H12779

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

DESCRIPTIVE REPORT

Type of Survey:	Navigable Area
Registry Number:	H12779

LOCALITY

State(s):	South Carolina
General Locality:	Southeast Atlantic Ocean
Sub-locality:	Charleston Harbor Entrance Channel Anchorage

2015

CHIEF OF PARTY
Shepard M. Smith, CAPT/NOAA

LIBRARY & ARCHIVES

Date:

U.S. DEPARTMENT OF COMMERCE NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION	REGISTRY NUMBER:
HYDROGRAPHIC TITLE SHEET	**H12779**

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):	**South Carolina**
General Locality:	**Southeast Atlantic Ocean**
Sub-Locality:	**Charleston Harbor Entrance Channel Anchorage**
Scale:	**20000**
Dates of Survey:	**05/03/2015 to 06/16/2015**
Instructions Dated:	**04/10/2015**
Project Number:	**OPR-G380-TJ-15**
Field Unit:	**NOAA Ship *Thomas Jefferson***
Chief of Party:	**Shepard M. Smith, CAPT/NOAA**
Soundings by:	**Multibeam Echo Sounder**
Imagery by:	**Side Scan Sonar 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 https://www.ncei.noaa.gov/.

Table of Contents

List of Tables

List of Figures

Descriptive Report to Accompany Survey H12779

Project: OPR-G380-TJ-15

Locality: Southeast Atlantic Ocean

Sublocality: Charleston Harbor Entrance Channel Anchorage

Scale: 1:20000

May 2015 - June 2015

NOAA Ship *Thomas Jefferson*

Chief of Party: Shepard M. Smith, CAPT/NOAA

A. Area Surveyed

Survey H12779 was conducted in the Southeast Atlantic Ocean in the vicinity of Charleston Harbor Entrance Channel Anchorage.

A.1 Survey Limits

Data were acquired within the following survey limits:

Northwest Limit	Southeast Limit
32° 43' 51" N 79° 48' 23.93" W	32° 39' 6.08" N 79° 41' 9.03" W

Table 1: Survey Limits

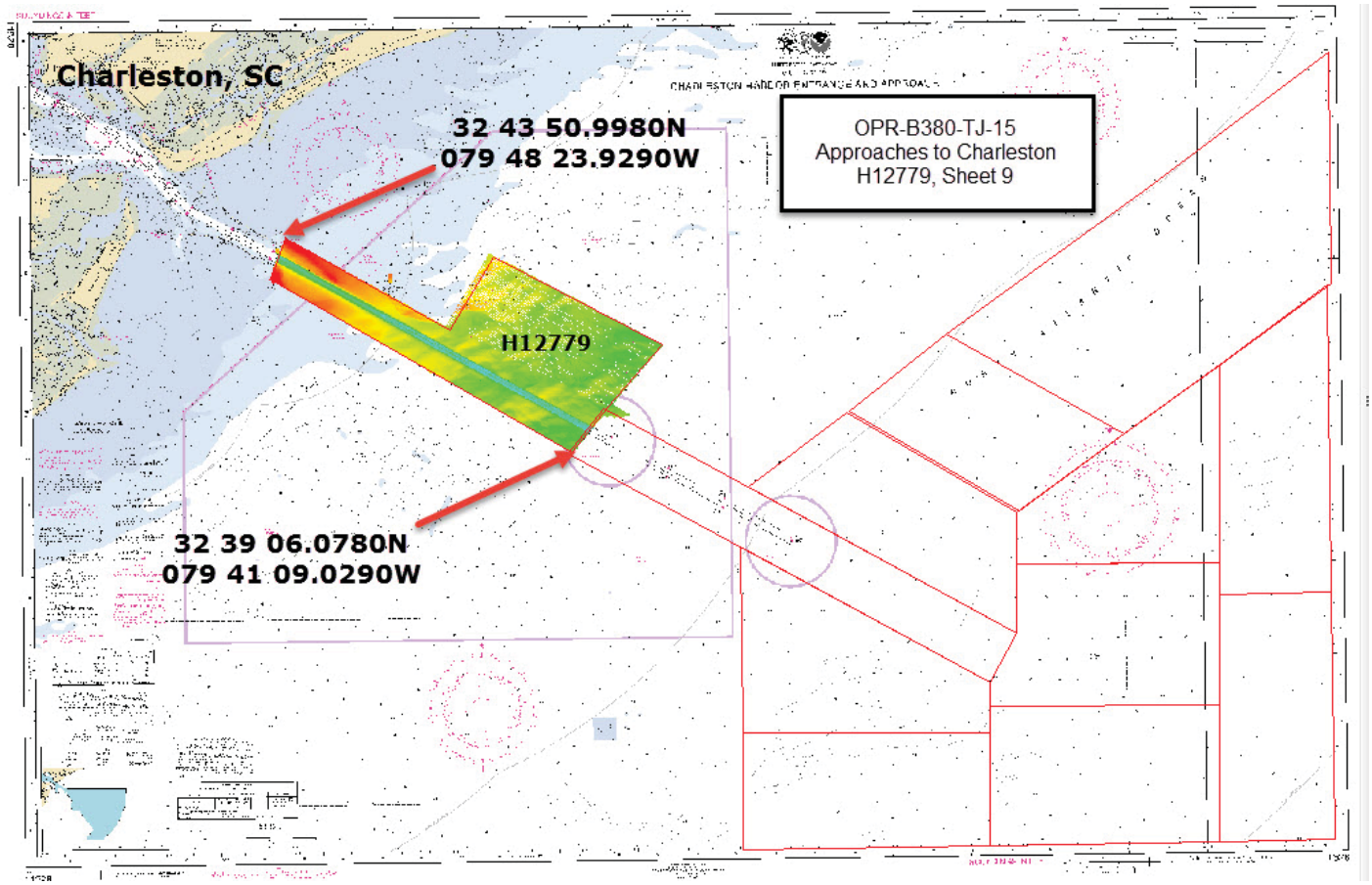


Figure 1: H12779 Survey Limits overlaid on RNC 11528.

Survey H12779 approximately covered an additional 0.11 square nautical miles on the eastern edge of of it's limit area to accommodate for missed data on junction survey H12766. Also, additional survey coverage was conducted over three charted Obstructions and one Wreck PA.

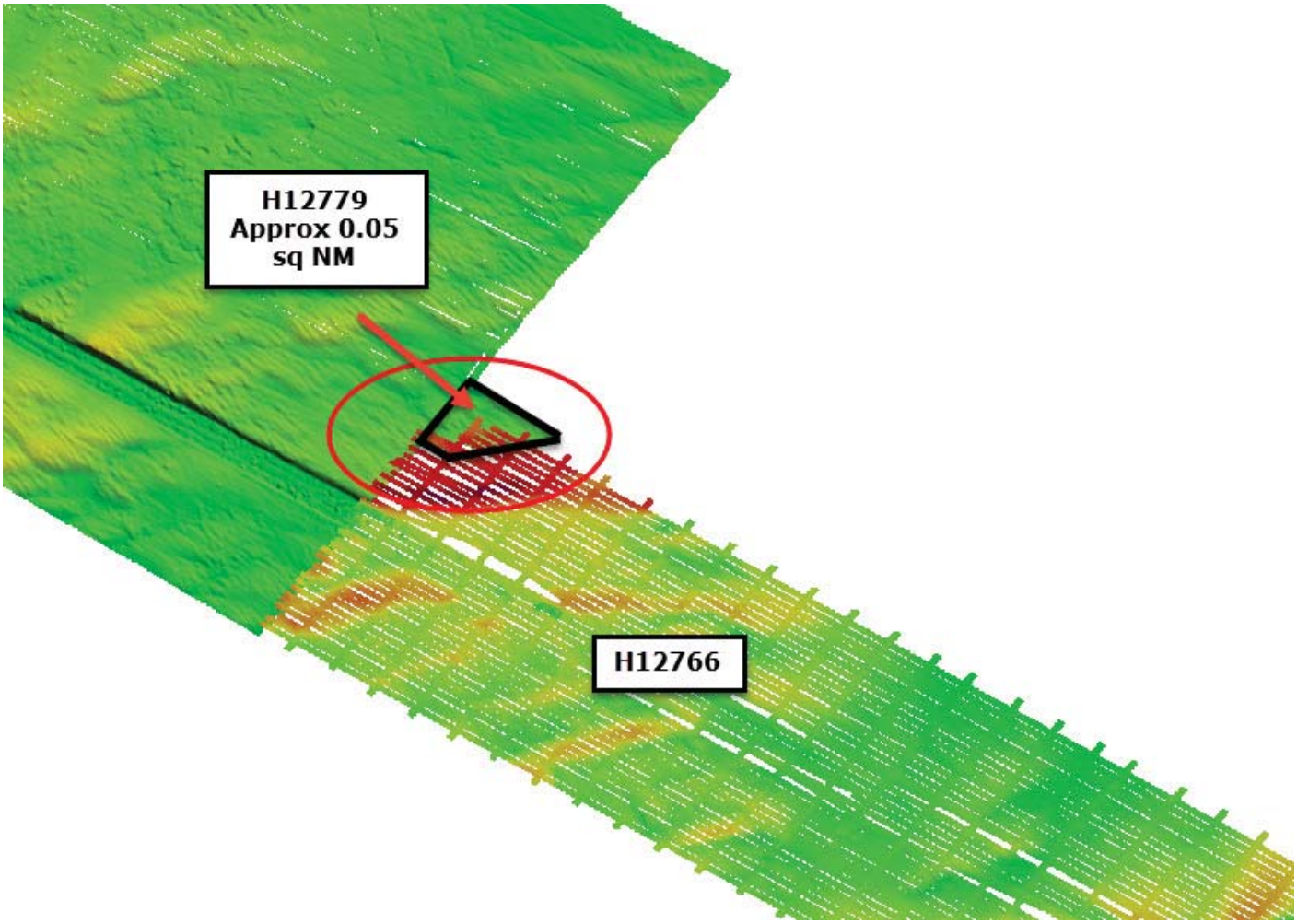


Figure 2: Additional coverage area on Eastern edge of H12779.

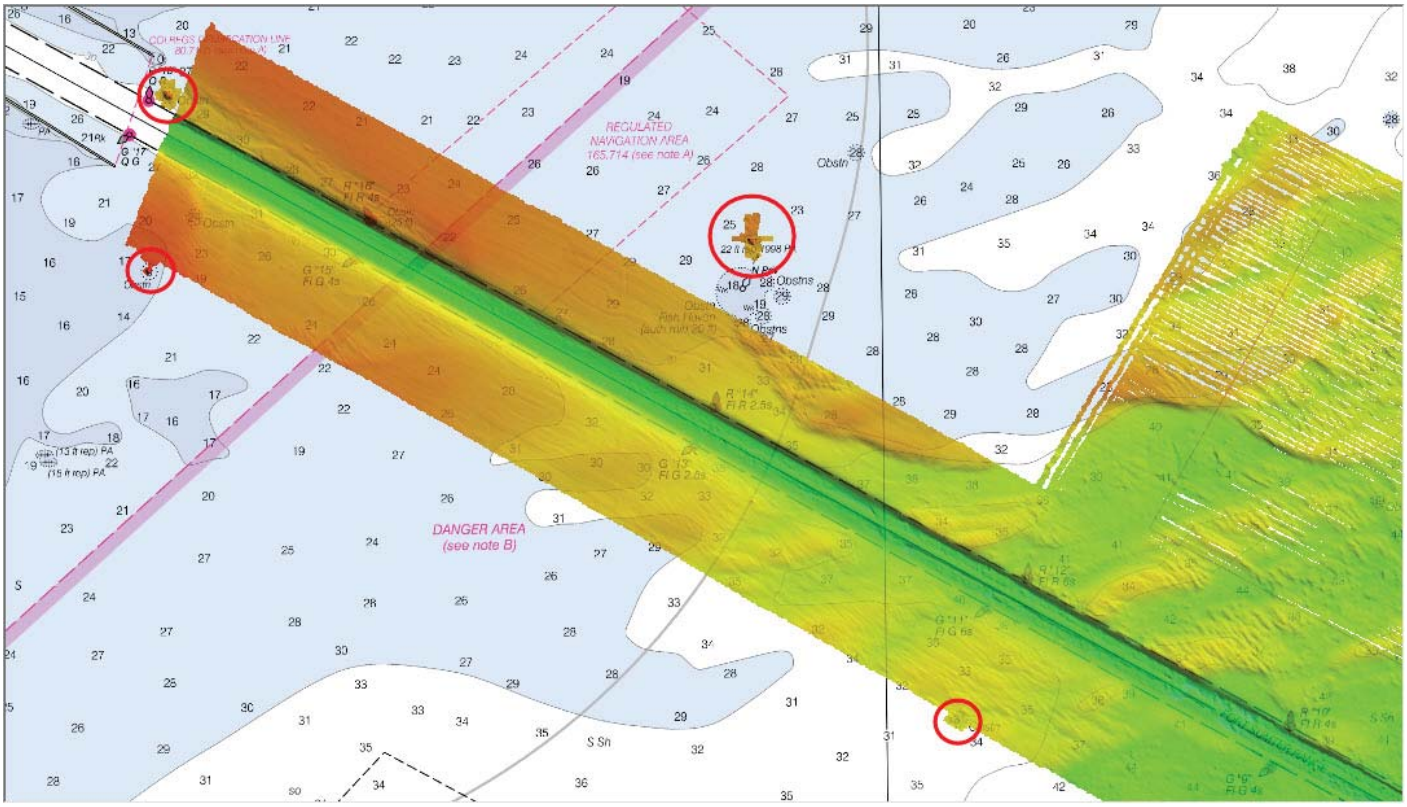


Figure 3: Coverage over three Obstructions and one Wreck PA. Western portion of sheet H12779.

A.2 Survey Purpose

This project is being conducted in support of NOAA's Office of Coast Survey to provide contemporary hydrographic data in support of a new nautical chart in this area and in response to a harbor deepening project in the Port of Charleston which will better serve deeper draft ships transiting the area.

A.3 Survey Quality

The entire survey is adequate to supersede previous data.

A.4 Survey Coverage

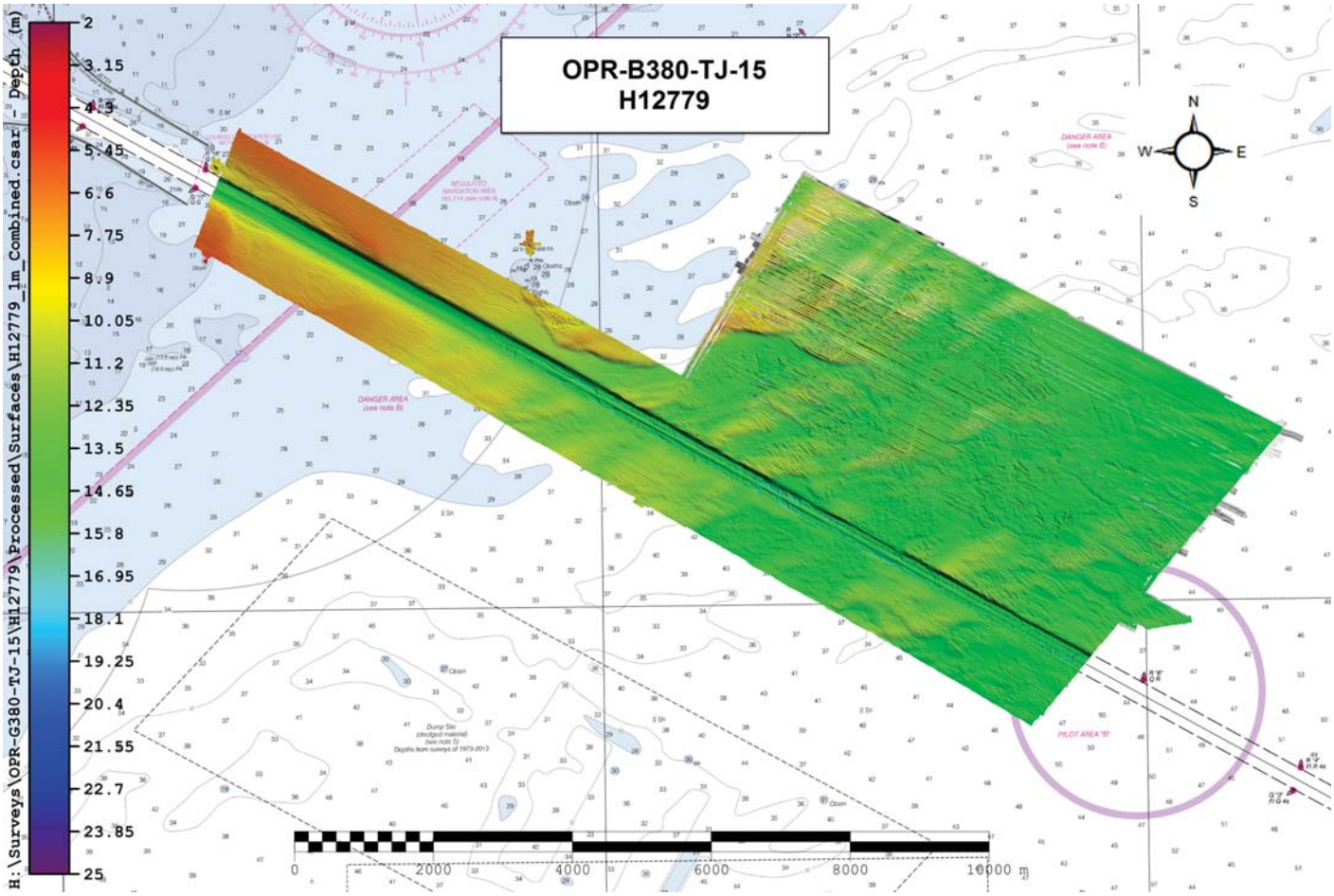


Figure 4: H12779 total coverage area.

Survey H12779 utilized two different methods of coverage; Object Detection Multibeam in the channel and up to 0.5 nautical miles on either side, as well as 200% SSS with concurrent multibeam in the anchorage area in the North Eastern section of the sheet. All survey data collected by Object Detection Multibeam was computed to a 50cm finalized CUBE surface.

Holidays were calculated based on conditions set by the HSSD section 5.2.2.1. The resulting surface contains 17 holidays; although the surrounding data does not indicate significant features, obstructions or dangers to navigation. Significant holidays are highlighted with images and latitude and longitude positions. The holidays present do not supersede the overall quality of sheet H12779.

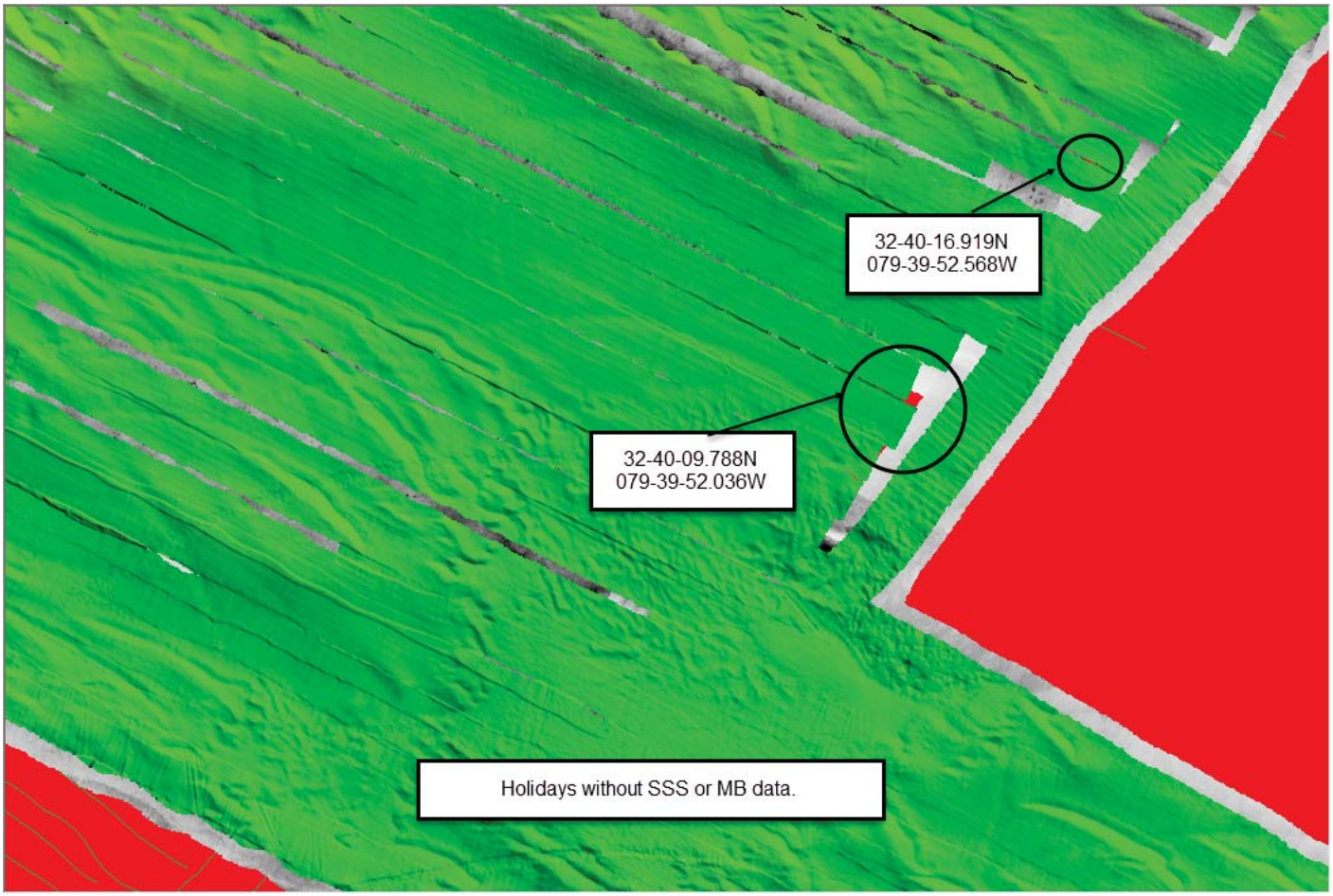


Figure 5: Side Scan Sonar holidays not covered by H12779_MB_1m_MLLW_Final.csar.

Figure 6: Multibeam holidays in southwestern section of sheet H12779.

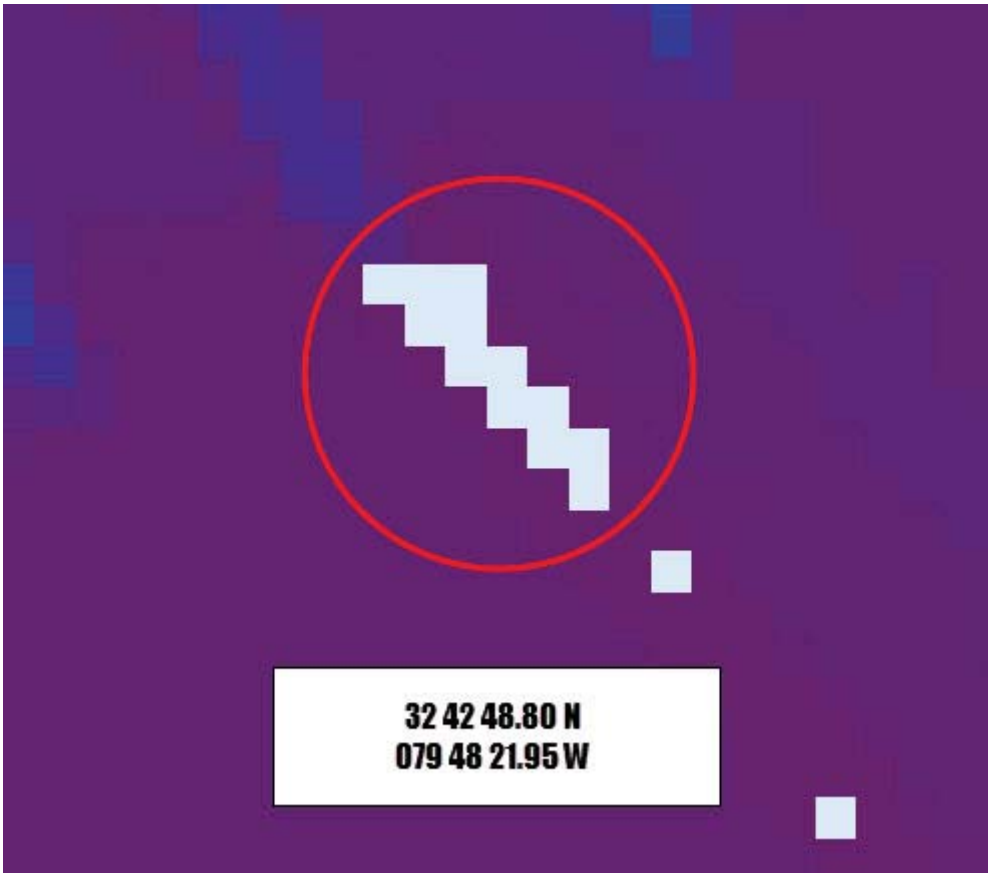


Figure 7: Multibeam holidays southwestern section of sheet H12779.

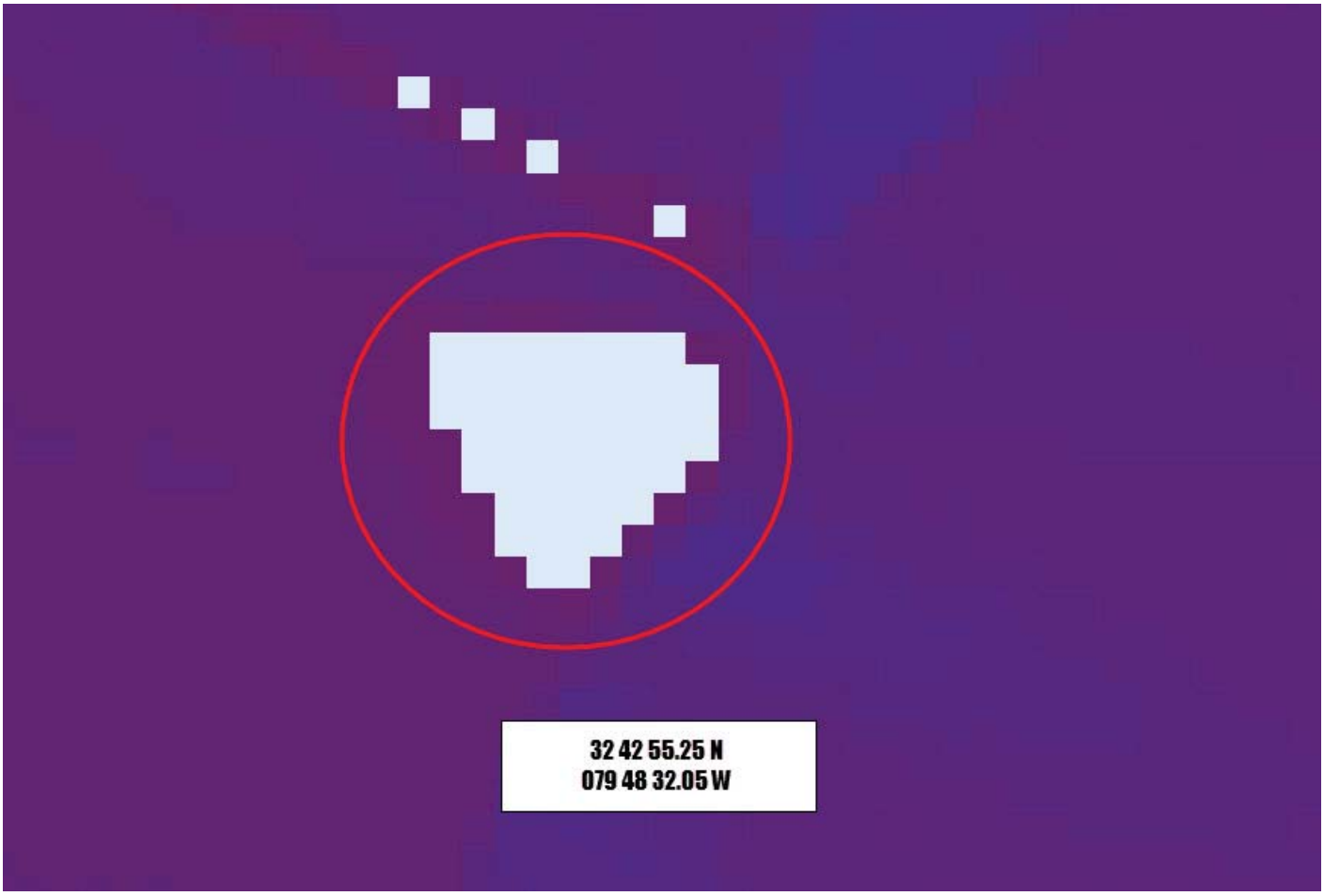


Figure 8: Multibeam holidays southwestern section of sheet H12779.

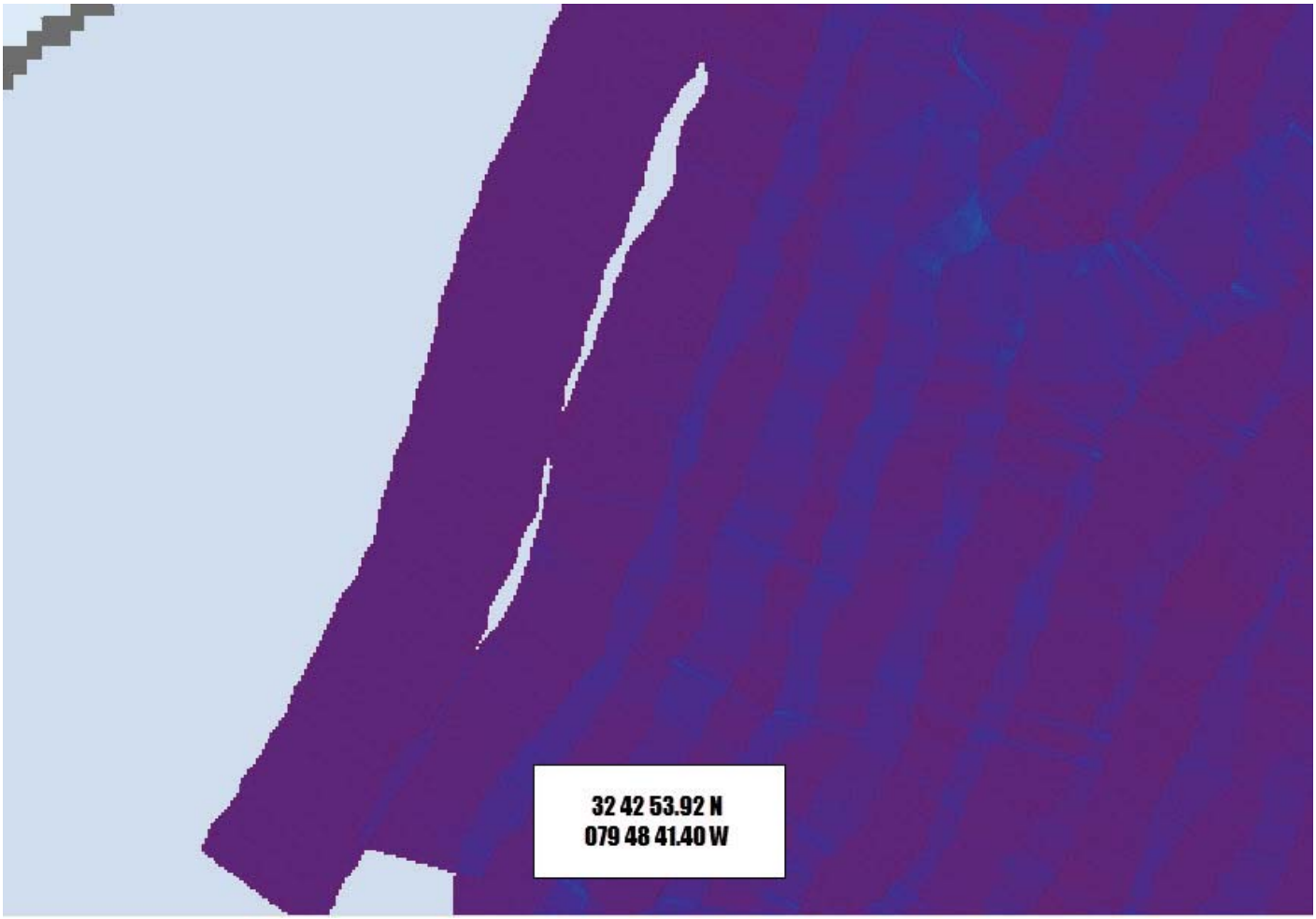


Figure 9: Multibeam holidays on very most southwestern edge of sheet H12779.

Figure 10: Multibeam holidays mid channel, western section of sheet H12779.

A.5 Survey Statistics

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

	HULL ID	*S222*	*3101*	*3102*	*Total*
LNM	SBES Mainscheme	0	0	0	0
	MBES Mainscheme	0	281.46	284.68	566.14
	Lidar Mainscheme	0	0	0	0
	SSS Mainscheme	0	0	0	0
	SBES/SSS Mainscheme	0	0	0	0
	MBES/SSS Mainscheme	326.18	25.14	34.81	386.13
	SBES/MBES Crosslines	0	20.57	18.12	38.69
	Lidar Crosslines	0	0	0	0
Number of Bottom Samples					0
Number of AWOIS Items Investigated					0
Number Maritime Boundary Points Investigated					0
Number of DPs					0
Number of Items Investigated by Dive Ops					0
Total SNM					15.52

Table 2: Hydrographic Survey Statistics

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

Survey Dates	Day of the Year
05/03/2015	123
05/04/2015	124
05/15/2015	135
05/16/2015	136
05/17/2015	137
05/18/2015	138
05/20/2015	140
05/21/2015	141
05/28/2015	148
05/29/2015	149
06/01/2015	152
06/02/2015	153
06/03/2015	154
06/07/2015	158
06/16/2015	167

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.

On June 13, 2015 two new Trimble GA830 positioning antennas were installed on S222. The antennas were calibrated utilizing the GPS Azimuth Measurement System process. The configuration file produced was then applied to the POSMV 5 unit utilized by S222.

B.1.1 Vessels

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

Hull ID	***S222***	***3101***	***3102***
LOA	208 feet	31 feet	31 feet
Draft	15 feet	5.2 feet	5.2 feet

Table 4: Vessels Used

2015-124	0.450 m
2015-131	0.430 m
2015-148	0.449 m
2015-155	0.532 m
2015-166	0.440 m

Figure 11: Static draft values applied to S222_Reson7125_ROV_400kHz_2015.hvf

Data was acquired by S222, 3101 and 3102. The three platforms collected Reson multibeam echosounder soundings, multibeam backscatter data; side scan sonar imagery, sound velocity profiles, surface sound speed readings, and position and attitude data.

B.1.2 Equipment

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

Manufacturer	Model	Type
Reson	7125-ROV	MBES
Reson	7125-SV1	MBES
Reson	7125-SV2	MBES
Klein	5000 v1	SSS
Klein	5000 v2	SSS
Applanix	POS M/V v4	Positioning and Attitude System
Applanix	POS M/V v5	Positioning and Attitude System
Trimble	SPS351 DGPS Beacon	Positioning System
Seabird	Seacat 19	Conductivity, Temperature, and Depth Sensor
Seabird	Seacat 19+	Conductivity, Temperature, and Depth Sensor
Brook Ocean Technology	MVP-100	Sound Speed System
AML Oceanographic	Smart SV&P	Sound Speed System
Reson	SV-70	Sound Speed System
Reson	SV-71	Sound Speed System

Table 5: Major Systems Used

Vessel configurations, equipment operations, and data acquisition & processing were consistent with specifications described in the DAPR, with the exception of the two Trimble antennas mention in section B.1.

B.2 Quality Control

B.2.1 Crosslines

Crosslines acquired for this survey totaled 4.3% of mainscheme acquisition.

Thomas Jefferson's launches collected 38.69 linear nautical miles of MBES crosslines, equating to 4.3% of mainscheme MBES data. A swath filter reducing the beam angles on the port and starboard sides from 70 degrees to 60 degrees was applied to all crosslines collected with the Reson 7125

SV2 to reduce outer beam uncertainty. Crosslines were compared to mainscheme using a difference surface, created in CARIS HIPS & SIPS. A surface combining the 50 cm and 1 m mainscheme, H12779_MB_1m_MLLW_Combined_Final.csar, was created to difference crosslines at a 1 m resolution. A total 99.9% of 3,196,909 nodes were within 0.33 m of each other.

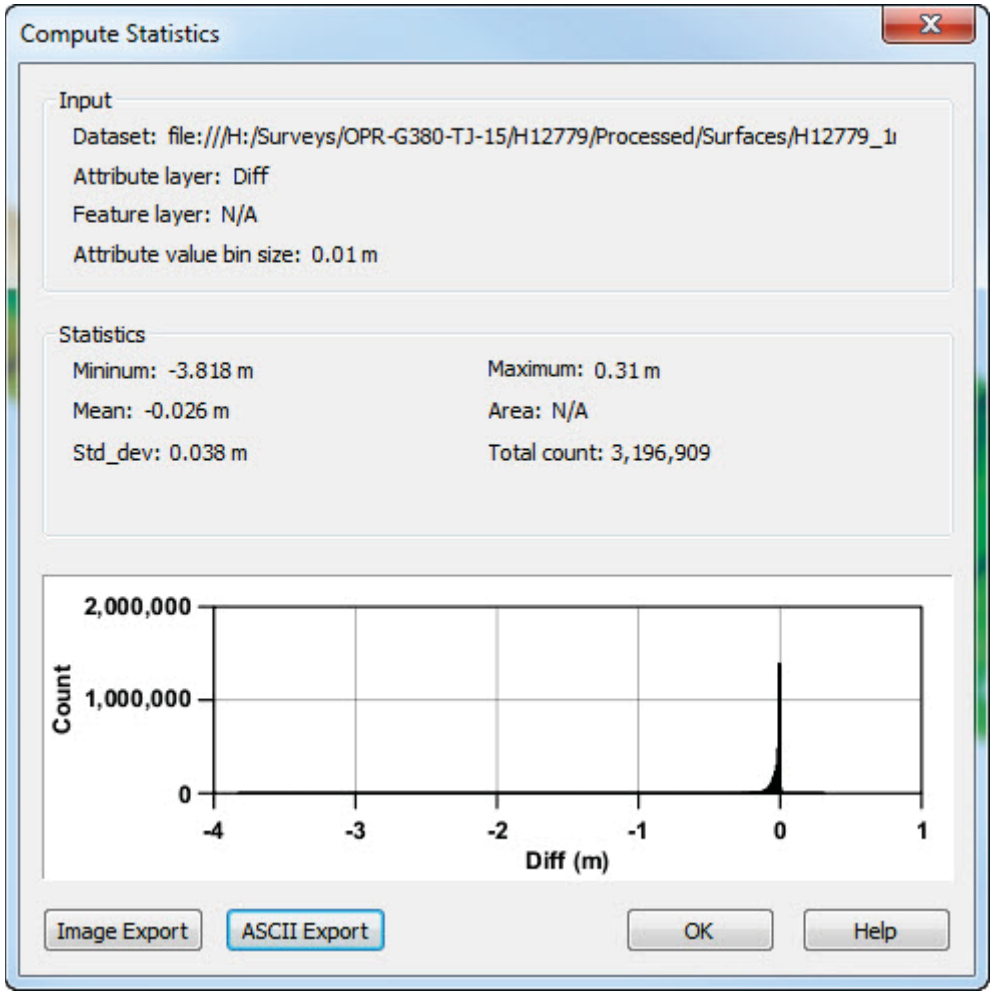


Figure 12: H12779_MB_1m_MLLW_Combined_Final & H12779_MB_1m_MLLW_XL difference statistics.

B.2.2 Uncertainty

The following survey specific parameters were used for this survey:

Measured	Zoning
0 meters	0.125 meters

Table 6: Survey Specific Tide TPU Values

Hull ID	Measured - CTD	Measured - MVP	Surface
S222	0 meters/second	1 meters/second	0.2 meters/second
3101	4 meters/second	0 meters/second	0.2 meters/second
3102	4 meters/second	0 meters/second	0.2 meters/second

Table 7: Survey Specific Sound Speed TPU Values

Total Propagated Uncertainty values for survey H12779 were derived using a combination of: real time uncertainties for vessel motion; a priori values for equipment and vessel characteristics; an a priori value for the separation model used to reduce soundings to chart datum; and field assigned values for sound speed uncertainties. The realtime uncertainties for vessel motion include roll, pitch, gyro, navigation, and elevation. The uncertainties in these measurements were recorded as part of the POSPac Marinestar 5P 3D positional solution, as well as the POSPac Marinestar IAPPK solution, and were applied to the soundings via an SBET RMS file generated by Applanix POSPac. Uncertainties for sonar mounting and vessel speed were based on Appendix 4, table 4.9 of the NOAA Field Procedures Manual (FPM) (ed 2014). These were applied to the data via the CARIS HIPS Hydrographic Vessel File. The uncertainty associated with the VDatum separation model was supplied by the Hydrographic Services Division’s Operations Branch, and is listed under the Zoning (see Table 6). Finally, the uncertainty associated with sound speed measurements were based on the frequency and location of CTD casts, in accordance with the guidance set by Appendix 4 of the FPM (ed 2014) (see Table 7).

Total Propagated Uncertainty was then evaluated to ensure compliance with section 5.1.3 of NOAA's Hydrographic Survey Specification and Deliverables (HSSD). First the maximum allowable uncertainty for each node was calculated using the equation: -Uncertainty/((0.5^2+((Depth*0.013)^2))^0.5). Second the ratio between actual uncertainty and maximum allowed uncertainty is found for each node. The resulting 'TVU_QC' layer was filtered using a color map to show any areas where actual uncertainty exceeded the maximum allowed uncertainty. Additionally the Pydro Finalized CSAR QA tool was utilized for each surface to be submitted. For H12779_MB_1m_MLLW_Final.csar, 99.9% of 25,923,363 nodes passed uncertainty standards. For H12779_MB_50cm_MLLW_Final.csar, 99.9% of 111,887,588 nodes passed uncertainty standards. For H12779_MB_1m_MLLW_Combined_Final.csar, 99.9% of 50,436,635 nodes passed uncertainty standards.

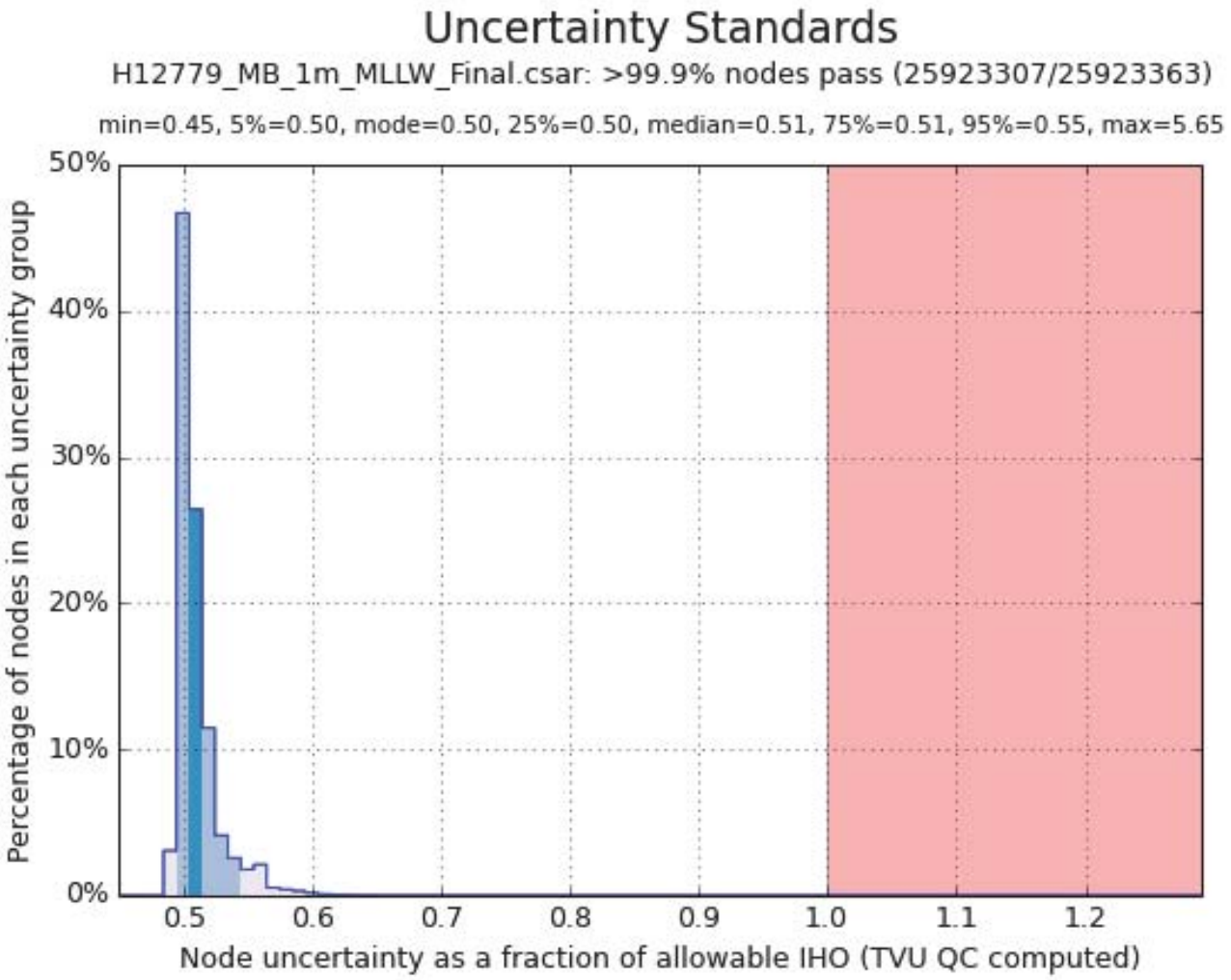


Figure 13: H12779_MB_1m_MLLW_Final Uncertainty Standards statistics utilizing Pydro Finalized CSAR QA.

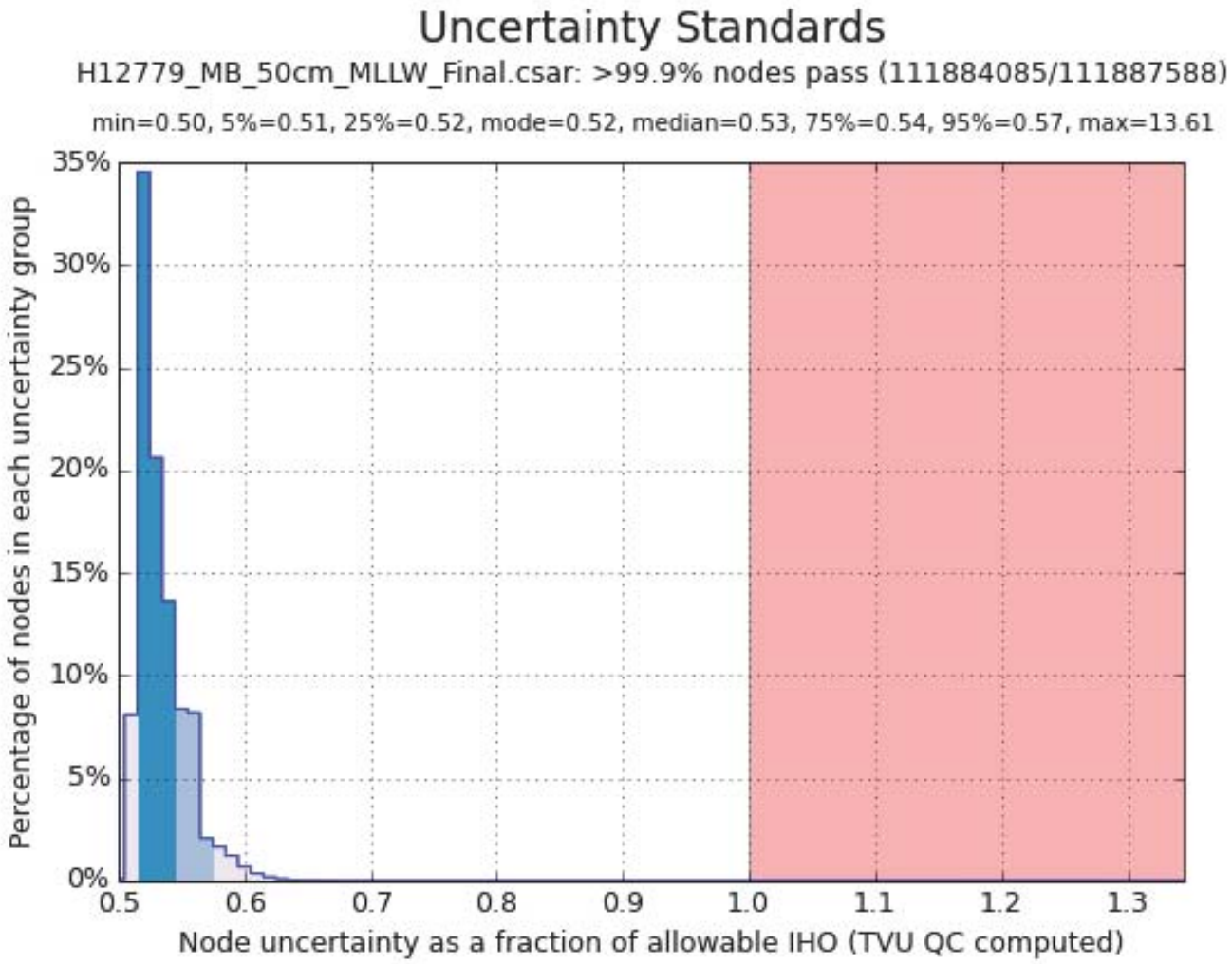


Figure 14: H12779_MB_50cm_MLLW_Final Uncertainty Standards statistics utilizing Pydro Finalized CSAR QA.

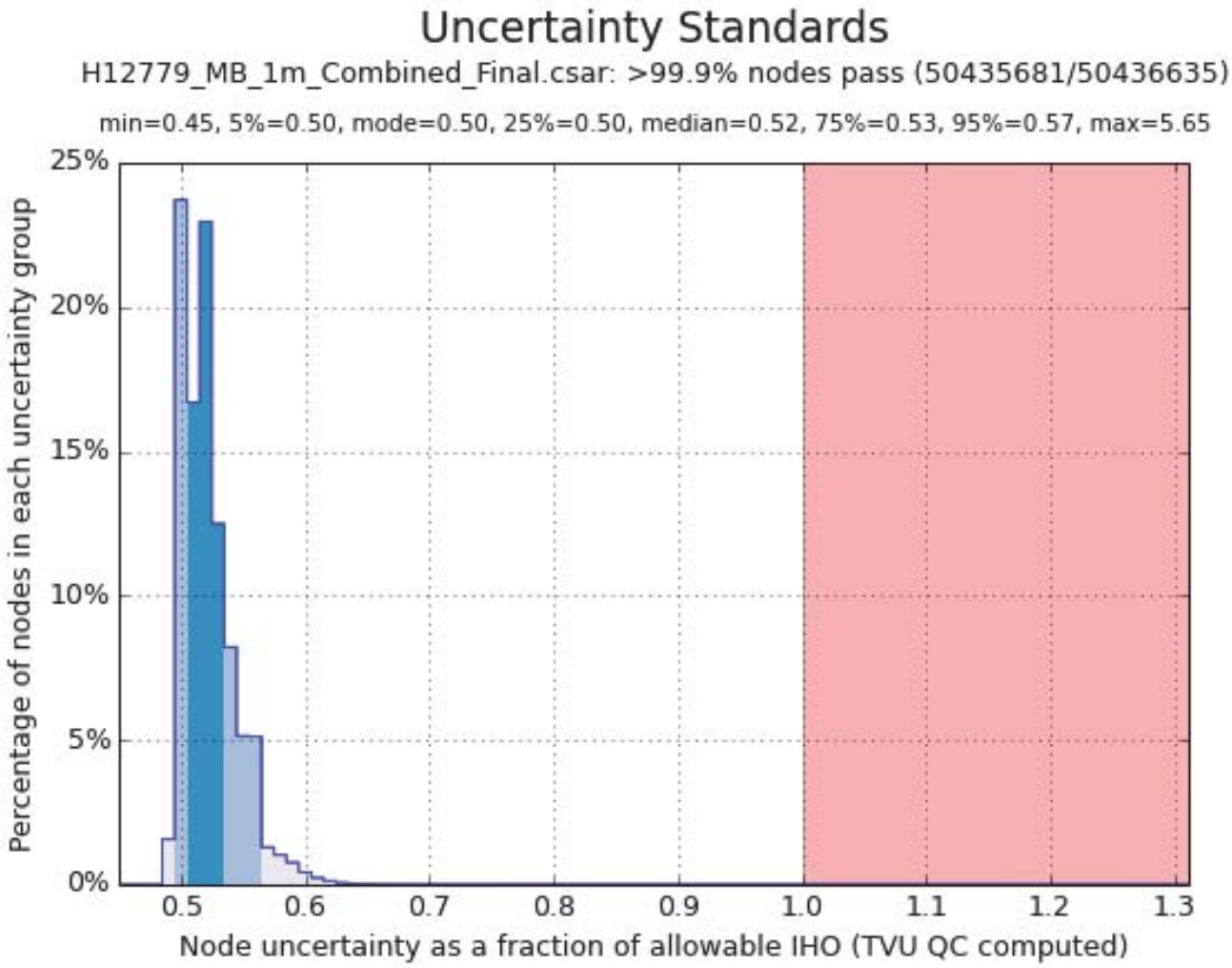


Figure 15: H12779_MB_1m_MLLW_Combined_Final Uncertainty Standards statistics utilizing Pydro Finalized CSAR QA.

B.2.3 Junctions

One contemporary survey, H12766, was acquired during the same relative time frame of acquisition and junctions H12779.

The difference between survey H12779 and H12766 ranged from –1.117 m to 1.708 m. The mean was -0.069 m, and the standard deviation was 0.095 m. When differenced 99.91% of 175,229 nodes were within 0.33 m of each other.

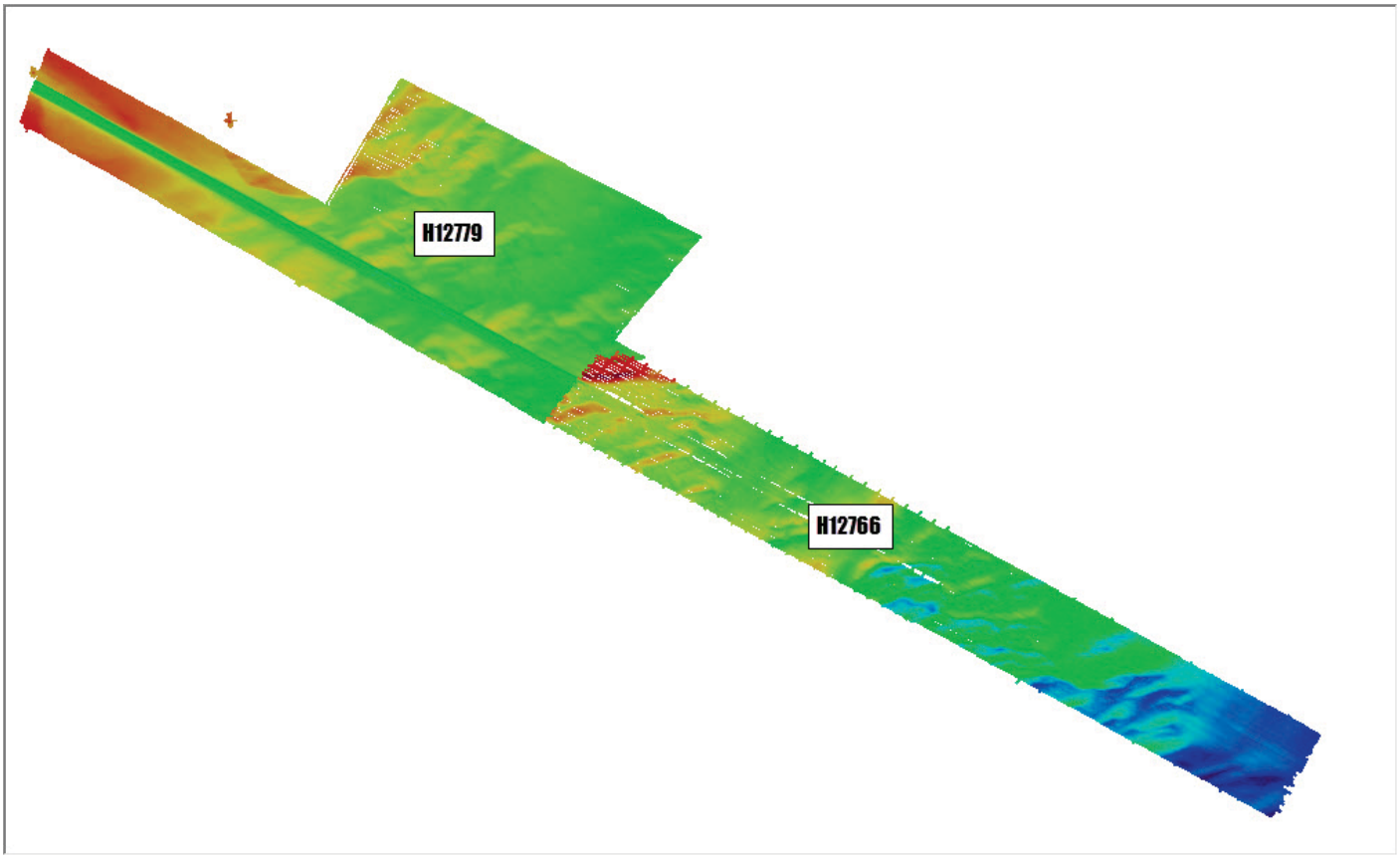


Figure 16: H12779 and H12766 junction boundary.

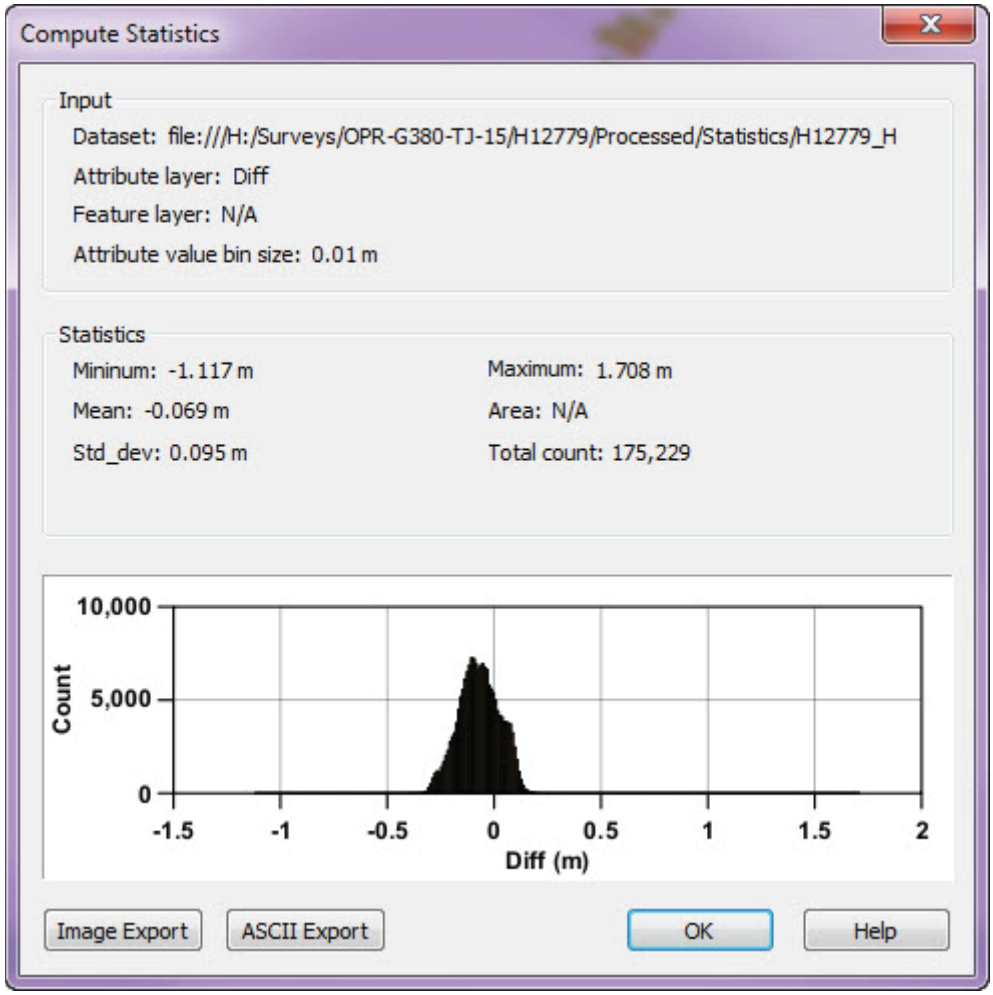


Figure 17: H12779 and H12766 difference statistics.

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

3101 Klein 5000 Light Weight Side Scan Sonar

Survey launch 3101 exhibited a continuous systematic "striation" artifact in its SSS data. This artifact distorted the data by repeating or smearing the image through the striations. The chief hydrographer chose to utilize launches 3101 and 3102 to collect Object Detection Multibeam in the channel and up to 0.5 nautical

miles on either side. Survey platform S222 utilized set line spacing SSS in the Northern anchorage area. Once the SSS artifacts were resolved, both HSL's were used to collect SSS holidays from the ship and were combined into the 100 and 200% mosaics.

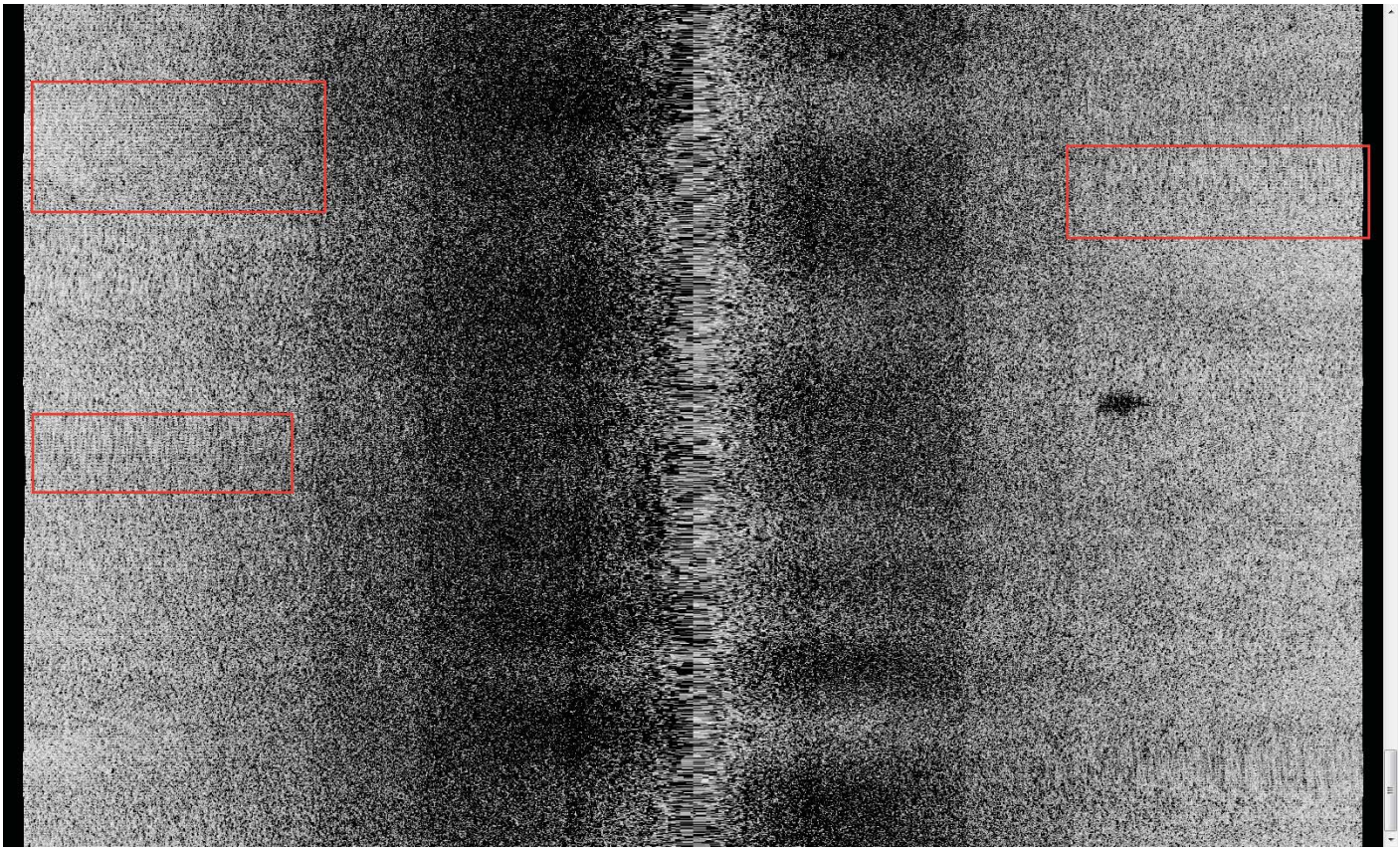


Figure 18: 3101 SSS systematic artifact.

B.2.6 Factors Affecting Soundings

3101 and 3102 Vertical Offsets

Survey vessel S222, 3101, and 3102 collected positioning data via POSMV units with Fugro Marinestar Precise Point Positioning raw data inputs. All raw data was run through Post Processed Precise Point Positioning (5P) using POSPac MMV 7.1.5637.21708 software. Survey launches 3101 and 3102 exhibited high vertical offsets after the POSPac SBETs were applied. Data which exhibited vertical offset measurements greater than 30 cm were reprocessed using IAPPK solutions. The following survey days' positioning data for launch 3101 was reprocessed using an IAPPK solution; DN123 (XLs), DN124(XLs), DN148, DN149, DN152. The following survey days' positioning data for launch 3102 was reprocessed using an IAPPK solution; DN123(XLs), DN135, DN136, DN137, DN138, DN140,DN148, DN149, DN152. In all, 57.8% of the data was processed using IAPPK and 42.2% was processed using Marinestar 5P.

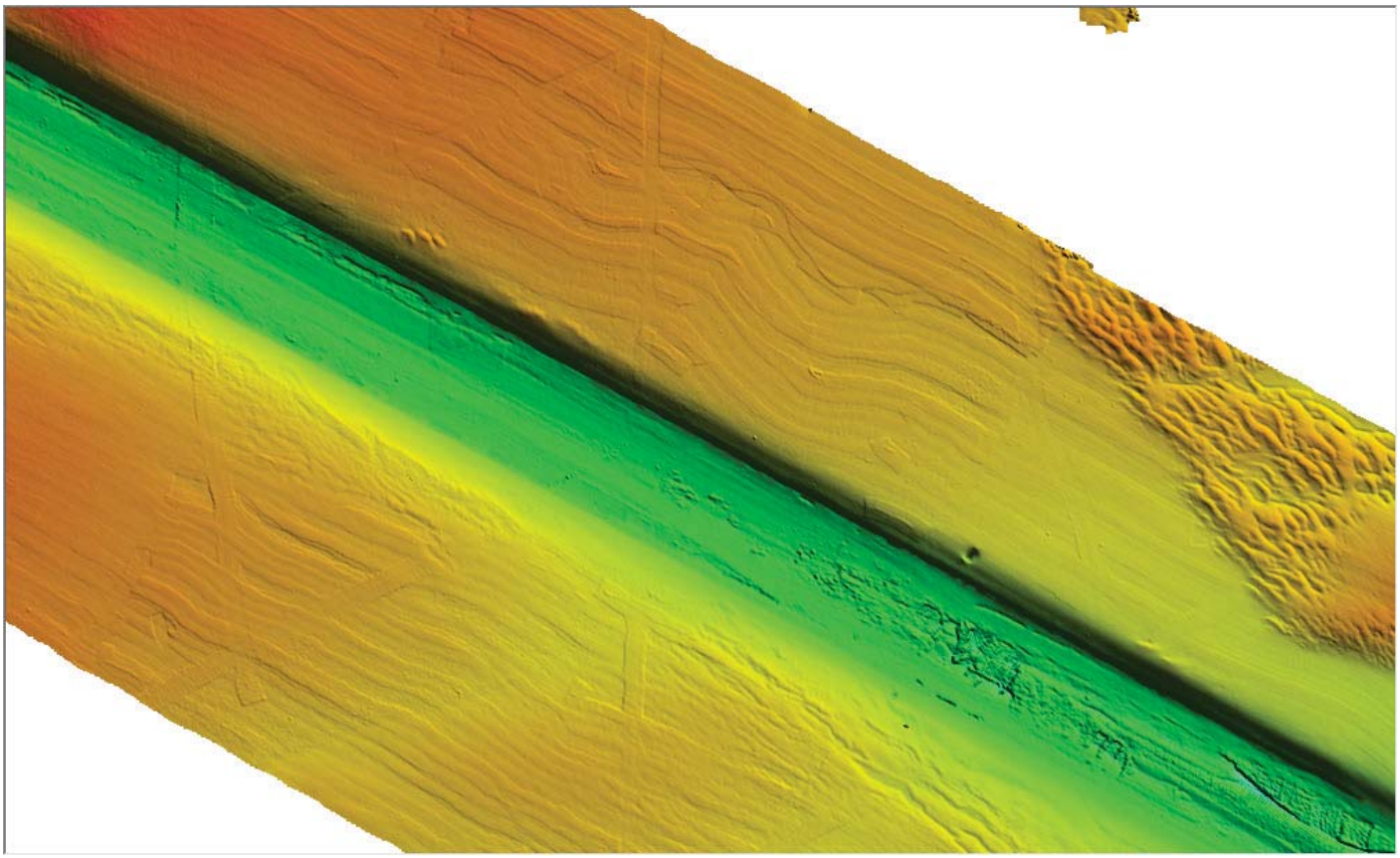


Figure 19: Launch 3101 DN138 and DN140 survey data after IAPPK solutions were applied. H12779_MB_50cm_MLLW_Final.csar exaggerated at 15.

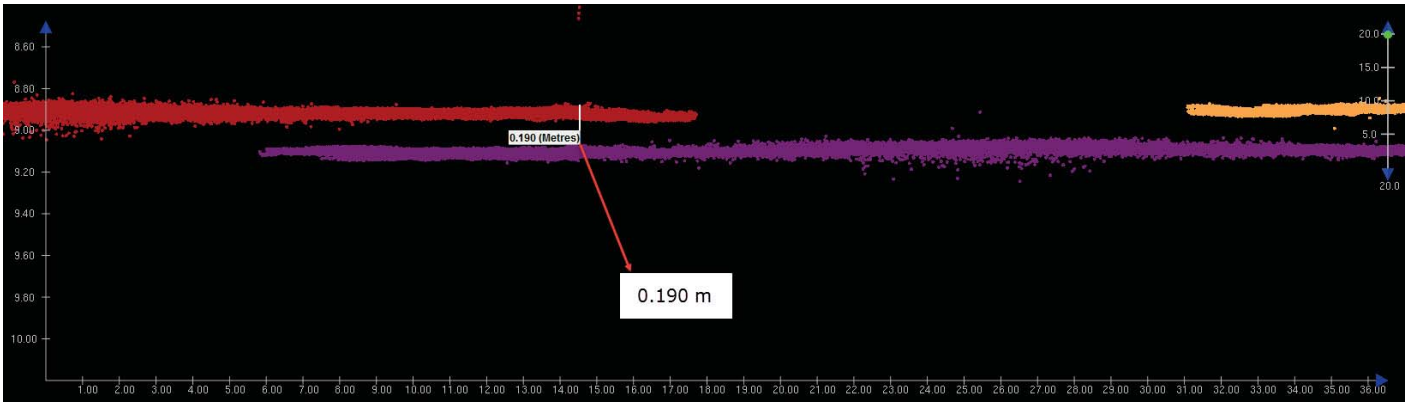


Figure 20: Subset of launch 3101 data DN138. Vertical difference of 0.190 m.

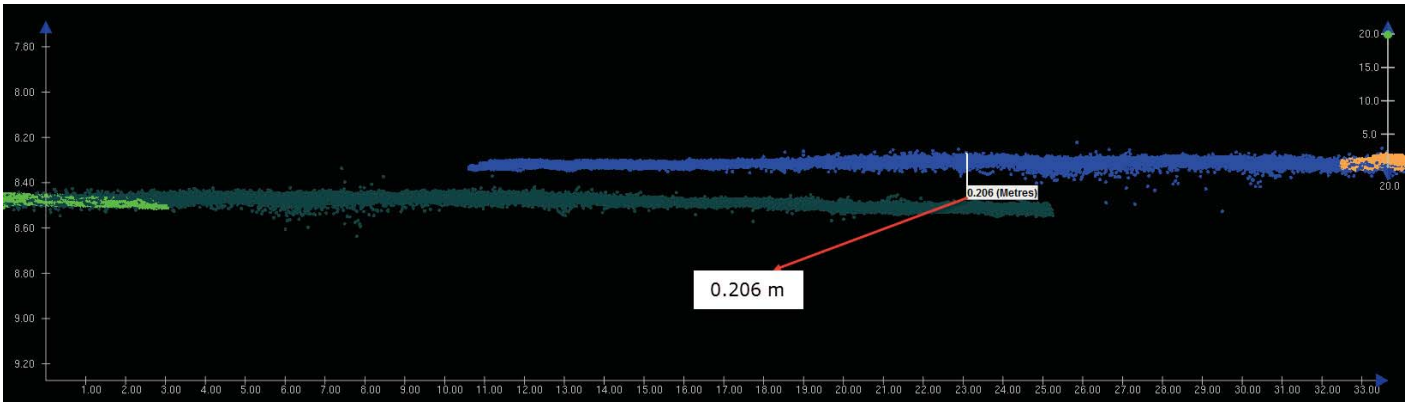


Figure 21: Subset of launch 3101 data DN140. Vertical difference of 0.206 m.

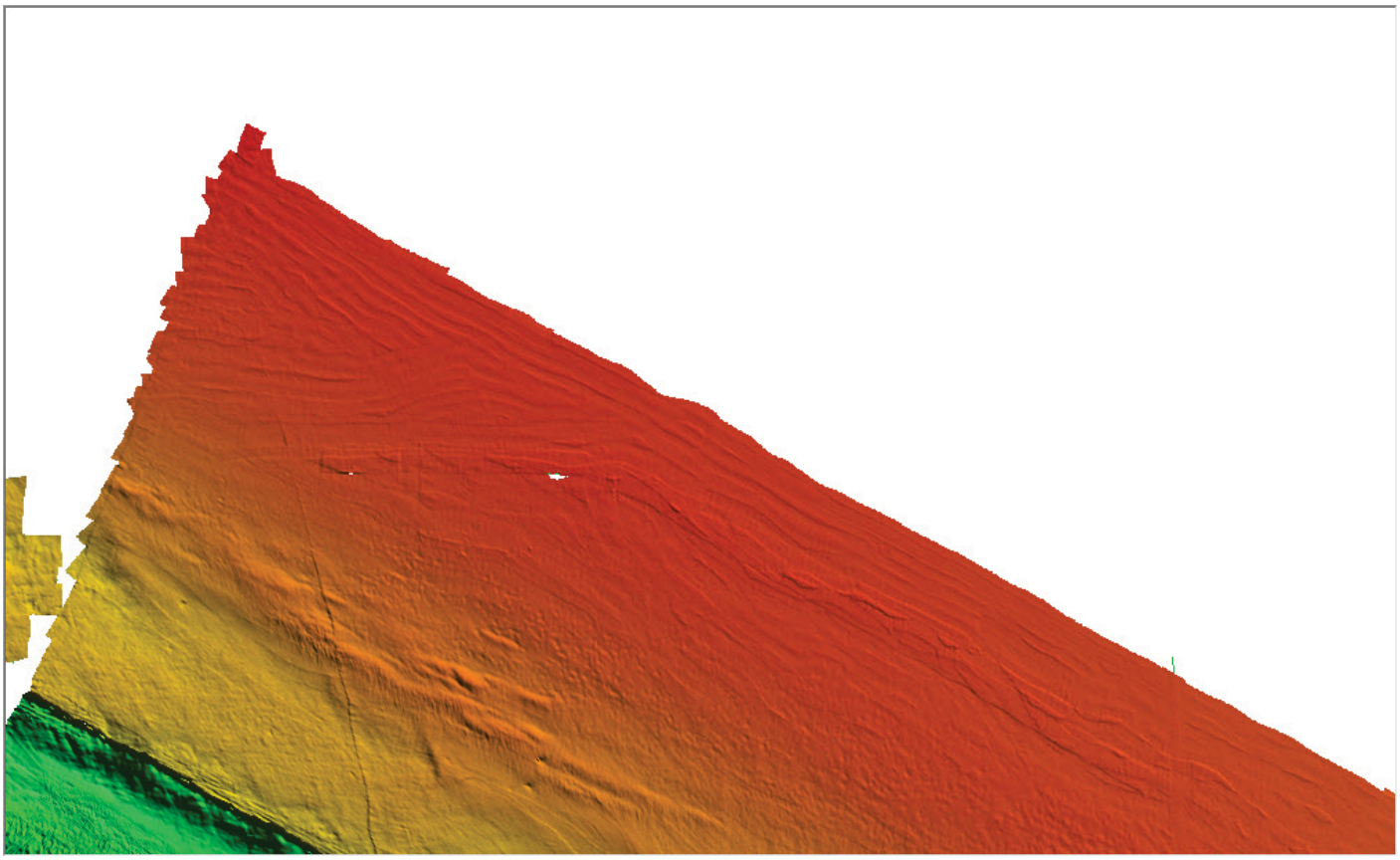


Figure 22: Launch 3101 DN149 survey data survey data after IAPPK solutions were applied. H12779_MB_50cm_MLLW_Final.csar exaggerated at 15.

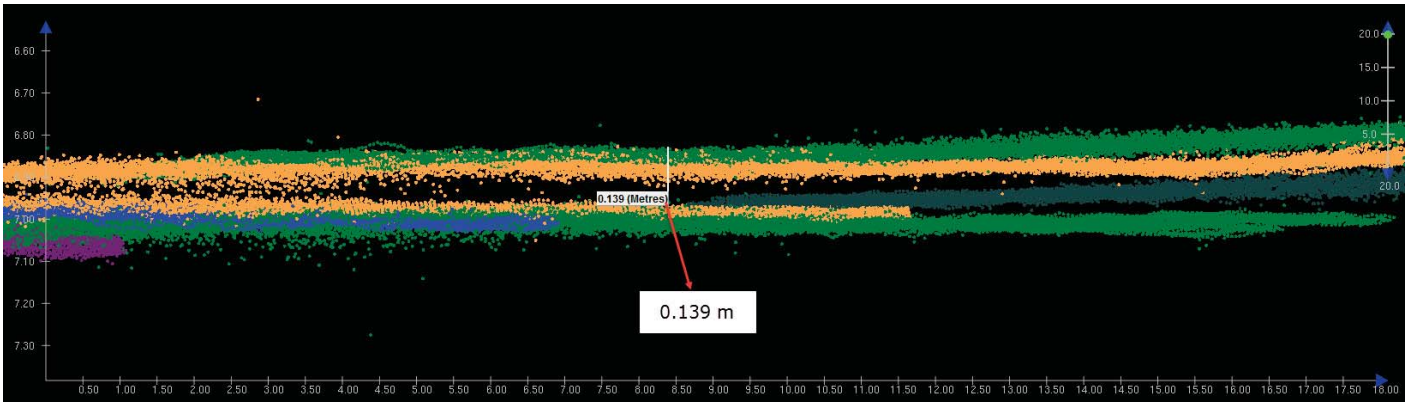


Figure 23: Subset of launch 3101 data DN149. Vertical difference of 0.139 m.

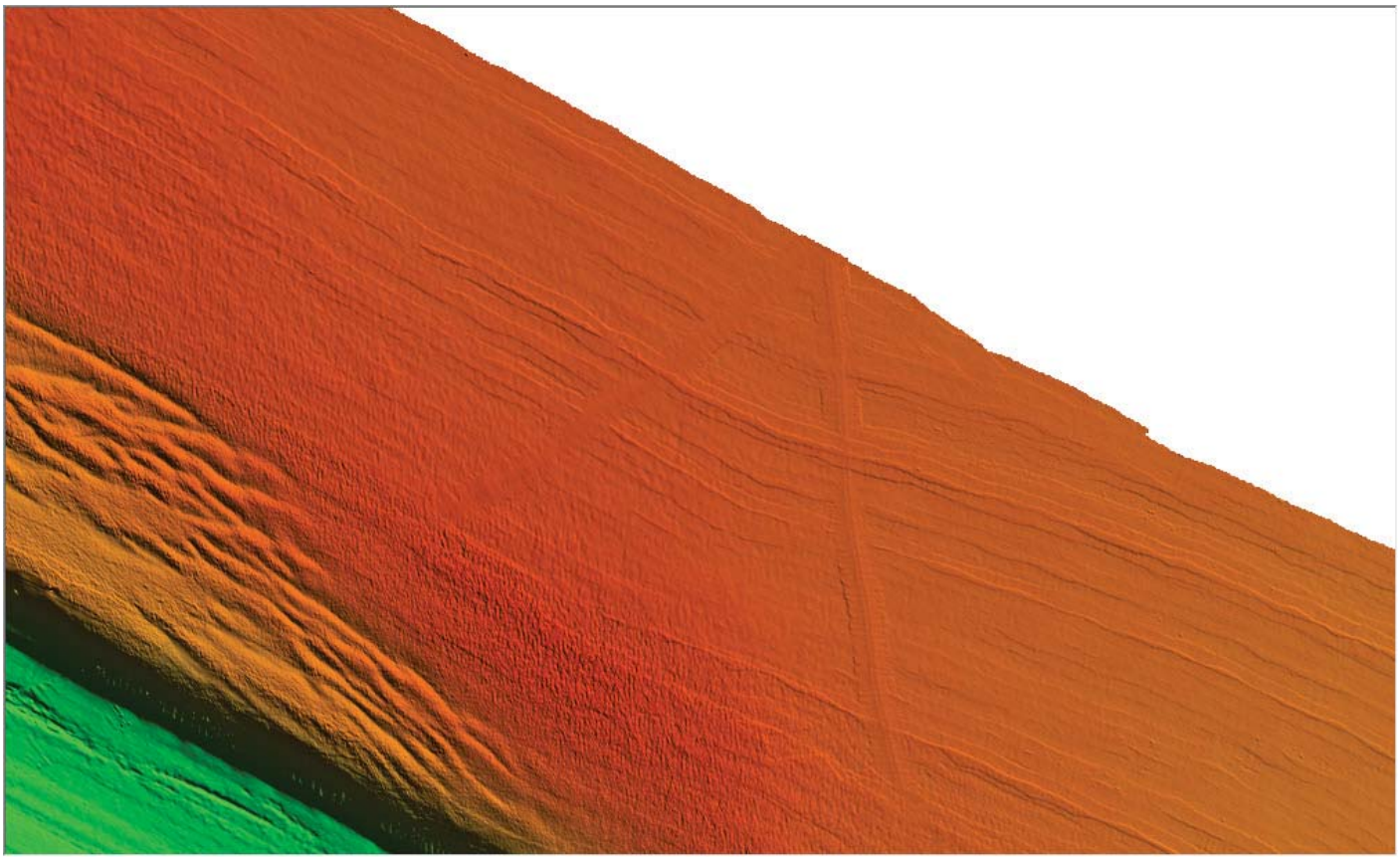


Figure 24: Launch 3102 DN148 survey data survey data after IAPPK solutions were applied. H12779_MB_50cm_MLLW_Final.csar exaggerated at 15.

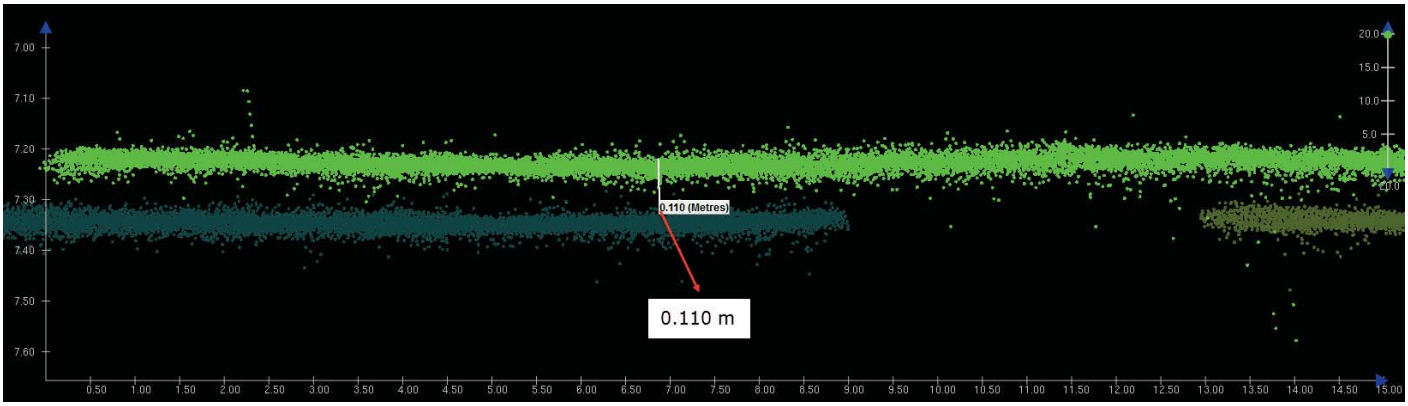


Figure 25: Subset of launch 3102 data DN148. Vertical difference of 0.110 m.

3101 Days of Acquisition	Smart Base COR Stations (Primary Station in blue)	Single Base COR Stations
123 XLs	SCHA, KNS5, NCFF,NCSL, SCLC, TCAO	--
124 XLs	--	SCHA
148	SCHA, KNS6, NCFF, SCEB, SCWT, TCA0	--
149	SCHA, KNS6, NCFF, SCEB, SCEB, SCWT, TCA0	--
152	--	SCHA

Figure 26: Base Stations utilized by 3101's IAPPK solutions.

3102 Days of Acquisition	Smart Base COR Stations (Primary Station in blue)	Single Base COR Stations
123 XLs	--	SCHA
135	SCHA, KNS5, NCFF,SCEB,SCWT, TCA0	--
136	SCHA, KNS5, NCFF, SCEB, SCWT, TCA0	--
137	--	SCHA
138	SCHA, KNS5, NCFF, NCSL, SCEB, TCA0	--
140	--	SCHA
148	SCHA, KNS6, NCFF, SCEB, SCWT, TCA0	--
149	SCHA, CCV6, CN15, NCFF, SCEB, SCWT	--
152	SCHA, KNS5, NCFF, SCEB, SCWT, TCA0	--

Figure 27: Base stations utilized by 3102's IAPPK solutions.

B.2.7 Sound Speed Methods

Sound Speed Cast Frequency: CTD cast performed by launches 3101 & 3102 were taken at a minimum of 4 hour intervals; or in areas where surface sound speed changed by 3 m/s compared to the previous cast taken. MVP casts were performed by S222 at a minimum of 30 minute intervals; or in areas where surface sound speed changed by 3 m/s compared to the previous cast taken.

For survey H12779, two MVP casts taken outside the sheet exceeded the distance limits determined by HSSD section 5.2.3.3. The two casts were not removed from the applied sound velocity profiles due to the field unit's observations of depths where they were taken. The observed depths provided adequate sound speed profiles to be applied to the data close by, and did display characteristics or values that differed from the surrounding environment.

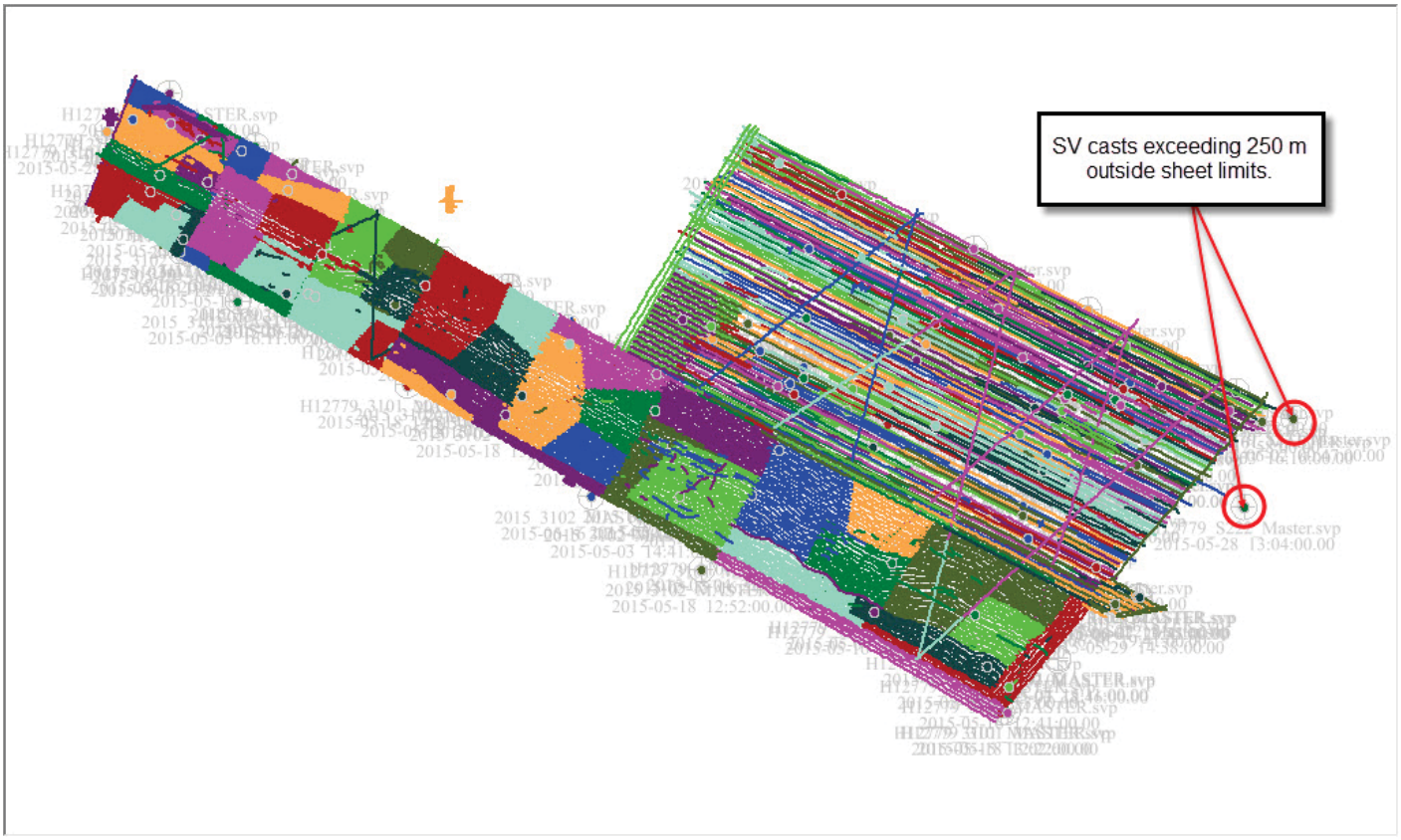


Figure 28: H12779 geographic coverage of sound velocity casts from S222, 3101 and 3102.

B.2.8 Coverage Equipment and Methods

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

B.2.9 Density Requirements for survey H12779

Density requirements for H12779 were analyzed using the Pydro Finalized CSAR QA script. It was found 99.6% of H12779_MB_1m_MLLW_Final.csar nodes contain five or more soundings. It was found 99.9% of H12779_MB_50cm_MLLW_Final.csar nodes contain five or more soundings. It was found 99.8% of H12779_MB_1m_Combined_MLLW_Final.csar nodes contain five or more soundings.

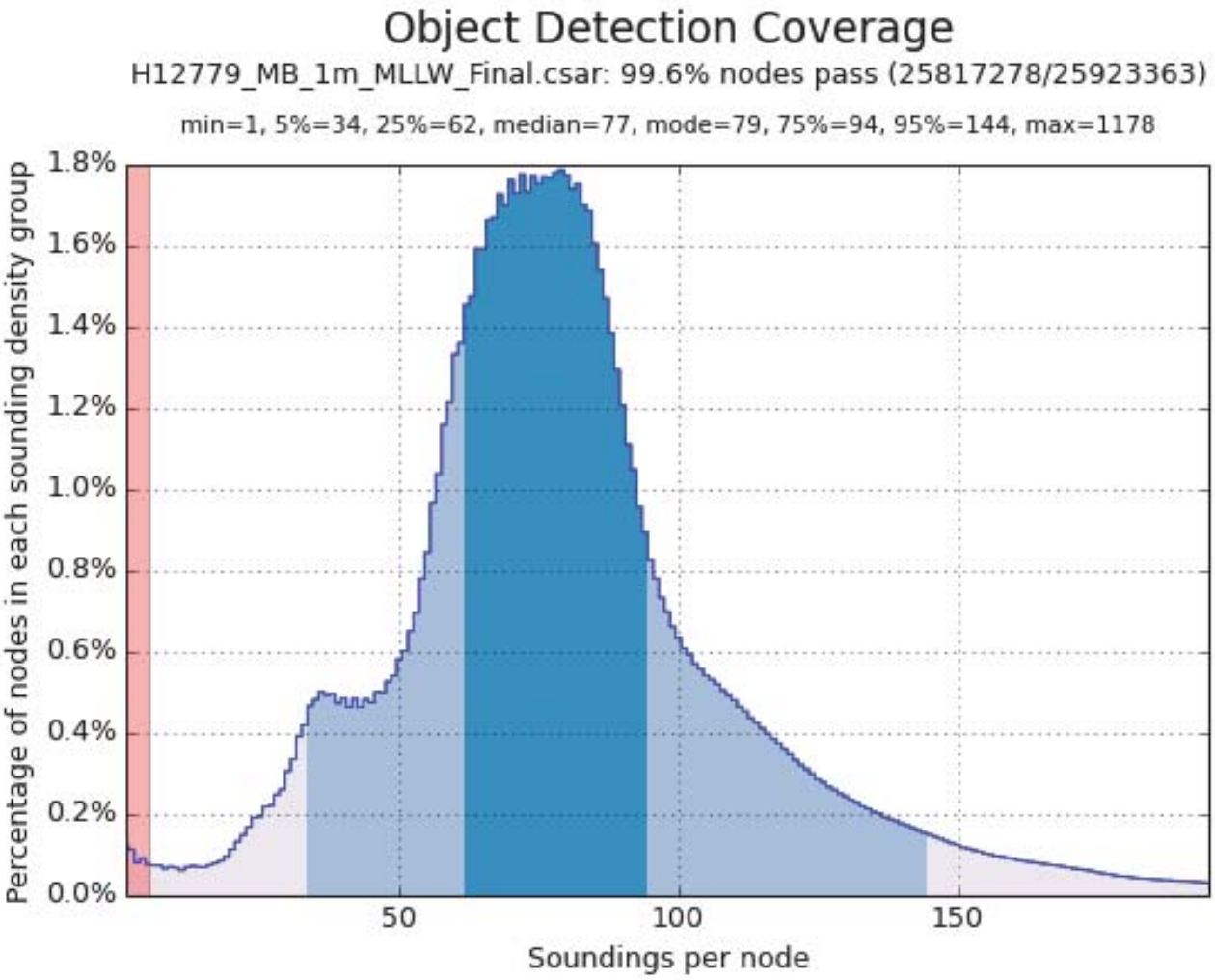


Figure 29: H12779_MB_1m_MLLW_Final.csar Object Detection Coverage, 99.6%

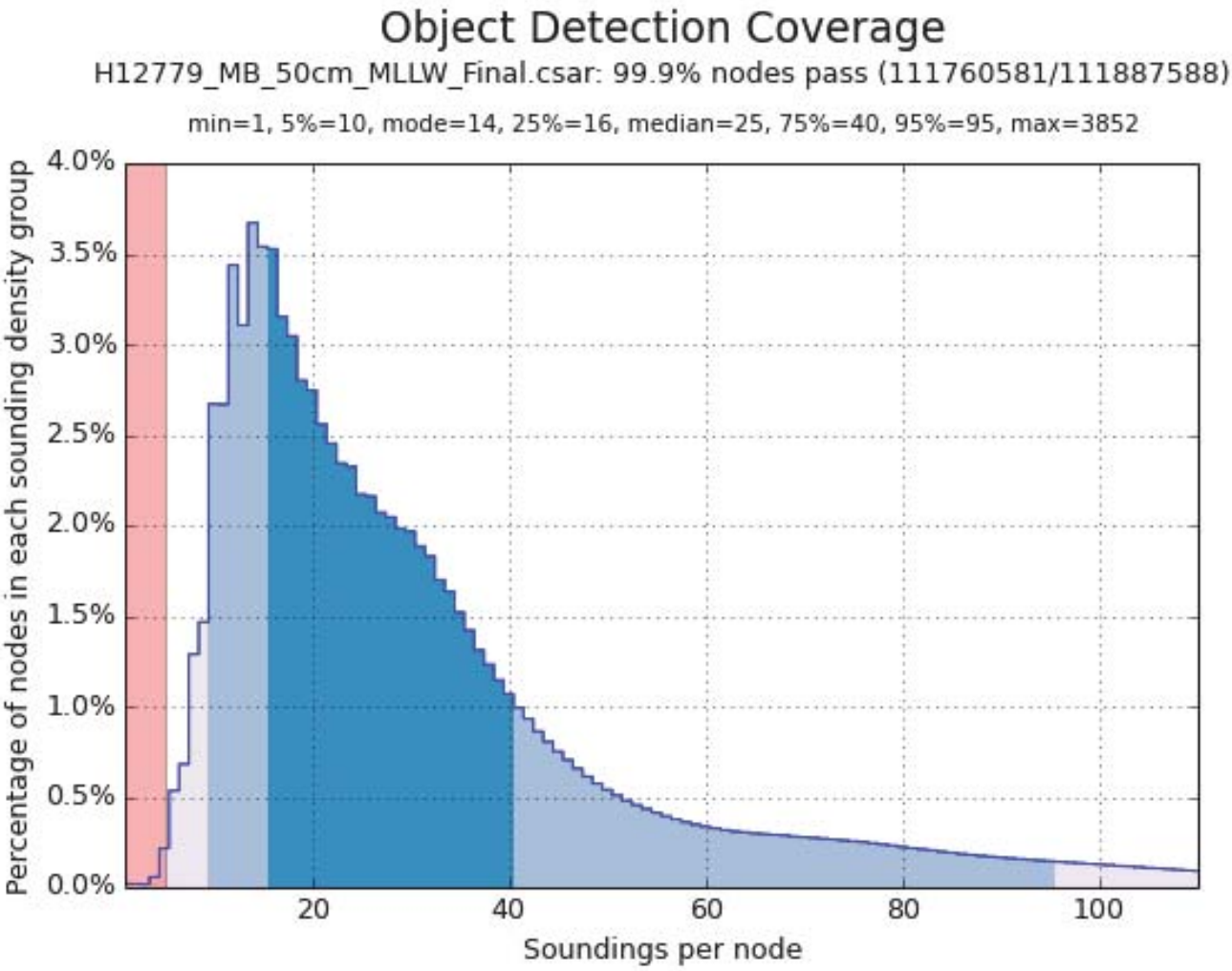


Figure 30: H12779_MB_50cm_MLLW_Final.csar Object Detection Coverage, 99.9%

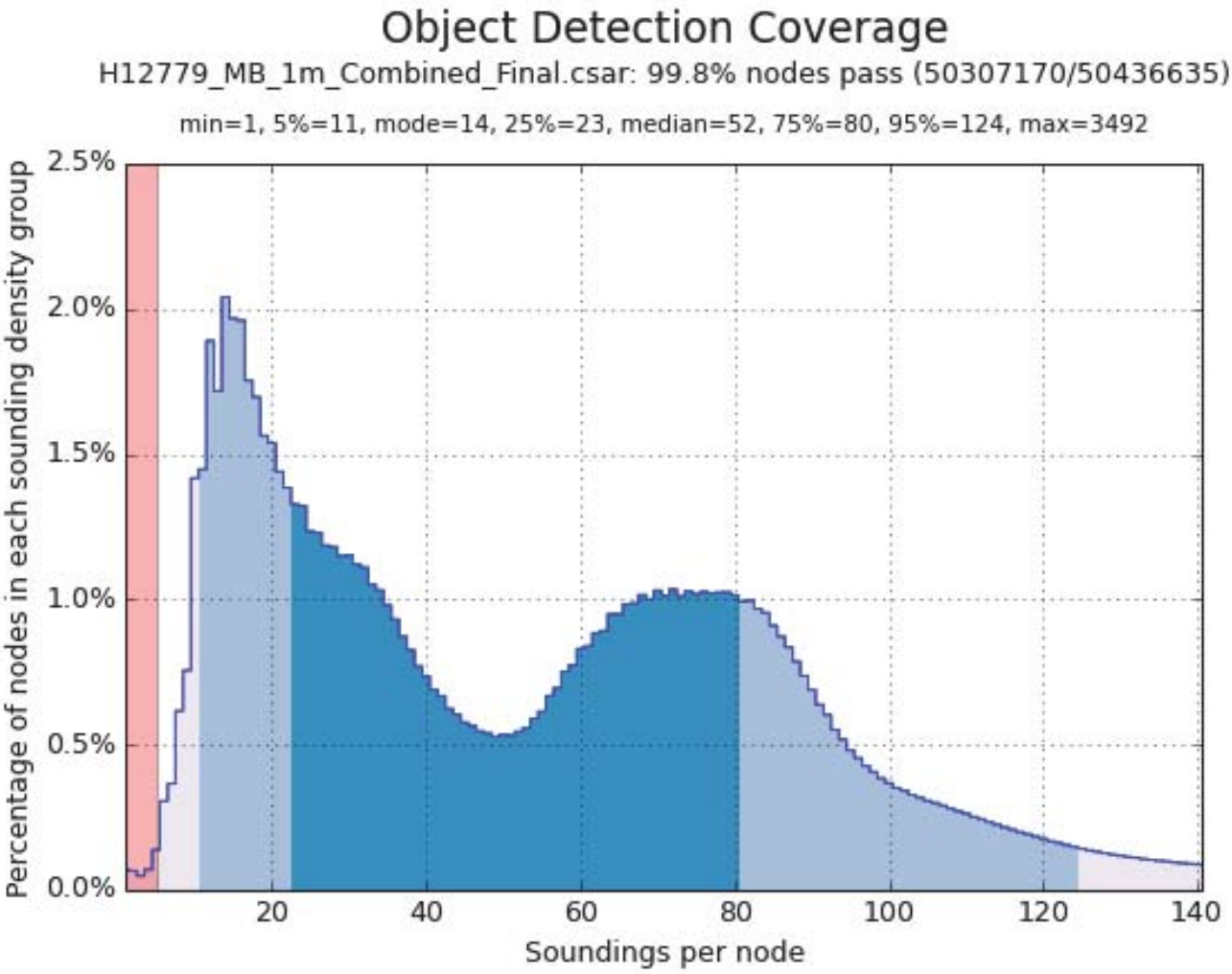


Figure 31: H12779_MB_1m_MLLW_Combined_Final.csar Object Detection Coverage, 99.8%

B.3 Echo Sounding Corrections

B.3.1 Corrections to Echo Soundings

Static draft measurements were taken for S222 during survey acquisition for H12779 and applied to it's HVF after the initial DAPR was signed. Updates to the S222 HVF can be found in the DAPR Appendix_I_Vessel_Reports.

B.3.2 Calibrations

All sounding systems were calibrated as detailed in the DAPR.

B.4 Backscatter

Backscatter data was logged as 7k files and submitted to the Atlantic Hydrographic Branch for processing. One line per vessel, per day was processed aboard the Thomas Jefferson in order to assess and ensure quality.

B.5 Data Processing

B.5.1 Software Updates

The following software updates occurred after the submission of the DAPR:

Manufacturer	Name	Version	Service Pack	Hotfix	Installation Date	Use
Caris	HIPS/SIPS	9.0.13			04/14/2015	Processing
Caris	HIPS/SIPS	9.0.14			06/07/2015	Processing
Caris	HIPS/SIPS	9.0.16			07/24/2015	Processing
Caris	HIPS/SIPS	9.017			08/30/2015	Processing
Applanix	PosPAC	7.1.5637.21708			08/30/2015	Processing

Table 8: Software Updates

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
H12779_MB_1m_MLLW_Finalized	CUBE	1 meters	6.15 meters - 24.30 meters	NOAA_1m	200% SSS
H12779_MB_50cm_MLLW_Finalized	CUBE	0.5 meters	2.23 meters - 23.51 meters	NOAA_0.5m	Object Detection
H12779_MB_1m_MLLW_Combined_Finalized	CUBE	1 meters	3.51 meters - 24.30 meters	NOAA_1m	Object Detection
H12779_SSS_100	SSS Mosaic	1 meters	-	N/A	100% SSS

Surface Name	Surface Type	Resolution	Depth Range	Surface Parameter	Purpose
H12779_SSS_200	SSS Mosaic	1 meters	-	N/A	200% SSS

Table 9: Submitted Surfaces

Per section 5.2.2.1 of the NOAA HSSD Manual (ed 2015), all Object Detection MBES data was gridded according to depth: 0.5m resolution for depths ranging from 0 - 20m.

Per section 5.2.2.1 of NOAA HSSD Manual (2015 ed), MBES surfaces were gridded according to the Project Instructions for OPR-B380-TJ-15 guidelines for 200% side scan sonar with set multibeam line spacing. For the 1m grid, the chief hydrographer decided to exceed the requirements for set line spacing, by using object detection methods, because the data met the specifications outlined in HSSD.

B.5.3 Multimbeam Data Filters

A swath filter was applied to the data to remove sonar side lobe anomalies in the RESON SV2 system. The filter used logic that rejected bathymetric data points beyond 60 degrees on either side of nadir. The filter was only applied to cross lines. All other erroneous data was manually rejected by the hydrographer during normal data processing and editing.

C. Vertical and Horizontal Control

Per section 5.1.2.3 of the FPM (2014 ed), no Horizontal and Vertical Control Report has been generated for Survey H12779.

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
Charleston	8665530

Table 10: NWLON Tide Stations

File Name	Status
8665530.tid	Final Approved

Table 11: Water Level Files (.tid)

File Name	Status
G380TJ2015CORP.zdf	Final

Table 12: Tide Correctors (.zdf or .tc)

A request for final approved tides was sent to N/OPS1 on 07/07/2015. The final tide note was received on 07/29/2015.

Refer to Tide Note for Hydrography in the Descriptive Report Appendices I-Tide & Water Levels.

Non-Standard Vertical Control Methods Used:

VDatum

Ellipsoid to Chart Datum Separation File:

2015_G380_VDatum_NAD83_MLLW_rev2.csar

All soundings submitted as H12779 are reduced to MLLW using documented VDatum techniques. If it is deemed necessary to change the water level reduction method to discrete zoning the following additional information will be useful:

1) The National Water Level Observation Network (NWLON) stations serving as datum control for this survey is Charleston, SC (8665530).
2) The submitted water level files (8665530_Verified.tid) are the final approved water levels for the period of hydrography. These files have been loaded to all CARIS lines submitted as H12779.
3) The submitted tide corrector (G380TJ2015CORP.zdf) is the preliminary zoning file that was accepted as final per final tide note, submitted in Appendix I. This file has been loaded to all CARIS lines submitted as H12779.

4) A request for final approved tides was sent to COOPS on 07 July 2015. The final tide note was received on 29 July 2015, stating that preliminary zoning is accepted as the final zoning for project OPR-G380-TJ-15, H12779.

C.2 Horizontal Control

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

The projection used for this project is The projection used for this project is UTM zone 17 north. Additional information discussing the use of 5P for this survey can be found in the accompanying DAPR..

The following PPK methods were used for horizontal control:

Smart Base
Single Base

NOAA Ship Thomas Jefferson and her launches acquire positioning data via POSMV TPUs. S222 utilizes a POSMV 5, while launches 3101 and 3102 utilize a POSMV 4. The POSMV 4 TPUs have an upgraded firmware package allowing them to collect data comparable to a POSMV 5. All of these TPUs utilize a Fugro Marinestar Virtual Base Station subscription which collects Precise Point Positioning data.

D. Results and Recommendations

D.1 Chart Comparison

Chart comparison procedures were followed as outlined in section 4.5 of the FPM (2014 ed) and section 8.1.4 sub section D.1 of the HSSD (2015 ed). The ENC and RNC versions of the relevant charts were reviewed to ensure that the latest USCG Local Notice to Mariners (LNM) has been applied.

Additional chart comparisons for survey H12779 were conducted using a selected sounding set generated at chart scale (1:40000) with a radius of 1m. In CARIS BDB, the soundings were then converted into a point cloud, from which a 1m interpolated surface was generated. Contouring was run on the interpolated surface and the results are shown in the figure below.

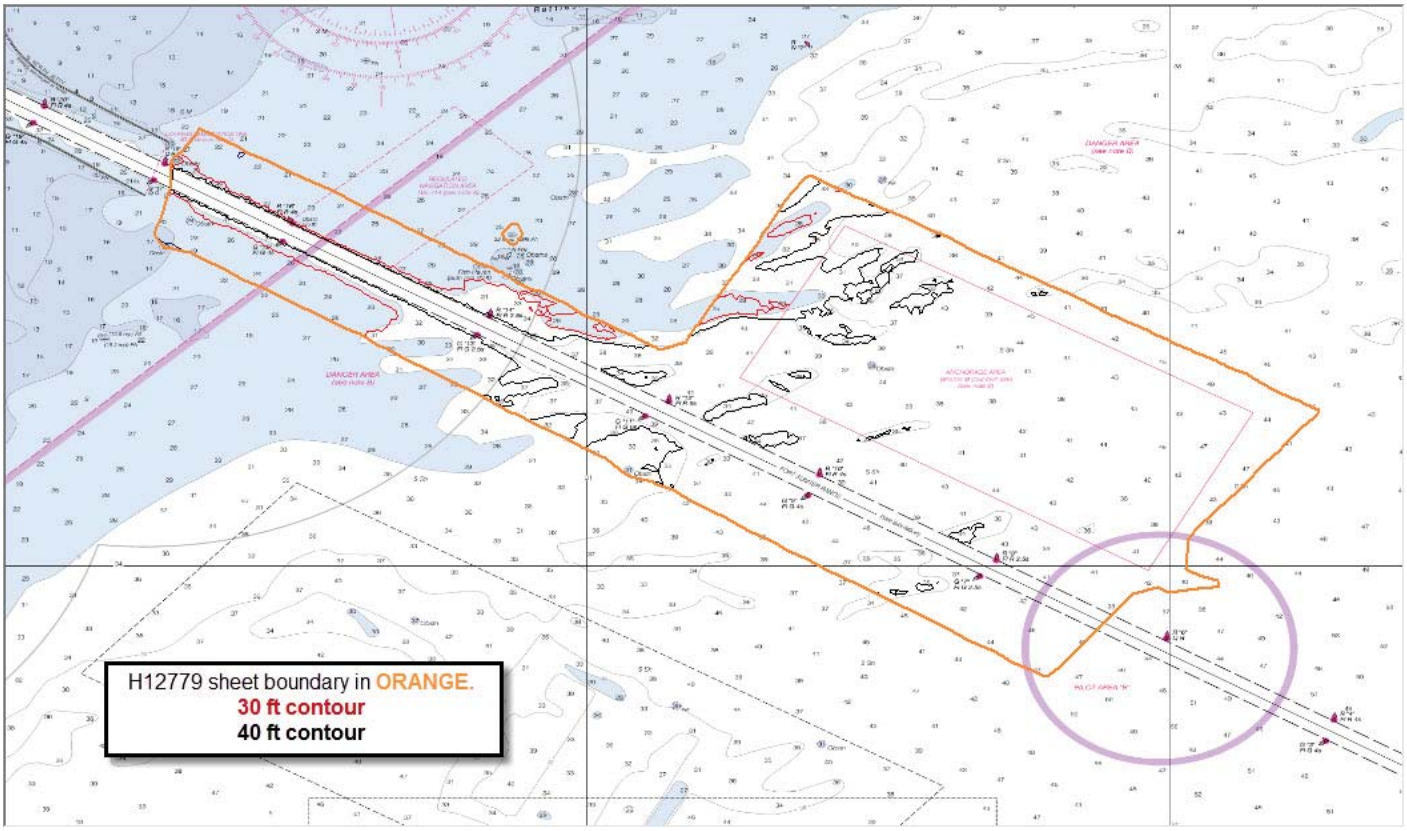


Figure 32: Contours derived from H12779 data overlaid on RNC 11528.

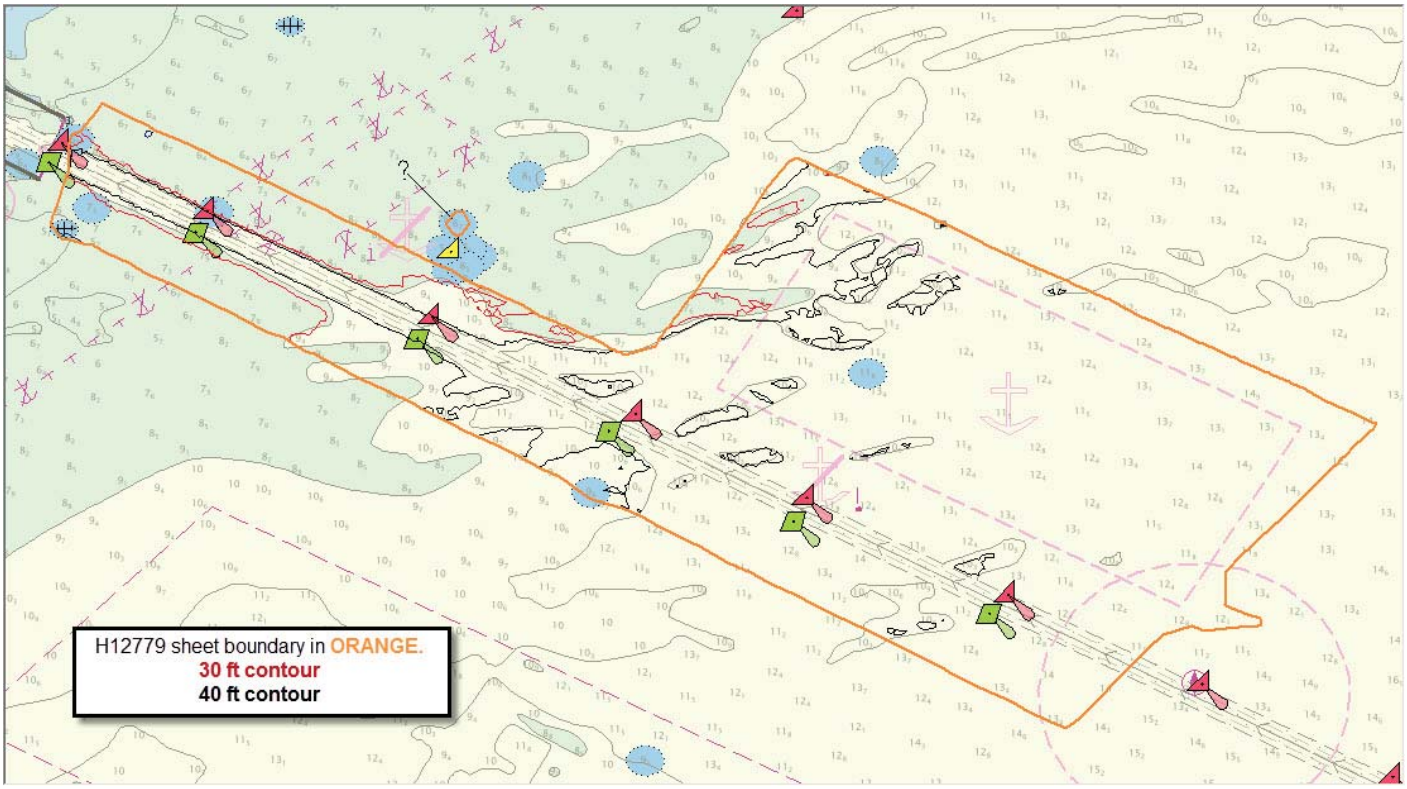


Figure 33: Contours derived from H12779 data overlaid on ENC US5SC25M

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
11528	1:40000	1	07/2014	09/02/2015	07/07/2015

Table 13: Largest Scale Raster Charts

11528

In general, survey H12779 is in agreement with chart 11528. The smoothed contours of the chart are in general agreement to surveyed soundings, though perhaps too generalized for the area. Surveyed depths concur with charted depths within 1-2ft. The Hydrographer recommends updating all contours and soundings with the digital data from survey H12779.

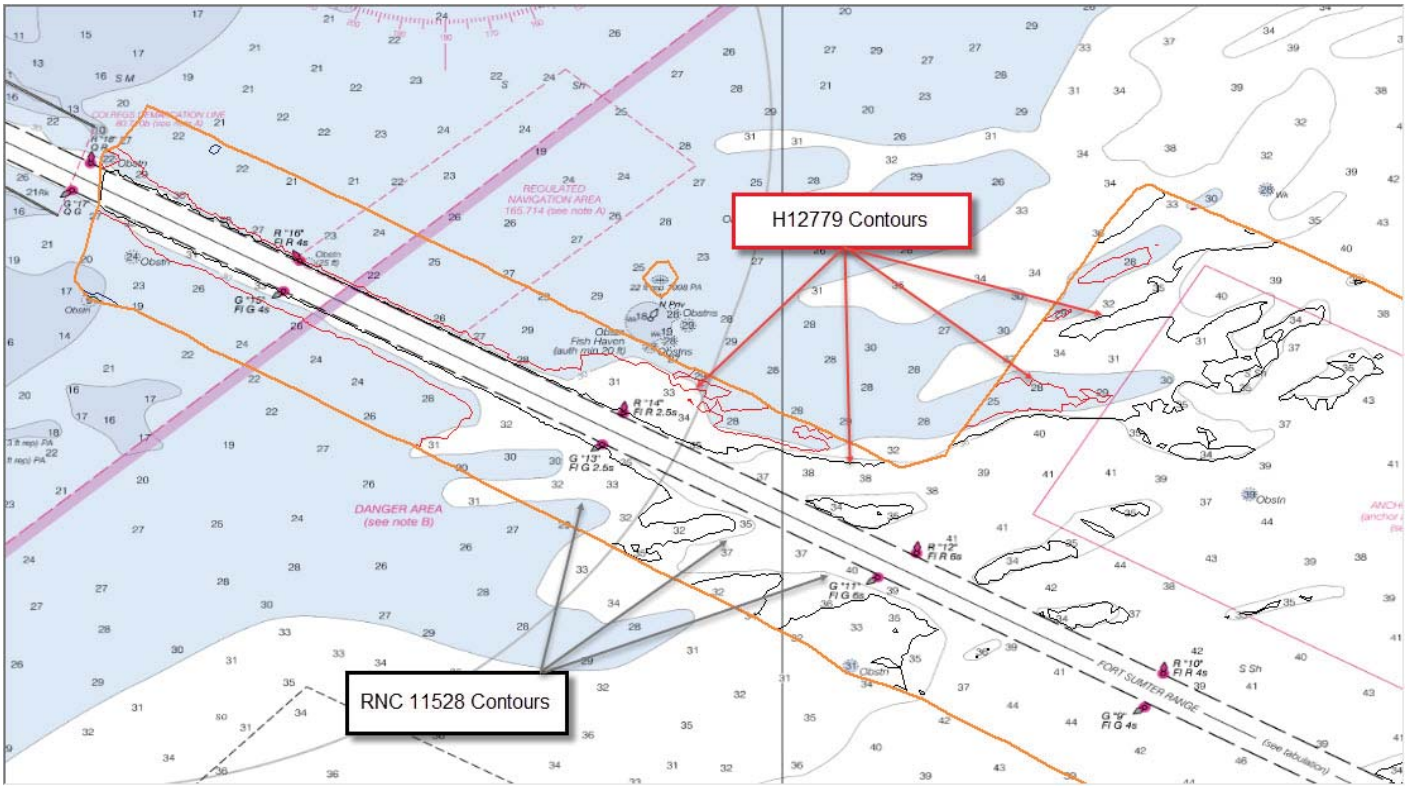


Figure 34: Western section of H12779 RNC comaprison.

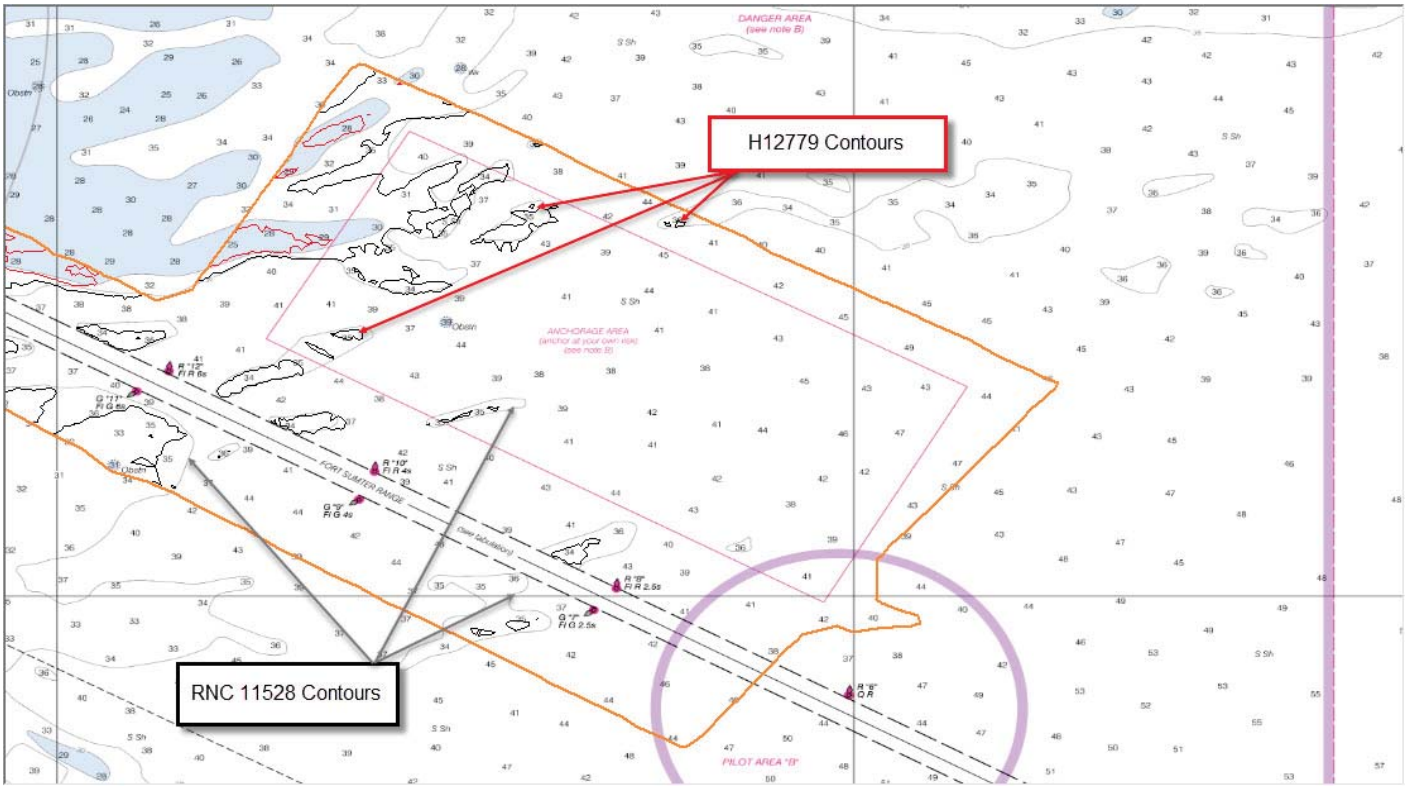


Figure 35: Western section of H12779 RNC comaprison.

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?
US5SC25M	1:40000	1	06/17/2015	06/17/2015	NO

Table 14: Largest Scale ENCs

US5SC25M

In general, survey H12779 is in agreement with ENC US5SC25M. The smoothed contours of the chart are in general agreement to surveyed soundings, though perhaps too generalized for the area. Surveyed depths concur with charted depths within 1-2ft. The Hydrographer recommends updating all contours and soundings with the digital data from survey H12779.

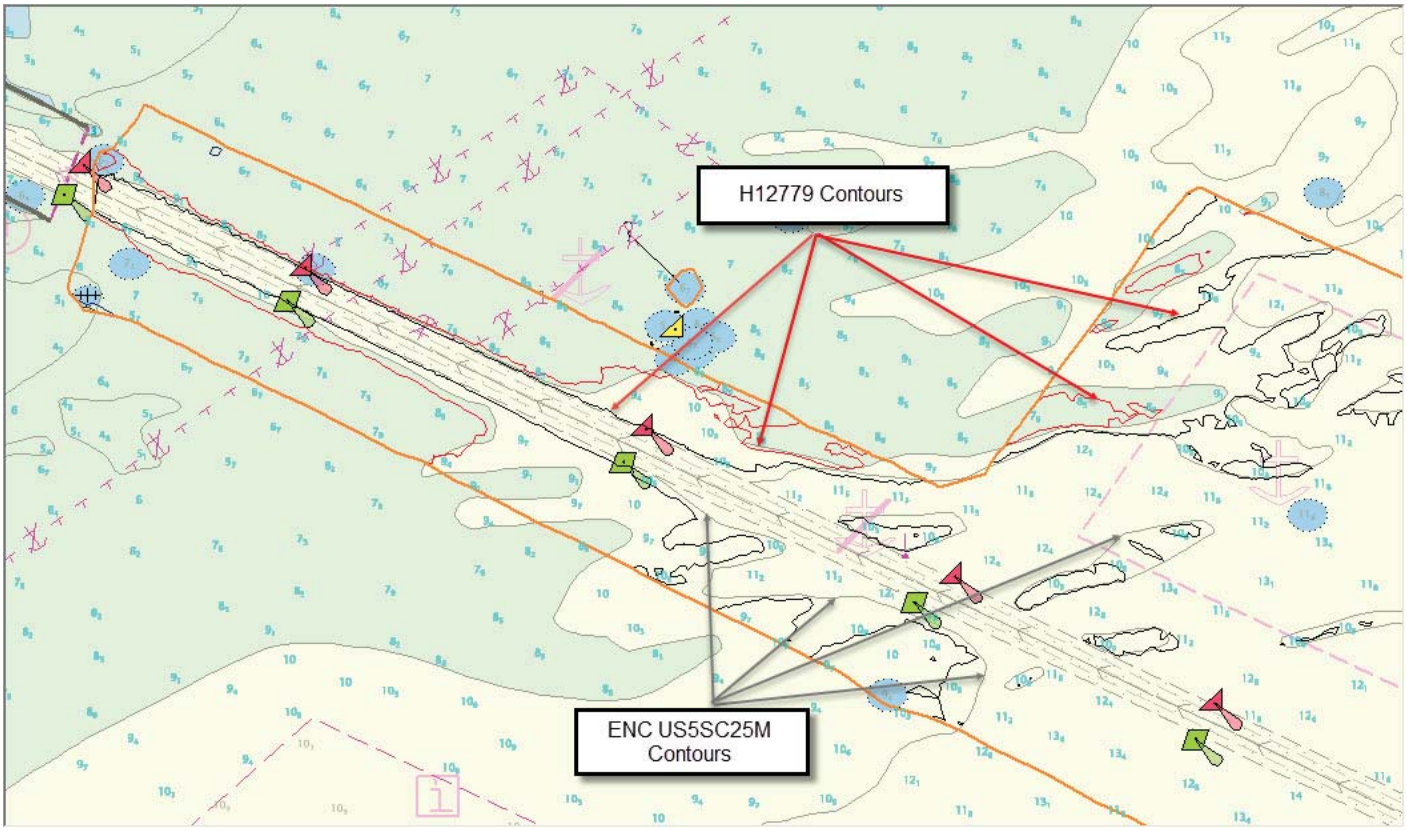


Figure 36: Western portion of H12779 contours compared to ENC US5SC25M.

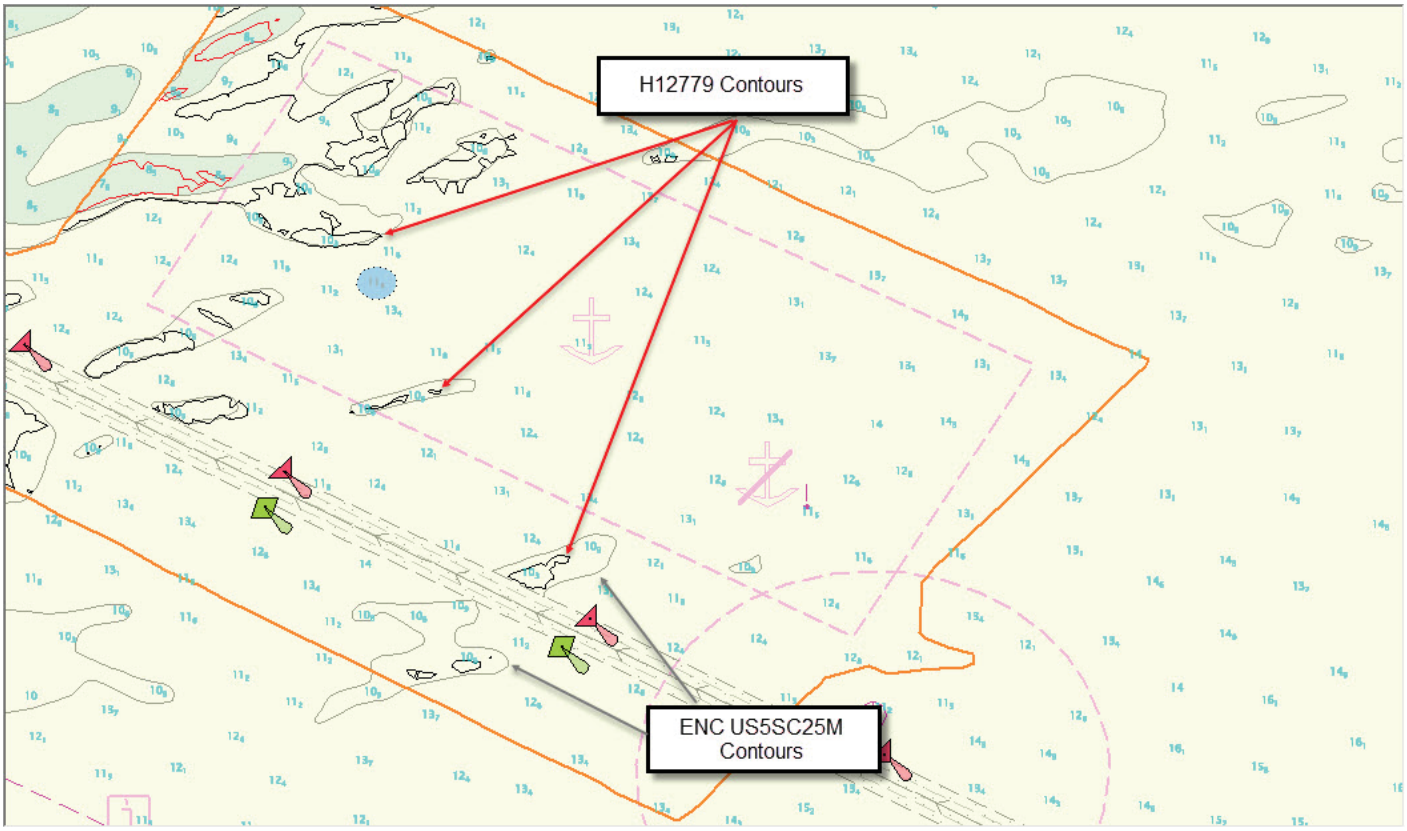


Figure 37: Eastern portion of H12779 contours compared to ENC US5SC25M.

D.1.3 AWOIS Items

No AWOIS items were assigned for this survey.

D.1.4 Maritime Boundary Points

No Maritime Boundary Points were assigned for this survey.

D.1.5 Charted Features

A total of 17 charted features were investigated during the course of survey H12779. Consult the H12779_FFF.hob file for more information about the charted features in the survey area.

D.1.6 Uncharted Features

A total of 10 uncharted features were discovered in survey H12779. Consult the H12799_FFF.hob file for more information about the charted features in the survey area.

D.1.7 Dangers to Navigation

The following DTON reports were submitted to the processing branch:

DTON Report Name	Date Submitted
Dangers to Navigation for Survey H12779	2015-05-28

Table 15: DTON Reports

Danger to Navigation Reports are included in Appendix II of this report.

D.1.8 Shoal and Hazardous Features

All shoals are in agreement with the previously charted depths.

D.1.9 Channels

Survey H12779 encompasses 7.730 linear nautical miles of the Fort Sumter Range which has a maintained depth of 47 feet. Comparing a sounding set based on the depth layer of H12779_MB_50cm_MLLW_Final CUBE surface to the most recent chart it was found that most of the soundings are 2 feet deeper than the controlled depth.

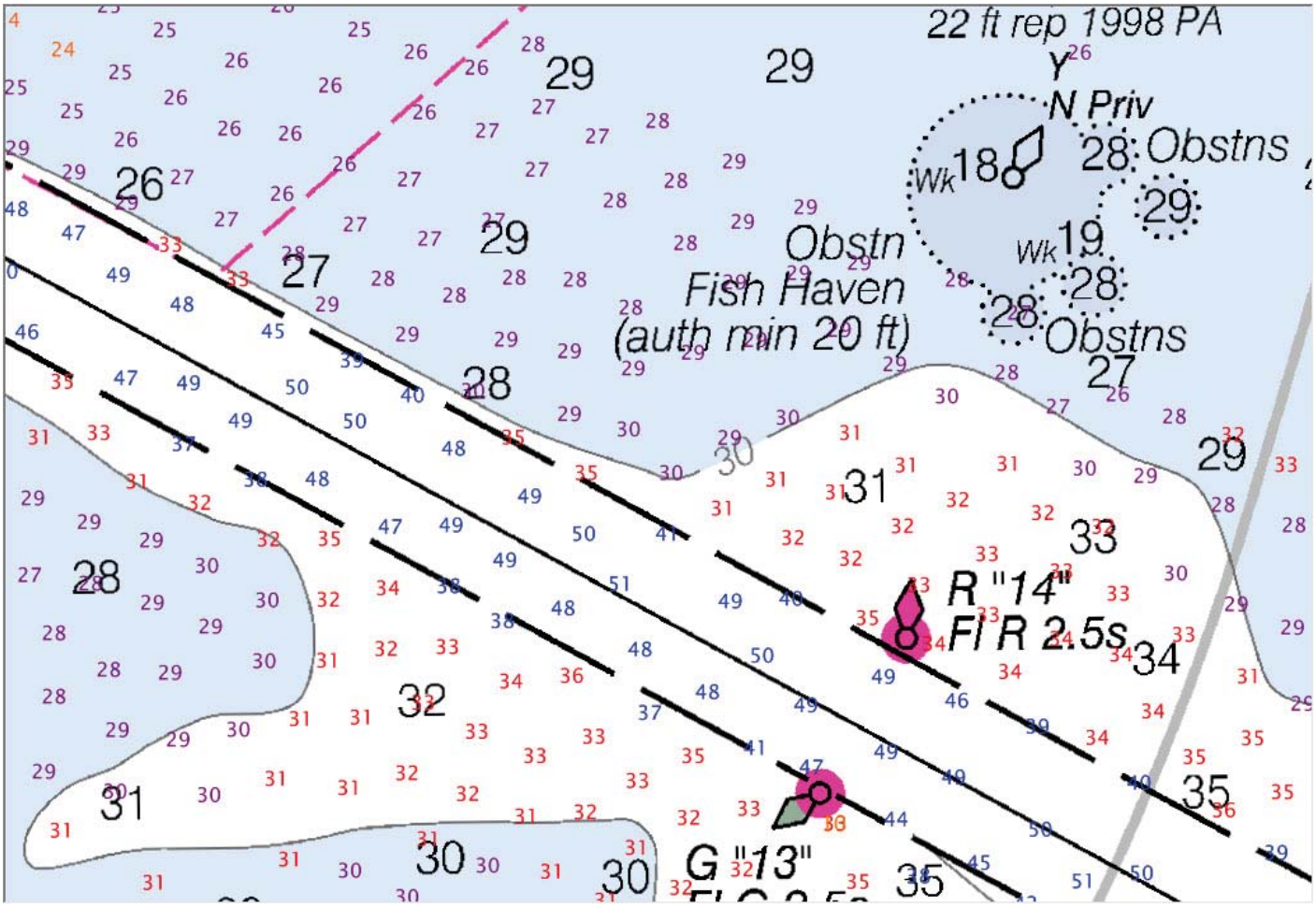


Figure 38: Soundings plotted form H12779_MB_1m_MLLW_Combined_Final CUBE surface.

D.1.10 Bottom Samples

No bottom samples were required for this survey.

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

Consult H12779_FFF.hob.

D.2.9 Construction and Dredging

No present or planned construction or dredging exist within the survey limits, except within the channel maintained by the Army Corps of Engineers.

D.2.10 New Survey Recommendation

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

D.2.11 Inset Recommendation

No new insets are recommended for this area.

E. Approval Sheet

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

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

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

Approver Name	Approver Title	Approval Date	Signature
Shepard M. Smith, CAPT/NOAA	Chief of Party	11/15/2015	 c=US, o=U.S. Government, ou=DoD, ou=PKI, ou=NOAA, cn=SMITH.SHEPARD.M.1006778930 2015.11.15 19:11:58 -05'00'
Joseph K. Carrier, LT/NOAA	Field Operations Officer	11/15/2015	 DN: c=US, o=U.S. Government, ou=DoD, ou=PKI, ou=NOAA, cn=CARRIER.JOSEPH.KELSO.III.1553373152 Date: 2015.11.15 15:48:50 Z
Alex C. Ligon	Sheet Manager	11/15/2015	Alex Campfield Ligon Digitally signed by Alex Campfield Ligon DN: cn=Alex Campfield Ligon, o=NOAA, ou=Thomas Jefferson, email=alex.c.ligon@noaa.gov, c=US Date: 2015.11.16 16:51:42 Z

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 Porpagated Error
TPU	Topside Processing Unit
USACE	United States Army Corps of Engineers
USCG	United Stated Coast Guard
UTM	Universal Transverse Mercator
XO	Executive Officer
ZDA	Global Positiong System timing message
ZDF	Zone Definition File

APPENDIX I

TIDES AND WATER LEVELS

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

TIDE NOTE FOR HYDROGRAPHIC SURVEY

DATE : July 07, 2015

HYDROGRAPHIC BRANCH: Atlantic
HYDROGRAPHIC PROJECT: OPR-G380-TJ-2015
HYDROGRAPHIC SHEET: H12779

LOCALITY: Approaches to Charleston, SC
TIME PERIOD: May 03 - June 16, 2015

TIDE STATION USED: 8665530 Charleston, SC
Lat. 32° 46.9'N Long. 79° 55.4' W
PLANE OF REFERENCE (MEAN LOWER LOW WATER): 0.000 meters
HEIGHT OF HIGH WATER ABOVE PLANE OF REFERENCE: 1.648 meters

REMARKS: RECOMMENDED ZONING

Preliminary zoning is accepted as the final zoning for project OPR-G380-TJ-2015, H12779, during the time period between May 03 - June 16, 2015.

Please use the zoning file G380TJ2015CORP submitted with the project instructions for OPR-G380-TJ-2015. Zones SA138 and SA162 are the applicable zones for H12779.

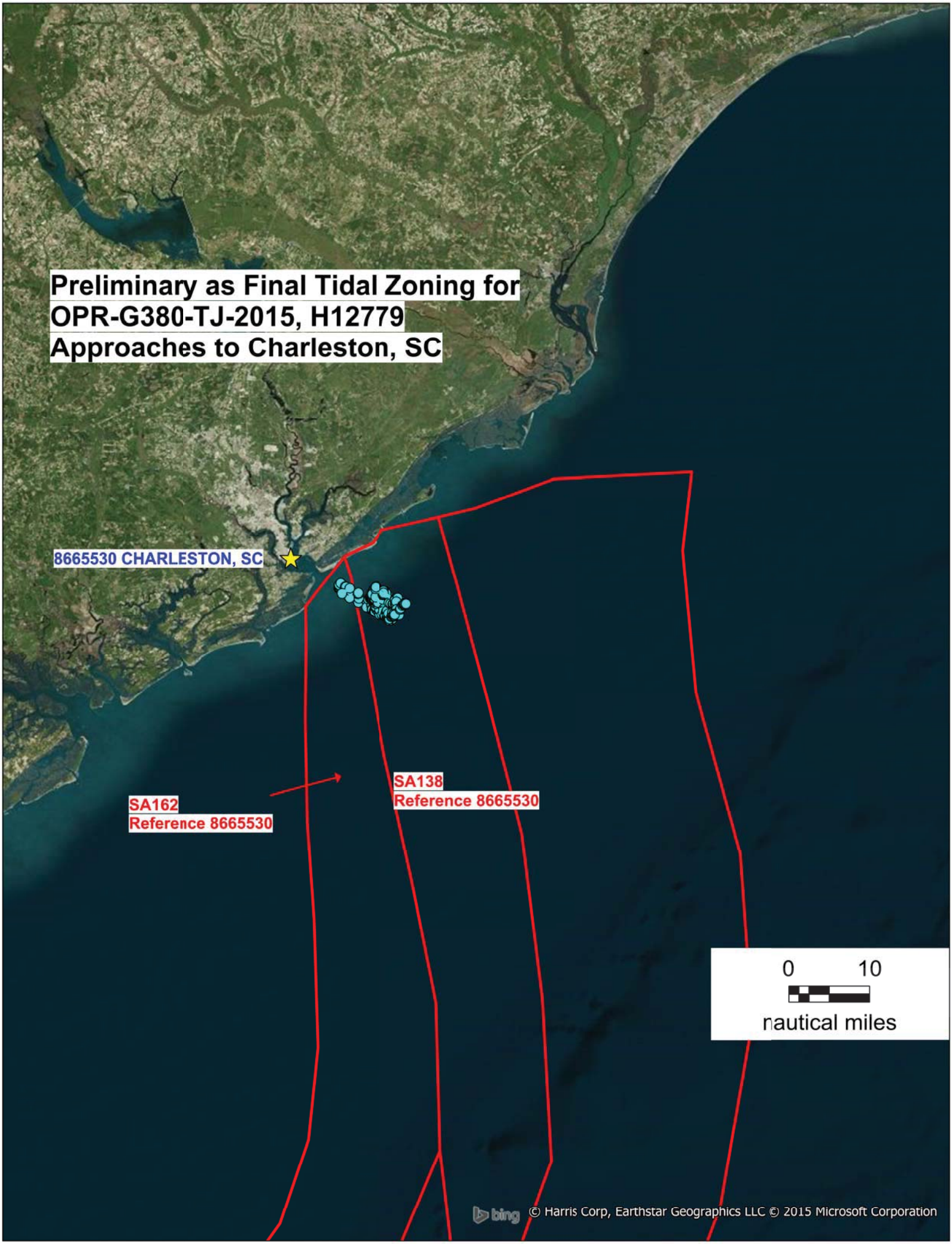
Refer to attachments for zoning information.

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: 2015.07.08 14:46:36 -04'00'

CHIEF, PRODUCTS AND SERVICES BRANCH


Preliminary as Final Tidal Zoning for
OPR-G380-TJ-2015, H12779
Approaches to Charleston, SC
8665530 CHARLESTON, SC
SA138
Reference 8665530
SA162
Reference 8665530
0
10
nautical miles
bing
© Harris Corp, Earthstar Geographics LLC © 2015 Microsoft Corporation

APPENDIX II

SUPPLEMENTAL SURVEY RECORDS AND CORRESPONDENCE

Alex Ligon - NOAA Federal <alex.c.ligon@noaa.gov>

Fwd: OPR-G380-TJ-15: DTON

1 message

Joseph Carrier - NOAA Federal <joseph.carrier@noaa.gov> Tue, Mar 8, 2016 at 6:56 PM
To: Alex Ligon - NOAA Federal <alex.c.ligon@noaa.gov>

____
Joseph K. Carrier III, LT/NOAA
Acting Executive Officer, NOAA Ship *Thomas Jefferson*

439 West York Street
Norfolk, VA 23510
cell: (757) 647-0187
voip: (541) 867-8927
fax: (757) 512-8295
http://www.moc.noaa.gov/tj/

---------- Forwarded message ----------
From: **Joseph Carrier - NOAA Federal** <joseph.carrier@noaa.gov>
Date: Tue, Jun 9, 2015 at 12:16 PM
Subject: OPR-G380-TJ-15: DTON
To: ocs.ndb@noaa.gov
Cc: Michael Gonsalves - NOAA Federal <michael.gonsalves@noaa.gov>, Matthew Jaskoski - NOAA Federal <matthew.jaskoski@noaa.gov>, Kathryn Pridgen - NOAA Federal <kathryn.pridgen@noaa.gov>, "CO.Thomas Jefferson - NOAA Service Account" <co.thomas.jefferson@noaa.gov>

Hello,

TJ located a submerged crane adjacent to the Charleston, SC shipping channel. The feature is currently charted as a position approximate however the actual feature is located well to the south of the PA. Please see attached H12779_DTON package and if you have any further questions, please don't hesitate to email or call at your convenience.

Very respectfully,
Joe Carrier, LT/NOAA

Field Operation's Officer, NOAA Ship *Thomas Jefferson*
439 West York Street
Norfolk, VA 23510
cell: (757) 647-0187
voip: (301) 713-7782
fax: (757) 512-8295
http://www.moc.noaa.gov/tj/

H12779_DTON.zip
625K

Coast Pilot 4 – Chapter 6
Charts 11528, 11524, 11521

(126) **Charleston Harbor**, 264 miles southwestward of Cape Hatteras and 65 miles northeastward of Savannah River, is the approach to the city of Charleston and to the Cooper, Wando and Ashley Rivers. The harbor is easy of access day or night in clear weather, and is one of the best harbors of refuge on the South Atlantic coast. **Charleston Harbor Wildlife Sanctuary** is a Marine Protected Area (MPA).

(127)**Caution**

(128) The areas generally to the east and southeast of Charleston Harbor are used extensively by the US Navy and other military services to conduct various types of surface, subsurface, and aircraft training exercises. Fleet Area Control and Surveillance Facility (FACSFAC), Jacksonville, FL, exercises cognizance of the operating areas, makes area assignments, ensures promulgation of firing notices, issues schedules, and prescribes necessary additional regulations.

(129) The entrance to Charleston Harbor is between converging jetties. The north jetty is almost completely submerged at MHW. There are no lights on the jetties and smaller craft approaching from the north close to shore at MHW should exercise extreme caution not to confuse the south jetty for the north jetty. It is recommended all vessels align seaward of Lighted Buoy 18 before final approach to the jetty entrance.

(130) **Charleston**, the largest city and port in South Carolina, is at the confluence of Cooper and Ashley Rivers. The distance from the end of the jetties to the southernmost wharves at Charleston is about 7 miles. The city is a center of a rich agricultural district for which it is the distributing point. Numerous manufacturing plants are in and near the city. The principal wharves are along the west bank of Cooper River and the east bank of the Wando River. Imports are building cement, plywood, wool, bananas, nonferrous ores, chemicals, fertilizer, frozen meats, automobiles, steel products, naval stores and petroleum products. Exports are soybeans, clay, paper products, corn, wood pulp, lumber, heavy machinery, chemicals, fertilizer, textiles, automobiles and general cargo.

(132)

Prominent features

(133) The entrance to Charleston Harbor is between converging jetties which extend nearly 3 miles seaward. Prominent to the northward of the entrance are several tanks on Sullivans Island and one on Isle of Palms, and the Charleston Light. **Fort Moultrie** and the town of **Sullivans Island** are on the north side of the entrance; the 155-foot conical tower of the abandoned old Charleston Lighthouse on Morris Island is south of the entrance; **Fort Sumter** is on the southwest side of the channel just inside the entrance.

(134) The twin diamond-shaped towers of the (US Route 17) Ravenel fixed bridge are reported to be 575 feet tall and clearly visible to the mariner before entering the channel. The bridge is brightly lit at night. Lighted buoys mark the west and east sides of the channel, respectively.

(135) **Charleston Light** (32°45'29"N., 79°50'36"W.) 163 feet above water, is shown from a triangular tower, upper half black, lower half white, on Sullivans Island.

(136)
COLREGS Demarcation Lines

(137) The lines established for Charleston Harbor are described in **80.710**, chapter 2.

(138)
Charleston Harbor Navigational Guidelines

(139) In recent years, a substantial number of oceangoing vessels of increased size and draft have begun calling at the Port of Charleston. Although the waterways of Charleston Harbor compare favorably with other ports of the same approximate volume of shipping, the maritime interests of the port have prudently considered the publication of a number of safe navigational practices and procedures that have evolved in recent years. These practices and procedures are known as the Charleston Harbor Navigational Guidelines.

(140) It is recommended that all vessels, particularly those which must navigate in the channel because of draft constraints, hereafter referred to as deep-draft vessels, strictly adhere to these guidelines. Nothing in them shall supersede nor alter any applicable laws or regulations. In construing and complying with these guidelines, regard shall be had to all dangers to navigation and collision and to any special circumstances, including the limitations of the vessels involved, which may make a departure from the guidelines necessary to avoid immediate danger.

(141) For purposes of these guidelines, **poor-handling vessels** are those, which because of their configuration, history of loss of controllability, or steering characteristics, or low power, are unable to consistently navigate within the channel half width or cannot maintain a speed of 8 knots through the water. If an adequate number of tugs are made fast to provide maneuverability, power, and a capable speed through the water of at least 8 knots, the assisted vessel will not be considered a poor handling vessel. Tandem tows, except for small scows and nondescript vessels which operate outside the main channel should not be attempted.

(142) For the purposes of these guidelines, the inbound approach to the (U.S. Route 17) Ravenel fixed bridge spans over Hog Island Reach commences at Lighted Buoy 28 (32°46'22"N., 79°53'15"W.) on Rebellion Reach. Inbound vessels intending to transit the Cooper River upstream of the fixed bridge should give a security call on VHF-FM channel 13 upon entering Mount Pleasant °44.4'N., 79°50.7'W.).

(143) Commercial vessels outbound from piers above the fixed bridge should give a similar Security call when unmoored or beginning the downbound transit. Poor- handling vessels intending to transit reaches of the Cooper River above Rebellion Reach should be prepared to delay their transit to allow other vessels to clear outbound or to allow full-powered and more maneuverable vessels to precede them.

(144) Inbound poor-handling vessels should not proceed in Rebellion Reach past Buoy 28 but rather should anchor or heave-to out of the channel to await the passage of outbound vessels or more maneuverable inbound vessels.

(145) Outbound poor-handling vessels should not depart their berths until inbound vessels have passed clear of their berths, or until other vessels scheduled to depart have left their berths and have preceded them down the reaches of the Cooper River.

(146) The maritime interests at the Port of Charleston construe that the navigation safety regulations contained in Title 33, Code of Federal Regulations, Part 162.65, exist to preserve the safety of the port and waterways of Charleston. These regulations are supported by these local interests and reports of violations of those regulations on the part of noncomplying vessel operators will be reported to Coast Guard authorities.

(147)

Draft limitations

(148) While the project depths for Charleston Bar and Charleston Harbor are published as 47 feet and 45 feet, respectively, private dredging operations and natural influences have normally permitted vessels of slightly greater draft than 45 feet to transit the main channels of Charleston Harbor. Tidal ranges average 5.2 feet in most harbor locations. Bar and harbor pilots at Charleston consider actual depths based upon recent soundings, the state of the tide, and the need for under keel clearances to allow for both static and dynamic hydraulic effects between harbor bottom, hull, and the ship's propeller(s). The pilots generally require a four foot margin for clearance, between the lowest point on the vessel's hull and the harbor bottom, for vessels transiting Charleston's waterways at normal harbor speeds. The pilot office provides guidance on all vessel movements in which the vessel's deepest draft is greater than 36 feet, and for tank vessels with deepest drafts over 34 feet.

(149)

Low visibility

(150) Not infrequently, portions of Charleston Harbor are affected by poor visibility. This occurs during line squalls of heavy rain accompanying the passage of frontal systems, rare snow squalls, and fog. Fog associated with a generalized weather pattern occasionally settles over the entire port area including the fairways offshore. Fog over only a part of the harbor, however, is a reasonably frequent occurrence. Vessels, having unmoored in good visibility, may find during their transit that visibility has become reduced to a few yards. Similarly, vessels proceeding inbound from the sea buoy may commence the transit in good visibility only to lose it while transiting the Charleston Harbor.

(151) These aforementioned reduced visibility conditions may last for only several hours or they may extend to several days. The purpose of these guidelines is not to amend nor negate the application of the Rules of the Road and good navigational practice, but to assist vessels underway in transiting

the harbor expeditiously and with minimum risk to themselves and to the port. The Commissioners of Pilotage for the Port of Charleston have issued policy guidance to pilots that whenever visibility is less than 1,000 yards, pilots should not knowingly get a vessel underway outbound, or proceed inbound inshore of Lighted Buoys 27 and 28 on Rebellion Reach, unless an emergency or other special circumstance exists. The pilots licensed by the Commissioners are required to comply with such policy.

(152) During periods of low visibility, the Charleston Branch Pilots provide information to Navy Port Services Division and the National Weather Service on actual visibility conditions experienced at the Pilot Office, located on the Battery (32°46.4'N., 79°55.5'W.), on board the Association pilot boats, and on board oceangoing vessels being piloted by Charleston Branch Pilots. The pilot office monitors VHF-FM channels 13, 14, 16 and 18A on a continuous basis.

(153) The Charleston Branch Pilots Office provides information on visibility and vessel movements to mariners, when requested, and when such information is available. The Charleston Branch Pilots do not accept responsibility for financial losses resulting from information that is provided by their office, nor do they accept liability in the event that deaths, injuries and/or property damages may result from the use or misuse of information provided by the pilot office. The pilot office is, however, in the best position to determine when reduced visibility exists in the Lower Harbor. At times when reduced visibility exists, regulatory action by the Coast Guard Captain of the Port may be necessary. The Charleston Branch Pilots Association may contact the Captain of the Port and recommend such action as may be necessary consistent with the policy guidance of the Commissioners of Pilotage.

(154) At no time shall the Navigation Rules, International- Inland be abridged or amended by these low visibility navigational guidelines. These guidelines are intended to enhance safety under conditions wherein navigation is not otherwise constrained.

(155)

Areas of Particular Concern

(156) Four areas in the Cooper River are considered to be particularly troublesome. These areas are listed in order of ascension when proceeding from sea.

(157) (1) **Intracoastal Waterway** (32°45.7'N., 79°52.3'W.). This represents the eastern conjunction of this waterway with Rebellion Reach. Westbound vessels proceeding on the waterway into Charleston Harbor are not readily visible to vessels inbound from sea until they are clear of the northernmost part of Sullivans Island. This waterway is extensively used by tows, and its junction with the harbor of Charleston is subject to strong and unpredictable crosscurrents at various stages of the tide. Westbound tows intending to enter Charleston Harbor from the Intracoastal Waterway should give a Security call on VHF-FM channel 13, 15 minutes prior to entry, or upon clearing the Ben Sawyer Bridge (32°46.3'N., 79°50.5'W.), and adjust speed so as to enter the harbor when the channel is clear. Every effort, including holding, should be made to avoid unduly restricting deep-draft vessels transiting the main ship channel, and allow them to clear this area when either inbound or outbound.

(158) (2) **Drum Island Turn** (32°48.8'N., 79°54.9'W.).Navigation of this turn is complicated by (a) poor visibility caused by Drum Island blocking the view of vessels approaching one another, (b) close proximity, 700 yards, to the fixed bridge span over Hog Island Reach, and the vulnerability of the bridge to collision in the event vessel control is lost, and (c) crosscurrents on ebb tide from the confluence of the Cooper and Wando Rivers. Vessels should make every effort to avoid meeting at this turn, which includes Hog Island Reach above Lighted Buoy 41, north of the Ravenel Bridge. Commercial vessels should give another Security call on VHF-FM channel 13, 15 minutes prior to arriving at this turn. The vessel with the fair tide should initiate a proposal for meeting or passing and the vessel stemming the tide should hold as necessary. Any departure from this procedure should be agreed to by both vessels in a timely manner. Poor-handling vessels should not attempt to navigate this turn, except when a suitable number of tugs are immediately available for assistance, because such vessels are likely to become unmanageable, raising a substantial risk of collision with the bridge abutments and, thereby, becoming a threat to the lives of persons in the vehicles on the bridge. Local knowledge is necessary to predict current effects as they tend to set across the channel on both the flood and ebb.

(159) (3) **Shipyard Creek Junction** (32°49.7'N., 79°55.8'W.). This junction is complicated by the movement of vessel traffic in and out of Shipyard Creek and by ebb currents of unusually high velocity. Upbound low-powered vessels, particularly tugs with deep-draft tows, should not attempt transit of this area, except on flood tide, as their speed over the ground will be so slow that they will effectively restrict the main channel for hours. Tankships moored at the oil terminal facing on the lower portion of Daniel Island Reach are susceptible to current surges and suction from passing deep-draft vessels. Tankships mooring at that facility should employ an array of suitable mooring lines including wire ropes and winches with manually or hydraulically set brakes. It is recommended that a listening watch be maintained on VHF-FM channel 13 so that mooring lines can be tended during the passing of deep-draft vessels whose Security broadcasts have announced their intention to transit the upper Cooper River. In addition, vessels so moored may advise the Office of the Charleston Branch Pilots Association of their working frequencies so that such VHF communications between piloted vessels and moored vessels may be facilitated.

(160) (4) **North Charleston and Filbin Creek Reaches** (32°52.2'N., to 32°53.8'N., 79°57.9'W.). The main channel in these reaches is immediately adjacent to the pier heads of a number of oil terminals which receive tank vessels. The channel in these reaches is minimally 500 feet in width, thus the passage of deep-draft vessels often occurs in close proximity to moored tank vessels transferring bulk liquid inflammable, combustible and hazardous cargoes.

(161) The presence of the Route I-526 highway bridge and its vertical structures that are surrounded by a “rip-rap” protective fender system, further restricts navigation. When tank vessels are moored at any of these facilities, the situation becomes complicated by the wake effect and suction from passing vessels upon cargo hose and mooring lines of moored tank vessels and the possible loss of visibility of the bridge structure owing to the disbursement of large quantities of water vapor into the atmosphere from a nearby industrial plant.

(162) To provide the maximum distance between moored and passing vessels, the area encompassed by these reaches should be limited to one way traffic with respect to the transit of deep-draft vessels past any tank vessel moored at one, or more, of the several oil terminal docks. Likewise, no deep-draft vessel should overtake and pass another vessel in these reaches in the vicinity of moored tank vessels.

(163) Deep-draft commercial vessels intending to transit these reaches should make a Security call on VHF-FM channel 13, 15 minutes prior to the intended transit and shall adjust speed so as to avoid a meeting or passing situation in the vicinity of moored tank vessels. While passing moored tank vessels, transiting deep-draft vessels shall give due regard for the wake and suction effects upon the moored vessels. Local knowledge is necessary to predict current effects as they tend to set across the channel on both flood and ebb.

(164) Poor-handling vessels should be assisted by a suitable number of assist tugs when transiting these reaches to avoid collision with tank vessels moored at the oil terminals. It is recommended that moored tank vessels maintain a listening watch on VHF-FM channel 13 to be alert to the intentions of deep-draft vessels to transit these reaches, and thereby have line handlers prepared to tend mooring lines during the transit. In addition, vessels so moored should advise the Office of the Charleston Branch Pilots Association of their working frequencies so that such VHF communications between piloted vessels and moored vessels may be facilitated.

(165) To prevent problems which might arise from failure to exchange information necessary for safe meeting and passing on the river, the Coast Guard Captain of the Port conducts spot check monitoring of VHF-FM channel 13.

(166)

Seagoing Tugs and Barges

(167) Seagoing tugs and barges arriving at or departing Charleston Harbor should, upon arrival, make a **security call** 15 minutes prior to entering Fort Sumter Range, or upon departing a dock or anchorage, make a security call 15 minutes before getting underway. Such security calls should be made on VHF-FM channel 13. It is recommended that such vessels further call the Charleston Branch Pilots' association on VHF-FM channel 16 to ascertain the presence and movement of other vessels on the bar and in the harbor.

(168)

Small-craft Precautions

(169) Small craft should comply with the Federal Regulations of **33 CFR 162.65(b)**, Chapter 2. Small craft should take precautions whenever anchoring or mooring in close proximity to the main shipping channels by always maintaining a proper lookout, displaying proper navigational lights, and exercising good seamanship. Such small craft are subject to the hydraulic and hydrodynamic effects generated by deep-draft vessels passing in the main shipping channels even when such deep-draft vessels are proceeding at minimally slow speeds necessary to maintain steerageway. These effects can cause extreme surging and, in shallow water, can generate high waves. Vessels anchored in shallow water seeing the approach of a deep-draft vessel should get underway and meet these potential hydraulic and dynamic effects in a safe and seamanlike manner. Small craft should never anchor by the stern nor should they moor to the rock jetties, aids to navigation or bridge abutments.

(170)

Procedures for docking and undocking in Charles- ton Harbor

(171) The procedures for docking and undocking deep-draft vessels in Charleston Harbor have been developed by the Charleston Harbor Navigation Safety Committee. These procedures were developed with conventional vessels in mind; they do not preclude case-by-case consideration of other vessels representing the application of advanced technology in vessel controllability systems or any other mitigating circumstances. The general rules regarding vessels moored at commercial vessel berths are:

(172) (1) Vessels to be docked must have a 50-foot horizontal clearance at both bow and stern from vessels already docked at berths adjacent to the intended berthing space.

(173) (2) The South Carolina State Ports Authority Terminal Tariff No. 8, Rule 34-170, requires calling at Authority berths to use tugs.

(174) (3) The following mooring assist tug guidelines are recommended for vessels calling at Charleston Harbor Terminals:

(175) **Columbus Street Terminal**: Vessels calling at all berths at the SCSPA Columbus Street Terminal present a risk of allision with the US Route 17 Arthur Ravenel Bridge span over Town Creek, which is situated less than 1,400 feet from the furthest inland berth at that Terminal, if the movements of those vessels are not safely arrested and controlled during docking and undocking maneuvers. Therefore, an appropriate number and capability of tugs should be employed to assist with the movement of the vessels of various dimension and draft with due consideration to the tidal currents and the direction of vessel movement, ie.. inbound or outbound.

(176) (a) For docking or undocking, vessels over 50,000 Dead Weight Tons (dwt) should employ two tugs:

(177) 1. A tractor tug as an escort tug capable of rendering assistance through its influence on the speed and direction of travel of the vessel in the event of a casualty, steering or propulsion failure, and thereby reducing the possibility of an allusion. The tractor tug should not be less than 4,000 hp; and

(178) 2. A tug employed to control the vessel's head. The tug should not be less than 3,300 hp, unless the vessel is fitted with a fully functional bow thruster, in which case a 3,000 hp tug may be used.

(179) Vessels over 50,000 dwt should not moor starboard side to on ebb tide.

(180) (b) For docking or undocking, vessels between 30,000 dwt and 50,000 dwt should employ two tugs:

(181) 1. Either a tractor or conventional tug, not less than 3,300 hp, as an escort tug;

(182) 2. A second tug capable of assisting the vessel's head.

(183) Vessels between 30,000 dwt and 50,000 dwt should not moor starboard side to on ebb tide.

(184) (c) For docking or undocking, vessels less than 30,000 dwt should employ a tug, not less than 3,300 hp, as an escort and a second tug capable of assisting the vessel's head.

(185) (d) Tugs employed to the guidelines as escort tugs shall meet up with inbound vessels not later than Rebellion Reach.

(186) **Allied Terminal:** Vessels over 40 feet in draft, when docking, shall arrive at the terminal in such time so as to complete mooring operations prior to the commencement of ebb tide. There are no undocking restrictions. Vessels with a draft of 34 feet or less may dock at any time.

(187) **Shipyard River Coal Terminal, Chevron, Braswell and Detyens Shipyards, Salmons:** There are no undocking restrictions at these facilities. Docking shall be accomplished on flood tide only (off mouth of Shipyard Creek).

(188) **McCalloy:** Docking shall be accomplished at flood tide only (off mouth of Shipyard Creek). Vessels over 535 feet in length shall undock only during daylight. The maximum length of vessels that can be accommodated is 580 feet. There are no other undocking restrictions.

(189) **Navy Facilities:** Former Naval Station Pier "K"; North side; docking and undocking of vessels shall be during slack water or flood tide. South side; docking and undocking of vessels shall be on slack water only. Navy small craft are exempt from this restriction. Naval Weapons Station (NWS), Pier "A", 950'"Bob Hope"– class, flood tide only.

(190) South Carolina State Ports Authority North Charleston Terminal ("Port Terminal"), Grain Dock and the Navy Weapons Station "TC" Dock: There are no undocking restrictions. There are no docking restrictions on vessels less than 700 feet in length. Ships 700 feet and over should not be docked starboardside-to during ebb tide.

(191) **Koch, Alcoa, Fina, North Hess, Marathon, Shell:** No restrictions on docking or undocking, except that deep loaded tankships shall not be docked starboardside-to during ebb tide.

(192) There are no restrictions at any other commercial terminal in Charleston Harbor (ie., Amoco, Westvaco) provided that adequate depths of water are maintained at dockside.

(193) In construing and complying with these docking restrictions, regard shall be had to all special circumstances which may make a departure from these guidelines necessary to avoid danger.

(194) Published tide tables provide tidal conditions at certain selected locations. For specific tidal conditions at the various berths, mariners are urged to consult the docking tug companies.

(195)
Channels

(196) The entrance to Charleston Harbor is between converging jetties, the inner portions of which are submerged. The north jetty is almost completely submerged at MHW from offshore to about 32°44'28"N., 79°49'56"W., thence submerged to shore; caution is advised. Mariners should align seaward of Lighted Buoy 18 on their final approach. An opening in the south jetty is marked by buoys and had a reported controlling depth of 20 feet in 2009.

(197) A Federal project provides for a channel 47 feet deep over the Bar (Ft. Sumter Range) and through the Harbor entrance and, thence 45 feet deep into the major reaches of Cooper River, Wando River and Town Creek to Goose Creek, 13.6 miles above the mouth; and a connecting channel into Shipyard Creek 32 feet deep. A 35-foot Navy-maintained channel extends from the head of the Federal project in Cooper River to a turning basin at a naval facility, about 2.6 miles above Goose Creek; thence 30 feet for another 0.8 mile. The channels require constant dredging to maintain them at or near project depths, due to the silting of Cooper River. (See Notice to Mariners and latest editions of charts for controlling depths.) **South Channel,** from the main channel to off the Battery, is no longer maintained. In 1996, the controlling depths were 24 feet from a junction with Rebellion Reach to a junction with Ashley River channel, thence 24 feet to off the Battery. The channels are well marked by lighted ranges and other aids to navigation. Charleston Entrance Lighted Buoy C (32°37'05"N., 79°35'30"W.) is about 15 miles southeast of Charleston Light and is equipped with a racon.

(198)
Anchorages

(199) The principal anchorage for deep-draft vessels is in the triangle westward of the junction of Rebellion Reach of the main channel with South Channel. (See **110.173**, chapter 2, for limits and regulations.)

(200)
Dangers

(201)

A dangerous wreck exists at location 32° 42’ 43.83”N, 079°48’ 37.44”W, 0.56 nautical miles (1.046km) SSE of Buoy G “17”. The feature shows a surveyed least depth of 7.28’ (2.22m) in a surrounding depth of 19.53’ (5.954m).

The danger area of a former World War II minefield is off the entrance to Charleston Harbor. The area is open to unrestricted surface navigation but all vessels are cautioned not to anchor, dredge, trawl, lay cables, bottom, or conduct any similar type of operation because of residual danger from mines on the bottom. An **“anchor at your own risk”** anchorage, within the danger area, is on the north side of the entrance channel about 7 miles NW of Charleston Entrance Lighted Whistle Buoy C. The rectangular anchorage is enclosed by the following points:

(202) 32°42.9'N., 79°42.8'W.;
(203) 32°41.3'N., 79°39.3'W.;

(204) 32°39.9'N., 79°40.2'W.; and
(205) 32°41.6'N., 79°43.7'W.

(206) The area has been searched on many occasions and no unexploded ordnance has been discovered. Vessels have routinely anchored in this offshore anchorage for many years without mishap. A lost anchor is located at position 32° 40' 58.96"N, 079° 40' 44.00"W, 1.12NM (2.087KM) NE of Buoy R "8", and its chain extends to the West of its position.

(207) **A regulated navigation area** extends northeastward and southeastward along the northern side of the entrance channel from Charleston Entrance Channel Lighted Buoy 16. (See **165.714**, chapter 2, for limits and regulations.)

(208)
Marine Protected Area (MPA)

(209) **Charleston Bump Closed Area-Highly Migratory Species,** portion of Exclusive Economic zone (EEZ) extends from southern NC to southern GA near Jeckyll Island.

(210) Caution

(211) Vessels approaching Charleston Harbor must guard against an inshore set which may amount to a knot or more due to indraft of current into the various inlets. In this area, preceding a northeasterly or following a southerly gale, a hazy atmospheric condition may be encountered, which results in low visibility of lights even in fine weather when it is clear overhead. During the periods when this condition prevails, it is reported that excessive inshore sets have been experienced.

(212) **Rattlesnake Shoal**, 3 miles offshore and the same distance east-northeastward of the north jetty at the entrance to Charleston Harbor, is about 2 miles long east and west; its least depth is 10 feet. A buoy is E of the outer end of the shoal.

(213) Two unmarked rectangular drill minefields are about 8 miles northward and 5 miles north-northeastward of the sea buoy (Charleston Entrance Lighted Buoy C). Depths of 30 feet were reported in the northern minefield in 1969. A lighted buoy is about 1.5 miles southeastward of the northern minefield and marks a wreck and fish haven area. There are several drill minefields westward and southwestward of the sea buoy. There are also several unmarked charted dangers inside the sea buoy; caution is advised in this area.

(2XX) A submerged buoy block with no aid to navigation present is located 750m to the WSW of the sea buoy at 32°36.98'N., 79°35.955'W

(2XX) A submerged buoy is located at 32°41.948'N, 079°45.927'W, 68m SE of buoy G "13".

(214)
Routes

(215)
From northward, the safer approach to Charleston Harbor, and the one generally used by deep-draft vessels, is outside Frying Pan Shoals Lighted Buoy 16. The course should be shaped west-southwesterly

to pick up Cape Romain Shoal Buoy 6CR, and then the Charleston sea buoy. From southward, a northeast course, from a point about 3 miles southeastward of Savannah Light, will lead to the Charleston sea buoy.

(216)

Currents

(217) Off the entrance to Charleston Harbor the tidal currents are rotary with velocities of about 1 knot. Near the entrance to the jetties the current sets fair with the channel at strengths of flood and ebb and can be expected to set across the channel with a velocity of about 0.2 knot about 3 hours after strength of flood and ebb, setting northeastward and southwestward, respectively.

(218) It is reported that tide rips, hazardous to small craft, may be encountered off the jetties when wind and current are opposed.

(219) It is reported that with a west-northwesterly storm the ebb current off Fort Sumter and north of Drum Island attains a velocity of about 4 knots.

(220) In the channel between the west end of the south jetty and the submerged jetty, the average velocities of the current at strengths of flood and ebb are about 1.2 knots and 2.8 knots, respectively.

(221) Daily predictions for Charleston Harbor, off Fort Sumter, are contained in the Tidal Current Tables, and predictions for a number of other locations in the harbor and tributaries can be obtained through the use of Table 2 of the Tidal Current Tables. Tidal Current Charts are available for Charleston Harbor, including the entrance thereto, and Wando, Cooper, and Ashley Rivers.

(222)

Weather, Charleston and vicinity

(223) The temperate climate is modified by its exposure to the ocean. This is most noticeable in winter, when minimum temperatures are often 10° to 15°F (5.6° to 9.4°C) warmer on the peninsula than at the airport. Summers are warm and humid although sea breezes keep 100°F (37.8°C) readings a rarity. This is the rainiest season but most of the precipitation falls as brief, heavy showers or thundershowers. Prevailing winds are generally southerly in summer and spring, compared to the more frequent northerlies of fall and winter. Gales are infrequent and are most likely associated with local spring storms or hurricanes, which may also produce severe thunder storms and tornadoes. From late September through early November weather is often sunny and pleasant except for the threat of a hurricane, which also exists in summer.

(224) The average temperature at Charleston is 66°F (18.9°C) with an average high of 76°F (24.4°C) and an average low of 55°F (12.8°C). January is the coolest month with an average high of 59°F (15°C) and

an average low of 38°F (3.3°C). July is the warmest month with an average high of 90°F (32.2°C) and an average low of 72°F (22.2°C). The warmest temperature on record is 104°F (40°C) recorded in July 1986 and the coolest temperature on record is 6°F (-14.4°C) recorded in January 1985. June, July, and August have each recorded temperatures in excess of 100°F (37.8°C) while each month, November through April, has recorded temperatures below freezing. Temperatures above 90°F (32.2°C) can be expected on 53 days during any given year while temperatures below 32°F (0°C) can be expected on 33 days during any given year.

(225) The average annual precipitation of Charleston is 52 inches (1,321 mm). Thanks to an abundance of thunderstorms, averaging 14 each year during July, July is the wettest month with 7.25 inches (184.2 mm). November is the driest month averaging about 2.5 inches (63.5 mm). Snowfall is rare in Charleston averaging less than one inch (25.4 mm) in any given year. However snow has fallen in each month, November through March. The greatest snowfall in a 24-hour period was 6 inches (152.4) in December 1989.

(226) Charleston Harbor offers few of the characteristics of a haven during hurricane force winds. The following recommendations along with more detailed information can be found in the **Hurricane Havens Handbook for the North Atlantic Ocean** mentioned in chapter 3. Large ships should evade at sea or seek shelter elsewhere when a hurricane threatens. During a severe tropical storm (50-63 knots), some moorings along the Cooper River, Shipyard Creek and Town Creek may be adequate unless the vessel has a large sail area. While anchorage for deep- draft vessels is available in the triangle westward of the confluence of Rebellion Reach (of the main channel) with South Channel, use of this anchorage is not recommended because of the restricted scope while riding at anchor, the hazards of collision, and the difficulty of leaving if necessary.

(227) The topography of the entire harbor area is nearly flat and at sea level provides little shelter from wind and tide. The highest accurate storm tide on record was 11.2 feet (3.4 m) above mean low water in the August 1893 storm. Smaller vessels, fishing boats and sailing craft should stay fast or seek shelter along the west side of the Cooper River, northward of the Battery.

(228) Since 1842, 58 tropical storms have come within 50 miles (93 km) of Charleston, 34 of these since 1950. The most noteworthy of recent memory was Hurricane Hugo in 1989. Hugo made landfall near Sullivan's Island, north of Charleston, early in the morning of September 22nd. Highest sustained winds in Charleston were 68 knots with gusts to 85 knots, however local reports noted gusts as high as 94 knots.

(229) The National Weather Service Office is at the Municipal Airport about 12 miles outside of the city. **Barometers** may be compared there. (See Appendix B for the **Charleston climatological table.)**

(230)

Pilotage, Charleston (Items in RED were verified by speaking with the Pilot Office)

(231) Pilotage is compulsory for all foreign vessels and for all US vessels under register in the foreign trade. This compulsory pilotage is regulated pursuant to 46 USC 8501 and Title 54, Chapter 15 of the 1976 South Carolina Code, as amended, and Chapter 136 of the South Carolina Code of Regulations. The State pilotage regulatory agency is the Commissioners of Pilotage, Port of Charleston, P.O. Box 20096, Charleston, SC 29413; telephone 843–577–8659.

(232) Pilotage is optional for US vessels in the coastwise trade which have on board a pilot licensed by the Federal Government pursuant to the Federal pilotage requirements of 46 USC 8502 and 46 CFR 15. Both Federal and State pilotage is available from the Charleston Branch Pilots Association, 6 Concord Street, Charleston, SC 29401, telephone 843–577–6695, FAX 843–577–0632. The Association maintains ~~two~~ four offshore pilot boats, the FORT SUMTER, FORT MOULTRIE, FORT JOHNSON, and FORT RIDLEY They also have two boats, the SIS and the PALMETTO STATE, used primarily as a shuttle and for other harbor work. These four boats have black hulls and aluminum superstructures, and have the word "PILOT" on their sides.

(233) Pilots board vessels day or night from the pilot boats in the vicinity of the sea buoy Charleston Entrance Lighted Buoy C (32°37'05"N., 79°35'30"W.) for PILOT AREA "A", and in the vicinity of R "6" Buoy (32-39-22 N, 079-40-01 W) for PILOT AREA "B". Vessels are requested to maintain a speed of 8 to 10 knots and provide a ladder 2 meters above the water on the leeward side. The pilot boats are equipped with radar and maintain radiotelephone communications on VHF-FM channels 13, 14, 16, and 18A. The pilot office at Charleston monitors these channels on a 24-hour basis. Pilots may be obtained directly by telephone, FAX (above), through the Charleston Marine Operator, or by prior arrangement through ships' agents. The usual practice is for ship agents to FAX orders directly to the pilot office, at 843–557–0632. At least 3 hours advance notice for orders of arrival at the sea buoy and departure from the port is required.

(234) Public vessels such as Navy and Coast Guard ships are exempt from pilotage requirements but their commanding officers frequently request pilots in an advisory capacity. When pilots are taken, naval vessels may use either federally licensed civilian employees of the Navy or pilots from the Charleston Branch Pilots Association as pilots on their vessels. The Port Services Division of US Naval Station, Charleston, coordinates pilotage for naval vessels through the two groups of pilots.

(235)

Towage

(236) Tugs are required for docking and undocking. Tugs up to 5,100 hp are available at all hours by arrangements through ships' agents. They usually meet vessels bound for Charleston proper at or near the Customhouse Reach, and vessels bound for North Charleston at or near North Charleston Reach. Tugs can also be engaged for salvage or deep-sea towing.

(237)

Quarantine, customs, immigration, and agricultural quarantine.

(238) (See chapter 3, Vessel Arrival Inspections, and Appendix A for addresses.)

(239) **Quarantine** is enforced in accordance with regulations of the US Public Health Service. (See Public Health Service, chapter 1.) The quarantine office is in the Federal Building. There are several large public and private hospitals in Charleston.

(240) Charleston is a **customs port of entry.**

(241)
Coast Guard

(242) A **Sector Office** is at the Coast Guard Station (32°46.4'N., 79°56.6'W.) on the east side of the Ashley River. (See Appendix A for address.)

(243)
Harbor regulations

(244)
The Coast Guard exercises jurisdiction over the Port of Charleston through the Captain of the Port. The South Carolina State Ports Authority exercises jurisdiction over the authority's facilities through its Executive Director at the headquarters building, located at 176 Concord Street. The ports authority berthing office is manned at all times and can be reached at 843–557–8659 or call Port Harbormaster on VHF-FM channel 16. Additional information can be obtained through the State Ports Authority's Harbormaster at 843–577–8192 or VHF- FM channel 16, call sign, KBP 636. The Commissioners of Pilotage, Port of Charleston, have issued policy guidelines for safe vessel movement to the pilots regulated by that State agency in the Commissioners of **Pilotage Policies** and **Procedures Manual.** Chapter 136 of South Carolina State Code of Regulations contains regulations concerning vessel traffic restrictions, docking and undocking.

(245)
Wharves

(246) Only the major facilities at Charleston and North Charleston are described. These facilities are all northward of the Battery along the west side of Cooper River and Town Creek, and in Shipyard Creek and the east bank of the Wando River. All of the berths have highway connections and most have either direct or beltline rail connections with the Class I or Class II railroad system. Water is also available at most berths. General cargo at the port can be handled by ship's tackle or special equipment which is available at most facilities. Special equipment, if available, is mentioned in the description of the particular facility.

(247) There are many smaller facilities in Charleston which are used by barges and small vessels, and as vessel- repair berths; these are not described. For a complete description of the port facilities, see Port Series No. 13, published and sold by the US Army Corps of Engineers.
(See Appendix A for address.)

(248) Facilities at Charleston proper, along the west side of Cooper River and Town Creek, northward of the Battery (32°46'08"N., 79°55'44"W.):

(249) **State Pier 2, Union Pier**: 0.75 mile north of the Battery; 2,620 feet of berthing space with dolphin off of the south end; 35 feet alongside; deck height, 12 feet; handles general cargo and heavy machinery; passenger terminal; owned and operated by South Carolina State Ports Authority.

(250) **State Pier 8, Columbus Street Terminal:** about 1.4 miles north of the Battery; 3,440 feet of berthing space; 40 feet alongside; deck height, 12 feet; three gantry cranes to 125 tons; handles general and containerized cargo including heavy lift items; owned and operated by South Carolina State Ports Authority. Three container cranes are also available.

(251) **State Pier 9:** joining State Pier 8 to the northward; marginal type wharf with 437-foot face and 30-foot apron; 35 feet alongside; deck height, 12 feet.

(252) **Allied Terminal Wharf and Barge Dock:** 3.4 miles northward of the Battery, just below the entrance to Shipyard Creek; offshore wharf with 78-foot face, 1,000 feet of berthing space with mooring dolphins; 40 feet alongside; deck height, 10 feet; handles asphalt and petroleum products; bunkering vessels.

(253) **Facilities in Shipyard Creek, on the west side of Cooper River about 3.8 miles northward of the Battery**:

(254) **Kinder-Morgan Bulk Terminal**: south side of Shipyard Creek, just inside the entrance; marginal wharf with 390-foot face; 44 feet alongside; deck height, 14 feet; one 16-ton electric crane; handles miscellaneous liquid and dry bulk commodities including coal and stone.

(255) **Kinder-Morgan Bulk Terminal** : west side of Shipyard Creek about 400 yards westward of Shipyard River Terminal Wharf; 130-foot face, berthing for 660- foot vessels with dolphins; 44 feet alongside; deck height, 13 feet; handles petroleum products and bunkering vessels.

(256) **Facilities at North Charleston, along the west side of Cooper River, northward of the Battery**:

(257) **Thomas Cement Terminal:** (32°52'47"N., 79°58'05"W.): L-shaped offshore wharf with 250-foot face, 550 feet with dolphins; 40 feet alongside; deck height, 11.5 and 16.5 feet; handles petroleum products.

(258) **AlcoaTerminal Wharf**: about 250 yards of northward of Koch Terminal Wharf; 520-foot face, 700 feet of berthing space with dolphins; 40 feet alongside; deck height, 14 feet; handles liquid chemicals and alumina.

(259) **Shell Oil Wharf**: about 550 yards northward of Koch Terminal Wharf; offshore wharf with 142-foot face, 257 feet of berthing space with dolphins; 40 feet alongside; deck height, 13 feet; handles petroleum products.

(260) **Marathon Petroleum Co. Wharf**: about 300 yards northward of Texaco Wharf; offshore wharf with 50- foot face, 275 feet with dolphins; 40 feet alongside; deck height, 14 feet; handles petroleum products .

(261) **Amerada Hess Corp. North Terminal**: about 200 yards northward of Marathon Petroleum Co. Wharf; offshore wharf with 68-foot face, 600 feet of berthing space with mooring dolphins; 40 feet alongside; deck height, 12 feet; handles petroleum products.

(262) **Westvaco Corp. Wharf**: about 0.65 mile northward of Amerada Hess Corp. North Terminal; marginal type wharf with 480-foot face; 655 feet usable with dolphins; 40 feet alongside; deck height, 12 feet; handles paper products.

(263) **State Pier 15, South Carolina State Ports Authority North Charleston Terminal**: joining Westvaco Corporation wharf to the northward; marginal wharf with 2,460-foot face; 40 feet alongside; deck height, 12 feet; six container cranes, container handlers and top loaders; handles general cargo, RO/RO, and frozen products; owned and operated by South Carolina State Ports Authority.

(264) **South Carolina State Ports Authority Grain Wharf**: about 0.4 mile northward of State Pier 15; marginal type wharf with 380-foot face; 40 feet alongside; deck height, 12 feet; handles dry bulk cargo; operated by South Carolina Farm Bureau Marketing Association.

(265) **Naval Weapons Station TC Dock**: about 0.2 mile northward of the South Carolina State Ports Authority Grain Wharf: marginal type wharf with a 1,500-foot face; 40 feet alongside. (For further information contact the operator.)

(266) The piers at the former Navy Base, and Navy Yard are now under the operation of other government agencies and private corporations. The Maritime Administration uses several of these piers as lay berths for their ships. The US Coast Guard also berths vessels at these piers. Pier "Zulu" is used by commercial vessels for cargo handling. Detyens Shipyard operates drydock facilities and berths at the former Navy Yard.

(267) **Cargo facilities on east bank of Wando River, east of Cooper River**:

(268) **WandsWelch Terminal**: about 1.7 miles north of Drum Island; 3,800-foot face; 40 feet alongside; deck height, 15½ feet; nine 40-long ton container cranes, container handlers and toploaders; handles containerized general cargo; operated by South Carolina State Ports Authority.

(269)

Supplies

(270) All types of marine supplies and provisions can be obtained in Charleston. Water is available at most of the berths; diesel fuel is available by barge or truck.

(271)

Repairs

(272) Detyens Shipyard, Inc., offers drydocking services at its facilities at the former Navy Yard. Another commercial repair facility with a 1,000-ton capacity marine railway is on the south side of Stono River on the Intracoastal Waterway at Mile 476.4. This facility is discussed in chapter 12.

(273) Several shops, on and off the waterfront, can make above-the-waterline hull repairs, and repairs to gasoline and diesel engines and electronic equipment anywhere in the harbor; the largest shafts that can be produced are 30 feet by 48 inches.

(274) Wrecking and salvage gear is available at Charleston for normal operations and special equipment can be brought in.

(275) Repair facilities for small craft are on the Wando and Stono Rivers.

(276)

Communication

(277) The port of Charleston is served by a Class I and a Class II railroad system, which connect with most of the wharves either directly or through three beltline railroads. A number of steamship lines connect the port with principal foreign ports; frequent sailings are maintained by most of the lines. The Municipal Airport 12 miles northwestward of the Battery is served by four commercial airlines. Truck and bus lines serve the port. There are excellent highway connections with Interstate Route 26 and US Routes 17, 701, 52, 52A, and 78.

Joseph Carrier - NOAA Federal <joseph.carrier@noaa.gov>

OPR-G380-TJ-15Combined sheets

6 messages

Joseph Carrier - NOAA Federal <joseph.carrier@noaa.gov> Sun, Jun 7, 2015 at 10:34 PM
To: Kathryn Pridgen - NOAA Federal <kathryn.pridgen@noaa.gov>
Cc: "CO.Thomas Jefferson - NOAA Service Account" <co.thomas.jefferson@noaa.gov>, "OPS.Thomas Jefferson - NOAA Service Account" <ops.thomas.jefferson@noaa.gov>

Katy,

TJ would like to modify the sheet layout to match available resources and keep the momentum we have with the early sheets. Essentially, we need to combine H12771 and H12803 because we don't have an available sheet manager. It's been great to give everyone the experience with at least one sheet but TJ feels these two sheets can be combined and managed with much less overhead; one package from TJ, one DR, one SAR, one H-cell, etc... If the weather holds and equipment stays operational, we should be able to close it out by the time we leave Charleston.

Please let us know if you have any concerns. Attached is a screen grab of the proposed sheet limits.

Very respectfully,
Joe Carrier, LT/NOAA

Field Operation's Officer, NOAA Ship *Thomas Jefferson*
439 West York Street
Norfolk, VA 23510
cell: (757) 647-0187
voip: (301) 713-7782
fax: (757) 512-8295
http://www.moc.noaa.gov/tj/

Combined sheets.jpg
373K

Kathryn Pridgen - NOAA Federal <kathryn.pridgen@noaa.gov> Mon, Jun 8, 2015 at 1:47 PM
To: Joseph Carrier - NOAA Federal <joseph.carrier@noaa.gov>
Cc: "CO.Thomas Jefferson - NOAA Service Account" <co.thomas.jefferson@noaa.gov>, "OPS.Thomas Jefferson - NOAA Service Account" <ops.thomas.jefferson@noaa.gov>

Joe,
I dont think that will be a problem, especially if you are confident that the combined sheet will be completely surveyed by the end of the survey. I dont want to leave a sheet partially surveyed. I will work on combining those two sheets into one sheet H12771, I will cancel the other sheet H12803. Will that work?

Katy

[Quoted text hidden]
--
Kathryn Pridgen
Physical Scientist
NOAA-HSD OPS
301-713-2722 ext 145
kathryn.pridgen@noaa.gov

Joseph Carrier - NOAA Federal <joseph.carrier@noaa.gov> Mon, Jun 8, 2015 at 1:50 PM
To: Kathryn Pridgen - NOAA Federal <kathryn.pridgen@noaa.gov>
Cc: "CO.Thomas Jefferson - NOAA Service Account" <co.thomas.jefferson@noaa.gov>, "OPS.Thomas Jefferson - NOAA Service Account" <ops.thomas.jefferson@noaa.gov>

Katy,

Thank you for working with us on this one and for the quick reply. Please cancel H12803 and add the coverage area to H12771.

Joe

Very respectfully,
Joe Carrier, LT/NOAA

Field Operation's Officer, NOAA Ship *Thomas Jefferson*
439 West York Street
Norfolk, VA 23510
cell: (757) 647-0187
voip: (301) 713-7782
fax: (757) 512-8295
http://www.moc.noaa.gov/tj/

[Quoted text hidden]

Kathryn Pridgen - NOAA Federal <kathryn.pridgen@noaa.gov> Mon, Jun 8, 2015 at 1:57 PM
To: Joseph Carrier - NOAA Federal <joseph.carrier@noaa.gov>
Cc: "CO.Thomas Jefferson - NOAA Service Account" <co.thomas.jefferson@noaa.gov>, "OPS.Thomas Jefferson - NOAA Service Account" <ops.thomas.jefferson@noaa.gov>

Alright, its all fixed, my sheet are now identical to your graphic.
Katy
[Quoted text hidden]

Joseph Carrier - NOAA Federal <joseph.carrier@noaa.gov> Mon, Jun 8, 2015 at 3:16 PM
To: Kathryn Pridgen - NOAA Federal <kathryn.pridgen@noaa.gov>
Cc: "CO.Thomas Jefferson - NOAA Service Account" <co.thomas.jefferson@noaa.gov>, "OPS.Thomas Jefferson - NOAA Service Account" <ops.thomas.jefferson@noaa.gov>

Thanks Katy

Very respectfully,
Joe Carrier, LT/NOAA

Field Operation's Officer, NOAA Ship *Thomas Jefferson*
439 West York Street
Norfolk, VA 23510
cell: (757) 647-0187
voip: (301) 713-7782
fax: (757) 512-8295

http://www.moc.noaa.gov/tj/

[Quoted text hidden]

Kathryn Pridgen - NOAA Federal <kathryn.pridgen@noaa.gov> Mon, Jun 8, 2015 at 3:42 PM
To: Joseph Carrier - NOAA Federal <joseph.carrier@noaa.gov>, Jacklyn James - NOAA Federal <jacklyn.c.james@noaa.gov>
Cc: "CO.Thomas Jefferson - NOAA Service Account" <co.thomas.jefferson@noaa.gov>, "OPS.Thomas Jefferson - NOAA Service Account" <ops.thomas.jefferson@noaa.gov>

Joe and the rest of the TJ,
I am getting ready to go to sea on the Rainier (I leave on Wednesday) for the remainder of the Charleston project. While I am at sea, Jacklyn James, will be the HSD contact for the rest of the Charleston Survey. For any further questions, comments, or issues please contact Jackie at HSD, jacklyn.c.james@noaa.gov.

Thanks!

Katy
[Quoted text hidden]

Joseph Carrier - NOAA Federal <joseph.carrier@noaa.gov>

Re: TJ DAPR Questions

2 messages

Russell Quintero - NOAA Federal <russell.quintero@noaa.gov> Tue, Jun 2, 2015 at 2:37 AM
To: matthew.jaskoski@noaa.gov
Cc: _OMAO MOA OPS Thomas Jefferson <OPS.Thomas.Jefferson@noaa.gov>, "LTJG Matthew Forrest, NOAA" <Matthew.R.Forrest@noaa.gov>

Pulling Joe and Matt into the conversation.

On 5/30/15, Russell Quintero - NOAA Federal <russell.quintero@noaa.gov> wrote:
> Jasko,
>
> I'm helping TJ with their DAPR for this year while I'm out here
> augmenting. We wanted to get AHB's feedback on a few things we are
> doing a little differently.
>
> The xmlDAPR is certainly helpful, but there are parts of the
> implementation that create far more work than is necessary, and even
> deviate from the HSSD.
>
> The TJ DAPR is undergoing final review, but is essentially done
> already. To facilitate the speed of composition, we have deviated from
> the xmlDAPR while continuing to adhere to the HSSD. The specific
> changes are:
>
> 1) We are not tracking interchangeable hardware. We obviously track
> the serial numbers of all components of the sensor (Tpu and fish for a
> SSS for instance), but anything that can be swapped out at will is not
> tracked. Processing computers that are freely interchangeable with no
> effect on the data are not tracked in the DAPR. Already hardware like
> monitors and external hard drives that are deemed to have no effect
> are not tracked, we are just shifting that line slightly further.
>
> 2) The xmlDAPR requires that you transcribe out of the HVF all of the
> values used in the survey, for every sensor and vessel. It also
> requires transcribing the output of things like the dynamic draft and
> patch test. In contrast, the HSSD actually specify that these should
> be in a separate appendix.
>
> Doing these as a separate appendix is actually far, far faster on the
> ship, far easier, and less prone to error. The Vessel Editor in Caris
> can generate a report that contains all of the relevant info with only
> a few button clicks instead of manually transferring every single
> value.
>
> As such, we complied with the HSSD instead of the xmlDAPR schema. To
> make that work, we occasionally had to mark "Not Applied" to some
> correctors, and then add an "Additional Discussion" block immediately
> following that explained how we did those correctors and referenced
> the appropriate appendix.
>
>
> While we are confident that we are in compliance with the HSSD, we
> wanted to make sure the Branch wouldn't have any opposition to this

> approach.
>
> V/r,
> Russ
>
> --
> Lieutenant Russell Quintero, NOAA
> DoD Liaison, Office of Coast Survey
> 1315 East-West Highway
> SSMC3 - 6110
> Silver Spring, MD 20910
>
> 301-713-2780x152 Office
> 970-481-2030 Mobile
>

--
Lieutenant Russell Quintero, NOAA
DoD Liaison, Office of Coast Survey
1315 East-West Highway
SSMC3 - 6110
Silver Spring, MD 20910

301-713-2780x152 Office
970-481-2030 Mobile

Matthew Jaskoski - NOAA Federal <matthew.jaskoski@noaa.gov> Tue, Jun 2, 2015 at 11:53 AM
To: Russell Quintero - NOAA Federal <russell.quintero@noaa.gov>
Cc: _OMAO MOA OPS Thomas Jefferson <OPS.Thomas.Jefferson@noaa.gov>, "LTJG Matthew Forrest, NOAA" <Matthew.R.Forrest@noaa.gov>

Hey Russ,
I don't have a problem if you all want to generate a *.pdf DAPR in the traditional manner as opposed to using the xml (as long as it meets the requirements of HSSD, of course).

I believe the xmlDAPR is in a phase of substantial re-write and I would highly recommend you email the current deficiencies to the xmlDR/DAPR folks for inclusion in the re-scheming discussion. My understanding is that in the new version the vessel offsets and inventory items will be automatically populate from the HVF and Hybase respectively, so that may be part of the different schema/stylesheet architecture.

thanks for the heads-up,
Jasko

Lieutenant Commander Matthew Jaskoski, NOAA
Chief, Atlantic Hydrographic Branch
439 W. York St.
Norfolk, VA 23510
Office: 757-441-6746 x200
Cell: 757-647-3356
[Quoted text hidden]

Joseph Carrier - NOAA Federal <joseph.carrier@noaa.gov>

OPR-G380-TJ-15: Horcon Report

5 messages

Joseph Carrier - NOAA Federal <joseph.carrier@noaa.gov> Sun, Jun 7, 2015 at 8:55 PM
To: Matthew Jaskoski - NOAA Federal <matthew.jaskoski@noaa.gov>
Cc: Castle Parker - NOAA Federal <castle.e.parker@noaa.gov>, "OPS.Thomas Jefferson - NOAA Service Account" <ops.thomas.jefferson@noaa.gov>, "CO.Thomas Jefferson - NOAA Service Account" <co.thomas.jefferson@noaa.gov>

LCDR Jaskoski,

Historically, TJ hasn't managed tide or base stations during survey operations and therefore didn't submit a Horcon report with surveys. Using Fugro's MarineStar we have been able to stay out of the tide guage and base station installation business. Do you foresee a need for TJ to submit a Horcon report with these Charleston surveys using MarineStar?

Very respectfully,
Joe Carrier, LT/NOAA

Field Operation's Officer, NOAA Ship *Thomas Jefferson*
439 West York Street
Norfolk, VA 23510
cell: (757) 647-0187
voip: (301) 713-7782
fax: (757) 512-8295
http://www.moc.noaa.gov/tj/

Matthew Jaskoski - NOAA Federal <matthew.jaskoski@noaa.gov> Mon, Jun 8, 2015 at 1:09 PM
To: Joseph Carrier - NOAA Federal <joseph.carrier@noaa.gov>
Cc: Castle Parker - NOAA Federal <castle.e.parker@noaa.gov>, "OPS.Thomas Jefferson - NOAA Service Account" <ops.thomas.jefferson@noaa.gov>, "CO.Thomas Jefferson - NOAA Service Account" <co.thomas.jefferson@noaa.gov>

Hey Joe,
Assuming the ship isn't generating another report about the MarineStar integration and ERS on the project (that will accompany the data to NGDC) - I think it would be a good idea to submit an HVCR since it is a project-wide element that represents a significant departure from our past-practices. I think you could use Tyanne's report on MarineStar as the bulk of your text for your HVCR. All you really need is some background information on how the MarineStar Systems works, and a brief description of the methods, adequacy of positioning, and any confidence checks that were done - to meet the intent of the HVCR. The intent is to document the positioning activities that took place as part of the project.

hope this helps,
regards,
Jasko

Lieutenant Commander Matthew Jaskoski, NOAA
Chief, Atlantic Hydrographic Branch
439 W. York St.
Norfolk, VA 23510
Office: 757-441-6746 x200
Cell: 757-647-3356
[Quoted text hidden]

Joseph Carrier - NOAA Federal <joseph.carrier@noaa.gov> Mon, Jun 8, 2015 at 1:48 PM
To: Matthew Jaskoski - NOAA Federal <matthew.jaskoski@noaa.gov>
Cc: Castle Parker - NOAA Federal <castle.e.parker@noaa.gov>, "OPS.Thomas Jefferson - NOAA Service Account" <ops.thomas.jefferson@noaa.gov>, "CO.Thomas Jefferson - NOAA Service Account" <co.thomas.jefferson@noaa.gov>

Jasko,

Thanks for the quick reply. Since TJ has never installed tide gauges or base stations for projects in the past and I don't have any examples on our network to work from. If you have one you can share like the ERS survey from the Hassler I'd really like to take a look and see how they did their report.

Since I'm going to be using Tyanne's report as a reference, do you mind if I ask for her help on revising the HVCR to make sure it's accurate?

Regards,
Joe

Very respectfully,
Joe Carrier, LT/NOAA

Field Operation's Officer, NOAA Ship *Thomas Jefferson*
439 West York Street
Norfolk, VA 23510
cell: (757) 647-0187
voip: (301) 713-7782
fax: (757) 512-8295
http://www.moc.noaa.gov/tj/

[Quoted text hidden]

Matthew Jaskoski - NOAA Federal <matthew.jaskoski@noaa.gov> Mon, Jun 8, 2015 at 3:40 PM
To: Joseph Carrier - NOAA Federal <joseph.carrier@noaa.gov>
Cc: Castle Parker - NOAA Federal <castle.e.parker@noaa.gov>, "OPS.Thomas Jefferson - NOAA Service Account" <ops.thomas.jefferson@noaa.gov>, "CO.Thomas Jefferson - NOAA Service Account" <co.thomas.jefferson@noaa.gov>

hey Joe,
I think this got kicked back to me because of the attached DAPR pdf file sizes. did you get the earlier email? note there is a change in my recommendation regarding the HVCR

Jasko

Lieutenant Commander Matthew Jaskoski, NOAA
Chief, Atlantic Hydrographic Branch
439 W. York St.
Norfolk, VA 23510
Office: 757-441-6746 x200
Cell: 757-647-3356

On Mon, Jun 8, 2015 at 11:35 AM, Matthew Jaskoski - NOAA Federal <matthew.jaskoski@noaa.gov> wrote:

> Hey Joe,
> I'm going to reverse course on my earlier recommendation that you include an HVCR. It looks like FH did not do an HVCR for the survey that they completed to the elipse, I believe they detailed everything in the DR/DAPR. This seems like a legitimate way to proceed, and considering you all did not establish any actual HorVerCon equipment the generation of a HVCR might be an unnecessary encumbrance on the ship. You could/should detail the MarineStar info in the DAPR - particularly sections A.4, B.1.4, and probably C.4-5.

from AHB's view we are content if you want to skip the HVCR and add the information about MarineStar in the DAPR (with any project specific deviations from the DAPR outlined in the appropriate DR).

Jasko

Lieutenant Commander Matthew Jaskoski, NOAA
Chief, Atlantic Hydrographic Branch
439 W. York St.
Norfolk, VA 23510
Office: 757-441-6746 x200
Cell: 757-647-3356

[Quoted text hidden]

Joseph Carrier - NOAA Federal <joseph.carrier@noaa.gov> Mon, Jun 8, 2015 at 4:49 PM
To: Matthew Jaskoski - NOAA Federal <matthew.jaskoski@noaa.gov>
Cc: Castle Parker - NOAA Federal <castle.e.parker@noaa.gov>, "OPS.Thomas Jefferson - NOAA Service Account" <ops.thomas.jefferson@noaa.gov>, "CO.Thomas Jefferson - NOAA Service Account" <co.thomas.jefferson@noaa.gov>

Jasko,

Thanks for the update and thanks for reconsidering the HVCR!

Very respectfully,
Joe Carrier, LT/NOAA

Field Operation's Officer, NOAA Ship *Thomas Jefferson*
439 West York Street
Norfolk, VA 23510
cell: (757) 647-0187
voip: (301) 713-7782
fax: (757) 512-8295
http://www.moc.noaa.gov/tj/

[Quoted text hidden]

Joseph Carrier - NOAA Federal <joseph.carrier@noaa.gov>

OPR-G380: Soundings and Set line spacing

5 messages

Joseph Carrier - NOAA Federal <joseph.carrier@noaa.gov> Sat, May 30, 2015 at 11:43 PM
To: Matthew Jaskoski - NOAA Federal <matthew.jaskoski@noaa.gov>
Cc: "CO.Thomas Jefferson - NOAA Service Account" <co.thomas.jefferson@noaa.gov>

Jasko,

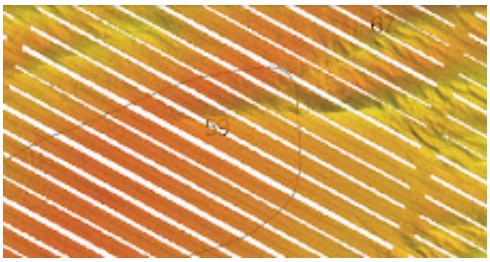
When sorting through some of the Charleston surveys where TJ is using set line spacing with concurrent 200% MB to achieve object detection. We noticed that there were a few soundings per sheet that land between the MB lines.

Section 5.2.2.3 of the 2014 HSSD says "All charted depths falling between sounding lines and shallower than adjacent surveyed soundings shall be verified or disproved."

In TJ's case, most of these soundings fall within very flat bottom areas and are 1-2 ft different on either side of the soundings (see attached). At such slight differences, it would be hard to say if it were within our estimated uncertainty or just a shoal sounding. Interested to hear what AHB's thoughts are and please don't hesitate to ask if you would like to discuss further.

Very respectfully,
Joe Carrier, LT/NOAA

Field Operation's Officer, NOAA Ship *Thomas Jefferson*
439 West York Street
Norfolk, VA 23510
cell: (757) 647-0187
voip: (301) 713-7782
fax: (757) 512-8295
http://www.moc.noaa.gov/tj/



59foot_32_33_48n_79_32_00W_sounding.jpg
470K

Matthew Jaskoski - NOAA Federal <matthew.jaskoski@noaa.gov> Mon, Jun 1, 2015 at 6:30 PM
To: Joseph Carrier - NOAA Federal <joseph.carrier@noaa.gov>, Edward Owens - NOAA Federal <edward.owens@noaa.gov>
Cc: "CO.Thomas Jefferson - NOAA Service Account" <co.thomas.jefferson@noaa.gov>

Hey Joe (I'm looping in Ed here for carto-perspective),
I think by the letter of the law the centroid should be ensonified to remove the charted shoal sounding with a deeper one. However, as you point out 1-2 ft is right about the TVU as well as right around the charted depth vertical uncertainty for a CATZOC A1 area as depicted on the final product.

Considering their has been little change to the seafloor, and the new depths are w/in 1-2ft of the charted depths it does seem like a waste of resources to slit these lines simply to "paint the number" I don't think we will have a

problem superseding soundings in the type of situation you described - Ed what do you think?

Jasko

Lieutenant Commander Matthew Jaskoski, NOAA
Chief, Atlantic Hydrographic Branch
439 W. York St.
Norfolk, VA 23510
Office: 757-441-6746 x200
Cell: 757-647-3356
[Quoted text hidden]

CAPT Shepard Smith <shep.smith@noaa.gov> Mon, Jun 1, 2015 at 7:04 PM
To: Matthew Jaskoski - NOAA Federal <matthew.jaskoski@noaa.gov>
Cc: Joseph Carrier - NOAA Federal <joseph.carrier@noaa.gov>, Edward Owens - NOAA Federal <edward.owens@noaa.gov>, "CO.Thomas Jefferson - NOAA Service Account" <co.thomas.jefferson@noaa.gov>

Also, there is no indication of anything unusual in the sidescan, and no indication of unresolved shoaling (gradient of seafloor is level on both sides of the gap).

CAPT Shepard M. Smith, NOAA

[Quoted text hidden]

Edward Owens - NOAA Federal <edward.owens@noaa.gov> Tue, Jun 2, 2015 at 3:46 PM
To: CAPT Shepard Smith <shep.smith@noaa.gov>
Cc: Matthew Jaskoski - NOAA Federal <matthew.jaskoski@noaa.gov>, Joseph Carrier - NOAA Federal <joseph.carrier@noaa.gov>, "CO.Thomas Jefferson - NOAA Service Account" <co.thomas.jefferson@noaa.gov>

CAPT, et al,

Didn't seem to get any of the graphics described in the thread...? No matter, think I get the gist. Based on Shep's last statement, that recount is the best practice we apply for shoal disprovals in set line spacing datasets. If there is an indication of shoaling or indication thereof in the SS we would question the ability to disprove that shoal sounding and apply logic of the magnitude of depth variance and nav. signif. between the surveyed and charted depths to decide the charting action. If no shoaling is indicated by those same means the shoaler charted sounding is superseded by the survey data. If this occurs on the edge of the survey (outermost line) we would typically resort to retaining the shoaler charted value. Does that hit all the notes?

Regards, Edward

[Quoted text hidden]

Shep Smith - NOAA Federal <shep.smith@noaa.gov> Tue, Jun 2, 2015 at 4:29 PM
To: Edward Owens - NOAA Federal <edward.owens@noaa.gov>
Cc: Matthew Jaskoski - NOAA Federal <matthew.jaskoski@noaa.gov>, Joseph Carrier - NOAA Federal <joseph.carrier@noaa.gov>, "CO.Thomas Jefferson - NOAA Service Account" <co.thomas.jefferson@noaa.gov>

Ed,

Thanks, I think that answers the question, and I think is a reasonable approach. We will use this guidance in choosing when to split.

Best Regards,

Shep

CAPT Shepard M. Smith, NOAA
Commanding Officer, NOAA Ship Thomas Jefferson
National Oceanic and Atmospheric Administration

[Quoted text hidden]

Joseph Carrier - NOAA Federal <joseph.carrier@noaa.gov>

OPR-G380-TJ-15

2 messages

Joseph Carrier - NOAA Federal <joseph.carrier@noaa.gov> Sun, Jun 7, 2015 at 11:06 PM
To: Michael Gonsalves - NOAA Federal <michael.gonsalves@noaa.gov>
Cc: Kathryn Pridgen - NOAA Federal <kathryn.pridgen@noaa.gov>, "CO.Thomas Jefferson - NOAA Service Account" <co.thomas.jefferson@noaa.gov>, "OPS.Thomas Jefferson - NOAA Service Account" <ops.thomas.jefferson@noaa.gov>

LCDR Gonsalves,

The project instructions require TJ to use HSSD 2014. TJ is requesting to use the 2015 HSSD for OPR-G380-TJ-15.

Please advise if HSD has any concerns.

Very respectfully,
Joe Carrier, LT/NOAA

Field Operation's Officer, NOAA Ship *Thomas Jefferson*
439 West York Street
Norfolk, VA 23510
cell: (757) 647-0187
voip: (301) 713-7782
fax: (757) 512-8295
http://www.moc.noaa.gov/tj/

Kathryn Pridgen - NOAA Federal <kathryn.pridgen@noaa.gov> Mon, Jun 8, 2015 at 2:00 PM
To: Joseph Carrier - NOAA Federal <joseph.carrier@noaa.gov>

Joe,
HSD has no issues with using HSSD 2015 instead of HSSD 2014.

Katy Pridgen
[Quoted text hidden]
--
Kathryn Pridgen
Physical Scientist
NOAA-HSD OPS
301-713-2722 ext 145
kathryn.pridgen@noaa.gov

UNITED STATES DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration
Office of Marine and Aviation Operations,
Marine Operation Center-Atlantic, NOAA Ship Thomas Jefferson
Norfolk, Virginia 23510

August 11, 2015

MEMORANDUM FOR: Captain Eric W. Berkowitz
Chief, Hydrographic Surveys Division

FROM: Captain Shepard M. Smith, NOAA
Commanding Officer, NOAA Ship Thomas Jefferson

SUBJECT: NOAA Ship *Thomas Jefferson* ERS Capability

Under the project instructions OPR-G380-TJ-15, the NOAA Ship *Thomas Jefferson* (TJ) was tasked with surveying the approaches to Charleston, SC by referencing the vertical datum to the ellipse.

The crew of the *Thomas Jefferson* with support from the Atlantic Hydrographic Branch, Hydrographic Systems Technical Programs and Hydrographic Surveys Division collaborated to evaluate different methods of surveying to the ellipse. The ship and launches were integrated with Fugro's Marinestar-XP service, which provides a 1 sigma accuracy of approximately +/-10cm in the horizontal and +/-15cm in the vertical planes using a combination of GPS satellites and geostationary communications satellites.

The majority of the project area was beyond 30km from the nearest CORS base station, SCHA. When TJ arrived at the project area, station SCHA was offline for multiple days making initial comparisons impossible. Both the proximity and availability of the CORS station data made further attempts to test and compare the single base IAPPK and Real-time PPP challenging. Once the CORS station was available and ephemeris could be downloaded, multiple days were processed using IAPPK on the inshore sheet H12779. The availability of IAPPK to validate and or resolve vertical issues with 5P proved valuable in determining whether the the hydrographer chose to interpolate or to plan and execute ERS holidays.

Testing and subsequent integration of the Post Processed Precise Point Positioning (5P) method has proven efficient, accurate and reliable. Compared to traditional methods using discrete zoned/TCARI based tides, the *Thomas Jefferson* found Fugro's commercial service, MarineStar during data acquisition and post processing to consistently provide results within acceptable tolerances outlined in the Hydrographic Survey Specifications and Deliverables HSSD. Further, the system generally provided output within the stated 15cm of vertical uncertainty documented in it's technical capabilities.

A comparison between crosslines and mainscheme at 1m resolution demonstrated the internal consistency of the VDatum method was more accurate than traditional zoned tides (internal document: Faulkes, et al., 2015). Using an Ellipsoid Referenced Zone Tide comparison with Survey H12766, the observed vertical solution demonstrated parity with the regional separation model provided by HSD Operations, giving confidence that the SBET solutions created from 5P were satisfactory. Further, the reduced processing times associated with 5P allowed TJ survey personnel to more quickly identify problematic lines within the survey, thereby reducing bottlenecks and increasing efficiency. Throughout the project, the TJ worked with HSTP to develop new tools and procedures necessary to analyze and identify issues with the Smoothed Best Estimate of Trajectory (SBET). These tools provided the hydrographer with the ability to identify

suspected problem areas between ERS and the resultant grids through interpolation using the Pydro Pospac auto QC tool (v5092). In areas of extensive communication loss of MarineStar data(>8min), the ship found it more efficient to resurvey lines or utilize IAPPK. Since there currently are no specifications in regards to interpolating ERS data, the TJ incorporated a higher percentage of crosslines than required by the Hydrographic Specifications and Deliverables (2015 ed.) to better constrain areas of data dropouts, and ensure any systematic errors were promptly discovered and resolved in a timely manner.

The *Thomas Jefferson* expects to submit all of the surveys under Project OPR-G380-TJ-15 as full Ellipsoidally Referenced Surveys.

Joseph Carrier - NOAA Federal <joseph.carrier@noaa.gov>

VDatum SEP Uncertainity

2 messages

Kathryn Pridgen - NOAA Federal <kathryn.pridgen@noaa.gov> Tue, Apr 14, 2015 at 1:04 PM
To: Joseph Carrier - NOAA Federal <joseph.carrier@noaa.gov>, Shep Smith - NOAA Federal <shep.smith@noaa.gov>

We failed to include the uncertainty for the VDatum SEP. The uncertainty for the provided model is 0.125m two sigma.

--
Kathryn Pridgen
Physical Scientist
NOAA-HSD OPS
301-713-2722 ext 145
kathryn.pridgen@noaa.gov

Joseph Carrier - NOAA Federal <joseph.carrier@noaa.gov> Mon, Apr 20, 2015 at 12:24 PM
To: _OMAO MOA XO Thomas Jefferson <xo.thomas.jefferson@noaa.gov>, Alex Ligon - NOAA Federal <alex.c.ligon@noaa.gov>, Allison Stone - NOAA Federal <allison.c.stone@noaa.gov>, Brittany Anderson - NOAA Federal <brittany.l.anderson@noaa.gov>, Diane Perry - NOAA Federal <diane.m.perry@noaa.gov>, Eileen Pye - NOAA Federal <eileen.o.pye@noaa.gov>, Kimberly Glomb - NOAA Federal <kimberly.glomb@noaa.gov>, Peter Lewit - NOAA Federal <peter.lewit@noaa.gov>, Rita Bowker - NOAA Federal <rita.s.bowker@noaa.gov>, Stephen Moulton <stephen.f.moulton@noaa.gov>, Todd Walsh - NOAA Federal <todd.walsh@noaa.gov>, Abigail Winz - NOAA Federal <abigail.higgins@noaa.gov>, Daniel Hodge - NOAA Federal <daniel.w.hodge@noaa.gov>, Marybeth Head <Marybeth.Head@noaa.gov>, Megan Guberski <Megan.Guberski@noaa.gov>, Shepard Smith <shep.smith@noaa.gov>, Tyanne Faulkes - NOAA Federal <tyanne.faulkes@noaa.gov>

FYI, on the Charleston project planning.

Very respectfully,
Joe Carrier, LT/NOAA

Field Operation's Officer, NOAA Ship *Thomas Jefferson*
439 West York Street
Norfolk, VA 23510
(301) 713-7782
(757) 483-8755
http://www.moc.noaa.gov/tj/
[Quoted text hidden]

APPROVAL PAGE

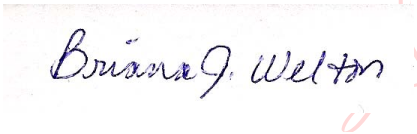
H12779

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

- H12779_DR.pdf
- Collection of depth varied resolution BAGS
- Processed survey data and records
- H12766_H12771_H12779_H12794_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.



Digitally signed by
WELTON.BRIANA.JANE.1267667531
DN: c=US, o=U.S. Government, ou=DoD,
ou=PKI, ou=NOAA,
cn=WELTON.BRIANA.JANE.1267667531
Date: 2016.08.31 16:34:52 -04'00'

Approved:_____

Lieutenant Commander Brianna Welton, NOAA
Chief, Atlantic Hydrographic Branch