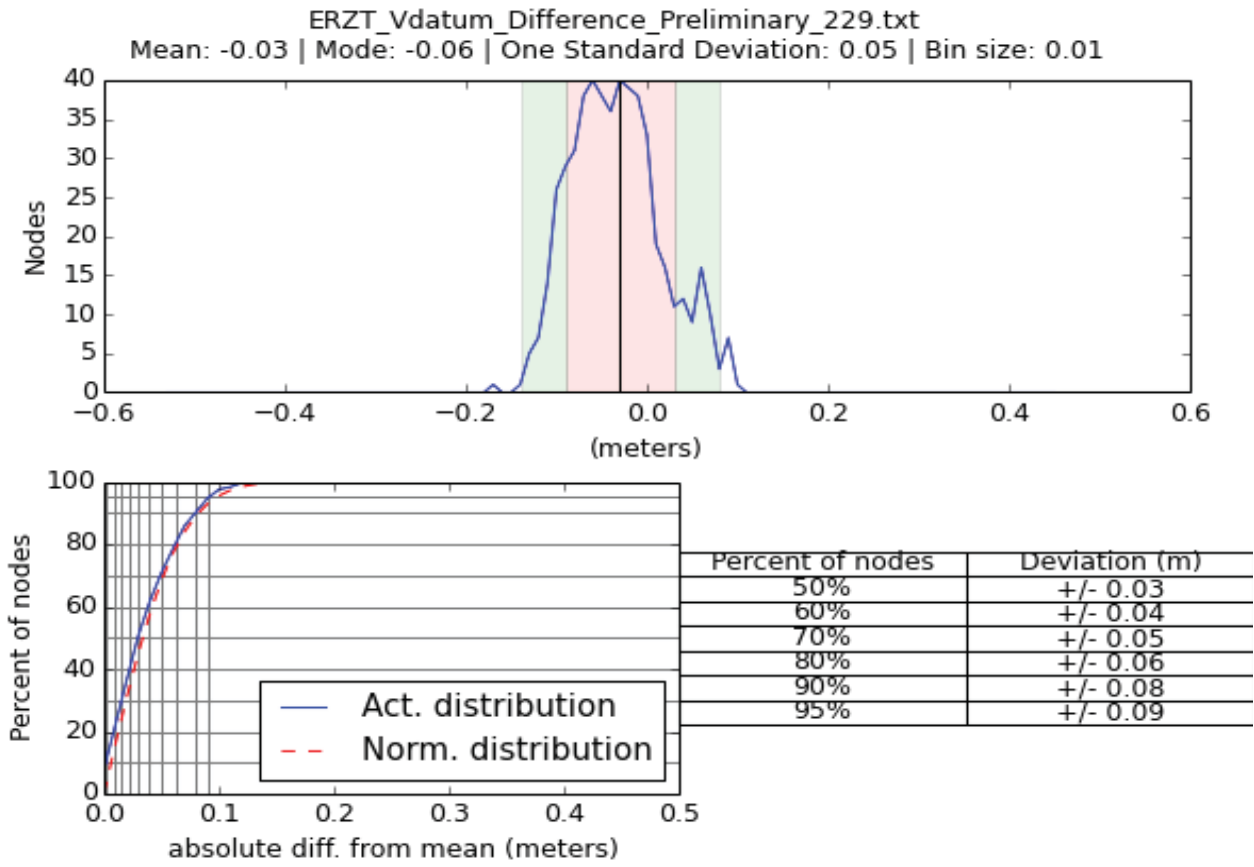


Figure 5: ERZT Vdatum difference surface statistics



OPS.Ferdinand Hassler - NOAA Service Account <ops.ferdinand.hassler@noaa.gov>

OPR-D304-FH-15 ERS Checkline Analysis and VDatum ERZT comparison

3 messages

OPS.Ferdinand Hassler - NOAA Service Account

Wed, Aug 26, 2015 at 4:44 PM

<ops.ferdinand.hassler@noaa.gov>

To: Kathryn Pridgen - NOAA Federal <kathryn.pridgen@noaa.gov>, Katrina Wyllie - NOAA Federal <katrina.wyllie@noaa.gov>, Megan Greenaway - NOAA Federal <megan.greenaway@noaa.gov>

Cc: Corey Allen - NOAA Federal <Corey.Allen@noaa.gov>

Hi All,

Please find the ERS Checkline Analysis and VDatum ERZT comparison report attached to this email for your review. The ERS Check Line and Deliverables SOP was followed to create this report. Please advise if there are any questions or comments. Thanks.

V/r,
Jon

Field Operations Officer, NOAA Ship *Ferdinand R. Hassler*
29 Wentworth Road
New Castle, NH, 03854



OPR-D304-FH-15 ERS Checkline Analysis and VDatum ERZT comparison.pdf

267K

Megan Greenaway - NOAA Federal <megan.greenaway@noaa.gov>

Fri, Aug 28, 2015 at 11:20 AM

To: "OPS.Ferdinand Hassler - NOAA Service Account" <ops.ferdinand.hassler@noaa.gov>

Cc: Kathryn Pridgen - NOAA Federal <kathryn.pridgen@noaa.gov>, Katrina Wyllie - NOAA Federal <katrina.wyllie@noaa.gov>, Corey Allen - NOAA Federal <Corey.Allen@noaa.gov>, Michael Gonsalves - NOAA Federal <Michael.Gonsalves@noaa.gov>

Received. Thank you for the report.

Based on this report, it is OPS assumption that the FH is recommending this project be submitted with chart datum derived from the ellipsoid by using the OPS-provided VDATUM separation model and PPK CORS single base post processed navigation.

Please confirm.

Your report looks good. For future projects please include a statement as the one above, "The FH is recommends this project be submitted with chart datum derived from the ellipsoid by using the OPS-provided VDATUM separation model and PPK CORS single base post processed navigation."

Thanks,
Megan

On Wed, Aug 26, 2015 at 4:44 PM, OPS.Ferdinand Hassler - NOAA Service Account

<ops.ferdinand.hassler@noaa.gov> wrote:

Hi All,

Please find the ERS Checkline Analysis and VDatum ERZT comparison report attached to this email for your review. The ERS Check Line and Deliverables SOP was followed to create this report. Please advise if there are any questions or comments. Thanks.

V/r,
Jon

Field Operations Officer, NOAA Ship *Ferdinand R. Hassler*
29 Wentworth Road
New Castle, NH, 03854

OPS.Ferdinand Hassler - NOAA Service Account

Sat, Oct 17, 2015 at 5:46 AM

<ops.ferdinand.hassler@noaa.gov>

To: Megan Greenaway - NOAA Federal <megan.greenaway@noaa.gov>

Cc: Kathryn Pridgen - NOAA Federal <kathryn.pridgen@noaa.gov>, Katrina Wyllie - NOAA Federal <katrina.wyllie@noaa.gov>, Corey Allen - NOAA Federal <Corey.Allen@noaa.gov>, Michael Gonsalves - NOAA Federal <Michael.Gonsalves@noaa.gov>

Yes, FH recommends this project be submitted with chart datum derived from the ellipsoid by using the OPS-provided VDATUM separation model and PPK CORS single base post processed navigation. Thanks.

V/r,
Jon

Field Operations Officer, NOAA Ship *Ferdinand R. Hassler*
29 Wentworth Road
New Castle, NH, 03854

On Fri, Aug 28, 2015 at 11:20 AM, Megan Greenaway - NOAA Federal <megan.greenaway@noaa.gov> wrote:
Received. Thank you for the report.

Based on this report, it is OPS assumption that the FH is recommending this project be submitted with chart datum derived from the ellipsoid by using the OPS-provided VDATUM separation model and PPK CORS single base post processed navigation.

Please confirm.

Your report looks good. For future projects please include a statement as the one above, "The FH is recommends this project be submitted with chart datum derived from the ellipsoid by using the OPS-provided VDATUM separation model and PPK CORS single base post processed navigation."

Thanks,
Megan

On Wed, Aug 26, 2015 at 4:44 PM, OPS.Ferdinand Hassler - NOAA Service Account <ops.ferdinand.hassler@noaa.gov> wrote:

Hi All,

Please find the ERS Checkline Analysis and VDatum ERZT comparison report attached to this email for your review. The ERS Check Line and Deliverables SOP was followed to create this report. Please advise if there are any questions or comments. Thanks.

V/r,
Jon

Field Operations Officer, NOAA Ship *Ferdinand R. Hassler*
29 Wentworth Road
New Castle, NH, 03854



OPS.Ferdinand Hassler - NOAA Service Account <ops.ferdinand.hassler@noaa.gov>

Re: REQUESTING PERMISSION Fwd: OPR-D304-FH-15 Sheet H12841 Bottom Samples

2 messages

Michael Gonsalves - NOAA Federal <michael.gonsalves@noaa.gov> Mon, Oct 19, 2015 at 11:48 AM
To: "OPS.Ferdinand Hassler - NOAA Service Account" <OPS.Ferdinand.Hassler@noaa.gov>
Cc: Corey Allen - NOAA Federal <corey.allen@noaa.gov>, Starla Robinson - NOAA Federal <starla.robinson@noaa.gov>

Hey Jon,

Starla had to step out of the office, so I'm replying in her stead. After discussion, we provisionally agree with your proposal. We in HSD have always approved of the FH's method of using the backscatter mosaic to determine the density and distribution of bottom samples. If, in developing a mosaic of the unsurveyed areas, you find the bottom characteristics to be similarly uniform, then please proceed with the reduced bottom samples. If you later discover the seafloor is less homogeneous than previously anticipated, then please adjust your sampling as appropriate.

You may include this message in your project correspondence folder.

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

On Mon, Oct 19, 2015 at 9:45 AM, Starla Robinson - NOAA Federal <starla.robinson@noaa.gov> wrote:

----- Forwarded message -----

From: **OPS.Ferdinand Hassler - NOAA Service Account** <ops.ferdinand.hassler@noaa.gov>
Date: Sun, Oct 18, 2015 at 9:06 PM
Subject: OPR-D304-FH-15 Sheet H12841 Bottom Samples
To: Starla Robinson - NOAA Federal <Starla.Robinson@noaa.gov>
Cc: Megan Greenaway - NOAA Federal <megan.greenaway@noaa.gov>

Hi Starla,

As *Hassler* enters the final week of acquisition on D304, I would like to propose a reduction to the bottom samples requested for H12841 from twelve to six. The green circles in the attached jpg are my proposed new bottom sample locations within H12841. All but one utilize originally requested locations.

The backscatter imagery from H12841 (only partial coverage through yesterday) indicates a fairly consistent sea floor. Bottom samples from adjacent sheets H12840 and H12839 resulted in the same fine sand and broken shell consistency across the board.

Please let me know by 0700 EDT Wednesday if HSD Ops agrees to this proposal or not since that is when the ship plans to commence bottom sample acquisition. Thank you.

V/r,
Jon

Field Operations Officer, NOAA Ship *Ferdinand R. Hassler*
29 Wentworth Road
New Castle, NH, 03854

--

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

OPS.Ferdinand Hassler - NOAA Service Account

Mon, Oct 19, 2015 at 4:34 PM

<ops.ferdinand.hassler@noaa.gov>

To: Michael Gonsalves - NOAA Federal <michael.gonsalves@noaa.gov>

Cc: Corey Allen - NOAA Federal <corey.allen@noaa.gov>, Starla Robinson - NOAA Federal <starla.robinson@noaa.gov>

Thank you Mike. Understood on the conditions.

V/r,
Jon

Field Operations Officer, NOAA Ship *Ferdinand R. Hassler*
29 Wentworth Road
New Castle, NH, 03854

[Quoted text hidden]



OPS.Ferdinand Hassler - NOAA Service Account <ops.ferdinand.hassler@noaa.gov>

Hydro Hot List removal request, OPR-D304-FH-15

2 messages

OPS.Ferdinand Hassler - NOAA Service Account

Tue, Oct 27, 2015 at 9:24 AM

<ops.ferdinand.hassler@noaa.gov>

To: "_NOS CO-OPS OET Team" <nos.coops.oetteam@noaa.gov>, "_NOS.CO-OPS.HPT" <NOS.COOPS.HPT@noaa.gov>

Bcc: Nicholas Morgan - NOAA Federal <nicholas.morgan@noaa.gov>

Good morning,

NOAA Ship *Ferdinand Hassler* has completed project OPR-D304-FH-15 on October 24, 2015. Please remove the following station from the Hydro Hot List for project OPR-D304-FH-15:

8651370 - Duck, NC

Thank you,
LT Jon Andvick, NOAA

Field Operations Officer, NOAA Ship *Ferdinand R. Hassler*
29 Wentworth Road
New Castle, NH, 03854

Hua Yang - NOAA Affiliate <hua.yang@noaa.gov>

Tue, Oct 27, 2015 at 9:38 AM

To: "OPS.Ferdinand Hassler - NOAA Service Account" <ops.ferdinand.hassler@noaa.gov>

Cc: "_NOS CO-OPS OET Team" <nos.coops.oetteam@noaa.gov>, "_NOS.CO-OPS.HPT" <NOS.COOPS.HPT@noaa.gov>, Gerald Hovis - NOAA Federal <gerald.hovis@noaa.gov>

Good morning LTJon Andvick,

Thank you very much for your timely notice. The station will be marked "Completed" soon and be deleted from the Hydro Hot List for the project in a week.

Best regards,

Hua Yang

Hydrographic Planning Team
NOAA/National Ocean Service
Center for Operational Oceanographic Products and Services
Station 7128
1305 East West Highway, SSMC4
Silver Spring, MD 20910
Office: 301-713-2890 x210
Email: Hua.Yang@noaa.gov
Web: <http://tidesandcurrents.noaa.gov/>

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

[Quoted text hidden]



OPS.Ferdinand Hassler - NOAA Service Account <ops.ferdinand.hassler@noaa.gov>

Weekly Hydro Ship Activity Report - Ferdinand Hassler

3 messages

OPS.Ferdinand Hassler - NOAA Service Account

Tue, Oct 27, 2015 at 9:18 AM

<ops.ferdinand.hassler@noaa.gov>

To: progress.sketches@noaa.gov

Cc: "CO.Ferdinand Hassler - NOAA Service Account" <co.ferdinand.hassler@noaa.gov>, AHB Chief - NOAA Service Account <ahb.chief@noaa.gov>, Corey Allen - NOAA Federal <Corey.Allen@noaa.gov>, Samuel Greenaway - NOAA Federal <samuel.greenaway@noaa.gov>, Eric Younkin - NOAA Federal <eric.g.younkin@noaa.gov>, Katrina Wyllie - NOAA Federal <katrina.wyllie@noaa.gov>, Kathryn Pridgen - NOAA Federal <kathryn.pridgen@noaa.gov>, Megan Greenaway - NOAA Federal <megan.greenaway@noaa.gov>, Starla Robinson - NOAA Federal <Starla.Robinson@noaa.gov>, Erin Weller - NOAA Federal <erin.weller@noaa.gov>, Meghan McGovern - NOAA Federal <meghan.mcgovern@noaa.gov>

RECAP: Oct 18 - 24

Building sea states overnight Saturday forced a pause in survey operations and the ship anchored in Hampton Roads on Sunday. The ship resumed mainscheme MBES coverage on sheet H12841 Monday evening. Bottom sample acquisition, remaining crosslines and holiday coverage for H12841 occurred Wednesday. The ship returned to MOC-A in Norfolk Thursday morning for fueling and crew transfer, departing again Friday afternoon to wait for weather at Hampton Roads anchorage. FH resumed mainscheme MBES coverage on sheet H12841 Saturday around noon, but engine fuel system problems Saturday evening forced the ship to secure the port main engine and transit to Lynnhaven Roads anchorage for repairs. With that, survey operations for project OPR-D304-FH-15 were finished.

PLAN: Oct 25 - 31

FH moved anchorages from Lynnhaven Roads to Hampton Roads on Sunday for better protection from weather. Engine repairs are in progress, and expected to be completed Tuesday. The ship plans to return to MOC-A in Norfolk after the engine repairs are completed. FH will remain alongside MOC-A until Friday, when the weather is forecast to be favorable to begin the transit to New Castle, NH.

V/r

LT Jon Andvick, NOAA

Field Operations Officer, NOAA Ship *Ferdinand R. Hassler*
29 Wentworth Road
New Castle, NH, 03854



FH_Weekly_Update_10_24_2015.pdf

222K

OPS.Ferdinand Hassler - NOAA Service Account

Wed, Oct 28, 2015 at 12:24 PM

<ops.ferdinand.hassler@noaa.gov>

To: Erin Weller - NOAA Federal <erin.weller@noaa.gov>

Hi Erin,

As the Mid-Atlantic Nav Manager, please note that NOAA Ship *Ferdinand Hassler* is now finished with survey operations for OPR-D304-FH-15, Approaches to Chesapeake Bay. Please let me know if you have any questions. Thanks.

V/r,

Jon

Field Operations Officer, NOAA Ship *Ferdinand R. Hassler*
29 Wentworth Road
New Castle, NH, 03854

[Quoted text hidden]

Erin Weller - NOAA Federal <erin.weller@noaa.gov>

Thu, Oct 29, 2015 at 8:42 AM

To: "OPS.Ferdinand Hassler - NOAA Service Account" <ops.ferdinand.hassler@noaa.gov>

Thank you

Erin C. Weller
Physical Scientist
NOAA's National Ocean Service
Office of Coast Survey, Hydrographic Survey Division
Atlantic Hydrographic Branch
[757.441.6746 ext. 101](tel:757.441.6746)

[Quoted text hidden]



Final Tide Notes for OPR-D304-FH-2015, Registry Nos. H12840, H12841, and H12843 (Revised)

1 message

Hua Yang - NOAA Affiliate <hua.yang@noaa.gov> Fri, Nov 20, 2015 at 8:52 AM
To: "CO.Ferdinand Hassler - NOAA Service Account" <co.ferdinand.hassler@noaa.gov>, "OPS.Ferdinand Hassler - NOAA Service Account" <ops.ferdinand.hassler@noaa.gov>
Cc: Corey Allen - NOAA Federal <Corey.allen@noaa.gov>, Michael Gonsalves - NOAA Federal <michael.gonsalves@noaa.gov>, Castle Parker - NOAA Federal <Castle.E.Parker@noaa.gov>, AHB Chief - NOAA Service Account <ahb.chief@noaa.gov>, Gerald Hovis - NOAA Federal <gerald.hovis@noaa.gov>, "_NOS.CO-OPS.HPT" <nos.coops.hpt@noaa.gov>

DATE: 11/20/2015

MEMORANDUM FOR: LCDR Briana Welton
Commanding Officer, Ferdinand Hassler

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

SUBJECT: Delivery of Tide Requirements for Hydrographic Surveys

This is notification that the preliminary zoning is accepted as the final zoning for survey project OPR-D304-FH-2015, Registry Nos. H12840, H12841, and H12843 (Revised), during the time period between August 05 and October 24, 2015. The accepted reference station for Registry Nos. H12840, H12841, and H12843 (Revised) is Duck, NC (8651370).

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


Thanks,

Hua Yang

Hydrographic Planning Team
NOAA/National Ocean Service
Center for Operational Oceanographic Products and Services
Station 7128
1305 East West Highway, SSMC4
Silver Spring, MD 20910
Office: 301-713-2890 x210
Email: Hua.Yang@noaa.gov
Web: <http://tidesandcurrents.noaa.gov/>

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

3 attachments

 **H12843Rev.pdf**
598K

H12841.pdf

 604K

 **H12840.pdf**
604K



OPS.Ferdinand Hassler - NOAA Service Account <ops.ferdinand.hassler@noaa.gov>

NOAA Ship Hassler SV Correct

9 messages

Richard Brennan - NOAA Federal <richard.t.brennan@noaa.gov>

Wed, Feb 15, 2017 at 10:11 AM

To: Briana Welton <Briana.Welton@noaa.gov>, Benjamin K Evans <benjamin.k.evans@noaa.gov>, CO HASSLER <CO.Ferdinand.Hassler@noaa.gov>, "OPS. Ferdinand Hassler" <OPS.Ferdinand.Hassler@noaa.gov>, Russell Quintero - NOAA Federal <Russell.Quintero@noaa.gov>, Samuel Greenaway - NOAA Service Account <Samuel.Greenaway@noaa.gov>, Lorraine Robidoux - NOAA Federal <lorraine.robidoux@noaa.gov>

LCDR Jaskoski,

I have reviewed the technical details associated with the situation surrounding the Hassler surveys that are currently in question. As currently understood, there are approximately 16 surveys between AHB and Hassler. The issue, as I understand it in general terms, is that the data in question was not SVP corrected after SBET computation and application to the data. Based on my technical review I would like the current remediation:

1. Pick one survey to serve as a representative example of this set. Save the current BASE surface with the SVP applied *before* SBET application as `_OLD`. Then, re-apply SVP and recompute a *new* grid. Do a difference surface and compute the min, max, average, and standard deviation for this difference surface.

Based on my review the SBET process does no change the roll, pitch, or yaw nor the location of the transducer in the water column - or at least not in a meaningful way. This representative data set should confirm that.

2. Please report the finding of this analysis. Assuming it is exceedingly small, I think the next steps are:

- Create a revised DAPR that can be used for all surveys that describes the problem and the analysis. I expect that you will work with AHB to arrange this documentation is properly included with all surveys.
- I will provide a waiver in light of this analysis that authorizes the data to proceed using the current process.
- Include both the waiver and this email in the separates for all theses surveys to document the action taken.
- Ensure Hassler SOPs are updated to ensure this process is corrected.

3. If the analysis shows anything more than a 5cm difference, please advise me. We will discuss how to proceed from there.

It is my expectation that we will manage similar problems encountered with other field units or our contractors in a similar and consistent fashion. If there are any questions, concerns, or details I have not addressed I expect you or LCDR Welton will contact me with that information.

Rick

CAPT Rick Brennan, NOAA

Chief, Hydrographic Surveys Division

1315 East-West Highway, SSMC3 Room 6823

Silver Spring, MD 20910

Work: [301-713-2700](tel:301-713-2700)

Cell: [443-994-3301](tel:443-994-3301)

OPS.Ferdinand Hassler - NOAA Service Account <ops.ferdinand.hassler@noaa.gov>

Wed, Feb 15, 2017 at 10:36 AM

To: James J Miller <james.j.miller@noaa.gov>, Patrick Debrousse - NOAA Federal <patrick.j.debrousse@noaa.gov>, Jonathan French - NOAA Federal <jonathan.r.french@noaa.gov>

Field Operations Officer, NOAA Ship *Ferdinand R. Hassler*
29 Wentworth Road
New Castle, NH, 03854

[Quoted text hidden]

CO.Ferdinand Hassler - NOAA Service Account <co.ferdinand.hassler@noaa.gov> Wed, Feb 15, 2017 at 10:53 AM
To: Richard Brennan - NOAA Federal <richard.t.brennan@noaa.gov>
Cc: Briana Welton <Briana.Welton@noaa.gov>, Benjamin K Evans <benjamin.k.evans@noaa.gov>, "OPS. Ferdinand Hassler" <OPS.Ferdinand.Hassler@noaa.gov>, Russell Quintero - NOAA Federal <Russell.Quintero@noaa.gov>, Samuel Greenaway - NOAA Service Account <Samuel.Greenaway@noaa.gov>, Lorraine Robidoux - NOAA Federal <lorraine.robidoux@noaa.gov>

CAPT,
Will do.

v/r
Matt

Lieutenant Commander Matthew Jaskoski, NOAA
Commanding Officer, NOAA Ship *Ferdinand R. Hassler* (S-250)
CO cell: (240) 687-4602
Ship's VIOP: (541) 867-8935
Sat Phone: (808) 851-3826
Personal cell: (757) 647-3356

[Quoted text hidden]

OPS.Ferdinand Hassler - NOAA Service Account <ops.ferdinand.hassler@noaa.gov> Wed, Feb 15, 2017 at 3:26 PM
To: Jeffery Marshall - NOAA Federal <jeffery.marshall@noaa.gov>

FYI

Field Operations Officer, NOAA Ship *Ferdinand R. Hassler*
29 Wentworth Road
New Castle, NH, 03854

----- Forwarded message -----

From: **Richard Brennan - NOAA Federal** <richard.t.brennan@noaa.gov>
Date: Wed, Feb 15, 2017 at 10:11 AM
Subject: NOAA Ship Hassler SV Correct
To: Briana Welton <Briana.Welton@noaa.gov>, Benjamin K Evans <benjamin.k.evans@noaa.gov>, CO HASSLER <CO.Ferdinand.Hassler@noaa.gov>, "OPS. Ferdinand Hassler" <OPS.Ferdinand.Hassler@noaa.gov>, Russell Quintero - NOAA Federal <Russell.Quintero@noaa.gov>, Samuel Greenaway - NOAA Service Account <Samuel.Greenaway@noaa.gov>, Lorraine Robidoux - NOAA Federal <lorraine.robidoux@noaa.gov>

[Quoted text hidden]

CO.Ferdinand Hassler - NOAA Service Account <co.ferdinand.hassler@noaa.gov> Tue, Feb 21, 2017 at 12:55 PM
To: Richard Brennan - NOAA Federal <richard.t.brennan@noaa.gov>
Cc: Briana Welton <Briana.Welton@noaa.gov>, Benjamin K Evans <benjamin.k.evans@noaa.gov>, "OPS. Ferdinand Hassler" <OPS.Ferdinand.Hassler@noaa.gov>, Russell Quintero - NOAA Federal <Russell.Quintero@noaa.gov>, Samuel Greenaway - NOAA Service Account <Samuel.Greenaway@noaa.gov>, Lorraine Robidoux - NOAA Federal <lorraine.robidoux@noaa.gov>

CAPT,
attached is our report of analysis of the two grids. The algorithm chose a couple different hypotheses around features and a slope area, but it appears that both grids are nearly identical. No change to VALSOU's etc.

v/r
Matt

Lieutenant Commander Matthew Jaskoski, NOAA
Commanding Officer, NOAA Ship *Ferdinand R. Hassler* (S-250)
CO cell: (240) 687-4602
Ship's VIOP: (541) 867-8935

Sat Phone: (808) 851-3826
Personal cell: (757) 647-3356

[Quoted text hidden]



H12932 Re-SVC Process Analysis.pptx
1988K

Briana Welton - NOAA Federal <briana.welton@noaa.gov>

Wed, Mar 1, 2017 at 8:28 AM

To: "CO.Ferdinand Hassler - NOAA Service Account" <co.ferdinand.hassler@noaa.gov>

Cc: Richard Brennan - NOAA Federal <richard.t.brennan@noaa.gov>, Benjamin K Evans <benjamin.k.evans@noaa.gov>, "OPS. Ferdinand Hassler" <OPS.Ferdinand.Hassler@noaa.gov>, Russell Quintero - NOAA Federal <Russell.Quintero@noaa.gov>, Samuel Greenaway - NOAA Service Account <Samuel.Greenaway@noaa.gov>, Lorraine Robidoux - NOAA Federal <lorraine.robidoux@noaa.gov>

LCDR Jaskoski and CAPT Brennan,

Based on the ship's analysis, I agree that reprocessing is unnecessary. I suggest that the ship accurately document how the data have been processed either in a revised DAPR or in the DR for each survey as deviation from the DAPR for all surveys still in the ship's control; and that AHB document how the data have been processed for the surveys that are in our control.

V/r,

Bri

[Quoted text hidden]

<H12932 Re-SVC Process Analysis.pptx>

Richard Brennan - NOAA Federal <richard.t.brennan@noaa.gov>

Thu, Mar 2, 2017 at 10:30 AM

To: Briana Welton - NOAA Federal <briana.welton@noaa.gov>

Cc: "CO.Ferdinand Hassler - NOAA Service Account" <co.ferdinand.hassler@noaa.gov>, Benjamin K Evans <benjamin.k.evans@noaa.gov>, "OPS. Ferdinand Hassler" <OPS.Ferdinand.Hassler@noaa.gov>, Russell Quintero - NOAA Federal <Russell.Quintero@noaa.gov>, Samuel Greenaway - NOAA Service Account <Samuel.Greenaway@noaa.gov>, Lorraine Robidoux - NOAA Federal <lorraine.robidoux@noaa.gov>

LCDR Welton,

I concur with your recommendations. Please proceed with this plan as you described.

LCDR Jaskoski,

Please work with AHB with regard to the best path regarding DAPR revision or documentation of this process in the DR.

Rick

CAPT Rick Brennan, NOAA

Chief, Hydrographic Surveys Division
1315 East-West Highway, SSMC3 Room 6823
Silver Spring, MD 20910
Work: 301-713-2700
Cell: 443-994-3301

[Quoted text hidden]

CO.Ferdinand Hassler - NOAA Service Account <co.ferdinand.hassler@noaa.gov>

Thu, Mar 2, 2017 at 10:39 AM

To: Richard Brennan - NOAA Federal <richard.t.brennan@noaa.gov>

3/2/2017

National Oceanic and Atmospheric Administration Mail - NOAA Ship Hassler SV Correct

Cc: Briana Welton - NOAA Federal <briana.welton@noaa.gov>, Benjamin K Evans <benjamin.k.evans@noaa.gov>, "OPS. Ferdinand Hassler" <OPS.Ferdinand.Hassler@noaa.gov>, Russell Quintero - NOAA Federal <Russell.Quintero@noaa.gov>, Samuel Greenaway - NOAA Service Account <Samuel.Greenaway@noaa.gov>, Lorraine Robidoux - NOAA Federal <lorraine.robidoux@noaa.gov>

Will do.

v/r
Matt

Lieutenant Commander Matthew Jaskoski, NOAA
Commanding Officer, NOAA Ship *Ferdinand R. Hassler* (S-250)
CO cell: (240) 687-4602
Ship's VIOP: (541) 867-8935
Sat Phone: (808) 851-3826
Personal cell: (757) 647-3356

[Quoted text hidden]

CO.Ferdinand Hassler - NOAA Service Account <co.ferdinand.hassler@noaa.gov>

Thu, Mar 2, 2017 at 10:42 AM

To: Briana Welton - NOAA Federal <briana.welton@noaa.gov>

Cc: "OPS.Ferdinand Hassler" <ops.ferdinand.hassler@noaa.gov>

Hey Bri,
we've got these ready to go - might be able to submit them before we depart on Saturday, if not they'll be ready to go at our next inport (3/15-18)

Jasko

Lieutenant Commander Matthew Jaskoski, NOAA
Commanding Officer, NOAA Ship *Ferdinand R. Hassler* (S-250)
CO cell: (240) 687-4602
Ship's VIOP: (541) 867-8935
Sat Phone: (808) 851-3826
Personal cell: (757) 647-3356

[Quoted text hidden]

APPROVAL PAGE

H12841

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

- H12841_DR.pdf
- Collection of depth varied resolution BAGS
- Processed survey data and records
- H12841_GeoImage.pdf

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

Approved: _____

Lieutenant Commander Briana Welton Hillstrom, NOAA
Chief, Atlantic Hydrographic Branch